

Water Laws and Policies for a Sustainable Future: A Western States' Perspective



A Report Prepared by the Staff of the Western States Water Council

Craig Bell, Executive Director
Jeff Taylor, Legal Counsel

June, 2008

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List of Commonly Used Abbreviations

ADNR = Alaska Department of Natural Resources

ADWR = Arizona Department of Water Resources

AMA = Active Management Area

AMS = American Meteorological Society

AWBA = Arizona Water Banking Authority

BiOp = Biological Opinion

BLM = Bureau of Land Management

BMP = Best Management Practice

BOD = Biochemical Oxygen Demand

BOR = Bureau of Reclamation

CAP = Central Arizona Project

CBO = Congressional Budget Office

CCC = California Coastal Commission

CEQA = California Environmental Quality Act

CWA = Clean Water Act

CWCB = Colorado Water Conservation Board

DNRC = Montana Department of Natural Resources and Conservation

DOH = Department of Health

DOI = Department of the Interior

DWR = California Department of Water Resources

EA = Environmental Assessment

EIR = Environmental Impact Report

EIS = Environmental Impact Statement

EPA = Environmental Protection Agency

EPOC = Emerging Pollutant of Concern

ESA = Endangered Species Act

FWS = United States Fish and Wildlife Service

GMA = Growth Management Act

IDWR = Idaho Department of Water Resources

IID = Imperials Irrigation District

IWRB = Idaho Water Resources Board

IWSB = Idaho Water Supply Bank

NAIWMC = North American Interstate Weather Modification Council

NAS = National Academy of Sciences

NCSE = National Council for Science and the Environment

NEPA = National Environmental Policy Act

NMFS = National Marine Fisheries Service

NOAA = National Oceanic and Atmospheric Administration

NPDES = National Pollutant Discharge Elimination System

NPS = National Park Service

NRC = National Research Council

OMB = Office of Management and Budget

OTA = Congressional Office of Technology Assessment

OWRD = Oregon Water Resources Department

OWT = Oregon Water Trust

PDR = Purchase of Development Rights

PVID = Palo Verde Irrigation District

RICD = Recreational In-Channel Diversion

RPA = Reasonable and Prudent Alternative

SDWA = Safe Drinking Water Act

SRF = State Revolving Fund

SNWA = Southern Nevada Water Authority

SWRCB = State Water Resources Control Board

TCEQ = Texas Commission on Environmental Quality

TDR = Transfer of Development Rights

TDS = Total Dissolved Solids

TSS = Total Suspended Solids

TWB = Texas Water Bank

TWDB = Texas Water Development Board

UGA = Urban Growth Area

UGB = Urban Growth Boundary

USFS = United States Forest Service

UWMP = Urban Water Management Plan

WPA = Watershed Planning Act

WRIA = Water Resource Inventory Areas

WGA = Western Governors' Association

WSWC = Western States Water Council

WWT = Washington Water Trust

Table of Contents

Executive Summary	i
 Chapter 1. Water Policy and Growth	 1
<u>Chapter 1, Section 1. Growth Management and Water in the West</u>	<u>2</u>
1.1.A. Introduction	2
1.1.B. State Growth Initiatives and their Relation to Water	3
1.1.B.(i) Land Use Planning Requirements	4
1.1.B.(i)(a) Local Planning	4
1.1.B.(i)(b) Regional Planning	6
1.1.B.(i)(c) Statewide Planning	7
1.1.B.(i)(d) Effectiveness of Land Use Planning to Integrate Water and Growth	9
1.1.B.(ii) Other Land Use Tools	10
1.1.B.(ii)(a) Urban Growth Boundaries	10
1.1.B.(ii)(b) Growth Moratoria	11
1.1.B.(ii)(c) Subdivision and Commercial-Building Requirements	12
1.1.B.(ii)(d) Environmental Impact Reviews for New Development	15
1.1.B.(ii)(e) Impact Fees	17
1.1.B.(ii)(f) Conservation Easements	18
1.1.B.(ii)(g) Purchase and Transfer of Development Rights	20
1.1.B.(iii) Water Planning Requirements	21
1.1.B.(iii)(a) Water Plans	22
1.1.B.(iii)(b) Watershed Planning	23
1.1.C. Options to Improve Integration of Water Management and Land Use Planning	25
1.1.C.(i) Comprehensive Watershed Planning and Management	26
1.1.C.(ii) Integrated Planning Systems	28
1.1.C.(ii)(a) Greater Coordination between Land Use Planning Agencies and Water Resources Agencies	28
1.1.C.(ii)(b) Coordination between Federal, State, and Local Governments ..	29
1.1.C.(ii)(c) Coordination between Local Governments through Regional Planning	30
1.1.C.(iii) Requiring Local Comprehensive Plans that Include a Water Resources Element	30
1.1.C.(iv) Consistency and Implementation of Water and Land Use Plans	32
1.1.C.(iv)(a) Requiring Consistency among Land Use Plans and Water Plans	32
1.1.C.(iv)(b) Requiring Consistency between Comprehensive Plans and Ordinances and Development	33
1.1.C.(iv)(c) Requiring the Consideration of Local and Regional Comprehensive Plans when Making Water Allocation Decisions	34
1.1.C.(v) Permit Requirements for New Development	35

1.1.C.(v)(a) Environmental Review	35
1.1.C.(v)(b) Water Availability Review	36
1.1.C.(v)(c) Conditions for Permits	36
1.1.C.(v)(c)(1) Best Management Practices.....	37
1.1.C.(v)(c)(2) Mitigation measures	38
1.1.C.(v)(c)(3) Impact fees.....	38
1.1.C.(vi) Clarify Utilities’ Duty to Serve	38
1.1.D. Conclusion	39

<u>Chapter 1, Section 2.</u> Growth Management Plans as Part of the Public Interest Review for Water Right and Transfer Applications	40
1.2.A. Introduction*	40
1.2.B. Statutory Requirements for Considering Local Growth Management Plans in Reviewing Water Rights Applications.....	41
1.2.C. Considering Local Growth Management Plans as part of the Public Interest Review	46
1.2.C.(i) Incorporating Local Growth Management Planning into the Public Interest Review	47
1.2.C.(ii) States with undefined Public Interest Standards – Agency and Judicial Interpretations	51
1.2.C.(ii)(a) Maximum-Benefits	51
1.2.C.(ii)(a)(1) Maximum-Benefit’s Problem with the Non-Delegation Doctrine.....	52
1.2.C.(ii)(a)(2) Would the Maximum-Benefits Model Consider Local Growth Management Plans as Part of the Public Interest Calculus?.....	53
1.2.C.(ii)(b) Other-Laws Model.....	54
1.2.D. Options for considering Growth Management Plans.....	57
1.2.E. Conclusion.....	60

<u>Chapter 1, Section 3.</u> Domestic Well Exemptions and their Impact on Growth Management.....	61
1.3.A. Introduction.....	61
1.3.B. Domestic Wells in the West.....	61
1.3.C. Conclusion.....	65

Chapter 2. Legal and Institutional Context for Augmenting Existing Water Supplies	66
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<u>Chapter 2, Section 1.</u> Prior Appropriation in the West.....	67
2.1.A. Introduction.....	67
2.1.B. Intent to Apply Water to Beneficial Use.....	67
2.1.C. Actual Diversion	69
2.1.D. Actual Beneficial Use	70
2.1.E. “First in Time, First in Right”	70
2.1.F. Nature and Scope of Right.....	70

2.1.G. Conclusion	71
<u>Chapter 2, Section 2. Demand Management</u>	<u>72</u>
2.2.A. Introduction.....	72
2.2.B. State Statutes Mandating Water Demand Management.....	72
2.2.B.(i) Arizona	72
2.2.B.(ii) California.....	73
2.2.B.(iii) Washington.....	73
2.2.C. Components of Water Demand Management	73
2.2.C.(i) Conservation.....	73
2.2.C.(ii) Public Education.....	74
2.2.C.(iii) Water Recycling.....	74
2.2.C.(iv) Efficient Water Allocation	74
2.2.C.(v) Water Pricing.....	75
2.2.C.(v)(a) Agricultural Water Pricing.....	77
2.2.C.(vi) Privatization.....	78
2.2.D. Conclusion	78
<u>Chapter 2, Section 3. Water Storage.....</u>	<u>79</u>
2.3.A. Introduction.....	79
2.3.B. Barriers to Surface Water Storage.....	80
2.3.B.(i) The Clean Water Act	80
2.3.B.(ii) The Endangered Species Act.....	81
2.3.B.(iii) The Wild and Scenic Rivers Act.....	82
2.3.B.(iv) General Environmental Protection Statutes.....	83
2.3.C. Groundwater Storage and Conjunctive Use	83
2.3.D. Groundwater Recharge	84
2.3.D.(i) The Clean Water Act.....	85
2.3.D.(ii) The Endangered Species Act	85
2.3.D.(iii) The National Environmental Policy Act.....	85
2.3.D.(iv) The Safe Drinking Water Act.....	85
2.3.D.(v) State Water Laws.....	86
2.3.E. Conclusion.....	86
<u>Chapter 2, Section 4. Water Conservation.....</u>	<u>87</u>
2.4.A. Introduction.....	87
2.4.B. The Legislative Approach to Encouraging Water Conservation	88
2.4.B.(i) Agricultural Conservation Incentives.....	88
2.4.B.(i)(a) California	88
2.4.B.(i)(b) Washington	89
2.4.B.(i)(c) Montana	89
2.4.B.(i)(d) Oregon	90
2.4.B.(ii) Municipal Water Conservation Incentives	91
2.4.B.(ii)(a) Washington	91
2.4.B.(ii)(b) California	92
2.4.B.(ii)(c) Arizona.....	92

