



WESTERN STATES WATER COUNCIL
June 24-26, 2013 - Casper, WY - Hilton Garden Inn

Tab A – Schedule of Meetings – Agenda –
30-day Notice

WESTERN STATES WATER COUNCIL
172nd COUNCIL MEETING
Casper, Wyoming
June 24-26, 2013

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- B. Membership List
- C. WSWC Policy Positions
 - a. Extreme Events Legislation (STRONG Act, S. 904)
 - b. Hydraulic Fracturing
 - c. Missouri River System Authorized Purposes (H.R. 1460)

Sunsetting Positions

- #323 - Modifying Position #319 to call for a “shared vision on water planning and policy” instead of a “national water policy vision.” (July 23, 2010)
- #324 - Urging the Administration and Congress to support Department of Energy hosted energy-water and other collaborative water programs conducted at national laboratories (July 23, 2010)

List of Current WSWC Policy Statements and Sunsetting Positions

- D. Budget
- E. Executive / Water Resources Committee Draft 2013-2014 Work Plans
- F. Water Quality / Legal Committee Draft 2013-2014 Work Plans
- G. WGA Policies
- H. WSWC Strategic Directions Survey
- I. Sandia Data Review
- J. WaDE Fact Sheets
- K. Draft 2014 Washington,DC Spring Meetings - Agenda
- L. Future Council Meetings
- M. Drought Impacts Workshop Agenda / Drought Prediction Workshop Agenda
- N. California Irrigation Management Information System (CIMIS)
- O. Government Accounting Office (GAO) Freshwater Availability and Use Report Questions
- P. WSWC/ICWP/USGS Water Resources Program Budget Priorities
- Q. Federal Legislation Update
- R. Federal, State, and Interstate Hydraulic Fracturing Efforts
- S. EPA Draft National Rivers and Streams Assessment
- T. Clean Water Act Jurisdiction
- U. Wyoming Order on Groundwater for Hydraulic Fracturing
- V. *The Aransas Project v. Shaw*
- W. 2013 WSWC/NARF Settlements Symposium Agenda
- XYZ. Sunsetting Positions for Fall 2013 Meeting (#325-#327)
Newsletter Index

SCHEDULE OF MEETINGS

WESTERN STATES WATER COUNCIL 172nd COUNCIL MEETINGS

Hilton Garden Inn
Casper, Wyoming
June 24-26, 2013

<u>Date</u>	<u>Time</u>	<u>Meeting</u>	<u>Room</u>	<u>Adjournment</u>
<u>Monday, June 24</u>				
	11:30 am	Field Trip - Meet in Hotel Lobby (see registration form for details) <i>(Please pay the \$35.00/person registration fee in advance)</i> Lunch is provided. Reception sponsors are indicated below.		7:00 pm
	7:00 pm	Management Subcommittee <i>(over dinner)</i>		
<u>Tuesday, June 25</u>				
	8:00 am	Water Resources Committee	Magnolia Dahlia	11:30 am
	12:00 pm	Executive Committee <i>(over lunch)</i>	Plumeria Room	1:00 pm
	1:15 pm	Water Quality Committee	Magnolia Dahlia	3:15 pm
	3:30 pm	Legal Committee	Magnolia Dahlia	5:45 pm
	6:00 pm	Social Hour sponsors: ENTECH, Inc. HDR Hageman Law P.C. Holland & Hart Nelson Engineering Sunrise Engineering TriHydro Corporation WWC Engineering	Plumeria Room	7:00 pm
<u>Wednesday, June 26</u>				
	8:00 am	Full Council Meeting including <i>Photography Session</i>	Magnolia Dahlia	11:30 am

AGENDA
MANAGEMENT SUBCOMMITTEE

Hilton Garden Inn
Casper, Wyoming
June 24, 2013

Call to Order at: 7:00 p.m.
Conducting: Phil Ward, Chair

Room: Restaurant

TAB

1. **Welcome**
2. **Approval of Minutes**
- D 3. **Report on Budget and Finances** – Jerry Rigby
- C 4. **Proposed and Sunsetting Positions** – Tony Willardson
WR Com a. STRONG Extreme Events Legislation (S. 904)
WQ Com b. Hydraulic Fracturing
WR Com c. Missouri River System Authorized Purposes (H.R. 1460)
- Exec Com Sunsetting Positions
#323 - Modifying Position #319 to call for a “shared vision on water planning and policy” instead of a “national water policy vision.” (July 23, 2010)
- WR Com #324 - Urging the Administration and Congress to support Department of Energy hosted energy-water and other collaborative water programs conducted at national laboratories (July 23, 2010)
- G 5. **WGA/WSWC Activities** – Tony Willardson
- H 6. **WSWC Strategic Directions** – Phil Ward
- I 7. **Sandia Data Review** – Tony Willardson
- J 8. **Water Data Exchange (WaDE) Report** – Tony Willardson
- E 9. **FY 2013-2014 Executive Committee / WestFAST Draft Work Plans** – Phil Ward
a. Committee Chairs and Vice Chairs
b. Legislative & Advocacy Subcommittee Creation
- K 10. **WestFAST Principals Meeting/Call/Washington DC Meeting** – Tony Willardson
11. **FY2015 Federal Budget Recommendations** – Tony Willardson
- L 12. **Future WSWC/WGA Meetings**
a. WGA Annual Meeting – Park City, Utah – June 27-30, 2013
b. WSWC/CDWR Drought Impacts Workshop – San Diego, California - August 5-7, 2013
c. WSWC/NARF Indian Water Rights Settlement Symposium, New Mexico – August 13-15, 2013
d. WSWC Fall Council Meetings – Deadwood, South Dakota – October 2-4, 2013
- XYZ 13. **Fall 2013 Meeting Sunsetting Positions**
#325 - Urging the Administration and NASA to enhance the agency’s focus areas on research for water resources application and to promote long term engagement with the Council, state and regional agencies in the western U.S. responsible for water management and policy (October 29, 2010)
#326 - Addressing implementation of the SECURE Water Act and to express concern that many of the authorized programs and activities, including USGS federal streamgaging activities remain unfunded or underfunded (October 29, 2010)
#327 - Supporting legislation requiring the federal government to pay state filing fees in state general stream adjudications (October 29, 2010)
14. **Other Matters**

AGENDA
WATER RESOURCES COMMITTEE
Hilton Garden Inn - Casper, Wyoming
June 25, 2013

Called to Order at: 8:00 a.m.
Conducting: Dennis Strong, Chair

Room: Magnolia Dahlia Room

TABS

1. **Welcome and Introductions**
2. **Approval of Minutes**
- C 3. **Proposed and Sunsetting Positions**
 - a. Extreme Events Legislation (S. 904 STRONG Act)
 - b. H.R. 1460 Re: Revising certain authorized purposes described in the Missouri River Mainstem Reservoir System Master Water Control Manual
Sunsetting Position
#324 - Supporting Department of Energy hosted energy-water and other water programs conducted at national laboratories (July 23, 2010)
4. **Missouri River Natural Flows** – Michelle Klose
5. **Wyoming Weather Modification Pilot Project** – Barry Lawrence
6. **Border Water Issues** – Carlos Rubenstein
- I 7. **Sandia Data Review** – Sara Larsen
- J 8. **Water Data Exchange (WaDE) Update** – Sara Larsen
9. **NOAA Briefing Materials** – Tony Willardson
- M 10. **CDWR/WSWC Drought Prediction and Impacts Workshops** – Jeanine Jones
- N 11. **California Irrigation Management Information System (CIMIS)** – Jeanine Jones
- Break
- O 12. **GAO Water Report** – Lisa Vojta and Elizabeth Erdmann, General Accounting Office (via phone)
- H 13. **WSWC Strategic Directions** – Phil Ward
- P 14. **ACWI Shrinking Budget Work Group** – Sue Lowry
- Q 15. **Federal Legislation Update** – Tony Willardson
 - a. Reclamation State Emergency Drought Relief Act Reauthorization
 - b. National Integrated Drought Information System (NIDIS) Reauthorization
 - c. Reclamation Conduit Hydropower Development Authority
 - d. Hydropower Regulatory Efficiency/Improvement Acts of 2013
 - e. Water Resources Development Act (WRDA)
16. **CEQ Principles and Requirements** – Tony Willardson
- E 17. **FY 2013-2014 Water Resources Committee Draft Work Plan** – Dennis Strong
18. **Other Matters/Adjourn**

AGENDA
EXECUTIVE COMMITTEE

Hilton Garden Inn
Casper, Wyoming
June 25, 2013

Call to Order at: 11:45 a.m.
Conducting: Phil Ward, Chair

Room: Plumeria Room

TAB

1. **Welcome and Introductions**
 2. **Approval of Minutes**
 - D 3. **Report on Budget and Finances** – Jerry Rigby
 - C 4. **Proposed and Sunsetting Positions** – Tony Willardson
WR Com a. STRONG Extreme Events Legislation (S. 904)
WQ Com b. Hydraulic Fracturing
WR Com c. Missouri River System Authorized Purposes (H.R. 1460)
- Sunsetting Positions
- Exec Com **#323** - Modifying Position #319 to call for a “shared vision on water planning and policy” instead of a “national water policy vision.” (July 23, 2010)
- WR Com **#324** - Urging the Administration and Congress to support Department of Energy hosted energy-water and other collaborative water programs conducted at national laboratories (July 23, 2010)
- G 5. **WGA/WSWC Activities** – Tony Willardson
 - H 6. **WSWC Strategic Directions** – Phil Ward
 - I 7. **Sandia Data Review** – Tony Willardson and Sara Larsen
 - J 8. **Water Data Exchange (WaDE) Report** – Tony Willardson
 - E 9. **FY 2013-2014 Executive Committee / WestFAST Draft Work Plans** – Phil Ward
a. Legislative & Advocacy Subcommittee Creation
 - K 10. **WestFAST Principals Meeting/Call/Washington, DC Meeting** – Tony Willardson
 11. **FY2015 Federal Budget Recommendations** – Tony Willardson
 - L 12. **Future WSWC/WGA Meetings**
 - a. WGA Annual Meeting – Park City, Utah – June 27-30, 2013
 - b. WSWC/CDWR Drought Impacts Workshop – San Diego, California - August 5-7, 2013
 - c. WSWC/NARF Indian Water Rights Settlement Symposium, New Mexico – August 13-15, 2013
 - d. WSWC Fall Council Meetings – Deadwood, South Dakota – October 2-4, 2013
 - XYZ 13. **Fall 2013 Meeting Sunsetting Positions**
 - #325** - Urging the Administration and NASA to enhance the agency’s focus areas on research for water resources application and to promote long term engagement with the Council, state and regional agencies in the western U.S. responsible for water management and policy (October 29, 2010)
 - #326** - Addressing implementation of the SECURE Water Act and to express concern that many of the authorized programs and activities, including USGS federal streamgaging activities remain unfunded or underfunded (October 29, 2010)
 - #327** - Supporting legislation requiring the federal government to pay state filing fees in state general stream adjudications (October 29, 2010)
 14. **Other Matters**

AGENDA

WATER QUALITY COMMITTEE MEETING

Hilton Garden Inn
Casper, Wyoming
June 25, 2013

Call to Order at: 1:15 pm (Mountain)
Conducting: J.D. Strong, Chair

Room: Magnolia Dahlia Room

TAB

1. **Welcome and Introductions** – J.D. Strong
2. **Approval of Minutes** – J.D. Strong
- C 3. **Proposed Position: Hydraulic Fracturing** – J.D. Strong
- F 4. **2013-2014 Draft Committee Workplan** – J.D. Strong
5. **Wyoming Water Quality Update: Hydraulic Fracturing** – Kevin Frederick, Administrator, Wyoming Water Quality Division
- R 6. **State and Interstate Hydraulic Fracturing Efforts** – Mike Smith, Executive Director, Interstate Oil and Gas Compact Commission, and Mike Paque, Executive Director, Ground Water Protection Council (via phone)
- S 7. **EPA's 2008-2009 Draft National Rivers and Streams Assessment** – Patrick Snyder, Environmental Scientist, South Dakota Department of Environment and Natural Resources (via phone)
- T 8. **WSWC Strategy Discussion: Clean Water Act Jurisdiction** – Nathan Bracken
9. **Other Matters** – J.D. Strong

AGENDA

LEGAL COMMITTEE MEETING

Hilton Garden Inn
Casper, Wyoming
June 25, 2013

Call to Order at: 3:30 PM (Mountain)
Conducting: Maria O'Brien, Chair

Room: Magnolia Dahlia Room

TAB

1. **Welcome and Introductions** – Maria O'Brien
2. **Approval of Minutes** – Maria O'Brien
- F 3. **2013-2014 Draft Committee Workplan** – Maria O'Brien
- U 4. **Wyoming Update: Water Rights for Hydraulic Fracturing** – Pat Tyrrell
- V 5. ***The Aransas Project v. Shaw*** – Carlos Rubinstein
6. **Dividing the Waters Initiative** – Justice Gregory Hobbs, Colorado Supreme Court
- Q 7. **Litigation and Legislation Update** – Nathan Bracken
- W 8. **WSWC-NARF Symposium on the Settlement of Indian Reserved Water Rights Claims** – Nathan Bracken
9. **Other Matters** – Maria O'Brien

AGENDA

172nd COUNCIL MEETING

Hilton Garden Inn
Casper, Wyoming
June 26, 2013

Call to Order at: 8:00 a.m.
Conducting: Phil Ward, Chair

Room: Magnolia Dahlia Room

TAB

1. **Welcome and Introductions**
2. **Approval of Minutes**
3. **Wyoming Water Resources Issues**
 - a. **Current Topics in Wyoming** – Pat Tyrrell, Wyoming State Engineer
 - b. **Utilizing Landsat Imagery for Consumptive Use Estimates** – Steve Wolff, Colorado River Coordinator, Wyoming State Engineer's Office
 - c. **Celebrating 125 Years of the Wyoming State Engineer's Office** – John Shields, Interstate Streams Engineer, Wyoming State Engineer's Office

Break *Photo Session*

4. **U.S. Department of Interior Water Resources Activities** – Anne Castle, Assistant Secretary for Water and Science
5. **WestFAST Report** – Jean Thomas, U.S. Forest Service, WestFAST Chair
6. **Nominating Subcommittee Report** – Roland Westergard
7. **Committee Reports** – Action Items
 - C, E a. Water Resources Committee – Dennis Strong
 - C, E b. Executive Committee – Pat Tyrrell
 - C, F c. Water Quality Committee – J.D. Strong
 - F d. Legal Committee – Maria O'Brien
8. **State Reports**
- L 9. **Future Council Meetings**
10. **Other Matters**

Adjourn



WESTERN STATES WATER COUNCIL

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Web Page: www.westernstateswater.org

MEMORANDUM

TO: Council Members

FROM: Tony Willardson, Executive Director

DATE: May 24, 2013

RE: **30-Day Notice of Summer Council Meetings in Casper, Wyoming (June 24-26, 2013)**

This memorandum is to advise you that in 30 days the 172nd meetings of the Western States Water Council will be held in Casper, Wyoming. The meetings will be held June 24-26 (Monday through Wednesday), at the Hilton Garden Inn located at 1150 N. Poplar Street. If you have not yet made your hotel reservations, we would urge you to do so at your earliest convenience. Reservations may be made directly at 1-307-266-1300 or call Central Reservations at 1-800-HILTONS, and please identify the Western States Water Council group for the \$84 room rate. A WSWC meeting schedule is attached for your reference, and agenda are posted on our website.

Three new policy positions have been proposed. The first supports legislation, such as the Strengthening The Resiliency of Our Nation on the Ground Act or STRONG Act (S. 904), which would create an interagency working group with cabinet-level representation from all relevant federal agencies in order to: (1) provide a strategic vision of extreme weather resilience; (2) conduct a gap and overlap analysis of current and planned federal activities related extreme weather and its impacts on the United States, such as flooding and drought; and (3) develop a National Extreme Weather Resilience Plan. The second position addresses hydraulic fracturing, noting federal efforts to study potential adverse impacts on water quantity and quality should leverage state knowledge, experience, policies, and regulations. The third proposed position regards H.R. 1460 which would remove "fish and wildlife" as an authorized purpose for which the Corps can manage the Missouri River Mainstem Reservoir System. It is in the form of a letter to the House Water Resources and Environment Subcommittee Chair Bob Gibbs and opposes this and other legislation that would alter the System's authorized purposes before a comprehensive study is completed.

We will also be reviewing two sunseting WSWC policy positions: (1) Position #323, which was subsequently superseded by our Position #344 Vision on Water; and (2) Position #324 urging the Administration and Congress to support Department of Energy hosted energy-water and other collaborative water programs conducted at national laboratories. All proposed and sunseting positions are attached.

On Monday afternoon, our Wyoming-hosted field trip is scheduled for departure from the hotel at 11:45 a.m. and first stop at the airport to pick up passengers. A box lunch is included. Advance registration is requested, and the fee is \$35 per person. Please be prepared with comfortable walking shoes, hat, sunglasses, lightweight jacket, and an umbrella. The registration form is available on our website and should be returned by June 7, 2013.

The WSWC Committee meetings will be held consecutively on Tuesday, June 25th. The Water Resources, Water Quality, and Legal Committee meetings will be available via webinar and/or conference call, if you are not able to attend the meetings. If you wish to participate in the Executive Committee meeting via teleconference, please send a request via email to Cheryl or Tony so that arrangements can be made to accommodate your participation. The Full Council meeting on Wednesday morning will also be available via webinar and teleconference. The webinar and teleconference information will be provided with the briefing books by email the week prior to the meetings. Members that wish to receive a hard copy of the briefing books should **notify Julie Groat no later than June 14** at jgroat@wswc.utah.gov.

Members and guests are invited to attend a reception Tuesday evening at the hotel from 6:00 to 7:00 pm. Our meeting and reception sponsors include: ENTECH, Inc., HDR, Hageman Law P.C., Holland & Hart, Nelson Engineering, Sunrise Engineering, TriHydro Corporation, and WWC Engineering.

The Full Council will meet on Wednesday morning, June 26. Anne Castle, Assistant Secretary for Water and Science will address U.S. Department of the Interior water resources activities. Recently appointed EPA Region 8 Administrator Shaun McGrath has also been invited to address Council members.

The meeting schedule, agenda, and registration form are all available with updates through our website: <http://www.westernstateswater.org/>.

As is Council policy, an Executive Committee and Committee Chairs conference call will be held to discuss the proposed and sunset policy positions, as well as other matters. **The conference call is scheduled on Tuesday, May 28, at 2:30 pm Mountain Time** (3:30 pm Central Time; 1:30 pm Pacific Time), and a call-in number will be provided Executive Committee members, designated alternates, and the Committee Chairs in a separate email.

For the purpose of the conference call and the meetings themselves, the Council has adopted an internal policy specifying the process for establishing credentials for participation by persons who are not appointed Council representatives. That policy requires written notification when anyone not appointed as a Council representative is designated to act on behalf of a member, either in person or via conference call. An email is sufficient notice. As always, since each state has only one vote, the Executive Committee member or a designee is responsible for voting on any proposed Council action.

If we can be of any assistance or answer any questions regarding the foregoing, please give us a call.

cc: WGA Staff Council and WGA Staff

Attachments: Schedule of Meetings
Proposed Policy Positions (3)
WSWC Sunsetting Positions (2)
WGA Staff Council List

Tab B – Membership List

WESTERN STATES WATER COUNCIL MEMBERSHIP LIST May 31, 2013

OFFICERS

Chair - **Phil Ward**
Vice-Chair - **Patrick Tyrrell**
Secretary-Treasurer - **Jerry Rigby**

STAFF

Executive Director - **Tony Willardson**
Legal Counsel - **Nathan Bracken**
Federal Liaison - **Eric Stevens**
Hydrologist/Programmer - **Sara Larsen**
Secretaries: **Cheryl Redding and Julie Groat**

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*Ex-Officio Member

**Executive Committee Member

†Council members denoted by this symbol are listed by virtue of their office, pending receipt of a letter of appointment by their Governor.

CALIFORNIA

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COLORADO

***Honorable John Hickenlooper**

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IDAHO

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KANSAS

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MONTANA

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Candace West

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Hal Simpson - Colorado
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Jerry Rigby - Idaho
David Barfield - Kansas
Tim Davis - Montana
Brian Dunnigan - Nebraska
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Roland Westergard - Nevada
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Scott Verhines - New Mexico
Todd Sando - North Dakota
J.D. Strong - Oklahoma
Phil Ward - Oregon
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Steve Pirner - South Dakota
Kent Woodmansey - South Dakota
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Dennis Strong - Utah
Maia Bellon - Washington
Patrick T. Tyrrell - Wyoming
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FEDERAL AGENCY SUPPORT TEAM**

(updated 05/16/2013)

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Tab C – WSWC Policy Positions

**PROPOSED
POSITION STATEMENT
of the
WESTERN STATES WATER COUNCIL
in support of
STRENGTHENING THE RESILIENCY OF OUR NATION
TO THE IMPACTS OF EXTREME WEATHER EVENTS**

**Casper, Wyoming
June 24, 2013**

WHEREAS, the Nation continues to suffer the effects, including loss of life and economic, social, and environmental damages, from increasingly extreme weather events, including tornadoes, hurricanes, extreme precipitation, and drought; and

WHEREAS, Western States have recently experienced extreme seasonal and year-to-year weather volatility that has brought record or near-record events with floods, followed by drought and wildfires, as well as devastating tornadoes, all threatening public safety and property, often taxing the capacity of our aging water infrastructure system; and

WHEREAS, the 2012 prolonged drought afflicting the West and the Nation was nearly unprecedented in its scope, duration and severity – and developed so quickly as to be commonly referred to as a “flash drought;” and

WHEREAS, the drought has been magnified in regions of the country due to the failure of Mexico to deliver the water required to the United States under the treaties executed by the two countries, and

WHEREAS, present water resources planning and sound decision-making depends on our ability to understand, monitor, predict, and adapt to droughts, floods, extreme storms, and other weather events; as well as reliable treaty commitments, and (#349 and #339)

WHEREAS, investments in research, forecasting, and monitoring the development of extreme weather events provide an opportunity to significantly improve planning and project design and operation to avoid or minimize the loss of life and property, as well as mitigate economic and environmental damages; and

WHEREAS, advances in weather forecasting research, such as that of NOAA’s Hydrometeorological Testbed program on West Coast atmospheric rivers, demonstrate the potential for improving extreme event forecasting at the operational time scale (#332); and

WHEREAS, in the West, sound decisionmaking demands accurate and timely data on precipitation, temperature, soil moisture, snow depth, snow water content, streamflow, and similar information; and (#345 and #332)

WHEREAS, there is a need for maintaining and improving existing monitoring networks that help provide early warning as well as tracking impacts of extreme events; and (#346)

WHEREAS, the Council has supported development of an improved observing system for Western extreme precipitation events, to aid in monitoring, prediction, and climate trend analysis associated with extreme storms (#332); and

WHEREAS, there is a need for developing new monitoring technologies such as remote sensing that provide more timely data availability and better spatial coverage for assessing drought impacts; and (#346)

WHEREAS, the Council supports reauthorization of the National Integrated Drought Information System (NIDIS) and the Bureau of Reclamation's Emergency Drought Response authority; and (#346)

WHEREAS, there is a continuing need for greater collaboration between and among federal agencies, federal and state agencies (including local government), non-governmental and public/private organizations and businesses;

NOW THEREFORE BE IT RESOLVED that the Western States Water Council supports as a high priority federal administrative actions to authorize and implement appropriate actions to plan, prepare for and avoid, minimize or mitigate the impacts of extreme weather events, including developing an expanded and enhanced westwide extreme precipitation monitoring system. (#332)

BE IT FURTHER RESOLVED that the Western States Water Council also supports legislation (~~S. 904~~)—advancing the goals of: (1) minimizing the loss of life and property economic, environmental and social cost; (2) improving collaboration and coordination among agencies and organizations at all levels; (3) increasing consultation with state, local and tribal governments; (4) maintain and enhance data gathering and monitoring, as well as communication capabilities, identifying and addressing gaps and overlap; (5) identify and address federal agency responsibilities, as well as regulatory and other preparedness and response barriers, (6) recognize and address regional differences; and (7) avoid unfunded mandates -- and pledge to work with the Congress to appropriately address current and future needs to improve extreme events response and resiliency.

113th CONGRESS

1st Session

S. 904

To minimize the economic and social costs resulting from losses of life, property, well-being, business activity, and economic growth associated with extreme weather events by ensuring that the United States is more resilient to the impacts of extreme weather events in the short- and long-term, and for other purposes.

IN THE SENATE OF THE UNITED STATES

May 8, 2013

Mrs. GILLIBRAND (for herself and Mr. WICKER) introduced the following bill; which was read twice and referred to the Committee on Commerce, Science, and Transportation

A BILL

To minimize the economic and social costs resulting from losses of life, property, well-being, business activity, and economic growth associated with extreme weather events by ensuring that the United States is more resilient to the impacts of extreme weather events in the short- and long-term, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. SHORT TITLE.

This Act may be cited as the 'Strengthening The Resiliency of Our Nation on the Ground Act' or the 'STRONG Act'.

SEC. 2. FINDINGS AND PURPOSE.

(a) Findings- Congress makes the following findings:

(1) Extreme weather has serious economic costs for Americans, American businesses, and State and local governments. Hurricanes, droughts, floods, tornadoes, extreme heat, and extreme cold cause death, result in loss of property and well-being, especially among the most vulnerable populations, and negatively impact business activity and economic growth.

(2) Superstorm Sandy, which devastated the Eastern United States in late October 2012, resulted in more than 100 deaths, the evacuation of hundreds of thousands of people from their homes, power outages affecting more than 8,500,000 homes, massive flooding, gasoline shortages, and a crippled

regional energy and transportation infrastructure. As a result of this storm, Congress passed the Disaster Relief Appropriations Act, 2013, which appropriated \$50,500,000,000 for post-Sandy recovery efforts.

(3) In the past 30 years, there have been more than 130 weather-related disasters in the United States that each generated at least \$1,000,000,000 in damages or more than \$880,000,000,000 in total standardized loss. In addition, there have been many other extreme weather events that generated less than \$1,000,000,000 in damages, but still caused immeasurable harm to the Nation's citizens, infrastructure, and economy.

(4) Hurricane Katrina led to more than 1,800 deaths, property damage exceeding \$80,000,000,000, more than \$120,000,000,000 in Federal spending, and long-term impacts on the economy and livelihoods of those living in the Gulf Coast region.

(5) In 2011, one of the most severe and costly years for weather and climate on record, extreme weather hit every region in the United States, resulting in--

(A) prolonged droughts in the South and the West;

(B) deadly floods in the Southeast and Midwest;

(C) hundreds of devastating tornadoes across the United States;

(D) Hurricane Irene in the Northeast;

(E) more than \$50,000,000,000 in weather-related damages;

(F) 14 extreme weather events, which resulted in more than \$1,000,000,000 in damages each and caused a combined death toll of hundreds of people; and

(G) many other extreme weather events with lesser, but still significant, impacts.

(6) In 2012, in addition to Superstorm Sandy, the United States experienced--

(A) drought conditions in more than 60 percent of the contiguous United States at the peak of the drought, including more than 2,200 counties that have received disaster designations from the Secretary of Agriculture due to the drought;

(B) deadly floods in Minnesota, Tropical Storm Debby in Florida, and Hurricane Isaac in Louisiana;

(C) destructive wildfires on more than 9,000,000 acres across 37 States;

(D) power outages affecting more than 3,400,000 homes due to severe storms during the summer; and

(E) deadly heat waves, highlighted by July as the warmest month on record for the contiguous United States and more than 9,600 daily high temperature records broken during June, July, and August.

(7) These events and natural disaster trends, when combined with the volatility of weather, ongoing demographic changes, and development in high risk areas, indicate that the negative impacts of

extreme weather events and natural disasters have the potential to increase over time. The fact that a significant number of people and assets continue to be located in areas prone to volatile and extreme weather indicates that these events will continue to be expensive and deadly if the United States fails to enhance its resiliency to such events. Recent studies show that the intensity and frequency of some types of, but not all, extreme weather events will likely increase in the future.

(8) Economic savings can be achieved by considering the impacts of extreme weather over the short- and long-term in the planning process. For example, a 2005 review of the Federal Emergency Management Agency's hazard mitigation programs, conducted by the National Institute of Building Sciences' Multi-Hazard Mitigation Council, found that every dollar spent on hazard mitigation yields a savings of \$4 in future losses.

(9) There are several efforts currently underway at the Federal, regional, tribal, State, and local levels that have helped lay the foundation for a federally coordinated effort to increase the Nation's resiliency to extreme weather events, such as the Hurricane Sandy Rebuilding Task Force, the Presidential Policy Directive on National Preparedness (referred to in this Act as 'PPD-8'), the National Preparedness System, the whole community approach led by the Department of Homeland Security, and the Silver Jackets Program by the Army Corps of Engineers. Other recent reports on this subject include the National Academies of Sciences' reports 'Disaster Resilience: A National Imperative' and 'Building Community Disaster Resilience through Public-Private Collaboration'.

(b) Purpose- The purpose of this Act is to minimize the economic and social costs and future losses of life, property, well-being, business activity, and economic growth by making the United States more resilient to the impacts of extreme weather events over the short- and long-term, thereby creating business and job growth opportunities by--

(1) ensuring that the Federal Government is optimizing its use of existing resources and funding to support State and local officials, businesses, tribal nations, and the public to become more resilient, including--

(A) encouraging the consideration of, and ways to incorporate, extreme weather resilience across Federal operations, programs, policies, and initiatives;

(B) promoting improved coordination of existing and planned Federal extreme weather resilience and adaptation efforts that impact extreme weather resilience and ensuring their coordination with, and support of, State, local, regional, and tribal efforts;

(C) minimizing Federal policies that may unintentionally hinder or reduce resilience, such as damaging wetlands or other critical green infrastructure, or lead Federal agencies to operate at cross purposes in achieving extreme weather resilience; and

(D) building upon existing related efforts, such as the Hurricane Sandy Rebuilding Task Force, the PPD-8, the National Preparedness System, and the whole community approach;

- (2) communicating the latest understanding and likely short- and long-term human and economic impacts and risks of extreme weather to businesses and the public;
- (3) supporting decisionmaking that improves resilience by providing forecasts and projections, data decision-support tools, and other information and mechanisms; and
- (4) establishing a consistent vision and strategic plan for extreme weather resilience across the Federal Government.

SEC. 3. DEFINITIONS.

In this Act:

- (1) **EXTREME WEATHER**- The term `extreme weather' includes severe and unseasonable weather, heavy precipitation, hurricanes, storm surges, tornadoes, other windstorms (including derechos), extreme heat, extreme cold, and other qualifying weather events as determined by the interagency group established under section 4(a)(1).
- (2) **RESILIENCE**- The term `resilience' means the ability to prepare and plan for, absorb, recover from, and more successfully adapt to adverse events in a timely manner.

SEC. 4. EXTREME WEATHER RESILIENCE GAP AND OVERLAP ANALYSIS.

(a) Interagency Working Group-

(1) IN GENERAL-

(A) **ESTABLISHMENT**- The Director of the Office of Science and Technology Policy (referred to in this section as the `Director'), with input from the Department of Homeland Security, shall establish and chair an interagency working group with Cabinet-level representation from all relevant Federal agencies.

(B) **DUTIES**- The working group shall--

- (i) come together to provide a strategic vision of extreme weather resilience;
- (ii) conduct a gap and overlap analysis of Federal agencies' current and planned activities related to achieving short- and long-term resilience to extreme weather and its impacts on the Nation, such as storm surge, flooding, drought, and wildfires; and
- (iii) develop a National Extreme Weather Resilience Plan in accordance with section 5(a).

(2) **ADDITIONAL REPRESENTATION FROM EXECUTIVE OFFICE OF THE PRESIDENT**- The interagency working group established under paragraph (1) shall include representatives of the relevant offices and councils within the Executive Office of the President, including--

(A) the Office of Management and Budget;

(B) the National Security Staff;

(C) the Council of Economic Advisors;

(D) the Council on Environmental Quality; and

(E) the Domestic Policy Council.

(3) CONSULTATION WITH TRIBAL, STATE, AND LOCAL REPRESENTATIVES-

(A) IN GENERAL- The Federal interagency working group established under paragraph (1) shall work closely with an advisory group to take into account the needs of State and local entities across all regions of the United States. The advisory group shall consist of--

(i) 1 representative from the National Emergency Management Association;

(ii) 7 representatives from States and State associations; and

(iii) 8 representatives from local entities and associations, including representation from a tribal nation and at least 1 major metropolitan area.

(B) KEY SECTORS- The representatives described in subparagraph (A) shall, in the aggregate, represent all of the key sectors set forth in subsection (b)(1).

(C) MEETINGS- The Director shall meet with the representatives described in subparagraph (A) not fewer than 9 times during the development of--

(i) the gap and overlap analysis under this section; and

(ii) the National Extreme Weather Resilience Action Plan under section 5.

(4) COOPERATION BY FEDERAL AGENCIES- In carrying out the activities described in subsection (b), Federal agency representatives participating in the working group shall be forthright and shall fully cooperate with the Office of Science and Technology Policy.

(5) DETAILEES- Upon the request of the Director, each agency or entity referred to in paragraph (1) shall provide the working group with a detailee, without reimbursement from the working group, to support the activities described in subsection (b), section 5, and section 7(a). Such detailee shall retain the rights, status, and privileges of his or her regular employment without interruption.

(6) VOLUNTEER SERVICES- Notwithstanding section 1342 of title 31, United States Code, the working group may investigate and use such voluntary services as the working group determines to be necessary.

(b) Gap and Overlap Analysis- In conducting the gap and overlap analysis required under subsection (a)(1), Federal agency representatives shall--

(1) develop a Federal Government-wide working vision for resilience to the impacts of extreme weather events in the short- and long-term, in accordance with the purpose set forth in section 2(b), through an

effort led by the Director and the interagency working group, which includes goals and objectives for key sectors. Key sectors shall include--

- (A) agriculture;
- (B) forestry and natural resources management;
- (C) water management, including supply and treatment;
- (D) energy supply and transmission;
- (E) infrastructure, including natural and built forms of water and wastewater, transportation, coastal infrastructure, and other landscapes and ecosystems services;
- (F) public health and healthcare delivery, including mental health and hazardous materials management;
- (G) communications, including wireless communications;
- (H) housing and other buildings;
- (I) national security;
- (J) emergency preparedness;
- (K) insurance; and
- (L) other sectors that the Director considers appropriate;

(2) consider and identify the interdependencies among the key sectors when developing the vision referred to in paragraph (1);

(3) create summaries of the existing and planned efforts and programmatic work underway or relevant to supporting State and local stakeholders in achieving greater extreme weather resilience in the short and long term for each sector identified under paragraph (1) and across the sectors, specifically including summaries of--

(A) individual Federal agency programs, policies, regulations, and initiatives, and research and data collection and dissemination efforts;

(B) areas of collaboration and coordination across Federal agencies; and

(C) areas of coordination with State and local agencies, private entities, and regional cooperation;

(4) identify specific Federal programs, statutes, regulations, policies, and initiatives which may unintentionally hinder resilience efforts, including an analysis of disincentives, barriers, and incompatible programs, policies, or initiatives across agencies and sectors;

(5) examine how the severity and frequency of extreme weather events at the local and regional level may change in the future and communicate these potential risks to stakeholders;

(6) work together to identify and evaluate existing Federal tools and data to describe, analyze, forecast, and model the potential impacts identified under paragraph (5) and develop recommendations to strengthen their ability to provide reliable and accurate forecasts at the national, regional, State, and local levels;

(7) identify gaps and overlaps in Federal agency work, resources, and authorities that impair the ability of the United States to meet the vision for short- and long-term extreme weather resilience, by comparing the goals and objectives identified for each sector and across sectors with the summaries identified in paragraph (3), specifically identifying gaps relating to--

(A) individual Federal agency programs, policies, and initiatives, and research data collection and dissemination efforts;

(B) areas of collaboration and coordination across Federal agencies;

(C) areas of coordination with State and local agencies and private entities, and regional cooperation;

(8) determine potential measures to address the issues referred to in paragraph (4) and to address the gaps and overlaps referred to in paragraph (7) by--

(A) designating individual or multiple Federal agencies to address these gaps;

(B) building upon existing delivery mechanisms;

(C) evaluating options for programs, policies, and initiatives that may particularly benefit extreme weather resilience efforts, including the role of ecosystem-based approaches;

(D) recommending modifications to existing Federal agency programs, statutes, regulations, policies, and initiatives to better support extreme weather resiliency;

(E) requesting new authorities and resource requirements, if needed; and

(F) identifying existing Federal Government processes that can be built upon to address the purpose of this Act; and

(9) establish, with the assistance of the General Services Administration or such other Federal agency as the Director may designate, a Federal advisory working group to provide ongoing collective input to the process.

(c) Working Group- The Federal advisory working group established pursuant to subsection (b)(9) shall consist of relevant private sector, academic, State and local government, tribal nation, regional organization, vulnerable population, and nongovernmental representatives, with representation from each sector described in paragraph (1). The Director may designate an existing Federal advisory committee under which the working group would operate independently, with the same rights and

privileges held by members of the advisory committee. The members of the working group established pursuant to subsection (b)(9) may not simultaneously serve as members of the advisory committee designated pursuant to this subsection. The activities of the working group should complement and not duplicate the stakeholder process conducted under PPD-8.

SEC. 5. NATIONAL EXTREME WEATHER RESILIENCE ACTION PLAN.

(a) In General- Based on the results of the gap and overlap analysis conducted under section 4, the Director, working with the interagency working group established under such section, and considering the efforts described in section 2(a)(9), shall develop a National Extreme Weather Resilience Action Plan (referred to in this section as the `Plan')--

(1) to build upon existing Federal Government processes referred to in section 4(b)(8)(F)--

(A) to address the results of the gap and overlap analysis under section 4; and

(B) to incorporate the activities required under subsection (c);

(2) to best utilize existing resources and programs through improved interagency coordination and collaboration;

(3) to improve Federal coordination with existing regional entities, State and local governments, networks, and private stakeholders;

(4) to make data and tools accessible and understandable and to help facilitate information exchange for tribal, State, and local officials, businesses, and other stakeholders in a manner that addresses the needs expressed by these stakeholders;

(5) to facilitate public-private partnerships;

(6) to improve Federal agencies' economic analytical capacity to assess--

(A) the likelihood and potential costs of extreme weather impacts by region and nationally; and

(B) the relative benefits of potential resilience measures to multiple stakeholders;

(7) to provide tools to stakeholders--

(A) to conduct analyses similar to those described in paragraph (6); and

(B) to support decisionmaking;

(8) to support resiliency plans developed by State and local governments, regional entities, and tribal nations, to the extent possible; and

(9) to request further resources, if necessary, to fill in gaps to enable national resilience to extreme weather, including resilience of tribal nations, and particularly vulnerable populations, and the use of green infrastructure and ecosystem-based solutions.

(b) Cooperation- Any Federal agency representative contacted by the Director, in the course of developing the Plan, shall be forthright and shall fully cooperate with the Office of Science and Technology Policy, as requested.

(c) Required Activities-

(1) RESPONSIBILITIES- The Plan shall include specific Federal agency and interagency responsibilities, identify potential new authorities, if necessary, and employ risk analysis--

(A) to address the gaps identified through the gap and overlap analysis; and

(B) to improve Federal interagency coordination and Federal coordination with State, regional, local, and tribal partners.

(2) AVAILABLE FUNDING OPPORTUNITIES-

(A) IDENTIFICATION- The Director shall identify--

(i) existing Federal grant programs and other funding opportunities available to support State and local government extreme weather resiliency planning efforts; or

(ii) projects to advance extreme weather resiliency.

(B) PUBLICATION- The Director shall publish the information described in subparagraph (A) in the information portal identified in paragraph (3).

(C) RESPONSIBILITIES- Each participating agency shall--

(i) consider incorporating criteria or guidance into existing relevant Federal grant and other funding opportunities to better support State and local efforts to improve extreme weather resiliency; and

(ii) evaluate and modify existing Federal funding opportunities, as appropriate, to maximize the return on investment for pre-disaster mitigation activities.

(3) INFORMATION PORTAL-

(A) IN GENERAL- The Plan shall--

(i) include the establishment of an online, publicly available information portal for use by Federal agencies, their partners, and stakeholders, that directs users to key data and tools to inform resilience-enhancing efforts; and

(ii) build off and be complementary to existing Federal efforts, including data.gov.

(B) MAINTENANCE- The coordinating entity identified under paragraph (3) shall be responsible for establishing and maintaining the information portal.

(C) INFORMATION SUPPLIED- Information shall be supplied as requested by Federal agencies, their partners, academia, and private stakeholders, in coordination with regional, State, local, and tribal agencies.

(D) CONTENTS- The information portal established under this paragraph shall direct users to coordinated and systematic information on--

(i) best or model practices;

(ii) data;

(iii) case studies;

(iv) indicators;

(v) scientific reports;

(vi) resilience and vulnerability assessments;

(vii) guidance documents and design standards;

(viii) incentives;

(ix) education and communication initiatives;

(x) decision support tools, including risk management, short- and long-term economic analysis, and predictive models;

(xi) planning tools;

(xii) public and private sources of assistance; and

(xiii) such other information as the coordinating entity considers appropriate.

(4) COORDINATING ENTITY- The Plan shall include the identification of a Federal agency, interagency council, office, or program, which participated in the gap and overlap analysis and Plan development. Such entity shall--

(A) coordinate the implementation of the Plan;

(B) track the progress of such implementation; and

(C) transfer responsibilities to another Federal agency, interagency council, office, or program to serve as the coordinating entity if the entities participating in the working group agree that circumstances necessitate such a change.

(5) RESILIENCY OFFICER- Each Federal agency that assists with the gap and overlap analysis required under section 4 shall designate, from among the agency's senior management, a Senior Resiliency Officer, who shall--

(A) facilitate the implementation of the agency's responsibilities under paragraph (1);

(B) monitor the agency's progress and performance in implementing its responsibilities under paragraph (1);

(C) report the agency's progress and performance to the head of the agency and the coordinating entity identified under paragraph (3); and

(D) serve as the agency lead in ongoing coordination efforts within the Federal agency and between the coordinating entity, other Federal agencies, public and private partners, and stakeholders.

(d) Publication-

(1) DRAFT PLAN- Not later than 420 days after the date of the enactment of this Act, the Director shall publish a draft of the Plan developed under this section in the Federal Register.

(2) PUBLIC COMMENT PERIOD- During the 60-day period beginning on the date on which the draft Plan is published under paragraph (1), the Director shall--

(A) solicit comment from the public; and

(B) conduct a briefing for Congress to explain the provisions contained in the draft Plan.

(3) FINAL PLAN- Not later than 120 days after the end of the public comment period described in paragraph (2), the Director shall publish the final Plan in the Federal Register.

(e) Implementation- Not later than 630 days after the date of the enactment of this Act, the Director shall begin implementing the final Plan published under subsection (d)(3).

(f) Financing- To the extent possible--

(1) Federal funding should be used to leverage private sector financing for resilience building activities, consistent with the implementation of the Plan, through public-private partnerships; and

(2) Federal grant and loan programs of the Federal agencies participating in the interagency working group for this effort shall consider extreme weather resilience as a key factor when awarding funding, including the projected extreme weather risk to a project over the course of its expected life.

(g) Tribal, State, and Local Responsibilities- The Plan may not place new unfunded requirements on State or local governments.

SEC. 6. AUTHORIZATION OF OTHER ACTIVITIES.

(a) In General- Federal agencies are authorized to develop tools and disseminate information to improve extreme weather resilience in the key sectors set forth in section 4(b)(1).

(b) Office of Science and Technology Policy- In conducting the gap and overlap analysis under section 4 and developing the National Extreme Weather Resilience Action Plan under section 5, the Director may carry out additional activities in support of the purpose of this Act.

SEC. 7. REPORTS.

(a) Government Accountability Office Report- Not later than 1 year after the date of the enactment of this Act, the Comptroller General of the United States shall submit a report to Congress that--

(1) identifies existing Federal Government programs and policies related to disaster relief, response, and recovery that impede improving short- and long-term extreme weather resilience; and

(2) make recommendations for how the programs or policies could be structured differently to better support short- and long-term resilience after an extreme weather event.

(b) Initial Report- Not later than 2 years after the date of the enactment of this Act, the Director shall submit a report to Congress that contains--

(1) the results of the gap and overlap analysis;

(2) the final National Extreme Weather Resilience Action Plan;

(3) an update on the implementation of the plan; and

(4) available resources for the sustained implementation of the plan.

(c) Triennial Reports- Not later than 2 years after the submission of the report under subsection (a), and every 3 years thereafter, the coordinating entity identified under section 5(c)(3), in cooperation with the interagency working group established under section 4(a), shall submit a report to Congress that--

(1) contains an update of the National Extreme Weather Resilience Action Plan;

(2) describes the progress of the plan's implementation;

(3) improves upon the original analysis as more information and understanding about extreme weather events becomes available;

(4) establishes criteria for prioritization of activities described in the plan;

(5) reconsiders and makes changes to the plan based on the availability of new information described in paragraph (3); and

(6) identifies cost-effective changes to laws, policies, or regulations that could advance the purpose of this Act.

(d) FEMA Reports on Funding-

(1) FINDINGS- Congress finds the following:

(A) The Federal Emergency Management Agency grant programs are a key vehicle that exists to fund activities related to resiliency planning and projects.

(B) In order to ensure that the United States becomes more resilient to extreme weather, it is important to ensure that sufficient resources are available to support resiliency activities

(2) REPORTS- At the end of each fiscal year, the Director of the Federal Emergency Management Agency (FEMA) shall submit a report to Congress that--

(A) identifies the amounts that were made available to the FEMA during such fiscal year for State and local entities to use for activities that support the purposes of this Act;

(B) identifies the amounts disbursed by FEMA to State and local entities during such fiscal year for such activities;

(C) describes the resources requested by State and local entities for activities that support the purposes of this Act; and

(D) identifies the difference between the amounts disbursed by FEMA and the amounts requested from FEMA by State and local entities.

SEC. 8. AUTHORIZATION OF APPROPRIATIONS.

(a) Amounts for Analysis, Plan Development and Implementation, and Reports- There are authorized to be appropriated such sums as may be necessary for fiscal years 2014 through 2016--

(1) to conduct the gap and overlap analysis required under section 4;

(2) to conduct the activities required under section 5, including the creation and maintenance of the information portal; and

(3) to prepare the reports to Congress required under subsections (b) and (c) of section 7.

(b) Availability of Funds- Amounts appropriated pursuant to subsection (a) shall remain available for the purposes set forth in such subsection through December 31, 2016.

**RESOLUTION
of the
WESTERN STATES WATER COUNCIL
regarding
HYDRAULIC FRACTURING**

**Casper, Wyoming
June 26, 2013**

WHEREAS, hydraulic fracturing is a process that injects sand, water, and other fluids, including various chemical compounds, underground to aid in the extraction of oil and natural gas;

WHEREAS, hydraulic fracturing has been used for over 60 years in conventional oil and gas production, with over one million wells having been fractured in the United States alone;

WHEREAS, although there may be concerns in some areas, although concerns about hydraulic fracturing have been voiced by some, western states have experienced few, if any, adverse impacts involving water quality and water allocation attributable to hydraulic fracturing;

Comment [NB1]: Carlos Rubinstein of Texas suggested this alternative language after the Executive Committee call on May 28, 2013.

WHEREAS, states have primary and exclusive authority over the allocation and administration of rights to the use of water used in hydraulic fracturing operations;

WHEREAS, hydraulic fracturing is responsible for 30% of the nation's recoverable oil and natural gas, lessening the nation's dependence on foreign energy supplies and providing billions of dollars in direct and indirect economic benefits each year, including hundreds of thousands of jobs;

WHEREAS, states have decades of experience, knowledge, and information regulating hydraulic fracturing and other oil and gas activities;

WHEREAS, states are best positioned to regulate hydraulic fracturing because of their understanding of regional and local conditions and their ability to tailor regulations to fit the needs of the local environment; and

WHEREAS, states currently employ a range of programmatic elements and regulations to ensure that hydraulic fracturing does not impair water resources and environmental values, including but not limited to requirements pertaining to well permitting, well construction, the handling of exploration and production waste fluids, the closure of wells, and the abandonment of well sites.

NOW, THEREFORE, BE IT RESOLVED, that federal efforts involving hydraulic fracturing, including efforts to study potential adverse impacts on water quantity and quality, should leverage state knowledge, experience, policies, and regulations.

BE IT FURTHER RESOLVED, that federal efforts to study the potential impacts of hydraulic fracturing on water resources should be limited in scope, based upon sound science, and driven by states given the lack of significant widespread impacts associated with hydraulic fracturing in the experience of our member states and increasingly limited federal funds; and

Position No. _____

BE IT FURTHER RESOLVED, that the Western States Water Council opposes any and all efforts that would diminish the primary and exclusive authority of states over the allocation of water resources used in hydraulic fracturing.

DRAFT



WESTERN STATES WATER COUNCIL

5296 Commerce Drive, Suite 202 | Murray, Utah 84107 | (801) 685-2555 | FAX (801) 685-2559

Web Page: www.westgov.org/hwswc

, 2013

The Honorable Bob Gibbs
Chairman
House Water Resources and Environment
Subcommittee
B-370A Rayburn House Office Building
Washington, DC 20515

The Honorable Timothy Bishop
Ranking Member
House Water Resources and Environment
Subcommittee
2163 Rayburn House Office Building
Washington, DC 20515

Dear Chairman Gibbs and Ranking Member Bishop:

I am writing on behalf of the Western States Water Council, representing the governors of 18 western states on water policy issues, to express concern about H.R. 1460. As introduced by Representative Sam Graves of Missouri, H.R. 1460 would remove “fish and wildlife” as an authorized purpose for which the Corps can manage the Missouri River Mainstem Reservoir System (the “System”).

The System is the largest collectively managed group of reservoirs in the United States, consisting of six dams in four states that control runoff from approximately half of the Missouri River Basin. Pursuant to the 1944 Flood Control Act, the Corps operates the System for eight authorized purposes: flood control, navigation, irrigation, power, water supply, water quality control, recreation, and fish and wildlife. ~~By removing fish and wildlife as an authorized purpose, H.R. 1460 is intended to enable the Corps to focus more closely on flood control and navigation.~~

However, the Act has not been reviewed since its passage in 1944, and there is now a question as to whether the System’s current operations best satisfy the Basin’s contemporary needs. In particular, flood control, hydropower, and water supply have provided significant benefits as originally expected, while navigation has fallen far short of its anticipated benefits. Congressionally authorized studies to review the System’s eight authorized purposes and determine whether adjustments are needed have also stalled due to a lack of funding. Rather than singling out one authorized purpose for elimination before these needs can be studied, river management and states in the System may be better served by a comprehensive, simultaneous, and transparent review of all eight authorized purposes to develop a plan for the sustainable future management of the System.

In addition, maintaining fish and wildlife as an authorized purpose is necessary for management actions that benefit economically and recreationally important species. Prior studies have also shown that these species support substantial economic activity. For example, the Corps estimated in 2004 that recreation provided annual project benefits of \$87 million in the upper Missouri River Basin and \$20-\$38 million in the lower Missouri River Basin, which includes spending pertaining to fish and wildlife resources. In contrast, the Corps estimated that navigation provided \$9 million in annual project benefits, ~~the smallest contribution of the seven~~

~~authorized purposes it studied.~~

~~At the same time, while economic activity involving fish and wildlife has increased, the amount of commercial goods shipped on the Missouri River has decreased significantly since peak commercial tonnage in 1977. Moreover, the U.S. Government Accountability Office reported in 2009 that 83% of the total tonnage shipped on the Missouri River between 1994 and 2006 originated and/or terminated in the State of Missouri alone, with 84% of the tonnage shipped consisting of sand and gravel.~~

Lastly, removing fish and wildlife as an authorized purpose will not negate the Corps' obligation to protect these resources in the System. The Corps will still need to coordinate with the U.S. Fish and Wildlife Service on recovery efforts for threatened and endangered species listed under the Endangered Species Act, including the pallid sturgeon, interior least tern, and piping plover. The U.S. Fish and Wildlife Coordination Act also requires the Corps to continue mitigating fish and wildlife habitat losses caused by the Bank Stabilization and Navigation Project.

In light of the above concerns, we urge you to oppose H.R. 1460 and other legislation that would alter the System's authorized purposes before a comprehensive study is completed. Thank you for considering the Council's views on this matter.

Sincerely,

Phillip C. Ward
Chair, Western States Water Council

cc: The Honorable, Bill Shuster, Chairman, House Transportation and Infrastructure Committee
The Honorable Nick Rahall, Ranking Member, House Transportation and Infrastructure Committee
The Honorable Jo-Ellen Darcy, Assistant Secretary of the Army (Civil Works)

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113th Congress (2013 - 2014)