2.4.B.(ii)(d) Nevada	93
2.4.B.(ii)(e) Utah.....	93
2.4.C. Water Banking: Depositing Conserved Water	94
2.4.D. The Watershed Approach to Incentivize.....	95
2.4.E. Legal and Policy	96
2.4.E.(i) Third Party Impacts	96
2.4.E.(ii) “Public Interest” Review	96
2.4.E.(iii) Endangered Species Act	97
2.4.E.(iv) A Colorado River Basin Perspective	97
2.4.F. Conclusion	97
 <u>Chapter 2, Section 5. Water Reuse</u>	 99
2.5.A. Introduction	99
2.5.B. Legal Constraints.....	99
2.5.B.(i) Federal Regulations	99
2.5.B.(ii) State Regulations.....	100
2.5.B.(iii) Rights to Effluent	101
2.5.B.(iv) Reuse of Irrigation Water	102
2.5.C. Institutional/Societal Constraints	104
2.5.C.(i) Public Acceptance	104
2.5.C.(ii) Health Risks	105
2.5.C.(iii) Environmental Effects.....	105
2.5.C.(iv) Cost.....	106
2.5.D. Conclusion	107
 <u>Chapter 2, Section 6. Water Right Transfers</u>	 109
2.6.A. Introduction	109
2.6.B. Legal Constraints.....	109
2.6.B.(i) Beneficial Use	109
2.6.B.(ii) Forfeiture and Abandonment.....	110
2.6.B.(iii) District Constraints on Transfers.....	111
2.6.B.(iv) State Restrictions on Interbasin and Interstate Transfers	112
2.6.B.(v) Federal Restrictions on Transfers	113
2.6.B.(v)(a) Bureau of Reclamation.....	114
2.6.B.(v)(a)(1) Ownership of Water Right.....	114
2.6.B.(v)(a)(2) Profitability of Transfer	115
2.6.B.(v)(a)(3) The Warren Act	116
2.6.B.(v)(a)(4) Appurtenancy Requirement and Project Boundaries	116
2.6.B.(v)(a)(5) Transfer of Title to Project Works.....	117
2.6.B.(v)(a)(6) Beneficial Use and Consumptive Use	117
2.6.C. Third Party Impacts	117
2.6.C.(i) No Injury Rule.....	118
2.6.C.(i)(a) Historical or Consumptive Use	118
2.6.C.(ii) Public Interest Reviews	118
2.6.C.(iii) Area-of-Origin Protection Statutes.....	119
2.6.C.(iv) Environmental Effects	120

2.6.C.(v) Effects on Rural Communities	121
2.6.E. Conclusion.....	121
<u>Chapter 2, Section 7. Water Banking.....</u>	123
2.7.A. Introduction.....	123
2.7.B. Water Banking Programs by State	124
2.7.B.(i) Arizona	124
2.7.B.(ii) California.....	125
2.7.B.(ii)(a) Drought Water Banks	125
2.7.B.(ii)(b) Dry Year Water Purchase Programs.....	126
2.7.B.(ii)(c) Groundwater Banks	126
2.7.B.(iii) Colorado	127
2.7.B.(iv) Idaho	127
2.7.B.(iv)(a) State Water Supply Bank	128
2.7.B.(iv)(b) Local Rental Pools	128
2.7.B.(iv)(c) Shoshone-Bannock Water Bank	129
2.7.B.(v) Kansas.....	129
2.7.B.(vi) Montana.....	129
2.7.B.(vii) Nevada.....	130
2.7.B.(viii) New Mexico	130
2.7.B.(ix) Oregon	131
2.7.B.(ix)(a) Central Oregon Water Bank.....	131
2.7.B.(ix)(b) Oregon Water Trust	132
2.7.B.(ix)(c) Bureau of Reclamation Klamath Basin Water Bank	132
2.7.B.(x) Texas.....	133
2.7.B.(x)(a) Texas Water Bank	133
2.7.B.(x)(b) Texas Water Trust.....	133
2.7.B.(x)(c) Edwards Aquifer Authority Groundwater Trust	134
2.7.B.(xi) Washington.....	134
2.7.B.(xi)(a) Yakima River Basin Water Exchange	134
2.7.B.(xi)(b) Salmon Creek Water Lease Bank	135
2.7.C. Conclusion.....	135
<u>Chapter 2, Section 8. Rotating Fallowing and Dry Year Leasing</u>	136
2.8.A. Introduction.....	136
2.8.B. California.....	137
2.8.C. Colorado.....	138
2.8.D. Kansas	139
2.8.E. Oregon	139
2.8.F. Conclusion	139
<u>Chapter 2, Section 9. Desalination.....</u>	141
2.9.A. Introduction.....	141
2.9.B. Seawater Desalination Issues	142
2.9.B.(i) Locating a Seawater Desalination Facility	142
2.9.B.(ii) Water Intake Issues for Seawater Desalination.....	144

2.9.B.(iii) Concentrate Disposal Issues for Seawater Desalination	144
2.9.C. Inland Disposal Methods.....	145
2.9.C.(i) Discharge to Surface Water.....	145
2.9.C.(ii) Discharge to Sewers	146
2.9.C.(iii) Discharge with Other Water.....	146
2.9.C.(iv) Evaporation or Solar Ponds	147
2.9.C.(iv)(a) Evaporation Ponds	147
2.9.C.(iv)(b) Solar Ponds	148
2.9.C.(v) Injection Wells.....	148
2.9.C.(vi) Irrigation	149
2.9.C.(vii) Zero Liquid Discharge.....	150
2.9.D. Conclusion	150
 <u>Chapter 2, Section 10. Weather Modification</u>	 151
2.10.A. Introduction.....	151
2.10.B. What is Weather Modification?	152
2.10.C. “Cloud Rustling:” The Potential for Interstate Conflict.....	154
2.10.C.(i) Possible Liability and Other Issues	155
2.10.D. Weather Modification Affecting Federally Designated Wilderness.....	157
2.10.E. Conclusion.....	158
 Chapter 3. Preparations for Climate Change Impacts	 159
 <u>Chapter 3, Section 1. Preparations for Climate Change Impacts.....</u>	 160
3.1.A. Introduction.....	160
3.1.B. Legal and Institutional Tools for Managing Water during Climate Change.....	162
3.1.B.(i) Demand Management.....	163
3.1.B.(ii) Increasing or “Stretching” Existing Supplies	164
3.1.B.(iii) Conservation.....	167
3.1.B.(iv) Water Banking.....	169
3.1.B.(v) Water Transfers	170
3.1.B.(vi) A Caution.....	171
3.1.C. Conclusion.....	171
 Chapter 4. Coordination and Cooperation in Protecting Instream Flows.....	 173
 <u>Chapter 4, Section 1. State Tools to Preserve Instream Flows</u>	 174
4.1.A. Introduction.....	174
4.1.B. Legal Context for Preserving Instream Flows.....	175
4.1.B.(i) Traditional Prior Appropriation.....	175
4.1.B.(ii) Prior Appropriation Adapts to Preserve Instream Values	176
4.1.B.(iii) Federal Statutes, Resource Management, and Instream Flows.....	177
4.1.B.(iv) Possibilities Exist for Federal Accommodation Under State Law	179
4.1.C. Public Interest Criteria for Appropriating and Transferring Water Rights .	180

4.1.D. Other Tools to Protect Instream Flows	185
4.1.D.(i) Flow-Release Conditions	185
4.1.D.(ii) Protective State Legislation (Wild and Scenic Rivers Acts).....	185
4.1.D.(iii) Instream Appropriations and Reservations	187
4.1.D.(iv) Water Markets	188
4.1.D.(v) Water Transfers to Instream Use.....	191
4.1.D.(vi) Water Banking.....	191
4.1.D.(vii) Incidental Instream Flows	193
4.1.D.(viii) Basin Closures and Moratoria.....	193
4.1.E. Individual State Laws for Preserving Instream Flows	194
4.1.E.(i) Alaska	194
4.1.E.(ii) Arizona	195
4.1.E.(iii) California.....	197
4.1.E.(iv) Colorado	198
4.1.E.(v) Idaho	200
4.1.E.(vi) Kansas.....	202
4.1.E.(vii) Montana.....	203
4.1.E.(viii) Nebraska.....	205
4.1.E.(ix) Nevada	207
4.1.E.(x) New Mexico.....	208
4.1.E.(xi) North Dakota	210
4.1.E.(xii) Oklahoma.....	210
4.1.E.(xiii) Oregon	211
4.1.E.(xiv) South Dakota	212
4.1.E.(xv) Texas.....	213
4.1.E.(xvi) Utah.....	215
4.1.E.(xvii) Washington.....	216
4.1.E.(xviii) Wyoming	217
4.1.F. Cooperative Instream Flow Efforts	217
4.1.G. Conclusion	222

Index.....	225
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Foreword:

The staff of the Western States Water Council (WSWC) prepared this report in response to the Western Governors' Association (WGA) 2006 report, *Water Needs and Strategies for a Sustainable Future* (WGA Water Report).¹ The WGA Water Report recognizes the complex water-related challenges confronting the West. It analyzes these challenges and provides recommendations under six headings: (1) "Water Policy and Growth;" (2) "State Needs and Strategies to Meeting Future Demands;" (3) "Water Infrastructure Needs and Promising Strategies for Meeting Them;" (4) "Resolution of Indian Water Rights;" (5) "Preparations for Climate Change Impacts;" and (6) "Coordination and Cooperation in Protecting Aquatic Species under the Endangered Species Act."

The WGA asked the WSWC to take the lead in implementing these recommendations. Pursuant to this request, the WSWC prepared a scope of work identifying "tasks." This report responds to tasks relative to four of these six headings. First, this report discusses legal and institutional issues associated with growth management in the West; including the impact public interest criteria can play during the applications process for water rights and water transfers. It also addresses the impact exempt wells can have on growth management. Second, this report outlines the legal and institutional context for augmenting existing water supplies. This part of the report explores the limitations, challenges, and opportunities our legal and institutional framework presents to water administrators. Third, this report addresses how water administrators can adapt existing legal and institutional mechanisms to provide greater flexibility in light of the uncertainties of climate change. Finally, this report discusses coordination and cooperation in protecting aquatic species under the Endangered Species Act. This largely focuses on state legal mechanisms, or "tools," that can be utilized to provide water for instream use, including instream uses related to ESA compliance.

This report is designed to be a reference resource for governors, state officials, legislators, water administrators, and other interested individuals as they consider and address the challenges identified in the WGA Water Report. To increase its accessibility, and to emphasize its relationship to the WGA Water Report, the contents of this report are arranged sequentially as the related recommendations appear in the WGA Water Report. Each chapter begins with a brief explanation about its relationship to the WGA Water Report.

¹ A copy of the report can be obtained at http://www.westgov.org/wga_reports.htm (follow "Water Needs and Strategies for a Sustainable Future" hyperlink) (last visited Jan. 23, 2008).

Executive Summary

The Western Governors’ Association recognized formidable challenges in its 2006 report, *Water Needs and Strategies for a Sustainable Future* (WGA Water Report). The WGA Water Report identified six specific areas of concerns and made recommendations to address them. In order to explore and address these recommendations more fully, the WGA and the Western States Water Council developed a “Proposed Scope of Work for Implementation.” The Proposed Scope of Work for Implementation identified several “Tasks” to address the identified recommendations. This report developed from some of these “Tasks.” The Report is organized into four chapters that are directly related to four of the six sections in the WGA Water Report (Numbers 1, 2, 5, and 6, respectively).

Chapter 1: Water Policy and Growth

Chapter 1, Water Policy and Growth, is divided into three sections. Section 1, Growth Management and Water in the West, focuses on land-use planning and its relationship to water-use planning. Section 2, Growth Management Plans as Part of the Public Interest Review for Water Right and Transfer Applications, considers the applicability of growth management plans to the administrative processes of appropriating and transferring water rights. Section 3, Domestic Well Exemptions and their Impact on Growth Management, acknowledges how domestic wells can complicate growth management efforts.

Chapter 1, Section 1: Growth Management and Water in the West

It is not uncommon for local land use planning agencies to approve new development only to later find that there are insufficient water supplies to serve it. This scenario illustrates a disconnect that often exists between land use planning agencies and water planning agencies. To alleviate this problem, some states have enacted legislation to manage the consequences of growth, particularly as they relate to water resource allocation.

States have employed many tools to manage and accommodate growth. Land use planning requirements vary from state to state and are typically implemented on the local level. However, some states, like Oregon, are very active in land use planning at the state level. Most states require or encourage local governments to create and adopt local comprehensive plans, but there are different approaches to what must be included in the plan and whether it is binding on subsequent land use decisions. Land use planning can effectively integrate water and growth management if states require local governments to create binding, comprehensive plans that include a detailed, accurate assessment of water supply and a commitment to limit demand accordingly.

In addition to planning, urban growth boundaries (UGBs)—boundaries that separate urbanizable land from rural land—can integrate water and growth. Temporary growth moratoria can be another tool to stop growth altogether in a municipality or county for a limited time. Some states, like Texas, have enabling statutes that delineate the purposes and conditions under

which growth moratoria may be employed, but moratoria are an imperfect and indirect means of integrating water and growth management because they are typically only valid for as long as there is a water supply deficit.

Some states, like Arizona, require developers to prove that proposed subdivisions will have an adequate supply of water before construction can begin. Other states, including California, require all new development of a certain size to undergo an environmental assessment before beginning construction to analyze the potential impacts the development will have on the surrounding environment, including local water supply. While these tools can create a direct link between specific developments and water, they may be more useful if they are used in concert within a comprehensive growth management framework.

Impact fees are another tool for managing growth that many states have authorized in the past several years. Impact fees allow localities to pass the cost of building new infrastructure for obtaining new water supplies to developers. These fees may be an effective way to coordinate water and growth because developers must internalize or pass on the cost of acquiring new water supplies instead of having municipalities, utilities, or counties absorb the costs.

Conservation easements enable landowners to voluntarily donate an easement restricting development rights on their land to a government agency or non-profit organization. Likewise, purchase of development rights (PDR) programs allow landowners to sell development rights to their property to a government agency. In a similar program, called the transfer of development rights (TDR), governments assign developmental rights to all types of property in their jurisdiction based on the type of development that is authorized for that land. While these tools can encourage the conservation of open space and agricultural lands, they only link water and growth to the extent they foreclose new development and its attendant water demand.

Water plans do not normally integrate water and growth because they are usually very general and deal almost exclusively with water use and only rarely with land use. However, some states authorize or require regional or local water plans, which may be more effective for integrating water and land use if they are binding upon local governments. Some states also authorize and encourage watershed planning on a state, regional, or local basis. Advocates of watershed planning and management assert that once planners have assessed a watershed's 'carrying capacity,' it should be seriously considered by planners and officials when making development decisions. But because most modern efforts at watershed planning are still in their formative stage, it is unclear whether they are effective at integrating water and growth. Existing political institutions, land use patterns, and piecemeal watershed programs may be barriers to the effective use at watershed planning and management as they currently exist.

Water resources and land use planning are disconnected in the United States in part because local, regional, and state agencies that make land and water use decisions are fragmented. An integrated planning system that pulls together agencies that exercise authority over water resources and land use planning could do a great deal to streamline the currently bifurcated system of land use and water use. Adequate funding and access to water data can help local governments include a more meaningful water resources component in local plans. Clarifying the law for a utility's duty to serve customers within its service area may also help.

Although policy shifts in this area have allowed utilities to deny service on certain grounds, such as water conservation, the law is still unclear. The lack of clarity may hinder the ability of a utility to deny water service even when there is a legitimate water shortage.

Chapter 1, Section 2: Growth Management Plans as Part of the Public Interest Review for Water Right and Transfer Applications

Considering growth management plans or other land-use regulations during the appropriations process could provide another step towards integrating land use and water management. Public interest review could provide an administrative opportunity to evaluate growth management plans before new water appropriations or transfers are approved. Because many anticipate water availability will constrain future growth and development, denying applications that are contrary to the public interest could curtail unlimited development, or at least force developers to obtain water from more viable sources.

Some states, like Oregon, have actually integrated consideration of local, tribal, and community growth management decisions into application reviews for new appropriations and transfers. Similarly, Washington's laws and regulations suggest that the Washington Department of Ecology (Ecology) may have a duty to consider whether some water allocation decisions will impact local growth management plans. Idaho appears to be another state that has expressed intent that its water agency considers local growth management plans while reviewing some water rights applications.