H.R.1460

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{link: 'http://thomas.loc.gov/cgi-bin/bdquery/z?d113:H.R.1460:@@L',title: 'THOMAS - BSS - H.R.1460 - All Information' }
```

H.R.1460

Latest Title: To direct the Chief of the Army Corps of Engineers to revise certain authorized purposes described in the Missouri River Mainstem Reservoir System Master Water Control Manual.

Sponsor: [Rep Graves, Sam](#) [MO-6] (introduced 4/10/2013) [Cosponsors](#) (4)

Latest Major Action: 4/11/2013 Referred to House subcommittee. Status: Referred to the Subcommittee on Water Resources and Environment.

Jump to: [Summary](#), [Major Actions](#), [All Actions](#), [Titles](#), [Cosponsors](#), [Committees](#), [Related Bill Details](#), [Amendments](#)

SUMMARY AS OF:

4/10/2013--Introduced.

Directs the Chief of the Army Corps of Engineers to revise the Missouri Mainstem Reservoir System Master Water Control Manual and any related regulations to delete fish and wildlife as an authorized purpose of the Corps.

MAJOR ACTIONS:

NONE

ALL ACTIONS:

4/10/2013:

Referred to the House Committee on Transportation and Infrastructure.

4/11/2013:

Referred to the Subcommittee on Water Resources and Environment.

TITLE(S): *(italics indicate a title for a portion of a bill)*

- **OFFICIAL TITLE AS INTRODUCED:**
To direct the Chief of the Army Corps of Engineers to revise certain authorized purposes described in the Missouri River Mainstem Reservoir System Master Water Control Manual.

COSPONSORS(4), ALPHABETICAL [followed by Cosponsors withdrawn]: (Sort: [by date](#))

[Rep Hartzler, Vicky](#) [MO-4] - 4/10/2013

[Rep Long, Billy](#) [MO-7] - 4/10/2013

[Rep Luetkemeyer, Blaine](#) [MO-3] - 4/10/2013

[Rep Wagner, Ann](#) [MO-2] - 4/15/2013

COMMITTEE(S):

Committee/Subcommittee:	Activity:
House Transportation and Infrastructure	Referral, In Committee
Subcommittee on Water Resources and Environment	Referral

RELATED BILL DETAILS:

NONE

AMENDMENT(S):

NONE

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RESOLUTION
of the
WESTERN STATES WATER COUNCIL
Regarding
A SHARED VISION ON WATER PLANNING AND POLICY
Stateline, Nevada
July 23, 2010

WHEREAS, the Western States Water Council has long recognized the importance of planning and policy in protecting and wisely managing our national water resources for the benefit of our present and future generations, including our environment; and

WHEREAS, different entities are currently evaluating the need for a shared vision on water policy and new federal legislation to advance water resources planning and management at all levels; and

WHEREAS, States and their political subdivisions share primary responsibility for planning and managing our nation's water resources, both surface and ground water, quantity and quality; and

WHEREAS, States are primarily responsible for allocating and administering rights to the use of water for myriad uses; and are in the best position to identify, evaluate and prioritize their needs; and

WHEREAS, the focus should be on a grassroots, small watershed approach to identifying water problems and potential solutions from the ground up, integrating these efforts into individual state plans; and

WHEREAS, regional or multi-state and multiple river basin planning and strategic plans should be comprised of these building blocks, i.e., state, local and tribal water resource plans; and

WHEREAS, it is paramount to move state, local and tribal government participation back into the process of federal decisionmaking, as the U.S. Army Corps of Engineers is attempting to do under its Shared Vision Planning initiatives, before too much momentum has been built toward federal policy decisions; and

WHEREAS, the federal government should support States and their planning efforts by providing technical and appropriate financial assistance; and

WHEREAS, developing optimal solutions to our water-related challenges will require an integrated approach and greater partnerships – sharing roles and responsibilities – among state, local, tribal and federal agencies; and

WHEREAS, the above approach should consider all needs together, develop effective solutions which are complementary rather than conflicting, and provide direction for selecting the most appropriate governmental entities or organizations for implementing solutions; and

WHEREAS, comprehensive plans developed under state or tribal leadership with federal assistance should (a) reduce inefficiencies caused by project-specific responses to competing demands, (b) reduce contradictory actions by multiple state, local and federal agencies, and (c) minimize hastily conceived reactions to the latest real or perceived crisis; and

WHEREAS, Federal agencies should use state water plans (a) to help determine water policy and planning priorities that best align federal agency support to states, (b) to inform decision making regarding regional water issues, and (c) to coordinate investment in water infrastructure;

NOW THEREFORE BE IT RESOLVED, that any vision for any water policy, water plan or planning process must recognize, defer to and support State, tribal and local government water plans and planning processes;

BE IT FURTHER RESOLVED, that any federal legislation should explicitly recognize and provide support for ongoing watershed efforts in and between the states, tribes and local entities and closely consult with the states in the implementation of any new federal program(s); and

BE IT FURTHER RESOLVED, that Congress should direct federal water resource agencies to include integrated water resources management, planning and planning assistance as one of their primary missions; and

BE IT FURTHER RESOLVED, that the Administration and Congress should look at the WSWC/WestFAST partnership as a model for a better way to focus federal support on state priorities; and

BE IT FURTHER RESOLVED, that any federal legislation should avoid strategies that increase mandates on state, tribal and local governments; and

BE IT FURTHER RESOLVED, that nothing in any act of Congress should be construed as affecting or intending to affect or in any way to interfere with the laws of the respective States relating to: (a) water or watershed planning; (b) the control, appropriation, use, or distribution of water used in irrigation or for municipal or any other purposes, or any vested right acquired therein; or (c) intending to affect or in any way to interfere with any interstate compact, decree or negotiated water rights agreement.

RESOLUTION
of the
WESTERN STATES WATER COUNCIL
urging the
ADMINISTRATION AND CONGRESS
TO SUPPORT WATER RESEARCH AND DEVELOPMENT PROGRAMS
at the
DEPARTMENT OF ENERGY NATIONAL LABORATORIES
Stateline, Nevada Casper, Wyoming
July 23, 2010 June 26, 2013

WHEREAS, the Western States Water Council (the Council) has long recognized the importance of protecting and wisely managing our national water resources for the benefit of our present and future generations, including our environment; and

WHEREAS, one purpose of the Council is to accomplish effective cooperation among western states in the conservation, development and management of water resources; and

WHEREAS, a second purpose of the Council is to maintain vital state prerogatives, while identifying ways to accommodate legitimate federal interests; and

WHEREAS many watersheds are already over-appropriated, and new stresses are emerging from climate, population growth, land use changes and water needs for energy development and in-stream uses; and

WHEREAS, there is growing concern, particularly in the Arid West, over our ability to continue to supply water of adequate quality in quantities needed to sustain current and future uses, including energy and environmental uses; and

WHEREAS, the failure to provide for such needs would have significant regional and national consequences; and

WHEREAS, present water resources planning and sound future decision-making depends on our ability to understand, monitor, anticipate and adapt to changing ~~climate~~ conditions; and

WHEREAS, electricity generation and other energy development is a significant driver of present and future water demands and the expertise and research of the national labs can supplement and enhance the ability of most state, local and tribal water managers and water providers have a limited ability to undertake the necessary research to understand and develop ~~climate~~ adaptation strategies; and

WHEREAS, water-related research at the Department of Energy and National Laboratories should be guided by State needs as expressed in state planning documents and through planning processes; and

WHEREAS, in the West, States in compliance with State law have exclusive authority over the appropriation and adjudication of water rights for all uses, and the allocation of water for energy development, including the determination of whether or not there is any unappropriated water available for use.

NOW, THEREFORE, BE IT RESOLVED that the Western States Water Council urges the Administration and the Congress to recognize the primary role of the States in allocating water for energy and ~~place a priority on the value of~~ support Department of Energy hosted energy-water programs programs and research conducted at National Laboratories and other undertaken in collaboration with state water resources agencies, ~~ve water programs,~~ including but not limited to work at: the Idaho National Laboratory (INL) and its Mountain West Water Institute; Lawrence Berkeley and Lawrence Livermore National Laboratories in California; Los Alamos and Sandia National Laboratories in New Mexico; the National Renewable Energy Laboratory (NREL) in Colorado; and Pacific Northwest National Laboratory (PNNL) in Washington, that collaboratively provide an essential links between federal energy research programs and water issues of concern to the western states.

WSWC Policy Statements

The WSWC policy statements are posted on its website at <http://www.westgov.org/wswc/policy.html>. Policy positions will be deactivated three years after their adoption, unless extended by formal action of the Council. The following is a brief description of all current positions, listed by date of adoption and corresponding number.

2013

- Urging the Administration and the Congress to give a high priority to federal programs, such as the National Oceanic and Atmospheric Administration's Regional Integrated Science and Assessments (RISA) program (April 5, 2013) - #349
- Supporting implementation of the Rural Water Supply Act of 2006 (April 5, 2013) - #350
- Supports federal legislative and administrative actions to authorize and implement reasonable hydropower projects and programs (April 5, 2013) - #351

2012

- Regarding States' water rights and natural flows (October 12, 2012) - #348
- Supporting legislation to reauthorize the Reclamation States Emergency Drought Relief Act (October 12, 2012) - #347
- Supporting legislation to reauthorize the National Integrated Drought Information System (NIDIS) Act, and accompanying letter to NOAA Administrator Lubchenco (October 12, 2012) - #346
- Regarding federal water and climate data collection and analysis programs (October 4, 2012) - #345
- WSWC Vision on Water (June 8, 2012) - #344
- Supporting legislative action to establish a dedicated funding source for completion of federal rural water projects authorized by Congress (June 8, 2012) - #343
- Regarding water transfers and National Pollutant Discharge Elimination System (NPDES) discharge permits (June 8, 2012) - #342
- Addresses proposed changes to Reclamation's policy manual and requests Reclamation enter into a dialogue with the WSWC (March 15, 2012) - #341
- Supports state primacy over groundwater (March 15, 2012) - #340
- Supports federal applied research and hydroclimate data collection programs (March 15, 2012) - #339
- Commending the introduction of S. 1343, the Energy and Water Integration Act of 2011 (March 15, 2012) - #338

2011

- Stating that any federal ground water quality strategy must reflect a true state-federal partnership, and provide adequate funding consistent with statutory authorities (October 7, 2011) - #337
- Supporting Indian water rights settlements (October 7, 2011) - #336
- Recommending policy changes at the federal level to expedite state general stream adjudications (October 7, 2011) - #335
- Supporting the Water Resources Research Institutes (requesting Congress to reauthorize and appropriate funds for the WRRRI program) (July 29, 2011) - #334
- Regarding the Reclamation Fund (asks Congress to fully use the fund for authorized water projects and programs in the West) (July 29, 2011) - #333
- Supporting Federal Research and Development of Updated Hydroclimate Guidance for Extreme Meteorological Events (July 29, 2011) - #332
- Opposes Preemption of State Water Law in Federal Legislation (July 29, 2011) - #331
- Letter commenting on EPA and COE *Draft Guidance on Identifying Waters Protected by the Clean Water Act* (July 29, 2011) - #330.5
- Regarding the Clean Water State Revolving Fund and the Drinking Water State Revolving Fund (Apr 15, 2011) - #330
- Regarding the National Levee Safety Act of 2007 and the Interpretation of Levees and Water Supply Canals (Apr 15, 2011) - #329

2010

- Regarding pesticide applications and National Pollutant Discharge Elimination System discharge permits (Dec 14, 2010) - #328
- Supporting legislation requiring the federal government to pay state filing fees in state general stream adjudications (Oct 29, 2010) - #327
- Addressing implementation of the SECURE Water Act and to express concern that many of the authorized programs and activities, including USGS federal streamgaging activities, remain unfunded or underfunded (Oct 29, 2010) - #326
- Urging the Administration and NASA to enhance the agency's focus areas on research for water resources application and to promote long term engagement with the Council, state and regional agencies in the western U.S. responsible for water management and policy (Oct 29, 2010) - #325
- Urging the Administration and Congress to support Department of Energy hosted energy-water and other collaborative water programs conducted at national laboratories (July 23, 2010) - #324
- Modifying Position #319 to call for a "shared vision on water planning and policy" instead of a "national water policy vision." (July 23, 2010) - #323

Sunsetted Positions

2012

- #313 Letter Regarding National Water Research and Development Initiative Act. *(There is no current legislation)*
- #315 Letter to House Transportation and Infrastructure Committee leaders raising concerns regarding a draft bill entitled the Sustainable Watershed Planning Act. *(outdated, not reintroduced)*
- #317 Supporting the Bureau of Reclamation's Field Services Program. *(outdated)*
- #318 Offering general comments to CEQ on the Principles and Guidelines. *(outdated)*
- #319 Describing principles that are important to the Western states in considering a "national vision" for water policy. *(superseded by more recent position)*

2011

- #297 Strong support for legislation to establish a National Drought Council to improve national drought preparedness, mitigation, and response efforts. *(There is no current legislation)*
- #298 In cooperation with the Interstate Council on Water Policy expressing strong support for increased funding for the Cooperative Water Program and the National Streamflow Information Program. *(superseded by more recent position statements and letters)*
- #299 Supporting S. 2842, the Aging Water Infrastructure and Maintenance Act. *(enacted)*
- #300 Regarding introduction of the Cooperative Watershed Management Act of 2008 (S. 3085). *(enacted)*
- #301 Commenting on H.R. 135, the "21st Century Water Commission," specifically declaring that the WSWC be involved in the selection of members and that it include State and Native American involvement. *(Bill has not been reintroduced)*
- #302 Supporting the enactment of S. 895 to provide the Bureau of Reclamation with authority to assess rural water supply needs and for sufficient funding. *(enacted)*
- #303 Revised resolution in support of the Weather Modification Research and Technology Transfer Act. *(No federal research program or legislation has been reintroduced)*
- #306 Urging support for full funding of the USGS National Streamflow Information Program (NSIP) and sufficient funding for the Cooperative Water Program to match non-USGS contributions. *(outdated)*
- #307 Letter to Senator Bingaman, Senate Energy and Natural Resources Committee, expressing interest in S. 3231, the Omnibus Public Lands Management Act. *(outdated)*
- #311 Letter to Steve Stockton offering assistance to the Corps in their water planning initiative. *(outdated)*

2010

- #287 Setting forth the Council's past perspectives on a proposed "Twenty-First Century Water Commission." (*outdated - see #301 above*)
- #289 Support of the proposed Water Conservation, Efficiency and Management Act, to specifically authorize the Bureau of Reclamation's water conservation programs. (*separately authorized*)
- #290 Concern over the Administration's decision to zero out funding for the U.S. Bureau of Reclamation's Technical Assistance to States (TATS) Program. (*outdated*)
- #291/#292 Regarding the proposed Agricultural Water Enhancement Program. (*enacted*)
- #295 Concern over budget request for federal funding for water and wastewater treatment, specifically EPA's State Revolving Fund (SRF) Capitalization Grants. (*combined with #296 and replaced with #330 – Apr 15, 2011*)
- #296 Concern with OMB directive to EPA disallowing the use of SRF revenues to repay bonds. (*combined with #295 and replaced with #330 – Apr 15, 2011*)

2009

- #276 Urging the Congress and Administration to Continue to Recognize State Primacy Regarding Water Rights and Water Quality Certification in the Federal Licensing of Hydroelectric Projects. (*supplanted by WGA resolution*)
- #277 Letter commending the American Indian Environmental Office of EPA for its efforts in establishing the Tribal Water Program Council and expressing a hope that it would "offer an ongoing opportunity for state-tribal cooperation on issues of mutual interest." (*outdated*)
- #279 Support for legislation (S. 2751 and H.R. 5136) to create a National Integrated Drought Information System within the National Oceanic and Atmospheric Administration. (*authority enacted*)
- #280 Strong support for federal legislation, the National Drought Preparedness Act, to establish a national policy for drought and coordinate "proactive measures at all levels of government to plan, prepare and mitigate the serious impacts of drought." (*deferred to WGA resolution*)
- #281 Support for Reclamation's Water Conservation Field Services Program and "Bridging-the-Headgate" Partnerships. (*outdated*)
- #282 Regarding Federal Non-Tribal Fees in General Adjudications asking the Congress to pass legislation requiring the Federal government, when a party to a general water rights adjudication, to pay fees for costs imposed by the state to conduct the proceedings to the same extent as all other users. (*deferred to WGA resolution*)
- #283 Reiterating strong support for maintaining a thermal band as part of the Landsat Data Continuity Mission, and the necessary funding. (*separately updated*)

2008

- #262 Support for the U.S. Geological Survey's Cooperative Water Program (CWP) and opposes any effort to force the privatization of related USGS services. (*separately updated*)
- #268 The Western States Water Council endorses policy resolutions adopted by the Western Governors' Association, and will allow these policies to guide the Council in matters relevant to implementation and potential reauthorization of the Clean Water Act. (*deferred to WGA resolution*)
- #269 Water Efficiency Standards for Plumbing Products (*subsequently enacted*)
- #270 Reauthorization of the Farm Bill. (*reauthorized*)
- #271 Support for the National Aeronautics and Space Administration's Landsat Data Continuity Mission and calling for continued funding to include a thermal infrared sensor. (*superseded by 2009 WSWC Position No. 283*)
- #273 Support for the Nonpoint Source Grant program administered by the U. S. Environmental Protection Agency under Section 319 of the Clean Water Act. (*outdated*)

Tab D – Budget

W S W C Proposed FY14 Budget

		Approved Budget FY2013	Actual thru 4/30/13	Estimated Inc/Exp for Remaining FY	Estimated Total Income / Expense		Proposed Budget FY2014	% Change from FY2013 Estimated Expenditures
							Over / -Under	
INCOME								
Member States Assessments		\$ 450,000.00	\$ 480,000.00	\$ 15,000.00	\$ 495,000.00	1	\$ 510,000.00	3.03%
Newsletter		\$ 6,000.00	\$ 5,000.00	\$ -	\$ 5,000.00		\$ 4,500.00	-10.00%
WGA / WSWC Contracts		\$ 165,000.00	\$ 91,435.00	\$ -	\$ 91,435.00		\$ 104,600.00	14.40%
Other Contracts		\$ -	\$ -	\$ -	\$ -		\$ -	0.00%
Corporate Sponsorships		\$ 10,000.00	\$ 4,275.00	\$ 600.00	\$ 4,875.00		\$ 5,500.00	12.82%
Symposium (WQ/WQ)	2	\$ -	\$ -	\$ -	\$ -	2	\$ 10,000.00	0.00%
Symposium (AWMS)	2	\$ 20,000.00	\$ 8,275.00	\$ -	\$ 8,275.00	2	\$ -	-100.00%
Symposium (CDWR)	2	\$ 20,000.00	\$ 4,400.00	\$ -	\$ 4,400.00	2	\$ 16,000.00	263.64%
Symposium (NIDIS)	5	\$ -	\$ 1,400.00	\$ -	\$ 1,400.00		\$ -	0.00%
Symposium (WSWC / NARF)		\$ -	\$ -	\$ -	\$ -	2	\$ 25,000.00	100.00%
Symposium Sponsors	4	\$ -	\$ 37,000.00	\$ -	\$ 37,000.00		\$ -	-100.00%
Savings Interest		\$ 3,900.00	\$ 3,842.00	\$ 770.00	\$ 4,612.00		\$ 4,500.00	-2.43%
Other		\$ -	\$ -	\$ -	\$ -		\$ -	0.00%
TOTAL INCOME		\$ 674,900.00	\$ 635,627.00	\$ 16,370.00	\$ 651,997.00		\$ 680,100.00	4.31%
EXPENSE								
Accounting		\$ 8,100.00	\$ 6,750.00	\$ 1,350.00	\$ 8,100.00		\$ 8,100.00	0.00%
Annual & Sick Leave Funding		\$ 1,500.00	\$ 1,250.00	\$ 250.00	\$ 1,500.00		\$ 1,500.00	0.00%
Audit	3	\$ 5,000.00	\$ -	\$ -	\$ -	3	\$ 8,500.00	100.00%
Contingencies		\$ 4,200.00	\$ 3,851.00	\$ 1,400.00	\$ 5,251.00		\$ 5,400.00	2.84%
Contract Services		\$ 10,000.00	\$ 3,295.00	\$ 1,100.00	\$ 4,395.00		\$ 10,000.00	127.53%
Equipment Replacement Fund		\$ 3,000.00	\$ 2,500.00	\$ 500.00	\$ 3,000.00		\$ 3,000.00	0.00%
Furniture-Equipment		\$ 2,500.00	\$ 920.00	\$ 1,000.00	\$ 1,920.00		\$ 2,500.00	30.21%
Insurance		\$ 1,000.00	\$ 778.00	\$ -	\$ 778.00		\$ 1,000.00	28.53%
Maintenance Contracts		\$ 6,000.00	\$ 6,446.00	\$ 600.00	\$ 7,046.00		\$ 7,500.00	6.44%
Meeting Expenses		\$ 20,000.00	\$ 14,923.00	\$ 5,000.00	\$ 19,923.00		\$ 25,000.00	25.48%
Office Supplies		\$ 4,200.00	\$ 2,262.00	\$ 1,200.00	\$ 3,462.00		\$ 4,000.00	15.54%
Payroll Benefits		\$ 145,000.00	\$ 114,119.00	\$ 24,100.00	\$ 138,219.00		\$ 145,000.00	4.91%
Payroll Salaries		\$ 285,000.00	\$ 223,691.00	\$ 44,900.00	\$ 268,591.00		\$ 275,800.00	2.68%
Payroll Taxes		\$ 24,500.00	\$ 18,352.00	\$ 3,600.00	\$ 21,952.00		\$ 23,000.00	4.77%
Pension Management		\$ 3,500.00	\$ 3,255.00	\$ 200.00	\$ 3,455.00		\$ 3,500.00	1.30%
Postage & Freight		\$ 7,100.00	\$ 3,491.00	\$ 1,500.00	\$ 4,991.00		\$ 5,000.00	0.18%
Printing & Reproduction		\$ 13,300.00	\$ 8,570.00	\$ 2,000.00	\$ 10,570.00		\$ 12,000.00	13.53%
Rent Expense		\$ 33,000.00	\$ 27,658.00	\$ 5,600.00	\$ 33,258.00		\$ 34,300.00	3.13%
Reports & Publications		\$ 4,000.00	\$ 1,593.00	\$ 3,275.00	\$ 4,868.00		\$ 5,000.00	2.71%
Symposium (AWMS)	2	\$ 20,000.00	\$ 7,437.00	\$ -	\$ 7,437.00	2	\$ -	-100.00%
Symposium (WQ/WQ)		\$ -	\$ -	\$ -	\$ -		\$ 10,000.00	100.00%
Symposium (CDWR)	2	\$ 20,000.00	\$ 9,654.00	\$ -	\$ 9,654.00	2	\$ 16,000.00	100.00%
Symposium (NIDIS)	5	\$ -	\$ 5,234.00	\$ -	\$ 5,234.00		\$ -	0.00%
Symposium (WSWC / NARF)		\$ -	\$ -	\$ -	\$ -	2	\$ 25,000.00	100.00%
Telephone		\$ 4,000.00	\$ 2,799.00	\$ 700.00	\$ 3,499.00		\$ 4,000.00	14.32%
Travel		\$ 50,000.00	\$ 34,349.00	\$ 7,000.00	\$ 41,349.00		\$ 45,000.00	8.83%
TOTALS EXPENSES		\$ 674,900.00	\$ 503,177.00	\$ 105,275.00	\$ 608,452.00		\$ 680,100.00	11.78%
NET RESERVE GAIN(LOSS)		\$ -			\$ 43,545.00		\$ -	

- 1 Full dues from 17 states
- 2 Memo entries only -- projected income equals projected expense
- 3 Management subcommittee approved change to biannual audit
- 4 Current year decision to break out
- 5 Surprise meeting / No budget

WESTERN STATES WATER COUNCIL
FINANCIAL PROJECTIONS

SCENARIO	note re expense	EXPENSE	% refers to expense	DUES	% refers to dues	note re income	INCOME	% refers to income	note re reserves	Change in Designated Funds	RESERVES
2001-02	1	465,343		25,000		1	500,147		1		265,665
2002-03	1	460,675	-1.00%	25,000		1	462,885	-7.45%	1	(21,589)	246,286
2003-04	1	487,983	5.93%	25,000		1	473,010	2.19%	1	13,333	244,646
2004-05	1	442,174	-9.39%	25,000		1	455,994	-3.60%	1	(582)	257,884
2005-06	1	465,168	5.20%	25,000		1	488,055	7.03%	1	(994)	279,777
2006-07	1	479,477	3.08%	25,000		1	485,911	-0.44%	1	(2,250)	283,961
2007-08	1	531,712	10.89%	27,500	10%	1	586,263	20.65%	1	(2,484)	336,028
2008-09	1	580,712	9.22%	30,000	9.10%	1	567,874	-3.14%	1	170	323,360
2009-10	1	553,254	-4.73%	30,000		1	611,224	7.63%	1	(51,379)	329,951
2010-11	1	540,580	-2.29%	30,000		1	579,320	-5.22%	1	(16,935)	351,756
2011.12	2	539,166	-0.26%	30,000		1	616,949	6.50%	1	(39,275)	390,264
2012-13	3	608,452	12.85%	30,000		3	670,350	8.66%	3	(38,550)	413,612
2013-14	4	670,100	10.13%	30,000		4	686,100	2.35%	4		429,612
2014-15	5	686,100	2.39%	30,000		5	686,100	0.00%	5		429,612

- 1 Actual Income, Expenditures and Reserves
- 2 Actual expenses before auditor adjustments
- 3 Based on estimated figures for fiscal year.
- 4 Based on proposed budget

- 5 Estimated projection

Western States Water Council
Pro Forma Balance Sheet
 As of May 31, 2013

	May 31, 13
ASSETS	
Current Assets	
Checking/Savings	
1000 · Cash	
1030 · Wells Fargo	31,966.71
1050 · Petty Cash	293.63
1130 · Investments Assess	400,699.22
1140 · Leave Payout Sinking Fund	121,337.28
1150 · Equip Replacement Fund	35,559.52
Total 1000 · Cash	589,856.36
Total Checking/Savings	589,856.36
Other Current Assets	
1300 · Prepaid Expenses	
1310 · Insurance	676.04
1320 · Postage	1,200.00
Total 1300 · Prepaid Expenses	1,876.04
Total Other Current Assets	1,876.04
Total Current Assets	591,732.40
Fixed Assets	
1500 · Fixed Assets	
1505 · Purchase amount	78,858.12
1510 · Accumulated Depreciation	(66,027.73)
Total 1500 · Fixed Assets	12,830.39
Total Fixed Assets	12,830.39
Other Assets	
1800 · Deposits	3,807.51
1900 · Amt for Compensated Absences	118,737.79
Total Other Assets	122,545.30
TOTAL ASSETS	727,108.09
LIABILITIES & EQUITY	
Liabilities	
Current Liabilities	
Other Current Liabilities	
2200 · Payroll Liabilities	
2220 · FICA	704.79
2230 · FICAE	705.57
2240 · FITW	1,476.00
2260 · MEDI	164.82
2270 · MEDIE	164.82
2280 · SITW	1,078.00
2290 · SUTA	146.80
2300 · 1099 Withholdings	470.00
2310 · AD&D	23.88
2330 · Dental	336.12
2340 · Disability	167.78
2350 · Life	316.14
2360 · Medical	8,077.44
2370 · Pension	3,832.21

Western States Water Council
Pro Forma Balance Sheet
As of May 31, 2013

	<u>May 31, 13</u>
2390 · PrePaid P/R Liabilities	(4,667.72)
2395 · Workers Comp Ins	69.17
Total 2200 · Payroll Liabilities	<u>13,065.82</u>
2400 · Pre-Billed Revenue	30,000.00
Total Other Current Liabilities	<u>43,065.82</u>
Total Current Liabilities	43,065.82
Long Term Liabilities	
2500 · Oblig for Compensated Absences	118,737.79
2520 · Current Yr Budget Offset / Comp	1,375.00
2550 · HRA - Willardson	2,982.17
2600 · Investment in Fixed Asset	
2605 · Current value	65,521.03
2610 · Adjust for depreciation	(66,027.73)
Total 2600 · Investment in Fixed Asset	<u>(506.70)</u>
2670 · Current Yr Budget Offset / F/A	2,750.00
Total Long Term Liabilities	<u>125,338.26</u>
Total Liabilities	168,404.08
Equity	
3900 · Retained Earnings	442,108.62
Net Income	116,595.39
Total Equity	<u>558,704.01</u>
TOTAL LIABILITIES & EQUITY	<u><u>727,108.09</u></u>

Western States Water Council
Pro Forma Profit & Loss Budget Performance
 May 2013

	May 13	Budget	Jul '12 - May 13	YTD Budget	Annual Budget
Ordinary Income/Expense					
Income					
4000 · Revenues					
4100 · Member States Assessments	0.00		480,000.00	450,000.00	450,000.00
4200 · Newsletter	0.00	500.00	5,000.00	5,500.00	6,000.00
4440 · WGA / WSWC Contracts	31,241.87	13,750.00	122,676.76	151,250.00	165,000.00
4550 · Council Meeting Sponsors	500.00	833.33	4,775.00	9,166.67	10,000.00
4800 · Interest Income					
4810 · Savings	0.00		3,055.85		
4820 · Sinking Fund	0.00		648.29		
4830 · Equipment Fund	0.00		138.41		
4800 · Interest Income - Other	0.00	325.00	0.00	3,575.00	3,900.00
Total 4800 · Interest Income	<u>0.00</u>	<u>325.00</u>	<u>3,842.55</u>	<u>3,575.00</u>	<u>3,900.00</u>
Total 4000 · Revenues	<u>31,741.87</u>	<u>15,408.33</u>	<u>616,294.31</u>	<u>619,491.67</u>	<u>634,900.00</u>
Total Income	31,741.87	15,408.33	616,294.31	619,491.67	634,900.00
Expense					
6010 · Contingencies	13.89	350.00	3,865.09	3,850.00	4,200.00
6020 · Contracted Services	0.00	833.33	3,295.23	9,166.67	10,000.00
6030 · Equip Replacement Fund	250.00	250.00	2,750.00	2,750.00	3,000.00
6040 · Furniture & Equipment	0.00	208.33	919.89	2,291.67	2,500.00
6060 · Insurance	0.00		778.00	1,000.00	1,000.00
6090 · Annual & Sick Leave Funding	125.00	125.00	1,375.00	1,375.00	1,500.00
6110 · Maintenance Contracts	0.00	500.00	6,446.43	5,500.00	6,000.00
6160 · Meetings & Arrangements	166.94	1,666.67	15,089.81	18,333.33	20,000.00
6170 · New Officers	0.00		341.55		
6300 · Office Supplies	0.00	350.00	2,262.27	3,850.00	4,200.00
6400 · Payroll - Salaries	22,542.23	23,750.00	246,233.41	261,250.00	285,000.00
6490 · Payroll Taxes & Benefits					
6500 · Benefits					
6510 · Dental Insurance	319.32		3,512.54		
6520 · Life Insurance	30.50		335.50		
6530 · LT Disability Insurance	167.80		1,836.40		
6540 · Medical Insurance	7,730.86		83,441.48		
6550 · Pension Plan	3,832.21		37,074.12		
6500 · Benefits - Other	0.00	12,083.33	0.00	132,916.67	145,000.00
Total 6500 · Benefits	<u>12,080.69</u>	<u>12,083.33</u>	<u>126,200.04</u>	<u>132,916.67</u>	<u>145,000.00</u>
6600 · Taxes					
6610 · FICAE	1,397.60		15,266.47		
6630 · MEDIE	326.86		3,570.39		
6640 · SUTA	0.72		540.79		
6650 · Worker's Comp	69.17		768.69		
6600 · Taxes - Other	0.00	2,041.67	0.00	22,458.33	24,500.00
Total 6600 · Taxes	<u>1,794.35</u>	<u>2,041.67</u>	<u>20,146.34</u>	<u>22,458.33</u>	<u>24,500.00</u>
Total 6490 · Payroll Taxes & Benefits	13,875.04	14,125.00	146,346.38	155,375.00	169,500.00
6700 · Pension Management	0.00	291.67	3,255.80	3,208.33	3,500.00
6750 · Postage & Freight	12.32	591.67	3,503.08	6,508.33	7,100.00
6780 · Printing & Reproduction	430.20	1,108.33	9,000.50	12,191.67	13,300.00

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Accrual Basis

Western States Water Council
Pro Forma Profit & Loss Budget Performance
 May 2013

	May 13	Budget	Jul '12 - May 13	YTD Budget	Annual Budget
6800 · Professional Fees					
6810 · Accounting	0.00	675.00	6,750.00	7,425.00	8,100.00
6830 · Auditing	0.00		0.00	5,000.00	5,000.00
Total 6800 · Professional Fees	0.00	675.00	6,750.00	12,425.00	13,100.00
6850 · Rent	2,569.27	2,750.00	30,226.97	30,250.00	33,000.00
6890 · Reports & Publications	0.00	333.33	1,593.10	3,666.67	4,000.00
7020 · Telephone	90.00	333.33	2,888.68	3,666.67	4,000.00
7040 · Travel	1,196.15	4,166.67	35,545.08	45,833.33	50,000.00
Total Expense	41,271.04	52,408.33	522,466.27	582,491.67	634,900.00
Net Ordinary Income	(9,529.17)	(37,000.00)	93,828.04	37,000.00	0.00
Other Income/Expense					
Other Income					
8800 · Symposium Income					
8810 · AWMS	0.00		8,275.00	10,000.00	10,000.00
8820 · CDWR	600.00		5,000.00	20,000.00	20,000.00
8860 · NIDIS	0.00		1,400.00		
8890 · Sponsors	0.00		37,000.00		
Total 8800 · Symposium Income	600.00		51,675.00	30,000.00	30,000.00
Total Other Income	600.00		51,675.00	30,000.00	30,000.00
Other Expense					
9100 · Symposium Expenses					
9110 · AWMS	0.00		7,437.19	10,000.00	10,000.00
9120 · CDWR	6,583.09		16,236.87	20,000.00	20,000.00
9160 · NIDIS	0.00		5,233.59		
Total 9100 · Symposium Expenses	6,583.09		28,907.65	30,000.00	30,000.00
Total Other Expense	6,583.09		28,907.65	30,000.00	30,000.00
Net Other Income	(5,983.09)		22,767.35	0.00	0.00
Net Income	(15,512.26)	(37,000.00)	116,595.39	37,000.00	0.00

MEMBER ASSESSMENTS
FY2013-2014

STATE (18 states)	Full Member	Associate Member	Date of Payment	Amount Paid	Date Received	Received From	Check # or Warrant #
Alaska	--						
Arizona	\$30,000		5/10/2013	\$30,000	5/15/2013	Dept of Water Resources	21-5946048
California	\$30,000						
Colorado	\$30,000						
Idaho	\$30,000		5/13/2013	\$30,000	5/17/2013	Dept of Water Resources	126076612
Kansas - Dept of Agric.	\$15,000						
Kansas - Office of Water	\$15,000						
Montana	\$30,000						
Nebraska	\$30,000		5/21/2013	\$30,000	5/21/2013	Dept of Natural Resources	ACH Payment
NV - Div of Wat Resources	\$15,000		5/9/2013	\$15,000	5/13/2013	Division of Water Resources	5856172
NV - Div of Envit'l Protectn	\$15,000						
New Mexico	\$30,000						
ND - State Water Comm'n	\$15,000						
ND - Environmental Health	\$15,000		5/10/2013	\$15,000	5/17/2013	Dept of Health	52610507
OK - Water Resources Bd	\$15,000						
OK - Environmental Quality	\$15,000						
Oregon	\$30,000						
South Dakota	\$30,000						
TX - Water Developmt Bd	\$15,000		6/17/2013	\$15,000	6/17/2013	TX Water Development Bd.	ACHHCTX Supporting Document # 21302981001
TX - Environmental Quality	\$15,000						
Utah	\$30,000						
Washington	\$30,000						
Wyoming	\$30,000		6/6/2013	\$30,000	6/10/2013	WY State Engineer's Office	1972217
Subtotal	\$510,000						
Total	\$510,000			\$165,000			

Tab E – Executive and Water Resources
Committee Draft FY2013-2014
Work Plans

**D-R-A-F-T
EXECUTIVE COMMITTEE
WORK PLAN
2013/2014**

1. NEWSLETTER

Work to date: *Western States Water* provides members and others with accurate and timely information on various water resources topics at state, regional and national levels. It is provided as a free service to members, governors and their staff, member state water resource agencies, state water users associations, selected multi-state organizations, key Congressmen and their staffs, and top federal administration officials. Other public and private agencies and individuals may subscribe for a fee. It is primarily distributed via email, and is posted on our website, with password protection (for recent issues).

2013-14: Along with the Council's regular meetings, the newsletter requires our most significant commitment of staff resources, though that is usually ancilliary to other efforts. The response from members and others receiving the newsletter has been consistently positive. The Council will continue to provide this service. ~~The staff will continue to send the weekly publication~~ via email, except for those who request a hard copy.

Time Frame: Ongoing

2. REGULAR MEETINGS

Work to Date: The first meeting of the Council was held in Stateline, Nevada in 1965, and regular meetings have been held since. Currently, the Council meets three times per year, rotating among the member states, which host the meetings at a location of their choice. Guest speakers and topics for discussion are scheduled according to members' interests and needs. External policy positions for consideration are noticed 30-days before the Council meets and are distributed not only to members, but also to WGA staff and the governors' staff. Any position statement not noticed may be brought before the Council for consideration at a meeting by unanimous consent, but if approved, must be sent to WGA for review prior to distribution consistent with mutually agreed upon procedures for policy coordination between WGA and WSWC.

Time frame: South Dakota will host the Fall 2013 meetings in Deadwood, and the Spring 2014 meetings will be held in conjunction with the biennial DC Seminar. Montana would be next in line to host the Summer 2014 meetings.

3. 2014 DC SEMINAR/FEDERAL & CONGRESSIONAL CONTACTS

Work to date: In March 2013, Council officers, members and staff traveled to Washington, D.C. and had over 30 visits with Administration and Congressional officials in support of

WSWC and WGA positions and priorities. [Native American Rights Fund \(NARF\)](#) staff joined in many of the visits and together with WSWC members and staff presented a briefing for congressional staff on the importance of Indian water rights settlements (attended by 16 staffers). Some of the feedback from these meetings suggested a need for greater contact and communication between the Council and federal policymakers.

2013/2014: The Council's Officers and Executive Committee will oversee preparations for the D.C. Seminar to be held in the Spring of 2014. The Council will again hold its biennial seminar in collaboration with the Interstate Council on Water Policy (ICWP). The purpose of the seminar is to enhance [Administration and Congressional contacts](#) and advise [congressional staff them](#) on major national water issues from the perspective of western states. WSWC members and staff will also schedule visits with individual congressional offices, as well as visits with WestFAST principals. The WestFAST Liaison Officer and WestFAST members will participate in these visits [with Executive Branch agencies](#).

Time frame: Spring 2014

4. WGA/WSWC COORDINATION and COLLABORATION

Work to Date: The publication of the WGA/WSWC report(s) entitled "Water Needs and Strategies for a Sustainable Future," raised awareness of the challenges facing the West. The WGA adopted the 2006 and 2008 reports as policy, and the Council has worked to implement their recommendations, many of which have been completed. In June 2010, the Council completed and the WGA accepted a Progress Report summarizing implementation activities. In 2011, WGA adopted two comprehensive policy statements, one focused on water quantity and the other on water quality, and both were based on the water reports and past policy statements.

Of particular note, a priority recommendation was establishment of the Western States Federal Agency Support Team (WestFAST) and the hiring of a liaison officer in the Council's offices.

2013/14: The Committee will continue to oversee the implementation of specific policy recommendations and other actions, while working with WGA to evaluate appropriate follow up steps to take advantage of the momentum created by the WGA/WSWC water reports. That may include preparation of another WGA water report, including revising, refining and augmenting recommendations from the 2006 and 2008 reports, in light of past and present activities – or other appropriate action as determined in consultation with WGA.

As in the past, the Council will continue to propose policy resolutions for WGA consideration. Further, the WSWC Chair and Executive Director will participate in WGA meetings as appropriate. Lastly, the Council and WGA will review current practices intended to facilitate policy coordination and evaluate the need, if any, for changes. This review will include members' communication with WGA Staff Advisory Council members. [Working with the WGA, the Council will also review WestFAST activities and needs.](#)

Time Frame: July – December

5. WESTFAST

Work to date: WestFAST's creation has had many benefits. It is a unique forum for addressing western (and national) water issues that has brought together a dozen federal agencies to collaborate with each other and state agencies with water-related responsibilities. WestFAST's workplan focuses on addressing issues raised and discussed with the Council and WGA (which in turn support development and implementation of related federal policies and programs). WestFAST and the Council have also ~~undertaken~~ discussed in development of a set of collaborative principles to guide federal/state working relationships. WestFAST is in its fifth year of existence.

2013/14: The Committee will continue to oversee the Council's work with WestFAST, including the preparation and implementation of WestFAST's work plan and principles for collaboration with the States. Further, the Committee will work to ensure participating agencies realize the real and potential benefits of WestFAST, and work to build a sound foundation for continuing collaboration.— The Council will also seek to build closer ties with WestFAST principals.

Time Frame: Ongoing

6. WATER MANAGEMENT/INDIAN WATER RIGHTS SETTLEMENT SYMPOSIA

Work to date: An annual WSWC Water Management Symposium has traditionally been held under the auspices of the Executive Committee. However, the Committee has usually asked one of the other committees to take the lead.

In 2012, the Council held a symposium in November in Phoenix, Arizona in collaboration with relevant federal agencies, multiple stakeholders, and public and private experts on Western State Water Resources Infrastructure Needs & Strategies. ~~It that~~ explored state financing authorities, policies, programs and projects, as well as public-private financing and cost sharing resources, with a goal of identifying common interests and promoting partnerships.

In 2011, the Council under the leadership of its Legal Committee, sponsored its biennial Indian Water Rights Settlement Symposium with the Native American Rights Fund (NARF) in Billings, Montana that included a cultural event on the Crow Reservation. Over 200 participated.

2013/2014: The Council will again sponsor the biennial Indian Water Rights Settlement Symposium, to be held near Santa Fe, New Mexico in cooperation with NARF, the State of New Mexico, and WGA. The Legal Committee will lead Council participation.

Time Frame – August 2013

7. ANNUAL REPORT

Since its organization in 1965, the Council has prepared and published an annual report. The annual report includes a brief discussion of the Council's formation and a detailed summary of its current membership and activities. It is a report of the Council's meetings, and provides an explanation of resolutions and positions and other actions taken by the Council. Further, it includes a description of other important activities and events, ~~such as~~ as well as workshops, seminars and symposia sponsored by the Council. It also describes the Council's involvement in major current water policy issues. Lastly, biennially, it includes an audit of the Council's finances, and current rules of organization.

Time frame: July – September (for the 2012 calendar year).

8. NATIONAL WATER RESOURCES POLICY, VISION AND PLANNING

The Council has been involved in discussions of national water policy and planning since its inception in 1965. In 2009, the U.S. Army Corps of Engineers completed a survey of state water plans and national water related needs and trends. ~~Further, a series of regional workshops were held in the West, East and Midwest culminating in a National Collaborative Water Resources Conference in Washington, D.C.~~ In 2010, the Corps released a summary "National Report: Responding to National Water Resources Challenges." ~~The discussion was focused on the need for a national water vision and collaboratively building a "toolbox" to help address national water resources challenges.~~

WSWC members and staff participated in this effort, but there was no apparent consensus regarding a need for a national water policy or vision. Council members raised concerns over a top-down regulatory approach to national water policy, as compared to a bottom-up approach with technical assistance and financial incentives, recognizing the primary role of the states in water resources planning, development, management and protection. The Council considered and adopted a resolution setting forth its own specific principles for a water vision.

The Corps is in the process of building a "toolbox" intended to assist states and others with their management challenges. An internet portal for sharing information has been established, and States have been asked to provide an extensive list of material for inclusion on a voluntary basis.

Separately, the Corps, National Oceanic and Atmospheric Administration (NOAA) and U.S. Geological Survey (USGS) are working towards staffing a National Water Center and implementing an Integrated Water Resources Science and Services (IWRSS) initiative.

2013/2014: Under the direction of the Committee, Council members and staff will continue working with the Corps, other federal agencies, and various stakeholder groups to elevate water issues as a priority at all levels of public and private discourse, as well as support water resources planning, development and management as a strategic national resource.

The Council will continue to collaborate with federal agencies and others on water policy initiatives, review the final Corps' report and other agency reports, as well as the individual state reports and summarize any common themes.

The Council will also identify common elements of state water plans, compare planning approaches, and provide options for states to improve their planning processes, as well as recommend ways federal agencies can provide appropriate assistance, including needed "tools."

Time frame: Ongoing

F:\WORKPLAN\2013-2014 EXECUTIVE COMMITTEE Draft Workplan.doc

**DRAFT
WATER RESOURCES COMMITTEE
WORK PLAN
2013/2014**

1. M3 Initiative: Measuring, Monitoring and Management

The Council has a long history of working to improve the measurement, monitoring and management of western water resources and related data (see Position #320, October 16, 2009, and Position #326, October 29, 2010). Data collection, management, distribution and visualization are critical for sound decisionmaking, but related programs are often underappreciated and underfunded.

2013/14: The Council, in an attempt to better communicate the critical need for water data, will develop a “M3 Initiative,” revising and renewing its message to better bring attention to water data needs and develop strategies to meet those needs. Consistent reliable future funding will be one major focus for the initiative. There are a number of items under this functional area, divided as outlined below. Part of this effort will be to highlight critical measuring and monitoring “tools,” for any water management “toolbox,” and communicating their value for enhancing our ability to wisely manage water resources.

Subcommittee: Phil Ward, Chair (OR); Jeanine Jones (CA); Hal Simpson (CO); Estevan Lopez (NM); Barry Norris (OR); Dr. Robert Mace (TX); and Sue Lowry (WY). Dr. Mace also represents the WSWC on the federal Advisory Committee on Water Information (ACWI), and Sue Lowry is also an ACWI member.

Time Frame: ongoing

A. WATER DATA EXCHANGE (WaDE)

Work to date: In 2011, the Council interviewed and hired a program manager to begin work on a water data exchange. It is a collaborative effort between the Western States Water Council (WSWC), the Western States Federal Agency Support Team (WestFAST), the Western Governors’ Association (WGA), and the Department of Energy Labs. These data are important for a number of applications. Some examples include, but are certainly not limited to: (a) state and regional water planning; (b) local watershed and urban planning and development; (c) siting of electric power generation and other energy production facilities; and (de) enabling a better understanding of the links between energy, water quantity and water quality. This effort is in direct support of a Department of Energy study that is evaluating water availability for energy production in the West. -Another national effort, the Water Census, which is led by the U.S. Geological Survey (USGS), is also looking for ways to better understand water availability and use. WaDE will support these efforts by laying the groundwork for exchanging the core data that support these studies.

A common ‘schema’ or format that can be used for sharing water availability and data has been completed. A common portal has been created, with a link on the WSWC website.

Fifteen states have been interviewed regarding their existing data systems. Moreover, a mapping tool has been created to allow states to review data, beginning with that gathered from the States by Sandia National Lab. The states are evaluating the resources required for them to participate, and the WSWC has applied for a grant to help states link up.

The Committee also sponsored a WaDE workshop in conjunction with the April 2013 WSWC meetings in Denver, Colorado. The workshop focused on bringing water and energy managers together to discuss current efforts and consider ways to better integrate water and energy planning, fulfilling a requirement under the DOE contract with WGA.

2013/14: The Committee, through a Subcommittee and various work groups, will continue to gather information on state water availability and use data and summarize existing state capabilities. WSWC staff will continue working to help individual members states build the capacity to connect to WaDE. This will entail a number of site visits, as well as regular communication among members and state information technology staff to gather, input and manage data, testing the schema and refining products for presenting consumptive use and water availability information for decisionmaking. Work to help states visualize and review Sandia data on water availability will also continue.

Timeframe: Ongoing - See WaDE timeline.

B. NATIONAL WATER AVAILABILITY AND USE ASSESSMENT

Work to date: In 2010, the Council staff began working as part of a USGS Ad Hoc Group on a National Water Assessment to develop a strategic plan to improve the acquisition, storage and dissemination of data on existing surface and ground water supplies and uses, both consumptive and non-consumptive, identifying trends and common themes, as well as present and future events and factors that may affect future water supplies, including changing demographics, environmental policies, energy demands, and climate, etc. The Council specifically referenced support for a national assessment in a letter to Senator Jeff Bingaman regarding implementation of the SECURE Water Act (Position #326, October 29, 2010). WaDE will better enable the western states to share water use, water allocation, and water planning data with one another and with the federal government. It will also seek to improve the sharing of Federal data that supports state water planning efforts.

2013/14: The Council will continue working with member states, USGS and various federal agencies to gather and disseminate water resources data using WaDE and other resources. The Council will continue to participate with USGS efforts to advance a National Water Assessment.

Timeframe: Ongoing

C. USGS COOPERATIVE STREAMGAGING

Work to Date: The Council has consistently supported the fully-federally funded USGS National Streamflow Information Program (NSIP) and Cooperative Water Program (CWP), a

federal/state streamgaging program partnership. The Council continues to urge the Congress to appropriate sufficient money to restore a 50-50% CWP funding match. As federal program costs have increased, western states have urged USGS to focus on basic data collection, as opposed to analysis and modeling studies. WSWC representatives are also participating in an ACWI review of the USGS water resources program in general, with a goal of identifying priority needs.

2013: The Council, through the Committee, will continue working with the Interstate Council on Water Policy and other interested organizations to represent states' interests in maintaining a viable and useful streamgaging network, focused on gathering basic water data and information. The Council will continue to pursue opportunities to support funding for USGS cooperative streamgaging and other important programs. The Council will continue to participate in the ACWI review, and make recommendations for the FY2014 USGS budget.

Timeframe: Ongoing

D. NRCS SNOW SURVEY AND WATER SUPPLY PROGRAMS

Work to Date: The Council has consistently supported the snow survey program, and urged the Congress to appropriate sufficient money to maintain and modernize the current system. Recent cuts have led to serious declines in program capabilities, with abandoned snow courses and threatening maintenance of SNOTEL sites. Further, sustained reductions in resources threaten the continued viability of the program as it now exists, and will lead to the loss of critical long-term data essential for western water and emergency management.

2013/14: The Committee and Council will continue to pursue opportunities to support funding for the NRCS snow survey program and related soil and climate analysis network (SCAN), as well as upgrading and modernizing the current snow survey and water supply forecasting system. The Council will also work with USDA, NRCS and the states to explore options for maintaining a sustainable system, including any state- interest in funding specific SNOTEL sites, with a goal of helping NRCS ensure adequate funding is available for operation and maintenance.

Timeframe: Ongoing

E. LANDSAT DATA CONTINUITY MISSION (LDCM) PROGRAM

Work to Date: More and more states are using remote sensing, particularly Landsat thermal infrared (TIR) band data, for water rights administration and to better monitor and manage water use, especially agricultural water use. In 2010, following several years of work, the President's budget request to Congress included funding for the thermal infrared sensor (TIRS) as part of LDCM, largely in response to the Council's efforts. LDCM is critical as Landsat 5 has ceased functioning and Landsat 7 images are degraded by technical problems. Landsat & is also nearing the end of its design life. On February 11, 2013 LDCM was launched from Vandenberg Air Force Base in California, and has begun sending its first earth

images. ~~In May, operation of the satellite was transferred~~ ~~Once fully tested, satellite and data operations will be transferred~~ from NASA to USGS, ~~and it is now known as Landsat 8.~~

2013: The Council has been credited with ensuring LDCM/Landsat 8 included TIRS, enabling states to continue to advance the application of the science to western water management and uses. The Committee will continue to work towards the timely and orderly development of future Landsat missions to ensure the continued availability of TIRS data. The Committee will also work with member states, local and federal agencies to promote the increased use of this data to improve water management and decisionmaking.

Timeframe: Ongoing

F. DROUGHT, NIDIS and EXTREME WEATHER EVENTS

Work to Date: Drought is a recurring natural phenomenon, the effects of which can be minimized through appropriate planning and preparedness activities. Much of the West, particularly the Midwest and Southwest, is again experiencing drought. The Council supported authorization and also expressly supports reauthorizing a National Integrated Drought Information System (NIDIS) to provide timely hydrologic and weather-related information for drought management.

The Council has also supported reauthorization of the Reclamation States Emergency Drought Response Act, to provide the Bureau of Reclamation with continuing drought planning, response and assistance capabilities.

Moreover, the Council recently expressed its support for federal applied research and hydroclimate data collection programs to assist water agencies at all levels of government in adapting to weather extremes and climate variability and change (Position #339, March 15, 2012). The Council also supports development of an improved western observing system for extreme precipitation events and research to better understand hydroclimate processes (Position #332, July 29, 2011). Since 2006, the Council has held a number of workshops related to climate adaptation and extreme events, including future drought and floods.

The Council and California Department of Water Resources hosted a July 2012 workshop on extreme weather events, a September 2012 NIDIS reauthorization workshop, and an April 2013 workshop on improving drought prediction. The Council is also collaborating with the National Oceanic and Atmospheric Administration (NOAA) to prepare and present a congressional briefing on the importance of atmospheric research and monitoring programs.

2013/14: The Committee will continue working to improve preparedness and response to drought, floods and other extreme events in cooperation with member states, the WGA and WestFAST. The Council will also continue to support and advise WGA and NOAA with respect to the National Integrated Drought Information System (NIDIS), and other weather/climate monitoring and adaptation efforts (including RISAs work), as WGA seeks to coordinate federal and state efforts to address drought information needs and compile data on related impacts. The Council will also continue to assist California's DWR with its ongoing series of drought and extreme events workshops. The next in this series of workshops will

be held in August 2013. The Council will work towards reauthorization of both NIDIS and Reclamation's authorities.

Time Frame: Ongoing

G: GROUNDWATER MONITORING

Work to date: The Council supports ~~the~~ USGS ground water measurement and monitoring, as expressed in Position #~~345320~~ (October 12, ~~20126, 2009~~) regarding federal water and climate data collection and analysis programs. Moreover, groundwater measurement and monitoring are important components of a number of western state water management programs. The Council has participated in activities sponsored by the National Groundwater Association. Further, the Council continues to track federal groundwater efforts related to both quantity and quality (in cooperation with the see Water Quality Committeework plan).

2013/14: The Council will consider development of an appropriate groundwater component for its M3 Initiative, as well as working collaboratively with other state and federal interests and non-governmental organizations. The Council will also promote the use of existing state information on groundwater resources.

Timeframe: Ongoing

2 WESTERN WATER INFRASTRUCTURE PROJECTS AND PROGRAM FUNDING

Work to date: Many western states face overwhelming infrastructure financing needs, as well as declining budgets for ongoing services. The Council's origins are associated with challenges to augment and better manage the West's water supply. Augmenting the West's water supply continues to be a priority. The Council has in the past prepared reports on state water resources programs and project cost sharing and financing and analyzed state water use fees. In 2002, a matrix of state water resource funding sources and mechanisms was prepared. In March 2008, the Council held a conference focused on water resources infrastructure issues. In November 2010, the Council convened another symposium and summarized the proceeding in "Western Water Resources Infrastructure Strategies: Identifying, Prioritizing and Financing Needs." The latest in the series of symposia was held in November 2012 in Phoenix, Arizona. The Council ~~The Council~~ has begun to compile an updated summary of western state infrastructure financing authorities, funding sources, policies and programs.

The Council has also supported expenditures from the Reclamation Fund for authorized project purposes, including specifically authorized rural water supply projects and authorized projects as part of negotiated Indian water rights settlements.

2013/14: The Council will continue to call on the Congress to ensure that revenues raised from the development of western resources, specifically revenues accruing to the Reclamation Fund, are appropriated and expended as intended for the development and management of western water resources (consistent with Position #333, July 29, 2011). The Council will otherwise

support efforts to secure adequate federal funding to meet growing western water needs, and work to develop a strategy to communicate important infrastructure needs-

The Council, with support from the Water Resources and Water Quality Committees, will begin preparations for the next in a series of symposia on infrastructure financing needs and complete an updated summary of western state infrastructure financing authorities, funding sources, policies and programs.

Subcommittee: Jeanine Jones (CA), Chair; Hal Simpson (CO); Mike Volesky (MT); and John Utton (NM).

Time Frame: Ongoing

3. ENERGY & WATER RESOURCES – INTEGRATED MANAGEMENT

Work to date: The increase in demands for water to meet energy needs is raising interest in the interrelationship between water and power resources, including transportation fuels, and opportunities to better understand the energy-water nexus and maximize efficiencies. The Council has addressed various aspects of energy issues as they relate to water resources as part of its regular meetings, including the demand for water resources created by new energy development, particularly coalbed methane (CBM) and biofuels, as well as potential water quality problems. Hydraulic fracturing is a current issue and long standing practice with which the states have considerable experience. (See Water Quality Committee workplan.) The use of water produced by energy development has also been discussed.

Since 2009, the Council has worked with the WGA to look at the present and future water needs related to renewable and traditional energy production, and related impacts on water supplies. The Council has also urged the Administration and Congress to support Department of Energy hosted energy-water programs conducted at national laboratories (Position #324, July 23, 2010).

In 2012, the Council completed a review of the water requirements for concentrated solar power development in the Southwest and related institutional issues and permitting requirements. It is working with the National Renewable Energy Lab (NREL) to publish a report.

2013/14: Working with the WGA and the Department of Energy's labs, the Council will continue to compile existing information through WaDE addressing water availability and anticipated demands for energy resources development (and the implications for water use in the West), focused on fulfilling the tasks envisioned under DOE/WGA grants. Further, the Council will consider and evaluate any federal legislation and other potential collaborative efforts in addressing energy and water needs.

The Council will evaluate as appropriate specific energy and water related issues as they arise, such as hydraulic fracturing and other practices.

Subcommittee: Dennis Strong (UT), Chair; William Staudenmaier (AZ); Jeanine Jones (CA); (CO); John Simpson (ID); Eileen Grevey Hillson (NM), Todd Sando (ND); Robert Mace (TX); and Sue Lowry (WY).

Timeframe: Ongoing through 2014

4. 2013 FARM BILL

Work to date: The Council has an interest in various water-related aspects of the Farm Bill, particularly Title II – Conservation. In 2005, the Council prepared and adopted a position in the form of a letter on various aspects of the Farm Bill that was submitted to USDA. In 2008, the Congress passed the last Farm Bill. One significant change was creation of a new Agricultural Water Enhancement Program (AWEP), to provide for an integrated, watershed approach to water and land management under the Environmental Quality Improvement Program (EQIP). The Council endorsed the change.

2013/14: The Committee and Council will continue to be active in the discussion of federal agricultural and farm programs and funding, particularly AWEP implementation, while encouraging conservation programs, policies and spending that support western state water management objectives.

Subcommittee: Jeanine Jones (CA), Chair; Paul Frohardt (CO); David Glatt (ND); Phil Ward (OR); Walt Baker (UT); Stephen Bernath (WA) and Sue Lowry (WY).

Timeframe: Ongoing

5. WRDA

Work to date: The Council has in the past supported regular passage of a Water Resources Development Act (WRDA), and has addressed a number of specific policy issues, while not taking any position on specific project authorizations.

2013/14: The Council will continue to work with the Congress and Corps on WRDA related issues, including the treatment of irrigation canals under the proposed new levee safety program. Further, the Council will continue to work to ensure that state water rights and prerogatives are protected, specifically as it relates to natural flows, Corps storage and other issues.

Subcommittee: ????

[\[Joint Water Resources Water Quality Infrastructure Financing Subcommittee? WIFIA?\]](#)

**Tab F – Water Quality and Legal Committee
Draft FY2014 Work Plans**

**WATER QUALITY COMMITTEE
WORK PLAN
July 1, 2013 to June 30, 2014**

1. HYDRAULIC FRACTURING

Work-to-Date: The Environmental Protection Agency (EPA) is preparing a study on the relationship between hydraulic fracturing and drinking water, a final draft of which is expected in 2014. In May 2013, the Bureau of Land Management (BLM) also issued a proposed rule for hydraulic fracturing on public lands, which includes a variance process that would allow states to propose their own standards if they can prove that their regulations meet or exceed the requirements in BLM's rule. In addition, EPA, the Department of Energy (DOE), and the Department of the Interior (DOI) agreed in April 2012 to develop "a Multi-Agency Unconventional Oil and Gas Research program to support policy decision by relevant state and federal agencies. The effort is intended to help support the White House's March 2011 "Blueprint for a Secure Energy Future."

The Western Governors' Association (WGA) Resolution #10-17) states that EPA's study "...must leverage the knowledge base and the policies already in place at the state level that are protecting American's drinking water." The resolution also states that collaboration and coordination among other stakeholders "...will greatly benefit the process and provide invaluable aid to EPA throughout [the] study."

In June 2013, the WSWC adopted Position # _____, which states: (1) federal efforts involving hydraulic fracturing should leverage state knowledge, experience, policies, and regulations; (2) such efforts should be limited, based upon sound science, and driven by states; and (3) the WSWC opposes any and all efforts that would diminish the primary and exclusive authority of states over the allocation of water resources used in hydraulic fracturing.

Comment [NB1]: This assumes that the WSWC will pass the proposed hydraulic fracturing resolution.

2013-2014: The Committee will work with the Water Resources and Legal Committees to support the WGA and WSWC positions, and will continue to monitor and update the WSWC on developments involving hydraulic fracturing, including but not limited to EPA's study, BLM's proposed rule, and the EPA/DOE/DOI research program.

The Committee will also work in collaboration with the Water Resources and Legal Committees to prepare a summary of the applicable WSWC states' experiences with hydraulic fracturing. The summary will compliment previous reports by the Groundwater Protection Council and others that describe how state programmatic elements and regulations ensure that hydraulic fracturing does not impair water resources and environmental values. Examples of the types of information sought for the summary include but are not limited to: (1) the impacts of hydraulic fracturing on water quality, if any; (2) examples of how state regulations and other efforts protect water quality; (3) the economic benefits of hydraulic fracturing; (4) water supplies and amounts used for hydraulic fracturing; (5) state interaction with federal agencies involving hydraulic fracturing; and (6) the degree to which states utilize oil and gas taxes and other revenue related to hydraulic fracturing to fund water-related efforts, including but not limited to water planning, water management, and water regulation and protection. WSWC staff will prepare the summary

under the direction of the Committees, and will gather the necessary information through independent research and focused telephone interviews with select staff from the applicable WSWC state agencies. It is also envisioned that the full WSWC will review the summary.

Time Frame: 2014

2. INTEGRATED WATER RESOURCE MANAGEMENT

Work-to-Date: Paragraphs (B)(4) and (B)(15) of WGA Resolution #11-7 state: “Western Governors support integrated water resource management and encourage the development of comprehensive water plans with state leadership and federal assistance.... Western Governors urge increased collaboration between water users and federal agencies in protecting clean water supplies recognizing the importance of high-value watersheds and natural features (such as wetlands and forests) that provide ecological services, including stormwater and flood mitigation, water quality protection and groundwater recharge.”

2013-2014: In conjunction with the Water Resources and Legal Committees, the Committee will hold an invitation only workshop to bring together state experts and other relevant stakeholders to discuss the interaction between water quality and quantity. The purpose of the workshop will be to produce findings and policy options for the WSWC to consider as it implements WGA Resolution #11-7 by providing further insight on: (1) how state water quantity and quality regulations interact with each other; (2) how states can protect water quality within the existing framework of the prior appropriation doctrine; and (3) the proper relationship between federal environmental protections and the states’ primary and exclusive authority over the allocation of water resources. Under the WSWC’s direction, WSWC staff will prepare a summary of the meeting.

Time Frame: 2014, pending available staff time and resources.

3. ONGOING MONITORING EFFORTS

There are a number of ongoing water quality issues that pertain to WSWC policies or are otherwise of interest that the Committee will monitor and address on an as needed basis. These issues are listed below in order of priority.

a. Clean Water Act Jurisdiction*

Work-to-Date: In 2011, the EPA and the U.S. Army Corps of Engineers released draft guidance intended to provide clearer, more predictable guidelines for determining which water bodies are subject to Clean Water Act (CWA) jurisdiction, consistent with the U.S. Supreme Court’s *Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers (SWANCC)* and *Rapanos v. United States (Rapanos)* decisions. The Corps and EPA submitted a final version of the guidance to the Office of Management and Budget (OMB) in February 2012, but OMB has yet to release the final guidance. In December

2012, the Administration published a list of intended regulations that indicated that EPA and the Corps intend to pursue rulemaking to clarify the extent of CWA jurisdiction. Both agencies have also indicated that they are focusing on rulemaking and that the Administration has not determined whether it will issue the guidance in the interim.

In July 2011, the WSWC sent a letter to the EPA commenting on the guidance, which stated that rulemaking is preferable to the development of a guidance document. Among other things, the letter expressed concern that the draft guidance provided no clear and concise limits to federal jurisdiction and could expand jurisdiction beyond the limitations delineated in *SWANCC* and *Rapanos*. The WSWC expressed further concern that the guidance's use of the term "shallow sub-surface hydrologic connection" could be interpreted as referring to groundwater, tributary or alluvial groundwater, water stored in the bed and banks of streams, or soil moisture.

WSWC members and staff held various meetings with Congressional and Administration officials, including visits with EPA, the Corps, and relevant Congressional Committee staff. The WSWC also sent a follow up letter to EPA and the Corps in April 2013, urging the agencies not to issue the guidance and to focus on rulemaking instead.

2013-2014: The Committee will continue to work with the Water Resources and Legal Committees to follow and comment on the development of federal guidance and/or regulations and other federal actions regarding CWA jurisdiction in accordance with the WSWC's July 2011 comment letter.

Time Frame: Ongoing

* See Item 5 of the Legal Committee Workplan

b. State Revolving Funds (SRFs) and Infrastructure Financing

Work-to-Date: Paragraph B(20) of WGA Position #11-15 and WSWC Position #330 urge the Administration and Congress "...to work together to ensure that stable and continuing federal appropriations, increased annually by a construction inflation index, are made to the SRF capitalization grants at funding levels adequate to help states address their water infrastructure needs." The positions also state that the SRF programs should provide greater flexibility and fewer restrictions on state SRF management.

In December 2009, Congress passed the American Recovery and Reinvestment Act (ARRA), which provided a short-term increase in SRF funding but coupled the funding with a requirement that states use no less than 30% of federally issued SRF funds for principal forgiveness. The Consolidated Appropriations Act of 2012 (P.L. 112-74), which Congress passed in December 2011, later modified this requirement so that states must now use at least 20%, but no more than 30% of their SRF funds for principal forgiveness, negative interest loans, grants or a combination thereof. The law further encourages states to target additional subsidies to communities that could otherwise not

afford an SRF loan. Since ARRA has expired and federal SRF funding has decreased, this mandate reduces state infrastructure financing capacities by requiring states to essentially give away a portion of their available loan funds.

Of note, the Consolidated Appropriations Act also requires states use at least 10% of their federally-issued Clean Water SRF funds for green infrastructure, water or energy efficiency improvements, or other “environmentally innovative activities.”

There has also been some discussion in Congress of adding a “Buy American” provision to the SRFs on an ongoing basis. Some SRF managers are concerned that such a provision would prove unrealistic and burdensome for SRF-funded water and wastewater projects, and could result in increased project costs, reduced interest in the SRF programs, project delays, and other challenges.

WSWC members and staff have met with Congressional and Administration staff on multiple occasions to support the SRFs. Most recently, in March 2013 to advocate the WSWC’s SRF position and urge the removal of the principal forgiveness mandate.

2013-2014: The Committee will continue to support the WGA/WSWC position by advocating stable and continuing SRF appropriations as well as greater flexibility for state SRF management, including the removal of the principal forgiveness mandate. In particular, WSWC staff will continue to update the Committee on developments within Congress and the Administration that have the potential to impact the SRFs. As needed, Committee members and WSWC staff will also meet with the Administration and Congress to further the objectives of the WGA/WSWC position.

Time Frame: Ongoing

c. EPA’s Water Transfers Rule

Work-to-Date: Paragraph B(10) of WGA Resolution #11-15 and WSWC Position #316 generally support EPA’s Water Transfers Rule (940 C.F.R. § 122.3(i)), which clarifies that water transfers are exempt from National Pollutant Discharge Elimination System (NPDES) permitting under Section 402 of the CWA. The rule states that transfers do not require NPDES permits if they do not add pollutants and if there is no intervening municipal, industrial, or commercial use between the diversion and the discharge of the transferred water.

The rule has been challenged in multiple courts and a challenge filed by nine states, including Washington, is currently pending before the U.S. District Court for the Southern District Court of New York (SDNY). EPA has also indicated in the past that it may reconsider the rule and had formed an interagency workgroup to explore options for addressing the rule that includes representatives from EPA, the Corps, the U.S. Department of Agriculture, and the Department of the Interior.

The Committee and WSWC staff have carried out a number of efforts to support EPA's Water Transfers Rule, including meeting with Administration and Congressional officials to advocate the WSWC's position and updating the WSWC and others stakeholders on recent developments, among other efforts.

2013-2014: The Committee and WSWC staff will: (1) continue to support the WGA and WSWC positions; (2) monitor any and all activities impacting EPA's rule, including but not limited to the SDNY litigation and possible efforts by EPA to reconsider the rule; and (3) inform the WSWC of ongoing developments.

Time Frame: Ongoing

d. Nutrients

Work-to-Date: EPA's Office of Water is working to carry out a National Nutrient Strategy to accelerate state adoption of numeric water quality standards while building the scientific and technical infrastructure for developing new criteria to address nitrogen and phosphorus pollution.

On March 16, 2011, EPA Acting Assistant Administrator for Water Nancy Stoner issued a memo to EPA's Regional Administrators to synthesize key principles regarding the agency's technical assistance and collaboration with states. The memo urged the regions to place new emphasis on working with states to achieve near-term reductions in nutrient loadings. Most notably, the memo provided a "Recommended Elements of a State Nutrients Framework" to serve as a tool to "...guide ongoing collaboration between EPA regions and states in their joint effort to make progress on reducing nitrogen and phosphorus pollution." It also asked each region to use the framework as a basis for discussions with interested and willing states, the goal of which would be to tailor the framework to particular state circumstances.

The Committee and WSWC staff have followed and updated the WSWC on EPA efforts involving nutrients. Various Committee meetings have also featured presentations from EPA and state officials on federal and state nutrient management efforts.

Of further note, Paragraph B(15) of WGA Resolution #11-15 asks EPA to consider the following in its efforts to address nutrient pollution: (1) addressing excessive nutrients through the NPDES program can be difficult for a number of reasons, including the fact that adverse impacts vary from water body to water body and nutrients are often times produced by non-point sources that fall outside of NPDES jurisdiction; (2) numeric criteria require significant investments of time and money to develop, and may not always be effective because the link between nutrient concentrations and adverse impacts varies considerably, and levels of nutrients that cause impairments in one stream may not cause impairments in another; and (3) effective nutrient reduction strategies should not focus exclusively on numeric criteria, but should also provide states with sufficient

flexibility to utilize their own incentives and authorities under the CWA to establish standards and control strategies to address nutrient pollution.

2013-2014: The Committee and WSWC staff will monitor EPA's nutrient efforts and inform the WSWC of ongoing developments. It will also ensure that the WSWC's efforts do not duplicate those of the Association of Clean Water Administrators.

Time Frame: Ongoing

e. **Pesticide Permits and National Pollutant Discharge Elimination System (NPDES) Permits**

Work-to-Date: The Sixth Circuit Court of Appeals' 2009 ruling in *National Cotton Council v. Environmental Protection Agency* vacated an EPA rule that exempted pesticide applications made in compliance with the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). The decision has national implications because it consolidated rule challenges filed in eleven circuits, and because the U.S. Supreme Court declined to review the decision.

WSWC Position #328 urges Congress to amend the CWA and FIFRA to clarify that FIFRA-compliant pesticide applications do not require NPDES permits. Paragraph B(13) of WGA Resolution #11-15 also states that the Western Governors support FIFRA's primary role in regulating pesticide applications to water, and will seek state-based solutions that compliment rather than duplicate FIFRA.

WSWC members and staff have supported these positions through multiple visits with Congressional officials. WSWC staff also completed a summary of state information and examples of how dual CWA-FIFRA regulation will impact western states. Additionally, the WSWC sent a letter to Senate Majority Leader Harry Reid (R-NV) and Senate Minority Leader Mitch McConnell (R-KY) in December 2011 asking them to support related pesticides regulatory legislation.

Most recently, legislation (S. 175 and S.802/H.R. 935) has been introduced in the 113th Congress that would overturn the Sixth Circuit's decision and prevent EPA and states from requiring NPDES permits for pesticide applications.

2012-2013: The Committee will continue to: (1) monitor and inform the WSWC about developments involving this issue; and (2) work with key Congressional members and their staff consistent with the WGA and WSWC positions to support legislation that would clarify that FIFRA-compliant pesticide applications do not require NPDES permits.

Time Frame: Ongoing

f. Abandoned Hardrock Mine Remediation

Work-to-Date: The WGA and WSWC have long supported legislation to amend the Clean Water Act (CWA) to protect authorized third parties, or “Good Samaritans,” who voluntarily clean up abandoned hardrock mines, from inheriting perpetual liability for the site under the CWA (WGA Policy Resolutions #10-3 and #11-15, Paragraph B(14)).

A number of Good Samaritan bills have been introduced in Congress over the years, including legislation introduced by Senator Mark Udall (D-CO). These bills have been unsuccessful due to concerns about the potential impacts of amending the CWA and perceptions that sufficient protections already exist under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). However, considerable uncertainty exists as to whether CERCLA and other existing authorities provide Good Samaritans with sufficient protection from third party lawsuits for sites in which there is a continuing discharge of pollutants as defined by the CWA.

Over the past several years, the Committee has worked to support Good Samaritan legislation and other efforts to clean up abandoned hardrock mines, including multiple visits with Congress and the Administration, Congressional testimony in support of such legislation, and involvement in a WGA-organized Task Force focused on crafting an exemption for Good Samaritan activities by state governments. In March 2013, the WSWC also met with the Environmental Protection Agency (EPA) to discuss a memorandum the agency prepared to clarify administrative protections for Good Samaritans.

2013-2014: The Committee will coordinate with the WGA and encourage efforts to clean up abandoned hardrock mines, including but not limited to enactment of Good Samaritan legislation. As part of this effort, the Committee will work with key Congressional members/staff, Administration officials, and other stakeholders to develop and support efforts to clean up abandoned hardrock mines in accordance with the WGA’s policies.

In addition to the above actions, the Committee will: (1) work with the Administration and Congress to provide liability protections to Good Samaritans under existing authorities; and (2) evaluate the prospects for Good Samaritan legislation in the 113th Congress.

Time Frame: Ongoing

**LEGAL COMMITTEE
WORK PLAN
July 1, 2013 to June 30, 2014**

1. ENERGY-WATER NEXUS

Work-to-Date: Since 2009, the WSWC has worked with the Western Governors' Association (WGA) to study water needs related to energy production and transmission in the West under a grant from the WGA to help carry out a Regional Transmission Expansion Planning (RTEP) project with the Department of Energy, Sandia National Laboratory, and the Western Electricity Coordinating Council. The purpose of RTEP is to study energy generation and transmission requirements and to develop long-term, interconnection-wide transmission expansion plans. Part of the WSWC's grant with the WGA for this effort requires the WSWC to:

...prepare an analysis of legal and administrative issues associated with new permits or transfers of water for energy development in Texas and the states of the Western Interconnection, i.e., Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, South Dakota, Utah, Washington, and Wyoming. The analysis may include a handful of case studies on how water supplies are being provided or may be acquired for new energy projects and on how energy development is affecting water supply and management in the West.

2013-2014: WSWC staff will work in conjunction with, and under the supervision of, the Water Resources and Legal Committees to prepare a report that satisfies the above requirement. Since the WSWC and WGA have already studied many of the above issues in prior efforts, WSWC staff will compile relevant information from past WSWC-WGA reports, workshops, and other efforts, and conduct independent research as needed. With respect to the case studies, WSWC staff will work with the Committees to select specific projects, issues, or notable developments involving: (1) renewable energy; (2) natural gas and hydraulic fracturing; (3) coal; (4) hydropower; and (5) nuclear power. Ideally, the case studies will represent different geographic regions of the West and address a range of energy projects, issues, and developments.

Time Frame: April 2013 – October 2013

2. WATER CONSERVATION

Work-to-Date: The WSWC has carried out a number of projects involving water conservation over the years. In 1983, it published its report "Water Conservation and Western Water Resource Management," which discussed the various aspects of water conservation, its potential benefits and limitations, as well as its role in western water law and management. The report also summarized water conservation activities in sixteen western states. Subsequent WSWC efforts include a 1993 update to the report as well as various roundtables, workshops, and symposia focused on conservation, among other efforts.

The current WGA/WSWC position on conservation is found in Paragraph B(12) of WGA Resolution #11-7, which states: “Western Governors encourage adoption of strategies to make existing water supplies go further, including the use of water conservation.... The Governors encourage investment in research into promising water-saving strategies.”

2013-2014: The Legal Committee will develop a report on agricultural and urban water conservation that will focus on the issues associated with improving or implementing a conservation program at the state level. In particular, it will: (1) include a literature review of existing research related to water conservation; (2) describe concerns related to abandonment and forfeiture and discuss existing state protections for conservation; (3) describe issues and state efforts regarding consumptive use requirements as they pertain to conservation; (4) describe issues and state efforts regarding adverse impacts to water right holders associated with conservation; (5) carry out case studies of existing water conservation and salvage programs in California, Montana, Oregon, Utah, and Washington to identify the “lessons learned” from these programs; and (6) identify policy options for states to consider when working to implement or improve a conservation program at the state level.

The report will build upon past WGA and WSWC conservation efforts, including but not limited to the 1983 report, the 1993 update, and the 2012 WGA-WSWC Water Transfers report. As a first step, WSWC staff will work with the Committee’s Water Conservation Subcommittee to define the term “conservation” for the purposes of the report. Past WSWC reports have defined the term “water conservation” as “decreasing water withdrawals and/or consumption by reducing demand through the appropriate and more efficient use of available water supplies.” In addition, the report will recognize that conservation is a means to an end and not an end in and of itself.

WSWC staff will develop the report under the guidance and direction of the Committee’s Water Conservation Subcommittee and the Water Resources Committee’s Water Use Efficiency/Conservation Subcommittee. Rather than issue a survey to gather the necessary information, WSWC staff will rely on independent research and focused telephone interviews with select staff from the applicable WSWC state agencies. It is also envisioned that WSWC member states will review the report to ensure its accuracy. Additional outreach may be conducted with other stakeholders in the environmental, urban, and agricultural communities on an as-needed basis.

Time Frame: October 2013 to June 2014.

Subcommittee: Jeanine Jones (CA), John Simpson (ID), Greg Ridgley (NM), and Phil Ward (OR)

Comment [NB1]: These are the folks from our Denver meeting who expressed the most interest in this issue.

3. AD HOC GROUP ON RESERVED INDIAN WATER RIGHTS

Work-to-Date: The WGA and WSWC have long supported the negotiated resolution of Indian water rights claims (WGA Resolution #10-11 and WSWC Position #336). As a result of this support, the WGA and WSWC have worked with the Native American Rights Fund (NARF) for over thirty years as part of the Ad Hoc Group on Reserved Indian Water Rights to promote negotiated settlements.

In recent years, the Group's focus has highlighted the need to secure a permanent funding mechanism that will ensure that any settlement authorized by Congress and approved by the President will be implemented. The Ad Hoc Group has also initiated quarterly conference calls or in-person meetings with the Department of Interior to discuss key issues associated with Indian water rights settlements. In March 2013, the Ad Hoc Group traveled to Washington, DC, and met with over 30 Congressional and Administration offices in support of Indian water rights settlements, including a Congressional briefing with the Congressional Native American Caucus.

2013-2014: The Reserved Rights Subcommittee, working with WGA staff, will oversee WSWC efforts in the following areas: (1) activities to gather support for an appropriate remedy to settlement funding issues, including efforts to support the Reclamation Water Settlements Fund, development of a permanent settlement funding mechanism, and funding for federal assessment, negotiation, and implementation teams; (2) with the Ad Hoc Group, continue meeting with the Administration via the quarterly conference calls and other face-to-face opportunities to discuss key issues associated with Indian water rights settlements; and (3) work with NARF to hold the 13th biennial Symposium on the Settlement of Indian Reserved Water Rights Claims, which will take place on August 13-15 in Santa Fe, New Mexico in conjunction with the Tesuque, Nambe, Pojoaque, and San Ildefonso pueblos, which were part of the Aamdor settlement.

Time Frame: Ongoing

Reserved Rights Subcommittee: Bill Staudenmaier (AZ); Cindy Chandley (AZ); DL Sanders (NM); Bidtah Becker (NM); and Norman Johnson (UT)

4. STATE AND FEDERAL COLLABORATION REGARDING THE ADJUDICATION OF FEDERAL NON-TRIBAL WATER RIGHTS

Work-to-Date: In 2011, the Committee created a Federal Non-Tribal Water Claims Subcommittee to evaluate ways the WSWC can improve the effective resolution of federal non-tribal water rights claims. The Subcommittee consists of WSWC members and WestFAST members, who serve in an *ex officio* capacity.

To carry out its mission, the Subcommittee issued a questionnaire in 2012 to WSWC member states, the Bureau of Land Management, the Bureau of Reclamation, the Department of Defense, the U.S. Army Corps of Engineers, the U.S. Fish and Wildlife Service, and the U.S. Forest Service. The questionnaire sought information on issues and challenges involving federal non-tribal water right claims,¹ as well as examples of successful state and federal efforts to resolve these claims. Questionnaire responses identified a broad range of issues that generally fell into one or more of the following categories: (1) accommodating federal water needs and interests within state legal frameworks; (2) water uses associated with activities on federal land; and (3) issues associated with state general stream adjudications. Responses also indicated a broad consensus that the WSWC and WestFAST could develop a clearinghouse of information on

¹ For the purposes of the questionnaire, the term "federal non-tribal water right claim" encompassed federal reserved right claims, federal state-based claims, and claims relating to the aforementioned federal agencies that do not involve water right claims made by a tribe.

efforts to resolve federal non-tribal water rights claims. Many responses also suggested that the WSWC and WestFAST hold a workshop to inform the development of the clearinghouse.

2013-2014: As suggested by a number of questionnaire responses, the WSWC and WestFAST will hold a one-day workshop in 2014 to bring together 40-50 invited state and federal officials to identify the specific issues, tools, and information to be included in a clearinghouse. The workshop would also provide insight into the framework, design, and format of the clearinghouse (e.g., a report, regularly updated website or database, etc.). Ideally, the workshop and the information from the questionnaire responses will provide the WSWC and WestFAST with sufficient information to develop the clearinghouse. WSWC staff would develop the workshop and related clearinghouse under the direction of, and in consultation with, the Legal Committee's Non-Tribal Federal Water Needs Subcommittee.

Time Frame: The Committee will hold the workshop in 2014, possibly in conjunction with the WSWC's spring 2014 meetings in Washington, D.C., with completion of the final clearinghouse taking place by the end of 2014. Given state and federal travel restrictions, the Committee may need to hold the workshop via webinar or a series of webinars.

Federal Non-Tribal Water Claims Subcommittee: Candace West (MT), Melissa Hornbein (MT), DL Sanders (NM), Dwight French (OR), and Herman Settemeyer (TX). WestFAST members participating in the Subcommittee in an *ex officio* capacity include: Lee Koss (Bureau of Land Management), Joe Cole (Department of Defense), Andrew Hautzinger (U.S. Fish and Wildlife Service), and Jean Thomas (U.S. Forest Service).

5. CWA JURISDICTION*

Work-to-Date: In 2011, the EPA and the U.S. Army Corps of Engineers released draft guidance intended to provide clearer, more predictable guidelines for determining which water bodies are subject to Clean Water Act (CWA) jurisdiction, consistent with the U.S. Supreme Court's *Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers* (*SWANCC*) and *Rapanos v. United States* (*Rapanos*) decisions. The Corps and EPA submitted a final version of the guidance to the Office of Management and Budget (OMB) in February 2012, but OMB has yet to release the final guidance. In December 2012, the Administration published a list of intended regulations that indicated that EPA and the Corps intend to pursue rulemaking to clarify the extent of CWA jurisdiction. Both agencies have also indicated that they are focusing on rulemaking and that the Administration has not determined whether it will issue the guidance in the interim.

In July 2011, the WSWC sent a letter to the EPA commenting on the guidance, which stated that rulemaking is preferable to the development of a guidance document. Among other things, the letter expressed concern that the draft guidance provided no clear and concise limits to federal jurisdiction and could expand jurisdiction beyond the limitations delineated in *SWANCC* and *Rapanos*. The WSWC expressed further concern that the guidance's use of the term "shallow sub-surface hydrologic connection" could be interpreted as referring to groundwater, tributary or alluvial groundwater, water stored in the bed and banks of streams, or soil moisture.

WSWC members and staff held various meetings with Congressional and Administration officials, including visits with EPA, the Corps, and relevant Congressional Committee staff. The WSWC also sent a follow up letter to EPA and the Corps in April 2013, urging the agencies not to issue the guidance and to focus on rulemaking instead.

2013-2014: The Committee will continue to work with the Water Resources and Water Quality Committees to follow and comment on the development of federal guidance and/or regulations and other federal actions regarding CWA jurisdiction in accordance with the WSWC's July 2011 comment letter.

Time Frame: Ongoing

*See Item 3(a) of the Water Quality Committee Workplan

DRAFT

Tab G – WGA Policies

Tab H – WSWC Strategic Directions Survey

WSWC Strategic Directions Survey

Please enter your name (optional).

Please enter your agency/organization/company (optional).

GENERAL ISSUES

What are the most important water-related issues facing your state at this time?

COUNCIL DIRECTION

Given the Council's current Vision on Water - Position #344 (www.westgov.org/wswc/-344%20Vision%20on%20Water%20Final.pdf), please rank the importance of the following focus areas.

You need not rank every item.

	Extremely Important	Very Important	Important	Somewhat Important	Less Important
State primacy in the management and allocation of water resources	<input type="radio"/>				
Federal regulatory streamlining	<input type="radio"/>				
Development and implementation of state water plans	<input type="radio"/>				
Completion of state general stream adjudications	<input type="radio"/>				

	Extremely Important	Very Important	Important	Somewhat Important	Less Important
Meeting the demands of a growing population	<input type="radio"/>				
Balancing economic and environmental demands	<input type="radio"/>				
Changing social values	<input type="radio"/>				
Stakeholder cooperation and collaboration	<input type="radio"/>				
Integrated water resources planning and management	<input type="radio"/>				
Grassroots/watershed approach to problem-solving	<input type="radio"/>				
Sustainable economic growth	<input type="radio"/>				
Enhanced environmental protections	<input type="radio"/>				
High quality of life	<input type="radio"/>				
Federal-State cooperation	<input type="radio"/>				
Stakeholder cooperation	<input type="radio"/>				
Decision-making at the lowest practicable level	<input type="radio"/>				

What importance would you place on the Council's role/efforts with respect to the following?
 You need not rank every item.

	Extremely Important	Very Important	Important	Somewhat Important	Less Important
Interstate cooperation related to planning, conservation, development, management and protection of water resources	<input type="radio"/>				

	Extremely Important	Very Important	Important	Somewhat Important	Less Important
Protecting state rights and prerogatives with respect to western water resources	<input type="radio"/>				
Communicating Council positions to federal administration/congressional offices/officers	<input type="radio"/>				
Promoting Council priorities for federal spending	<input type="radio"/>				
Collaborating with other interstate water organization and NGOs (ICWP, ACWA, CSG-West, etc.)	<input type="radio"/>				
Communicating with NGOs interested in water (NWRA, TNC, TU, etc.)	<input type="radio"/>				
Communicating with water user groups and interests	<input type="radio"/>				

Are there any other roles or efforts that the Council engages in that you think are important?

Please rank the amount of effort the Council puts into each of the following areas.

	Not Enough	About Right	Too Much
Frequency of our communication with federal/congressional offices	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Advocacy with respect to federal budgetary issues	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Assistance with addressing state agency administrative issues	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Not Enough

About Right

Too Much

Representing state interests/facilitating state participation in federal judicial proceedings (i.e., writing/assisting in writing legal amicus briefs)



Please list any other items that you think are important, that might require more or less attention from the Council.

Please rank Council efforts in representing the interests of its member states.

Not Enough

About Right

Too Much

Your state's issues



Small states' issues



Large states' issues



Single state's issues



Issues of interest to only a few states (3 or 4)



All states overall



Should the Council become more involved in international (North American) water issues?

- Yes
- No

Should the Council become more involved in world water forums?

- Yes
- No

How effective is the Council as a source of information for you on....

	Extremely Effective	Very Effective	Effective	Somewhat Effective	Less Effective
State administrative, policy/program, legislative and judicial issues	<input type="radio"/>				
Interstate issues	<input type="radio"/>				
International issues	<input type="radio"/>				
Technological/scientific topics	<input type="radio"/>				
Federal administration, budgetary and regulatory issues	<input type="radio"/>				
Congressional legislative and budgetary issues	<input type="radio"/>				
Federal cases and legal issues	<input type="radio"/>				
Water quality and water quantity interests and issues	<input type="radio"/>				
Environmental protection and economic development issues	<input type="radio"/>				

If you would like to explain or elaborate on any of your answers on the Council's current direction, please add your comments here.

COUNCIL/WGA RELATIONSHIP

Please rank the following.

Extremely Very Effective Effective Somewhat Less Effective

Effective

Effective

Communication
between Council
members and
their governors'
offices



Do you regularly communicate with your WGA Staff Advisory Council counterpart?

- Yes
- No

Does the Council appropriately represent the governors on water issues?

- Yes
- No

Do you view the Council as a bipartisan organization?

- Yes
- No

If you would like to explain or elaborate on any of your answers on the Council's relationship with WGA, please add your comments here.

WESTFAST

Have you contacted a WestFAST member personally with a question or a concern?

- Yes
- No

In your experience, has WestFAST enhanced state access to participating federal agencies?

- Yes
- No

If you would like to explain or elaborate on any of your answers on WestFAST, please add your comments here.

COUNCIL BENEFITS

Please rank the following.

	Extremely Beneficial	Very Beneficial	Beneficial	Somewhat Beneficial	Less Beneficial
Benefits to your state from participation in the Council.	<input type="radio"/>				
Benefits to your agency, organization, firm or company from participation in the Council	<input type="radio"/>				
Benefits to you personally from your participation in the Council.	<input type="radio"/>				
Rank the overall value of your participation on the Council?	<input type="radio"/>				

Do you feel your state's investment in Council participation is worth the cost(s)?

- Yes
- No

Please describe what the Council could do to add greater value for your participation.

If you would like to explain or elaborate on any of your answers on the Council's benefit to its members, please add your comments here.

COMMUNICATION

Please rank the following means of communication for their importance to you and your organization.

	Extremely Important	Very Important	Important	Somewhat Important	Less Important
Overall communication from the Council	<input type="radio"/>				
Newsletter publication	<input type="radio"/>				
Email	<input type="radio"/>				
Phone calls	<input type="radio"/>				
www.westernstateswater.org	<input type="radio"/>				
Social media	<input type="radio"/>				
Regular Council meetings	<input type="radio"/>				
Symposia/Workshops	<input type="radio"/>				
Webinars	<input type="radio"/>				

If you would like to explain or elaborate on any of your answers on the Council's communication, please add your comments here.

MEMBERS

High Above Average Average Below Average Low

rank the effectiveness or quality of current Council meetings?

Please rank the following.

Extremely Important Very Important Important Somewhat Important Less Important

What is your opinion of the value or potential value of the Water Data Exchange (WaDE) program?

Should the Council consider greater investments in similar interstate cooperative efforts?

- Yes
- No

If you would like to explain or elaborate on any of your answers on the Council's internal policies and practices, please add your comments here.

COUNCIL STAFF

Is the Council's current level of staff support appropriate to meet your needs?

- Yes
- No

Please rank the following with regard to your satisfaction.

Extremely Satisfied Very Satisfied Satisfied Somewhat Satisfied Less Satisfied

How satisfied are you with any personal and/or professional assistance staff has provided to you?



How satisfied are you with the overall quality of the staff?



If you would like to explain or elaborate on any of your answers on the Council's staff, please add your comments here.

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Tab I – Sandia Data Review



Sandia Water Metric Data

Review Site/Mapping Application



Goals for the Review Site:

1. Allow the state agencies to visualize the results of the Sandia Water/Energy project via an easy-to-use, streamlined mapping application
2. Allow state agencies to review the parameters and assumptions that populated Sandia's models for their appropriateness.
3. Provide an easy mechanism for providing feedback to the Sandia research team on either the estimate itself, the methodology, or the model assumptions.
4. Allow state partners to ensure that requested changes have been made.

What is the Sandia Data Review Site?

The Western States Water Council (WSWC) has been engaged by the Western Governors' Association (WGA) to work collaboratively with Sandia National Lab on their *Energy and Water in the Western and Texas Interconnects* project.

The goals of Sandia's research are to minimize costs and stress over water, and maximize reliability and transmission capacity through the West. The data are intended for use by the electric power long-range transmission planning teams at the Western Electric Coordinating Council (WECC) and the Electric Reliability Council of Texas (ERCOT), and many other applications, such as:

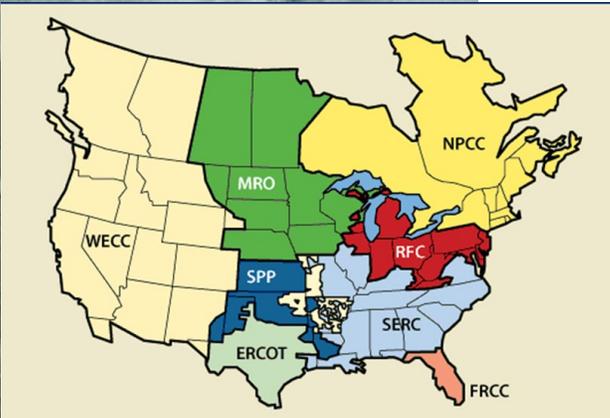
1. State and Regional Water Planning
2. Local Development Planning
3. Siting of Energy Production Facilities
4. Enabling a Better Understanding of the Link Between Water Quantity and Water Quality

To achieve this the research team at Sandia National Laboratory has been conducting extensive research to evaluate where and what types of water may be available for development and/or transfer, especially for electric power generation, and to characterize future demand for other sectors as well.

How were the Sandia metrics developed?

During 2011 – 2012, and with the assistance of the WSWC, Sandia engaged with state agencies to access their water estimates and utilize their in-house expertise. The data-gathering process was manual and labor-intensive, and required an evaluation of the differences between state data estimates. Sandia was able to generate six primary metrics on new, developable water available within the states that coincide with the WECC and ERCOT service area, at a large basin scale across the West.

After the metrics were developed, a cross-disciplinary team of experts from western state agencies participated in metric refinement and validation. WECC and ERCOT will use these metrics as a long-range, screening tool to understand how water may constrain energy development in the West. Now that the metrics are fully assembled, the state agencies need to review and refine them to provide additional quality control. Viewing the data and making changes via a map interface makes the whole process flow much more easily.

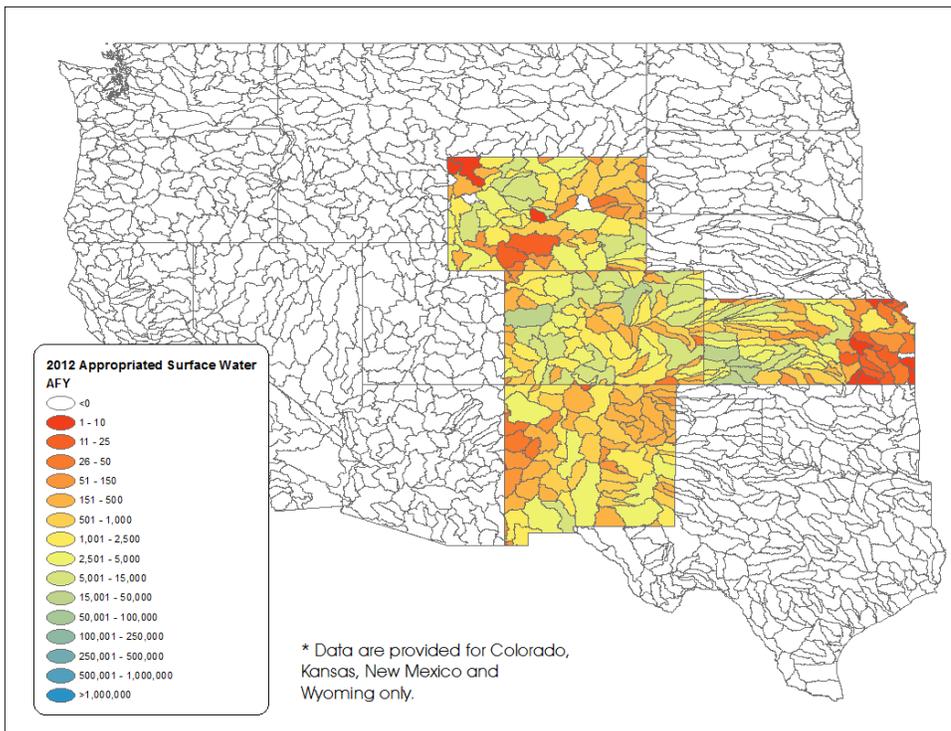


How will the Review Site work?

State agencies will be able to login to the mapping application portal, scroll through a map gallery of each metric and the metric's accompanying cost-to-develop estimate, as well as the estimated future demand (2030), future availability (2030), and the difference between these two figures. The reviewer will be able to zoom to the basin estimate developed by Sandia to review the metric figures. Information about the methodology used for that basin will be accessible. If the review partner needs to request a change, they can populate a review form, which is immediately logged into Sandia's Change Request repository. Change request are also made available real-time so that the same basin is not reviewed twice. Once the basin estimate has been adjusted, the status of the basin is altered and the review partner notified of the change.

Who's Participating in This Effort?

Sandia National Lab will maintain the data and make all proposed changes, while the Western States Water Council has developed the review site mapping application and will host this securely online. They will also engage with their state members show them how to use the review site and make sure that the review process is as streamlined as possible.



Interested in the Data Review?

If you are one of the state agency partners that needs access to the review site, please contact Sara Larsen at the WSWC for more information.

Phone: 801-685-2555

Email: saralarsen@wswc.utah.gov

Western States Water Council
5296 South Commerce Drive, Suite 202
Murray, UT 84107
801-685-2555
<http://www.westernstateswater.org>



For more information and the status of this project, see: www.westernstateswater.org/wade/sandia-review/

Sandia Data Review – Interim Status Report

Vince Tidwell, the Sandia “Energy and Water in the Western and Texas Interconnects” principal investigator, presented their water availability metric results to WSWC members at the 2012 Fall Council Meeting in San Antonio, TX. At that time, WSWC members expressed a desire to review the estimates more closely. It was proposed that a mapped format would be an easy way to review the data and methods used to generate the metrics. To accomplish this, WSWC developed a Sandia Data Review online mapping application where state representatives can effectively review the metrics using a streamlined process. This mapping application is now being used by the state agencies to review the data. Six of the 17 states that comprise the study have proposed changes to the metric estimates (outlined in red). Five are currently performing the review (grayed out). As the review is a phased process and only allows four states to undergo the review at a time, it is hoped that the remaining states will complete their review by the end of July of 2013. After the data have undergone the review and the values revised to the satisfaction of state agencies, WSWC will make the data available using a modified version of the developed mapping application. The Sandia mapping application is proposed to be served online as a subset application within the data portal that will be hosted by the WSWC for the WaDE project. The following maps contain the most recent revisions to the Sandia data.

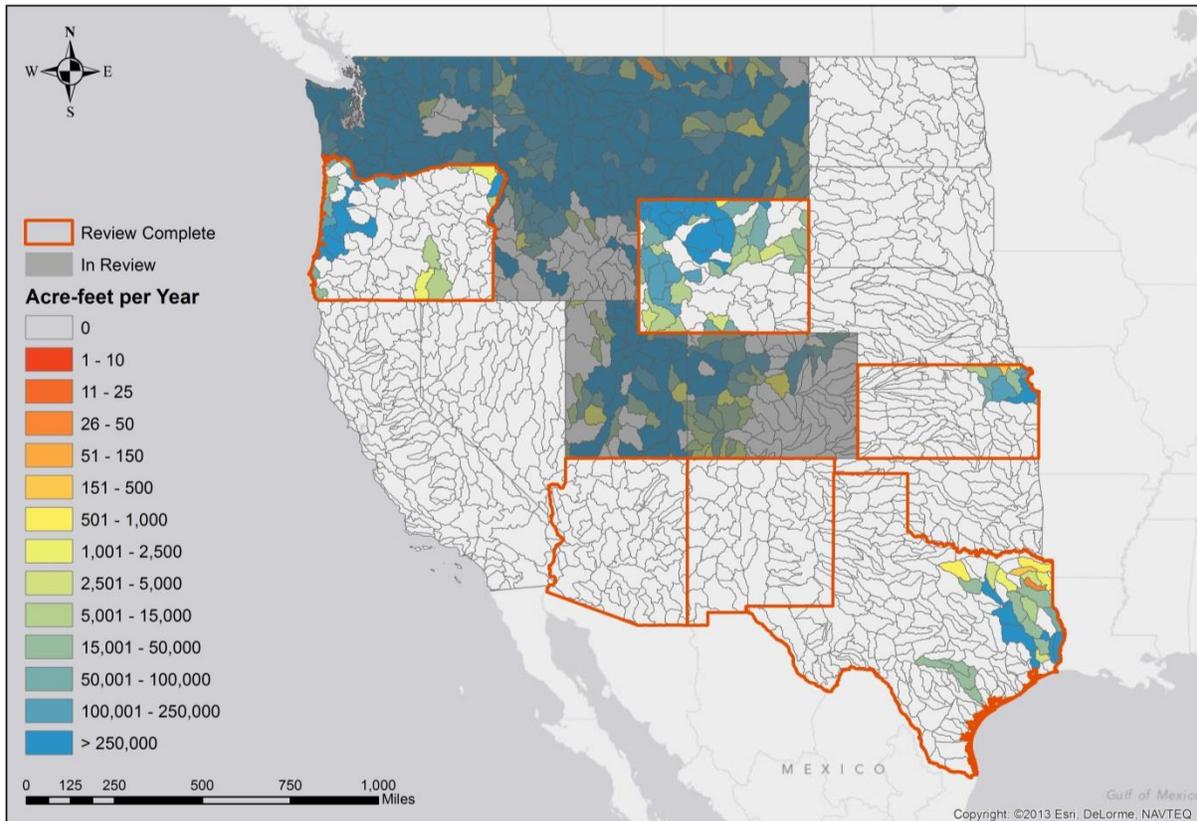
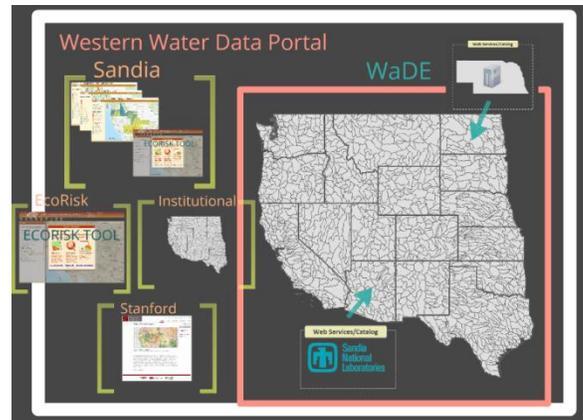


Figure 1 Unappropriated Surface Water

Figure 2 Appropriated Water and Cost

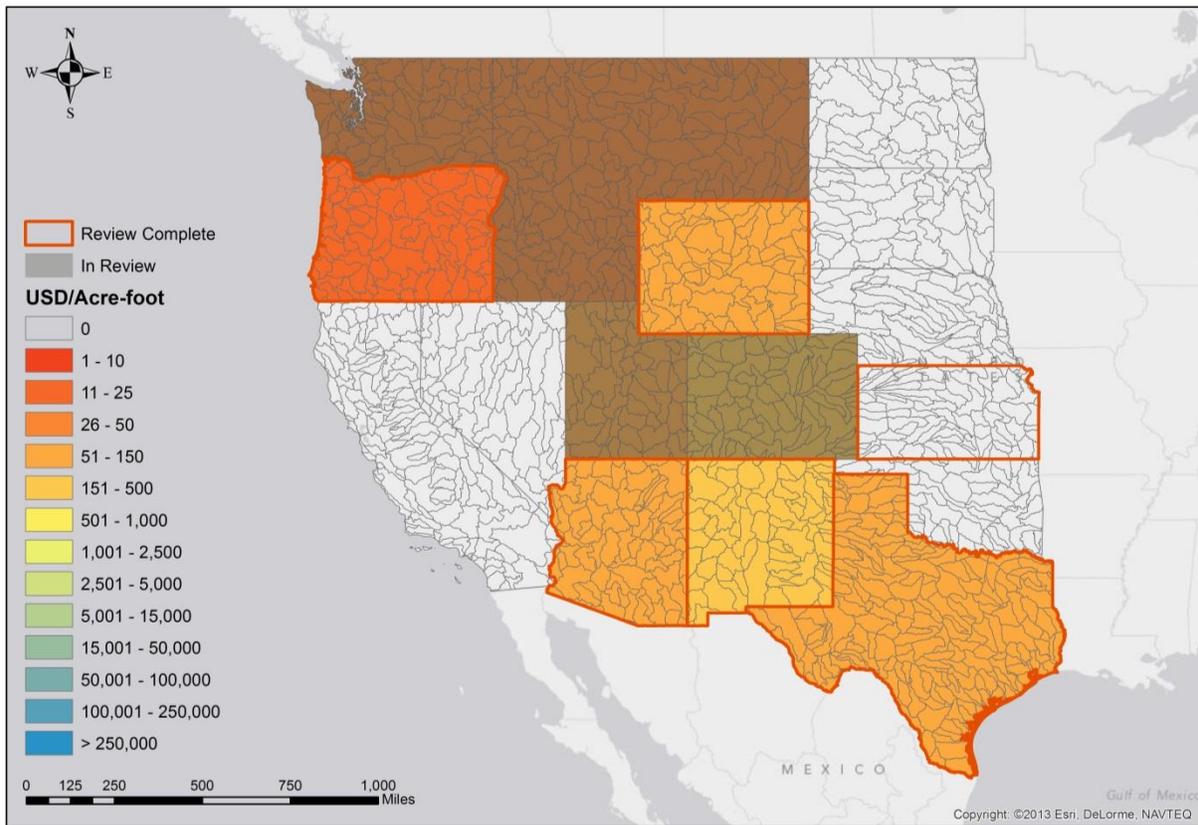
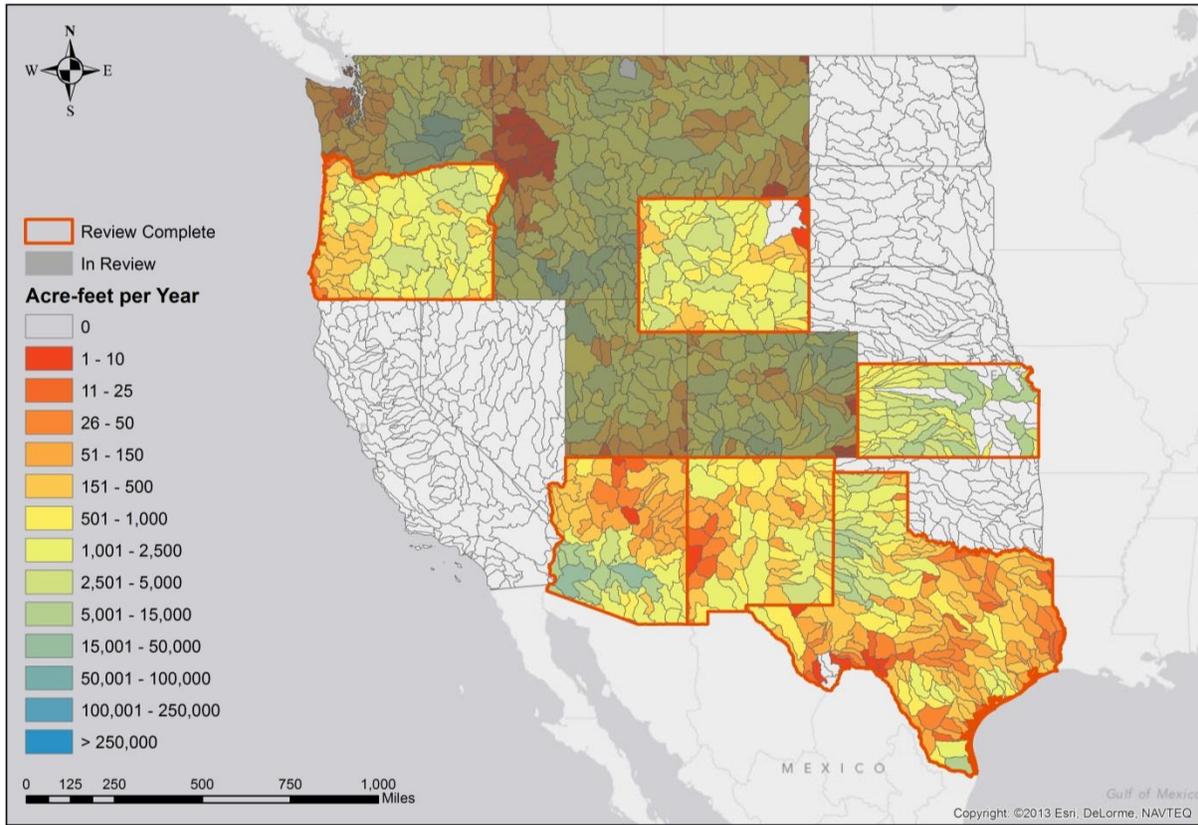


Figure 3 Potable Groundwater and Cost

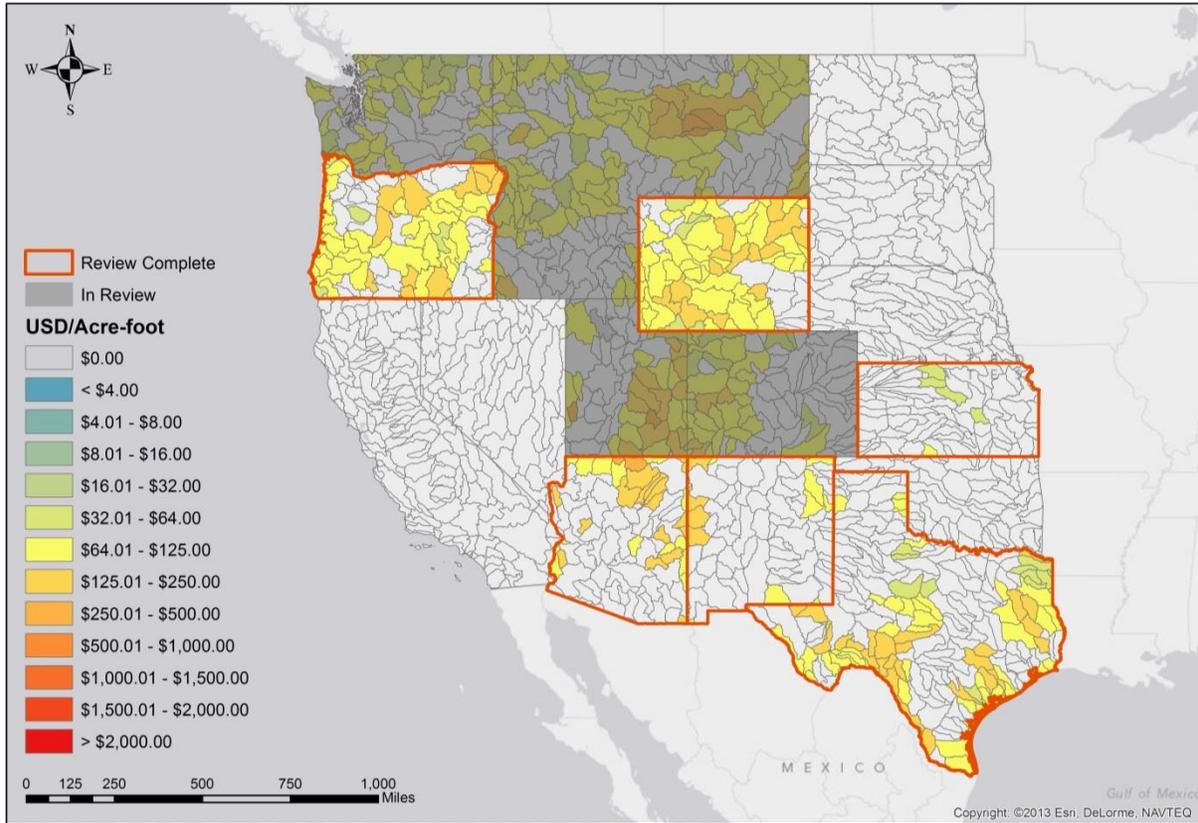
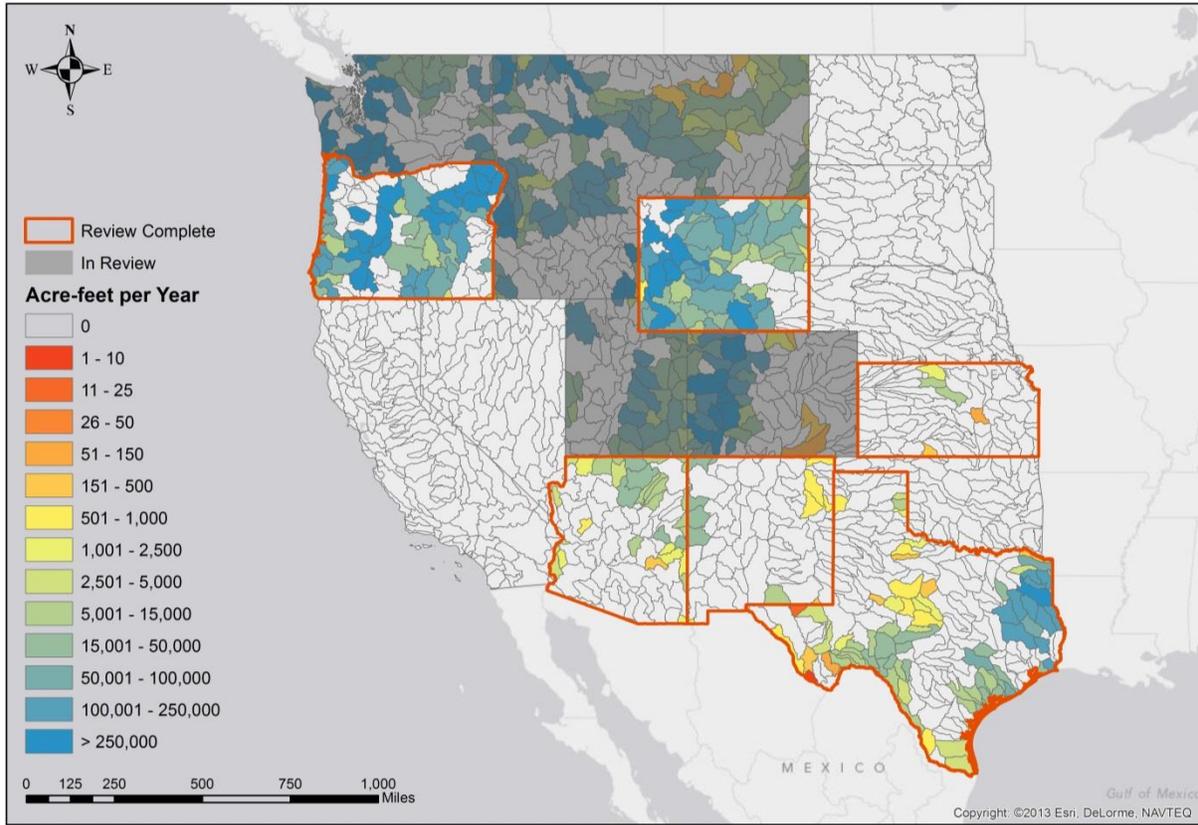


Figure 4 Brackish Groundwater and Cost

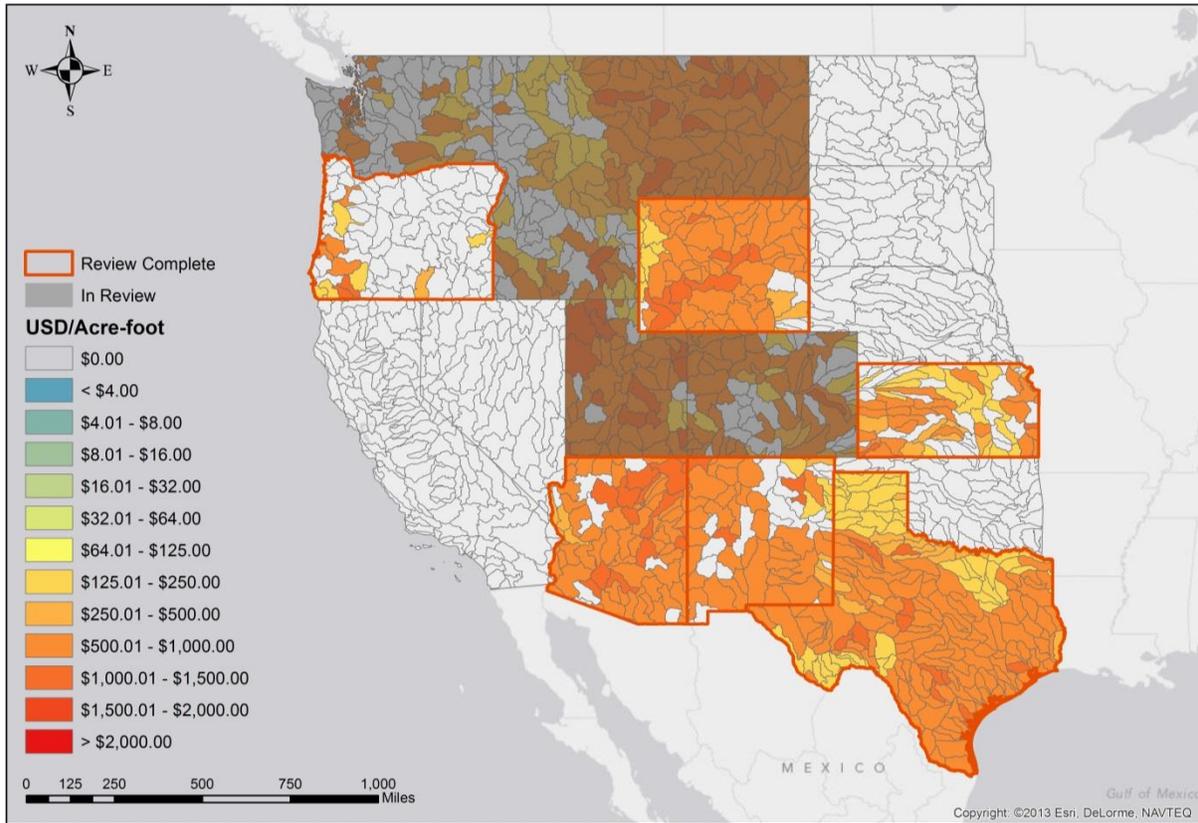
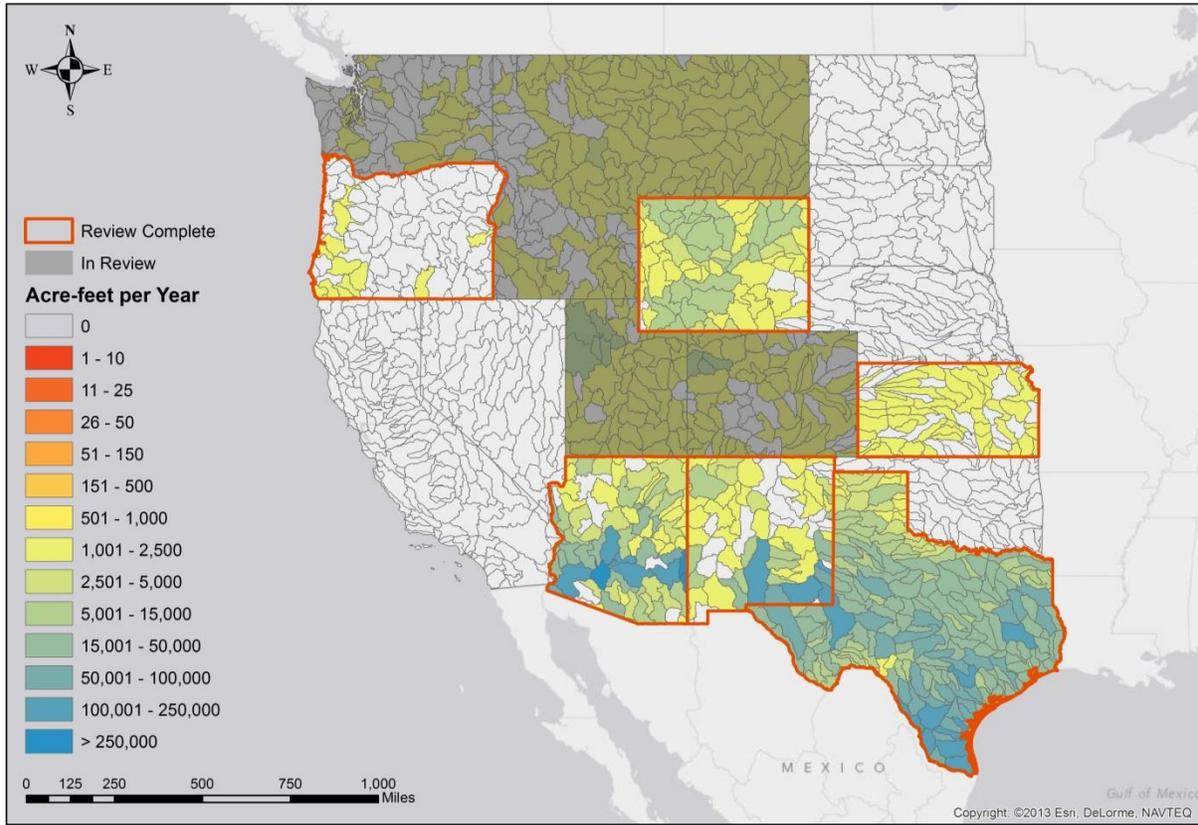


Figure 5 Wastewater Reuse and Cost

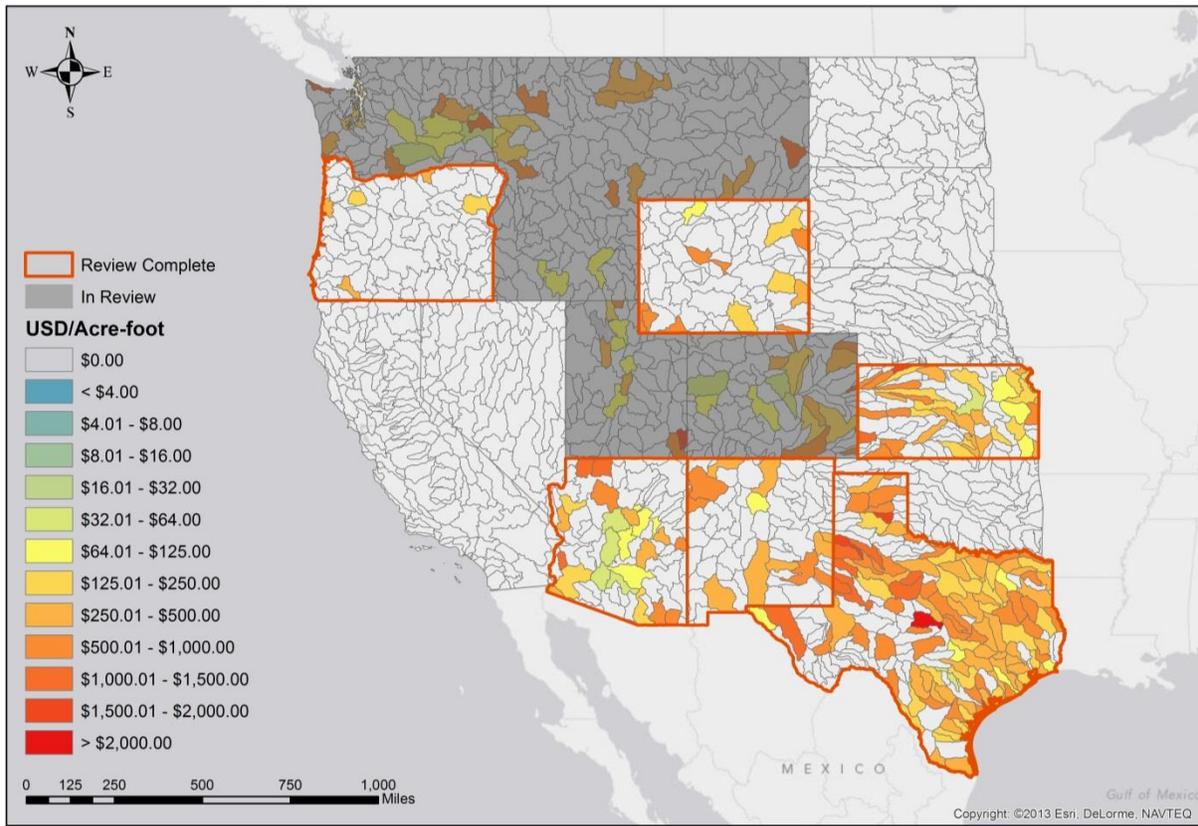
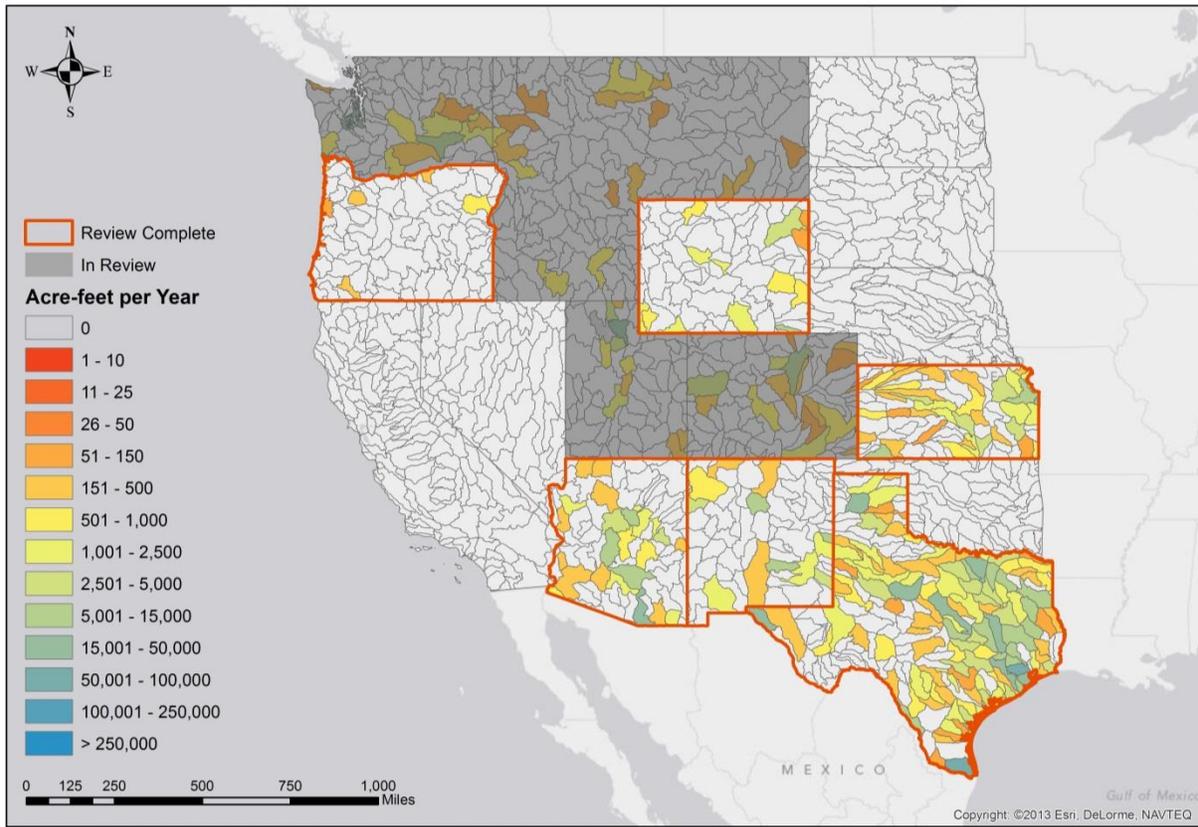


Figure 6 Change in Demand from 2012 to 2030

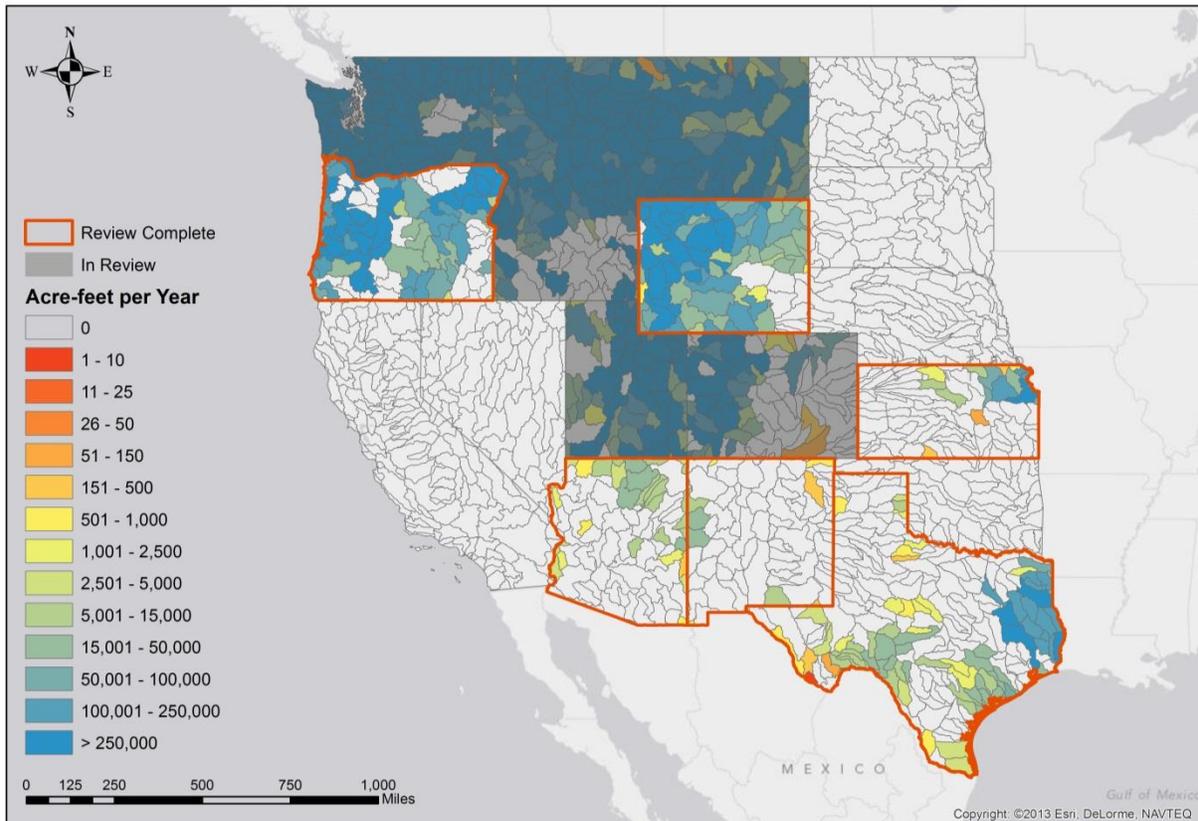
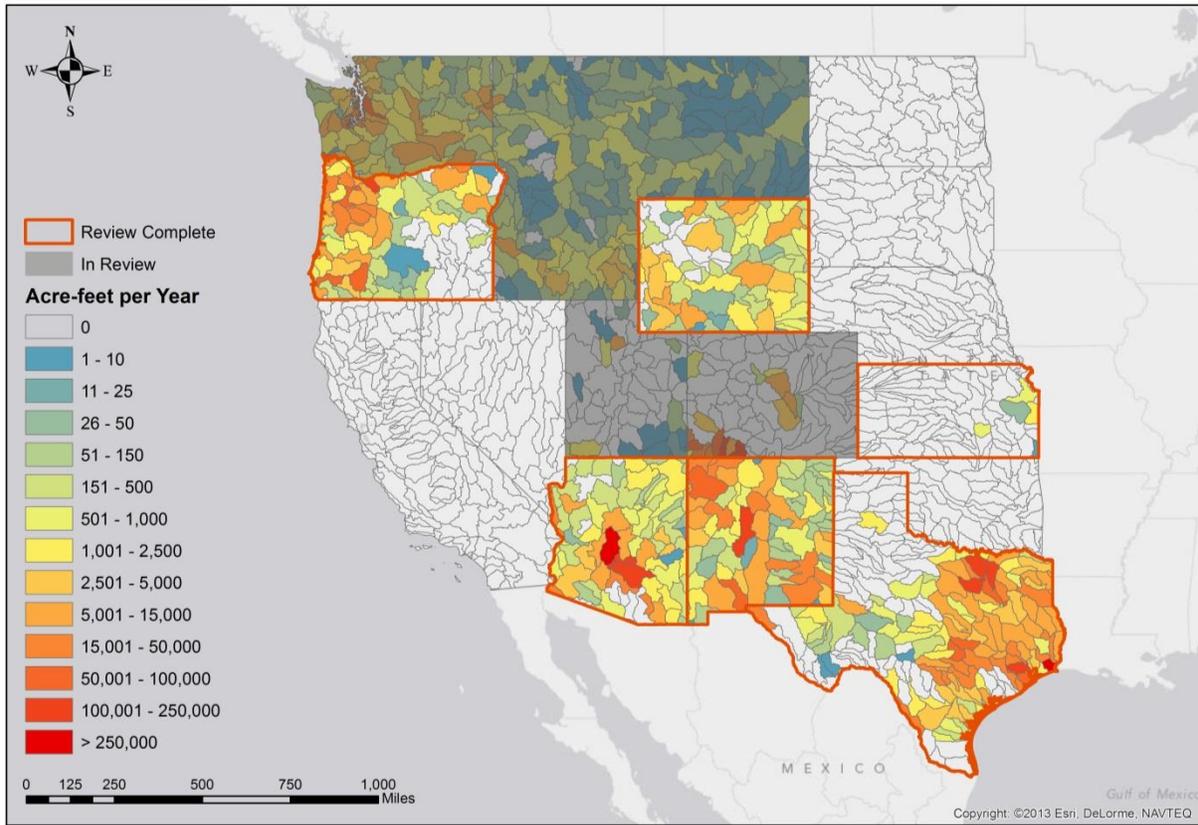


Figure 7 Unappropriated Surface Water Minus Change in Demand (above)

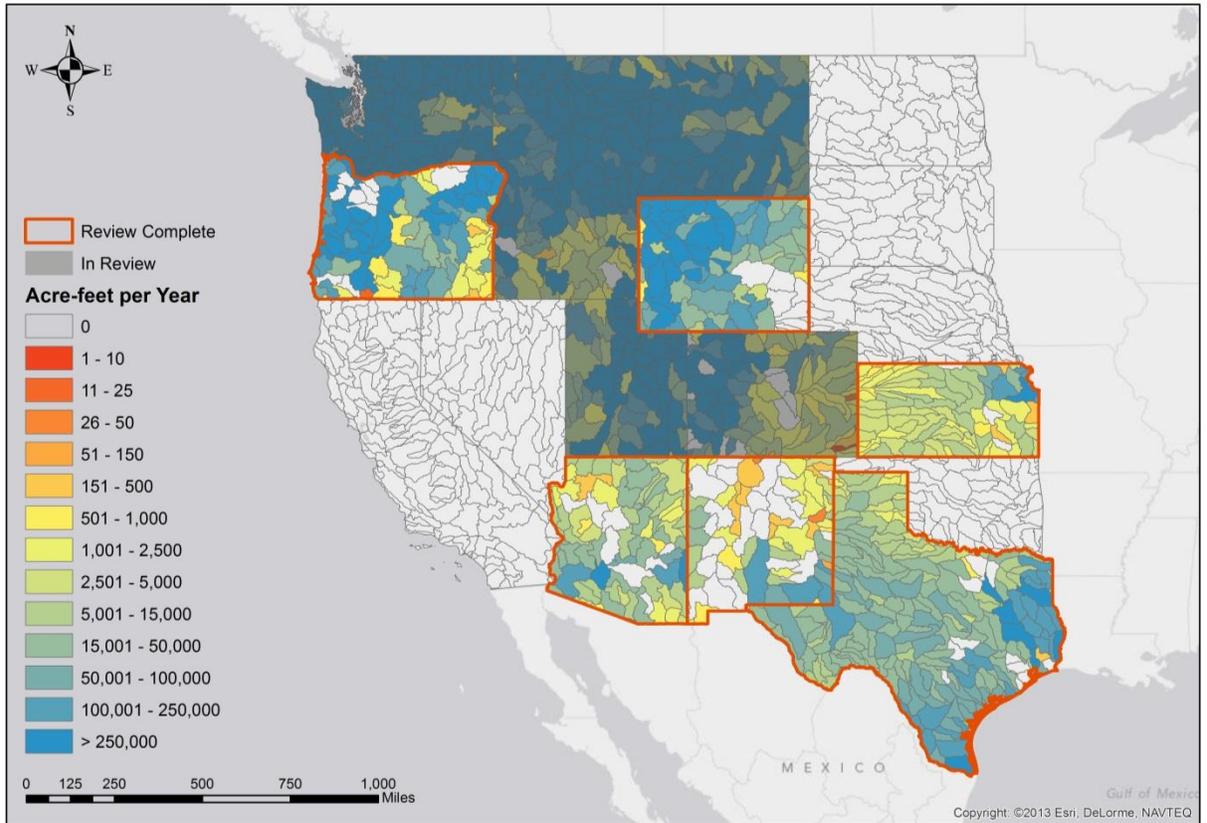


Figure 8 Total New Water Supplies Minus Change in Demand (above)

Tab J – WaDE Fact Sheets



▶ THE BIG PICTURE: WHAT IS WADE AND HOW WILL IT HELP STATES AND FEDERAL AGENCIES MANAGE WATER IN THE WEST?



▶ HOW DOES WADE DOVETAIL INTO FEDERAL WATER RELATED EFFORTS?



▶ 2012 WADE PROGRAM HIGHLIGHTS AND NEXT STEPS IN 2013—GETTING THE STATES PLUGGED IN

○ WSWC | ○ WaDE | ○ 2013



Western States Water Council

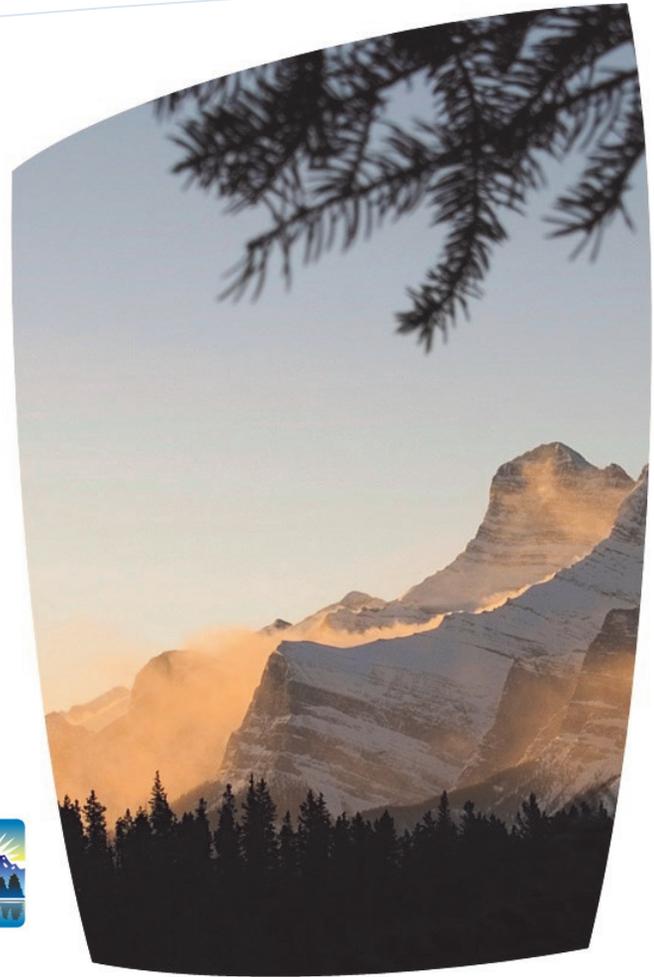
PROVIDING A FRAMEWORK FOR THE WESTERN STATES TO SHARE WATER DATA

The Water Data Exchange (WaDE) Program will enable the Western states to share important water data with each other, federal agencies and the public. It also seeks to improve the sharing of federal water datasets that support state water planning efforts.

WaDE: The Big Picture

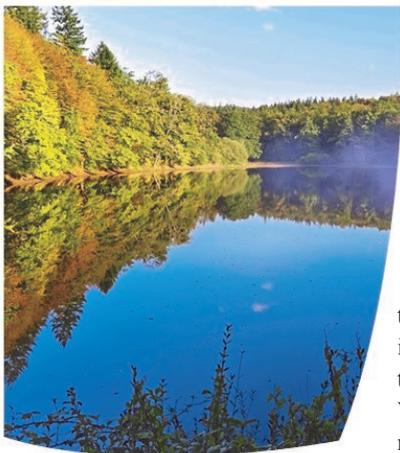
WaDE is a cooperative effort between the Western States Water Council (WSWC), representing the 18 Western states, the Western Governors' Association (WGA), the Department of Energy (DOE), Western Federal Agency Support Team (WestFAST), and the National Laboratories, led by Sandia National Laboratory. The focus of WaDE is to enable the states to share important water data (water availability estimates, water use by sector, and water allocation data) with each other, federal agencies and the public. This will enable the states to participate in answering regional and national questions about water availability, resiliency and scarcity in a cost-effective, repeatable and sustainable

way. WaDE is also interested in promoting and incorporating shared federal datasets concerning water management (streamgage data, snowpack and streamflow forecasts, reservoir storage and gage elevations, etc.) to assist the states, and make their water planning efforts easier.



WaDE and Federal Efforts

WaDE will allow for a comprehensive survey of the states' capabilities and the differences in water data programs, which will provide a clearer picture of regional water issues. WaDE will also begin to provide the data necessary for addressing many federal priorities. It can fit within the USGS Water for America Initiative's National Water Census, the federal Integrated Water Resources Science and Services (IWRSS) initiative, and continuing Department of Energy (DOE), Government Accountability Office (GAO), and Environmental Protection Agency (EPA) water studies.



2012 Highlights and Next Steps...

Much of the infrastructure for WaDE has been built, but the states also need to plug into the WaDE program for it to function as envisioned.

2012 was an extremely busy year for the WaDE program. Four workgroups were established to oversee various facets of project development. The State Capabilities Assessment group issued a survey to begin to gather information on the variability between the states' water data programs. A summary report will be published in 2013. The Methods group established a data schema for storing information about the methods used by the states. The Data Exchange Template and Data Exchange Methodologies groups worked to finalize the WaDE data schema (a formalized format for

the data) and to advise on the infrastructure and means of transferring the desired data. Version 0.02 of the WaDE schema is available for download and review at the WSWC website (see below). Outreach visits to vet the data schema and to garner support for the project were conducted with 14 of the 18 WSWC member states. These efforts will continue into 2013. Several infrastructure components were created or installed, such as a database server and web server for hosting the central portal. Databases for housing the data at the states were created, as well as the code that allows the data to be queried using a web service (live data link). A proto-type web

mapping interface was also built and demonstrated at the WSWC Fall Council Meeting in San Antonio, TX.

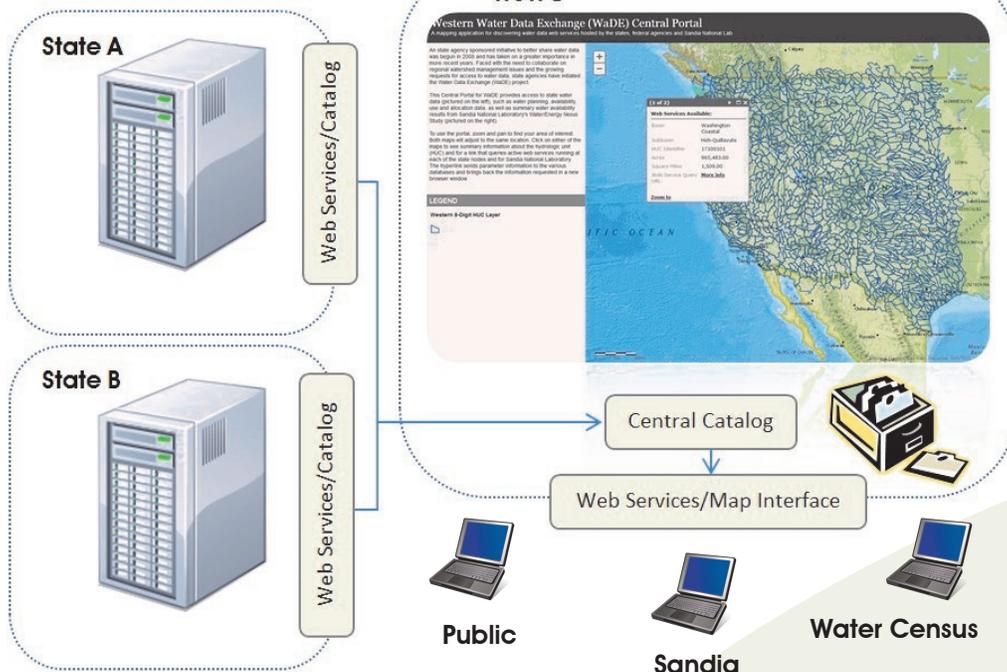
Lessons Learned during WaDE project implementation so far:

- States have varying degrees of sophistication for water planning and IT capabilities. Some gather targeted data and some do not.
- States are using different spatial/temporal scales, the data are not yet uniform.
- States currently have limited resources to do the local WaDE

A Distributed Approach to Data



- WaDE uses a distributed framework that relies on partners sharing data using web services (live data links).
- The data are housed at the states and remain under their purview.
- Datasets are discoverable using a central portal and a central catalog.
- Queried data are returned using eXtensible Mark-up Language (XML), which can be directly ingested into models and other products.



Working with Sandia National Lab

WSWC has also been working with Sandia National Lab on a study of water and energy transmission for the Western U.S. During 2012, Sandia developed a suite of water availability metrics, reviewing different water supply sources and estimating current and future demands by watershed. In 2013, WSWC will work with the state water agency staff members to thoroughly proof the estimates and methods that went into the Sandia metrics before they are made available to the public using a custom mapping application. This dataset will be useful to state and regional water planners and can be used as a screening tool by energy planners.

Western States Water Council

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<http://westernstateswater.org>



For more information about WaDE, contact Sara Larsen, WaDE Program Manager, saralarsen@wswc.utah.gov

PROGRESS REPORT

Awardee Name: Western Governors' Association

Award Number: OE0000422

Sub-Award Number: 30-230-70

Sub-Recipient: Western States Water Council

Project Name: Interconnection Transmission Planning and Analysis

Project Director: Tony Willardson

Date of Report: July 1, 2013

Period Covered (by the report): 01/01/13 to 07/01/13

Comparison of Accomplishments to Goals and Objectives: See attached.

Cost Status: Modified budget: \$ 353,445.00

Total sub-award funds received: \$ 183,979.10

Remaining unobligated balance: \$ 169,465.90

Schedule Status: See attached.

Changes in Approach: None.

Actual/Anticipated Problems or Delays: None.

Any Absence or Changes of Key Personnel: None.

Description of Product: Please see the enclosed for more information about program progress, schedules and deliverables. Also, detailed information can be found on the WSWC website (<http://www.westernstateswater.org/wade>).

WSWC/WADE PROGRESS REPORT

January 1, 2013 – July 1, 2013

The following answers correspond to the specific tasks for the “Resource Assessment and Interconnection-Level Transmission Analysis and Planning” grant project (the Project) as set forth in the WSWC Scope of Work, which is found in Exhibit A of WGA Contract Number 30-230-70.

Task 1(a): The Western States Water Council (WSWC) has continued to work with member states, the Western Governors’ Association (WGA) and Sandia National Laboratory to refine the state water data that Sandia has acquired over the past year (pertinent to subtasks 3.1 and 4.1 of the national laboratories’ scopes of work). In Spring 2012, the Sandia research team developed a series of water availability metrics that could be incorporated into long-term electricity transmission planning models. A multidisciplinary group of state and federal water agency staff assisted in the vetting of the preliminary water metric and these were then made available to the Western Electricity Coordinating Council (WECC) for incorporation into their models. The results of incorporating state water data into WECC’s models are pending.

Vince Tidwell, the Sandia principal investigator, presented the metric results to WSWC members at the 2012 Fall Council Meeting in San Antonio, TX. At that time, WSWC members expressed a desire to review the estimates more closely. It was proposed that using a mapping format would be an easier way to review the data and methods used to generate the metrics. To accomplish this, WSWC developed a Sandia Data Review online mapping application where state representatives can effectively review the metrics using a streamlined process. This mapping application is fully functional at this time and is being used by the state agencies to review the data. Six of the 17 states that comprise the study have finalized their metric estimates. Five are currently performing the review. As the review is a phased process and only allows four states to undergo the review at a time, it is anticipated that the remaining states will be able to complete their review by the end of July of 2013. After the data have undergone a thorough review, WSWC will import the vetted Sandia data into the WaDE databases catalogue for access using web services, and will also make the data available using a modified version of the developed mapping application. The Sandia mapping application is proposed to be served online as a subset application within the data portal that will be hosted by the WSWC for the WaDE project (see below).

In order to provide direct support for this effort, and to ensure the sustainability and repeatability of the Project, the WSWC has initiated an affiliated project to work with its member states to establish a framework that will allow for real-time access to state water allocation, availability, use, and planning data through a common portal. The project is referred to as the ‘Water Data Exchange’ or WaDE Project by WSWC staff and WSWC members. As a preliminary step, the WSWC has conducted an inventory of the states’ current water data practices and is putting together a draft document containing survey results. These are anticipated to be made available in July 2013. Also, to provide information and updates on WaDE, its schedules, workgroup meetings, and draft components, WSWC continues to maintain a webpage: <http://www.westernstateswater.org/wade>.

The WaDE project also involves several teams assembled to provide project governance, which are well documented in prior progress reports. These workgroups' efforts on WaDE have continued as needed through July 2013. Outreach efforts also continued through June, as Sara Larsen, WaDE Program Manager (and Dwane Young, WestFAST Liaison, during his earlier tenure), visited with states that were not originally in the project plan. To date, the project has added Kansas, Oklahoma, Nebraska, Wyoming, Montana, California, and Nevada for a total of 15 out of the 18 WSWC states. Project staff visited these states to provide a more thorough overview of the proposed WaDE data schema, identify individual state issues, and to enlist support for the project. Information gathered throughout the outreach phase of the project was reviewed in October, and the proposed schema was updated to reflect needed changes. These are now available under a version 0.2 nomenclature, and via the WaDE website under "Draft Items" (<http://www.westernstateswater.org/wade/draft-items>). Related to the outreach effort, WSWC was invited to speak about the WaDE project at the National Ground Water Association (NGWA) annual meeting in San Antonio, TX in May. WSWC staff was also invited to speak on both Landsat and the WaDE project at the Universities Council on Water Resources (UCOWR)/National Institutes for Water Resources (NIWR) annual conference in Lake Tahoe, NV in June. These invitations included the submission of journal articles to UCOWR's peer-reviewed journal on water data initiatives and management, which will be published in early 2014.

Several of the infrastructure components of the WaDE project were still under development during the most recent review period. Databases that reflect the proposed data schema were created using SQL Server and Postgres, while an Oracle database is pending. Software code was written that allows for the extraction of requested data from the databases using an internet browser and a pre-configured URL query – essentially turning the databases into live data links (also known as RESTful web services). During the early part of 2013, at the suggestion of Workgroups 3 and 4, the web service code was re-written to match the EPA's Exchange Network REST service specification. The recommendation of the workgroups stemmed from a desire to have a well-established, standardized URL format, both for integration into the Exchange Network (EN) dataflow (see sections on Exchange Network grant application) and also for increased discoverability. Several other modifications to the web service code were also made to accommodate recommendations of the Workgroups. Other tasks included updating databases to reflect the v0.2 schema and the creation of a flow configuration document (FCD), which serves as a map or set of guidelines for partners who wish to implement the WaDE node within their server environments. The FCD can be found on the "Draft Items" webpage (link above).

Some state water data and the water availability metrics developed by Sandia were also entered into one of the databases to assess their "fit" into the WaDE schema, and to serve as sample data for a WaDE mapping application prototype. This customized mapping application was built to access the WSWC web servers over the internet, make requests of the sample data, and return it to the user in a platform-independent format (XML), which is also human-readable, by incorporating coded stylesheets super-imposed over the returned XML. The component framework and the customized mapping application prototype capabilities were demonstrated to WSWC members at the 2012 Fall WSWC Meeting in San Antonio, Texas on October 10-12th.

During the outreach phase of the WaDE effort, a majority of state agencies expressed their support for the WaDE project and its goals of enabling easy, cost-effective, near real-time water data sharing. However, due to drastic budget cuts and a downsized workforce, they have expressed concerns about available resources. Many of the agencies have reduced staff sizes and can only address absolutely mission-critical tasks. To address this, the WSWC proposed to assist the states in finding funding to make the WaDE component deployment less of a burden on state resources. One option presented was the opportunity to partner on a grant application submitted to the Environmental Protection Agency's (EPA) Exchange Network (EN) program. This program typically allocates funding of approximately \$10 million each year for the states to establish environmental data 'flows' as data exchanges, similar to those proposed in the WaDE program.

Five partner states were selected – Texas, Oklahoma, Idaho, Oregon and Washington – to participate in the grant application. Each of the grant partners were asked to evaluate the WaDE deployment scope of work and produce a preliminary budget estimate, a letter of intent from their directors, and a schedule for accomplishing the various WaDE deployment tasks. Grant funds were also requested for the continuance of the WaDE program management position through the partner state effort timeline. Each partner state returned the requested materials, and the grant was submitted Nov. 9th, 2012. The grant proposal has passed the EPA's initial screening process and is currently under review. WSWC expected to hear of the awards of the EPA's FY 2013 EN grants in April of 2013, but due to sequestration and congressional budgeting delays, their announcements are also delayed. It is presumed that if WaDE were to receive funding, this would be dispersed in the late summer. Incorporation of the WaDE data schema as a primary data flow within the EPA would establish a vested interest in WaDE as a fully-fledged and rigorously documented web service within the EPA's existing data exchange framework. It is likely that, if WaDE is funded in FY 2013, that the EPA would continue to fund WaDE efforts in future years to encourage remaining states to 'plug in' to the project. Regardless of the EN governance board's decision for FY 2013, WSWC anticipates assembling another partnership grant application in late summer for FY 2014. While the results of the grant application are yet unknown, a similar interview related to the WaDE "Scope of Work" has been conducted with other states that have expressed an interest in plugging into the WaDE framework. The figures generated by these interviews and the EN grant application process have resulted in a wide range of estimated costs to the states, which vary depending on the current loads on their server environments and whether they have to purchase IT support from a centralized IT department, among other factors. More "Scoping" meetings will be conducted to assess the related costs for the states who wish to deploy the WaDE infrastructure in the coming year.

Also of note is the departure of Dwane Young, the second WestFAST Liaison to the Council. He was a primary proponent of the WaDE project and was heavily involved in its inception and development, as well as conducting workgroup meetings and outreach visits. His two-year tenure as Council Liaison Officer ended as planned on Oct. 31, 2012. He was replaced by Eric Stevens, an engineer from the Army Corp of Engineers. The nature of the WestFAST position is somewhat nonlinear in that new liaisons may or may not have the same skillsets/interests/objectives as their prior counterparts. Eric has opted to effectively transition the WaDE project to WSWC staff.

Task 1(b): The water demand and availability models discussed in Tasks 3 and 4 of the National Laboratories' Scopes of Work will accomplish these objectives. The WSWC has continued to assist Sandia in the development of these models and case studies. As indicated above, WSWC is developing an application where state agency staff members can review the data, methods and metrics generated by the Sandia research team in 2012, and provide them with feedback and requests for adjustments to the actual numbers, the methodology used, or the parameters used to make assumptions in Sandia's models. The team of state agency representatives WSWC put together at the onset of 2012 has been reassembled and expanded to review a new water metric for Sandia related to impacts of energy development on water for the environment. WSWC, Sandia National Lab, Argonne National Lab and the environmental metric team have developed a beginning "straw man" metric for these issues and anticipate publication of their results in the form of a mapping application, as a subset application to the WaDE project portal in late summer.

Task 1(c): In late 2011, Sandia completed an analysis of the potential impact of drought on electric generation availability for input into long term transmission modeling and planning efforts by the WECC and Electric Reliability Council of Texas (ERCOT). Sandia performed the study with support from Argonne National Laboratory, Pacific Northwest National Laboratory, and the National Renewable Energy Laboratory. The study responds to a request that the WGA developed with input from the WSWC and in conjunction with the transmission modeling teams and participating interconnections. (The final report can be found here: <http://energy.sandia.gov/wp/wp-content/gallery/uploads/Drought-Analysis-Report-Final.pdf>).

The study: (1) conducted a thorough literature review of recent studies of drought and the potential implications for electricity generation; (2) analyzed historical drought patterns in the western United States; (3) used the results to develop three design drought scenarios for further analysis; and (4) quantified the risk to electricity generation for each of eight hydrological basins under the three drought scenarios and considered the implications for transmission planning.

As part of the on-going National Lab efforts, researchers at the University of Texas – Austin have also performed an analysis of whether higher temperatures in climate change scenarios would impact the performance of energy generation facilities in Texas, due to regulations that govern the temperature of plant effluent. They found that several facilities included in their analysis would be impacted by higher ambient air temperatures if current operating restrictions were in place.

Task 1(d): See response to Task 3 below.

Task 2: Sandia is continuing to review and incorporate legal and institutional water availability into their metrics. They will use this data to develop a tool that will further refine the availability of water and identify what state-level water rights regulations are in place for surface water and groundwater, the extent to which water rights have been adjudicated, and what additional controls may apply. It may also identify which basins are closed to future appropriation and indicate what rules are in place for water transfers, among other things. The WSWC's Legal Committee workplan includes a project that will assist Sandia with this task and also WGA by preparing an analysis of legal and administrative issues

associated with new permits or transfers of water for energy development in Texas and the states of the Western Interconnection. In addition, WSWC will develop a mapping application that has the spatial extent of special management areas, groundwater management districts, etc., which will assist with evaluating areas where there are restrictions to further water development including for energy production.

Task 3: Throughout the course of the project, the WSWC will work to carry out the policy-related tasks set forth in Task 1(d) and Task 3, and review the status of Sandia's water data gathering effort discussed in the Task 1(a) response above. Some specific tasks are described below:

Task 3(a&b): WSWC assisted the WGA in carrying out a related project under a separate DOE grant that addressed the legal and administrative issues associated with the water-related impacts of concentrated solar energy development in the West. Although separate from the Project, this effort contributed to the WGA's efforts to evaluate energy and water needs. In December 2012, the WGA and WSWC published a report on water transfers as part of another separate effort with funding assistance from the Walton Family Foundation. Entitled, "Water Transfers in the West: Projects, Trends, and Leading Practices in Voluntary Water Trading," the report provides an overview of voluntary, intrastate water transfers in the West and identifies tools and policy options that states and other stakeholders can consider when working to avoid or mitigate adverse impacts associated with transfers, including ways to facilitate water banking and conservation. A WSWC report describing aspects of water conservation policy related to the prior appropriation doctrine is being contemplated in the WSWC's 2013 workplan for its Legal Committee. Both of these efforts will provide valuable information for evaluating the means of acquiring water for present and future energy needs.

Task 3(c): WSWC hosted a Water/Energy Nexus Workshop the day prior to its Spring Council Meeting on April 2nd, in Denver, Colorado. This meeting was held to convene water managers, electricity generators and regulators to serve as an information exchange and to evaluate how electricity and water providers can better coordinate and integrate their planning activities. The workshop was attended by approximately sixty participants in person and another ten attendees via webinar. A summary of the meeting and the initial discussion results and recommendations has been published and can be found on the WSWC website (<http://www.westernstateswater.org/wswc-wga-waterenergy-symposium-april-2-2013-denver-colorado/>), as well as other meeting documentation and presentations.

Task 4(a): WSWC Executive Director Tony Willardson serves as an alternate to the State Provincial Steering Committee (SPSC) and a member of the Environmental Data Task Force (EDTF) and has participated in various meetings during the reporting period. The WSWC will continue to coordinate with the SPSC and EDTF throughout the duration of the Project.

Task 4(b): The WSWC's Water Resources and Energy Subcommittee, under its Water Resources Committee, will continue to assist the WGA and the national laboratories in developing the water demand and availability models discussed above. Dennis Strong, Director of the Utah Division of Water Resources, is the Governor's appointed representative and current Chair of both the Committee and the Subcommittee. The Subcommittee consists of other appointed WSWC members and water managers

from Arizona, California, Idaho, North Dakota, Texas, and Wyoming. Among other things, the Subcommittee has continued to work with Sandia to develop and carry out the concept for the models and the data gathering effort discussed in Task 1(a). It will continue to assist Sandia in the development of the models and other related efforts throughout the duration of the Project.

WSWC – WGA Energy-Water Nexus Workshop

April 2, 2013 – Denver, CO

The Workshop Scope, Goals and Outcomes

The Western States Water Council (WSWC) and the Western Governors' Association (WGA) co-sponsored a workshop on water and energy nexus topics pertinent to water and energy planners, and utility managers on April 2nd, 2013, in Denver, Colorado. The intended audience of the workshop was a diverse group of energy managers and interests, water district managers and interests, researchers, and environmental stakeholders from private, public and the academic sector. The purpose of the workshop was to present new information on water/energy research being conducted throughout the West and across the nation, that was thought to be helpful and informative to the attendees. The workshop was also intended as a forum for examining topics that the Council or WGA could review for emphasis when making recommendations to the western states' governors. For example, topics covered by the speakers and the breakout sessions included, but were not limited to: water used for energy extraction, different energy supply sources, renewable energy development, water use trends and emerging technologies, new tools for quantifying resource risk, innovations in data sharing, and programs for taking an integrated approach to energy and water resources for statewide water planning efforts.

The workshop was attended by approximately 60 people in person. An additional 10 attendees participated via webinar, for a total of approximately 70 attendees. The invited speakers addressed a wide range of topics, and were able to provide a significant update on the status of water-energy nexus research being conducted. A latter portion of the workshop was reserved for breakout sessions, where attendees would be able to answer questions (either provided to begin discussion or self-selected), and give feedback on what they'd heard during the presentations. These were moderated and directed by group moderators, who summarized the groups' discussions and "reported back" on the results to the other attendees at the end of the workshop.

Speaker Summaries

The workshop began with remarks from Tony Willardson, Executive Director of the WSWC. He welcomed the workshop participants and explained the origin of the workshop and its intended scope and goals. Tom Iseman, the Water Policy Program Manager at WGA, also made remarks on his agency's interest in and support of ongoing water and energy nexus research being conducted. He anticipated hearing more about these efforts, and then hearing the thoughts of the participants during the workshop breakout sessions. Tom then introduced the keynote speaker for the workshop, Commissioner Jim Tarpey.

Commissioner Jim Tarpey, Colorado Public Utilities Commission – Energy and Policy Perspectives on Water in the West

Jim Tarpey began by discussing the regulatory process for the Colorado Public Utility Commission (PUC) and its relationship to other major utilities. He reviewed the statutes within Colorado that relate to public utilities, and the two specific statutes that would relate to water and energy nexus

topics. One observation of interest presented by Commissioner Tarpey was that the Colorado PUC is recognized under Colorado's state constitution, as opposed to creation by statute, which gives them the ability to address issues akin to the state legislature. If the state legislature leaves a perceived gap in addressing an emerging issue, the PUC can work to fill those gaps. Commissioner Tarpey described the traditional approach of the PUC for evaluating proposed energy projects, indicating that a cost/benefit approach was used where least economic cost was typically the main criteria that led to new projects. This process was used until the mid-nineties. At that time, Colorado PUC began looking at projects with a new approach that viewed energy development from a portfolio perspective, and considered a wider variety of factors for new development. The Colorado PUC now considers such things as 1) whether the project promotes the development of rural economies; 2) whether the project minimizes water use; 3) whether the project diversifies Colorado's energy portfolio; 4) whether the project reduces the impact of volatile energy pricing; and 5) whether the project improves Colorado's natural environment. Commissioner Tarpey emphasized that debate amongst the interested parties is a good thing, and that the Colorado PUC would like more entities to become involved in the planning process.

Brad Nickell, Western Electric Coordinating Council (WECC) – Incorporating Water into Long-Range Electricity Transmission Planning

Brad Nickell began his presentation by describing the organization of WECC, from the utility level to sub-regional to the interconnection level. The Transmission Expansion Planning Policy Committee (TEPPC) is the governing body of the planning community within WECC, and is charged with building infrastructure such that the system works now and well into the future. This includes compliance monitoring and enforcement when necessary, as well as managing the planning process and standard development, which are brought through various committees. WECC is focused on public policy directives that influence the energy industry, and pulls together state and federal policy for this sector. WECC has the capability to help coordinate the aggregation and dissemination of datasets that are important to long-range transmission planning. They also provide a forum for facilitation and discussion between stakeholders. Water has always been an issue for energy generation planning, but had never been incorporated as a specific modeling parameter until now. Mr. Nickell discussed the scenarios that WECC was reviewing for the coming decade, into 2022. He estimated that 60% of WECC's portfolio at that time would use water for cooling processes and that, even though this was still a relatively small piece of the "water use pie," it was important because energy generation is one of the fastest growing consumers of water. WECC conducts long-range planning and this is where the new water data from a study by Sandia National Lab would be applied. Models show that there is an incremental increase in water usage, and importantly, places where they are running into water availability limitations are in renewable energy zones and major gas-trading hubs. Their models also look at different cooling technologies such as wet versus dry, and what kinds of tradeoffs that result in terms of geography and climate. Mr. Nickell discussed the opportunities presented by WECC's collaboration with Sandia to evaluate water supply sources and cost to develop those sources. Some of the data have been incorporated, while some are still too politically sensitive to ingest into models. He indicated there is a need to take advantage of these collaborative opportunities and leverage them, such that there is increased confidence and reliability in their long-range planning models.

Paul, Faeth, CNA Corporation – Policy Analysis for the Energy-Water Nexus at the Electric Reliability Council of Texas (ERCOT)

Paul Faeth first discussed what kind of entity CNA is, and its role in water and energy planning for ERCOT. CNA is a private, non-profit company that conducts research studies, including work on the energy-water and climate nexus. The study presented at the workshop was funded by a regulatory assistance project focused on helping public utility commissions address water issues. CNA evaluates the results of these studies and has the ability to incorporate water into them. CNA models included 19 different energy generation options and a wide variety of policy scenarios, which were extrapolated out to a 30-year horizon, given fixed costs for certain model parameters (capital and fuel costs). The results from the models will be published in May or June of 2013. A site specific example, the population in Texas is estimated to grow by 4 million people every 10 years, and power demand is project to increase up to 73%. Projections also suggest that wind costs will decrease by 25% over the same timeframe, but CNA models look at both the decrease and no decrease in wind cost scenarios. They also incorporate other policy issues such as a carbon tax or cap. Mr. Faeth presented the baseline scenario as well as several other permutations of the CNA models for the ERCOT region to show what effects these might have on water withdrawals and on carbon dioxide emissions. The takeaway message from the models is that a decrease in the cost of wind would result in a baseline scenario that is favorable to both water consumption and carbon emissions.

Vince Tidwell, Sandia National Laboratory – Energy and Water in the Western and Texas Interconnects

Vince Tidwell, the principal investigator for a major water-energy nexus project funded by the Department of Energy, presented some background information on their study. He discussed the project's goals and how they were working with WECC and ERCOT to supply comprehensive data for their long-range transmission planning (a horizon of 20 years). He presented data on the water consumption factors for various electricity generating technologies, and gave an example of the spatial water consumption factors for coal facility water use (i.e. how local climate can impact water use by the same energy generation technology). He also discussed the climate component of the study. This portion evaluates climate variability, drought scenarios and changes in water demand. This portion also looks at the vulnerability of power generation systems due to lowered lake levels and thermal effluent temperatures. Results indicate that a single year drought (using the drought of record – 2011) would not significantly alter operations, but that multiple year droughts would have some impact on Texas' energy generation. The effluent limitation analysis suggested that operations would be very near their thermal limits in future summers. Mr. Tidwell also presented on a series of water availability metrics that were developed by his research team and a volunteer team of water experts. The metrics included different water supply sources (appropriated and un-appropriated surface water, potable and brackish groundwater, and wastewater reuse), as well as current and future water demand trends. Much of the data was taken from state water agencies via direct interaction or from online sources. These metrics, as well as associated cost for development, were aggregated to an 8-digit hydrologic unit code (HUC) scale to provide a more comprehensive and comparable dataset on water availability and cost across the West. When comparing new water supply sources to the projected change in demand by sector, it was found that just developing un-appropriated water supply sources would not be sufficient to meet

demand, but that use of the entire water supply portfolio would meet water demand in most locations. Mr. Tidwell summarized several other facets of the study efforts, including a metric for environmental limitations to water supply development, water for fuel extraction, an energy for water provision calculator, and a water data exchange where the Sandia data would be able to provide their results and access the latest planning data available from state agencies.

Jeanine Jones, California Department of Water Resources – Ongoing Energy/Water Research in California

Jeanine Jones highlighted California's long history of planning for energy and water. In the past, these were not coordinated efforts, but the acknowledgement of climate change impacts resulted in new initiatives to force coordination between the resource planning agencies. State legislation was passed in 2006 that mandated reduction in greenhouse gas (GHG) emissions; in particular, the 2005 Governors' executive order to create a climate action team (CAT), resulted in the creation in a number of "kittens," – subcommittees named RCAT and WETCAT. California became very interested in embedded energy because of a discussion about how much was needed for the movement, treatment and use of water in the state. This high energy use is exacerbated by climate change due to an increase in water demand, and also the energy demand for other parts of the water supply and use cycle, such as groundwater pumping. Snowpack is projected to decline at mid-elevations, which also increases vulnerability. California's Department of Water Resources is the largest energy consumer in the state. Ms. Jones discussed the Public Interest Energy Research (PIER) Program, highlighting their significant contribution to the research surrounding water-energy nexus topics, and indicating that they have been replaced with a new program known as the Electric Program Investment Charge (EPIC). She then discussed some of the new requirements for formal planning within the state for energy and water development, including recommended actions addressing water use efficiency, water recycling, water system energy efficiency, reuse of urban runoff, increased renewable energy production and a public goods charge for water. Ms. Jones also highlighted some of the benefits of state interagency research coordination, such as reduced duplication of effort, standardization of global climate models and emissions storylines used for state planning programs, and facilitation of program implementation.

Eric Evenson, US Geological Survey (USGS) – Federal Perspectives on the Nexus: A Water/Energy Partnership

Eric Evenson began his presentation by pointing out that water and energy are two parts of a three-legged stool, which also includes food production. He suggested that agricultural production should be included when discussing the nexus. USGS would like to better understand the fluxes of material between each, but it would require a level of detail for water use data that is not currently possessed. He discussed USGS' efforts to quantify how much water is used by the thermoelectric power generation sector, including both withdrawals and uses, categorized by fuel type and cooling technology employed. USGS is working with the Energy Information Administration (EIA) to address recommendations made by the Government Accountability Office (GAO) concerning these trends. These efforts also include developing a process to involve stakeholders to improve data collection and dissemination. Their current research elucidates patterns related to withdrawal amounts and cooling type that vary by geography. The East Coast is dominated by a pattern of once-through cooling, while

saline water use dominates along coastal areas, and closed loop plants are more prevalent in the West. The overall budget for plants in the continental U.S. is dominated by once-through cooling. However, from a consumptive use standpoint, cooling towers have the greatest consumptive use, with recirculating ponds playing a lesser role.

Doug Larson, Western Interstate Energy Board (WIEB) – Water and the Western Interstate Energy Board

Doug Larson began his presentation by describing the role that WIEB plays in energy planning for the West. They are planning for load growth, and the West has some of the best solar, wind and geothermal energy potential. He also discussed the role of coal, which is inexpensive but in decline. Many coal plants are faced with major retrofits in order to comply with air quality regulations. With regard to water, a lessening of coal as energy generation fuel will reduce water needs in the West. Natural gas is more flexible, and can be located in urban areas with transportation infrastructure. It is also more easily ramped up and ramped down. Mr. Larson also discussed new generation capacity that will be coming online in the next decade, stating that the portfolio presented is a result of a mix of variables that include cost, state policy and resource flexibility. Renewable energy is also expected to increase, most of which is driven by state renewable portfolio standards (RPS) requirements. Within the solar arena, the two available options vary with respect to water resources – photo-voltaic (PV) solar requires very little water, while concentrated solar power (CSP) uses more. A technology to look into with respect to the water sector would be dry-cooled CSP technology. Mr. Larson indicated that the electric sector could benefit greatly if better water information were available.

Richard Belt, Xcel Energy – Long-Term Water Strategies for Energy Utilities

Richard Belt presented on water and energy nexus issues related to a local energy utility, reminding the audience that all water issues are inherently local. He reviewed the projected breakdown of uses for the state of Colorado in 2050, pointing out that, of the 3% projected to be used by self-supplied industries, only 50% was used by thermoelectric energy generation. There are many strategies that can be employed by local energy providers concerning water supply. Xcel uses a “little bit of everything” approach to diversifying its water portfolio. These strategies include the procurement of direct flow water rights/storage, self-supplied or contract supply, native basin and trans-basin diversions, and recycled wastewater. Xcel focuses on supply integration and on maximizing supply flexibility. They are also focused on increasing their engagement with stakeholders and water providers. Some strategies employed with regard to drought include cooperative agreements with both the municipal and the agricultural sectors. These can consist of contracts, trades, “unique” arrangements, interruptible supply, and use of recharge credits. Mr. Belt presented on Xcel’s water stewardship program, which addresses plant process improvements and greater incorporation of water reuse. It also includes reviewing new technologies surrounding water use, such as combine-cycle gas generation, hybrid cooling, wastewater recycling, incorporating renewables into their portfolio, and demand side management.

Jordan Macknick, National Renewable Energy Laboratory (NREL) – Energy Production and Water Use Trends

Jordan Macknick began his presentation with a visual review of historic water withdrawals by sector from 1950 – 2005. The graph presented illustrated the dramatic rise in withdrawals for the energy sector over that time span. Energy-water nexus research conducted at NREL has been to quantify both the operational water consumption and the operational water withdrawals necessary for each of the major subgroups of energy generation technologies. NREL has also conducted research on the implications of generating electricity based on various combinations of energy types, from an energy portfolio that had a heavy coal composition, including carbon capture and sequestration, to that with a phase-out of coal to a higher percentage of renewable technologies. This evaluation also broke the projected water use down by 18 different regions across the US. A life cycle analysis (LCA) of water use by major groupings of energy generation was also presented. LCA takes a “cradle to grave” look at the costs or impacts of a specific technology or policy. Mr. Macknick discussed specifically the water use of shale gas extraction during hydraulic fracturing, explaining its variability, but generally less than what is required for operations. He presented a comparison of shale gas wastewater management trends, which indicate that there is a trend away from surface water discharge in Pennsylvania, while that trend is reversed in Colorado. He summarized his talk with a restatement of national trends toward a more constant rate of withdrawal over the past 30 years, and by suggesting that these withdrawals and uses may change depending on various regional factors and the fuel systems and cooling systems chosen.

Jessica Shi, Electric Power Research Institute (EPRI) – Innovative Water Saving Technologies for the Electric Power Sector

Jessica Shi began her presentation by discussing the role EPRI plays in sponsoring innovative technology development through their Water Conservation Program. She provided background information for, and a breakdown on, the membership of EPRI. The Water Conservation Program was initiated in 2011, and seeks to develop “out of the box,” game-changing cooling and water treatment ideas with a high potential for water conservation. Their first collaborative round resulted in 114 proposals and several white papers, solicited from national and global collaborators and from all EPRI sectors (environment, nuclear, generation and power distribution unit). Ms. Shi provided several examples of project proposals that had the potential to save significant quantities of water that were currently under investigation. These ranged from the effects of reducing condensing temperature on steam turbines to increase efficiency, to heat absorption by nanoparticles added into a coolant during the cooling phase of energy production. Several other potential projects were presented that dealt with hybrid dry/wet cooling, reverse osmosis membrane self-cleaning techniques, and the integration of membrane distillation and use of degraded water supply sources to decrease the use of potable water. Ms. Shi also discussed the details of an upcoming joint solicitation that will be issued by the National Science Foundation (NSF) and EPRI, before summarizing their joint efforts to date.

Robert Goldstein, Electric Power Research Institute (EPRI) – WaterPRISM: Water Availability and Resource Risk Management

Robert Goldstein presented on WaterPrism, a new decision support framework for managing water resource risk. Drivers for the development of the WaterPrism tool include electric power reliance on water resources, the need to manage environmental, regulatory, reputational and financial risks, and

the need to establish a roadmap to sustainability given the complexities of water/energy systems. The design of the software includes data on the available surface water and groundwater storage for a given watershed, as well as population, demand, and land use data. The combination of these supports a regional water balance that compares the projected water demand with the available water. The tool's functionality has been demonstrated by two pilots in the Green River Watershed in Kentucky, and the Muskingum River Watershed in Ohio. The datasets required for the runs were gathered and some demand management strategies were incorporated into the scenarios. The interface has the ability to show the savings of each strategy over a business-as-usual (BAU) baseline. It can also show the impact of decommissioning power plants that are less water efficient and conversion to other energy generation supply sources such as natural gas. WaterPrism allows the modeler to look at scenarios as they are evolving, and provides localized, fine resolution decision support.

Sara Larsen, Western States Water Council (WSWC), WaDE: A Water Data Exchange for Energy/Water Utility Planners

Sara Larsen first described the water/energy nexus work being conducted by Sandia National Laboratory, emphasizing the difficulty that the Labs had gaining access to and aggregating state water data. At the same time, the WGA and WSWC began discussing the possibility of sharing data between the states. State water planning data contains flow records for streamgages, water supply budgets, estimates of use, physical and legal availability and allocation data. These data collection efforts and estimates reflect local knowledge. States want their data to be published, so they agreed to initiate the Water Data Exchange (WaDE) project as a means to do so. WaDE's goal is to enable the states to start sharing water data with each other, the public and with federal agencies, while also encouraging federal partners to adopt standardized data schemas and publish relevant datasets using web services. Ms. Larsen explained how the WaDE framework was distributed so that the data remain at the state hosts' sites instead of transferring databases back and forth. Data are returned in an interoperable format using XML and REST-based web services. It will provide important water planning data estimates. Some data are gathered by the states, some are not, but the schema is something that the states can work toward. The states will continually be asked to answer national and regional questions about water availability and uses in the future. Participation in WaDE allows the states to be proactive about publishing their data to a variety of partners.

Nathan Morris, Nebraska Department of Natural Resources, INSIGHT: Integrated Water Resource Tools

Nathan Morris presented on Nebraska's new INSIGHT program, which is short for Integrated Network of Scientific Information and Geo-Hydrologic Tools. He described the purview of the Nebraska Department of Natural Resources as overseeing surface water rights, while the natural resource districts that cover the state administer groundwater. INSIGHT will integrate a variety of data and provide a centralized comprehensive set of records to support management decisions for Nebraska and broader efforts. The final product will use a mapping format, which will make the information easy to access by the public and other stakeholders. These will benefit by having access to data about water uses, demands and available supply. INSIGHT information is integrated and published used three primary mechanisms: the data management framework, the web-mapping framework and a web interface for

data viewing and retrieval. The viewing interface will be a combination of looking at information for each basin of interest, including pictures and a summary of the water supply sources and uses, as well as a timeline of that supply and use over many years for a longer perspective. INSIGHT is undergoing testing, and will likely be complete in July of 2013.

Breakout Session Summaries

After the presentations, the attendees were subdivided into groups for a breakout/discussion section to be held in an adjacent room. Each group had a moderator assigned to them and was given four questions to get their discussion going. If none of the questions were of interest to the group, they could propose a question and answer that instead.

Yellow Group – Questions and Answers

Yellow group was moderated by Tom Iseman of the WGA. His group selected three questions to answer. Question One: What data are still needed for energy and/or water planning? The group expressed the need for water availability data that is inter-seasonal, spatial and for a variety of water supply sources, including definitions of water availability related to physical, legal, political, social and environmental factors. It was suggested that some of this data is available, but that they need to be more timely and comparable between areas or regions. This may include cost information about the water, and could encompass a life-cycle analysis of different sources and their impacts on other sectors. Some regions have more pressing issues related to water availability than others. Question Two: How does energy development planning in your region impact the water sector? For some group members, a concern is the movement of water from the agricultural sector to the energy sector. There is a need to consider feedback loops, and the local economic and demographic changes caused by this transfer of use. There is a need to determine the amount of water used for new technologies of energy extraction and if there is a trend toward increasing use. Question Three: How is lack of data (for either energy or water activities) a constraint to good planning? This depends on the state doing the planning. A question was posed about what the drivers are for starting to include certain types of data into a planning process. This could be either a crisis or a proactive approach to a perceived emerging issue. Sometimes it's not a lack of data that is the problem but a lack of being able to find the data. They need to be centralized, comparable, and easily accessed.

Green Group – Questions and Answers

Green group was moderated by Vince Tidwell of Sandia National Lab. His group selected three questions to answer. Question One: Is there (enough) interaction between energy and water planners? The group used examples of water and energy groups working jointly on projects to demonstrate some instances of cooperative planning (i.e. Colorado Water Resources and Xcel Energy, Pacificorp, Manitoba Water Works and hydropower operations). The group looked for more opportunities for collaboration between the two resource groups, noting that many of these instances for cooperation were a result of environmental or endangered species concerns. Question Two: What are some of the most important energy/water models and data that are being used by energy/water resource planners? The group cited several instances where models were used to answer water/energy related questions, such as watershed models to prove up water rights, or decision support systems for evaluating new developments. Forecasts for streamflow and climate models are being incorporated into hydropower

operations and environmental regulation for use on different time frames. The group noted some gaps in modeling tools include a linkage between hydropower with broad power dispatch modeling, and with more variable renewable energy sources. There is also a lack of incorporation between each resource group (i.e. water only recently being integrated as a parameter or constraint to planning, energy use planned into water development, etc.). Question Three: What are some of the main issues with energy used for the water supply and consumption cycle? In many cases, a lack of good data is a primary constraint to identifying issues with energy used for water provision, despite energy cost being a significant factor in overall operating budgets. Using renewables to power water provision provides an outlet from the negative feedback loop created by increasing energy use for water provision.

Blue Group – Questions and Answers

Blue group was moderated by Tony Willardson of the WSWC. His group worked to address two their possible questions. Question One: Concerning water/energy efficiency and conservation, what are some of your strategies? The group specified several options for both energy and water demand side management strategies. Education and outreach were seen as very important to establishing more of a conservation ethic related to both resources. Some regions facing scarcity may need to mandate some level of water conservation, or simply adopt new water-related regulations (i.e., watering lawns only at night). It was suggested that pricing water in such a manner that encourages conservation was a very effective strategy. Question Two: What is your organization's vulnerability to extended drought? Energy providers are vulnerable to drought in terms of their water available for withdrawal for cooling at the facility, as well as by regulation of effluent temperatures. Energy producers do have options during a drought, which include paying agricultural irrigators to fallow their fields, or purchasing/leasing senior water rights. In this manner the agricultural sector acts as a buffer during extreme drought years. States also have the right to exert emergency measures for either sector in extreme cases of drought.

Red Group – Questions and Answers

Red group was moderated by Nathan Bracken of the WSWC. His group focused on one question that was of import to the group. How can energy planners take long-term drought or climate change into their planning? The group felt that energy planners needed to be proactive about addressing this issue. They would need to consider cross-boundary impacts, and the drivers of the drought/extreme weather. Group members desired to see agencies plan for the extremes of their forecasts instead of averages. This could include new approaches for determining what those extremes are. FERC relicensing processes could include and work to address climate change impacts. Increasing energy portfolios to include more drought resilient sources of energy (such wind, photo-voltaic solar, and small-hydro) was also an option. Multi-scale planning would be needed – working from local to regional to national levels. New technologies that conserve water should be fostered, while other cooling technologies that have more intensive water use could possibly be limited. Establishing a framework and encouraging the use of water markets could also provide additional flexibility in the face of a prolonged drought or climate change.

Conclusion

After the breakout/discussion session, the groups' moderators and the participants met back in the conference room to report on the answers to the questions they had discussed. Each moderator

explained their questions and answers to all other participants. Tony Willardson also discussed the “next steps” to be taken by the WSWC with regard to publishing the results of the current workshop, and the need for continuing a dialogue about energy and water in the future, with the possibility of conducting more workshops that built on the information gathered that day. He commented on the breadth and depth of the topics and research that had been presented by the speakers that day. He also noted that the breakouts had provided much needed insight and some excellent suggestions for further inquiry.

WSWC-WaDE State Water Planning Program Assessment

Executive Summary

Whether addressing population growth, national security, drought, climate change, or meeting our growing energy needs, questions surrounding water availability in the West will only increase and become more important in the coming years. The Water Data Exchange (WaDE) is a project initiated by the WSWC, in cooperation with the Western Governors' Association (WGA), to assist state water agencies to answer these kinds of local and national water availability questions more easily and at a lower cost, by enabling the exchange of water planning and use data. The goals of the project involve establishing a governance structure, evaluating current capabilities and methods used, and designing a common format that specifically targets the desired data. The Water Information and Data Subcommittee, which directly oversees the WaDE project, agreed to create four workgroups to lay the groundwork for the development of the data exchange. The State Capabilities Assessment Workgroup was charged with the task of evaluating the current capabilities of the western states with regard to their water planning and water rights/permitting programs.

In order to build the framework for the data exchange effectively, a better understanding of how the states collect, generate, manage and share data was needed. To assess this, a survey was sent to each of the relevant state agencies. Some questions addressed policy and planning tasks, while others covered data management. The survey was divided into questions addressing four topics: surface water data, groundwater data, data management, and methodology. The survey was distributed in February and collected through the summer of 2012. Fourteen of the 18 WSWC member states responded to the survey at that time. Some states described their programs in great detail, while others were brief. This document attempts to summarize those responses and explore the similarities between state programs, finding points of overlap. It also serves to highlight several differences in program approach that may pose a challenge to regional analysis and comparison of planning and permitting data.

The results of the survey were assembled and a summary table of the primary data available from each state program was generated (See Table 1 – attached). Commonalities between the state programs include the following:

- Most of the states are managing and maintaining streamgages and streamgage data. Many also rely on the USGS streamgage network as an important component to their water supply planning and water permitting processes.
- Many are managing and maintaining some groundwater monitoring/elevation data.
- All states manage their water rights and permitting using an enterprise-level database management system, with some information available in a geospatial format (such as points of diversion or places of use).
- Generally withdrawals/diversions are tracked (and some consumptive use), and some states have the ability to summarize these types of data by a geospatial unit and/or by beneficial use.
- Most states that have basins, aquifers, or regions that require special management or institutional/legal restrictions are generally maintaining these in a database/geospatial format as well.

The table also reveals differences in the state planning program data and identifies data gaps that pose a challenge:

- Some states have water supply and demand documentation for specific areas of the state. However, these are not typically generated for the entire state on a repeating basis. Also, as they are usually published as a report on the state's website – the data are not often stored in a database.
- Most states do not summarize water availability by basin using either a legal definition (i.e. appropriable water within the basin), or an estimate of physical water supply (i.e., a water budget for the watershed to determine inputs, yield and outflows). However, some states do analyze water availability as part of their permitting process and these are generated on an ad hoc or site specific basis. Repeated summary of water availability by basin/aquifer is a desired outcome for decision support; therefore, the lack of data and a specific definition of the term “water availability” constitutes a challenge for analysis.
- Most states track allocations and diversions of their waters, but do not have a statewide program for tracking consumptive uses or return flows. Some states do have extensive programs for estimating consumptive use, especially in areas that require additional oversight or data specific to a beneficial use category. For example, they may have robust estimates for agriculture, but track domestic use to a lesser degree. Very few states have comprehensive statewide programs. This adds a degree of uncertainty for estimating current and future demands for water as well as future availability. Water use is also one of the important components in the USGS' approach to the National Water Census program, and has been identified by USGS as a significant data gap.

Another challenge when reviewing state water information is variability in the spatial and temporal scale used for estimating and publishing data products. Some states summarize information on a large basin scale, while some work at a much finer resolution. Some states use customized basin delineations that are altered to account for administrative functions, such as a basin that is curtailed at a county boundary, etc. This presents a challenge to users who wish to see a regional synthesis of water data on some comparable scale (such as the USGS National Water Census goal of providing water budgets at a HUC-12 resolution). Also, some states publish their data by month, some by water year (Nov. 1st – Oct. 31st), some by calendar year. The current WaDE schema supports a wide variety of reporting for both spatial and temporal scales, including custom delineations. However, a regional analysis of similar types of data will remain disjointed unless the states find a way to incorporate a common basin/time scale into their current workflows or develop a translation function for the desired output. Similar issues exist with comparison of data products between states that use distinctly different methodologies. An example would be a comparison of Utah and Idaho consumptive uses data, where one uses a statewide land-use survey and the other uses Landsat remotely sensed data as a basis for calculations.

Regarding data management, all states surveyed use an enterprise-level database for storing and manipulating some of their data. About two-thirds of the states use Microsoft SQL Server, almost all others use Oracle. Some relevant data are maintained in Microsoft Access and/or Excel. Most states also use .Net as their preferred software application development platform, and the remainder use Java and Python, or a combination of platforms.

Table 1. State Water Program Capabilities Assessment Survey - Available Data Matrix

STATE	Water Supply Measurement Data				Summary Level Data (Data summarized by HUC, County or Custom Delineation)							
	Streamgage Data		Groundwater Monitoring Data		Water Availability		Withdrawals or Consumptive Water Use		Derived Water Supply		Regulatory Summary	
	Maintaining? Managing?	In a Database/GIS?	Maintaining? Managing?	In a Database/GIS?	Estimating?	In a Database/GIS?	Estimating?	In a Database/GIS?	Tracking?	In a Database/GIS?	Tracking?	In a Database/GIS?
AK	Yes	Yes	No	No	No	No	No	No	No	No	No	No
AZ	No	No	Yes	Yes	No	No	Yes (partial)	Yes	No	No	Yes	Yes
CA	Yes	Yes	Yes	Yes	No	No	Yes (by district)	Yes	No	No	Yes	Yes
CO	Yes	Yes	No	No	No	No	Yes (by division)	No	Yes	Yes	Yes	Yes
ID	Yes	Yes	Yes	Yes	No	No	Yes (partial)	Yes	No	No	Yes	Yes
KS	No	No	Yes	Yes	No	No	Yes (partial)	Yes	No	No	Yes	Yes
MT	No	No	Yes	No	No	No	No	No	No	No	Yes	Yes
NE	Yes	Yes	Yes	No	Yes (partial)	Yes (in process)	Yes (partial)	Yes (in process)	Yes	Yes (in process)	Yes	Yes
OK	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No
OR	Yes	Yes	Yes	Yes	No	No	Yes (nested)	Yes	No	No	Yes	Yes
TX	Yes	Yes	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes
UT	Yes	Yes	No	No	Yes	Yes (in process)	Yes	Yes (in process)	Yes	Yes (in process)	Yes	Yes
WA	Yes	Yes	Yes	Yes	Yes	Yes	Yes (partial)	Yes	Yes (partial)	Yes	Yes	Yes
WY	Yes	Yes	Yes	Yes	Yes (partial)	Yes (partial)	Yes	No	No	No	Yes	Yes

*States not provided are pending return of the survey.

STATE	Detailed Allocation & Water Use Data								Data Management	
	Water Allocations		Diversions/Withdrawals		Consumptive Use		Return Flows			
	Managing?	In a Database/GIS?	Tracking?	In a Database/GIS?	Tracking?	In a Database/GIS?	Tracking?	In a Database/GIS?	DB Environment	Development Platform
AK	Yes	Yes	Yes	Yes	Yes (partial)	Yes	No	No	Oracle, Access	Java, Python
AZ	Yes	Yes	Yes (partial)	Yes	Yes (partial)	Yes	No	No	Oracle, Access	.Net
CA	Yes	Yes	Yes	Yes	Yes (partial)	Yes	No	No	Oracle, MySQL	Java, .Net, Coldfusion
CO	Yes	Yes	Yes	Yes	No	No	Yes	Yes	SQL Server	.Net
ID	Yes	Yes	Yes	Yes	Yes (partial)	Yes	Yes (partial)	Yes	SQL Server, Access, ArcGIS	Java, .Net, Python
KS	Yes	Yes	Yes	Yes	No	No	Yes (partial)	No	Oracle	Java
MT	Yes	Yes	Yes (partial)	Yes	No	No	Yes (partial)	Yes	Oracle, SQL Server	.Net, Python, PL/SQL
NE	Yes	Yes	Yes (partial)	Yes	No	No	Yes (partial)	No	SQL Server, Access, ArcGIS	.Net, Python
OK	Yes	Yes	Yes	Yes	Yes (partial)	Yes	No	No	SQL Server, Access, ArcGIS	.Net, Python
OR	Yes	Yes	Yes	Yes (partial)	No	No	No	No	Informix	.Net, Python
TX	Yes	Yes	Yes (partial)	Yes	No	No	No	No	SQL Server	Java, .Net, Python
UT	Yes	Yes	Yes	Yes	Yes (in process)	Yes	Yes (partial)	No	SQL Server, Access, ArcGIS	.Net, Python, ASP
WA	Yes	Yes	Yes (partial)	Yes	No	No	No	No	SQL Server	.Net
WY	Yes	Yes	Yes (partial)	Yes	Yes (partial)	Yes	No	No	SQL Server	.Net

*States not provided are pending return of the survey.

Tab K – Draft 2014 Washington, D.C. Spring
Meetings - Agenda

**Preliminary Schedule
Western States Water Council**

2014 Water Policy Seminar and 174th Council Meeting

**Hotel TBD - 2014
Washington, DC**

**in cooperation with the
Interstate Council on Water Policy
(about 100 people)**

Tuesday, Date TBD

8:00 am – 5:00 pm **WSWC Members/Staff Hill Visits**

Wednesday, Date TBD

8:00 am – 5:00 pm **WSWC / ICWP Joint Session**

Administration Officials

Congressional Panel

5:30 pm – 6:30 pm **WSWC / ICWP Joint Reception -- All members and guests**

Thursday, Date TBD

8:00 am – 9:45 am **WSWC Water Resources Committee**

10:00 am – 11:45 am **WSWC Water Quality Committee**

12:00 pm – 1:15 pm **WSWC Executive Committee** (over lunch, separate room)

1:30 pm – 3:15 pm **WSWC Legal Committee**

3:30 pm – 5:00 pm **WSWC Full Council Meeting**

Friday, Date TBD

8:00 am – 11:30 am **WSWC / WestFAST Principals Meeting**

1:00 pm – 3:00 pm **WSWC Hill Visits**

Tab L – Future Council Meetings

WESTERN STATES WATER COUNCIL

FUTURE MEETINGS

2013

Measuring, Quantifying, and Reporting Drought Impacts Workshop

San Diego, California
Doubletree San Diego Downtown
August 5-7, 2013

Indian Water Rights Settlement Symposium

Santa Fe, New Mexico
Hilton Santa Fe at Buffalo Thunder
August 13-15, 2013

Fall Council Meeting

Deadwood, South Dakota
The Lodge at Deadwood
October 2-4, 2013

2014

Spring Council Meeting

Washington, D.C.

Upcoming Council Meeting Host States:

Montana (last hosted 8/10/2007 in Bozeman)
Arizona (last hosted 11/16/2007 in Phoenix)
North Dakota (last hosted 7/11/2008 in Medora)
Oklahoma (last hosted 10/17/2008 in Oklahoma City)
Kansas (last hosted 4/24/09 in Kansas City)
Utah (last hosted 7/17/09 in Park City)

MEETING SCHEDULE

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	Alaska	Arizona	California	Colorado	Idaho	Kansas	Montana	Nebraska	Nevada	New Mexico	North Dakota	Oklahoma	Oregon	South Dakota	Texas	Utah	Washington	Wyoming	Other
141								Lincoln 3/21/03											
142																Wellsville 8/1/03			
143			Monterey 11/07/03																
144									Las Vegas 4/2/04										
145													Newport 7/16/04						
146										Santa Ana Pueblo 10/29/04									
147					Boise 4/22/05														
148																	Seattle 7/15/05		
149															San Antonio 10/21/06				
150																			Wash. DC 3/29/06
151				Breckenridge 7/21/06															
152																			Sheridan 10/6/06
153																			Sioux Falls 5/4/07
154							Bozeman 8/10/07												
155		Phoenix 11/16/07																	
156																			Wash. DC 3/7/08

Tab M – Drought Impacts Workshop/
Drought Prediction Workshop
Agenda

DRAFT AGENDA

Workshop

Measuring, Quantifying, and Reporting Drought Impacts

Sponsored by: Western States Water Council and California Department of Water Resources

August 5 – 7, 2013

**Doubletree San Diego Downtown
1646 Front Street, San Diego, CA**

Monday, August 5

- 11:00 **Registration**
- 1:00 **Welcome and Opening Remarks, Workshop Purpose and Desired Outcomes**

Tony Willardson, Western States Water Council (WSWC)
Jeanine Jones, California Department of Water Resources (CDWR)
- 1:45 **Federal Agency Panel – (federal program data sources)**

Mary Bohman, Administrator, USDA's Economic Research Service (invited)
Dr. Cynthia Clark, Administrator, USDA's National Agricultural Statistics Service (invited)
Juan Garcia, Administrator, USDA'S Farm Service Agency (invited)
Brandon Willis, Administrator, USDA's Risk Management Agency (invited)
Tom Tidwell, Chief, U.S. Forest Service (invited)
Neil Kornze, Principal Deputy Director, Bureau of Land Management (invited)
Dan Ashe, Director, U.S. Fish and Wildlife Service (invited)
Rolf Olsen, Water Resources Systems Engineer, U.S. Army Corps of Engineers (invited)
- 3:30 Break
- 3:45 **State and Local Agency Panel – (state/local agency data needs, data sources)**

Jeanine Jones, Interstate Resources Manager, CDWR
Dr. Robert Mace, Deputy Executive Administrator, Texas Water Development Board (invited)
Tracy Streeter, Director, Kansas Water Office (invited)
Scott Verhines, State Engineer, New Mexico Office of the State Engineer (invited)
Jim Lochhead, CEO/Manger, Denver Water (invited)
Association of California Water Agencies (invited)
Kathy Mannion, Legislative Advocate, Regional Council of Rural Counties (invited)
- 5:00 **Adjourn**
- 6:00 **Reception – Cash Bar**

Tuesday, August 6

- 8:00 **Potential Role for NIDIS**
Roger Pulwarty/Veva Deheza
- 8:30 **Breakout Session – Discussion of Data Needs and Sources**
- 10:15 Break
- 10:30 **Report Back From Breakout Session and Discussion**
- 11:00 **Emerging Approaches to Measuring Impacts**

NIDIS CA Crop Following Project - Forrest Melton, NASA Ames
Idaho DWR Metric, Drought and Remote Sensing – Rick Allen, University of Idaho (invited)
Remote Sensing and Wildfire - Son Nghiem of NASA JPL
- 12:00 **Lunch (on your own)**
- 1:30 **Perspectives From Unmanaged Water Uses Sectors**
- 2:30 **Breakout Session – Discussion of Impact Quantification**
- 3:45 **Break**
- 4:00 **Report Back From Breakout Session and Discussion**
- 5:00 **Adjourn**

Wednesday, August 7

- 8:00 **Lessons Learned From NDMC Drought Impact Reporter Website**
Mark Svoboda, Monitoring Program Area Leader, NDMC
- 8:30 **Breakout Session – Building Institutional Framework for Quantification and Reporting**
- 10:15 **Break**
- 10:30 **Report Back From Breakout Session and Discussion**
- 11:30 **Action Items and Closing Remarks**
- 12:00 **Adjourn**

AGENDA Workshop

Improving Drought Prediction at Seasonal to Inter-Annual Timescales

**Sponsored by
Western States Water Council and California Department of Water Resources**

**Cooperating Organization
Western Governors' Association**

April 29 – May 1, 2013

**Doubletree San Diego Downtown
1646 Front Street, San Diego, CA**

Monday, April 29

- 11:00 **Registration**
- 1:00 **Welcome and Opening Remarks, Workshop Purpose & Desired Outcomes**

Tony Willardson, Western States Water Council (WSWC)
Jeanine Jones, California Department of Water Resources (CDWR)
Jim Ogsbury/Holly Probst, Western Governors' Association (via phone)
- 1:30 **National Integrated Drought Information System (NIDIS) Activities and Reauthorization**

Robin Webb, ESRL Branch Chief, National Oceanic and Atmospheric Administration
- 2:00 **Other Federal Activities**

NOAA Drought Taskforce Activities, Annarita Mariotti, Climate Program Office, National Oceanic and Atmospheric Administration (via phone)
Spring Sub-seasonal Prediction for Reservoir Operations - Levi Brekke, Water and Climate Research Coordinator, U.S. Bureau of Reclamation
- 3:00 **Drought Prediction: Good News (and Other News)**

Martin Hoerling, Meteorologist, National Oceanic and Atmospheric Administration (via phone)
- 3:30 **Break**
- 3:45 **The Colorado River Basin Drought – How Much Longer Will it last?**

Michelle Stokes, Hydrologist in Charge, Colorado Basin River Forecast Center (via phone)
- 4:15 **Potential Interstate Cooperation on Irrigation Scheduling Data**

Kent Frame, Program Manager, California Department of Water Resources
- 5:00 **Adjourn**
- 6:00 **Reception – Cash Bar**

Tuesday, April 30

7:30 **Continental Breakfast**

8:30 **State Perspectives on Drought Prediction**

Jeanine Jones, Interstate Resources Manager, California Department of Water Resources
Don Ostler, Executive Director, Upper Colorado River Compact Commission
Tracy Streeter, Director, Kansas Office of Water
John Nielsen-Gammon, Texas State Climatologist

10:15 **Break**

10:30 **Opportunities With Existing Information**

Exploiting Indicator Information – Anne Steinemann, Visiting Researcher, Scripps Institution of Oceanography
Regional Hydrological Extremes Assessment System – Joshua Fisher, Scientist, NASA Jet Propulsion Lab
Exploring Hydroclimate Time Series – Kelly Redmond, Regional Climatologist, Western Regional Climate Center/Desert Research Institute

12:00 **Lunch**

1:00 **Synergies/Relationships With Other Forecasts/Predictions**

Seasonal Wildfire Prediction – Tom Rolinski, Meteorologist, USFS Riverside Fire Prediction Center
Operational NWS Forecasting – Alex Tardy, Meteorologist, San Diego Weather Forecast Office

2:00 **Predicting Wet Conditions to Predict Dry Conditions**

HMT's Progress on Atmospheric River Storms – Marty Ralph, ESRL Branch Chief, National Oceanic and Atmospheric Administration
Atmospheric Rivers as Drought Busters: Past, Present and Future – Mike Dettinger, U.S. Geological Survey, Scripps Institution of Oceanography
Interannual Variability & Climate Transitions – Mike Anderson, California State Climatologist, California Department of Water Resources
Soil Moisture Measurement Needs – Mike Strobel, Director, National Water & Climate Center, NRCS

3:45 **Break**

4:00 **Small Group Break-Outs to Discuss Potential Ways to Improve Drought Prediction**

5:00 **Adjourn**

Wednesday, May 1

7:30 **Continental Breakfast**

8:30 **Report Back From Break-Outs and Discussion**

9:15 **Drought Economic Impacts and the Value of Improved Predictive Ability**

Midwestern Agricultural Drought – Mark Svoboda, National Drought Mitigation Center
Urban Water Agencies – Jeff Mosher, Executive Director, National Water Research Institute
Small Water Systems – Michael Sims, Circuit Rider, California Rural Water Association

10:30 **Break**

10:45 **Where Do We Go From Here? (facilitated discussion)**

11:30 **Action Items and Closing Remarks**

12:00 **Adjourn**

Tab N – California Irrigation Management Information System (CIMIS)

CIMIS Overview

The California Irrigation Management Information System (CIMIS) is a program of the Office of Water Use Efficiency (OWUE), California Department of Water Resources (DWR) that manages a network of over 120 automated weather stations in the state of California. CIMIS was developed in 1982 by DWR and the University of California, Davis to assist irrigators in managing their water resources efficiently. Efficient use of water resources benefits Californians by saving water, energy, and money.

Data Collection and Transmission

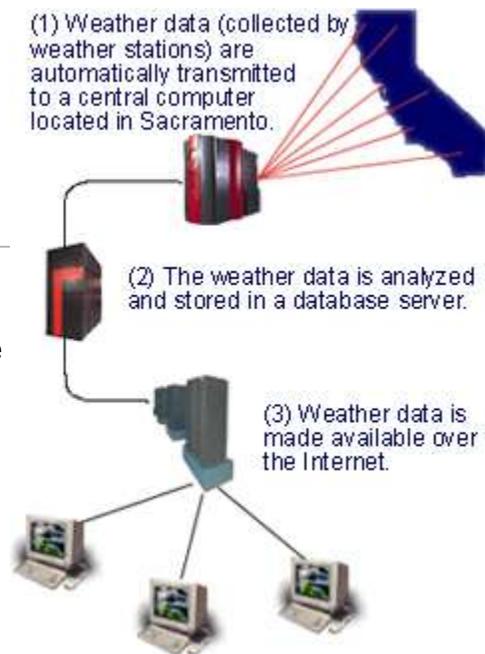
CIMIS weather stations collect weather data on a minute-by-minute basis, calculate hourly and daily values and store them in the dataloggers. A computer at the DWR headquarters in Sacramento calls every station starting at midnight Pacific Standard Time (PST) and retrieves each day's data.

In case of a communication problem between the central computer and a given station, the computer skips that station and calls the next station. After all other stations have reported the polling computer comes back to the station with a communication problem trying to establish a connection at predetermined time intervals. The interrogation continues into the next day until all of the station data have been transmitted.

Data Processing

Once the data is transmitted, the central computer analyzes it for quality, calculates [reference evapotranspiration](#) (ET_o - for grass reference and ET_r - for alfalfa) and other intermediate parameters, flags the data (if necessary), and stores them in the CIMIS database. Evapotranspiration (ET) is a loss of water to the atmosphere by the combined processes of evaporation from soil and plant surfaces and transpiration from plants. Reference evapotranspiration is the loss of water from standardized grass or alfalfa surfaces over which the stations are sitting. Irrigators have to use crop factors, known as crop coefficients, to convert ET_o/ET_r into an actual evapotranspiration (ET_c) by a specific plant.

Since most of the CIMIS stations are sitting on standardized grass surfaces,



reference evapotranspiration is commonly referred to as "ET_o" in this web site. However, it is worth mentioning that a few CIMIS stations are sited on standardized alfalfa surfaces and therefore evapotranspiration from such surfaces is referred to as ET_r.

Data Retrieval

Estimated parameters (such as ET_o, net radiation (R_n), dew point temperature, etc.) and measured parameters (such as solar radiation (R_s), air temperature (T), relative humidity (RH), wind speed (u), etc.) are stored in the CIMIS database for unlimited free access by registered CIMIS data users. In the past, users were accessing the CIMIS database via the dial-up and telnet systems. CIMIS then developed an older version of its current web site, during which time users were able to access the database using the dial-up, telnet, and/or the web systems. Once the web site became fully functional, the dialup and telnet options were terminated. Currently, the web system is the only platform for retrieving the CIMIS data. In addition to the web, CIMIS developed an [ftp site](#) for those interested in automated access of the data. However, the ftp site only provides daily data for the previous 7 days and monthly data for the previous 12 months. Also available at the ftp site is one year's worth of rolling daily ET_o data. This means that the beginning and ending dates of this data advance forward by one day everyday.

Selecting Representative Stations

The CIMIS weather stations are randomly distributed throughout the State of California. It is very important that the selected station represents the same microclimate as the area of interest. Some resources available to assist you in this regard include the CIMIS web site, local water districts, farm advisors, consultants, and CIMIS staff.

Contact information for CIMIS staff at the Sacramento headquarters and the DWR districts are provided in the [CIMIS Staff](#) link on the Home Page. Questions regarding the selection of a CIMIS station, installation of new station, missing data, and/or information on how to use the data can be directed to the CIMIS staff in your DWR district. There are four DWR districts in California. To find out in which district your County lies, [click here](#), for district location maps. If you have problems contacting the CIMIS staff in your district, you can [Contact Us](#) at headquarters in Sacramento.

Trends in CIMIS Data Users

Although CIMIS was initially designed to help agricultural growers and turf managers administering parks, golf courses and other landscapes to develop water budgets for determining when to irrigate and how much water to apply, the user base has expanded over the years. In addition to those mentioned above, current CIMIS data users include local water agencies, fire fighters, air control board, pest control managers, university researchers, school teachers and students, construction engineers, consultants, hydrologists, state and federal agencies, utilities, lawyers, weather agencies, and many more.

The number of registered CIMIS data users has also been growing steadily over the years. Currently, there are over 6000 registered CIMIS data users. It is worth mentioning here that this number reflects only those that are primary users of the CIMIS data. It has been established that many users get the CIMIS data from these primary users for various uses. Examples include local water districts and consultants providing the CIMIS data to their clients. Therefore, there are secondary and tertiary CIMIS data users that have not been accounted for by the figure presented here.

Tab O – Government Accounting Office
(GAO) Freshwater Availability and
Use Report Questions

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JEFFREY DUNCAN
DEMOCRATIC STAFF DIRECTOR

August 13, 2012

The Honorable Gene Dodaro
Comptroller General of the United States
U.S. Government Accountability Office
441 G St., N.W.
Washington, D.C. 20548

Dear Mr. Dodaro:

Freshwater flows abundantly in the nation's lakes, rivers, streams, and underground aquifers. However, because of climatic conditions and increased usage, water is not always available when and where it is needed or in the amount desired. Users with different interests and objectives, such as agricultural irrigation or municipal water supply, must share the available water, and users may not always get the amount of water they need or want, particularly in times of shortage. Competition for water and the potential for conflict grow as the number of users increases and/or the amount of available water decreases, and conflicts can extend across state or national borders.

The widespread drought conditions of 2012 have renewed attention on a critical challenge for the United States—ensuring a sufficient freshwater supply to sustain quality of life and economic growth. Across the nation, there is increasing competition to meet the freshwater needs of growing cities and suburbs, farms, industries, recreation, and wildlife. In 2003, GAO issued GAO-03-514—*Freshwater Supply: States' Views of How Federal Agencies Could Help Them Meet the Challenges of Expected Shortages*. This report provided a comprehensive overview of water availability and use trends, as well as state views on expected shortages and ways in which the federal government could help them meet future challenges.

We would like to request that GAO update this seminal report in light of new and continued stresses on water supplies. Specifically, we would like GAO to report on the following key issues:

- How have freshwater conditions, including both surface and groundwater, changed in the last decade? What have been the drivers and effects of these changes? And to what extent do these changes over the last decade match the predictions made in GAO-03-514?

The Honorable Gene Dodaro
Page 2
August 13, 2012

- What is the forecast over the next 10 years for water availability and use? What are the potential implications for agriculture, municipal supply (including possible impacts on water rates), thermoelectric power plants, oil and gas production and mining, and other major sectors of the economy? How are changes in the climate and extreme weather expected to affect water availability and use? What locations are most likely to experience water shortages and why? And what are the potential consequences of such shortages?
- How does the federal government support state water management efforts and what could the federal government do to enhance its support?

Please contact Camille Calimlim Touton (Camille.Calimlim@mail.house.gov or 202-225-6065) with the Committee on Natural Resources to discuss in detail the specific scope of work and timeline for completing this request. Thank you for your consideration and attention to this request.

Sincerely,


Edward J. Markey

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August 13, 2012

The Honorable Gene L. Dodaro
Comptroller General of the United States
U.S. Government Accountability Office
441 G Street NW
Washington, DC 20548

Dear Mr. Dodaro:

Water and energy are two fundamental, inextricably linked building blocks of the U.S. economy. Large amounts of water are consumed in generating thermoelectric power and in extracting oil, gas, uranium and coal. At the same time, large amounts of energy are used in extracting, treating and distributing water. Thus, shortages in water could cause shortages in energy, and vice versa. As America's population grows and the climate changes, we will have to make more efficient use of water and possibly develop new water supplies.

Currently, 52 percent of the country is experiencing moderate to exceptional drought conditions.¹ These conditions have forced state officials to make difficult choices involving energy and water. One local regulator in Pennsylvania suspended 64 permits to withdraw water from streams and other sources for extraction purposes, including for heavy drilling in northeastern Pennsylvania's patch of the Marcellus Shale reservoir.² Droughts like this will only become more frequent and severe in coming years, according to a recent report from the Intergovernmental Panel on Climate Change (IPCC).³ Increasingly, energy production may have to compete for water needed for other purposes, including drinking water and agriculture.

Available and developing technologies have the potential to significantly reduce water use for all of these purposes. Several oil and gas companies are developing techniques that reduce their water use and address potential drinking water contamination. Gas turbines could reduce water use in power generation by as much as

¹ The U.S. Drought Monitor as of August 7, 2012, available at <http://droughtmonitor.unl.edu/>

² E&E News, "Drought conditions strain driller's water use in major Pa. watershed," 19 July 2012

³ Intergovernmental Panel on Climate Change, "Managing the Risk of Extreme Events and Disasters to Advance Climate Change Adaptation," 2012.

60 percent compared to conventional steam turbines, and dry cooling systems could cut water consumption by up to 10 percent compared to wet circulation cooling. Similarly, communities and water districts across the country are working on ways to reuse and recycle water for agricultural and municipal use.

Since 2009, GAO has issued five reports examining the interdependencies of energy production and water use.⁴ In these reports, GAO has shown that a considerable amount of water is used to cool thermoelectric power plants, grow feedstock and convert them into biofuels, and extract oil and natural gas—especially from oil shale formations in Colorado and Utah, where water scarcity is a significant problem. An assessment of technologies available to reduce water use would complement this previous work and help guide future policy action to address the energy-water challenge.

Because energy security and the availability of water are critical elements of U.S. national and economic security, I request that GAO's Center for Science, Technology, and Engineering conduct an assessment of available and developing technologies that could reduce water use and water scarcity. Specifically, I request that you assess:

1. Technologies to reduce fresh water consumption and employ alternative water sources in thermoelectric power plants;
2. Technologies to reduce fresh water consumption and prevent or address water contamination in drilling and mining activities, such as commercial oil and shale-gas development and uranium mining;
3. Technologies to improve the efficiency of drinking water and waste water processes;
4. Technologies to reduce the impact of agriculture on water resources;
5. Technologies to provide new fresh water supplies through approaches such as desalination that converts sea water and brackish water into new sources of fresh water for power generation or human consumption;
6. Locations in the United States facing water scarcity problems that would benefit most from such available and developing technologies. This includes assessing (1) the amount of water currently being used in such locations for

⁴GAO, *Energy-Water Nexus: Information on the Quantity, Quality, and Management of Water Produced during Oil and Gas Production*, GAO-12-156 (Washington, D.C.: Jan 9, 2012); *Energy-Water Nexus: Amount of Energy Needed to Supply, Use, and Treat Water Is Location-Specific and Can Be Reduced by Certain Technologies and Approaches*, GAO-11-225 (Washington, D.C.: Mar. 23, 2011); *Energy-Water Nexus: A Better and Coordinated Understanding of Water Resources Could Help Mitigate the Impacts of Potential Oil Shale Development*, GAO-11-35 (Washington, D.C.: Oct. 29, 2010); *Energy-Water Nexus: Many Uncertainties Remain about National and Regional Effects of Increased Biofuel Production on Water Resources*, GAO-10-116 (Washington, D.C.: Nov. 30, 2009); and *Energy-Water Nexus: Improvements to Federal Water Use Data Would Increase Understanding of Trends in Power Plant Water Use*, GAO-10-23 (Washington, D.C.: Oct. 16, 2009).

The Honorable Gene L. Dodaro
Page 3
August 13, 2012

thermoelectric power plants, drilling and mining, drinking water and waste water, and agriculture; and (2) the amount of water that could be saved by adopting available or developing technologies in each of these areas.

Thank you for your consideration of this request. Given the importance of both energy and water to the United States' future economic security and prosperity, such an assessment will inform the Congress in its policy deliberations and assist in formulating an appropriate long-term national vision and strategy. Please contact Reece Rushing or Camille Calimlim Touton of the Natural Resources Committee, at 202-225-6065 to discuss in detail the specific scope of work and timeline for completion.

Sincerely,

A handwritten signature in blue ink that reads "Edward J. Markey". The signature is written in a cursive style with a large, stylized "M".

Edward J. Markey

GAO Freshwater Availability and Use Questions

Objective 1 (changes since 2003)

1. What have been the key changes regarding freshwater availability and use since 2003?
 - a. What are the drivers of these changes?
 - b. What are the effects of these changes?
2. Which freshwater uses, such as irrigation or ecosystem services/ecological flows, do you think are currently of greatest concern in terms of impacting freshwater availability for other uses?
3. What types of uses do you think are currently most vulnerable to restricted water availability?

Objective 2 (forecasts)

4. What is the forecast for the next 10 years for freshwater availability and use, and what will be the drivers and effects of these changes?
 - a. Which uses do you think will have the greatest impact on freshwater availability the next 10 years?
 - b. Which uses do you think will be most vulnerable to limited or excessive freshwater availability in the next 10 years?
 - c. What geographic areas do you think will experience the greatest change in freshwater availability and in what way?
 - d. What geographic areas are most in need of support from the federal government, and what type of support is needed?
5. What drivers of change (e.g., increased energy production, climate change) are of greatest concern in terms of anticipated impact on water supplies in the next 10 years?

Objective 3 (federal support)

6. What are the most and least effective ways in which the federal government supports states' water management efforts?
 - a. How, if at all, has federal support for states' water management efforts changed since 2003, and why?
 - b. What could the federal government do to enhance its support?
 - c. What barriers, if any, are there to working effectively with the federal government, and what is necessary to overcome these barriers?
 - d. What could Congress do to improve national and state water management efforts?
7. To what extent do federal laws and policies help or hinder states' water management efforts? Please provide examples.

Data

8. What key data already exist and are currently missing that would be needed to provide an accurate nationwide assessment of freshwater availability and use?
 - a. To what extent do you anticipate the National Water Census address the data gaps?

9. What are the key freshwater availability and use and water quality data sources upon which your organization and other water stakeholders rely?
 - a. How, if at all, has freshwater availability and use data changed since 2003 and why?
 - b. How, if at all, has water quality data changed since 2003, and why?
 - c. What are the greatest freshwater data needs (e.g., consumption data; pharmaceutical data; aquifer recharge rates; evapotranspiration; soil moisture data; more reliable/higher quality data)?
 - i. Who could use the data, and how could they use the data? How could such data better inform Congress and the public?
 - d. How can federal agencies get better data on freshwater availability and use and water quality? What efforts are needed, and who should be involved in these efforts? What are the greatest obstacles?
10. What technologies have been most effectively used to collect data and assist in management of freshwater supplies?
 - a. What have been the most important technological advances for water planning since 2003?
11. Some people with whom we've spoken have raised concerns about reduced funding for USGS's streamgages and, as a result, loss of gages, particularly long-term gages. To what extent is reduction in the number of streamgages a concern to your organization?
 - a. Why are such data important? What is the effect of reduced gages, particularly long-term gages?
 - b. To what extent do you have similar concerns with efforts to measure groundwater and rainfall?
12. With regard to groundwater resources, what federal data is available to help states, researchers, etc. better understand the quantity and quality of this resource?
 - a. Are these data sufficiently accessible and "user friendly" to users? If not, how could they be made more accessible?
 - b. To what extent have states changed how they manage the relationship between groundwater and surface water since 2003? How?
 - c. How does the availability and quality of surface water data compare to that for groundwater data?

Drivers of change:

13. To what extent are the following factors a concern with regard to current and future freshwater availability and use?
 - a. Degraded water quality.
 - b. Climate change.
 - c. Drought.
 - d. Flooding/excess water.
 - e. Energy's demand for water.
 - f. Population growth.
 - g. Irrigation.
 - h. Infrastructure challenges.

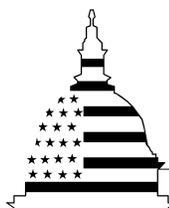
General

14. What are the key themes/messages regarding freshwater supply and management that you think it would be beneficial to highlight?
15. To what extent do you believe reinstatement of the Water Resources Council or establishment of another National Water Commission or a similar entity would be beneficial? Why/why not?
16. To what extent would a national water strategy or policy be beneficial? Why/why not?
17. Are you aware of any states that have or are trying to codify maintenance of freshwater resources specifically for the purposes of ecosystem services/ecological flows into their water management efforts?
 - a. If yes, what state(s) and how effective have their efforts been?
 - b. If no:
 - i. Do you think efforts to codify minimum flows for these purposes would be useful? Why/why not?
 - ii. Why do you think states haven't codified minimum flows for these purposes?
18. In your opinion what are the key economic factors affecting the availability and use of freshwater? For example, such factors could include prices (both prices of water and the prices of other goods that rely on water) and incentives.
 - a. How do these factors affect freshwater availability and use?
 - b. Has there been a discernable change in these factors since 2003? If so, what has been the impact on use and availability of the freshwater?
 - c. Do you anticipate such changes to continue in the next ten years? Why/why not?
19. Are you aware of examples of states or localities with particularly effective/ineffective freshwater management plans, including drought or flood plans?
 - a. If so, what are some of the key characteristics that you believe have made the plans effective/ineffective?
20. Are you aware of examples of states or localities that have instituted particularly effective/ineffective conservation strategies (incentives or restrictions)?
 - a. If so, what are the states/localities, what strategies did they employ, and why were the strategies effective/ineffective?
21. Are you aware of examples of states or localities that have instituted particularly effective/ineffective strategies to adapt to excess water (such as floods)?
 - a. If so, what are the states/localities, what strategies did they employ, and why were the strategies effective/ineffective?
22. Are there any individuals/organizations that you should we speak with to discuss our objectives? Are there reports or studies that you would suggest we review?

July 2003

FRESHWATER SUPPLY

States' Views of How Federal Agencies Could Help Them Meet the Challenges of Expected Shortages



G A O

Accountability * Integrity * Reliability

FRESHWATER SUPPLY

States' Views of How Federal Agencies Could Help Them Meet the Challenges of Expected Shortages

Why GAO Did This Study

The widespread drought conditions of 2002 focused attention on a critical national challenge: ensuring a sufficient freshwater supply to sustain quality of life and economic growth. States have primary responsibility for managing the allocation and use of water resources, but multiple federal agencies also play a role. For example, Interior's Bureau of Reclamation operates numerous water storage facilities, and the U.S. Geological Survey collects important surface and ground-water information.

GAO was asked to determine the current conditions and future trends for U.S. water availability and use, the likelihood of shortages and their potential consequences, and states' views on how federal activities could better support state water management efforts to meet future demands.

For this review, GAO conducted a web-based survey of water managers in the 50 states and received responses from 47 states; California, Michigan, and New Mexico did not participate.

What GAO Found

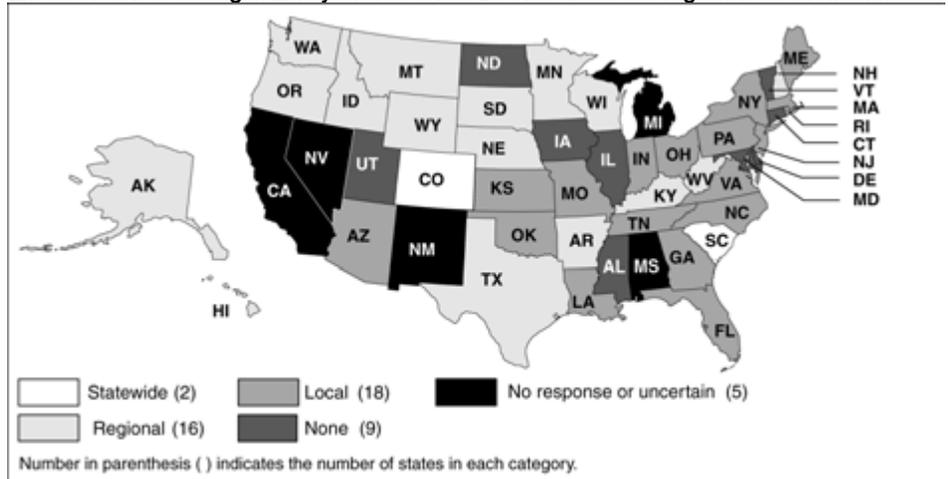
National water availability and use has not been comprehensively assessed in 25 years, but current trends indicate that demands on the nation's supplies are growing. In particular, the nation's capacity for storing surface-water is limited and ground-water is being depleted. At the same time, growing population and pressures to keep water instream for fisheries and the environment place new demands on the freshwater supply. The potential effects of climate change also create uncertainty about future water availability and use.

State water managers expect freshwater shortages in the near future, and the consequences may be severe. Even under normal conditions, water managers in 36 states anticipate shortages in localities, regions, or statewide in the next 10 years. Drought conditions will exacerbate shortage impacts. When water shortages occur, economic impacts to sectors such as agriculture can be in the billions of dollars. Water shortages also harm the environment. For example, diminished flows reduced the Florida Everglades to half its original size. Finally, water shortages cause social discord when users compete for limited supplies.

State water managers ranked federal actions that could best help states meet their water resource needs. They preferred: (1) financial assistance to increase storage and distribution capacity; (2) water data from more locations; (3) more flexibility in complying with or administering federal environmental laws; (4) better coordinated federal participation in water-management agreements; and (5) more consultation with states on federal or tribal use of water rights. Federal officials identified agency activities that support state preferences.

While not making recommendations, GAO encourages federal officials to review the results of our state survey and consider opportunities to better support state water management efforts. We provided copies of this report to the seven departments and agencies discussed within. They concurred with our findings and provided technical clarifications, which we incorporated as appropriate.

Extent of State Shortages Likely over the Next Decade under Average Water Conditions



Source: GAO analysis of state water managers' responses to GAO survey.

www.gao.gov/cgi-bin/getrpt?GAO-03-514.

To view the full report, including the scope and methodology, click on the link above. For more information, contact Barry Hill at (202) 512-9775 or hillb@gao.gov.

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Abbreviations

USDA	U.S. Department of Agriculture
USGS	U.S. Geological Survey

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Contents



United States General Accounting Office
Washington, D.C. 20548

July 9, 2003

The Honorable Pete V. Domenici
Chairman
Committee on Energy and Natural Resources
United States Senate

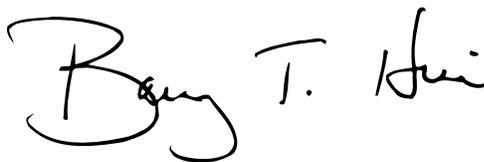
The Honorable James M. Jeffords
Ranking Minority Member
Committee on Environment and Public Works
United States Senate

The Honorable Mike Crapo
Chairman
The Honorable Bob Graham
Ranking Minority Member
Subcommittee on Fisheries, Wildlife, and Water
Committee on Environment and Public Works
United States Senate

In response to your requests, this report identifies current conditions and future trends for U.S. water availability and use, the likelihood of shortages and their potential consequences, and state views on how federal activities could better support state water management efforts to meet future needs. While we are not making a specific recommendation, we encourage Agriculture, Commerce, Energy, Homeland Security, Interior, Corps, and Environmental Protection Agency officials to review the results of our state survey and consider modifications to their plans, policies, or activities as appropriate to better support state efforts to meet their future water needs.

We will send copies of this report to the Secretaries of Agriculture, Commerce, Energy, Homeland Security, and Interior; the Assistant Secretary of the Army for Civil Works; and the Administrator of the Environmental Protection Agency. We will also send copies to the states that participated in our review. This report will also be available on GAO's Web site at <http://www.gao.gov>.

Please contact me at (202) 512-3841 if you or your staff have any questions. Major contributors to this report are listed in appendix III.

A handwritten signature in black ink that reads "Barry T. Hill". The signature is written in a cursive style with a large, looped "B" and a distinct "Hill" at the end.

Barry T. Hill
Director, Natural Resources
and Environment

Executive Summary

Purpose

The widespread drought conditions of 2002 focused attention on a critical challenge for the United States—ensuring a sufficient freshwater supply to sustain quality of life and economic growth. Yet droughts are only one element of this complex issue. Water availability and use depend on many factors, such as the ability to store and distribute water, demographics, and social values. Across the nation, there is increasing competition to meet the freshwater needs of growing cities and suburbs, farms, industries, recreation and wildlife.

States are primarily responsible for managing the allocation and use of freshwater supplies. However, federal laws provide for control over the use of water in specific cases, such as on federal lands or in interstate commerce. Many federal agencies engage in activities, such as operating large water storage facilities and administering federal environmental protection laws, that influence state decisions. Federal agencies generally coordinate their activities with the states and complement state efforts to manage water supplies. On occasion, however, these activities conflict with state or other user objectives, such as when the need to leave water in a river to protect fish under federal environmental laws affects the delivery of irrigation water to farmers.

To assist congressional understanding of the range and complexity of freshwater supply issues, the Chairman of the Senate Committee on Energy and Natural Resources, the Ranking Member of the Senate Committee on Environment and Public Works, and the Chairman and Ranking Member of the Subcommittee on Fisheries, Wildlife, and Water, Senate Committee on Environment and Public Works asked GAO to identify (1) current conditions and future trends for U.S. water availability and use, (2) the likelihood of shortages and their potential consequences, and (3) state views on how federal activities could better support state water management efforts to meet future demands. To conduct this review, we focused on water supply and generally assumed a continuation of existing quantity allocations and current pricing conditions. Among other things, GAO conducted a Web-based 50-state survey of state water managers and obtained responses from 47 states; California, Michigan, and New Mexico did not participate. GAO also met with state water managers in seven geographically dispersed states—Arizona, Florida, Georgia, Illinois, Pennsylvania, Virginia, and Washington. GAO's complete scope and methodology is described in chapter 1.

Background

Freshwater flows abundantly in the nation's lakes, rivers, streams, and underground aquifers. However, because of climatic conditions and other factors, water is not always available when and where it is needed or in the amount desired. Users with different interests and objectives, such as agricultural irrigation or municipal water supply, must share the available water, and users may not always get the amount of water they need or want, particularly in times of shortage. Competition for water and the potential for conflict grow as the number of users increases and/or the amount of available water decreases, and conflicts can extend across state or national borders.

Federal, state, local, tribal, and private interests share responsibility for developing and managing the nation's water resources within a complex web of federal and state laws, regulations and contractual obligations. State laws predominantly govern the allocation and use of water. The federal government has recognized the primacy of states' laws regarding water allocation and use in numerous acts, such as the Reclamation Act and the Clean Water Act, and the Supreme Court has ruled that states' laws govern the control, appropriation, use, and distribution of federal reclamation project water.

Federal agencies engage in five basic categories of activities that influence state water resource management decisions:

- Constructing, operating and maintaining water storage infrastructure, primarily through the U.S. Army Corps of Engineers (Corps) and the Department of the Interior's (Interior) Bureau of Reclamation (Reclamation).
- Collecting and disseminating data on water availability and use, primarily through Interior's U.S. Geological Survey (USGS).
- Administering clean water and wildlife protection laws, primarily through agencies such as the Environmental Protection Agency, the Department of Commerce's (Commerce) National Marine Fisheries Service, and Interior's U.S. Fish and Wildlife Service.
- Assisting in the development and implementation of water management compacts and treaties, often involving multiple federal agencies.

- Managing water resources on federal lands by, for example, Interior’s Bureau of Land Management and the U.S. Department of Agriculture’s (USDA) Forest Service, and protecting tribal water rights by Interior’s Bureau of Indian Affairs.

Results in Brief

The last comprehensive national water availability and use assessment, completed 25 years ago, identified critical problems, such as shortages and conflicts among users. Future water availability and use is difficult to predict. For example, while USDA’s 1999 forecast of future water use—total availability—projects a rise in total withdrawals of only 7 percent by 2040, it also warns of the tenuous nature of such projections. If the most important and uncertain assumptions used in USDA’s projection, such as a decrease in irrigated acreage, fail to materialize, water use may be substantially above the estimate. Current trends indicate that demands on the nation’s water resources are growing. While the nation’s capacity for storing surface-water is limited and ground-water is being depleted, demands for freshwater are growing as the population increases, and pressures increase to keep water instream for fisheries, wildlife habitat, recreation, and scenic enjoyment. For example, ground-water supplies have been significantly depleted in many parts of the country, most notably in the High Plains aquifer underlying eight western states, which in some areas now holds less than half of the water held prior to commencement of ground-water pumping. Meanwhile, according to Bureau of the Census projections, the southwestern states of California, New Mexico, Arizona, and Nevada, states that are already taxing their current water supplies, are each expected to see their population increase by more than 50 percent from 1995 to 2025. Furthermore, the potential effects of climate change create additional uncertainty about future water availability and use. For example, less snow pack as a result of climate change could harm states that rely extensively on melted snow runoff for their freshwater supply.

State water managers expect freshwater shortages in the near future, and their consequences could be severe. According to the results of GAO’s survey, even under normal water conditions, water managers in 36 states anticipate water shortages in localities, regions, or statewide within the next 10 years. Under drought conditions, 46 managers expect shortages in the next 10 years. Such shortages may be accompanied by severe economic, environmental, and social impacts. While no studies have measured the total economic impact of shortages, recent shortages have resulted in damages to specific segments of the economy. For example, in the summer of 1998, a drought that ranged from Texas to the Carolinas

resulted in an estimated \$6 to \$9 billion in losses to the agriculture and ranching sectors. Water shortages can also result in environmental losses: damages to plant and animal species, wildlife habitat, and water quality. For example, diminished flows into the Florida Everglades have resulted in significantly reduced habitat for the wildlife population and a 90 percent reduction in the population of wading birds. Water shortages can also raise social concerns, such as conflicts between water users, reduced quality of life, and give rise to the perception of inequities in the distribution of disaster relief assistance. Many of these impacts are evident in the federally-operated Klamath Project—dams, reservoirs, and associated facilities—that sits on the California-Oregon border. Here, under drought conditions, several federal agencies—including Reclamation, the Fish and Wildlife Service, and the National Marine Fisheries Service—are trying to balance the water needs of, among others, irrigators, who receive water from the project, and endangered fish, which must have sufficient water to survive. In 2002, thousands of fish died while water was delivered for agricultural irrigation; the prior year, farmers experienced crop losses while water was used to maintain stream flows for fish.

In responding to our Web-based survey, state water managers identified the potential federal actions that would most help them meet their states' water needs. Water managers from 47 states ranked their preferences within each of the five basic categories of federal activities. First, state water managers favored more federal financial assistance to plan and construct additional state water storage and distribution capacity and also favored more consultation with the states regarding the operation of federal storage facilities. Second, state managers favored having federal agencies collect water data in more locations to help them determine how much water is available. Third, state managers favored federal efforts to provide flexibility in how they comply with or administer federal environmental laws as well as consultation on these laws' development, revision, and implementation. Fourth, state managers favored improving coordination of federal agencies' participation with the states in water management agreements and increasing technical assistance to states in developing and implementing them. Finally, state managers favored more consultation with states on how federal agencies or tribal governments use their water rights, and increased financial and technical assistance to determine the amount of federal water rights. Federal officials identified current activities within each of these areas that support state efforts and explained that while some state preferences, such as funding for storage construction, would require congressional authorization, others can be

addressed through ongoing efforts to enhance communication and cooperation. Appendix I contains the results of the survey.

Principal Findings

Water Availability and Use Trends Raise Concerns about Meeting Future Needs

The U.S. Water Resources Council completed the most recent, comprehensive, national water availability and use assessment in 1978.¹ That assessment found that parts of the nation had inadequate water supplies and growing demand, resulting in water shortages and conflicts among users. The most recent forecast of future water use—but not availability—is USDA’s 1999 estimate for 2040. This forecast projects a rise in total withdrawals of only 7 percent despite a 41-percent increase in the nation’s population. Yet the forecast also warns of the tenuous nature of such projections. For example, if the most important and uncertain assumptions used in USDA’s projection, such as irrigated acreage, fail to decrease as assumed, water use may be substantially above the estimate.

Current trends—such as declining ground-water levels and increasing population—indicate that the freshwater supply is reaching its limits in some locations while freshwater demand is increasing. Specifically, the building of new, large reservoir projects has tapered off, limiting the amount of surface-water storage, and the storage that exists is threatened by age and sedimentation. Significant ground-water depletion has already occurred in many areas of the country; in some cases the depletion has permanently reduced an aquifer’s storage capacity or allowed saltwater to intrude into freshwater sources. Tremendous population growth, driving increases in the use of the public water supply, is anticipated in the Western and Southern states, areas that are already taxing existing supplies. Demand to leave water in streams for environmental, recreational and water quality purposes add to supply concerns. Finally, some experts expect that climate change will affect water supply conditions in all regions of the country, either through increased demands associated with higher temperatures or changes in supply because of new precipitation or runoff patterns.

¹ The Council, established by the Water Resources Planning Act in 1965 (P.L. 89-80), comprising the heads of several federal departments and agencies, such as Interior and the Environmental Protection Agency, has not been funded since 1983.

**State Water Managers
Expect Freshwater
Shortages in the Near
Future, Which May Have
Severe Consequences**

Under normal water conditions, state water managers in 36 states anticipate water shortages locally, regionally, or statewide within the next 10 years, according to GAO's survey. Under drought conditions, the number grows to 46. Water managers expect these shortages because of depleted ground-water, inadequate access to surface-water, and growing populations, among other conditions, and despite ongoing actions to address their current and future water needs, such as: planning to prepare for and respond to droughts; assessing and monitoring water availability and withdrawals; and implementing water management strategies, such as joint management of surface and ground-water resources. In addition, water managers are reducing or reallocating water use, and developing or enhancing supplies by increasing water storage capacity, or less conventionally, seeding clouds to increase winter precipitation and developing saltwater desalination operations to produce freshwater.

If the anticipated water shortages actually occur, they could have severe economic, environmental and social impacts. The nationwide economic costs of water shortages are not known because the costs of shortages are difficult to measure. However, Commerce's National Oceanic and Atmospheric Administration has identified eight water shortages from drought or heat waves, each resulting in \$1 billion or more in monetary losses over the past 20 years. For example, the largest shortage resulted in an estimated \$40 billion in damages to the economies of the Central and Eastern United States in the summer of 1988. Water shortages can also have environmental impacts, damaging plant and animal species, wildlife habitat, and water quality. The Florida Everglades experience illustrates how dramatically reduced water flows can alter an ecological system. In 1948, following a major drought and heavy flooding, the Congress authorized the Central and Southern Florida Project—an extensive system of over 1,700 miles of canals and levees and 16 major pump stations—to prevent flooding, provide drainage, and supply water to South Florida residents. This re-engineering of the natural hydrologic environment reduced the Everglades to about half its original size and resulted in losses of native wildlife species and their critical habitat. In social terms, water shortages can create conflicts between water users, reduce quality of life, and create perceptions of inequities in the distribution of impacts and disaster relief. Federal experiences in operating the Klamath Project on the California-Oregon border, illustrate the conflicts that can arise when shortages occur. Farmers who rely on irrigation water from the project claim that Reclamation's attempts in 2001 to manage water for fish survival resulted in crop losses, while environmentalist, fishermen, and tribal representatives claim that subsequent actions by Reclamation in 2002 to

provide water for farmers resulted in low river flows, contributing to the death of more than 30,000 fish. As a result, litigation over river flows is ongoing, and federal and state legislation has been enacted to address the financial damages of the various parties.

State Water Managers Identified Potential Federal Actions to Help Them Meet Future Challenges

To identify potential federal actions to help states address their water challenges, GAO sought the views and suggestions of state water managers. Water managers from 47 states ranked actions federal agencies could take within five basic categories of federal activities:

- **Planning, constructing, operating, and maintaining water storage and distribution facilities.** State water managers reported their highest priority was more federal financial assistance to plan and construct their state's freshwater storage and distribution systems and also favored having more input in federal facilities operations. For example, over the next 10 years, 26 states are likely to add storage capacity, and 18 are likely to add distribution capacity. Consequently, water managers in 22 states said that more federal financial assistance would be most useful in helping their state meet its water storage and distribution needs. Reclamation and Corps officials understand the states' need for financial assistance for storage and distribution projects, and provide financial assistance on a project-by-project basis, as Congress authorizes and appropriates funds.
- **Collecting and sharing water data.** According to 37 states, federal agencies' data are important to their ability to determine the amount of available water. Managers in 39 states ranked expanding the number of federal data collection points, such as streamgage sites, as the most useful federal action to help their state meet its water information needs. Officials at USGS, USDA's Natural Resources Conservation Service, and Commerce's National Weather Service have ongoing efforts and/or plans to expand or improve their data collection programs.
- **Administering federal environmental protection laws.** According to 23 state water managers, more flexibility in how they comply with or administer federal environmental laws would help states meet their obligations under the laws while also meeting their water management goals. The managers cited instances in which they believed that federal environmental laws had restricted the state's ability to develop new storage capacity, distribute water, or meet the needs of offstream users. Officials from the Environmental Protection Agency, the Fish and

Wildlife Service, and the National Marine Fisheries Service said they try to accommodate state concerns about federal environmental laws, but were obligated to ensure that the laws are complied with and administered as Congress intended. However, they also stated that their agencies use the flexibility they have under current law to help the states administer or comply with federal environmental laws.

- **Participating in water-management agreements.** In the 29 states that participate in an interstate or international water-management agreement, state water managers ranked better coordination of federal agencies' participation in the agreements as the most useful among potential federal actions to help states develop, enforce, and implement such agreements. Seven of these managers said that federal agencies had not fulfilled their responsibilities under interstate or international agreements during the last 5 years. In these cases, the managers pointed out that lack of coordinated federal actions—such as the failure to establish federal priorities in a river basin—have created uncertainty for state participants in water-management agreements. Reclamation and Corps officials stated that in most cases they have fulfilled their responsibilities under water-management agreements, but occasionally circumstances outside their control, such as funding, prevent them from carrying out these responsibilities. Nevertheless, these officials stated, their participation in water-management agreements could be improved through their ongoing efforts to enhance coordination and communication with states and other water resource stakeholders, thus assisting in the implementation of water-management agreements.
- **Managing water rights for federal and tribal lands.** Of the 31 state managers reporting that federal agencies or tribal governments claim or hold water rights (either state granted or federal reserved) in their state, 12 reported that the most helpful potential federal action would be to consult more with the states on federal or tribal use of these rights, and 16 indicated that their state had experienced a conflict within the last 5 years between a federal agency's use of its water rights and the state's water management goals. For example, a federal agency had challenged the state over ground-water rights the state had issued to users because the withdrawals threatened federal surface-water rights. Disputes related to a federal agency's use of state-granted rights are typically heard in state water courts, where the federal agency receives no preference over any other water right holder.

While states have principal authority for water management, federal activities and laws affect or influence virtually every water management activity undertaken by states. Although the state managers value the many contributions of federal agencies to their efforts to ensure adequate water supplies, they also indicate that federal activities could better support their efforts in a number of areas. The information we collected from state water managers should be useful to the federal agencies in determining how their activities affect states and how they can be more supportive of state efforts to meet their future water needs. While we are not making a specific recommendation, we encourage Agriculture, Commerce, Energy, Homeland Security, Interior, Corps, and Environmental Protection Agency officials to review the results of our state survey and consider modifications to their plans, policies, or activities as appropriate to better support state efforts to meet their future water needs.

Appendix I contains the full survey results.

Agency Comments and Our Evaluation

We provided copies of our draft report to the Departments of Agriculture, Commerce, Energy, Homeland Security, and the Interior; the U.S. Army Corps of Engineers, and the Environmental Protection Agency. The Department of the Interior concurred with our findings and provided technical clarifications, which we incorporated as appropriate. Interior's complete letter is in appendix II. The other departments and agencies concurred with our findings and provided technical clarifications, which we incorporated as appropriate. They did not provide formal, written comments.

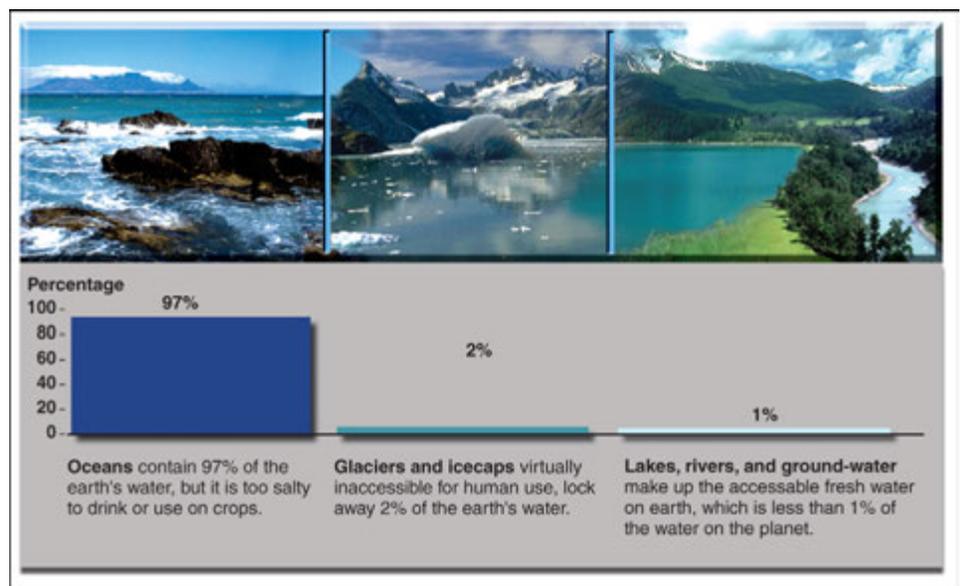
Introduction

Freshwater flows abundantly through the nation’s lakes, rivers, streams and underground aquifers. Nature regularly renews this precious resource, but users do not always have access to freshwater when and where they need it, and in the amount they need. To make more water available and usable throughout the United States, federal agencies have built massive water storage projects and engage in other water development, management, and regulatory activities. Federal agencies have control over water use in some cases, such as on federal lands or in interstate commerce, but state laws predominantly govern water allocation and use.

Water Is an Abundant and Renewable Resource but Not Always Readily Available

Water is one of the earth’s most abundant resources—covering about 70 percent of the earth’s surface. However, accessible freshwater makes up less than 1 percent of the earth’s water. As shown in figure 1, about 97 percent of the water on the planet is in the oceans and too salty to drink or to use to grow crops. Another 2 percent is locked away in glaciers and icecaps, virtually inaccessible for human use.

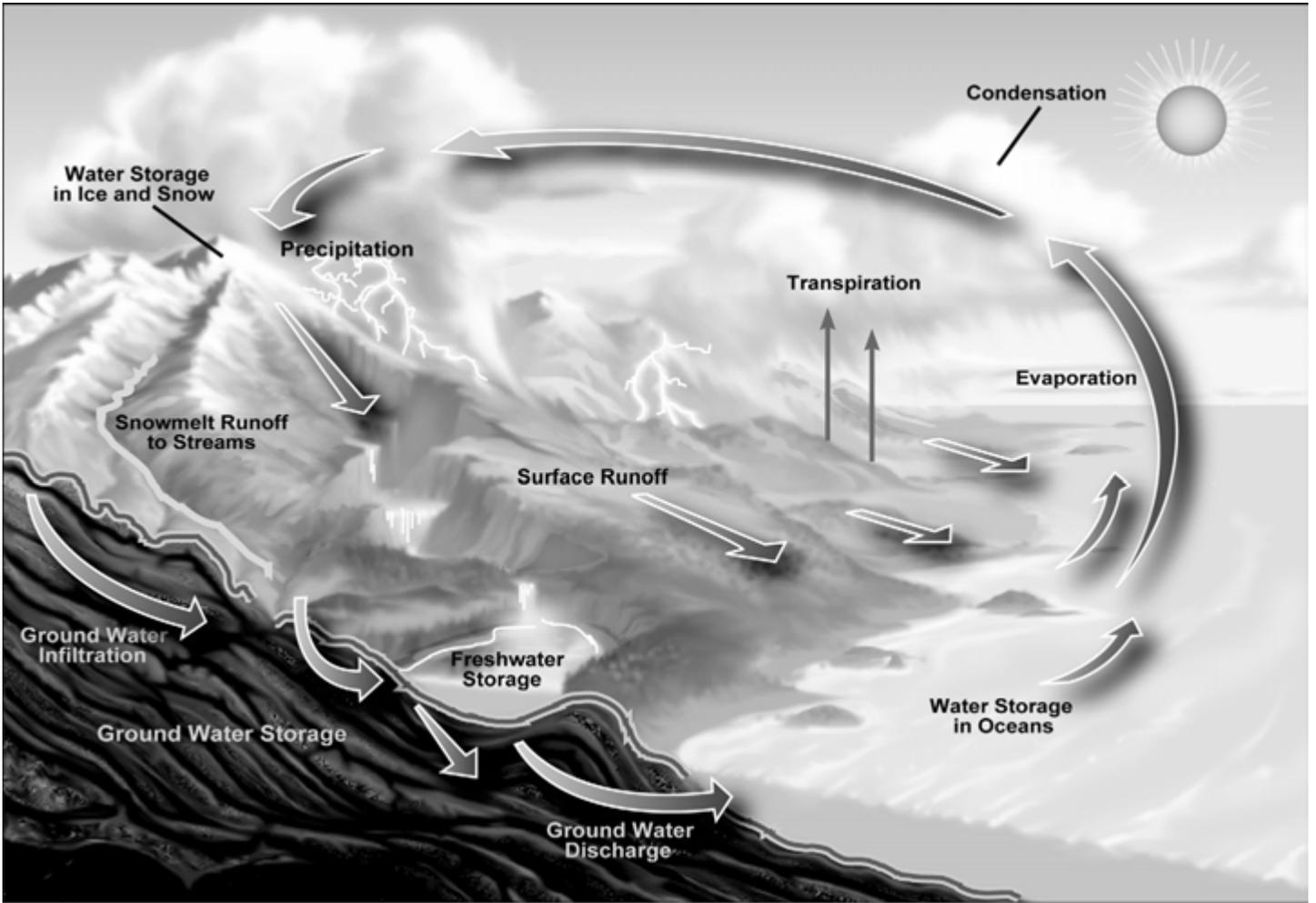
Figure 1: Water Sources, Volumes, and Percentages of Total Water



Source: USGS (data) and Art Explosion (photos); GAO (analysis).

Water is also a renewable resource—the water that was here a million years ago is still here today, continuously moving back and forth between the earth’s surface and atmosphere through the hydrologic cycle, as figure 2 shows. In this cycle, evaporation occurs when the sun heats water in rivers, lakes, or the oceans, turning it into vapor or steam that enters the atmosphere and forms clouds. The evaporative process removes salts and other impurities that may be picked up either naturally or as a result of human use. When the water returns to earth as rain, it runs into streams, rivers, lakes, and finally the ocean. Some of the rain soaks below the earth’s surface into aquifers composed of water-saturated permeable material such as sand, gravel, and soil, where it is stored as ground-water. When water returns to earth from the atmosphere as snow, it usually remains atop the ground until it melts, and then it follows the same path as rain. Some snow may turn into ice and glaciers, which can hold the water for hundreds of years before melting. The replenishment rates for these sources vary considerably—water in rivers is completely renewed every 16 days on average, but the renewal periods for glaciers, ground-water, and the largest lakes can run to hundreds or thousands of years.

Figure 2: The Hydrologic Cycle



Source: USGS.

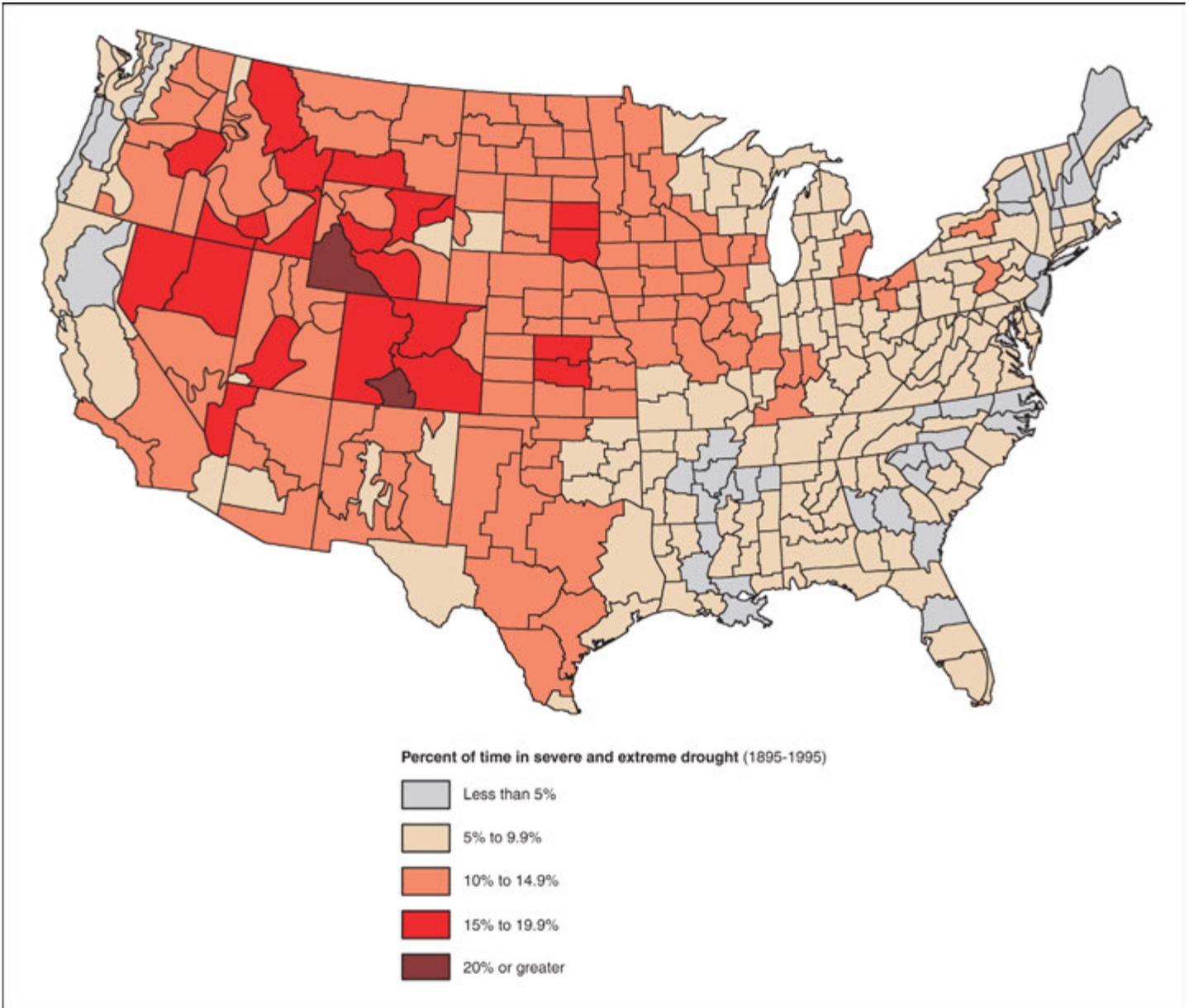
The United States has plentiful water resources. Rainfall averages nearly 30 inches annually, or 4,200 billion gallons per day throughout the continental 48 states. Two-thirds of the rainfall rapidly evaporates back to the atmosphere, but the remaining one-third flows into the nation's lakes, rivers, aquifers, and eventually to the ocean. These flows provide a potential renewable supply of about 1,400 billion gallons per day, or about 14 times the U. S. Geological Survey's (USGS) most recent estimate of daily consumptive use—the amount of water withdrawn from, but not immediately returned to, a usable water source.¹ Much larger quantities of freshwater are stored in the nation's surface and ground-water reservoirs. Reservoirs created by the damming of rivers can store about 280,000 billion gallons of water, lakes can hold larger quantities, and aquifers within 2,500 feet of the earth's surface hold water estimated to be at least 100 times reservoir capacity.

Despite the abundance and renewability of the water supply, variability in the hydrologic cycle creates uncertainty in the timing, location and reliability of supplies. For example, while rainfall averages 30 inches annually nationwide, the average for specific areas of the country generally increases from west to east, from less than 1 inch in some desert areas in the Southwest to more than 60 inches in parts of the Southeast. Drought and flood are a normal, recurring part of the hydrologic cycle. Meteorological droughts, identified by a lack of measured precipitation, are difficult to predict and can last months, years, or decades.² As shown in figure 3, at least some part of the United States has experienced severe or extreme drought conditions every year since 1896. Therefore, regions will encounter periods when supplies are relatively plentiful, or even excessive, as well as periods of shortage or extreme drought.

¹ USGS fully defines consumptive use as water that has evaporated, transpired (e.g., from vegetation), incorporated into products or crops, consumed by humans or livestock, or otherwise removed from the immediate water environment.

² While meteorological measurements are the first indicators of drought, other definitions of drought exist. For example, *agricultural drought* occurs when there is not enough moisture in the soil to meet the needs of a particular crop at a particular time, *hydrological drought* refers to deficiencies in water supplies, and *socioeconomic drought* is associated with supply and demand for water as an economic good.

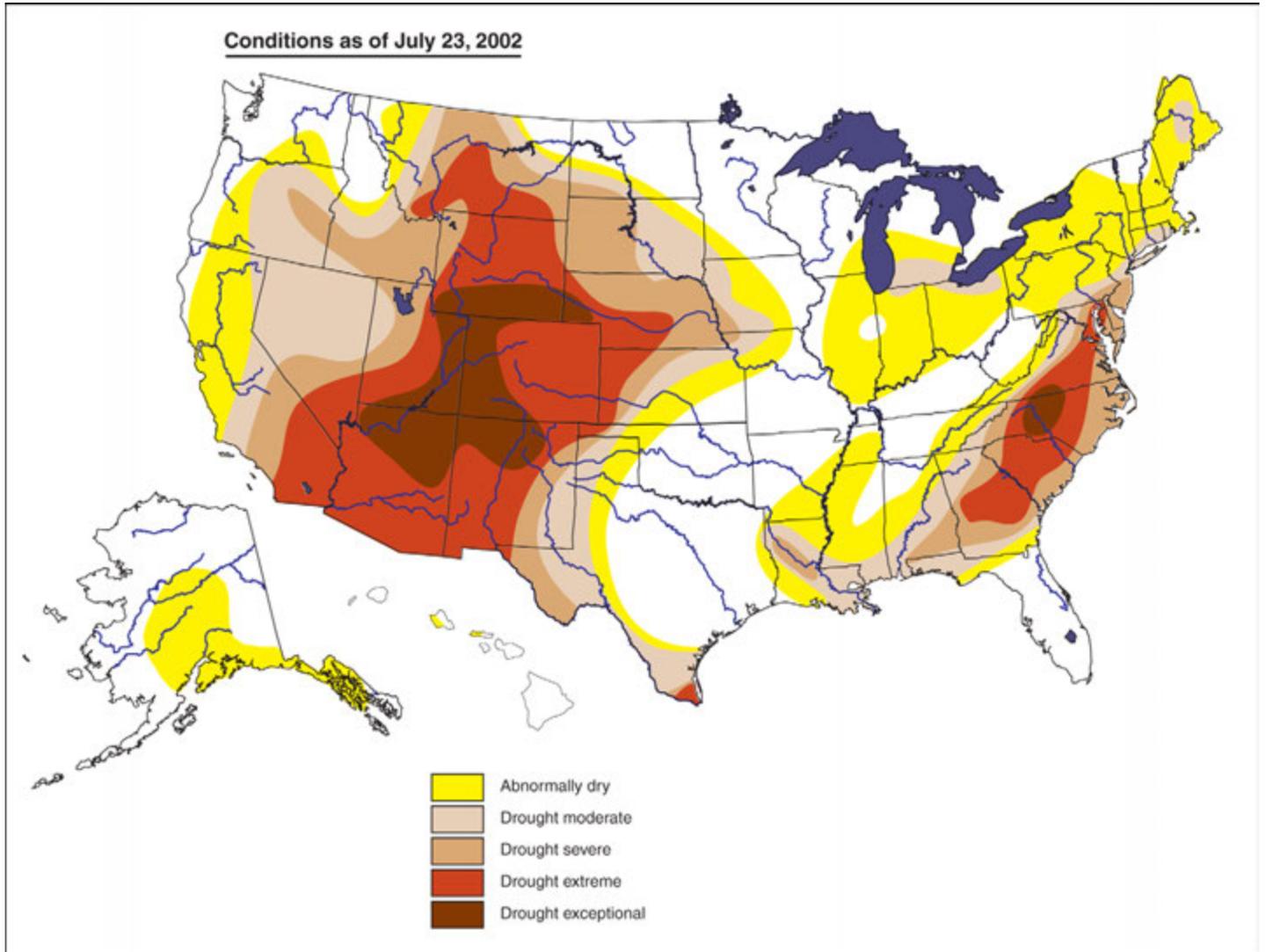
Figure 3: Percent Time in Severe and Extreme Drought Nationwide, 1895 to 1995



Source: National Drought Mitigation Center, University of Nebraska-Lincoln.

The variability in water availability was evident during 2002, when the United States had warmer than normal temperatures and below-average precipitation, which led to persistent or worsening drought throughout much of the nation. As the year began, moderate to extreme drought covered one-third of the nation and expanded to cover more than half of the nation during the summer, as shown in figure 4. Subsequently, heavy rainfall during July in Texas alleviated some of the drought conditions but led to widespread flooding. In addition, above average rainfall from September through November brought significant drought relief to the Southeast, where more than 4 years of drought had affected much of the region from Georgia to Virginia. However, severe drought conditions persisted over most of the interior Western states and the central and northern plains, with abnormal dryness across the Midwest through the end of the year.

Figure 4: Drought Conditions across the Nation as of July 23, 2002



Source: National Drought Mitigation Center, University of Nebraska-Lincoln; U.S. Department of Agriculture; and National Oceanic and Atmospheric Administration.

Water resource issues tend to be local or regional. Water flows naturally within river basins. USGS recognizes 352 river-basins in the United States that typically encompass 5,000 to 20,000 square miles. However, even within river basins, the availability of water resources varies. Sharing the water within basins is usually possible, but poses challenges because water ignores jurisdictional boundaries and these jurisdictions may have competing interests. Therefore, distributing water from where it is to where it is needed may require the coordination of local, regional, state, federal, and even foreign interests.

Transferring water from one basin to another is even more complicated, since water generally cannot be moved between basins unless transfer facilities (i.e., canals, pipelines, and pumps) are constructed. Moreover, in most cases, river basin boundaries do not coincide with those of major underground aquifer systems. For this reason, numerous entities are involved in the many aspects of water resource planning, management, regulation, and development, and solutions to water-management problems are often not easily found.

The Federal Government Has Authority to Manage Water Resources but Recognizes State Authorities

The federal government has authority to manage water resources, but it recognizes the states' authority to allocate and use water within their jurisdictions. Federal authority is derived from several constitutional sources, among them the Commerce Clause³ and the Property Clause.⁴ The Commerce Clause permits federal regulation of water that may be involved in or may affect interstate commerce,⁵ including efforts to preserve the navigability of waterways.⁶ The Property Clause permits federal regulation of water as necessary for the beneficial use of federal property.⁷ In addition,

³ U.S. Const. art. I, §8, cl. 3.

⁴ U.S. Const. art. IV, §3, cl. 2.

⁵ See e.g., *United States v. Byrd*, 609 F.2d 1204, 1210 (7th Cir. 1977); *Utah v. Marsh*, 740 F. 2d 799, 803 (10th Cir. 1984).

⁶ *United States v. Rio Grande Irrigation Co.*, 174 U.S. 690, 703 (1898).

⁷ *Id.*

under the Compact Clause of the Constitution, states cannot enter into agreements, or compacts, with each other—including those for the management of interstate waters—without the consent of Congress.⁸

Federal laws often require federal agencies engaged in water resource management activities to defer to state laws or cooperate with state officials in implementing federal laws. For example, under the Reclamation Act, the Bureau of Reclamation (Reclamation), within the Department of the Interior, must defer to and comply with state laws governing the control, appropriation, use, or distribution of water unless applying the state’s law would be inconsistent with an explicit congressional directive regarding the project.⁹ Similarly, the Water Supply Act of 1958 recognizes nonfederal interests in water supply development. The act states:

“It is declared to be the policy of the Congress to recognize the primary responsibilities of the States and local interests in developing water supplies for domestic, municipal, industrial, and other purposes and that the Federal Government should participate and cooperate with States and local interests in developing such water supplies in connection with...Federal navigation, flood control, irrigation, or multiple purpose projects.”¹⁰

Other federal laws have affirmed this recognition.¹¹

⁸ U.S. Const. art. I, §10, cl. 3.

⁹ 43 U.S.C. § 383; *California v. United States*, 438 U.S. 645 (1978).

¹⁰ 43 U.S.C. § 390b.

¹¹ *See, e.g.*, the McCarran Amendment, 43 U.S.C. § 666, which waives U.S. sovereign immunity and allows the federal government to be sued in state court to determine its rights to the use of water in a river system or other source. Both the Clean Water Act, as amended, 33 U.S.C. § 1251(g) *et seq.*, and the Endangered Species Act, 16 U.S.C. § 1531 *et seq.*, state that it is the policy of Congress that federal agencies cooperate with state and local agencies to resolve water resource issues.

Consequently, federal agencies have traditionally followed a policy of deferring to the states for managing and allocating water resources. Officials of federal agencies involved in water resources management recently reiterated that their role is providing assistance while recognizing state primacy for water allocation. For example, in November 2001 testimony before the Senate Committee on Environment and Public Works, the Assistant Secretary of the Army for Civil Works stated:

“I want to emphasize that Corps involvement in water supply is founded in deference to state water rights. During the enactment of the Flood Control Act of 1944, Congress made clear that we do not own the water stored in our projects...Our policy is to continue our commitment to consistency with state water law...we must respect the primacy of state water law.”

The Commissioner of the Bureau of Reclamation echoed this approach in his testimony at the same hearing, stating that it is important to emphasize the primary responsibility of local water users in developing and financing water projects, with Reclamation playing the important roles of maintaining infrastructure and applying expertise to help locals meet water needs. Specifically addressing Western water challenges in August 2002, he stated:

“As in the past, Reclamation will continue to honor State water rights...working with the states, our partners and all water users to leverage resources, to work at collaborative problem solving and to develop long-term solutions.”

State Laws Governing Water Allocation and Use Generally Follow Two Basic Doctrines

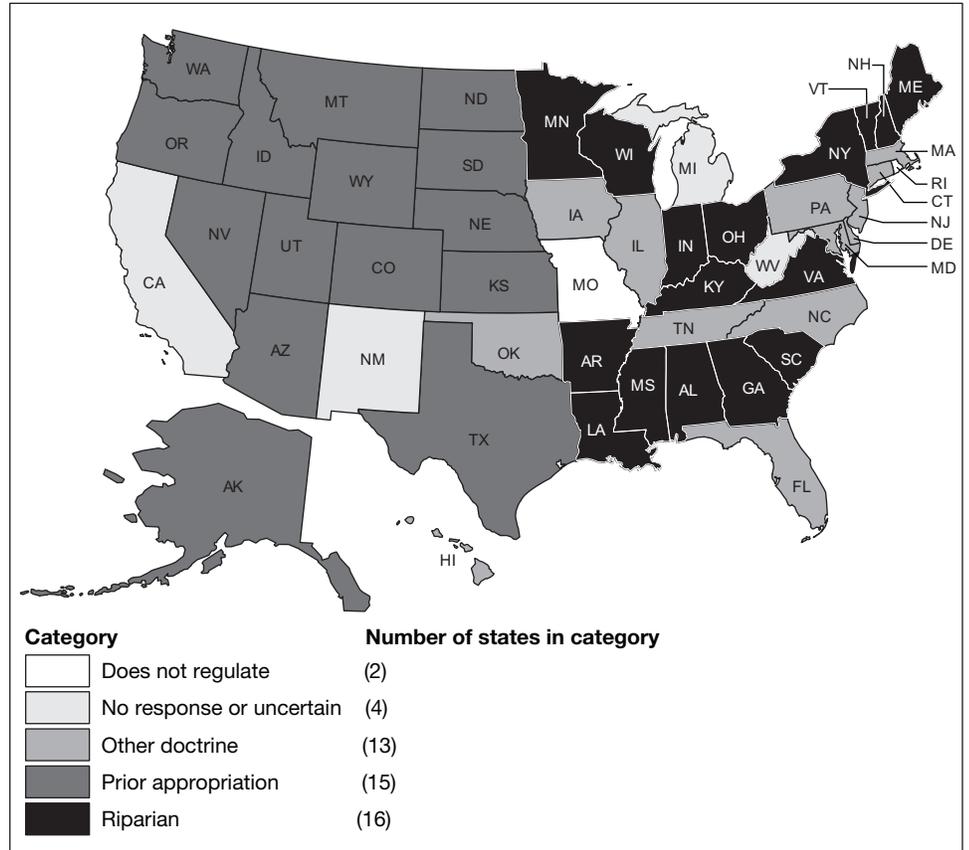
The variety of state water laws relating to the allocation and use of water can generally be traced to two basic doctrines: the riparian doctrine and the prior appropriation doctrine. Under the riparian doctrine, water rights are linked to land ownership—owners of land bordering a waterway have a right to use the water that flows past the land for any reasonable purpose. Landowners may, at any time, use water flowing past the land even if they have never done so before; all landowners have an equal right to use the water and no one gains a greater right through prior use. In contrast, the prior appropriation doctrine does not link water rights with land ownership. Water rights are instead linked to priority and beneficial water use—parties who obtain water rights first generally have seniority for the use of water over those who obtain rights later, and rights holders must put the water to beneficial use or abandon their right to use the water. Simply put, “first in time, first in right” and “use it or lose it.” When there is a water shortage, under the riparian doctrine all water users share the shortage in

proportion to their rights, while under the prior appropriation doctrine, shortages fall on those who last obtained a legal right to use the water.

For managing surface-water allocation and use, Eastern states generally adhere to riparian doctrine principles and Western states generally adhere to prior appropriation doctrine principles. We obtained information on the water management doctrines of 47 states from our 50-state Web-based survey of state water managers. As shown in figure 5, 16 states follow either common-law riparian or regulated riparian (state permitted) doctrine, 15 states follow prior appropriation doctrine, 13 states follow other doctrines, and 2 states do not regulate surface-water allocation.¹²

¹² Three states did not respond to our survey, and one state was uncertain.

Figure 5: Doctrines Used by States to Govern Surface-Water Allocation

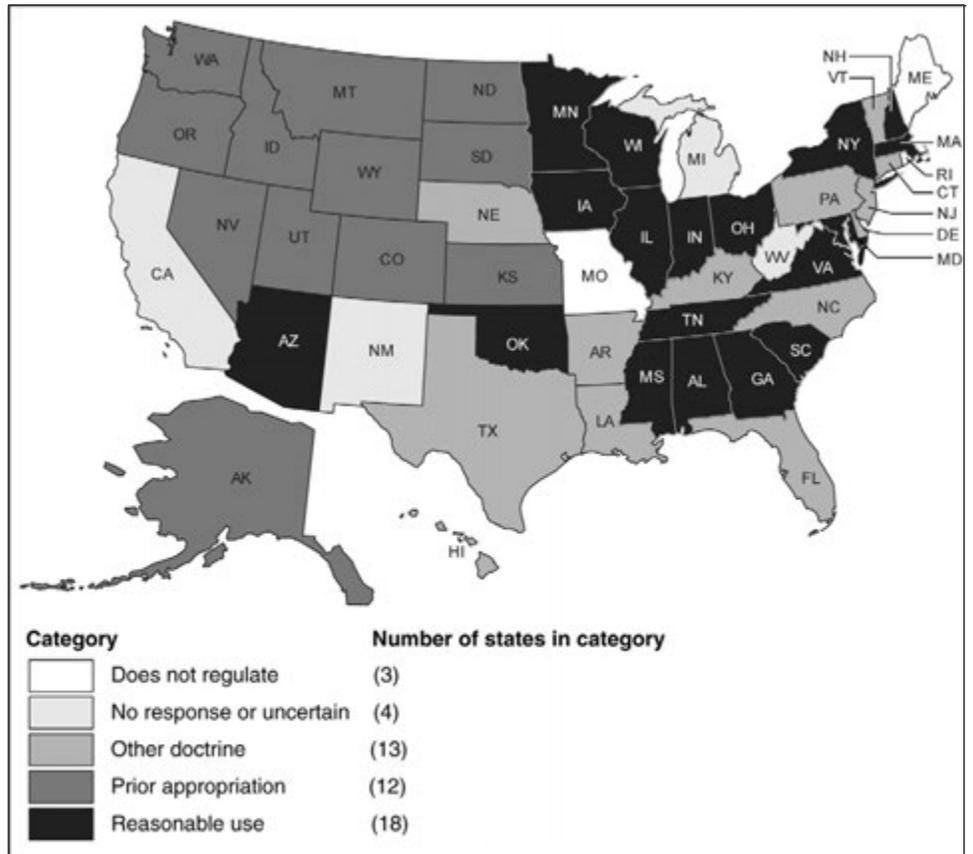


Source: GAO analysis of state water managers' responses to GAO survey.

Special rules apply to allocating ground-water rights, but most state approaches reflect the principals of prior appropriation or riparian doctrines, with some modifications that recognize the unique nature of ground-water. As shown in figure 6, 18 states follow the riparian-derived doctrine of reasonable use; 12 states follow the prior appropriation doctrine; 13 states follow other approaches, such as granting rights to water beneath property to the landowners (absolute ownership) or dividing rights among landowners based on acreage (correlative rights); and 3 states do not regulate ground-water allocation.¹³

¹³ Three states did not respond to our survey, and one state was uncertain.

Figure 6: Doctrines Used by States to Govern Ground-Water Allocation

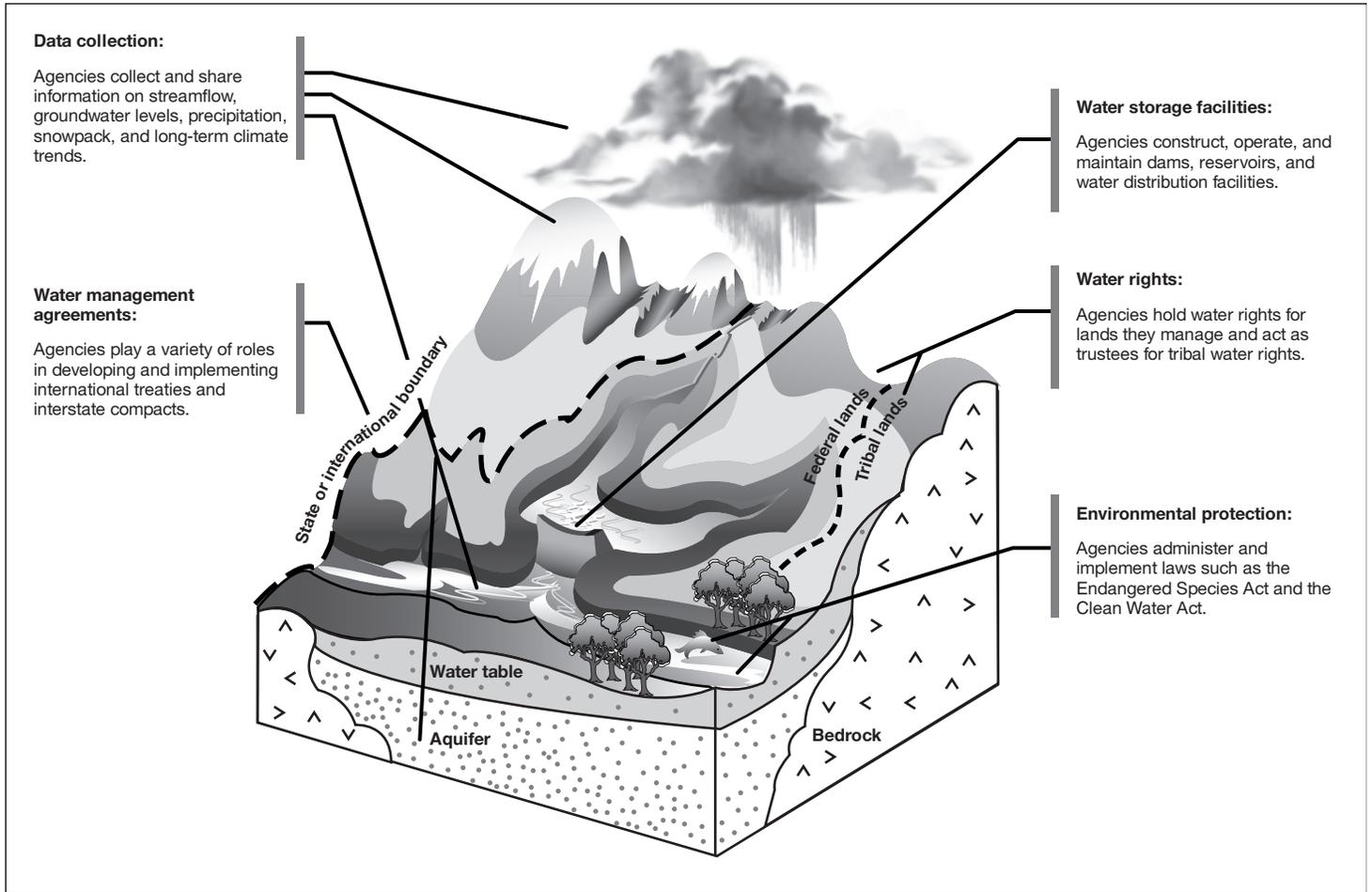


Source: GAO analysis of state water managers' responses to GAO survey.

Multiple Federal Agencies Have Water Management Responsibilities

Many federal agencies play a role in managing the nation's freshwater resources, as shown in figure 7. They build, operate and maintain large storage and distribution facilities; collect and share water availability and use data; administer clean water and environmental protection laws; assist in developing and implementing water-management agreements and treaties; and act as trustees for federal and tribal water rights. In performing these activities, each federal agency attempts to coordinate with other federal agencies and state water managers and users.

Figure 7: Overview of Federal Activities



Source: GAO.

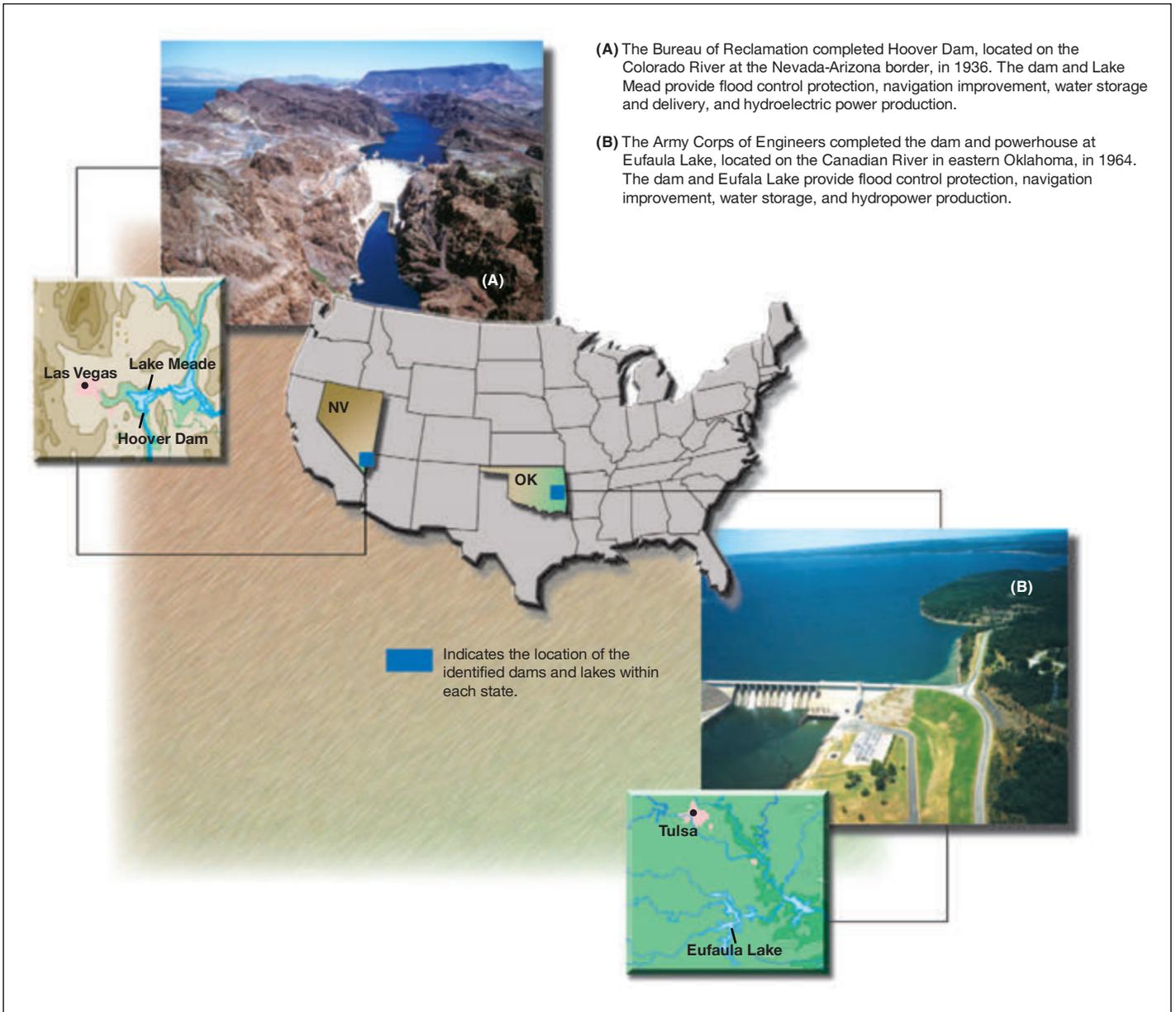
Reclamation and the Corps of Engineers Manage Large Water Storage Facilities

Reclamation and the Corps of Engineers construct, operate, and maintain large facilities to store and manage untreated water, such as Reclamation's Hoover Dam in Arizona and the Corps' Eufaula Lake in Oklahoma (see fig. 8).¹⁴ While federal facilities compose only about 5 percent of the estimated 80,000 dams in the nation, they include many of the largest storage facilities, holding huge quantities of water for a wide variety of purposes, such as irrigation, industrial and municipal uses.¹⁵ Reclamation's water delivery quantities are usually specified under long-term contracts at subsidized prices, while the Corps provides water storage space in reservoirs under long-term contracts.

¹⁴ For information on national needs for drinking water and wastewater infrastructure, see U.S. General Accounting Office, *Water Infrastructure: Information on Financing, Capital Planning, and Privatization*, [GAO-02-764](#) (Washington, D.C., May 5, 1999).

¹⁵ Other federal agencies have facility management responsibilities not directly related to water storage and distribution. For example, the Federal Emergency Management Agency within the Department of Homeland Security is responsible for coordinating dam safety efforts, and the Federal Energy Regulatory Commission—an independent five-member commission appointed by the President and confirmed by the Senate—licenses and regulates non-federal hydropower projects.

Figure 8: Reclamation's Hoover Dam and the Corps' Eufaula Lake Water Storage Facilities



Sources: Bureau of Reclamation and U.S. Army Corps of Engineers (photos and captions); MapArt and Art Explosion (topographical and U.S. maps).

Reclamation has constructed irrigation, water storage, and distribution facilities throughout the 17 Western states. Today, these facilities serve many additional purposes, including municipal and industrial water supplies, power generation, recreation, and flood control. Reclamation manages about 348 reservoirs, with a total storage capacity of 245 million acre-feet of water, and approximately 250 diversion dams that provide water to approximately 9 million acres of farmland and nearly 31 million people.¹⁶ Reclamation also manages about 18,000 miles of water delivery facilities and operates a variety of additional facilities, such as pumps and structures for fish passage, to meet the needs of water users.

Reclamation no longer operates and maintains all of the facilities that it has built. It has transferred operation and maintenance responsibilities for many of the facilities it owns—primarily to irrigation districts.¹⁷ Typically, Reclamation has retained operation and maintenance responsibilities for water facilities that are large, serve multiple purposes, or control water diversions across state or international boundaries. Reclamation currently has only one ongoing water storage or distribution construction project: the Animas-La Plata project in Southwest Colorado and Northwest New Mexico, which will store and deliver water to two Indian tribes and others for irrigation, municipal and industrial uses.¹⁸ Congress has authorized but not funded additional Reclamation water resources projects, such as the Dixie Project in Utah, which was originally authorized in 1964.

Through its Civil Works Program, the Corps constructed and now operates and maintains water storage facilities across the nation.¹⁹ Corps projects originally were intended to control floods and provide for navigation, but Congress has since expanded the agency's mandate to store water for some municipal, industrial, irrigation, recreation, and/or hydropower uses. Today, the Corps manages 541 reservoirs with a total storage capacity of

¹⁶ An acre-foot is the amount needed to cover an acre of land with 1 foot of water, sufficient to meet the needs of a family of four for 1 year.

¹⁷ According to the Reclamation officials, the agency has transferred operation and maintenance responsibilities for 415 water storage and delivery facilities since Reclamation constructed them.

¹⁸ For more information, see U.S. General Accounting Office, *Animas-La Plata Project: Status and Legislative Framework*, [GAO/RCED-96-1](#) (Washington, D.C., Nov. 17, 1995).

¹⁹ Unlike Reclamation, the Corps does not own or operate water distribution facilities.

330 million acre-feet, of which about 15 percent is jointly used for irrigation and other purposes, and another 3 percent for municipal and industrial uses. Although municipal, industrial, and agricultural water supply storage is a small portion of total storage capacity, the Corps estimates that the facilities supply water to nearly 10 million people in 115 cities. The Corps has rarely undertaken construction of new water storage facilities since the 1980s. In accordance with the 1986 Water Resources Development Act, the Corps has transferred to non-federal interests the operation and maintenance responsibilities for the one storage facility it has constructed since 1986.

In addition to Reclamation and the Corps, federal agencies responsible for managing natural resources—such as USDA’s Forest Service, and Interior’s Bureau of Land Management, Fish and Wildlife Service, and National Park Service—also construct water facilities on their lands to support their agencies’ objectives, and authorize the construction of facilities by other parties on their lands.²⁰ Interior’s Bureau of Indian Affairs, acting as trustee for tribal interests, authorizes similar facilities on tribal lands. The dams on these federal or tribal lands are typically much smaller than those operated by Reclamation and the Corps; many are not inventoried unless they meet certain size or hazard criteria. More specifically:

- Forest Service lands contain about 2,350 inventoried dams to provide water for many purposes such as fire suppression, livestock, recreation, and fish habitat;
- Bureau of Land Management lands contain about 1,160 dams, primarily providing water for livestock and wildlife;
- the Fish and Wildlife Service has an estimated 15,000 water storage and distribution facilities, primarily to provide water for fisheries as well as for waterfowl and migratory bird habitat;
- the National Park Service has 451 dams within its boundaries to manage water for habitat, fire suppression, flood control and recreation; and

²⁰ Non-federal parties also construct and operate water storage projects on federal lands. Federal natural resource agencies issue permits for these activities. For example, the National Park Service issued a permit to the City of San Francisco to construct and operate, within the Yosemite National Park, Hetch Hetchy reservoir, the primary water source for the city.

- the Bureau of Indian Affairs owns an estimated 500 to 1,000 dams that control flood and erosion and manage water for irrigation, flood control, stockwater, and recreation.

Several Agencies Collect and Share Water Data

Several federal agencies collect and distribute information on water availability and use including surface-water, ground-water, rainfall, and snowpack. Interior's USGS is primarily responsible for collecting, analyzing, and sharing data on water availability and use. It collects, analyzes, and shares information on surface-water availability, ground-water availability, and water use through four programs:

- The National Streamflow Information Program collects surface-water availability data through its national streamgage network, which continuously measures the level and flow of rivers and streams at 7,000 stations nationwide, as shown in figure 9, for distribution on the Internet.
- The Ground-Water Resources Program collects information from about 600 continuous ground-water-monitoring stations in 39 states and Puerto Rico for distribution on the Internet. In addition, the agency manually collects ground-water data intermittently in thousands of locations; compiling and reporting this data can take months.
- The National Water Use Information Program compiles extensive national water use data collected from states every 5 years for the purpose of establishing long-term water use trends.
- The Cooperative Water Program is a collaborative program with states and other entities to collect and share surface and ground-water data.

Figure 9: USGS' Nationwide Streamgage Network



Source: USGS.

Commerce's National Weather Service and USDA's Natural Resources Conservation Service combine their data, together with USGS streamgage data, to forecast water supplies and floods. They post water supply forecasts twice a month on the Internet, and they provide daily, and sometimes hourly, flood forecast information to water storage facility management agencies and other interested parties through arranged communication channels. The National Weather Service measures rainfall with over 10,000 gages nationwide, providing data for weather and climate forecasts; it also collects snowfall data in cities and rural areas. The Natural Resources Conservation Service operates 670 automated, high-elevation snow and climate measurement sites in 12 states; these sites use advanced radio technology to report data on the Internet about once each day. The agency also periodically conducts manual surveys at about 1,000 other stations; it supplies data from these sites to federal and non-federal water managers who request it.

Federal agencies often collect water data or conduct water resources research in support of their own responsibilities. For example, both the National Park Service and the Forest Service collect streamflow data to supplement USGS' streamgauge information; the Bureau of Indian Affairs conducts some research on water availability on tribal lands as a part of the agency's trust responsibilities to tribes; Reclamation and the Corps collect data on reservoir levels and water flows through their facilities; and Agriculture's Agricultural Research Service and Cooperative State Research Education and Extension Service conduct and fund water quantity and quality research.

Several Agencies Administer Clean Water and Environmental Protection Laws

Several federal agencies administer clean water and environmental protection laws that affect water resource management. The Environmental Protection Agency administers the Clean Water Act, as amended—the nation's principal federal law regulating surface-water quality. States and localities play a significant role in its implementation. Under the act, among other things, municipal or industrial parties that discharge pollutants must meet the regulatory requirements for pollution control.²¹ The Environmental Protection Agency administers a permit system that requires control of discharges to meet technology and/or water quality based requirements. In addition, the act requires parties that dispose of dredge or fill material in the nation's waters, including wetlands, to obtain a permit from the Corps.²² Furthermore, the act requires states to develop and implement programs to control non-point sources of pollution, which include run off from chemicals used in agriculture and from urban areas.²³ The Clean Water Act can affect available water supplies, for example, by reducing offstream use or return flows to address water quality concerns.

²¹ 33 U.S.C. §1311(a).

²² 33 U.S.C. §1344(a), (d).

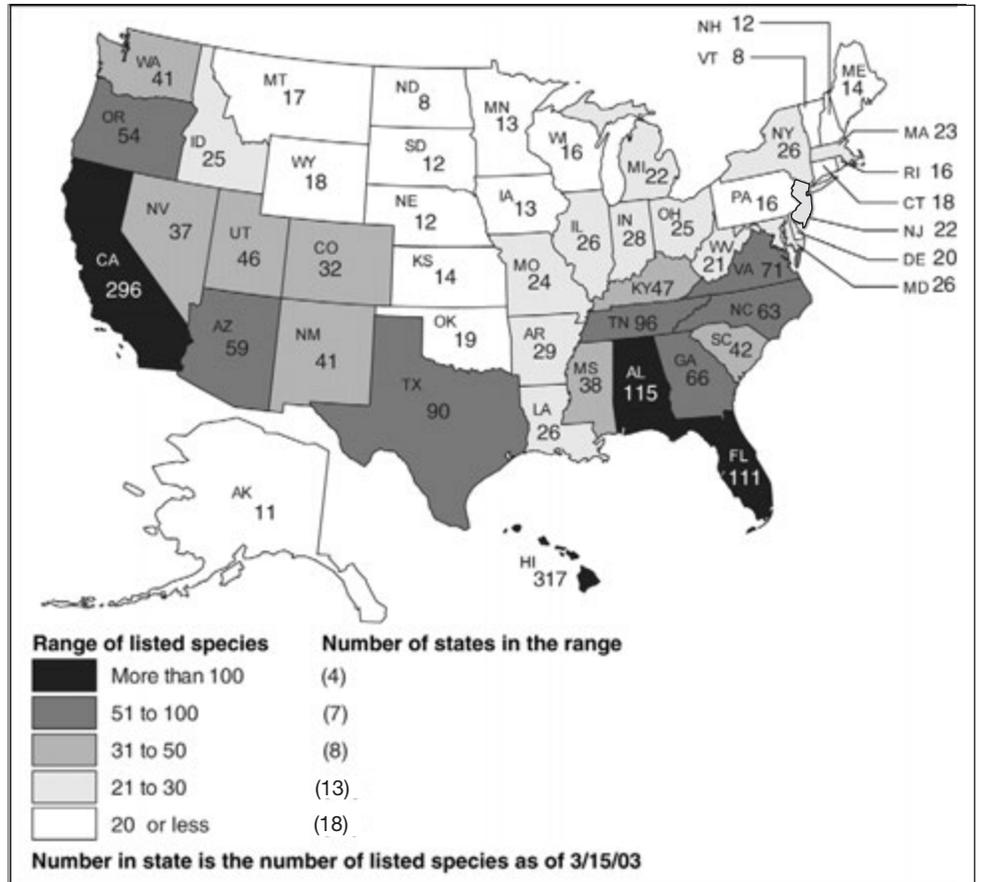
²³ 33 U.S.C. §1329.

Interior's Fish and Wildlife Service and Commerce's National Marine Fisheries Service are responsible for administering the Endangered Species Act. This act requires federal agencies to ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of any listed species of plant or animal or adversely modify or destroy designated critical habitat.²⁴ The Fish and Wildlife Service is responsible for administering the act for land and freshwater species, and the National Marine Fisheries Service is responsible for marine species, including Pacific salmon, which spend part of their lifespans in freshwater. To implement the act, the agencies identify endangered or threatened species and their critical habitats, develop and implement recovery plans for those species, and consult with other federal agencies on the impact that their proposed activities may have on those species. If the Fish and Wildlife Service or National Marine Fisheries Service finds that an agency's proposed activity will jeopardize an endangered or threatened species, then a "reasonable and prudent alternative" must be identified to ensure the species is not jeopardized.²⁵ Numerous endangered species rely on the nation's waters, as shown in figure 10. The Endangered Species Act can affect water management activities, for example, by necessitating certain stream flow levels to avoid jeopardizing listed species or critical habitat.

²⁴ 16 U.S.C. §1536(a)(2).

²⁵ 16 U.S.C. §1536(a)(3)(a).

Figure 10: Number of Listed Threatened and Endangered Species by State, as of March 2003

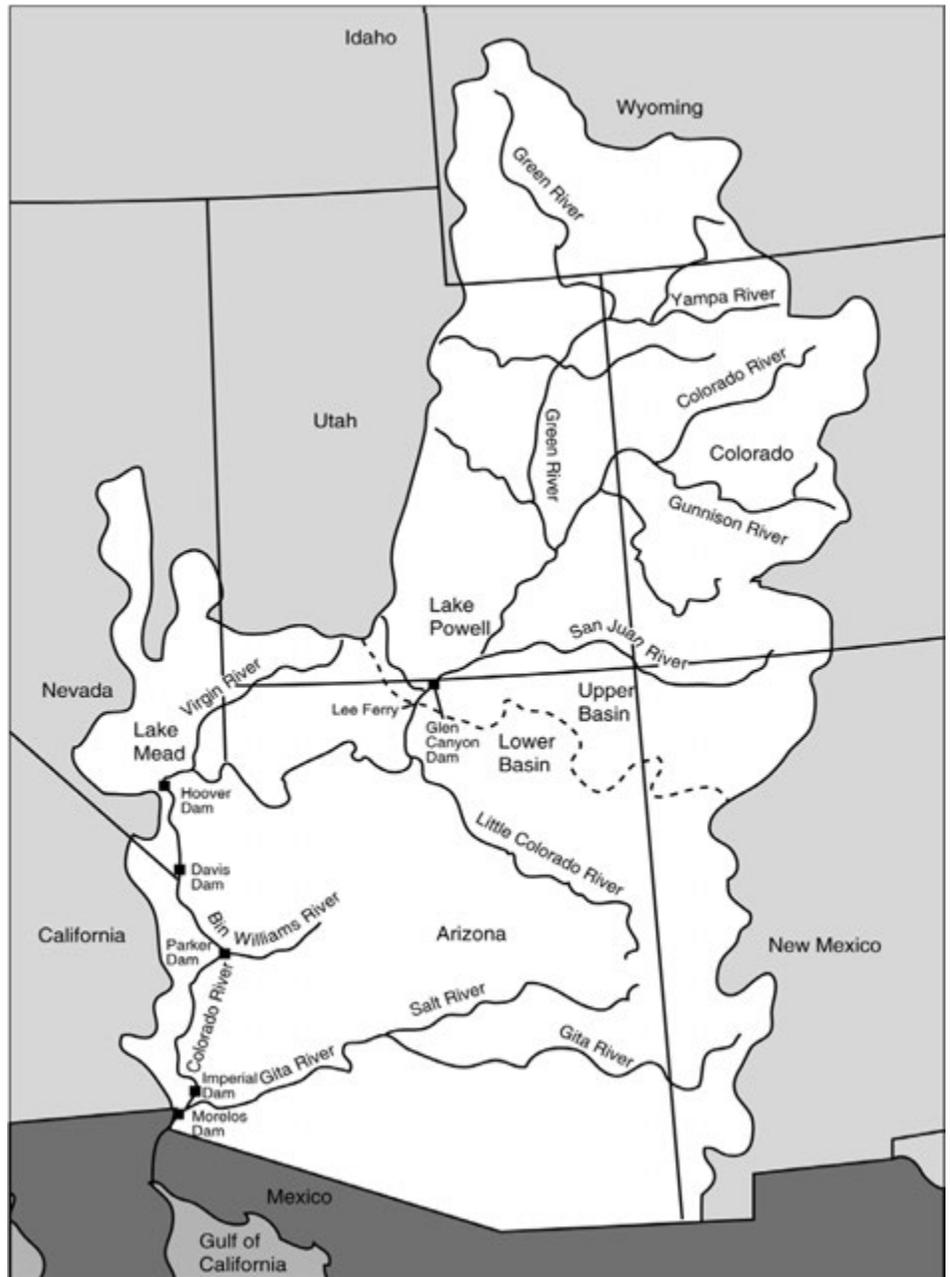


Sources: U.S. Fish and Wildlife Service (data) and GAO (analysis).

**Agencies Help Develop
and Implement
Water-Management
Agreements**

States enter into agreements—interstate compacts—to address water allocation, quality, and other issues on rivers and lakes that cross state borders. According to the Fish and Wildlife Service, at least 26 interstate compacts address river water allocation between two or more states; 7 address water pollution issues; and 7 address general water resource issues, including flood control. Federal agencies may assist in developing and implementing these compacts, provide technical assistance, participate in and consult with oversight bodies, develop river operating plans, act as stewards of tribal and public natural resources, and enforce compacts. For example, the Supreme Court appointed the Secretary of Interior as the River Master responsible for implementing the water allocation formula of the 1922 Colorado River Compact. Under the compact, the states of the Upper Colorado River Basin (Colorado, New Mexico, Utah, and Wyoming), as shown in figure 11, are required to deliver to the states of the Lower Basin (Arizona, California, and Nevada) a minimum of 75 million acre-feet of water over 10-year periods.

Figure 11: Colorado River Basin Crosses Seven State Borders



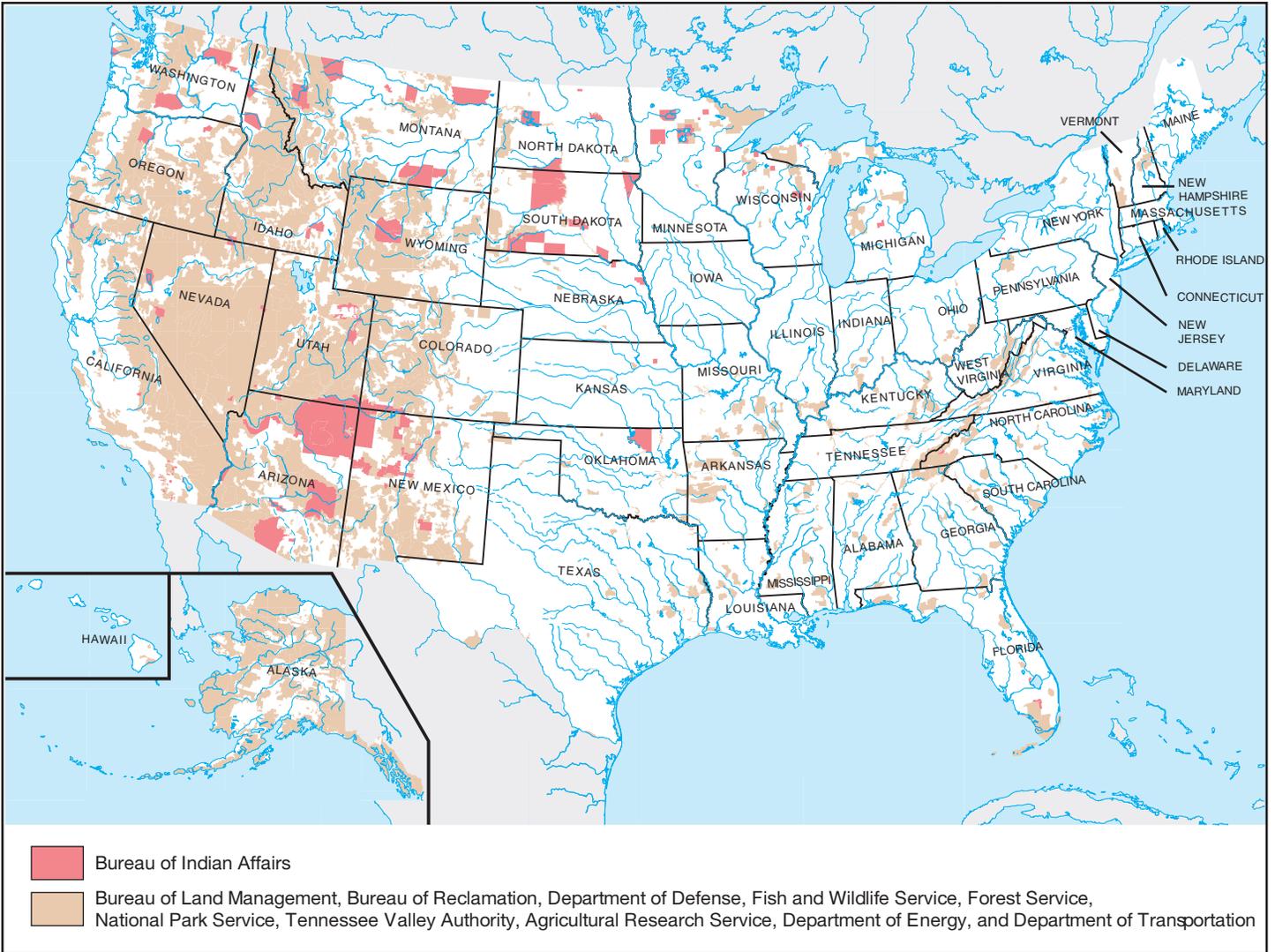
Source: Bureau of Reclamation.

Through international treaties with Canada and Mexico, the United States can coordinate activities such as water allocation, flood control, water quality, and power generation activities, as well as resolve water related disputes along the nations' international borders. The 1909 Boundary Water Treaty established the International Joint Commission of the United States and Canada, and the 1944 Water Treaty with Mexico provided the International Boundary and Water Commission with the authority to carry out the treaty. These bi-national commissions help the member nations coordinate water management activities, monitor water resources, and resolve disputes. For example, the International Boundary Water Commission recently facilitated an agreement between Mexico and the United States regarding Mexico's water debt under the treaty.

Agencies Are Responsible for Federal and Tribal Water Rights

Numerous federal natural resources management agencies and the Bureau of Indian Affairs are trustees for the water rights of federal and tribal lands. The states grant the great majority of water rights to these agencies, but the agencies also have federal reserved rights. The federal government has reserved water rights to fulfill the purposes of federal lands such as national forests, national parks, and wildlife refuges and for tribal lands. Federal lands account for 655 million acres, or 29 percent, of U.S. lands, primarily in the Western states as shown in figure 12.

Figure 12: Federal and Tribal Lands in the United States



Source: National Atlas of the United States.

The exact number and amount of federal reserved rights are not known. However, Bureau of Land Management officials estimate that 20 percent of the agency's water rights are federally reserved, largely for underground springs. The Fish and Wildlife Service estimated that it has very few federally reserved rights: almost all water rights for their activities are state granted. A Forest Service official estimated that half of the service's water rights are federally reserved. The National Park Service relies on both federal reserved and state granted rights, depending on the specific park circumstances.

The Bureau of Indian Affairs, as trustee for tribal resources in the United States, has the primary statutory responsibility for protecting tribal water rights. The Supreme Court has found that water rights in a quantity sufficient to fulfill the purposes of the reservations are implied when the United States establishes reservation lands for a tribe.²⁶ Tribes typically use water rights to ensure water is available for irrigation, hydropower, domestic use, stockwatering, industrial development and the maintenance of instream flows for rivers.

Objectives, Scope, and Methodology

To assist congressional deliberations on freshwater supply issues, we identified (1) the current conditions and future trends for U.S. water availability and use, (2) the likelihood of shortages and their potential consequences, and (3) state views on how federal activities could better support state water management efforts to meet future demands.

To identify the current conditions and future trends for U.S. water availability and use, we met with federal officials and collected and analyzed documentation from Reclamation, USGS, the Bureau of Indian Affairs, Bureau of Land Management, National Park Service, and Fish and Wildlife Services within the Department of the Interior; the Natural Resources Conservation Service, Forest Service, Rural Utilities Service, Agriculture Research Service, Economic Research Service, and Cooperative State Research, Education, and Extension Service within the Department of Agriculture; the National Weather Service and National Marine Fisheries Service within the Department of Commerce; the Army Corps of Engineers within the Department of Defense; the Federal Emergency Management Agency within the Department of

²⁶ *Winters v. United States*, 207 U.S. 564 (1908).

Homeland Security; the Environmental Protection Agency; and the Federal Energy Regulatory Commission. Although rising demands and environmental pressures have encouraged discussions of market based solutions, we assumed a continuation of current pricing and quantity allocation practices in our discussion of supply and demand trends and water shortages.

We analyzed the reports of past federal water commissions, including the U.S. Water Resources Council, National Water Commission, and the Western Water Policy Review Advisory Commission, and nonfederal organizations, such as the Western States Water Council and American Water Works Association. We also analyzed National Research Council, Congressional Research Service, and our own reports.

To determine the likelihood of shortages and their potential consequences, we analyzed water shortage impact information from the National Drought Mitigation Center at the University of Nebraska-Lincoln, the National Oceanic and Atmospheric Administration's National Climatic Data Center, and from the states. We did not assess the accuracy of the various estimates of the economic impacts of water shortages. We obtained information from Congressional Research Service reports, our own reports, and analyzed media accounts of water shortages. We obtained the views of state water managers regarding the likelihood of water shortages using a Web-based survey of managers in the 50 states.

To obtain states' views on how federal activities could better support state water management efforts to meet future demands, we conducted a Web-based survey of state water managers in the 50 states. We developed the survey questions by reviewing documents and by talking with officials from the federal agencies listed above and the state water managers in three state offices—Arizona, Illinois, and Pennsylvania. The questionnaire contained 56 questions that asked about state water management; collection and dissemination of state water quantity data by federal agencies; federal water storage and conveyance within their state; the effects of federal environmental laws on state water management; the effects of interstate compacts and international treaties on state water management; and the effects of federal and tribal rights to water on state water management.

We pretested the content and format of the questionnaire with state water managers in Georgia, Florida, Virginia, and Washington. During the pretest we asked the state managers questions to determine whether

(1) the survey questions were clear, (2) the terms used were precise, (3) the questionnaire placed an undue burden on the respondents, and (4) the questions were unbiased. We also assessed the usability of the Web-based format. We made changes to the content and format of the final questionnaire based on pretest results.

We posted the questionnaire on GAO's survey Web site. State water managers were notified of the survey with an E-mail message sent before the survey was available. When the survey was activated, an E-mail message informed the state water managers of its availability and provided a link that respondents could click on to access the survey. This E-mail message also contained a unique user name and password that allowed each respondent to log on and fill out their own questionnaire. To maximize our response rate we sent reminder E-mails, contacted non-respondents by telephone, and mailed follow-up letters to non-respondents.

Questionnaires were completed by state water officials in 47 states (California, Michigan, and New Mexico did not participate) for a response rate of 94 percent. We performed analyses to identify inconsistencies and potential errors in the data and contacted respondents via telephone and E-mail to resolve these discrepancies. We did not conduct in-depth assessments of the state water official's responses. A technical specialist reviewed all computer programs for analyses of the survey data. Aggregated responses of the survey are in appendix I.

We conducted our work from March 2002 through May 2003 in accordance with generally accepted government auditing standards.

Freshwater Availability and Use Is Difficult to Forecast, but Trends Raise Concerns about Meeting Future Needs

No federal entity has comprehensively assessed the availability and use of freshwater to meet the nation's needs in 25 years. While forecasting water use is notoriously difficult, numerous signs indicate that our freshwater supply is reaching its limits. Surface-water storage capacity is strained and ground-water is being depleted as demands for freshwater increase because of population growth and pressures to keep water instream for environmental protection purposes. The potential effects of climate change create additional uncertainty about the future availability and use of water.

National Water Availability and Use Has Not Been Assessed in Decades

National water availability and use was last comprehensively assessed in 1978.¹ The U.S. Water Resources Council, established by the Water Resources Planning Act in 1965,² assessed the status of the nation's water resources—both surface-water and ground-water—and reported in 1968 and 1978 on their adequacy to meet present and future water requirements. The 1978 assessment described how the nation's freshwater resources were extensively developed to satisfy a wide variety of users and how competition for water had created critical problems, such as shortages resulting from poorly distributed supplies and conflicts among users. The Council has not been funded since 1983.

While water availability shortages have occurred as expected, total water use actually declined nearly 9 percent between 1980 and 1995, according to USGS.³ As figure 13 shows, after continual increases in use from 1960 to 1980, total use began declining in 1980.

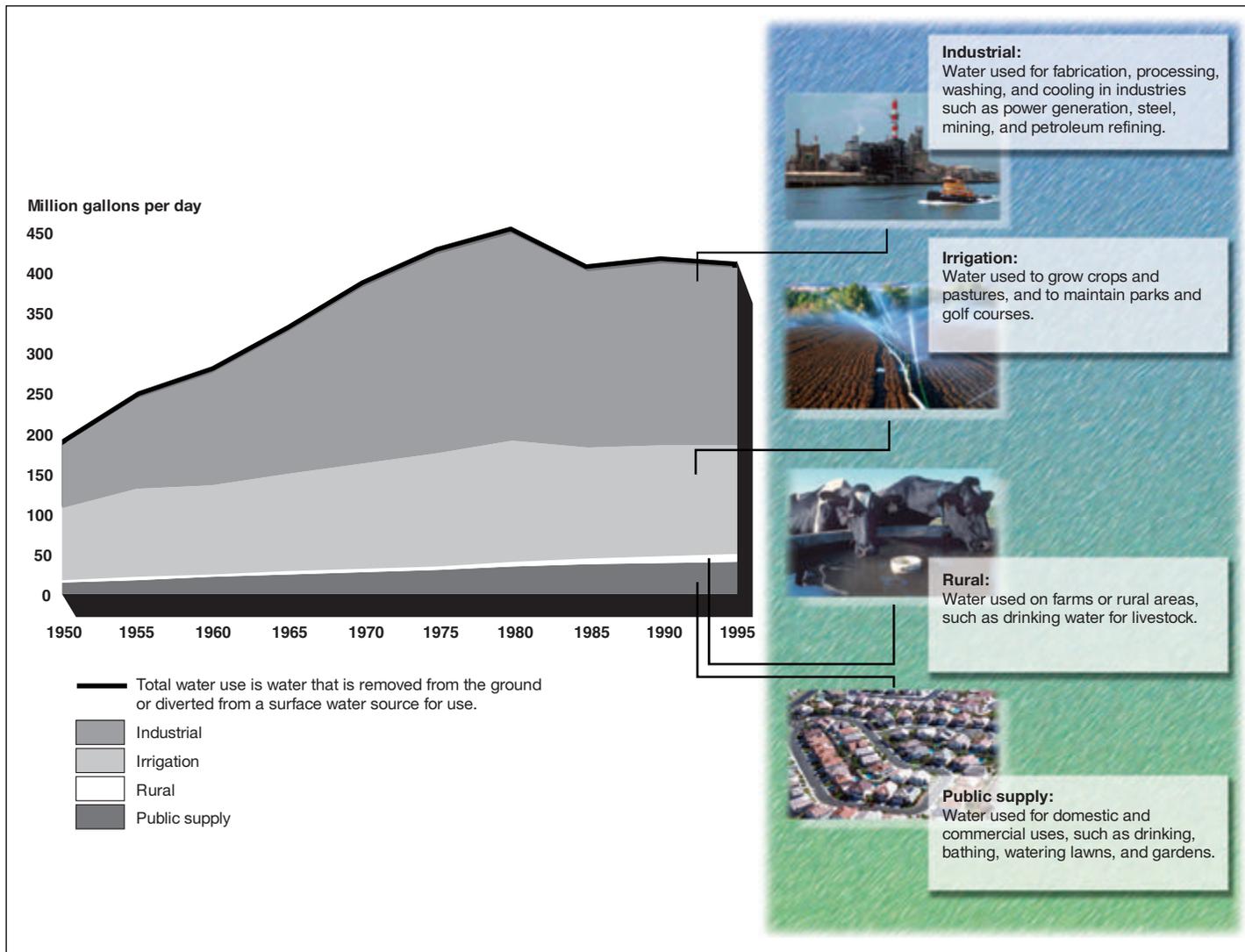
¹ In its 2002 report to Congress, USGS described the concepts for a national assessment of freshwater availability and use. (*Report to Congress: Concepts for National Assessment of Water Availability and Use*, Circular 1223, 2002.)

² Pub. L. No. 89-80, 79 Stat. 244 (1965).

³ 1995 is the most recent data available; USGS' 2000 national water use information is not yet ready for publication.

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Figure 13: Trends in Water Withdrawals by Use Category, 1950-1995



Sources: USGS (chart data and top photo), Natural Resources Conservation Service (photos), and GAO (analysis).

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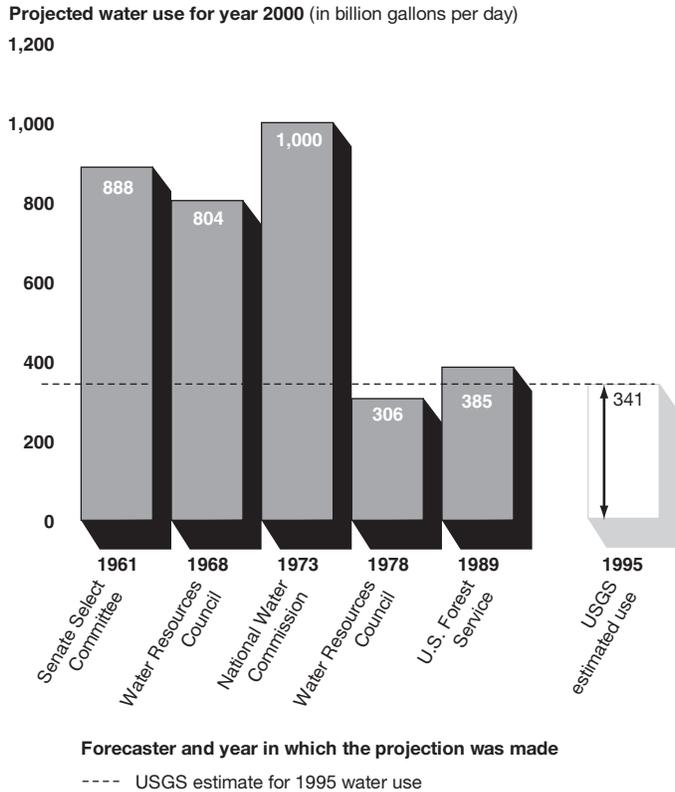
The reasons for the decrease in actual use illustrate why forecasting water use is so difficult. According to USGS, most of the increase from 1950 to 1980 was due to expanded irrigation and hydropower generation. In the 1980s, more efficient irrigation techniques, coupled with new technologies that lowered industrial use, helped ease demand more than anticipated and returned more water to the nation's waterways and aquifers. Water use also declined because of enhanced public awareness and many states' conservation programs. Only public supply and rural use, driven by population growth and livestock needs, respectively, continued to grow after 1980. Accordingly, a 1999 USDA study found that past water use projections for 2000 show consistently large differences among the forecasts and large discrepancies between projected and actual water use (fig. 14).⁴ Key factors influencing some of the excessive projections include overestimating population increases, not accounting for technological advances, not anticipating the introduction of environmental laws, and underestimating the impact of conservation efforts.⁵

⁴ Brown, Thomas C. 1999. *Past and Future Freshwater Use in the United States: A Technical Document Supporting the 2000 USDA Forest Service RPA Assessment.*

⁵ Various agencies, such as the Environmental Protection Agency, have programs that provide technical assistance to states, water districts, and water users for efficiency, conservation, and reuse efforts.

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Figure 14: Projections of United States Water Use for 2000



Sources: U.S. Forest Service (data), USGS (data), and GAO (analysis).

The most recent water use—but not availability—forecast is the USDA’s 1999 projection for 2040, which identifies a rise in total water use of only 7 percent despite a 41-percent increase in the nation’s population. However, the agency includes a warning about the tenuous nature of such projections. For example, irrigated acreage is one of the most important yet uncertain assumptions in the projection. If irrigated acreage does not drop in most Western river basins as assumed, use may be substantially above the estimate. As such, there are compelling reasons for concern regarding the future availability of freshwater to meet the nation’s growing demands.

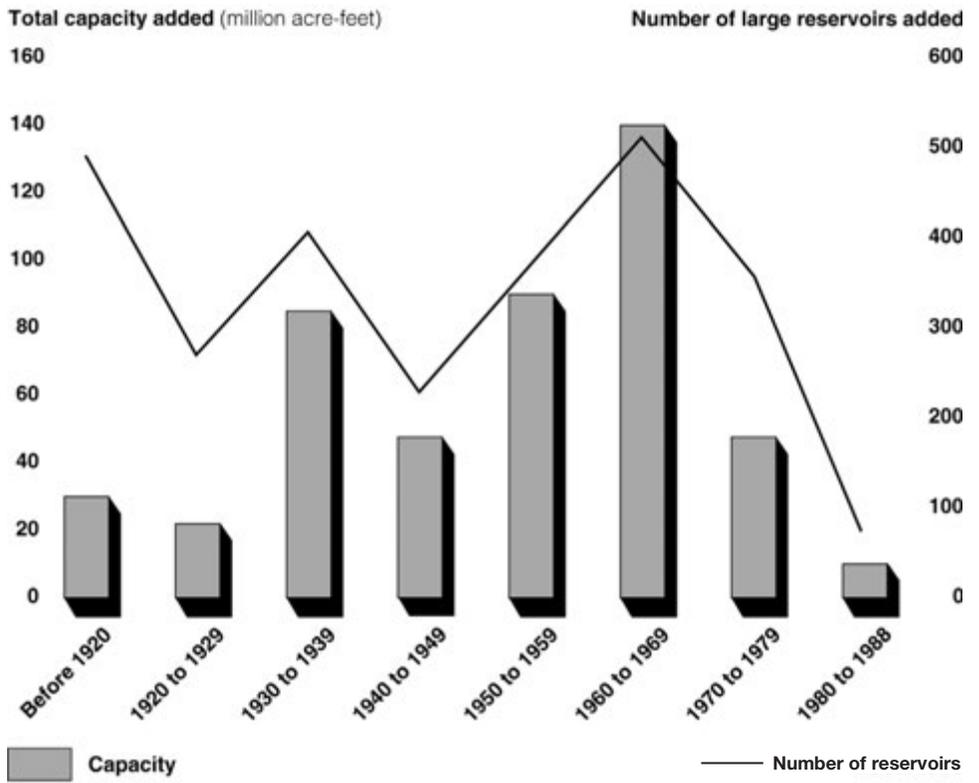
Trends in Water Availability and Use Raise Concerns about the Nation's Ability to Meet Future Needs

While the nation does not have a current assessment of water availability and use, current trends raise concerns about the nation's ability to meet future needs. Numerous signs point to the danger that our freshwater supply is reaching its limits. These indicators include constraints on surface storage capacity and depletion of ground-water resources at the same time as demands for freshwater are on the rise. Increased demand comes from a growing population and pressures to keep water instream for fisheries, wildlife habitat, recreation, and scenic enjoyment. The potential effects of climate change create additional uncertainty about future water availability and use.

Surface Storage Construction and Maintenance Is Declining

The construction of large reservoirs in the United States has slowed markedly since peaking during the 1960s, as shown in figure 15. Reclamation has only one large water storage project underway—Animas-La Plata in Colorado and New Mexico; the Corps has none. Furthermore, because of the high cost and ecological impact of reservoirs and dams, researchers and agency officials generally agree that it is unlikely that the construction of such large-scale projects will be at the forefront in meeting future water needs.

Figure 15: Number and Capacity of Large Reservoirs Completed by Decade



Sources: USGS (data) and GAO (analysis).

Available evidence also indicates that existing reservoirs may not be able to continue storing water at current levels. Many of the federal and nonfederal dams that support storage reservoirs are aging and in need of repair. The American Society of Engineers has rated over 2,000 dams as unsafe, and nearly 10,000 as having high hazard potential, according to the Federal Emergency Management Agency's fiscal year 2001-2002 report to Congress on the National Dam Safety Program. According to Reclamation officials, approximately 50 percent of Reclamation's dams were built before 1950, and many of these before the development of current engineering standards. Reclamation recognizes that upgrading and maintaining existing infrastructure is vital to ensuring dependable supplies of water, and anticipates that future costs to rehabilitate Reclamation's infrastructure will be substantial. The Corps estimates it has a critical maintenance

backlog of \$884 million, largely for dredging waterways and repairing structures such as locks, dams, and breakwaters. While the direct impact on water supply is not clear, extensive maintenance and repair will be needed in future years to ensure the continued viability of the water management infrastructure.

Moreover, the amount of water available for use from these reservoirs is continually being reduced by sedimentation—the flow of soil, rock and other natural materials into reservoirs. Over time, sedimentation can significantly reduce reservoir water storage capacities. According to a 1995 Resources for the Future report,⁶ the total reduction resulting from the buildup of sediment is estimated at about 1.5 million acre-feet per year. For example, USGS' reservoir sedimentation studies in Kansas found that decreases in water-storage capacity from sedimentation ranged from less than 5 percent to about 50 percent at various locations.

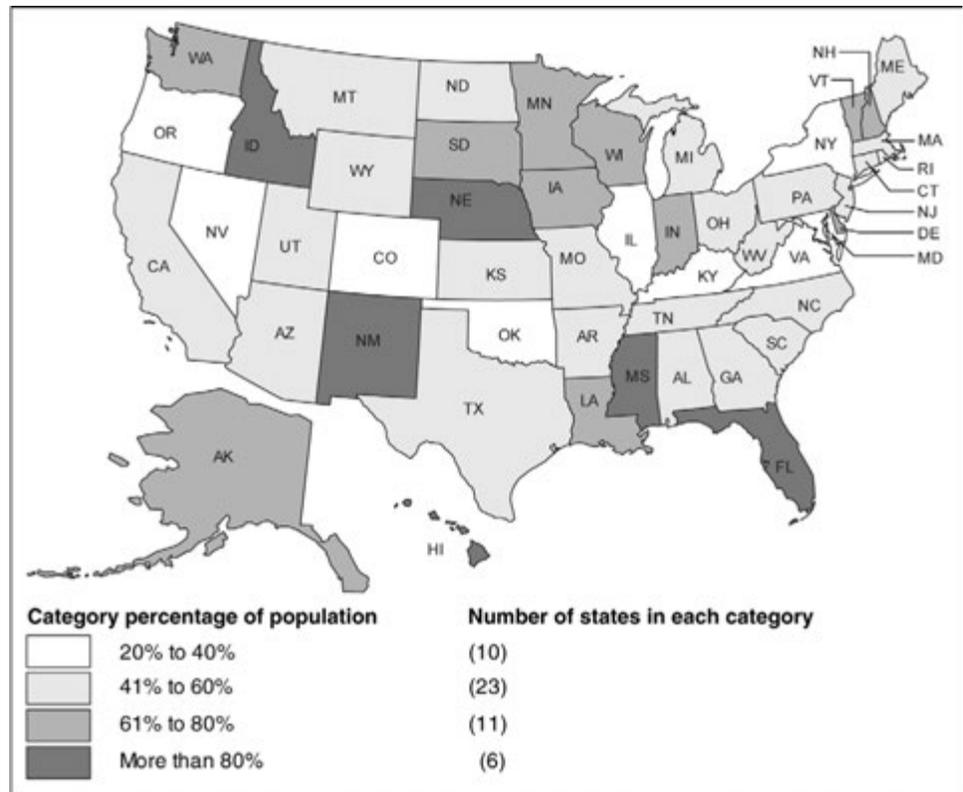
Ground-Water Is Being Depleted

As shown in figure 16, ground-water is a major source of drinking water in every state. It provides about 40 percent of the nation's public water supply, and more than 40 million people—including 97 percent of the rural population—supply their own drinking water from domestic wells. Ground-water is also the source of about 37 percent of the water used for irrigation and livestock, is a major contributor to flow in many streams and rivers, and has a strong influence on river and wetland habitats for plants and animals.

⁶ Resources for the Future, established in 1952, conducts independent research on environmental and natural resource issues.

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Figure 16: Estimated Percentage of Population Using Ground-Water as Drinking Water in 1995 by State



Sources: USGS (data) and GAO (analysis).

Ground-water depletion is occurring across the nation. According to USGS, ground-water depletion may be related to the slowed construction of surface reservoirs in recent years—as surface-water resources become fully developed and allocated, ground-water commonly offers the only available source for new development. USGS has documented significant ground-water depletion in particular areas of the Southwest; the Sparta aquifer of Arkansas, Louisiana, and Mississippi; the Cambrian-Ordovician aquifer of the Chicago-Milwaukee area; and the High Plains aquifer (consisting largely of the Ogallala aquifer). The High Plains aquifer underlies a 174,000-square-mile region including parts of eight states (Colorado, Kansas, Nebraska, New Mexico, Oklahoma, South Dakota,

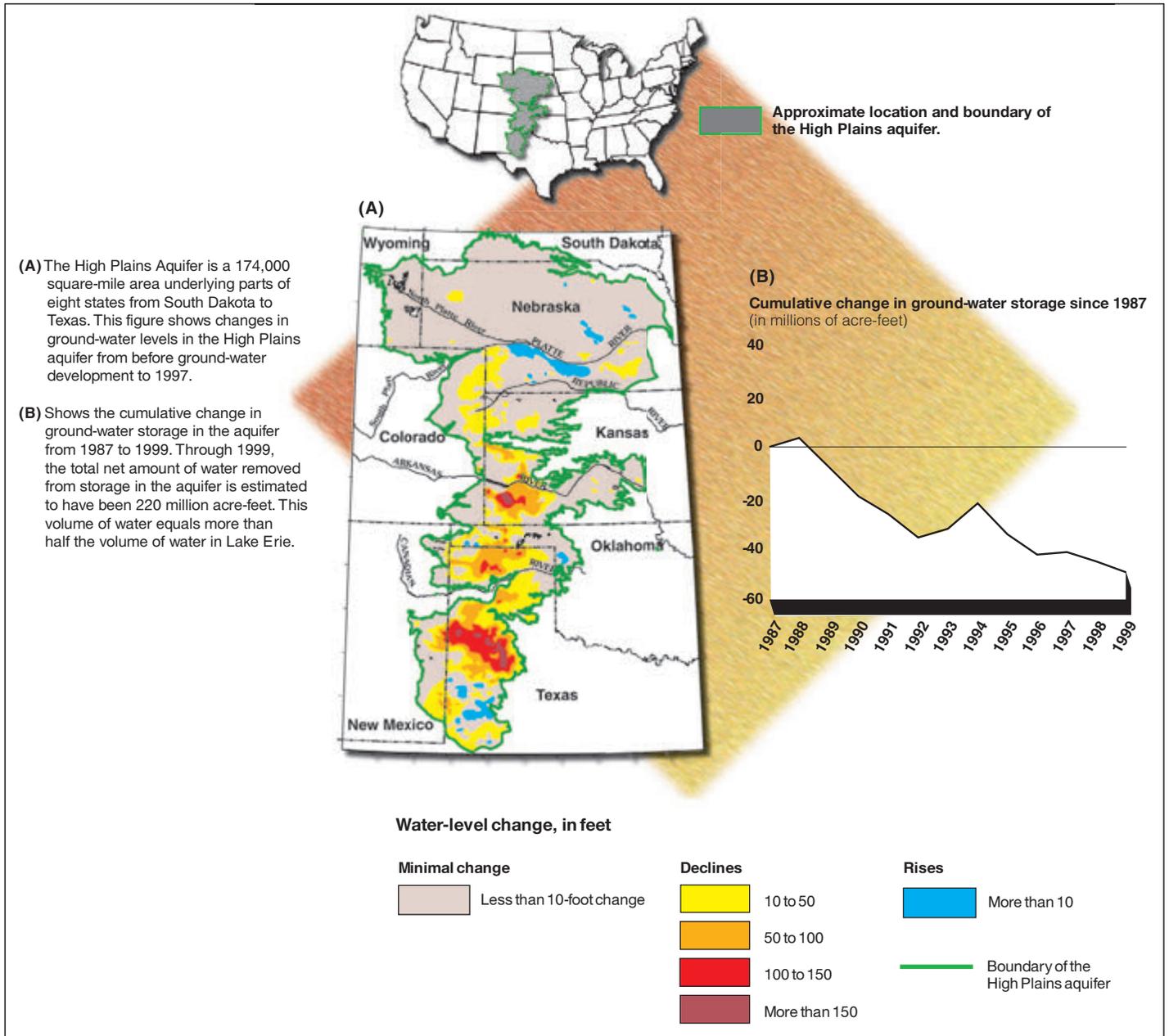
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Texas, and Wyoming) and supplies about 30 percent of all ground-water used nationwide for irrigation.

Ongoing water-level monitoring in the High Plains aquifer provides a well-documented example of the long-term depletion of ground-water resources. Ongoing monitoring, initiated in 1988, found that the intense use of ground-water has caused major declines in the water level and reduced the ground-water remaining in storage in some areas to a level that makes the aquifer no longer economical to use. As shown in figure 17, the changes are particularly evident in the central and southern High Plains, where more than half of the ground-water that was available before pumping started has been depleted. Through 1999, an estimated 220 million acre-feet have been removed from storage in the aquifer—or more than half the volume of water in Lake Erie. Water levels continue to decline in many areas of the aquifer, but the rate of decline has slowed during the past 2 decades in some areas. The decline is attributed to decreases in irrigated acreage, improvements in irrigation and cultivation practices, and above-normal precipitation and groundwater recharge during the period.

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Figure 17: Changes in Ground-Water Levels in the High Plains Aquifer from before Irrigation Pumping to 1999

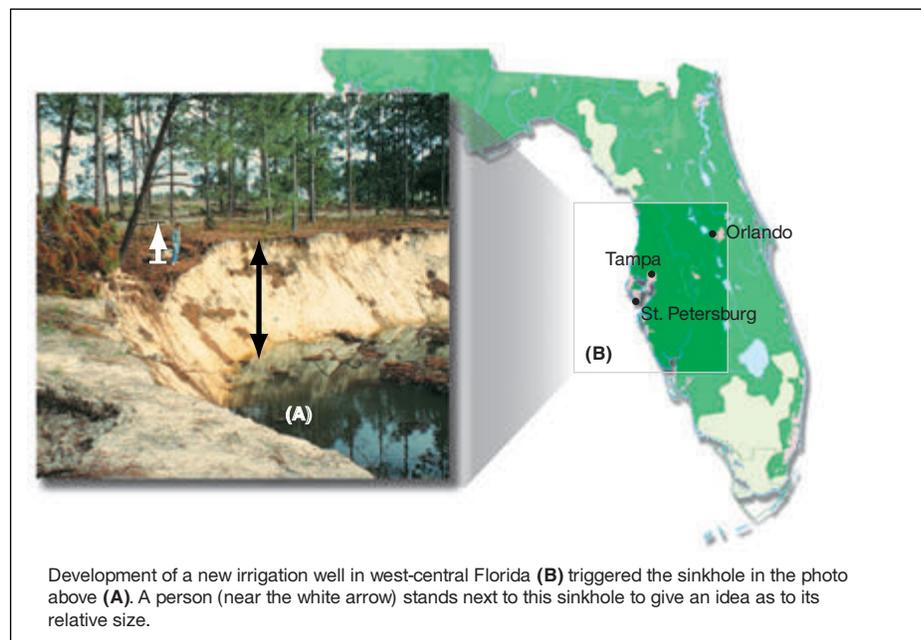


Sources: USGS (data) and GAO (analysis).

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Ground-water depletion has, in some cases, resulted in land subsidence and a permanent reduction of an aquifer's water storage capacity. According to USGS, many areas across the United States have experienced subsidence, a decline in land-surface elevation caused by the removal of subsurface support through the withdrawal of ground-water. Subsidence can severely damage structures such as wells, buildings, and highways, and creates problems in the design and operation of facilities for drainage, flood protection, and water distribution. Furthermore, the compaction of aquifer materials that causes subsidence can result in a permanent reduction of 10 to 30 percent of the storage capacity of some aquifer systems. In the arid Southwest, subsidence shows as deep fissures or "cracks" in the earth's surface, while in the humid East, subsidence is evidenced by "sinkholes." Figure 18 shows a sinkhole in west-central Florida caused by drilling for a new irrigation well.

Figure 18: Sinkhole in West-Central Florida Caused by Development of a New Irrigation Well

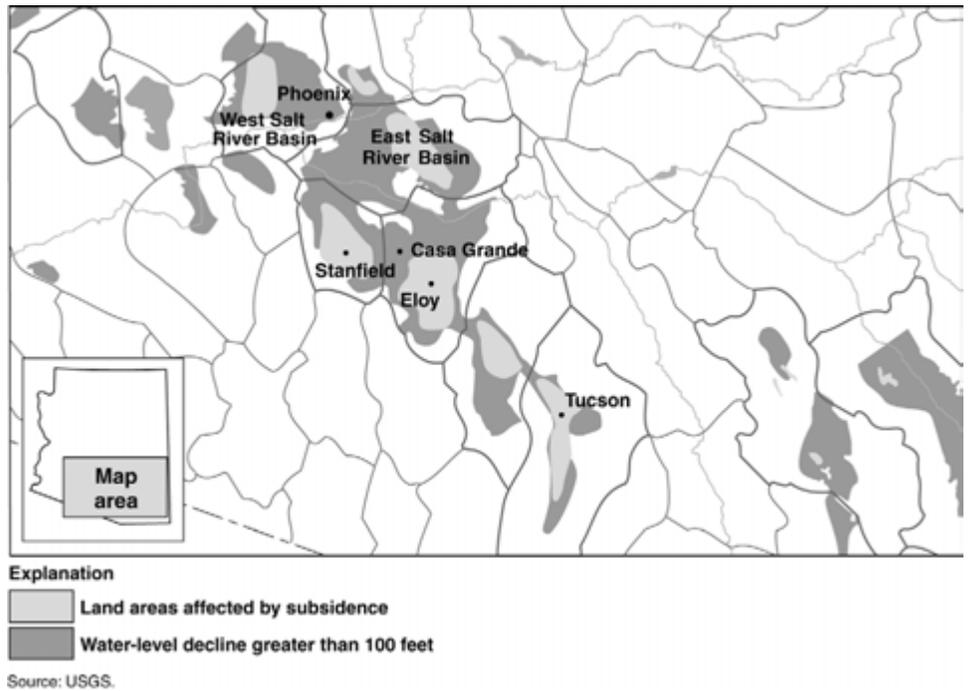


Sources: USGS (photo and caption), Map Art (map), and GAO (analysis).

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USGS has extensively examined land subsidence in south-central Arizona. Ground-water pumping for agriculture in the aquifers serving the basins of south-central Arizona began in the late 1800s, and by the 1940s many of the basins had undergone intensive ground-water pumping. Ground-water depletion has been widespread over these basins, as shown in figure 19, and some water-level declines have exceeded 300 feet. These declines have resulted in regional subsidence, exceeding 10 feet in some areas.

Figure 19: Land Subsidence in South-Central Arizona



Depleting aquifers in many coastal areas may also result in saltwater intrusion, making the water unusable for drinking, irrigation, and other purposes requiring freshwater. According to USGS, incidences of saltwater intrusion have been documented in almost all coastal states, especially along the Atlantic coast—affecting areas from Miami, Florida, to Cape Cod, Massachusetts. In particular, saltwater intrusion is occurring in:

- Florida, in the Jacksonville, Tampa, and Miami areas;
- Georgia and South Carolina, in the Brunswick and Savannah areas, and on Hilton Head Island, respectively; and
- New Jersey, in parts of Atlantic, Gloucester, Monmouth, Cape May, Ocean, and Salem Counties.

The threat of saltwater intrusion is also present in much of the interior of the country, where deep saline water underlies the freshwater. For example, ground-water withdrawals from the alluvial aquifer for irrigation near Brinkley, Arkansas, have caused upward movement of saline water from the underlying Sparta aquifer into the alluvial aquifer.

Projected Population Growth Will Increase Freshwater Demands

The U.S. Bureau of the Census projects substantial population growth by 2025 in areas of the nation where demand is already stressing the water supply. This growth could threaten the water supply even further. According to USGS, population growth drives increases in the use of the public water supply.⁷ Indeed, public use increased by 4 percent while population increased by 7 percent from 1990 to 1995. The difference in rates indicates the success of conservation in lowering per-capita use, from 184 gallons per day in 1990 to 179 gallons per day 1995. Whether conservation will continue to lower per capita use and at what rate is unknown.

⁷ Other factors that influence the demand for water include the price of water, the price of other goods (such as, the price of energy used in water pumps and the price of goods produced using water), income, instream demands for habitat and other ecological needs, and climate.

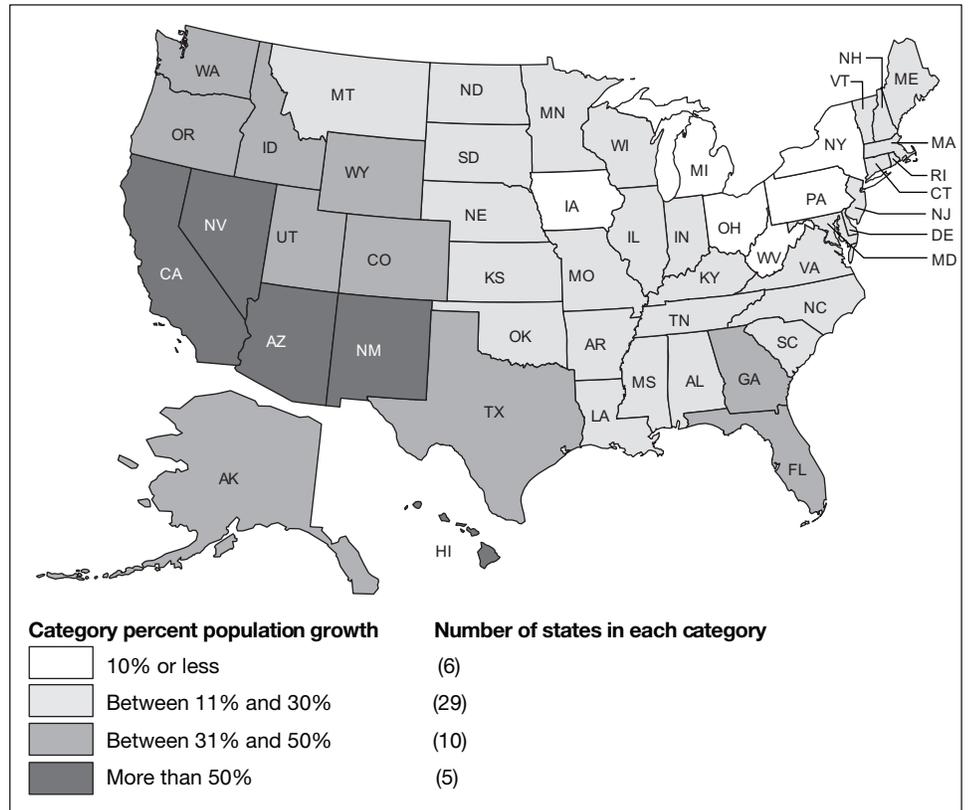
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According to the Bureau of the Census' 1997 projections, net population change through 2025 will be most evident in three states—California, Texas, and Florida—each of which is projected to gain more than 6 million persons.⁸ These three states will account for 45 percent of the net population change in the United States. California, the most populous state, with 12 percent of the nation's population in 1995, is expected to have 15 percent of the nation's population by 2025. As shown in figure 20, Western and Southern states will not only have the largest net growth but will also grow at the fastest rates. California is expected to grow faster than any other state after 2000, with an estimated 56-percent growth rate between 1995 and 2025.

⁸ Net population change is births minus deaths plus net migration.

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Figure 20: States' Population Growth from 1995 to 2025

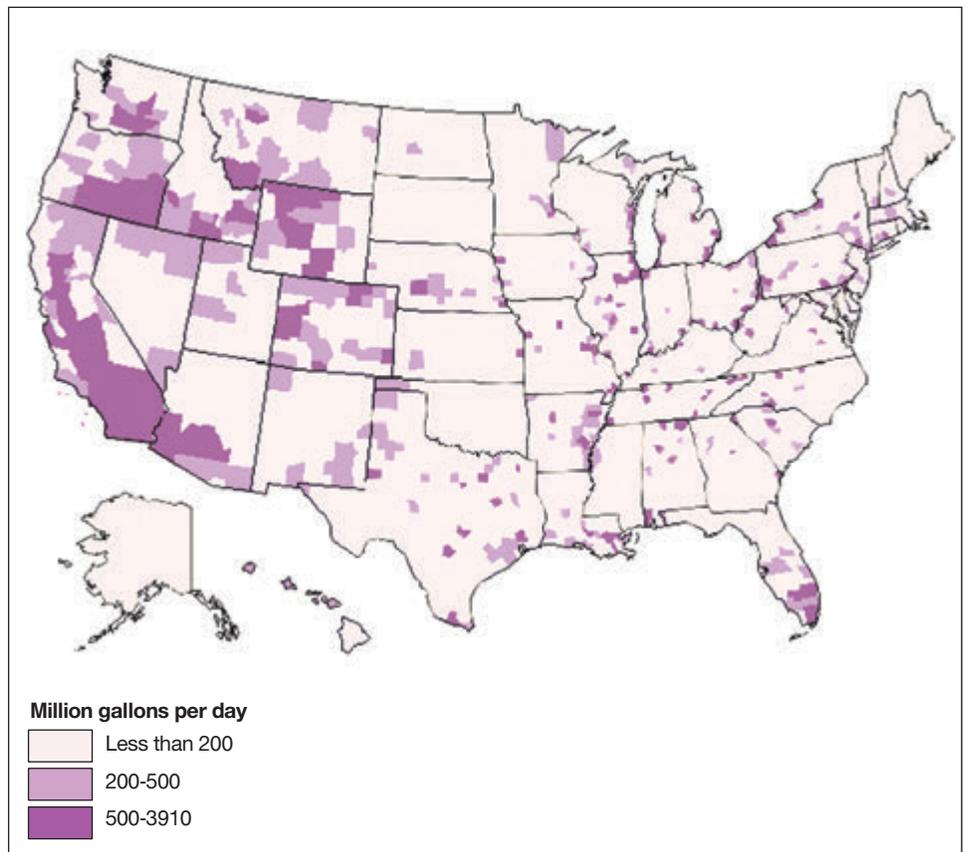


Source: U.S. Census Bureau.

Many of the states that are growing the most or at the fastest rates are also those that are currently stressing freshwater supplies. Figure 21 shows total freshwater use in the United States in 1995, by county, in million gallons used per day, and illustrates that many of the states that are expected to grow the most or the fastest—California, Nevada, Arizona, New Mexico, Florida, and Texas—also include significant areas that are already using water at among the greatest daily rates in the nation. In some of these same areas of high water use, the consumptive use of water nears or exceeds the renewable water supply, indicating that all or most of the water that is available is used. For example, according to USGS, in the Lower Colorado River basin, covering most of Arizona and significant parts of Nevada and New Mexico, the population consumed 10.6 billion gallons per day, but the renewable supply is only 10.3 billion gallons per day.

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Figure 21: Total Freshwater Withdrawals by County, 1995



Source: USGS.

Western states are already experiencing the effects of this anticipated growth. For example, due to ongoing population growth and the effects of recent drought, several Colorado River basin states, such as New Mexico and Arizona, are demanding that California, one of the biggest users of Colorado River water, adhere to the 1922 Colorado River Compact. For many years Southern California had been using Colorado River water that was not used by the other states, and had come to rely on this water to meet the demands of its users. After prolonged negotiations, the California users, such as irrigation and municipal water districts, could not agree on a plan to reduce their Colorado River water use. As a result, Reclamation has begun limiting California to its legal entitlement of 4.4 million acre feet of

Colorado River water annually. State users are continuing to discuss a potential water-sharing agreement, and stored water is expected to prevent immediate severe impacts. However, Southern California water users have begun considering alternative supplies, such as obtaining water from Northern California water right holders, storing water in surface reservoirs and underground aquifers, and building desalination facilities to turn ocean water into freshwater.

Based on recent media reports, many metropolitan areas in other parts of the nation are also experiencing the impact of population growth on water supply. For example:

- Atlanta, Georgia, the fourth fastest growing metropolitan area in the United States from 1990 to 2000, is recovering from a prolonged drought and is exploring ways to meet increased demand due to population growth.
- Chicago, Illinois, the seventh fastest growing metropolitan area between 1990 and 2000, has experienced significant ground-water depletion.
- Tampa, Florida, another area experiencing high population growth, began operating a new desalination plant in early 2003 to produce 25 million gallons of drinking water daily. This technology is seldom used in the United States owing to the relatively high cost of desalting water.
- Denver, Colorado, officials have proposed strict water conservation measures for 2003 because of anticipated water shortages; measures include limits on landscape watering and the amount of grass that can be planted at new homes.
- New York City's water supply reached its most worrisome levels in more than 30 years during 2002, resulting in a drought emergency declaration for the city and four upstate counties. More than 9 million residents experienced water restrictions. The states of New Jersey, Pennsylvania, Maryland, Maine, and New Hampshire also enacted water restrictions.

Growing Demand to Leave Water Instream Affects Offstream Availability

Over the past 30 years, the nation has increasingly emphasized protecting the environment. Among other things, the public places higher value on leaving water instream for endangered species, recreation, and scenic enjoyment, which may limit the use of existing water supplies and the development of new supplies. Federal laws such as the Endangered Species Act and the Wild and Scenic Rivers Act reflect these environmental values. However, when water is left instream to protect wetlands, fisheries, and endangered species or to preserve the wild and scenic status of a river, it cannot be simultaneously available for traditional offstream uses such as irrigation and municipal and industrial supply.

Under the Endangered Species Act, plants and animals may be listed as threatened or endangered, depending on the risk of extinction. Once a species is listed, powerful legal tools are available to help the species recover and to protect its habitat. Implementation of the Endangered Species Act resulted in immediate challenges for water resource managers. For example, the Tellico Dam, on the Little Tennessee River was already under construction when Congress enacted the Endangered Species Act in 1973. Construction of the dam, which provides flood control, hydropower and water supply, was challenged under the act to prevent jeopardizing the endangered snail darter—a species of fish. In 1979, Congress specifically exempted the project from the Endangered Species Act, allowing the project to be completed.⁹ Subsequently, the snail darter was found in other locations and reclassified as threatened.

More recently, in the Klamath River Basin on the California-Oregon border, Reclamation's actions to comply with the Endangered Species Act by leaving water instream resulted in losses to traditional offstream users. After consulting with the Fish and Wildlife Service and the National Marine Fisheries Service about the operation of the Klamath Project in 2001, an acute drought year, Reclamation allocated nearly all the project water to the protection of endangered species in the Klamath River (Coho salmon) and the reservoir (two species of sucker fish). While this action met Reclamation's obligations under the Endangered Species Act not to jeopardize any endangered species, Reclamation could not then meet its contractual water delivery obligations to irrigators, who consequently experienced crop losses. The potential for future conflicts over the

⁹ Energy and Water Development Appropriations Act, Pub. L. No. 96-69, 93 Stat. 437 (1980).

implementation of the Endangered Species Act is strong as competition grows between instream and offstream water demands.

The Wild and Scenic Rivers Act provides protection for a designated river or segment by limiting the future licensing of dams, reservoirs and other water projects on, or adversely affecting, protected segments.¹⁰ Conflict can arise over how much water should remain in rivers to maintain their wild and scenic values and over whom should decide the proper amount of water. Environmentalists and boaters may prefer high, strong flows in wild and scenic stretches, while others stress the need for water to be available above and below wild and scenic segments for farming and other economic development, potentially reducing flows. For example, in August 2002, addressing the issue of water in the Salmon River, the Idaho Supreme Court ordered federal and state officials to participate in formal mediation, with consultation from environmental, industry and local government representatives, to determine the quantities of water to be legally reserved for all six wild and scenic rivers in Idaho. The court ordered the state and the Forest Service to reach a compromise on water allocation; if they do not, the case will be returned to state water court.

Climate Change Makes Future Supply and Demand Conditions Uncertain

Uncertainties regarding potential reductions in water availability also result from the natural variations of the hydrologic cycle and the possibility that greenhouse gasses, such as man-made concentrations of carbon dioxide and other gasses in the atmosphere, might warm the earth and thereby alter the cycle. According to the U.S. Global Change Research Program, composed of federal and nonfederal representatives, water supply conditions in all regions of the United States are likely to be affected by climate change in the future, either through increased demands associated with higher temperatures or changes in supply because of changes in precipitation and runoff patterns.

A 2002 federal interagency report summarized climate and precipitation changes for the contiguous United States during the past century and expected changes over the next century.¹¹ The report noted that for the past century, warming amounted to about 1 degree Fahrenheit, and that

¹⁰ The National Park Service, Bureau of Land Management, Forest Service, and Fish and Wildlife Service, all manage designated rivers.

¹¹ U.S. Department of State, *U.S. Climate Action Report 2002*, Washington, D.C., May 2002.

total annual precipitation increased by an estimated 5 to 10 percent. While most regions experienced greater precipitation, parts of the upper Great Plains and the Rocky Mountains had less precipitation. For the next century, the report noted the following likely changes—average temperature increases of 3 to 9 degrees Fahrenheit across the nation, increased precipitation and evaporation, and more frequent occurrences of unusual warmth and extreme wet and dry conditions.

The U.S. Global Change Research Program, which coordinates federal agencies' climate research activities, concludes that climate change will pose many challenges to water supply management in future years. Program research indicates that changes in the amount, timing, and distribution of rain, snowfall and runoff are probable, leading to changes in water availability as well as in competition for water resources. Precipitation is very likely to continue to increase on average, especially in the nation's middle and northern areas, with much of the increase coming in the form of heavy downpours, which are not as easily absorbed for storage in underground aquifers. Snowpack, which serves as natural water storage in mountainous regions and northern portions of the United States, gradually releases its water in spring and summer; however, snowpack is very likely to decrease as the climate warms, despite increasing precipitation. It is very likely that more precipitation will fall as rain, and that snowpack will develop later and melt earlier. As a result, peak stream flows will very likely come earlier in the spring, and summer flows will be reduced. Potential impacts of these changes include an increased possibility of flooding in winter and early spring and more shortages in the summer.

Expected Freshwater Shortages May Harm the Economy, the Environment, and Communities

Freshwater shortages are likely in the near future and their impact on the economy, environment, and communities may be severe.¹ Under normal water conditions, state water managers in 36 states anticipate water shortages in localities, regions, or statewide within the next 10 years. Under drought conditions, 46 state water managers expect shortages. While no studies have measured the total economic impacts of shortages, recent shortages have resulted in billions of dollars in damages to specific segments of the economy, such as agriculture. Water shortages can also damage plant and animal species, wildlife habitat, and water quality. Moreover, water shortages can harm the nation's social fabric, for example, by creating conflicts between water users, reducing the quality of life, and creating perceptions of inequitable treatment among communities due to varying levels of water availability or relief for water shortage impacts.

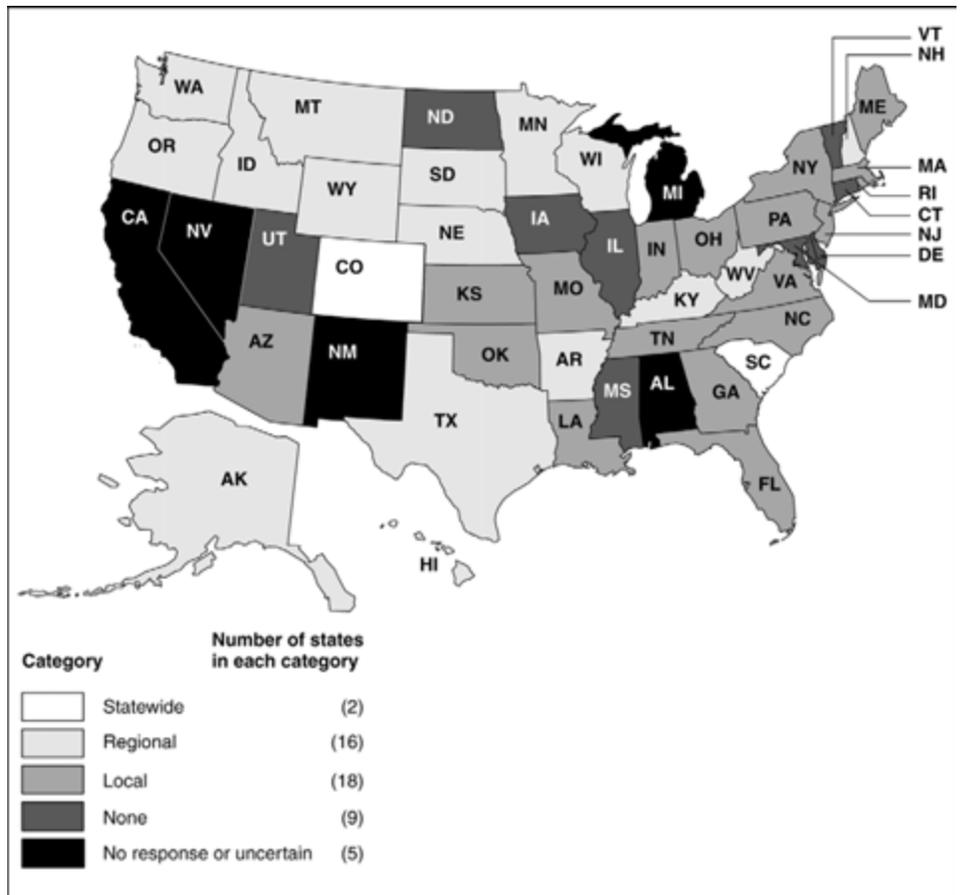
State Water Managers Expect Shortages within 10 Years

Consistent with the water availability and use trends, state water managers expect water shortages in the near future. According to our survey of state water managers, 36 of 47 states expect some portion of their state to experience shortages under average water conditions within the next 10 years.² As shown in figure 22, 18 state managers expect shortages to occur in one or more localized areas, while 18 state managers expect regional or statewide shortages. Water managers indicated that their states are vulnerable to shortages because they do not always have the infrastructure to store and distribute water where and when it is needed, they rely on diminishing ground-water resources, or because population growth has outpaced existing storage capacity in some regions of the state.

¹ Shortages are at prevailing water prices; we did not consider the potential effects of changes in water prices for this review.

² Based on discussions with state water managers during survey pretests, we asked managers to use the last 10 to 20 years to determine average water conditions for their state.

Figure 22: Extent of State Shortages Likely over the Next Decade under Average Water Conditions



Source: GAO analysis of state water managers' responses to GAO survey.

The probability of shortages increases and the effects broaden under drought conditions. According to 46 of the 47 water managers, their states are likely to experience shortages within the next 10 years under drought conditions. Water managers in 6 states predict the shortages to occur in one or more localized areas within their state, 29 managers predict shortages in one or more regions in their state, and 11 managers predict statewide shortages.

States expect these shortages despite their efforts to prepare. Recognizing the challenges ahead, state water managers reported that state, regional, and/or local authorities are planning for their current and future water needs:

- **Drought preparedness and response planning.** Twenty-three states have a drought preparedness plan to reduce drought vulnerability, and 41 states have a drought response plan to provide assistance to those affected by drought.
- **Assessing and monitoring water availability and use.** Forty-four states are monitoring water availability and use by, for example, measuring streamflows or water withdrawals.
- **Implementing water management strategies.** Thirty-eight states are coordinating the management of surface and ground-water resources to help meet their current and future water needs.
- **Reducing or reallocating water use.** Forty states are taking actions to conserve water, and 15 states are allowing voluntary water transfers among users, allowing water to be bought and sold or leased.
- **Developing or enhancing supplies.** Some states are undertaking scientific or technological approaches—eight western states are using cloud seeding to increase precipitation within the state, and nine coastal states are developing saltwater desalination operations to make freshwater.

Freshwater Shortages Have Severe Economic, Environmental, and Social Consequences

Shortages of freshwater may harm not only a local area, but also multiple regions and sectors of the economy for many years. Water shortages can also damage the environment and create conflicts between water users.

Water Shortages Can Cause Billions of Dollars in Economic Damages

No estimates are available on the total economic costs of water shortages to the nation. However, adequate supplies of water must be available to produce goods and provide services, and shortages can create both direct and indirect problems. For example, shortages reduce crop, rangeland, and forest productivity; increase fire hazards; increase mortality rates for livestock and wildlife; and damage wildlife and fish habitat. In 2003, alone, Congress provided an additional \$3.1 billion in appropriations to offset agricultural losses. Water shortages also have indirect impacts. For example, reductions in crop, rangeland, and forest productivity reduces income for farmers and agribusiness, increases prices for food, contributes to higher unemployment, increases foreclosures on banks loans to farmers and businesses, and requires more spending for disaster relief.

While national estimates are not available, regional and state estimates provide some insight into the severity of water shortages. According to a 2000 report on extreme weather events from the National Oceanic and Atmospheric Administration,³ eight water shortages from drought or heat waves had each resulted in \$1 billion or more in monetary losses over the past 20 years in various states. The more significant of the economic impacts included were:

- \$6 to \$9 billion in losses for the agriculture and ranching sectors of Texas/Oklahoma and eastward to the Carolinas in the summer of 1998,
- \$5 billion in economic damages in Texas and Oklahoma from fall 1995 to summer 1996,

³ The National Oceanic and Atmospheric Administration's National Climatic Data Center is responsible for monitoring and assessing the earth's climate and is the world's largest repository of weather data. The center gathers water shortage related information including economic impact data.

- \$40 billion in damages to the economies of the Central and Eastern United States in summer 1988, and
- \$20 billion in economic damages to the Central and Eastern United States from June to September 1980.

River basin commissions and states also reported recent drought-related economic losses of hundreds of millions of dollars. For example, the Susquehanna River Basin Commission,⁴ reported that, as a result of the 1999 drought, 34 counties in New York State declared an agricultural disaster with losses of about \$2.5 billion, and it estimated Pennsylvania crop losses at \$500 million, with some farmers losing as much as 70 to 100 percent of their crops. The Commission also reported that other water-dependent industries, such as nurseries, suffered significant losses and electrical power plants had trouble getting sufficient water supplies to meet operational needs because of low stream flows. Similarly, in December 2001, the Washington State Department of Ecology estimated that the 2001 drought cost between \$270 million to \$400 million in damages to agricultural production, a loss of 4,600 to 7,500 agricultural jobs, and placed at risk an additional 950 to 1,400 jobs in the food processing, wholesaling, trucking, warehousing, and transportation services sectors. Finally, persistent drought conditions could also put at risk another 4,500 to 6,000 jobs in the construction, retail, and service sectors, among others.

In addition to lost economic productivity, droughts also increase federal and state government expenditures. For example, Washington State paid almost \$8 million in drought related expenditures to obtain water for several irrigation districts, maintain stream flow in critical fish-bearing streams, and to monitor stream flows. In addition, the state paid \$1 million to the Bonneville Power Administration, which markets electrical power in the Pacific Northwest, to offset losses in power-generating revenues.

While the most commonly estimated economic impacts of water shortages occur in agriculture and related sectors, less obvious sectors of the economy are also affected.

⁴ The Susquehanna River Basin Commission coordinates water resources efforts of the states of Maryland, New York, and Pennsylvania and the federal government to administer water resources in the Susquehanna River Basin.

- In March 2002, New Jersey declared a state of water emergency (rainfall in 35 of the past 49 months had been below normal, with 8 of the last 12 significantly below normal). Among other things, the state suspended the distribution of water for construction or use by any new building, dwelling, or structure in three south New Jersey townships. The pace of development in these townships threatened to damage the ecological and water supply capability of the local aquifer system. The monetary losses resulting from this suspension are difficult to quantify, but, at a minimum, building suppliers and other construction-related sectors lost revenues, and local municipalities lost tax revenues.
- In February 2003, the Southern Nevada Water Authority approved a plan to restrict water use in the Las Vegas Valley during an ongoing drought. Residents and businesses, such as golf courses, will be required to curtail water use. For example, golf courses will be required to use no more than 7 acre-feet of water per year. According to an operator of three golf courses, he will have to remove 90 acres of grass at an estimated cost of \$500,000.

Some organizations are developing estimates of the economic impacts of droughts. For example:

- University of Georgia researchers have developed an economic model to measure the potential economic impacts of a drought for the 20-county regional economy in southwest Georgia. Using this model, the researchers estimated that each \$1 million decline in agricultural production results in an additional \$700,000 decline in other economic segments, for a total loss of \$1.7 million. In addition, for each job lost in agriculture, 1.4 jobs are lost in other economic sectors, for a total of 2.4 jobs lost.
- Texas requires regional water planning groups to evaluate the social and economic impacts of not meeting regional needs for water supply. For example, a regional group for Northeastern Texas projected that by 2010 unmet regional water needs would result in 93,000 fewer jobs, 199,000 fewer people, and about a 13 percent loss in personal income. Based on these regional reports, in 2002, the Texas Water Development Board reported that if the state does not ensure it has enough water to meet projected needs, it will have 7.4 million fewer jobs, 13.8 million fewer people, and 38 percent less income within the state by 2050.

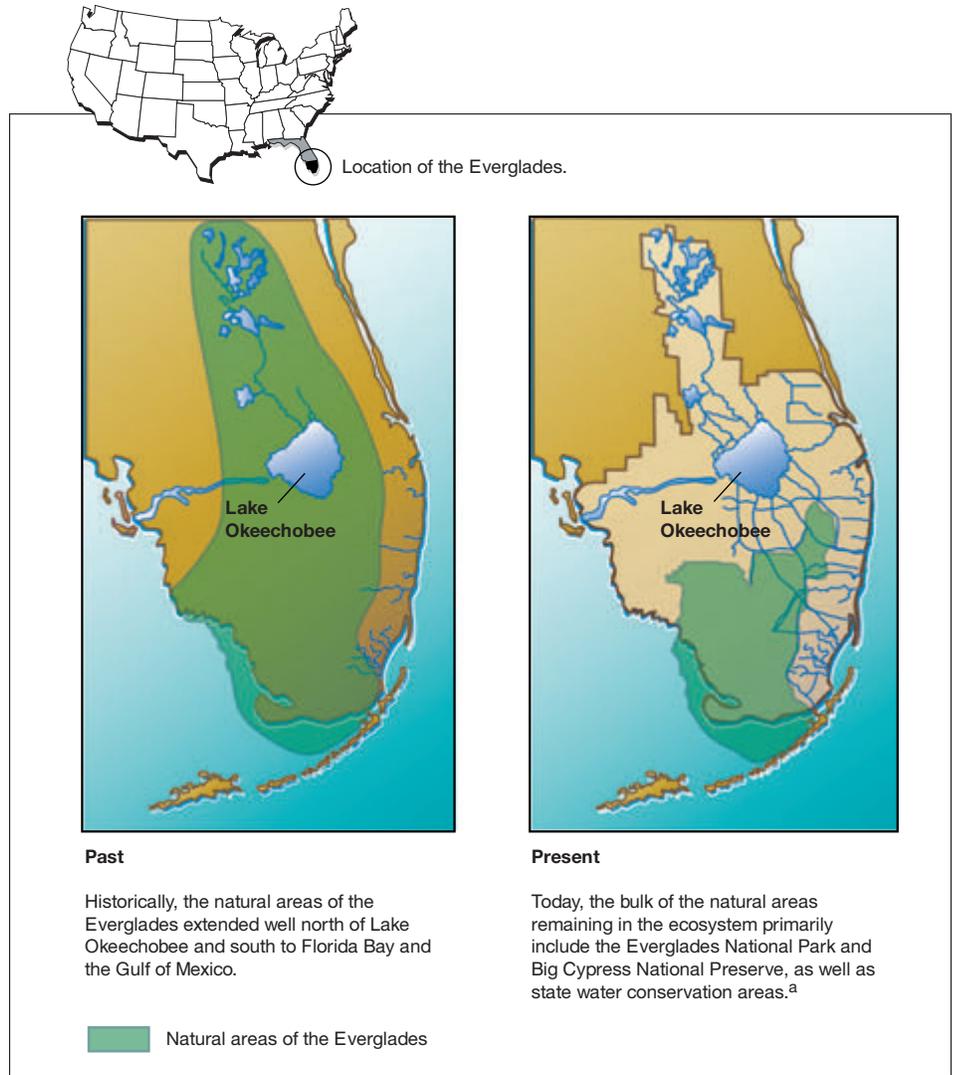
Water Shortages Damage the Environment

Water shortages can result in environmental losses—damages to plant and animal species, wildlife habitat and air and water quality. Following a water shortage, some conditions quickly return to normal, while other effects may linger or change conditions permanently. The Florida Everglades experience illustrates the effects that reduced water flows can have on an ecological system.

Following periods of major drought in the 1930s and 1940s and heavy flooding in 1947, Congress authorized in 1948 the Central and Southern Florida Project—an extensive system of over 1,700 miles of canals and levees and 16 major pump stations—to prevent flooding and saltwater intrusion into the aquifer underlying the wetlands, as well as to provide drainage and supply water to the residents of South Florida. Some drained areas became farmland, while others became heavily urbanized. These engineering changes, coupled with agricultural and industrial activities and urbanization, have reduced the Everglades to about half its original size, as shown in figure 23, and damaged the environment. For example, the population of wading birds once numbered in the millions, has fallen by 90 percent in recent decades. Moreover, some scientists believe that the reduced flow of freshwater into Florida Bay may be hastening its environmental decline. An effort to restore the Everglades is currently underway involving numerous federal, state, tribal and local entities. The current estimated costs, which are shared equally by federal agencies and the state, for activities in the South Florida ecosystem restoration initiative—including the three goals of getting the water right, restoring, preserving and protecting natural habitats, and fostering the compatibility of the built and natural systems—are \$14.8 billion.

Chapter 3
Expected Freshwater Shortages May Harm the
Economy, the Environment, and Communities

Figure 23: The Everglades—Past and Present



Source: South Florida Water Management District.

^aOther smaller natural areas are dispersed throughout South Florida, such as national wildlife refuges and state, local, or privately owned lands, but are not shown in the figure.

Water Shortages Can Cause Social Discord

Water shortages can raise a number of concerns for communities, such as:

- Conflicts arising between various water users, managers, and government entities due to competition for scarce water resources;
- Threats to the lifestyles of individuals whose livelihoods depend on water, such as farmers and commercial fishermen; and
- Feelings of undue burden from a shortage, such as feelings of unfair treatment in the amount or timing of relief efforts by government entities.

The experiences in the Klamath River Basin, on the California-Oregon border, illustrate how these concerns can play out. In 2001, severe drought in the Klamath River Basin exacerbated conflicts among numerous interests: farmers who rely on water for irrigation, commercial fishermen who rely on salmon spawned in the river for their livelihood, environmental groups interested in protecting endangered species, and Native American tribes with long-standing cultural, fishing and water rights interests. In April 2001, Reclamation announced that it would not be able to supply water to farmers in the majority of the basin so that the limited supplies could be used to protect endangered or threatened species under the Endangered Species Act.⁵ Many farmers claimed to have suffered crop losses as a result of restricted water deliveries and protested the decision in public demonstrations; some individuals unlawfully opened water control gates. Farmers viewed the diversion of water as breaking the federal government's long-standing promise to provide water and land for farming and as harming the agriculture based culture that had developed in the area since the project was initiated in the early 1900s.

Subsequent to the National Academy of Sciences' February 2002 review of the scientific support for minimum lake and river flows, Reclamation developed a 10-year operating plan to comply with the requirements of the Endangered Species Act while also allowing water deliveries to irrigators. However, in September 2002 as many as 30,000 adult salmon and steelhead died while returning to the Klamath and Trinity Rivers to spawn. California State Department of Fish and Game officials and others argue that low

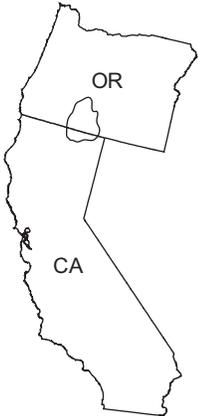
⁵ Reclamation operates a federal water supply project in the Upper Basin that has provided water for irrigation to farmers for nearly 100 years.

river flows and high water temperature may have stressed the salmon and made them more susceptible to disease. Consequently, according to local media accounts, the environmentalists, Indian tribal leaders, and commercial fishermen now claim that the government is catering to farmers and ignoring their concerns (see fig. 24). The result has been on going litigation over river flows and legislation to address the financial damages of the various parties. Although the Klamath water supply issues were made more acute by the severe drought, the conflicts over who gets water will continue because demands are greater than current supplies.

Figure 24: Competition for Water in the Klamath Basin

(A) In May 2001, supporters of Klamath Basin farmers formed a "bucket brigade" by standing shoulder to shoulder and passing buckets of water from the Link River to a canal used to deliver water for irrigation.

(B) In April 2002, supporters of providing water for fish and wildlife within the Klamath Basin advocate their position.



Sources: (A) California Farm Bureau Federation (photo and caption). (B) Bureau of Reclamation (photos and caption). GAO analysis.

The competition for water is by no means unique to the Klamath Basin. Similar conflicts are brewing in other areas, such as the Columbia and Snake River System in the Northwest, the San Joaquin and Sacramento Basins in California, the Missouri River System in the Northern Plains states, the Middle Rio Grande in New Mexico, and the Florida Everglades. Recognizing the potential for conflict due to water shortages, in May 2003, Interior proposed concentrating federal financial and technical assistance in key western watersheds and in critical research and development such as conservation and desalination to help predict, prevent, and alleviate future water supply conflicts.⁶

⁶ U.S. Department of Interior, *Water 2025: Preventing Crises and Conflict*, Washington, D.C., May 2003.

Federal Activities Could Further Support State Water Management Efforts

To identify potential federal actions to help states address their water management challenges, we sought the views and suggestions of state water managers. We also asked federal officials to identify their current activities in each of these categories and the extent to which they can support state preferences for assistance. Water managers from 47 states ranked actions federal agencies could take within five basic categories of activities:¹

- **Planning, constructing, operating, and maintaining water storage and distribution facilities.** The most helpful potential federal action was to provide more federal financial assistance to plan and construct additional state water storage and distribution capacity; states also favored more consultation on the operation of federal water storage and distribution systems.
- **Collecting and sharing water data.** Collecting water data at more locations would be most useful, compared with actions to improve the accuracy, timeliness, access, format, or analyses of the data.
- **Administering federal environmental protection laws.** The most beneficial potential federal actions were (1) more state flexibility in how they comply with or administer federal environmental laws and (2) more consultation with the states on these laws' development, revision, and implementation.