While some states have integrated growth management decisions and water administration to one degree or another, most states have public interest criteria that must be considered before an appropriation is approved. A significant number of states also require public interest review before a transfer is approved. But is not always clear whether public interest review allows water administrators to consider growth management plans. This varies between states, particularly if public interest criteria are developed judicially as opposed to statutorily. One way to possibly ensure that growth management initiatives are considered in the calculus of the public interest review is to ensure that growth plans clearly address state and local water resources. A direct way to ensure consideration is to enact legislation specifically requiring state water agencies to consider local growth in the review process for appropriations and transfers. This can be done by statutorily defining the public interest to include growth management plans. If states require administrative bodies to consider growth management plans for new appropriations, they may also want to consider requiring it for transfers as well.

Chapter 1, Section 3: Domestic Well Exemptions and their Impact on Growth Management

Exempt wells may complicate growth management, particularly if they are used to circumvent measures that would otherwise limit development in a given area. Oftentimes, exempt wells are not regulated to the same degree as other water uses. If water use is not metered, it may be difficult to accurately assess the impact exempt wells have upon hydrologically connected waters. While the impact of an individual exempt well on water resources may be negligible, the aggregate impact of many exempt wells can be significant.

Inasmuch as exempt wells have the potential to impact water resources, states should evaluate whether current policies regarding exempt domestic wells are consistent with state or local growth management policies. Incorporating domestic wells into existing water regulatory schemes may prove necessary before land and water management can be comprehensively integrated.

Chapter 2: Legal and Institutional Context for Augmenting Existing Water Supplies

Chapter 2, Legal and Institutional Context for Augmenting Existing Water Supplies, is divided into ten sections. Section 1, Prior Appropriation in the West, reviews elementary principles of the prior appropriation doctrine. Section 2, Water Demand Management, covers practices that can help moderate water consumption in the West. Section 3, Water Storage, explores possible means for developing additional water storage. Section 4, Water Conservation, reviews legislative and institutional means for reducing water use and the importance of considering third-party impacts. Section 5, Water Reuse, presents the legal, institutional, and societal constraints relevant to water reclamation. Section 6, Water Right Transfers, recognizes that reallocating water via transfers can help satisfy future water needs, but potential adverse consequences should be evaluated beforehand. Section 7, Water Banking, discusses the array of banking options available in western states. Section 8, Rotating Fallowing and Dry Year Leasing, analyzes land-use practices that can encourage conservation during drought. Section 9, Desalination, addresses the legal implications for disposing concentrate. Section 10, Weather Modification, explores liability and conflict considerations for large-scale weather modification programs.

Chapter 2, Section 1: Prior Appropriation in the West

Prior appropriation is the predominant method for allocating water resources in the West. Historically, prior appropriation required a water user to show (1) intent to apply water to beneficial use; (2) a diversion to convey water from the stream to the place of use; (3) timely and beneficial use of water. While this generic formula has been adapted over time, these elements are fundamental to appropriation doctrine. Following the proper administrative steps and acquiring a right give the user priority. The system of priority is summarized by the common law maxim “first in time, first in right.” Priority ensures that those possessing senior rights will have their rights satisfied before those with junior rights. Water rights are property interests that can be taxed, regulated, or taken by eminent domain. Also, water rights can terminate if abandoned, forfeited, or prescriptively acquired by someone else. Prior appropriation provides the basic framework within which the following sections relate.

Chapter 2, Section 2: Water Demand Management

Demand management is the use of strategies to reduce water demand, rather than increase supply. Current demand-management strategies include urban use conservation, public education, recycling, water pricing, and privatization of water supplies. Three states—Arizona, California, and Washington—have statutes requiring local municipalities or other water suppliers to assess or undertake demand management measures. States and municipalities are also increasingly utilizing conjunctive use as a management strategy. Conjunctive use encourages the

complementary use of surface and groundwater supplies and also encourages groundwater storage.

Chapter 2, Section 3: Water Storage

Groundwater storage is the practice of storing excess surface water in underground aquifers. Groundwater recharge, which is closely related to and often overlaps with storage, is the practice of replenishing groundwater sources artificially with fresh or reclaimed water. Groundwater storage and recharge are both subject to federal and state environmental laws and state water laws, and raise issues of beneficial use, forfeiture, and the commingling of separate types of water and water rights. In addition, storage and recharge may be difficult due to the need for interjurisdictional cooperation.

Nevertheless, groundwater storage and recharge are being used more often as a result of the difficulty of constructing new storage facilities for surface water. While constructing new surface water storage facilities can be politically unpopular due to potential negative environmental effects, state and local agencies are still considering them as a means to supplying more water when alternative means of producing and stretching water supply are inadequate. In addition, new surface water projects are likely to be smaller and more “environmentally friendly,” and they must meet the requirements imposed by state and federal water and environmental regulations, including the Clean Water Act, the Endangered Species Act, the Wild and Scenic Rivers Act, the National Environmental Policy Act, and corresponding state statutes.

Chapter 2, Section 4: Water Conservation

In addition to pursuing opportunities for water storage, many states actively encourage water conservation to use existing water supplies more efficiently. Providing incentives to conserve water, as opposed to regulation of rights, has been seen as most effective in the agricultural sector. California, Washington, Montana, and Oregon have taken steps to encourage agricultural conservation by removing the disincentive inherent in the “use it or lose it” aspect of the prior appropriation system. The Oregon and Montana programs have struggled, both because of the cost involved and the difficulty in determining how much water has actually been conserved. However, Washington’s program has recently met with success, most notably in the Yakima area. While agricultural conservation incentives have had mixed results, municipal conservation has successfully been encouraged through educational programs, funding incentives, and statutory requirements.

Chapter 2, Section 5: Water Reuse

As new water supplies become more scarce, water reuse is becoming an increasingly practical and cost-effective option for meeting demand. Legal constraints to water reuse include federal and state provisions regulating content and quality of effluent and recycled water, questions about who has rights to effluent, and uncertainties about the reuse of agricultural water rights without injuring other users. Institutional or societal constraints to water reuse include public acceptance of recycled water, health risks associated with reuse, potential environmental effects of water recycling, and the cost of implementing water recycling systems.

Chapter 2, Section 6: Water Right Transfers

The reallocation of water supplies through markets is another tool. Water transfers can be effective in securing needed water by reallocating water from lower valued uses to higher valued uses, but constraints imposed by the prior appropriation system and the need for regulation to protect third parties from negative effects resulting from transfers must be considered. Legal constraints to water transfers include the doctrines of beneficial use, forfeiture, and abandonment, constraints imposed by water districts, state restrictions on interbasin and interstate transfers, and federal restrictions on transfers, including those imposed by the Bureau of Reclamation and environmental protection statutes. The desire to protect third parties and the environment from the negative effects of water transfers can impose significant barriers to potential transfers. Policy tools used to mitigate negative third party impacts include the no injury rule, the historical or consumptive use limitation, public interest reviews, area of origin protection statutes, and statutes or policies that attempt to curtail negative effects on the environment and rural communities.

Chapter 2, Section 7: Water Banking

Water banks are another method of reallocating water supplies. Water banks are administrative entities that allow and encourage the storage of unused water and the transfer of water to new users and uses. Most western states or their local water agencies have utilized or are in the process of implementing some type of water bank to facilitate transfers or store unused or excess water. States can tailor the operation of a water bank to fit the needs of those it serves, including the time it is operative, administration of the bank, and purpose of the bank. Most states that have created water banks have had to change state law regarding forfeiture and abandonment as it relates to water rights involved in banking.

Chapter 2, Section 8: Rotating Fallowing and Dry Year Leasing

Other forms of transferring water that do so on a temporary basis are rotating fallowing and dry year leasing. Rotating fallowing, which is the practice of temporarily fallowing irrigated fields on a rotating basis, can free up agricultural water for sale or lease without permanently retiring farmland and devastating local communities. Rotating fallowing programs have been adopted by a few states. However, little information is available about the success of these programs. Dry year leasing, although related, is slightly different. A dry year lease, a contract between a governmental entity or public corporation and another water user for use of their water right during drought years, can also be an effective tool. California's Dry Year Water Purchase Program (DYWPP) is an example of one successful dry year leasing program. In 2001 and 2002 the DYWPP secured over 160,000 acre-feet of water for California's water bank, helping to alleviate a water shortage.

Chapter 2, Section 9: Desalination

Desalination is the process of removing salt and other minerals from seawater or brackish water to make it suitable for human use. If the necessary technology continues to improve,

desalination may play a more essential role in meeting water needs for the future. One major problem for coastal seawater desalination facilities is the effect on marine life and coastal resources. Another major concern, for both inland and coastal facilities, apart from considerable costs, is disposal of the brine concentrate resulting from the process. Disposal methods currently used or advocated are discharge to surface water, discharge to sewers, discharge with other water, the use of evaporation or solar ponds, the use of injection wells, using concentrate for irrigation, and zero liquid discharge.