- **Participating in water-management agreements.** The highest preferences were increasing federal agencies' coordination with, and technical assistance to, the states in developing and implementing these agreements.
- **Managing water rights for federal and tribal lands.** The most helpful potential actions were (1) more consultation with states on how federal agencies or tribal governments use their water rights, (2) increased financial and technical assistance to determine how much water federal agencies and tribes are entitled to, and (3) better coordinated participation among federal agencies and tribes in the establishment and use of their water rights.

¹ State water managers in 47 states responded to our survey; California, Michigan, and New Mexico did not participate.

Appendix I contains the detailed results of the survey.

States Preferred More Financial Assistance to Increase Water Storage and Distribution Capacity and Consultation on Federal Storage Operations

In terms of water storage and distribution capacity, state water managers reported their highest priority was more federal financial assistance to plan and construct the state's freshwater storage and distribution systems. According to our survey, over the next 10 years, 26 states are likely to add storage capacity, and 18 are likely to add distribution capacity. The additional storage and distribution capacity will be used to meet a variety of needs, such as augmenting local supplies, connecting water systems, and developing ground-water storage. Consequently, water managers in 22 states said that more federal financial assistance would be most useful in helping their state meet its water storage and distribution needs. For example, of the 26 states that are likely to add storage capacity, 16 plan to seek federal assistance, as do 14 of the 18 states that are likely to add distribution capacity. Estimated costs to add this storage and conveyance capacity could be in the billions of dollars for each state if built as planned. For example, Texas estimated in its 2002 State Water Plan the capital costs of water supply projects over the next 50 years, including the addition of 8 major reservoirs, to be \$17.9 billion.

Reclamation and Corps officials understand the states' need for financial assistance for storage and distribution projects, and provide financial assistance on a project-by-project basis, as the Congress authorizes and appropriates funds. Current authorized and funded water projects include Reclamation's Animas-La Plata project in southwest Colorado and northwest New Mexico for storing and distributing water in these states at a cost of about \$700 million, and the Corps' and the state of Florida's participation in the estimated \$14.8 billion effort to restore the Florida Everglades. Reclamation and Corps officials were not aware of any state requests directly to them to provide financial assistance to plan or construct new state storage or distribution projects, with the exception of projects under the ongoing CALFED program.²

State water managers also favored more consultation on the operation of federal water storage facilities. While federal agencies develop plans to

² In fiscal year 2003, Congress provided \$23 million in funding to Reclamation's Central Valley Project for activities that support the California Bay-Delta Restoration Program (CALFED), including investigations of water storage opportunities and ongoing reservoir planning activities.

govern the operations of each facility, changes in water availability, such as a drought, and new or changing demands for water, such as a new endangered species listing or residential development, can alter the state's water management goals in a river basin. State managers sometimes pursue a change in the operations of a federal water storage facility to better help the state meet its multiple water management goals. State water managers in 29 states said they had worked with federal water project managers within the last 5 years to obtain changes in federal operations to better meet their state's water management goals. The state managers requested changes in federal operations to help balance instream water uses—that is, environmental, recreation, hydropower production, and navigation uses—with offstream water uses, such as municipal water supply and irrigation. For example, one western state asked Reclamation to modify facility operations to benefit fish spawning, while several states requested changes to Corps facility operations to support the states' water management goals—for example, to improve water quality, recreation, and minimize flooding impacts.

Reclamation and Corps officials told us their agencies currently work with state water managers on a daily basis to meet the needs of water users affected by their facilities. Furthermore, they are making efforts to consult more with the states and thereby prevent future conflicts related to their operations. According to a Reclamation official, operators at the agency's facilities annually share operations plans with state water managers and other stakeholders to review the previous year's operations and solicit their views on the need for changes to meet new or increased demands. Furthermore, Reclamation plans to identify river basins with the greatest potential for future conflict between water users and environmental needs and to develop future operating plans with input from all users. Officials said they are trying to prevent water management crises on the scale of those that have occurred in the Klamath, Columbia, Middle Rio Grande, and Colorado River basins and avoid costly litigation. A Corps' official stated that the Portland, Oregon, district office holds a daily public briefing in its reservoir control room to describe conditions in the entire Columbia Basin, and the Corps shares its operating plans annually with the states.

While Reclamation and Corps officials welcome state water managers' views on operations, the agencies are not always able to accommodate state requests when the request would prevent or limit the agency's ability to meet its obligations under laws or contracts. For example, Reclamation officials said they must consider the authorized purpose of the facility, the agency's contractual obligations for water delivery, environmental

regulations, and the requirements of state law when considering a state request. In addition, federal officials said they could not honor some requests because modifying facility operations to meet the needs of one water user may adversely affect water availability for other water users. For example, Reclamation received a request from one state to change facility operations to increase water flows for downstream rafting in the spring; however, another state said the additional release would decrease the quality of recreational fishing. Once the states agreed on a compromise, Reclamation modified its releases to meet the water needs of both users. Corps officials shared similar experiences. For example, a state requested that the Corps store more water in a flood control reservoir. The Corps asked the state if it was willing to accept responsibility for the environmental impacts of flooding more area behind the reservoir. The state agreed and the Corps adjusted the annual operating plan.

States Believe They Would Benefit from Federal Data Collection in More Locations

State water managers placed a high value on data collected under federal programs to support the states' ability to complete specific water management activities. For example:

- 37 states reported that federal agencies' data are important to their ability to determine the amount of available surface-water,
- 22 states reported that the federal data are important to their planning for environmental mitigation or restoration activities, and
- 14 of the 29 states that participate in interstate or international water-management agreements reported that federal data are important to monitoring the terms of the agreements.

To supplement the data collected under federal programs, some states also collect their own water data. However, in some circumstances, data collected under federal programs may be more credible and consistent than the state data, according to state water managers. For example, one state water manager said his state participates in the USGS Cooperative Program because other states with which it manages shared waters consider USGS-collected information more credible than the state-collected information. Another state manager said that consistent, long-term, federal data collection is extremely valuable and cannot be replicated by the state. Furthermore, according to USGS and state officials, state and locally collected data is not always comparable because collection practices are not standardized.

Water managers in 39 states ranked expanding the number of data collection points for federal agencies as the most useful action to help their state meet its water information needs. Specifically, state managers reported that the addition of more monitoring stations to measure stream flow, aquifer levels, and snow pack depths would help states decide, for example, whether to allow additional water withdrawals from particular sources. State managers suggested more monitoring locations are particularly needed in rural areas, where water is shared among multiple states, or areas needing increased water flows to meet environmental protection needs. For example, one state manager said more monitoring stations are needed on the smaller tributaries, where the needs of endangered or threatened fish are in conflict with traditional offstream uses.

Officials at the USGS, the Natural Resources Conservation Service, and the National Weather Service, each have ongoing efforts and/or plans to improve their data collection programs. However, they need to do so within current funding levels. USGS—the agency primarily responsible for water data collection and analysis—officials said the agency continually examines how to allocate its resources to meet its national responsibilities while also helping states. According to agency officials, USGS and the states generally agree on which water sources to monitor; however, the agency and the states sometimes differ on how many locations to monitor for a particular source. Disagreement occurs because USGS’ monitoring stations are widely distributed to meet its nationwide responsibilities, rather than concentrated to benefit a particular state.

To meet demand for more data and more sophisticated water supply forecasts, Natural Resources Conservation Service officials say they need to double the current number of snow pack monitoring stations and water supply forecasting activities. Specifically, the agency has identified the need to automate and expand reporting on snow pack data in the Great Lakes and the Northeast, as it does for the West. Finally, officials at the National Weather Service said they plan to automate rainfall data reporting, which will make these data more readily accessible, but they have no plans to expand data collection locations.

According to USGS, Natural Resources Conservation Service and National Weather Service officials, obtaining additional funding is their primary barrier to expanding or automating data collection. To address funding limitations, they have developed collaborative relationships to accept data from other entities, including states and universities, and make these data

available to users on their web sites. Because data quality is a concern under this process, the federal agencies must verify that the entities' data collection practices meet federal standards before accepting the data. To help ensure quality, the agencies participate in interagency work groups that set standards for federal water data collection and dissemination, such as the Advisory Committee on Water Information.

States Favor More Flexibility in How They Comply with or Administer Federal Environmental Laws and More Opportunities for Comment

Federal laws such as the Endangered Species Act and the Clean Water Act provide important protections to the nation's wildlife and natural resources. The Endangered Species Act provides protection and assists the recovery of threatened or endangered plant and animal species and their critical habitat, and the Clean Water Act requires improvements to water quality and the prevention of discharges of pollutants into our nation's waters.

The implementation of these laws can also affect state water management goals and objectives. For example, the Endangered Species Act can create a demand to leave water instream to ensure that species or critical habitat are not jeopardized, thus competing with traditional offstream water demands, such as irrigation, municipal, and industrial uses. When demand is high among traditional users or supplies are limited, fulfilling the demands created by federal environmental laws can be challenging for some state managers.

According to our survey, the impacts of federal environmental protection laws on state water managers vary, depending on the particular water demands and uses within each state. For example, while 25 state water managers reported that the Clean Water Act increased water availability for instream purposes, managers offered diverse views of the law's effects on offstream availability. Managers in 11 states reported that the Clean Water Act's water quality impacts increased water availability for offstream uses, such as drinking water, while managers in 18 states reported that the law decreased offstream water availability, for example, because of the need to leave water instream to maintain water quality standards. Similarly, 26 state managers reported that the Endangered Species Act tended to decrease the amount of water available for offstream uses, but managers were more evenly divided on whether the law has made more water available for instream uses. For example, managers in 16 states reported that the Endangered Species Act has helped increase water availability for instream uses, such as maintaining fish habitat, while 9 managers reported

decreased availability because the law limited water availability for hydropower production, another instream water use.

Overall, 23 state water managers ranked having more flexibility in how they comply with or administer federal environmental laws as the most useful among potential actions that would help states meet the requirements of federal environmental protection laws while also meeting water management goals. Because the effects of the laws are so varied, we did not identify a consensus regarding the specific elements of compliance or administration of these laws that required more flexibility. However, state water managers described instances in which they believed that federal environmental laws restricted the state's ability to develop new water storage capacity, distribute water, or meet the needs of offstream users.

Federal officials from the Environmental Protection Agency, the Fish and Wildlife Service, and the National Marine Fisheries Service, agreed that while they try to accommodate state concerns about federal environmental laws, the amount of flexibility they can provide is limited by their obligation to ensure that the laws are complied with and administered as Congress intended. However, officials cited examples of current and planned efforts to use the flexibility they have under current law to help the states comply with or administer federal environmental laws like the Clean Water Act and Endangered Species Act. For example, Environmental Protection Agency officials said they are assessing ways to make their water quality programs more efficient and effective, which may result in more flexibility for the states. National Marine Fisheries Service and Fish and Wildlife Service officials said they already have considerable flexibility under the Endangered Species Act to accommodate state-developed water management plans that also meet the needs of listed threatened or endangered species. Officials of both the services said they encourage states to work cooperatively with them to develop water management plans.

In 17 states, water managers also said they would like federal agencies to seek more state advice on developing, revising, and implementing federal environmental laws. Specifically, three state managers made the following suggestions:

- Congress and federal agencies should seek states' input when reauthorizing the Endangered Species Act.³
- Federal agencies should recognize and support states' species recovery plans; this could help agencies to develop federal recovery plans that are better coordinated with state activities.
- States should peer review federal agencies' science and decisions, thus better balancing state and federal viewpoints.

Regarding federal actions to seek more state advice, federal agency officials cited several examples of ongoing and planned efforts to enhance their working relationships and reduce conflicts with state agencies and other stakeholders. The Fish and Wildlife Service and National Marine Fisheries Service have existing joint policies to use the expertise and solicit the participation of states in the recovery planning process, and to solicit peer review of draft recovery plans. Agency officials commonly cited the use of river basin-wide agreements as an example of efforts to formally bring together state, federal, and other stakeholders to address important issues, such as providing certainty in water supplies while protecting wildlife habitats and preventing additional threatened or endangered species listings or protecting water quality. Officials of several agencies cited examples of successful cooperative agreements used in the California Bay-Delta, Upper Colorado River Basin, Snake River Basin, and in the Lemhi and Upper Salmon River Basins. According to a Fish and Wildlife Service official, such agreements signal enhanced efforts at developing relationships, sharing information, and getting advice from the states. According to officials, the Environmental Protection Agency hopes to facilitate cooperative relationships, for example, by awarding grants to states to explore comprehensive solutions at the watershed level. Reclamation officials cited planned actions to prevent federal/state conflicts regarding environmental issues. For example, the agency plans

³ Endangered Species Act reauthorization has been on the legislative agenda since authorization expired in 1992, and bills have been introduced in each Congress to address various aspects of endangered species protection.

to provide more staff training on the purpose, processes, and requirements of the Endangered Species Act in order to ensure clarity regarding the act's requirements and the agency's responsibilities.

State Managers Would Gain from Improved Coordination of Federal Participation in Interstate or International Water-Management Agreements

State water managers in the 29 of 47 states that participate in an interstate or international water-management agreement ranked better coordination of federal agency participation with the state in the agreements as most useful among potential federal actions to help states in the development, enforcement, and implementation of such agreements. While many states said that federal agencies had fulfilled their responsibilities under interstate or international agreements during the last 5 years, seven state managers said that one or more agencies had not. These seven managers, and others, described instances in which they believe that federal agencies have not met their responsibilities under water-management agreements, such as:

- Ignoring obligations under participation agreements, such as the Corps not paying its river basin commission membership dues.
- Mismanaging existing river management facilities and failing to construct needed water storage facilities, such as projects for storing Colorado River water.
- Inadequately enforcing the water allocation terms of international treaties by not vigorously enforcing the terms of the U.S. water-management treaty with Mexico.
- Not resolving federal river basin priorities, thus creating uncertainty for state compact participants regarding federal actions.

Officials from Reclamation and the Corps stated that in most cases they have fulfilled their responsibilities under water-management agreements, but occasionally circumstances outside their control prevent them from carrying out their responsibilities. For example, in the case of the Corps not paying its river basin commission dues, Corps officials indicated that congressional appropriations language specifies that the federal government should no longer contribute financially to the annual expenses of these commissions. A Corps official stated that the agency has little funding available for efforts to coordinate activities under compacts, and moreover, other federal agencies have not approached the Corps to engage in coordination efforts. A Reclamation official acknowledged that he had

encountered barriers to coordination with other federal agencies—for example, federal agency officials are sometimes unwilling to sacrifice relationships they have developed with stakeholders in the interest of improving coordination among all parties.

Nevertheless, Reclamation and Corps officials stated that their participation in water-management agreements could be improved through their ongoing efforts to enhance coordination and communication with states and other water resource stakeholders. For example, Reclamation plans to facilitate meetings and assist water management projects in basins where the greatest potential for conflict exists among water users and environmental uses, thus laying the groundwork for the development of future water-management agreements. These efforts are similar to those officials described to assist the states and other stakeholders to allow more input into the operation of federal storage facilities.

States also ranked as important increased technical assistance to develop or implement water-management agreements. Of the 29 states in our survey that already participate in water-management agreements, 11 said they plan to propose, negotiate, or participate in a new water-management agreement within the next 5 years. For example, one state manager suggested federal assistance would be helpful in establishing a compact for managing water from an underground aquifer with another state. Another state water manager suggested that the state would benefit from assistance in the form of federal studies on water availability, use, and demand on sources shared between the United States and Canada.

Water management agencies do not have specific programs or funds to assist states in developing or implementing water-management agreements, according to agency officials. However, Reclamation and Corps officials pointed out that the federal agencies do assist in implementing agreements through the ongoing operation of federal water projects within the compact river basins, helping to ensure that the agreement terms are met. For example, Corps officials pointed to efforts by 10 federal agencies to assist in implementing agreements in the Alabama-Coosa-Tallapoosa and Apalachicola-Chattahoochee-Flint river basins located in Alabama, Florida, and Georgia. Furthermore, to help implement the water management treaty with Mexico, a National Weather Service official said the agency provides forecasting tools to Mexico to help facilitate accurate water supply forecasting on both sides of the border.

States Favored Having More Influence on the Use of Federal and Tribal Water Rights as Well as Greater Federal Efforts to Define These Rights

Of the 31 state managers reporting that federal agencies or tribal governments claim or hold water rights (either state granted or federal reserved) in their state, 12 reported that the most helpful potential federal action would be to consult more with the states on federal or tribal use of these rights. Sixteen of these water managers indicated that their state had experienced a conflict within the last 5 years between how a federal agency used its water rights and the state's water management goals. State water managers reported conflicts with 13 different agencies, such as Reclamation, the Forest Service, the Park Service, and the Bureau of Land Management. State managers also described instances of federal agencies challenging state decisions to grant water rights to others. For example:

- In one state, Reclamation challenged the state over ground-water rights it had issued to users because the withdrawals threatened federal surface-water rights.
- Similarly, a tribe sued the same state to stop issuance of ground-water rights potentially impacting water availability for tribal lands. According to state officials, both cases were settled by agreement.
- Another manager reported that the state and a federal agency disagreed on whether a federal lands leaseholder or the federal agency should hold the water right for water held in small storage facilities on federal lands. The court awarded the right to the leaseholder, despite federal concerns over future use of the water on its lands.

According to officials from the federal resource management agencies and Reclamation, the agencies exercise their state-granted water rights in accordance with state water laws and the agencies try to coordinate with the states over their use of water under federal reserved rights. National Park Service, Bureau of Land Management, and Forest Service officials said their agencies typically seek state-granted water rights for offstream uses of water on their lands, such as camp and picnic grounds or livestock watering. Typically, disputes related to federal agency use of state-granted rights are heard in state water courts where the federal agencies receive no preference over any other water right holder. Officials provided several examples of how their agencies work with the states and non-federal water users to minimize disputes. A National Park Service official said his agency seeks to reach mutually acceptable compromises with other water users, even though the other users' rights are often junior to the federal reserved rights. A Bureau of Land Management official said while his agency has federal reserved rights to water in a certain state, the agency also applies

for state rights because the state does not recognize the agency's federal reserved water right.

State water managers also favored increased financial and technical assistance to states to adjudicate water rights (the determination of the legal rights and priorities of all persons for a particular source as of a certain time) for federal agencies and tribal governments. Federal agencies and tribes may be entitled to water rights that would deprive others of water they have been using for many years. Until adjudicated or determined by the courts, the extent of such rights is unknown. Consequently, water managers, particularly those in Western states, are concerned about the unquantified water rights for federal and tribal lands, as well as the costs of quantifying these rights through adjudication. For example, 14 state water managers said quantifying federal reserved water rights is important to their state's ability to manage its water; similarly, 12 state water managers said quantifying tribal water rights is important.

To reduce uncertainty regarding water rights, some western states are conducting general adjudications to formally quantify and order by priority all rights claimed. These adjudications include determinations of federal water rights, which, since the McCarran Amendment was enacted in 1952, have been within the states' jurisdictions.⁴ This process of establishing the priority system is complicated and costly, and federal claims are often the largest and most difficult to adjudicate. For example, according to the Western States Water Council, 400 of the 700 claims being adjudicated in the Klamath Basin are federal claims. While all other water users claiming rights must pay filing fees to the state for the adjudication of these rights, the federal government does not, according to a Supreme Court ruling.

⁴ Pub. L. No. 82-495, §208, 66 Stat. 549, 560 (1952); see chapter 1, footnote 11, for more information on the McCarran Amendment.

Federal agency officials confirmed that the total quantity of water rights for federal and tribal lands is not known. While state and federal courts have settled some federal claims since the McCarran Amendment was enacted, a substantial majority of tribal and federal water rights have not yet been quantified. Currently, adjudications of tribal, federal, and other parties' water rights are underway in many states.⁵ For example, the U.S. Forest Service is participating in 43 adjudications and the National Park Service in 45, according to agency officials. As of March 2003, the Bureau of Indian Affairs reported it has settled 20 water rights cases, but most tribal rights are still unquantified.

According to officials, the federal resource management agencies file claims in accordance with state rules and abide by the results of the state adjudications. However, federal law prohibits the agencies from paying adjudication filing fees. A National Park Service official said it might be preferable to have a compromise between the two extremes of having the federal government pay millions of dollars to adjudicate every one of its water rights and paying nothing. This official notes that adjudications are in the federal interest—having water rights quantified creates more certainty for federal planning and decision-making.

Conclusions

While states have principal authority for water management, federal activities and laws affect or influence virtually every water management activity undertaken by states. With limited supplies and growing demands, state water managers face the challenge of future water shortages and their potentially severe consequences. Although the state managers value the many contributions of federal agencies to their efforts to ensure adequate water supplies, they also indicate that federal activities could better support their efforts in a number of areas. In some of these areas—such as providing funding for more state storage and distribution capacity or more flexibility in how states comply with federal environmental laws—federal agencies are limited in what they can do. However, in other areas—such as seeking increased state input to federal facility operations or enhancing coordination with states—more supportive federal actions may not necessarily involve new authority or significant expenditures. Slight shifts of federal priorities or renewed emphasis on matters that impact state efforts might be sufficient to help states better manage their water

⁵ For any water right holder, including federal agencies, participation in adjudication involves submitting a claim for the amount, location, and use of water.

resources. The information we collected from state water managers should be useful to agencies in determining how their activities affect states and how they can be more supportive of state efforts to meet their future water needs. While we are not making a specific recommendation, we encourage Agriculture, Commerce, Energy, Homeland Security, Interior, Corps, and Environmental Protection Agency officials to review the results of our state survey and consider modifications to their plans, policies, or activities as appropriate to better support state efforts to meet their future water needs.

Agency Comments and Our Evaluation

We provided copies of our draft report to the Departments of Agriculture, Commerce, Energy, Homeland Security, and the Interior; the U.S. Army Corps of Engineers, and the Environmental Protection Agency. The Department of the Interior concurred with our findings and wrote that the report provides valuable information to federal agencies for improving interactions with state water managers and will be helpful to state and local resource managers in identifying federal activities and plans that support water management efforts at all levels of government. Interior also provided technical clarifications, which we incorporated as appropriate. Interior's complete letter is in appendix II. The other departments and agencies concurred with our findings and provided technical clarifications, which we incorporated as appropriate. They did not provide formal, written comments.

GAO Analysis of Our Survey of the Effects of Federal Activities on State Water Availability, Management, and Use

To obtain states' views on how federal activities could better support state water management efforts to meet future demands, we conducted a Web-based survey of state water managers in the 50 states. We developed the survey questions by reviewing documents and by talking with officials from the federal agencies listed on pages 42 and 43 and the state water managers in three state offices—Arizona, Illinois, and Pennsylvania. The questionnaire contained 56 questions that asked about state water management; collection and dissemination of state water quantity data by federal agencies; federal water storage and conveyance within their state; the effects of federal environmental laws on state water management; the effects of interstate compacts and international treaties on state water management; and the effects of federal and tribal rights to water on state water management.

To access the Web-based survey and the results for each question go to [GAO-03-834SP](#) on the GAO Web site.

Q1. Has your state conducted an assessment of water availability, withdrawals, and/or consumption?

	Checked (percent)	Number of respondents
1. Water availability statewide (most or all regions of your state)	53.2	47
2. Water availability only for some regions or localities within your state	29.8	47
3. Water withdrawals statewide (most or all regions of your state)	76.6	47
4. Water withdrawals only for some regions or localities within your state	10.6	47
5. Water consumption statewide (most or all regions of your state)	51.1	47
6. Water consumption only for some regions or localities within your state	17.0	47
7. None of the above	8.5	47

Q2. Has your state conducted an assessment, either for all of your state or for portions of your state, of the economic and/or environmental effects of water shortages, including drought?

	Checked (percent)	Number of respondents
1. Actual economic effects of recent water shortages, including drought	25.5	47
2. Potential economic effects of future water shortages, including drought	25.5	47

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	Checked (percent)	Number of respondents
3. Actual environmental effects of recent water shortages, including drought	17.0	47
4. Potential environmental effects of future water shortages, including drought	23.4	47
5. None of the above	53.2	47

Q3. Which of the following plans does your state have?

	Checked (percent)	Number of respondents
1. Drought preparedness plan(s)	48.9	47
2. Drought response plan(s)	87.2	47
3. State does not have either of the above plans	8.5	47
4. Uncertain about state plans	2.1	47

Q4. Did your state receive federal assistance for the development of its drought preparedness and/or response plan(s)?

Yes (percent)	No (percent)	Uncertain (percent)	Number of respondents
11.9	76.2	9.5	41

Q5. In the next 1-10 years which, if any, portions of your state, are likely to experience water shortages under average water conditions?

Entire state (most, or all, of your state) (percent)	One or more regions within your state (percent)	One or more small localized areas within your state (percent)	None of the above (percent)	Uncertain (percent)	Number of respondents
4.3	34.0	38.3	19.1	4.3	47

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Q6. In the next 1-10 years which, if any, portions of your state, are likely to experience water shortages under drought conditions?

Entire state (most, or all, of your state) (percent)	One or more regions within your state (percent)	One or more small localized areas within your state (percent)	None of the above (percent)	Uncertain (percent)	Number of respondents
23.4	61.7	12.8	0.0	2.1	47

Q7. In the next 10-20 years which, if any, portions of your state, are likely to experience water shortages under average water conditions?

Entire state (most, or all, of your state) (percent)	One or more regions within your state (percent)	One or more small localized areas within your state (percent)	None of the above (percent)	Uncertain (percent)	Number of respondents
4.3	44.7	34.0	12.8	4.3	47

Q8. In the next 10-20 years which, if any, portions of your state, are likely to experience water shortages under drought conditions?

Entire state (most, or all, of your state) (percent)	One or more regions within your state (percent)	One or more small localized areas within your state (percent)	None of the above (percent)	Uncertain (percent)	Number of respondents
25.5	68.1	4.3	0.0	2.1	47

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Q9. Which, if any, of the following actions are being taken by your state government and/or by regional or local authorities to address current and future water needs in your state?

	Checked (percent)	Number of respondents
1. Developing markets to allow voluntary water transfers among users	31.9	47
2. Developing new water supplies through reuse of reclaimed water	48.9	47
3. Developing new water supplies through recycling of storm water	10.6	47
4. Developing new water supplies using desalination (seawater or brackish ground water)	19.1	47
5. Encouraging, requiring, and/or providing incentives for water conservation	85.1	47
6. Improving vegetation management along streams and rivers to increase stream flow	42.6	47
7. Improving riparian buffers to enhance water quality and increase water quantity	70.2	47
8. Increasing storage capacity, including surface storage reservoirs or artificial groundwater recharge	63.8	47
9. Managing surface and ground water together (conjunctive management) so that these sources can be used in combination or alternately	80.9	47
10. Monitoring water availability and withdrawals within the state	93.6	47
11. Pursuing water price restructuring	29.8	47
12. Requiring local water agencies to conduct water availability assessments before approving new development or changes in land use	29.8	47
13. Using cloud seeding to induce precipitation where it might not occur naturally, or in greater quantities than might occur naturally	17.0	47
14. Using inter-basin transfer of water	59.6	47
15. Other actions being taken to address water needs (Please specify below.)	34.0	47

If answer 15 is checked (in Q9 above), please provide a brief description (of other actions being taken to address your state's water needs).

Providing description (percent)	Number of respondents
100	16

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Q10. In general, what is the legal doctrine used by your state to govern the allocation of surface water?

Prior appropriation (percent)	Common-law riparian (percent)	Regulated riparian (percent)	A combination of prior appropriation and riparian (percent)	State does not regulate surface water allocation (percent)	Other (percent)	Uncertain (percent)	Number of respondents
31.9	14.9	19.1	6.4	4.3	21.3	2.1	47

If 'other' is checked (in Q10 above), please describe how your state governs the allocation and use of surface water.

Providing description (percent)	Number of respondents
100	10

Q11. In general, what is the legal doctrine used by your state to govern the allocation of ground water?

Correlative rights (percent)	Reasonable use (percent)	Prior appropriation (percent)	Absolute ownership (percent)	State does not regulate ground water allocation (percent)	Other (percent)	Uncertain (percent)	Number of respondents
6.4	38.3	25.5	2.1	6.4	19.1	2.1	47

If 'other' is checked (in Q11 above), please describe how your state governs the allocation and use of ground water.

Providing description (percent)	Number of respondents
100	9

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Q12. Overall, about how much of your state's data on water availability and withdrawals is provided by federal agencies?

	Little or none (percent)	Less than half (percent)	About half (percent)	More than half (percent)	All or almost all (percent)	Uncertain (percent)	Number of respondents
a. Data on ground water availability	26.7	40.0	11.1	11.1	11.1	0.0	45
b. Data on ground water withdrawals	59.6	27.7	4.3	8.5	0.0	0.0	47
c. Data on surface water availability	13.0	10.9	28.3	30.4	15.2	2.2	46
d. Data on surface water withdrawals	63.8	21.3	6.4	6.4	2.1	0.0	47

Q13. Please provide the name(s) of the federal agency(ies) that provide water availability and/or withdrawal data to you.

Provided agency name(s) (percent)	Number of respondents
89.4	47

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Q14. Overall, how important are data provided by federal agencies to your state's ability to complete each of the following activities?

	Very important (percent)	Somewhat important (percent)	Equally important and unimportant (percent)	Somewhat unimportant (percent)	Very unimportant (percent)	Number of respondents
a. To determine the quantity of available ground water	34.9	34.9	16.3	9.3	4.7	43
b. To determine the quantity of ground water withdrawals	13.2	15.8	18.4	28.9	23.7	38
c. To determine the quantity of available surface water	53.3	28.9	13.3	0.0	4.4	45
d. To determine the quantity of surface water withdrawals	8.1	18.9	21.6	27.0	24.3	37
e. To determine the quantity of consumptive water use	10.3	12.8	25.6	25.6	25.6	39
f. To assess the economic effects of water withdrawals	3.8	15.4	23.1	23.1	34.6	26
g. To assess the environmental effects of water withdrawals	17.5	32.5	15.0	25.0	10.0	40
h. To plan environmental mitigation or restoration	27.0	32.4	18.9	16.2	5.4	37
i. To monitor the terms of water allocation agreements that distribute water among multiple parties (such as states)	35.5	22.6	6.5	12.9	22.6	31

Q15. What type(s) of water quantity data, not currently being collected by the federal government, would be most useful in helping your state with its water management?

Providing answer (percent)	Number of respondents
74.5	47

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Q16. Which actions, with respect to federal collection and dissemination of data, would be most useful to your state? Rank each of the following actions from most useful (1st) to least useful (6th).

	Mean Ranking	Number of respondents
a. Collect data at more locations	1.3	45
b. Improve the accuracy of data currently being collected	3.8	45
c. Improve the timeliness of dissemination	3.3	45
d. Improve access to data previously collected (for example, historical)	3.8	45
e. Provide data in a more usable format	4.4	45
f. Provide more analyses of data	4.3	45

Q17. Are there other actions federal agencies could take to improve their collection and dissemination of water quantity data?

Providing answer (percent)	Number of respondents
57.4	47

Q18. How much of your state's water is stored using facilities constructed, operated, or maintained by the federal government?

Little or none (percent)	Less than half (percent)	About half (percent)	More than half (percent)	All or almost all (percent)	Uncertain (percent)	Number of respondents
36.2	23.4	8.5	25.5	2.1	4.3	47

Q19. How likely is it that your state will add storage capacity within the next 10 years?

Very likely (percent)	Somewhat likely (percent)	Equally likely and unlikely (percent)	Somewhat unlikely (percent)	Very unlikely (percent)	Uncertain (percent)	Number of respondents
36.2	19.1	10.6	12.8	21.3	0.0	47

Q20. Has your state estimated the cost to add storage capacity?

Yes (percent)	No (percent)	Uncertain (percent)	Number of respondents
27.7	57.4	14.9	47

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Q21. Does your state plan to seek federal assistance for the addition of storage capacity?

Definitely yes (percent)	Probably yes (percent)	Probably no (percent)	Definitely no (percent)	Uncertain (percent)	Number of respondents
23.9	30.4	23.9	4.3	17.4	46

Q22. What activities have federal agencies participated in during the past 5 years with respect to non-federal storage infrastructure in your state?

	Checked (percent)	Number of respondents
1. Planning of facilities	29.8	47
2. Reviewing plans for facilities	29.8	47
3. Operating and/or maintaining facilities	17.0	47
4. Constructing facilities	12.8	47
5. None of these activities	31.9	47
6. Uncertain	23.4	47

Q23. Within the last 5 years, has your state requested that a federal agency modify its operation of a federal storage facility to better meet the state's water management goals?

Yes, many times (percent)	Yes, a few times (percent)	Yes, but only once or twice (percent)	No (percent)	Our state does not have any federal storage facilities (percent)	Uncertain (percent)	Number of respondents
23.4	23.4	14.9	23.4	8.5	6.4	47

If 'yes' is checked (in Q23 above), please provide some examples of the types of changes requested and the agencies that you requested make the changes.

Providing examples (percent)	Number of respondents
86.2	29

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Q24. How much of your state's water is conveyed using facilities (for example, an aqueduct or canal) constructed, operated, or maintained by the federal government?

Little or none (percent)	Less than half (percent)	About half (percent)	More than half (percent)	All or almost all (percent)	Uncertain (percent)	Number of respondents
68.1	19.1	2.1	8.5	0.0	2.1	47

Q25. How likely is it that your state will add conveyance capacity within the next 10 years?

Very likely (percent)	Somewhat likely (percent)	Equally likely and unlikely (percent)	Somewhat unlikely (percent)	Very unlikely (percent)	Uncertain (percent)	Number of respondents
25.5	12.8	2.1	10.6	36.2	12.8	47

Q26. Has your state estimated the cost to add conveyance capacity?

Yes (percent)	No (percent)	Uncertain (percent)	Number of respondents
19.1	74.5	6.4	47

Q27. Does your state plan to seek federal assistance for the addition of conveyance capacity?

Definitely yes (percent)	Probably yes (percent)	Probably no (percent)	Definitely no (percent)	Uncertain (percent)	Number of respondents
19.1	12.8	40.4	6.4	21.3	47

Q28. What activities have federal agencies participated in during the past 5 years with respect to non-federal conveyance infrastructure in your state?

	Checked (percent)	Number of respondents
1. Planning of facilities	29.8	47
2. Reviewing plans for facilities	31.9	47
3. Operating and/or maintaining facilities	4.3	47
4. Constructing facilities	10.6	47
5. None of these activities	44.7	47
6. Uncertain	17.0	47

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Q29. Has the lack of maintenance (e.g., repair or rehabilitation) of federal storage or conveyance facilities reduced water availability in your state within the last 5 years?

Yes, many times (percent)	Yes, a few times (percent)	Yes, but only once or twice (percent)	No (percent)	Our state does not have any federal storage or conveyance facilities (percent)	Uncertain (percent)	Number of respondents
6.4	0.0	8.5	53.2	14.9	17.0	47

If 'yes' is checked (in Q29 above), please provide example(s) of poor maintenance and how it affected water availability in your state.

Providing examples (percent)	Number of respondents
85.7	7

Q30. Which actions would be most useful in helping your state meet its water management goals with respect to the storage and conveyance of water? Rank each of the following actions from most useful (1st) to least useful (6th).

	Mean Ranking	Number of respondents
a. Improve the maintenance of federal facilities	4.8	44
b. Increase federal technical assistance for the planning, construction, operation, or maintenance of state storage and conveyance infrastructure	3.5	44
c. Increase federal financial assistance for the planning and construction of state storage and conveyance infrastructure	1.9	44
d. Increase federal financial assistance for the operation and maintenance of state storage and conveyance infrastructure	3.4	44
e. Seek more state input in operation of federal storage facilities	3.4	44
f. Streamline federal review processes of proposed state storage and conveyance facilities	4.0	44

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Q31. Are there other actions federal agencies could take to improve their participation in the planning, review, construction, operation, and/or maintenance of federal water storage and conveyance infrastructure?

Providing answer (percent)	Number of respondents
44.7	47

Q32. What effect has each of the federal laws listed below had on water availability, for in-stream purposes, in your state within the past 5 years?

	Greatly increased water availability (percent)	Somewhat increased water availability (percent)	Had no effect on water availability (percent)	Somewhat decreased water availability (percent)	Greatly decreased water availability (percent)	Uncertain (percent)	Number of respondents
a. Clean Water Act	14.9	38.3	29.8	6.4	0.0	10.6	47
b. Coastal Zone Management Act	2.5	15.0	65.0	2.5	0.0	15.0	40
c. Endangered Species Act	0.0	34.0	27.7	14.9	4.3	19.1	47
d. Federal Power Act	2.2	24.4	33.3	15.6	0.0	24.4	45
e. Fish and Wildlife Coordination Act	0.0	21.7	37.0	8.7	2.2	30.4	46
f. Rivers and Harbors Appropriation Act	0.0	7.3	56.1	7.3	0.0	29.3	41
g. Safe Drinking Water Act	6.4	19.1	44.7	14.9	0.0	14.9	47
h. Wild and Scenic Rivers Acts	0.0	10.9	56.5	6.5	4.3	21.7	46
i. Wilderness Act	0.0	2.2	68.9	2.2	2.2	24.4	45

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Q33. What effect has each of the federal laws listed below had on water availability, for off-stream purposes, in your state within the past 5 years?

	Greatly increased water availability (percent)	Somewhat increased water availability (percent)	Had no effect on water availability (percent)	Somewhat decreased water availability (percent)	Greatly decreased water availability (percent)	Uncertain (percent)	Number of respondents
a. Clean Water Act	6.5	17.4	23.9	37.0	2.2	13.0	46
b. Coastal Zone Management Act	0.0	7.7	64.1	10.3	0.0	17.9	39
c. Endangered Species Act	0.0	2.2	26.1	50.0	6.5	15.2	46
d. Federal Power Act	0.0	8.9	40.0	22.2	0.0	28.9	45
e. Fish and Wildlife Coordination Act	0.0	2.3	32.6	30.2	2.3	32.6	43
f. Rivers and Harbors Appropriation Act	0.0	4.9	56.1	7.3	2.4	29.3	41
g. Safe Drinking Water Act	8.7	19.6	43.5	10.9	2.2	15.2	46
h. Wild and Scenic Rivers Act	0.0	2.3	52.3	18.2	4.5	22.7	44
i. Wilderness Act	0.0	0.0	66.7	2.4	2.4	28.6	42

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Q34. Which actions would be most useful in helping your state fulfill the requirements of federal environmental laws while meeting its water management goals? Rank each of the following actions from most useful (1st) to least useful (4th).

	Mean Ranking	Number of respondents
a. Charge for the use of water from federal storage and conveyance facilities and use funds to help mitigate damage to environment from projects	4.0	46
b. Give the states more flexibility in compliance or administration of federal environmental laws	1.8	46
c. Improve coordination among federal agencies in implementing environmental laws	2.5	46
d. Seek more state input into development, revision and implementation of federal environmental laws	1.8	46

Q35. Are there other actions federal agencies could take to help your state fulfill the requirements of federal environmental laws?

Providing answer (percent)	Number of respondents
40.4	47

Q36. Does your state participate in an interstate compact or international treaty to allocate water among multiple parties?

Yes (percent)	No (percent)	Uncertain (percent)	Number of respondents
61.7	36.2	2.1	47

Q37. About how much of your state's water is affected by an interstate compact and/or international treaty?

Little or none (percent)	Less than half (percent)	About half (percent)	More than half (percent)	All or almost all (percent)	Uncertain (percent)	Number of respondents
20.7	44.8	0.0	31.0	3.4	0.0	29

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Q38. Within the last 5 years, have any federal agencies participated in the development, implementation or enforcement of an interstate compact affecting water availability in your state?

	Checked (percent)	Number of respondents
1. Federal agency or agencies have participated in the development of an interstate compact(s)	17.2	29
2. Federal agency or agencies have participated in the implementation of an interstate compact(s)	58.6	29
3. Federal agency or agencies have participated in the enforcement of an interstate compact(s)	31.0	29
4. None of the above	17.2	29

Q39. Within the last 5 years, have any federal agencies participated in the development, implementation or enforcement of an international treaty affecting water availability in your state?

	Checked (percent)	Number of respondents
1. Federal agency or agencies have participated in the development of an international treaty(ies)	13.8	29
2. Federal agency or agencies have participated in the implementation of an international treaty(ies)	27.6	29
3. Federal agency or agencies have participated in the enforcement of an international treaty(ies)	27.6	29
4. None of the above	55.2	29

Q40. Within the last 5 years, have federal agencies participating in the development, implementation, or enforcement of an interstate compact(s) and/or international treaty(ies) affecting water allocation fulfilled their responsibilities?

All agencies have fulfilled all responsibilities (percent)	One or more agencies have not fulfilled their responsibilities (percent)	Uncertain (percent)	Number of respondents
50.0	26.9	23.1	26

If 'one or more agencies' is checked (in Q40 above), please specify the agency(ies) and briefly describe how often responsibilities have not been fulfilled.

Providing answer (percent)	Number of respondents
100	7

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Q41. Does your state plan to propose, negotiate, or participate in a new interstate compact or international treaty within the next 5 years?

Definitely yes (percent)	Probably yes (percent)	Probably no (percent)	Definitely no (percent)	Uncertain (percent)	Number of respondents
13.8	24.1	37.9	13.8	10.3	29

Q42. Which actions would be most useful in helping your state with respect to the development, enforcement, and implementation of interstate compacts and international treaties? Rank order each of the following actions from most useful (1st) to least to the least useful (6th).

	Mean Ranking	Number of respondents
a. Better coordinate federal participation with the state	2.6	28
b. Better coordinate participation among federal agencies	2.8	28
c. Create a market-based allocation system for water shared by states	5.3	28
d. Develop alternative tools for resolving water allocation conflicts among states	3.0	28
e. Increase technical assistance to assist the states with development or implementation	2.8	28
f. Make it easier to amend or revise existing agreements	4.5	28

Q43. Are there other actions that would be useful in helping your state with respect to the development, enforcement, and implementation of interstate compacts and international treaties?

Providing answer (percent)	Number of respondents
41.4	29

Q44. Do any federal agencies hold or claim water rights in your state?

Yes	No	Uncertain	Number of respondents
51.1	31.9	17.0	47

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Q45. Currently, about how much of your state's water is allocated to fulfill federal water rights?

Little or none (percent)	Less than half (percent)	About half (percent)	More than half (percent)	All or almost all (percent)	Uncertain (percent)	Number of respondents
50.0	37.5	0.0	4.2	0.0	8.3	24

Q46. If all federal claims to water in your state were quantified, about how much of your state's water would be allocated to fulfill these rights?

Little or none (percent)	Less than half (percent)	About half (percent)	More than half (percent)	All or almost all (percent)	Uncertain (percent)	Number of respondents
37.5	29.2	4.2	4.2	4.2	20.8	24

Q47. How important is the quantification of federal water rights to your state's ability to manage its water?

Very important (percent)	Somewhat important (percent)	Equally important and unimportant (percent)	Somewhat unimportant (percent)	Very unimportant (percent)	Uncertain (percent)	Number of respondents
29.2	29.2	12.5	12.5	16.7	0.0	24

Q48. Within the last five years, has your state experienced any conflict between how a federal agency employed its water rights and your state's water management goals?

Yes, many times (percent)	Yes, a few times (percent)	Yes, but only once or twice (percent)	No, our state has not experienced any conflict (percent)	Uncertain (percent)	Number of respondents
13.6	40.9	18.2	27.3	0.0	22

If 'yes' is checked (in Q48 above), please specify the agency(ies).

Providing answer (percent)	Number of respondents
93.8	16

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Q49. Do any tribal governments hold or claim water rights in your state?

Yes (percent)	No (percent)	Uncertain (percent)	Number of respondents
52.2	41.3	6.5	46

Q50. Currently, about how much of your state's water is allocated to fulfill tribal water rights?

Little or none (percent)	Less than half (percent)	About half (percent)	More than half (percent)	All or almost all (percent)	Uncertain (percent)	Number of respondents
73.9	26.1	0.0	0.0	0.0	0.0	23

Q51. If all tribal claims to water in your state were quantified, about how much of your state's water would be allocated to fulfill these rights?

Little or none (percent)	Less than half (percent)	About half (percent)	More than half (percent)	All or almost all (percent)	Uncertain (percent)	Number of respondents
45.8	25.0	0.0	4.2	4.2	20.8	24

Q52. How important is the quantification of tribal water rights to your state's ability to manage its water?

Very important (percent)	Somewhat important (percent)	Equally important and unimportant (percent)	Somewhat unimportant (percent)	Very unimportant (percent)	Uncertain (percent)	Number of respondents
37.5	12.5	12.5	8.3	25.0	4.2	24

Q53. Within the last five years, has your state experienced any conflict between how a tribal government employed its water rights and the state's water management goals?

Yes, many times (percent)	Yes, a few times (percent)	Yes, but only once or twice (percent)	No, our state has not experienced any conflict (percent)	Uncertain (percent)	Number of respondents
4.3	26.1	21.7	39.1	8.7	23

If 'yes' is checked (in Q53 above), please specify the tribal government(s).

Writing comment (percent)	Number of respondents
83.3	12

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Q55. Which actions would be most useful in helping your state fulfill federal and tribal rights to water while meeting your state's water management goals? Rank each of the following actions from most useful (1st) to least useful (6th).

	Mean Ranking	Number of respondents
a. Better coordinate participation among federal agencies in the establishment and use of federal or tribal water rights	3.0	25
b. Clarify federal policy on tribal governments' authority to sell water rights	4.1	25
c. Improve the efficiency of water use, including increasing conservation when applicable, on federal and tribal lands	4.7	25
d. Increase financial and technical assistance to states for adjudication of federal and tribal water rights	2.9	25
e. Seek more state input into the use of federal or tribal water rights and potential effects on state water management goals	2.2	25
f. Streamline federal processes to quantify federal or tribal water rights	4.1	25

Q56. Are there other actions that federal agencies could take to help your state fulfill federal and tribal rights to water while meeting your state's water management goals?

Providing answer (percent)	Number of respondents
38.7	31

Additional Comments: If you would like to make additional comments concerning any topic related to water availability, management, or use, please feel free to do so in the space provided.

Providing answer (percent)	Number of respondents
36.2	47

Note: Question 54 was not included because it was used only for navigation purposes in the Web-based questionnaire.

Comments from the Department of the Interior



United States Department of the Interior

OFFICE OF THE SECRETARY
Washington, D.C. 20240

JUN 10 2003

Mr. Barry T. Hill
Director, Natural Resources and Environment Team
U.S. General Accounting Office
441 G Street, N.W.
Washington, D.C. 20548

Dear Mr. Hill:

Thank you for providing the Department of the Interior (DOI) the opportunity to review and comment on the draft U.S. General Accounting Office (GAO) report entitled, "FRESHWATER SUPPLY: States' View of How Federal Agencies Could Help Them Meet the Challenges of Expected Shortages," (GAO-03-514) dated May 8, 2003. In general, we agree with the findings and the recommendations in the report.

The report appears to be accurate and represents a substantial effort on the part of the GAO staff involved in the review. We acknowledge the critical need for Federal-state partnerships in addressing the national challenge of ensuring adequate water supplies for all of our citizens. The report provides valuable information to Federal agencies for improving interactions with state water managers in addressing existing and potential water shortages across the country. The report will be helpful also to state and local resource managers in identifying Federal activities and plans that support water management efforts at all levels of Government. Finally, we are confident that information contained in this report will be of great value to Congressional committees in their deliberations on national water policy issues.

The enclosure provides specific comments from the U.S. Fish and Wildlife Service, U.S. Geological Survey, National Park Service, and the DOI's Office of Budget. We hope our comments will assist you in preparing the final report.

Sincerely,

P. Lynn Scarlett
Assistant Secretary - Policy,
Management and Budget

Enclosure

GAO Contacts and Staff Acknowledgments

GAO Contacts

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Keith Oleson (415) 904-2218

Acknowledgments

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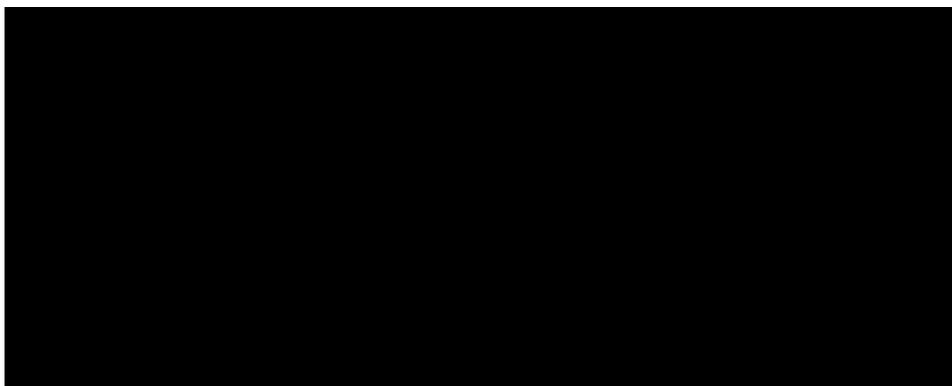
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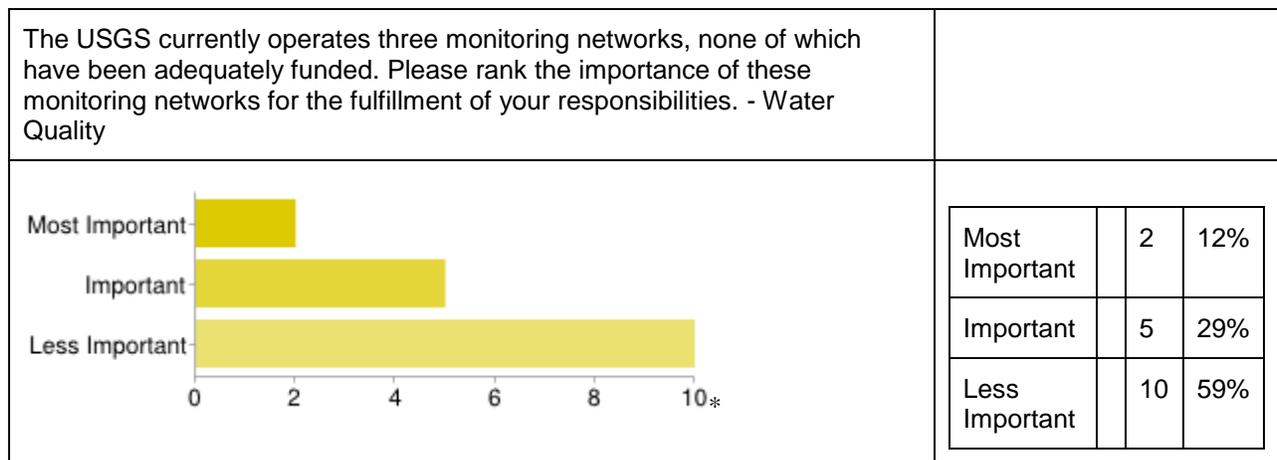
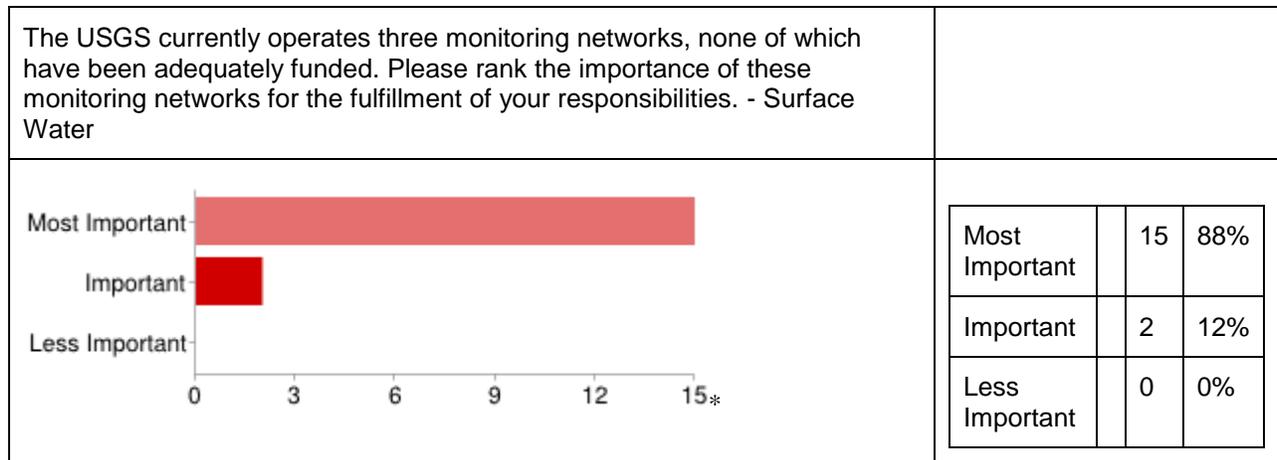
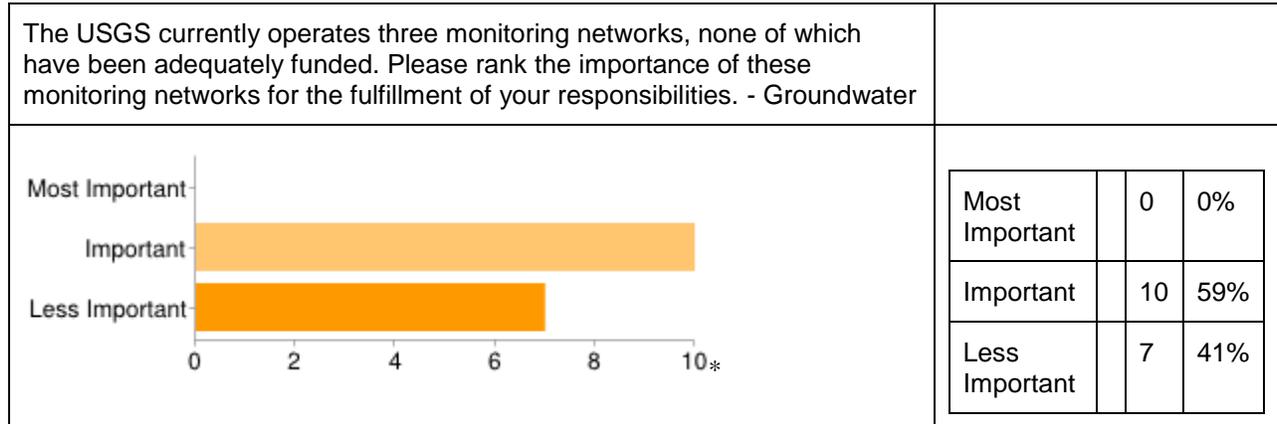
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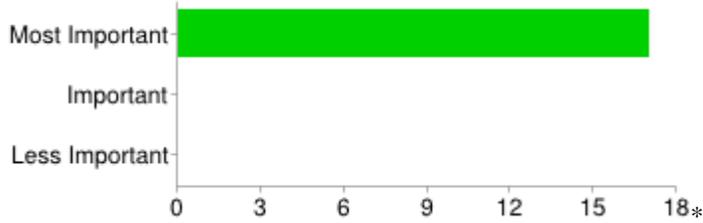


Tab P – WSWC/ICWP/USGS Water
Resources Program Budget
Priorities

ACWI – USGS Budget Priorities Survey – WSWC Responses

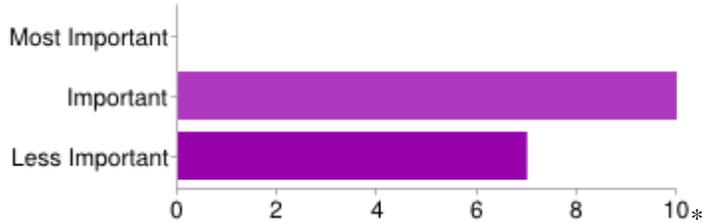


The USGS conducts various activities in all three areas (surface water, groundwater, water quality and combinations thereof.) Please rank these activities. - Data Collection



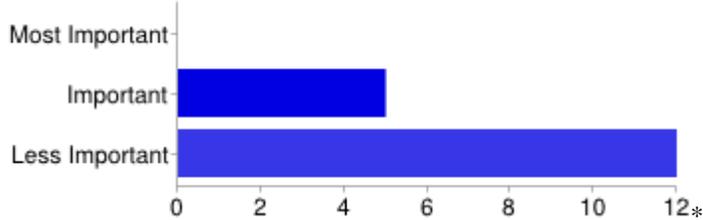
Most Important	17	100%
Important	0	0%
Less Important	0	0%

The USGS conducts various activities in all three areas (surface water, groundwater, water quality and combinations thereof.) Please rank these activities. - Interpretive Studies



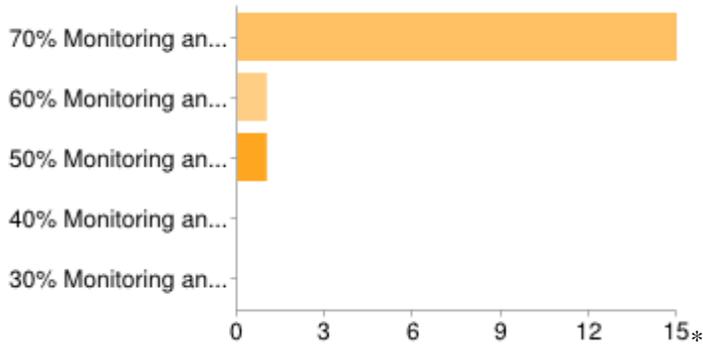
Most Important	0	0%
Important	10	59%
Less Important	7	41%

The USGS conducts various activities in all three areas (surface water, groundwater, water quality and combinations thereof.) Please rank these activities. - Models and other applications



Most Important	0	0%
Important	5	29%
Less Important	12	71%

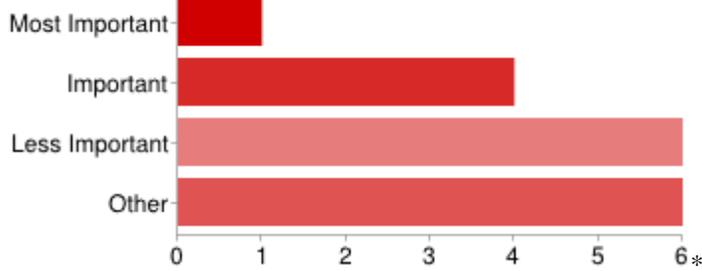
The USGS Cooperative Water Program (CWP or COOP Program) shares the cost of monitoring sites and interpretive studies, so long as they (the monitoring site or the interpretive study) meet national objectives. What does your agency/organization think is the right balance?



70% Monitoring and 30% interpretive studies	15	88%
60% Monitoring and 40% interpretive studies	1	6%
50% Monitoring and 50% interpretive studies	1	6%
40% Monitoring and 60% interpretive studies	0	0%
30% Monitoring and 70% interpretive studies	0	0%

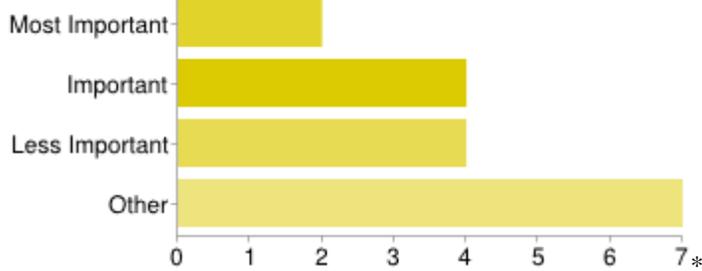
People may select more than one checkbox, so percentages may add up to more than 100%.

Several new initiatives have been proposed or authorized recently. Which of these new initiatives are most important to your agency/organization? - The National Water Census or water availability and use study using a "water budget" approach for each HUC-8 watershed



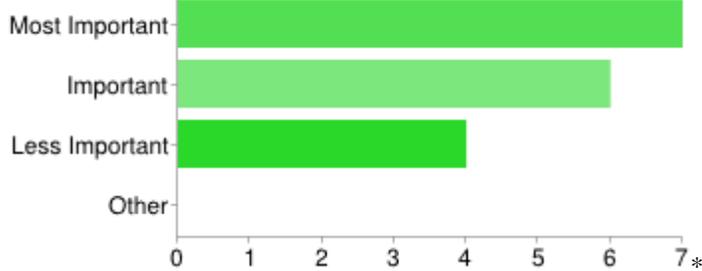
Most Important	1	6%
Important	4	24%
Less Important	6	35%
Other	6	35%

Several new initiatives have been proposed or authorized recently. Which of these new initiatives are most important to your agency/organization? - The National Groundwater Monitoring Network



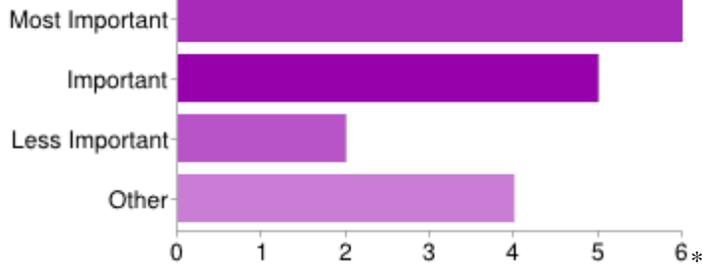
Most Important	2	12%
Important	4	24%
Less Important	4	24%
Other	7	41%

Several new initiatives have been proposed or authorized recently. Which of these new initiatives are most important to your agency/organization? - LANDSAT data and satellite operations (not satellite design and launch logistics/funding) as part of remote sensing capabilities



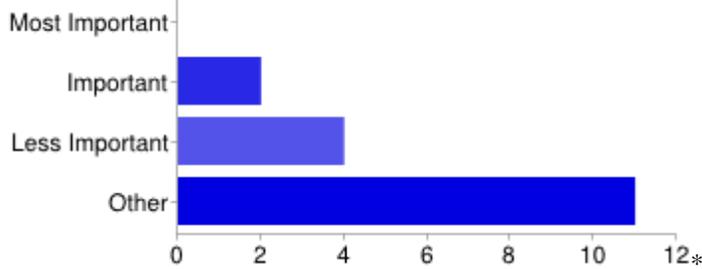
Most Important	7	41%
Important	6	35%
Less Important	4	24%
Other	0	0%

Several new initiatives have been proposed or authorized recently. Which of these new initiatives are most important to your agency/organization? - Water Data Portal development to provide better access to existing data



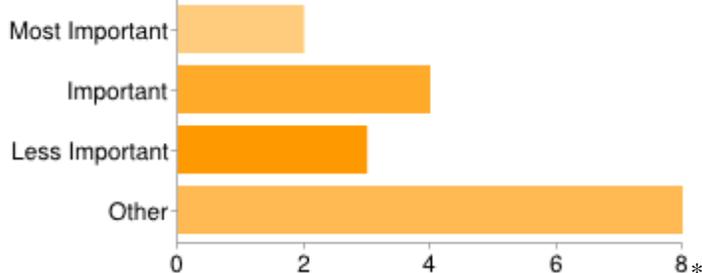
Most Important	6	35%
Important	5	29%
Less Important	2	12%
Other	4	24%

Several new initiatives have been proposed or authorized recently. Which of these new initiatives are most important to your agency/organization? - Assessment of hydraulic fracturing impacts to water quality and availability (a national initiative to supplement ongoing CWP interpretive studies)



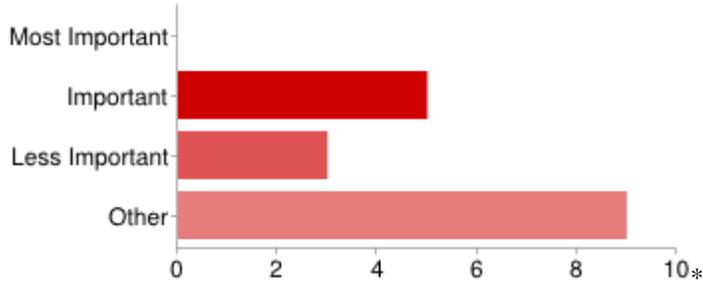
Most Important	0	0%
Important	2	12%
Less Important	4	24%
Other	11	65%

Several new initiatives have been proposed or authorized recently. Which of these new initiatives are most important to your agency/organization? - Groundwater availability studies



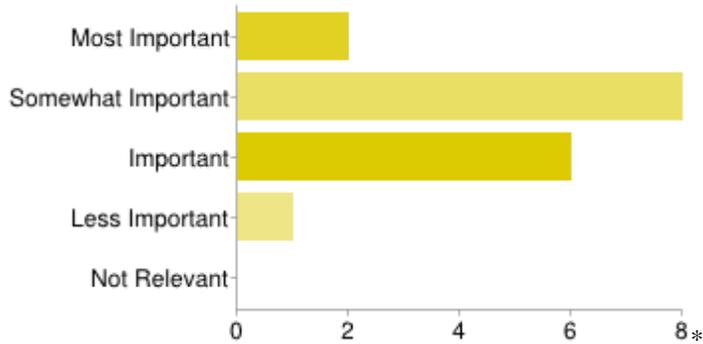
Most Important	2	12%
Important	4	24%
Less Important	3	18%
Other	8	47%

Several new initiatives have been proposed or authorized recently. Which of these new initiatives are most important to your agency/organization? - Decision support systems for extreme events/climate change and adaptation



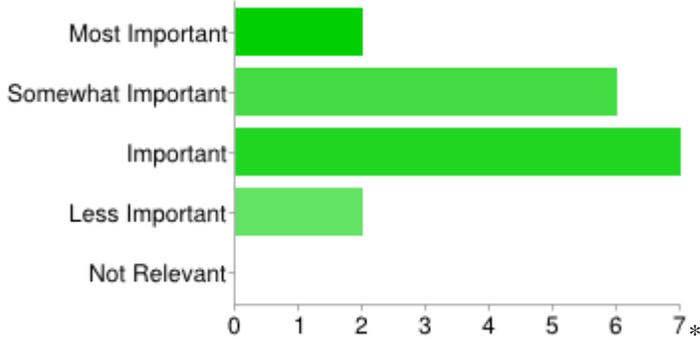
Most Important	0	0%
Important	5	29%
Less Important	3	18%
Other	9	53%

Travel costs are a significant and sometimes essential budget item. What USGS travel-related requirements does your agency/organization consider the most important? - Research and scientific advancement



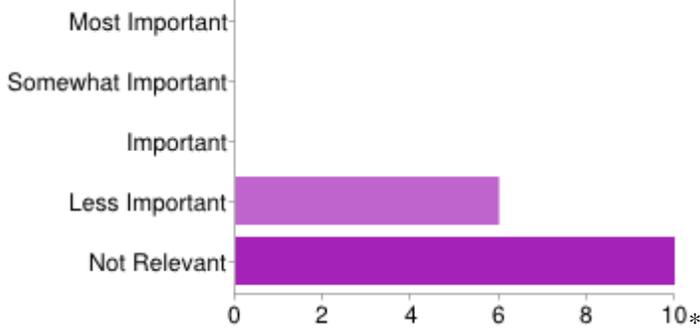
Most Important	2	12%
Somewhat Important	8	47%
Important	6	35%
Less Important	1	6%
Not Relevant	0	0%

Travel costs are a significant and sometimes essential budget item. What USGS travel-related requirements does your agency/organization consider the most important? - USGS responsiveness to states, other agencies, watershed groups, etc.



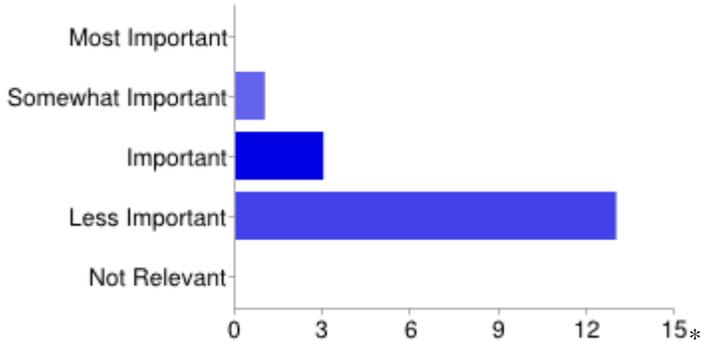
Most Important	2	12%
Somewhat Important	6	35%
Important	7	41%
Less Important	2	12%
Not Relevant	0	0%

Travel costs are a significant and sometimes essential budget item. What USGS travel-related requirements does your agency/organization consider the most important? - International needs and opportunities



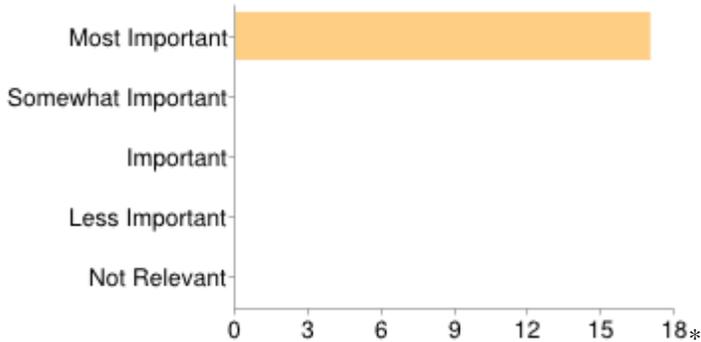
Most Important	0	0%
Somewhat Important	0	0%
Important	0	0%
Less Important	6	35%
Not Relevant	10	59%

Travel costs are a significant and sometimes essential budget item. What USGS travel-related requirements does your agency/organization consider the most important? - Internal meetings among USGS leadership, regional executives and Water Science Centers



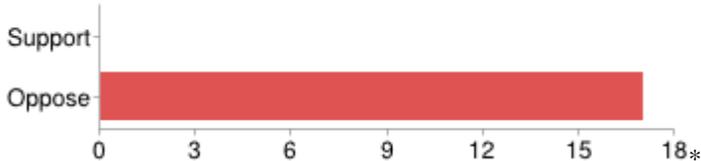
Most Important	0	0%
Somewhat Important	1	6%
Important	3	18%
Less Important	13	76%
Not Relevant	0	0%

Travel costs are a significant and sometimes essential budget item. What USGS travel-related requirements does your agency/organization consider the most important? - Field trips to maintain equipment, collect data, etc.



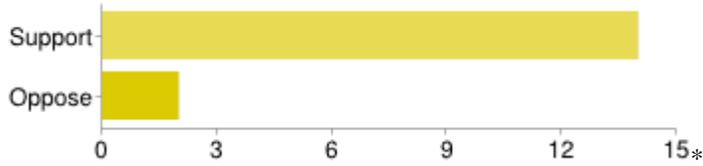
Most Important	17	100%
Somewhat Important	0	0%
Important	0	0%
Less Important	0	0%
Not Relevant	0	0%

Do you support or oppose cutting USGS monitoring states (for all three monitoring networks)?



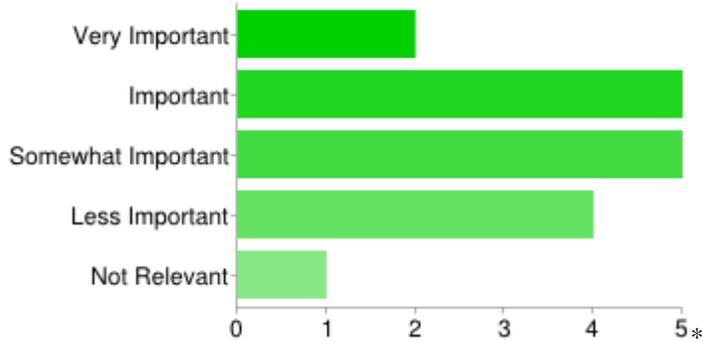
Support	0	0%
Oppose	17	100%

Do you support or oppose USGS providing more standards, protocols and training in an effort to enable other agencies and organizations to do the monitoring (at their own expense) and still maintain acceptable levels of QA/QC?



Support	14	88%
Oppose	2	13%

How important is the work of the Water Resources Research Institute in your state to fulfilling your agency/organization's responsibilities?



Very Important	2	12%
Important	5	29%
Somewhat Important	5	29%
Less Important	4	24%
Not Relevant	1	6%

People may select more than one checkbox, so percentages may add up to more than 100%.

Tab Q – Federal Legislation Update

LITIGATION AND LEGISLATION UPDATE
172ND WSWC MEETINGS
CASPER, WYOMING – JUNE 25, 2013

Nathan Bracken
WSWC Legal Counsel
nbracken@wswc.utah.gov

This summary describes developments regarding notable legislation and litigation that pertain to WGA/WSWC policies or are otherwise of interest. The summary focuses mostly on federal legislative developments and litigation developments that took place after the WSWC's 2013 spring meetings held on April 3-5, 2013, in Denver, Colorado. This update is current as of June 13, 2013, and begins with the most recently introduced legislation.

NOTABLE LEGISLATION

Bill Number(s)	Details	Date/Status	Sponsor(s)
S. 1135	<p>Issue – Hydraulic Fracturing</p> <p>Title – None: The text of this bill was not available as of the date of this summary, but its sponsors indicate that it would amend the Safe Drinking Water Act to repeal a certain exemption for hydraulic fracturing. See also the Climate Protection Act of 2013 (S. 332).</p> <p><i>Note: The WSWC will consider a proposed position at its June 2013 meetings in Casper, Wyoming, which urges federal efforts involving hydraulic fracturing to include state expertise and to ensure that such efforts do not infringe upon the states' primary authority regarding the allocation of water used in hydraulic fracturing.</i></p>	06/11/13: Bill introduced and referred to the Senate Environment and Public Works Committee	Sen. Robert Casey (D-PA) introduced the bill with four co-sponsors, including Sen. Jeff Merkley (D-OR)
H.R. 2307	<p>Issue - Water Sharing with Mexico/Rio Grande/Colorado River</p> <p>Title – Working to Address Treaty Enforcement Rapidly for Texas Act: Would direct the Secretary of State to report on: (1) efforts by Mexico to meet its Rio Grande water deliveries; and (2) benefits to the United States of the interim international cooperative measures in the Colorado River Basin through 2017 and extension of Minute 318 cooperative measures to address the continued effects of the 2010 Mexican earthquake. See H.R. 1863, also from Rep. Filemon Vela (D-TX).</p>	06/10/13: Bill introduced and referred to the House Committee on Foreign Affairs	Rep. Filemon Vela (D-TX) introduced H.R. 2307 with co-sponsor Rep. Michael Conaway (R-TX)

N/A – draft bill	<p>Issue – FY 2014 Agriculture Appropriations/NRCS</p> <p>Title – None: Would appropriate \$19.5B for federal agriculture efforts. This amount is \$1.3B below FY 2013 enacted levels, \$516M below the President’s request, and about equal to current levels as modified by automatic sequestration spending cuts. Of this amount, the bill would appropriate \$823M for the Natural Resources Conservation Service (NRCS), which is about \$2.3M below FY 2013 levels. For more information, see: http://appropriations.house.gov/news/documentsingle.aspx?DocumentID=336517.</p>	06/04/13: House Appropriations Committee releases draft bill	House Appropriations Agriculture Subcommittee Chair Rep. Robert Aderholt (R-AL)
N/A – draft bill	<p>Issue – Extreme Weather Events</p> <p>Title – None: Would make weather data, forecasts, and warnings “...the top priority in the planning and management of programs within all relevant [National Oceanic and Atmospheric Administration (NOAA)] line offices.” The draft bill would also authorize \$100M for each of fiscal years 2014-2017 for NOAA’s Office of Oceanic and Atmospheric Research (OAR) to improve warnings and forecasts for “...high impact weather events that endanger life and property.” The funding would come out of funds for operations, research, and facilities in OAR.</p> <p>For more information, see: http://science.house.gov/press-release/subcommittee-reviews-legislation-improve-weather-forecasting.</p> <p><i>*WSWC Policies #349, #339, and #332</i></p> <p><i>**WGA Resolution #11-6, Paragraphs B(1), B(2), and B(8)</i></p>	05/23/13: The Subcommittee on the Environment within the House Science, Space and Technology Committee held a hearing the on the draft bill	House Science Subcommittee on the Environment Chair Chris Stewart (R-UT)
S. 1006	<p>Issue – Clean Water Act (CWA) Guidance/Section 404</p> <p>Title – Preserve the Waters of the U.S.: Would prevent the Environmental Protection Agency (EPA) and the U.S. Army Corps of Engineers (Corps) from finalizing their proposed CWA guidance, or using the guidance as the basis for future rulemaking or any decision regarding the scope of the CWA. The bill is identical to legislation (S. 2245) Barrasso introduced last year. Of note, Sen. John Barrasso (R-WY) introduced the text of this bill as an amendment to the Water Resources Development Act (S. 601), which received 54 votes but fell short of the 60 votes needed to pass. See also S. 861/H.R. 1829.</p> <p><i>*WSWC Policy #330.5 and 04/10/13 letter to EPA and Corps expressing a preference for rulemaking as opposed to guidance to clarify CWA jurisdiction</i></p>	05/22/13: Bill introduced and referred to the Senate Environment and Public Works Committee	Sen. John Barrasso (R-WY) introduced the bill with 27 co-sponsors, including 14 westerners

<p>N/A – 302(b) Allocation</p>	<p>Issue – FY 2014 Appropriations</p> <p>Title – House Appropriations Committee’s Subcommittee Allocations for FY 2014: Establishes the following FY 2014 budget spending caps, or 302(b) allocations, for the House Appropriations Committee’s twelve Subcommittees. Allocations for Subcommittees with jurisdiction over water and related issues are:</p> <table border="1" data-bbox="415 407 1346 776"> <thead> <tr> <th></th> <th>FY 2014 Allocation</th> <th>FY 2013 Allocation</th> <th>FY 2013 Enacted</th> </tr> </thead> <tbody> <tr> <td>Agriculture</td> <td>\$19.45B</td> <td>\$19.4B</td> <td>\$20.5B</td> </tr> <tr> <td>Commerce, Justice, Science</td> <td>\$46.8B</td> <td>\$51.1B</td> <td>\$50.2B</td> </tr> <tr> <td>Energy-Water</td> <td>\$30.4B</td> <td>\$32.1B</td> <td>\$36.7B</td> </tr> <tr> <td>Interior-Environment</td> <td>\$24.3B</td> <td>\$28B</td> <td>\$29.8B</td> </tr> </tbody> </table> <p>Of note, the Interior-Environment allocation is 18% below FY 2103 levels, 20% below the President’s FY 2014 request, and 14% below sequestered levels. For more, see: http://appropriations.house.gov/uploadedfiles/05_21_13_fy_2014_report_on_the_suballocation_of_budget_allocations.pdf.</p> <p>For a <i>Congressional Quarterly</i> table comparing the FY 2014 allocations for all 12 Subcommittees to FY 2013 levels, see: http://media.cq.com/pub/table/index.php?id=142.</p>		FY 2014 Allocation	FY 2013 Allocation	FY 2013 Enacted	Agriculture	\$19.45B	\$19.4B	\$20.5B	Commerce, Justice, Science	\$46.8B	\$51.1B	\$50.2B	Energy-Water	\$30.4B	\$32.1B	\$36.7B	Interior-Environment	\$24.3B	\$28B	\$29.8B	<p>05/21/13: House Appropriations Committee approves allocations</p>	<p>House Appropriations Committee Chair Hal Rogers (R-KY)</p>
	FY 2014 Allocation	FY 2013 Allocation	FY 2013 Enacted																				
Agriculture	\$19.45B	\$19.4B	\$20.5B																				
Commerce, Justice, Science	\$46.8B	\$51.1B	\$50.2B																				
Energy-Water	\$30.4B	\$32.1B	\$36.7B																				
Interior-Environment	\$24.3B	\$28B	\$29.8B																				
<p>S. 971/H.R. 2026</p>	<p>Issue – CWA/Forest Roads</p> <p>Title – Silviculture Regulatory Consistency Act of 2013: Would amend the CWA to prohibit EPA from requiring or from promulgating regulations that require a permit under the National Pollutant Discharge Elimination System (NPDES) for a discharge of stormwater runoff resulting from forest roads and the following silviculture activities: (1) nursery operations; (2) site preparation; (3) reforestation; (4) thinning; (5) prescribed burning; (6) pest and fire control; (7) harvesting operations; and (8) surface drainage. The bill would not exempt silvicultural activities resulting in the discharge of dredged or fill material.</p> <p>Notably, the U.S. Supreme Court’s March 2013 decision in <i>Decker v. NEDC</i> upheld</p>	<p>05/17/13: H.R. 2026 introduced and referred to the Water Resources and Environment Subcommittee within the House Transportation and Infrastructure Committee</p> <p>05/17/13: S. 971 introduced and referred</p>	<p>Sen. Ron Wyden (D-OR) introduced S. 971 with 10 co-sponsors, including western Sens. Mike Crapo (R-ID), James Risch (R-ID), Max Baucus (D-MT), John Thune (R-SD), and John Cornyn (R-TX)</p>																				

	<p>EPA's interpretation of its Silvicultural Rule, which has long been interpreted as not requiring NPDES permits for stormwater runoff from forest roads. EPA also issued a final amendment to its rule in November 2013 to further clarify that stormwater discharges from logging roads do not require NPDES permits. Nevertheless, the bill's sponsors believe that litigation will continue absent legislation that removes further ambiguity in the CWA and reaffirms the recent EPA and Court determinations.</p> <p><i>*Relevant WGA Resolution: #11-15, Paragraph B(6)</i></p>	to the Senate Committee on Environment and Public Works	Rep. Jaime Herrera Beutler (R-WA) introduced H.R. 2026 with 45 co-sponsors, including 11 westerners
H.R. 1948	<p>Issue – CWA/Cooperative Federalism</p> <p>Title – Clean Water Cooperative Federalism Act: Would amend the CWA to limit EPA's ability to oversee state water quality standards and permitting decisions. The bill would also limit EPA's ability to retroactively veto dredge and fill permits previously issued by the Corps under Section 404(c) of the CWA. The bill is similar to legislation (H.R. 2018) introduced in 2011. See also S. 861/H.R. 1829.</p>	<p>05/13/13: Bill introduced</p> <p>05/14/13: Referred to Subcommittee on Water Resources and Environment within the House Transportation and Infrastructure Committee</p>	Rep. John Mica (R-FL) introduced the bill, along with Transportation and Infrastructure Committee Ranking Member Nick Rahall (D-WV) and Water Resources and Environment Subcommittee Chair Bob Gibbs (R-OH)
S. 954/H.R. 1947	<p>Issue – Farm Bill/ Environmental Quality Incentives Program (EQIP)/Pesticides</p> <p>Senate Title – Agriculture Reform, Food, and Jobs Act of 2013: Would set national agricultural, nutrition, conservation, and forestry policy for the next five years. The bill is similar in many respects to legislation (S. 3240) the Senate passed last year but failed to pass the House. The \$955B bill is estimated to yield around \$24B in spending cuts, which it will achieve in part by consolidating 23 conservation programs into 13. Among other things, it would absorb many parts of Wildlife Habitat Incentives Program (WHIP) into EQIP.</p> <p>House Title – Federal Agriculture Reform and Risk Management Act of 2013: Would authorize around \$940B over the next 10 years and is similar to legislation (H.R. 6083) the Committee reported last year, but with deeper cuts of around \$40B. Like S. 954, the bill would consolidate 23 conservation programs into 13, but would maintain current funding for the EQIP, which would absorb WHIP functions. It also includes provisions to limit EPA authority, including one to amend CWA and the Federal Insecticide Fungicide and Rodenticide Act (FIFRA) to clarify that FIFRA-compliant</p>	<p>05/13/13: H.R. 1947 introduced and referred to the House Agriculture Committee</p> <p>05/14/13: S. 954 introduced and referred to the Senate Agriculture Committee, which reported the measure</p> <p>05/29/13: House Agriculture Committee reports H.R. 1947</p> <p>06/10/13: Senate passes</p>	<p>Senate Agriculture Committee Chair Debbie Stabenow (D-MI) introduced S. 954</p> <p>House Agriculture Committee Chair Frank Lucas (R-OK) introduced H.R. 1947 with Ranking Member Collin Peterson (D-MN)</p>

	<p>pesticide applications do not require NPDES permits.</p> <p>Of note, H.R. 1947 would impose a \$20.5B cut to the national food stamp program over the next 10 years, which the Senate is unlikely to support. Speaker of the House John Boehner (R-OH) has also indicated that the Republican leadership could bring H.R. 1947 to the floor in June.</p> <p><i>* WSWC Position: #328 and 12/20/11 WSWC letter to Senate leaders urging them to hold a vote on legislation (H.R. 872) that would have amended the CWA and FIFRA to clarify that pesticides applications do not require NPDES permits</i></p> <p><i>** WGA Resolution: #11-15, Paragraph B(13)</i></p> <p><i>Note: The 2008 Farm Bill expired in September 2012.</i></p>	S. 954 66-27	
H.R. 1877	<p>Issue – Infrastructure/Clean Water State Revolving Fund (SRF)/Water Infrastructure Finance and Innovation Act (WIFIA)</p> <p>Title – Water Quality Protection and Job Creation Act of 2013: Would authorize \$13.8B in federal funding over five years to capitalize the Clean Water SRF. It would also establish conditions for the use of Clean Water SRF funds, including the continued application of federal Davis-Bacon prevailing wage protections and the establishment of Buy American requirements.</p> <p>The bill would also: (1) authorize \$250M in grants over five years for alternative water sources projects under section 220 of the CWA; (2) authorize \$2.5B over five years for sewer overflow control grants under section 221 of the CWA; (3) establish a Clean Water Trust Fund to provide capitalization grants for the CWSRF; and (4) create a program similar to WIFIA proposals (e.g., S. 335 and Title XI of S. 601) to authorize direct federal loans and loan guarantees for water-related infrastructure construction, including direct loans to existing state infrastructure financing authorities to be used for the same purposes and in the same manner as projects funded under the Clean Water SRF.</p> <p><i>*WSWC Position #330 and 08/24/12 letter to House leaders urging Congress to provide states with sufficient flexibility to manage the Clean Water and Drinking Water SRFs, and expressing concern about increasing restrictions on the SRFs</i></p> <p><i>**WGA Resolution #11-15, Paragraph(B) (20)</i></p>	05/08/13: Bill introduced and referred to the Subcommittee on Water Resources and Environment within the House Transportation and Infrastructure Committee	Rep. Tim Bishop (D-NY), who serves as the Ranking Member of the Subcommittee on Water Resources and Environment within the House Transportation and Infrastructure Committee, introduced the bill along with 29 co-sponsors, including western Reps Don Young (R-AK), Ann Kirkpatrick (D-AZ), Grace Napolitano (D-CA), John Garamendi (D-CA), Janice Hahn (D-CA), Dina Titus (D-NV), Peter DeFazio (D-OR), Eddie Bernice

			Johnson (D-TX), and Rick Larsen (D-WA)
S. 904	<p>Issue – Extreme Weather Events</p> <p>Title – Strengthening The Resiliency of Our Nation on the Ground (STRONG) Act: Would direct the Office of Science and Technology Policy (OSTP) within the White House to chair an interagency workgroup comprised of Cabinet-level participants to conduct a gap and overlap analysis of federal agencies’ current and planned activities on short and long-term extreme weather resiliency. The analysis would look at a number of sectors, including water management, water and wastewater infrastructure, agriculture, and forestry and natural resources management, among others. A federal advisory workgroup composed of private and public representatives would play a consulting role, as would a similar group of state and local representatives.</p> <p>The bill would also require the federal interagency workgroup to develop a national extreme weather resiliency plan based on the gap and overlap analysis. The resiliency plan is intended to support state, local, and private and public sector resiliency efforts and to communicate extreme weather information clearly and effectively, including through an information clearinghouse. The plan would not create new state responsibilities or requirements, but would focus instead on providing state, local, and private decision makers with information and tools to help them develop greater resiliency based on their own needs.</p> <p>Lastly, the bill would require reports on federal programs, policies, and funding related to extreme weather planing and response efforts. It would authorize “such sums as necessary” to carry out the above purposes.</p> <p><i>*WSWC Policies #349, #339, and #332</i></p> <p><i>**WGA Resolution #11-6, Paragraphs B(1), B(2), and B(8)</i></p> <p><i>Note: The WSWC will consider a position at its June 2013 meetings in Casper that supports the goals of legislation similar to S. 904</i></p>	05/08/13: Bill introduced and referred to the Senate Committee on Commerce, Science, and Transportation	Sen. Kristen Gillibrand (D-NY)
H.R. 1837	<p>Issue – CWA/Fill Material</p> <p>Title – Clean Water Protection Act: Would amend Section 502 of the CWA to define “fill material” to mean “any pollutant which replaces portions of waters of the United</p>	05/06/13: Bill introduced and referred to the Water Resources and Environment	Rep. Frank Pallone (D-NJ) introduced the bill with 65 co-sponsors, including

	States with dry land or which changes the bottom elevation of a water body for any purpose.” Under the bill, the “fill material” would not include pollutants discharged into the water primarily to dispose of waste.	Subcommittee within the House Transportation and Infrastructure Committee	20 westerners
S. 861/H.R. 1829	<p>Issue – CWA Guidance/Section 404</p> <p>Title – Coal Jobs Protection Act: Would require EPA to approve or veto Section 402 permit applications under the CWA within 270 days of application. If EPA does not act within this time, the permit would be automatically approved. The bill would also give EPA 90 days after it receives a 404 permit application to begin the approval process, while also giving the Administration a year to conduct an environmental assessment. Failure to act within these time frames would mean that the application would be approved, the permit would be issued, and the permit could never be subject to judicial review.</p> <p>Among other things, the bill would prohibit EPA from finalizing its draft CWA guidance or using the guidance as the basis for rulemaking. It would also place limitations on EPA’s authority to modify state water quality standards and would specify conditions under which the EPA can approve and deny state requests to administer Section 402 permitting programs. See also S. 1006.</p> <p><i>**WSWC Policy #330.5 and 04/10/13 letter to EPA and Corps expressing a preference for rulemaking as opposed to guidance to clarify CWA jurisdiction</i></p> <p><i>**The WSWC sent a follow up letter to EPA and the Corps in April 2013 reaffirming its preference for rulemaking as opposed to guidance to clarify CWA jurisdiction</i></p>	05/06/13: S. 861 and H.R. 1829 are introduced and referred to the Senate Committee on Environment and Public Works and to the Subcommittee on Water Resources and the Environment within the House Transportation Committee	<p>Senate Minority Leader Mitch McConnell (R-KY) introduced the S. 861</p> <p>Rep. Shelley Moore Capito (R-WV) introduced H.R. 1829 with 18 co-sponsors, including western Representatives Steve Daines (R-MT) and Cynthia Lummis (R-WY)</p>
S. 769/H.R. 1630	<p>Issue – Wilderness/Federal Reserved Rights/Utah</p> <p>Title – America’s Red Rock Wilderness Act: Would designate land in Utah as part of the National Wilderness Preservation System. It would also reserve a “quantity of water determined by the Secretary to be sufficient” for the wilderness areas, but specifies that nothing in the act would “relinquish or reduce any water rights reserved or appropriated by the United States in the State” on or before the date of its enactment. The bill further states that it does not establish a precedent for future water rights designations and that it will not affect the interpretation of any other Act or designations under any other Act.</p>	04/18/13: Legislation introduced in the Senate and House, with S. 769 being referred to the Senate Committee on Energy and Natural Resources and H.R. 1630 being referred to the House Natural Resources Committee	Sen. Dick Durbin (D-IL) with 13 co-sponsors, including western Sens Barbara Boxer (D-CA), Mark Udall (D-CO), Michael Bennet (D-CO), Jeff Merkley (D-OR), and Patty Murray

		04/26/13: H.R. 1630 referred to the House Subcommittee on Public Lands and Environmental Regulations	(D-WA) Rep. Rush Holt (D-NJ) introduced the bill with 84 co-sponsors, including 26 westerners
H.R. 1489	<p>Issue – Dam Safety</p> <p>Title – Dam Safety Act of 2013: Would: (1) amend the National Dam Safety Program Act to authorize \$8M per year for the National Dam Safety Program for FY2013-FY2016; (2) require the head of a federal agency to provide information to states under certain circumstances regarding a dam's condition and emergency operations; (3) include a program objective to develop and implement a comprehensive dam safety hazard education and public awareness program to assist the public in mitigating against, preparing for, responding to, and recovering from dam incidents; (4) permit the invitation of nongovernmental organizations to participate in National Dam Safety Review Board meetings; and (5) prohibit the amount of funds allocated to a state to carry out the dam safety program from exceeding the amount committed by the state to implement program activities (currently, 50% of the reasonable cost of implementing the state dam safety program).</p>	04/11/13: Bill introduced and referred to the Subcommittee on Economic Development, Public Buildings, and Emergency Management within the House Committee on Transportation and Infrastructure	Rep. Sean Maloney (D-NY)
S. 715	<p>Issue – Rural Water Projects</p> <p>Title – Authorized Rural Water Projects Completion Act: Would establish a Reclamation Rural Water Construction Fund (RRWC) to help fund high-priority rural water projects that Congress has already authorized. The bill would finance the RRWC with \$80M per year in revenues that would otherwise be deposited in the Reclamation Fund for each of fiscal years 2014 through 2030. The bill also specifies that “no amounts” may be deposited in the RRWC if doing so would increase the federal deficit, and that the Secretary of the Interior “may use” money from the RRWC to complete construction of authorized projects subject to certain conditions.</p> <p><i>*WSWC Position #343 and 07/31/13 testimony in support of similar legislation (S. 3385) before the Senate Energy and Natural Resources Committee</i></p>	<p>04/11/13: Bill introduced and referred to the Subcommittee on Water and Power within the Senate Energy and Natural Resources Committee</p> <p>04/16/13: Subcommittee hearings held</p>	Sen. Max Baucus (D-MT) introduced the bill with nine co-sponsors, including western Sens. Jon Tester (D-MT), Martin Heinrich (D-NM), John Hoeven (R-ND), Heidi Heitkamp (D-ND), and Tim Johnson (D-SD)
H.R. 1460	<p>Issue – Missouri River</p> <p>Title – None: Would remove “fish and wildlife” as one of the eight authorized purposes</p>	04/10/13: Bill introduced and referred to the Water Resources	Rep. Sam Graves (R-MO) and four co-sponsors, all of

	<p>for which the Corps can manage the Missouri River Mainstem Reservoir System. According to the bill's sponsor, the purpose of the bill is to enable the Corps to focus more closely on two authorized purposes, namely flood control and navigation.</p> <p>Of note, the 1944 Flood Control Act authorized the System's eight purposes. However, these purposes have not been reviewed since the Act's passage in 1944, which has raised questions about whether the System's current operations best satisfy the Missouri River Basin's contemporary needs. Congress has authorized studies to review the Basin's current needs but these studies have stalled due to a lack of appropriations.</p> <p><i>Note: The WSWC will consider a position at its June 2013 meetings in Casper that opposes the bill and other legislation that would alter the System's authorized purposes before a comprehensive study is completed</i></p>	and Environment Subcommittee within the House Transportation and Infrastructure Committee	whom are from Missouri
H.R. 1352	<p>Issue – Colorado River</p> <p>Title – Lower Colorado River Protection Act: Would establish: (1) the Lower Colorado River Management Conference to develop a Lower Colorado River Pollution Elimination and Ecosystem Restoration Plan, and (2) the Lower Colorado River Protection Program (LCRPP) within EPA Region 9 to provide staff and support services to the Conference. The bill would also direct EPA, acting through the Director of the LCRPP, to establish a multidisciplinary environmental research program for the Lower Colorado River. Authorizes EPA to make grants to conduct environmental and pollution control projects in the Lower Colorado River Basin.</p> <p>Among other things, the bill would authorize EPA, through the Director of the LCRPP, to monitor or evaluate the release or discharge of pollutants in the Basin, to prevent, reduce, or eliminate pollution in the River, or to restore or maintain the ecosystem health of the River in accordance with the Plan. Directs EPA to develop a list of existing federal programs that are authorized to conduct projects that fit project requirements and to work with other agencies to avoid committing resources to projects that other programs will implement.</p>	<p>03/21/13: Bill introduced and referred to the House Natural Resources Committee and the Transportation and Infrastructure Committee's Subcommittee on Water Resources and the Environment</p> <p>04/11/13: Referred to the House Natural Resources Committee's Water and Power, Fisheries, and Public Lands Subcommittees</p>	Rep. Raul Grijalva (D-AZ)
S. 601	<p>Issue – Corps/Infrastructure</p> <p>Title – Water Infrastructure Development Act (WRDA) of 2013: Would authorize funding for Corps water projects involving the construction and maintenance of dams, levees, and other water infrastructure. Notable provisions include:</p> <p><u>Project Authorization:</u> Title I would authorize projects with completed Chief of Engineer</p>	<p>03/18/13: Bill introduced and referred to Senate Environment and Public Works Committee</p> <p>03/20/13: Senate</p>	Senate Environment and Public Works Committee Chair Barbara Boxer (D-CA) introduced the bill with co-sponsor Ranking Member

<p>reports that the Assistant Secretary of the Army for Civil Works has referred to Congress by the date of the bill’s enactment. This currently represents around 18 projects that address flood risk management, navigation, hurricane and storm damage risk reduction, and environmental restoration.</p> <p><u>Project Delivery:</u> Title II would make reforms intended to increase flexibility for non-federal sponsors of Corps projects and accelerate project delivery.</p> <p><u>Dam Optimization:</u> Section 2014 would authorize the Corps to operate dams for “other related project benefits,” including environmental protection and improved recreation, so long as project purposes are not “adversely impacted.” The bill also includes language indicating that it will not supersede or authorize “...any amendment to a multistate water-control plan, including the Missouri River Master Water Control Manual.” Furthermore, the amendment includes language stating that Section 2014 will not affect “...any water right in existence on the date of enactment of this Act; or [preempt] or [affect] any State water law or interstate compact governing water.”</p> <p><u>Water Supply:</u> Earlier versions of Section 2015 would have amended the Water Supply Act (WSA) of 1958 to require Congressional authorization for allocations or reallocations of storage water for municipal or industrial water supply at Corps and Bureau of Reclamation reservoirs if the total cumulative amount allocated would exceed five percent of the reservoir’s conservation storage. Alabama’s delegation inserted this section to address disputes involving the Corps’ operation of projects in the Apalachicola-Chattahoochee-Flint (ACF) and Alabama-Coosa-Tallapoosa (ACT) River Systems in the Southeast. However, the section has been completely re-written so that it now expresses concern over the operation of projects in the ACF and ACT systems and urges the affected states to develop an interstate water compact. Absent such action, the bill states that Congress “should consider appropriate legislation to address these matters including any necessary clarification to the [WSA] or other law.” In addition, Section 2014 states that it “...does not alter existing rights or obligations under law.”</p> <p><u>Surplus Water:</u> Section 2064 states: “No fee for surplus water shall be charged under a contract for surplus water if the contract is for surplus water stored on the Missouri River.”</p> <p><u>Project Deauthorization:</u> Section 2049 would require the Corps to provide Congress with a list of all uncompleted authorized projects and create a Commission to identify projects for deauthorization. The Commission would hold public hearings and solicit comments to make final recommendations to Congress, which would have the opportunity to disapprove of deauthorizations.</p>	<p>Environment and Public Works Committee unanimously reports bill</p> <p>05/15/13: Senate passes bill 83-14</p>	<p>David Vitter (R-LA)</p>
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	<p><u>Upper Missouri Basin Flood and Drought Monitoring:</u> Section 5008 would create a flood and drought monitoring program in the Upper Missouri River Basin to operate U.S. Geological Survey (USGS) streamgages and restore, maintain, and provide soil moisture and snowpack monitoring, including NRCS SNOTEL sites. The Corps would establish the program in coordination with NOAA, NRCS, USGS, and Reclamation. The bill would authorize \$11.25M for the program.</p> <p><u>Mississippi River:</u> Section 5023 would authorize a study of severe flooding and drought management in the Mississippi River Basin. Earlier versions raised concerns among some Missouri River states that the study would facilitate operation of authorized Missouri River System projects to support navigation on the Mississippi River. The final bill includes a savings clause that states: “Nothing in this section impacts the operations and maintenance of the Missouri River Mainstem System.”</p> <p><u>Levee Safety:</u> Title VI would create a national levee safety program intended to provide national leadership and encourage establishment of state and tribal levee safety programs. For the purposes of the program, it would be focused on “canal structures,” which it defines in part as “...an integral part of a flood risk reduction system that protects the leveed area from flood waters associated with hurricanes, precipitation events, seasonal high water and other weather-related events.”</p> <p>Title VI includes a number of exclusions that specify, among other things, that the term “levee” does not include a canal regulated by a federal or state agency to ensure that applicable federal safety criteria are met or a levee or a canal structure that is: (1) not part of a federal flood damage reduction system; (2) not recognized under the National Flood Insurance Program as providing protection from the 1%-annual-chance-or-greater flood; (3) not greater than three feet high; (4) has a leveed area with a population of less than 50 individuals; and (5) has a leveed area less than 1,000 acres. The bill would authorize \$300M for FY 2014 through FY 2023 for grants to state and tribal levee safety programs and another \$300M for the same time period for levee rehabilitation assistance grants.</p> <p><u>Financing:</u> Title X would establish a five-year WIFIA pilot program similar to other proposals (e.g., S. 335 and H.R. 1877) within the Corps and EPA. Modeled on the Transportation Infrastructure Finance and Innovation Authority program, WIFIA would provide loans and loan guarantees for flood control, water supply, and waste water projects. Among other things, the program would seek to promote increased development of infrastructure by establishing additional opportunities for financing water resources projects “...that complement but do not replace or reduce existing federal infrastructure financing tools such as the [Clean Water and Drinking Water State Revolving Funds</p>		
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	<p>(SRFs)].” Buy American requirements would also apply to the program.</p> <p>Entities eligible to receive assistance under the program include: (1) corporations; (2) partnerships; (3) joint ventures; (4) trusts; (5) federal, state, or local governmental entities; (6) tribal governments or a consortium of tribal governments; and (7) state infrastructure financing authorities</p> <p>Eligible projects include: (1) flood control or hurricane and storm damage reduction efforts; (2) activities eligible for assistance under the Clean Water SRF; (3) activities eligible for assistance under the Drinking Water SRF (4) enhanced energy efficiency in the operation of a public water system; (5) efforts to repair, rehabilitate, or replace a treatment works, community water system, or aging water distribution facility; (6) brackish or sea water desalination, managed aquifer recharge, or water recycling projects; (7) the purchase of real property or an interest therein for certain purposes; and (8) a combination of projects under #2 and #3 for which a state infrastructure financing authority submits a single application. The Corps would be responsible for projects under #1 while EPA would be responsible for projects under #2 through #6 and #8. Both agencies would be responsible for projects under #7 and #9.</p> <p>The bill would authorize \$50M for each of fiscal years 2014 through 2018 for WIFIA, and require regular reporting to Congress on the financial performance and public benefit of projects receiving funding under the program.</p> <p><u>Extreme Weather:</u> Title XI would require the Corps to develop a study and recommendations relating to options for reducing risk to human life and property from extreme weather events, such as hurricanes, coastal storms, and inland flooding.</p> <p><i>Note: House Transportation and Infrastructure Committee Chair Bill Shuster (R-PA) has indicated that WRDA will be a priority but has questioned the Senate’s approach.</i></p> <p><i>*WSWC Positions #329 (supporting development of a national levee safety program but stating that such a program should not apply to water supply canals) and #322 (extreme events)</i></p> <p><i>**WGA Resolution #11-7, Paragraph (B)(11)(b,) and comment letter dated 05/07/13</i></p>		
S. 565	<p>Issue – Mississippi River Navigation/Missouri River Flows</p> <p>Title – Mississippi River Navigation Sustainment Act: Would authorize a study to improve the “coordinated and comprehensive” management of water resource projects in</p>	03/14/13: Introduced in the Senate and referred to the Senate Committee on Environment and	Sen. Dick Durbin (D-IL) introduced the bill

	<p>the greater Mississippi River Basin related to extreme weather conditions, and to evaluate the feasibility of any modifications to water resource projects, including the development of new water resource projects, to improve “the reliability of navigation and more effectively reduce flood risk.”</p> <p>Among other things, the study would: (1) “<u>evaluate the effect on navigation and flood risk management to the Mississippi River of all upstream rivers and tributaries</u>, especially the confluence of the Illinois River, <u>Missouri River</u>, and Ohio River;” (2) “identify and make recommendations to remedy challenges to the Corps...presented by extreme weather, including river access, in carrying out its mission to maintain safe, reliable navigation” (emphasis added).</p>	Public Works	
S. 802/H.R. 935	<p>Issue – CWA/FIFRA/Pesticides</p> <p>Title – Sensible Environmental Protection Act of 2013: Would amend the CWA and FIFRA to clarify that pesticide applications made in compliance with FIFRA do not need NPDES permits. The bill would also overturn the 6th Circuit Court of Appeals decision in <i>National Cotton Council v. EPA</i>, which held that pesticide applications require NPDES permits. The court’s decision went into effect on October 31, 2011, but EPA delayed enforcement until March 2012.</p> <p>The bills are similar to S. 175/H.R. 935, which would only amend FIFRA to state that “notwithstanding any other law, no permit shall be required” to use pesticides registered under FIFRA.</p> <p><i>* WSWC Position: #328 and 12/20/11 WSWC letter to Senate leaders urging them to hold a vote on prior legislation (H.R. 872) that would have amended the CWA and FIFRA to clarify that pesticides applications do not require NPDES permits</i></p> <p><i>** WGA Resolution: #11-15, Paragraph B(13)</i></p>	<p>03/04/13: H.R. 935 introduced and referred to the Subcommittee on Water Resources and Environment within the House Transportation and Infrastructure Committee, and the Horticulture Subcommittee within the House Agriculture Committee</p> <p>04/23/13: S. 802 introduced and referred to the Senate Committee on Environment and Public Works</p>	<p>Sen. Kay Hagan (D-NC) introduced S. 802 with 13 co-sponsors, including Environment and Public Works Ranking Member David Vitter (R-LA) and western Sens. Mike Crapo (R-ID), James Risch (R-ID), Deb Fischer (R-NE), Heidi Heitkamp (D-ND), and James Inhofe (R-OK)</p> <p>House Transportation and Subcommittee on Water Resources and Environment Chair Bob Gibbs (R-OH) introduced H.R. 935 with 46 co-sponsors, including 19 westerners</p>

S. 434	<p>Issue – Indian Water Rights</p> <p>Title – Blackfoot Water Rights Settlement Act of 2013: Would authorize a settlement of the water rights claims of the Blackfoot Tribe in Montana. Among other things, it would authorize about \$400.8M in federal funding for a Blackfoot Settlement Trust Fund “to be managed, invested, and distributed by the Secretary for the benefit of the Tribe, to remain available until expended.” Montana would provide \$34M for the settlement.</p> <p><i>*WSWC Position #336</i> <i>**WGA Resolutions #10-18, and #11-7, Paragraph (B)(14)</i></p>	<p>03/04/13: Bill introduced and referred to Senate Committee on Indian Affairs</p> <p>05/08/13: Senate Committee on Indian Affairs holds hearing on the bill</p>	<p>Sen. Max Baucus (D-MT) with co-sponsor Sen. Jon Tester (D-MT)</p>
S. 376	<p>Issue – National Integrated Drought Information System (NIDIS)</p> <p>Title – Drought Information Act of 2013: Would reauthorize NIDIS and authorize \$14.5M for each of fiscal years 2014 through 2018 for the program. The bill would add language pertaining to NIDIS’ mission stating that the program will “better inform and provide for more timely decisionmaking to reduce drought related impacts and costs.”</p> <p>It would also make a number of amendments to NIDIS’ system functions, including: (1) development of a drought early warning system that “collects and integrates information on the key indicators of drought in order to make usable, reliable, and timely forecasts of drought, including assessments of the severity of drought conditions and impacts; and provides such information...on both national and regional levels;” (2) communicating drought forecasts, drought conditions, and drought impacts on an ongoing basis to state, federal, tribal, and local government decisions makers, as well as the public and private sectors; (3) “provid[ing] timely data, information, and products that reflect local, regional, and State differences in drought conditions;” (4) coordinating and integrating “...Federal research in support of a drought early warning system;” (5) building upon existing forecasting and assessment programs and partnerships; and (6) continuing ongoing research activities related to drought.</p> <p>Among other things, the bill would require the Department of Commerce to produce a report for Congress that describes NIDIS implementation, discusses specific plans for the development of NIDIS programs, and identifies research, monitoring, and forecasting needs to enhance the predictive capability of drought early warnings, the length and severity of droughts, and the contribution of weather events to reducing or ending drought conditions. In developing the report, Commerce would consult with relevant federal, regional, state, tribal, and local governments, the private sector, and research institutions.</p> <p><i>*WSWC Position #346</i></p>	<p>02/25/13: Bill introduced and referred to the Senate Committee on Commerce, Science, and Transportation</p>	<p>Sen. Mark Pryor (D-AR) introduced the Senate bill with co-sponsors Sens. Mark Udall (D-CO), Jerry Moran (R-KS), John Thune (R-SD), and Tom Udall (D-NM)</p>

	<p><i>**WGA Resolution #11-7, Paragraphs B(3) and B(7); WGA 05/09/13 letter and related testimony to Congress in support of NIDIS. See: http://westgov.org/policies/doc_download/1711-nidis-senate-5-9-13.</i></p>		
H.R. 745	<p>Issue – Desalination</p> <p>Title – None: Would reauthorize the Water Desalination Act of 1996 through 2018. The bill would authorize \$3M for each of fiscal years 2013 through 2018. Rep. Grace Napolitano (D-CA) introduced similar legislation (H.R. 2664) in the 112th Congress. The Act was reauthorized in December 2011 and will expire on September 30, 2013 absent Congressional action.</p>	<p>02/15/13: Introduced in House and referred to the Subcommittee on Water and Power within the House Natural Resources Committee and the House Science, Space, and Technology Committee</p> <p>03/07/13: Referred to the Subcommittee on Environment within the House Science, Space, and Technology Committee</p> <p>05/23/13: House Natural Resources Subcommittee on Water and Power holds hearing on bill</p>	<p>Water and Power Subcommittee Chair Grace Napolitano (D-CA) and 26 co-sponsors, including 16 westerners</p>
S. 659/H.R. 518	<p>Issue – Drought/Bureau of Reclamation</p> <p>Title – None: Would reauthorize the Reclamation States Emergency Drought Relief Act, which authorizes the Bureau of Reclamation to assist state drought planning efforts and minimize or mitigate drought impacts in the 17 Reclamation states. The bill would reauthorize the Act until 2018 and appropriate \$110M to fund the program until that time, a \$20M increase. H.R. 518 would also require Reclamation to ensure that the drought contingency plans it develops under the Act reflect current water conditions and address long-term climate variability and change.</p> <p><i>*WSWC Position #347 and 04/30/13 written testimony submitted to the Senate Energy and Natural Resources Committee on support of S. 659</i></p>	<p>02/15/13: H.R. 518 introduced and referred to the Subcommittee on Water and Power within the House Natural Resources Committee</p> <p>03/22/13: S. 659 introduced and referred to the Subcommittee on Water and Power within the Senate on Energy and Natural Resources</p>	<p>Senate Energy and Natural Resources Committee Chair Ron Wyden (D-OR) introduced S. 659</p> <p>House Natural Resources Committee Ranking Member Ed Markey (D-MA) introduced the H.R. 518 with 13 co-sponsors,</p>

	** <i>WGA Resolution #11-7, Paragraph B(7)</i>	Committee 04/16/13: Subcommittee hearings held on S. 659	including Subcommittee Ranking Member Grace Napolitano (D-CA) and western Reps. Raúl Grijalva (D-AZ), Julia Brownley (D-CA), Judy Chu D-CA), Ben Ray Luján (D- NM), and Ruben Hinojosa (D-TX)
S. 335	<p>Issue – Water Infrastructure</p> <p>Title – Water Infrastructure Finance and Innovation Act (WIFIA) of 2013: Modeled after the Transportation Infrastructure Finance and Innovation Authority, the bill would create a financial mechanism within EPA aimed at providing lower cost capital for eligible drinking water and sewer infrastructure projects. In particular, the bill would authorize EPA to make direct loans or loan guarantees to eligible entities, including entities that own or operate treatment works that serve the general public or community water systems, as well as state infrastructure financing authorities under certain circumstances. Entities eligible for assistance under the Clean Water and Drinking Water SRFs would also be eligible for funding under the program. The bill would authorize “such sums” as are necessary for the program. See also H.R. 1877 and Title X of S. 601.</p> <p><i>*WSWC Position #330</i> <i>**WGA Resolutions #11-7, Paragraph (B)(11), and #11-15, Paragraph (B)(20)</i></p>	02/14/13: Bill introduced and referred to the Senate on Environment and Public Works Committee	Sen. Jeff Merkley (D-OR)
S. 332	<p>Issue – Climate/Hydraulic Fracturing/Safe Drinking Water Act (SDWA)</p> <p>Title – Climate Protection Act of 2013: Together with a companion bill, the Sustainable Energy Act (S. 329), would enact a fee on carbon pollution emissions to fund investments in energy efficiency and renewable energy technologies, such as wind, solar, geothermal, and biomass. The legislation would also provide rebates to consumers to offset efforts by oil, coal, or gas companies to raise prices.</p> <p>Section 301 of S. 322 would amend the SDWA to enact the Fracturing Responsibility and Awareness of Chemicals Act (FRAC Act), last proposed as S. 587 and H.R. 1084 in the 112th Congress, by requiring disclosure of chemical constituents used in fracking with</p>	02/14/13: Bill introduced and referred to the Senate Committee on Environment and Public Works	Senator Bernie Sanders (I-VT) introduced the bill with co-sponsor and Senate Environment and Public Works Committee Chair Barbara Boxer (D-CA)

	<p>protections for proprietary chemical formulas. S. 322 would also: (1) end the so-called “Halliburton” exemption by amending the SDWA to include regulation of hydraulic fracturing; (2) authorize EPA to “prescribe... a program applicable” to states if EPA disapproves of a state underground injection program (or part of a program) under Section 1422 of the SDWA; (3) require an EPA report describing the quantity of “fugitive methane emissions” emitted as a result of any leak in natural gas infrastructure, including recommendations for eliminating such leaks; and (4) state that it is the sense of Congress that the U.S. should reduce greenhouse gas emissions by 80% by 2050, as compared to 2005 levels. See also S. 1135.</p> <p><i>*The WSWC will consider a proposed position at its June 2013 meetings in Casper, Wyoming, which urges the federal efforts involving hydraulic fracturing to include state expertise and to ensure that such efforts do not infringe upon the states’ primary authority regarding the allocation of water used in hydraulic fracturing.</i></p>		
<p>S. 306/H.R. 678/H.R. 1963</p>	<p>Issue – Hydropower</p> <p>Title – Bureau of Reclamation Small Conduit Hydropower Development and Rural Jobs Act: Would amend the amend the Reclamation Project Act of 1939 to: (1) authorize installation of small hydropower units on Reclamation-owned canals and conduits; (2) offer a preference for the award of lease of power privileges to water user organizations operating or receiving water from a project; (3) require Reclamation to use its categorical exclusion process under NEPA for hydropower projects capable of producing 5 megawatts or less; and (4) make Reclamation’s Power Resources Office the “lead office” for requests to develop small hydropower projects. See also S. 545/H.R. 267.</p> <p>H.R. 1963 is similar to S. 306/H.R. 678 and uses nearly identical language. However, it would amend the Water Conservation and Utilization Act of 1939 to provide similar provisions for eleven Reclamation facilities that were constructed under that act and would not be covered under S. 306/H.R. 678. Unlike S. 306/H.R. 678, it would not specify Reclamation’s Power Resources Office as the “lead office” for requests to develop small hydropower projects.</p> <p><i>*WSWC Policy #351</i></p> <p><i>**WGA Resolutions #10-14, #10-15, #11-7(B)(9), (C)(e) and 04/23/13 WGA letter supporting S. 306/H.R. 678, available at: http://westgov.org/policies/doc_download/1707-wga-wswc-hydropower-letter-4-22-13.</i></p>	<p>02/13/13: S. 306 and H.R. 1963 introduced in the House and Senate and referred to the Senate Energy and Natural Resources Committee and the House Natural Resources Committee’s Subcommittee on Water and Power</p> <p>03/05/13: Subcommittee hearings held on H.R. 678</p> <p>03/20/13: House Natural Resources Committee reports H.R. 678</p> <p>04/10/13: House passes H.R. 678 by a vote of 416-7</p>	<p>Sen. John Barrasso (R-WY) introduced S. 306 with co-sponsors Sens. Mike Crapo (R-ID), James Risch (R-ID), and Michael Enzi (R-WY)</p> <p>Rep. Scott Tipton (R-CO) introduced H.R. 678 with 11 co-sponsors, including Subcommittee Chair Tom McClintock (R-CA) and western Reps. Paul Gosar (R-AZ), Jim Costa (D-CA), Mike Coffman (R-CO), Cory Gardner (R-CO), Adrian Smith (R-NE), Mark Amodei (R-</p>

		<p>04/23/13: Senate Committee on Natural Resources holds hearing on S. 545 and H.R. 267</p> <p>05/13/13: Senate Energy and Natural Resources Committee reports H.R. 678 and S. 306</p> <p>05/14/13: H.R. 1963 introduced and referred to the Subcommittee on Water and Power within the House Natural Resources Committee</p> <p>05/23/13: House Subcommittee on Water and Power holds hearing on H.R. 1963</p>	<p>NV), Kevin Cramer (R-ND), and Cynthia Lummis (R-WY)</p> <p>Rep. Steve Daines (R-MT) introduced H.R. 1963 with co-sponsors Reps. Doug LaMalfa (R-CA), Scott Tipton (R-CO), Kevin Cramer (R-ND), and Cynthia Lummis (R-WY)</p>
S. 545/H.R. 267	<p>Issue – Hydropower</p> <p>Title – Hydropower Regulatory Efficiency Act of 2013: Would allow small hydropower projects under ten megawatts and conduit hydropower facilities under five megawatts to receive an exemption from the Federal Energy Regulatory Commission (FERC) permitting process. It would also authorize FERC to study the feasibility of a streamlined two-year permitting process for hydropower development at existing closed-loop pumped storage projects and non-powered dams, and direct the Department of Energy to study how existing pumped storage can support intermittent renewable energy sources like solar and wind.</p> <p><i>*WSWC Policy #351</i></p> <p><i>**WGA Resolutions #10-14, #10-15, #11-7(B)(9), (C)(e) and 04/23/13 WGA letter supporting S. 306/H.R. 678, available at: http://westgov.org/policies/doc_download/1707-wga-wswc-hydropower-letter-4-22-13.</i></p>	<p>01/15/13: H.R. 267 introduced and referred to the House Committee on Energy and Commerce</p> <p>02/04/13: House Energy and Commerce Committee unanimously reports H.R. 267</p> <p>02/13/13: House passes H.R. 267 422-0</p> <p>02/14/13: H.R. 267 Referred to Senate Committee on Energy and Natural Resources</p>	<p>Senate Energy and Natural Resources Committee Ranking Member Lisa Murkowski (R-AK) introduced S. 545, with Committee Chair Ron Wyden (D-OR) and co-sponsors Sens. Mark Begich (D-AK), Michael Bennet (D-CO), Mike Crapo (R-ID), James Risch (R-ID), Patty Murray (D-WA), and Maria</p>

		<p>03/13/13: S. 545 introduced and referred to the Senate Committee on Energy and Natural Resources</p> <p>04/23/13: Senate Committee on Natural Resources holds hearing on S. 545 and H.R. 267</p> <p>05/13/13: Senate Committee on Natural Resources reports S. 545 and H.R. 267</p>	<p>Cantwell (D-WA)</p> <p>Rep. Cathy McMorris Rodgers (R-WA) introduced H.R. 267 with nine co-sponsors, including western Reps. Diana DeGette (D-CO), Cory Gardner (R-CO), Lee Terry (R-NE), Ben Ray Lujan (D-NM), Greg Walden (R-OR), and Jim Matheson (D-UT)</p>
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NOTABLE LITIGATION

Case Names	Issue – Endangered Species Act/State Water Rights Permits
<i>The Aransas Project v. Shaw</i>	<p>The U.S. District Court for the Southern District of Texas held the Texas Commission on Environmental Quality (TCEQ) liable for causing an unlawful “take” of 23 endangered whooping cranes in violation of Section 9 of the Endangered Species Act (ESA). In particular, the court held that the state’s surface water permit system did not ensure sufficient in-stream flows in the San Antonio and Guadalupe river systems, which the court found led to a reduction in freshwater inflows to the Aransas National Wildlife Refuge during a severe drought in 2008-2009. According to the court, the reduction in fresh water increased salinity, which adversely affected the cranes’ primary food sources in the Refuge.</p> <p>In reaching this decision, the court held that TCEQ should have prevented the take, reasoning that its emergency powers authorize it to modify or amend existing prior appropriation water rights or deny issuance of new permits to protect ESA-listed species and can be compelled to do so in time of drought. The court also found that “...ESA prohibitions apply to actions by state water agencies where their regulatory programs approve actions by third parties that contribute to causing the take.” In determining whether the non-profit organization that filed the suit had standing to sue TCEQ, the court also found that the organization satisfied the “causation” element of the standing analysis by establishing a causal relationship between freshwater inflows to the Refuge and TCEQ’s water management practices, finding that “...federal courts have found causation where there has been a direct relationship between the challenged government regulation and the resulting ‘take.’”</p>
Courts	
U.S. District Court for the Southern District of Texas , Case No. 2:10-cv-075, 2013 U.S. Dist. LEXIS 33258	
Relevant Dates	
<p>03/11/13: Decision filed</p> <p>03/26/13: 5th Circuit Court of Appeals stays lower court ruling and grants TCEQ’s motion to expedite the appeal, placing the</p>	

<p>case on its August oral argument calendar and establishing a briefing schedule that will result in the final reply briefs being filed by mid-June</p>	<p>In addition, the court enjoined TCEQ from granting new water right permits that affect the San Antonio and Guadalupe Rivers until Texas provides “reasonable assurances” that such permits will not take whooping cranes. It also ordered TCEQ to seek an incidental take permit from the Fish and Wildlife Service that will lead to the development of a habitat conservation plan.</p> <p>On March 26, the 5th Circuit Court of Appeals granted a request by the Texas Attorney General to stay the decision. The Fifth Circuit also ordered an expedited appeal and placed the case on its August oral argument calendar. In response, TCEQ issued the following statement: “Texas is appreciative of the Fifth Circuit’s decision to stay the lower court ruling. As we said previously, this case is an attempt to rewrite the Texas Water Code. It is critical that the state retain the ability to regulate state surface water as provided under state law, and not the [ESA].” For more on the case, see: http://www.tceq.texas.gov/news/releases/3-15TAPStay.</p>
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Case Names	Issue – EPA’s Water Transfers Rule
<p><i>Friends of the Everglades v. EPA</i>, 699 F.3d 1280 (11th Cir. 2009)</p> <p><i>New York, et al. v. EPA, et al.</i>, (S.D.N.Y.) (08-CV-8430)</p>	<p>In 2008, EPA promulgated its “Water Transfers Rule,” clarifying that certain water transfers do not require NPDES permits under the CWA. When EPA finalized the rule in 2008, opponents immediately challenged it in the Southern U.S. District Court of New York (SDNY) and the Southern U.S. District Court of Florida (SDFL). However, in issuing the rule, EPA opined that judicial review of the rule could only take place before the U.S. Circuit Courts of Appeal, and not the federal district courts. Given this position, opponents filed protective challenges in multiple circuits, which were consolidated in the 11th Circuit. The district court challenges were then stayed pending the 11th Circuit's decision.</p> <p>The 11th Circuit subsequently stayed the consolidated rules challenge case pending the outcome of a related case that was also before the court, commonly known as the “Lake Okeechobee Case,” 570 F.3d 1210 (11th Cir. 2009). That case upheld the rule in 2009 as a reasonable interpretation of the CWA entitled to deference. The U.S. Supreme Court subsequently denied certiorari in 2010, allowing the consolidated rules challenge to proceed.</p>
Courts	
<p>11th Circuit Court of Appeals</p> <p>Southern U.S. District Court of New York (SDNY)</p>	<p>In August 2012, a three-judge panel of the 11th Circuit heard oral argument on the consolidated petitions. The panel addressed two arguments made by the petitioners: (1) whether the Court of Appeals has jurisdiction under the CWA to review the rule; and (2) whether the rule is valid. On October 26, 2012, the court held that it did not have original subject matter jurisdiction to hear the consolidated challenge under the plain language of the CWA. As a result, the 11th Circuit dismissed the consolidated rules challenge without addressing whether the rule is valid. The U.S. Solicitor General has authorized the filing of an appeal with the U.S. Supreme Court over the 11th Circuit’s dismissal. EPA’s petition for certiorari due June 28.</p>
Relevant Dates	
<p>03/12/12: Challenges to EPA’s rule filed. The challenges are later consolidated in the 11th Circuit and stayed pending the outcome of a related case known as “Lake Okeechobee”</p>	<p>The 11th Circuit’s dismissal of the consolidated rules challenge allowed the challenges pending before the SDNY and the SDFL to proceed. However, on November 14, 2012, the petitioners moved to dismiss their challenge in SDFL, presumably given the precedent favoring the rule that the 11th Circuit’s set forth in its “Lake Okeechobee” decision.</p>

<p>06/04/09: 11th Circuit issues “Lake Okeechobee” decision, upholding EPA’s water transfers rule.</p> <p>11/29/10: U.S. Supreme Court denies certiorari for the 11th Circuit’s “Lake Okeechobee” decision, allowing consolidated rules challenge to proceed</p> <p>10/26/12: 11th Circuit finds that it does not have original jurisdiction to hear the consolidated rules challenge and dismisses the action</p> <p>11/14/12: Petitioners move to dismiss their challenge in SDFL, leaving only the challenge before the SDNY</p> <p>01/30/13: SDNY grants motions to intervene</p> <p>03/22/13: Plaintiffs’ motions for summary judgment and Defendants’ motion to dismiss filed</p> <p>06/07/13: Defendants file memorandums in support of their motion for summary judgment and in response to Plaintiffs’ motion for summary judgment</p> <p>06/21/13: Plaintiff s’ responses or replies due</p> <p>07/12/13: Defendants’ final replies due</p>	<p>Notwithstanding these developments, the SDNY action is proceeding and the court has approved requests by the following intervenors to join the action:</p> <ul style="list-style-type: none"> • A coalition of western states led by Colorado and New Mexico, which also includes Alaska, the Arizona Department of Water Resources, Idaho, Nebraska, Nevada, North Dakota, Texas, Utah, and Wyoming; • A coalition of over 20 western water providers; • The South Florida Water Management District (SFWMD); and • New York City. <p>The parties and the judge have agreed that the case will be decided “on paper” and that there will be no trial. It is also expected that EPA’s appeal of the 11th Circuit’s dismissal will not delay briefing in SDNY, although the agency has indicated that it will seek a stay if the Supreme Court agrees to review the 11th Circuit’s dismissal of the consolidated rules challenge.</p> <p>On June 7, the intervenors filed coordinated briefs in support of their motion for summary judgment and in response to plaintiffs’ motions for summary judgment. The arguments for each brief are as follows:</p> <ul style="list-style-type: none"> • EPA argued that the rule is reasonable interpretation of an ambiguous provision of the CWA, and that the agency is entitled to <i>Chevron</i> deference; • The western states argued that the rule is consistent with the “clear statement rule,” which requires a clear statement from Congress to authorize federal intrusion into an area of traditional state authority, such as water use; • The western water providers argued that vacating the rule would supersede or abrogate individual water rights because NPDES requirements would be prohibitively expensive, technically impractical, and compel curtailment of water transfers; • SFWMD argued that the rule is not only reasonable, but the singularly permissible statutory interpretation; and • New York City argued that the rule must be upheld under <i>Chevron</i> based on the language of the CWA that relates to NPDES jurisdiction and other provisions. <p>Some experts believe that the SDNY will likely strike down the rule under the 2nd Circuit’s decision in <i>Catskill Mountains Chapter of Trout Unlimited v. City of New York</i>, 451 F.3d 77 (2nd Cir. 2006), which held that the CWA unambiguously requires NPDES permits for water transfers. The SDNY’s decision will likely be appealed to the 2nd Circuit. If the 2nd Circuit strikes down the rule under <i>Catskill</i>, it would lead to a split between the circuits given the 11th Circuit’s “Lake Okeechobee” decision, thereby setting up a possible appeal to the U.S. Supreme Court.</p> <p>* WSWC Policy: #342 ** WGA Resolution: #11-15, Paragraph B(10)</p> <p><i>Special thanks to Peter Nichols, Special Asst. Attorney General for Colorado and New Mexico, who provided much of the information used in the summary of this litigation.</i></p>
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<p>07/28/13: EPA petition for certiorari to the U.S. Supreme Court regarding 11th Circuit dismissal of the consolidated rule challenge due</p>	
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Case Name	Issue – Out of State Water Diversions (Oklahoma and Texas)
<p><i>Tarrant Regional Water District v. Hermann</i>, No. 11-889; 2013 U.S. LEXIS 4542 (2013)</p>	<p>This case involves a challenge that the Tarrant Regional Water District in North Texas brought against the Oklahoma Water Resources Board (OWRB) over Oklahoma statutes that limit out-of-state water diversions. Tarrant brought the suit as part of a larger effort to secure water for North Texas’ rapidly growing population. In particular, it argued that the Red River Compact between Arkansas, Louisiana, Oklahoma, and Texas preempted the statutes because language in the Compact entitled it to acquire water from a specific subbasin within Oklahoma, while OWRB argued the reverse, noting among other things that the Compact lacked explicit language authorizing cross-border diversions. A federal district court ruled in OWRB’s favor, and the 10th Circuit affirmed, prompting Tarrant to ask the Court to review the decision.</p>
<p>Court</p>	
<p>U.S. Supreme Court</p>	<p>In a decision by Justice Sonia Sotomayor, the Court unanimously rejected Tarrant’s interpretation of the Compact, stating: “Three things persuade us that cross-border rights were not granted by the Compact; [1] the well-established principle that States do not easily cede their sovereign powers, including their control over waters within their own territory; [2] the fact that other interstate water compacts have treated cross-border rights explicitly; and [3] the parties’ course of dealing.”</p>
<p>Relevant Dates</p>	
<p>09/07/11: 10th Circuit issues decisions for <i>Tarrant</i></p>	<p>With respect to the third point, the Court noted that no signatory state to the Compact had previously sought a cross-border diversion and that Tarrant had attempted to purchase water from Oklahoma in 2000-2002, which the Court described as “...a strange offer if Tarrant believed it was entitled to demand such water without payment under the Compact.”</p>
<p>01/04/13: U.S. Supreme Court agrees to review the 10th Circuit’s decision</p>	
<p>02/26/13: Texas files an amicus brief in support of Tarrant</p>	
<p>02/26/13: U.S. Solicitor General files an amicus brief in support of Tarrant</p>	<p>The Court also rejected Tarrant’s argument that the statutes violated the Dormant Commerce Clause of the U.S. Constitution. Tarrant based this argument on the premise that a portion of water in the subbasin at issue was not apportioned to any state and was therefore available for permit applications from entities like itself. The Court found that the Compact allocated the water in question to Oklahoma “unless and until another State calls for an accounting and Oklahoma is asked to refrain from utilizing more than its entitled share.” As a result, the Court concluded that Oklahoma’s statutes “cannot discriminate against interstate commerce with respect to unallocated waters because the Compact leaves no waters unallocated.”</p>
<p>03/27/13: Arkansas and Louisiana file an amicus brief in support of OWRB</p>	

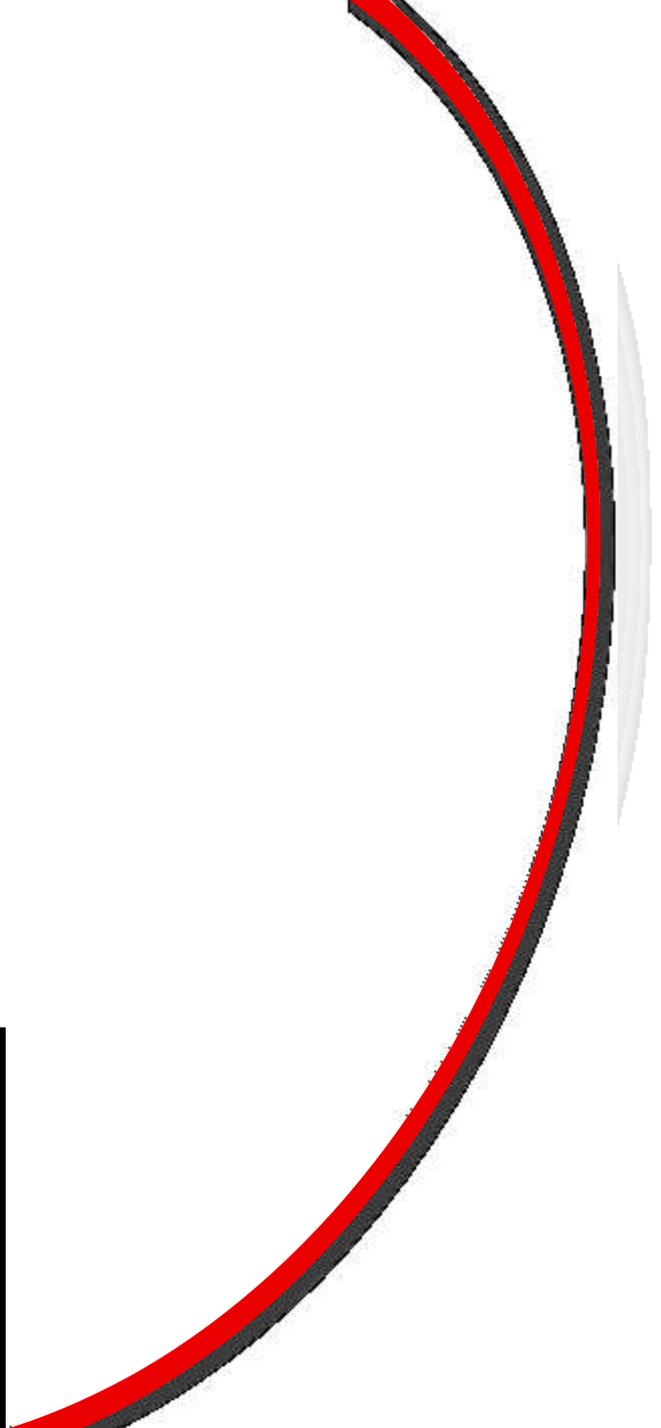
<p>03/28/13: Colorado, Idaho, Indiana, Michigan, Nevada, New Mexico, and Utah file an amicus brief in support of OWRB</p> <p>04/23/13: Court holds oral arguments</p> <p>06/13/13: Court rules unanimously for OWRB</p>	
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Case Names	Issue – Indian Water Rights (Oklahoma)
<p><i>OWRB. v. U.S.</i> (general stream adjudication before Oklahoma Supreme Court – No. 110,375)</p> <p><i>Chickasaw Nation et al. v. Fallin et al.</i> (tribal action before federal district court)</p>	<p>The Choctaw and Chickasaw tribes have filed a federal lawsuit in the U.S. District Court for the Western District of Oklahoma against Governor May Fallin, the OWRB, and others, asserting federally-protected rights to water within a 22-county area of southeastern Oklahoma.</p> <p>Unlike other tribal claims that typically focus mostly on reserved water rights claims, the tribes argue that the federal government gave them fee simple title to their treaty lands. Although the lands themselves were later allotted, the tribes allege that they never gave up the underlying water rights. As such, the tribes assert that their rights are “superior and paramount” to those claimed under state law and that they have the right to regulate the water in the 22 counties.</p>
<p>Courts</p> <p>Oklahoma Supreme Court</p> <p>U.S. District Court for the Western District of Oklahoma</p>	<p>The Oklahoma Supreme Court has granted a request by the OWRB to begin a comprehensive general stream adjudication under the McCarran Amendment to determine the water rights in the area. The federal government has also filed a notice to remove the case to federal court, arguing that an adjudication is not needed because there is no water shortage at the present time. OWRB has also filed for dismissal of the federal lawsuit. The parties are currently engaged in mediation and the federal court has stayed formal proceedings. For more, see: http://www.owrb.ok.gov/util/legal.php.</p>
<p>Relevant Dates</p>	

<p>08/18/11: Tribes file federal lawsuit</p> <p>02/10/12: OWRB files motion to dismiss federal lawsuit/OWRB asks Oklahoma Supreme Court to authorize a general stream adjudication</p> <p>02/23/12: Oklahoma Supreme court grants OWRB general stream adjudication request</p> <p>03/27/12: The federal court issues the first of a series of stays</p>	
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Tab R – Federal, State, and Interstate
Hydraulic Fracturing Efforts

Michel Paque, GWPC





WELCOME

- States First Initiative and its purpose
- Phase I: State Regulatory Exchange and its programs
- Plan of Action
- We need YOU!



ABOUT THE EFFORT

- Partnership between IOGCC and GWPC
- Announced by 2013 IOGCC Chairman and Alabama Governor Bentley at the 2012 IOGCC Annual Meeting
- Launch at 2013 IOGCC Midyear Meeting in Point Clear
- Discussed & supported by GWPC Board



STATES FIRST INITIATIVE

PURPOSES OF THE INITIATIVE

- 1. In Recognition of Excellence in State Regulatory Development**



PURPOSES OF THE INITIATIVE

1. State Recognition

2. Nation's Economic Growth



STATES FIRST INITIATIVE

PURPOSES OF THE INITIATIVE

1. State Recognition
2. Nation's Economic Growth
- 3. National Security/ Energy Independence**



PURPOSES OF THE INITIATIVE

1. State Recognition
2. Nation's Economic Growth
3. National Security/ Energy Independence
- 4. Efficiency of State Regulatory Structures**



STATES FIRST INITIATIVE

STATE OIL AND GAS REGULATORY EXCHANGE

- Phase I of the States First Initiative
- Open communications
- Share best practices
- Focus on field operations
- Continuous improvement



STATES FIRST INITIATIVE



STATES FIRST INITIATIVE

A Partnership of IOGCC and GWPC

PHASE I: STATE OIL AND GAS REGULATORY EXCHANGE

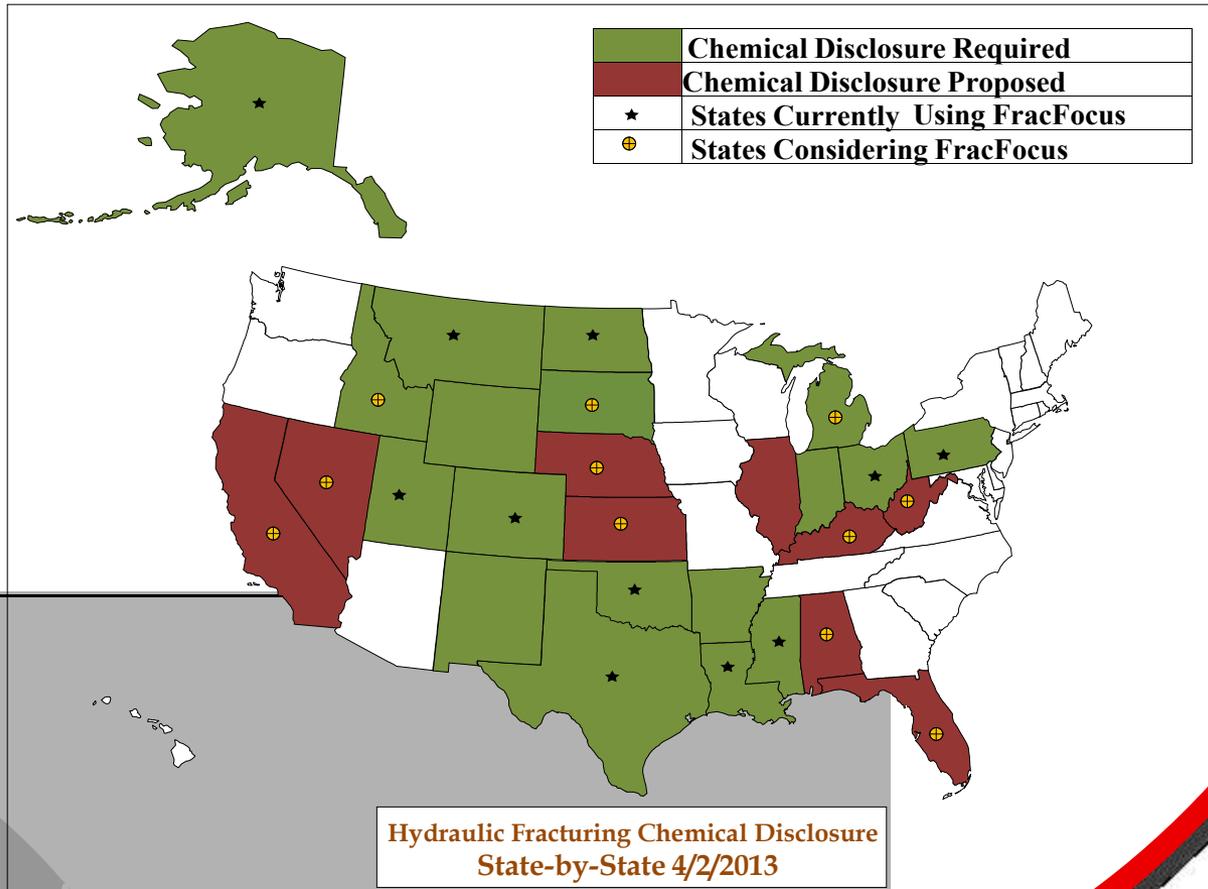
Underground Injection Control	Hydraulic Fracturing	Inspector Training & Certification	Effective Regulation through Continuous Improvement	Science and Technology Transfer
<ul style="list-style-type: none">• Establish UIC program guidelines• Class II UIC well peer reviews (States & US EPA)• Class VI Carbon Capture and Storage and Enhanced Oil Recovery (EOR)	<p>FracFocus 2.0</p> <ul style="list-style-type: none">• Expand search capabilities• Enhance public value• Adopted by 12 states, 7 states in rule making to adopt• 525 participating companies• RBDMS interface	<ul style="list-style-type: none">• State oil & gas inspector certification course• Affiliated with major universities• Technology-based webinar training	<ul style="list-style-type: none">• Continuous improvement of field practices<ul style="list-style-type: none">- Water management- Well construction• Enhance state capabilities<ul style="list-style-type: none">- Magnitude of field staff, inspections• Risk Based Data Management System (RBDMS) expansion<ul style="list-style-type: none">- Hydraulic fracturing- Field inspection	<ul style="list-style-type: none">• Review emerging technology and applied research<ul style="list-style-type: none">- Coordination with US DOE- Universities and NGOs- Others



STATES FIRST INITIATIVE

STATE OIL AND GAS REGULATORY EXCHANGE

Hydraulic Fracturing





STATES FIRST INITIATIVE

STATE OIL AND GAS REGULATORY EXCHANGE

Hydraulic Fracturing

FracFocus 2.0 Interest

- **590 participating companies**
- **47,185 registered wells**

(As of June 12, 2013)

- **468,985 website visits**
- **319,417 unique visitors**

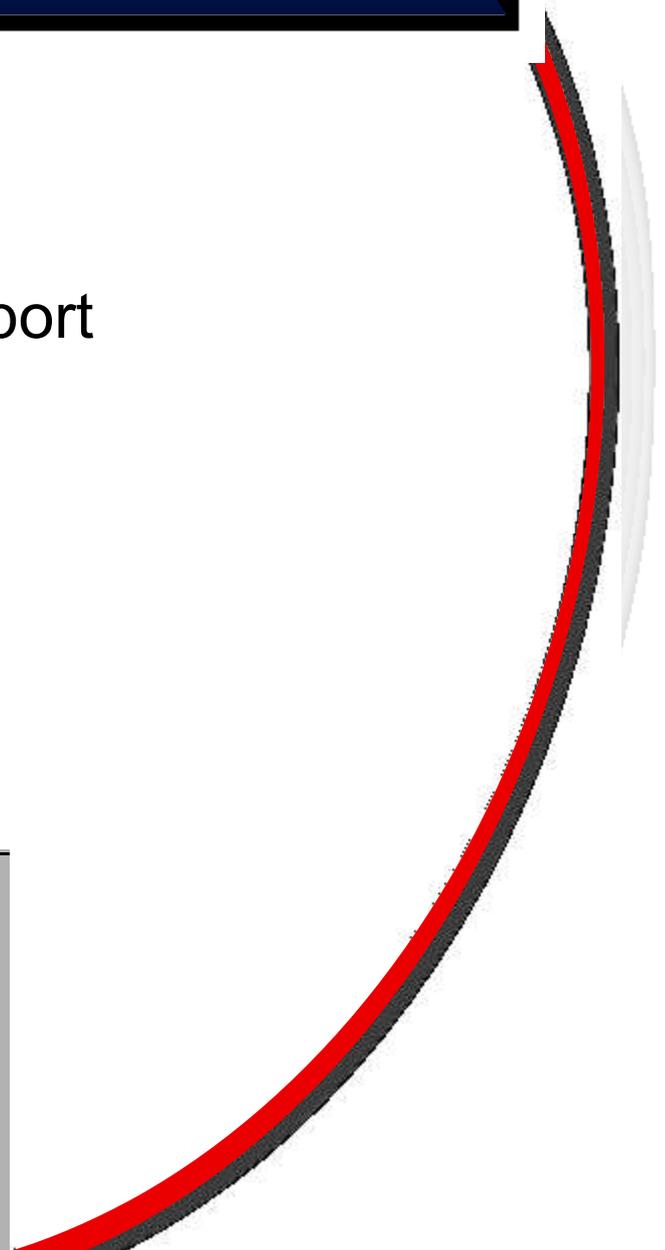
(As of April 25, 2013)



STATES FIRST INITIATIVE

PLAN OF ACTION

Governors' letter of support





STATES FIRST INITIATIVE

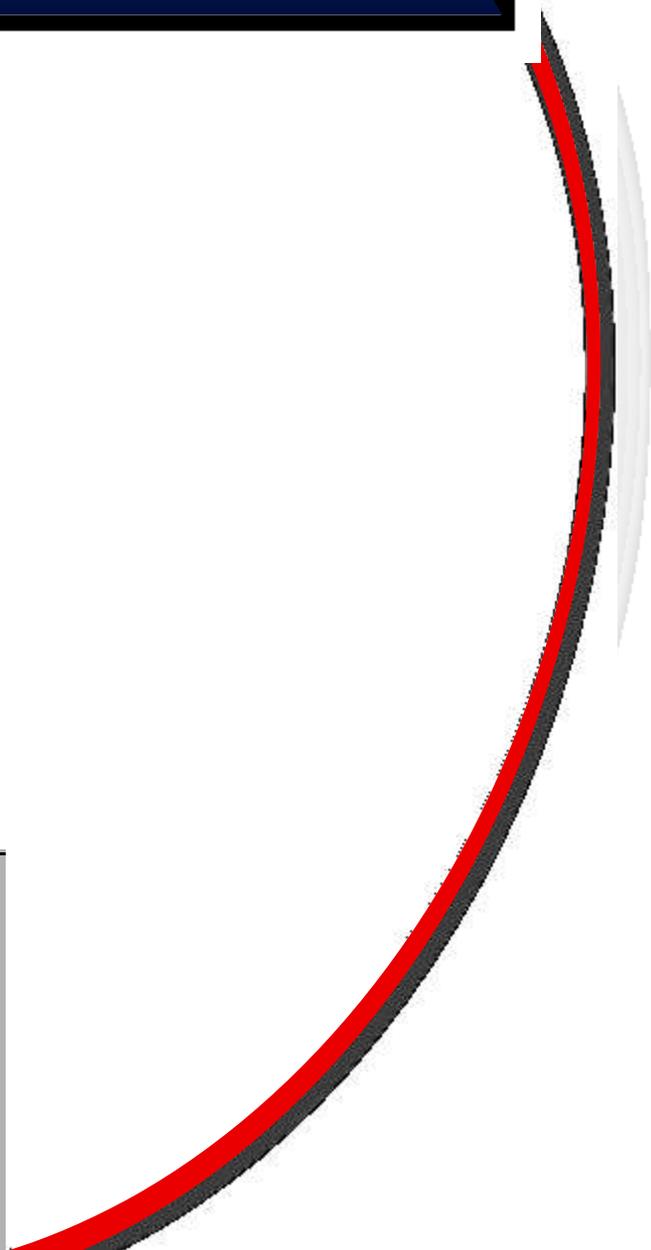
GOALS

- Enlist governors' support
- Inform industry
- Open communications for states and Federal agencies
- Empower states
- Educate Congress
- Build public confidence
- Continuously improve state oil and gas regulations



STATES FIRST INITIATIVE

QUESTIONS





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MORE INFORMATION

www.ecos.org/section/events/?id=4907

Agenda, Sponsorship Opportunities, Hotel:

Lia Parisien, lparisien@ecos.org or (202) 266-4931

Registration:

Edin Ferreira, eferreira@ecos.org or (202) 266-4920

Tenth Draft Agenda

7:45 – 8:30 a.m.	Registration and Continental Breakfast
8:30 – 8:40 a.m.	<p>Welcome and Introductory Remarks</p> <ul style="list-style-type: none"> ❖ Teresa Marks, President, ECOS, and Director, Arkansas Department of Environmental Quality ❖ Dick Pedersen, Vice President, ECOS, and Director, Oregon Department of Environmental Quality
8:40 – 9:55 a.m.	<p>Panel Discussion – Environmental Protection, Energy Security, and Economic Gain: Striking a Balance</p> <ul style="list-style-type: none"> ❖ Nicholas Gertler, Partner, Tapestry Networks (moderator) ❖ Martha Rudolph, Chair, ECOS Air Committee, and Director, Environmental Programs, Colorado Department of Public Health and Environment ❖ The Honorable Bob Perciasepe, Acting Administrator, U.S. Environmental Protection Agency (invited) ❖ Erik Milito, Director, Upstream and Industry Operations, American Petroleum Institute ❖ Roger Bernstein, Vice President, State Affairs, American Chemistry Council ❖ Karen Obenshain, Director, Fuels, Technology, and Commercial Policy, Edison Electric Institute ❖ Amy Mall, Senior Policy Analyst, Natural Resources Defense Council

10:00 – 11:15 a.m.	<p>Panel Discussion – State Perspectives: Safeguarding the Environment through Novel Approaches</p> <ul style="list-style-type: none"> ❖ Richard Fields, Senior Associate, Tapestry Networks (moderator) ❖ Dave Glatt, Chair, ECOS Waste Committee, and Chief, Environmental Health Section, North Dakota Department of Health ❖ Justin Johnson, Chair, ECOS Cross-Media Committee, and Deputy Secretary, Vermont Agency of Natural Resources ❖ Bryan Shaw, Ph.D., Chairman, Texas Commission on Environmental Quality ❖ Todd Parfitt, Director, Wyoming Department of Environmental Quality ❖ Laurie Stevenson, Deputy Director for Business Relations, Ohio Environmental Protection Agency ❖ Scott Perry, Deputy Secretary for Oil and Gas Management, Pennsylvania Department of Environmental Protection
11:15 – 11:30 a.m.	<p>Break, with Refreshments</p>
11:30 a.m. – 12:45 p.m.	<p>Panel Discussion – Air Quality: Meeting the Methane Challenge</p> <ul style="list-style-type: none"> ❖ Dick Pedersen, Vice President, ECOS, and Director, Oregon Department of Environmental Quality (moderator) ❖ Janet McCabe, Deputy Assistant Administrator, U.S. Environmental Protection Agency Office of Air and Radiation ❖ Mark Brownstein, Associate Vice President & Chief Counsel, U.S. Climate and Energy Program, Environmental Defense Fund ❖ Paula Gant, Senior Vice President, Policy and Planning, American Gas Association ❖ Erica Bowman, Vice President & Chief Economist, America’s Natural Gas Alliance ❖ Stephanie Timmermeyer, Vice President for Environment, Health, and Safety, Access Midstream ❖ Michael Woelk, President & CEO, Picarro
12:45 – 2:00 p.m.	<p>Luncheon and Keynote Address</p> <ul style="list-style-type: none"> ❖ Keynote Presentation by The Honorable John Kasich Governor, State of Ohio (invited), Introduced by Teresa Marks, President, ECOS, and Director, Arkansas Department of Environmental Quality
2:00 – 2:15 p.m.	<p>Fresh Air Break</p>
2:15 – 3:30 p.m.	<p>Panel Discussion – Water Quality and Quantity: Weighing the Impacts</p> <ul style="list-style-type: none"> ❖ Teresa Marks, President, ECOS, and Director, Arkansas Department of Environmental Quality (moderator) ❖ Ramona Trovato, Associate Assistant Administrator, U.S. Environmental Protection Agency Office of Research and Development ❖ Mark Boling, President, V+ Development Solutions, Southwestern Energy Company ❖ Daniel Deeb, Partner, Schiff Hardin LLP ❖ Jeff Glover, Vice President, Professional Associate, & Senior Project Manager, HDR Engineering, Inc. ❖ Betsy Bicknell, Senior Environmental Engineer, Eastern Research Group, Inc.
3:30 – 3:45 p.m.	<p>Break, with Refreshments</p>
3:45 – 5:00 p.m.	<p>Panel Discussion – Best Practices: Supplementing Regulation with Voluntary Measures</p> <ul style="list-style-type: none"> ❖ Randy Huffman, Cabinet Secretary, West Virginia Department of Environmental Protection (moderator) ❖ Mary Gade, President, Gade Environmental Group, LLC ❖ Dawn Coughlin, Senior Manager, Environmental Affairs, Hess Corporation ❖ Justin Russo, Senior Vice President, Safety and Loss Prevention, Energi Insurance Services, Inc. ❖ John Walliser, Vice President, Legal and Government Affairs, Pennsylvania Environmental Council ❖ Andrew Place, Interim Executive Director, Center for Sustainable Shale Development
5:00 – 6:00 p.m.	<p>Complimentary Hotel Monaco Wine Reception for All Attendees (Lobby)</p>
5:30 – 7:00 p.m.	<p>Closed, Sponsored Wine and Hors d’Oeuvre Reception for Sponsors and ECOS Members (Garden Table Area of Hotel Monaco’s Poste Moderne Brasserie, with Rain Backup in the Southeast Room)</p>



FEDERAL REGISTER

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May 24, 2013

Part II

Department of the Interior

Bureau of Land Management

43 CFR Part 3160

Oil and Gas; Hydraulic Fracturing on Federal and Indian Lands; Proposed Rule

DEPARTMENT OF THE INTERIOR**Bureau of Land Management****43 CFR Part 3160**

[WO-300-L13100000.FJ0000]

RIN 1004-AE26

Oil and Gas; Hydraulic Fracturing on Federal and Indian Lands**AGENCY:** Bureau of Land Management, Interior.**ACTION:** Supplemental notice of proposed rulemaking and request for comment.

SUMMARY: On May 11, 2012, the Bureau of Land Management (BLM) published in the *Federal Register* a proposed rule entitled Oil and Gas; Well Stimulation, Including Hydraulic Fracturing, on Federal and Indian Lands. The BLM has used the comments on that draft to make improvements and is now seeking additional comment on a revised proposed rule. Key issues in this updated draft include: the use of an expanded set of cement evaluation tools to help ensure that usable water zones have been isolated and protected from contamination; and more detailed guidance on how trade secrets claims will be handled, modeled on the procedures promulgated by the State of Colorado. The revised proposed rule would also provide opportunities for the BLM to coordinate standards and processes with individual States and tribes to reduce administrative costs and to improve efficiency.

DATES: Send your comments on this supplemental notice of proposed rulemaking (SNPR) to the BLM on or before June 24, 2013. The BLM need not consider, or include in the administrative record for the final rule, comments that the BLM receives after the close of the comment period or comments delivered to an address other than those listed below (see **ADDRESSES**). If you wish to comment on the information collection requirements in this SNPR, please note that the Office of Management and Budget (OMB) is required to make a decision concerning the collection of information contained in this SNPR between 30 to 60 days after publication of this document in the *Federal Register*. Therefore, a comment to OMB is best assured of being considered if OMB receives it by June 24, 2013.

ADDRESSES: *Mail:* U.S. Department of the Interior, Director (630), Bureau of Land Management, Mail Stop 2134 LM, 1849 C St. NW., Washington, DC 20240, Attention: 1004-AE26. *Personal or*

messenger delivery: Bureau of Land Management, 20 M Street SE., Room 2134 LM, Attention: Regulatory Affairs, Washington, DC 20003. *Federal eRulemaking Portal:* <http://www.regulations.gov>. Follow the instructions at this Web site.

Comments on the information collection requirement: *Fax:* Office of Management and Budget (OMB), Office of Information and Regulatory Affairs, Desk Officer for the Department of the Interior, fax 202-395-5806. *Electronic mail:* oir_submission@omb.eop.gov. Please indicate "Attention: OMB Control Number 1004-0203," regardless of the method used to submit comments on the information collection burdens. If you submit comments on the information collection burdens, please provide the BLM with a copy of your comments, at one of the addresses shown above.

FOR FURTHER INFORMATION CONTACT: Steven Wells, Division Chief, Fluid Minerals Division, 202-912-7143 for information regarding the substance of the rule or information about the BLM's Fluid Minerals Program. Persons who use a telecommunications device for the deaf (TDD) may call the Federal Information Relay Service (FIRS) at 1-800-877-8339 to contact the above individual during normal business hours. FIRS is available 24 hours a day, 7 days a week to leave a message or question with the above individual. You will receive a reply during normal business hours.

SUPPLEMENTARY INFORMATION:**Executive Summary**

"Hydraulic fracturing," a process used to stimulate production from oil and gas wells, has been a growing practice in recent years. Public awareness of hydraulic fracturing has grown as new horizontal drilling technology has allowed increased access to shale oil and gas resources across the country, sometimes in areas that have not previously or recently experienced significant oil and gas development. The rapid expansion of this practice has caused public concern about whether fracturing can lead to or cause the contamination of underground water sources, whether the chemicals used in fracturing should be disclosed to the public, and whether there is adequate management of well integrity and the "flowback" fluids that return to the surface during and after fracturing operations.

The Bureau of Land Management (BLM) oversees approximately 700 million subsurface acres of Federal mineral estate and 56 million subsurface

acres of Indian mineral estate across the United States. This revised proposed rule and the initial proposed rule would modernize BLM's management of hydraulic fracturing operations by ensuring that hydraulic fracturing operations conducted on the public mineral estate (including split estate where the Federal Government owns the subsurface mineral estate) follow certain best practices, including: (1) The public disclosure of chemicals used in hydraulic fracturing operations on Federal and Indian lands; (2) Confirmation that wells used in fracturing operations meet appropriate construction standards; and (3) A requirement that operators put appropriate plans in place for managing flowback waters from fracturing operations.

Like the initial proposed rule, this revised proposed rule would apply to Indian lands so that these lands and communities receive the same level of protection provided on public lands. In most cases, the requirements in this rule can be satisfied by submitting additional information during the existing process that the BLM currently applies to operators when reviewing and approving an operator's Application for Permit to Drill (APD) on public or Indian lands. The rule would require that disclosure of the chemicals used in the fracturing process be provided to the BLM after the fracturing operation is completed. This information may be submitted to the BLM through an existing Web site known as FracFocus.org, already used by some states for reporting mandatory chemical disclosure of hydraulic fracturing chemicals. Submission of this information through this Web site allows an operator to provide the public and many State and tribal regulators with prompt access. This approach also has the benefit of reducing reporting burdens for oil and gas operators by avoiding duplicative reporting requirements and administrative duties for the BLM in many instances.

The BLM developed this revised proposed rule and the initial proposed rule with the intention of improving public awareness and strengthening oversight of hydraulic fracturing operations without introducing unnecessary new procedures or delays in the process of developing oil and gas resources on public and Indian lands. Some states, like Colorado, Wyoming, Arkansas, and Texas, have issued their own regulations addressing disclosures and oversight for oil and gas drilling operations. Operators with leases on Federal lands must comply with both BLM's regulations and with State

operating requirements, including State permitting and notice requirements to the extent they do not conflict with BLM regulations. State regulations pertaining to hydraulic fracturing operations are not uniform. The States that have regulated hydraulic fracturing typically require some notification to a state agency and some require reporting on FracFocus. Other States have not taken action in this area. This revised proposed rule seeks to create a consistent oversight and disclosure model that will apply across all public and Indian lands that are available for oil and gas development, and aims to streamline and minimize the efforts required to comply with any new requirements, while also protecting Federal and tribal interests and resources. Currently nearly 36 million acres of Federal land are under lease for potential oil and gas development. These leases can be found on public land and for public minerals in 24 states. The BLM has revised the proposed rule to reduce some of the information requirements to avoid duplication with the requirements of States (on Federal land) and tribes (on tribal land). The BLM has considered various options to encourage streamlining, flexibility, and more efficient operation on both BLM and tribal leases.

The BLM has for many years had a number of agreements with certain States and tribes concerning implementation of the various regulatory programs in logical and effective ways. The BLM will work with States and tribes to establish formal agreements that will leverage the strengths of partnerships, and reduce duplication of efforts for agencies and operators, particularly in implementing the revised proposed rule as consistently as possible with State or tribal regulations.

Similarly, the BLM has been looking to State regulations governing hydraulic fracturing for elements that should be incorporated into the revised proposed rule. Examples include allowing disclosure of chemical constituents of fracturing fluids through FracFocus, as required by several states, and adoption of the Colorado system of having operators submit an affidavit that undisclosed information about chemicals is entitled to protection as trade secrets.

Regarding Indian lands, the BLM fully embraces the statutes, Executive Orders, and other statements of governmental or departmental policy in favor of promoting tribal self-determination and control of resources. The Indian Mineral Leasing Act (IMLA), however, subjects all oil and gas operations on trust or

restricted Indian lands to the Secretary's regulations and does not authorize the Secretary to allow tribes to opt out of these regulations. Nonetheless, the BLM is actively addressing ways to use tribal rules in the implementation of the revised proposed rule. For example, the proposed rule recognizes the authority that may be delegated to the States and the tribes to implement various environmental programs under the Safe Drinking Water Act to protect underground sources of drinking water and has been revised to defer to State (on Federal land) or tribal (on tribal land) designations of aquifers as either requiring protection from oil and gas operations, or as exempt from any requirement to isolate water-bearing zones in section 3162.3–3(b).

The revised proposed rule also adds a provision allowing the BLM to approve a variance that would apply to all lands within the boundaries of a State, a tribe, or described as field-wide or basin-wide, that is commensurate with the state or tribal regulatory scheme. The BLM must determine that the variance would meet or exceed the effectiveness of the revised proposed rule. State and tribes would be invited to work with the BLM to craft variances that would allow technologies, processes or standards required or allowed by the State or tribe to be accepted as compliance with the rule. Such variances would allow the BLM and the States and tribes to improve efficiency and reduce costs for operators and for the agencies.

The proposed changes to existing hydraulic fracturing oversight are partly in response to recommendations put forward by the Shale Gas Production Subcommittee of the Secretary of Energy's Advisory Board in 2011. Also, current BLM regulations governing hydraulic fracturing operations on public lands are more than 30 years old and were not written to address modern hydraulic fracturing technologies and practices. In preparing this revised proposed rule, the BLM received input from members of the public and stakeholders, and consulted with tribal representatives.

The changes from the original proposed well stimulation rule are discussed in greater detail below, but some of the notable changes include the following. This revised proposed rule would require use of cement evaluation logs (CELs) in the place of the originally proposed cement bond logs (CBL). The use of the broader term of CEL is intended to allow a variety of logging methods to be used to show the adequacy of cementing, including technologies such as ultrasonic logs,

variable density logs, micro-seismograms, standard CBLs, CBLs with directional receiver array, ultrasonic pulse echo technique, and isolation scanners. CBLs would be accepted because they are one of the technologies included in CELs. However, if a State (on Federal land) or tribe (on Indian land) designates some other technology to meet its requirements for hydraulic fracturing wells that is at least as effective in assuring adequate cementing, the BLM may allow use of that technology as a variance from the CEL requirement.

The revised proposed rule would also change the operation of the trade secrets provision. The revised proposed rule allows operators to submit to the BLM an affidavit asserting exemption from disclosure of certain information having to do with the hydraulic fracturing fluid. The rule also gives the BLM the ability to demand the specific chemical details of any materials being proposed for trade secret exemption.

Further, although the BLM is not proposing a material change in the provision that allows hydraulic fracturing flowback fluids to be stored either in tanks or in lined pits, the BLM seeks comments on the costs and benefits of requiring flowback fluids to be stored only in closed tanks. Other provisions of the initial proposed rule have been modified for clarity or in response to comments. Accordingly, the entire revised proposed rule is available for public comment.

The BLM has analyzed the costs and the benefits of this proposed action in an accompanying Regulatory Impact Analysis available in the rulemaking docket. The estimated costs range from \$12 million to \$20 million per year. The range reflects uncertainty about the generalization of costs across all hydraulic fracturing operations. The potential benefits of the rule are more challenging to monetize than the costs, but that does not mean that the rule is without benefits. The rule creates a consistent, predictable regulatory framework, in accordance with the BLM's stewardship responsibilities under the *Federal Land Policy and Management Act* and other statutes, for hydraulic fracturing involving BLM-administered lands. The rule is designed to reduce the environmental and health risk that can be posed by hydraulic fracturing operations, particularly in the way the rule addresses flowback fluids, well construction, and hydraulic fracture design. The rule would ensure that operators demonstrate wellbore integrity with pressure tests on 100 percent of the hydraulically fractured wells and with

CELs on the casing strings that protect usable water on each type well. A type well is an oil and gas well that can be used as a model for well completion in a field where geologic characteristics are substantially similar. The authorized officer would evaluate whether substantially similar geologic conditions exist during review of the APD or sundry notice requesting approval of a group of wells for a field. CELs would be required only of type wells, “wildcat” wells that are not approved as part of a field development proposal, and whenever there is evidence of a problem with the cement job. The BLM is asking for comments on the effectiveness of this proposal.

I. Public Comment Procedures

II. Background

III. Discussion of the Revised Proposed Rule and Comments on the Proposed Rule

IV. Procedural Matters

I. Public Comment Procedures

If you wish to comment, you may submit your comments by any one of several methods: *Mail*: You may mail comments to U.S. Department of the Interior, Director (630), Bureau of Land Management, Mail Stop 2134LM, 1849 C Street NW., Washington, DC 20240, Attention: 1004–AE26. *Personal or messenger delivery*: Bureau of Land Management, 20 M Street SE., Room 2134LM, Attention: Regulatory Affairs, Washington, DC 20003. *Federal eRulemaking Portal*: <http://www.regulations.gov>. Follow the instructions at this Web site.

You may submit comments on the information collection burdens directly to the Office of Management and Budget, Office of Information and Regulatory Affairs, Desk Officer for the Department of the Interior, fax 202–395–5806, or oir_submission@omb.eop.gov. Please include “Attention: OMB Control Number 1004–0203” in your comments. If you submit comments on the information collection burdens, please provide the BLM with a copy of your comments, at one of the addresses shown above.

Please make your comments as specific as possible by confining them to issues directly related to the content of this revised proposed rule, and explain the basis for your comments. The comments and recommendations that will be most useful and likely to influence agency decisions are:

1. Those supported by quantitative information or studies; and
2. Those that include citations to, and analyses of, the applicable laws and regulations.

The BLM is not obligated to consider or include the comments received after

the close of the comment period (see **DATES**) or comments delivered to an address other than those listed above (see **ADDRESSES**) in the Administrative Record for the rule.

Comments, including names and street addresses of respondents, will be available for public review at the address listed under **ADDRESSES** during regular hours (7:45 a.m. to 4:15 p.m.), Monday through Friday, except holidays. Before including your address, telephone number, email address, or other personal identifying information in your comment, be advised that your entire comment—including your personal identifying information—may be made publicly available at any time. While you can ask in your comment to withhold from public review your personal identifying information, we cannot guarantee that we will be able to do so.

II. Background

Well stimulation techniques, such as hydraulic fracturing, are commonly used by oil and natural gas producers to increase the volumes of oil and natural gas that can be extracted from wells. Hydraulic fracturing techniques are particularly effective in enhancing oil and gas production from shale gas or oil formations. Until quite recently, shale formations rarely produced oil or gas in commercial quantities because shale does not generally allow flow of hydrocarbons to wellbores unless mechanical changes to the properties of the rock can be induced. The development of horizontal drilling, combined with hydraulic fracturing, has made the production of oil and gas from shale feasible. Hydraulic fracturing involves the injection of fluid under high pressure to create or enlarge fractures in the reservoir rocks. The fluid that is used in hydraulic fracturing is usually accompanied by proppants, such as particles of sand, which are carried into the newly fractured rock and help keep the fractures open once the fracturing operation is completed. The proppant-filled fractures become conduits for fluid migration from the reservoir rock to the wellbore and the fluid is subsequently brought to the surface. In addition to the water and sand (which together typically make up 98 to 99 percent of the materials pumped into a well during a fracturing operation), chemical additives are also frequently used. These chemicals can serve many functions in hydraulic fracturing, including limiting the growth of bacteria and preventing corrosion of the well casing. The exact formulation of the chemicals used varies depending

on the rock formations, the well, and the requirements of the operator.

Hydraulic fracturing is a common and accepted practice, and has been, in oil and gas production for decades. The BLM estimates that about 90 percent (approximately 3,400 wells per year) of wells drilled on Federal and Indian lands are stimulated using hydraulic fracturing techniques. Although many of these are conventional wells, much of the new activity occurs on wells designed to produce shale oil and gas or to employ horizontal drilling techniques. Over the past 10 years, there have been significant technological advances in horizontal drilling, which is frequently combined with hydraulic fracturing. This combination, together with the discovery that these techniques can release significant quantities of oil and gas from large shale deposits, has led to production from geologic formations in parts of the country that previously did not produce significant amounts of oil or gas. The resulting expansion of oil and gas drilling into new parts of the country because of the availability of new horizontal drilling technologies has significantly increased public awareness of hydraulic fracturing and the potential impacts that it may have on water quality and water consumption, unless adequately regulated and safely implemented.

The BLM’s existing hydraulic fracturing regulations are found at 43 CFR 3162.3–2. These regulations were established in 1982 and last revised in 1988, long before the latest hydraulic fracturing technologies became widely used. In response to public interest in hydraulic fracturing and in the BLM’s regulation of hydraulic fracturing, in particular, the Department of the Interior (Department) held a forum on hydraulic fracturing on November 30, 2010, in Washington, DC, attended by the Secretary of the Interior and more than 130 interested parties. The BLM later hosted public forums (in Bismarck, North Dakota on April 20, 2011; Little Rock, Arkansas on April 22, 2011; and Golden, Colorado on April 25, 2011) to collect broad input on the issues surrounding hydraulic fracturing. More than 600 members of the public attended the April 2011 forums. Some of the comments frequently heard during these forums included concerns about water quality, water consumption, and a desire for improved environmental safeguards for surface operations. Commenters also strongly encouraged the agency to require public disclosure of the chemicals used in hydraulic fracturing operations on Federal and Indian lands. Commenters from the oil and gas industry suggested

changes that would make the implementation of the rule more practicable, from their perspective, and some opposed adoption of any such rules affecting hydraulic fracturing on the Federal mineral estate. Further, the BLM distributed copies of the then-draft rule to affected federally recognized tribes in January 2012 and invited comments from affected tribes.

Around the time of the BLM's forums, at the direction of President Barack Obama, the Secretary of Energy convened a Shale Gas Production Subcommittee (Subcommittee) of the Secretary of Energy Advisory Board to evaluate hydraulic fracturing issues. The Subcommittee met with industry, service providers, state and Federal regulators, academics, environmental groups, and many other stakeholders. On August 18, 2011, the Subcommittee issued initial recommendations in its "90-day Interim Report." The Subcommittee issued its final report, entitled "Shale Gas Production Subcommittee Second Ninety Day Report" on November 18, 2011. The Subcommittee recommended, among other things, that more information be provided to the public about hydraulic fracturing operations whether or not they occur on the Federal mineral estate, including disclosure of the chemicals used in fracturing fluids. The Subcommittee also recommended the adoption of stricter standards for wellbore construction and testing. The final report also recommended that operators engaging in hydraulic fracturing undertake pressure testing to ensure the integrity of all casings. These reports are available to the public from the Department of Energy's Web site at <http://www.shalegas.energy.gov>.

On May 11, 2012, the BLM published in the **Federal Register** the initial proposed rule entitled "Oil and Gas; Well Stimulation, Including Hydraulic Fracturing, on Federal and Indian Lands" (77 FR 27691). The comment period on the initial proposed rule closed on July 10, 2012. At the request of public commenters, on June 26, 2012, the BLM published in the **Federal Register** a notice extending the comment period for 60 days (77 FR 38024). The extended comment period closed on September 10, 2012. The BLM received over 177,000 comments on the initial proposed rule from individuals, Federal and state governments and agencies, interest groups, and industry representatives. After reviewing the comments on the proposed rule, the BLM now proposes to revise the initial proposed rule. As did the initial proposed rule, this revised proposed rule would apply to all wells

administered by the BLM, including those of Federal, tribal, and individual Indian trust lands. Substantive comments on the initial proposed rule that informed the BLM's decisions on the revised proposed rule are discussed in the section-by-section discussion of this preamble. In the final rule, the BLM will provide a complete discussion of the comments submitted on the initial proposed rule (although some are discussed in this preamble) and those received as a result of this revised proposed rule.

The BLM's revised proposed rule is generally consistent with the American Petroleum Institute's (API) guidelines for well construction and well integrity. See API Guidance Document HF 1, Hydraulic Fracturing Operations—Well Construction and Integrity Guidelines, First Edition, October 2009. HF1 discusses the importance of maintaining wellbore integrity with casing and a cementing program. It recommends pressure tests after cementing casing strings, and describes some circumstances where CBLs are used to verify adequate cementing. The API also has published guidelines for water management that support the use of lined pits for water management. See API Guidance Document HF 2—Water Management Associated with Hydraulic Fracturing, First Edition, 2010.

Based on the input provided from a broad array of sources, including the individuals who spoke at the BLM's public forums and the recommendations of the Subcommittee, BLM proposed critical improvements to its regulations for hydraulic fracturing on May 11, 2012. Careful consideration of the comments received on the proposed rule, however, showed that further improvements and clarifications were appropriate. As did the initial proposed rule, this revised proposed rule would apply to all wells administered by the BLM, including those on Federal, tribal, and individual Indian trust lands.

Tribal consultation is a critical part of this rulemaking effort, and the Department is committed to making sure tribal leaders play a significant role as BLM and the tribes work together to develop resources on public and Indian lands in a safe and responsible way. During the proposed rule stage, the BLM initiated government-to-government consultation with tribes on the proposed rule and offered to hold follow-up consultation meetings with any tribe that desires to have an individual meeting. In January 2012, the BLM held four regional tribal consultation meetings, to which over 175 tribal entities were invited. To build upon established local relationships, the

individual follow-up consultation meetings involved the local BLM authorized officers and management, including State Directors. After the issuance of the proposed rule, tribal governments, tribal members, and individual Native Americans were also invited to comment directly on the proposed rule.

In June 2012, the BLM held additional regional consultation meetings in Salt Lake City, Utah; Farmington, New Mexico; Tulsa, Oklahoma; and Billings, Montana. Eighty-one tribal members representing 27 tribes attended the meetings. In these sessions, the BLM and tribal representatives engaged in substantive discussions of the proposed hydraulic fracturing rule. A variety of issues were discussed, including but not limited to the applicability of tribal laws, validating water sources, inspection and enforcement, wellbore integrity, and water management, among others. Additional individual consultations with tribal representatives have taken place since that time. Also consultation meetings were held at the National Congress of American Indian Conference in Lincoln, Nebraska, on June 18, 2012, and at New Town, North Dakota on July 13, 2012.

Responses from tribal representatives informed the agency's actions in defining the scope of acceptable hydraulic fracturing operations. One of the outcomes of these meetings is the requirement in this rule that operators certify that operations on Indian lands comply with tribal laws.

The revised proposed rule also seeks to create less of an administrative burden than the initial proposed rule while providing the same benefits. This change was made in response to both tribal and industry comments.

The BLM has been and will continue to be proactive about tribal consultation under the Department's newly formalized Tribal Consultation Policy, which emphasizes trust, respect and shared responsibility in providing tribal governments an expanded role in informing Federal policy that impacts Indian lands. Consultation will continue during the comment period of this revised proposed rule. Tribal governments, tribal members, and individual Native Americans were also invited to comment directly on the proposed rule, as they are invited to comment on the revised proposed rule.

Several tribal representatives and tribal organizations have commented that the hydraulic fracturing rule should not apply on Indian land, or that tribes should be allowed to decide not to have the rule apply on their land (that is, "opt out" of the rule). The BLM fully

embraces the statutes, Executive Orders, and other statements of governmental or departmental policy in favor of promoting tribal self-determination and control of resources. In addition, the Department remains bound by specific statutes in which Congress has delegated specific authority and duties to the Department regarding the management and regulation of resources. The IMLA provides in pertinent part as follows: “All operations under any oil, gas, or other mineral lease issued pursuant to the terms ... of this title or any other Act affecting restricted Indian lands shall be subject to the rules and regulations promulgated by the Secretary of the Interior.” 25 U.S.C. 396d. The Department has consistently interpreted this statutory directive as allowing uniform regulations governing mineral resource development on Indian and Federal lands. Thus, an opt-out provision would not be consistent with the Department’s procedures under IMLA, and the revised proposed rule does not provide such an option.

There has also been a suggestion that the Secretary should delegate her regulatory authority to the tribes if the tribe has regulations that meet or exceed the standards in the BLM regulation. The IMLA does not authorize the Secretary to delegate her regulatory responsibilities to the tribes, and therefore the revised proposed rule does not include a delegation provision. Nonetheless, there are opportunities for tribes to assert more control over oil and gas operations on tribal land by entering into Tribal Energy Resource Agreements under the Indian Energy Development and Self-Determination Act (part of the Energy Policy Act of 2005), and to pursue contracts under the Indian Self-Determination and Education Assistance Act of 1975.

Also, the proposed rule has been revised to defer to State (on Federal land) or tribal (on Indian land) designations of aquifers as either requiring protection from oil and gas operations, or as exempt from the requirement to isolate water-bearing zones in section 3162.3–3(b). Revised section 3162.3(k) provides that for lands within the jurisdiction of a State or a tribe that State or tribe could work with the BLM to craft a variance that would allow compliance with State or tribal requirements to be accepted as compliance with the rule, if the variance meets or exceeds this rule’s standards. The BLM is also seeking comments on whether compliance with State or tribal requirements to disclose chemical constituents of hydraulic fracturing fluids should be deemed as compliance

with the proposed rule if the State or tribal requirements meet or exceed the standard in the rule at section 3162.3–3(i).

As explained elsewhere in this preamble, the BLM intends to reach out to States and to tribes to review existing agreements, to strengthen those that could provide a greater role for States and tribes, and to reach new agreements where there have been none. The BLM will seek new and improved agreements to reduce regulatory burdens and to increase efficiency, while fulfilling the Secretary’s responsibilities mandated by statutes as steward for the public lands and trustee for Indian lands.

The BLM invites the public’s comments on whether there are other opportunities in the revised proposed rule to incorporate or to defer to State or tribal standards or requirements.

Although greater use of State or tribal standards or procedures could reduce compliance costs for operators and increase consistency, enforcement issues could arise. On Federal lands, the BLM enforces the Federal regulations and lease conditions, and the States enforce their regulations. On Indian lands, the BLM enforces the Federal regulations and the terms of the leases, and the tribes have the power to enforce their own law. Comments are requested on practical enforcement challenges that might arise if the BLM incorporates or defers to State or tribal laws or procedures, and on any proposed solutions.

Over the past few years, in response to strong public interest, several States—including Colorado, Wyoming, Arkansas, and Texas—have substantially revised their State regulations related to hydraulic fracturing. One of the BLM’s key goals in updating its regulations on hydraulic fracturing is to complement State efforts by providing a consistent standard across all public and Indian lands nationwide. The BLM has revised the initial proposed rule to make reported information consistent and easily accessible to the public. For instance, the BLM is working closely with the Groundwater Protection Council and the Interstate Oil and Gas Compact Commission so that operators may report chemicals used in hydraulic fracturing operations to BLM through the existing FracFocus.org Web site, which is already well established and used by many States. This online database includes information from oil and gas wells in approximately 12 States and includes information from over 500 companies. The BLM understands that the database is in the process of being improved and will in

the near future have enhanced search capabilities and allow for easier reporting of information. If operators are unable to use FracFocus or elect not to, they may elect to report chemicals used on Federal or Indian lands directly to the BLM. The BLM intends to report that information to the public through FracFocus.

The BLM recognizes the efforts of some States to regulate hydraulic fracturing and seeks to avoid duplicative regulatory requirements. However, it is important to recognize that a major impetus for a separate BLM rule is that States are not legally required to meet the stewardship standards applying to public lands and do not have trust responsibilities for Indian lands under Federal laws. Thus, the rule may expand on or set different standards from those of States that regulate hydraulic fracturing operations, but do not need to adhere to the same resource management and public involvement standards appropriate on Federal lands under Federal law. This revised proposed rule encourages efficiency in the collection of data and the reporting of information by proposing to allow operators in States that require disclosure on FracFocus to meet both the State and the BLM requirements through a single submission to FracFocus.

III. Discussion of the Revised Proposed Rule and Comments on the Proposed Rule

As was discussed in the proposed rule, the BLM is revising its hydraulic fracturing regulations, found at 43 CFR 3162.3–2, and adding a new section 3162.3–3. Existing section 3162.3–3 would be retained and renumbered.

The *Federal Land Policy and Management Act* (FLPMA) directs the BLM to manage the public lands so as to prevent unnecessary or undue degradation, and to manage those lands using the principles of multiple use and sustained yield. FLPMA defines multiple use to mean, among other things, a combination of balanced and diverse resource uses that takes into account long-term needs of future generations for renewable and non-renewable resources. FLPMA also requires that the public lands be managed in a manner that will protect the quality of their resources, including ecological, environmental, and water resources. The *Mineral Leasing Act* and the *Mineral Leasing Act for Acquired Lands* authorize the Secretary to lease Federal oil and gas resources, and to regulate oil and gas operations on those leases, including surface-disturbing activities. The *Act of March 3, 1909*, the

Indian Mineral Leasing Act and the *Indian Mineral Development Act* assigns regulatory authority to the Secretary over Indian oil and gas leases on trust lands (except those excluded by statute, i.e., the Crow Reservation in Montana, the ceded lands of the Shoshone Reservation in Wyoming, the Osage Reservation in Oklahoma, and the coal and asphalt lands of the Choctaw and Chickasaw Tribes in Oklahoma). As stewards of the public lands and minerals and as the Secretary's regulator for operations on oil and gas leases on Indian lands, the BLM has evaluated the increased use of hydraulic fracturing practices over the last decade and

determined that the existing rules for hydraulic fracturing require updating. The Secretary delegated to the BLM his authority to oversee operations on Indian mineral leases through the Departmental Manual (235 DM 1.K) under the Indian Allotted Lands Leasing Act and the Tribal Lands Leasing Act. The Secretary also approved the authorities section of the regulations which give the BLM authority under additional Indian related statutes.

As discussed in the background section of this preamble, the increased use of well stimulation activities over the last decade has also generated concerns among the public about

hydraulic fracturing and about the chemicals used in hydraulic fracturing. The proposed rule and this revised proposed rule are intended to increase transparency for the public regarding the fluids used in the hydraulic fracturing process, in addition to providing assurances that wellbore integrity is maintained throughout the fracturing process and that the fluids that flow back to the surface from hydraulic fracturing operations are properly stored, disposed of, or treated. The following chart explains the major changes between the proposed regulations and the regulations in this revised proposed rule.

Initial proposed regulation	Revised proposed regulation	Substantive changes
43 CFR 3160.0–5 Definitions	43 CFR 3160.0–5 Definitions	This revised proposed rule would revise the proposed term “stimulation fluid” to “hydraulic fracturing fluid” to be consistent with other changes to the rule. It also would delete the definition of “well stimulation” and add a definition of “hydraulic fracturing,” which excludes acidizing, enhanced secondary recovery and tertiary recovery. The terms used in other sections of this rule were also revised to make those sections consistent with the changes here. The rule would also include definitions of the terms “refracturing” and “type well.” “Refracturing” is defined as a hydraulic fracturing operation subsequent to an initial completion of an oil and gas well which used hydraulic fracturing previously. “Type well” is defined in this section to mean an oil and gas well that can be used as a model for other wells drilled by the same operator across the field. The revised proposed rule also clarifies the definition of “usable water” by specifying types of geologic zones that would be deemed to contain usable water, and other types that would be deemed not to contain usable water.
43 CFR 3162.3–2(a) Subsequent Well Operations.	43 CFR 3162.3–2(a) Subsequent Well Operations.	The revised proposed rule would replace the term “commingling” with the term “combining” to avoid confusion with the term “commingling” that is used in calculating royalties on production.
43 CFR 3162.3–3(a) Subsequent Well Operations; Well Stimulation.	43 CFR 3162.3–3(a) Subsequent Well Operations; Hydraulic Fracturing.	The revised proposed rule would change the scope of the regulation to apply only to hydraulic fracturing operations, and not to other “well stimulation” activities. It would clarify that the regulation also applies to refracturing operations.
(None)	43 CFR 3162.3–3(b) Isolation of Usable Water to Prevent Contamination.	This new paragraph would require that all fracturing and refracturing operations meet the performance standard in section 3162.5–2(d), which requires that operators must isolate all usable water and other mineral-bearing formations and protect them from contamination.
43 CFR 3162.3–3(c) What the Notice of Intent Sundry Must Include.	43 CFR 3162.3–3(d) What the Notice of Intent Sundry Must Include.	The revised proposed rule would add a new provision that allows the Notice of Intent (NOI) Sundry to be submitted for a single well or a group of wells with the same geological characteristics. If it is for a group of wells, the information should be for a “type well.”
43 CFR 3162.3–3(c)(2)	43 CFR 3162.3–3(d)(2)	The revised proposed rule would delete the requirement to submit a CBL for approval prior to commencing fracturing operations. Section 3162.3–3(i)(8), would require that a CEL be submitted after fracturing operations, unless there are problems with the cement job. The revised proposed rule would also add a requirement that the depths of usable water aquifers be based on a drill log of the subject well or of another well in the field.
43 CFR 3162.3–3(c)(4)	Deleted	The revised proposed rule would delete the requirement that the operator submit a pre-hydraulic fracturing certification that it will comply with all applicable permitting and notice requirements.
43 CFR 3162.3–3(c)(3)	43 CFR 3162.3–3(d)(3)	The revised proposed rule would add to the list of the source and location of water supply “reused or recycled water.”
43 CFR 3162.3–3(c)(5)	43 CFR 3162.3–3(d)(4)	The revised proposed rule would add to the requirements for a hydraulic fracturing design that the operator must include the estimated fracture direction and propagation plotted on the well schematics and on a topographical map of the same scale as the map used in the APD. It would also add a requirement to supply the estimated vertical distance to the nearest usable water aquifer above the fracture zone.

Initial proposed regulation	Revised proposed regulation	Substantive changes
43 CFR 3162.3–3(c)(6)	43 CFR 3162.3–3(d)(5)	The revised proposed rule would remove “chemical composition” from the information that is required to be submitted regarding the handling of recovered fluids.
43 CFR 3162.3(d) Mechanical Integrity Testing Prior to Well Stimulation. (None)	43 CFR 3162.3–3(f) Mechanical Integrity Testing Prior to Hydraulic Fracturing.	The revised proposed rule would add clarification that a mechanical integrity test (MIT) would be required for a re-fracturing operation.
(None)	43 CFR 3162.3–3(e)(1) Monitoring of Cementing Operations and Cement Evaluation Log Prior to Hydraulic Fracturing.	The revised proposed rule would add a new paragraph requiring that during cementing operations the operator must monitor and record the flow rate, density, and treating pressure, and then submit the monitoring report to the BLM within 30 days of completion of the hydraulic fracturing.
43 CFR 3162.3–3(c)(2)	43 CFR 3162.3–3(e)(2)	The revised proposed rule would add a new paragraph stating a general rule that an operator must run a CEL on each casing that protects usable water. A CEL may be ultrasonic logs, variable density logs, micro-seismograms, standard CBLs, CBLs with directional receiver array, ultrasonic pulse echo technique, an isolation scanner or other tool of equal effectiveness.
(None)	43 CFR 3162.3–3(e)(3)	The revised proposed rule would add a new paragraph that provides an exception to the CEL requirement where an operator’s “type well” has been shown to have successful cement bonding and subsequent wells have the same specifications and geologic parameters as the “type well,” and the cementing operations monitoring data parallels those of the type well.
(None)	43 CFR 3162.3–3(e)(4)	The revised proposed rule would add a new paragraph that if there is any indication of inadequate cementing, the operator must report it to the BLM within 24 hours, with written confirmation within 48 hours. The operator would be required to run a CEL showing that it has corrected the cementing job, and that usable water has been isolated to protect it from contamination. At least 72 hours prior to starting fracturing operations, the operator must submit to the BLM a certification indicating that it corrected the inadequate cement job and documentation showing that there is adequate cement bonding.
(None)	43 CFR 3162.3–3(e)(5)	The revised proposed rule would add a new provision stating that the operator must submit the information required by (e)(1) and (2) to the BLM in a Subsequent Report Sundry Notice.
43 CFR 3162.3–3(e)(1)	43 CFR 3162.3–3(g)(1)	This paragraph would be revised to apply to refracturing operations as well as fracturing operations. It also would be revised to make it clear that the pressure in the annulus between any intermediate casings and the production casing must be continuously monitored and recorded.
43 CFR 3162.3–3(e)(2) Monitoring and Recording During Well Stimulation.	43 CFR 3162.3–3(g)(2) Monitoring and Recording During Hydraulic Fracturing.	This paragraph would be revised to apply to refracturing operations as well as fracturing operations. For any incident of the annulus pressure increasing by more than 500 psi, the revised proposed rule would change the due date for a Subsequent Report Sundry Notice from 15 days after the occurrence to 30 days after completion of fracturing operations.
43 CFR 3162.3–3(g) Information that Must be Provided to the Authorized Officer After Completed Operations.	43 CFR 3162.3–3(i) Information that Must be Provided to the Authorized Officer After Completed Operations.	Changes to this section would add a clarification that the information is required for each well fractured or refractured, even if the BLM approved a Notice of Intent Sundry for a group of wells. The new provision would allow reporting of chemical information to the BLM either directly or through FracFocus or other database that the BLM specifies. The revised proposed rule would add a new provision that the operator submitting chemical information through FracFocus must specify that the information is for a Federal or Indian well, certify that the information is correct, and certify that the operator complied with applicable laws governing notice and permits. The revised proposed rule would also add a new provision clarifying that the operator is responsible for information submitted by its hydraulic fracturing contractor.
43 CFR 3162.3–3(g)(1)	43 CFR 3162.3–3(i)(2)	This revised section would delete the requirement that the operator report the actual access route and transportation method for all water used in stimulating the well, since this information is provided before the operation is approved.

Initial proposed regulation	Revised proposed regulation	Substantive changes
43 CFR 3162.3–3(g)(2), (4) and (5)	43 CFR 3162.3–3(i)(1)	The proposed regulation required two separate reports or tables (one for all additives of the actual stimulation fluid by trade name and purpose, and another for the complete chemical makeup (including the Chemical Abstracts Service Registry Number [CAS number]) of all materials used in the actual stimulation fluid). The revised proposed rule would require the information required in the FracFocus form: True vertical depth of the well, total water volume used, and for each chemical used (including the base fluid) the trade name, supplier, purpose, ingredients, CAS number, maximum ingredient concentration in the additive, and maximum ingredient concentration in the fracturing fluid.
43 CFR 3162.3–3(g)(6)	43 CFR 3162.3–3(i)(4)	A new requirement would be added by this rule to report the actual, estimated, or calculated direction of the fractures.
43 CFR 3162.3–3(g)(7)	Deleted	This revised proposed rule would delete the provision that would have expressly allowed the Subsequent Report Sundry Notice to be completed in part by attaching the hydraulic fracturing contractor's job log so long as the required information was included and readily apparent.
43 CFR 3162.3–3(g)(8) and (9)	43 CFR 3162.3–3(i)(7)	The revised proposed rule would revise the requirement for certification of wellbore integrity to include the monitoring of cementing operations and the CEL. It would also clarify that the certification of compliance with applicable law is different for Indian lands than for Federal lands.
(None)	43 CFR 3162.3–3(i)(8)	This rule would add a new paragraph requiring operators to submit the actual cement operations monitoring report, any CEL, and the MIT results.
(None)	43 CFR 3162.3–3(i)(9)	This rule would add a new paragraph allowing the BLM to require the operator to provide further information about any representation submitted under paragraph (i).
43 CFR 3162.3–3(h) and (i)	43 CFR 3162.3–3(j)(1) through (4)	In this revised proposed rule these sections have been significantly revised. The regulations would no longer require operators to submit all information about chemicals to the BLM, to segregate trade secrets, and to justify the assertion of trade secret protection. Instead, the regulations would instruct operators not to disclose trade secret information to the BLM or on FracFocus. Operators would submit an affidavit stating that the withheld information is entitled to withholding from the public under Federal statute or regulation. The BLM would retain authority to require operators to submit the claimed trade secret information.
(None)	43 CFR 3162.3–3(j)(4)	This rule would add a new paragraph requiring operators to keep the information claimed to be trade secrets for 6 years, by reference to existing 43 CFR 3162.4–1, which applies to all lease operations.
* * *	43 CFR 3162.3–3(k)	This rule would add a new provision allowing States and tribes to work with the BLM to create variances applicable to all lands within a field, a basin, a State, or Indian lands. Such a variance would have to meet or exceed the effectiveness of the rule provision it replaces.

Section-by-Section Discussion of the Revised Proposed Rule and Discussion of Comments

Comments Addressed in This Revised Proposed Rule

In this revised proposed rule, the BLM discusses many of the comments received on the proposed rule. The BLM will fully discuss comments on the initial proposed and revised proposed rules in the eventual announcement of the final rule. Commenters provided detailed and helpful information. The BLM desires to demonstrate how public comment assisted in framing the issues and to ultimately produce this revised proposed rule. The Department does not address every comment in this revised rule, because the changes in this revised

proposed rule have mooted some comments on the initial proposed rule. Other comments were not central to the re-evaluation the BLM has undertaken, and thus discussion of those few comments would not contribute to the public's understanding of the reasons the BLM is publishing the revised proposed rule.

Additionally, not every change in the revised proposed rule responds to a specific comment. Some revisions clarify the proposed rule, and still other revisions allow this revised rule to be more effective with reduced costs and delays to operators and to the BLM.

This revised proposed rule identifies some issues on which the BLM specifically seeks comments. The public, however, may submit comments

on any provision of the revised proposed rule. All comments received in response to the initial proposed rule will be in the record of any final rule; accordingly, the public does not need to resubmit comments to the initial proposed rule in response to this revised proposed rule.

General Comments on the Initial Proposed Rule

The BLM received comments both supporting and questioning the need for a rule regulating hydraulic fracturing. Supporters stated, among other things, that the rule protects groundwater and ensures that operators properly handle flowback water. In general, the opposition stated that BLM regulation of hydraulic fracturing is unnecessary and

argued that no scientific basis exists that hydraulic fracturing causes groundwater contamination and that it is a low-risk operation. The opposition further argued that States should regulate hydraulic fracturing and that many States already have current rules. The BLM acknowledges that many States do have regulations in place; however, not all of the States that contain Federal lands under the BLM's jurisdiction have hydraulic fracturing regulations. Further, FLPMA and other Federal law provide for public involvement that is not always required in State law. In addition, the BLM has responsibilities for Indian resources and State regulations do not apply to Indian lands. Furthermore, States do not uniformly require measures that would uphold the BLM's responsibilities for federally managed public resources, to protect the environment and human health and safety on Federal and Indian lands, and to prevent unnecessary or undue degradation of the public lands. By taking additional steps to ensure wellbore integrity and to control the handling of flowback water, potential impacts of hydraulic fracturing can be mitigated.

Some commenters questioned whether the BLM's proposed regulations are premature, because the Environmental Protection Agency (EPA) is currently conducting a multi-year study on the potential impact of hydraulic fracturing on drinking water resources, with a final report due in 2014. The BLM is aware of the ongoing EPA study relating to the impacts of hydraulic fracturing. While the EPA study may offer additional information regarding the potential impacts of hydraulic fracturing, nothing in the revised proposed regulations would contradict or conflict with the EPA study, which does not focus on the management of public lands and resources subject to Federal public lands law. Notwithstanding the findings that will be included in the EPA's anticipated study, this revised regulation prevents undue or unnecessary degradation of public lands and furthers the Secretary's trust responsibilities on Indian lands.

Some commenters disputed the authority of the BLM to regulate well construction and regulate water supplies used for, or potentially impacted by, hydraulic fracturing. Other commenters asserted that the proposed rule infringes upon State and tribal water rights authority. FLPMA directs the BLM to manage the public lands so as to prevent unnecessary or undue degradation. FLPMA also requires that the public lands be managed in a

manner that will protect the quality of resources, *i.e.* ecological, environmental, and water resources. Regulating wellbore construction meets these mandates. The Indian lands leasing statutes direct the Secretary to regulate oil and gas operations on Indian lands. The Secretary has delegated his authority for regulating downhole activities on Indian mineral leases to the BLM. The BLM has historically regulated the construction of wellbores through approvals of APDs (applying the Onshore Oil and Gas Order Numbers 1 and 2). This rule would supplement existing regulations regarding wellbore construction (Onshore Oil and Gas Order Number 2, Drilling (53 FR 46790)).

The revised proposed regulations at sections 3162.3-3(d)(3) and 3162.3-3(i)(2) would require submission of information on water sources to assist the BLM in assessing the environmental effects of individual drilling operations. The National Environmental Policy Act and the implementing regulations by the Council on Environmental Quality require that Federal agencies assess the environmental impacts of their proposed actions and inform their decision-making. The information on water sources will be part of an environmental assessment regarding how water is being supplied for the hydraulic fracturing operation. The BLM does not intend to regulate water use, but instead to acquire information on the water used incidental to oil and gas operations on Federal and Indian lands. Acquisition of this information is similar to requirements in Onshore Oil and Gas Order No. 1, Approval of Operations (72 FR 10308) for drilling a well. Onshore Order No. 1 requires the operator to identify the source, access route, and transportation method for all water anticipated for use in drilling the proposed well. Based on information received at this time, the requirement in Onshore Order No. 1 has not caused conflicts with State or tribal water rights authorities. Likewise, based on BLM's previous experience with the information requirements of its existing onshore orders, BLM does not anticipate that the requirements proposed here will cause any conflicts. The revised proposed regulation does not regulate Indian, State, and private water rights. Accordingly, the Department made no revisions to the initial proposed rule as a result of these comments.

The BLM received some comments stating that the rule should clarify the jurisdiction or scope of this rule. The revised proposed rule falls under 43 CFR part 3160. The jurisdiction (scope) of all sections under part 3160, which

would include this revised proposed rule, is defined in existing regulations at 43 CFR 3161(a), which states: "[a]ll operations conducted on a Federal or Indian oil and gas lease by the operator are subject to the regulations in this part." Therefore, this revised proposed rule would not apply to hydraulic fracturing operations on private or State leases, even leases included in a Federal or Indian agreement. The BLM's only jurisdiction on private and State leases is for site security, measurement, and reporting of production when the private or State lease is committed to a Federal or Indian agreement. Existing regulations already define the jurisdiction or scope of the revised proposed rule, so the Department made no revisions to the initial proposed rule as a result of these comments.

Some commenters requested that the BLM coordinate permitting and reporting with States to avoid duplication. Some commenters faulted the BLM for undermining the efforts of State oil and gas commissions to regulate hydraulic fracturing. The BLM has revised the initial proposed rule to avoid duplication with State requirements. Nonetheless, the BLM needs to have accurate information about the construction and completion of oil and gas wells on Federal and Indian land. The BLM acknowledges the efforts necessary to comply with State or tribal and BLM regulations, but modern information technology significantly reduces the time and expense of reporting the same information to both a State or tribal agency and to the BLM. Federal law is clear that the Federal Government has extensive authority over Federal lands and Indian lands, and that State governments may exercise certain powers on non-Indian lands, except in instances where Federal law preempts State law. The notice, approval, testing, operational, and reporting requirements of the revised proposed regulation would in no way undermine the efforts of State agencies to regulate hydraulic fracturing. The BLM recognizes the advantages to building upon existing relationships established with the different States and tribes as a prudent approach to maintaining efficiency and flexibility while reducing duplication. It makes sense for both the BLM and the States or tribes with oil and gas activity to explore ways to coordinate implementation of this revised proposed rule. For States or tribes that maintain hydraulic fracturing rules that meet or exceed the standards that would be imposed by this revised proposed rule, the BLM will pursue amending or

updating the existing agreement with each State or tribe to reflect the expectation and responsibilities for each agency. An example of an existing agreement is the State of Colorado which has a Memorandum of Agreement with the BLM (and the United States Forest Service) for Permitting and Oil and Gas Operations on BLM and National Forest Service Lands in Colorado.

The BLM is committed to working with tribes to coordinate implementation of this revised proposed rule with the tribes' laws, rules, and permitting and inspection programs. The contents of such agreements or understandings might be different for each tribe, but such agreements actively seeking opportunities to share standards, information, and processes should yield more consistency for operators and better efficiency for the BLM and tribal agencies.

Some commenters said that the proposed rule is inconsistent with existing laws or regulations such as the *Energy Policy Act of 2005* and EPA's New Source Performance Standards. For instance, some commenters believed that the proposed permitting requirements would cause delays in permitting that would violate the timeframes mandated by the Energy Policy Act. The BLM disagrees with these comments. Changes from the initial proposal in this revised proposed rule would reduce possible permitting delays and BLM projected workload. The BLM would meet the requirements of the Energy Policy Act by informing the operator what steps remain to be completed and the schedule for completion of these requirements for processing of their drilling permits. Often delays occur from submittal of incomplete information or surveys as part of the drilling permit proposal, or due to turnover in industry permitting specialists. The BLM has increased the number of drilling permits approved over the past 3 years, and does not believe such productivity gains will be negatively impacted by this revised proposed rule. The BLM received some comments that certain definitions and requirements in the proposed rule were vague. The commenters stated that without clarification, this purported vagueness could lead to misinterpretation by operators and inconsistent application by BLM engineers and inspectors. Because the revised proposed rule uses different approaches to regulation than the initial proposed rule, some definitions have been revised. The BLM worked to ensure the revisions also increased clarity. The BLM believes that the

definitions are sufficiently clear to the industry, the BLM, and the public. To the extent that some definitions might be construed as open-ended, it is because the rule must allow for some degree of flexibility to accommodate the wide range of geologic and environmental conditions encountered on Federal and Indian leases.

Some commenters stated that the BLM does not have the staffing, budget, or the number of experts needed to implement the rule, which will cause delays in approvals. The BLM does not agree with the assertion regarding the lack of BLM staff expertise. Also the revisions proposed in this revised proposed rule would reduce the amount of staff time required to implement the rule and limit any permitting delays. The changes include the option of including multiple wells with substantially similar geology in the permit application (type wells), narrowing the scope of the rule to include only hydraulic fracturing, and the elimination of the proposed requirement for the BLM to review and approve CBLs prior to hydraulic fracturing. These changes are discussed further in other sections of this rule.

Some BLM offices, especially those that process a large volume of drilling applications, may experience delays in implementing the revised proposed rule. The BLM is mindful of this issue and already provides remote assistance from other offices. As with the implementation of any new rule, some delays may be inevitable. This rule, however, will help prevent unnecessary or undue degradation of public lands and to provide protection to Indian trust resources.

Some commenters recommended that the BLM, State, or tribes should inspect all hydraulic fracturing operations on Federal and Indian land. The BLM did not revise the rule as a result of these comments. As part of the BLM's annual inspection strategy, the BLM inspects all workover operations, including hydraulic fracturing, on Federal and Indian lands that are rated as a high priority. This rating depends on measuring many factors, including the type of operation, the location, and the potential impacts of the operation.

The BLM received some comments objecting to the application of the rule to "well stimulation" operations which, as defined in the May 2012, proposed rule, includes any operation designed to increase the permeability of the reservoir rock. The definition specifically included acidization, but could also be interpreted to mean other operations such as thermal stimulation and maintenance fracturing, designed to

open up fractures near the wellbore. Some of the commenters stated that the requirements in the proposed rule were too onerous for what they considered to be routine maintenance operations. The commenters requested that the rule apply only to hydraulic fracturing operations.

The BLM agrees with these comments and made several revisions to the revised proposed rule as a result. Section 3162.3-3(a) has been revised to apply only to hydraulic fracturing and refracturing, rather than to well stimulation as stated in the proposed rule.

In addition, definitions of "hydraulic fracturing" and "refracturing" have been added to the revised proposed rule (section 3160.0-5) instead of the previous definition of well stimulation. In this revised proposed rule, the term "hydraulic fracturing" specifically excludes enhanced secondary recovery, such as water flooding, tertiary recovery, recovery through steam injection, and other types of well stimulation such as acidizing.

Some commenters requested clarification of the requirements for operators who conduct hydraulic fracturing operations on or near land managed by other Federal agencies such as the National Park Service (NPS) and the United States Forest Service (USFS). One commenter wanted to ensure that a comprehensive NEPA document was prepared and that the BLM include the NPS as a cooperating agency when hydraulic fracturing operations are near National Parks. Another commenter wanted the rule to specify that it applied to USFS managed land. When warranted, the BLM invites other agencies, including the USFS and the NPS, to participate in the preparation of the NEPA analysis.

The involvement of other agencies reflects the site-specific issues and potential impacts to resources. On USFS lands, the USFS typically has the lead responsibility for compliance with NEPA as part of its review of the surface use plan of operation, and the BLM serves as a cooperating or joint lead agency. The revised proposed rule, as with all of the other regulations in 43 CFR part 3160 (see 43 CFR 3161.1—Jurisdiction), would apply to USFS lands. No revisions were made to the rule as a result of these comments.

The BLM received some comments requesting that the rule include a ban on the use of diesel fuel in hydraulic fracturing operations. Jurisdiction over the use of diesel fuel in hydraulic fracturing operations lies with the EPA through its administration of the Underground Injection Control (UIC)

program. (SDWA, Section 1421(d)(1)(B), 42 U.S.C. 300h(d)(1)(B)(ii), 40 CFR 144.11). Owners or operators who inject diesel fuels during hydraulic fracturing related to oil and gas operations must obtain a UIC permit before injection begins. The EPA published draft permitting guidance for oil and gas hydraulic fracturing operations using diesel fuels in May 2012. Thus the BLM did not revise the rule as a result of these comments.

The BLM received some comments that certain provisions of the proposed rule were open ended, which would give BLM too much discretion and would result in uncertainty, delays, and increased costs for operators. For example, some comments suggested that the ability of the BLM to request additional information in the Sundry Notice requesting approval for hydraulic fracturing (section 3162.3–3(d)(7)) was open ended. The BLM believes that the provisions in the revised proposed rule are necessary to provide the flexibility essential to regulating operations over a broad range of geologic and environmental conditions. Requests for information from the Authorized Officer are administratively appealable if an operator believes the directive lacks a proper basis. The BLM did not revise the rule as a result of these comments.

The BLM received some comments suggesting that all wells permitted prior to the effective date of the rule should be exempt from the provisions of the rule, that the rule be phased in over a period of 180 days, and that older wells should be reviewed for information only. The BLM understands the commenters' concerns. Nonetheless, the primary goal of this rule is to ensure that hydraulic fracturing does not cause negative impacts to Federal or Indian resources, including groundwater and surface water. This is achieved by ensuring wellbore integrity is maintained throughout the hydraulic fracturing process and placing restrictions on the handling of flowback water. Achieving these goals is critical regardless of when the BLM approved the APD or if the proposed operation will take place immediately after the effective date of the rule or 180 days after the effective date of this rule. The BLM did not revise the rule as a result of these comments.

Section Discussion

As an administrative matter, this rule would amend the authorities section for the BLM's oil and gas operations regulations at 43 CFR 3160.0–3 to include FLPMA. Section 310 of FLPMA authorizes the Secretary of the Interior to promulgate regulations to carry out

the purposes of FLPMA and other laws applicable to the public lands. See 43 U.S.C. 1740. This amendment would not be a major change and would have no effect on lessees, operators, or the public.

This rule would remove the terms “nonroutine fracturing jobs,” and “routine fracturing jobs,” from 43 CFR 3162.3–2(a) and 43 CFR 3162.3–2(b). It would add a new section, 43 CFR 3162.3–3, for hydraulic fracturing operations. In this rule, there would be no distinction drawn between “nonroutine” or “routine” hydraulic fracturing operations. Prior approval would be required for hydraulic fracturing operations, but would be available concurrently with the prior approval process that is already in place for general well drilling activities through the APD process. The running of CELs on surface or intermediate casing strings, which is currently an optional practice, would be required for new wells where the casing protects usable water, except for wells substantially similar to an operator's “type well” for which the operator has demonstrated the efficacy of the cement bonding of casing under similar geological conditions within the same field. All wells would require mechanical integrity testing prior to hydraulic fracturing.

The revised proposed rule includes eight new definitions for technical terms used in the rule. These definitions will improve readability and clarity of the regulations.

Published in this rule are the following definitions:

- *Annulus* means the space around a pipe in a wellbore, the outer wall of which may be the wall of either the borehole or the casing; sometimes also called the *annular space*.
- *Bradenhead* means a heavy, flanged steel fitting connected to the first string of casing that allows suspension of intermediate and production strings of casing, and supplies the means for the annulus to be sealed off.
- *Hydraulic fracturing* means those operations conducted in an individual wellbore designed to increase the flow of hydrocarbons from the rock formation to the wellbore through modifying the permeability of reservoir rock by breaking it. Hydraulic fracturing does not include enhanced secondary recovery such as water flooding, tertiary recovery, recovery through steam injection, or other types of well stimulation operations such as acidizing. The BLM changed the proposed rule's term “stimulation fluid” to “hydraulic fracturing fluid” throughout these regulations.

- *Hydraulic fracturing fluid* means the liquid or gas, and any associated solids used in hydraulic fracturing, including constituents such as water, chemicals, and proppants.

- *Proppant* means a granular substance (most commonly sand, sintered bauxite, or ceramic) that is carried in suspension by the fracturing fluid and that serves to keep the cracks open when fracturing fluid is withdrawn after a hydraulic fracture treatment.

- *Refracturing* means a hydraulic fracturing operation subsequent to the completion of a prior hydraulic fracturing operation in the same well. For purposes of this definition, a hydraulic fracturing operation is completed when a well begins producing oil or gas, or when equipment necessary to inject the hydraulic fracturing fluid at sufficient pressure to fracture the stratum is removed from the well pad, whichever occurs earlier.

- *Type well* means an oil and gas well that can be used as a model for well completion in a field where geologic characteristics are substantially similar within the same field, and where operations such as drilling, cementing, and completions using hydraulic fracturing are likely to be successfully replicated using the same design.

Usable water means generally those waters containing up to 10,000 ppm of total dissolved solids.

The proposed rule used the term “well stimulation” to describe the activities being regulated by this rule. In this revised proposed rule, that term is replaced with the term “hydraulic fracturing.” The reason for the change is because, after reviewing all of the comments and considering the available information, the BLM has determined that only hydraulic fracturing operations require the additional measures in this rulemaking. This definition also has language that explains the types of secondary recovery activities to which this rule does not apply.

This rule also includes the following three terms that were not in the proposal: Hydraulic fracturing fluid; refracturing; and type well. These terms are defined so that there is a common understanding of the regulatory provisions that follow.

This rule would delete the definition of “fresh water,” and is consistent with how the BLM has been protecting all usable waters in its onshore orders. Usable water includes fresh water (often defined as water containing less than 5,000 parts per million (ppm) of total dissolved solids (TDS)) and water that is

of lower quality than fresh water. The BLM has been more protective when it seeks to protect all usable water during drilling operations, not just fresh water. This policy was established upon the effective date of Onshore Order No. 2, December 19, 1988. Water with up to 10,000 ppm TDS may be used for some agricultural or industrial purposes, often with some treatment, and thus would continue to be protected under this revised proposed rule. Not all waters of up to 10,000 ppm TDS need to be isolated or protected from hydraulic fracturing operations; clarifying edits have been added to help the public understand how the rule will affect operations.

The rule would revise section 3162.3–2(a) by removing the phrase “perform nonroutine fracturing jobs” from the current 43 CFR 3162.3–2(a). The phrase “routine fracturing jobs, or” would also be removed from existing section 3162.3–2(b). This rule does not affect requirements for acidizing jobs, and this rule would not remove the reference to acidizing jobs from section 3162.3–2(b). Hydraulic fracturing operations are addressed under section 3162.3–3.

In paragraph (a) of this section, the term “commingling” in the initial proposed rule would be replaced with the term “combining” to clarify the intent of this requirement and to avoid confusion with the meaning of “commingling” as that term is used in a production accounting context and in sections 3162.7–2 and 3162.7–3 of this title. The term “commingling” in a production accounting context refers only to the combining of production from different leases, communitized areas (CA), participating areas (PA), or State or private mineral estates prior to royalty measurement. Commingling, whether it is downhole commingling or surface commingling, requires BLM approval to ensure that the allocation method is consistent with Onshore Oil and Gas Order Number 3, Site Security (54 FR 8056), Onshore Oil and Gas Order Number 4, Measurement of Oil (54 FR 8086), and Onshore Oil and Gas Order Number 5, Measurement of Gas (54 FR 8100), for royalty measurement purposes. The combining of production from different intervals or zones within a wellbore also requires BLM approval to ensure that the zones proposed for combining are compatible from a reservoir standpoint, regardless of the royalty implications. The intent of the requirement in this section would be to address reservoir concerns from combining zones or intervals; therefore, the word “commingling” was changed to “combining.” The royalty implications of commingling production

from different leases, CAs, PAs, or State and private properties are handled under a separate approval process in 43 CFR 3162.7–2 and 3162.7–3.

Refracturing operations within 5 years from the approval of a Notice of Intent Sundry would be considered a “recompletion” under section 3162.3–2(b). The subsequent report on those operations would require the information and certifications prescribed in section 3162.3–3(i) of this rule. Under section 3162.3–3(c)(3)(i), a refracturing operation more than 5 years after the approval of the Notice of Intent Sundry would require BLM’s approval of a new Notice of Intent Sundry.

The revised proposed rule would change the scope of the regulation to apply only to hydraulic fracturing operations and not to other well stimulation activities. Section 3162.3–3(a) would make it clear that this section applies only to hydraulic fracturing operations and that all other injection activities must comply with section 3162.3–2. This language is necessary to make the distinction between hydraulic fracturing and other well injection activities, such as secondary and tertiary recovery operations. Secondary and tertiary recovery operations do not involve the injection of chemicals at pressures high enough to fracture strata, and thus do not raise the same concerns of breaching the well bore and migrating into usable water.

New paragraph 3162.3–3(b) would require that all fracturing and refracturing operations meet the performance standard in section 3162.5–2(d) of this title. Among other things, that section requires operators to isolate all usable water and other mineral-bearing formations and protect them from contamination.

Some commenters requested more clarity on how the definition of usable water would apply to the requirement to isolate and protect usable water from contamination from hydraulic fracturing operations. The BLM has revised the definition of usable water to specify that, for purposes of the hydraulic fracturing regulations, usable water includes underground sources of drinking water, zones actually used for water supply for industrial or agricultural purposes (unless the operator shows that the industrial or agricultural user would not be harmed by failure to protect or isolate), and zones designated by the State or the tribe as requiring isolation or protection from oil and gas operations. The BLM has also revised the section to specify that, for the purposes of the hydraulic fracturing regulations, usable water does

not include the zone authorized for hydraulic fracturing, zones designated as “exempted aquifers” under the Safe Drinking Water Act (SDWA), and zones that the State or tribe have explicitly designated as exempt from any requirement for oil and gas operators to isolate or protect. Any other zones containing water that does not exceed 10,000 ppm TDS would be considered usable water. The BLM recognizes that including aquifers not otherwise exempted would be consistent with its Oil and Gas Onshore Orders, but may make the rule more stringent than other Federal, State, and tribal laws. The BLM invites comments specifically on the incremental costs associated with protecting zones that contain up to 10,000 ppm of total dissolved solids, that are not already protected under SDWA or equivalent State or tribal law, and not excluded in the proposed definition (i.e., those aquifers protected by part (4) in the proposed definition of usable water). BLM may consider excluding such zones in the final rule.

The BLM believes that the revised language makes explicit the appropriate deference to the expertise and professional judgment of the State or tribal agencies entrusted to manage the groundwater resources under their respective jurisdictions.

Section 3162.3–3(c) would require the BLM’s approval of all proposals for hydraulic fracturing or refracturing activity. The operator has the option of applying for the BLM’s approval in its APD, including the information required by paragraph (d) of this section.

The operator may submit a Sundry Notice and Report on Wells (Form 3160–5) as a Notice of Intent Sundry for the hydraulic fracturing proposal for the BLM’s approval before the operator begins the fracturing activity. This section would supersede and replace existing section 3162.3–2(b) that states that no prior approval is required for routine fracturing. That reference in the existing section would be deleted. Also, an operator must submit a new Sundry Notice prior to hydraulic fracturing activity:

- If the BLM’s previous approval for hydraulic fracturing is more than 5 years old,
- If the operator becomes aware of significant new information about the relevant geology, the fracturing operation or technology, or the anticipated impacts to any resource, or
- If the operator proposes refracturing of the well.

The 5-year period is consistent with practices in some States, including Montana, Wyoming, and Colorado,

which require that operators reconfirm well integrity for fracturing operations through a pressure test every 5 years. The requirement to submit a new NOI for refracturing is new to this revised proposed rule and is added to clarify that approval of a single hydraulic fracturing operation in a well does not allow for multiple refracturing procedures without compliance with the notice, monitoring, and reporting requirements.

The BLM understands the time-sensitive nature of oil and gas drilling and well completion activities and does not anticipate that the submittal of additional hydraulic fracturing-related information with APD applications will significantly impact the timing of the approval of drilling permits. The BLM believes that the additional information that would be required by this rule would be reviewed in conjunction with the APD and within the normal APD processing time frame. Also, the BLM anticipates that requests to conduct hydraulic fracturing operations on existing wells that have been in service more than 5 years will be reviewed promptly. The BLM understands that delays in approvals of operations can be costly to operators and the BLM intends to avoid delays whenever possible. Furthermore, if an operator believes that approval of hydraulic fracturing would be swifter if it is not part of the APD, the operator has the option of submitting the Notice of Intent Sundry at a later date. However, the operator does not obtain an exemption from any requirement of this regulation by submitting a Notice of Intent Sundry after drilling and cementing operations have commenced.

Section 3162.3–3(d) has been revised from what was originally proposed to allow the Sundry Notice required by this section to be submitted for a single well or a group of wells. If the submission is for a group of wells that share substantially similar geological characteristics, the information should describe the “type well.” “Type well” is a term commonly used in the oil and gas industry and the BLM added it as a new definition in section 3160.0–5 of this rule. By constructing and monitoring a type well, including running a CEL on casing that encounters usable water, the operator demonstrates that its engineering design and execution effectively isolate aquifers with usable water in the field. The same operator may then replicate the type well for each of the wells in the approved group for the same field. The operator would not need to run a CEL on those wells unless the monitoring data indicated a problem with the cementing.

Section 3162.3–3(d)(1) would require a report that includes the geological names, a geological description, and the proposed measured depth of the top and the bottom of the formation into which hydraulic fracturing fluids would be injected. The report is needed so that the BLM may determine the properties of the rock layers and the thickness of the producing formation and identify the confining rocks above and below the zone that would be stimulated.

Under this revised proposed rule, section 3162.3–3(d)(2) would be revised by removing the reference to the CBL, because under this rule prior approval of a CBL or other CEL would no longer be routinely required. The change in this section is as a result of changes to paragraph (e) and is necessary to make this section consistent with those changes. Section 3162.3–3(d)(2) would be revised to require the operator to submit the measured or estimated depths of all occurrences of usable water using a drill log from the subject well or any other well sharing the same geological characteristics within the same geologic formation, which will help the BLM in its efforts to make sure that water resources are protected. As it pertains to the depths of all occurrences of usable water, the word “estimated” has been added because at the planning stages of the operation, the actual measured depths would not generally be available.

Although prior approval of a CEL would no longer be routinely required, operators would be required to submit to the BLM the results of a CEL with the post-completion sundry notice. The BLM will be reviewing the well drilling and completion records and logs including the CEL, to help verify that operators have complied with their duty to assure that the casings are properly cemented.

Section 3162.3–3(d)(3) would require reporting of the measured depth to the perforations in the casing and uncased hole intervals (open hole). This section would also require the operator to disclose specific information about the water source to be used in the fracturing operation, including the location of the water that would be used as the base fluid. The BLM needs this information to determine the impacts associated with operations. This rule would add “reused or recycled water” to the example list of sources and location of the water supply to be used for fracturing operations. The rule makes it clear that reused or recycled water is a recognized source of water supply for these types of operations. The information required by this paragraph does not interfere with State or tribal

regulation of water allocation. The operators would need to comply with all State or tribal water laws, but need not disclose to the BLM the documents evidencing their rights to use the water. This regulation would in no way discourage operators from reusing or recycling water for new hydraulic fracturing operations.

Initial proposed section 3162.3–3(c)(4) would have required operators to certify in writing that they have complied with all applicable Federal, tribal, State, and local laws, rules, and regulations pertaining to fracturing fluids before a fracture is attempted. This section has been deleted from the revised proposed rule because the BLM believes that requiring this certification after the operator has completed hydraulic fracturing operations (see section 3162.3–3 (i)(7)) adequately protects Federal and Indian lands and resources and, therefore, the burden on industry of providing and on the BLM of reviewing that information ahead of operations is not justified.

Section 3162.3–3(c)(5) has been renumbered in this revised proposed rule as section 3162.3(d)(4) and has been revised. Section 3162.3–3(d)(4) would require the operator to submit a plan for the hydraulic fracturing design. This information is needed in order for the BLM to be able to verify that the proposed hydraulic fracturing design is adequate for safely conducting the proposed well stimulation.

Section 3162.3–3(d)(4)(i) would require the operator to submit the estimated total volume of fluids that will be used in the hydraulic fracturing operations.

Section 3162.3–3(d)(4)(ii) would require submission of the anticipated surface treating pressure range. This information is needed by the BLM to verify that the maximum wellbore design burst pressure will not be exceeded at any stage of the hydraulic fracturing operation.

Section 3162.3–3(d)(4)(iii) would require the maximum injection treating pressure information to be submitted. This information is needed by the BLM to verify that the maximum allowable injection pressure will not be exceeded at any stage of the hydraulic fracturing operation.

Section 3162.3–3(d)(4)(iv) would require the operator to submit the estimated fracture direction, length, and height, including the fracture propagation plotted on a map so that the BLM can ensure that the fracturing operations do not threaten aquifers, other resources, or other operations. The rule would also require that the information include the estimated

fracture propagation plotted on the well schematics and on a map. The rule would require that the map must be of a scale no smaller than 1:24,000, which is the scale required for the map included in an APD.

The rule also would add a new paragraph 3162.3–3(d)(4)(v) that requires submission of the estimated vertical distance to the base of the nearest usable water aquifer above the fracture zone. The rule would require this information to assure that usable water is isolated from propagated fissures. Fracturing operations that are expected to propagate fissures vertically to depths near those of usable water may require closer scrutiny by the BLM than those with thousands of feet between the fissures and aquifers.

Section 3162.3–3(d)(5) would require the operator to provide for BLM's approval information about the handling of recovered fluids. This information is being requested so that the BLM has all necessary information regarding chemicals being used in the event that the information is needed to help protect health and safety or to prevent unnecessary or undue degradation of the public lands. The BLM has deleted the requirement for operators to provide the estimated chemical composition of flowback fluids because it would in effect require operators to reveal the total chemical constituents of their hydraulic fracturing fluids prior to operations. It would also require speculation as to the chemistry of fluids in the target zone, and their reactions, if any, with the hydraulic fracturing fluids. The BLM has determined that operators may justifiably change the chemical composition of hydraulic fracturing fluids after approval of fracturing operations, and even during those operations in response to such factors as availability of chemicals and unexpected geologic conditions. Thus, the reliability of the pre-operational estimated composition of flowback fluids could be imperfect. The composition of actual flowback fluids could be appropriately determined from the post-operational disclosure of the chemicals used in the fracturing operations. It is most important at the approval stage, however, for the operator to show that it has an adequate plan to manage and contain the recovered fluids that would prevent them from contaminating surface water or groundwater without regard to their specific chemical composition.

Section 3162.3–3(d)(5)(i) would require the operator to submit to the BLM an estimate of the volume of fluid to be recovered during flowback,

swabbing, and recovery from production facility vessels. This information is required to ensure that the facilities needed to process or contain the estimated volume of fluid will be available on location.

Section 3162.3–3(d)(5)(ii) would require the operator to submit to the BLM the proposed methods of managing the recovered fluids. This information is needed to ensure that the handling methods will adequately protect public health and safety.

Section 3162.3–3(d)(5)(iii) would require the operator to submit to the BLM a description of the proposed disposal method of the recovered fluids. This is consistent with existing BLM regulations for produced waters (i.e., Onshore Oil and Gas Order Number 7, Disposal of Produced Water, (58 FR 47354)). This information is requested so that the BLM has all necessary information regarding disposal of chemicals used in the event it is needed to protect the environment and human health and safety on Federal and Indian lands and to prevent unnecessary or undue degradation of the public lands.

Section 3162.3–3(d)(6) would require the operator to provide, at the request of the BLM, additional information pertaining to any facet of the hydraulic fracturing proposal. For example, the BLM may require new or different tests or logs in cases where the original information submitted was inadequate, out of date, or incomplete. Any new information that the BLM may request will be limited to information necessary for the BLM to ensure that operations are consistent with applicable laws and regulation, or that the operator is taking into account site-specific circumstances. Such information may include, but is not limited to, tabular or graphical results of an MIT, the results of logs run, the results of tests showing the total dissolved solids in water proposed to be used as the base fluid, and the name of the contractor performing the hydraulic fracturing operation.

Comments on What the Notice of Intent Sundry Must Include

Some commenters requested baseline water testing prior to hydraulic fracturing operations; however, the BLM cannot authorize operators to enter non-Federal land to conduct baseline water testing, so the BLM did not change the revised proposed rule as a result. Whether to require baseline water testing on Federal land will be addressed, as is the current practice, as part of the analysis under the National Environmental Policy Act (NEPA) review, and the "downhole review" by the BLM authorized officer pursuant to

Onshore Oil and Gas Orders Nos. 1 and 2. For example, if local drilling or geologic conditions, such as downhole stratigraphy involving faults, fissures, natural fractures, karst/limestone or other similar conditions require extra vigilance for any leaks of wellbore fluids to the usable water, then additional testing for baseline water could be required by the BLM as a condition of approval (COA) of a drilling permit. Similarly, the site-specific NEPA analysis of a drilling permit might reveal local environmental conditions that indicate a need to require baseline testing as a COA.

The BLM received some comments requesting that the BLM require up-front disclosure of the chemicals proposed for use in the hydraulic fracturing fluid. Commenters indicated that only through full up-front disclosure could the BLM and the public assess impacts to water, land, air quality, and human health and safety. The proposed rule was not revised based on these comments. Analysis of the impacts from hydraulic fracturing is done as part of the NEPA analysis conducted prior to the issuance of permits. For the purposes of NEPA compliance, the exact composition of the fluid proposed for use is not required because chemicals used in the hydraulic fracturing process are generally considered potentially hazardous for the purpose of impact analysis and mitigation. Operators will be aware that the rule requires disclosure of hydraulic fracturing chemicals after operations are complete and operators will also be required to certify that the hydraulic fracturing fluid used complied with all applicable permitting and notice requirements and all applicable Federal, State, and local laws, rules, and regulations (a separate but similar certification is required for Indian lands). The operator would also be required to certify that wellbore integrity was maintained prior to and throughout hydraulic fracturing operations. The BLM believes that the post-fracturing disclosures and certifications would provide adequate assurances that the hydraulic fracturing operations protect public health and safety and protect Federal and Indian resources.

The BLM also received comments in opposition to pre-disclosure of chemical constituents because of trade secret concerns and positing that the actual chemicals used will change from the pre-drilling stage based on the results encountered during drilling. While the BLM agrees with these comments, no revisions to the revised proposed rule were made because neither the initial proposed rule nor the revised proposed

rule would require pre-disclosure of chemicals.

The BLM received some comments expressing concern about additional delays that would be caused by the permitting process in the proposed rule. According to the comments, unnecessary delays would be caused by having to submit voluminous amounts of information for each well proposed for hydraulic fracturing or acidization, the review and approval of CBLs prior to hydraulic fracturing, and the lack of BLM staff to perform these additional reviews. Based on consideration of these comments, the initial proposed rule has been revised. The changes include the option of including multiple wells with similar geology in the permit application (“type wells”), narrowing the scope of the rule to include only hydraulic fracturing, and the elimination of the requirement for the BLM to review and approve CBLs prior to hydraulic fracturing. These changes are discussed further in other sections of this preamble.

The BLM received some comments regarding the amount of information required in section 3162.3–3(c) of the proposed rule in order for the BLM to grant approval of hydraulic fracturing operations. The commenters stated that much of this information, such as flowback time and flowback volume, is speculative. Commenters indicated that data such as treatment volumes, chemical composition, and other specific design parameters can only be determined after the well has been drilled. Commenters also suggested that instead of providing site-specific design details which could change, the BLM should allow operators to submit a generic master design plan or type well proposal.

The BLM agrees with these comments. The revised proposed rule (section 3162.3–3(d)) would provide for a more streamlined permitting process by allowing a Notice of Intent Sundry Notice to cover a group of wells with similar geologic characteristics, rather than just a single well. If the Sundry Notice is for a group of wells, the information required in section 3162.3–3(d) would be submitted for a type well that represents a typical completion and hydraulic fracturing procedure for the group of wells included in the Sundry Notice. The requirement to submit a CBL prior to the BLM granting approval for hydraulic fracturing is also being removed in the revised proposed rule.

The BLM received some comments that suggested that more information should be required prior to approving a plan or application for a permit to hydraulically fracture a well. Some of

the additional information suggested to be obtained included the total amounts of waste, recycling methods, produced fluid disposal plans, fluid transportation plans, on-site storage and chemical composition of flowback water, more geologic data, an emergency spill response plan, and information about confining zones. All of the suggestions are already parts of required APD components and other BLM regulations including Onshore Orders Nos. 1, 2, and 7. The BLM did not revise the rule as a result of these comments.

Some comments suggested that the BLM require more information both pre- and post-hydraulic fracturing, including common chemical names, composition of recovered fluids, sources of water used and storage/containment methods. Existing regulations require advance approval of plans for handling waste and hazardous materials and sources of water used in drilling and completing wells on Federal and Indian lands. The BLM did not revise the rule as a result of these comments.

The BLM received some comments stating that the proposed rule should provide for “estimates” rather than actual information in the permit application. The reason given for providing estimates is that the hydraulic fracturing plan could change from the time it is approved based on conditions encountered during drilling and for other reasons. The BLM partially agrees with this comment and has revised the rule so that it would allow the operator to submit information for a type well drilled in an area of similar geology in lieu of submitting information specific to every well proposed for hydraulic fracturing. The BLM understands that some of the information such as formation depths, will be estimations of various parameters; for example, well-specific geological strata, formation depth/zone of perforation and fracture, expected amount of fracturing fluid injection volumes and flowback from the wellbore, expected pressure and temperature during drilling and completions, etc. However, the BLM also requires that the operator submit a Sundry Notice if major changes from the approved permit are requested.

The BLM received some comments that the proposed rule requires documentation that is duplicative of other regulatory requirements and documents already submitted to the BLM, particularly the APD and Well Completion reports. The BLM agrees that some of the data that would be required in this rule is similar to that found or contained in other reports, forms and approved plans. However, the BLM believes that the requested

information is unique to the hydraulic fracturing operation and is necessary for the BLM to ensure that operations are conducted in a manner that will protect groundwater, surface water, and other resources. The BLM did not revise the rule as a result of this comment. The BLM received some comments regarding the timeframes for hydraulic fracturing permit approvals. The commenters suggested that the rule should specify a set amount of time in which the BLM must complete its review of hydraulic fracturing proposals, and if that time was exceeded, the proposal would be automatically approved. The BLM did not revise the rule as a result of these comments because the imposition of a timeframe or “automatic” approvals could limit the BLM’s ability to ensure protection of usable water and other resources. The BLM cannot abdicate its statutorily mandated responsibilities to prevent unnecessary or undue degradation of public lands and to protect Federal and Indian resources by establishing an artificial deadline. As discussed in other sections, however, the revised proposed rule would make several changes to the permitting process that would reduce the possibility of unreasonable delays.

The BLM received some comments questioning the rationale or need for the information requested in both the permit and the subsequent report. The BLM has determined that the requested information is important to assess the environmental impacts of the proposed operation as well as to ensure that hydraulic fracturing operations will be conducted in a manner that prevents waste of valuable minerals, protects other resources, and ensures public health and safety. No revisions to the rule were made as a result of this comment.

The BLM received some comments objecting to the requirement to estimate or calculate fracture lengths both in the application for hydraulic fracturing (section 3162.3–3(d)) and in the subsequent report (section 3162.3–3(i)). The primary objection expressed by the commenters is the difficulty, expense, and high degree of uncertainty in estimating, calculating, or measuring fracture lengths. According to the commenters, calculating fracture lengths requires elaborate computer models, which are often proprietary, and measuring fracture lengths requires seismic monitoring which adds time and expense. Some commenters questioned the need for this information, especially given that the target zone is usually thousands of feet below any known usable water zones. Other commenters stated that there is a

significant economic incentive to contain fractures to the target zone in order to minimize the volume of fluid required in the fracturing process.

In order to evaluate the potential impacts of the proposed hydraulic fracturing application, the BLM must have information showing the estimated fracture lengths. This information is used to help ensure that fractures will not intersect known fault zones, communicate with older unplugged wells with questionable wellbore integrity, or communicate with usable water zones. The BLM is aware that the fracture lengths provided in the application and subsequent report are estimates. For the subsequent report, the reporting of actual fracture lengths can be used to identify potential problems. The BLM did revise section 3162.3–3(i) as a result of these comments; moreover, section 3162.3–3(d) was revised to clarify how the estimated fracture lengths are to be provided to the BLM in the application.

Section Discussion

Section 3162.3–3(e) is new to the rule. This section would require monitoring of cementing operations and would require a CEL prior to hydraulic fracturing operations for each casing that protects usable water. The requirements are necessary to ensure that the usable water aquifers intersected during well drilling have been isolated to protect them from contamination. Because aquifers are permeable, operators routinely isolate them from hydraulic fracturing operations by lining the wellbore with a tubular casing (typically metal casing). “Surface casings” are typically run for the top 1,000 to 1,500 feet of a well. “Intermediate casings” are used where necessary at greater depths. Operators pump cement to the outside of the casing to assure that the casing will transmit the pressures of hydraulic fracturing to the surrounding rock without failure, and to assure that neither fracturing fluids nor produced oil and gas leak through or around the casing and are lost. Cementing operations, however, do not always yield a perfect result. There may be gaps, voids, or channels between a casing and the rock wall of the wellbore that lack adequate cement, and thus may be vulnerable to failure or leaks. A CEL is a class of tools that can be run down a casing to assess whether there are any significant gaps or voids in the cement behind a casing. Operators typically run a CEL on intermediate casings, but not on surface casings when the cement flows back to the surface. For surface casing an operator generally

observes the cement in the annulus, and uses additional cement as needed. The initial proposed regulations at section 3162.3–3(c)(2) would have required a CBL prior to all hydraulic fracturing operations. However, a CBL is only one of a suite of technologies that are described as CELs. Under this revised proposed rule, other cement evaluation technologies, either existing or developed in the future, that are equally effective may be used. An “equally effective” technology in this context would be any methodology or tool that is at least as reliable as a CBL in detecting gaps or voids in the cement behind a casing and meets the performance objective of validating the wellbore integrity and isolating zones of usable water.

Operators may choose from several well logging techniques to evaluate the quality of the cement behind casing. Various types of logs provide different types of information. For example, a CBL presents the reflected amplitude of an acoustic signal transmitted by a logging tool inside the casing. Another acoustic log presents the waveforms of the reflected signals detected by the logging tool receiver and provides qualitative insights concerning the casing, the cement sheath and the formation. Ultrasonic logging tools measure the resonant echoes.

Under this rule, operators would have the flexibility of using suitable logs to confirm a good cement bond behind the casing to protect and isolate usable water. The BLM will review those logs after post-completion submission by the operator.

New section 3162.3–3(e)(1) would require the operator to monitor and record the flowrate, density, and treating pressure, and to submit a cement operation monitoring report to the BLM within 30 days after completion of hydraulic fracturing operations. The required monitoring data would provide important indications of problems with the cementing of casings. That monitoring data would help to verify the results of a CEL and for wells where no CEL is required will provide the primary assurance that cementing operations conformed to those of a proven type well.

New section 3162.3–3(e)(2) would require the operator to run a CEL for each casing that protects usable water, unless it is exempt from doing so under (e)(3) of this section, and to submit these logs to the BLM within 30 days after completion of the hydraulic fracturing operations. A CEL includes, but is not limited to, a CBL, ultrasonic imager, variable density logs, micro-

seismograms, CBLs with directional receiver array, ultrasonic pulse echo technique, or isolation scanner.

Comments on Cement Bond Logs

The BLM received some comments in response to proposed sections 3162.3–3(b)(i), 3162.3–3(b)(ii), 3162.3–3(c)(2), that would have required operators to run CBLs and obtain approval from the BLM prior to commencing hydraulic fracturing operations. The commenters focused on seven main issues: (1) Allowing the use of other technology besides CBLs; (2) The use of other metrics to demonstrate zonal isolation; (3) Delays and costs associated with running and obtaining approval of CBLs prior to commencing hydraulic fracturing operations; (4) Reliability and interpretation of CBLs; (5) The incorporation of API Standard 65–2; (6) The ability for operators to challenge or appeal findings from the BLM regarding CBL results; and (7) The possibility of requiring CBLs on all casing strings, not just the surface casing. These comments are discussed in further detail below.

Some commenters suggested that the BLM should allow the use of other technologies in lieu of a CBL. The other technologies that were suggested include ultrasonic logs, variable density logs, micro-seismograms, standard CBLs, CBLs with directional receiver array, ultrasonic pulse echo technique, and isolation scanners. The BLM agrees with this comment and believes that these technologies could be effective at demonstrating zonal isolation. Therefore, section 3162.3–3(e)(2) would replace the term CBL with a more generic term, “cement evaluation log,” (CEL) which would include the technologies suggested by the commenters. It would also permit operators to use logging tools which are the most appropriate in any given situation.

Some commenters stated that a CBL provides only one indication of the quality of a cement job. The comments said that there are other, perhaps more reliable, methods of determining the quality of the cement job such as:

- Monitoring cement returns to the surface during the cement job. If good cement returns are achieved, it is a positive indication that there were no unexpected or untreated voids or fractures in the wellbore, which helps ensure that cement was properly placed between the wellbore and the casing;
- Placing centralizers on the lower joints of casing to ensure the casing is concentric to the wellbore, allowing a uniform cement sheath to form between the casing and the wellbore;

- Witnessing the amount of “fall back” of cement in the annulus; while it is normal for the top of the cement to retreat down the annulus as the cement sets, excessive fall-back can indicate that problems were encountered during the cement job;

- Monitoring the pressures, flow rates, volumes, and densities of cement during the cement job. If these parameters are consistent with the values anticipated during the design of the cement job, it is a good indication that no unexpected conditions were encountered during the cementing and that a cement seal has been established;

- Ensuring that there were no equipment failures during the cement job, such as line breaks or pump failures; and

- Applying other analytic techniques such as temperature logs and formation integrity tests.

Some commenters stated that the BLM should require the operator to run a CBL only if one or more of these methods indicated a problem with the cement job. The BLM agrees with these comments and proposes several revisions in the revised proposed rule as a result. The revised proposed rule includes a new section 3162.3–3(e)(1) that would establish requirements for monitoring cementing operations, including the need to monitor and record flow rate, density, and pumping pressure of the cement. In addition, section 3162.3–3(e)(4) would require the operator to run a CEL if there are indications of an inadequate cement job such as lost returns, cement channeling, gas cut mud, or equipment failure. If the monitoring information provides indications of an inadequate cement job, the operator would also be required to notify the BLM within 24 hours, submit a written report within 48 hours, and to certify that the inadequate cement job had been corrected and document that zonal isolation had been achieved prior to starting hydraulic fracturing operations. The BLM also agrees with the importance of centralizers in obtaining zonal isolation; however, because Onshore Order No. 2 (Section III.B.1.f) already requires centralizers on the bottom 3 joints of surface casing, an additional requirement to run centralizers is not needed in this rule.

Some commenters objected to the cost of running a CBL on every well and, perhaps more importantly, the delay associated with the BLM review of CBLs prior to allowing operators to start hydraulic fracturing operations. Some comments referenced the current delays in permitting due to lack of staff and stated that this additional approval step would only serve to exacerbate these

delays. Several revisions are included in the revised proposed rule as a result of these comments. For wells where there are no indications of an inadequate cement job, section 3162.3–3(e)(3) would provide an option to run a CEL only on a type well that is representative of local geology and typical drilling and completion techniques. If the CEL run on the type well demonstrated zonal isolation, CELs would not be required on subsequent wells where there were no indications of an inadequate cement job. However, Section 3162.3–3(e)(4) would require an operator to run a CEL on all wells where there are indications of an inadequate cement job, such as, but not limited to, lost returns, cement channeling, gas cut mud, or failure of equipment, that show that remedial action and evaluation are necessary. In addition, the revised proposed rule would eliminate the need for the BLM to review and approve the CEL prior to commencing hydraulic fracturing operations. Instead, operators would submit CELs run under section 3162.3–3(e)(2) within 30 days of completing hydraulic fracturing operations. CELs for type wells would have to be submitted prior to exempting subsequent wells under 3162.3–3(e)(3) from the requirement to run a CEL. Operators would submit CELs run under 3162.3–3(e)(4) at least 72 hours prior to commencing hydraulic fracturing operations; however no approval from the BLM would be necessary. The BLM considered a requirement for operators to receive BLM approval prior to commencing hydraulic fracturing operations in these cases. The BLM believes that the combination of the proposed notice and certification requirements would provide adequate assurance of wellbore integrity prior to hydraulic fracturing without incurring additional delay or workload. The proposed 24-hour notice would also allow the BLM time to prioritize inspections of the hydraulic fracturing operation to verify compliance with these proposed regulations, Onshore Order Number 2, and the approved APD.

The BLM received some comments expressing concern about the reliability of CBLs and the difficulties of interpreting CBLs. Some commenters stated that CBLs are not effective until the cement has reached a certain compressive strength because CBLs work on the principal of acoustic attenuation. At low compressive strengths, commenters stated that the acoustic properties of cement and water are very similar and it is difficult to delineate between the two when

interpreting logs. The commenters went on to state that the problem is more pronounced in surface casing because the lower formation temperature near the surface prolongs the setting process, requiring more time to achieve levels of compressive strength that are required for reliable log interpretation.

Comments about the additional waiting times varied. One commenter suggested that a CBL on the surface casing and intermediate casing would delay drilling operations 24 hours for each test. Other commenters suggested that the CBL requirement would delay drilling operations by up to 72 hours for the surface casing alone. The commenters suggested that during this time, operators would be required to maintain idle drilling equipment on site, at a significant cost to the operators.

After researching these concerns, the BLM acknowledges the potential difficulties of running and interpreting CBLs. As a result, the BLM has determined that requiring CBLs on every well may be unnecessarily expensive, may induce unnecessary delay, and will not provide increased protection beyond what will be available by requiring a CEL on type wells. Therefore, the revised proposed rule would give operators the option of running a CEL on a type well as discussed previously. A CEL would still be required on all wells where there are indications that there is an inadequate cement job. The BLM also believes that allowing the use of other technology such as ultrasonic logs could make the log interpretation less subjective.

The BLM also received some comments expressing concerns about the ability of BLM staff to properly interpret CBLs. According to the commenters, without adequate training and experience, the BLM could misinterpret a CBL run in a wellbore with an adequate cement job and conclude that there was an inadequate cement job. This misinterpretation would result in additional time and expense for the operator to either challenge the BLM’s finding or to conduct expensive and unnecessary remedial work. The BLM does not agree with the assertion regarding the lack of staff training and experience. However, the BLM believes that the previously discussed changes, including providing a type well option, and eliminating the need for a requirement to obtain BLM approval of CELs prior to starting hydraulic fracturing operations, address the commenters’ concerns.

The BLM received some comments which requested that the rule include an appeal process for operators if the BLM

were to deny hydraulic fracturing on a well because the CBL could not demonstrate zonal isolation. The BLM did not revise this rule as a result of this comment because a BLM decision to deny authorization to hydraulically fracture a well would be subject to the administrative reviews already established in 43 CFR 3165.3 and 3165.4. In addition, as discussed earlier, the revised proposed rule would eliminate the requirement for operators to obtain BLM approval of CELs prior to starting hydraulic fracturing operations.

Some commenters recommended that the BLM require operators to run CELs on all casing strings, not just the surface casing because the isolation of usable water, as required in Onshore Order No. 2, may be accomplished by other casing strings. The proposed rule published in May 2012 required CBLs on all casing strings protecting usable water. The BLM clarified this requirement in 3162.3–3(e)(2), with exceptions for type wells, in this revised proposed rule.

Section Discussion

New section 3162.3–3(e)(3) would explain that an operator is not required to run a cement evaluation log on the casings if the operator:

(1) Had submitted a CEL for a type well that showed successful cement bonding to protect against downhole fluid cross-migration; and

(2) Completes a subsequent well or wells with the same specifications and geologic characteristics as the type well, and approved in the same group sundry notice for a single field, and the cementing operations monitoring data parallels those of the type well.

The BLM believes that where an operator has designed a type well to be replicated across a field (and often from the same well pad), and the cement monitoring data for each well and the CEL for the type well show no indications of cement problems, the operator should be allowed to construct the other wells in an approved group within the same field without the expense and potential delays of running a CEL for each well. The same well design and construction repeated within the same field with the same monitoring data should yield the same result: adequate cementing. After considering the comments, the BLM believes that requiring each well to have a CEL for the surface casing as originally proposed would impose costs and possibly delays on operators without providing significant additional assurance of adequate cementing to protect usable water aquifers. In view of the comments that insist that a CBL on surface casing is unnecessary when the cement returns

to the surface, the BLM is also seeking comments on whether the requirements to run a CEL on wells where there is no indication of an inadequate cement job, as proposed in paragraphs 3162.3–3(e)(2) and (e)(3), is appropriate, including specific information about the costs and benefits of requiring CELs in such cases. Under new section 3162.3–3(e)(4), for any well, if there is any indication of an inadequate cement sheathing behind the casing such as, but not limited to, lost returns, cement channeling, gas cut mud, or failure of equipment, the operator would be required to notify the BLM within 24 hours of the occurrence, followed by a written report within 48 hours. Furthermore, the operator would be required to remedy the situation first following the standard industry practice. When logging operations indicate that the cement job is defective, either in the form of poor cement bonding or communication between zones, a remedial cementing technique known as squeeze cementing may be performed to establish zonal isolation. The commonly used steps to remedy such problems include perforating the casing at the defective interval and forcing, or “squeezing,” cement slurry through the perforations and into the annulus to fill the voids. In addition, squeeze cementing may be an effective technique for repairing casing leaks caused by a corroded or split casing. The objective is to restore the barrier integrity of the formations that were disrupted by drilling. To confirm a good cement sheathing behind the casing, the operator must run a CEL showing that usable water has been isolated to protect it from contamination. If deemed necessary, the BLM could require the operator to submit the CEL for BLM approval prior to continued operations. At least 72 hours prior to commencing hydraulic fracturing operations, the operator would be required to submit to the BLM a signed certification indicating that the operator corrected the inadequate cement job and documentation showing that there is adequate cement bonding. These requirements were added because the revised proposed rule has eliminated the requirement to submit a CBL for each well for approval by the BLM prior to continuing operations. Accordingly, where there are indications of a problem with cementing, the BLM needs to have timely and complete information showing correction of the problem. If an operator failed to report a cementing problem, the BLM would utilize one or more of its existing enforcement options. This could include: shutting

down operations on the well until the operator takes the appropriate corrective actions; issuing an order of the authorized officer requiring remedial action; or monetary assessments for failure to comply. The BLM would enforce the appropriate action regardless of whether the original requirements for the well included the running of a CEL. Also, the BLM would put a high priority on witnessing that operator’s operations on this and future wells to ensure compliance with these proposed regulations, Onshore Order Number 2, and the approved APD.

New section 3162.3–3(e)(5) would require operators to include in the Subsequent Report Sundry Notice under section 3162.3–3(i) the records and logs produced under sections 3162.3–3(e)(1) and (e)(2).

Section 3162.3–3(f) would require the operator to perform a successful MIT before beginning hydraulic fracturing or refracturing operations. This requirement is necessary to help ensure the integrity of the wellbore under anticipated maximum pressures during hydraulic fracturing operations. Wellbore integrity may be degraded over time, and thus it is necessary to perform a MIT prior to each refracturing operation.

Section 3162.3–3(f)(1) would require the MIT to emulate the pressure conditions that would be seen in the proposed hydraulic fracturing. This test would show that the casing is strong enough to protect usable water and other subsurface resources during hydraulic fracturing operations.

Section 3162.3–3(f)(2) would establish the minimum engineering criteria for using a fracturing string as a technique during hydraulic fracturing. The requirement to be 100 feet below the cement top would be imposed to ensure that the production or intermediate casing is surrounded by a competent cement sheath as required by Onshore Order No. 2. The 100 foot requirement is required by some State statutes (e.g., Montana Board of Oil and Gas Conservation, section 36.22.1106, Hydraulic Fracturing) and is a generally accepted standard in the industry. Testing would emulate the pressure conditions that would be seen in the proposed hydraulic fracturing in order to ensure that the casing used in the well would be robust enough to handle the pressures.

Section 3162.3–3(f)(3) would require the well to hold the pressure for 30 minutes with no more than 10 percent pressure loss. This requirement is the same standard applied in Onshore Order No. 2, Section III.B.h., to confirm the mechanical integrity of the casing.

This language does not set a new standard in the BLM's regulations. This test, together with the other requirements, would demonstrate if the casing is strong enough to protect water and other subsurface resources during hydraulic fracturing operations. The BLM believes that all of these tests are important to show that reasonable precautions have been taken to ensure the protection of other resources during hydraulic fracturing operations.

Comments on Mechanical Integrity Testing

Some commenters objected to the cost of the requirement for an MIT prior to hydraulic fracturing due primarily to the delay and the cost of rig time. The BLM disagrees with this comment. A casing pressure test is already required by Onshore Order No. 2. Section III.B.1.h. of Onshore Order No. 2 requires that operators test all casing strings below the conductor to 0.22 psi per foot of casing string length or 1,500 psi, whichever is greater, but not to exceed 70 percent of the minimum internal yield. While the test pressure for the MIT may differ from what is required by Onshore Order No. 2, there is no significant increase in rig time required to run the MIT as proposed.

Mechanical integrity testing is a common hydraulic testing method; operators typically conduct such tests after every surface- or intermediate-casing cement job. Operators first perform a casing pressure test to verify the mechanical integrity of the tubular string and then drill out the casing shoe. Next, they perform a pressure integrity test by increasing the internal casing pressure until it exceeds the pressure that will be applied during the next drilling phase. If no leakage is detected, the cement seal is deemed successful.

The BLM believes that performing a successful MIT prior to starting hydraulic fracturing is essential to ensuring the casing and fracture string (if used) are capable of withstanding the pressure used and serves as an early indicator whether the applied pressures can be successfully supported. No revisions to the initial proposed rule were made as a result of this comment.

The BLM received some comments stating that an MIT is not needed on every well and should only be required on wells that are more than 5 years old or if pressure exceeds 80% of casing yield. The BLM believes that the requirements in section 3162.3-3(f)(1) of the revised proposed rule are standard industry practice and are required to ensure the casing is capable of withstanding the pressures applied during hydraulic fracturing operations.

No revisions to the revised proposed rule were made as a result of this comment.

Some comments suggested that the BLM require the operator to perform an MIT before and after hydraulic fracturing to ensure that there were no casing failures during the hydraulic fracturing process. No revisions to the revised proposed rule were made as a result of this comment. Sections 3162.3-3(f)(1) and (f)(2) of this rule would require the operator to test the casing and fracture string (if used) to the maximum anticipated treating pressure. If the MIT is successful prior to hydraulic fracturing and the treatment pressure does not exceed the MIT test pressure, there is no reason to run another MIT after treatment. The BLM believes that the tests required under this rule are sufficient to show that the casing is strong enough to protect water and other subsurface resources during hydraulic fracturing operations.

Some comments suggested changing the term "MIT" to "pressure testing." No revisions to the initial proposed rule were made as a result of this comment. The BLM believes that the term "Mechanical Integrity Test" is widely understood by industry, is used by many State regulatory agencies, and accurately describes the intent of the test. Nonetheless, we invite comments as to whether there are other tests that would be equally effective as an MIT for confirming that well casings will withstand the pressures of hydraulic fracturing operations.

One comment recommended that the BLM should require reporting the results of the MIT with the subsequent report rather than prior to hydraulic fracturing. The BLM did not revise the rule as a result of this comment because there is no specific provision in the revised proposed rule that would require the operator to submit the MIT results to the BLM prior to fracturing. A related comment suggested that the BLM should be notified of any failures or anomalies in the MIT prior to hydraulic fracturing. The BLM does not believe that a requirement to notify the BLM of a failed MIT is necessary to ensure wellbore integrity prior to fracturing. The revised proposed rule (section 3162.3-3(f)) would require a successful MIT prior to hydraulic fracturing; therefore, if the MIT failed and the operator proceeded with hydraulic fracturing operations, the operator would be in violation of the rule and would be subject to enforcement actions. No revisions to the initial proposed rule were made as a result of this comment.

The BLM received some comments suggesting that the proposed 10 percent allowable loss in pressure during the MIT is excessive. No revisions to the revised proposed rule were made as a result of this comment. The proposed 10 percent allowable pressure drop for the MIT is the same as the allowable pressure drop during the testing of casing and blowout prevention equipment in Onshore Order No. 2. The allowable pressure drop is included to set objective and enforceable standards of what the BLM considers to be a successful test.

Section Discussion

Section 3162.3-3(g)(1) would require the operator to continuously monitor and record the annulus pressure at the bradenhead and has been revised to apply to refracturing as well as fracturing operations. The pressure in the annulus between any intermediate casing and the production casing must also be continuously monitored and recorded. The pressure during the fracturing should be contained in the string through which the fracturing fluid is being pumped. Unexpected changes in the monitored and recorded pressure(s) provide an early indication of the possibility that well integrity has been compromised and that immediate action should be taken to prevent well failure. This information is needed by the BLM to ensure that hydraulic fracturing operations are conducted as designed. This information also shows that fracturing fluids are going to the intended formation and not into other geologic horizons such as aquifers. This section is different from the proposal in that it would require monitoring and recording of pressure between the annulus and any intermediate casing. This revised proposed rule makes this distinction because monitoring and recording of pressure in the annuli between all intermediate casings and the production casing more accurately shows downhole conditions, whereas the initial proposed rule required only monitoring and recording pressure in the annulus between the production casing and the intermediate string adjacent to the production string. Failure in other casing strings would not have been identified. The revision is proposed in order to detect potential failures of any casing string that may contribute to cross zonal flow.

Section 3162.3-3(g)(2) has been revised to apply to fracturing and refracturing operations and would require the operator to orally notify the BLM as soon as possible, but no later than 24 hours following the incident, if during the fracturing operation the

annulus pressure increases by more than 500 pounds per square inch over the annulus pressure immediately preceding the fracturing. Within 30 days after the occurrence, the operator must submit a Subsequent Report Sundry Notice (Form 3160–5, Sundry Notices and Report on Wells) to the BLM containing all details pertaining to the incident, including corrective actions taken. This information is needed by the BLM to ensure that fracturing fluids are going into the formation for which they were designed. The BLM also needs to obtain reasonable assurance that other resources are adequately protected. An increase of pressure in the annulus of this amount could indicate that the casing had been breached during hydraulic fracturing. Consistent with the BLM's Onshore Order No. 2, the operator must repair the casing should a breach occur. This section is different from the initial proposed rule. The initial proposed rule required the submission of the Subsequent Report Sundry Notice within 15 days after the occurrence. The revised proposed rule would require submission within 30 days after the occurrence. This revision was made to this rule to reduce the number of reports required from operators. The report can be part of the same Subsequent Report Sundry Notice required in revised proposed section 3162.3–3(i).

Section 3162.3–3(h) would require the operator to store recovered fluids in tanks or lined pits. This provision grants flexibility for the operator to choose using either a lined pit or a storage tank. This provision is necessary because flowback fluids could contain hydrocarbons from the formation and could also contain additives and other components that might degrade surface and groundwater if they were to be released without treatment. This section is consistent with existing industry practice and American Petroleum Institute (API) recommendations for handling completion fluids, including hydraulic fracturing fluids (see Section 6.1.6 of API Recommended Practice 51R, Environmental Protection for Onshore Oil and Gas Production Operations and Leases, First Edition, July 2009). Because the use of lined pits or tanks for the storage of recovered fluids reasonably protects land and water from spills or leaks of recovered fluids, the BLM believes that this provision is consistent with FLPMA's mandate to prevent unnecessary or undue degradation of the public lands and the BLM's obligations to protect environmental quality and Indian trust resources.

Typically, most of the hydraulic fracturing fluid that will be recovered from a well is recovered before the well begins producing significant quantities of oil or gas. Traces of the fracturing fluids, however, may be produced for long periods of time thereafter, usually with water from the formation. It is not the BLM's intent for the proposed rule to displace Onshore Order No. 7 for disposal of produced water. The BLM invites comments on the potential benefits of distinguishing flowback fluid from produced water and suggested ways to distinguish the two.

Commenters should consider that Onshore Order No. 7 allows for temporary storage in reserve pits for up to 90 days, with the possibility of an extension. Onshore Order No. 1 requires all pits to be reclaimed within six months of well completion or well plugging, with the possibility of a variance.

Additional conditions of approval for the handling of flowback water may be placed on the operation by the BLM if needed to ensure protection of the environment and other resources. The BLM recognizes the ongoing efforts of States to regulate hydraulic fracturing operations. This regulation would not preempt any State or tribal law that might require use of such technologies as double-lined pits or tanks as part of a reuse or recycling requirement.

Comments on the Handling of Recovered Fluids

Commenters expressed a variety of views on proposed section 3162.3–3(f). That section would require storage of flowback fluids in lined pits or tanks. Some commenters were critical of allowing storage of flowback fluids in lined pits, stating that pits increase the likelihood of accidental discharges, that pit liners may react with flowback fluids and cause failures and seepage, that pits must be fenced to exclude wildlife, and that the fluids stored in pits would cause air pollution. Those commenters recommended that pits be double-lined, that they be equipped with leak detection systems, or that storage in pits be prohibited and that the rule should require flowback fluid to be stored in tanks, or in a closed-loop containment and reuse system. Some commenters were in favor of BLM's proposal to require a plan for handling flowback fluids, as in proposed section 3162.3–3(c)(6), but sought additional encouragement in the rule for injection and recycling of those fluids.

Other commenters believed that requiring lined pits or tanks for flowback fluids was appropriate. Some, though, argued that those requirements

were duplicative of the requirements of some State regulations. Some commenters recommended that the rule simply adopt the requirements of Onshore Order No. 7 for flowback pits.

The BLM shares commenters' concerns about contributions of pits to air quality problems, and the possibility of failures, leaks, and overflow events. The BLM is also concerned about excluding wildlife, including migratory birds, from pits on well sites, but a separate Instruction Memorandum has been issued and describes appropriate fencing, netting, and other actions to help prevent wildlife and livestock injury or mortality from various aspects of oil and gas operations, including open pits. See the BLM's Instruction Memorandum WO–IM–2013–033 of December 13, 2012. The BLM is also interested in evaluating the costs of requiring flowback fluids to be stored in closed tanks.

In a sampling of State regulations, it was found that most States require flowback fluids to be stored in lined pits or tanks. One State, California, requires storage in tanks, and another, New Mexico, allows lined pits to be approved as a variance from requiring storage in tanks. It also appears that some States, such as Texas and Oklahoma, are encouraging the use of mobile recycling systems.

Onshore Order No. 7 allows disposal of produced water in unlined pits in certain circumstances. The BLM does not believe that storage of hydraulic fracturing flowback fluids in unlined pits is appropriate because of the far greater volume of flowback fluids compared with typical volumes of produced water, and because of the chemical constituents of flowback fluids may pose different or increased risks if they come into contact with surface water or groundwater.

The revised proposed rule at 3162.3–3(h) has not been materially changed in response to the comments on the proposed rule. The revised proposed rule would not preempt State laws that require the use of tanks, or efforts to expand use of mobile recycling systems.

Some comments were also received requesting that the final rule state that all flowback water be captured in tanks and removed from the site without the use of pits. This would require that the BLM distinguish flowback water from produced water and also require additional tankage since flowback water is generally returned to the surface mixed with water produced from the formation. The BLM seeks comments on whether the following is an appropriate distinction: fluids recovered from a hydraulically fractured well before it

begins production of oil or gas will be considered flowback and subject to revised proposed rule section 3162.3–3(h); fluids recovered from a hydraulically fractured well after it begins production of oil or gas will be considered produced water and subject to Onshore Order No. 7. The BLM is also interested in the public’s views on whether such a distinction should be in the regulation, or be issued as non-binding guidance.

In view of comments raising concerns that flowback fluids present hazards to the environment beyond those that can be controlled in lined pits, the BLM is specifically requesting comments on whether the rule should require flowback fluids to be stored only in closed tanks, and not allow them to be stored in lined pits. Is the exclusive use of tanks preferable for the handling of flow-flowback water from either an environmental or economic perspective? Are there additional environmental or economic concerns that should be considered as the BLM considers a requirement for the use of tanks for the disposal of flow-flowback waters? Another alternative would be for the rule to specify that a lined pit must be equipped with a leak detection system, as is required for lined pits for produced water under Onshore Order No. 7. Some commenters advocated for requiring double-lined pits. The BLM asks for comments on the costs and benefits of the foregoing alternatives for storage of flowback fluids. Specific information about the environmental and economic costs and benefits of those alternatives would be most useful. Information on the prevalence of tank use versus lined pits would also be helpful.

A number of comments were received on the proposed rule that raised issues

that are already addressed in other places in the BLM’s Oil and Gas operations regulations and the Onshore Orders. The Onshore Orders may be viewed at: http://www.blm.gov/mt/st/en/prog/energy/oil_and_gas/operations/orders.print.html.

Section Discussion

Section 3162.3–3(i) has been reorganized from what was in the proposed rule and would require the operator to submit to the BLM certain information within 30 days after fracturing or refracturing operations are complete. The information required by paragraph (i)(1) of this section on the depth of the well, water volume used, and information about the chemicals used in the fracturing fluid may be submitted through FracFocus or another BLM-designated database, or in the Subsequent Report Sundry Notice. If the information is submitted through FracFocus, or another BLM-designated database, the operator must specify whether the information is for a Federal or Indian well, certify that the information is correct, and certify compliance with applicable law. All other information required under paragraph (i) would be submitted in the Subsequent Report Sundry Notice. If, for some reason, the operator is unable to submit the information about the chemicals through FracFocus or another BLM-designated database, the operator must timely submit the required information directly to the BLM. The BLM would determine if the hydraulic fracturing operation was conducted as approved and would retain this information as part of the individual well record and it would be available for use when the well has been depleted and the plugging of the well is being

designed. This section would also make it clear that any information submitted by a contractor or agent of the operator is considered to have been submitted directly from the operator to the BLM. In other words, the operator is responsible for information submitted by contractors or agents. This section also would require the operator to submit information to the BLM within 30 days after the hydraulic fracturing operations are completed for each well, even if the BLM approved hydraulic fracturing of a group of wells (see section 3162.3–3(c)).

Section 3162.3–3(i)(1) is new to the rule and would require that the operator submit to the BLM the true vertical depth of the well, total water volume used, and for each chemical used (including base fluid) the trade name, supplier, purpose, ingredients, Chemical Abstract Service Number (CAS #), maximum ingredient concentration in additive (% by mass), and maximum ingredient concentration in hydraulic fracturing fluid (% by mass). Total water volume includes “new” water and any produced water or water reused or recycled from prior hydraulic fracturing operations. The percent mass value is the mass value for each component (Mc) divided by the value of the entire fluid mass (Mt) times 100. $(Mc/Mt) \times 100 = \text{percent value}$. The information should be based on the maximum potential for concentration, and thus the total may exceed 100 percent by a reasonable, but minimal, amount. The percent mass values should be for the entire stimulation operation, not for the individual stages. Table 1 presents an example of the kind of information that may be submitted.

TABLE 1—SAMPLE HYDRAULIC FRACTURING FLUID PRODUCT COMPONENT INFORMATION DISCLOSURE
Well Identification/Location and Other Fracturing Information

	Value	Remarks
Fracture Date	Start mm/dd/yyyy	Finish mm/dd/yyyy
State	Wyoming.	
County	Sublette.	
API Number	XX–XXX–XXXX.	
Operator Name:	XYZ COMPANY.	
Well Name and Number	Name and Number.	
Longitude	– 109.123456.	
Latitude	42.54321.	
Production Type	Gas, wet gas, oil.	
True Vertical Depth (TVD) in feet	14,193.	
Total Fluid Volume Injected (gal)	X,XXX,XXX.	

HYDRAULIC FRACTURING FLUID COMPOSITION

Trade name	Supplier	Purpose	Ingredients	Chemical abstract service number (CAS #)	Max. ingredient concentration in additive (% by mass)	Max. ingredient concentration in HF Fluid (% by mass)**	Comments
SAND	XYZ Corp. ...	Proppant	Crystalline silica, quartz.	14808-60-7	100.00	7.48357	
LGC-39 UC	XYZ Corp. ...	Liquid Gel Concentrate.	Polysaccharide	Confidential Business Information.	60.00	0.16265	

** A long list of other materials may follow

The information required in paragraph 3162.3-3(i)(1) may be submitted directly to the BLM or through FracFocus or another BLM-designated database service. Substantially similar information required to be submitted by this section was proposed in sections 3162.3-3(g)(4) and (g)(5). The required information has been restated to conform to the fields for disclosure provided by FracFocus. Disclosure through FracFocus, though voluntary, would save operators from submitting data both to FracFocus and to the BLM in the States that require posting to FracFocus. It would also provide to the public timely information from a single Web site on fracturing operations on Federal, Indian (under these regulations), and non-Federal/non-Indian wells (through State law or voluntary submission). If the operator experiences any problem with submitting required information through FracFocus, it should notify the BLM promptly. The operator would be required to submit the information to the BLM within 30 days after completing the hydraulic fracturing operation, whether or not it is able to submit it through FracFocus.

Some commenters on the proposed rule were critical of FracFocus because of limitations in its ability to search and aggregate data across individual wells. The BLM has been in discussions with persons responsible for FracFocus and expects that recent and foreseeable improvements to the system will address many of these concerns.

Section 3162.3-3(i)(2) would require the operator to submit information on the actual measured depth of perforations or the open-hole interval (i.e., non-cased wellbore), the source and location(s) of the water used in the hydraulic fracturing fluid, and actual pump pressures. This information identifies the producing interval of the well and would be available for use when the well has been depleted and plugging of the well is being designed. The level of detail of the required information about the sources of the

water used has been reduced from that in initial proposed section 3162.3-3(g)(1), because the deleted information (access route and transportation method) would not be useful to the BLM after the conclusion of operations. Requiring a subsequent report on the actual sources of water used, however, would allow the BLM to check the accuracy of the pre-fracturing notice and to remain informed of important trends in sourcing of water for hydraulic fracturing operations.

Section 3162.3-3(i)(3) would require submission of information on the actual surface pressure and rate at the end of each fluid stage, and the actual flush volume, rate, and final pump pressure. This information is needed by the BLM for it to ensure that the maximum allowable pressure was not exceeded at any stage of the hydraulic fracturing operation.

Section 3162.3-3(i)(4) would require submission of information pertaining to the actual, estimated, or calculated fracture length, height, and direction. This information is required so that the BLM can verify that the intended effects of the hydraulic fracturing operations remain confined to the petroleum-bearing rock layers and will not have unintended consequences on other rock layers or aquifers. The revised rule requires an operator to indicate the direction of hydraulic fracture. This was not in the initial proposed rule, and is necessary for the BLM to have accurate information pertaining to the extent and direction of the fracturing operations.

Section 3162.3-3(i)(5) would require submission of the following information concerning the handling of recovered fluids:

(1) The volume of fluid recovered during flowback, swabbing, or recovery from production facility vessels;

(2) The methods of handling the recovered fluids, including, but not limited to, transfer pipes and tankers, holding pond use, re-use for other stimulation activities, or injection; and

(3) The disposal method of the recovered fluids, including, but not limited to, injection, hauling by truck,

or transporting by pipeline. The disposal of fluids produced during the flowback from the hydraulic fracturing process must follow the requirements set out in Onshore Order No. 7, Disposal of Produced Water, Section III. B.

The information is necessary to assure that the lands and waters have not been contaminated by flowback fluids. The proposed regulation at 3162.3-3(g)(10) included a requirement for information on pipeline requirements. Pipeline systems are not ordinarily used for transfer of flowback fluids. This revised proposed rule at section 3162.3-3(h)(5)(ii), instead would require information on transfer pipes and tankers.

Section 3162.3-3(i)(6) would state that if the actual operations deviate from the approved plan, the deviation(s) must be documented and explained. Understanding the complexities of hydraulic fracturing, the BLM expects there often to be slight differences between the proposed plan and the actual operation. The explanation would provide the BLM with a better understanding not only of the particular well, but also of the technologies used in various geologic areas.

Section 3162.3-3(i)(7) is a renumbered section that would require the operator to submit to the BLM a certification signed by the operator that:

(1) Wellbore integrity was maintained prior to and throughout the hydraulic fracturing operation, as required by paragraph (b) of this section. This requirement was originally proposed in section 3162.3-3(h)(9). It would also require the operator to certify that it complied with the requirements of paragraphs (e), (f), (g) and (h) of this section; and

(2) For Federal lands, the hydraulic fracturing fluid used complied with all applicable permitting and notice requirements as well as all applicable Federal, State, and local laws, rules, and regulations; or

(3) For Indian lands, the hydraulic fracturing fluid used complied with all applicable permitting and notice requirements as well as all applicable

Federal and tribal laws, rules, and regulations.

Operators must certify that they have complied with the requirements for monitoring cementing operations, mechanical integrity testing, and monitoring during fracturing operations; the accuracy of these certifications will be checked through the submission of the monitoring and testing data as required in section 3162.3–3(i)(8). Assurances of wellbore integrity are critical for knowing whether further inquiries are needed to assess any environmental contamination. The certification of compliance with applicable permitting and notice requirements was in the proposed regulation both for the notice of intent and for the subsequent operations. This rule would require only that the certification be included with the Subsequent Operations Sundry Notice.

In response to comments provided in meetings with tribal representatives, in this revised proposed rule, the certification required for Indian lands is detailed separately from the certification required for Federal lands. Consistent with the overall approach of this rule, the revision is to clarify that this part does not apply State or local law to Indian lands. This section does not specify which laws apply on Indian or on Federal lands, but only the necessary certification.

Section 3162.3–3(i)(8) is also new to the revised proposed rule and it would require the operator to submit evidence supporting the information required in paragraphs (e)(1), (e)(2), and (f) of this section, including the cement operations monitoring report, any CEL, and the result of any MIT. The initial proposed rule would have required submission to the BLM of cement bond logs prior to completing operations, but that requirement has been revised in response to comments that the costs of delays for CBLs would be excessive. As mentioned above, requiring the monitoring and testing data, including any CELs after operations, will be sufficient to check the accuracy of operators' certification that the operations were in compliance with the rule.

New section 3162.3–3(i)(9) would provide that the BLM may require submission of data substantiating the information required in paragraph (i) of this section. The required information would provide a more complete record of the well. If there is an indication that a closer examination is necessary, the operator would provide the authorized officer with the data relevant to the information reported with the Subsequent Operations Sundry Notice.

Comments on Information That Must Be Provided to the BLM After Completed Operations

The BLM received some comments regarding the disclosure through the FracFocus Web site of chemical constituents used by operators during hydraulic fracturing operations. This online database includes information from oil and gas wells in roughly 12 States and includes information from over 500 companies. The commenters were divided between those supporting disclosure using FracFocus and those opposed to its use. Supporters of FracFocus indicated it was a common database which many State agencies already use, that the BLM does not have the necessary manpower to process and post information on their own, and that FracFocus allows for transparency of data to the public.

The BLM agrees with these comments and has proposed revisions to the proposed rule at section 3162.3–3(i) that would recognize FracFocus as an approved method of disclosing chemicals. However, the BLM would also accept other methods of disclosure, including the submittal of a Sundry Notice, or the posting of the information in another BLM-designated database. The revised proposed rule makes it clear that an operator should not disclose any information on the Subsequent Report Sundry Notice or on FracFocus that it believes to be exempt from disclosure under the Trade Secrets Act or other Federal law. However, under the revised proposed rule, the BLM would have the authority to require the submittal Trade Secret information on a case-by-case basis. A more detailed discussion of the Trade Secrets Act is provided under that section of the preamble.

Commenters objecting to the use of FracFocus were concerned that the database lacks search capability or filtering and sorting of information, provides incomplete disclosure, and that copyright protection prohibits data from being copied. Commenters also expressed concerns that FracFocus is not updated in a timely manner, needs a dedicated funding source independent from the oil and gas industry, and that FracFocus is not a government run Web site and not subject to Federal laws or oversight. Some comments proposed that the BLM develop an independent government-run database for chemical disclosure.

While the BLM did not revise this rule in response to these comments, it understands that FracFocus is in the process of improving the database with enhanced search capabilities to allow for easier reporting of information. In

addition, information submitted to the BLM through FracFocus will still be required to comply with this rule. The BLM believes that working with the Groundwater Protection Council and the Interstate Oil and Gas Compact Commission to improve FracFocus will be more cost-effective and beneficial than creating a separate database for Federal and Indian wells.

The BLM received some comments that suggested that the rule should require the reporting of the maximum concentration of each constituent in the hydraulic fracturing fluid instead of the actual concentration, as was stated in the proposed rule. Commenters also suggested that the concentration in percent of total fluids should be reported. The BLM agrees with these suggestions because by using maximum concentration, the information is consistent with the data fields in FracFocus and the requirements of this rule. Most hydraulic fracturing operations are conducted on one section or segment at a time along the length of the horizontal well bore within the target zone. Operators may adjust or vary the actual concentrations of chemicals in later fracturing segments based on results in the earlier segments. In such a situation, there may be no one concentration of certain chemicals, but the maximum concentration could be readily reported. In addition, the maximum concentration expressed in percent of total fluid would be helpful in determining the toxicity of the fluid in case of accidental spill or exposure. For these reasons, the revised proposed rule (section 3162.3–3(i)(1)) would require the maximum concentration of each chemical used in both the additive and in the hydraulic fracturing fluid.

The BLM received some comments objecting to the amount of information required in the subsequent report required in section 3162.3–3(g). Some commenters suggested that the reporting of chemical constituents should include only those constituents that were added and not chemicals that could be native to the target zone. One comment objected to the requirement that the subsequent report must be submitted to the BLM and suggested that the operator maintain the information and submit it only upon request. Some comments stated that not all chemicals have a Chemical Abstracts Service Registry Number (CAS#) assigned to them and, therefore, should not be required. The BLM did not change the revised proposed rule as a result of these comments because the information required is important to its overall goal of ensuring public safety and environmental protection.

The BLM received some comments that more information should be required in the subsequent report, including the volume of the base fluid and each chemical used and proppants. The BLM did not revise the revised proposed rule as a result of these comments because the information already required is sufficient to ensure public safety and environmental protection.

The BLM also requests comments on whether, if the State (for Federal lands) or the tribe (for Indian lands) requires submission of the same or more information about the chemical constituents of hydraulic fracturing fluids, and provides that the information would be publicly available (except for trade secrets protected under State or tribal law), the BLM should deem compliance with those disclosure requirements within 30 days from completion of hydraulic fracturing operations to be compliance with proposed section 3162.3–3(i)(1). Such an amendment would reduce the compliance burden on operators in some areas, compared with the revised proposed section 3162.3–3(i)(1). However, if the State or the tribe does not require posting of the data on FracFocus, it could be less convenient for the public or the BLM to obtain the data, or to compare data across jurisdictions.

The BLM received some comments that stated an operator cannot certify actions of a third party or a contractor. The BLM disagrees with this comment. Existing regulations (43 CFR 3162.3(b)) specify that an operator is responsible for the conduct of every contract service provider on the operator's well site and lease, including the on-site activities and regulatory compliance of any hydraulic fracturing contractor. This requirement in the revised proposed rule is consistent with existing Federal regulations; therefore the BLM did not revise this rule as a result of this comment.

Some comments stated that the rule needs clarification on how to certify that wellbore integrity has been maintained throughout the hydraulic fracturing process. Certification of wellbore integrity would include certification of the monitoring requirements proposed in section 3162.3–3(f)(2). No revisions to the initial proposed rule were made as a result of this comment.

The BLM received some comments that said the rule should require operators to certify that they have complied with all Federal, State, and local laws. The BLM did not revise the rule as a result of these comments. The BLM believes, since all lease

exploration, development, construction, production, operations, and reclamation activity is required to be conducted in a manner which conforms to all applicable Federal, State, and local laws and regulations, that requiring additional certifications, as suggested, would be redundant and cause unnecessary delays in approval and processing of APDs and sundry notices. All lease operations are already subject to the terms of the lease and its stipulations, the regulations of 43 CFR part 3100, Onshore Oil and Gas Orders, NTLs, the approved APD, and any written instructions or orders of the BLM authorized officer. In addition, the initial proposed rule and the revised proposed rule at section 3162.3–3(i)(7) would require the operator to certify that the hydraulic fracturing fluid used complied with all applicable permitting and notice requirements as well as all applicable tribal or Federal, State, and local laws, rules, and regulations. The BLM did not revise the rule as a result of this comment. However, we note that BLM would not normally take enforcement action based on an operator's innocent use of chemicals inadvertently mis-labeled by the manufacturer. BLM does not want to create an incentive in the rule that would make mis-labeled chemicals more valuable than properly labeled chemicals.

Section 3162.3–3(j) is substantially different from the proposed rule. This section would notify the operator of procedures it needs to follow to identify information otherwise required to be submitted under this section that the operator believes to be exempt, by law, from public disclosure. The operator should not disclose any particular information on the Subsequent Report Sundry Notice or through FracFocus that it believes to be exempted from public disclosure by the Trade Secrets Act or other Federal law. Instead, the operator should identify that particular information as a trade secret. For any information submitted under section 3162.3–3(j)(1), the operator would be deemed to have waived any right to protect that information from public disclosure. For the claimed exemption of any information required under paragraph (i)(1) of this section, the operator would be required to submit to the BLM an affidavit that:

- (1) Identifies the Federal statute or regulation that prohibits the public disclosure;
- (2) Affirms that the information is not publicly available;
- (3) Affirms that the information is not required to be publicly available under any applicable law;

(4) Affirms that the release of the information would likely harm the operator's competitive position; and

(5) Affirms that the information is not readily apparent through reverse engineering.

For information which the operator does not believe to be exempt from public disclosure, this regulation is similar to the proposed regulations. Under section 3162.3–3(j)(2), any information provided in a Subsequent Report Sundry Notice or through FracFocus or other designated database would not be protected by the Trade Secrets Act or other Federal law.

For information claimed to be exempt from public disclosure, this rule is different from the proposed rule's exemption requirements. The proposed regulation would have required operators to submit the identities of all the chemicals used in the fracturing operations, to segregate the information the operator considered to be exempt from disclosure, and to justify the exemption. This rule does not require submission to the BLM information exempt by law from public disclosure. Instead, under section 3162.3–3(j)(1), the operator would submit an affidavit similar to the one required by regulations in the State of Colorado. If the affidavit is complete, it is possible that the operator may not be asked to submit any additional information regarding the claimed trade secrets. The BLM would have the discretion to require the operator to submit the undisclosed information for the BLM's review. Also, the BLM retains the discretion to adjudicate whether the undisclosed chemicals are exempt from public disclosure. If the BLM requested the information and determined that the information is exempt from disclosure, it would be kept confidential to the extent allowed by law.

Comments On Information Claimed To Be Exempt From Public Disclosure

Some commenters addressed the BLM's management of information about chemicals used in hydraulic fracturing operations. The proposed regulation would have required operators to provide information identifying all of the chemicals used in hydraulic fracturing fluids. For information that operators believed to be exempt from public disclosure under Federal law (referred to here as "trade secrets"), the proposed regulation would have required operators to submit that information to the BLM, mark that information as a trade secret and provide a justification for not releasing that information to the public. A commenter noted that not all States

with oil and gas operations require public disclosure of the chemicals used in hydraulic fracturing fluids and that those that do require public disclosure are not uniform in their requirements. Some commenters wanted the BLM to provide for disclosure of trade secrets to the public, either upon demand of health officials or first responders or at the request of any member of the public. Other commenters wanted additional assurances that trade secrets would be kept confidential, or objected to providing trade secret information to the BLM, and some stated that uncertainty in protection of trade secrets could stifle innovation.

The *Federal Trade Secrets Act* makes it a crime for any Federal employee to make an unauthorized disclosure of a trade secret. See 18 U.S.C. 1905. The BLM lacks statutory authority to exclude hydraulic fracturing chemicals by regulation from the scope of the Trade Secrets Act. A commenter argued that the general rulemaking authority of the Secretary found in FLPMA, the *Mineral Leasing Act*, and the Indian mineral leasing statutes is sufficient for the BLM to require public disclosure of all chemicals without regard to the *Federal Trade Secrets Act*. The judicial opinions cited by that commenter, though, are distinguishable because the statutes at issue in those cases clearly contemplated public disclosure, and thus provided the necessary legal authorization for disclosure. The commenter's assertion that more information provided to the public would assist the BLM in its statutory duties does not render disclosure of operators' trade secrets "authorized by law."

Some States that require submission of trade secret information about hydraulic fracturing chemicals have laws which allow disclosure under certain circumstances to medical providers, public health officials, land owners, or first responders. The *Federal Trade Secrets Act*, however, does not provide for such exceptions.

The BLM believes that the initial proposed rule requiring operators to disclose trade secret information with justification for protecting each piece of information and requiring the BLM to maintain the confidentiality of all trade secret chemicals would not be the best solution. It would increase paperwork burdens on operators, and custodial requirements for the BLM. Because the BLM could not reveal trade secret information, the benefits of requiring operators to submit all such information would be limited. Revised section 3162.3-3(j) would instead instruct operators not to submit trade secret

information with their disclosure of non-trade secret chemical information. Rather, operators claiming that some chemical information is a trade secret would withhold the information and submit an affidavit, modeled on the one used by the State of Colorado, to affirm that the undisclosed information is entitled to protection from public disclosure. The original affidavit may be submitted to the BLM with the subsequent report sundry notice within 30 days of completion of hydraulic fracturing operations, or an electronic version acceptable to the BLM field office may be submitted within that time. The electronic version would have the same legal effect as an original affidavit.

The operators would keep the undisclosed information for 6 years, under existing 43 CFR 3162.4-1(d). The BLM would have the discretion to require any operator to provide the withheld information. The BLM might demand withheld chemical information for reasons that could include the need to assist in tracing the origin of chemicals in a possible contamination event or to assure that operators are not claiming trade secret protection without justification.

Some commenters asserted that various engineering and construction features of oil and gas wells may be deserving of trade secret protection. For information, other than that required in revised proposed section 3162.3-3(i)(1), believed to be protected from public disclosure, the submitter must comply with the existing regulations at 43 CFR 3100.4. The procedure in revised proposed section 3162.3-3(j) applies only to the information required in revised proposed section 3162.3-3(i)(1).

Some commenters directed the BLM's attention to statutes such as the *Occupational Safety and Health Act* and the *Emergency Response and Community Right to Know Act*, and to regulations promulgated by other Federal agencies under the authority of such Acts. Those statutes, though, do not authorize the BLM to regulate the information required under those programs or to authorize disclosure of trade secrets. The revised proposed rule, however, would not interfere with other Federal agencies administering their programs, and would not preempt applicable State, local, or tribal laws that might require operators or other agencies to make chemical information available.

Other commenters asserted that operators should not be responsible for asserting and justifying trade secret protection for chemicals selected by service contractors. On the contrary,

operators are responsible for all operations on their well sites and for compliance with all of the BLM's operating and reporting regulations. Some commenters believed that 10 days notice of a decision by the BLM before information would be released to the public was not sufficient to obtain temporary relief from a court. However, ten days is the notice for such decisions under the Department's FOIA regulations at 43 CFR 4.23(g). Some commenters suggested that trade secret issues should be centrally coordinated within the agency rather than be subject to field office case-by-case determinations. Trade secret issues are inherently specific to technologies, well locations, fracture zones, and times. The BLM will address trade secret issues at the most appropriate level of its organization, but that does not need to be specified in regulation.

Section Discussion

Under new section 3162.3-3(j)(4), information that the operator claimed to be exempt from disclosure would be required to be maintained in the operator's records for 6 years after the completion of the hydraulic fracturing operations, by referring to existing regulations at 43 CFR 3162.4-1(d). That time period will assure that records are available, but should not be unduly burdensome for operators. Section 3162.3-3(j)(4) has been added because the revised proposed rule has eliminated the requirement that operators routinely report information on trade secret chemicals to the BLM. In order for the BLM to have access to the withheld information, the rule needs a mandatory retention requirement. Existing section 3162.4-1(a) requires retention of "accurate and complete records with respect to all lease operations," and subsection (d) of that section requires those records be retained for 6 years from the date they were generated. The reference to section 3162.4-1(d) is to provide consistency for operators. The BLM, however, is interested in comments with environmental and economic information that would show that another time period would be more appropriate.

Section 3162.3-3(k) would provide the operator with a process for requesting a variance from the minimum standards of this regulation. Variances apply only to operational activities, including monitoring and testing technologies, and do not apply to the actual approval process. The revised proposed rule adds a provision allowing the BLM to designate a variance applicable to all wells in a field, a basin,

a State, or within Indian lands. Such a variance would be based on the BLM's determination that the variance will meet or exceed the effectiveness of the regulation and would allow the BLM to adapt the regulatory requirements to the unique geology of an area. It would also be another way that the BLM could defer to a standard, technology, or process required or allowed by State or tribal law that meets or exceeds the effectiveness of the revised proposed rule. Under section 3162.3–3(k)(1) a request for a variance would be required to specifically identify the regulatory provision of this section for which the variance is being requested, explain the reason the variance is needed, and demonstrate how the operator will satisfy the objectives of the regulation for which the variance is being requested.

Section 3162.3–3(k)(2) states that the BLM must make a determination that the variance request meets or exceeds the objectives of the regulation. For example, an operator could request a variance from the requirement to monitor pressure in the annulus between any intermediate casing string and the production string because the last intermediate string was run as a liner and did not extend to the surface. The BLM could grant a variance in this situation because monitoring the annulus between the production casing and an intermediate string that did extend to the surface meets the objective of ensuring mechanical integrity is maintained during the hydraulic fracturing operation. This variance provision is consistent with existing BLM regulations such as Onshore Order Number 1 (see Section X. of Onshore Order No. 1).

Section 3162.3–3(k)(3) would state that a variance under this section does not constitute a variance to provisions of other regulations, laws, or orders.

Section 3162.3–3(k)(4) makes clear that the BLM has the right to rescind a variance or modify any condition of approval due to changes in Federal law, technology, regulation, field operations, noncompliance, or other reasons. The BLM would intend for an operator to rely on a variance, and thus would not expect to rescind it. When BLM finds that rescinding a variance is necessary, ordinarily, the BLM's rescission of a variance would be effective only prospectively. Conceivably, an operator might obtain a variance through such misrepresentations that it must not continue to benefit from the variance, or a variance is issued in violation of a statute or causes such significant harm that it must be rescinded retroactively, but such situations should rarely occur.

Section 3162.5–2(d) would remove the references to fresh water and removes the phrase “containing 5,000 ppm or less of dissolved solids.” This rule would require the operator to isolate all usable water and other mineral bearing formations and protect them from contamination. This language does not set a new standard in the BLM's regulations and does not create new compliance requirements for those operating on public and Indian lands. Since 1988, Onshore Order No. 2, Section II.Y., has defined usable water and at Section III.B. has required the operator to “protect and/or isolate all usable water zones.” Revised proposed section 3162.5–2(d) brings these regulations into conformity with Onshore Order No. 2, and provides the appropriate standard for control of

wells, including hydraulic fracturing operations. Properly constructed and cemented production casing, and where appropriate, intermediate casing, will in most cases provide effective isolation of usable water and other mineral-bearing formations below the surface casing.

IV. Procedural Matters

Federal and Indian Oil and Gas Leasing Activity