Chapter 2, Section 10: Weather Modification

Weather modification is the process of seeding clouds either with silver iodide, dry ice, or ground-based propane generators in order to aid in the formation of precipitation. Studies out of Colorado, Montana, and Australia have found that weather modification can increase snowpacks by around ten percent, and it is hoped that weather modification can be used to augment snowpack in the West. However, there is concern that weather modification may promote precipitation in one area to the detriment of another and may result in interstate litigation or private citizen litigation against the modification programs. Anticipating this issue, states such as Colorado, Montana, Oklahoma, and Texas have statutory authorization to form interstate compacts or best management practices on weather modification.

Chapter 3: **Preparations for Climate Change Impacts**

Climate change has the potential to affect water resources in the West. While scientists acknowledge some uncertainty about the impacts, climate change may very well result in (1) earlier snowmelt; (2) reduced runoff; (3) greater evapotranspiration; (4) more intense, though less frequent precipitation events; and (5) sea water intrusion in coastal aquifers. All of these impacts would strain existing supplies. In addition, higher evapotranspiration rates may also result in greater demand. These prospects, coupled with the West's rapid growth rate, could lead to dire consequences if water resource managers are not adequately prepared.

As water resource managers anticipate and plan for the potential impacts of climate change, increasing the flexibility in water administration will be vital. While few states have statutorily added mechanisms to increase administrative flexibility specifically to address water-related impacts of climate change, many of the tools discussed in Chapter 2 can be adapted to provide needed flexibility. Demand management, efforts to "stretch" existing supplies, water banking, and water transfers may prove especially helpful. In addition, states that share river basin or groundwater resources may want to consider addressing potential future supply reductions. Proactively addressing potential supply reductions now can reduce conflict in the future.

Chapter 4: **Coordination and Cooperation for Protecting Instream Flows**

While a number of valuable opportunities exist under federal law to protect and enhance flows, under the prior appropriation doctrine, a variety of state laws and programs (tools) have developed to preserve instream flows, which can be exercised during administrative, judicial, or legislative determinations over water allocation. In one form or another, all western states have

laws that allow at least some instream flow protection. Many states statutorily authorize instream appropriations. Some create minimum flow protections or instream flow rights. Yet others provide indirect mechanisms to preserve instream flows. In addition, all states may utilize their administrative agencies to protect instream flows. For example, some states condition the approval of new appropriations applications on meeting minimum flows.

The development and application of broad public interest criteria provides an administrative mechanism to deny new applications. Likewise, many state agencies weigh public interest criteria when evaluating proposed transfers. Administrative rules and regulations oftentimes allow interested individuals or entities to assert that a proposed course of action contravenes the public interest. That determination, however, ultimately rests with the agency in charge of administering a state's water resources.

Water may also be obtained for instream flows by acquiring existing rights, through water transfers, water leases, and water banks. Water banks have developed in several states in the West and have been used to facilitate transfers to instream uses.

Other tools for instream preservation include coordinated flow-release conditions and protective state legislation. Protective flow-release conditions coordinate state and federal reservoir releases to maintain or enhance instream flows. Protective legislation, such as those patterned after the national Wild and Scenic Rivers Act, can either directly or indirectly promote instream values.

States should anticipate continued conflicts over instream flows because of the limited nature of the resource, statutory mandates, statutory limitations, administrative policies, and the divergent interests of individuals, governments, and organizations. While recognizing the existence of tools and remedies under federal law in the context of the competition for scarce water resources, those seeking to protect and enhance instream flows should first utilize existing state tools before resorting to other means, as this approach can not only avoid conflict, but provide enhanced protection within the regime of state laws and administration. Although all states do not offer the same array of tools, this Report encourages participants to utilize those which are available as a first course of action. In instances where specific interests cannot be accommodated under state law, a process of negotiated compromises resulting in formal agreements is the most desirable approach to resolve conflicts.

Chapter 1

Water Policy and Growth

The WGA Water Report acknowledges that water is scarce in much of the West (relative to water demand). Engineering feats like reservoirs, transbasin diversions, and groundwater development have augmented existing supplies that have sustained virtually unlimited growth.² However, most recognize that water availability will ultimately constrain growth. For the first time in our history, legal and physical limits are appearing on our planning horizon.

Chapter 1 discusses important water policy and growth considerations as decision makers, resource administrators, and the public prepare for this horizon. Section 1, “Growth Management and Water in the West,” is a survey of growth management approaches among western states and their relationship to water resources. The recommendations in part 1 of the WGA Water Report, “Water Policy and Growth,” provided the impetus for this section. Section 1 emphasizes the relationship between land-use planning and water-use planning.

Section 2, “Growth Management Plans as Part of the Public Interest Review for Water Right and Transfer Applications,” considers how existing administrative processes may be able to incorporate growth management concerns. This section emanates from a “Task” for recommendation “1.C.” of the WGA Water Report. The “Task” reads: “Prepare a report summarizing western state review processes for new applications and transfers and the application of public interest criteria and other mechanisms under state law to consider local, tribal and watershed plans and decisions relative to growth management.” The discussion contemplates whether administrators can consider growth management plans during the application process (for both appropriations and transfers) when evaluating the “public interest.”

Section 3, “Domestic Well Exemptions and their Impact on Growth Management,” is a brief introductory piece noting the impact exempt wells can have on water policy and growth management. Exempt wells may circumvent growth management plans if they are not properly incorporated into the planning process. Together, these three sections highlight important challenges as we plan for the demands of growth and the constraints of supply.

² Growth is used broadly in this Report and includes additional water to supply an increase in municipal, tribal, agricultural, industrial, commercial, navigational, environmental, and recreational use.

Chapter 1

Section 1

Growth Management and Water in the West

1.1.A. Introduction

A common scenario in the western states is a situation in which new development is approved by local land use planning agencies, only to subsequently find that there are insufficient water supplies for the development. In Contra Costa County in California, for example, where county officials approved an 11,000 unit project that was outside the incorporated area of the county on the assumption that the development would be served by the East Bay Municipal Utilities District (EBMUD).³ EBMUD had not been consulted and sued the county, “arguing that it could not reliably meet demands within its current service area if it were required to take on this new responsibility.”⁴

The problems associated with the “disconnect” between land use planning agencies and water planning agencies have been increasing because of the tremendous growth occurring in western states. Among individuals and agencies that deal with planning, development, transportation, natural resources and a host of other issues, it is a well-known fact that the West is experiencing unprecedented rates of growth. “Seven of the ten fastest-growing states in the country between 2000 and 2003 are in the West,” including Nevada, Arizona, Texas, Colorado, Idaho, Utah, and California.⁵ Although growth is welcomed and encouraged by most states and political subdivisions, it can be problematic for communities in western states that are already experiencing or will soon experience sprawl, transportation issues, and loss of agricultural land, as well as increasing water constraints due to the region’s aridity and fluctuating hydrological cycles. Most states have a desire to accommodate growth and encourage the resultant increase in economic prosperity while, at the same time, ensuring the current and future stability of the

³ Ellen Hanak, Public Policy Institute of California, *Water for Growth: California’s New Frontier* 51 (2005) at http://www.ppic.org/content/pubs/report/R_705EHR.pdf (last visited Aug. 13, 2007) (citation omitted) [hereinafter Hanak, *Water for Growth*].

⁴ *Id.* at 51-52 (noting that EBMUD prevailed in court, but the experience prompted it to “push for legislation to preclude this type of uncoordinated planning in the future” culminating in SB 610 and 221, which require water availability reviews for large new developments).

⁵ A. Dan Tarlock & Sarah B. Van de Wetering, *Western Growth and Sustainable Water Use: If There Are No ‘Natural Limits,’ Should We Worry About Water Supplies?*, 27 PUBLIC LAND & RESOURCES L. REV. 33, 40 (2006) (citing to the U.S. Census Bureau, *Statistical Abstract of the United States: 2004-2005* 21 and noting that the other 3 top-growing states are Florida, North Carolina, and Georgia).

quality of life and accessibility of regional natural resources. As a result, many states have begun to enact legislation in the past several years in an attempt to more carefully plan for and manage the consequences of growth.