To understand the context of the costs and benefits of this rule, BLM includes background information concerning the BLM's leasing of Federal oil and gas, and management of Federal and Indian leases. This analysis explains the basis for the conclusions related to the procedural matters sections that follow. The BLM Oil and Gas Management program is one of the largest mineral leasing programs in the Federal Government. At the end of fiscal year (FY) 2012, there were 48,699 Federal oil and gas leases covering 37,792,212 acres. For FY 2012, there were 92,583 producible and service drill holes and 99,015 producible and service completions on Federal leases. In FY 2012, onshore Federal oil and gas leases produced about 118 million barrels (Bbl) of oil, 2.81 billion Mcf (thousand cubic feet) of natural gas, and 2.84 billion gallons (Gal) of natural gas liquids, with a production value of almost \$23 billion and generating royalties of almost \$2.6 billion. Oil and gas production from Indian leases was almost 29 million barrels of oil, 256 million Mcf of natural gas, and 155 million gallons of natural gas liquids, with a production value of \$3.4 billion and generating royalties of \$561 million.

TABLE 2—FEDERAL AND INDIAN OIL AND GAS PRODUCTION AND ROYALTIES, FISCAL YEAR 2012

	Sales volume	Sales value (\$ million)	Royalty (\$ million)
Federal Leases:			
Oil (Bbl)	118,142,826	\$10,442	\$1,275
Gas (Mcf)	2,806,572,692	9,258	976
NGL (Gal)	2,839,924,280	2,947	298
Subtotal	22,648	2,550
Indian Leases:			
Oil (Bbl)	28,989,309	2,441	424
Gas (Mcf)	256,176,345	762	116
NGL (Gal)	155,313,421	183	21
Subtotal	3,386	561

Source: Office of Natural Resource Revenue, Federal Onshore Reported Royalty Revenue, Fiscal Year 2012 and American Indian Reported Royalty Revenue, Fiscal Year 2012.

Estimating Benefits and Costs

This analysis estimates the potential costs and benefits that would occur as a result of the rule. Therefore, this analysis measures the impacts in relation to the current operating environment (or the baseline).

In analyzing the costs and benefits of the rule, it is important to differentiate between the activities that operators currently conduct and those additional activities that the rule would compel. This change in behavior provides the basis of the cost and benefit estimates.

OMB Circular A-4 recognizes that not all benefits and costs can be described in monetary or even in quantitative terms. In such cases, the circular directs agencies to present any relevant quantitative information along with a description of the unquantifiable effects.

Measuring the Incremental Change

Many of the provisions in the rule are conducted voluntarily by operators as a matter of company practice or standard industry practice. Operators have a vested interest in ensuring that wells are constructed properly to avoid problems that might jeopardize their investment. As a matter of industry practice, operators typically perform the following tasks:

- Develop a plan for the hydraulic fracturing operation;
- Monitor the cementing processes;
- Cement the casing to protect water zones;
- Conduct pressure tests on casing strings during the drilling process or before hydraulic fracturing operations;
- Maintain drill logs identifying usable water zones;
- Run CBLs and/or other evaluation logs on the production casing and sometimes on the intermediate casing, if formations of interest that are above the producing zone or to maintain compliance with State regulations, State permit requirements, or Federal permit requirements;
- Monitor annulus pressures during the hydraulic fracturing operation; and
- Manage the flowback of fluids.

Some practices required in the rule are already conducted by operators in order to comply with existing applicable State regulations or requirements. Such State regulations often dictate how an operator cements a well, what tests or logs it conducts, how it handles flowback, or whether it must disclose the chemical contents of the hydraulic fracturing fluid. In addition to regulations, states may place requirements in the drilling permits as conditions of approval.

Some of the provisions in the rule repeat existing Federal requirements.

Operators on Federal and Indian lands are already in compliance with those provisions, and therefore the rule does not pose an additional burden. For example, the BLM has casing and cementing requirements to protect and/or isolate usable water zones, found in Onshore Order No. 2, that are consistent with the final rule. Operators on Federal and Indian leases who are drilling in compliance with Onshore Order No. 2 would also be in compliance with this rule; accordingly the rule poses no additional burden for drilling and cementing operations, but does require testing and reporting to assure that usable water zones are isolated. Like State regulatory authorities, the BLM or a tribe may also place requirements on operators as a condition of approval for the drilling permit. Where appropriate and possible, the analysis does not consider impacts in areas where operators already adhere to the rule's provisions as a matter of voluntary practice or regulatory compliance with existing Federal, tribal or State regulations or requirements in conditions of approval.

Costs Framework

To examine the costs of the rule, the analysis considers the number of hydraulic fracturing operations that would be subject to the various requirements and the costs of the various requirements. While the rule would apply to all hydraulic fracturing operations on Federal and Indian lands, specific provisions in the rule may apply only to a subset of those operations. For example, the rule requires Subsequent Report (SR) Sundry submissions for all hydraulic fracturing operations. However, the number of required NOI Sundry requests and the CELs conducted would be fewer.

The three key components to the cost formulation are the estimated number of hydraulic fracturing operations, the applicability of provisions to those operations, and the compliance costs to satisfy the provisions. Lower estimates in either of these areas would lead to lower estimates of the total costs of the rule. Likewise, higher estimates would lead to higher estimated total costs.

Protecting usable water: The BLM already requires casing and cementing to protect usable water zones that are consistent with the final rule. Therefore, the rule does not pose an additional burden to operators.

Pressure Testing Requirement: The pressure testing requirement is consistent with standard industry practice, State regulations, and BLM regulations. The requirement does not pose an additional burden to operators.

Pit liner or storage tank requirement: The requirement to manage flowback in lined pits or storage tanks is consistent with almost all existing State regulations in States where new oil and gas activity is occurring on BLM-managed lands. The requirement would pose an additional burden to operators only on Federal and Indian leaseholds in States or on Indian lands without existing requirements and for those operators that do not voluntarily comply.

Disposal of flowback: The revised proposed rule would require that operators comply with applicable laws and is consistent with Onshore Order No. 7 disposal requirements for produced water. We do not expect that these provisions will pose additional burdens to operators.

Cement evaluation logs on casing strings that protect usable water: The rule has a provision to conduct CELs on the casing strings that protect usable water. The applicable casing strings include the surface casing and sometimes the intermediate casing. Operators do not typically run CELs to evaluate the cement behind the surface casing, so the rule would require an additional step and cost in the drilling process. Not all wells require intermediate casing, and wells that require intermediate casing may do so for reasons other than to protect usable water. In addition to requiring a CEL on the surface casing of type wells and wells not associated with a type-well development proposal, the rule would compel CELs on intermediate casing that protects usable water, and further, is deemed to compel CELs only on those intermediate casings where the operator would not otherwise conduct a CEL in compliance with State regulations or conditions of approval or do so voluntarily.

Subsequent wells under a type well approval: Under the revised proposed rule, not all wells would be subject to the CEL requirement. The subject activity should reflect the number of CELs on single wells and on type wells, but not for the subsequently drilled wells under a type well approval.

Requiring a CEL when there is an indication of inadequate cementing: Under the rule, operators on all wells (single wells, type wells, and subsequent wells to a type well) are required to run a CEL when there is an indication of inadequate cementing of a casing string that protects usable water. The BLM and many State regulations and requirements have established protocols for remedial actions in the event of inadequate cementing. Those protocols require operators to remediate

to the authorized officer's satisfaction and where the regulatory authority may request results from a CEL. For example, Onshore Order 2 requires that operators perform remedial cementing if cement is not circulated back to the surface for the surface casing (Section III.B.1.c). Onshore Order 2 also requires an additional pressure test or remedial action as specified by the authorized officer if a pressure test indicates that casing strings do not meet minimum standards (Section III.B.1.h). Onshore Order 2 lists other minimum standards and corrective actions, including some that require logging or testing, remedial cementing, and actions specified by the authorized officer.

Measuring the costs of a CEL: The rule introduces a new step (or steps) to the drilling process, depending on the well. This new step potentially poses an additional cost burden to operators for the costs of the CEL and the costs to maintain idle drilling equipment if the drilling process is delayed.

After cementing the casing, operators must wait for a period of time for the cement to harden before conducting any well tests and drilling the plug. The BLM requires operators to wait until the cement at the casing shoe reaches a compressive strength of 500 psi. States generally have compressive strength standards similar to the BLM's. For example, the State of Montana requires operators to wait 8 hours and New Mexico requires operators to wait anywhere from 8 to 18 hours.

While waiting for the cement behind the surface casing to set, operators will install other required equipment on the well, including blowout preventers. After the cement has hardened sufficiently and the operator has satisfied Federal or State requirements, operators would normally conduct a pressure test on the surface casing, drill through the plug, drill for an additional interval into the formation, and then test the shoe. After a successful shoe test, operators then drill the intermediate hole. The process is generally the same for the intermediate casing; however, operators may also run a log on the intermediate casing depending on the circumstances described before.

We received some comments on the proposed rule suggesting that, by requiring CBLs, the rule would force all operators to maintain idle drilling equipment while the cement reached additional compressive strength sufficient for a CBL to show meaningful results. At issue is the idea that an operator would need to wait an additional amount of time before pressure testing the casing or drilling through the plug.

An operator does not have to stand idle at this point in time. For example, an operator may pressure test the surface casing, drill out the plug, test the shoe, and then drill the intermediate hole. An operator may then perform a CEL at any point in time before setting the intermediate casing, *i.e.*, while replacing a drill bit. In any of these scenarios, however, ancillary delays associated with the availability of the logging company and the time required to run the log could still result.

Operators drilling multiple wells on a pad should also be able to run a CEL and avoid potential drilling delays. When drilling multiple wells on a pad, an operator may use a smaller drilling rig (known throughout the industry as a "double" rig) to sequentially drill a casing hole, set casing, and cement casing of each well, one by one. After the surface holes have all been sequentially drilled, cased, and cemented, the operator will remove the small drilling rig from the pad, and bring in a large drilling rig to drill the subsequent sections of each well. If an operator is drilling multiple wells in this fashion, then it may continue the drilling process while the cement sets on the first well, and log that well at the operator's convenience. In these situations, the operator would incur no additional costs associated with maintaining idle drilling equipment.

Benefits Framework

While the potential benefits of the rule are more challenging to monetize than the costs, they are significant. The rule is designed to reduce the environmental and health risk posed by hydraulic fracturing operations, particularly in its treatment of flowback fluids, well construction, and hydraulic fracture design. Stronger field operations with sound resource protections provide improved efficiency for the BLM to administer the program management for oil and gas with fewer protests, fewer compliance problems, fewer FOIAs, and other activities that divert limited available staff.

The primary challenge in monetizing benefits lies in the quantification of a risk that is largely unknown. Risk is the product of the likelihood of an incident occurring and the impact that would result. In this context, risk is the probability of an incident occurring from hydraulic fracturing times the cost of the damage. The monetized benefit of this rule would be the reduction in risk attributed to the rule, which also represents the avoided costs of remediating damage.

Though operators are required to remediate damage when it occurs, there

may be uncertainty about the true cost or extent of the damage or limitations in connecting an incident with an operation. Even if the damage is internalized, the overall benefit to society would be less than if the incident was avoided (if the compliance costs are less than the damage costs), since resources would have been unnecessarily dedicated to the remediation.

Operators are required to notify the BLM when undesirable events occur. Undesirable events may include accidents, or accidental spills or releases of hydrocarbon fluids, produced water, hydraulic fracturing flowback fluids, or other substances. These events have the potential to adversely affect public lands and other important resources; reduce the value of the minerals and lands; plus add expensive costs to the BLM inspection and enforcement by diverting limited staff.

There are limitations in using the BLM data on undesirable events for this analysis. First, the data do not specify whether the undesirable events occurred as a result of any of the drilling or completion activities associated with the hydraulic fracturing operations. In addition, the available data cannot be readily matched with particular provisions in the rule. The data provides figures for the incidence of spills, accidents, injuries, and other impacts on a well, but the pit liner information is generally not specified in the incident reports for spills or leaks. As such, there is difficulty in quantifying the level of risk reduction that would be attributed to the regulations, even though the regulations would most certainly reduce risk.

Damage, in general, is unknown, particularly when attempting to generalize damage costs which may vary by expected magnitude and reversibility of effects. Also, the valuation of the damage may also take many and highly variable forms. For example, an undesirable incident occurring during hydraulic fracturing might require the remediation of surface or subsurface areas. The incident might also require that the operator shut-in temporarily or plug the well before it may produce all of the mineral resources. In this case, the operator would lose revenue and society would not benefit from the produced resources. Such would be the same for spills.

Discounted Present Value

There is a time dimension to estimates of potential costs and benefits. The potential events described, if they occur at all, may be in the distant future.

The further in the future the benefits and costs are expected to occur, the smaller the present value associated with the stream of costs and benefits. As such, future costs and benefits must be discounted.¹ The discount factor is then used to convert the stream of costs and benefits into “present discounted values.” When the estimated benefits and costs have been discounted, they can be added to determine the overall value of net benefits.

The OMB’s basic guidance on the appropriate discount rate to use is provided in OMB Circular A–94. The OMB’s Circular A–94 states that a real discount rate of 7 percent should be used as a base-case for regulatory analysis. The OMB considers the 7 percent rate as an estimate of the average before-tax rate of return to private capital in the U.S. economy. It is a broad measure that reflects the returns to real estate and small business capital as well as corporate capital. It approximates the opportunity cost of capital, and it is the appropriate discount rate whenever the main effect of a regulation is to displace or alter the use of capital in the private sector.

OMB Circular A–4 also states that a 3 percent discount rate should be used for regulatory analyses and provides an explanation of the use of the discount rate as follows: “The effects of regulation do not always fall exclusively or primarily on the allocation of capital. When regulation primarily and directly affects private consumption (e.g., through higher consumer prices for goods and services), a lower discount rate is appropriate. The alternative most often used is sometimes called the ‘social rate of time preference.’ This simply means the rate at which ‘society’ discounts future consumption flows to their present value.”

The analysis also examines potential costs and benefits using 10 and 12 percent discount rates. The consideration of higher discount rates are appropriate for this analysis, since the rule imposes costs on the oil and gas industry and the opportunity cost of not having that available capital is generally higher than 3 and 7 percent. The higher rates also serve as a sensitivity test.

Uncertainty

The costs and benefits provided in this analysis are estimates and come with uncertainty. We describe the primary sources of uncertainty below:

- **Type well applicability:** The estimates for the rule rely largely on the concept of the type well. In terms of cost calculations, the uncertainty lies in an average number of wells that would be covered under a type well approval. While the BLM is confident that the average number of wells that an operator completes in a field is a good measure with which to base the estimate, the measure is positively skewed by a fewer number of firms with a high number of wells. This does not suggest a problem with the data, but rather that the experiences of operators will vary, and that the likely scenario is that the typical operator completes fewer wells than the average. In terms of benefit calculations, there is uncertainty about the effectiveness of the type well concept, and how reliably the CEL results on casing strings of a type well assure adequate cementing for subsequent wells in the same geologic area.

- **Length of delay time to run a CEL:** A large source of uncertainty is the amount of time that the CEL requirement might delay drilling operations. The BLM received comments suggesting that the CEL would delay drilling operations for up to 72 hours. The CEL on the surface casing, in particular, poses a new step in the drilling process for operators. A large source of uncertainty is the extent to which operators would be subject to delays, and if so, how they will be able to incorporate this new requirement and minimize or eliminate potential delays through operating efficiencies.

- **Percent of wells encountering problems during the cementing process:** Cementing problems and downhole conditions, in general, are not widely reported metrics. This analysis uses 3 percent as the basis for calculating the potential costs and benefits.

- **Benefits of specific provisions for well integrity and NOI Sundry submission:** Further uncertainty lies in

the estimation of benefits and the cumulative effect of the rule’s provisions on mitigating the potential risks of hydraulic fracturing operations. This rule has specific provisions that would help operators and the BLM better identify potential issues in wellbore integrity and fracturing design, before operations begin. However, it is difficult to attribute benefits to one single test (for instance the CEL) when that is only one part of the overall evaluation of wellbore integrity.

Results

Where appropriate, this analysis monetizes costs and benefits expected to occur over the next 10 years, from 2013 to 2022. This period of analysis was chosen because 10 years is the length of the primary lease term on BLM-managed lands. The analysis presents a range of expected outcomes due to uncertainty about the generalization of costs and benefits across all hydraulic fracturing operations. In developing the rule, the BLM considered several alternatives. The alternatives primarily focused on two topic areas: Verification of proper cementing behind casing strings through CELs and the management of flowback fluids from operations. One alternative would require CELs on casing strings protecting usable water for all wells and the use of storage tanks to manage flowback. A second alternative would require CELs on casing strings protecting usable water for all wells but does not establish requirements for storage tanks or lined pits. Table 3 and Table 4 show a summary of incremental costs and benefits, respectively, for the rule and the alternatives examined. To annualize the incremental costs and benefits, the analysis calculates the annualized value (AV). Where monetized, the results are presented in 2012 dollars.

The entire results are available in the full Economic Analysis and Regulatory Flexibility Analysis available at the address listed in the **ADDRESSES** section of this rule.

TABLE 3—SUMMARY OF COSTS
[\$Million]

Annualized value	Revised proposed rule	Alternative 1	Alternative 2
Undiscounted	12–20	119–213	119–213
Discounted at 3%	12–19	118–213	118–213

¹Discount factor = 1/(1+ r)^t where r is the discount rate and t is time measured in years during which benefits and costs are expected to occur.

TABLE 3—SUMMARY OF COSTS—Continued
[\$Million]

Annualized value	Revised proposed rule	Alternative 1	Alternative 2
Discounted at 7%	12–19	118–212	118–212
Discounted at 10%	12–19	117–211	117–211
Discounted at 12%	12–19	117–211	117–211

The annualized values of the costs do not vary significantly across different discount rates. This is expected for several reasons. When the original cost schedule is relatively constant over time (neither front-loaded nor back-loaded)

the AV will be relatively similar to the average cost. This is expected with compliance costs related to this rule, since the total compliance costs for the rule are expected to be relatively similar over future years, owing to similar

activity data (i.e., the number of hydraulic fracturing operations) and that the compliance costs for a single operation are contained within a short timeframe.

TABLE 4—SUMMARY OF NON-MONETIZED BENEFITS

Non-monetized benefits	Rule (percent)	Alternative 1 (percent)	Alternative 2 (percent)
Percent of individual hydraulic fracturing plans reviewed by the BLM	11	100	100
Percent of hydraulic fracturing operations using unlined pits	0	0	0.15
Percent of individual wells where wellbore integrity is demonstrated with CELs on casing strings that protect usable water	8	96	96
Percent of wells where wellbore integrity is demonstrated with pressure tests	100	100	100
Percent of hydraulic fracturing operations where chemical content of fluids are disclosed	100	100	100

Non-monetized benefits	Estimated baseline (percent)	Rule	Alternative 1	Alternative 2
Likelihood of Minor Incident	2.70	N/A	N/A	N/A
Likelihood of Major Incident	0.03	N/A	N/A	N/A

Estimated Costs of Revised Proposed Rule

Annualized costs to the industry are estimated to be between about \$12 and \$20 million when undiscounted and when using discount rates of 3, 7, 10, and 12 percent. The net present value of total costs over the 10-year period are estimated to be between \$102 to \$166 million when discounted at 3 percent, between \$84 and \$136 million when discounted at 7 percent, between \$73 and \$119 million when discounted at 10 percent, and between \$67 and \$109 million when discounted at 12 percent.

The largest cost burden lies with the CEL requirement, which is also the source of the greatest amount of uncertainty when developing estimates. Drilling methods, procedures, and requirements vary across operations, locations, and States, so it is challenging to place an exact dollar figure on the appropriate cost.

The estimated costs for the CEL requirement are driven to a large extent by the amount of time operators might have to maintain idle drilling equipment on-site. The lower bound of the estimated CEL requirement includes the annual costs of conducting CELs on the surface casing, assuming that

operators using a small rig to drill the surface holes of wells would likely avoid the costs of maintaining idle drilling equipment. The estimate possibly represents the lowest possible cost; however, there is a chance it could be even lower depending on the ability of the operators on other wells to maximize efficiencies and reduce delays. The upper bound of the estimated CEL requirement does not account for the potential of operators to reduce delays below 24 hours per CEL on the surface casing and 48 hours on the intermediate casing. While the estimate possibly represents the maximum total cost, it may underestimate the total costs if CELs result in delays assumed.

The BLM has assumed delay times to account for additional compressive requirements and ancillary delays that could occur. However, there are several ways for operators to reduce the amount of idle time. The Economic Analysis prepared for this rule analyzed the sensitivity of the upper bound total estimates to assumed idle times. If operators are able to reduce the assumed delays by 25 percent, then the upper bound costs estimates would be reduced by 19 percent. On the other hand, if the

assumptions underestimate the delay times by 25 percent, then the upper bound estimate would be increased by 19 percent.

The administrative compliance costs are non-trivial and are based on a per submission cost of \$478. It is likely that operators, over time, will be able to gain efficiencies and reduce costs below the estimates provided.

The costs provided are estimates of the direct costs and not the overall costs to society. There is uncertainty about the effect that the rule would have across all potential hydraulic fracturing operations. The rule has a provision for type well approval of the NOI Sundry and log requirements (unless the operator encounters problems with improper cementing) and affords operators drilling many wells in a geologic area greater efficiency than it does for operators drilling a single well or few wells. If one assumes that operators cannot derive efficiencies to avoid the costs of idle rig time, it could favor activity in development fields over exploratory areas.

There is also flexibility in how the various BLM authorized officers might treat applications for variances, and to what extent that will allow operators to potentially reduce costs. There are well

construction methods, such as the use of a “frac string,” that reduce the pressures placed on the intermediate casing and surface casing strings during hydraulic fracturing operations. This is one potential area where an operator might receive a variance.

Average Compliance Costs for Operators

The provisions of the rule would result in compliance costs ranging from \$3,138 to \$5,110 for all hydraulic fracturing operations differentially, for example, if the operation is for a type well versus a subsequent well. Averaging the total compliance costs for the industry in the first year of

regulation by the number of hydraulic fracturing operations, the BLM expects the compliance costs to range from \$3,138 to \$5,110 per operation. The CEL requirements represent the bulk of that portion, \$2,591 to \$4,564. Average compliance costs per operation for each of the policy options are shown in Table 5.

TABLE 5—AVERAGE COMPLIANCE COSTS IN 2013 ACROSS ALL OPERATIONS FOR THE RULE, ALTERNATIVE 1, AND ALTERNATIVE 2

Requirement	Average across all operations					
	Revised proposed rule		Alternative 1		Alternative 2	
	Low	High	Low	High	Low	High
Count of Hydraulic Fracturing Operations (in 2013)	3,566		3,566		3,566	
CEL on Surface Casing	\$1,980	\$3,953	\$24,894	\$49,692	\$24,894	\$49,692
CEL on Intermediate Casing	409	409	5,140	5,140	5,140	5,140
CEL if Inadequate Cementing	202	202	0	0	0	0
Lining Pits	9	9	9	9	0	0
NOI Sundry	54	54	478	478	478	478
SR Sundry	478	478	478	478	478	478
Variance Requests	5	5	48	48	48	48
Total	3,138	5,110	31,047	55,845	31,038	55,836

BLM Administrative Burden

The processing of NOI Sundry, SR Sundry, and variance requests associated with the rule would pose additional burden to the BLM; however, it is unclear the extent to which the BLM can meet the additional burden with existing capacity. An additional 8.44 FTE of workload is estimated to be required to meet the administrative burden of the rule in the first year of implementation.

Benefits of the Revised Proposed Rule

The rule provisions, as described in the revised proposed rule, would require an operator to conduct tests on a well before it conducts hydraulic fracturing operations on that well. For all operators on Federal and Indian land the revised proposed rule would compel operators to conduct an average of 293 CELs per year on surface casings, 14 CELs per year on intermediate casings, and 110 CELs per year on casing strings where there is an initial indication of inadequate cementing.

Relative to the initial proposed rule, the revised proposed rule would not compel as many CELs. Therefore, there is a chance that the rule would not reduce as much risk as the alternatives. The rule would ensure that operators demonstrate wellbore integrity with pressure tests on 100 percent of the wells and with CELs on the casing strings that protect usable water on 8 percent of wells. The level of risk

reduction across subsequent wells relies on the replication of adequate cementing across multiple wells in a geographic area with the same geologic characteristics.

The rule would compel 110 CELs to demonstrate that inadequate cementing was corrected by operators. As such, it requires a verification of proper remedial cementing on the very wells that pose greater risk.

Under the rule, operators would submit an average of 432 NOI Sundry applications per year covering about 3,816 hydraulic fracturing operations (average over the 10-year period, 2013–2022). The BLM would receive individual hydraulic fracturing plans for an estimated 11 percent of the expected operations, and the remaining 89 percent of operations would be for subsequent wells to a type well. The type well provision, relative to the alternatives, reduces burden on the industry and the BLM. The submission of NOI Sundry applications would provide the BLM with the necessary information to make informed decisions about the public’s resources and thus improve the public welfare, and have the same benefits for Indian resources and Indian welfare.

The rule is estimated to compel only six additional lined pits per year, simply because most of the States where the BLM manages oil and gas resources already require lined pits. For those six pits, the requirement would

immediately remove sources of harm to the environment and the public from the contamination of the surface environment with fracturing fluids.

The rule would compel 3,816 Sundry reports and public disclosures of the chemical content of the hydraulic fracturing fluids. The increase in information about additives could aid water users when they consider the potential effects of hydraulic fracturing operations and constituent chemicals.

Overall, the rule would potentially reduce the risks associated with hydraulic fracturing operations. The BLM estimated the likelihood of an incident resulting from a hydraulic fracturing operation could be between 0.03 and 2.70 percent. Damage from an incident could cost between \$15,000 and \$1 million for remediation plus any lost revenue from unrecoverable resources, including spilled or stranded resources.

Economic Impact Analysis and Distributional Assessments Energy System Impact Analysis

Executive Order 13211 requires that agencies prepare and submit to the Administrator of the Office of Information and Regulatory Affairs (OIRA), OMB, a Statement of Energy Effects for certain actions identified as significant energy actions. Section 4(b) of Executive Order 13211 defines a “significant energy action” as “any action by an agency (normally

published in the **Federal Register**) that promulgates or is expected to lead to the promulgation of a final rule or regulation, including notices of inquiry, advance notices of proposed rulemaking, and notices of proposed rulemaking: (1)(i) That is a significant regulatory action under Executive Order 12866 or any successor order, and (ii) is likely to have a significant adverse effect on the supply, distribution, or use of energy; or (2) that is designated by the Administrator of OIRA as a significant energy action.”

The additional burden posed by this rule would vary by the type of well proposed for hydraulic fracture. A key consideration is the extent to which the costs of the requirements might impact investment, production, employment, and a number of other factors. That is, to what extent, if any, would an

operator choose to invest in other areas, non-Federal and non-Indian lands, when faced with the cost requirements of the rule. Since the bulk of the costs would apply to hydraulic fracturing operations on wells that are yet to be drilled (and not on existing wells and to refracturing operations), operators will be able to account for any cost increases up front when making investment decisions. The BLM believes that the additional cost per hydraulic fracturing operation is insignificant when compared with the drilling costs in recent years, the production gains from hydraulically fractured wells operations, and the net incomes of entities within the oil and natural gas industries.

Table 6 shows the average compliance costs, by well type or operation, as a percent of the total costs of drilling a

well. For a single well or a type well, the compliance costs represent about 0.4 to 1.4 percent of the costs of drilling a well. For a subsequent well to a type well, the costs represent between 0.01 and 0.02 percent of the total drilling costs. For existing wells and refracture operations, the percentages are even lower, at about 0.01 to 0.03 percent. When averaging the compliance costs across all operations, the costs represent between 0.04 and 0.13 percent of the costs of drilling a well.

Since the estimated compliance costs are not a substantial when compared with the total costs of drilling a well, the BLM believes that the rule is unlikely to have an effect on the investment decisions of firms, and the rule is unlikely to affect the supply, distribution, or use of energy.

TABLE 6—THE AVERAGE COMPLIANCE COSTS OF THE REVISED PROPOSED RULE AS A PERCENT OF TOTAL DRILLING COSTS

Activity	Well type fracturing operation					Average across all operations (percent)	
	Type well or single well		Subsequent well under type well approval (percent)	Existing well (percent)	Refracture operation (percent)	Low (percent)	High (percent)
	Low (percent)	High (percent)					
Percent of Drilling Costs for a Crude Oil, Natural Gas, and Dry Well (2007\$) ¹ ...	0.7128	1.3301	0.0167	0.0243	0.0241	0.0752	0.1225
Percent of Drilling Costs for a Crude Oil Well (2007\$) ¹	0.7434	1.3871	0.0174	0.0253	0.0251	0.0784	0.1277
Percent of Drilling Costs for a Natural Gas Well (2007\$) ¹	0.7611	1.4202	0.0178	0.0259	0.0257	0.0803	0.1308
Percent of Drilling Costs for a horizontal well in the Bakken Three Forks (reported in 2010) ²	0.5507	1.0275	0.0129	0.0188	0.0186	0.0581	0.0946
Percent of Drilling Costs for a horizontal well in the Marcellus Shale (reported in 2011) ³	0.3913	0.7301	0.0092	0.0133	0.0132	0.0413	0.0672

NOTES:

¹ Average drilling costs in 2007 range from \$3.9 million to about \$4.2 million. U.S. Energy Information Administration (January 31, 2012). *Costs of Crude Oil and Natural Gas Wells Drilled*.

² Costs of \$5.4 million cited by Investopedia from Continental Resources. Investopedia (March 12, 2010). *Oil Service Costs to Move Higher*.

³ Costs of \$7.6 million cited by Marcellus Drilling News from a University of Pittsburgh Study (Marcellus Drilling News (September 2011) *How much does it cost to drill a single Marcellus well? \$7.6M*).

Employment Impact Analysis

Executive Order 13563 reaffirms the principles established in Executive Order 12866, but calls for additional consideration of the regulatory impact on employment. It states, “Our regulatory system must protect public health, welfare, safety, and our environment while promoting economic growth, innovation, competitiveness, and job creation.” An analysis of employment impacts is a standalone analysis and the impacts should not be included in the estimation of benefits and costs.

This proposed rule would require operators, who have not already done

so, to conduct one-time tests on a well or make a one-time installation of a mitigation control feature. In addition, operators would be required to perform administrative tasks related to a one-time event.

Compliance with the operational requirements is expected to shift resources from firms in the crude oil and natural gas extraction industries (NAICS codes: 211111—Crude Petroleum and Natural Gas Extraction, 211112—Natural Gas Liquid Extraction) to firms providing support services for drilling oil and gas wells (NAICS code: 213111—Drilling Oil and Gas Wells). For example, the requirement for a CEL

on the surface casing represents a burden to the operator, but a benefit to the company running the log.

Of principal interest is the extent to which the financial burden is expected to change operators’ investment decisions. If the financial burden is not significant and all other factors are equal, then one would expect operators to maintain existing levels of investment and employment. The BLM believes that the proposed rule would result in an additional cost per well stimulation that is small and will not alter the investment or employment decisions of firms.

Firms in the support services for oil and gas drilling industry are likely to benefit from the rule, since they would likely carry out the operational requirements of the rule. Though we do not know the incremental revenue gains from performing these services, the operational requirements themselves are likely to require additional capacity.

Executive Order 12866, Regulatory Planning and Review

In accordance with the criteria in Executive Order 12866, the Office of Management and Budget has determined that this rule is a significant regulatory action.

The rule will not have an annual effect on the economy of \$100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local, or tribal governments or communities. However, the rule may raise novel policy issues because of the requirement that operators provide to the BLM information regarding hydraulic fracturing operations that they are not currently providing to the BLM.

This rule would not create inconsistencies or otherwise interfere with an action taken or planned by another agency. This rule would not change the relationships of the oil and gas operations with other agencies. These relationships are included in agreements and memoranda of understanding that would not change with this rule. In addition, this rule would not materially affect the budgetary impact of entitlements, grants, loan programs, or the rights and obligations of their recipients. Please see the discussion of the impacts of the rule as described earlier in this section of the preamble.

Regulatory Flexibility Act

Congress enacted the Regulatory Flexibility Act of 1980 (RFA), as amended, 5 U.S.C. 601–612, to ensure that Government regulations do not unnecessarily or disproportionately burden small entities. The RFA requires a regulatory flexibility analysis if a rule would have a significant economic impact, either detrimental or beneficial, on a substantial number of small entities. For the purposes of this analysis, the BLM assumes that all entities (all lessees and operators) that may be affected by this rule are small entities, even though that is not actually the case.

The rule deals with hydraulic fracturing on all Federal and Indian lands (except those excluded by statute).

There would be some increased costs associated with the enhanced recordkeeping requirements and some new operational requirements. However, the BLM expects that these costs would be minor in comparison to overall operations costs. Therefore, the BLM has determined under the RFA that the rule would not have a significant economic impact on a substantial number of small entities. Please see the discussion earlier in this section of the preamble for a discussion of the impacts of the rule.

Small Business Regulatory Enforcement Fairness Act

The Regulatory Flexibility Act as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA) generally requires an agency to prepare a regulatory flexibility analysis of any rule subject to notice and comment rulemaking requirements under the Administrative Procedure Act or any other statute, unless the agency certifies that the rule will not have a significant economic impact on a substantial number of small entities. Small entities include small businesses, small governmental jurisdictions, or small not-for-profit enterprises.

The BLM reviewed the Small Business Administration (SBA) size standards for small businesses and the number of entities fitting those size standards as reported by the U.S. Census Bureau in the 2007 Economic Census. Using the Economic Census data, the BLM concludes that about 99 percent of the entities operating in the relevant sectors are small businesses in that they employ fewer than 500 employees.

The BLM also examined potential impacts on small businesses that are most likely to be impacted by the rule and, more specifically, the requirements that would pose a burden to operators. Using Automated Fluid Mineral Support System data for well completions, the BLM compiled a list of firms that completed wells within the past 5 years. The BLM expects that these firms are most likely to be financially impacted by the CEL requirements. From that list the BLM researched company annual report filings with the SEC to determine annual company net incomes and employment figures. From the original list, the BLM found 55 company filings. Of those, 33 firms were classified as small businesses.

Using the net income data for the small businesses that filed SEC Form 10-K, the BLM used the estimated compliance costs per well type or fracturing operation, and the average costs across all operations to calculate

the percent of compliance costs as a portion of annual company net incomes for 2011. Averaging results for the small businesses that the BLM examined, the average costs of the rule are expected to represent between 0.041 and 0.066 percent of the company net incomes.

Therefore, after considering the economic impact of the rule on these small entities, the screening analysis indicates that this rule will not have a significant economic impact on a substantial number of small entities.

Unfunded Mandates Reform Act

Under the Unfunded Mandates Act, agencies must prepare a written statement about benefits and costs prior to issuing a proposed or final rule that may result in aggregate expenditure by State, local, and tribal governments, or by the private sector, of \$100 million or more in any one year.

This rule does not contain a Federal mandate that may result in expenditures of \$100 million or more for State, local, and tribal governments, in the aggregate, or to the private sector in any one year. Thus, the rule is also not subject to the requirements of Sections 202 or 205 of the *Unfunded Mandates Reform Act* (UMRA).

This rule is also not subject to the requirements of Section 203 of UMRA because it contains no regulatory requirements that might significantly or uniquely affect small governments; it contains no requirements that apply to such governments nor does it impose obligations upon them.

Executive Order 12630, Governmental Actions and Interference With Constitutionally Protected Property Rights (Takings)

Under Executive Order 12630, the rule would not have significant takings implications. A takings implication assessment is not required. This rule would establish recordkeeping requirements for hydraulic fracturing operations and some additional operational requirements on Federal and Indian lands. All such operations are subject to lease terms which expressly require that subsequent lease activities be conducted in compliance with subsequently adopted Federal laws and regulations. The rule conforms to the terms of those Federal leases and applicable statutes, and as such the rule is not a governmental action capable of interfering with constitutionally protected property rights. Therefore, the rule would not cause a taking of private property or require further discussion of takings implications under this Executive Order.

Executive Order 13352, Facilitation of Cooperative Conservation

Under Executive Order 13352, the BLM has determined that this rule would not impede facilitating cooperative conservation and would take appropriate account of and consider the interests of persons with ownership or other legally recognized interests in land or other natural resources. This rulemaking process involved Federal, State, local and tribal governments, private for-profit and nonprofit institutions, other nongovernmental entities and individuals in the decision-making. The process provides that the programs, projects, and activities are consistent with protecting public health and safety.

Executive Order 13132, Federalism

Under Executive Order 13132, this rule would not have significant Federalism effects. A Federalism assessment is not required because the rule would not have a substantial direct effect on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government. The rule would not have any effect on any of the items listed. The rule would affect the relationship between operators, lessees, and the BLM, but would not impact States. Therefore, under Executive Order 13132, the BLM has determined that this rule would not have sufficient Federalism implications to warrant preparation of a Federalism Assessment.

Executive Order 13175, Consultation and Coordination With Indian Tribal Governments

Under Executive Order 13175, the President's memorandum of April 29, 1994, "Government-to-Government Relations with Native American Tribal Governments" (59 FR 22951), The Department of the Interior Policy on Consultation with Indian Tribes (Dec. 1, 2011), and 512 Departmental Manual 2, the BLM evaluated possible effects of the rule on federally recognized Indian tribes. The BLM approves proposed operations on all Indian onshore oil and gas leases (except those excluded by statute). Therefore, the rule has the potential to affect Indian tribes. In conformance with the Department's policy on tribal consultation, the Bureau of Land Management held four tribal consultation meetings to which over 175 tribal entities were invited. The consultations were held in:

- Tulsa, Oklahoma on January 10, 2012;
- Billings, Montana on January 12, 2012;

- Salt Lake City, Utah on January 17, 2012; and
- Farmington, New Mexico on January 19, 2012.

The purpose of these meetings was to solicit initial feedback and preliminary comments from the tribes. To date, the tribes have expressed concerns about the BLM's Inspection and Enforcement program's ability to enforce the terms of this rule; previously plugged and abandoned wells being potential conduits for contamination of groundwater; and the operator having to provide documentation that the water used for the fracturing operation was legally acquired. The BLM considered these concerns during the drafting of the proposed rule.

After publication of the proposed rule, the BLM held another series of meetings to obtain comments and recommendations from tribes and tribal organizations. Those meetings were held in June 2012 in Salt Lake City, Utah; Farmington, New Mexico; Tulsa, Oklahoma; and Billings, Montana. The BLM also engaged in one-on-one consultations as requested by several tribes. Some tribal representatives were concerned about risks to the quality of their vital water supplies. Others, though, were more concerned with the risk that increased compliance costs would drive the industry off of Indian lands, and deprive the tribes of much-needed revenues and economic development.

The BLM has considered and responded to the concerns expressed by the tribal representatives both orally and in written comments, as described above. In particular, it has made changes that will reduce economic burdens of compliance for many operators. Several tribes provided written and oral comments critical of the proposed rule. Other tribes argued that the proposed rules violated tribal sovereignty. The proposed rule, however, is not unique. Regulations promulgated by the Bureau of Indian Affairs render the BLM's operating regulations in 43 CFR part 3160 applicable to oil and gas leases of trust and restricted Indian lands, both tribal and individually-owned. See 25 CFR 211.4, 212.4, and 225.4.

Some tribes insist that those BIA regulations are in violation of FLPMA, which they argue restricts the BLM's authority to Federal lands. Section 301 of FLPMA, however, charges the Director of the BLM to carry out functions and duties as the Secretary may prescribe with respect to the lands and the resources under the Secretary's jurisdiction according to the applicable provisions of FLPMA and any other

applicable law. 43 U.S.C. 1731(a). See also 43 U.S.C. 1731(b). The Act of March 3, 1909 (1909 Act) (at 25 U.S.C. 396), the Indian Minerals Leasing Act (IMLA) (at 25 U.S.C. 396d) and the Indian Mineral Development Act (IMDA) (at 25 U.S.C. 2107) provide the Secretary of the Interior with authority to promulgate regulations governing oil and gas operations and mineral agreements on certain Indian lands. As previously cited, the Secretary, through the regulations promulgated by the BIA, has assigned to the BLM part of the Secretary's trust responsibilities to regulate oil and gas operations on those Indian lands. This rule concerning Indian lands is promulgated pursuant to the 1909 Act, the IMLA, and the IMDA, and will be implemented by the BLM under those authorities, consistent with Section 301 of FLPMA.

Some tribes have asked that the proposed rule exempt Indian lands from its scope. Such an exemption would require the Secretary of the Interior to conclude, among other things, that usable waters in Indian lands, and the persons who use such waters, are less deserving of protection than waters and water users on Federal land. The Department of the Interior declines to reach that conclusion.

Some tribes have advocated that the proposed rule should allow Indian tribes to decide individually whether the hydraulic fracturing regulations would apply on their lands. The BIA's regulations, however, apply all of the BLM's oil and gas operating regulations to Indian lands, and do not allow the tribes to pick and select which of the BLM's regulations apply on their lands.

The tribes, however, report that industry representatives have threatened not to bid on Indian leases if the initial proposed rule were promulgated. The tribes are concerned that a major source of revenue and of economic development might leave Indian lands because of the costs of compliance with the proposed rule. The BLM has carefully considered the tribes' comments, along with those of the oil and gas industry and of concerned citizens and governments. The revised proposed rule includes several changes from the initial proposed rule to reduce the costs and other burdens of compliance. Examples include allowing operators to use any one of a class of CELs to verify the adequacy of cement casings, not requiring the CEL to be submitted or approved before fracturing operations if there is no indication of problems with the cementing, and the "type well" approach allowing an operator's approved group of wells that conform to the operator's proven type

well in the same field to be hydraulically fractured without additional CELs, unless there is a problem with the cementing. The revised proposed rule also explicitly states that BLM will require isolation of zones that the tribes designate for protection from oil and gas operations, and will not require isolation of zones that tribes have exempted from protection. (Note, though, that the revised proposed rule would not exempt an operator from the provisions of the SDWA.) Furthermore, the BLM could approve a variance applicable to all or parts of Indian lands, provided the variance meets or exceeds the effectiveness of the revised proposed rule. Such a variance could allow an operator's compliance with a tribe's standard or procedure to be accepted as compliance with the revised proposed rule, thus reducing the compliance burdens for operators. Such changes should significantly reduce compliance costs for operators while still assuring protection of usable water resources.

The BLM is aware that the revised proposed rule would nonetheless result in some higher costs for operators on Federal and Indian lands, compared with compliance costs for hydraulic fracturing on non-Federal, non-Indian lands in several States. Regulatory compliance costs, however, are only one set in a long list of costs that operators compare to anticipated revenues when deciding whether and how much to bid on a Federal or Indian lease. It has not been the BLM's experience that regulatory compliance costs have caused the industry as a whole to avoid valuable oil and gas resources on Federal and Indian lands.

Executive Order 12988, Civil Justice Reform

Under Executive Order 12988, the Office of the Solicitor has determined that this rule would not unduly burden the judicial system and meets the requirements of Sections 3(a) and 3(b)(2) of the Order. The Office of the Solicitor has reviewed the rule to eliminate drafting errors and ambiguity. It has been written to minimize litigation, provide clear legal standards for affected conduct rather than general standards, and promote simplification and avoid unnecessary burdens.

Paperwork Reduction Act

The Paperwork Reduction Act (PRA) (44 U.S.C. 3501–3521) provides that an agency may not conduct or sponsor, and a person is not required to respond to, a "collection of information," unless it displays a currently valid control number. Collections of information

include requests and requirements that an individual, partnership, or corporation obtain information, and report it to a Federal agency (44 U.S.C. 3502(3); 5 CFR 1320.3(c) and (k)).

The BLM included its information collection request in the proposed rule and invited public comment. OMB did not approve or disapprove the request at that time. The BLM has revised the information collection that was in the proposed rule and has re-submitted its information collection request. In accordance with the PRA, the BLM is inviting public comment on its request that OMB approve new uses of Form 3160–5 (Sundry Notices and Reports on Wells). The BLM is proposing that these new uses would replace certain existing uses of Form 3160–5 for hydraulic fracturing operations.

OMB has approved the use of Form 3160–5 under control number 1004–0137, Onshore Oil and Gas Operations (43 CFR part 3160), to collect information on a number of operations, including some hydraulic fracturing operations. Once the BLM is authorized to collect hydraulic fracturing information in accordance with finalized new section 3162.3–3 and new control number 1004–0203, the BLM will request revision of control number 1004–0137 to:

- Add the new hydraulic fracturing uses and burdens of Form 3160–5 to control number 1004–0137;
- Remove the existing hydraulic fracturing uses and burdens from the existing approval of Form 3160–5; and
- Discontinue new control number 1004–0203.

The new collection of information would be required to obtain or retain a benefit for the operators of Federal and Indian (except on the Osage Reservation, the Crow Reservation, and certain other areas) onshore oil and gas leases, units, or communitization agreements that include Federal leases. The BLM has requested a 3-year term of approval for the new control number.

The information collection request for this revised proposed rule has been submitted to OMB for review under 44 U.S.C. 3504(h) of the Paperwork Reduction Act. A copy of the request can be obtained from the BLM by electronic mail request to Candice Money at cmoney@blm.gov or by telephone request to 202–912–7144. You may also review the information collection request online at <http://www.reginfo.gov/public/do/PRAMain>.

The BLM requests comments to:

- Evaluate whether the proposed collection of information is necessary for the proper performance of the functions of the agency, including

whether the information will have practical utility;

- Evaluate the accuracy of the agency's estimate of the burden of the proposed collection of information, including the validity of the methodology and assumptions used;
- Enhance the quality, utility, and clarity of the information to be collected; and
- Minimize the burden of the collection of information on those who are to respond, including through the use of appropriate automated, electronic, mechanical, or other technological collection techniques or other forms of information technology, e.g., permitting electronic submission of responses.

Comments on the information collection requirements should be sent to both OMB and the BLM as directed in the **ADDRESSES** section of this preamble. OMB is required to make a decision concerning the collection of information contained in this revised proposed rule between 30 to 60 days after publication of this document in the **Federal Register**. Therefore, a comment to OMB is best assured of having its full effect if OMB receives it by June 24, 2013.

Summary of Information Collection Requirements

The revised proposed rule is intended to increase transparency for the public regarding the fluids and additives used in hydraulic fracturing, and to protect Federal and Indian resources. The proposed provisions that include information collection requirements are amendments to 43 CFR 3162.3–2 and new 43 CFR 3162.3–3.

OMB has approved the use of Form 3160–5 under control number 1004–0137 for the operations listed in existing section 3162.3–2. As revised in the proposed rule, section 3162.3–2 would no longer include hydraulic fracturing jobs (i.e., nonroutine fracturing, routine fracturing, and acidizing) on the list of operations for which prior approval and subsequent reports would be required. Other categories of operations would remain subject to the information collection requirements in section 3162.3–2. Once the BLM is authorized to collect hydraulic fracturing information under new section 3162.3–3 and a new control number, the BLM will request revision of control number 1004–0137 by removing the hydraulic fracturing burdens from the existing approval of Form 3160–5. New section 3162.3–3 would require operators to use Form 3160–5 both to seek prior BLM approval of hydraulic fracturing operations, and to submit a report on

subsequent actual hydraulic fracturing operations. It would also encourage operators to use Form 3160–5 if they want to request a variance from the requirements of new section 3162.3–3.

In accordance with the PRA, the BLM invited public comments on the information collection in the initial proposed rule. One commenter submitted comments specifically in response to this opportunity. In addition, some commenters addressed the necessity, practical utility, and/or estimated burdens of the proposed collections.

1. Necessity/Avoidance of Unnecessary Duplication

The PRA requires each Federal agency to certify that its collections of information are necessary for the proper performance of agency functions, and are not unnecessarily duplicative of information otherwise reasonably accessible to the agency. 43 U.S.C. 3506(c)(3)(A) and (B).

One commenter stated that the proposed collections are unnecessary, given the existing Eight-Point Drilling Program associated with APDs and the subsequent well completion reports. In addition, the commenter stated that operators on Indian lands already comply with Colorado State rules that make Federal disclosure a redundant and unnecessary burden on operators.

Other commenters also questioned whether the proposed collections are necessary and avoid unnecessary duplication. For example:

- One commenter stated that the proposed collection of both pre- and post-fracturing information is a requirement to submit basically the same information twice, and recommended that the BLM consider requiring submission of pre-completion information and then requiring operators to advise the BLM of any post-completion changes or deviations;

- Another commenter recommended that operators be allowed to submit a generic or Master Plan for similar operations on a plan of development, at the field or unit level;

- One commenter stated that the proposed collection of information about the water source to be used in hydraulic fracturing duplicates protections afforded by the Environmental Protection Agency and States under the Clean Water Act and the Safe Drinking Water Act;

- One commenter stated that the proposed collections duplicate State-required collections in Colorado, New Mexico, Alabama, and Texas;

- One commenter stated that the proposal to collect an estimate of the

volume of fluid to be recovered during flowback, swabbing, and recovery from production facility vessels (43 CFR 3162.3–3(c)(6)(i)) duplicates a requirement in Wyoming for post-fracturing reporting as to the amounts, handling, and disposal or reuse of hydraulic fracturing fluid; and

- One commenter stated that the information in the NOI Sundry and the Subsequent Report Sundry Notice duplicates information required and approved by individual States, and suggested that the BLM provide for exemptions for operators in States that have adopted hydraulic fracturing regulations, or accept information filed under State laws or regulations in lieu of requiring operators to submit duplicative information to the BLM for approval.

Some commenters specifically questioned the necessity of proposed section 3162.3–3(c)(2), which would have required the Notice of Intent Sundry to include the “proposed measured depths (both top and bottom) of all occurrences of usable water and the CBLs (or another log acceptable to the authorized officer) proving that the occurrences of usable water have been isolated to protect them from contamination.”

Some comments included statements of support. One commenter stated that full disclosure of chemicals involved in the hydraulic fracturing process results in a transparent process that benefits industry, regulatory agencies, and the public.

Some other commenters generally supported transparency and full disclosure of pollution data. For example, one commenter stated that the post-fracturing collection of information on the volume of water used in the fracturing process will aid water resource managers in planning water resources on and near Federal lands, and suggested that the same type of information be collected on the Notice of Intent Sundry.

Some commenters were supportive of disclosure of information through FracFocus.org to avoid duplicating or creating another platform for disclosure.

Response: Because hydraulic fracturing has been a growing practice in recent years, the BLM has determined that the collections of information in the revised proposed rule are necessary to enable the BLM to meet its statutory obligations to regulate operations associated with Federal and some Indian oil and gas leases; prevent unnecessary or undue degradation; and manage public lands using the principles of multiple use and sustained yield. The collections of information

will assist in the modernization of the BLM’s management of hydraulic fracturing operations in ways not anticipated when the existing collection requirements approved under control number 1004–0137 were developed, and will enable the BLM to ensure that operators are using best practices in fracturing operations. Moreover, the information that States, tribes, or other Federal agencies collect is not necessarily reasonably accessible to the BLM. For these reasons, the BLM has determined that the collections in the revised proposed rule are necessary, and are not unnecessarily duplicative of existing Federal, tribal, or State collection requirements. Accordingly, the BLM is not adopting the suggestion that it provide for exemptions for operators on Indian lands or in States that have promulgated hydraulic fracturing regulations; or that the BLM accept information filed under State or tribal laws or regulations in lieu of information that meets BLM standards. However, if information submitted in accordance with State laws or regulations meets the standards prescribed by the BLM, such information may be submitted to the BLM in accordance with the revised proposed rule.

In response to comments that requiring both pre- and post-fracturing information amounts to a requirement to submit basically the same information twice, the BLM has deleted the following pre-fracturing collections:

- Submission of a CBL for approval before commencing fracturing operations, which was part of proposed 43 CFR 3162.3–3(c)(2); and
- Submission of a pre-fracturing certification of compliance with all applicable permitting and notice requirements, which was proposed as 43 CFR 3162.3–3(c)(4).

The revised proposed rule (at 43 CFR 3162.3–3(d)) also allows an NOI Sundry to be submitted for a single well or a type well covering a group of wells sharing substantially similar geological characteristics within the same geologic formation. If the submission is for a group of wells, the information should describe a “type well,” defined in the revised proposed rule to mean an oil and gas well that can be used as a model for well completion in a field where geologic characteristics are substantially similar across the field, and operations such as drilling, cementing, and hydraulic fracturing are likely to be successfully replicated using the same design. This provision will give operators an opportunity to streamline the submission of pre-fracturing information in appropriate

circumstances. However, the revised proposed rule provides (at 43 CFR 3162.3–3(e)(4)) that where there are indications of problems with the cementing of casings, the operator must submit information showing that the problem has been corrected before commencing hydraulic fracturing operations, and (at 43 CFR 3162.3–3(i)) that post-fracturing data for each well is required.

The BLM has taken these actions in recognition that:

- The BLM can meet its statutory responsibilities without collecting a full complement of pre-fracturing data; but
- The BLM needs more complete post-fracturing information in order to meet its statutory responsibilities.

The BLM has not adopted the suggestions to:

- Allow operators to meet their pre-fracturing information-submission obligations by submitting a generic or master plan for similar operations on a plan of development, at the field or unit level;
- Allow operators to meet their post-fracturing obligations solely by advising the BLM of any post-completion changes or deviations; or
- Require data about water volume in pre-fracturing as well as post-fracturing information collections.

Both the proposed rule and the revised proposed rule include provisions that require more detailed data after fracturing than before fracturing. For example, the information about water volume that is required before fracturing is limited to a plan that includes the estimated total volume of fluid to be used. See section 3162.3–3(d)(4) of the revised proposed rule (proposed as 43 CFR 3162.3–3(c)(5)).

Regarding post-fracturing information, the BLM has revised proposed section 3162.3–3(g)(1) (designated as section 3162.3–3(i)(1) of the proposed rule) to require the total water volume used and in other paragraphs within subsection (i) of the revised proposed rule, operators are required to provide:

- The actual surface pressure and rate at the end of each stage of the hydraulic fracturing operation, and the actual flush volume, rate, and final proposed pump pressure (section 3162.3–3(i)(3)); and
- The volume of fluid recovered during flowback, swabbing, or recovery from production facility vessels (section 3162.3–3 (i)(5)(i)).

In both the initial proposed and revised proposed rule, the BLM has identified water volume to be a necessary element of both pre- and post-fracturing information collections. The BLM is requiring all hydraulic

fracturing and refracturing operations to isolate all usable water and other mineral-bearing formations and protect them from contamination. 43 CFR 3162.3–3(b) and 3162.5–2. Operators are thus on notice that they must meet this performance standard during all operations covered by this rule. The commenter's suggestion seems to be to collect pre-fracturing information about water volume that is as detailed, or similarly detailed, as that which will be collected after fracturing. However, upon consideration of this comment, the BLM has determined that the same amount of detail both before and after fracturing is not necessary in order to enable the BLM to verify that the proposed engineering design is adequate for safely conducting the proposed hydraulic fracturing. In addition, the BLM understands that such detail is unlikely to be available before commencing hydraulic fracturing. The BLM, therefore, has not adopted the commenter's suggestion. Regarding the comments about FracFocus, section 3162.3–3(i) of the revised proposed rule allows the following required post-fracturing information to be submitted to the BLM through FracFocus, another data base specified by the BLM, or in a Subsequent Report Sundry Notice:

- True vertical depth of the well;
- Total water volume used; and
- For each chemical used (including base fluid) the trade name, supplier, purpose, ingredients, Chemical Abstract Service Number (CAS #), maximum ingredient concentration in additive (% by mass), and maximum ingredient concentration in hydraulic fracturing fluid (% by mass).

The initial proposed rule, at 43 CFR 3162.3–3(g), would have required that this information, as well as additional information, be included in SR Sundry Notices, and provided no other options for submission. However, the preamble to the initial proposed rule indicated that this information is intended to be posted on a public Web site, and that the BLM was working with the Groundwater Protection Council to determine whether the disclosure can be integrated into FracFocus. Some commenters expressed concerns that this statement in the preamble could result in duplicative submissions of information. By clarifying the regulatory text, the BLM is preventing such unnecessary duplication.

2. Practical Utility

The PRA requires each Federal agency to certify that its collections of information have "practical utility." 43 U.S.C. 3506(c)(3)(A). A collection has

practical utility if the agency can use the information that is collected.

Some commenters questioned whether the BLM has sufficient expertise and staffing to use the information that is collected. One commenter specifically stated that it has seen no indication that the BLM intends to provide the training and education to enable its staff to use the information.

One commenter also stated that the proposed collections could result in submissions of inaccurate information to the BLM because the details of a hydraulic fracturing design are typically not available to operators until after a well has been drilled and specific details regarding the target formation have been obtained. The commenter suggested that a more appropriate approach would be to collect appropriate information as it is obtained and for information purposes only.

Response: The BLM employs many petroleum engineers and technicians, and they are well qualified to use the information required by the revised proposed rule, and thus disagrees with commenters that question the BLM's ability to use the information that is required in the revised proposed rule. The BLM also disagrees with statements to the effect that pre-fracturing data will be inaccurate. The industry has many years of experience collecting and enhancing the accuracy of pre-fracturing engineering and data collection.

3. Reduction of Burdens on the Public

The PRA requires each Federal agency to certify that its collections of information:

- Reduce respondents' burdens to the extent practicable and appropriate;
- Are written using plain, coherent, and unambiguous terminology that is understandable to those who are to respond;
- Will be implemented in ways consistent and compatible, to the maximum extent practicable, with respondents' existing reporting and recordkeeping practices; and
- To the maximum extent practicable, use information technology to reduce burden and improve data quality, agency efficiency, and responsiveness to the public.

43 U.S.C. 3506(c)(3)(C) through (E) and (J).

One commenter stated that the BLM underestimated the annual costs associated with the proposed rule. Some commenters commented generally that the BLM has underestimated burdens under the Paperwork Reduction Act, other statutes, and various executive orders.

Other comments included the following:

- One commenter stated that the BLM should consider ways to minimize the submission of information by allowing operators to conduct fracturing operations within acceptable operating ranges and allowing operators to use standard completion reports; and

- One commenter suggested that, to reduce the burdens on operators, the BLM should allow operators to submit generic hydraulic fracturing plans for a targeted zone in resource play areas that can be referenced when an APD is submitted. Similarly, another commenter requested that the rule provide for acceptance of a general Operator’s Master Fluid Management

Plan that may be used consistently across a plan of development.

Response: The BLM has revised its estimates of the burdens to respondents, in part because of responses to comments that are described above. Specifically, the BLM has deleted some aspects of the pre-fracturing collection from the revised proposed rule, and has provided in the revised proposed rule for submission of pre-fracturing data either for each well or for a type well covering a group of wells sharing substantially similar geological characteristics within the same geologic formation. These revisions of the proposed rule result in a reduction of the estimated annual number of NOI

Sundries from 1,700 to 415. They also result in a reduction of the estimated number of Variance Requests, from 170 to 41, because such requests apply to NOI Sundries. These estimates are the average of the expected responses over the first 3 years of implementation.

The estimated number of annual SR Sundry Notices has increased because the revised proposed rule (at 43 CFR 3162.3–3) now requires post-fracturing data on both fracturing and re-fracturing operations. This revision results in an increase in the estimated annual responses, from 1,700 to 3,657.

The following table shows the itemized estimated burdens associated with the revised proposed rule:

A. Type of response	B. Number of responses/ revised proposed rule	C. Hours per response (same for proposed and revised proposed rule)	D. Total hours/revised proposed rule (column B × column C)
Sundry Notices and Reports on Wells/Well Stimulation/Notice of Intent Sundry (43 CFR 3162.3–3) Form 3160–5	415	8	3,320
Sundry Notices and Reports on Wells/Well Stimulation/Subsequent Report Sundry Notice (43 CFR 3162.3–3) Form 3160–5	3,657	8	29,256
Sundry Notices and Reports on Wells/Well Stimulation/Variance Request (43 CFR 3162.3–3) Form 3160–5	41	8	328
Totals	4,113	32,904

The general comments about the BLM’s analysis under the Paperwork Reduction Act, other statutes, and various executive orders did not address the specific information collection associated with the proposed rule. Therefore, the BLM has not changed the collection in response to these comments. However, the BLM invites further comments on the revised collection in this revised proposed rule.

The BLM has not adopted the suggestions to allow operators to conduct fracturing operations within acceptable operating ranges, to allow operators to use standard completion reports, or to allow operators to submit Fluid Management Plans or generic hydraulic fracturing plans for a targeted zone in resource play areas that can be referenced when an APD is submitted. Such provisions would not enable the BLM to meet its statutory responsibilities.

National Environmental Policy Act

The BLM has prepared an environmental assessment (EA) that concludes that this rule would not constitute a major Federal action that may result in a significant adverse effect on the human environment under section 102(2)(C) of the National

Environmental Policy Act (NEPA), 42 U.S.C. 4332(2)(C). The EA and the draft Finding of No Significant Impact are available for review and on file in the BLM Administrative Record at the address specified in the **ADDRESSES** section.

Data Quality Act

In developing this rule, we did not conduct or use a study, experiment, or survey requiring peer review under the Data Quality Act (Pub. L. 106–554).

Executive Order 13211, Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use

Under Executive Order 13211, agencies are required to prepare and submit to OMB a Statement of Energy Effects for significant energy actions. This Statement is to include a detailed statement of “any adverse effects of energy supply, distribution, or use (including a shortfall in supply, price increases, and increase use of foreign supplies)” for the action and reasonable alternatives and their effects.

Section 4(b) of Executive Order 13211 defines a “significant energy action” as “any action by an agency (normally published in the **Federal Register**) that

promulgates or is expected to lead to the promulgation of a final rule or regulation, including notices of inquiry, advance notices of proposed rulemaking, and notices of proposed rulemaking: (1)(i) That is a significant regulatory action under Executive Order 12866 or any successor order, and (ii) is likely to have a significant adverse effect on the supply, distribution, or use of energy; or (2) that is designated by the Administrator of OIRA as a significant energy action.

The BLM believes that the additional cost per hydraulic fracturing operation is insignificant when compared with the drilling costs in recent years, the production gains from hydraulically fractured wells operations, and the net incomes of entities within the oil and natural gas industries. For a single well or a type well, the compliance costs represent about 0.4 to 1.5 percent of the costs of drilling a well. For a well subsequent to a type well, the costs represent between 0.04 and 0.08 percent of the total drilling costs. For existing wells and refracture operations, the percentages are even lower, at about 0.01 to 0.03 percent. When averaging the compliance costs across all operations, the costs represent between

0.04 and 0.13 percent of the costs of drilling a well.

Since the estimated compliance costs are not a substantial when compared with the total costs of drilling a well, the BLM believes that the rule is unlikely to have an effect on the investment decisions of firms, and the rule is unlikely to affect the supply, distribution, or use of energy. As such, the rule is not a "significant energy action" as defined in Executive Order 13211.

Clarity of the Regulations

Executive Order 12866 requires each agency to write regulations that are simple and easy to understand. We invite your comments on how to make these proposed regulations easier to understand, including answers to questions such as the following:

- 1. Are the requirements in the proposed regulations clearly stated?
- 2. Do the proposed regulations contain technical language or jargon that interferes with their clarity?
- 3. Does the format of the proposed regulations (grouping and order of sections, use of headings, paragraphing, etc.) aid or reduce their clarity?
- 4. Would the regulations be easier to understand if they were divided into more (but shorter) sections?
- 5. Is the description of the proposed regulations in the **SUPPLEMENTARY**

INFORMATION section of this preamble helpful in understanding the proposed regulations? How could this description be more helpful in making the proposed regulations easier to understand?

Please send any comments you have on the clarity of the regulations to the address specified in the **ADDRESSES** section.

Authors

The principal authors of this rule are: Subijoy Dutta of the BLM Washington Office; Donato Judice of the BLM Great Falls, Montana Oil and Gas Field Office, assisted by the BLM's Division of Regulatory Affairs and the Department of the Interior's Office of the Solicitor.

List of Subjects 43 CFR Part 3160

Administrative practice and procedure; Government contracts; Indians—lands; Mineral royalties; Oil and gas exploration; Penalties; Public lands—mineral resources; Reporting and recordkeeping requirements.

43 CFR Chapter II

For the reasons stated in the preamble, and under the authorities stated below, the Bureau of Land Management amends 43 CFR part 3160 as follows:

PART 3160—ONSHORE OIL AND GAS OPERATIONS

■ 1. The authorities citation for part 3160 is revised to read as follows:

Authority: 25 U.S.C. 396d and 2107; 30 U.S.C. 189, 306, 359, and 1751; and 43 U.S.C. 1732(b), 1733, and 1740.

Subpart 3160—Onshore Oil and Gas Operations: General

§ 3160.0-3 [Amended]

■ 2. In § 3160.0-3 add "the Federal Land Policy and Management Act (43 U.S.C. 1701 *et seq.*)," after "the Mineral Leasing Act for Acquired lands, as amended (30 U.S.C. 351-359),".

■ 3. Amend § 3160.0-5 by adding definitions of "annulus," "bradenhead," "hydraulic fracturing," "hydraulic fracturing fluid," "proppant," "refracturing," "type well," and "usable water," in alphabetical order and by removing the definition of "fresh water".

The additions read as follows:

§ 3160.0-5 Definitions.

* * * * *

Annulus means the space around a pipe in a wellbore, the outer wall of which may be the wall of either the borehole or the casing; sometimes also called annular space.

* * * * *

Bradenhead means a heavy, flanged steel fitting connected to the first string of casing that allows the suspension of intermediate and production strings of casing and supplies the means for the annulus to be sealed.

* * * * *

Hydraulic fracturing means those operations conducted in an individual wellbore designed to increase the flow of hydrocarbons from the rock formation to the wellbore through modifying the permeability of reservoir rock by fracturing it. Hydraulic fracturing does not include enhanced secondary recovery such as water flooding, tertiary recovery, recovery through steam injection, or other types of well stimulation operations such as acidizing.

* * * * *

Hydraulic fracturing fluid means the liquid or gas, and any associated solids used in hydraulic fracturing, including constituents such as water, chemicals, and proppants.

* * * * *

Proppant means a granular substance (most commonly sand, sintered bauxite, or ceramic) that is carried in suspension by the fracturing fluid that serves to keep the cracks open when fracturing

fluid is withdrawn after a hydraulic fracture operation.

* * * * *

Refracturing means a hydraulic fracturing operation subsequent to the completion of a prior hydraulic fracturing operation in the same well. For purposes of this definition, a hydraulic fracturing operation is completed when a well begins producing oil or gas, or when equipment necessary to inject the hydraulic fracturing fluid at sufficient pressure to fracture the stratum is removed from the well pad, whichever occurs earlier.

* * * * *

Type well means an oil and gas well that can be used as a model for well completion in a field where geologic characteristics are substantially similar within the same field, and where operations such as drilling, cementing, and hydraulic fracturing are likely to be successfully replicated using the same design.

* * * * *

Usable water means generally those waters containing up to 10,000 parts per million (ppm) of total dissolved solids. The following geologic zones are deemed to contain usable water:

(1) Underground sources of drinking water as defined by the U.S. Environmental Protection Agency or by State law (for Federal lands) or tribal law (for Indian lands);

(2) Zones in use for supplying water for agricultural or industrial purposes, regardless of the concentration of total dissolved solids, unless the operator demonstrates that the existing agricultural or industrial user would not be adversely affected;

(3) Zones designated by a State (for Federal lands) or a tribe (for Indian lands) as requiring isolation or protection from oil and gas operations; and

(4) Zones containing up to 10,000 ppm of total dissolved solids that are not excluded by paragraphs (A), (B), or (C) of this definition. The following geologic zones are deemed not to contain usable water:

(A) Zones from which an operator is authorized to produce hydrocarbons;

(B) Zones designated as exempted aquifers pursuant to the Safe Drinking Water Act; and

(C) Zones which the State (for Federal lands) or the tribe (for Indian lands) has designated as exempt from any requirement to be isolated or protected from oil and gas operations.

* * * * *

Subpart 3162—Requirements for Operating Rights Owners and Operators

■ 4. Amend § 3162.3–2 by revising the first sentence of paragraph (a) and revising paragraph (b) to read as follows:

§ 3162.3–2 Subsequent well operations.

(a) A proposal for further well operations must be submitted by the operator on Form 3160–5 for approval by the authorized officer prior to the operator's commencing operations to redrill, deepen, perform casing repairs, plug-back, alter casing, recompleat in a different interval, perform water shut off, combine production between zones, and/or convert to injection. * * *

(b) Unless additional surface disturbance is involved and if the operations conform to the standard of prudent operating practice, prior approval is not required for acidizing jobs or recompletion in the same interval; however, a subsequent report on these operations must be filed on Form 3160–5.

* * * * *

■ 5. Revise § 3162.3–3 to read as follows:

§ 3162.3–3 Subsequent well operations; Hydraulic fracturing.

(a) *Activities To Which This Section Applies.*

This section applies to all hydraulic fracturing operations, and refracturing operations. All other injection activities must comply with section 3162.3–2.

(b) *Isolation of Usable Water to Prevent Contamination.* All hydraulic fracturing and refracturing operations must meet the performance standard in section 3162.5–2(d) of this title.

(c) *When an Operator Must Submit Notification for Approval of Hydraulic Fracturing.* A proposal for hydraulic fracturing or refracturing must be submitted by the operator and approved by the BLM before commencement of operations. The proposal may be submitted in one of the following ways:

(1) The operator may submit with its application for permit to drill the information required in paragraph (d) of this section;

(2) The operator may submit a proposal for hydraulic fracturing operations on Form 3160–5 (Sundry Notices and Reports on Wells) as a Notice of Intent Sundry for approval by the authorized officer prior to hydraulic fracturing. If the hydraulic fracturing operation would cause additional surface disturbance, the proposal must include a surface use plan of operations; or

(3) If an operator has received BLM approval for hydraulic fracturing

operations, it must submit a new Notice of Intent Sundry if:

(i) Hydraulic fracturing or refracturing operations have not commenced within 5 years after the effective date of approval of the fracturing operation;

(ii) The operator has significant new information about the geology of the area, the stimulation operation or technology to be used, or the anticipated impacts of the fracturing operation to any resource; or

(iii) The operator proposes refracturing of the well. For refracturing operations, the operator must submit any information in this section that is required by the authorized officer, including a mechanical integrity test.

(d) *What the Notice of Intent Sundry Must Include.* The authorized officer may prescribe that each proposal contain all or a portion of the information set forth in section 3162.3–1 of this title. The Sundry Notice may be submitted for a single well or a group of wells within the same geologic formation. If the submission is for a group of wells, the information should describe a type well. If the type well has not been completed, the cement evaluation log described in paragraph (e)(2) of this section must be provided to BLM before drilling operations may begin on the other wells in the group. If information submitted in accordance with State (on Federal lands) or tribal (on Indian lands) laws or regulations meets the standards prescribed by the BLM, such information may be submitted to the BLM as part of the Sundry Notice.

The Notice of Intent Sundry must include the following:

(1) The geological names, a geological description, and the proposed measured depth of the top and the bottom of the formation into which hydraulic fracturing fluids are to be injected;

(2) The measured or estimated depths (both top and bottom) of all occurrences of usable water by use of a drill log from the subject well or another well in the vicinity and within the same field;

(3) The proposed measured depth of perforations or the open-hole interval, estimated pump pressures, and information concerning the source and location of water supply, such as reused or recycled water, or rivers, creeks, springs, lakes, ponds, and wells, which may be shown by quarter-quarter section on a map or plat, or which may be described in writing. It must also identify the anticipated access route and transportation method for all water planned for use in fracturing the well;

(4) A plan for the proposed hydraulic fracturing design that includes, but is not limited to, the following:

(i) The estimated total volume of fluid to be used;

(ii) The anticipated surface treating pressure range;

(iii) The maximum injection treating pressure;

(iv) The estimated or calculated fracture direction, length, and height, including the estimated fracture propagation plotted on the well schematics and on a map. The map must be of a scale no smaller than 1:24,000; and

(v) The estimated vertical distance to the nearest usable water aquifer above the fracture zone;

(5) The following information concerning the handling of recovered fluids:

(i) The estimated volume of fluid to be recovered during flowback, swabbing, and recovery from production facility vessels;

(ii) The proposed methods of handling the recovered fluids, including, but not limited to, pit requirements, pipeline requirements, holding pond use, re-use for other stimulation activities, or injection; and

(iii) The proposed disposal method of the recovered fluids, including, but not limited to, injection, hauling by truck, or transporting by pipeline; and

(6) The authorized officer may request additional information prior to the approval of the Notice of Intent Sundry.

(e) *Monitoring of Cementing Operations and Cement Evaluation Log Prior to Hydraulic Fracturing.*

(1) During cementing operations the operator must monitor and record the flow rate, density, and treating pressure and submit a cement operation monitoring report to the authorized officer within 30 days after completion of the hydraulic fracturing operations.

(2) The operator must run a cement evaluation log or logs on each casing that protects usable water and the operator must submit those logs to the authorized officer within 30 days after completion of the hydraulic fracturing operations, except as provided under (e)(3) of this section. A cement evaluation log, is any one of a class of tools that verify the integrity of annular cement bonding, such as, but not limited to, a cement bond log, ultrasonic imager, variable density logs, micro-seismograms, CBLs with directional receiver array, ultrasonic pulse echo technique, or isolation scanner. An operator may select the tool used to prepare the CEL, as long as it is at least as effective in verifying the integrity of annular cement bonding as is a cement bond log.

(3) An operator is not required to run a cement evaluation log on the casings of a subsequent well where an operator:

(i) Submitted a cement evaluation log for a type well (see paragraph (d) of this section) that shows successful cement bonding to protect against downhole fluid cross-migration into water zones; and

(ii) Completes a subsequent well or wells with the same specifications and geologic characteristics as the type well, and approved in the same group sundry notice for the same field (see paragraph (d) of this section), and the cementing operations monitoring data parallels those of the type well.

(4) For any well, if there is an indication of an inadequate cement job (such as, but not limited to, lost returns, cement channeling, gas cut mud, or failure of equipment), then the operator must report that information to the authorized officer within 24 hours, followed by a written report within 48 hours. Prior to commencing hydraulic fracturing operations, the operator must run a cement evaluation log showing that the inadequate cement job has been corrected and the occurrences of usable water have been isolated to protect them from contamination. At least 72 hours before commencing the hydraulic fracturing operation, the operator must submit:

(i) A signed certification indicating that the operator corrected the inadequate cement job; and

(ii) Documentation that shows that there is adequate cement bonding.

(5) The operator must submit the information required by paragraph (e)(1), and (e)(2) of this section with the Subsequent Report Sundry Notice required in paragraph (i) of this section.

(f) *Mechanical Integrity Testing Prior to Hydraulic Fracturing.* Prior to hydraulic fracturing, or refracturing, the operator must perform a successful mechanical integrity test (MIT) of the vertical sections of the casing.

(1) If hydraulic fracturing through the casing is proposed, the casing must be tested to not less than the maximum anticipated treating pressure.

(2) If hydraulic fracturing through a fracturing string is proposed, the fracturing string must be inserted into a liner or run on a packer-set not less than 100 feet below the cement top of the production or intermediate casing. The fracturing string must be tested to not less than the maximum anticipated treating pressure minus the annulus pressure applied between the fracturing string and the production or intermediate casing.

(3) The MIT will be considered successful if the pressure applied holds

for 30 minutes with no more than a 10 percent pressure loss.

(g) *Monitoring and Recording During Hydraulic Fracturing.*

(1) During any hydraulic fracturing or refracturing operation, the operator must continuously monitor and record the annulus pressure at the bradenhead. The pressure in the annulus between any intermediate casings and the production casing must also be continuously monitored and recorded. A continuous record of the annulus pressure during the fracturing operation must be submitted with the required Subsequent Report Sundry Notice (Form 3160-5, Sundry Notices and Reports on Wells) identified in paragraph (i) of this section.

(2) If during any hydraulic fracturing or refracturing operation the annulus pressure increases by more than 500 pounds per square inch as compared to the pressure immediately preceding the stimulation, the operator must take immediate corrective action and must orally notify the authorized officer as soon as practicable, but no later than 24 hours following the incident. Within 30 days after the hydraulic fracturing operations are completed, the operator must submit a report containing all details pertaining to the incident, including corrective actions taken, as part of a Subsequent Report Sundry Notice (Form 3160-5, Sundry Notices and Reports on Wells).

(h) Storage of all recovered fluids must be in either tanks or lined pits. The authorized officer may require any other BLM approved method to protect the mineral resources, other natural resources, and environmental quality from the release of recovered fluids.

(i) *Information that Must be Provided to the Authorized Officer After Completed Operations.* The information required in paragraphs (i)(1) through (i)(8) of this section must be submitted to the authorized officer within 30 days after the hydraulic fracturing or refracturing operations are completed. The information is required for each well, even if the BLM approved fracturing of a group of wells (see § 3162.3-3(d)). The information required in paragraph (i)(1) of this section must be submitted to the authorized officer through FracFocus, another BLM-designated database, or in a Subsequent Report Sundry Notice (Form 3160-5, Sundry Notices and Reports on Wells). If information is submitted through FracFocus or another designated database, the operator must specify that the information is for a Federal or an Indian well, certify that the information is correct, and certify compliance with applicable law as

required by paragraph (i)(7)(ii) or (i)(7)(iii) of this section using FracFocus or the designated database. The information required in paragraphs (i)(2) through (i)(8) of this section must be submitted to the authorized officer in a Subsequent Report Sundry Notice. The operator is responsible for the information submitted by a contractor or agent, and the information is considered to have been submitted directly from the operator to the BLM. The operator must submit the following information:

(1) The true vertical depth of the well, total water volume used, and for each chemical used (including base fluid) the trade name, supplier, purpose, ingredients, Chemical Abstract Service Number (CAS #), maximum ingredient concentration in additive (% by mass), and maximum ingredient concentration in hydraulic fracturing fluid (% by mass).

(2) The actual measured depth of perforations or the open-hole interval, and actual pump pressures and the source(s) and location(s) of the water used in the hydraulic fracturing fluid.

(3) The actual surface pressure and rate at the end of each stage of the hydraulic fracturing operation, and the actual flush volume, rate, and final pump pressure.

(4) The actual, estimated, or calculated fracture length, height and direction;

(5) The following information concerning the handling of recovered fluids:

(i) The volume of fluid recovered during flowback, swabbing, or recovery from production facility vessels;

(ii) The methods of handling the recovered fluids, including, but not limited to, transfer pipes and tankers, holding pond use, re-use for other stimulation activities, or injection; and

(iii) The disposal method of the recovered fluids, including, but not limited to, injection, hauling by truck, or transporting by pipeline. The disposal of fluids produced during the flowback from the hydraulic fracturing process must follow the requirements set out in Onshore Order Number 7, Disposal of Produced Water, Section III.B. (October 8, 1993, 58 FR 58506).

(6) If the actual operations deviate from the approved plan, the deviation(s) must be documented and explained.

(7) A certification signed by the operator that:

(i) Wellbore integrity was maintained prior to and throughout the hydraulic fracturing operation, as required by paragraph (b) of this section. The operator must also certify that it complied with the requirements in

paragraphs (e), (f), (g), and (h) of this section;

(ii) For Federal lands, the hydraulic fracturing fluid used complied with all applicable permitting and notice requirements as well as all applicable Federal, State, and local laws, rules, and regulations; and

(iii) For Indian lands, the hydraulic fracturing fluid used complied with all applicable permitting and notice requirements as well as all applicable Federal and tribal laws, rules, and regulations.

(8) The operator must submit well logs and records of adequate cement bonds including the cementing operations monitoring report, any cement evaluation log, and the result of the mechanical integrity test as required by paragraphs (e)(1), (e)(2), and (f) of this section.

(9) The authorized officer may require the operator to provide documentation substantiating any information submitted under paragraph (i) of this section.

(j) *Identifying Information Claimed to be Exempt from Public Disclosure.*

(1) For the information required in paragraph (i)(1) of this section, the operator will be deemed to have waived any right to protect from public disclosure information submitted with a Subsequent Report Sundry Notice or through FracFocus or another designated database. For information required in paragraph (i)(1) of this section that the operator claims to be exempt from public disclosure, the operator must submit to the BLM an affidavit that:

(i) Identifies the Federal statute or regulation that allows withholding of the information from the BLM or prohibits the BLM from disclosing the information if it were in the BLM's possession;

(ii) Affirms that the information is not publicly available;

(iii) Affirms that the information is not required to be publicly available under any applicable law;

(iv) Affirms that the release of the information would likely harm the operator's competitive position; and

(v) Affirms that the information is not readily apparent through reverse engineering.

(2) The BLM may require any operator to disclose to the BLM any information claimed to be exempt from public disclosure, along with any other relevant information.

(3) If the BLM determines that the information is not exempt from disclosure, the BLM will make the information available to the public after providing the operator with no fewer than 10 business days' notice of the BLM's determination.

(4) The operator must maintain records of the information claimed to be exempt from disclosure for the period of time as required by section 3162.4-1(d) of this title.

(k) *Requesting a Variance from the Requirements of this Section.* The operator may make a written request to the authorized officer for a variance from the requirements under this section. The BLM encourages submission using a Sundry Notice (Form 3160-5, Sundry Notices and Reports on Wells). In cooperation with a State (for Federal lands) or a tribe (for Indian lands), the BLM may issue a variance that would apply to all wells within a State or within Indian lands, or to specific fields or basins within the State or the Indian lands, if the BLM finds that the variance meets the criteria in paragraph (k)(2) of this section.

(1) A request for a variance must specifically identify the regulatory provision of this section for which the

variance is being requested, explain the reason the variance is needed, and demonstrate how the operator will satisfy the objectives of the regulation for which the variance is being requested.

(2) The authorized officer, after considering all relevant factors, may approve the variance, or approve it with one or more conditions of approval, only if the BLM determines that the proposed alternative meets or exceeds the objectives of the regulation for which the variance is being requested. The decision whether to grant or deny the variance request is entirely within the BLM's discretion.

(3) A variance under this section does not constitute a variance to provisions of other regulations, laws, or orders.

(4) Due to changes in Federal law, technology, regulation, BLM policy, field operations, noncompliance, or other reasons, the BLM reserves the right to rescind a variance or modify any conditions of approval. The authorized officer must provide a written justification if a variance is rescinded or a condition of approval is modified.

■ 6. Amend § 3162.5-2 by revising the first sentence of paragraph (d) to read as follows:

§ 3162.5-2 Control of wells.

* * * * *

(d) *Protection of usable water and other minerals.* The operator must isolate all usable water and other mineral-bearing formations and protect them from contamination.

* * * * *

Tommy P. Beaudreau,

Acting Assistant Secretary, Land and Minerals Management.

[FR Doc. 2013-12154 Filed 5-23-13; 8:45 am]

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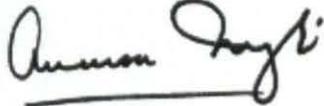
MEMORANDUM

APR 13 2012

TO: Assistant Secretaries, National Laboratories
Department of Energy

Assistant Secretaries, Bureau Directors
Department of the Interior

Assistant Administrators, Regional Administrators
Environmental Protection Agency

FROM: Arun Majumdar, Acting Under Secretary of Energy
Department of Energy 

David J. Hayes, Deputy Secretary
Department of the Interior 

Bob Perciasepe, Deputy Administrator
Environmental Protection Agency 

SUBJECT: Multi-Agency Collaboration on Unconventional Oil and Gas Research

OVERVIEW: In March 2011, the White House released a “Blueprint for a Secure Energy Future” (Blueprint) - a comprehensive plan to reduce America's oil dependence, save consumers money, and make our country the leader in clean energy industries. The Blueprint supports the responsible development of the Nation’s oil and natural gas, with the specific goals of promoting safe practices and reducing energy imports. The Department of Energy (DOE), the Department of the Interior (DOI), and the Environmental Protection Agency (EPA) each will have a critical role to play in this mission.¹

To this end, the DOE, DOI, and EPA will develop a multi-agency program directed toward a focused collaborative Federal interagency effort to address the highest priority challenges associated with safely and prudently developing unconventional shale gas and tight oil resources. The goal of this program will focus on timely, policy relevant science directed to research topics where collaboration among the three Agencies can be most effectively and efficiently conducted to provide results and technologies that support sound policy decisions by state and Federal agencies responsible for ensuring the prudent development of energy sources while protecting human health and the environment. This program responds to the Blueprint and to relevant recommendations of the Secretary of Energy Advisory Board Subcommittee on Natural Gas.²

¹ The 31 March 2011 *White House Blueprint for a Secure Energy Future* instructed the Federal Government to “conduct research to examine the impacts of fracking on water resources,” directing the EPA and DOE to sponsor research ...”

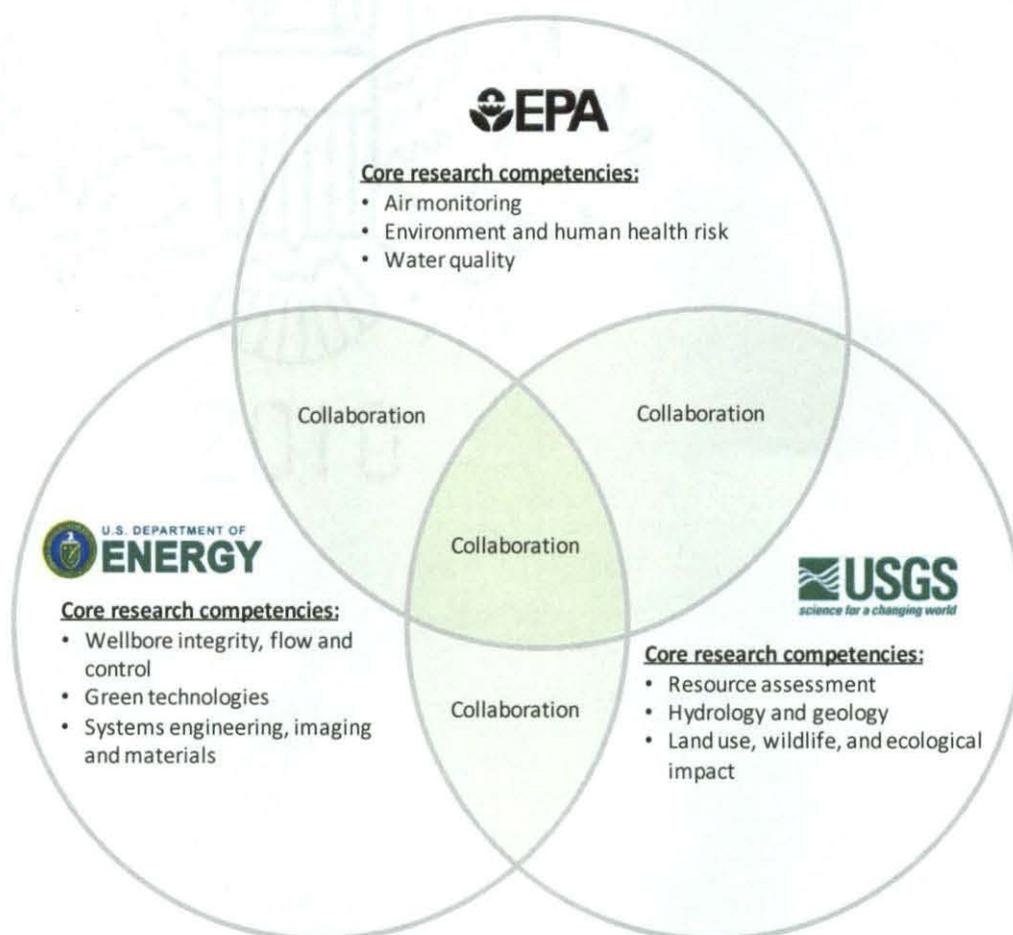
² The Secretary of Energy Advisory Board recommended that “the federal government has a role especially in basic R&D, environment protection, and safety” and recommends that the DOE, DOI and EPA “all have mission responsibility that justify a continuing, tailored, Federal R&D effort.” http://www.shalegas.energy.gov/resources/081811_90_day_report_final.pdf

Interagency Collaboration

The DOE, DOI, and EPA will identify research priorities and collaborate to sponsor research that improves our understanding of the impacts of developing our Nation's unconventional oil and gas resources and ensure the safe and prudent development of these resources. Through enhanced cooperation, the Agencies will maximize the quality and relevance of this research, enhance synergies between the Agencies' areas of expertise, and eliminate redundancy. The Agencies remain responsible for implementing their own authorities and internal priority-setting processes.

The goals of this interagency collaboration are as follows:

1. Focus each Agency on its area of core competency. Each Agency has a different combination of experiences, research strengths, personnel, resources, and mission mandates leading to complementary research core competencies.



The Venn diagram summarizes the core research competencies of each of the three Agencies. Further details can be found in the appendix to this memorandum.

2. Collaborate on research topics as appropriate. While each Agency will focus on its areas of core research competency, there will be tasks for which the combined capabilities of more than one Agency will be necessary to address a particular research topic.

An example of collaboration is research on water use for hydraulic fracturing, in which the EPA focuses on the impacts and effectiveness of current technology, DOE focuses on improvements that future technological innovations may yield, and USGS focuses on stream gage and groundwater monitoring to determine water availability, use, and groundwater flow modeling. Another example is the ongoing prospective case study in the Marcellus Shale that the three Agencies are currently collaborating on in support of the EPA's congressionally mandated study on hydraulic fracturing. Where practical and advisable, efforts will be made among the Agencies to apply common and/or consistent monitoring, sampling, and analytical protocols. These and other topic areas are represented by the green areas in the Venn diagram and will be further defined in the research plan discussed in the section below.

3. Bring coordination and consistency to the annual budget process. Effective research requires a sustained, well-planned effort. The three Agencies will work to ensure that the annual budget process is part of a coordinated multi-year effort with targeted results.

Forming the Partnership

The three Agencies will take the following steps:

Interagency management structure: The three Agencies will create a Steering Committee to coordinate the Agencies' activities for unconventional oil and gas research. Each Agency will contribute two members to the Steering Committee: one member focused on policy and one member focused on research and technology. The Office of Science and Technology Policy (OSTP) will also provide a member to serve on the Steering Committee. The lead agency of the Steering Committee will rotate annually among the three Agencies in alphabetical order: DOE, DOI, EPA. The Steering Committee will provide leadership, coordinate the activities of the three participating Agencies, and reach out to other relevant Federal, state and local organizations.

Formalizing a research plan: Within 9 months of formation, the Steering Committee will publish a formal multi-year Research Plan that will:

- a. analyze and synthesize the state of knowledge of unconventional oil and gas research to assist in identifying and prioritizing new research directions;
- b. identify, categorize, and prioritize research topics relevant to the safety and environmental sustainability of unconventional oil and natural gas exploration and production;
- c. identify gaps in available data and appropriate activities to address these topics;
- d. identify research milestones and deliverables;
- e. describe steps to promote transparency and maximize stakeholder participation and notification;
- f. establish specific mechanisms for cooperative relationships among the three member Agencies in planning and conducting research and reviewing the results; and
- g. determine future plans, goals and objectives.

Within 6 months of formation the Steering Committee will have a draft of the research plan prepared for public comment.

As part of establishing the research plan, the Steering Committee will solicit comments from the scientific community, public and relevant stakeholders and will hold periodic workshops for this purpose, as appropriate.

Ongoing collaboration: The Steering Committee, augmented by appropriate staff, will meet on a quarterly basis to discuss research efforts being conducted under the research plan, track key milestones, identify and address any implementation challenges, and ensure that work in the priority areas is carried out efficiently and effectively.

Initial engagement: The Steering Committee will hold its inaugural meeting within one month of the effective date of this memorandum. In this meeting, the three member Agencies will nominate members to serve on the Steering Committee, and will further refine as necessary the steps outlined in this memorandum.

Progress Report: The three Agencies will issue an annual public progress report in conjunction with the budget process providing an update on the status of research under way in the previous year, including significant findings, progress toward milestones set forth in the research plan, and any changes in research direction or focus planned for the following year.

Appendix: Agency Roles and Core Competencies

- Department of Energy

The DOE has research experience and capabilities in wellbore integrity, flow and control; green technologies; and complex systems, imaging, materials, earth science and engineering. Practices employed by companies engaging in exploration and production of shale gas evolve rapidly. An understanding of these technologies and practices is critical if the Federal Government is to accurately quantify the risks of these activities.

Wellbore integrity, flow and control: The DOE capabilities in this area include experience and expertise in quantifying, evaluating, and mitigating potential risks resulting from the production and development of the shale gas resources, to include multi-phase flow in wells and reservoirs, well control, casing, cementing, drilling fluids, and abandonment operations associated with drilling, completion, stimulation and production operations. The DOE has experience in evaluating seal-integrity and wellbore-integrity characteristics in the context of protection of groundwater.

Green technologies: The DOE has experience and expertise in the development of a wide range of new technologies and processes, to include innovations which reduce the environmental impact of exploration and production such as greener chemicals or additives used in shale gas development, flowback water treatment processes and water filtration technologies. Data from these research activities assists regulatory agencies in making a science-based cost-benefit analysis of requiring producers to adopt new technologies to mitigate environmental risks.

Systems engineering, imaging and materials: The DOE specializes in the development of complex, engineered systems, high-speed computing and predictive modeling, and has experience in quantifying and mitigating low-frequency, high-impact risks. This includes evaluating human factors which potentially contribute to failures. The DOE has developed and evaluated novel imaging technologies for areal magnetic surveys for the detection of unmarked abandoned wells, and for detecting and measuring fugitive methane emissions from exploration, production, and transportation facilities. The DOE also has experience in understanding of fundamental interactions caused during the drilling process, such as the equation of state research that investigates the relationship between pressure, temperature, and viscosity of multi-phase fluids at the high temperatures and pressures associated with deep drilling and hydraulic fracturing. The DOE's experience in engineered underground containment systems for CO₂ storage brings capabilities that are relevant to the challenges of safe shale gas production, such as evaluating cement-casing integrity in corrosive environment to characterize long-term wellbore integrity for CO₂ sequestration.

- Department of the Interior:

The United States Geological Survey (USGS) has research experience and capabilities in resource assessments; natural systems, geology, hydrology; and evaluation of effects on land use, wildlife and ecological systems.

Resource Assessment: The USGS conducts research and assessments of the undiscovered, technically recoverable oil and gas resources of the United States (exclusive of the Federal Outer Continental Shelf). The USGS assessments use a geology-based assessment methodology that characterizes the total petroleum system considering source rock richness, petrophysical properties, thermal maturation, petroleum generation, migration, and reservoir rock as important factors in evaluating the hydrocarbon accumulation. Assessments incorporate uncertainty, are fully risked, and are reported as statistical estimates of gas, oil, and natural hydrocarbon liquids content. They support analyses to determine those resources that are economically recoverable. These assessments play an important role in Federal policymaking and land management and also support decision making at tribal, state and local levels.

Geology and Hydrology: Understanding the stratigraphy, physical trapping mechanisms, petroleum geochemistry, and stress conditions of unconventional basin gas and oil-bearing formations is critical to determining local and regional variations in gas and oil abundance, composition, and quality that identify rock formation targets and guide operational plans for drilling and hydrofracturing, and for understanding and forecasting the composition of produced waters. The USGS expertise in earthquake seismology, geothermal systems, and geologic carbon sequestration is appropriate for induced seismicity evaluation. Down hole rock composition, native and flowback fluid composition, borehole temperature and pressure, and in situ stress levels are used to generate groundwater flow models and geochemical models that provide estimates of solute transport and rates and the potential fate of injected waters and their constituents. The USGS operates more than 7,700 of the Nation's surface water streamgages and groundwater monitoring wells each of which provide data critical for assessing and modeling water availability and water quality important to understanding water use, contaminant occurrences, flood hazards, and ecological flows. Cooperative agreements with state and local agencies provide additional data. Water quantity and quality are potentially affected by energy production activities. The USGS maintains an extensive, nationwide water monitoring capability and conducts assessments of surface and groundwater availability throughout the Nation, including both fresh and brackish groundwater resources.

Land Use, Wildlife, and Ecologic Impact: The USGS has diverse capabilities to evaluate potential impacts to biological resources and the water resources available to sustain them due to activities associated with shale gas and tight oil production. Landscape scale research is important to quantifying the response of key species and habitats to land disturbance, contaminants, and other potential impacts resulting from development of shale gas and tight oil resources and to develop best management practices to mitigate impacts. Remotely sensed airborne imagery is used to assess forest fragmentation and effects of shale gas activities on land use patterns, wetlands, and migratory bird populations. The USGS also assesses the effects of habitat change on key aquatic species including endangered species affected by hydrocarbon production.

- Environmental Protection Agency:

The EPA has research experience and capabilities across a wide range of scientific and technical disciplines that support the Agency's mission of protecting human health and safeguarding the environment. This includes core competencies in the areas of environmental and human health risk assessment, air quality, and water quality. The EPA has the unique ability to conduct research that spans the characterization of sources and emissions, to pollutant fate and transport, to ecosystem and human exposures, health effects and risk assessment, and to the prevention and management of environmental risks.

Environmental and Human Health Risk: The EPA has extensive capabilities to characterize the effects of contaminants and environmental stressors on ecosystem integrity and human health for air and water contaminants and mixtures associated with gas extraction practices. Ecological research capabilities that support risk assessments focus on evaluating potential physical, chemical, and biological changes to ecosystems, disruptions of ecological flows in headwater rivers, and impacts on terrestrial wildlife, stream macrobenthos, and fish. The Agency also has the expertise to evaluate landscape pattern changes in terms of available habitat and changes in vulnerability for rare or unique ecosystems. The EPA research capabilities that support human health risk assessments include conducting field measurements and other types of studies to characterize exposures, performing laboratory and computational toxicology studies for hazard identification and dose response assessments, and developing and applying risk assessment methods to evaluate human health risks posed by environmental contaminants.

Air Quality: The EPA possesses expertise in the measurement and modeling of air pollutants from sources related to all phases of gas extraction, processing, storage, and distribution. This includes using mobile and fixed air monitoring systems to estimate local, regional, and national exposures to air pollutants.

Water Quality: Groundwater protection research capabilities at the EPA include quantifying the effects of exploration and production activities on ground water quantity and quality, conducting subsurface hydrogeological and geochemical modeling, evaluating well integrity issues, and assessing the potential for releases to groundwater from wells or surface impoundments during drilling, completion, operation or post closure.

BLUEPRINT FOR A SECURE ENERGY FUTURE



March 30, 2011

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Introduction: *Blueprint for a Secure Energy Future*

“We cannot keep going from shock to trance on the issue of energy security, rushing to propose action when gas prices rise, then hitting the snooze button when they fall again. The United States of America cannot afford to bet our long-term prosperity and security on a resource that will eventually run out. Not anymore. Not when the cost to our economy, our country, and our planet is so high. Not when your generation needs us to get this right. It is time to do what we can to secure our energy future.”

President Obama, March 30, 2011

Rising prices at the pump affect everybody – workers and farmers; truck drivers and restaurant owners. Businesses see it impact their bottom line. Families feel the pinch when they fill up their tank. For Americans already struggling to get by, it makes life that much harder. Demand for oil in countries like China and India is only growing, and the price of oil will continue to rise with it. That’s why we need to make ourselves more secure and control our energy future by harnessing all of the resources that we have available and embracing a diverse energy portfolio.

Every president since Richard Nixon has called for America’s independence from oil, but Washington gridlock has prevented action again and again. If we want to create a more secure energy future, and protect consumers at the pump, that has to change. When President Obama took office, America imported 11 million barrels of oil a day. Today, he pledged that by a little more than a decade from now, we will have cut that by one-third, and put forward a plan to secure America’s energy future by producing more oil at home and reducing our dependence on oil by leveraging cleaner, alternative fuels and greater efficiency.

We’ve already made progress toward this goal – last year, America produced more oil than we had in the last seven years. We’re taking steps to encourage more offshore oil exploration and production – as long as it’s safe and responsible. And, because we know we can’t just drill our way out of our energy challenge, we’re reducing our dependence on oil by increasing our production of natural gas and biofuels, and increasing our fuel efficiency. Last year, we announced ground-breaking fuel efficiency standards for cars and trucks that will save consumers thousands of dollars and conserve 1.8 billion barrels of oil.

And beyond our efforts to reduce our dependence on oil, we must focus on expanding cleaner sources of electricity, including renewables like wind and solar, as well as clean coal, natural gas, and nuclear power – keeping America on the cutting edge of clean energy technology so that we can build a 21st century clean energy economy and win the future.

To help us reach these goals, the *Blueprint for a Secure Energy Future* outlines a three-part strategy:

- **Develop and Secure America's Energy Supplies:** We need to deploy American assets, innovation, and technology so that we can safely and responsibly develop more energy here at home and be a leader in the global energy economy.
- **Provide Consumers With Choices to Reduce Costs and Save Energy:** Volatile gasoline prices reinforce the need for innovation that will make it easier and more affordable for consumers to buy more advanced and fuel-efficient vehicles, use alternative means of transportation, weatherize their homes and workplaces, and in doing so, save money and protect the environment. These measures help families' pocketbooks, reduce our dependence on finite energy sources and help create jobs here in the United States.
- **Innovate our Way to a Clean Energy Future:** Leading the world in clean energy is critical to strengthening the American economy and winning the future. We can get there by creating markets for innovative clean technologies that are ready to deploy, and by funding cutting-edge research to produce the next generation of technologies. And as new, better, and more efficient technologies hit the market, the Federal government needs to put words into action and lead by example.

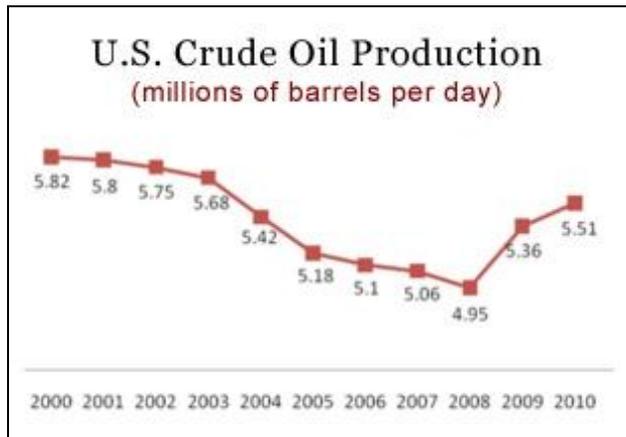
What follows is a roadmap that aims to distill some of the challenges at hand, and to outline strategies for surmounting those challenges that build on the strong record of what the Obama Administration has already accomplished and set in motion.

Executive Summary: *Blueprint for a Secure Energy Future*

Develop and Secure America's Energy Resources

Expand Safe and Responsible Domestic Oil and Gas Development and Production

Even as we develop next generation energy technologies, we will continue to rely on oil and gas.



Source: EIA

encouraging the exploration of new frontiers of production and of new ways to safely make use of domestic assets like our vast reserves of natural gas.

Last year, U.S. crude production reached its highest level since 2003. But we must ensure that production is safe, responsible, and efficient. In the wake of *Deepwater Horizon*, the Administration has reformed safety and environmental standards for oil and gas exploration, making structural reforms within the Department of the Interior to improve oversight. At the same time, we are encouraging exploration, development, and production—rewarding industry for effectively and responsibly utilizing resources that belong to the American people. Additionally, we are

Lead the World Towards Safer and More Secure Energy Supplies

We know that markets are global. The recent crude oil price increases, which translate into higher prices at the pump, have many causes, including the global economic recovery and unrest in the Middle East. But a major cause of the recent price rise is the concern that global oil demand will outpace supply over the next few years. The dependence of the global vehicle fleet on oil makes this problem especially acute. That's why we are working to reduce oil demand and increase reliable supplies of oil around the world in the years ahead, as we also work to diversify the fuel mix in our vehicle fleets. We have already taken, and will take more, steps at home both to reduce oil demand through efficiency, technology, and conservation and to increase domestic production in a manner that is safe and protects our environment. We are also acting in the international arena to moderate global oil demand and secure additional supplies of liquid fuels.

Provide Consumers with Choices to Reduce Costs and Save Energy

Reduce Consumer Costs at the Pump with More Efficient Cars and Trucks

Transportation is the second costliest expense for most American households, and it's responsible for more than 70 percent of our petroleum consumption. So, one of the best ways to make our economy less dependent on oil – and save consumers money – is simply to make our transportation more efficient. Since taking office, President Obama has taken bold steps to transform these challenges into opportunities across the transportation sector. These efforts

include the historic investments in advanced vehicle and fuel technologies, public transit, and high speed rail under the Recovery Act, as well as the ambitious new fuel economy standards put into place for cars and trucks – which will raise average fuel economy to 35.5 miles per gallon by 2016, and save 1.8 billion barrels of oil over the lifetime of the vehicles covered. These actions are already helping to lower transportation costs by reducing our dependence on oil, provide more transportation choices to the American people, and revitalize the U.S. manufacturing sector.

But we need a sustained effort, which is why the President set an ambitious goal that by 2015 we would have 1 million electric vehicles on the road, becoming the world’s leader in advance vehicle technologies. To help reach this goal, the President is proposing bold steps to improve the efficiency of all modes of transportation, from air to highways to rail to water, and to develop alternative fuels. He is continuing to push forward on fuel economy standards for cars and trucks. He has proposed to speed the adoption of electric vehicles with new more effective tax credits for consumers and support for communities that create an environment for widespread adoption of these advanced vehicles in the near term. And he is taking steps to encourage increased use of biofuels.

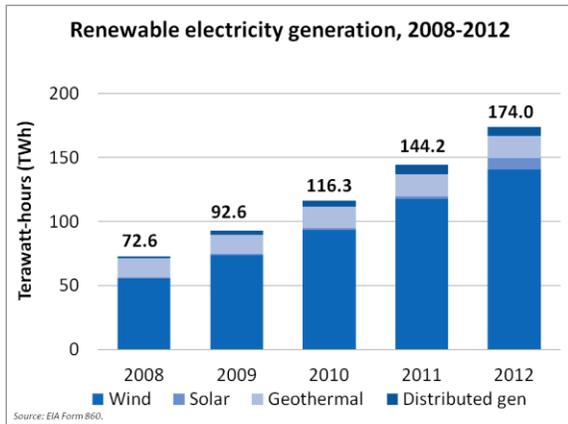
Cut Energy Bills with More Efficient Homes and Buildings

Our homes, businesses and factories account for more than 70 percent of the energy we consume, and we need to invest in energy efficiency in the residential, commercial, and industrial sectors to improve U.S. competitiveness, lower electricity bills, and protect our environment. This is why the President has laid out a bold vision for sparking a new home-grown industry in making our homes, buildings, and factories more energy efficient. The President’s plan lays a foundation for the private sector to dramatically scale up investments and reap the enormous benefits that come with greater energy efficiency. Because there is no “one size fits all” solution, the Administration is supporting a variety of programs that are tailored to the unique challenges of each sector and will leverage public dollars to encourage private sector investment and job creation. Building on efficiency investments in the Recovery Act , which have already led to the weatherization of about 350,000 projects that are helping lower income Americans reduce energy bills, the Administration’s ongoing efficiency agenda crosses sectors. It includes an ongoing commitment to passing HOMESTAR legislation to will help homeowners finance retrofits, a “Better Buildings Initiative” to make commercial facilities 20 percent more efficient by 2020, and a range of steps to promote industrial efficiency.

Innovate Our Way to a Clean Energy Future

Harness America’s Clean Energy Potential

A global race is underway to develop and manufacture clean energy technologies, and China and other countries are playing to win. To rise to this challenge, we need to tap into the greatest resource we have: American ingenuity. We have the most dynamic economy in the world, and there is no reason we can’t lead the world. But clean energy innovation, and the jobs that come with it, don’t just happen. That’s why, in his State of the Union address, President Obama proposed an ambitious but achievable standard for America: By 2035, we will generate 80 percent of our electricity from a diverse set of clean energy sources – including renewable energy sources like wind,



solar, biomass, and hydropower; nuclear power; efficient natural gas; and clean coal. A Clean Energy Standard (CES) will provide the signal investors need to move billions of dollars of capital off of the sidelines and into the clean energy economy, creating jobs across the country and reducing air pollution and greenhouse gas emissions.

We're already making great strides in this direction. Agencies across the Federal government, including the Departments of Energy, Agriculture, and the Interior, are working to promote clean energy deployment by

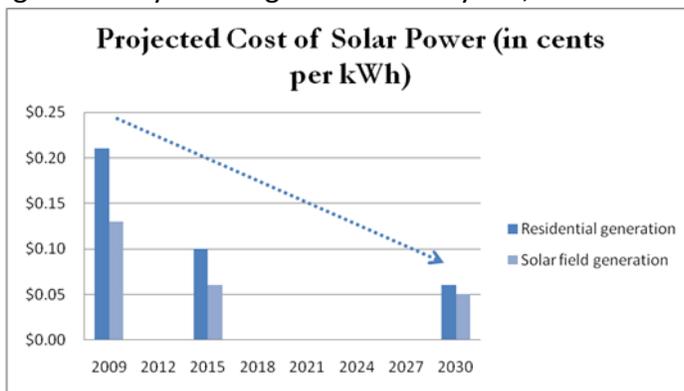
offering grants under the Recovery Act to renewable energy manufacturers and developers; funding cutting-edge R&D; modernizing our rural energy infrastructure; siting the world's largest solar power plants on public lands; and opening a new frontier for offshore wind development. Thanks to these concerted efforts, we are on track to double renewable energy generation by 2012.

Looking ahead, meeting the President's target will position the United States as a global leader in developing and manufacturing cutting-edge clean energy technologies. It will ensure continued growth in the renewable energy sector, building on the progress made in recent years. And it will spur innovation and investment in our nation's energy infrastructure, creating American jobs.

Creating a market for new technologies will be central to charting a path to a clean energy future – but there is more we need to do. For that reason, the Administration is also advancing policies that will help to modernize the electric power grid while ensuring a safe and reliable power plant fleet.

Win the Future Through Clean Energy Research and Development

Maintaining our leadership in research and development is critical to winning the future and deploying innovative technologies that will create quality jobs and move towards clean energy economy that reduces our reliance on oil. But as we aspire to achieve new breakthroughs – a battery that will take a car 300 miles on a single charge or a way to turn sunlight into fuel like gasoline, we are already beginning to see how our investments in the future are changing the game today. Through the Recovery Act, the Administration has invested in a host of clean energy



Source: DOE

Massachusetts startup that received a \$4 million ARPA-E grant to develop solar panel components

for 80 percent less than the current cost, and which has since secured \$33.4 million in private investment. These kinds of innovations can help us to achieve a “Sunshot” – making new solar technologies cost-competitive and achieving dreams of a clean energy future.

Lead by Example: Clean Energy and the Federal Government

As new technologies emerge, the Federal government has a responsibility to lead by example. Our government owns and manages approximately 500,000 buildings and operates more than 600,000 fleet vehicles. The electricity used for its buildings, the fuel used in its cars and trucks, and the energy required in military operations make it the largest energy consumer in the US economy. That’s why President Obama signed an Executive Order that made it the responsibility of every Federal agency to help move the nation towards a clean energy economy by leading by example, practicing what we preach, and improving the government’s energy efficiency while expanding our use of clean energy. And that’s why the *Blueprint* announces new steps, to improve the Federal fleet’s performance so that it is composed entirely of alternative fuel vehicles, is fuel-efficient.

DEVELOP AND SECURE AMERICA'S ENERGY SUPPLIES

Expand Safe and Responsible Domestic Oil and Natural Gas Development and Production

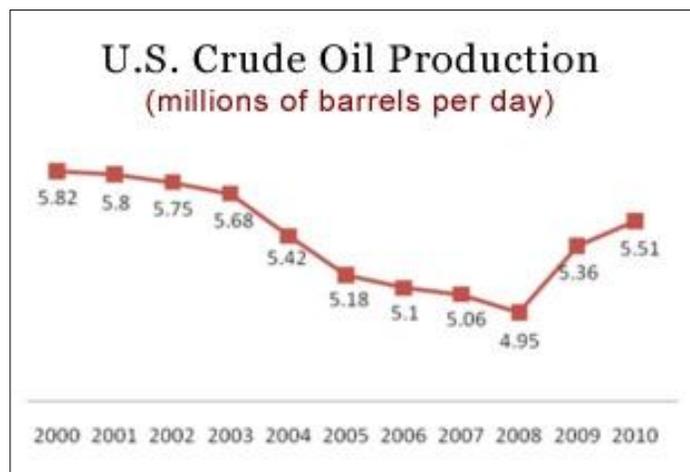
"All these actions can increase domestic oil production in the short and medium term. But let's be clear – it is not a long-term solution."

President Obama, March 11, 2010

The Challenge

America's oil and natural gas supplies are critical components of our Nation's energy portfolio. Their development enhances our energy security and fuels our Nation's economy. Recognizing that America's oil supplies are limited, we must develop our domestic resources safely, responsibly, and efficiently, while taking steps that will ultimately lessen our reliance on oil and help us move towards a clean energy economy.

Over the last two years, domestic oil and natural gas production has increased. In 2010, American oil production reached its highest level since 2003, and total U.S. natural gas production reached its highest level in more than 30 years. Much of this increase has been the result of growing natural gas and oil production from shale formations as a result of recent technological advances. These resources, when developed with appropriate safeguards to protect public health, will play a critical role in domestic energy production in the coming decades.



Source: EIA

America's public lands and Federal waters provide resources that are critical to the nation's energy security. To encourage robust exploration and development of the nation's resources, the Administration has offered millions of acres of public land and Federal waters for oil and gas leasing over the last two years. Oil production from the Outer Continental Shelf increased more than a third – from 446 million barrels in 2008 to more than 600 million barrels of estimated production in 2010. Responsible oil production from onshore public lands also increased over the past year – from 109 million barrels in 2009 to 114 million barrels in 2010. These increases are occurring at the same time that oil imports are decreasing; for the first time in a decade, imports accounted for less than half of what we consumed.

Of course the *Deepwater Horizon* oil spill served as a reminder that we must develop our domestic energy resources both safely and responsibly. Eleven men died and Americans watched as nearly five million barrels of oil spilled into the Gulf of Mexico. Subsequent reviews exposed significant weaknesses in the regulatory process and an industry unduly complacent about the safety of offshore oil and gas development. The tragedy underscored the need for exploration and production to proceed with the utmost consideration for achieving the world's highest standards for safe and responsible production.

Progress to Date

- **Raising the Bar for Safety:** In response to the *Deepwater Horizon* oil spill in the Gulf of Mexico, the Obama Administration has launched the most aggressive and comprehensive reforms to offshore oil and gas regulation and oversight in U.S. history. The reforms, which strengthen requirements for everything from well design and workplace safety to corporate accountability, are helping to ensure that the U.S. can safely and responsibly expand development of its offshore energy resources. These unprecedented reforms set standards and certification protocols for well design, testing, and control equipment and establish rigorous performance standards to reduce workplace error and require operators to maintain comprehensive safety and environmental management programs.

Already, the Administration has launched commonsense requirements to improve safety, including directing deepwater operators to demonstrate that they have the capability to contain a sub-sea discharge like the *Deepwater Horizon* oil spill. Since these important new standards were put into place, the Department of the Interior has continued to issue shallow water permits – and the pace of deepwater permitting has escalated now that operators have begun successfully demonstrating containment capability.

- **Ensuring Efficiency and Integrity of Oversight:** The Administration is reforming and strengthening offshore energy oversight by re-organizing the former Minerals Management Service into three separate agencies to eliminate conflicts, restore integrity by separating the functions of managing development of the Nation's offshore resources: enforcing safety and environmental standards, and collecting revenues. Upon completion of the re-organization, the three separate agencies will include:

- **Office of Natural Resources Revenue (ONRR)**, which has already been established and is responsible for collecting royalties, rents, and other revenue;
- **Bureau of Ocean Energy Management (BOEM)**, which will be responsible for managing development of the nation's offshore resources, including oil, gas and renewable resources and;
- **Bureau of Safety and Environmental Enforcement (BSEE)**, which will independently and rigorously enforce safety and environmental regulations. To foster a culture of safety and rigor, DOI is recruiting new expertise – including inspectors, engineers, and scientists – and establishing heightened ethical standards for all personnel.

- **Improving Offshore Drilling Safety, Well Containment, and Spill Response:** The Administration established the Ocean Energy Safety Advisory Committee, which will bring government, industry, academia and other stakeholders together to drive advancements in safety equipment and technology.
- **Identifying the Best Public Land Sites for Development:** Domestic oil and gas development, both onshore and offshore, should take place in the right places to minimize harm to the environment as well as to public health and safety. Onshore, the Administration has implemented important reforms that require adequate planning and analysis to identify potential areas where development is most appropriate. These reforms have taken place while millions of acres of public land are offered for exploration and production. In 2010, 29 onshore oil and gas lease sales were held, covering 3.2 million acres, including one sale within the National Petroleum Reserve-Alaska encompassing approximately 1.8 million acres. In 2011, over 30 sales on public lands are expected. Offshore, in 2010, 37 million acres in the Gulf of Mexico were offered for lease. In addition, the Administration is developing a 5-year (2012-2017) comprehensive plan for offshore oil and gas exploration and production, which will ensure that areas with active leases, including the Gulf of Mexico and Alaska, are considered for further leasing and development. The strategy also calls for conducting studies to assess the potential oil and gas resources available in the Mid - and South Atlantic.
- **Maximizing Operational Efficiency and Reducing Air Emissions:** The Natural Gas STAR Program, a flexible, voluntary partnership between EPA and oil and natural gas operating companies, encourages companies—both in the United States and internationally—to adopt proven, cost-effective technologies and practices that improve operational efficiency and reduce methane emissions. This very successful voluntary program has 130 domestic partner companies and 8 international partner companies. EPA and partner companies have identified over 80 technologies and practices that can cost-effectively reduce methane emissions from the oil and natural gas sector. Natural Gas STAR partners reported domestic emissions reductions of 86 Bcf, worth over \$421 million, in 2009.

Moving Forward

- **Continuing to Ensure the “Gold Standard” for Safe and Responsible Oil and Gas Development:** The Administration will continue to review the existing regulatory structures governing both onshore and offshore oil and gas development and identify potential efficiencies in those processes and any crucial gaps that pose safety or environmental risks.
- **Providing Incentives to Spur Efficient Oil and Gas Development:** The President recently directed the Department of Interior to determine the acreage of public lands (onshore and offshore) that have been leased to oil and gas companies and remain undeveloped. More than 70 percent of the tens of millions of offshore acres under lease are inactive—including almost 24 million inactive leased acres in the Gulf of Mexico, where an estimated 11.6 billion barrels of oil and 59.2 trillion cubic feet of natural gas of technically recoverable resources are going unused. Onshore, about 57 percent of leased acres – almost 22 million acres in total – are neither being explored nor developed.

The American taxpayer – owners of our Nation’s public lands – have a right to expect that companies given access to public lands for oil and gas development will develop the resources efficiently or step aside to allow other companies to do so. The Administration is evaluating potential changes to elements of the leasing process that will encourage timely development. These potential changes include:

- **Using Shorter Lease Terms to Encourage Rapid Development:** Adopting shorter lease terms, particularly onshore, would provide industry with a built-in incentive to develop leases more rapidly. Adopting this approach would also trigger the earlier release of non-producing leases, making them available to other companies who may be more willing or able to invest in their development. Offshore, the Administration has already implemented adjustments to lease terms for shallower waters. The terms of onshore leases, which currently are issued for standard 10-year terms, are constrained by a nearly century-old statute.
 - **Rewarding Rapid Development with Lease Extensions.** The Administration is taking a new approach to lease-extensions that rewards diligence by tying extensions more directly to lessee investment in exploration in development. For offshore leases, DOI has already begun to implement this new approach—for example, by requiring the spudding of a well before a lease extension is granted. DOI plans to build on recent reforms for both offshore and onshore leasing, so that when companies approach lease deadlines or apply for extensions, their record of demonstrating diligent exploration and development will help determine whether they should be able to continue using their leases, or whether those leases would be better utilized by others.
 - **Rewarding Rapid Development through Rental Payments and Graduated Royalties:** Although the price of oil and gas provides the primary financial incentive for current leaseholders to move forward in diligently investing in their leases, different fee and royalty structures may promote more expedited development. For example, Texas has used a graduated royalty rate system to provide developers with a discounted royalty rate if production occurs in the earlier years of a lease. The FY 2012 Budget proposes initial steps to encourage more rapid development.
- **Developing Region-Specific Strategies to Facilitate Responsible Development:** The Administration will continue to evaluate the feasibility of oil and gas development in frontier areas and develop appropriate strategies to facilitate responsible development in those areas identified as having great potential for domestic oil and gas production. Also, the Administration will integrate feasibility evaluations into the longer term Coast and Marine Spatial Planning process being undertaken as part of the National Ocean Policy.
- **Alaska – Onshore and Offshore Development:** Facilitating responsible development in Alaska poses unique challenges, given that many areas of Alaska are frontier areas where less is known about the scope of economically recoverable oil and gas resources, the potential environmental and public health impacts of production, and exploration and development can be more difficult given the often-harsh conditions of the area. As a result, planning and exploration activities can take longer than in other areas of the U.S., making

the above incentives and other changes potentially inappropriate for Alaska. The Administration remains committed, however, to facilitating development in this region, which will require coordination across the Federal government. Accordingly, the Administration is creating a high-level, cross-agency team to access opportunities to coordinate and facilitate a more efficient offshore permitting process in Alaska, while ensuring that safety, health, and environmental standards are fully met.

Mid- and South Atlantic – Offshore Development: Ensuring that development takes place in the right ways and the right places is critical to the success of both renewable and conventional energy strategies. DOI is currently conducting environmental analysis on potential seismic testing in the Mid and South Atlantic planning areas, which would help determine the scope of potential recoverable resources in this region.

➤ **Encouraging Responsible Development Practices for Natural Gas:** Recent technology and operational improvements in extracting natural gas resources, particularly shale gas, have increased gas drilling activities nationally and led to significantly higher natural gas production estimates for decades to come. In order to take full advantage of this important domestic energy resource, we must proactively address concerns that have been raised regarding potential negative impacts associated with hydraulic fracturing (“fracking”) practices. That is why the Administration is taking steps to address these concerns and ensure that natural gas production proceeds in a safe and responsible manner. Initiatives supported by the Administration include:

- **Disclosure of Fracking Chemicals:** The Administration is calling on industry to be more transparent about the use of fracking chemicals.
- **Leading by Example:** In April, DOI will hold a series of regional public meetings to discuss the potential for expanding shale gas production on Federal lands. These events will provide a forum to develop a framework for responsible production on public lands.
- **Research:** The Federal government will conduct research to examine the impacts of fracking on water resources. At Congress’ direction, EPA will continue with its study of fracturing impacts on drinking water and surface water, and DOE will likewise sponsor research on these issues.

Setting the Bar for Safety and Responsibility: To provide recommendations from a range of independent experts, the Secretary of Energy, in consultation with the EPA Administrator and Secretary of Interior, should task the Secretary of Energy Advisory Board (SEAB) with establishing a subcommittee to examine fracking issues. The subcommittee will be supported by DOE, EPA and DOI, and its membership will extend beyond SEAB members to include leaders from industry, the environmental community, and states. The subcommittee will work to identify, within 90 days, any immediate steps that can be taken to improve the safety and environmental performance of fracking and to develop, within six months, consensus recommended advice to the agencies on practices for shale extraction to ensure the protection of public health and the environment.

- **Offering Technical Assistance to State Regulators:** States exercise oversight of oil and gas drilling using delegated authority under Federal environmental laws and additional authorities under state law. Some have made more progress than others on enhancing protections to deal with the challenges of fracking. DOE and EPA are establishing a mechanism to provide technical assistance to states to assess the adequacy of existing state regulations. EPA will continue to perform a strong backstop role under Federal environmental laws and will take actions, as necessary, to protect public health and the environment.

Tab S - EPA Draft National Rivers and Streams Assessment

NRSA Comments

South Dakota Department of Environment and
Natural Resources

Patrick Snyder

NRSA Technical Document

Table F-1. Nutrient and Salinity Category Criteria for NRSA Assessment

Ecoregion	Salinity as Conductivity (µS/cm) Good-Fair	Salinity as Conductivity (µS/cm) Fair-Poor	Total N (µg/L) Good-Fair	Total N (µg/L) Fair-Poor	Total P (µg/L) Good-Fair	Total P (µg/L) Fair-Poor
CPL	500	1000	1092	2078	56.3	108
NAP	500	1000	329	441	8.2	15.7
SAP	500	1000	296	535	17.8	24.4
UMW	500	1000	716	1300	21.6	44.7
TPL	1000	2000	1750	3210	165	338
NPL	1000	2000	948	1570	91.8	183
SPL	1000	2000	698	1570	52.0	95.0
WMT	500	1000	131	229	14.0	36.0
XER	500	1000	246	462	35.5	70.0

Assigning Conditions to Sites

SITE_ID	FW_ECO9	PTL	PTL_COND	WGTNRSA09
FW08TX045	CPL	50.095	Good	2856.86321
FW08MS038	CPL	50.16	Good	1797.020464
FW08AR088	CPL	50.199	Good	1217.875312
FW08FL032	CPL	50.53	Good	95.71833047
FW08FL075	CPL	52.226	Good	1443.405585
FW08FL006	CPL	52.704	Good	74.90203981
FW08FL025	CPL	53.109	Good	77.20109705
FW08DE011	CPL	55.071	Good	123.4970313
FW08AR017	CPL	55.948	Good	219.8559518
FW08LA006	CPL	56.31	Fair	1252.656303
FW08AR084	CPL	56.477	Fair	714.6330036
FW08LA039	CPL	57.006	Fair	103.7228523

SITE_ID	FW_ECO9	PTL	PTL_COND	WGTNRSA09
FW08MS010	CPL	103.881	Fair	970.8940624
FW08FL064	CPL	104.863	Fair	1443.405585
FW08AR052	CPL	105.034	Fair	146.6308015
FW08SC014	CPL	105.565	Fair	123.8125791
FW08GA054	CPL	106.173	Fair	3535.217565
FW08DE001	CPL	106.271	Fair	866.430957
FW08AR013	CPL	108.661	Poor	1217.875312
FW08GA018	CPL	110.106	Poor	252.7802905
FW08AR012	CPL	111.559	Poor	142.26412
FW08SC019	CPL	113.773	Poor	333.7616676
FW08GA006	CPL	114.014	Poor	252.7802905
FW08TN028	CPL	114.119	Poor	3686.689357

What Happened?

Northern Plains Example
Published Threshold
Good/Fair - Total P – 91.8 ug/L

SITE_ID	FW_ECO9	PTL	PTL_COND	WGTNRSA09
FW08WY061	NPL	13.6969	Good	355.4242971
FW08SD017	NPL	16.0913	Good	292.3687298
FW08MT090	NPL	16.6375	Good	311.6537221
FW08MT071	NPL	17.1944	Good	311.6537221
FW08WY038	NPL	17.7681	Good	34.71345642
FW08MT049	NPL	19.29	Fair	335.7143341
FW08SD091	NPL	19.725	Fair	40.51438747
FW08MT066	NPL	20.2531	Fair	362.3787377
FW08ND142	NPL	20.2788	Fair	87.06703563

Northern Plains Example
Published Threshold
Fair/Poor - Total P – 183 ug/L

SITE_ID	FW_ECO9	PTL	PTL_COND	WGTNRSA09
FW08SD039	NPL	20.4125	Fair	109.7145575
FW08WY058	NPL	21.5263	Fair	34.71345642
FW08SD006	NPL	22.0513	Fair	88.75744281
FW08MT014	NPL	23.105	Fair	385.1368345
FW08SD067	NPL	23.5975	Fair	40.51438747
FW08ND002	NPL	25.115	Poor	172.5853193
FW08SD052	NPL	25.3406	Poor	109.7145575
FW08WY054	NPL	26.8038	Poor	355.4242971
FW08SD040	NPL	27.5481	Poor	40.51438747
FW08SD046	NPL	28.6338	Poor	78.68567174

Threshold Value Errors

Water Quality

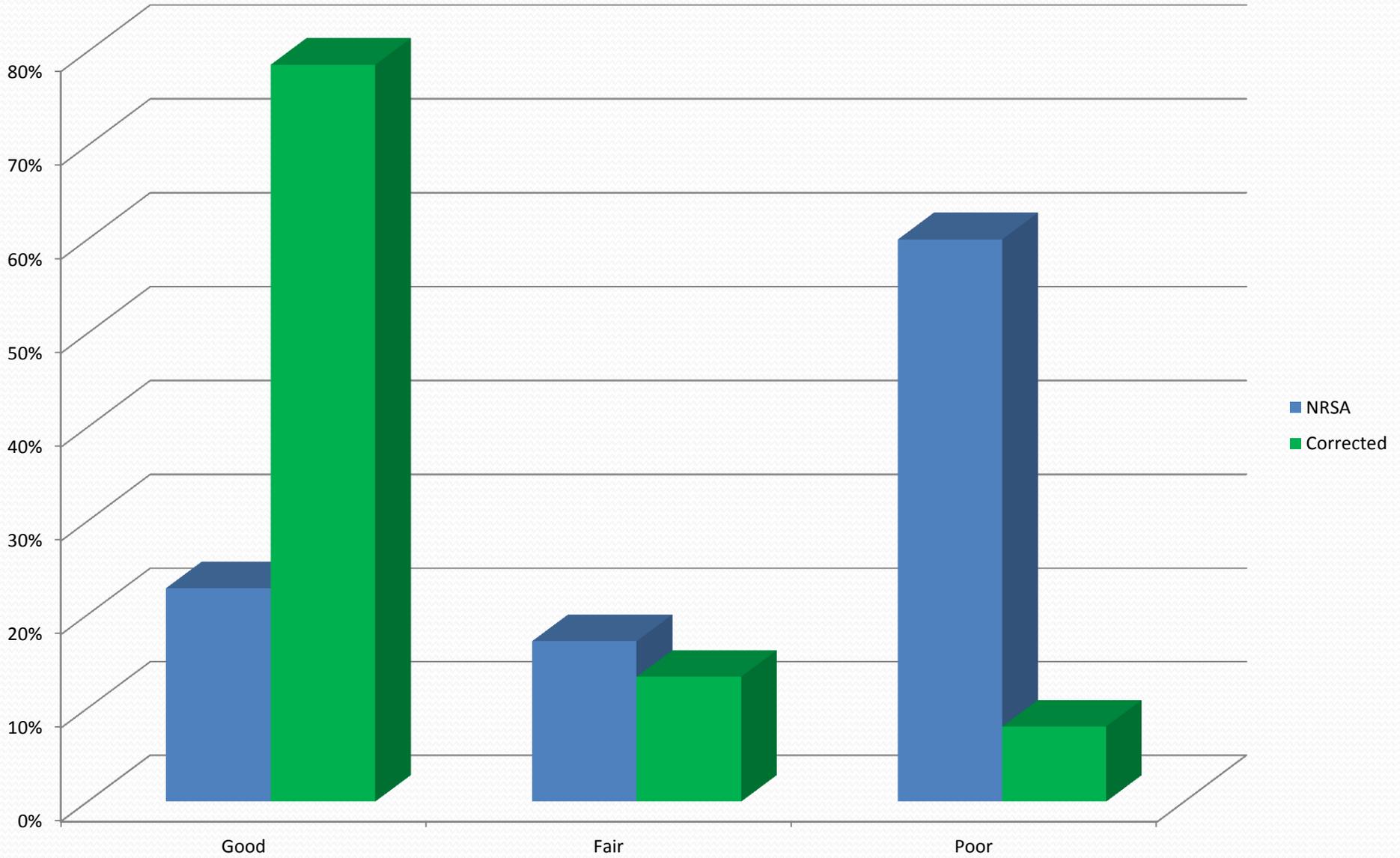
- Southern Appalachians -> Northern Plains
- Northern Plains-> Temperate Plains
- Southern Plains-> Upper Midwest
- Upper Midwest -> Southern Appalachians
- ????? -> Southern Plains

Threshold Values Errors

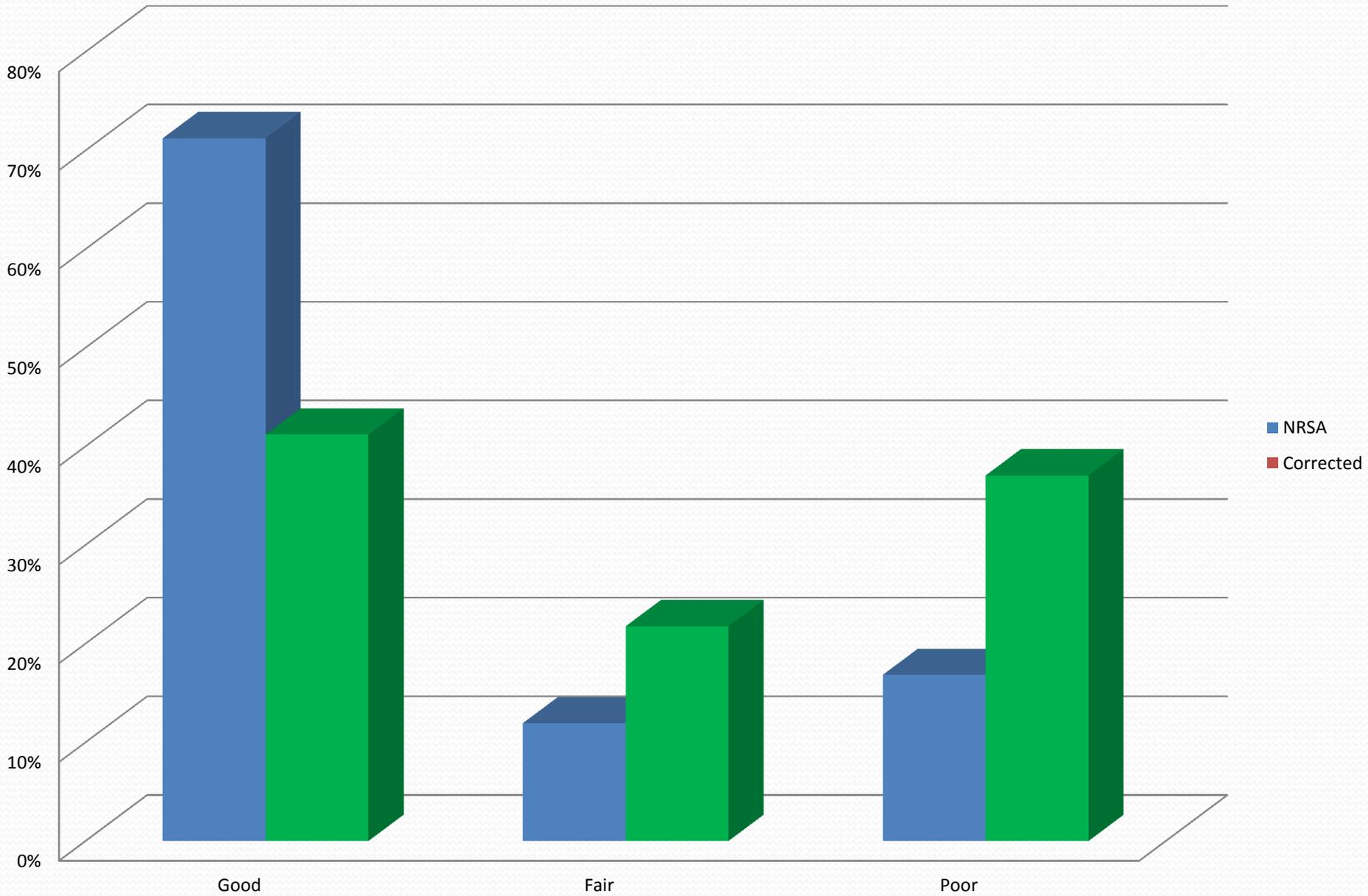
Fish MMI

- ?????? -> Southern Appalachians
- ?????? -> Western Mountains
- ?????? -> Xeric West

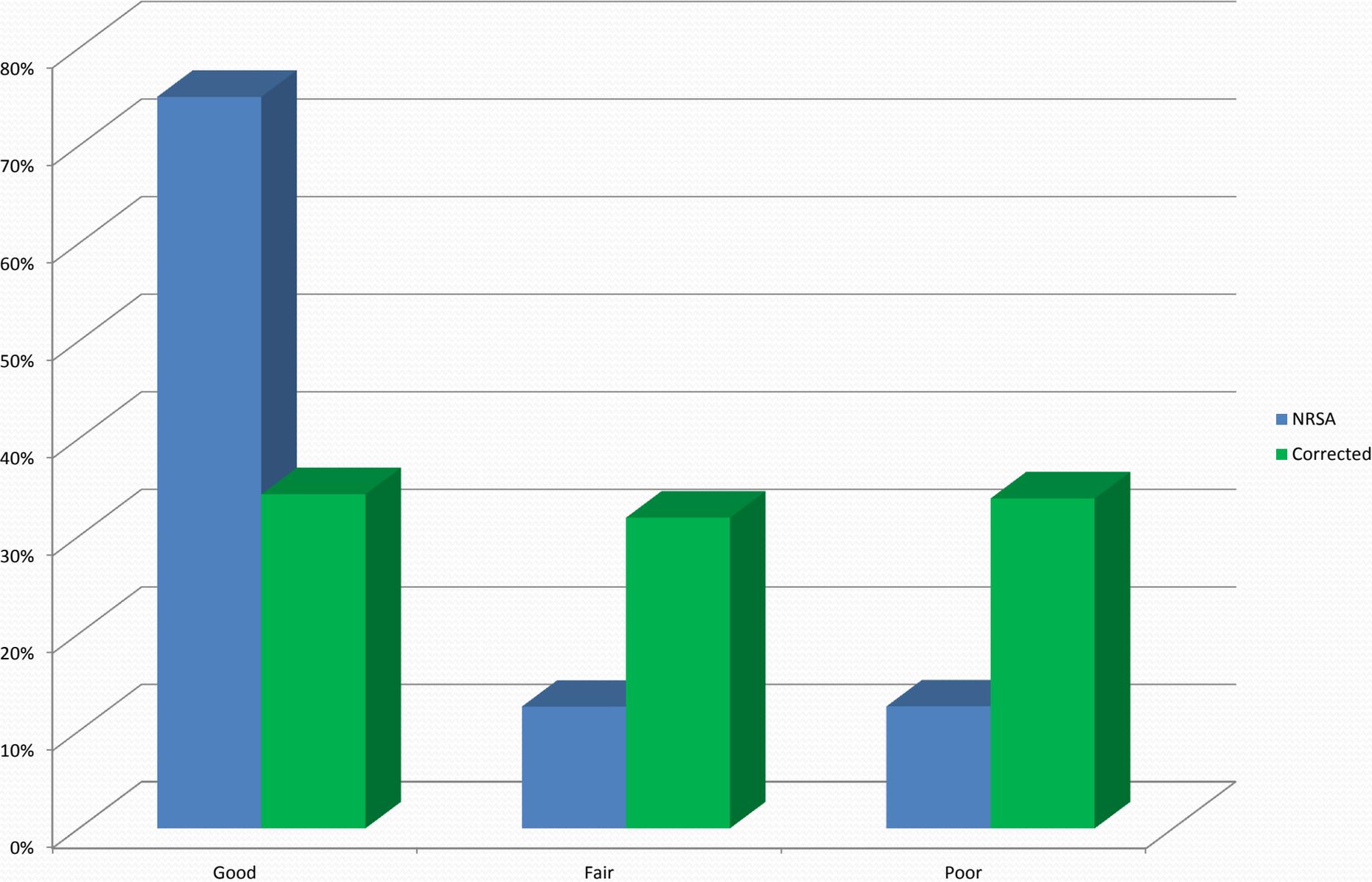
Northern Plains Total N



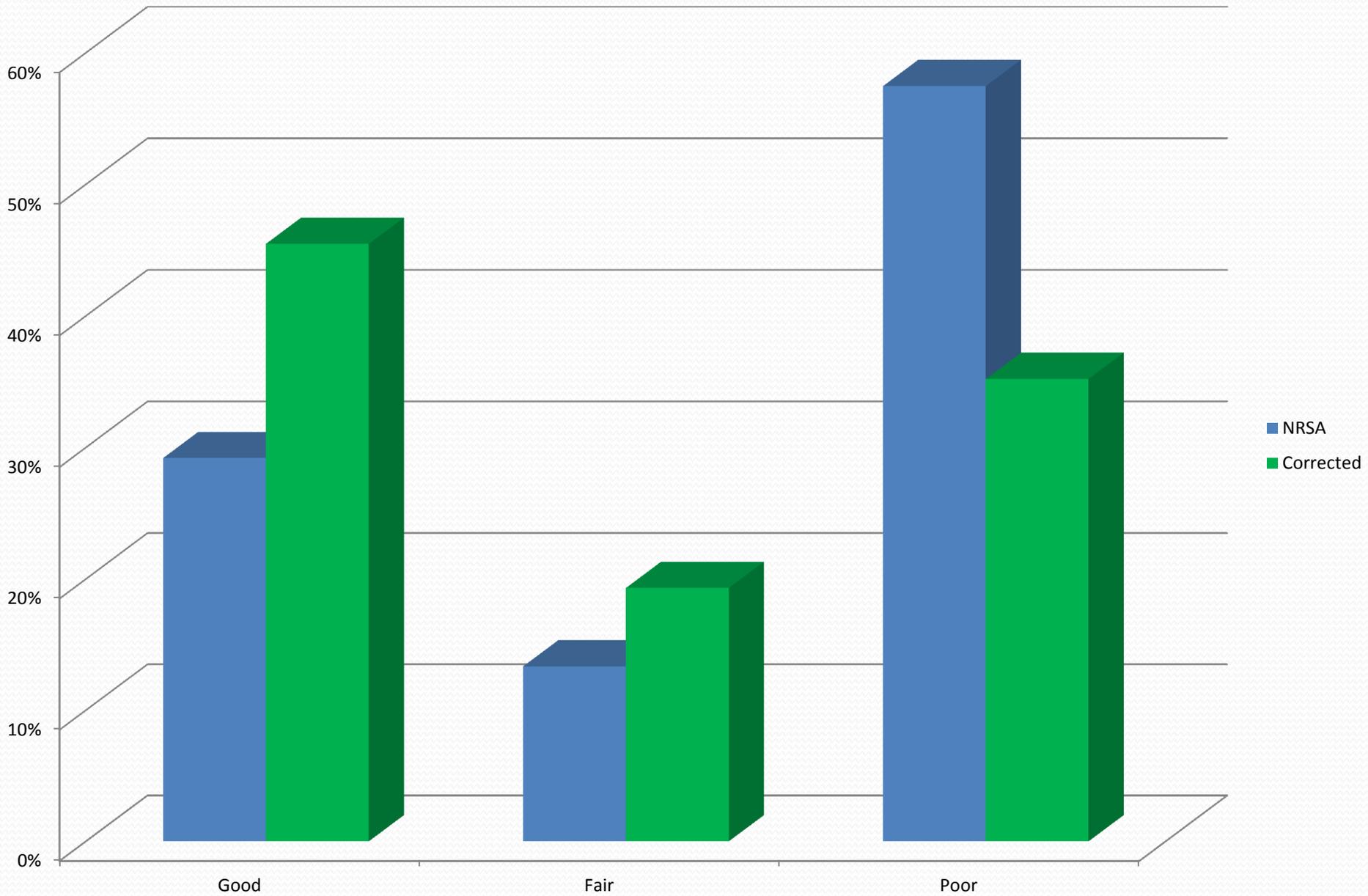
Southern Appalachian Total N



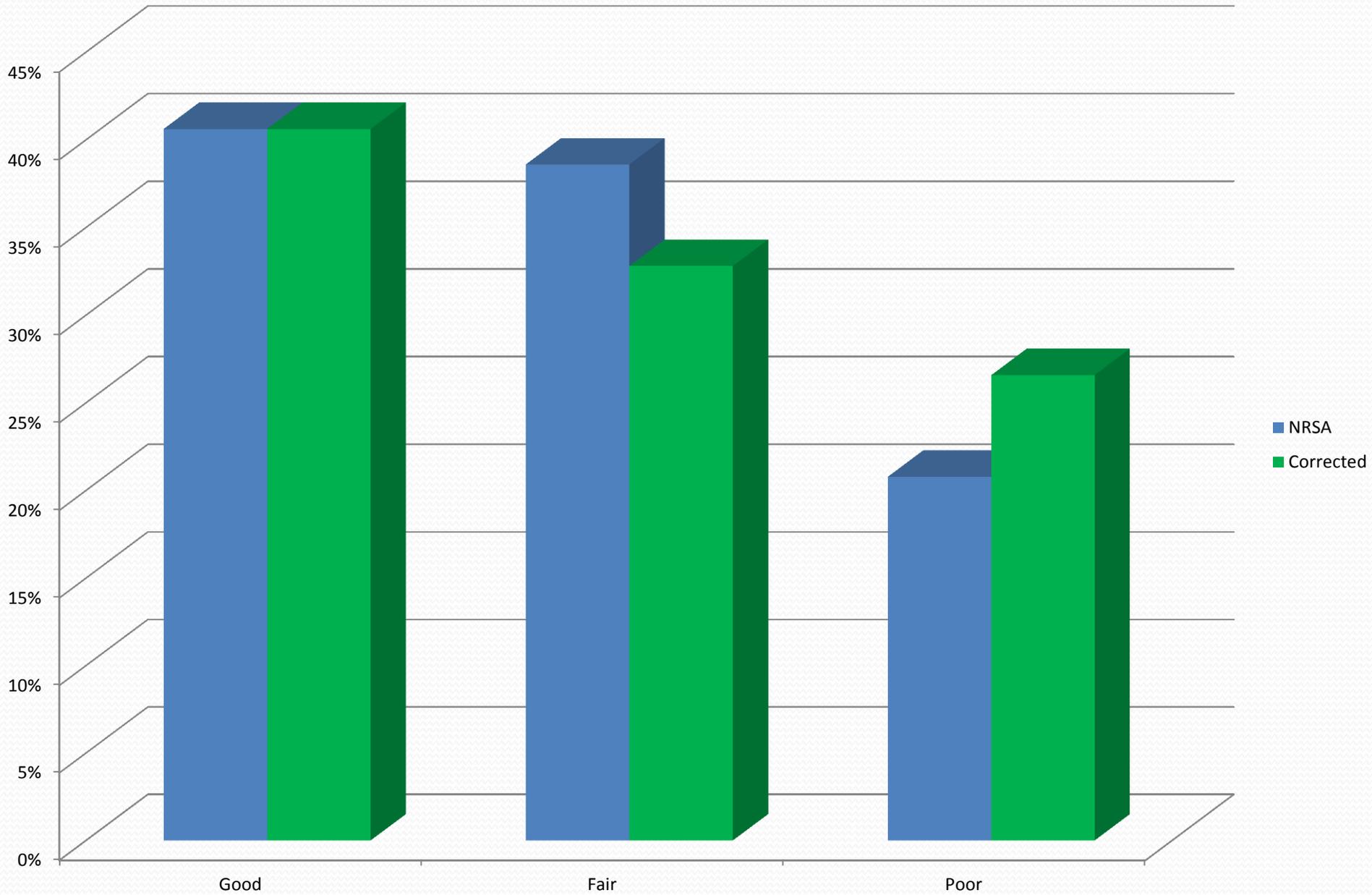
Southern Plains Total N



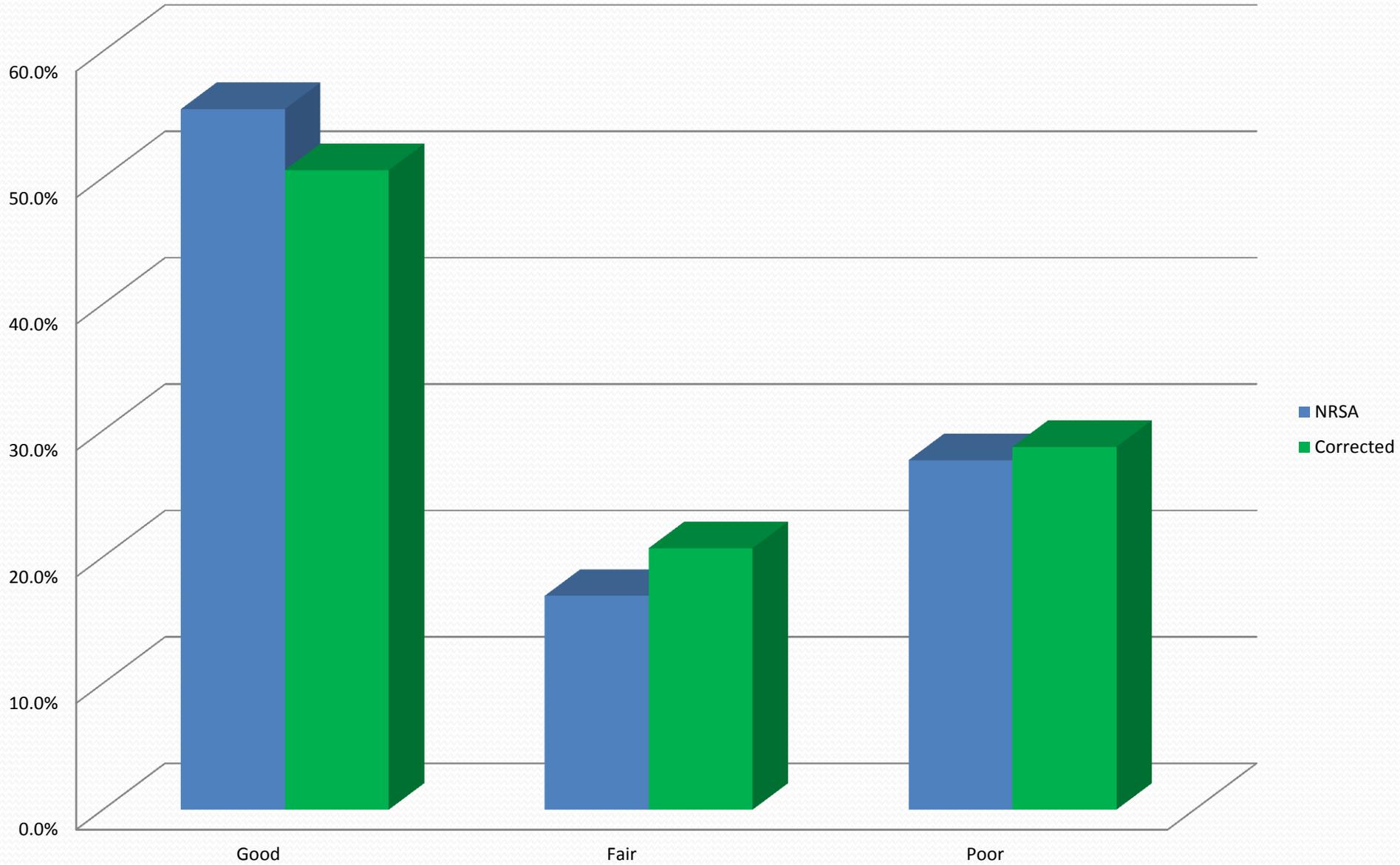
Temperate Plains Total N



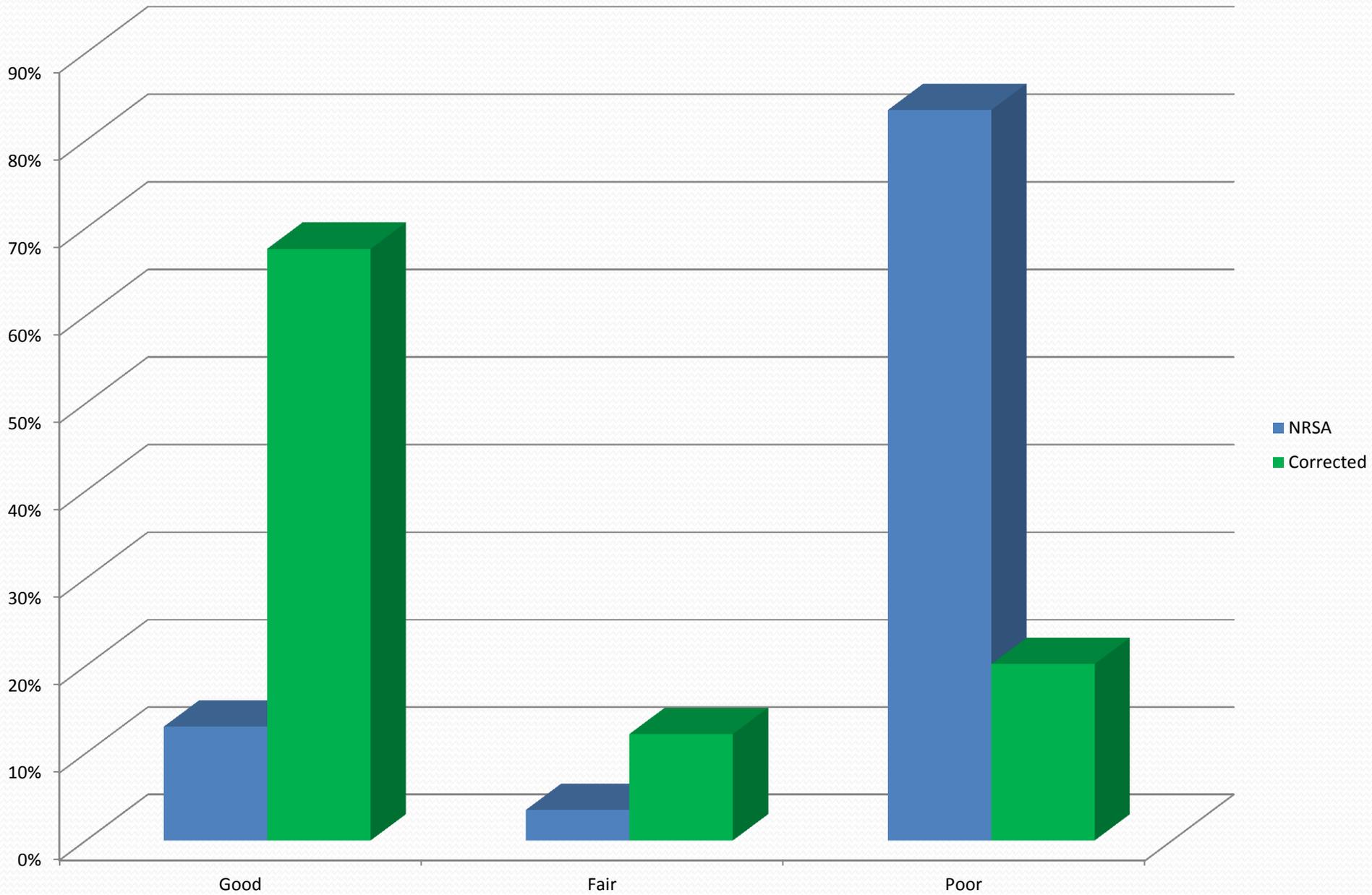
Upper Midwest Total N



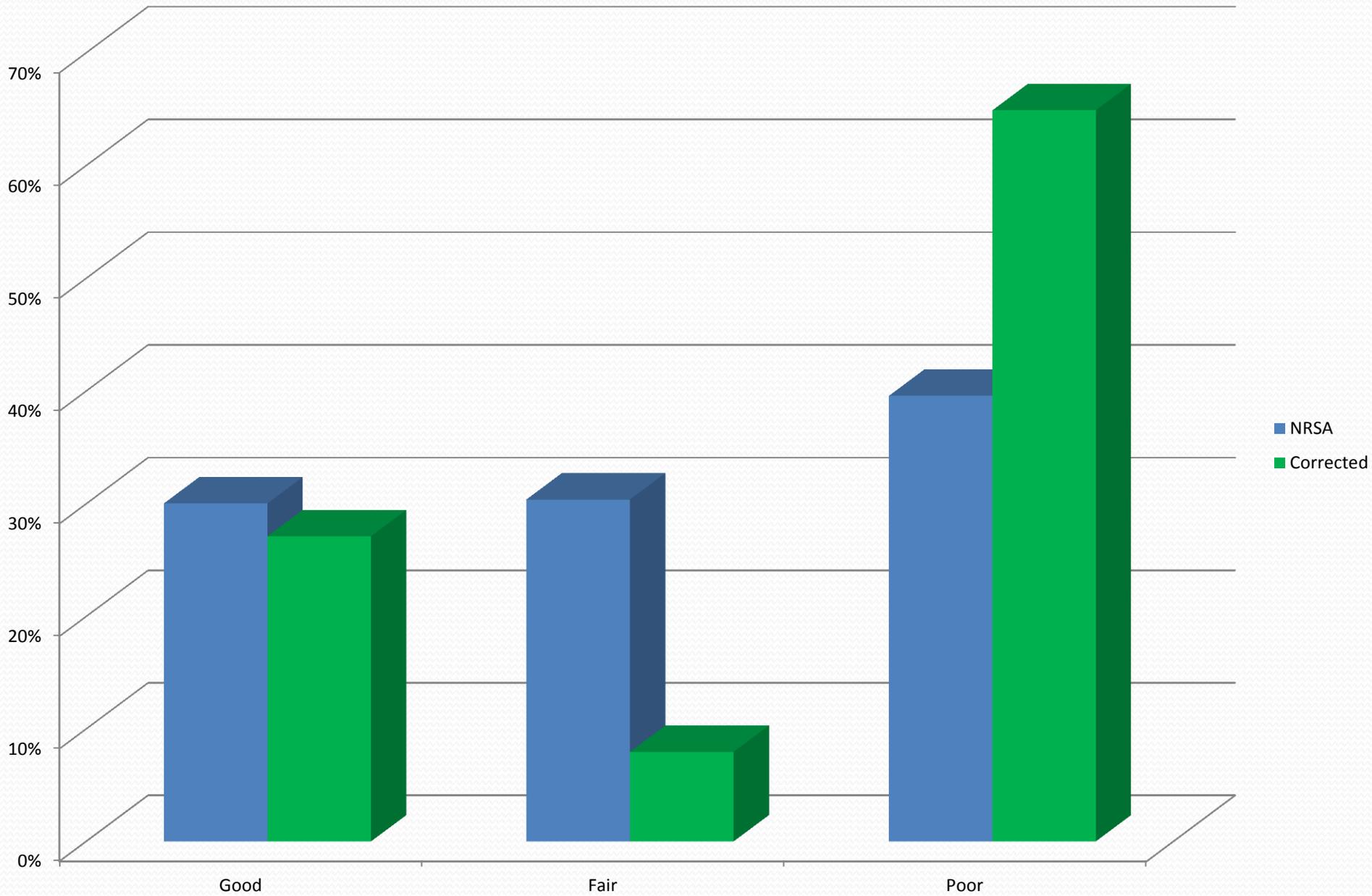
National Total N



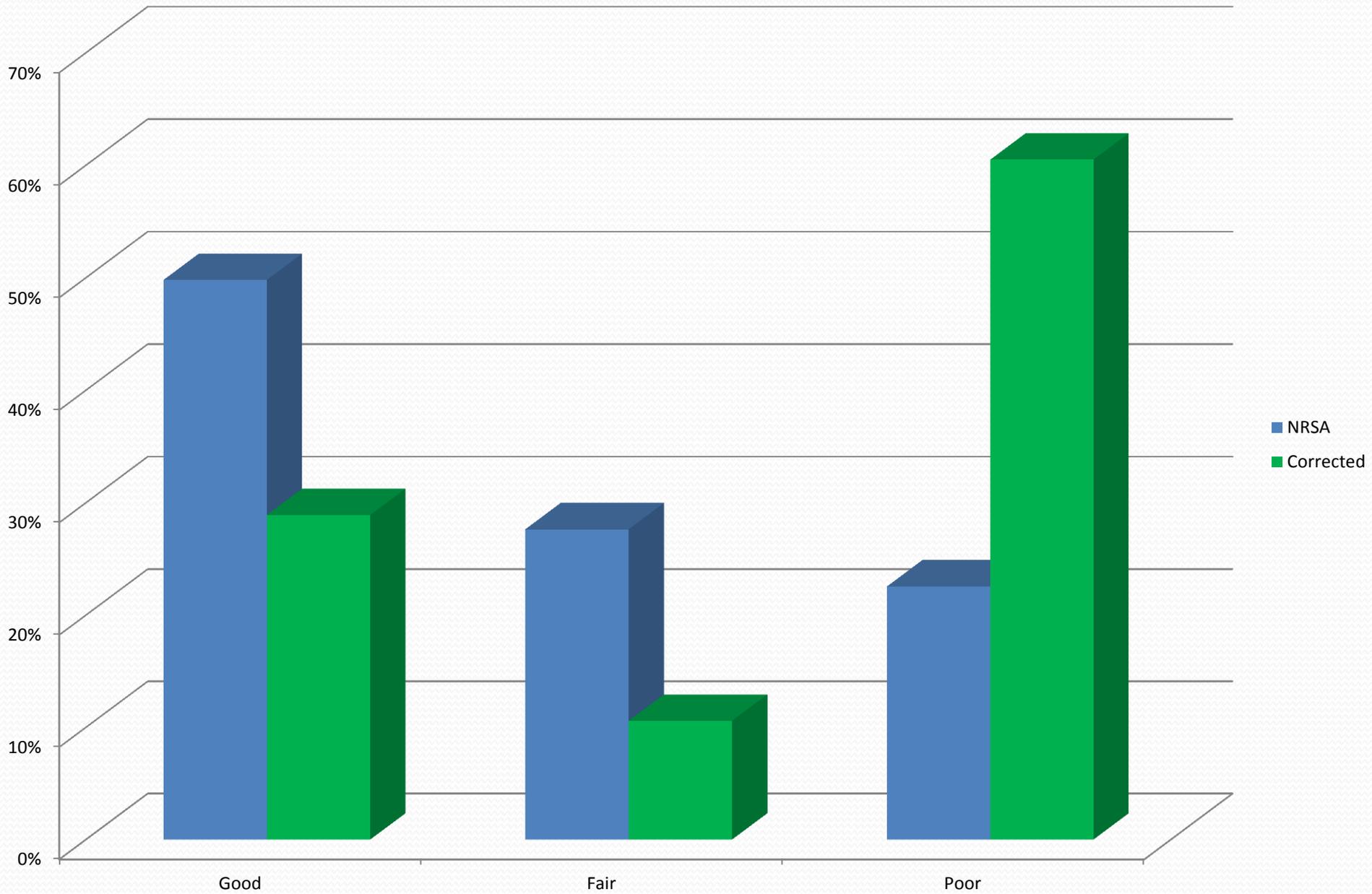
Northern Plains Total P



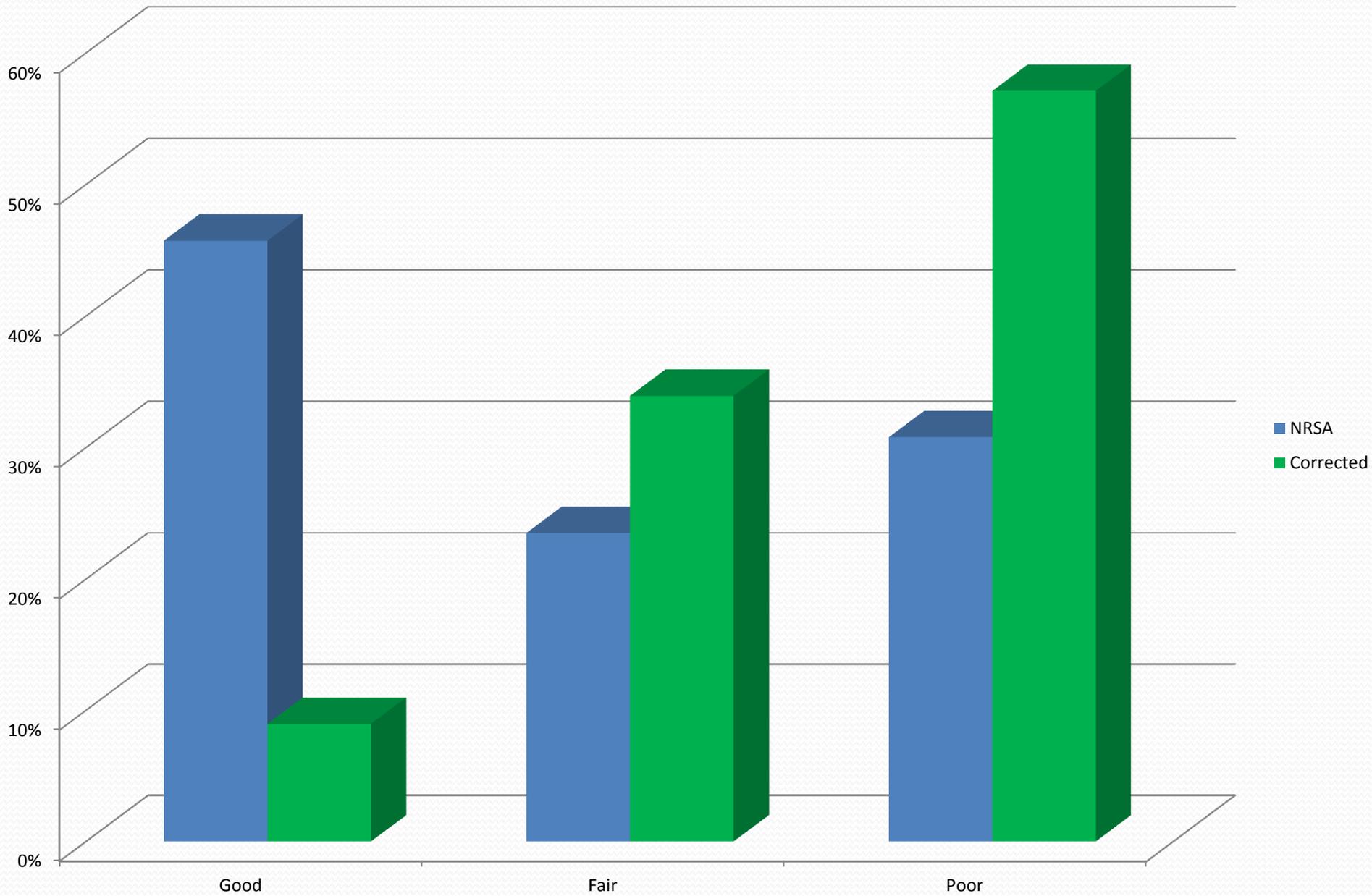
Southern Appalachians Total P



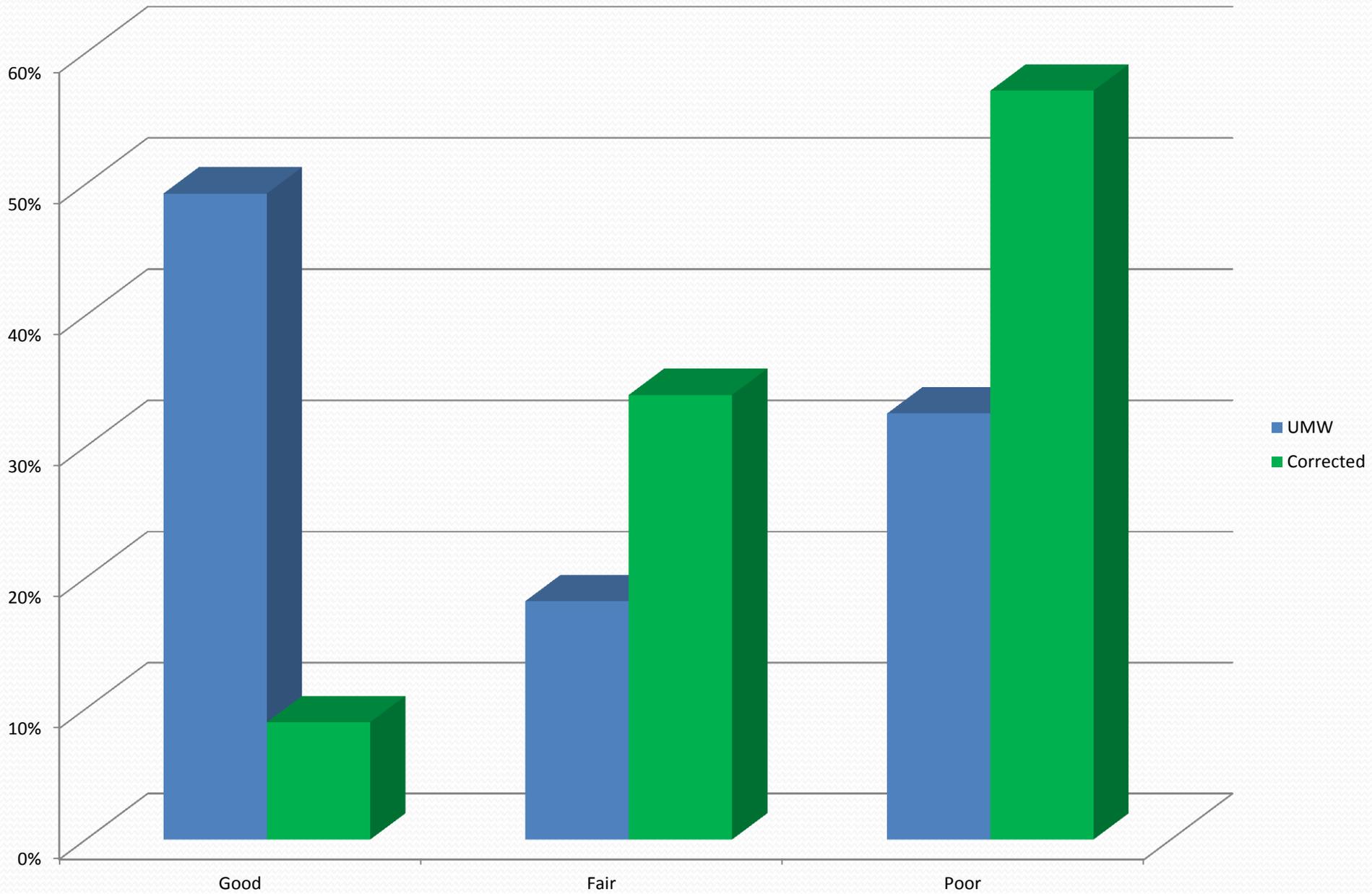
Southern Plains Total P



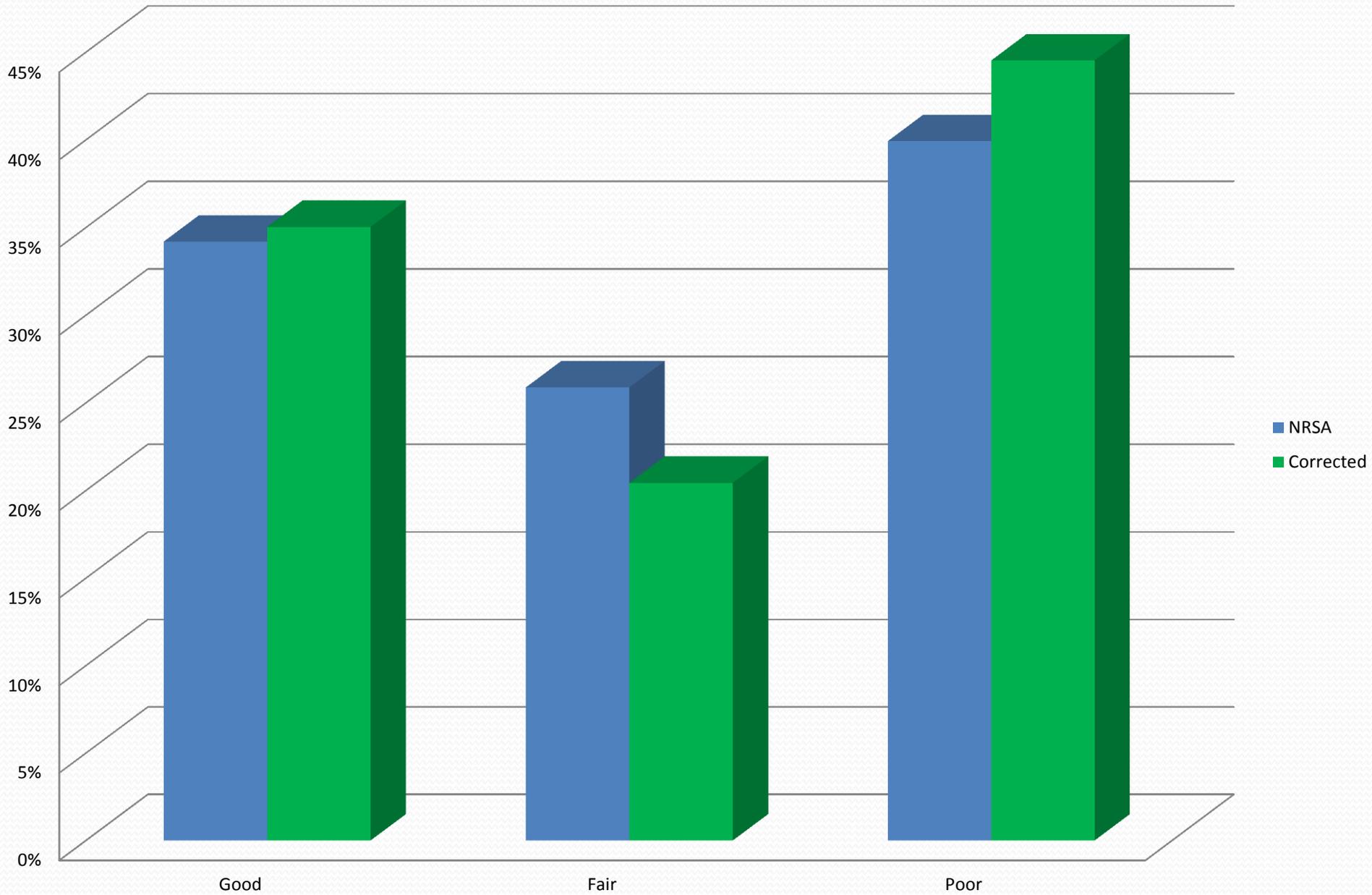
Temperate Plains Total P



Upper Midwest Total P



National Total P



Number of Site Condition Errors Water Quality

Ecoregion	Conductivity	Nitrogen	Phosphorus
CPL	0	2	0
NAP	0	0	0
NPL	78	125	119
SAP	0	170	82
SPL	0	81	76
TPL	0	85	103
UMW	55	10	89
WMT	0	0	0
XER	0	0	0
Grand Total	133	473	469



Questions?



DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES

JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3181
denr.sd.gov

May 8, 2013

Ellen Tarquinio
USEPA Headquarters
Ariel Rios Building
1200 Pennsylvania Avenue, N. W.
Mail Code: 4503T
Washington, DC 20460

RE: 2008 – 2009 National Rivers and Streams Assessment

Dear Ms. Tarquinio:

Thank you for the opportunity to comment on the draft 2008-2009 National Rivers and Streams Assessment (NRSA). This report received a significant amount of press coverage when EPA released its draft. EPA's fact sheet states 55% of the nation's river and stream miles do not support healthy populations of aquatic life. Phosphorus and nitrogen pollution and poor habitat were identified as the most widespread problems.

The South Dakota Department of Environment and Natural Resources is the state agency charged with protecting South Dakota's lakes and streams. Portions of South Dakota are in the following three ecoregions: Northern Plains, the Temperate Plains, and the Western Mountains. After reviewing the draft NRSA, the draft technical report, and the associated data, we were disappointed to find a number of significant errors. While these errors are detailed in the attached comments, a couple of these errors are described briefly below.

The following table lists the ecoregions where the incorrect threshold values were used to determine stream conditions based on phosphorus and nitrogen concentrations, and the number of stream miles in poor condition based on both the NRSA analysis and the Department's analysis. As highlighted in the table, the NRSA grossly overestimates the stream miles in poor condition for two of the ecoregions that include portions of South Dakota.

Ecoregions	% Miles Poor Condition Phosphorus		% Miles Poor Condition Nitrogen	
	NRSA % miles	Corrected % miles	NRSA % miles	Corrected % miles
Northern Plains	84	20	60	8
Southern Appalachians	40	65	17	37
Southern Plains	23	61	13	34
Temperate Plains	31	11	58	35
Upper Midwest	33	57	21	27

Based on our comparison to the published threshold values, nitrogen and phosphorus in the Northern Plains and Temperate Plains are not nearly as significant as EPA claims in the NRSA.

For the Temperate Plains, the macroinvertebrate MMI conditions are particularly at odds with the other biological indicators as well as the water chemistry and physical habitat indices. This may suggest the macroinvertebrate MMI was not developed appropriately for this ecoregion. As noted in the comments below, EPA needs to re-evaluate its analysis of this data and correct the errors prior to finalizing the NRSA report.

Sincerely,



Steven M. Pirner
Secretary

Cc: ACWA
ECOS
Western States Water Council
EPA Region 8

Biological Condition

The “Fact Sheet” released by EPA states “55% of the nation’s river and stream miles do not support healthy populations of aquatic life, with phosphorus and nitrogen pollution and poor habitat the most widespread problems.” This statement is misleading. On a national level, the report discusses three indicators used to determine aquatic biological condition: 1) benthic macroinvertebrates, 2) periphyton, and 3) fish. Instead of using all three indices to determine an overall biological condition, the macroinvertebrate multimetric index was chosen as the primary indicator of aquatic health. The 55% is based only on the macroinvertebrate multimetric index, not all aquatic life. The periphyton and fish multimetric indices indicate a much lower percent of waterbodies in poor condition. It appears EPA is biased in selecting which facts are presented to the public and media, failing to present less dramatic facts, which are of equal importance according to the NRSA.

Water Quality and Fish MMI

After reviewing the available water quality and fish metrics data, there appear to be significant errors relating to assigning conditions to samples sites.

Our review indicates the following errors:

- The total nitrogen and total phosphorus threshold values for the Upper Midwest were used to assign conditions to the South Appalachians;
- The salinity as conductivity, total nitrogen, and total phosphorous threshold values for the Southern Plains were used to assign conditions to the Upper Midwest;
- The total nitrogen and total phosphorus threshold values for the Northern Plains were used to assign conditions to the Temperate Plains;
- The salinity as conductivity, total nitrogen, and total phosphorous threshold values for the Southern Appalachians were used to assign conditions to the Northern Plains; and
- The total nitrogen and total phosphorus threshold values published for the Southern Plains were not the threshold values used to assign conditions for this ecoregion.

Additionally, two sites located in the Coastal Plains, FW08AR010 and FW08LA051, were incorrectly designated as in Good condition for nitrogen, when they should have been designated as Fair.

Below is a summary of the number of errors identified for each category and each ecoregion:

Ecoregion	Phosphorus	Nitrogen	Salinity	Fish MMI
Coastal Plains	0	2	0	0
Northern Appalachians	0	0	0	0
Northern Plains	119	125	78	0
Southern Appalachians	82	170	0	55