These approaches to managing growth have been given different names over the years, and the current term used to describe these efforts is “smart growth” strategies or initiatives. Although no single definition has been adopted that succinctly or comprehensively describes the essential characteristics or components of a growth management or smart growth program, one source explains that “[t]he conventional understanding is that growth management influences the rate, amount, type, location and quality of growth.”⁶ A state survey revealed that most state smart growth approaches had several common elements, including “(1) eliminating state subsidies that promote sprawl; (2) promoting infill development; (3) preserving farmland, open space, and areas of environmental and recreational value; and (4) supporting local planning by providing incentives and technical assistance to local governments and encouraging them to enter into regional planning agreements.”⁷

This report seeks to examine the growth initiatives that have been adopted by western states and the extent to which they incorporate issues of water management and supply, if at all. It also attempts to give an analysis of the success of the various types of initiatives in relation to integrating water supply concerns with growth management. This analysis will be limited in scope due to the recent enactment of many of the programs as well as the relative scarcity of information on those programs that have been in existence for longer periods of time. Descriptions of various state growth initiatives and the limited analysis of their effectiveness will be discussed in section 1.1.B. and section 1.1.C., then offers options that have been formulated and discussed by planners and scholars for more closely and effectively integrating state water management decisions with local land use decision-making.

1.1.B. State Growth Initiatives and their Relation to Water

Growth initiatives can and do take many different forms that are as varying as the needs of the states adopting them. This section attempts to give an overview of the tools that western states use primarily for growth management with a focus on those that tie growth to water supply or have the potential to do so. An effort is made to highlight at least one program from each western state, although the overview is, of necessity, only a sampling of state tools for managing growth. However, since several states have experienced fewer challenges relative to growth and its interplay with water, their programs may be mentioned only briefly. Additionally, although the various tools are separated into categories based on their main components, some planning tools are closely related to other tools and may fit into more than one category. As a result, there is some overlap and simplification of categorical distinctions. As noted above, the analysis of the effectiveness of these programs is limited to how effective they are or could be at addressing water availability in the context of growth, and general analyses of their effectiveness as growth management tools per se will be discussed only in passing, if at all. Because of this focus,

⁶ Daniel R. Mandelker, *Managing Space to Manage Growth*, 23 WM. & MARY ENVTL. L. & POL’Y REV. 801, 804 (1999).

⁷ Ed Bolen et al., *Smart Growth: A Review of Programs State by State*, 8 HASTINGS W-NW J. ENVT’L L & POL’Y 145, 147 (2002).

initiatives or tools that are effective at managing growth but less effective as a way to integrate water considerations with growth will be discussed only briefly.

1.1.B.(i) Land Use Planning Requirements

Land use planning has typically been controlled, created and implemented at the local level despite the fact that “the states [have] full authority to regulate the development and use of land,”⁸ since local governments are typically more cognizant of and able to respond to the planning needs and desires of their communities. However, in recent years, states have taken a larger role in local planning issues because, “as [the] developmental impacts [of growth] became regional, the need to incorporate external effects into local land development could no longer be ignored.”⁹ Additionally, “[t]he problems caused by fractionalized governments and local parochialism translated into a lack of local governments’ ability to coordinate necessary planning strategies throughout the region.”¹⁰ States have therefore become involved in the planning process in an effort to guide local planning efforts and encourage regional collaboration and coordination.

As a result of the growing state involvement in local planning, many states have legislation authorizing or requiring local governments to create comprehensive plans for the development of their area. In addition, some states authorize or require regional coalitions to plan for the development of the region, and others create general land use plans on a statewide basis. States approach local, regional, and statewide planning requirements in various ways depending on the reasons for which planning authority or requirements are put in place.

1.1.B.(i)(a) *Local Planning*

In some states, local governments are authorized and encouraged to create comprehensive plans for their jurisdictions, but they are not required to do so. This is the case in Montana¹¹ as well as Kansas,¹² where cities and counties are not required to adopt comprehensive plans, although they are given the authority to do so. However, there is strong encouragement to adopt comprehensive plans in both states, since the power to enact zoning and subdivision regulations is conditioned on the locality having a comprehensive plan in place.¹³ In Kansas, if a city or county planning commission elects to adopt a comprehensive plan, the plan must discuss specific elements, including an analysis of “past and present conditions and trends relating to land use, population and building intensity, public facilities, transportation and transportation facilities, economic conditions, natural resources and . . . any other element deemed necessary to the

⁸ James C. Nicholas, *Symposium: State and Regional Land Use Planning: The Evolving Role of the State*, 73 ST. JOHN’S L. REV. 1069 (1999).

⁹ *Id.* at 1074.

¹⁰ Robert Freilich, *From Sprawl to Smart Growth: Successful Legal, Planning, and Environmental Systems*, 3 (ABA 1999) (citation omitted) [hereinafter Freilich, *From Sprawl to Smart Growth*].

¹¹ MONT. CODE ANN. §§ 76-1-601 to 76-1-606 (2005).

¹² KANSAS STAT. ANN. § 12-747 (2006).

¹³ MONT. CODE ANN. §§ 76-1-601 to 76-1-606 (counties and municipalities are authorized but not required to adopt growth policies that include certain elements, but local governments are required to have a growth policy in place in order to enact zoning and subdivision regulations); KAN. STAT. ANN. § 12-749 (a local government must have a comprehensive plan in place in order to enact subdivision regulations).

comprehensive plan.”¹⁴ Along with such analyses, the planning commission is required to give recommendations for the development of the area, including land uses, population and building intensity standards, public facilities including transportation facilities, public improvement programming, sources and expenditure of public revenue, utilization and conservation of natural resources, and any other element that is necessary to the plan.¹⁵ There is no requirement that the natural resources element discuss or analyze water supply, nor is such an analysis required by any other element in the plan. The planning commission is required to review the comprehensive plan at least once each year,¹⁶ and the plan constitutes “the basis or guide for public action. . . .”¹⁷

In contrast, some states like Alaska¹⁸ and Utah¹⁹ require local governments to create comprehensive plans, but the elements that must be included in those plans are left to the discretion of the municipality or county. Similar to the framework of Kansas, the Alaska law does not require the inclusion of a water supply analysis in the plan, although a locality could include such an analysis if it so chose. Zoning, permitting, and other land use regulations are required to be in accordance with and to facilitate implementation of the comprehensive plan.²⁰

A third approach to planning is that taken by Colorado, in which all counties²¹ and municipalities²² are required to create and adopt master plans that are only advisory unless made binding by inclusion in the subdivision, zoning, platting or other land development regulations of the county or municipality.²³ Regional planning commissions have a duty to create and adopt a plan for the development of the region, but these plans are not official advisory plans unless they are adopted by the counties or municipalities of the region.²⁴ In creating and adopting the master plan of a county or region, the planning commission is required to consider certain elements.²⁵ However, inclusion of any or all elements in the master plan is left to the discretion of the planning commission.²⁶ In contrast, master plans of municipalities must include the planning commission’s recommendations for a number of elements, if applicable or appropriate, including transportation, public places and facilities, the location and extent of an adequate and suitable supply of water, modification of public ways and rights-of-way, a zoning plan, land use plan, plan for extraction of commercial mineral deposits, plan for location and placement of public utilities, projections of population growth and housing needs, and an analysis of geological and natural hazards.²⁷

¹⁴ KAN. STAT ANN. § 12-747(b).

¹⁵ *Id.*

¹⁶ *Id.* § 12-747(d).

¹⁷ *Id.* § 12-747(c).

¹⁸ ALASKA STAT. §§ 29.40.010 to 29.40.200 (2007).

¹⁹ UTAH CODE ANN §§ 10-9a-101 to 10-9a-803 (municipal planning) and 17-27a-101 to 17-27a-803 (county planning) (2007).

²⁰ *Id.* § 29.40.040.

²¹ COLO. REV. STAT. § 30-28-106 (2006).

²² *Id.* § 31-23-206.

²³ 2007 Colo. HB 1246 §§ 1 & 2.

²⁴ COLO. REV. STAT. § 30-28-106(2).

²⁵ *Id.* §30-28-106(3)(a).

²⁶ *Id.*

²⁷ *Id.* § 31-23-206(1).

Another approach that has been adopted by states such as Arizona²⁸ and California²⁹ is one in which all local governments are required to create and adopt a general plan that contains a list of specified elements and is controlling of other land use actions and regulations. Under Arizona's framework, all cities are required to adopt a general plan that includes a land use element establishing a general land use plan for areas within the municipality as well as a statement of population density and building intensity, programs and policies promoting infill or compact development, consideration of air quality and access to solar energy, and policies maintaining a variety of land uses.³⁰ Plans must also include a circulation element that delineates transportation issues in correlation with the land use element.³¹ For municipalities with a population of 10,000 or more and those with a population of 2,500 and a growth rate in excess of 2%, plans must include an open space element, a growth area element, an environmental planning element, a cost of development element, and a water resources element.³² Cities of 50,000 or more must include these and additional elements in their general plans. Counties are also required to create and adopt comprehensive plans that contain elements very similar to those found in the general plans of cities.³³ The water resources element for larger and growing municipalities and counties must address "the known legally and physically available surface water, groundwater and effluent supplies, [t]he demand for water that will result from future growth projected in the general plan, added to existing uses[,] and "[a]n analysis of how the demand for water that will result from future growth projected in the general plan will be served by the water supplies [identified by the first component] . . . or a plan to obtain additional necessary water supplies."³⁴

1.1.B.(i)(b) *Regional Planning*

Many states also authorize or require regional planning in an effort to complement and enhance local planning efforts. For example, Oklahoma municipalities are authorized to create planning commissions that are then required to "prepare from time to time plans for the betterment of the municipality as a place of residence or for business."³⁵ In addition, any municipality can create a regional planning commission that is responsible for preparing "plans for the systematic development and betterment of the regional district for residence, manufacturing, or business purposes."³⁶

In addition to requiring all cities and counties that meet certain population parameters to prepare and adopt master plans,³⁷ Nevada law also requires counties to establish regional planning commissions to create and adopt comprehensive regional policy plans "for the balanced

²⁸ ARIZ. REV. STAT. §§ 9-461 to 9-461.13 (municipal planning) and 11-821 to 11-833 (county planning) (2007).

²⁹ CAL. GOVT. CODE § 65300 to 65303.4 (2007).

³⁰ ARIZ. REV. STAT. § 9-461.05.C.1.

³¹ *Id.* § 9-461.05.C.2.

³² *Id.* § 9-461.05.D.

³³ *Id.* § 11-821 to 11-833.

³⁴ *Id.* § 9-461.05.D.5.

³⁵ OKLA. STAT. tit. 11, § 45-103 (2007).

³⁶ *Id.* § 46-103.

³⁷ NEV. REV. STAT. ANN. §§ 278.150, 278.160 (2007) (once a plan is established, ordinances and zoning decisions must conform to it (§ 278.0284)).

economic, social, physical, environmental and fiscal development and orderly management of the growth of the region for a period of at least 20 years.”³⁸ The regional policy plan of counties of more than 400,000 must include a discussion of conservation, population, land use and development, transportation, public services and facilities, air quality, and strategies to promote development in established neighborhoods and areas where public services are available.³⁹ The regional plan for counties of more than 100,000 but less than 400,000 must include similar elements.⁴⁰ The conservation element of the regional plan must include provisions for the use and protection of water and other natural resources.⁴¹ Actions relating to development, zoning, land subdivision or capital improvements must conform to the master plan of the city or county,⁴² which must conform to the regional plan.⁴³

1.1.B.(i)(c) *Statewide Planning*

Although land use planning is mostly left to local governments and, in some states, regional coalitions, some states also take an active approach to planning at the state level. One state that is a pioneer in planning and has one of the most comprehensive statewide, regional, and local planning regimes in the nation is Oregon, whose planning statutes have been in place for several decades. As opposed to states that take a “bottom-up” approach, Oregon is very involved in planning at the state level and has 19 Statewide Planning Goals with which local comprehensive plans must be consistent. Oregon law requires all cities and counties to prepare comprehensive local plans that are in compliance with the statewide goals and then to enact ordinances that implement the comprehensive plan.⁴⁴ Once minimum standards are met for comprehensive plans, however, local governments have broad flexibility as to what should be included in plans and the type of regulations they adopt to implement those plans.⁴⁵ Local governments must have their plans approved or “acknowledged” by the state Land Conservation and Development Commission (the Commission).⁴⁶ If a plan has not been acknowledged by the Commission, the local government must make land use decisions in compliance with the statewide goals, but if a plan has been acknowledged, the locality must make land use decisions in compliance with the plan and its attendant land use regulations.⁴⁷ Counties are responsible for coordinating planning activities within the county “to assure an integrated comprehensive plan for the entire area of the county”⁴⁸ and planning duties and responsibilities undertaken by state agencies must be compatible with local comprehensive plans and regulations that have been acknowledged by the Commission.⁴⁹

³⁸ *Id.* § 278.02528(1).

³⁹ *Id.* § 278.02528(2).

⁴⁰ *Id.* § 278.0274.

⁴¹ *Id.* §§ 278.02528, 278.0274.

⁴² *Id.* § 278.0284.

⁴³ *Id.* § 278.0274(7).

⁴⁴ OR. REV. STAT. § 197.175(2) (2005).

⁴⁵ See Oregon Task Force on Land Use Planning, *2007 Progress Report*, Appendix C, page 1, at http://centralpt.com/upload/301/1729_2007_progress_report_020107.pdf (last visited Aug. 23, 2007) [hereinafter *Oregon 2007 Progress Report*].

⁴⁶ OR. REV. STAT. 197.175(2)(c), (d).

⁴⁷ *Id.*

⁴⁸ *Id.* § 195.025(1).

⁴⁹ *Id.* § 197.180(1)(b)(A) (subsection (2) identifies the limited circumstances in which an agency is not required to act in accordance with local comprehensive plans).

The statewide planning goals “express the state’s policies on land use and on related topics, such as citizen involvement, housing, and natural resources.”⁵⁰ Goal 5 seeks “[t]o protect natural resources and conserve scenic and historic areas and open spaces.”⁵¹ The goal requires local governments to “adopt programs that will protect natural resources . . . for present and future generations” and it requires many resources to be inventoried, including riparian corridors, wetlands, state scenic waterways, and groundwater resources, among others.⁵² The guidelines accompanying Goal 5 suggest that conservation and development plans should consider and not exceed “the carrying capacity of the air, land and water resources of the planning area.”⁵³ In addition, the guidelines suggest that “[t]he conservation of both renewable and non-renewable natural resources . . . should be used as the basis for determining the quantity, quality, location, rate and type of growth in the planning area.”⁵⁴

Much has been opined and written on the effectiveness and wisdom of Oregon’s land use planning system, and these opinions are as varied as opinions regarding the need for and wisdom of land use planning regulations generally.⁵⁵ Oregon lawmakers are also interested in the effectiveness of the state’s land use planning system, as evidenced by the creation of the Oregon Task Force on Land Use Planning—often referred to as the Big Look Task Force—to review the effectiveness of the state land use planning system and make recommendations for any needed changes.⁵⁶ Among its preliminary findings, the Task Force found that Oregon’s system has protected agricultural and forest lands, and it has contained urban sprawl and managed growth better than most other states.⁵⁷ However, the Task Force also found that Oregon’s current system “does not have the flexibility needed to respond to a changing Oregon” and “does not adequately recognize [the] state’s diverse landscapes, economies and values.”⁵⁸ Additionally, despite Oregon’s emphasis on coordination between local governments and state agencies, the Task Force found that the system suffers from “a lack of coordination and strategic alignment between [the Commission] and state agencies and local governments.”⁵⁹ The Task Force also found that while most Oregon citizens support land use planning, they believe strongly in private

⁵⁰ Or. Dep’t of Land Conservation and Dev., *Statewide Planning Goals*, at <http://www.lcd.state.or.us/LCD/goals.shtml> (last visited Aug. 23, 2007).

⁵¹ Oregon Statewide Planning Goals and Guidelines, “Goal 5: Natural Resources, Scenic and Historic Areas, and Open Spaces,” 1, Oregon Administrative Rules 660-015-0000(5) at <http://www.lcd.state.or.us/LCD/docs/goals/goal5.pdf> (last visited Aug. 23, 2007) [hereinafter Goal 5].

⁵² *Id.*

⁵³ *Id.* at 2, Guideline A.4.

⁵⁴ *Id.* at 2, Guideline B.2.

⁵⁵ See, e.g., Jess M. Krannich, *A Modern Disaster: Agricultural Land, Urban Growth, and the Need for a Federally Organized Comprehensive Land Use Planning Model*, 16 CORNELL J.L. & PUB. POL’Y 57, 83 (2006) (asserting that Oregon’s program has many deficiencies, including an imbalance between development and agricultural protection, insufficient infrastructure necessary to control development, and it is incapable of responding to ordinary market pressures); David L. Szlanfucht, Note, *How to Save America’s Depleting Supply of Farmland*, 4 DRAKE J. AGRIC. L. 333, 336 (1999) (describing Oregon’s land use system as “perhaps the most successful farmland preservation program in the nation”).

⁵⁶ *Oregon 2007 Progress Report*, *supra* note 45, at appendix A, page 1.

⁵⁷ Oregon Task Force on Land Use Planning, *Big Look Task Force Preliminary Findings and Recommendations* 7 (2007), at http://centralpt.com/upload/301/2528_BigLook_stakeholderbrochure.pdf (last visited Aug. 23, 2007).

⁵⁸ *Id.* at 9.

⁵⁹ *Id.*

property rights,⁶⁰ as evidenced by the passage of Measure 37 in 2004. Some scholars have voiced concerns that Measure 37 will severely impair the functionality and effectiveness of Oregon's land use planning system,⁶¹ as discussed in further detail below.