Southern Plains	76	81	0	0
Temperate Plains	103	85	0	0
Upper Midwest	89	10	55	0
Western Mountains	0	0	0	65
Xeric	0	0	0	33

The published fish metric threshold values for assigning ecological conditions for the Southern Appalachians, Western Mountains and Xeric were not the threshold values used in the dataset.

It is strongly recommended that all the data for the NRSA be reviewed to assure that the appropriate threshold values were used to assign the correct ecological conditions for all regions.

Quality Control Expectations

Despite the rigorous quality control and quality assurance activities set forth in the NRSA Quality Assurance Project Plan (QAPP), the NRSA draft document fails to provide a quality assurance/quality control (QA/QC) section or appendix to address the results of those activities. A QA/QC section should have been included in this draft to provide the public and scientific community with an opportunity to review and comment on quality results. It would provide greater transparency to include supporting quality assurance documentation on an assessment of this magnitude. SDDENR reviewed the chemical data and associated quality control alerts and found that approximately 39% of phosphorus samples and 41% of nitrogen samples nationwide exceeded sample holding times.

SDDENR recommends EPA include a QA/QC section or appendix in the NRSA final report. This section or appendix should contain tables and charts, such as those provided in the NRSA QAPP, that include results of QA/QC activities, determinations if data and measurement quality objectives were met, summaries of site audits and corrective actions, data qualifiers and data usability decisions. As stated in the 3/26/2013 press release, EPA intends to use this information to inform decision making about addressing critical needs for surface water. Decision making of this importance should be backed by robust quality assurance.

Tab T – Clean Water Act Jurisdiction



WESTERN STATES WATER COUNCIL

5296 Commerce Drive, Suite 202 | Murray, Utah 84107 | (801) 685-2555 | FAX (801) 685-2559

Web Page: www.westgov.org/lwswc

April 10, 2013

Sent via email: Perciasepe.bob@epa.gov
ASACWPOC@conus.army.mil

Mr. Robert Perciasepe
Acting Administrator
U.S. Environmental Protection Agency
Ariel Rios Building
1200 Pennsylvania Avenue, NW (1101A)
Washington, DC 20460

Ms. Jo Ellen Darcy
Assistant Secretary of the Army (Civil Works)
108 Army Pentagon
Washington, DC 20310-0108

RE: EPA and Army Corps Draft Clean Water Act Guidance and Rulemaking

Dear Acting Administrator Perciasepe and Assistant Secretary Darcy:

On behalf of the Western States Water Council, representing the governors of 18 western states, I am writing to reiterate concerns regarding the *Draft Guidance on Identifying Waters Protected by the Clean Water Act*, which the Council set forth in the enclosed comment letter dated July 29, 2011.

It is our understanding that your agencies are developing a proposed rule to clarify Clean Water Act (CWA) jurisdiction, as indicated in the Uniform Regulatory Agenda and Regulatory Plan published on December 21, 2012. As explained in our comment letter, the Council prefers rulemaking to clarify CWA jurisdiction instead of legally unenforceable guidance. Therefore, we urge you not to issue or apply the guidance to determine CWA jurisdiction while your agencies develop a new rule.

The vast majority of states have long worked as co-regulators with your agencies to protect water quality pursuant to the framework of cooperative federalism embodied in the CWA. Although states are responsible for implementing and administering most CWA programs, EPA and the Corps did not consult with the states in developing the draft guidance, nor did they share the document with the states prior to releasing it for public comment in April 2011. We understand your agencies have since revised the guidance after the public comment period and submitted it to the Office of Management and Budget for final review. Nevertheless, the revised guidance has not been made public nor has it been provided to the states for review.

We remain concerned about the lack of state consultation in developing the guidance and the potential that the final document may not adequately account for state needs and perspectives. The complexities of CWA jurisdiction and the broad ramifications for state and federal water quality programs warrant a formal and transparent rulemaking process. Unlike guidance, the notice and comment provisions of formal rulemaking facilitate early and ongoing engagement with states and other stakeholders. Formal rulemaking also triggers Executive Order 13132, which provides states with further opportunity to review a proposed regulation and offer perspectives prior to the publication of a rule.

Mr. Perciasepe and Ms. Darcy

April 10, 2013

Page 2

States bear the primary responsibility for preventing, reducing, and eliminating water pollution. By providing greater consultation with states, formal rulemaking is more likely than guidance to produce actual water quality improvements because it would better take into account state needs and perspectives, as well as the states' on-the-ground expertise and knowledge of water quality conditions and challenges within their borders. Issuing the guidance in the interim while EPA and the Corps pursue rulemaking would be a distraction that would create unnecessary conflict and uncertainty that would hinder the development of an effective rule.

Lastly, we urge you to continue to view the states as co-regulators and to ensure that state water managers have a robust and meaningful voice in the development of any rule regarding CWA jurisdiction, particularly in the early stages of development before irreversible momentum precludes effective state participation.

We appreciate your consideration of our concerns and look forward to continuing our work with EPA and the Corps to protect water quality in the West.

Sincerely,

A handwritten signature in black ink, appearing to read "Phillip C. Ward". The signature is fluid and cursive, with a large initial "P" and "W".

Phillip C. Ward
Chair, Western States Water Council

Enclosure (WSWC Position #330.5)



WESTERN STATES WATER COUNCIL

5296 Commerce Drive, Suite 202 I Murray, Utah 84107 I (801) 685-2555 I FAX (801) 685-2559

Web Page: www.westernstateswater.org

Position #330.5

July 29, 2011

Water Docket
Environmental Protection Agency
Mail Code 2822T
1200 Pennsylvania Avenue, NW
Washington, DC 20460

RE: EPA-HQ-OW-2011-0409

To Whom It May Concern:

On behalf of the Western States Water Council, representing the governors of 18 western states, we are writing to provide our comments on the Environmental Protection Agency (EPA) and U.S. Army Corps of Engineers' *Draft Guidance on Identifying Waters Protected by the Clean Water Act*. Before commenting on the guidance, we wish to express our preference for EPA and the Corps promulgating a clarifying rule, as opposed to legally unenforceable guidance.

We understand that the intent of the draft guidance is to provide clearer, more predictable guidelines for determining which water bodies are subject to Clean Water Act (CWA) jurisdiction, consistent with the U.S. Supreme Court's *Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers (SWANCC)*¹ and *Rapanos v. United States (Rapanos)*² decisions. It is also our understanding that EPA and the Corps intend to undertake rulemaking after the guidance is final to provide further clarification regarding the extent of CWA jurisdiction. Indeed, Justice Kennedy's opinion in the *Rapanos* decision would appear to invite promulgation of a rule.

The guidance provides no clear and concise limits to federal jurisdiction. Further, it could actually lead to an expansion of claims of jurisdiction beyond the limitations delineated in *SWANCC* and *Rapanos*, and if promulgated as regulations, once applied, would likely lead to further litigation.

A. State Water Resources Allocation and Water Rights Administration

Section 101(g) of the CWA expressly states: "It is the policy of Congress that the authority of each State to allocate quantities of water within its jurisdiction shall not be superseded, abrogated or otherwise impaired by this Act. It is the further policy of Congress that nothing in this Act shall be construed to supersede or abrogate rights to quantities of water which have been established by any State. Federal agencies shall co-operate with State and local agencies to develop comprehensive solutions to prevent, reduce and eliminate pollution in concert with programs for managing water resources."

Section 101(b) of the CWA further states: "It is the policy of Congress to "recognize, preserve, and protect the primary responsibilities and rights of States to prevent, reduce, and eliminate pollution"

¹ 531 U.S. 159 (2001).

² 547 U.S. 715 (2006).

The guidance and any subsequent regulations regarding the extent of CWA jurisdiction should reference Sections 101(b) and 101(g), and should not infringe upon the states' primary authority to allocate water and administer water rights within their borders and protect water quality.

B. The Watershed Approach to Jurisdiction

The draft guidance sets forth a “watershed” approach for satisfying Justice Kennedy’s “significant nexus” test in which CWA jurisdiction is determined by reference to the nexus between the watershed and the closest traditional navigable water, not the nexus between the particular wetland or tributary in question and the navigable waters. Under this approach, virtually any tributary or wetland, or “other waters,” no matter how far removed, no matter how small or insignificant, could become jurisdictional if aggregated with all other tributaries and wetlands or other waters within a watershed. Such an outcome raises questions as to whether a watershed approach is consistent with *SWANCC* and *Rapanos*, which hold that the CWA’s jurisdiction is not without limits.³

Questions also remain as to whether the EPA and the Corps can use guidance to promulgate a “watershed” approach instead of a “case-by-case” determination. In particular, Justice Kennedy stated in his concurring opinion in *Rapanos* that “absent more specific regulations,” a “case-by-case” analysis is needed to determine jurisdiction for wetlands based upon adjacency to navigable tributaries.⁴ Kennedy further stated that such a showing is necessary to avoid “unnecessary application” of the CWA given the “potential overbreadth” of the federal regulations at issue in *Rapanos*.⁵ The draft guidance, while not a regulation, needs further clarification to ensure that it complies with this requirement.

With respect to CWA jurisdictional determinations for tributaries, the draft guidance states that a significant nexus is presumed to be established if it can be shown that the tributary: (1) contains a bed, bank, and ordinary high water mark; and (2) drains, or is part of a network of tributaries that drain, into a downstream navigable water or interstate water. However, the draft guidance does not address how much water a tributary is required to drain in order to meet this test, leaving open the possibility that an ephemeral or other stream with a *de minimis* volume of flowing water is enough to constitute a jurisdictional tributary. This could create uncertainty and lead to further confusion about the types of waters subject to CWA jurisdiction, particularly in the arid West where there are a variety of waters with minimal flows.

In light of the above, the Council urges EPA and the Corps to ensure that the guidance and any related regulations comply with *SWANCC* and *Rapanos*, while also providing clear and recognizable limits on CWA jurisdiction. In carrying out these tasks, EPA and the Corps should also ensure that the guidance does not displace nor circumvent the regulatory and legislative processes.

C. Groundwater

Page 16 of the draft guidance states that a wetland can be deemed to be “adjacent,” and therefore jurisdictional, if there is an unbroken “surface or shallow sub-surface hydrologic connection between the wetland and the jurisdictional waters.” Although the draft guidance does not use the term “groundwater,” nor define the term “shallow sub-surface hydrologic connection,” it could be interpreted as referring to

³ See *Rapanos*, 547 U.S. at 739 (stating, “The Corps’ expansive interpretation of the ‘waters of the United States’ is thus not ‘based on a permissible construction of the statute.’”); *Id.* at 778 – 79 (J. Kennedy concurring) (stating that the deference owed to regulations at issue in *Rapanos* does not extend so far as to apply CWA jurisdiction “...whenever wetlands lie alongside a ditch or drain, however remote and insubstantial, that eventually may flow into traditional navigable waters.”). *Id.* at 778-79 (Kennedy concurring)

⁴ *Id.* at 782.

⁵ *Id.*

groundwater, tributary or alluvial groundwater, water stored in the bed and banks of streams, or even soil moisture, again expanding the jurisdictional reach without legal basis or limit, resulting in greater uncertainty and likely litigation.

Groundwater is not subject to the CWA and states are solely responsible for protecting, allocating and administering water rights pertaining to this resource. Accordingly, administrative and judicial interpretations of the CWA have consistently treated groundwater separately from “waters of the United States.” The guidance and any related regulations regarding the extent of CWA jurisdiction should make clear that such jurisdiction does not extend to groundwater, and that groundwater allocation and water rights administration fall under the exclusive purview of the states.

D. States as Co-Regulators

The states, EPA, and the Corps have made progress in working together to carry out the CWA’s goal of controlling water pollution. The EPA and Corps should continue to view states as co-regulators and should ensure that state water managers have a robust and meaningful voice in the development of any guidance and/or regulations regarding CWA jurisdiction, particularly in the early stages of development before irreversible momentum precludes effective state participation.

E. Conclusion

In sum, the guidance and/or regulations that EPA and the Corps may promulgate regarding CWA jurisdiction should: (1) provide clear and concise limits to federal jurisdiction; (2) not infringe upon the states’ primary authority to allocate water and administer water rights within their borders; (3) be consistent with *SWANCC* and *Rapanos*, while also providing clear and recognizable limits on the extent of CWA jurisdiction; (4) make clear that CWA jurisdiction does not extend to groundwater and that groundwater allocation and water rights administration fall under the exclusive purview of the states; and (5) be developed with robust and meaningful state participation.

We very much appreciate the opportunity to comment on the draft guidance, and look forward to continuing our work with EPA and the Corps to address water quality in the West. Thank you again for considering the Council’s views on this matter.

Sincerely,



Weir Labatt, III
Chair, Western States Water Council

Tab U - Wyoming Order on Groundwater
for Hydraulic Fracturing

IN THE OFFICE OF ADMINISTRATIVE HEARING
UPON REFERRAL FROM THE
ENGINEER'S OFFICE, GROUND WATER DIVISION
STATE OF WYOMING

IN THE APPLICATION FOR PERMIT TO)
APPROPRIATE GROUNDWATER BY) OAH Docket No. 12-050-037
4 QUARTERS LAND AND LIVESTOCK, LLC) PERMIT NO. U.W. 195230

ORDER OF THE STATE ENGINEER

INTRODUCTION

THIS MATTER came on for hearing before the State Engineer and the Laramie County Control Area Advisory Board on February 28, 2012, in Cheyenne, Wyoming, to consider the application filed by 4 Quarters Land and Livestock, LLC to appropriate ground water from the High Plains Aquifer in Laramie County, Wyoming, identified at the application stage as Temporary Filing No. U.W. 42-8-183. This hearing was conducted pursuant to the Stipulated Order Establishing Hearing Procedure dated January 25, 2012 and as identified as OAH Docket No. 12-050-037 relating to permit No. U.W. 195230. The State Engineer having reviewed and considered the evidence presented by the Applicant and the Ground Water Division of the State Engineer's Office and the recommendation of the Laramie County Control Area Advisory Board does hereby make the following Findings of Fact, Public Interest Analysis, Conclusions of Law, and Order:

FINDINGS OF FACT

1. 4 Quarters Land & Livestock, LLC, (4 Quarters) filed an enlargement application (Temporary Filing No. U.W. 42-8-183) for the Torrie #1 well (Permit No. U.W. 173371) with the State Engineer on August 30, 2010, which sought to withdraw an additional 100,000,000 gallons of water per year from that well. (Ex. A). The 4 Quarters enlargement application requests an additional 100,000,000 gallons of water (307 acre-feet) per year for miscellaneous uses to include oil and gas well production and completion, road construction, construction, and fire protection for Laramie and Albany Counties. (Ex. A).
2. The Torrie #1 well, existing Permit No. U.W. 173371 authorizes 5,000,000 gallons of water per year for the miscellaneous uses of fire protection, reservoir supply and temporary use for road construction. These uses are authorized only within

Cimmaron Estates Subdivision. (Ex. A).

3. On March 30, 2011, the State Engineer approved the enlargement application for an additional 1,518,465 gallons per year, for a total annual appropriation of 20 acre-feet (6,518,465 gallons), to be used for construction purposes and fire protection within Laramie County, not just within Cimmaron Estates Subdivision. (Ex. 26). The State Engineer did not grant 4 Quarters' request within the enlargement application to use water for oil and gas well production. 4 Quarters appealed this decision on April 22, 2011.

4. The Torrie #1 well is the same physical well previously registered as the Vaughn No. 1 well. (Tr. p. 96). The Vaughn No. 1 well, represented by Well Registration No. U.W. 514, was adjudicated under Proof No. U.W. 2111 in the amount of 625 gallons per minute for the irrigation of 60.044 acres, with a priority date of January 8, 1957. (Ex. 24).

5. The Vaughn No. 1 well was not permitted for any use other than irrigation. (Ex. 23, pp 1, 8) within the SW1/4NW1/4, SE1/4NW1/4, NE1/4SW1/4, NW1/4SW1/4, SW1/4SW1/4, and NW1/4SE1/4 of Section 2, Township 15 North, Range 67 West of the 6th Prime Meridian.

6. The Vaughn No. 1 well was observed by State Engineer's Office staff irrigating alfalfa in 1986. (Tr. p. 213). The consumptive irrigation requirement for alfalfa near Cheyenne in Laramie County, Wyoming, is 24.32 inches of water during the growing season. (Ex. 31). Applied over the permitted area of 60.044¹ acres, this amount equals approximately 120 acre-feet. (Tr. p. 216).

7. The Vaughn No. 1 well and all lands permitted to be irrigated under it are located within the Laramie County Control Area. (Exs. 4, 24).

8. The Vaughn No. 1 well was completed at a depth of 181 feet, within the Ogallala formation. (Ex. 25).

9. 4 Quarters filed a Petition for Voluntary Abandonment of the Vaughn No. 1 well with the Board of Control on October 13, 2005. (Ex. 23 p. 8). At the time 4 Quarters petitioned for voluntary abandonment of the water permitted to the Vaughn No. 1 well, the appropriation was not being put to beneficial use and would not be used in the future for irrigation purposes because the land was being subdivided for residential use. (Ex. 23, p. 8).

10. 4 Quarters had legal representation at the time it filed its Petition for Voluntary Abandonment of the Vaughn No. 1 well. (Tr. p. 96).

11. The Board of Control granted 4 Quarters' Petition for Voluntary Abandonment of the Vaughn No. 1 well on November 16, 2005. (Ex. 23, p.3).

¹ The transcript contained the number 60.066 acres. The correct value is 60.044 acres.

12. On October 13, 2005, the same day 4 Quarters petitioned the Board of Control to have the Vaughn No. 1 well appropriation abandoned, it completed an application for the Torrie # 1 well requesting appropriation of 5 million gallons of water annually. (Ex. 25). The State Engineer's Office approved 4 Quarters' Application for the Torrie #1 well on March 10, 2006, in the amount of 5 million gallons per year under permit U.W. 173371. (Ex. 25).
13. 4 Quarters filed a Statement of Completion and Description of Well or Spring, Form U.W.6, for the Torrie #1 well on August 30, 2010. (Ex. 25, p.4).
14. The proposed means of diversion and construction of the Torrie #1 well are adequate. (Tr. p. 49). The well has existed since at least 1957 and the pump test performed recently shows that the proposed means of diversion and construction are adequate.
15. Between 2006 and 2010, 4 Quarters reported using between 16.74 and 18 acre-feet of water per year (an average of approximately 5,700,000 gallons) from the Torrie #1 well, with the majority of that being for irrigation uses. (Ex. 29). Irrigation is not an approved use for the Torrie #1 well, permit 173371. (Ex. 25).
16. The Laramie County Control Area is one of only three ground water control areas in Wyoming. It was established in its present configuration by the Wyoming State Board of Control in 1981. It comprises approximately the eastern two-thirds of Laramie County, Wyoming. (Ex. 10; Tr. pp. 133-36).
17. The Laramie County Control Area is underlain by the High Plains Aquifer System, which is composed of the Ogallala, Arikaree and White River Formations. (Ex. 6; Tr. p. 21).
18. Since its creation in 1981, groundwater levels within the Laramie County Control Area have continued to decline and conflicts between uses continue to occur, especially in areas of high irrigation development. (Tr. pp. 136-37).
19. Since designation of the Laramie County Control Area in 1981, approximately 2,800 domestic and stock well permits have been approved, and 15 irrigation wells have been approved. (Tr. pp. 214-15).
20. Groundwater flow in Laramie County is from west to east. (Tr. p. 63).
21. The saturated thickness of the High Plains Aquifer in the area of the Torrie #1 well ranges from 500 to 700 feet. (Ex. 2; Tr. p. 118).
22. There are very limited surface water sources within Laramie County, so water users rely on groundwater. (Tr. p. 136). Rural residential subdivisions and municipalities within the Control Area rely on groundwater as their source of supply. (Tr. pp. 136-37).
23. Water users are withdrawing groundwater from within the Control Area boundary at a greater rate than the aquifer is being recharged. (Tr. p. 137).

24. The Control Area Advisory Board has historically recommended approval of new groundwater well applications in areas where there is not a lot of use or potential to impact existing appropriators, but has generally not recommended approval in areas of high use. (Tr. pp. 141-42).

25. The State Engineer's Office has a statewide groundwater monitoring well network of approximately 200 wells, with 33 of those monitoring wells within Laramie County. (Tr. p. 146). Four of the closest State Engineer's Office monitoring wells to the 4 Quarters' application are the MX North b-1 well, the Laramie County No. 7 well, the Laramie County No. 8 well, and the Laramie County No. 10 well, all completed in the High Plains Aquifer, Ogallala Formation. Three of these monitoring wells have remained relatively stable during the period of 2000 to 2010, although the Laramie County No. 7 well and the Laramie County No. 10 well show a slight downward trend over that time indicating production in excess of recharge. (Exs. 8, R; Tr. p. 152). The Laramie County No. 8 well shows a more steady drawdown trend. (Ex. 8, p. 9).

26. The Laramie County Conservation District works with irrigators to help improve their efficiency through use of low pressure pivots and soil moisture monitoring to time irrigation in an effort to use less water. (Tr. p. 167).

27. The Conservation District applied to the USDA Natural Resource Conservation Service for a grant to fund the reduction of irrigation in Laramie County. (Tr. p. 168). This program is called the Agricultural Water Enhancement Program ("AWEP"). Under the AWEP program, over \$3.8 million is being spent over a five year period, 2010-2014, to provide incentives for agricultural producers to convert from irrigation to dryland crops or grazing. The aim of the program is to stabilize the groundwater resource, including the High Plains Aquifer, in Eastern Laramie County. The program recognizes that the High Plains aquifer in Laramie County is over pumped an average of about 8,300 acre-feet per year, and that most (140,000 acre-feet) of the 212,500 acre-feet used each year is applied to irrigated crops. The program aims to convert 3,600 acres of irrigated cropland to dryland crop or grazing systems. (Ex. 10, pp. 1-2).

28. Irrigators participating in the program are paid to convert their irrigated land to dry or pasture land, and abandon their water rights. (Tr. p. 168). Currently 1,300 acres are in the process of being abandoned, conserving almost 1,900 acre feet of water per year. (Tr. p. 169).

29. The State Engineer's Office has implemented multiple agency policies directed guiding the acquisition of water within Laramie County for oil and gas development purposes. (Exs. 11-15).

30. In late 2009, an oil company drilled the productive Jake well (oil well) in Northeastern Colorado, just south of the Wyoming Border. (Tr. p. 179). After discovery of the Jake well in Colorado, the State Engineer's Office began receiving multiple

inquiries about water availability due to producers having difficulty obtaining the water in Colorado. (Tr. p. 178).

31. Water users in Wyoming began selling water for oil and gas well drilling purposes without the use being permitted for that purpose. (Tr. p. 183). In response to the increased water demand caused by increased oil development, the State Engineer's Office has promoted the use of temporary water use agreements (TWUAs) under Wyo. Stat. Ann. § 41-3-110. (Exs. 12-15; Tr. p. 178).

32. TWUAs require existing active and historic water uses be demonstrated before water is allowed to be transferred to a new temporary use. (Exs. 13-15).

33. The State Engineer's Office has conducted numerous public meetings to inform the public and the oil and gas industry about declining groundwater supplies in Laramie County and how the water needs of oil and gas development can be met. (Exs. 5, 16-17; Tr. p. 187). The use of TWUAs allows the oil industry to obtain the temporary water it needs to drill and fracture oil wells, and results in no additional demand on the aquifer because the water for oil well development is not being used for irrigation as it was historically. (Tr. pp. 184-86).

34. From February 24, 2011 to February 8, 2012, between 25 and 75 TWUAs were approved by the State Engineer and were in place approved for oil and gas production purposes, authorizing between 2,745 and 4,818 acre-feet of water available for those purposes. The two most recent reports indicate 2.37 percent of the 2,744.56 acre-feet of water available under TWUAs on February 12, 2012 was sold (65 acre-feet) and 9.33 percent of the 3,978.02 acre-feet of water available on July 1, 2011 (371 acre-feet) has been sold. (Ex. 18).

35. The State Engineer's Office has also approved new appropriations within the Control Area for the purposes of oil and gas development. (Tr. p. 188). These new appropriations are for water wells in the deeper Lance and Fox Hills formations, not the High Plains Aquifer. (Tr. pp. 188-89). These new appropriations have permit conditions which will also help define communication between the High Plains Aquifer and the Lance Formation. (Exs. 20-21; Tr. p. 189). If the required monitoring of these new appropriations reveals that they are having a negative impact on the High Plains Aquifer, the State Engineer can place additional conditions on the appropriations, including shutting the wells down. (Tr. p. 190). To date, the State Engineer's Office has approved four such wells within the Control Area. (Tr. pp. 190-91). Each of these wells is time limited and will not be a permanent water production source for oil and gas development. (Tr. pp. 191-92).

36. The State Engineer's Office has also permitted additional appropriations outside of the Control Area within Laramie County for oil and gas production purposes. (Exs. 36-38).

37. From February 17, 2010, to February 17, 2012, the Wyoming Oil and Gas Conservation Commission issued 324 permits for oil and gas operators to drill horizontal wells in Laramie County, and 505 permits issued in total for Laramie, Platte and Goshen Counties. (Ex. P, p. 5; Tr. pp. 79-80). Any of the wells ultimately drilled pursuant to these permits would require water for drilling and hydraulic fracturing. (Tr. pp. 80-89). Hydraulic fracturing, or well stimulation, is the process of using the hydraulic force of slick water to fracture rock for the purpose of creating a better channel for crude oil to flow into a well bore and back to the surface. (Tr. pp. 70-71).

38. The State Engineer's Office estimates that it takes approximately 7 to 8 acre feet of water to drill and fracture an oil well in Southeast Wyoming (or approximately 2.5 million gallons of water). (Tr. pp. 192-193). The Supervisor of the Wyoming Oil and Gas Conservation Commission estimates about 1.5 to 2.0 million gallons per well for fracturing purposes. (Tr. p. 89).

39. The further water has to be transported to an oil well site, the more expensive that water is to an oil well operator. (Tr. p. 90).

40. More oil wells will likely be drilled in Southeast Wyoming. (Tr. pp. 90-91).

41. Oil and gas production in Wyoming results in almost \$2,000,000,000 in annual revenue to state and local governments. (Ex. P, p. 2; Tr. p. 73). Wyoming's petroleum industry employed approximately 21,000 people in 2010, and more recently employed about 18,000 people. (Tr. p. 74; Ex. P, p. 2).

42. Oil wells drilled in the Niobrara shale cost between 5 and 9 million dollars to drill. (Tr. p. 86). The cost of water for drilling and fracturing is a small portion of the total cost. (Tr. p. 95).

43. Lack of available water has not been an issue preventing operators from drilling oil wells in Southeast Wyoming. (Tr. pp. 91-92, 95).

44. Assuming each Niobrara shale oil well requires 2.5 million gallons of water for drilling and fracturing operations, there is sufficient water currently available under existing approved Temporary Water Use Agreements to satisfy the water needs of all currently permitted oil wells within Laramie County. (Tr. pp. 196-97).

45. The duration of the Niobrara oil play is uncertain. It is estimated that the current drilling activity may continue for 10-15 years. (Applicant's Br. p. 26).

46. The applicant's hydrogeologist conducted a 24 hour pump test on the Torrie #1 well in an effort to determine what impact the pumping would have on surrounding domestic wells. (Tr. pp. 40-45). The applicant's hydrogeologist concluded that the 24 hour pump test resulted in no impact on the monitored neighboring domestic wells. (Tr. p. 45). None of the monitoring wells (existing domestic wells) used by the applicant's hydrogeologist during the pump test were down gradient from the test well. (Tr. pp. 64-65).

47. The test, as conducted, did not define what long-term impacts may exist with respect to pumping the Torrie #1 well. (Ex. 33). The applicant concluded that the 24-hour pump test results indicated no concern that pumping the Torrie #1 would in any way injure other appropriators given the depth of the well (181 feet). (Tr. p. 45). The applicant has indicated it is likely the Torrie #1 well will impact itself first long before negatively impacting neighboring wells. (Applicant's Br. Ex. 1, p. 3).

48. There were approximately 100 homes within two miles of the Torrie #1 well in 2009. Each rural single family home consumes in the neighborhood of one acre-foot of water per year. (Tr. p. 214).

49. Multiple oil and gas operators have contacted 4 Quarters wanting to temporarily purchase water from 4 Quarters for oil well development. (Tr. pp. 98-102). 4 Quarters intends to sell water to oil well operators at one cent per gallon. If 4 Quarters was able to sell all of the water described in the application for oil and gas production purposes, it would generate \$1,000,000 in revenue. (Tr. p. 102).

50. There are no well spacing or well distribution regulations within this area of Laramie County and so there is no dispute with regard to whether the location of the proposed well would conflict with any such regulations. (Tr. p. 49).

51. By decision letter dated March 13, 2012, the Laramie County Control Area Advisory Board recommended denial of 4 Quarters' enlargement application.

52. The use of water for oil and gas well drilling purposes is a beneficial use of Wyoming's water. Wyo. Stat. Ann. § 41-3-110.

53. A determination that no unappropriated water exists in the high plains aquifer in the control area has not been made. (Tr. p. 48).

54. It is the State of Wyoming's policy to conserve its underground water resources. Wyo. Stat. Ann. § 41-3-909(a).

55. Applicant did not present any evidence or testimony that the additional water sought (beyond the 20 acre feet previously approved) would be used or needed for any purpose other than oil and gas operations.

56. The hearing held on February 28, 2012, was as required under Wyo. Stat. Ann. § 41-3-932(b) as the State Engineer was of the opinion that to issue the permit herein described would be detrimental to the public interest.

CONCLUSIONS OF LAW

57. To the extent that any of the foregoing Findings of Fact may constitute Conclusions of Law, they are hereby incorporated as such.

58. The Wyoming Constitution declares the control of water to be vested “in the state, which, in providing for its use, shall equally guard all the various interests involved.” Wyo. Const. art. 1, § 31.

59. The State Engineer shall supervise the distribution of the waters of the state and shall not deny any appropriation “except when such denial is demanded by the public interests.” Wyo. Const. art. 8 §§, 3, 5.

60. The State Engineer has the authority to consider approval or rejection of permit applications as prescribed by law. Wyo. Stat. Ann. §§ 41-4-503, 41-3-931 and 932.

61. The State Engineer, before approving or rejecting an application, may require such additional information as will enable him to properly guard the public interests. Wyo. Stat. Ann. §§ 41-4-505 and 41-3-932.

62. That the statute which controls the decision of the State Engineer in this matter is Wyo. Stat. Ann. § 41-3-932(c) which provides:

The application or petition shall be granted and the permit issued only if the state engineer finds, after receiving the advice of the control area advisory board, that there are unappropriated waters in the proposed source, that the proposed means of diversion or construction is adequate, that the location of the proposed well or other work does not conflict with any well spacing or well distribution regulation, and that the proposed use would not be detrimental to the public interest.

63. Statutory safeguards are in place to protect those sources of groundwater supply facing depletion within designated control areas. Wyo. Stat. Ann. §§ 41-3-912-915, 932.

64. The State Engineer may issue any permits subject to such conditions as he may find to be in the public interest. Wyo. Stat. Ann. § 41-3-933.

65. The State Engineer shall set a hearing before himself and the Control Area Advisory Board, or the State Board of Control, if he is of the opinion that the application or petition may be detrimental to the public interest, or he desires to obtain the recommendations of the Control Area Advisory Board. Wyo. Stat. Ann. § 41-3-932(b). Such a hearing was held in this case. In making my determination, I am relying upon all of the records, information, submissions, exhibits and memorandums provided by 4 Quarters and the State Engineer’s Office in this proceeding, the witness testimony heard at the February 28, 2012, hearing in this matter, and the recommendation of the Laramie County Control Area Advisory Board.

66. Preferred uses are listed under Wyoming law. Wyo. Stat. Ann. § 41-3-102. Industrial uses are listed under this statute following drinking water for man and beast, municipal uses, and a compilation under Wyo. Stat. Ann. § 41-3-102(b)(iii). Irrigation is superior and preferred only to hydropower. Wyo. Stat. Ann. § 41-3-102(iv). By inference, industrial use is preferred to irrigation use.

67. The State Engineer may, on complaint of the operator of a stock or domestic well, order an interfering operator to cease or reduce withdrawals of underground water or provide replacement water at the interfering operator's expense. Wyo. Stat. Ann. § 41-3-911.

68. The State Engineer, with the concurrence of the Board of Control, may order the adjudication of any ground water appropriation in the state. Wyo. Stat. Ann. § 41-3-935(d).

69. The State Engineer has complied with all substantive and procedural legal and any other requirements in reviewing the applications before him.

70. Any and all requirements of public notice and hearing have been fulfilled.

PUBLIC INTEREST ANALYSIS

Wyoming statutes contain no overt public interest tests in Title 41. In their proposed Conclusions of Law, both parties have suggested public interest considerations. The applicant (4 Quarters) suggests the use of an eight-point test as enumerated in Alaska statute. The State suggests a hybrid list, including characteristics of Wyo. Stat. Ann. §§ 41-3-104 and 41-3-115, among others, and factors specific to this case.

The State Engineer concludes the public interest in this case is served by an analysis of factors taken from approaches listed by both parties as well as additional considerations. The following factors are used for the instant case in considering the public interest for this enlargement application:

71. The advice of the Control Area Advisory Board. (See Finding of Fact ("FOF") ¶ 51). By Decision Letter dated March 13, 2012, the Laramie County Control Area Advisory Board recommended denial of 4 Quarters' enlargement application. Wyo. Stat. Ann. § 41-3-932(c). The Decision Letter did not provide any explanation as to why denial was recommended. However, discussions during the Board meeting indicated members of the Board had concern regarding the impact on a declining reservoir and the non-utilized availability of other water sources. The State Engineer concludes the Decision Letter represents the considered recommendation of an informed public body, and it is in the public interest to take that recommendation into account.

72. The benefit to the applicant of the proposed appropriation. (FOF ¶ 49). The applicant stands to generate up to an undisputed \$1,000,000 in potential revenue if this enlargement application is granted as applied for. The State Engineer concludes there is a benefit to the applicant of the proposed use. The State Engineer also notes that the primary use the Applicant described during hearing for the enlargement is for oil and gas operation purposes. (FOF ¶ 55).

73. The benefit or impact to the public, as represented by state and local governments, of the proposed use. (FOF ¶ 41). There exists an undisputed tangible financial benefit to

the State of Wyoming and local governments attributable to the oil and gas industry, approaching \$2,000,000,000 annually. The State Engineer concludes there are financial benefits to the public, as represented by state and local governments, of the proposed use. The duration of such benefits is uncertain. (FOF ¶ 45).

74. The benefit or impact of the proposed use to other appropriators. (FOF ¶¶ 22, 23, 33 and 49). Other appropriators would likely see impact rather than benefit from the proposed use. Nearby rural homes may see their domestic water wells affected if this enlargement grants 307 acre-feet per year and that amount is actually pumped. Similarly, nearby monitoring wells may show an increased drawdown trend from such production. Also, production of significant water from this well could affect other appropriators down-gradient, where water level declines are already severe. However, no modeling or technical data were provided to quantify such impact. An additional impact may occur indirectly through rendering the AWEP program (FOF ¶¶ 27, 28) ineffective if the sponsor of this program sees additional permitting of high-capacity wells from the High Plains aquifer as counter-productive. (Ex. I.; Tr. 169-170). The State Engineer concludes there may be negative impacts to other appropriators, but those impacts are not quantified. The State Engineer concludes it is in the public interest to consider effects on other appropriators and condition the permit to mitigate those effects so that alternate, preferred or senior uses are not foreclosed or unreasonably impacted.

75. Whether other sources of water are generally available for the proposed type of use. (FOF ¶ 34). Other sources of water are available for the proposed type of use. The cost of water is a function of distance between the source of water and the point of use. (FOF ¶ 39). The applicant opens the door for invocation of Wyo. Stat. Ann. § 41-3-104 by serial reference to uses under the Vaughn No. 1 Well, U.W. 514, as though if that certificate was never abandoned, and a change of use was sought, such a change would have automatically been granted. Whether such a change of use would have been granted would have had to survive the question of the effect of other sources of water being available for the new use and the fact that they are available. (FOF ¶ 34). Wyo. Stat. Ann. §§ 41-3-104(a)(iii). Specific locations of the applicant's potential customers are not known. The State Engineer concludes that all oil well drilling to date has been with water available from other locations or sources, and such availability has not hindered the drilling of oil wells in this part of Wyoming. (FOF ¶ 43). The State Engineer concludes there are other waters available for the proposed use and that it is in the public interest to consider that fact. The State Engineer also concludes that such a use is temporary. (FOF ¶ 45).

The State Engineer notes that both parties have debated the term "king maker" in reference to the allowing of valid, active water rights to sell water to the oil business through Temporary Water Use Agreements (the Kings) while not allowing the same to

new applicants. This term ignores the fact that valid, active water rights have value under Wyo. Stat. Ann. § 41-3-110. Others do not share that value, not as a result of any individual decision, but as a matter of law. Had 4 Quarters not voluntarily relinquished their early water right, they too potentially could have participated in this current market absent the need for the current enlargement application.

76. Demonstrated viability of the proposed use. Beneficial use is the basis, measure and limit of a water right. Wyo. Stat. Ann. § 41-3-101. All water right applications are essentially a “hunting license” and, at that stage, constitute a license to the applicant to try to put a proposed amount of water to a recognized beneficial use. There is no question in this case that serving the oil and gas drilling purposes, or road construction, will demand some water from this well. (FOF ¶ 37, 40). There is a question as to how much water ultimately will be demanded. (Contrast FOF ¶ 37 with FOF ¶ 34). It is difficult to know how much water will ultimately be beneficially used from this permit, compared to a site-specific irrigation or industrial use where the potential future consumptive use is known within some bounds at the application stage and the use is demonstrably appurtenant to the land. The record is replete with references as to how much water has purportedly been produced from this well without apparent, or at least any reported, injury to other appropriators. This reference in many cases has been to the well as it existed prior to abandonment of the original water right in 2005. (FOF ¶ 9). It is important to note that once a permit is properly and officially cancelled or a certificate is likewise abandoned its previous use is of no effect in arguing for reinstatement of any character of the previous instrument. It is as though the previous water right did not exist and the current enlargement application faces the scrutiny of a new application in all ways. Regardless of assertions to the contrary (Tr. p. 97), voluntary abandonment of a water right is exactly that. It is not a forced or coerced action, although the ease of same may be informed. (Tr. p. 204-205).

The applicant seeks to annually withdraw and sell, primarily for oil and gas drilling purposes, 307 acre-feet of water per year. This amount is 83 percent of all TWUA water sold as reported on July 1, 2011, and is 472 percent of the total amount of water sold reported on February 12, 2012. (FOF ¶ 34).

Historic production from the Vaughn No. 1 well and subsequently the Torrie #1 well has variously been reported:

- a. The affidavit of H. James Mueller (Ex. F) describes production of between 116,640,000 and 142,560,000 gallons of water per year (358-438 acre-feet) for irrigation from 1960 to 1997. This is an estimated, not measured, amount. This same affidavit describes use of half that amount (58,320,000 to 71,280,000 gallons, or 179-218 acre-feet) per year from 1997 to 2004. Again, this range is an estimate. For comparison, the annual consumptive irrigation requirement of 60

acres of alfalfa is about 120 acre-feet. (FOF ¶ 6). Multiplying the actual numbers (60.044 acres and a consumptive irrigation requirement of 24.32 inches or 2.027 feet) gives 121.7 acre-feet. This last amount is the maximum that would be allowed under any change of use proceedings, had the Vaughn No. 1 well not been abandoned, regardless how much was purported as pumped assuming the entire acreage was fully irrigated. *See* Wyo. Stat. Ann. § 41-3-104(a). Absent metered information to the contrary, current TWUAs from groundwater wells in the Laramie County Control Area limit temporary transfers from irrigation water rights to 1 foot (Ex. 14), or 1 acre-foot per acre. For the Vaughn No. 1 well the amount would be 60.044 acre-feet, had the water right not been abandoned. The Mueller affidavit suggests the Vaughn No. 1 pumped more water than needed by alfalfa by a factor of between 2.9 and 3.6 prior to 1997. No credence can be given to such excessive use of groundwater.

b. Four TWUAs issued on this well in the 1990s allowed use between 10 million gallons (30.7 acre-feet) and 36 million gallons (110 acre-feet) (Ex. J). No evidence or testimony was provided detailing the actual use under these TWUAs. Ostensibly, the larger of these two numbers could have derived from an actual use in order to allow issuance of the TWUA.

c. Reports from 4 Quarters for the years 2006-2009 indicate total use up to 5.8 million gallons (18 acre-feet), over 2/3 of which was for irrigation, an unpermitted use. (Exs. 25, 29).

The State Engineer concludes there exists little viability for annual pumping numbers in excess of 121.7 acre-feet per year as a demonstration that prior pumping under the Vaughn No. 1 well occurred without injurious effect on neighboring water rights. The State Engineer concludes that, unlike most water right applications, there is not just uncertainty in the amount of actual beneficial use that will be seen from this enlargement, but there is additional uncertainty in this case given the recent historic water sales for oil and gas well drilling in this county. The State Engineer concludes it unlikely this applicant will sell water for such a use in an amount approaching or exceeding all other sellers of this type combined. The State Engineer concludes it would be in the public interest to appropriately limit and condition water production from this well.

77. Equity of treatment in the Laramie County Control Area under Wyoming water law. New permits have been issued in the Laramie County Control Area for large capacity wells, although such issuance has been rare. (Tr. pp. 214-15.) No determination has been made that no unappropriated water exists in the High Plains Aquifer in the control area. (FOF ¶ 53). There are no well spacing requirements that issuance of increased production from the Torrie #1 would violate. (FOF ¶ 50). The enlargement application is in a part of the Control area where groundwater levels have not dropped as

severely as in other parts (FOF ¶ 25). The State Engineer concludes that industrial use is preferred to irrigation use but not domestic and stock watering use. Wyo. Stat. Ann. § 41-3-102. The State Engineer concludes that the proposed beneficial use itself is not detrimental to the public interest.

78. Whether any permit conditions are necessary and adequate to properly guard the public interest. It is possible that permit conditions can be included that would allow the Torrie #1 well to produce water in a way that allows the applicant to sell water for oil and gas drilling and other purposes, in excess of their current permit, without injuriously affecting other senior, preferred water rights, or precluding other uses. The State Engineer concludes that the use of conditions and limitations are appropriate in this case to guard the public interest, especially when considering that oil well drilling purposes are deemed temporary. (FOF ¶ 45). The State Engineer concludes that such conditions include time-limiting the permit, deepening restrictions, monitoring requirements, annual volumetric limits different from the application, reporting requirements, metering and backflow prevention requirements, and the ability to restrict or stop pumping from the Torrie #1 well on complaint of injury by other appropriators.

Public Interest Summary

The State Engineer concludes it has not been determined that there is no unappropriated water in the proposed source of water, that the means of construction and diversion of the Torrie #1 well is adequate, that the well does not conflict with any well spacing or well distribution regulation, and that to issue the application in part with conditions would not be detrimental to the public interest. The State Engineer concludes the recommendation of the Laramie County Control Area Advisory Board to deny shows there is a public interest in conserving the ground water resource and recognizes the point of view that unmanaged pumping from the High Plains Aquifer can cause injury to other appropriators and the ground water resource. The State Engineer concludes that there is a benefit to the applicant if the enlargement is granted. The State Engineer also concludes that reference to the historic production from the Vaughn No. 1 well is not compelling in terms of use without injury. The State Engineer concludes that all records presented on historic or even more recent use from the Vaughn No. 1 well or later the Torrie #1 well are either estimates or memory, or even illegal, and none come from actual metered data. The only reasonable quantities that may have been produced without apparent injury to the resource or other appropriators are defined by the consumptive irrigation requirement of 121.7 acre-feet or the maximum historic TWUA issuance of 110 acre-feet. The State Engineer concludes the lesser of these two numbers can reasonably be expected to be pumped while providing at least initial protection of the resource and other appropriators. The State Engineer concludes there is a benefit to the public at large, as measured by tax

receipts and other economic activity, of granting the enlargement. The State Engineer concludes that at the requested appropriation level of 307 acre-feet per year there could be negative effects on other senior or preferred uses of ground water, although those effects are not quantified. The State Engineer concludes there is other water available for the proposed use, and that such a consideration is a proper public interest question in this case. The State Engineer concludes there is a likelihood of use for oil well drilling from this well should the enlargement be granted. The State Engineer is circumspect that the entire amount sought by the applicant would be demanded or therefore be a reasonably foreseen quantity for beneficial use. The State Engineer concludes it would not be equitable to deny an enlargement for a type of use when other permits for a different type of use have been issued. The State Engineer concludes it is appropriate to attach protective limitations and conditions to this enlargement application when granting.

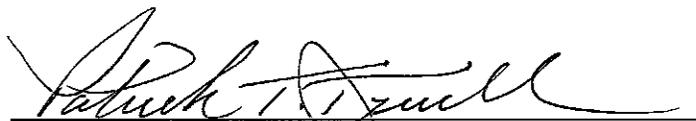
ORDER

IT IS HEREBY ORDERED, ADJUDGED, AND DECREED:

1. The applicant be affirmed the previously granted 20 acre-feet per year for construction and fire protection purposes, as described in permit UW 195230, with Albany County restored as a place of use.
2. The applicant be granted an additional 90 acre-feet for sale for oil and gas well drilling purposes only. Such purposes shall be temporary and shall cease on December 31, 2014 unless an extension is applied for and granted. The State Engineer will consider water levels obtained under No. 6 below, and other water level information, when evaluating any extension request. The total annual production authorized under the existing permits U.W. 173371 and U.W. 195230, and this order for the Torrie #1 well, is 110 acre-feet (35,840,000 gallons).
3. Should the applicant desire additional water via another enlargement, he shall construct at least one monitoring well no further than 500 feet from the Torrie #1 well in the interim and provide at least one year's worth of data (collected no less than quarterly) to the State Engineer's Office (SEO) along with the application for additional water. Such monitoring well(s) shall be side-gradient or down-gradient of the Torrie #1 well. No approval of additional quantity is guaranteed, as such will be dependent on SEO review of the monitoring well data. Any new enlargement request will also be reviewed considering historic production under this current enlargement.
4. The State Engineer will not grant any request to deepen the Torrie #1 well as long as this enlargement is in force, or if it is renewed, or if additional enlargements are sought.

5. The applicant will provide monthly production and sales reports to the SEO, segregated into amounts attributable to oil and gas drilling purposes versus other uses, all of which will be reported. All sales for out-of-state use will also be reported. Failure to timely provide complete reports will result in cancellation of this enlargement permit, notice to be heard having already been given by this condition.
6. Semi-annual non-pumping water level data will be provided to the SEO from the Torrie #1 well beginning June 1, 2012. Failure to timely provide such reports will result in cancellation of this enlargement permit, notice to be heard having already been given by this condition.
7. Prior to any sales for oil and gas drilling, or any other purpose under this enlargement, a water meter acceptable to the SEO will be installed, inspected, and approved by the SEO in writing. For water production measurement purposes, a motor or engine hour meter is unacceptable. A backflow prevention device, acceptable to the SEO, will also be in place and functional prior to any production of water under this enlargement. Noncompliance with any part of this requirement, whether related to water measurement or backflow prevention, will result in cancellation of this enlargement, notice to be heard having already been given by this condition.
8. Claims of interference from other valid appropriators due to increased pumping of the Torrie #1 well may result in mitigation through restriction in use or cessation of production.
9. The State Engineer, with the concurrence of the Board of Control, may order the adjudication of the Torrie #1 well at any time.

Dated this 9th day of April, 2012


Patrick T. Tyrrell, State Engineer

CERTIFICATE OF SERVICE

I certify that on this 9th day of April, 2012, the foregoing **ORDER OF THE STATE ENGINEER** was served by depositing true and correct copies in the United States mail, postage prepaid, addressed to the following:

Patrick J. Crank
NICHOLAS AND CRANK P.C.
P.O. Box 1709
Cheyenne, WY 82003

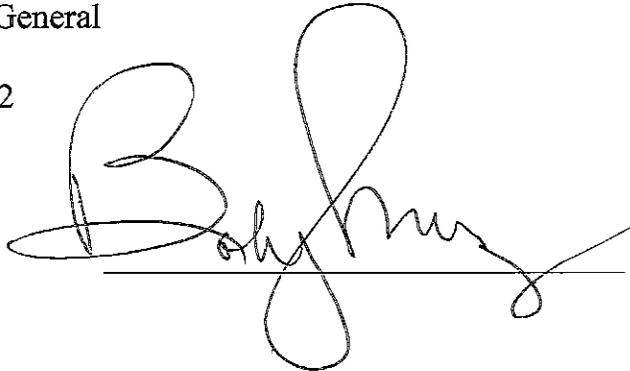
And by Inter-office mail addressed to:

State Engineer's Office
Ground Water Division (ORIGINAL)
Lisa Lindemann – Administrator
122 West 25th, Suite 505
Cheyenne, WY 82002

Office of Administrative Hearings
State of Wyoming
Deborah Baumer, Hearing Examiner
2020 Carey Avenue, Fifth Floor
Cheyenne, WY 82002-0270

Christopher M. Brown
Senior Assistant Attorney General
123 State Capitol Building
Cheyenne, Wyoming 82002

Cathleen D. Parker
Senior Assistant Attorney General
123 State Capitol Building
Cheyenne, Wyoming 82002



STATE OF WYOMING)
) ss
STATE ENGINEER)

The forgoing instrument was duly recorded in Miscellaneous Records Book ____,
Pages ____ through ____.

Clerk

Tab V – *The Aransas Project v. Shaw*



1 of 5 DOCUMENTS

THE ARANSAS PROJECT, Plaintiff, vs. BRYAN SHAW, et al., Defendants.**Case No. 2:10-cv-075****UNITED STATES DISTRICT COURT FOR THE SOUTHERN DISTRICT OF
TEXAS, CORPUS CHRISTI DIVISION***2013 U.S. Dist. LEXIS 33258***March 11, 2013, Decided
March 11, 2013, Filed****JUDGES:** Janis Graham Jack, Senior United States District Judge.**OPINION BY:** Janis Graham Jack**OPINION****MEMORANDUM OPINION AND VERDICT OF
THE COURT**

This case was tried to the Court over an eight-day period on December 5, 6, 7, 8, 9, 13, 14, and 15, 2011. ¹ As required by *Rule 52(a) of the Federal Rules of Civil Procedure*, [*6] the Court makes the following findings of fact and conclusions of law thereon. ²

1 Defendants and intervenors moved to reopen the case to introduce new evidence. (D.E. 328). As discussed herein, the Court considered the new evidence but found it flawed and preliminary, and not persuasive, and consequently, on December 6, 2012, denied the motion to reopen as moot.

2 Any finding of fact made herein that also constitutes a conclusion of law is adopted as a conclusion of law. Any conclusion of law made herein that also constitutes a finding of fact is adopted as a finding of fact. All findings of fact and conclusions are made by a preponderance of the evidence.

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I. [*7] INTRODUCTION.

In the annals of conservation, the return of the Whooping Crane from the brink of extinction is one of the most fabled stories. In the 1940's, less than fifteen of these remarkable birds -- the tallest in North America and the rarest species of crane in the world -- remained. With the creation of wildlife refuges and other conservation efforts, the population of the birds has slowly risen

to, including both those in captivity and those not in captivity, to around 500 birds. At issue here is the threat of extinction to the non-captivity population of around 300. However, the "whoopers" are still at risk, as development and environmental issues continue to threaten their habitat.

This case concerns the world's only self-sustaining, wild Whooping Crane population, known as the "AWB" flock, ³ and its winter home in South Texas at the

Aransas National Wildlife Refuge (the "Refuge"), and surrounding estuarine areas that comprise the AWB cranes' critical winter habitat. ⁴ The AWB cranes normally begin to arrive at their winter habitat in late October, and depart in early April of the following year.

³ The flock takes its name from the two protected preserves where the cranes live [⁸] most of their lives, migrating annually between their breeding grounds in Wood Buffalo National Park, Canada, and their winter home in Texas.

⁴ See Court's Exhibit 1, Map of AWB flock's wintering area, attached hereto. The cranes' winter habitat extends beyond the borders of the Refuge, but as used herein, the term "Refuge" implies the cranes' critical winter habitat.

The Aransas Refuge is located midway along the Texas Gulf coast, about 140 miles south of Houston and 50 miles north of Corpus Christi. ⁵ The cranes' wintering grounds are comprised of approximately 9,000 hectares of salt flats on the Refuge itself and also on adjacent islands, including the Blackjack Peninsula, San Jose Island, and Matagorda Island. ⁶ The area is bordered on the east by the Gulf of Mexico, receiving daily impulses of salt water with the changing of the tides.

⁵ The Aransas Refuge was established on December 31, 1937 as "a breeding ground for migratory birds and other wildlife ..." The Refuge is most notably known for being the winter home of the endangered Whooping Crane.

⁶ The Refuge is comprised of five units: (1) Aransas Unit/Blackjack Peninsula (47,261 acres); (2) Tatton Unit (7,568 acres); (3) Lamar Unit [⁹] (979 acres); (4) Myrtle Foester Whitmire Unit (3,440 acres); and (5) Matagorda Island Unit (56,683 acres). See Court's Ex. 1. See also PX-385 at 1-3.

The Refuge receives freshwater inflows from primarily two river sources, the San Antonio and the Guadalupe, each located to the north and slightly west of the area. ⁷ The San Antonio river flows into the Guadalupe river system, and the Guadalupe river flows directly into the Refuge, emptying into the San Antonio bay. The area where the freshwater enters the Refuge is referred to correctly as the "Guadalupe estuary," but it is known also as the "San Antonio bay." ⁸ The San Antonio and the Guadalupe river systems emerge from underground springs near San Antonio and run 250 miles southeast where they join together just before entering the San Antonio bay and flow into the AWB flock's winter habitat, that extends slightly north of the Refuge. ⁹ These freshwater inflows come from a combination of spring flows and rainfall. Id.

⁷ See PX-63, Diagram of Texas rivers and corresponding estuaries.

⁸ TAP witness, Dr. Paul Montagna explained that an estuary is defined as the area "where the river meets the sea," beginning at the mouth of the river and [¹⁰] continuing to the "pass" where the open ocean begins. (Montagna, Day 3, Tr 184-185). The estuary is named for its river source, so in this case, the Refuge is part of the Guadalupe estuary. Id. However, certain federal agencies, including the National Oceanic and Atmospheric Administration (NOAA) refer to the area by the primary bay name, in this case, the San Antonio bay. Id. Tr 186. To avoid confusion, the Court will refer to the system as the San Antonio bay/Guadalupe estuary. Portions of the Aransas Refuge are situated in the San Antonio bay/Guadalupe estuary, and the entire area comprises the AWB flock's critical habitat.

⁹ See PX-109 at 13, Refuge Annual Report (2004).

Whooping Cranes face extinction. Indeed today, it is estimated that only 500 Whooping Cranes exist worldwide. In 1967, the United States listed the Whooping Crane as threatened with extinction, *32 Fed. Reg. 4001 (Mar. 11, 1967)*, and in 1970, they were listed as endangered, *35 Fed. Reg. 16047 (Oct. 13, 1970)*. In 1973, both of these classifications were "grandfathered" into the Endangered Species Act. *16 U.S.C. § 1531, et seq.*, 87 Stat. 884.

Beginning in 1950, the United States Fish & Wildlife Service (USFWS) employed [¹¹] aerial surveys to provide an annual census of how many AWB cranes arrived at the Refuge in the fall, and how many departed in the spring. Mr. Tom Stehn, a USFWS biologist, worked at the Refuge for over 29 years, and personally developed and implemented a method to count the individual birds of the AWB flock utilizing the cranes' well-documented behaviors of site fidelity, site tenacity, and crane territoriality. ¹⁰ Because specific birds returned to their specific locations, Mr. Stehn was able to map their territories and to confirm their presence or absence with weekly aerial surveys. ¹¹ Based on his intimate knowledge of the AWB crane and his mapping of their territories, Mr. Stehn concluded that, at the start of the 2008 winter season, the AWB flock had grown to its peak number of 270 birds, plus or minus 2 to 3 percent.

¹⁰ "Site fidelity" is the tendency of a migrating bird to return to the same established territory each year with boundaries similar to the year before. (Chavez-Ramirez, Day 2, Tr 84; Stehn, Day 2, Tr 322). In birds, "territoriality" is defined as a

space that is defended by either an individual, a pair, or a family unit against other members of the same species for [*12] at least some portion of their annual cycle. (Chavez-Ramirez, Day 2, Tr 82-83). "Site tenacity" is similar to "site fidelity" but suggests that, once the bird has returned to its established territory, it will not establish a new territory that season. Id. Tr 87. Of course, none of these behaviors suggest that the Whooping Cranes will not freely move about the entire Refuge area.

11 Of the fifteen species of cranes in the world, only the Whooping Crane is territorial on its winter grounds. Mated pairs, some with juveniles, return to the Refuge each winter to specific staked territories. These territories have been mapped and used by the USFWS to conduct crane population counts. Indeed, one male crane, referred to as "Daddy Lobstick," has returned to the same territory for thirty years.

During the 2008-2009 winter, there was a severe drought. As the winter progressed, the AWB cranes began to demonstrate unusual behavior. For example, parents would deny their juveniles food, and the birds began venturing out of their specific territories in search of food and fresh water. When the cranes first arrive at the Refuge, it is normal for the parents to feed the juvenile. The juveniles' beaks [*13] are soft and tender, and it is necessary for the parent to break the shell and feed the crab to the begging juvenile. As the winter progresses, the parent pulls the crab from the water, kills it, and leaves it for the juvenile. During the 2008-2009 winter, Dr. Chavez-Ramirez observed a parent aggressively pushing his juvenile away from a crab that had been caught. He had never seen a parent deny food to a begging juvenile. Such behavior indicates that the parent was under food stress. The birds' behavior was so alarming that Mr. Stehn contacted Dr. Chavez-Ramirez, a biologist with two decades of field research on the AWB cranes and a member of the International Whooping Crane Recovery Team, and asked him to visit the Refuge and observe the cranes. Dr. Chavez-Ramirez was equally troubled and concerned with his observations of the cranes' behavior. Both he and Mr. Stehn observed that the lack of freshwater inflows had increased salinities across the Refuge. These hyper-saline conditions, verified by field measurements, led to a decrease in blue crabs and wolfberries, the staple diet of the AWB flock. This food shortage led to bird emaciation, stress behavior, and an over-all decline [*14] in bird health. That is, without proper freshwater inflows, the AWB's critical habitat had been thrown out of balance, with ramifications up and down the food chain. That winter, at least 23 AWB cranes, or 8.5 % of the AWB flock, died at the Refuge. Another 34 birds that left Texas in spring, failed to return in fall.

After news of the high crane mortality in the 2008-2009 winter became known, certain environmentalists, local coastal business owners, bird enthusiasts, and others formed "The Aransas Project," ("TAP"), a Texas nonprofit corporation. The TAP members have a direct interest in the AWB Whooping Cranes and the ecological health of the San Antonio, Carlos, Mesquite, and Aransas bays that connect to the Refuge.

The State of Texas owns its surface water, and this includes the water in the Guadalupe and the San Antonio River systems. Under Texas law, freshwater capture and use is regulated by the Texas Commission on Environmental Quality (TCEQ), a State agency. Through its permit process and regulatory powers, the TCEQ can affect the availability of freshwater to users along the river system.

Prior to filing this lawsuit, TAP petitioned the TCEQ for a water permit to require a certain [*15] amount of freshwater to remain instream in the Guadalupe and San Antonio river systems to ensure that sufficient amounts of freshwater reached the Refuge and surrounding areas adjacent to the San Antonio bay that comprise the critical habitat of the AWB cranes. TAP's permit request was denied, and on December 7, 2009, TAP gave notice of its intent to sue.

On March 10, 2010, TAP filed this lawsuit alleging that the TCEQ defendants had violated Section 9 of the Endangered Species Act (ESA), *16 U.S.C. § 1531 et seq.*, by failing to properly manage freshwater inflows into the San Antonio and Guadalupe bays during the 2008-2009 winter, causing an unlawful "take" of AWB cranes. (D.E. 1). TAP maintains that the TCEQ defendants' water management practices during 2008-2009, combined with the severe drought, drastically modified the AWB cranes' critical habitat making it hyper-saline. In turn, the hyper-saline conditions caused a reduction in the availability of wolfberries and blue crabs, the cranes' primary food resources, as well as in fresh drinking water. The lack of food and freshwater caused the cranes to become emaciated and to engage in stress behavior. Emaciation led to increased illness [*16] and disease susceptibility, and the cranes' unusual stress behaviors, including leaving the safety of their site territories, contributed to increased predation. In total, the adverse modification of the cranes' critical habitat effectively caused the death of at least 23 Whooping Cranes that winter season, constituting a "take" under the ESA.

TAP named as defendants TCEQ officials Bryan Shaw, Buddy Garcia, Carlos Rubinstein, and Mark Vickery, and also, the South Texas Watermaster, Al Segovia.¹² The Guadalupe-Blanco River Authority (GBRA) was granted leave to intervene. (D.E. 31, 35). Numerous other parties sought leave to intervene: Union

Carbide Corporation (D.E. 45); Texas Farm Bureau (D.E. 51); Texas Chemical Council (D.E. 53); San Antonio Water System (D.E. 59); San Antonio City Public Service (D.E. 70); and the San Antonio River Authority (SARA) (D.E. 110). The Court granted Texas Chemical Council's motion to intervene, but denied the others.¹³ (D.E. 86, 112). On appeal, the Fifth Circuit allowed the intervention of the SARA, but affirmed the denial of intervention of the other parties. (D.E. 182, 183).

¹² Defendants are named in their official capacities. Bryan Shaw is the Chairman [*17] of the TCEQ, Carlos Rubinstein is a Commissioner and Buddy Garcia is a former Commissioner of the TCEQ. Mark Vickery is a former Executive Director of the TCEQ and Al Sergovia is a retired South Texas Watermaster.

¹³ Various other parties have made Amicus Curiae appearances: City of Kerrville (D.E. 78); Upper Guadalupe River Authority (D.E. 82); CMC Steel Texas (D.E. 88); Bexar Metropolitan Water District (D.E. 102); East Central Special Utility District (D.E. 144); City of New Braunfels (D.E. 171); California Farm Bureau Federation, Oklahoma Farm Bureau Federation, Wyoming Farm Bureau Federation, Oregon Farm Bureau Federation, and American Farm Bureau Federation (D.E. 228).

Through this lawsuit, TAP is requesting declaratory and injunctive relief to ensure that the AWB flock has sufficient water resources to prevent future "takings." (D.E. 1 at 32-33).

II. STATUTORY FRAMEWORK.

A. The Endangered Species Act.

Enacted in 1973, the Endangered Species Act ("ESA") is an attempt to prevent the further elimination of animal species in the United States and to help those animal populations to increase. See *16 U.S.C. § 1531, et seq.* The ESA's stated purposes are "to provide a means whereby the ecosystems [*18] upon which endangered species and threatened species depend may be conserved... [and] to provide a program for the conservation of such endangered species and threatened species." *16 U.S.C. § 1531(b)*. The plain intent of Congress in enacting this statute was "to halt and reverse the trend towards species extinction, whatever the cost." *Tennessee Valley Authority v. Hill*, 437 U.S. 153, 184, 98 S. Ct. 2279, 57 L. Ed. 2d 117 (1978).

1. ESA § 9 prohibits "takes" of endangered species.

Under the ESA, the Secretary of the Interior ("Secretary") is required to promulgate regulations listing

those species of animals that are "threatened" or endangered" under specified criteria, and to designate their "critical habitat." *16 U.S.C. § 1533*. Section 9 of the ESA prohibits "takes" of all listed endangered species. *16 U.S.C. § 1531(a)(4)(B)*; *50 C.F.R. § 17.31*; *55 Fed. Reg. 26114 (June 26, 1990)*.¹⁴ The term "take" is defined as actions that "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect," a protected species. *16 U.S.C. § 1532(19)*. The term "harm" includes "significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including [*19] breeding, feeding or sheltering." *50 C.F.R. § 17.3*; *Babbitt v. Sweet Home Chapter of Communities for a Great Oregon*, 515 U.S. 687, 115 S. Ct. 2407, 132 L. Ed. 2d 597(1995). The term "harass" means "an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering." *50 C.F.R. § 17.3*. Congress intended to define "take" in the "broadest possible manner to include every conceivable way" in which any person could harm or kill wildlife. S. Rep. No. 307, 93rd Cong., 1st Sess. 1, reprinted in 1973 U.S. Code Cong. & Admin. News 2989, 2995. In this case, the crux of TAP's argument is that the TCEQ's actions and inactions in managing water diversions along the San Antonio and Guadalupe River systems caused "harm" to the endangered Whooping Cranes, by actually injuring and killing 23 birds. *50 C.F.R. § 17.3* (the "harm" regulation).

¹⁴ As noted above, Whooping Cranes are considered endangered under the ESA. *16 U.S.C. § 1531, et seq.*, 87 Stat. 884.

The ESA's prohibition against "takes" governs both the actions, and failure to act, by all "persons," [*20] including any "officer, employee, agent, department, or instrumentality of ... any State." *16 U.S.C. § 1532(13)*. The ESA prohibitions apply to actions by state agencies where their regulatory programs approve actions by third parties that contribute to causing the take. E.g., *Animal Welfare Inst. v. Martin*, 623 F.3d 19 (1st Cir. 2010) (citizens could challenge Maine's authorization of foothold traps that harmed lynx); *Strahan v. Coxe*, 127 F.3d 155 (1st Cir. 1997) (challenging Massachusetts' licensing of gill-net and lobster pot fishing as harming northern Right Whale); *Loggerhead Turtle v. County Council of Volusia County*, 148 F.3d 1231 (11th Cir. 1998) (ESA applies to citizen's challenge of county's refusal to ban beach driving during sea turtle nesting season); and *Defenders of Wildlife v. EPA*, 882 F.2d 1294 (8th Cir.1988) (challenging EPA and Secretary of Interior's permitting of strychnine pesticides and rodenticides).

Section 9 prohibits indirect as well as deliberate "takes" of endangered species. *Babbitt*, 515 U.S. at 700; *Strahan*, 127 F.3d at 163. Ordinary requirements of proximate causation apply. *Babbitt*, 515 U.S. at 700, n.13 (O'Connor, J., conc.); see also *Loggerhead Turtle*, 148 F.3d at 1251 n.23 [*21] ("proximate cause is not the same thing as a sole cause," citing *Cox v. Administrator United States Steel & Carnegie*, 17F.3d 1386, 1399 (11th Cir. 1994)). In fact, this Court has previously recognized in this case that proximate cause exists where a defendant government agency authorized the activity that caused the take. (See D.E. 270 at 15-16).

2. ESA § 10 addresses incidental takes.

Following the ESA's enactment, it became apparent that certain activities might result in an unintended take of an endangered species. For example, clearing certain acreage for development might destroy the habitat of a protected species of bird. Thus in 1982, Congress amended the ESA to authorize the issuance of permits allowing the take of a protected species if the take is incidental to otherwise lawful private actions. 16 U.S.C. § 1539(a). Section 10 of the ESA provides, "The secretary may permit, under such terms and conditions as he shall prescribe," any incidental taking otherwise prohibited by Section 9 that will not "appreciably reduce" the likelihood that the species will survive and recover. 16 U.S.C. § 1539(a)(1)(B), 2(B). A Section 10 "Incidental Take Permit" ("ITP") is issued by the USFWS [*22] after development and submission of a Habitat Conservation Plan ("HCP"), which must be approved by the USFWS. 16 U.S.C. § 1539(a)(2)(A); (B). The HCP must include conservation measures designed to minimize and mitigate the impacts of taking species listed under the Act. 16 U.S.C. § 1539(a)(2)(A)(ii). In the absence of an ITP or other exemption, the ESA forbids each and every take. 16 U.S.C. § 1538(a)(1).

Recognizing that some human activities will necessarily encroach upon wildlife, and in some instances, involve endangered species, ESA § 10 offers a method by which the developer, applicant or entity works with the USFWS to anticipate the impact of their actions and to minimize the potential take of an endangered species. Here, TAP is asking the Court to order the TCEQ defendants to apply for an ITP, thus acknowledging that their permit process and water enforcement actions, especially in times of drought, alter the critical habitat of the AWB cranes and can lead to a "take" of these endangered birds. Once the ITP is filed, ESA § 10 requires TCEQ defendants to work with the USFWS to formulate a Habitat Conservation Plan based on the best science available.

III. FINDINGS ON STANDING [*23] AND JURISDICTION.

A. Standing.

The ESA expressly authorizes citizen suits against any "person" alleged to be responsible for a "take." The ESA provides that any person may commence a civil suit on his own behalf- (A) to enjoin any person, including the United States and its agencies, who is alleged to be in violation of ESA provisions or regulations; (B) to compel the Secretary to enforce the provisions concerning the taking of any resident endangered species or threatened species within any State; or (C) against the Secretary where there is an alleged failure of the Secretary to perform any nondiscretionary act or duty. 16 U.S.C. § 1540(g)(1); see also *Tennessee Valley Auth.*, 437 U.S. at 184; *Defenders of Wildlife v. Bernal*, 204 F.3d 920, 925 (9th Cir. 2000). The district courts shall have jurisdiction, without regard to the amount in controversy or the citizenship of the parties, to enforce any ESA provision or regulation, or to order the Secretary to perform such act or duty, as the case may be. 16 U.S.C. § 1540(g). Although the ESA provides for citizens suits, the ESA plaintiff must satisfy the jurisdictional requirements of standing. *Bennett v. Spear*, 520 U.S. 154, 162, 117 S. Ct. 1154, 137 L. Ed. 2d 281 (1997). [*24] To satisfy the "case" or "controversy" requirement of Article III, which is the "irreducible constitutional minimum" of standing, a plaintiff must, demonstrate that he has suffered: injury in fact; that the injury is "fairly traceable" to the actions of the defendant, and that the injury will likely be redressed by a favorable decision. *Lujan v. Defenders of Wildlife*, 504 U.S. 555, 560-561, 112 S. Ct. 2130, 119 L. Ed. 2d 351 (1992).

1. Injury in fact.

In this case, the TCEQ defendants, GBRA, and SARA, have consistently challenged TAP's standing to sue. (See D.E. 213, 214, 215). In its December 5, 2011 Order denying TCEQ defendants' and intervenor's motion for partial summary judgment (D.E. 270), the Court found that TAP had satisfied the standing elements of injury in fact and redressability. *Id.* at 7-9. As to the injury requirement, the Court noted that many of the TAP members reside and work in the Aransas area and, for some, their livelihood depends in large part on the AWB cranes. (D.E. 270 at 7). Indeed, the tourism economy of the area relies on the annual migration of the Whooping Cranes to the nearby Refuge. This finding was reinforced by testimony at trial. For example, TAP member Albert Johnson is the proprietor [*25] of *The Crane House*, a small home that is rented to tourists, photographers, and naturalists that come specifically to observe the Whooping Cranes. ¹⁵ (Johnson, Day 4, Tr 182-183). TAP mem-

ber Ray Kirkwood works as the narrator on the *Wharf Cat*, a boat that tours the Aransas Refuge, allowing visitors to observe a healthy, active estuarial system, and the AWB Whooping Cranes in their winter home. (Kirkwood, Day 4, Tr 136, 141, 146-148). Aransas County Judge Burt Mills testified that the AWB flock has always been an important aspect of the tourist industry for Aransas County. (Mills, Day 4, Tr 108, 117).

15 See PX-106, Mission statement of *The Crane House Bed & Breakfast*.

In addition, the Court found that many of TAP's members are active birders and devote substantial time and effort to observing Whooping Cranes and other birds in their natural habitat. (D.E. 270 at 7). At trial, Deborah Corpora, a Rockport birder, testified as to the pleasures of watching the Whooping Cranes at the Aransas Refuge. (Corpora, Day 3, Tr 154-170). The evidence was uncontested that TAP members had aesthetic, recreational, economic, professional, and other interests in photographing, studying, protecting and otherwise [*26] enjoying the AWB cranes in their natural environment. (D.E. 270 at 7-8).

The Supreme Court has recognized that "environmental plaintiffs adequately allege injury in fact when they aver that they use the affected area and are persons "for whom the aesthetic and recreational values of the area will be lessened by the challenged activity." *Friends of the Earth, Inc. v. Laidlaw Envtl. Servs. (TOC)*, 528 U.S. 167, 183, 120 S. Ct. 693, 145 L. Ed. 2d 610 (2000). Fewer AWB cranes would adversely affect the tourism, visual observation, and recreational enjoyment of TAP members. Thus, TAP successfully demonstrated that its members were "among the injured" for purposes of standing. *Lujan*, 504 U.S. at 562-63.

2. Redressability.

In denying TCEQ defendants' and GBRA's motion for partial summary judgment, the Court previously found that TAP had also established redressability. (D.E. 270 at 9-12). To establish redressability, it must be "likely, as opposed to merely speculative, that the injury will be redressed by a favorable decision." *Friends of the Earth, Inc.*, 528 U.S. at 181. The relevant question is simply, "whether a plaintiff personally would benefit in a tangible way from the court's intervention." *Steel Co. v. Citizens for a Better Environment*, 523 U.S. 83, 103 n.5, 118 S. Ct. 1003, 140 L. Ed. 2d 210 (1998) [*27] (internal quotation marks omitted). "When . . . a plaintiff's asserted injury arises from the government's allegedly unlawful regulation (or lack of regulation) of someone else . . . causation and redressability ordinarily hinge on the response of the regulated (or regulable) third party to

the government action or inaction - and perhaps on the response of others as well." *Lujan*, 504 U.S. at 562.

In their motion for partial summary judgment, and again at trial, the TCEQ defendants argued that they lacked the authority or the power to control the activities of permitted water right users and Domestic and Livestock (D&L) water right owners. (D.E. 214). GBRA argued that, even if the TCEQ defendants did have the authority to alter the issuance of new or existing water permits, such an action would not noticeably affect freshwater flows to the Aransas Refuge such that any ordered relief would be "pointless." (D.E. 215). The Court rejected those arguments pretrial finding that, based on the summary judgment evidence alone, the TCEQ defendants have the authority over water permits and water diversions. (D.E. 270 at 11). At trial, witnesses for TAP established that the TCEQ defendants have [*28] the plenary authority to implement Texas laws and to fulfill federal law, and more particularly, the ESA,¹⁶ and that declaratory and injunctive relief would most certainly help the AWB flock.

16 The TCEQ's powers and authority are addressed in more detail in the Burford abstention discussion, *infra*.

With respect to declaratory judgments, the Supreme Court has stated, "the question . . . is whether the facts alleged, under all the circumstances, show that there is a substantial controversy between parties having adverse legal interests, or sufficient immediacy and reality to warrant the issuance of a declaratory judgment." *MedImmune, Inc. v. Genentech, Inc.*, 549 U.S. 118, 127, 127 S. Ct. 764, 166 L. Ed. 2d 604 (2007). TAP seeks a declaration that the TCEQ defendants have violated ESA Section 9 in the past and are presently violating Section 9 by issuing water permits and authorizing diversions, as well as a declaration that water diversion regulations are preempted by federal law when they purport to allow activities that result in the taking of Whooping Cranes. (D.E. 1 at 32, ¶¶ A, B, C). Such a declaration would assist TAP in its overall goal of developing a plan to protect the AWB flock.¹⁷

17 At oral argument, TAP confirmed [*29] that a declaratory judgment as to violation of ESA Section 9 would significantly redress its injury. (July 28, 2010, Hearing at 2:29:08; Mr. Blackburn: "I think that a declaratory judgment from this Court that the Endangered Species Act had been violated would also be an incentive to find a solution. We are willing to work with the State to come up and craft a solution.").

TAP has requested injunctive relief. (D.E. 1 at 32-33, ¶¶ D, E). At trial, the Court heard testimony from

TCEQ officials including Mark Vickery, a former TCEQ Executive Director, who testified that the TCEQ has the authority to issue or deny a permit, or to impose conditions on the permit. (Vickery, Day 4, Tr 205). Indeed, the TCEQ has the "continuing right of supervision of State water resources." Id. Tr 204. The Court rejects the TCEQ defendants' arguments that they are essentially powerless to regulate water resources in the manner TAP suggests. An injunction preventing new approvals of permits until there are "sufficient assurances" [*30] that these permits will not result in harm to the Whooping Cranes could effectively redress TAP's concerns regarding freshwater inflows to the Refuge for the benefit of the AWB flock.

Finally, as to TAP's request for development of an HCP and the issuance of an ITP under *16 U.S.C. § 1539(a)(2)*, this too would redress TAP's injury. The Supreme Court has rejected overly "draconian interpretation[s] of the redressability requirement." *Larson v. Valente*, 456 U.S. 228, 243 n. 15, 102 S. Ct. 1673, 72 L. Ed. 2d 33 (1982). A plaintiff "satisfies the redressability requirement when he shows that a favorable decision will relieve a discrete injury to himself. He need not show that a favorable decision will relieve his every injury." Id. At trial, TAP's experts offered several proposals to prevent future takings of Whooping Cranes. TAP has satisfied the standing requirement of redressability.

3. Causation.

As to the third element of standing, causation, the Court found prior to trial a relationship between the TCEQ defendants' water management practices and the freshwater flows to the Aransas Refuge. (D.E. 270 at 13-17). However, as to the second aspect of causation in this case, namely, TAP's allegation that low freshwater flows [*31] caused the deaths of at least 23 Whooping Cranes in 2008-2009, the Court concluded that material issues of fact remained. Id. at 17.

The federal courts have found causation where there has been a direct relationship between the challenged government regulation and the resulting "take." For example, in *Loggerhead Turtle v. County Council of Volusia County*, plaintiffs sued Volusia County, alleging inter alia, that its refusal to ban beachfront artificial light sources (cars), adversely impacted the loggerhead turtle, resulting in a taking in violation of ESA Section 9. *148 F.3d at 1234-35*. The Eleventh Circuit found the plaintiffs had standing, and had sufficiently alleged causation based upon the lack of regulation, "even though the actions or inactions of those third parties not before the court may be another cause of the harm." *148 F.3d at 1253* (internal citations and quotation marks omitted). Similarly, in *Strahan v. Coxe*, the district court found

sufficient causation between harm to the endangered northern Right Whale and governmental regulation of commercial fishing vessels and whale-watching vessels in Massachusetts waters. The court explained:

Indisputably, the actions of third [*32] parties not before the court -- commercial fishing and whale watch operations -- are the immediate cause of the harm to endangered whales alleged here. **Defendants do not place gillnets and lobster gear in coastal waters, nor do they operate whale watch vessels. Nevertheless, the actions of these third parties are dependent on the actions of the Defendants.** Fishing vessels cannot, legally, place gillnets and lobster gear in Massachusetts waters without permission from the Defendants. And whale watch vessels cannot, legally, approach within 500 yards of Right whales in Massachusetts waters without permission from the Defendants. Thus, to the extent that he challenges the operations of licensed commercial fishing and whale watch vessels, Strahan has shown a causal connection between the injury he has suffered (and will continue to suffer) and the actions of the Defendants in issuing such licenses.

Strahan v. Coxe, 939 F. Supp. 963, 978-79 (D. Mass. 1996) (emphasis added); see also *Defenders of Wildlife v. Gutierrez*, 532 F.3d 913, 924, 382 U.S. App. D.C. 312 (D.C. Cir. 2008) (in suit against Coast Guard alleging violations of ESA Section 9 due to establishment and maintenance of shipping lanes in areas inhabited [*33] by right whales, court rejected argument that chain of causation was too attenuated); *Seattle Audubon Soc'y v. Sutherland*, 2007 U.S. Dist. LEXIS 31880, 2007 WL 1300964 (W.D. Wash. May 1, 2007) (finding sufficient causation between state agency regulation over logging and taking of spotted owls, explaining, "[t]he alleged destruction of spotted owl habitat on private lands is fairly traceable to State Defendants' actions because State Defendants enforce the rules governing such logging operations and the independent logging operators cannot conduct Class III applications on their private lands without the authorization of the Department.").

As will be discussed in the Findings below, at trial TAP offered essentially uncontroverted evidence to establish: (1) the TCEQ defendants are responsible for water permitting and water diversions from the San Antonio and Guadalupe River systems, and the increased water

diversions have left less water for the cranes; (2) reduced water flows lead to high bay/estuary salinities (in excess of 30 to 40 ppt in wide spread sampling); (3) high San Antonio bay/Guadalupe estuary salinities lead to a reduction in the availability of wolfberries, blue crabs, and fresh drinking water; (4) [*34] the reduced availability of the cranes' primary food sources, coupled with the expenditure of more energy to fly farther to search for food and freshwater, leads to malnourishment and death; and (5) TCEQ defendant's water practices caused the death of at least 23 whooping cranes in the 2008-2009 winter. That is, the mortality of the Whooping Crane population is directly attributable to the lack of freshwater inflows to these crucial estuaries.

B. Burford abstention.

In both their pre- and post-trial briefings, defendants and intervenors have requested that the Court abstain from adjudicating this case pursuant to the Supreme Court's holding in *Burford v. Sun Oil Co.*, 319 U.S. 315, 63 S. Ct. 1098, 87 L. Ed. 1424 (1943) ("Burford abstention").

In *Burford*, the Supreme Court affirmed a district court decision dismissing an action in which the Sun Oil Company challenged a Texas Railroad Commission order granting Burford a permit to drill certain oil wells. 319 U.S. at 316-17. The competing drilling interests plus the State's regulatory powers of oil and gas conservation all came into play. *Id.* at 318. Recognizing the significant state regulatory framework, the Court concluded that federal court abstention was proper. The [*35] Court reasoned:

The state provides a unified method for the formation of policy and determination of cases by the Commission and by the state courts. The judicial review of the Commission's decisions in the state courts is expeditious and adequate. Conflicts in the interpretation of state law, dangerous to the success of state policies, are almost certain to result from the intervention of the lower federal courts. On the other hand, if the state procedure is followed from the Commission to the State Supreme Court, ultimate review of the federal questions is fully preserved here. Under such circumstances, a sound respect for the independence of state action requires the federal equity court to stay its hand.

Burford, 319 U.S. at 333-34.

The Fifth Circuit has explained that, "Burford abstention applies when a case involves a complex issue of unsettled state law that is better resolved through a state's regulatory scheme." *Moore v. State Farm Fire & Cas. Co.*, 556 F.3d 264, 272 (5th Cir. 2009) (citing *Burford v. Sun Oil Co.*, 319 U.S. 315, 332, 63 S. Ct. 1098, 87 L. Ed. 1424 (1943)). As part of its Burford abstention analysis, a court must consider five factors: (1) whether the cause of action arises under federal or state [*36] law; (2) whether the case requires inquiry into unsettled issues of state law or into local facts; (3) the importance of the state interest involved; (4) the state's need for a coherent policy in that area; and (5) the presence of a special state forum for judicial review. *Moore v. State Farm Fire & Cas. Co.*, 556 F.3d 264, 272 (5th Cir. 2009) (citing *Wilson v. Valley Elec. Membership Corp.*, 8 F.3d 311, 314 (5th Cir. 1993)).

Burford abstention represents "an extraordinarily and narrow exception to the duty of the District Court to adjudicate a controversy properly before it." *Quackenbush v. Allstate Ins. Co.*, 517 U.S. 706, 727-28, 116 S. Ct. 1712, 135 L. Ed. 2d 1 (1996); *Wilson v. Valley Elec. Membership Corp.*, 8 F.3d 311, 313 (5th Cir. 1993) (explaining that abstention remains the exception, not the rule). The "federal courts' obligation to adjudicate claims within their jurisdiction [is] virtually unflagging." *New Orleans Public Serv., Inc. v. Council of City of New Orleans*, ("NOPSI"), 491 U.S. 350, 359, 109 S. Ct. 2506, 105 L. Ed. 2d 298 (1989).

The most important aspect of *Burford* is whether there exists a state process to which a federal court might abstain. That is, there must be "time and adequate state-court review" available. *NOPSI*, 491 U.S. at 360. [*37] Additionally, the NOPSI court underscored "[w]hile *Burford* is concerned with protecting complex state administrative processes from undue federal interference, it does not require abstention whenever there exists such a process, or even in all cases where there is 'potential for conflict' with state regulatory law or policy." *Id.* at 362 (quoting *Colorado River Water Conservation District v. United States*, 424 U.S. 800, 815-16, 96 S. Ct. 1236, 47 L. Ed. 2d 483 (1976)).

In arguing for abstention, defendants and intervenors rely on the Fifth Circuit's decision in *Sierra Club v. City of San Antonio*, 112 F.3d 789 (5th Cir. 1997), an ESA case involving water withdrawals from the Edwards Aquifer that affected an endangered species, the fountain darter. *Id.* at 791. The district court issued an ESA injunction ordering the water officials to limit pumping from the Edwards Aquifer based on spring flows.¹⁸ *Id.* The injunction was to remain in effect until the defendants demonstrated a water management plan that would preserve the fountain darter, and defendants were further ordered to supply the court and a special master with

monthly water usage information. *Id.* On appeal, the Fifth Circuit held that the lower court erred by issuing [*38] an injunction finding that the case was not likely to succeed on the merits due to Burford. The Fifth Circuit noted the need for "uniform regulation" in the state regime governing water withdrawals, and found that the legislation in place, the "Edwards Aquifer Act," could "fairly be characterized as a comprehensive regulatory scheme. It represents a sweeping effort by the Texas Legislature to regulate the aquifer with due regard for all competing demands for the aquifer's water." *Sierra Club, 112 F.3d 794.*

18 Unlike this case, the named defendants in that action were not State officials or actors, but were independent aquifer pumpers. The State entity that was created to impose pumping restrictions, the Edwards Aquifer Authority (EAA), allegedly refused to act, and the Sierra Club sued the aquifer pumpers directly.

1. Senate Bill 3.

The TCEQ defendants, GBRA, and SARA argue that abstention is warranted in this case because the State of Texas now has in place a comprehensive regulatory scheme, Senate Bill 3 (S.B.3), that regulates the State's surface water flows. See *Tex. Water Code § 11.1471*, Environmental Flow Standards and Set-Asides (2007). The TCEQ and GBRA argue that S.B.3 addresses [*39] a number of environmental issues, including endangered species, and attempts to present a comprehensive state regulatory scheme such that federal abstention is mandated. TCEQ defendants and GBRA maintain that federal intervention would disrupt the S.B.3 process and undermine the State's efforts to manage its surface waters.

In 2001, the 77th Texas legislature passed Senate Bill 2, which directed the TCEQ, the Texas Water Development Board (TWDB), and the Texas Parks and Wildlife Department (TPWD), in cooperation with other agencies, "to ... jointly establish and continuously maintain an instream flow data collection and evaluation program." Texas Water Code (TWC) § 16.059. In addition, the agencies were directed to "... conduct studies and analyses to determine appropriate methodologies for determining flow conditions in the state rivers and streams necessary to support a sound ecological environment." *Id.*

In 2007, the Texas legislature passed S.B.3, establishing the Environmental Flows Allocation Process, also known as "E-flows," to address inflow water needs. See *TWC § 11.1471*, et seq. S.B.3 mandates that the TCEQ:

(1) adopt appropriate environmental flow standards for each river basin [*40]

and bay system in this state that are adequate to support a sound ecological environment, to the maximum extent reasonable considering other public interests and other relevant factors;

(2) establish an amount of unappropriated water, if available, to be set aside to satisfy the environmental flow standards to the maximum extent reasonable when considering human water needs; and

(3) establish procedures for implementing an adjustment of the conditions included in a permit or an amended water right ...

TWC § 11.1471(a). To achieve these objectives, S.B.3 directs the TCEQ to establish and implement a comprehensive plan for each of Texas' seven major river basins and bays to determine appropriate E-flows.

Pursuant to S.B.3, the TCEQ developed a scheme for collecting data and information to formulate E-flow recommendations. *TWC § 11.02362* et seq. For each river basin and bay system, there is a stakeholder team and a science team to consider and formulate flow recommendations to the TCEQ, and there are two statewide groups that oversee the entire process.¹⁹ The statewide Environmental Flows Advisory Group (EFAG) is responsible for appointing members to the statewide Science Advisory Committee, [*41] as well as appointing members to each local stakeholder team.²⁰ *TWC § 11.0236.* EFAG is permitted to make comments on the recommendations of the local science teams for each basin. *Id.*

19 Texas' seven major estuaries along the east coast are, from north to south: (1) Sabine-Neches Estuary; (2) Trinity-San Jacinto Estuary; (3) Lavaca-Colorado Estuary; (4) Guadalupe Estuary; (5) Mission-Aransas Estuary; (6) Nueces Estuary; and (7) Laguna Madre Estuary. See PX-63.

20 In October 2009, EFAG appointed the members of the Guadalupe-San Antonio BBASC. A list of members for the Guadalupe-San Antonio river basins is filed as Exhibit 5 to D.E. 57.

The Science Advisory Committee (SAC) is responsible for defining the geographical extent of each river basin and bay system for the "sole purpose of developing environmental flow regime recommendations." *TWC § 11.02361.* The SAC provides overall direction and coordination, and ensures that consistent and acceptable scientific principles are utilized throughout the environ-

mental flows allocation process in each region. The SAC has issued technical guidance documents for the local science teams to use in developing recommended flow regimes,²¹ and has created [*42] a framework for review and evaluation of the science team recommendations.²²

21 For example, in June 2009, the SAC issued *Methodologies for Establishing Freshwater Inflow Regimes for Texas Estuaries, Within the Context of the Senate Bill 3 Environmental Flow Process*. See (D.E. 57, Ex. 4).

22 A copy of the SAC's review criteria and framework is found at http://www.tceq.state.tx.us/assets/public/permitting/watersupply/water_rights/eflows/framework_sac_review_20100107.pdf.

Under S.B.3, each region has a Basin and Bay Area Stakeholder Committee (BBASC). *TWC* § 11.02362(c)(1). The BBASC stakeholder team for each region must have at least seventeen members, and these teams are required to reflect a fair and equitable balance of local groups with interests in the basin and bay system.²³ The stakeholder team considers the recommendations of the science team, but it also considers other factors, including the present and future water needs related to water supply planning for that local basin and bay system. The BBASC is charged with appointing members to the area's Basin and Bay Expert Science Team ("BBEST"). *TWC* § 11.02362(c)(3). BBEST members are required to be technical experts with special [*43] knowledge regarding the river basin and bay system or the development of environmental flow regimes. *TWC* § 11.02362(i), (m). Pursuant to S.B.3, the local BBEST science team calculates the amount of water that needs to remain instream to protect the health and vitality of the given estuary. The BBEST submits its recommendations to the stakeholder BBASC team, as well as to the TCEQ. The stakeholder team considers the BBEST's recommended environmental flow regime, adds their associated policy considerations, and develops strategies to meet the flow recommendations. *TWC* § 11.02362(o). BBASC is not, however, required to follow or give any particular weight to the BBEST's technical recommendations. (Montagna, Day 3, Tr 232-33). The implementation strategies for protecting flows can include options such as efficiency incentives, the dedication of treated wastewater, and the purchase or donation of existing water rights. Id.

23 *Tex. Water Code* § 11.02362(f). The statute requires that the interest groups include agricultural water uses (including irrigation, free-range livestock, and concentrated animal feeding operations); recreational water users (including coastal

recreational anglers and [*44] businesses supporting water recreation); municipalities; soil and water conservation districts; industrial water users (including refining, electricity generation, chemical manufacturing, and paper and timber production); commercial fisherman; public interest groups; regional water planning groups; groundwater conservation districts; river authorities and other conservation and reclamation districts with jurisdiction over surface water; and environmental interests.

After the BBEST and BBASC each make a recommendation to the TCEQ, the TCEQ, through a public rule-making process, has one year to use those recommendations to legally adopt environmental flow standards for the river basin and inflows to the associated bay system.²⁴

24 For the Guadalupe/San Antonio river basins, the BBEST submitted its recommendations on the amount of water necessary to ensure a sound ecological environment to the BBASC on March 1, 2011. The BBASC submitted its recommendations to the TCEQ and to EFAG on September 1, 2011. The deadline for the TCEQ to adopt environmental flow standards for the Guadalupe and San Antonio area was September 1, 2012. See http://www.texaswatermatters.org/Guadalupe_SanAntonio_Mission_Aransas.htm.

Although [*45] S.B.3 does establish a comprehensive framework for the State of Texas to *determine* the amount of freshwater inflows that need to remain instream to protect the overall health of the State's river system, it makes no attempt to *ensure* that such recommended amounts remain. Indeed, to the contrary, S.B.3 specifically excludes from consideration the inflow needs of the bays and estuaries in times of water shortages. In addition, S.B.3 fails to address existing permits and water usage. In short, S.B.3 does not address, concern, protect, or assist the endangered whooping cranes, and therefore, provides no grounds for abstention.

S.B.3 sets forth the "Policy Regarding Waters of the State." *TWC* § 11.0235. It recognizes that the waters of the state are held in trust for the public, and that the right to use state water may be appropriated only as expressly authorized by law. Id. § 11.0235(a). It acknowledges that maintaining the biological soundness of the state's rivers, lakes, bays, and estuaries "is of great importance to the public's economic health and general well-being," and it encourages "voluntary water and land stewardship to benefit the water in the state,..." *TWC* § 11.0235(b). However, [*46] there is no steadfast commitment to the bays and estuaries:

The legislature has expressly required the [TCEQ] commission while balancing all other public interests to consider and, **to the extent practicable**, provide for the freshwater inflows and instream flows necessary to maintain the vitality of the state's streams, rivers, and bay and estuary systems in the commission's regular granting of permits for the use of state waters.²⁵

TWC § 11.0235(c) (emphasis added). Thus, consideration of the bays and estuaries is initially relegated "to the extent practicable" status in balancing water demands. But to add insult to injury, the legislature goes on to provide that, in times of water shortages and drought, the needs of the bays and estuaries are expressly exempt from consideration:

...As an essential part of the state's environmental flows policy, all permit conditions relating to freshwater inflows to affected bays and estuaries and instream flow needs must be subject to a temporary suspension if necessary for water to be applied to essential beneficial uses during emergencies.

TWC § 11.0235(d). That is, in times of drought or other water emergencies, S.B.3 specifically authorizes the [*47] TCEQ to suspend the recommended freshwater inflows to bays and estuaries that the S.B.3 process had determined to be necessary to maintain the ecosystem's health.

25 Since 1985, the TCEQ has been required by statute to consider the impact to bays and estuaries and instream uses when a permit is requested: *Texas Water Code § 11.147(b)* provides:

In its consideration of an application for a permit to store, take, or divert water, the commission shall assess the effects, if any, of the issuance of the permit on the bays and estuaries of Texas. For permits issued within an area that is 200 river miles of the coast, to commence from the mouth of the river thence inland, the commission shall include in the permit any conditions considered necessary to maintain beneficial inflows

to any affected bay and estuary system, to the extent practicable when considering all public interests and the studies mandated by *Section 16.058* as evaluated under *Section 11.1491*.

Thus, the protection of this provision extends only to permits within "200 river miles of the coast." *Id.*

Under S.B.3, "beneficial use" is defined as the "use of the amount of water which is economically necessary for a purpose authorized [*48] by this chapter, when reasonable intelligence and reasonable diligence are used in applying the water to that purpose and shall include conserved water." *TWC § 11.002(4)*. S.B.3 specifically identifies numerous purposes for which water may be appropriated. *TWC § 11.023(a)*. This list includes domestic and municipal uses; agricultural and industrial use, including development of power by means other than hydroelectric; mining and recovery of minerals; hydroelectric power; navigation; recreation and pleasure; public parks; and game preserves. *Id. § 11.023(a) (1), (2)*. The water needs of whooping cranes and other endangered species are not addressed by S.B.3, and in times of drought, they are expressly disregarded.

Moreover, the Texas legislature has specifically **excluded** as a beneficial use the allowance of water instream to benefit a bay or estuary. In response to state court litigation in which applicants sought a permitted water right to leave water instream,²⁶ the Texas legislature passed *§ 11.0237(a) of the Texas Water Code*, which provides:

The commission may not issue a new permit for instream flows dedicated to environmental needs or bay and estuary inflows. The commission may approve [*49] an application to amend an existing permit or certificate of adjudication to change the use to or add a use for instream flows dedicated to environmental needs or bay and estuary inflows.

TWC § 11.0237(a). Thus, Texas law prohibits the TCEQ from issuing a water permit for the purpose of allowing water to remain instream to maintain the bay or estuary inflows, or to otherwise address environmental needs.

26 See *TCEQ v. San Marcos River Foundation*, 267 S.W.3d 356, 360 (Tex. App. -- Corpus Christi 2008, pet. denied.). In that case, the San Marcos

River Foundation applied for a permit with the TCEQ in July 2000, requesting an appropriation of approximately 1.3 million acre feet of water to remain instream to benefit the Guadalupe/San Antonio bay and estuary system. GBRA and SARA, two of the defendant/intervenors in the case *sub judice*, objected and in March 2003, the TCEQ denied the permit. The Foundation filed suit to challenge the TCEQ's denial of the permit, but while the lawsuit was pending, § 11.0237(a) was enacted, thus specifically prohibiting the issuance of a permit to leave water instream to benefit the bays/estuaries, and the Foundation's action was dismissed as moot.

Finally, S.B.3 [*50] does not assist the whooping cranes because it applies only to applications for *new* water permits; it does not attempt to modify or amend water rights with priority dates earlier than September 1, 2007. Indeed, S.B.3 expressly prevents use of the E-flow process to regulate water users unless they are seeking *new* permits or *new* increases under existing permits:

(1) water appropriated under a permit for a *new* appropriation of water the application for which is pending with the Texas Commission on Environmental Quality on the effective date of this Act or is filed with the commission on or after that date; or

(2) the increase in the amount of water authorized to be stored, taken, or diverted under *an amendment to the existing water right* that increases the amount of water to be stored, taken or diverted and the application for which is pending with the Texas Commission on Environmental Quality on the effective date of this Act or is filed with the commission on or after that date.

Section 1.27 of Acts 2007, 80th Leg., ch 1430 2007 Tex. Gen. Laws 5846 (not codified in the Water Code) (emphasis added). Thus, S.B.3 and its quasi-considerations of maintaining necessary inflows has no impact [*51] on existing permits with a priority date before September 1, 2007. In addition, until the staggered S.B.3 process is actually completed, the TCEQ can continue to issue new water permits without regards to inflows.²⁷

27 The TCEQ developed a website dedicated to the E-flows process and mandates of S.B.3. The website offers updates on specific basin/estuary BBEST and BBASC recommenda-

tions, as well as SAC guidance and discussion papers. There is no indication that any river basin has yet completed the process, which includes TCEQ's adoption of a recommendation and corresponding rule formulation for each river basin. See http://www.tceq.state.tx.us/permitting/water_supply/water_rights/eflows/resources.html

S.B.3 establishes an administrative scheme to determine freshwater inflows to the state's bays and estuaries. It does not provide for enforcement of those recommendations, nor provide for penalties if the recommended inflows are not maintained. In addition, S.B.3 set certain deadlines for flow determinations to be made and adopted, but to date, no region has successfully completed the E-flow process. The TCEQ defendants, as well as GBRA and SARA, argue that S.B.3 provides an elaborate regulatory [*52] scheme for environmental flows that will address the concerns of the Whooping Crane, that federal intervention would disrupt the E-flow process, and therefore, that abstention is mandated under Burford. The Court disagrees. The mere existence of a state-created administrative body does not override the jurisdictional power of a federal court. The E-flow scheme and process may hopefully provide important and scientifically sound information to water officials and policy makers concerning each basin and bay, and eventually, promote actions to secure the recommended inflows and keep the rivers "wet." However, to suggest that S.B.3 can protect the whooping cranes, when by its own admission, it specifically excludes the cranes' habitat in times of water emergencies, is to argue that state law preempts federal law. This topsy-turvy view of federalism and the *Constitution's Supremacy Clause* has no basis in the existing constitutional scheme. The Court has jurisdiction under the ESA.

2. Texas surface waters.

Moreover, the Court finds that, not only does the ESA mandate federal court intervention in this case, but Texas' own water laws and policies warrant judicial oversight in this instance [*53] because, contrary to the position of defendants and intervenors, Texas law specifically authorizes the TCEQ to manage the State's surface waters in a manner consistent with conservation and in compliance with federal law, and the TCEQ defendants have failed to do so.

The surface waters in the State of Texas are owned by the state itself:

(a) The water of the ordinary flow, underflow, and tides of every flowing river, natural stream, and lake, and of every bay or arm of the Gulf of Mexico, and the

storm water, floodwater and rainwater of every river, natural stream, canyon, ravine, depression, and watershed in the state is the property of the state.

(b) Water imported from any source outside the boundaries of the state for use in the state and which is transported through the beds and banks of any navigable stream within the state or by utilizing any facilities owned by the state is property of the state.

TWC § 11.021.

"The waters of the state are held in trust for the public." *TWC § 11.0235(a)*. No person may divert, store or impound state-owned water without authorization, by permit, certificate of adjudication, or one of the statutory exemptions.²⁸ *TWC §§ 11.081, 11.121.*

28 Since the Irrigation [*54] Act of 1889, the allocation of surface water in Texas has been subject to the "prior appropriation" doctrine. *In re Adjudication of the Water Rights of the Upper Guadalupe Segment of the Guadalupe River Basin, 642 S.W.2d 438, 440 (Tex. 1982)*. As between lawful appropriators, first in time equals first in right. See *Tex. Water Code § 11.027*. The holder of a more senior water right is entitled to draw all of the water to which he or she is entitled before the holder of a more junior right is entitled to any. In 1967, the Texas Water Rights Adjudication Act required all appropriators of surface waters to prove their usage in court. *Guadalupe River, 642 S.W.2d at 439, 442*. This judicial process clarified who held a right to withdraw water, eliminated the dual riparian and prior appropriation regime, and recorded the priority of the rights to divert state water. Each person who went through the judicial process received a "certificate of adjudication." The certification process codified all rights that predated the existing permit system, and extinguished the claims of those who could not prove their use. *Tex. Water Code, ch. 11, subchapter G*. Thus, the most senior non-exempt rights recognized [*55] by Texas are generally certificates of adjudication.

Some water rights, such as Domestic and Livestock (D&L), are exempt from the permitting or adjudication process.²⁹ *TWC § 11.142*. A D&L user may divert water from a stream or may impound up to 200 acre-feet³⁰ of water at a time in an impoundment or reservoir.³¹ *Id.* D&L water rights are not recorded, nor are they moni-

tored by any water enforcement office. (Soward, Day 4, Tr 253).

29 Since the mid-1900's, Texas recognized "riparian rights," under which owners and occupiers of land along rivers could make "reasonable use" of the water flowing by. *Guadalupe River, 642 S.W.2d at 439*. Following the 1967 adjudication of water rights process, many riparian right owners received certificates of adjudication. Now, owners of river-front property are included under the D&L exemption of *TWC § 11.142*. Thus, technically, there are no longer any "riparian right" owners, as they are included within the D&L exemption. However, the term "riparian right" continues to exist.

30 An acre-foot of water is 325,851 gallons.

31 The D&L exemption provides, in relevant part: "Without obtaining a permit, a person may construct on the person's own property a dam or [*56] reservoir with normal storage of not more than 200 acre-feet of water for domestic and livestock purposes. A person who temporarily stores more than 200 acre-feet of water in a dam or reservoir ... is not required to obtain a permit for the dam or reservoir if the person can demonstrate that the person has not stored in the dam or reservoir more than 200 acre-feet of water on average in any 12-month period." *TWC § 11.142*.

The TCEQ is the state agency with "general jurisdiction" over both "water and water rights" in Texas.³² *TWC § 5.013(a)*. Via statute, the Texas legislature has conferred upon the TCEQ the plenary authority to implement Texas laws and to fulfill federal law. *TWC § 5.105*. The Texas Supreme Court has held that, when the legislature confers agency power, it impliedly intends that the agency have whatever powers are reasonably necessary to fulfill its express functions or duties. *Texas Natural Res. Conservation Comm'n v. Lakeshore Util. Co., 164 S.W.3d 368, 377-78 (Tex. 2005)*.³³

32 The jurisdiction and powers of the TCEQ are found in the Texas Water Code, Title 2, entitled "Water Administration," and in particular, Chapters 5 and 11. Chapter 5 creates the agency and defines [*57] its duties, powers, and areas of jurisdiction. Chapter 11 details water rights.

33 The Texas Supreme Court also holds that "[s]tatutes are given a construction consistent with constitutional requirements, when possible, because the legislature is presumed to have intended compliance with state and federal constitutions." *Brady v. Fourteenth Court of Appeals, 795 S.W.2d 712, 715 (Tex. 1990)*; *Tex. Gov't Code § 311.021*.

Texas' legal framework for resolving water conflicts is based on permit priority. *Section 11.027 of the Texas Water Code* provides simply: "As between appropriators, the first in time is the first in right." *TWC § 11.027*.

Former and current TCEQ employees and officials testified at trial about their water management responsibilities and powers. Al Segovia is a named TCEQ defendant in this action, and at the time this suit was filed, he was employed as both the South Texas Watermaster and the Concho River Watermaster. (Segovia, Day 4, Tr 52). In certain river basins, the TCEQ has implemented a watermaster program to protect priority water uses. See *TWC § 11.326*. The purpose of the watermaster program is to manage, monitor, archive, and enforce surface water rights based on priority. [*58] Id. Tr 53-54.

Under the watermaster program, water right owners, junior and senior, must contact the watermaster before diverting water. Id. Tr 55. Depending on the river conditions at the time, the watermaster can grant permission, delay permission, or if necessary due to drought, deny permission to take water. Id. The watermaster keeps records and monitors water use of permitted water right owners through various reporting mechanisms and forms. ³⁴ Id. Tr 57.

34 The watermaster office has employees known as watermaster specialists or deputies whose jobs are similar to game wardens or "water police." (Segovia, Day 4, Tr 68). Their offices are located throughout South Central Texas, and each one is responsible for approximately 10 counties. Id. Their job is to drive up and down the rivers and creeks and confirm that the water being taken by owners is authorized, and to report any instances in which it is not. Id. In monitoring water usage, watermaster deputies rely on the United States Geological Survey (USGS) gauges that are scattered throughout Texas, primarily on the main river systems. Id.

Water rights are relative to one another; the oldest water right is the most senior, and all other [*59] rights are junior to it. (Segovia, Day 4, Tr 60). If a junior water right owner seeks to withdraw water during a drought, the watermaster must organize a meeting to discuss the situation and determine if other owners can reduce their use. Id. Tr 61. In reality, the watermaster program is "no more than a balancing act," and it presents "a constant battle." Id. The watermaster has the authority to tell a water owner: "You can't take this water at this time." Id. Indeed, water users are "all under the same drought." Id.

When water diversions must be reduced, junior right holders are restricted first. (Segovia, Day 4, Tr 62). However, because Texas often suffers from drought con-

ditions, even senior holders must be restricted at times, and the watermaster has the authority to order restrictions or limitations on the amount of water diverted. Id. Tr 70-71. The first priority owners are those with D&L/riparian rights, and it is the watermaster's job to ensure that downstream riparian right owners get their water. Id. Tr 71. One method to address water demand is to stagger use along the river. Id. at 62. The primary objective is to "keep the river wet." Id.

D&L/riparian right owners are authorized [*60] to withdraw 200 acre-feet of water annually. (Segovia, Day 4, Tr 77-79). And see *TWC § 11.142*. However, the watermaster does not monitor the D&L/riparian owner's use. Id. A watermaster might visually check stored water to see if it remains at the same capacity, but there is no way of determining whether the riparian owner emptied and refilled the reservoir, thus using more than the allowed 200 acre-feet. Id. Tr 78-79.

Recently retired TCEQ Executive Director Mark Vickery, a named defendant in his official capacity, testified for TAP about the TCEQ's administrative and monitoring responsibilities concerning permitted water withdrawals, as well as enforcement authority. (Vickery, Day 4, Tr 195). In his role as Executive Director, he had policy discretion, as well as implementation authority. Id. Tr 198.

The TCEQ has enforcement authority over certificates of adjudication and water permits, and it has the authority to issue or deny a permit with conditions. (Vickery, Day 4, Tr 205). The TCEQ has the authority to contact industries about their water use and to encourage conservation efforts, such as industrial recycling. ³⁵ Id. Tr 210-211. Some permits require return flows, but it is not [*61] "routine, and most older permits do not include a return flow requirement." Id. Tr 212.

35 For example, "direct reuse" is a conservation operation by which diverted water sent to a waste plant can be taken and used, returned to the stream/river, and then retaken downstream multiple times. Id. Tr 211.

The Oath of Office for TCEQ Commissioners requires them to comply with federal law. ³⁶ (Vickery, Day 4, Tr 212, 215). Since 1985, the water permit process now requires the TCEQ to consider the impact of water diversions on bays and estuaries. Id. Tr 218. And see *TWC § 11.147(b)*. In addition, effective September 1, 2011, the legislature enacted *section 11.053(c) of the Texas Water Code*, entitled **EMERGENCY ORDER CONCERNING WATER RIGHTS**, which provides, in part:

(a) During a period of drought or other emergency shortage of water, as defined by commission rule, the executive director by order may, in accordance with the priority of rights established by *Section 11.027*:

(1) temporarily suspend the right of any person who holds a water right to use the water; and

(2) temporarily adjust the diversions of water by water rights holders.

(b) The executive director in ordering a suspension or adjustment [*62] under this section shall ensure that an action taken:

(1) maximizes the beneficial use of water;

(2) minimizes the impact on water rights holders;

(3) prevents the waste of water;

(4) takes into consideration the efforts of the affected water rights holders to develop and implement the water conservation plans and drought contingency plans required by this chapter;

(5) does not require the release of water that, at the time the order is issued, is lawfully stored in a reservoir under water rights associated with that reservoir.

TWC § 11.053.

36 See PX-172, copy of TCEQ Commissioner's Oath of Office.

Mr. Vickery agreed that, pursuant to the *§ 11.053* emergency rule, the TCEQ now expressly has the au-

thority to suspend or adjust water diversions in times of drought. Id. Tr 217. The TCEQ is charged with adopting rules to implement this section. Id.

The TCEQ has the discretion to make exceptions in both enforcement and in the implementation of terms and conditions of water rights. (Vickery, Day 4, Tr 224). For example, in 2008-2009, the TCEQ accommodated a request from the City of Kerrville to withdraw water to ensure that the public's health was protected. Id. The City of Kerrville was a junior water [*63] right. Id.

Mr. Larry Soward is a retired public servant with first-hand knowledge of not only the TCEQ, but its predecessor agencies, as well as state departments in land and agriculture.³⁷ (Soward, Day 4, Tr 235). His testimony established that the TCEQ has authority "across the board," in times of drought, and it can "... issue an emergency order to basically do anything that is necessary or appropriate to carry out their duties and responsibilities ..., in an emergency situation." (Soward, Day 4, Tr 266). In Mr. Soward's opinion, the TCEQ could use its emergency powers to protect the bays, estuaries, and whooping cranes. Id. S.B.3 does not provide protection to the cranes. Id. To the contrary, S.B.3 authorizes the TCEQ to suspend the recommended inflow provisions during times when the flow is not sufficient to meet the needs of water right holders. Id. S.B.3 expressly allows for bays and estuaries to be left unprotected in times of "emergencies," that is, drought, the very time when the cranes need those inflows to be maintained. Id. Tr 268.

37 Mr. Soward's résumé is PX-261.

There are a number of methods available to the TCEQ to evaluate and address the competing demands for water. [*64] (Soward, Day 4, Tr 274-275). Under its emergency powers, the TCEQ can modify the usufructory rights of permit holders. Id. Tr 270. With the September 1, 2011 enactment of *TWC § 11.053*, the TCEQ now has the express authority to suspend or adjust water diversions in times of drought. Id. Thus, the TCEQ is no longer constrained by "first in time, first in right." Id. Tr 271. The threatening of an endangered species could constitute an "emergency" or fall under the "public welfare" provision of *§ 11.053*. Id. Tr 271-272.

Finally, Mr. Vickery noted that there is no prohibition to prevent the TCEQ from requiring an inventory of D&L users. Id. The TCEQ could initiate surveys to determine how currently permitted water is being used and initiate cancellation of unused water rights. Id. In addition, although the TCEQ does not require used water to be returned to the stream, it is required by statute, and the TCEQ could enforce water return. Id. Tr 275.

TAP's witnesses established that the TCEQ has the authority to modify or amend existing water rights, delay

or deny issuance of new permits, access and evaluate D&L usage, and take any other action necessary in times of emergencies, including drought, [*65] to ensure that the necessary freshwater inflows reach the Aransas Refuge and the AWB cranes. Despite this authority, the TCEQ defendants did not exercise it in 2008-2009, and the permitted water diversions, along with the drought, effectively choked the San Antonio bay/Guadalupe estuary, creating hyper-saline conditions and adversely affecting the health of the AWB cranes.

In rebuttal to TAP's witnesses on TCEQ authority, the TCEQ defendants offered Mr. Todd Chenoweth, TCEQ special counsel for the Office of Water.³⁸ (Chenoweth, Day 5, Tr 147-148). Mr. Chenoweth reiterated TAP witnesses' testimony concerning the water permit process and provided additional detail in some areas. He did not contradict or dispute TAP's allegations that the TCEQ has authority to manage permitted water rights or address D&L usage. In fact, Mr. Chenoweth affirmed TCEQ's broad authority to manage water resources, and speculated as to additional actions the TCEQ could take under its broad powers. As previously noted, the TCEQ's duty to consider the water needs of the bays and estuaries applies only to those water permits/applications to divert or store water within 200 river miles of the coast. See *TWC* § 11.147(b). [*66] There are no provisions in S.B.3's E-flow process to extend the range of consideration. (Chenoweth, Day 5, Tr 163-164). Thus, even with S.B.3, the TCEQ need not consider the impact of freshwater diversions as to any permit application to store or divert water that is outside the 200 river miles from the coast. Many of the lakes and reservoirs that supply the San Antonio bay/Guadalupe estuary are outside of this 200 river miles limit.³⁹ In fact, the San Antonio River is 240 river miles long and the Guadalupe River 250 miles long. For example, with permit applications, the TCEQ could authorize less water than the amount requested. (Chenoweth, Day 5, Tr 182). The TCEQ could impose "special restrictions," prohibiting diversions if the instream water flow rate fell below a certain cubic feet per second (cfs). Id. He acknowledged that the TCEQ's Water Availability Model (WAM) does not take into account exempt D&L users.⁴⁰ Id. Mr. Chenoweth proposed other means by which the TCEQ and a water right holder could work together to conserve water use to benefit the environment.⁴¹ That is, Mr. Chenoweth's testimony confirmed the testimony of TAP's witnesses, that the TCEQ has the authority and [*67] power to modify, amend, adjust, or in any manner affect priority water rights if it determines it is necessary to do so.

38 Mr. Chenoweth's résumé is DX-297.

39 Texas has 188 major water-supply reservoirs. These reservoirs vary in size from 5,200

acre-feet conservation storage capacity for the Upper Nueces Lake to 4,472,900 acre-feet for the Toledo Bend reservoir. The lakes and reservoirs associated with the San Antonio bay/Guadalupe estuary are: Victor Braunig Lake; Olmos Reservoir; Medina Lake; Lake McQueeney; Lake Gonzales; Lake Dunlap; Coletto Creek Reservoir, Canyon Lake; and Calaveras Lake.

40 In Mr. Chenoweth's opinion, the D&L data is not important because, due to its superiority, even if the TCEQ knew the D&L water usage amount, it would simply add that number into the WAM model, and then subtract it right back out. (Chenoweth, Day 5, Tr 184). That is, the "naturalized flow process" and WAM already takes into account the D&L usage because the historical data collected was subject to the D&L withdrawals. Id. Tr 185. However, this reasoning incorrectly assumes that the TCEQ has no authority over D&L rights. Because the TCEQ could require reductions or modifications in D&L use, it would [*68] be essential to know the amount of water that is involved.

41 For example, where an entity anticipates that it may have difficulty with TCEQ compliance and thus subject to associated fines and penalties, the entity can participate in a Supplemental Environmental Project (SEP). (Chenoweth, Day 5, 205). Instead of paying fines and penalties, the entity can direct a portion of the money to a fund for environmental projects, rather than to the TCEQ. Id. There is also a Texas Water Trust, established by the Texas Water Development Board, and it funds water projects through a variety of mechanisms, such as EPA loans and bonds. Id. Tr 206. The Water Trust has funded water treatment plants, drinking water plants, and lake water plants. Id. It can partially fund construction of reservoirs. Id. It is also involved in science-based studies to improve estimates on predicting water availability. Id.

The last witness to testify about TCEQ authority was Margaret Hoffman, an attorney who worked at the TCEQ from 1993 to 2004, and served as the TCEQ executive director for some portion of her time there.⁴² (Hoffman, Day 8, Tr 218-251). Ms. Hoffman testified that TCEQ is constrained by what she called "permanent [*69] water rights."⁴³ Id. Tr 232. She explained that a permanent water right is a vested property right, as opposed to term permits, temporary permits, and seasonal permits, that are subject to being cancelled or revisited. Id. Tr 232. In times of water shortage, those "temporary" rights are modified first. Id.

42 Ms. Hoffman's CV is DX-299.

43 The *Texas Water Code*, § 11.040 provides that: "A permanent water right is an easement and passes with title to the land." *TWC* § 11.040(a). A "water right" is defined as "a right acquired under the laws of this state to impound, divert, or use state water." *TWC* § 11.002(5).

Ms. Hoffman testified that the Texas Water Code affords highest priority for municipal and domestic use,⁴⁴ but that in times of shortage, the TCEQ's primary responsibility is to protect senior water rights. *Id.* Tr 233. Ms. Hoffman was unaware of the September 1, 2011 Emergency Rule, *TWC* § 11.053, that expressly authorizes the TCEQ to temporarily suspend or adjust the right of any person who holds a water right. *Id.* Tr 243-44. She agreed that the TCEQ has the authority to cancel unused water rights, and was unaware of any prohibition against requiring D&L users to report their usage. [*70] *Id.* Tr 245.

44 *Section 11.024, Texas Water Code*, "Appropriation: Preferences" provides in part:

In order to conserve and properly utilize state water, the public welfare requires not only recognition of beneficial uses but also a constructive public policy regarding the preferences between these uses, and it is therefore declared to be the public policy of this state that in appropriating state water preference shall be given in the following uses and order named: (1) domestic and municipal uses, ... (2) agricultural uses and industrial uses, ... (3) mining and recovery of minerals; (4) hydroelectric power; (5) navigation; (6) recreation and pleasure; and other beneficial uses.

Ms. Hoffman confirmed that the TCEQ could cancel unused water rights, and require D&L users to report their water usage. Because she was unaware of *TWC* § 11.053, the Emergency Order Concerning Water Rights, effective September 1, 2011, that is, three months prior to trial, she was unable to offer any opinion or testimony as to its scope or application.

The Court concludes that TAP has established by a preponderance of the evidence, that the TCEQ defendants have the authority, power, and responsibility to manage water [*71] diversions, and the ESA requires that such management take into account the health and

survival of the AWB whooping cranes. The Court finds further that TCEQ has refused to issue a permit to permit freshwater inflow for the protection of the AWB habitat and that S.B.3 either by definition or application will not protect the winter habitat of the AWB.

In summary, S.B.3 does not constitute an elaborate regulatory scheme for environmental flows that will address the concerns of the Whooping Cranes because: (i) it is riddled with carve-outs and exceptions that relegate the ecological needs of the Whooping Cranes' to a secondary status; (ii) it has no enforcement mechanism, that policy framework, no matter how elaborate, has no "teeth;" (iii) bays and estuaries, in particular, are relegated to a lesser status as, by statute, the TCEQ may not issue a new permit dedicated to the environmental needs of a bay or estuary; and (iv) S.B.3 and its E-flows scheme only applies to the issuing of new water rights or the expansion of an existing water right.

IV. FINDINGS ON CAUSATION.

A. Court's findings as to witness expertise and credibility.

At trial, TAP presented seventeen (17) witnesses, ten (10) of [*72] whom were experts; GBRA eight (8); SARA one (1); and TCEQ two (2). As will be discussed in more detail later, TAP's experts were world renowned in their respective fields. Several of TAP's witnesses hold endowed chairs at prestigious universities, some are MacArthur Fellows, all have published numerous scientific papers in respected journals. Indeed, one witness, Dr. Ronald Sass, is a shared recipient of the 2007 Nobel Peace Prize for his environmental work. TAP's crane experts, Dr. Chavez-Ramirez, Dr. Archibald, and Mr. Stehn, have years of study in the field and have devoted their time and energies to the survival of the AWB species. All of TAP's experts were accepted as such and the Court finds their testimonies compelling and credible.

In contrast, the Court found an alarming trend in the experts that GBRA offered, most of whom had limited experience and insignificant knowledge of whooping cranes in particular. Indeed, in most instances it was established that GBRA selected the data for which its experts were to make a determination without regard to the peer reviewed published scientific data available. In particular, intervenors GBRA and SARA wholly financed what is called the [*73] SAGES report partially designed by Dr. Stephen E. Davis, who testified as a modeling expert, and Dr. R. Douglas Slack. This report did not include the Chavez-Ramirez or Stehn research. In fact, it used a report by Dr. Slack's graduate student Danielle Greer whose conclusions to the preferred food of whooping cranes was based on 90 plus hours of video of three crane areas. The Court watched all the videos

and finds that they were either too blurred to see anything or non-demonstrative of any habit, feeding or otherwise. When subjected to peer review Greer's conclusions were soundly criticized.

Dr. Slack testified that the whooping cranes had well developed supraorbital salt glands which rid the body of excess salt, making them capable of living in a salt water marsh with no freshwater. When pressed by the Court, he admitted that he had made up that entire statement.

Samuel Vaughn, an engineer who was employed by HDR Engineering in Austin, who has as principal clients GBRA and SARA, was offered as some type of an expert on crane mortality based on faulty information supplied solely by GBRA. GBRA witness, Dr. Miller, admittedly without any evidence to support the testimony stated that decreased [*74] blue crab population may be related to commercial fishing. Dr. Porter, GBRA's "niche mapper," used mapping based on the diet of the Whooping Crane supplied solely by the SAGES report as found by Greer. Again, this was all that was supplied to him as a "niche mapper" to the exclusion of all other published articles on Whooping Crane diet. Dr. Conroy was offered to challenge the Stehn mortality rates but was completely lacking in any expertise on whooping cranes or their habitat. His testimony relied solely on a prior review of the literature selected and provided by GBRA.

Dr. Stroud, a veterinary pathologist, was offered to explain the Whooping Crane necropsy findings of another pathologist. His opinion was that the carcass that showed an infection was not based on the original pathologist description but based on the original pathologist description that green fluid was observed in a joint. To him the color green meant gangrene. This conclusion had no scientific merit but he kept insisting that when he saw green he thought of gangrene.

In conclusion, these witnesses, offered by GBRA, were not credible and not reliable. A more in depth discussion follows herein.

B. TCEQ's water diversions [*75] reduce freshwater inflows to the Refuge.

TAP argues that lower freshwater inflows to the Refuge from the San Antonio and Guadalupe river systems result in higher bay/estuary salinities, and that the water practices of the TCEQ defendants cause those lower freshwater inflows to the Refuge. For 2008-2009, TAP maintains that those water practices caused the death of at least 23 Whooping Cranes. The fact that those diversions were "lawful water diversions under preexisting permits" is irrelevant in the context of this case because, as previously discussed, the ESA preempts state law to the extent it authorizes activities that cause a pro-

hibited take of a listed species. *16 U.S.C. § 1539(a)(1)(B)*.

1. Trungale established permitted water diversions lower inflows to Refuge.

TAP introduced Joe Trungale, a licensed water resources engineer who currently is employed as a private consultant in the Austin area, ⁴⁵ to demonstrate that TCEQ's regulation of water causes reduced freshwater inflow to the Refuge, (Trungale, Day 3, Tr 252). Between 1999 and 2004, Mr. Trungale worked as a river studies hydrologist with the Texas Parks and Wildlife Department. Id. Tr 253.

45 Mr. Trungale's résumé is PX-262.

Mr. [*76] Trungale employed simulation modeling of the San Antonio bay/Guadalupe estuary to predict salinity gradients that would occur in response to different freshwater inflow regimes. (Trungale, Day 3, Tr 254). The simulation modeling relied upon state and federal data sources, and employed TxBlend, a modeling system developed by the Texas Water Development Board ("TWDB"), ⁴⁶ and used also by the TCEQ BBEST teams in the major estuary systems along the Texas coast in response to S.B.3. Id. Tr 254-255. Mr. Trungale has employed the TxBlend model to evaluate salinity in the past and as a member of BBEST teams for Galveston Bay, Matagorda Bay, and the Colorado and Lavaca River basins. Id. Tr 256-258.

46 The TWDB staff have both calibrated and validated the TxBlend model for use in the San Antonio Bay system. (Trungale, Day 3, Tr 282); PX-85, PX-86.

The TxBlend model uses the instream flow data that has been measured by the USGS gauges over time, collected at the three most downstream gauges. (Trungale, Day 3, Tr 258). Id. These downstream gauges are used because they already reflect the upstream water diversions. Id. Tr 258. The model includes actual daily data inflow numbers collected from 1988 [*77] through 2009. Id. Tr 261. The gauges are positioned to get the best reflection as to what amount of water is making it from upstream to the mouth of the bay. Id. Tr 262. Thus, Trungale relied on *actual water diversion data* as reported to the South Texas Watermaster and TCEQ See DX-300 (list of all Guadalupe River Basin water right owners, permitted and adjudicated); DX-301 (list of all San Antonio River Basin water rights); DX-302 and DX-303 (over 1,000 pages of TCEQ historical data); DX-304 (TCEQ historical use data); and PX-83 (map of water rights in the Guadalupe and San Antonio river basins).

Using these sources of information, Mr. Trungale employed the TxBend model to generate three different scenarios of freshwater inflows to the San Antonio bay/Guadalupe estuary.⁴⁷ TAP's exhibits PX-92, PX-93, and PX-94, are maps constructed for the time period of May 2008 through April 2009, using the historical data provided. (Trungale, Day 4, Tr 7). All three exhibits show the salinity patterns in the AWB critical habitat. Id. PX-93 shows the *actual* salinities in the critical habitat for May 2008 - April 2009. Id. PX-92 shows what the salinities would have been if every reported diversion [*78] was added back into the stream. Id. Tr 8. That is, what the salinities would have been if there were no permitted diversions anywhere in the basin and all the river water flowed into the San Antonio bay/Guadalupe estuary. Id. Tr 9. The third scenario modeled the full use of certain existing permits: it took actual gauged flows and then assumed that six actual lower basin permits (all of which are GBRA's) diverted water to the maximum amount permitted. Id.; PX-94. Under the "full use of permits" scenario, there are dramatic changes with resulting salinity greater than 25 ppt. Id. Tr 10. The third scenario reflected a realistic, but very conservative, picture of increased water use in the near future. Id.

47 Mr. Trungale did not model a "worst case" scenario employing the full use of all existing issued permits throughout the basin, nor did he model the impact of exempt D&L diversions. He did not model the impact of pending permit applications.

Using TWBD inflow data for the full period of record, 1987-2009, TAP exhibit PX-90 was created; it provides a visual representation of the averaged over-time salinity levels across the San Antonio bay/Guadalupe estuary, which of course, includes [*79] the Refuge. (Trungale, Day 4, Tr 10). PX-90 demonstrates that for 2008-2009, a significant area of the bay had salinities greater than 25 parts ppt.⁴⁸ Id. Tr 12. Coincidentally, the winters of low freshwater inflows and high bay salinities correspond with the other "bad" winter years for cranes: the three winters of 1988-1989, 1989-1990 and 1990-1991 were all years of high winter Whooping Crane mortality (4.3%, 3.4% and 7.8% respectively). See PX-74. That is, as was later confirmed by TAP experts Sass and Ensor, higher salinity years correspond with higher crane mortality. Id.

48 The black line on the graph is actual inflows, and salinity is represented by color variations, with red indicating higher salinities and green indicating lower salinities. Id. Tr 10-11.

Low freshwater inflows result in markedly higher salinities in the bays; however, even high salinities in the

bay may be rapidly lowered by a month of relatively high freshwater inflows (e.g., October 2009-November 2009). (Trungale, Day 4, Tr 14); PX-96. For example, in the fall of 2009, at the start of the 2009-2010 Whooping Crane winter season, the bays had lower salinities due to increased inflows. Id. That is, relatively [*80] small amounts of freshwater inflows can make a significant difference to the bay salinities, and to the duration, frequency, and severity of high salinity conditions. Id. at 14-15.

Because even small inflows of freshwater can markedly decrease dangerous bay/estuary salinity levels, it would be useful to monitor bay salinities. (Trungale, Day 4, Tr 15). Then, if salinities reached an agreed upon "warning level," responsive actions would be triggered, such as reducing water diversions until the salinities lowered. Id. For example, in Matagorda Bay, a salinity trigger level, known as a "Cumulative Salinity Depletion" (CSD), is incorporated as a condition in one TCEQ issued water permit. Id. Tr 16; See PX-12 at 7-11 (TCEQ permit granted on April 29, 2011, issued to Lower Colorado River Authority that defines beneficial flow criteria and if the CSD exceeds a certain amount, then certain actions are to be taken).

Defendants and intervenors argue that Mr. Trungale's models "distort the impact of water diversions in 2008-2009," because the data may have characterized as "diverted" water than had been impounded years prior. (D.E. 320 at 18). However, Mr. Trungale testified that, given the limitations [*81] on available data, his models were "conservative" and, in his opinion, accurate. (Trungale, Day 4, Tr 48-49) ("it seems very much in the range of what I would expect to see."). Moreover, no defense witness challenged this aspect of Mr. Trungale's methodology. Indeed, GBRA witness Dr. George Ward admitted that Mr. Trungale "ran the model correctly." (Ward, Day 7, Tr 163). The evidence established that TCEQ's authorized diversions impact freshwater inflows and in turn, the salinities of the San Antonio bay/Guadalupe estuary.

2. Trungale's findings anticipated.

Mr. Trungale's findings were not surprising, and simply confirmed what the Whooping Crane International Recovery Team, USFWS, and TPWD officials had observed and warned about in prior years: decreased freshwater inflows correlate with higher crane mortality. For example, the Whooping Crane International Recovery Plan of 2007, published by the USFWS, recognizes that, in Texas, the largest threat to the AWB flock's survival is the reduction in freshwater inflows:

Freshwater inflows. Currently, expanding human populations throughout

the range of the whooping cranes continue to threaten survival and recovery of the birds. Impacts are [*82] particularly severe on the winter grounds. Freshwater inflows starting hundreds of kilometers inland, primarily from the Guadalupe and San Antonio rivers, flow into the Whooping Crane critical habitat at Aransas; these inflows are needed to maintain proper salinity gradients, nutrient loadings, and sediments that produce an ecologically healthy estuary (TPWD 1998). Spring flows originating from the Edwards Aquifer are also crucial, especially in times of drought when they can make up 70% of Guadalupe River water. Inflows are essential to maintain the productivity of coastal waters and produce foods used by the whooping cranes. Coastal waters with low saline levels are maintained by these instream flows, providing drinking water for cranes that would otherwise fly inland for freshwater.

TPWD has recommended target inflow levels needed to maintain the unique biological communities of the Guadalupe Estuary (TPWD 1998), which includes Whooping Crane critical habitat. Unfortunately, mechanisms to guarantee these flows are not provided by Texas water law, and critics have challenged the size of the target inflows.

....

Upstream reservoir construction and water diversions for agriculture and [*83] human use reduce freshwater inflows. Many existing water rights are currently only partially utilized, but greater utilization is expected over time. Water rights continue to be granted on the Guadalupe, and some sections of the river are already over-appropriated.

PX-11 at 21 (emphasis added).

On March 30, 2007, the Executive Director of the Texas Parks and Wildlife Department signed in concurrence with the findings and opinions of the Recovery Plan. (Archibald, Day 1, Tr 81-82); PX-11. Moreover, the State of Texas has previously recognized the significance of freshwater inflows, with one published study specifically calling for a guaranteed minimum annual inflow of 1.1 million acre-feet for San Antonio bay.

(Trungale, Day 3, Tr 294-295); PX-382. A similar recommendation was made in a more recent state study on recommended inflows by TCEQ's Guadalupe-San Antonio BBEST. (Trungale, Day 3, Tr 294-295).

In 2009, the USFWS identified the Whooping Crane as one of their "spotlight species," a species chosen for particular attention and a focus on recovery efforts. See PX-25. The Spotlight Species Action Plan for the Whooping Crane acknowledges that the critical habitat of the AWB flock is threatened, [*84] and it specifically addresses water diversions and decreased freshwater inflows:

At Aransas National Wildlife Refuge (NWR) and throughout the central Texas coast, ***decreases in freshwater inflows from water diversions and reservoir construction*** add to the following threats: reduction in available main food items at Aransas NWR, the blue crab (*Calinectes sapidus*) and wolfberry (*Lycium carolinianum*) [and] Increased intervals when winter marsh salinities exceed the threshold of 23 parts per thousand (ppt) thereby decreasing the availability of fresh drinking water for the cranes.

PX-25 at 1 (emphasis added). As discussed in more detail below, the decreased inflows and higher resulting salinities across the whooping cranes' habitat causes a reduction in the birds' primary food resources, blue crabs and wolfberries, as well as drinking water.

3. Dr. Ward's modeling not reliable.

GBRA witness Dr. George Ward reviewed Mr. Trungale's modeling. ⁴⁹ (Ward, Day 7, Tr 97-98). Dr. Ward was offered without objection as an expert on circulation, salinity, distribution, hydrology and modeling. Id. Tr 109.

⁴⁹ Dr. Ward is a research scientist at the University of Texas-Austin, and the associate director of [*85] the Center for Research and Water Resources. (Ward, Day 7, Tr 97-98). He is a member of the Science Advisory Committee in connection with Senate Bill 3. Id. Tr 107. His CV is DX-272.

Dr. Ward characterized the San Antonio bay/Guadalupe estuary as a "sluggish responder" to salinity because its exchange with the sea takes place up and down the coast, rather than at a direct entrance. (Ward, Day 7, Tr 127-28). When a freshwater pulse enters the San Antonio bay/Guadalupe estuary, it displaces

water, and if the pulse is large enough, it pushes fresh-water into the surrounding estuary and even out into the adjacent Gulf of Mexico. Id. Tr 128. The salinity then works its way back into the system by tidal exchange, internal circulations, density currents, and turbulence, and these processes are collectively referred to as "salinity intrusion." Id.

Dr. Ward used the same models as Mr. Trungale (no water diversions, historical diversions, and full permit diversions), and concluded that the average salinity in the San Antonio bay/Guadalupe estuary under the three Trungale scenarios varied only by approximately 1.5 ppt. (Ward, Day 7, Tr 128). Ward characterized this variance as simply "noise" in [*86] the natural variability. Id. Tr 132-36. Dr. Ward arrived at this conclusion by averaging the geographic distribution of salinities modeled by Mr. Trungale. (Ward, Day 7, Tr 134) ("Now, to try to compress this variation into something that's more assimilable to our human minds, I've just averaged them.").

Nowhere does Dr. Ward explain adequately why this manipulated use of average salinity across the entire bay system is a better, or even relevant, measure. To the contrary, Dr. Ward admitted that the key aspect of an estuary is the geographic distribution of salinity gradients:

Q. Now, in your review of -- in your critique of Joe Trungale's work, you didn't mention anything about geographic coverage, right?

A. That's correct.

Q. And isn't, in fact, the geographic distribution of various salinities a key aspect of the estuary?

A. It is.

(Ward, Day 7, Tr 153); DX-280. And Dr. Ward testified that "the intent of TxBlend is to predict salinity throughout the bay[/estuary]." Id. Tr 155. Yet Dr. Ward decided that the results of TxBlend are "very complicated" so he chose to "pre-digest" and "summarize" the results in his testimony. Id. His summary consisted of one number--an average salinity--to take [*87] the place of *thousands* of data points describing how salinity changes throughout the bay, both geographically and temporally. DX-424. This manipulation of the data produced no meaningful results for the Court, and did not cast doubt on the conclusion that water diversions result in higher salinities to the San Antonio bay/Guadalupe estuary, the critical winter habitat of the whooping cranes.

4. Dr. Montagna's observations and studies confirmed Trungale's modeling.

Dr. Paul Montagna is an expert in Texas estuaries: he is the endowed Chair for Ecosystems Studies and Modeling at the Harte Institute at Texas A & M Corpus Christi; he is a professor of Physical and Environmental Sciences; and he is the Coordinator for the Coastal and Marine Science Doctoral Program.⁵⁰ (Montagna, Day 3, Tr 171). He has worked in primarily two areas: (1) offshore oil and gas and deep sea ecology; and (2) estuarine research related to fresh water inflow. Id. Tr 173. At the time of trial, he was leading the research for NOAA on the oil spill associated with the Deepwater Horizon blowout. Id. He has studied and attempted to determine the environmental inflows needed for Corpus Christi bay and San Antonio bay. Id. [*88] Tr 174.

50 Dr. Montagna's résumé is PX-258.

Dr. Montagna described an estuary as "a semi-enclosed body of water, where freshwater and marine water mix. (Montagna, Day 3, Tr 176). Nearly all coastal zones in the world are estuarine environments. Id. There is always movement of water from the tides, and it is the mixing of fresh and marine water that "makes estuaries the most productive environments on earth." Id.

TAP exhibit PX-59 is a diagram of the habitats and geomorphological components of bar-built estuaries. (Montagna, Day 3, Tr 178). With Texas coasts, the beach is on a sand bar that essentially separates the bay/estuary from the ocean. Id. Tr 178. The bay closest to the ocean is referred to as the "primary bay," and the bay into which the river flows is referred to as the "secondary bay." Id. There is a gradient in habitats with more marsh habitats and oyster reefs near the rivers, and more beach habitats with sea grass beds near the ocean. Id. Tr 178-179. The most important aspect of the fresh water inflows is that it creates the very gradient of salinities across the bay to support the variety of communities and organisms that live there. Id. Tr 181.

Dr. Montagna's testimony affirmed [*89] Mr. Trungale's modeling that water diversions decrease freshwater inflows to the Refuge. TAP exhibit PX-60 is a diagram of diverted freshwater inflows. (Montagna, Day 3, Tr 181). When a diversion of freshwater occurs, for example by a dam across a river or impoundment, the water flow is decreased and the dilution power of rain water is lowered, increasing salinity in the bays. Id. Tr 182. In addition, a reduction in river inflows means a reduction in dissolved nutrients and organic matter to the bay, as well as a reduction in sediments. Id. If sediments get stopped behind a dam, there is less buildup of sedimentation in the marshes, and that could actually cause erosion rates to increase. Id. PX-61 is a conceptual model of inflow effects. Id. Tr 183. PX-61 demonstrates that freshwater inflows create the estuary conditions in the context of salinity, sediments, dissolved materials, nutri-

ents, organic matter, and also particulate matters. Id. The biology within the estuary responds to the estuary conditions, which are determined by the freshwater inflows. Id. Tr 183-184.

Dr. Montagna testified about his work on the Science Advisory Committee in connection with another S.B.3 region, the [*90] Nueces Bay, which is south of the San Antonio bay/Guadalupe estuary.⁵¹ (Montagna, Day 3, Tr 187). Although the purpose of the S.B.3 process is to develop environmental flows for the particular bay/estuary system, in the case of the Nueces Bay, it is no longer "ecologically sound." Id. In the 1930s, the Nueces Bay was low saline and productive. Id. Indeed, the Nueces Bay fossil record reveals that the area once supported large populations of rangia clams, bivalves that required very low salinities, from zero to ten ppt. Id. Tr at 193. However, as a result of the drought and the two dam systems, including Choke Canyon, conditions in Nueces Bay have changed dramatically; certain areas in Nueces Bay have salinities up to 45 ppt, which is 50 percent greater than sea water. Id. Tr 188. According to Dr. Montagna, human water management killed the Nueces Bay estuary. Id. Tr 194.

51 In Dr. Montagna's opinion, the S.B. 3 process of developing recommended inflows is hampered at the onset by the mandatory consideration of previously permitted water. (Montagna, Day 3, Tr 189). Indeed, because all existing permit right owners were "grandfathered" under S.B.3, the BBEST and BBASC teams have to work [*91] with the water that's "left over." Id. The process is further hampered because, of the permitted water, not all of it is being used. Id. Tr 191. In addition, there are little conservation restrictions in the existing permits. Tr 192.

The Nueces River Basin originates in Edwards County and flows southeast for approximately 315 miles to Nueces Bay near Corpus Christi. The Nueces River basin is located approximately 50 coastal miles to the southwest of San Antonio bay.

Mr. Vaughn is a BBEST scientist for both the San Antonio bay/Guadalupe estuary and for the Nueces Bay/Nueces estuary. In determining the salinity recommendations for the Nueces bay and estuary, the BBEST team chose five indicator species which had known salinity preferences which could be related to freshwater inflow, one of which was the blue crab. (Vaughn, Day 7, Tr 215-216). The BBEST team recommended a preferred salinity level of 18 ppt for Nueces Bay. Id. However, for the San Antonio bay/Guadalupe estuary, the BBEST team did not use the blue crab. Id. Tr 213. Dr. Ward acknowledged that, despite the proximately and connectivity of the San Antonio and Nueces bays, the Nueces

BBEST researchers employed the boost regression [*92] tree and the San Antonio team did not, so the blue crab was not selected as a focal species. Id. Tr 215. Dr. Ward admitted that this lawsuit was pending at the time of the San Antonio BBEST's recommendations.

One effort to restore the Nueces Bay is to pipe water directly to the marsh, and the U.S. Army Core of Engineers is conducting a field study concerning a restoration program. (Montagna, Day 3, Tr 194). However, the system will never support rangia or oysters again. Id. Tr 195. The Nueces Bay is a cautionary tale for the San Antonio bay/Guadalupe estuary. Id. If water management authorities continue to allow the storing of huge reservoirs of water, the estuarine bays no longer receive significant freshwater inflows, and the Guadalupe estuary could suffer the same high salinities and loss of species life as Nueces Bay/estuary. Id. Tr 196. However, there is still a chance to save the San Antonio bay/Guadalupe estuary because it is still "in pretty good condition." Id. Tr 197. The system can "rebound" from the negative effects of low inflow years if followed by good inflow years. Id. The real challenge is human behavior, because there have always been variations from year to year regarding [*93] rain and drought, and the organisms that live there have a certain ability to deal with that variability. Id. Tr 198. Water diversions are the problem, and in times of drought, "everyone should suffer equally." Id.

5. Dr. Davis' modeling.

SARA witness Dr. Stephen Davis is with the Everglades Foundation.⁵² In 2003, he helped design the methods for collecting data for a study of the San Antonio Guadalupe Estuarine System ("SAGES") report. (Davis, Day 8, Tr 9). The SAGES report was funded by two of the intervenors herein, GBRA and SARA, as well as the San Antonio Water System, an intervenor. (Slack, Day 4, Tr 143).

52 Dr. Davis' CV is DX-307.

For the SAGES report, Dr. Davis examined freshwater inflows and spatial patterns and water quality on three study sites along the north side of the San Antonio bay/Guadalupe estuary. Id. Tr 13-14. He employed data collected from "TCOON," the Texas Coastal Ocean Observation Network, which has a series of monitoring sites across the Texas coast, primarily focused in bays and estuaries, that measure everything from water level to wind, salinity, pH, and other water quality parameters. Id. Tr 14-15. Dr. Davis testified that during "high water" periods, the [*94] tidal creeks and ponds on his study sites were connected, but during the "low water" periods, they were separated. Id. Tr 21-22; DX-400. The terms "high water" and "low water" are not related to high tide

or low tide; prolonged periods exist where the pools are either connected or isolated. Id. The longer any pools remain disconnected, the greater the chances are of those pools drying out completely. Id. During a high water period, the estuary is inundated with water that facilitates the connection between bay waters, tidal creeks, and the isolated ponds. Id. Tr 23. This high water time allows for flushing of the salts that accumulated when water levels are low. Id. During the low water times, the soils become hyper-saline, up to 70 to 100 ppt. Id. The flushing that occurs with high water helps make the soil more favorable for marsh vegetation. Id. For the biota, the high water periods allow access to the estuary for fish, crabs, and other invertebrates. Id. Tr 24. The estuary is an important source of food, and also provides a refuge against large predators. Id. Tr 24.

On cross-examination, Dr. Davis admitted that, when prevailing winds come across the coast, water measurements would [*95] be higher on the south side of the bay/estuary while dropping on the north side. Dr. Davis' measurements only included the north side. (Davis, Day 8, Tr 64). Moreover, his measurements involved areas primarily *not* located on the Refuge itself. Id. Tr 65. Dr. Davis did not relate his testimony to Whooping Crane mortality or blue crab abundance. Id. Tr 60. He did not record any water levels in the bay/estuary during the 2008-2009 winter, nor did he offer any evidence that the tides were particularly low for the 2008-2009 winter.

The testimony of Mr. Trungale, that in 2008-2009, the salinities across the San Antonio bay/Guadalupe estuary would have been lower but for TCEQ's authorized water diversions, stands un-rebutted.

C. Higher salinities adversely affect blue crabs and wolfberries.

TAP presented evidence that, higher salinities in the bay/estuary, adversely affect the availability of blue crabs and wolfberries, the primary food resources of the cranes. Dr. Montagna testified that presently, the San Antonio bay/Guadalupe estuary typically has a brackish environment, between 15-25 ppt,⁵³ and the salinity gradient extends across the entire area, which "means that the entire bay winds [*96] up being an especially productive habitat." (Montagna, Day 3, Tr 200). The system is dynamic and salinity changes can occur day to day, even hour to hour, with tides and other factors. Id. Tr 201. Also, because it covers a larger area, its productivity is across a wide range of salinities. Id. Tr 202. Both productivity and resilience to change are a function of habitat size and in these instances, the larger the better. Id.

53 Dr. Montagna testified as to salinity measurements. (Montagna, Day 3, Tr 200-201). Usu-

ally, salinity is measured with a refractometer or an electronic gauge meter that measures in "practical salinity units" (psu), while parts per thousand (ppt) implies the technique of evaporating the water and measuring the remaining salt. Id. The measurements are functionally the same. Id. Tr 200.

1. Dr. Montagna on salinity preferences of blue crabs.

In connection with his evaluation of the salinities in different bays, Dr. Montagna has had the opportunity to study blue crabs. (Montagna, Day 3, Tr 203). TAP's exhibit PX-68 is a conceptual model of the blue crab life cycle.⁵⁴ The cycle begins with an adult female crab and egg sac. Id. The females migrate to the higher salinity [*97] zones where they release their eggs into the ocean, but remain close to the pass, where the bay and ocean meet. Id. Tr 204. The larvae that are released from the eggs pass through a series of stages. Id. Initially, they are plankton and live primarily in the ocean. Id. As the tides come in, plankton have behaviors which allow them to ride the current and move into the bay/estuary when the tide is flooding, and move out of the current when the tide is ebbing, so they do not lose ground, and eventually, the smaller ones wind up in the fresher parts of the bay/estuary further inland. Id. These small crabs seek the estuary because it is rich with nutrients, and this is one reason why estuaries are known as "nurseries" because so many species return to this area for the food supply and to develop and grow larger. Id. Tr 205. The estuary is the "ideal environment" for young crabs because they can hide from predators in the marshes, and the area is nutrient rich, thus increasing their chances of survival. Id. Tr 207. Blue crabs are found in basically all salinities, from the ocean to the river mouth, and this gradient of salinities directs the blue crab in its life cycle. Id.

54 Interestingly, [*98] about 95 percent of all commercial and recreational species have "this exact same kind of a life cycle" as the blue crab. (Montagna, Day 3, Tr 203).

Between 1980 to 2009, there has been a significant decline in blue crab abundance over the entire Texas coast. (Montagna, Day 3, Tr 208). And see PX-69, graph of blue crab abundance measured in trawls⁵⁵ from 1980 to 2009. Over-fishing plays a role in the decline, but while fishing regulations have become more stringent, the blue crab population has still not rebounded. Id. Tr 209. There is likely a climate component to the decrease. Id. However, there is simply no dispute that "blue crab abundances today are at historic lows, and that the blue crab populations themselves are highly threatened." Id. Tr 210. Given the long-term trend, this makes fluctua-

tions in salinities within a particular bay system "critical." Id.

55 In commercial fishery, crabs are caught with pots, but the trawl numbers were used as an independent measurement of the status of the population. (Montagna, Day 3, Tr 209).

Another important aspect of salinity is that disease organisms have a preference for higher salinities. (Montagna, Tr 211). Indeed, when female crabs depart [*99] for the ocean to release their egg sacs, the males remain in the lower salinity parts of the bay to avoid parasites. Id.

In 1985, after the TCEQ was first charged with considering the impact to bays and estuaries when a permit is requested, officials looked to see what available data might be useful. (Montagna, Day 3, Tr 213). The TPWD had previously collected monitoring data which included dissolved oxygen, salinity, temperature, depth of sample, and other information that could be used to examine freshwater inflow needs.⁵⁶ Id. Tr 214. Mr. Trungale employed a statistical model, the Boosted Regression Tree (BRT),⁵⁷ to evaluate the existing data from San Antonio bay/Guadalupe estuary. Id. Tr 213-14, 217. The BRT results confirmed that blue crabs' preferred salinity range is between 10-20 ppt, with reductions at 22 ppt, and a "sharp drop" above 25 ppt. Id. Tr 215, 224-25; PX-248.

56 This data had been collected with regards to creating fishing regulations, not to examine salinity gradients within specific estuaries. (Montagna, Tr 214).

57 BRT analyzes multiple predictive variables that impact crab catches (e.g., salinity, temperature, depth, time, dissolved oxygen) to create a regression [*100] equation. Id. Tr 214, 218-220, 228; PX-246, PX-247.

The BRT regression equation can also be used in combination with the geographical data to predict the distribution of blue crabs and how the distribution changes with salinity. (Montagna, Day 3, Tr 227-228). Dr. Montagna incorporated the BRT statistical information into a mapping system to graph the relationship between changing salinities and the chance of a Whooping Crane finding a blue crab in that area. Id. Tr 230-31. See PX-249; PX-250. As expected, with lower salinities, the greater the chances for a Whooping Crane to find a blue crab. Id. Tr 228.

2. Dr. Miller's blue crab data.

In rebuttal to Dr. Montagna, defendant-intervenor GBRA offered witness Dr. Thomas Miller, the director of the Chesapeake Biological Lab in Maryland.⁵⁸ He

testified as to the life cycle of the blue crab, and noted that blue crabs need access to high salinities at the zoea⁵⁹ stage; however, in direct contrast to Dr. Montagna's findings, he opined that blue crabs had no physiological need for low salinities. (Miller, Day 7, Tr 225-35). However, on cross-examination, Dr. Miller agreed that, while the blue crab might not require lower salinities biologically, [*101] the estuary and its freshwater inflows provide important nutrients, like nitrogen and phosphorus to the blue crabs. Id. Tr 257-58. He acknowledged that some plant species necessary to the blue crab's habitat, such as *Spartina alterniflora*, require lower salinities. Id. Tr 259. He admitted that some blue crab parasites are more prevalent in high salinities. Id. Tr 262. He conceded that, although there are viral infections that exist in freshwater that are more dangerous than parasites, those have only been reported in Mississippi, not Texas. Id. Tr 265. Thus, Dr. Miller offered no evidence to refute the importance to the blue crabs of the estuarine environment with corresponding freshwater inflows.

58 His CV is DX-257.

59 The "zoea" stage is the free-swimming planktonic, larval form of crabs and other decapod crustaceans. Dr. Montagna testified to this same fact: that the blue crab larvae are released by the adult females into the ocean water. (Montagna, Day 3, Tr 204).

Dr. Miller discussed commercial crabbing along the Texas coast as a possible reason for blue crab decline as opposed to freshwater inflows. (Miller, Day 7, Tr 252). However, he offered no evidence to suggest that commercial [*102] crabbing was more extensive in 2008-2009 to have adversely affected the blue crab population, and in turn, the whooping cranes.

In the Recovery Plan, the report cites to a study by Longley in 1994 who determined that: "A simple inverse relation exists between blue crab catch rates and mean salinity within an estuary." (PX-11 at 21). The Court finds that the preponderance of the accepted and sound scientific evidence establishes that an increase in bay/estuary salinities results in a decrease in blue crab abundance.

3. Wolfberry production.

Dr. Davis testified that salinity is an important factor for wolfberry production. (Davis, Day 8, Tr 66-70). In his SAGES report, he found that lower salinity levels in the summer led to increased fall fruit production at all three study sites. Id. Tr 70. He also testified that laboratory experiments confirm lower salinities are better for wolfberry fruit production. Id. GBRA witness Dr. Slack agreed that "having more freshwater inflows is beneficial

to wolfberry production." (Slack, Day 6, Tr 168, 173, 206).

4. Observations and measurements concerning blue crab abundance and wolfberry availability in 2008-2009.

As will be discussed in more detail below, [*103] the crane experts each testified as to the importance of the blue crab and wolfberry fruit in the crane diet, and their personal observations were confirmed by fecal studies. (Archibald, Day 1, Tr 73; Chavez-Ramirez, Day 2, 73-77). Mr. Stehn testified that, in 2008-2009, wolfberry production in the fall was "notably less than average." (Stehn, Day 3, Tr 28-29). Both Mr. Stehn and Dr. Chavez-Ramirez noted significantly reduced blue crab catchings by the cranes that winter. See PX-22. The preponderance of the credible evidence establishes that decreases in freshwater inflows to the San Antonio bay/Guadalupe estuary results in a decrease in blue crabs as well as wolfberries on the critical habitat of the AWB cranes.

D. Statistical modeling confirms higher salinities are associated with higher crane mortality on the Refuge.

TAP witness Dr. Ronald Sass is the former chair of Ecology and Evolutionary Biology at Rice University, and is currently an Emeritus Professor, a fellow of the Baker Institute of Public Policy, author of 165 peer-reviewed papers, including one on whooping cranes, and a shared recipient of the 2007 Nobel Peace Prize as a member of the Intergovernmental Panel on Climate [*104] Change. (Sass, Day 1, Tr 177-180). He is a biogeochemical expert in earth systems, including hydrologic and ecological aspects, and the statistical analysis of those systems.⁶⁰ He was asked to investigate the relationship between freshwater inflow and AWB crane mortality. (Sass, Day 1, Tr 182-83). Using Mr. Stehn's mortality data, and freshwater inflow data, PX-266, Dr. Sass found a statistically significant association between years of high crane mortality and low July through December freshwater inflows. (See e.g. PX-75, a graphic representation of the relationship between AWB crane mortality with freshwater inflow into the San Antonio bay estuary system; PX-76, Bar graph of Whooping Crane mortality and freshwater inflows).

60 His résumé is PX-260.

Dr. Sass employed the Fisher Exact Probability Test to test the hypothesis that high crane mortality is associated with low freshwater inflows. (Sass, Day 1, Tr 198, 206); PX-265. He concluded that low inflows and high mortality are "causally correlated" and "in all cases of high mortality you have low river flow, no exceptions really." Id. Tr 209-210. This conclusion is scientifically

supported and explained by the biological reasons in [*105] the extensive literature. Id. Tr 183-185.

TAP witness Dr. Kathy Ensor is the current chair of the Statistics Department at Rice University and a fellow of the American Society of Statistics, among many other honors.⁶¹ She is highly recognized as an environmental statistician. Dr. Ensor reviewed Dr. Sass's statistical results, and confirmed that he applied the Fisher Test correctly and appropriately. (Sass, Day 1, Tr 238). The result of the Fisher Test, (p-value = 0.02), demonstrates that there is a strong association between the level of freshwater inflows into San Antonio bay/Guadalupe estuary and AWB crane mortality. (Ensor, Day 1, Tr 239). Additional statistical tests using the same data as Dr. Sass confirmed the statistically significant correlation. Id. Tr 240. A significant relationship between levels of freshwater inflow to crane mortality means not occurring by chance. A Poisson Count Regression found a strong relationship (p-value < 0.0001) between low inflows and high mortality. (Sass, Day 1, Tr 241); PX-27; PX-28. Statistics can support a finding of causation when paired with a scientific argument or a biological explanation for that causation and here it does so support. [*106] (Ensor, Day 1, Tr 241-242).

61 Her résumé is PX-256.

As rebuttal to Drs. Sass and Ensor, GBRA offered Samuel Vaughn, a registered professional engineer who is employed at HDR Engineering in Austin.⁶² His expertise is in river basin hydrology, regional water supply planning, water rights permitting, river basin modeling, and statistical analyses. (Vaughn, Day 7, Tr 173-74). He serves on three BBESTs including the San Antonio bay/Guadalupe estuary, as well as for Nueces, and Sabine-Neches. Id. Tr 177. He served as a member on the Edwards Aquifer Habitat Conservation Plan. Id.

62 Mr. Vaughn's CV is DX-241.

Mr. Vaughn testified that his current employer, HDR Engineering, provides services to two intervenors, GBRA and SARA. (Vaughn, Day 7, Tr 202). He reran Dr. Sass' analysis concerning freshwater inflows and crane mortality, and he "did get the same answer." Id. Tr 207. He also ran a number of statistical tests, but he did not use winter crane mortality, but instead, *annual* crane mortality. Id. Tr 208-209. He decided that winter crane mortality was not a reliable count and instead viewed the health of the ABW crane "as a year round process." Id. Tr 209. However, he admitted that he had no scientific [*107] basis for employing annual mortality: he is not an ornithologist or a naturalist or a biologist. Id. Tr 210. The Court ruled that Mr. Vaughn was not qualified as an expert on selecting crane mortality data and applying it statistically. Id. Tr 212.

E. At least 23 Whooping Cranes died on the Refuge in 2008/2009.

In 1941, the total population of Whooping Cranes worldwide had been reduced to just 15 birds.⁶³ (Archibald, Day 1, Tr 59). Through conservation efforts, the AWB flock has slowly grown to that of almost 300 birds.⁶⁴ Id. As such, the AWB flock has become an international symbol of conservation success, "recovering from the brink of extinction."⁶⁵ Id.

63 When the crane population was reduced to just 15 birds, DNA evidence suggested that there were only three reproductively active females, and geneticists predicted that this population could not survive because of inbreeding. (Archibald, Day 1, Tr 76). Thus, through his "dancing" efforts with Tex, Dr. Archibald personally contributed to the AWB flock's genetic survival.

64 Compared to other endangered crane species, the Whooping Crane has by far the smallest wild population with around 300 individuals; the next rarest, the Japanese [*108] crane, has 2,800 birds, followed by the Siberian crane in Russia, with a population of 3,500. (Archibald, Day 1, Tr 69).

65 However, a wild population of 300 is still quite low, and therefore, the Recovery Team has expended considerable effort and funds in an attempt to establish other populations of whooping cranes in other parts of the continent, as well as to breed alternative flocks. Archibald, Day 1, Tr 69-70). Dr. Archibald detailed four experimental efforts: In 1966, twelve eggs were collected from the AWB flock at their breeding grounds in Canada and taken to the USFWS Patuxent Wildlife Research Center in Maryland where they were hatched. Id. By 1975, those birds began to breed in captivity, and today, there are 150 whooping cranes in captivity. Id. From this captive population, the Crane Foundation has attempted to reintroduce birds into the wild in Idaho and in New Mexico. Id. In 1975, Whooping Crane eggs were placed in the nests of sandhill cranes, which are abundant in the Rockies. Id. The program was successful to the point that the sandhill cranes raised the whooping cranes and the whooping cranes migrated with the sandhill, but the whooping cranes did not breed, and the [*109] program was discontinued. Id.

Years ago, whooping cranes bred in the wild in Louisiana; however, they were hunted extensively and the last birds in that area died in the 1940s. (Archibald, Day 1, Tr 71). In 1993, the

Recovery Team released 289 captivity-raised birds into the Florida marshlands, however today there are less than 20 of those birds alive. Id. In Florida, the increasing human population and the demands on the water table caused the wetlands to collapse. Id. Although the Florida whooping cranes were successful in breeding in the wild, with 10 chicks produced that fledged, the rate of reproduction could not keep up with the rate of mortality, and the program was discontinued in 2004 as a failure. Id.

There was a third experimental program to increase the Whooping Crane population conducted in Wisconsin in 2001. (Archibald, Day 1, Tr 71). That program involved teaching captivity-raised birds to fly behind an ultralight aircraft to Florida for the winter, in conjunction with releasing some captivity-raised birds directly to the wild flock. (Archibald, Day 1, Tr 71). That program shows some promise. Id. Tr 72. The final experiment of the Crane Foundation began in February 2012, [*110] when ten captivity-raised whooping cranes were released into Louisiana in an attempt to start a non-migrating flock. Id. In December 2012, 16 additional birds were released to that flock. Id. All of these are experimental populations, with those in Idaho and Florida declared failures, and the programs in Wisconsin and Louisiana classified as tentative. Id.

Testimony regarding the many deaths of AWB cranes in 2008-2009 came primarily from three witnesses: Dr. George Archibald; Dr. Felipe Chavez-Ramirez, and Mr. Tom Stehn. Dr. Archibald, Dr. Chavez-Ramirez, and Mr. Stehn, have been recognized as the leading authorities in their fields of biology, ornithology, and whooping cranes in particular. Dr. Archibald is a renowned expert on all cranes of the world, and he has been actively involved in Whooping Crane conservation efforts since 1966.⁶⁶ (Archibald, Day 1, Tr 56). Since 1990, he has been a member of the International Whooping Crane Recovery Team, a joint effort between Canada and the United States to identify the problems facing Whooping Crane sustainability and to propose solutions to those problems.⁶⁷ Id. Tr 57-58. He is co-founder of the International Crane Foundation, and a MacArthur [*111] Fellow. Id. Tr 59.

66 A copy of Dr. Archibald's résumé is found at PX-254.

67 Dr. Archibald's commitment to the survival of the species is illustrated in this narrative: In 1967, there were two wounded whooping cranes at the San Antonio Zoo, and they produced a sin-

gle offspring named "Tex." Id. Tex had health problems that necessitated hand rearing and, as a result, she imprinted on humans. Id. Tex did not meet another whooper until she was transferred to the U.S.G.S. Patuxent Center as a subadult. Id. In years of effort to pair her with a male Whooping Crane, Tex never laid a single egg; she rejected all advances from male cranes, and instead performed her courtship "dance" for her human keepers. Id. In 1975, Tex was sent to Dr. Archibald who "danced" with Tex for six years. In 1982, Tex was successfully artificially inseminated, resulting in a robust, male chick named "Gee Whiz." Id. Gee Whiz has gone on to be the father of many generations of whooping cranes, many of which are back in the wild. Id.

Dr. Felipe Chavez-Ramirez is currently employed by the Gulf Coast Bird Observatory in Lake Jackson, Texas, a nonprofit conservation organization created to protect the migratory bird habitat [*112] along the Gulf Coast of Mexico.⁶⁸ (Chavez-Ramirez, Day 1, Tr 253). He is a member of the International Whooping Crane Recovery Team and of the International Union for Conservation of Nature (IUCN) Crane Specialist group. Id. He conducted his PhD research on foraging and energetics of cranes at the Aransas Refuge during the winters of 1992-1993 and 1993-1994,⁶⁹ and he continued with over two decades of field research on the AWB flock. Id. Tr 253-303.

68 A copy of Dr. Chavez-Ramirez' résumé is found at PX-255.

69 GBRA witness, Dr. Douglas Slack, chaired the panel that reviewed Dr. Chavez-Ramirez' 1996 dissertation on food availability, foraging ecology, and energetics of the Whooping Crane.

Mr. Tom Stehn was the Refuge's biologist for 29 years, and he developed a methodology for counting the AWB cranes via aerial surveys and crane behavior.⁷⁰ (Stehn, Day 2, Tr 296-297). He served as the USFWS' International Whooping Crane Coordinator and as a Recovery Team leader. Id. Tr 297. As the Refuge biologist, he authored the USFWS' annual report on the status of the AWB flock from 1985 until his retirement in 2011, including a special report concerning the 2008-2009 winter.⁷¹ Id. Tr 298. He has [*113] published 16 additional Whooping Crane manuscripts that were subject to peer-review. Id. Tr 298.

70 Mr. Stehn's qualifications were offered without objection on Day 2 at Tr 285-287 and 289-300.

71 Copies of Mr. Stehn's annual reports were introduced at trial. See e.g. PX-22, DX-6 (Winter

2008-2009 Report, Oct. 2009); DX-7 (Winter 2008-2009 Report, August 2010); DX-107 (Annual Report, May 2002).

1. Counting cranes is rooted in crane behavior.

Dr. Archibald, Dr. Chavez-Ramirez and Mr. Stehn each testified and recognized that the task of counting cranes, and implicit thereto, determining a crane's absence or demise, is rooted in an understanding of the cranes' basic biology and behavior. Due to their size and color, cranes are highly detectable and conspicuous on their wintering grounds.⁷² (Archibald, Day 1, Tr 78). (See also PX-263, photograph of three whooping cranes; and DX-61, which includes hundreds of photographs of the AWB cranes). Crane families are cohesive and stay physically close together. (Archibald, Day 1, Tr 73; Chavez-Ramirez, Day 1, Tr 282-287). A juvenile will remain between 20 to 50 meters of one parent, and will immediately run to the parent if there is a disturbance or [*114] noise. (Chavez-Ramirez, Id.)

72 An adult AWB crane is approximately 5 feet tall with a wing span of 7 to 8 feet. (Archibald, Day 1, Tr 78). Whooping cranes have an area of bare, red skin on the top of their heads and on their mustache, which they can expand and contract voluntarily to indicate their emotional state. Id. The red is expanded in times of aggression or sexual behavior. Id. The call of a whooping cranes can be heard over a range of miles. Id.

The AWB flock typically arrives at the Aransas Refuge in late October each year, with each family unit returning to its specific territory from years' prior. (Archibald, Day 1, Tr 72-73). The territories are between 200 to 400 acres. Id. Whooping cranes are territorial and will aggressively defend their defined territory against other individuals of the same species. (Chavez-Ramirez, Day 2, Tr 82). By excluding other members of the same species, the crane is maintaining access to all the resources within the boundaries of the territory for itself, mate, or offspring. Id. Tr 83. Whooping cranes are territorial on their breeding grounds in Canada, and also on their wintering grounds at the Refuge. Id. The only purpose for defending a territory [*115] at the wintering grounds is to procure food resources, because there is no nest to protect and the bird already has a mate. Id. Tr 84. (And Archibald, Day 1, Tr 73, winter territories protect resources).

As migratory birds, the AWB flock demonstrates site fidelity. (Chavez-Ramirez, Day 2, Tr 84). This means that the same individual birds return to the same exact location on the Refuge year after year. Id. This behavior has been confirmed by banding, as the same

banded cranes return to their same established territories each winter. Id. Tr 85. In addition to site fidelity, whooping cranes exhibit site tenacity, which is the behavior of the whooping cranes to maintain their established territories. Id. Tr 87. Site tenacity has been demonstrated via the aerial surveys which show the same birds returning to, and remaining on, their specific site each winter. Id.

2. Tom Stehn determined peak population numbers for the USFWS.

As part of the international recovery effort, the USFWS has regularly monitored the whooping cranes at the Refuge, which is more accessible than the remote Canadian province where the birds summer. (Chavez-Ramirez, Day 1, Tr 73). Part of that monitoring includes population [*116] counts which have been conducted through aerial flights dating back to the 1950s.⁷³ (Stehn, Day 2, Tr 290). Stehn has conducted these flights for 29 years, longer than any other USFWS employee.

73 Aerial surveys are an accepted method of counting and monitoring many species of wildlife including polar bears, waterfowl, elk, and caribou. (Chavez-Ramirez, Day 2, Tr 32).

Stehn's first aerial census flight was in the fall of 1982. (Stehn, Day 2, Tr 289). Census flights had been conducted prior to that time, dating back to 1950, and performed on a weekly basis. Id. Tr 90. Stehn flew with an experienced pilot, Robert Tanner, who had flown for the previous refuge biologist, in a Cessna 152. Id. Stehn observed how things had been done in the past, and then, from year to year, the program evolved and he had significant input into the census methodology. Id.

Both aluminum and color banding of whooping cranes began in 1981, so when Stehn first conducted aerial counts, he was able to utilize banding to help identify individual cranes. (Stehn, Day 2, Tr 290-291). To conduct a survey, the pilot would drop the plane from approximately 200 feet to between 20 to 50 feet above the marsh and salt flats [*117] of the estuary, and fly just to the side of the cranes. Id. Tr 291-292. Using his naked eye, not binoculars, Stehn would record the color bands he observed. Id. Tr 292. Any crane could have as many as four bands, and multiple passes were made to record all of the information. Id. In more recent years, Stehn did not employ as many low passes because the color banding had faded. Id. Tr 293. In addition, they were now flying a different plane, a Cessna 210, making slower speeds less safe. Id. Finally, federal regulations limited flight time while, simultaneously, the range of crane territories increased, and so in 2007-2008, low pass counting was eliminated. Id. Thereafter, aerial surveys in

the Cessna 210 were conducted at approximately 200 feet for the duration of the flight. Id. Tr 294.

Each fall, in preparation of the cranes' arrival, Stehn began assessing the habitat, performing crab counts in October, while also monitoring salinities. (Stehn, Day 2, Tr 302). He would receive calls from the public along the migration route of the cranes notifying him about a possible sighting.⁷⁴ Id. Stehn would verify the sighting and effectively monitor the flock as it made its way south to the [*118] Aransas Refuge. Id. Tr 302-303. Once the birds arrived, he would begin his aerial surveys. Id. 304. From 1982 through September 2011, he was on all but two flights. Id.

74 The AWB flock's breeding grounds in Wood Buffalo Park, Canada, are inaccessible to humans as there are no roads, and it cannot be reached by boats. (Archibald, Day 1, Tr 73). At the center of the Wood Buffalo Refuge, Whooping Crane pairs will have a nest, with two eggs, and usually produce one or two live chicks. Id. After the chicks are hatched and ready, the flock leaves Wood Buffalo in small groups and flies to Saskatchewan, Canada, where they remain for four to six weeks to build up their fat reserves before the long migration to Texas. Id. After Saskatchewan, the birds fly to the Aransas Refuge and its surrounding wetlands, returning to their established territories. Id.

Mr. Stehn's preference was to conduct a census flight every week, with a total of 26 flights per season.⁷⁵ (Stehn, Day 2, Tr 304). In recent years, due to increased expenses and funding cutbacks, the number of flights was reduced to between eight to twelve a season. Id. The aerial flights enabled Stehn to verify the location and mapping of territories [*119] (on the early flights); identify the mated pairs with their juveniles; determine peak population; record evidence of mortality; record evidence of mate switches; verify habitat use of AWB crane families; observe crane movement outside of the typical winter grounds; and record sightings of banded cranes. Id. Tr. 308. On the aerial counts, Stehn was: "... finding every bird, to the best of my ability. And we are covering every location where I believe a Whooping Crane may be." Id. Stehn also used watercraft to search for cranes.

75 He continued to observe crane behavior by boat once a week also. (Stehn, Day 2, Tr 305).

In general, a flight would take 7.5 hours.⁷⁶ (Stehn, Day 2, Tr 309). When visibility was good, file-mile sections divided into quarter-mile grids were flown. Id. Tr 310. When visibility was an issue, the quarter-mile grids were reduced to 200 meters. Id. Tr. 310. During the

flights, if there was a deviation from the transect route, grids would be repeated to ensure that the total known range of the AWB flock had been covered. Id. Tr 311. If birds were missing from their known territory, the territory would be revisited and the birds searched for at surrounding watering holes [*120] or uplands. Id. Tr 311-312. Each sighted crane was marked on a map of the territories, along with a checklist of known crane families, to build towards the peak population number as well as to determine if a crane disappeared from its previously observed territory. Id. Tr 313-314. During the return leg of the five-mile transect, previously observed cranes were confirmed. Id. Thus, for most flights, Stehn was able to see each territory at least twice each flight. Id. Immediately after the flight, Stehn reviewed the results of his counts while it was "fresh in [my] mind." Id. Tr 315. Stehn has been observing some of the same cranes since 1982 and can identify individuals. Id. Tr 317. Stehn's recognition of each individual crane enabled him to build "from week to week on what is out there" and ensure the accuracy of the counts. Id.

76 On occasion, there might be a late start due to fog; the flight time would then be reduced to 5 hours. (Stehn, Day 2, Tr 307).

With the information gathered on these winter flights, Stehn determined a peak flock number each winter. To get the peak population number for the winter, Stehn analyzed the counts from the various flights. He calculated that, on an [*121] average flight, he was seeing approximately 95% of the flock. (Stehn, Day 2, Tr 319). Dr. Chavez-Ramirez confirmed this estimate. (Chavez-Ramirez, Day 2, Tr. 56-57) (stating the percentage of cranes counted was between upper nineties and mid eighties depending on the flight). The peak population number for 2008-2009 was 270. (Stehn, Day 2, Tr 320); PX-22 at 21.

GBRA witness Dr. Michael Conroy did not challenge the peak populations counts of Mr. Stehn, as adopted and published by the USFWS. In fact, Dr. Conroy expressly agreed that Stehn's peak flock size counts were "reasonably accurate." (Conroy, Day 8, Tr 90).

3. Crane mortality counts.

In addition to the peak flock number, Stehn determined winter crane mortality. His methodology for counting crane mortalities was basically the same as for determining population counts because both counts happened on the same aerial survey. (Stehn, Day 2, Tr 308). Like population counts, Stehn's methodology for counting AWB crane mortality was based on crane biology and "behavior, of what I have been observing for 30 years." Id. Tr 321. To determine mortality, Stehn did not

simply subtract one population count from another. Id. Instead, Stehn counted [*122] a mortality if a bird went missing from its known territory on two or more flights and was not relocated on subsequent flights. Id. Tr 324. That is, Stehn's mortality calculation was based on the sustained absence of a crane from its territory.⁷⁷ Id. Tr 321-322. If a crane disappeared from its known territory and did not return for the remainder of the winter, Stehn could reasonable conclude that the bird had died. Id. Tr 324. Stehn did not declare a mortality of an adult bird without repeated confirmation. Id. Tr 327; Day 3, Tr 61-62.

77 Dr. Chavez-Ramirez testified in detail about Whooping Crane territoriality, site fidelity, and site tenacity and confirmed that these behaviors could be used in counting cranes and in determining crane mortality. (Chavez-Ramirez, Day 2, Tr 84-85).

Stehn employed the same method to count juvenile mortalities because "the chick is always with the parents."⁷⁸ (Stehn, Day 2, Tr 327). On the rare occasions when a juvenile was separated from its parents, such as before the spring migration, Stehn was able to find those solitary juveniles. Id. Tr 327. If a juvenile went missing from its territory, Stehn would immediately circle back to make sure he did not [*123] simply overlook the bird. Id. Tr 326. Later on the same flight, he made another pass through the territory. Id. Tr 326. On the next flight, looking for the missing juvenile was a top priority. Id. A juvenile was not declared missing or dead without "two or even three consecutive flights." Id. Tr 327.

78 Dr. Archibald confirmed this established behavior of parent and juvenile cranes. (Archibald, Day 1, Tr 74-75) Dr. Chavez-Ramirez also noted that crane families are cohesive and stay physically close together. (Chavez-Ramirez, Day 1, Tr 289). He testified that a juvenile will remain between 20 to 50 meters of one parent, and will immediately run to a parent if there is a noise or disturbance. Id.

Mortality was inferred for only adults and their juveniles who went missing from their territories. Stehn did not attempt to count mortality of subadult birds,⁷⁹ which lack site fidelity, unless he found a carcass (which rarely happened, except in 2008-2009). (Stehn, Day 2, Tr 322-323). Stehn knew the number of pairs of adults, and knew the number of juveniles, and he used this knowledge to detect a mortality of those birds (not subadults). Id. Tr 324-325. In 2008-2009, the number of birds for [*124] which he sought to detect a possible mortality was 176 (70 adult pairs and 36 juveniles), not the peak population of 270. Id. Tr 324. Stehn replicated

this same methodology for mortality counts each year. Id. Tr 322.

79 Subadults are younger, non-breeding adults that correspond roughly to teenagers. (Stehn, Day 2, Tr 325). They do not exhibit the same territorial behavior as adult Whooping Cranes. Id. Tr 323.

Stehn's report for 2008-2009 concluded that at least twenty-three whooping cranes died that winter. See PX-22, "Whooping Cranes During the 2008-2009 Winter" (Stehn, Oct. 2009); PX-3, Whooping Crane Mortality Table, 1989-2009 (USFWS, 2010). At trial, the Court asked whether Mr. Stehn was satisfied with the mortality number of 23 for the 2008-2009 winter. Mr. Stehn responded: "Yes, as a conservative, as a conservative number, yes." (Stehn, Day 3, Tr 149). Stehn testified that the number of cranes that died in 2008-2009 was "higher than 23." Id., Day 2, Tr 322. Stehn estimated the loss to likely be higher than 23 because, when he counted mortalities, he did not generally attempt to detect the deaths of the subadult birds, unless he found a carcass. Id. Tr 322-323, 325. Stehn testified [*125] that there were 92 subadults in 2008-2009, and he said it was "reasonable to assume" that some of those birds died that are not included in the count of 23. Id. Tr 323. Stehn described 2008-2009 as the worst year on record. Id., Day 3, Tr 24.

Dr. Chavez-Ramirez, who flew 30 to 40 times with Mr. Stehn, testified that, based upon his personal experience, there was "no way" and it would be "almost impossible" that 23 birds were simply overlooked for the entire 2008-2009 winter season. (Chavez-Ramirez, Day 2, Tr 59-60). Mr. Stehn testified about each of the 23 instances when he determined a crane had died during 2008-2009 and plotted those locations on a map. (Stehn, Day 3, Tr 15-24; PX-377). Stehn was able to assess mortality based on his knowledge of the specific territories, the crane's habits, and his own detailed observations. Id. Tr 321.

In the 2008-2009 winter, four bird carcasses were recovered on the Refuge. Dr. Chavez-Ramirez testified that, between 1938 and 2011, less than 20 Whooping Crane carcasses in total had been recovered at the Refuge, four of which were in the 2008-2009 winter. (Chavez-Ramirez, Day 2, Tr 117). Dr. Chavez-Ramirez characterized the recovery of four carcasses [*126] as a "strikingly high" number for a single species for one year.⁸⁰ Id. Tr 119. The discovery of an unprecedented four carcasses supports the data and opinions of Stehn, and the opinions of Drs. Archibald and Chavez-Ramirez, that a large number of whooping cranes died during the 2008-2009 winter.

80 Other Refuge bird species, such as herons and egrets, are found in much greater numbers than the whooping cranes, and some species are present year round. (Chavez-Ramirez, Day 2, Tr 117-118). During his 300 days of field research over two winters, Dr. Chavez-Ramirez found maybe ten to twelve heron carcasses. Id. Tr 117-118. This comparison emphasizes how significant a number the four Whooping Crane carcasses represent. (Chavez-Ramirez, Day 2, Tr 119).

4. Defendants' and intervenors' objections to mortality counts.

As rebuttal to Tom Stehn's methodology for counting whooping cranes and determining mortality, defendant-intervenor GBRA offered the testimony of witness Dr. Michael Conroy, a research scientist at the University of Georgia, whose expertise is in applying statistical methods and mathematical modeling to analyze data from population surveys.⁸¹ He opined that Mr. Stehn's methodology [*127] for determining ABW crane mortality was not reliable because "the detection rates are not perfect" on these surveys. (Conroy, Day 8, Tr 93-94). Dr. Conroy offered that radio telemetry or mark and recapture would provide more accurate data. Id. Tr 94. Although this does not take into account the dangers inherent with these methods of tracking Whooping Cranes. (Archibald, Day 1, Tr 170-171) (noting "capture myopathy," which causes some birds to die simply due to the stress of being captured in order to be banded).

81 Dr. Conroy's CV is DX-368.

Dr. Conroy did not base this opinion on any personal observation of Mr. Stehn's methods, and he admitted that he has no experience with Whooping Cranes; rather he merely reviewed the literature and the materials and summaries of Stehn's reports provided to him by GBRA's counsel. (Conroy, Day 8, Tr 101-103, 106-107). Dr. Conroy's stated reason for challenging Stehn's mortality count as unreliable was that non-detection could be confused with mortality. Id. Tr. 93. He argued that the presumed dead cranes might have simply been overlooked, was temporarily absent from the territory, or that it left the survey area. Id. Tr 93-94. But this opinion reflects [*128] Dr. Conroy's lack of experience with this species and its basic biology, and is flatly contradicted by the more experienced experts who know about whooping cranes, spent years working in the field with whooping cranes, and who also participated in the census flights. (Stehn, Day 2, Tr 289-291, 311-312, 317); (Chavez-Ramirez, Day 2, Tr 19, 25, 38, 59).

Moreover, Dr. Conroy eventually admitted that, given the known characteristics of whooping

cranes--fixed territories, conspicuous individuals, identifiable by age--then sequential aerial visits would allow a person to infer mortality. (Conroy, Day 8, Tr 171-172). To the extent he argued against reliance on Mr. Stehn's findings, Dr. Conroy ignored the fact that Mr. Stehn would actively search for missing cranes each time, re-visiting the territory several times on the same and subsequent flights. (Stehn, Day 2, Tr 308, 311-312)(Chavez-Ramirez, Day 2, Tr 59). Dr. Conroy ignored that Mr. Stehn would search the uplands and freshwater ponds for missing cranes. (Stehn, Day 2, Tr 311-312). Dr. Conroy ignored the undisputed testimony that if a crane is in an unusual location or off the Refuge, it is quickly detected and reported to USFWS by land-owners, [*129] farmers and the public. (Stehn, Day 2, Tr 329-330).

Similarly, there is no evidence that missing juvenile cranes were somehow alive and hiding in their parents' territory or on the uplands, and eventually, Dr. Conroy conceded that Stehn detected most, if not all, juveniles present during each survey. (Conroy, Day 8, Tr 137). There is also no evidence that the missing juvenile cranes were sighted off the Refuge. Instead, testimony established that they likely would have been reported because of the "spotter" network and the public awareness of the highly conspicuous cranes. (Stehn, Day 2, Tr 302-303, 330); (Archibald, Day 1, Tr 65); (Conroy, Day 8, Tr 129).

Subject to rare exceptions, such as at the very end of winter, or if the juvenile attached to a Sandhill Crane flock, juvenile whooping cranes do not survive on their own. (Stehn, Day 3, Tr 99-100) ("my 29 years of experience says the juvenile cannot survive."). (Archibald, Day 1, Tr 151-152) ("Occasionally in biological systems, you'll have everything happen. It's what happens most of the time that's significant."). Thus when a known juvenile crane disappears from its territory, and is no longer seen elsewhere on or off the Refuge [*130] for the rest of the winter, Mr. Stehn justifiably concluded that it was dead.⁸²

82 For example, Mr. Stehn testified about one separated juvenile that spent a few days on the tour loop road in 2008-2009, then was reported a mile north of the refuge, then disappeared with no further sightings. (Stehn, Day 2, Tr 329-330); PX107-109. Another example of Mr. Stehn's ability to detect mortality from his aerial survey comes was demonstrated in his testimony about the shooting death of a crane in 1989. He related: "When that crane was shot, I was actually up in the air doing a census flight. And when I landed and drove back to the refuge office, I reported, "We've got a missing adult out there." And the

secretary said, "Yes, we've been in touch with law enforcement, and there's been a shooting." (Stehn, Day 3, Tr 105). In short, Mr. Stehn knew during his aerial survey that a crane was missing within hours of the incident, and he was correct--that missing adult was a confirmed mortality. Id.; DX-168 at TS000569-570.

Defendants and intervenors argue that, out of the 23 mortalities, only four carcasses were found. However, the credible testimony demonstrated that scavenging is the most reasonable [*131] explanation for why 19 carcasses were not discovered on the Refuge that winter. (Chavez-Ramirez, Day 1, Tr 116-117); (Conroy, Day 8, Tr 147-149, 151, 155-157). Dr. Chavez-Ramirez testified that there are at least eleven species of scavengers at the Refuge that would eat the carcass of a dead Whooping Crane. (Chavez-Ramirez, Day 1, Tr 117). This explains why only approximately 20 Whooping Crane carcasses have been found at the Refuge between 1938 and 2010, four of which were during 2008-2009. Id. Tr 116-117). Dr. Conroy admitted that carcass persistence is low in rural environments, and he also agreed that there were many scavengers on the Refuge. (Conroy, Day 8, Tr 147-149, 151, 155-157) (82 percent of crow and sparrow carcasses disappeared within six days; 92 percent of song-birds within five days; only 2 chicken carcasses out of 275 lasted over twenty-four hours; 62 percent of duck carcasses in a Texas wetland were gone within three days). Thus, the evidence explained why nineteen out of the 23 crane mortalities lacked a carcass: crane carcasses quickly disappear in the wild and so they are unlikely to be found.

Tom Stehn's population and mortality data has been relied upon for decades [*132] by experts in the field. Stehn's methodology was not challenged until this litigation. Yet, even defendants' and intervenors' experts admitted to utilizing Stehn's mortality counts. See e.g. PX-391at 3, SAGES report, where Dr. Slack acknowledges that mortality is "usually inferred from the disappearance of an individual from its territory."

F. Food stress caused the death of at least 23 cranes.

The credible evidence established that at least 23 whooping cranes died at the Refuge during the 2008-2009 winter. TAP's crane experts each testified that the birds' deaths were caused by food stress: the cranes' primary food sources, blue crabs and wolfberries, were not sufficiently available.

1. Necropsy findings.

Necropsies were performed on two carcasses recovered during the 2008-2009 winter. (See DX 118; DX-119). In the necropsy reports, emaciation is listed as

one of the causes of death in each case. Id. (And Chavez-Ramirez, Day 2, 145). These reports are the best evidence of the cause of death of these two cranes.

2. Opinions of the crane experts.

Dr. Archibald testified that, in 1976, the Recovery Team identified water diversions and reduced freshwater inflows as adversely affecting the cranes' [*133] habitat by reducing their primary food sources, the wolfberry fruit and blue crabs, as well as freshwater for drinking. (Archibald, Day 1, Tr 86). Crane experts who studied at the Refuge over the years had previously observed that, when freshwater inflows were sufficient, there might be no crane mortalities, or just one or two. Id. Conversely, in times of drought or decreased freshwater inflows to the Refuge, there would be a spike in crane deaths. Id. These same experts noted that, when the inflows were down, blue crabs and wolfberries were less abundant. Id. Tr 110.

Dr. Archibald testified expressly that the most important food for the AWB cranes on their wintering grounds is wolfberries and blue crabs. (Archibald, Day 1, Tr 111). Cranes eat wolfberries for the months they are available, October through December. Id. Tr 113. Dr. Chavez-Ramirez' field research specifically looked at the AWB flock's diet. (Chavez-Ramirez, Day 2, Tr 18-68). Over the decades, biologists studying the whooping cranes have generated a list of approximately 50 food items that whooping cranes have been observed to eat at least once, and the food items that show up consistently are blue crabs, wolfberries, [*134] and insects. (Chavez-Ramirez, Day 2, Tr 69-70). (See PX-42, food items of wintering whooping cranes on the Texas coast, compiled by Dr. Chavez-Ramirez based on his review of published literature). One of the earliest scientific papers on Whooping Cranes, authored by Robert Porter Allen in 1952,⁸³ includes fecal samplings, and he obtained similar results to those reached by Dr. Chavez-Ramirez. Id. Tr 72-74. Dr. Chavez-Ramirez' own fecal studies confirmed that blue crab and wolfberry were the predominant foods for wintering cranes.⁸⁴ Id. Tr 75-76. (See PX-52, plotting frequency of blue crab and wolfberry fruit in feces of AWB cranes in 1993-1994 winter). This predominance of food choice was demonstrated whether the birds were on the Aransas Refuge or Matagorda Island. Id. Tr 77. Throughout the reported scientific literature: "Blue crabs, hands down, [is] the most reported item by published research and other reporters." Id. Tr 78. In contrast to the SAGES report, Chavez-Ramirez stated that a Whooping Crane diet without blue crab, wolfberries, or freshwater would make the energy expended in a food search greater than the energy intake.

83 A copy of Dr. Robert Porter Allen's treatise, *The [*135] Whooping Crane*, Research Report No. 3 of the National Audubon Society (June 1952), was entered into evidence as PX-372.

84 The graph also demonstrates that the presence of wolf berry fruit in the fecal matter declines sharply after December, consistent with wolfberry availability. (PX-52). Also, when wolf berry is most abundant, there is a slight decrease in blue crab found in the fecal samples. Id.

Dr. Archibald testified that, if the winter is divided into monthly segments, as he did with his fecal studies, there are some months where the blue crab or wolfberry is not as significant, and clams or snails may appear to be the predominant food that week; however, it is only for a short time.⁸⁵ (Archibald, Day 2 Tr 93).

85 Dr. Archibald testified that Hunt and Slack divided the winter into periods for their study, *Winter Diets of Whooping Cranes, Sandhill Cranes in South Texas*. DX-378A. In the Hunt and Slack study, blue crab frequency was 61%. (Archibald, Day 2, Tr 281).

Mr. Stehn testified that, based on his years of experience observing the AWB cranes: "it's my opinion that whooping cranes really struggle when they don't have their primary abundant food sources of wolfberry and blue crab." [*136] (Stehn, Day 3, Tr 30). Dr. Chavez-Ramirez opined that without the blue crabs, he doubts that there would be enough food for the AWB cranes to survive, and that the flock "would either have to move or perish." (Chavez-Ramirez, Day 2, Tr 94). Dr. Archibald noted that the AWB cranes' territorial behavior, including site tenacity and fidelity, during the non-breeding winter season is a function of defending their food sources. (Archibald, Day 2, Tr 83-84, 87).

Mr. Stehn testified that, in 2008-2009, wolfberry production in the fall was "notably less than average." (Stehn, Day 3, Tr 28-29). By December 2008, Stehn observed that: "... blue crabs were extremely scarce. And we noticed the whooping cranes were not feeding on blue crabs. What happens is the blue crab level gets so low that it's not energetically feasible for a Whooping Crane to keep searching for crabs. And they have to go to other areas to look for food." Id. Tr 29. Stehn testified as to his observations: "I was very, very concerned. I mean, I was seeing a horrible picture of habitat for the whooping cranes that winter, and I was extremely alarmed by it." (Stehn, Day 3, Tr 28).

In response to Mr. Stehn's concerns, Dr. Chavez-Ramirez [*137] spent five days at the Aransas Refuge in the 2009 winter. (Chavez-Ramirez, Day 2, Tr 68). During this time, he observed very low crab capture

rates by the cranes. Id. Tr 68; DX-124 at TAP-006359. He also observed never-before seen behavior: a parent that was consuming a crab reacted aggressively when its juvenile approached, and refused to feed the crab to the juvenile. Id. Tr-97-98. Dr. Chavez-Ramirez opined that the parent was suffering from food stress, because normally the parent will feed the juvenile first. Id. He also observed delayed molting in juveniles, and opined that it was because of decreased food availability, as growing new feathers involves significant energy. Id. Tr 114.

TAP's crane experts all testified that, early in the winter, juveniles are "extremely reliant" on the parents to provide food. (Chavez-Ramirez, Day 2, Tr 115; Archibald, Day 1, Tr 74-75). Parental denial of food to a juvenile "could be lethal in some cases." (Chavez-Ramirez, Day 2, Tr 132). Parental denial of food and/or aggression toward juveniles could lead to the juvenile's leaving the family unit and the territory, and would explain the unusual recorded observations of isolated solitary juveniles [*138] in years with low food abundance, including 2008-2009. Id. Tr 132-133; PX-22 at 31-32; PX-107, PX-108, PX-109.

In 2008-2009, out of the 23 reported mortalities, 16 were juveniles. (Chavez-Ramirez, Day 2, Tr 65). Dr. Chavez-Ramirez opined that this indicated food stress because juveniles are less able to procure their own food, and if the parents refuse to feed them sufficient amounts, then the juveniles are likely to suffer higher mortality. Id. Tr 115. In 2008-2009, Mr. Stehn noticed the "very unusual" occurrence that juveniles were separating from their parents. (Stehn, Day 2, Tr 328). Mr. Stehn explained that healthy juveniles typically stay near their parents, and when a juvenile separates from its parents, it invariably disappears. Id. Tr 330, and Day 3, Tr 19-20. Dr. Chavez-Ramirez testified that, of the few occurrences that he has seen solitary juveniles, those were only during "bad" winters. (Chavez-Ramirez, Day 2, Tr 132-133).

A lack of adequate food and drinkable water in the territories can cause the AWB cranes to leave and fly to the uplands to locate freshwater ponds. (Chavez-Ramirez, Day 2, Tr 115-116). Dr. Chavez-Ramirez testified that some cranes began to leave the marsh [*139] and vegetative flats of the Refuge to fly upland to freshwater ponds when salinity levels reached 15 ppt, and that all cranes left when salinity reached 23 ppt. Id. Tr 242. Mr. Stehn drew these same conclusions based on his field observations, and he published these findings. (DX-123, Stehn & Taylor, 2007). When cranes are forced away from the safety of their territories they are at increased risk of predation. (Chavez-Ramirez, Day 2, Tr 116).

3. Defendants and intervenors failed attempt to disprove food stress was cause of cranes' death.

(a) Dr. Stroud.

In response to the necropsy reports, GBRA offered Dr. Richard Stroud who identified himself as a veterinary pathologist.⁸⁶ (Stroud, Day 6, Tr 6). He discussed the components of a diagnostic necropsy report. Id. Tr 23-26. He reviewed the autopsy reports for four crane carcasses, and offered his opinion that these birds did not die from malnutrition. Id. Tr 28-40. On cross-examination, however, Dr. Stroud admitted that the adult carcass, DX-118, was 25% below the normal weight of 6000 grams, and that it was emaciated, with no fat. Id. Tr 60. The juvenile bird, DX-119, died by predation; however, "severe emaciation" was also noted in the [*140] autopsy. Id. Tr 64. The third bird recovered was only a wing, and the fourth, only feathers. Dr. Stroud also agreed that the lack of food or starvation can lead to emaciation and that when a crane does not get adequate food and water, this can lead to infections and death. Id. Tr 45, 65. He agreed that a bird can acquire immune system problems and infection problems secondary to an already compromised body from emaciation or thirst. Id. Tr 45. He further affirmed that nutrition can be a factor in a compromised immune system. Id. In short, Dr. Stroud concurred with the most important point of these necropsy reports, which is that, when these birds died, they were emaciated, indicative of food stress.

86 Dr. Stroud's Curriculum Vitae ("CV") is DX-371.

The Court found Dr. Stroud evasive in response to questions of whether dehydration and lack of food source can contribute to compromising the host and lead to disease. (Stroud, Day 6, Tr 65-66, 74). He was confused about his basis for stating that alligators eat dead food in the wild. Id. Tr 67. And finally, until corrected by the Court, Dr. Stroud baselessly suggested that gangrene might be a cause of death of one of the necropsied cranes [*141] because the joint tissue was green in color. Id. Tr 31-33, 40, 47.

(b) Dr. Slack.

GBRA offered Dr. Douglas Slack to testify about crane habitat, behavior, and crane foraging ecology.⁸⁷ (Day 6, Slack, Tr 77). GBRA hired Dr. Slack in 2002 to study the San Antonio Guadalupe Estuarine System, and he is a lead author on the SAGES report. Intervenors GBRA and SARA paid 2.1 million to Dr. Slack and the SAGES team to answer the question "what do whooping cranes eat?" (Slack, Day 6, Tr 143). Dr. Slack employed a graduate student, Danielle Greer, (now Dr. Greer), to look at both food availability and a determination of of

what the whooping cranes were eating. Id. Tr 104-106. Greer made "hundreds of hours" of video-recordings of the cranes in the field, took notes while she was recording, and then obtained her primary data from analyzing the videotapes. Id. Tr 106-107. Greer claimed that cranes exhibited different behaviors in eating different kinds of food, and that she could determine what they were eating from observing their behavior on the tapes. Id. Tr 108. Greer focused on only three of the 200-plus Whooping Crane territories. Id. Tr 177. Based on Greer's observations, Dr. Slack and Greer [*142] concluded in the SAGES report that, even if blue crabs and wolfberries were not available in sufficient amount, the AWB flock would not be adversely affected because whooping cranes are omnivores. Id. Tr 118-120. The SAGES report was roundly criticized by Mr. Stehn and by the Texas Parks and Wildlife Department. PX-384; DX-394.

87 Dr. Slack's CV is filed at DX-370.

Dr. Slack testified that Dr. Greer had "intensive training" regarding how she determined from video recordings what food items cranes were eating, but admitted that he, her doctoral adviser, did not train her, and neither did Mr. Stehn or Dr. Chavez-Ramirez. Id. Tr 258-261. Dr. Slack then claimed that Dr. Greer had trained herself based on her experience in the field, and he heard her "talk about her evaluation and tapes," while in the laboratory. Id. Tr 263. But Dr. Slack admitted that Dr. Greer did not describe her methodology in her dissertation, and he is unaware of the technique she employed to discern what the cranes were eating. Id. Tr 265. Dr. Slack could not verify any of the food items Dr. Greer identified from watching the video recordings. Id. Tr 267. In one tape, Dr. Greer claimed to identify 900 food items, where [*143] Dr. Chavez-Ramirez, in reviewing the same segment, did not observe any. ⁸⁸ Id. Tr 257.

88 Dr. Chavez-Ramirez reviewed about 12 hours of Greer's video recordings, (PX-237 to PX-244), and despite his years of field research, he could not identify with certainty any one food item being eaten by a crane. (See PX-386, Dr. Chavez-Ramirez' summary of his review). GBRA submitted DVD's of Dr. Greer's recordings. (See DX-313 through DX-328). The Court reviewed all of the recordings and found many of them to be unclear and out-of-focus. Indeed, Dr. Slack, who claimed to have watched 40-45 hours of the tapes, agreed that 10 to 20 percent were "fuzzy." (Slack, Tr 255). The Court was unable to determine what food item was being eaten, if any, by the cranes.

Prior to being hired by GBRA in 2002, Dr. Slack employed and relied on the population counts and data collected by Mr. Stehn as the basis for his published articles. (Slack, Day 6, Tr 187-189). It was not until after he had been hired by GBRA, and subsequent to this litigation, that he authored, at GBRA's request, the "white paper," for the first time criticizing Tom Stehn's population and mortality counts. Id. Tr 189. In both the SAGES report and [*144] the white paper, Dr. Slack relied on the data of Greer. Id. Tr 277.

Dr. Slack did not personally spend any significant amount of time in the field, averaging one day per year over the past fifteen years. Id. Tr 95-96, 192-196. Contrary to the scientific literature, Dr. Slack testified that cranes did not need freshwater because they had functioning supraorbital salt glands which allowed them to secrete excess salt. Id. Tr 213. However, when questioned further by the Court, Dr. Slack admitted that he had no observational basis for this statement, he had not reviewed literature on cranes and freshwater, and that he "just made it up." Id. Tr 198-199, 207-208, 213, 215.

(c) Dr. Porter.

GBRA offered the testimony of Dr. Warren Porter, a professor of zoology and environmental toxicology at the University of Wisconsin, Madison. ⁸⁹ (Porter, Day 7, Tr 17). He is developer of the "niche mapper" which is a computer model that allows for the calculation of food and water requirements for any animal on the planet. Id. Tr 19. Dr. Porter has not studied whooping cranes in the wild, although his graduate student studied whooping cranes in Necedah, Wisconsin during the summer. Id. Tr 38-39.

89 Dr. Porter's [*145] CV is DX-420.

Dr. Porter's niche mapper considers the heat energy balance and the mass energy balance of an animal, and employs the "microclimate model" and the "endotherm model." Id. Tr 44-45. The microclimate model considers weather data such as temperature, wind speed, and humidity. Id. at 45-47. The endotherm model considers the heat generated by the animal's metabolism. Id. Tr 48-49. The category of data he collected for the Whooping Crane model were: latitude and longitude; elevation to calculate solar radiation; air temperature, humidity, and wind speed at 6 feet elevation; ground surface reflectivity; soil properties; and minimum and maximum shade microclimates for every hour. Id. Tr 49-50. Dr. Porter used Dr. Greer's and Dr. Howard Hunt's ⁹⁰ data concerning the AWB crane diet. Id. Tr 51. Dr. Porter did not use the data from Robert Porter Allen, Archibald, or Chavez-Ramirez. Id. Tr 58. His conclusion was that, no matter what the diet, AWB cranes "are always very

comfortably in a positive energy balance by a long shot." Id. Tr 65.

90 Hunt was a graduate student of Dr. Slack. (Slack, Day 7, Tr 84). Hunt's 1987 dissertation concerned cranes' movements following controlled burns of [*146] uplands. Id. Tr. 85. Hunt also studied the crane winter diet and published a fecal study with Dr. Slack as co-author. Id. Tr. 86, 96, 101. See DX-378. As part of his thesis, Hunt also measured the distance cranes would fly to freshwater ponds. Id. Tr 209. In short, Hunt's research confirmed the importance of blue crabs, wolfberries, and freshwater in the Whooping Crane diet.

Dr. Porter, showed a stunning lack of candor regarding his use of certain data. In determining which crane diet data to use, he claimed to have chosen the Greer and Hunt studies based on his review of the research. Id. Tr 39-40, 51. Upon further questioning, he could not recall if he or his students chose the crane diet data. Id. Tr 53, 55. He finally admitted that initially, he only used Greer's data, provided to him by GBRA, but then, after learning that Greer's data was being questioned as unreliable, he was provided with the Hunt study by GBRA. Id. Tr 80-81.

Dr. Porter had no personal experience studying cranes in the wild or observations about their feeding behavior on the Refuge. Id. Tr 38, 63. The Court concludes that the niche mapper model was of no value because it assumed food availability and did not address [*147] the energy expended by cranes when searching for food. Id. Tr 90-92.

G. Motion to reopen and the Abundance Survey.

On October 12, 2012, defendants and intervenors filed a motion to reopen the case to introduce into evidence a document entitled Aransas-Wood Buffalo Whooping Crane Abundance Survey (2011-12) (the "Abundance Survey") that was generated by the USFWS. (D.E. 328). In advance of Mr. Stehn's retirement, the USFWS appointed Dr. Brad Strobel, the lead author of the Abundance Survey, as the next Refuge biologist. In the winter of 2010-2011, Dr. Strobel trained with Mr. Stehn by accompanying him on census flights. However, in the winter of 2011-2012, Dr. Strobel implemented a new distance sampling survey method to estimate AWB crane populations. This distance sampling method is proposed in the Abundance Survey, and it was used during the 2011-2012 winter to estimate the AWB flock at the Aransas Refuge. (See D.E.328, Ex. 1, Abundance Survey at 11-14). After two years, Dr. Strobel is now leaving the Aransas Refuge to take a position at the Necedah National Wildlife Refuge in Wisconsin.

There is simply no comparison between Mr. Stehn's 29-years, hands-on experience in the field at the [*148] Aransas Refuge studying the AWB cranes and his findings and conclusions, to the superficial conclusions presented in the Abundance Survey. The Court finds that the Abundance Survey lacks the necessary probative value to justify reopening the case because it: (1) addresses peak population counts rather than mortality (and Tom Stehn's peak population numbers were never at issue); (2) is in conflict with evidence adduced at trial by both parties, which necessarily calls into question its reliability; (3) is preliminary and presents incomplete information that has not been subjected to peer review; (4) lacks underlying data; and (5) proposes an unacceptable error rate.

1. Population versus mortality.

The Abundance Survey addresses the previous population counts by Mr. Stehn, and it proposes a future method for conducting population counts. It is not a criticism, nor even an evaluation of Stehn's *mortality* counts, nor does it develop any new methodology for determining winter AWB crane mortality. As previously noted, GBRA's expert, Dr. Conroy, found Stehn's peak population counts "reasonably accurate." (Conroy, Day 8, Tr 90). In response to defendants' and intervenors' motion to reopen, Dr. [*149] Chavez-Ramirez reviewed the Abundance Survey and offered his opinion as to its merits. (See D.E. 342, Ex. A, Declaration of Chavez-Ramirez). In his declaration, Dr. Chavez-Ramirez notes that the Abundance Survey does not propose a methodology to determine winter mortality of AWB cranes at the Aransas Refuge, nor does it offer any data on mortality during the 2011-2012 winter, let alone the winter of 2008-2009 when the alleged "take" of the AWB cranes occurred. (Id., Chavez-Ramirez Dec. at ¶¶ 25-26). This is because "[s]tatistically based survey methods do not address mortality specifically." Id. at ¶ 26. Indeed, at the October 4, 2012 public meeting in Fulton Texas, Dr. Brad Strobel, lead author on the Abundance Survey, admitted that he did not know the winter mortality for AWB cranes during 2011-2012, the year of his study. (See D.E. 342, Ex. B, Declaration of TAP Regional Director Ronald B. Outen, authenticating video recording of October 4, 2012 public meeting and submitted as Exhibit 1 to his declaration). Thus, the Abundance Survey fails to address an essential issue at trial: Tom Stehn's methodology for determining AWB crane mortality. As such, it provides neither relevant nor [*150] helpful information to the Court.

2. Information in Abundance Survey conflicts with trial evidence.

Two propositions advanced by the Abundance Survey conflict with facts developed at trial. First, it as-

sumes, incorrectly, that Whooping Cranes are not territorial. Second, it criticizes Tom Stehn's past peak abundance surveys. These surveys were relied on by both parties at trial, and Mr. Stehn's underlying methodology in determining peak abundance remained basically unchallenged. Both of these propositions are contrary to the evidence adduced at trial by TAP and witnesses for the defendants and intervenors.

(a) Territoriality.

There is a bullet point in the Abundance Survey entitled: "Assumed Individuals Do Not Leave Their Territories" in which the authors question the territoriality of whooping cranes, stating that the the "assumption of territoriality is unnecessary and untenable given recent data." (D.E. 328-1 at 6). At trial, however, it was established that AWB cranes are highly territorial. Indeed, GBRA witness Dr. Conroy agreed that the AWB crane locations at the Aransas Refuge are largely predictable due to the established territories of the cranes, and that the territorial nature [*151] of the AWB cranes contributes to an accurate census. (Day 8, Conroy, Tr 137-138). One such exchange:

Q: You agree that as a general proposition the family groups and pairs have largely predictable locations due to their territoriality on the winter grounds.

A: I agree.

(Conroy, Day 8, Tr 130).

Dr. Slack testified at trial on behalf of the defendant GBRA and admitted that the SAGES report was premised on observing the AWB cranes in fixed and well-defined territories. (Slack, Day 6, Tr 116, 146, 156, 177-178). Moreover, in his October 25, 2011 deposition, Dr. Slack testified about AWB crane territoriality as follows:

Q: Now, with regard to life history, do whooping cranes have territories in the winter as well as on the breeding ground?

A: Yes.

Q: And could you describe what it means to - quote-unquote - have territory?

A. Territory is a defensive space.

(D.E. 342, Ex. H, Slack deposition excerpt at 70).

Both Dr. Archibald and Dr. Chavez-Ramirez confirmed Mr. Stehn's methodology for the identification of

family groups, their territories, and mortality based on well-established and documented crane behavior: territoriality and family cohesiveness, as confirmed by banding. (Archibald, Day 1, Tr [*152] 73, 89, 95); (Chavez-Ramirez, Day 2, Tr 82-87); (Stehn, Day 2, Tr 294-95, 321-22, 328-29 and Day 3, Tr 37). Dr. Archibald pointed out established AWB crane territories at the Aransas Refuge, (see PX-10), and testified:

Q: So what does it mean to have a territory?

A: It means that this is an area that's a piece of real estate that a pair of cranes defends against the intrusion of other cranes. And we consider that to protect their food source.

A: ... And we found that the same birds come back to the same territories year after year, generally speaking.

Q: So it's literally like a piece of real estate that they have some ownership interest in.

A: Exactly. In addition, we found that their offspring, particularly the males, establish territories near their Parents' territory.

(Archibald, Day 1, Tr 93-94).

Dr. Chavez-Ramirez also testified as to the territorial behavior of AWB cranes:

Q: Okay. And this behavior has been long, you've personally observed such behavior of the one crane family unit defending its territory against another crane family unit wandering in?

A: That's correct. I've seen it multiple times.

(Chavez-Ramirez, Day 2, Tr 88).

Dr. Chavez-Ramirez testified that, as early as 1952, Robert [*153] Porter Allen described crane territorial behavior, although it was not identified as such. (Chavez-Ramirez, Day 2, Tr 88-89, confirming Allen's description of territorial defense on page 142 of PX-372). Equally as important, in his declaration, Dr. Chavez-Ramirez notes that he is not aware of any recent data that casts doubt or refutes this documented territorial behavior of AWB cranes. (D.E. 343, Ex. A, Chavez-Ramirez Dec. at ¶ 27). To the contrary, the

Whooping Crane GPS tracking data that he has reviewed confirms territoriality in juveniles and paired adults at the Aransas Refuge. Id. at ¶ 29.

In their motion to reopen, defendants and intervenors attempt to equate crane territoriality with the faulty premise that cranes' do not venture beyond the boundaries of their territories, and suggest that Stehn's methodology relies on this faulty premise in determining mortality. However, not a single TAP witness testified that cranes do not leave their territories. Indeed, both Dr. Archibald and Dr. Chavez-Ramirez testified that, especially when food and freshwater resources are limited, cranes will seek out food on other crane's territories as well upland. (Archibald, Day 1, Tr 75-76, 91, [*154] 120, 125, 289); (Chavez-Ramirez, Day 2, Tr 115-116, 126-127). Mr. Stehn expressly acknowledged that cranes leave their territories, leading him to develop strategies for counting those birds. (Stehn, Day 2, Tr 310-314). Further, Dr. Chavez-Ramirez specifically refutes the statement in the Abundance Survey that "individuals do not leave their territories," and disputes that any biologist has previously relied on such an assumption. Id. at ¶ 22. Indeed, based on his own observations, Dr. Chavez-Ramirez has concluded that AWB cranes regularly leave and return to their territories, and that movements are increased "when conditions in that territory are not adequate, for example when the birds lack drinkable fresh water or sufficient food supplies. Id. at ¶¶ 24-25, ¶ 30. There is no evidence that Stehn based his methodology on cranes not leaving their territories.

(b) Peak Abundance.

Defendants *in toto* acknowledged that they are not challenging Mr. Stehn's methods for estimating the AWB peak population counts. Mr. Fernandes, attorney for the GBRA, stated: "just so it's real clear, we're not moving to exclude Mr. Stehn's population census counts, the two -- the population census counts and [*155] the peak -- the population census counts and the peak population counts that went from, you saw [TAP Exhibits] 270, 263, 283. We're not moving to exclude him on those population counts." (Fernandes, Day 2, Tr 300-301). The Abundance Survey criticizes Mr. Stehn's peak abundance census; however, GBRA's own expert, Dr. Conroy, confirmed that Mr. Stehn's census methodology would produce a reasonably accurate peak flock number. He agreed that, if Stehn repeated four surveys, each with only a 75% detection rate, then he could have detected 99.6% of the individuals in the area combined in those four surveys. (Conroy, Day 8, Tr 140). He testified further:

Q: And do you believe that Mr. Stehn's peak flock size estimates are an important

conservation tool for the whooping cranes?

A: Yes, I do.

Q: And in your opinion, are Mr. Stehn's peak flock size estimates accurate?

A: I believe that they are reasonably accurate.

Q: And what is the basis of that belief?

A: The basis of that belief is my review of his methods and his statements that most cranes are - the conspicuous nature of the cranes, the fact that they're probably counting most of the cranes on each of these surveys and that when you roll all [*156] those numbers up together into a single number we are probably getting something close to the actual peak population size.

(Conroy, Day 8, Tr 89-90).

Dr. Conroy also acknowledged that the cranes' site tenacity contributed to the accuracy of Stehn's population counts:

Q: You agree that a census may be possible when the animals, or birds in this case, are known to have strong site tenacity. It is possible in that instance, correct?

A: It is possible.

Q: You agree that the putative census involves identifying and mapping boundaries of defended territories; that's kind of the core starting point for that, correct?

A: That's one method that's used, correct.

(Conroy, Day 8, Tr 127).

No credible evidence casts doubt on the accuracy of Mr. Stehn's peak abundance counts. The Abundance Survey's criticism of Mr. Stehn's data is unsupported, and in turn, undermines the credibility of the Abundance Survey itself as there is no basis for its conclusions.

(c) The Abundance Survey is preliminary.

Rule 803(8)(C), Fed. R. Evid., excepts from the hearsay rule reports compiled by "public offices or agencies" in compliance with the office or agency's duty under law "unless the sources of information or other circumstances [*157] indicate lack of trustworthiness." *Fed. R. Evid. 803(8)*. Factors that may indicate a lack of trustworthiness include: "unreliability, inadequate investigation, inadequate foundation for conclusions, invasion of the jury's province." *Distaff, Inc. v. Springfield Contracting Corp.*, 984 F.2d 108, 111 (4th Cir. 1993)(citation omitted). In addition, the Distaff court noted that "the inability of the defense to cross-examine the author on the conclusions in the report is not a reason for exclusion." *Id.* at 112.

The Abundance Survey does not mask the fact it is not a final work product. Indeed, in the "message from the authors" section, the authors provide a disclaimer: "All data and conclusions contained in this report are preliminary and subject to revision." (See D.E. 328, Ex. 1, Abundance Survey at 2). They note that "a formal Whooping Crane survey protocol is in development." *Id.*, Ex. 1 at 7. Dr. Chavez-Ramirez has reviewed the Abundance Survey and has commented that it is "a highly preliminary report, and it requires refinement. It lacks discussion or presentation of much of the underlying data, which would all be presented in a finished study." (D.E. 342, Ex. A, Chavez-Ramirez Dec. [*158] at ¶ 10).

Tom Stehn's peak abundance methodology was accepted in the scientific community, and indeed, was employed by the USFWS for over two decades as the sole means of evaluating the health and sustainability of the AWB flock. In contrast, the methods and protocols proposed in the Abundance Survey are still under development and have not yet been reviewed or even made available to any scientist except a small, internal group within the USFWS. (D.E. 342, Ex. A, Chavez-Ramirez Dec. at ¶ 11). Dr. Chavez-Ramirez, who is a member of the International Crane Recovery Team, has not been asked to review the Abundance Survey, nor has any other member of the Recovery Team. *Id.*, Chavez-Ramirez Dec. at ¶ 12 -15. As admitted by the Abundance Survey authors, their proposed survey protocol has not yet been "submitted to professional peer review to ensure that the methods are appropriate, scientifically defensible and professionally valuable." (D.E. 328, Ex. 1, Abundance Survey at 7). Thus, at this point in time, the Abundance Survey has not yet been approved by the scientific community. In contrast, Tom Stehn's methodology has been repeatedly subjected to peer review; his results have been replicated; [*159] the data collected has been relied on; and conclusions from that data have formed the basis of real policies that have positively affected the AWB flock numbers. The Abundance Survey provides no information relevant to the issues before the Court.

Courts have rejected draft or preliminary government reports because they do not demonstrate sufficient trustworthiness to satisfy *Rule 803(8)*. See e.g. *Anderson v. Westinghouse Savannah River Co.*, 406 F.3d 248, 264 (4th Cir. 2005) (affirming the district courts on the grounds that "the Department of Energy's assessment was only a draft report"); *Smith v. Isuzu Motors Ltd.*, 137 F.3d 859, 861-63 (5th Cir. 1998) (rejecting the admission of a governmental report because there was no case law "to allow the admission of the preliminary or interim evaluative opinions of agency staff members"). In *Smith*, the Fifth Circuit observed that "other circuits ... have held that interim agency reports or preliminary memoranda do not satisfy 803(8)(C)'s requirements." *Id.* at 862 (collecting cases); *Plemer v. Parsons-Gilbane*, 713 F.2d 1127, 1140 (5th Cir. 1983) (noting that if administrative report is not final, it "may be considered untrustworthy" under 803(8)(C)); [*160] *Coleman v. Home Depo, Inc.*, 306 F.3d 1333, 1342 n.4 (3d Cir. 2002) (stating that, in determining trustworthiness under 803(8)(C), courts may consider, *inter alia*, "the finality of the agency findings, *i.e.*, the state of the proceedings at which the findings were made (whether they are subject to subsequent proceedings ...), and the likelihood of modification or reversal").

Due to the preliminary nature of the Abundance Survey, and because defendants and intervenors have offered no underlying data or analysis to assess the document's reliability or weight, the Court finds it is of no probative value. Further, the Court scheduled a hearing on defendants' and intervenors' motion to reopen case for January 14, 2013, so that it could question the authors about their theories, as it had done with Mr. Stehn. (D.E. 344). Defendants and intervenors were unable to produce these witnesses.

(d) No underlying data.

The Abundance Survey states that its purpose, in part, is to "describe the progression of work involved in building a credible survey program for this population of Whooping Cranes [AWB cranes] between 2010 through present (September 2012)." (D.E. 328, Ex. 1, Abundance Survey at 2). The [*161] Abundance Survey acknowledges that the USFWS has used aerial surveys for over 60 years, but then cautions that the surveys are "not important, in and of themselves," but as "a tool to measure recovery and bolster conservation efforts." *Id.* at 3. But of course, this is exactly what Tom Stehn did with the aerial surveys, and to suggest otherwise is no less than absurd. That aside, the Abundance Survey then offers a description of its new methods that were applied in the winter of 2011-2012. The authors propose: (1) primary and secondary sampling frames, with each "strata" composed of several "regions;" (2) a "peak" sampling time;

(3) standardization by use of 2 observers and 1 pilot;⁹¹ and (4) standardization by flights at specific times of day. *Id.* at 8. Despite these proposed standardization techniques, nowhere in the Abundance Survey do the authors list the actual number of cranes counted for the winter 2011-2012, or the computations or analysis that led the authors to the conclusion that the peak flock in the "primary sampling frame" ("PSF"), an area identified for the survey, was 254. As such, it is impossible to verify this conclusion.

91 At trial, Dr. Conroy agreed with TAP that [*162] a single observer is preferable to two or more because multiple observers would add variability. (Conroy, Day 8, Tr 134-135).

(e) Error rate of the Abundance Survey is unacceptable.

The Abundance Study authors state that one of the objectives of the report was to create a new annual peak abundance survey method "with precision enough to detect population declines" of the AWB flock. (D.E 328, Ex. 1, Abundance Survey at 7). Dr. Chavez-Ramirez notes that the new survey method employs a distance-based sampling technique to estimate a peak flock number within an unidentified area on the Aransas Refuge. (D.E. 342, Ex. A, Chavez-Ramirez Dec. at ¶ 17). Using the Abundance Survey results of 254 cranes and the suggested 12.6% variation coefficient, Dr. Chavez-Ramirez calculated the peak flock number to be as low as 198 birds and as high as 324 birds. *Id.*, Chavez-Ramirez Dec. at ¶ 18. According to Dr. Chavez-Ramirez:

The very high error rate estimated to date with the new methodology will not provide information useful to fulfill Objective 1 of the International Whooping Crane Recovery Program because increases, or decreases, in the population would be difficult to detect from year to year. Thus, [*163] the sampling method currently under development needs to continue to be modified and refined before it will be useful. Right now, it is not a better alternative to the previous census method.

This Survey Report does not allow me as a member of the Recovery Team to determine if the population is increasing or decreasing. The recovery team has suggested that the error rate must be reduced to detect changes of 5%, and the

Survey Report acknowledges they need to work towards this goal.

(D.E. 342, Ex. A, Chavez-Ramirez Dec. at ¶¶ 19-20).

Although TCQE defendants have not offered the Abundance Survey for purposes of the Court accepting this new methodology, the Court takes notice of Dr. Chavez-Ramirez's criticisms. The variation in these numbers is unacceptable. Mr. Stehn testified at trial that he observed approximately 95% of the AWB flock on any one aerial flight. (Stehn, Day 2, Tr 319). He opined that his error rate for his 2008-2009 population counts was 2-3%. (Stehn, Day 2, Tr 320-321). Dr. Chavez-Ramirez testified that the percentage of birds counted via Stehn's aerial flights was in the upper 90s to the mid-80s depending on the flight. (Chavez-Ramirez, Day 2, Tr 56-57). The Abundance [*164] Survey purports to offer a preferred, improved methodology to Tom Stehn's earlier work, but a comparison of the two methods reveals that Tom Stehn's labor-intensive census counting is more reliable and accurate than the Abundance Survey sampling. Having reviewed the Abundance Survey, the Court is even more certain of the accuracy and reliability of Tom Stehn's methodology for counting cranes and determining mortality of cranes in the AWB flock.

IV. INJUNCTIVE AND OTHER RELIEF.

A. The ESA allows for injunctive relief, and provides for a relaxed standard in granting it.

Absent a clear legislative statement to the contrary, the courts retain the power to order equitable relief. See *Weinberger v. Romero-Barcelo et al.*, 456 U.S. 305, 102 S. Ct. 1798, 72 L. Ed. 2d 91 (1982). The issue under consideration in *Weinberger* was whether the language of the Federal Water Pollution Control Act ("Act") requires a district court to enjoin all discharges of pollutants that do not comply with the Act's permit requirements or whether "the district court retains discretion to order other relief to achieve compliance." *Id.* at 306-07. The Court noted that statutes providing for particular grants of jurisdiction should be read against the backdrop [*165] of the courts' general ability to provide equitable relief. *Id.* at 313. Statutes should be read in this manner because the exercise of equitable relief reflects a "practice with several hundred years of history," that is one of which Congress is well aware. *Id.* Further, while Congress may guide or control the exercise of the courts' discretion, the Court does not "lightly assume that Congress has intended to depart from established principles." *Id.* (citations omitted). The Court then cited to a prior holding explaining the nature of the courts' equitable jurisdiction:

[T]he comprehensiveness of this equitable jurisdiction is not to be denied in the absence of a clear and valid legislative command. Unless a statute in so many words, or by a necessary and inescapable inference, restricts the court's jurisdiction in equity, the full scope of that jurisdiction is to be recognized and applied. 'The great principles of equity, securing complete justice, should not be yielded to light inferences of doubtful construction.'

Id. at 313 (internal citations omitted).

The Strahan court cited Weinberger as evidence that, in enacting the ESA, Congress did not intend to limit the courts' ability to fashion [*166] equitable relief. See *127 F.3d at 170* ("The ESA does not limit the injunctive power available in a citizen suit, and, thus, we understand the Act to grant a district court the full scope of its traditional equitable injunctive powers. 'Equitable injunction includes the power to provide complete relief in light of the statutory purpose.'") (citations omitted).

Rather than unequivocally restricting the courts' power to grant equitable relief, the ESA expressly authorizes it: "Except as [otherwise provided] any person may commence a civil suit on his own behalf-to enjoin any person, including the United States or any other governmental instrumentality or agency (to the extent permitted by the *eleventh amendment to the Constitution*), who is alleged to be in violation of any provision of [the ESA]." See *16 U.S.C. 1540(g)(1)(A)*. Furthermore, the ESA has been interpreted to provide for a relaxed standard in granting equitable relief: "When an injunction is sought under the ESA, the traditional balancing of equities is abandoned in favor of an almost absolute presumption in favor of the endangered species." See *Defenders of Wildlife v. Administrator, E.P.A.*, *688 F. Supp. 1334, 1355 (D. Minn. 1988)*, [*167] *aff'd in part and rev'd in part on other grounds (citing Tennessee Valley Authority v. Hill*, *437 U.S. 153, 173, 98 S. Ct. 2279, 57 L. Ed. 2d 117 (1978); Sierra Club v. Marsh*, *816 F.2d 1376, 1383 (9th Cir. 1987))*. The injunctive relief available under the ESA's citizen-suit provisions is not intended to foreclose relief available under other law. *Strahan*, *127 F.3d at 170 (1st Cir. 1997)*.

Several courts have also issued declarative relief for violations of the ESA pursuant to its citizen-suit provisions. See *Florida Homebuilders Ass'n v. Norton*, *496 F. Supp. 2d 1330 (M.D. Fla. 2007)* (granting plaintiff's request for declaration that defendant violated provisions of the ESA); see also *Colorado River Cutthroat Trout v. Dirk Kempthorne*, *448 F. Supp. 2d 170, 179 (D.D.C.*

2006) (same); *Florida Key Deer v. Stickney*, *864 F. Supp. 1222, 1242* (declaring that FEMA must consult with USFWS within 30 days of entry of the order) (internal citations omitted); *Alaska Fish & Wildlife Fed'n & Outdoor Council v. Dunkle*, *829 F.2d 933, 937 (9th Cir. 1987)*; *Alden v. Maine*, *527 U.S. 706, 747, 119 S. Ct. 2240, 144 L. Ed. 2d 636 (1999)* ("suits for declaratory or injunctive relief against state officers must therefore be permitted if the Constitution is to remain the supreme [*168] law of the land"); *Franklin v. Massachusetts*, *505 U.S. 788, 801-03, 112 S. Ct. 2767, 120 L. Ed. 2d 636 (1992)* (discretionary relief appropriate even if not coercive, and any relevant change would require a "discretionary" government action).

B. An ITP is an appropriate remedy in this case.

Mr. Frederick discussed the process behind the Incidental Take Permit (ITP), noting that, after formulation of the ESA under President Nixon, unforeseen problems arose for private landowners and developers because they could not engage in their normal, lawful activities due to the broad language of the ESA. (Frederick, Day 5, Tr 81). To address this, Congress amended the ESA to add §10(a)(1)(B) to allow an applicant concerned that his or her activity might pose a threat or possible take of an endangered species, to apply for a ITP. *Id.* The ITP process "allows flexibility for economic gain by the public, as well as protecting endangered and threatened species." *Id.* The ITP process involves creation of an HCP by the applicant, with involvement and advice from the USFWS. *Id.* Tr 81-82.

At first glance, the ITP process appears contrary to the goals of an HCP: it grants permission to conduct an activity that could be harmful to an endangered [*169] species, resulting in a "take." (Frederick, Day 5, Tr 82-83). However, the ITP process is designed to provide some balance between the often conflicting interests of property owners, developers, and conservationists. (Frederick, Day 5, Tr 82-83). For example, in Austin, Texas, a purchaser of property buys a tract of land for ultimate commercial development. *Id.* Tr 83. The land is the habitat of two bird species: the black-capped vireo and the golden-cheeked warbler. *Id.* If the land owner develops the property, he will destroy the habitat of the birds, and as such, development of the property is prohibited under the ESA. *Id.* However, if the land owner applies for an ITP, the land owner will now work in partnership with the federal government, and all of the resources and information that it has available. *Id.* The ITP permit/HCP might propose that the land owner leave certain trees, or build after nesting season, etc. *Id.* That is, the HCP created in connection with the ITP will consider the biology and habitat of the endangered species.

Id. An ITP applicant can ask for assistance from scientists other than those employed by the USFWS. Id. Tr 84.

Federal courts have not been hesitant to [*170] order an ITP. The First Circuit recently addressed the incidental-take permitting process in *Animal Welfare Institute v. Martin*, 623 F.3d 19, 28 (1st Cir. 2010). The court noted the statutory provision:

Section 10 of the ESA provides, 'The Secretary may permit, under such terms and conditions as he shall prescribe,' any incidental taking otherwise prohibited by Section 9 that will not 'appreciably reduce' the likelihood that the species will survive and recover. 16 U.S.C. § 1539(a)(1)(B), (2)(B). While [US] FWS must issue a permit to any plan that meets its application requirements, 16 U.S.C. 1539(a)(2)(B), [US]FWS may alter application requirements as "necessary and appropriate," 16 U.S.C. § 1539(a)(2)(A)(iv).

Id.

The parties in the Martin litigation entered into a consent decree that included very specific provisions as to how the Canadian lynx was to be protected from additional takes. Id. at 22 (citing district court opinion, *Animal Welfare Institute v. Martin*, 588 F. Supp. 2d 70, 76-77 (D.Me. 2008)). The district court provided a detailed description of the parties original consent decree, which required that the Commissioner impose very specific restrictions on trapping in particular [*171] areas. The consent decree was ordered to remain in effect "unless and until the [Fish and Wildlife Service] acts favorably on Maine's application for a federal 'incidental take permit' (ITP)." Id. at 23. The consent decree would also have expired if the Canadian lynx was delisted as an [endangered/threatened] species, or if the Fish and Wildlife Service promulgated a rule allowing incidental takes of Canadian lynx. Id. n. 4.

In *Strahan v. Coxe*, the First Circuit affirmed the lower court's order mandating that state-official defendants apply for an ITP. 127 F.3d at 158 (1st Cir. 1997) (affirming district court's order to state-official defendants to apply for an incidental take permit and noting that "[t]he ESA does not limit the injunctive power available in a citizen suit, and thus, we understand the Act to grant a district court the full scope of its traditional equitable injunctive powers. 'Equitable injunction includes the power to provide complete relief in light of the statutory purpose.'" (citations omitted). The *Strahan* court also affirmed the order of the district court mandating that state-official defendants and plaintiff to participate in a

collaborative effort See *Strahan*, 127 F.3d at 158 [*172] (where defendants were ordered to "convene an Endangered Whale Working Group and to engage in substantive discussions with the Plaintiff [Strahan], or his representative, as well as with other interested parties, regarding modifications of fixed-fishing gear and other measures to minimize harm to the Northern Right whales."). Thus, there is sufficient precedent to support TAP's proposed remedy of this Court ordering the TCEQ to participate in an ITP.

ITPs have had success protecting endangered species in the past. In Washington State, the ITP process was employed successfully concerning hundreds of thousands of acres of forest land, numerous large timber companies, and "a multitude of species on the [endangered] candidate list." (Frederick, Day 5, Tr 84-85). The timber companies were required to pay for the HCP as well as for the monitoring. Id. Tr 85. "But at the end they walked away with surety about their production into the future and we [USFWS] walked away with an endangered species that was protected on that piece of land." Id.

An ITP also does not put an applicant at risk. (Frederick, Day 5, Tr 95). Indeed, to not seek an ITP with the related HCP places the applicant at risk of [*173] violating federal law by taking an endangered species.⁹² An HCP can be developed under a partnership agreement with stakeholder participation. Id. Tr 96. The development time for an HCP can be under a year, while larger plans with stakeholder participation can take up to 18 - 24 months. Id. at 97.

92 There was no testimony as to whether or not the USFWS had advised the TCEQ that its actions might constitute a "take."

In this case, the actions of water diverters, such as GBRA and SARA as authorized by the TCEQ defendants, have adversely modified the AWB flock's critical habitat by diverting freshwater inflows, causing higher salinities in the San Antonio bay/Guadalupe estuary. (Frederick, Day 5, Tr 92). To avoid future prosecution, the TCEQ needs to apply for an ITP and develop a HCP to submit to the USFWS. Id. The HCP should include a provision to provide a higher volume of inflows to the estuary with monitoring of salinities at the bays to address the problem before the marsh becomes too saline. Id. Tr 92-93. Offering land would not address the problem. Id. Tr 93. The key issue at stake is the freshwater inflows into the Refuge: "Again, it's a voluntary effort by the applicant. However, [*174] I cannot foresee in any habitat conservation plan for this part of the world that would not include an increase in freshwater inflows." Id.

This assessment is corroborated by the USFWS Spotlight Species Action Plan, PX-25. The plan specifically identifies "decreases in freshwater inflows from water diversions and reservoir construction" as a threat to the survival of the Whooping Crane. *Id.* Tr 90. And see PX-25 at 1. The plan states that decrease in freshwater inflows threatens: (1) the cranes' main food items, blue crabs and wolfberry; and (2) freshwater availability. *Id.* Simply increasing the cranes' habitat would not address the problem because "without freshwater inflows to the bay it doesn't matter how much habitat you have..." *Id.* Tr 91. Salinity levels of the habitat must be kept lower than 23 ppt. *Id.* Mr. Frederick summarized:

But really the key to this whole thing, if I may expand, is the water. And just like the spotted owl in the Pacific Northwest, water salinity levels affect much more than the Whooping Crane and its food source, it affects everything in the estuary. So to me the number one thing in the plan is to work out something that during stressful times in the estuary [*175] there can be an increase in the inflows to keep these levels lower than they are. And from what I'm hearing, this year they're extraordinarily high because of the drought...

(*Id.*, Tr 91-92).

The TCEQ defendants are experts in water transfer, and the USFWS would work with them to develop the HCP. *Id.* Tr 92. In addition to the HCP, there can be a recovery implementation plan, like with the Edwards Aquifer. *Id.* Tr 94. "Again, it's a voluntary effort by the applicant. However, I cannot foresee in any habitat conservation plan for this part of the world that would not include an increase in freshwater inflows." *Id.*

The Edwards Aquifer Recovery Implementation Program ("EARIP") grew out of litigation that required the USFWS to prepare a Habitat Conservation Plan (HCP) that placed pumping caps on the Aquifer. Mr. Andrew Sansom, who participated in early discussions involving EARIP, testified that "the hammer of federal involvement" helped make the program a success despite the diverse interests involved. (Sansom, Day 5, Tr 17).

There exist a number of other resources and programs available to address water management. The Texas Water Trust is an entity that was established to hold water in stream [*176] for environmental purposes. *Id.* Tr 26. If an entity has water to sell, it can be bought and deposited in the trust. *Id.* Tr 29. Recent Texas legislation may also provide a mechanism to ensure TAP's relief.

Effective September 28, 2011, new Texas legislation grants to the Comptroller and TCEQ defendants the authority to "develop or coordinate the development of a habitat conservation plan" and to "apply for and hold a federal permit issued in connection with a habitat conservation plan." *Tex. Gov't Code* § 403.452(a)(1)-(2). The authority was specifically granted in order to "promote compliance with federal law protecting endangered species." *Id.* at § 403.452(a). Thus, the TCEQ defendants can be an applicant for an Incidental Take Permit under this provision, as long as they coordinate the application with the Comptroller. This legislation provides additional support for the ability of the TCEQ defendants to obtain a HCP, when coordinated with the Comptroller, and that funding may be obtained through the Comptroller's office. *Id.* § 403.452(a)(4)-(5). Indeed, the TCEQ has "the powers to perform any acts whether specifically authorized by this code or other law or implied by this code [*177] or other law, necessary and convenient to the exercise of its jurisdiction

Finally, there is also federal assistance available via the Natural Resources Damage Assessment ("NRDA"). (Sansom, Day 5, Tr 30. In the 1990s, NDRA money was used to purchase licenses from shrimp boat operators along the Gulf Coast in order to reduce the total number of shrimping licenses. *Id.* The shrimp license buy-back program created a limited entry into the fishery, thus reducing the overall catch effort in order to maintain the species. *Id.* Tr 30-31. Prospective NRDA funds might be available to the Texas coast to protect the bays and estuaries. *Id.* Tr 31. It is more difficult to procure water than land for environmental purposes. *Id.* Tr 35.

1. Dr. Sundig's economic analysis

Dr. David Sunding, an economist at the University of California, Berkeley, ⁹³ was hired by GBRA to do an analysis of "the economic impacts of changes in water availability to users in the GSA Basin, the Guadalupe-San Antonio Basin, that would result from imposition of a minimum instream flow requirement." (Sunding, Day 8, Tr 185). He chose an instream flow requirement of 1.15 million acre-feet, which is slightly less than the 1.3 million [*178] acre-feet advocated by TAP. *Id.* Tr 185. He selected a 50-year time span, identified surplus water in agriculture, and the cost of building feasible projects. ⁹⁴ *Id.* Tr 186. For example, in 2020, the cost of the instream flow requirement using 2011 dollars would be approximately 61 million dollars to the electric generating sector. *Id.* Tr 199. All sectors together, the loss was approximately \$251 million per year. *Id.* Tr 199. DX-253 reflects the present value of economic impacts for the 50-year time period calculated to be \$6.7 billion. *Id.* Tr 200.

93 Dr. Sunding's CV is DX-244.

94 Dr. Sunding's conclusion are presented in DX-245.

On cross-examination, Dr. Sunding agreed that a HCP is a process that can help resolve conflicts between economic activity and harm to an endangered species. (Sunding, Day 8, Tr 203). He admitted that he did not read plaintiff's original complaint, nor did he consider TAP's experts concerning a HCP or recovery implementation plan. Id. Tr 204-06. He did not consider any of the economic benefits that the instream flow requirement would provide. Id. Tr 208. He agreed that consideration of the value of the AWB flock would be considered in a "comprehensive analysis." [*179] Id. Tr 210.

IV. COURT'S ADDITIONAL FINDINGS OF FACT.

Based on the evidence submitted at trial and reviewed above, the Court adopts as its own TAP's proposed findings of fact. (See D.E. 319 at 2-50). In summary, the Court finds that the actions, inactions and refusal to act by the TCEQ defendants proximately caused an unlawful "take" of at least twenty-three (23) Whooping Cranes in the 2008-2009 winter in violation of the ESA. TAP has established that during the winter of 2008-2009: (1) the TCEQ defendants diverted freshwater flow, caused higher salinity in the San Antonio Bay ecosystem; (2) higher salinities resulted in decreased freshwater availability, along with decreased blue crab and wolfberry abundance; (3) Whooping Cranes require freshwater, wolfberry and blue crab to survive; (4) the AWB flock suffered increased mortality as a direct result of diverted freshwater, leading to the deaths of at least twenty-three (23) cranes in total; (5) TCEQ defendants' water management practices altered the salinity of San Antonio Bay and the designated critical habitat of the AWB flock; and (6) TCEQ defendants have failed to insure the survival of the critical habitat of the AWB. The assertions [*180] of the SAGES report that the Whooping Crane can survive without freshwater, wolfberries and blue crab are not credible. The Court reiterates that TAP has successfully demonstrated causation.

TAP presented statistical analyses demonstrating an association and a correlation between seasonal freshwater inflows and Whooping Crane mortality. (Ensor, Day 1, Tr 234-252; Sass, Day 1, Tr 177-229). The evidence established that the TCEQ defendants' water management practices alter the salinity of San Antonio Bay and the designated critical habitat of the Whooping Crane. (Trungale, Day 3, Tr 251 - Day 4, Tr 50). Estuarine ecology is dependent on freshwater inflows and blue crab abundance is related to salinity. (Montagna, Day 3, Tr 171 -250). Blue crabs and wolfberries are an important food source for the AWB cranes, and so is freshwater; cranes can become malnourished, and die,

due to significant salinity changes. (Chavez-Ramirez, Day 1, Tr 252; Day 2, Tr 284). This sequential testimony demonstrates that the water management activities of the TCEQ caused a "take" of whooping cranes by altering their behavior through habitat modification, depriving them of food and water resources, and ultimately, [*181] leading to malnourishment and death.

The aerial counts on which TAP relies in presuming at least 23 cranes died in the winter of 2008-2009 is an accurate count and the best evidence available in estimating crane mortality. (Stehn, Day 2, Tr 285; Day 3, Tr 153). Mr. Stehn's methodology for estimating the AWB crane population have been replicated and subject to peer review. Information related to both peak population and mortality counts have been published by the USFWS in the Whooping Crane Annual Reports. The annual reports are official USFWS documents. Defendants'/Intervenors' Daubert challenge to Stehn's methodology is overruled.

Dr. Chavez-Ramirez reviewed the locations and timing of crane mortalities in 2008-2009 and testified that their range-wide distribution spread throughout the winter did not indicate that any mass disease outbreak, or poisoning event such as a chemical spill, were likely causes. (Chavez-Ramirez, Day 2, Tr. 63-64, 66); PX-111(map); PX-32 (table); (Stehn, Day 3, Tr 31).

Following the AWB crane mortality of 2008-2009, GBRA, the largest commercial water supplier in the Basin, submitted a new water permit application for 189,000 acre-feet of water per year to be [*182] diverted from the Guadalupe. DX-248. Mr. Chenoweth admitted that, to the best of his knowledge, the TCEQ has never identified a target number specifically for San Antonio bay to protect the instream flows into the Bay. (Chenoweth, Day 5, Tr 234-35). He also admitted there is "no gauge requirement at the entrance to the bay saying how much water has to get to the bay, there's not a single thing like that." Id. Tr 235. Mr. Chenoweth also admitted there is no maximum salinity requirement. Id. Tr 236. The Court finds that, in times of drought and other habitat stressors, the habitat may require up to 1.3 million acre-feet of freshwater inflows beginning well in advance of the Whooping Cranes' arrival in October to prevent the salinity of the habitat exceeding 20 ppt.

To date, TCEQ defendants have not used their authority to regulate diversions, to oversee riparian withdrawals, to secure returns, to release water from reservoirs, or to take other actions that would increase water flows with a purpose to protect the ABW flock. The TCEQ does not cancel unused water rights, even though the agency has this authority. (Vickery, Day 4, Tr 219; Soward, Day 4, Tr 273, 308). The TCEQ does not monitor [*183] D&L water use, nor does it even have a reg-

istry of such riparian rights, although nothing prevents it from doing so.

In addition, permit conditions could take into account the impact of diversions on the water needs in San Antonio Bay, and (by statute) must do so for permits within 200 river miles of the Bay. (Chenoweth, Day 5, Tr 158-159). The bay is more than 200 miles from the sources of the San Antonio River and the Guadalupe River and therefore the framework of S.B. 3 is ineffective to protect the Whooping Crane habitat. However, the TCEQ has not calculated a sustainable inflow number for the Guadalupe or San Antonio Bay, nor has it considered the impact of permits more than 200 miles upriver. The TCEQ has not mandated a gauge at the entrance to the bay to require instream flows, nor has it ordered that a certain salinity requirement be maintained. *Id.* Tr 163-164, 234-36.

The TCEQ could manage surplus water return flows in a manner to ensure that the return flows are preserved to flow into San Antonio Bay for environmental reasons, including for the benefit of the AWB cranes. DX-397 at 17. Indeed, in the past, the TCEQ has exercised its authority to depart from the priority system [*184] for purposes not expressly specified by statute. For example, during the 2008-2009 time period, the TCEQ allowed the City of Kerrville to ignore the priority system. (Vickery, Day 4, Tr 224). The TCEQ has allowed certain oil and gas interests to obtain water in disregard of the priority system, although TCEQ later stopped these temporary permits following complaints from senior users. *Id.* Tr 224-25.

Despite the TCEQ defendants' protestations that they had no power to protect the AWB flock because their hands were tied by the "first in time, first in right" priority water system of Texas, the evidence, most of it from TCEQ officials, demonstrated that state-official defendants have certain powers to act under emergencies, although they have never used this power to take steps to protect the AWB flock. Indeed, the TCEQ has emergency authority to do anything that is necessary or appropriate to carry out duties and responsibilities, and this could extend to the protection of bays and wildlife. (Soward, Day 4, Tr. 266); DX-397 at 8-9). Furthermore, the TCEQ has the power and duty to abide by federal law and mandates. The Court finds that TAP has established by a preponderance of the evidence [*185] that there is a reasonably certain threat of imminent harm to the Whooping Crane that supports injunctive relief against the TCEQ defendants.

V. COURT'S CONCLUSIONS OF LAW.

From the facts, the Court concludes:

1. This Court has jurisdiction and the authority to grant the relief requested pursuant to *16 U.S.C. §§ 1540(c) & (g)* (Endangered Species Act), *28 U.S.C. § 1331* (federal question), and *28 U.S.C. § 2201 et seq.* (Declaratory Judgment Act).

2. The Endangered Species Act ("ESA") authorizes citizen suits, *16 U.S.C. § 1540(g)*, subject to certain requirements that TAP has satisfied.

3. Under *16 U.S.C. § 1540(g)(2)(A)(i)*, TAP notified the TCEQ defendants of their violations of the ESA and of TAP's intent to sue for those violations by certified letter sent on December 7, 2009 ("Notice Letter") (D.E. 1, Ex. 1). Defendants Shaw, Garcia, Rubinstein, Vickery, and Segovia and/or their authorized agents received the Notice Letter on December 9, 2009.

4. Plaintiff also gave notice of its intent to sue by sending the Notice Letter, on December 7, 2009, to Ken Salazar, Secretary of the Interior, and Sam Hamilton, Director of the USFWS, which was received on December 14, 2009.

5. More than sixty days [*186] have passed since the Notice Letter was served and the violations complained of in the Notice Letter are continuing and reasonably likely to continue to occur. The named Defendants have not taken any actions to remedy or prevent continued violations of the ESA. The Secretary of the Interior has not commenced an action to impose a penalty pursuant to *16 U.S.C. § 1540(a)* and the United States has not taken any action to prevent continued violations of the Act.

6. Venue is appropriate in the Corpus Christi Division of the Southern District of Texas under the ESA, *16 U.S.C. § 1540(g)(3)(A)*, because alleged violations have occurred and will occur in this district. Venue is also appropriate in this district under *28 U.S.C. § 1391(b)*.

7. Congress enacted the ESA, *16 U.S.C. § 1531 et seq.*, "to provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved... [and] to provide a program for the conservation of such endangered species and threatened species...." *16 U.S.C. § 1531(b)*.

8. Before a species receives critical protection under the ESA, the USFWS must list the species as either "threatened" or "endangered." *16 U.S.C. § 1533*. [*187] (Admitted).

9. An "endangered species" is one that is "in danger of extinction throughout all or a significant portion of its range." *16 U.S.C. § 1532(6)*. (Admitted).

10. Nearly a half-century ago, whooping cranes first were listed under the Endangered Species Preservation

Act of 1966 as threatened with extinction. 32 *Fed. Reg.* 4001. (Mar. 11, 1967). (Admitted).

11. Three years later they were listed as endangered. 35 *Fed. Reg.* 16047 (Oct. 13, 1970). (Admitted).

12. These listings were "grandfathered" into the ESA. 16 *U.S.C. § 1531, et seq.*, 87 Stat. 884.

13. Section 9 of the ESA, 16 *U.S.C. § 1538(a)(1)(B)*, broadly prohibits "takes" of all listed endangered species, including the Whooping Crane. 50 *C.F.R. § 17.31*; 55 *Fed. Reg.* 26114 (June 26, 1990). (Admitted).

14. The term "take" is defined as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." 16 *U.S.C. § 1532(18)*.

15. The term "harm" includes "significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering." 50 *C.F.R. § 17.3*. *Babbitt v. Sweet Home Chapter of Communities for a Great Oregon*, 515 *U.S.* 687, 115 *S. Ct.* 2407, 132 *L. Ed. 2d* 597 (1995) [*188] (upholding definition).

16. The term "harass" means "an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering." 50 *C.F.R. § 17.3*.

17. Congress intended to define "take" in the "broadest possible manner to include every conceivable way" in which any person could harm or kill fish or wildlife. S. Rep. No. 307, 93rd Cong., 1st Sess. 1, reprinted in 1973 *U.S. Code Cong. & Admin. News* 2989, 2995.

18. Congress specifically intended that the ESA's prohibition against "takes" governs the actions, and failure to act, by all "persons," including any "officer, employee, agent, department, or instrumentality of ... any State." 16 *U.S.C. § 1532(13)*.

19. Each of the individual defendant officials of TCEQ, sued in their official capacities, are "persons" within the meaning of the ESA. 16 *U.S.C. § 1532(13)*.

20. The *Supremacy Clause of the U.S. Constitution*, *U.S. Const. art. VI, cl. 2*, ensures that Section 9 of the ESA preempts contrary state regulations and other state laws. E.g., *Lorillard Tobacco Co. v. Reilly*, 533 *U.S.* 525, 540-41, 121 *S. Ct.* 2404, 150 *L. Ed. 2d* 532 (2001); [*189] *Morris v. Jones*, 329 *U.S.* 545, 553, 67 *S. Ct.* 451, 91 *L. Ed.* 488 (1947); *Northern Sec. Co. v. United States*,

193 *U.S.* 197, 347-48, 24 *S. Ct.* 436, 48 *L. Ed.* 679 (1904).

21. "The plain intent of Congress in enacting this statute was to halt and reverse the trend towards species extinction, whatever the cost." When Congress enacted the ESA, it intended the Act to be as far-reaching as possible and to prevent any taking of an endangered species "whatever the cost." *TVA v. Hill*, 437 *U.S.* 153, 184, 98 *S. Ct.* 2279, 57 *L. Ed. 2d* 117 (1978).

22. "Examination of the language, history, and structure of the legislation . . . indicates beyond doubt that Congress intended endangered species to be afforded the highest of priorities." *TVA v. Hill*, 437 *U.S.* 153, at 174.

23. State agency regulations, to the extent they conflict with the ESA, are preempted, pursuant to the *Supremacy Clause*. E.g., *Strahan v. Cox*, 127 *F.3d* 155, 168 (1st Cir. 1997).

24. Courts routinely reject arguments against the *Supremacy Clause* predicated on a state official's purported lack of authority to comply with federal law. *Washington v. Washington State Commercial Passenger Fishing Vessel Ass'n*, 443 *U.S.* 658, 695-96, 99 *S. Ct.* 3055, 61 *L. Ed. 2d* 823, modified sub nom., *Washington v. United States*, 444 *U.S.* 816, 100 *S. Ct.* 34, 62 *L. Ed. 2d* 24 (1979); *North Carolina Board of Education v. Swann*, 402 *U.S.* 43, 91 *S. Ct.* 1284, 28 *L. Ed. 2d* 586 (1971); [*190] *Pacific Rivers Council v. Brown*, 2002 *U.S. Dist. LEXIS* 28121, 2002 *WL* 32356431 (*D. Or.* Dec. 23, 2002); *Seattle Audubon Society v. Sutherland*, 2007 *U.S. Dist. LEXIS* 39044, 2007 *WL* 1577756, at *2 (*W.D. Wash.* May 30, 2007).

25. Cases uniformly recognize that, in appropriate circumstances, the ESA applies to suits involving state regulatory agencies.

26. The ESA prohibitions apply to actions by state agencies where their regulatory programs approve actions by third parties that contribute to causing the take. E.g., *Strahan*, 127 *F.3d* 155; *Animal Welfare Inst. v. Martin*, 623 *F.3d* 19 (1st Cir. 2010); *Defenders of Wildlife v. EPA*, 882 *F.2d* 1294 (8th Cir. 1988); *Loggerhead Turtle v. County Council of Volusia County*, 148 *F.3d* 1231 (11th Cir. 1998); *Seattle Audubon Soc'y v. Sutherland*, 2007 *U.S. Dist. LEXIS* 31880, 2007 *WL* 1300964 (*W.D. Wash.* May 2, 2007); *Animal Welfare Inst. v. Martin*, 588 *F. Supp. 2d* 70 (*D. Me.* 2008).

27. These cases derive from a decision by the Fifth Circuit, that upheld liability in similar circumstances against a federal agency. *Sierra Club v. Yeutter*, 926 *F.2d* 429, 433-34, 439 (5th Cir. 1991), followed in, e.g., *Strahan*, 127 *F.3d* at 163.

28. They implement the ESA prohibition that not only forbids a "take" but also forbids a person to "cause" a take to be committed. [*191] *16 U.S.C. §§ 1538(a)(1)(B), (C); 1538(g)*. More generally, Congress established that sometimes otherwise lawful activities can cause a take of a listed species if they are specifically exempted. *16 U.S.C. § 1539*. This is known as an "incidental take."

29. More generally, Congress established that sometimes otherwise lawful activities can cause a take of a listed species if they are specifically exempted. *16 U.S.C. § 1539*. This is known as an "incidental take."

30. The ESA prohibits such incidental takes, with an important exception: To avoid liability for a "take" caused by otherwise lawful activities, in some circumstances, Congress authorized responsible persons to seek an ITP pursuant to section 10 of the ESA. *16 U.S.C. § 1539(a)*.

31. The ITP is issued by USFWS after development and submission of a HCP which must be approved by the USFWS. *16 U.S.C. § 1539(a)(2)(A); (B)*.

32. The HCP must include conservation measures designed to minimize and mitigate the impacts of taking species listed under the Act. *16 U.S.C. § 1539(a)(2)(A)(ii)*.

33. In the absence of an ITP or other exemption, the ESA forbids each and every take. *16 U.S.C. § 1538(a)(1)*.

34. The ESA expressly authorizes injunctive relief [*192] against any "person" alleged to be responsible for a take, or otherwise in violation of the ESA, including any governmental instrumentality or agency. *16 U.S.C. § 1540(g)(1)*.

35. As the U.S. Supreme Court has held, Congress has accorded the protection of endangered species the highest of priorities, so courts do not have the discretion to withhold injunctive relief where it is necessary to prevent an imminent and likely violation of the ESA. *Tennessee Valley Auth., 437 U.S. at 184*.

36. A Court must issue an injunction if a plaintiff establishes by a preponderance of the evidence that there is "a reasonably certain threat of imminent harm to a protected species." *Defenders of Wildlife v. Bernal, 204 F.3d 920, 925 (9th Cir. 2000)*.

37. Declaratory relief is authorized by *28 U.S.C. § 2201 & 2202*.

38. TAP has satisfied the requirements of Article III standing because it has established injuries of its members which are fairly traceable to the TCEQ defendants' actions and inactions and because the requested relief

will redress those injuries. *Lujan v. Defenders of Wildlife, 504 U.S. 555, 560-61, 112 S. Ct. 2130, 119 L. Ed. 2d 351 (1992)* (environmental standing); *Hunt v. Washington State Advertising Commission, 432 U.S. 333, 343, 97 S. Ct. 2434, 53 L. Ed. 2d 383 (1977)* [*193] (associational standing).

39. TCEQ defendants have broad powers over surface waters, including the San Antonio and Guadalupe rivers at issue in this case.

40. Texas agencies are creatures of statute. *Tex. Natural Res. Conservation Comm'n v. Lakeshore Util. Co., 164 S.W.3d 368, 377-78 (Tex. 2005)*.

41. TCEQ's primary organic statute is Chapter 5 of the Texas Water Code, which creates the agency and defines its duties, powers and areas of jurisdiction.

42. The general powers of the TCEQ are stated: "The commission has the powers to perform any acts whether specifically authorized by this code or other law or implied by this code or other law, necessary and convenient to the exercise of its jurisdiction and powers as provided by this code and other laws." *Tex. Water Code § 5.102(a)*.

43. The TCEQ defendants' general powers extend to "any acts" that may be "authorized" or "implied" by the Water Code or by "other laws" - including the ESA - while they perform their duties and exercise their jurisdiction. *Tex. Water Code § 5.102(a)*.

44. When the Texas Legislature confers agency power, it impliedly intends that the agency has whatever powers are reasonably necessary to fulfill its express functions [*194] or duties. *Tex. Natural Res. Conservation Comm'n v. Lakeshore Util. Co., 164 S.W.3d 368, 378 (Tex. 2005)*.

45. Texas "[s]tatutes are given a construction consistent with constitutional requirements, when possible, because the legislature is presumed to have intended compliance with state and federal constitutions." *Brady v. Fourteenth Court of Appeals, 795 S.W.2d 712, 715 (Tex. 1990)*; *Tex. Gov't Code § 311.021*.

46. Moreover, TCEQ "has general jurisdiction over... water and water rights including the issuance of water rights permits, water rights adjudication, cancellation of water rights, and enforcement of water rights." *Tex. Water Code § 5.013(a)(1)*.

47. This regulatory authority is subject to a specific statutory mandate: TCEQ "shall administer the law so as to promote the judicious use and maximum conservation and protection of the quality of the environment and the natural resources of the state." *Tex. Water Code § 5.120*.

48. These provisions of the Water Code establish TCEQ's "authorized" and "implied" powers to protect endangered species, at least to avoid violations of the ESA.

49. The power and duty of TCEQ officials to comply with federal laws such as the ESA also is explicitly [*195] recognized by their oath of office. See *Tex. Const. Article XVI, § 1(a)* (duty to preserve, protect, and defend the Constitution and laws of the United States); *Tex. Gov't Code § 601.005*.

50. State law also grants TCEQ authority to regulate broadly; it can "adopt any rules necessary to carry out its powers and duties under this code and other laws of this state." *Tex. Water Code § 5.103(a)*.

51. One such rule adopted by TCEQ relates to the South Texas Watermaster. Specifically, during times of water shortage, TCEQ grants the South Texas Watermaster broad authority to cancel or modify declarations of intent to divert or impound water, order pass-through and releases of impounded water, order diverters to limit or cease diversions, or take any other action "necessary to ensure that downstream senior water rights, demands for domestic and livestock purposes, minimum stream flow requirements, minimum release requirements, and other conditions, are administered in accordance with applicable laws." *30 Tex. Admin. Code § 304.21(c)*.

52. This rule does not limit what is meant by "other conditions," or by "applicable laws," and is consistent with the above-described statutory power for TCEQ to remedy [*196] a violation of the ESA, here a prohibited take of whooping cranes.

53. TCEQ's powers must be understood in light of foundational provisions of Texas Water law.

54. The surface water at issue "is the property of the state." *Tex. Water Code § 11.021(a)*.

55. "The waters of the state are held in trust for the public." *Tex. Water Code § 11.0235(a)*.

56. No person may divert, store or impound state-owned water without authorization, by permit, certificate of adjudication, or one of the limited statutory exemptions. *Tex. Water Code §§ 11.081; 11.121*.

57. No TCEQ defendant, nor any other defendant, holds or benefits from an ITP, and there is no other exemption that might authorize a taking of a Whooping Crane.

58. Section 9 prohibits indirect as well as deliberate "takes" of endangered species. *Sweet Home, 515 U.S. at 700*, see also *Strahan, 127 F.3d at 163*.

59. Ordinary requirements of proximate causation apply to ESA cases. *Sweet Home, 515 U.S. at 700, n.13* (O'Connor J., conc.); see also, e.g., *Loggerhead Turtle v. County Council of Volusia County, 148 F.3d 1231, at 1251 n.23 (11th Cir. 1998)* (citing *Cox v. Administrator United States Steel & Carnegie, 17 F.3d 1386, 1399 (11th Cir. 1994)*) ("proximate [*197] cause is not the same thing as a sole cause").

60. Proximate causation exists where a defendant government agency authorized the activity that caused the take. See, e.g., *Strahan v. Coxe, 939 F. Supp. at 979; Loggerhead Turtle v. County Council of Volusia County, 148 F.3d 1231, 1247-53 (11th Cir. 1998)*.

61. But-for the regulatory and permitting scheme overseen by the TCEQ defendants, no state-owned water could be legally diverted, impounded or consumed.

62. Insofar as TCEQ defendants dispute whether they can be held liable for a "take" of Whooping Cranes, and also dispute that they are liable for a "take" of Whooping Cranes, the parties' disputes concerning application of the ESA establishes the predicate for declaratory relief: "a substantial controversy, between parties having adverse legal interests, of sufficient immediacy and reality to warrant the issuance of a declaratory judgment." *Maryland Casualty Co., v. Pacific Coal & Oil Co., 312 U.S. 270, 273, 61 S. Ct. 510, 85 L. Ed. 826 (1941)*; accord, e.g., *Golden v. Zwickler, 394 U.S. 103, 108, 89 S. Ct. 956, 22 L. Ed. 2d 113 (1969)*.

63. Declaratory relief serves the purpose of clarifying the legal duties and obligations in a controversy. E.g., *Refinery Holding Co., L.P. v. TRMI Holdings, Inc., 302 F.3d 343, 349 n.4 (5th Cir. 2002)*; [*198] *Sherwin-Williams Co. v. Holmes County, 343 F.3d 383, 390 n.2 (5th Cir. 2003)*.

64. To the extent TCEQ defendants argue that they can continue to implement a regulatory scheme that violates the ESA, a declaration can help redress the injury. E.g., *Alaska Fish & Wildlife Fed'n & Outdoor Council v. Dunkle, 829 F.2d 933, 937 (9th Cir. 1987)*; see also, e.g., *Alden v. Maine, 527 U.S. 706, 747, 119 S. Ct. 2240, 144 L. Ed. 2d 636 (1999)* ("suits for declaratory or injunctive relief against state officers must therefore be permitted if the Constitution is to remain the supreme law of the land"); *Franklin v. Massachusetts, 505 U.S. 788, 801-03, 112 S. Ct. 2767, 120 L. Ed. 2d 636 (1992)* (discretionary relief appropriate even if not coercive, and any relevant change would require a "discretionary" government action).

65. Based on the Findings of Fact set forth above, the TCEQ defendants can be and are liable for a "take" of the whooping cranes under Section 9 of the Endangered Species Act. *16 U.S.C. §§1538(a)(1)(B), (C)*;

1538(g); see also *Sierra Club v. Yeutter*, 926 F.2d 429 (5th Cir.1991); *Strahan*, 127 F.3d 155 (1st Cir. 1997); *Animal Welfare Inst. v. Martin*, 623 F.3d 19 (1st Cir. 2010); *Defenders of Wildlife v. EPA*, 882 F.2d 1294 (8th Cir. 1988); *Loggerhead Turtle v. County Council of Volusia County*, 148 F.3d 1231 (11th Cir. 1998).

66. [*199] Based on the Findings of Fact, it is appropriate for the Court to Order the TCEQ defendants to seek a Habitat Conservation Plan that could lead to an Incidental Take Permit. 16 U.S.C. § 1539(a); *Strahan v. Coxe*, 127 F.3d at 158 (affirming the district court's order to Massachusetts officials to obtain an Incidental Take Permit); *Animal Prot.Inst. v. Holsten*, 541 F. Supp. 2d 1073, 1081-82 (D.C. Minn. 2008) (ordering defendant state agency to apply for an Incidental Take Permit); *Sweet Home*, 515 U.S. at 700-701 (this form of relief also is consistent with the Congressional purposes for Incidental Take Permits, as discussed by the Supreme Court).

67. There is no legal basis for defendants' and intervenors' additional challenges to this Court's authority to grant relief.

68. Because TAP seeks only prospective declaratory and injunctive relief, and not damages, the *Eleventh Amendment* presents no bar to suit. *Ex Parte Young*, 209 U.S. 123, 28 S. Ct. 441, 52 L. Ed. 714 (1908); *Strahan v. Coxe*, 127 F.3d at 166.

69. There is no legal basis for this Court's abstention under *Burford v. Sun Oil Co.*, 319 U.S. 315, 63 S. Ct. 1098, 87 L. Ed. 1424 (1943).

70. TAP's proposed relief does not "offend" any cooperative approach between the Federal and State government [*200] to endangered species protection, which concerns ESA Section 6 agreements, none of which have been made in this case. See 16 U.S.C. § 1535.

71. TCEQ is an agency receiving funds through Article VI (Natural Resources) of the 2012-2013 appropriations bill, and therefore may undertake the functions identified in *Texas Government Code Section 403.452(a)(1), (2), (3), (5), or (6)*. *Tex. Govt. Code §403.453(a)(5)*; GENERAL APPROPRIATIONS ACT FOR THE 2012-13 BIENNIUM, at VI-16, Acts 2011, 82nd Leg., 1st C.S. (HB1), available at http://www.lbb.state.tx.us/Bill_82/GAA.pdf.

72. Pursuant to state law, TCEQ has the power to develop or coordinate the development of a Habitat Conservation Plan. *Tex. Govt. Code § 403.452(a)(1)*.

73. State law authorizes TCEQ specific powers "[t]o promote compliance with federal law protecting endangered species." *Tex. Govt. Code § 403.452(a)*.

74. Pursuant to state law, TCEQ has the power to apply for and hold a federal permit issued in connection with a Habitat Conservation Plan. *Tex. Govt. Code § 403.452(a)(2)*.

75. Pursuant to state law, the TCEQ has the power to impose or provide for the imposition of a mitigation fee in connection with a Habitat Conservation Plan. *Tex. Govt. Code § 403.452(a)(5)*.

76. [*201] Pursuant to state law, the TCEQ has the power to implement, monitor, or support the implementation of a Habitat Conservation Plan. *Tex. Govt. Code § 403.452(a)(6)*.

77. The TCEQ has "the powers to perform any acts whether specifically authorized by this code or other law or implied by this code or other law, necessary and convenient to the exercise of its jurisdiction and powers as provided by this code and other laws." *Texas Water Code § 5.102(a)*.

78. Pursuant to statute, the TCEQ "has general jurisdiction over... water and water rights including the issuance of water rights permits, water rights adjudication, cancellation of water rights, and enforcement of water rights." *Tex. Water Code § 5.013(a)(1)*.

79. The TCEQ "shall administer the law so as to promote the judicious use and maximum conservation and protection of the quality of the environment and the natural resources of the state." *Tex. Water Code § 5.120*.

80. There is extensive statutory authority for the TCEQ defendants' authority to regulate the surface waters of the State of Texas. See *Tex. Water Code §§ 5.102; 5.120; 11.021;11.022; 11.081; 11.121-124, 11.142; 11.143; 11.171-186*.

81. In Texas, surface water rights are usufructuary, [*202] giving an owner only a right of use, not complete ownership. *Edwards Aquifer Auth. v. Day*, 369 S.W.3d 814 (Tex. 2012). 2012).

82. Critical habitat is defined by the ESA as the specific areas within the geographical area occupied by the species, at the time it is listed, on which are found those physical or biological features that (1) are essential to the conservation of the species, and, (2) may require special management considerations or protections. It includes also specific areas outside the geographical area occupied by the species at the time it is listed, if the Secretary determines that such areas are essential for the conservation of the species. 16U.S.C. § 1532(5)(A)(i)-(ii).

83. Plaintiff is the prevailing party in this matter, and is entitled to an award of its reasonable attorney's fees and costs, as well as expert witness fees, incurred in this action. See 16 U.S.C. § 1540(g)(4).

84. Courts have awarded reasonable attorneys fees in ESA cases. See, e.g., *Center for Biological Diversity v. Marina Point Development Associates*, 446 F. App'x 843, 845-46(9th Cir. 2011); *Florida Key Deer v. Board of County Com'rs for Monroe County*, 772 F. Supp. 601, 603-04 (S.D. Fla. 1991).

VI. DECLARATORY [*203] RELIEF, ITP, AND HCP ORDERED.

The Court finds that this case is well-suited for an ITP and corresponding HCP. The preparation of an HCP would require the TCEQ defendants to address freshwater flows, and reduce and mitigate adverse impacts of water diversions and related practices on the AWB crane population. (Sansom, Day 5, Tr. 44-45; Frederick, Day 5, Tr 90-91). The HCP would identify how the TCEQ defendants would achieve goals related to inflows and protection of the AWB cranes. (Frederick, Day 5, Tr 93). The HCP process allows flexibility by protecting economic interests of stakeholders while also protecting the endangered species. Id. Tr 81. The USFWS guides the applicant through the process. Id. The HCP process is flexible. Id. Tr 86.

The Court holds that, based on the above Findings, the TCEQ defendants are liable for a "take" of the AWB cranes under Section 9 of the Endangered Species Act. *16 U.S.C. §§ 1538(a)(1)(B), (C); 1538(g)*; see also *Sierra Club v. Yeutter*, 926 F.2d 429 (5th Cir. 1991); *Strahan*, 127 F.3d 155 (1st Cir. 1997); *Animal Welfare Inst. v. Martin*, 623 F.3d 19 (1st Cir. 2010); *Defenders of Wildlife v. EPA*, 882 F.2d 1294 (8th Cir. 1988); *Loggerhead Turtle*, 148 F.3d 1231 (11th Cir. 1998). [*204] Thus, it is appropriate for the Court to Order the TCEQ defendants to seek an Incidental Take Permit pursuant to section 10(a) of the ESA, as well as a corresponding Habitat Conservation Plan. *16 U.S.C. § 1539(a)*; *Strahan*, 127 F.3d at 158 (affirming the district court's order to Massachusetts officials to obtain an Incidental Take Permit); *Animal Prot. Inst. v. Holsten*, 541 F. Supp. 2d 1073, 1081-82 (D.C. Minn. 2008) (ordering defendant state agency to apply for an Incidental Take Permit); see also *Sweet Home*, 515 U.S. at 700-701 (this form of relief also is consistent with the Congressional purposes for Incidental Take Permits, as discussed by the Supreme Court). This ordered relief does not interfere with any cooperative approach between the Federal and State governments to protect endangered species, (section 6 ESA agreements), and none of have been made in this case. See *16 U.S.C. § 1535*.

Thus, it is therefore **DECLARED** that:

(1) The TCEQ, its Chairman, and its Executive Director have violated section 9 of the ESA, and continue to do so through their water management practices which

include the decision to not monitor D&L users or to exercise emergency powers available to protect the [*205] endangered whooping cranes; and

(2) Texas water diversion regulations promulgated by the TCEQ, its Chairman, its Executive Director, and the Texas legislature are preempted by federal law when they purport to authorize water diversions that result in a taking of whooping cranes.

Therefore, it is **ORDERED** that:

(1) The TCEQ, its Chairman, and its Executive Director are enjoined from approving or granting new water permits affecting the Guadalupe or San Antonio Rivers until the State of Texas provides reasonable assurances to the Court that such permits will not take Whooping Cranes in violation of the ESA.

(2) Within thirty (30) days of the date of entry of this Order, the TCEQ, its Chairman, and its Executive Director shall seek an Incidental Take Permit that will lead to development of a Habitat Conservation Plan. See *16 U.S.C. § 1539(a)*; *50 C.F.R. § 17.22(b)* (listing requirements for an Incidental Take Permit).

The Court will retain jurisdiction over this action during the formulation of the HCP process.

The Court finds that Plaintiff TAP is the prevailing party in this matter, and is entitled to an award of its reasonable attorney's fees and costs, as well as expert witness fees, incurred [*206] in this action. See *16 U.S.C. § 1540(g)(4)*.

SIGNED and ORDERED this 11th day of March, 2013.

/s/ Janis Graham Jack

Janis Graham Jack

Senior United States District Judge

Tab W – 2013 WSWC/NARF Indian Water
Rights Settlement Symposium
Agenda

**SYMPOSIUM
ON THE
SETTLEMENT OF INDIAN RESERVED WATER RIGHTS CLAIMS**

AGENDA (Draft)

MONDAY, AUGUST 12, 2013

6:30 - 8:30 pm Early Registration

TUESDAY, AUGUST 13, 2013

7:00 am Registration

8:30 am **WELCOME**

Introductory Remarks

John Echohawk, Executive Director, Native American Rights Fund

Tony Willardson, Executive Director, Western States Water Council

Invocation – by invitation

9:00 am **OPENING KEYNOTE ADDRESS:** TBD

10:00 am Break

NEGOTIATION OF INDIAN WATER RIGHTS CLAIMS: THE BASICS

10:30 am **Gathering Background Information and the Role of Technicians in Negotiations**

Moderator: TBD

Tribe: Oliver Page, Stetson Engineers

State: TBD

Fed: TBD

Local: Cynthia Chandley, Partner, Snell & Wilmer

Noon **Luncheon Presentation – Indian Water Rights Settlement Database:** Barbara Cosens, Professor, University of Idaho College of Law

1:30 pm **Identifying Parties and Issues and How Negotiations Bind Larger Groups**

Moderator: TBD

Tribe: Nelson Cordova, Water Rights Coordinator, Taos Pueblo

State: TBD

Fed: TBD

Local: Maria O'Brien, Shareholder, Modrall Sperling

3:00 pm Break

A RETROSPECTIVE DISCUSSION ON SETTLEMENTS

3:30 pm **Panel Discussion**

Moderator: Susan Cottingham, Former Director, Montana Reserved Compact Commission

Tribe: Bidtah Becker, Assistant Attorney General, Navajo Nation Department of Justice

State: Chris Tweeten, Chairman, Montana Reserved Water Rights Compact Commission

Fed: TBD

Local: TBD

5:00 pm Adjourn

6:00 pm Reception

WEDNESDAY, AUGUST 14, 2013

8:30 am **KEYNOTE ADDRESS:** Estevan López, Director, New Mexico Interstate Stream Commission

THE ADMINISTRATION'S SETTLEMENT POLICY

9:15 am **Presentation:**
Anne Castle, Assistant Secretary for Water and Science, U.S. Department of the Interior
Kevin Washburn, Assistant Secretary for Indian Affairs, U.S. Department of the Interior

10:45 am Break

11:00 am **Response Panel**

Moderator: TDB
Tribe: TBD
State: Phil Ward, Director, Oregon Water Resources Department

Noon Lunch Break

1:00 pm **DESCRIPTION OF THE AAMODT WATER RIGHTS SETTLEMENT**

Moderator: TBD

Tribe: Charles Dorame, Chairman, Northern Pueblos Tributary Water Rights Association
State: Arianne Singer, Managing Attorney, Northern New Mexico Bureau, New Mexico State Engineer's Office
Fed: TBD

2:30 pm **Field Trip**

6:00 pm **Dinner and Cultural Presentation**

THURSDAY, AUGUST 15, 2013

SETTLEMENT LEGISLATION: GETTING BILLS THROUGH CONGRESS

8:30 am **Congressional Outlook for Funding for Indian Water Rights Settlements**

Moderator: TBD –

Panel:
TBD

10:15 am Break

10:30 am **Response Panel**

Tribe: TBD
State: TBD
Fed: TBD
Local: Christine Arbogast

Moderator: TBD

11:45 am **WRAP-UP/SUMMARY:** Stanley Pollack, Water Rights Counsel, Navajo Nation

12:15 pm Adjourn

Western States Water Council & Native American Rights Fund

SYMPOSIUM ON THE SETTLEMENT OF INDIAN RESERVED WATER RIGHTS CLAIMS

August 13-15, 2013
Hilton Santa Fe at Buffalo Thunder
Santa Fe, New Mexico

The Western States Water Council and Native American Rights Fund will cosponsor a Symposium on the settlement of Indian reserved water rights claims on August 13-15, 2013. The meetings will be held at the Hilton Santa Fe at Buffalo Thunder which is located about 20 minutes from Santa Fe in the Pojoaque Valley. A number of topics will be addressed by experts and participants regarding completed and ongoing negotiated settlements.

We expect another excellent conference. Successful symposia have been held since 1991. The primary meeting format consists of panel discussions with presenters who have been involved in negotiated settlements representing tribal, state, local, and federal governments, interest groups, congressional staff, and others. The meeting schedule provides opportunities for informal interchange and cultural enlightenment. Participant feedback from the meetings has been very positive. Continuing Legal Education Credit will be available for lawyers who attend.

For more information as it becomes available, see our websites at:
<http://www.westernstateswater.org> and <http://narf.org/water/>.

Sponsors are welcome and encouraged to contact Tony Willardson, WSWC Executive Director.



Western States Water Council

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Murray, UT 84107

Phone (801) 685-2555
www.westernstateswater.org

Tab XYZ – Sunsetting Positions for Fall
2013 Meeting (#325 - #327) and
Newsletter Index

**POSITION
of the
WESTERN STATES WATER COUNCIL
regarding
NASA'S APPLIED SCIENCE RESEARCH PROGRAM
San Diego, California
October 29, 2010**

WHEREAS, the Western States Water Council is a policy advisory body representing eighteen states, and has long been involved in western water conservation, development, protection, and management issues, and the member states and political subdivisions have long been partners in cooperative federal water and climate data collection and analysis programs; and

WHEREAS, in the West, water is a critical, vital resource (much of which originates from mountain snows) and sound decision making demands accurate and timely mapping of, and data on, altimetry, precipitation, temperature, snow water content, groundwater, land use and land cover, water use, water quality parameters, and similar information; and

WHEREAS, the demands for water and related climate data continue to increase along with the West's population, and this information is used by federal, state, tribal, and local government agencies, as well as private entities and individuals to: (1) forecast flood and drought occurrence; (2) project future water supplies for agricultural, municipal, and industrial uses; (3) estimate streamflows for hydropower production, recreation, and environmental purposes; (4) facilitate water management and administration of water rights, decrees, interstate compacts, and international water treaties; (5) assist in disaster response; (6) assess impacts of climate variability and change; and

WHEREAS, thermal infrared imaging data available from Landsat 5, Landsat 7 and as part of the Landsat Data Continuity Mission (LDCM) is used to measure and monitor agricultural and other outdoor water uses and needs, is increasingly important for present and future management of our scarce water resources, and is an example of the application of basic science pioneered by the National Aeronautics and Space Administration (NASA); and

WHEREAS, airborne and spaceborne remote sensing research missions have a potential to provide other information on varied temporal and spatial scales that could with sustained engagement ultimately be useful for water resources planning, management and decision-making; and

WHEREAS, NASA identifies "water and energy cycle" and "water resources" as topics to support in the agency's research and applications programs respectively; and.

WHEREAS, NASA's ARRA demonstration project on California applications for use of remote sensing information has illustrated that potential exists for repurposing data collected from certain present NASA missions for water management applications, and that additional potential exists for research applications with sensors planned in future Decadal Survey missions; and

WHEREAS, the successful transfer of technology from the research domain to the applications domain is dependent, in part, on on-going communication between researchers and those responsible for resource management and policy decisions and a long term commitment to maintain such communication;

NOW THEREFORE BE IT RESOLVED, that the Western States Water Council urges the Administration and NASA to enhance the agency's focus areas on research for water resources applications, and to promote long term engagement with the council and the state and regional agencies in the western US responsible for water management and water policy to maximize benefits to the public from NASA's existing and future investments in Earth observations, Earth system models and systems engineering.



WESTERN STATES WATER COUNCIL

5296 Commerce Drive, Suite 202 | Murray, Utah 84107 | (801) 685-2555 | FAX (801) 685-2559

Web Page: www.westgov.org/lwswc

Position #326

October 29, 2010

The Honorable Jeff Bingaman, Chairman
Energy and Natural Resources Committee
United States Senate
304 Dirksen Senate Building
Washington, DC 20510

via fax: (202) 224-6163

Dear Chairman Bingaman:

The Western States Water Council actively supported enactment of the SECURE Water Act, which deals with a number of long standing concerns among western states as expressed in the June 2006 Western Governors' Association water report, "Water Needs and Strategies for a Sustainable Future," and subsequent 2008 "Next Steps" Report. We appreciate your continuing leadership in addressing the serious water-related challenges facing the West and the Nation.

We especially appreciate the explicit recognition that "...States bear the primary responsibility and authority for managing the water resources of the United States" and that "the Federal Government should support the States, as well as regional, local and tribal governments...." We also appreciate the other provisions in the bill requiring federal agencies to "consult and coordinate with the applicable State water resource agency with jurisdiction," as well as comply with applicable State water laws and interstate compacts.

Western water law and policy are based on the reality of scarcity and the need to use water wisely. States continue to seek to increase efficiency and reduce water use, while at the same time effectuating sound infrastructure improvements and additions, particularly new water storage opportunities. We cannot ignore supply-side solutions to water shortages. The Council recognizes the difficult challenges facing the Nation related to our current economic woes and the federal budget deficit. However, we are concerned with the lack of investment in our Nation's water resources infrastructure.

Without the Bureau of Reclamation and federal investment in past water projects, the West would not be what it is today. Continuing investments and sacrifices will be needed to maintain our quality of life and protect our environment. Difficult choices have to be made at both the federal and state agency levels. As we plan for the future, states are well aware of the importance of maintaining our existing water-related infrastructure and prioritizing future capital investments. States are in the best position to identify, evaluate and prioritize their needs. State water plans should help form the basis for federal decisions, and the federal government should support States by providing technical and appropriate financial assistance.

We are also concerned that the lack of basic data and information on surface and ground water supplies, and present and projected water demands and consumptive uses, threatens both public and private planning and decisionmaking at all levels. Real-time water resources data are critical for timely actions in response to droughts, flooding and other extreme weather events, as well as climate adaptation. Moreover, our present day-to-day planning and management decisions depend on this information. We need better information now, as well as improved projections of future supplies and demands. The SECURE Water Act recognized and attempted to address many of these needs.

Specifically, we supported the enhanced spending authority for USGS streamgaging activities, a ground water monitoring system, brackish water study, new methods to estimate and measure water use, a national water use and availability assessment, establishment of an intra-governmental panel on climate change and water resources, a Reclamation Climate Change Adaptation Program, hydroelectric power assessment and effects of climate change, and financial assistance to non-federal entities for water-use efficiency improvements.

We strongly supported the USGS Water Use and Availability Assessment Program, which would provide grants to assist State water resource agencies. We are working with an Ad Hoc USGS group to implement this program, which includes gathering data and information on environmental water uses, including instream uses and outflows for bays and estuaries, as well as traditional consumptive water uses.

Unfortunately, many of the programs and activities authorized in the SECURE Water Act have largely gone unfunded or are underfunded. It is our understanding that amounts authorized for expenditure under the bill are in addition to assistance authorized and provided pursuant to other provisions of federal law. In general, we are concerned that the amounts authorized and subsequent appropriations must be sufficient to reasonably support the authorized activities.

Without timely and accurate water resources information, human life, health, welfare, property, and environmental and natural resources are at considerably greater risk of loss. The USGS has been a leader in developing and realizing the potential of state-of-the-art technology to provide real or near real-time data with the promise of vastly improving the quantity and quality of water-related information available to decisionmakers in natural resources and emergency management, with the States as essential partners.

We must work together as partners, and we very much appreciate Interior's support for the Western Federal Agency Support Team (WestFAST), which is working in concert with other Cabinet Departments, the Council and Western Governors' Association (WGA) to implement many of the recommendations in the WGA Water Reports. Increasing demands related to our growing population in the West, environmental protection imperatives, as well as uncertainty related to climate and unquantified Indian water right claims (and unfunded tribal settlements), make present and future western water resources planning and management particularly challenging. Other areas of the Nation are facing similar challenges. WestFAST is a model for state and federal cooperation and collaboration.

The Reclamation Act of 1902, recognizing the vital need to invest in Western water resources, created the Reclamation Fund as a means to finance such investments. The unobligated balance at the end of FY2011 is projected to be about \$9.35 billion (but spending from this special Treasury account is well below receipts and subject to appropriations and pay-go-rules). Receipts are more than sufficient to fund all current Reclamation expenditures and more. In essence, the unobligated balance grows as fund receipts are used to finance other government purposes.

There is a continuing need to highlight the importance of water to our Nation's economic vitality and environmental health, and we continue to urge the Congress to increase spending from the Reclamation Fund for authorized purposes. We recognize and appreciate your leadership in enacting separate legislation that authorizes future transfers from the Reclamation Fund for construction of projects related to Indian water rights settlements, which has been a longstanding goal of the Council.

The Council has been a proponent of watershed and basin-wide coordination and a commitment to involving all governmental entities and stakeholders with an interest in finding solutions to present and future water management challenges. The Council supports technical and financial assistance to states and local watershed groups and water districts as an appropriate federal role, authorized Reclamation program, and suitable Reclamation Fund expenditure.

We are encouraged by the requests for Interior's WaterSMART Program, and recognize the importance of the proposal in an increasingly tight federal budget. The program includes studies intended to identify basin-wide water supply issues, and in partnership with basin States, Tribes and stakeholders define options for meeting future water demands and related challenges. Three of the proposed basin studies involve several Council-member states, and we appreciate Reclamation's invitation to collaborate.

The WaterSMART program is in part designed to make water available through conservation for other uses. It is important to note that the allocation of water is primarily a state prerogative, and water transfers are subject to state water law and policy. The use of any WaterSMART program water savings will be subject to state law.

We would hope in the future to continue to work with you, your Committee, staff and the Congress to improve western water management under the new authorities provided by the SECURE Water Act.

Sincerely,



Weir Labatt, Chairman
Western States Water Council

RESOLUTION
of the
WESTERN STATES WATER COUNCIL
URGING CONGRESS TO REAFFIRM ITS DEFERENCE TO STATE WATER LAW,
PROVIDE FOR THE WAIVER OF THE UNITED STATES' IMMUNITY TO
PARTICIPATION IN STATE ADMINISTRATIVE AND JUDICIAL PROCEEDINGS,
AND PROVIDE FOR PAYMENT OF FEES REQUIRED BY STATE LAW

WHEREAS, water is the lifeblood of each of the arid Western States, the allocation of which determines the future of each Western State's economic, environmental, social and cultural fortunes; and

WHEREAS, each Western State has developed comprehensive systems for the appropriation, use and distribution of water tailored to its unique physiographic, hydrologic and climatic conditions found within that state;

WHEREAS, the United States does not have a water management system that is equivalent to those of the Western States for the appropriation, use or distribution of water; and

WHEREAS, Congress has consistently recognized the primacy of state water law because of the need for comprehensive water management systems tailored to the unique needs and characteristics of the individual states; and

WHEREAS, Congress enacted the McCarran Amendment, 43 U.S.C. § 666, to allow the joinder of the United States in state general stream adjudications, and Congress intended the United States to be subject to the same procedures as all other water right claimants joined in state general stream adjudications; and

WHEREAS, many of the Western States are conducting general stream adjudications for the purpose of quantifying all water right claims in accordance with the McCarran Amendment; and

WHEREAS, the United States is often the largest claimant of water rights in these general stream adjudications, and the adjudication of federal water right claims requires a large commitment of time, effort and resources by the state courts and by state agencies; and

WHEREAS, the adjudication of water rights claims is absolutely essential for the orderly allocation of water in all the Western States where state law is based on the prior appropriation doctrine; and

WHEREAS, many of the Western States' general stream adjudication procedures require claimants to pay a fee to offset the states' expenses arising from state general stream adjudications; and

WHEREAS, citing to *United States v. Idaho* the United States claims immunity from the payment of adjudication filing fees required of all other claimants to offset the state's judicial and administrative expenses in conducting general stream adjudications; and

WHEREAS, for the United States to be immune from sharing in the expenses of these proceedings constitutes an unfunded federal mandate to the states; and

WHEREAS, that drawn out adjudications are having a detrimental impact on the willingness of stakeholders in watersheds to collaborate on joint management and planning for water supply and water quality.

WHEREAS, the United States contends that it cannot be joined in state administrative or judicial proceedings with respect to water rights it has acquired under state law other than pursuant to the McCarran Amendment, 43 U.S.C. § 666; and

WHEREAS, it is inefficient and wasteful to require that a separate lawsuit be commenced for the sole purpose of regulating water rights acquired by the United States under state law; and

WHEREAS, the United States claims it is also immune from paying fees to states that are required of all other water users for the appropriation, use or distribution of water; and

WHEREAS, equity and fairness dictate that federal agencies who voluntarily seek to appropriate water pursuant to state law, or who acquire water rights based on state law, should be required to comply with state law, including the payment of fees, to the same extent as all other persons.

NOW, THEREFORE, BE IT RESOLVED that the Western States Water Council supports passage of legislation that at a minimum provides for the following:

1. Requires the federal government to participate in all state administrative and judicial proceedings with respect to water rights it acquires to the same extent as all other persons.
2. Requires the federal government (not Native American tribes) to pay filing fees as well as comply with all other state substantive and procedural water right adjudication laws to the same extent as all other persons.
3. Requires the federal government to pay applicable fees as well as comply with all other state substantive and procedural laws for the appropriation, use and distribution of water rights to the same extent as all other persons.
4. Provides for state administration of all water rights.

Position No. 327
Revised and Readopted
*(Originally adopted Nov. 17, 1995, readopted Nov. 20, 1998 and
revised and readopted Nov. 16, 2001, Oct. 29, 2004, Nov. 16, 2007, and Oct. 29, 2010)*

BE IT FURTHER RESOLVED that the Western States Water Council also urges Congress to appropriate moneys for payment of unpaid fees to states that have incurred expenses as a result of processing federal claims or federal objections to private claims in state general stream adjudications.

BE IT FURTHER RESOLVED that the Western States Water Council shall send a copy of this resolution to the congressional delegations representing the states and territories who are members of the Western States Water Council, to President Barack Obama, and to the President Pro-Tem of the United States Senate and the Speaker of the United States House of Representatives.

WESTERN STATES WATER NEWSLETTER INDEX

January 4, 2013 - May 23, 2013

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Landsat - continued	02-15	2022
	02-22	2023
National Aeronautics and Space Administration (NASA)	02-08	2021
National Oceanic and Atmospheric Administration (NOAA)	01-04	2016
	01-18	2018
	03-29	2028
New Mexico	01-18	2018
National Integrated Drought Information System (NIDIS)	02-22	2023
	03-01	2024
Ogallala Aquifer	05-23	2036
Principles and Guidelines	03-22	2027
Quantity - Quality Nexus	03-08	2025
Regional Integrated Science and Assessment (RISA)	01-18	2018
Rural Water Projects	04-19	2031

	Sequester	03-15	2026
	Streamgages	02-22	2023
	U.S. Army Corps of Engineers	03-29	2028
	U.S. Geological Survey (USGS)	01-04	2016
		02-15	2022
		02-22	2023
		05-23	2036
	Water Efficiency	01-04	2016
	Water Resources Council	03-22	2027
	Water Resources Development Act (WRDA)	02-15	2022
		03-29	2028
		05-17	2035
	Water Supply Outlook	02-01	2020
WATER RIGHTS	Aamodt Settlement	03-15	2026
	Blackfeet Tribe	05-10	2034
	Montana	05-10	2034
	New Mexico	03-15	2026
WESTERN GOVERNORS	Army Corps of Engineers	05-10	2034
	Drought	01-04	2016
		03-29	2028
	Hydropower	04-26	2032
	National Oceanic and Atmospheric Administration (NOAA)	01-04	2016
		03-29	2028
	Renewable Energy	03-29	2028
	State of the State Addresses	02-08	2021
	Utah	01-11	2018
	Water Resources Development Act (WRDA)	05-10	2034
	WGA 10-Year Energy Plan	01-18	2018
WESTERN STATES WATER COUNCIL	2013 Washington, DC Visits	03-08	2025
	Drought	05-03	2033
	Rural Water Projects	05-03	2033
	Spring Meetings - Denver, Colorado	04-08	2029
	Streamgages	02-15	2022
	U.S. Geological Survey (USGS)	02-15	2022

PEOPLE

Maia Bellon	03-01	2024
Chris Brown	01-25	2019
John Corra	01-25	2019
Dean Couch	03-15	2026
Garland Erbele	05-03	2033
Kevin Frederick	04-12	2030
David Hayes	05-03	2033
Harry LaBonde	01-25	2019
Sue Lowry	01-25	2019
Shaun McGrath	05-03	2033
Chris McKinnon	03-22	2027
Barbara Munson	03-01	2024
Todd Parfitt	01-25	2019
Holly Propst	03-22	2027
Mike Purcell	01-25	2019
Joe Rassenfoss	03-22	2027
Harris Sherman	05-03	2033
Ted Sturdevant	03-01	2024
Pat Tyrrell	01-25	2019
John Wagner	01-24 04-12	2019 2030
Kent Woodmansey	05-03	2033