Oregon's Measure 37

Landowners whose property is less valuable to them as a result of restrictive land use policies have argued that certain land use regulations result in regulatory takings of property in violation of the Fifth Amendment of the U.S. Constitution. This argument was the impetus behind the enactment of Oregon's Measure 37, a statute that requires local governments to compensate property owners for any diminution in value resulting from land use regulations. As an alternative to compensation, the government may choose to modify, remove, or not apply the land use regulation. Measure 37 became effective in December of 2004 and withstood a constitutional challenge pursuant to a ruling from the Oregon Supreme Court in early 2006. Because Measure 37 has been in effect only a short time as a result of the litigation, it is unclear what impact it will have on Oregon's land use planning system. However, scholars and researchers have posited that it will have a chilling effect on local land use planning and may even lead to paralysis of land use planning on the state and local levels as governments seek to avoid adopting regulations that could lead to future claims under Measure 37. See Sheila A. Martin & Katie Shriver, *Documenting the Impact of Measure 37: Selected Case Studies* 1 (2006); Edward J. Sullivan, "Year Zero: The Aftermath of Measure 37," 36 *Envtl. L.* 131 (2006).

Other states may also have to deal with similar affronts to their land use planning systems and the attendant uncertainty in the near future. For example, in 2006, voters in six other western states voted on measures similar to Oregon's Measure 37: Arizona (proposition 207), California (proposition 90), Idaho (proposition 2), Montana (initiative 154), Nevada (state question 6), and Washington (initiative 933). All of the measures were defeated except proposition 207 in Arizona. *Ariz. Rev. Stat. §§ 12-1131 et seq.*

1.1.B.(i)(d) Effectiveness of Land Use Planning to Integrate Water and Growth

Due in part to the fact that states have different requirements for local, regional, and statewide planning, as shown above, land use planning may or may not be an effective tool to integrate water and growth. Whether planning systems take a "bottom-up" or a "top-down" approach, they are considered more effective at integrating concerns of water supply with growth and development when communities are required to create a plan that assesses water supply. In any event, however, "[l]ocalities are increasingly considering growth's impacts on water supplies and water quality in their general or comprehensive planning documents."⁶² But the fact that so many concerns have been raised in recent years about the concept of integrating water and land use planning indicates that existing land use planning systems may not be as effective as they could be at integrating water and growth. Part of this stems from the fact that land use planning generally occurs at the local level, where some localities scrupulously inventory water supply and then pace growth accordingly, while others are much less water-conscious. It seems clear that planning systems that require water supply assessments are considered more effective at integrating water and growth.

⁶⁰ *Id.* at 8.

⁶¹ See, e.g., Caroline E.K. MacLaren, *Oregon at a Crossroads: Where do We Go from Here?*, 36 *ENVTL. L.* 53 (2006).

⁶² Craig Anthony Arnold, Introduction: *Integrating Water Controls and Land Use Controls: New Ideas and Old Obstacles*, in *WET GROWTH: SHOULD WATER LAW CONTROL LAND USE?* 1, 10-11 (Craig Anthony Arnold ed., 2005) [hereinafter Arnold, *Integrating Water Controls & Land Use Controls*].

1.1.B.(ii) Other Land Use Tools

In addition to land use planning requirements, many states have adopted other tools that govern land use in an effort to manage the rate of growth and where it occurs. Like land use planning requirements, other land use tools can take a variety of forms depending on the state and the objectives they are trying to reach. Many of the tools that are discussed in this section are closely related to and often subsumed within a state's requirements regarding land use planning on the local or regional level.

1.1.B.(ii)(a) *Urban Growth Boundaries*

One land use tool that many local governments and some states use to supplement local planning efforts is an urban growth boundary (UGB). A UGB is defined as “a long-term boundary used as a pro-active growth management tool that seeks to contain, control, direct or phase growth to promote more compact, contiguous urban development.”⁶³ Municipalities in some states are authorized to adopt UGBs if they so choose.⁶⁴ Oregon⁶⁵ and Washington,⁶⁶ two states that are very well-known for their comprehensive planning and growth management programs, require municipalities and counties to establish UGBs and urban growth areas (UGAs), respectively, as part of their planning process. In Oregon, districts, cities and counties are required to establish UGBs for their jurisdictions, and districts are authorized to require that comprehensive plans of cities and counties and any actions taken pursuant to those plans substantially comply with the functional plans and the UGB adopted by the district.⁶⁷ UGBs are established “to provide land for urban development needs and to identify and separate urban and urbanizable land from rural land.”⁶⁸ UGBs are established based on the need to accommodate long-term urban population as calculated in 20-year projections, and the location of the boundary is based on several factors, including “[c]omparative environmental, energy, economic and social consequences;” and “[c]ompatibility of the proposed urban uses with nearby agricultural and forest activities occurring on farm and forest land outside the UGB.”⁶⁹

Whether UGBs in general, and state-mandated UGBs like those of Oregon and Washington specifically, are effective or desirable as land use planning tools is contested among land use planners, legal analysts, politicians and landowners. In fact, a report from the Brookings Institution states that the use of UGBs “remains perhaps the most widely discussed

⁶³ Rachel D. Jaffe, Comment, *Stopping Sprawl in Lancaster County, Pennsylvania: Making the Case for Mandatory Urban Growth Boundaries*, 24 TEMP. J. SCI. TECH. & ENVTL. L. 143, 146 (2005) (citation omitted).

⁶⁴ Freilich, *From Sprawl to Smart Growth*, supra note 10, at 693.

⁶⁵ OR. REV. STAT. § 268.390 (2005); see also Michael Lewyn, *Sprawl, Growth Boundaries, and the Rehnquist Court*, 2002 UTAH L. REV. 1, 6-7 (2002) (Planning Goal 14, enacted by the Land Conservation and Development Commission (LCDC), specifically requires incorporated communities to establish UGBs).

⁶⁶ WASH. REV. CODE ANN. § 36.70A.110(1).

⁶⁷ OR. REV. STAT. § 268.390(3), (4); OR. ADMIN. R. 660-015-0000(14) (Statewide Planning Goal 14: Urbanization) at <http://www.lcd.state.or.us/LCD/docs/goals/goal14.pdf> (last visited July 20, 2007).

⁶⁸ *Id.*

⁶⁹ *Id.*

and controversial tool in the arsenal of urban containment policies.”⁷⁰ However, UGBs could provide a direct link between growth and water if local jurisdictions are required to consider water supplies when determining the placement of their UGBs.

This appears to be the case in Oregon, where Statewide Planning Goal 5 directs local governments to adopt “programs that will protect natural resources . . . for present and future generations.”⁷¹ The guidelines accompanying Goal 5, which are only suggestions and are not mandatory, contain a statement that “[t]he conservation of both renewable and non-renewable natural resources and physical limitations of the land should be used as the basis for determining the quantity, quality, location, rate and type of growth in the planning area.”⁷² While neither Goal 5 nor its guidelines specifically discuss UGBs and water, the state Land Conservation and Development Commission (LCDC) has interpreted them to require cities to base their plans and UGBs on known water supply. This is illustrated by the fact that in 1979, the LCDC, from whom local governments must receive approval for their comprehensive plans, denied an acknowledgement of the plan of the City of Stanfield “until the city justified its assumption that water would be available for proposed land uses within its urban growth boundary (UGB) or amended its plan and its UGB in a manner commensurate with the known water supply.”⁷³ If local governments are required to set their UGBs based on local water supply, UGBs could provide a direct link between water and growth.

1.1.B.(ii)(b) *Growth Moratoria*

Another land use tool that is related to UGBs is the use of growth moratoria to stop growth altogether for a limited period of time in a municipality or county. One source states that “[g]overnments at all levels have used land use permitting and development moratoria as effective planning tools for decades.”⁷⁴ In addition, the interest in the use of moratoria was heightened as a result of the United States Supreme Court’s widely discussed and analyzed decision in *Tahoe-Sierra Preservation Council v. Tahoe Regional Planning Agency*,⁷⁵ in which a 32-month moratorium on development around Lake Tahoe was upheld against a takings claim. Temporary development moratoria are typically adopted by local governments under their police power or an implied delegation arising from general land planning enabling legislation⁷⁶ in an effort “to effectively control land use development[,]” to “enable the city commission to effectively plan[,]” or “to preserve the status quo because of an implementation of a comprehensive plan or a plan revision.”⁷⁷ Additionally, development moratoria can give cities

⁷⁰ Rolf Pendall, Jonathan Martin, & William Fulton, The Brookings Institution Center on Urban and Metropolitan Policy, *Holding the Line: Urban Containment in the United States*, 20 (Aug. 2002) at <http://www.brookings.edu/es/urban/publications/pendallfultoncontainment.pdf> (last visited July 20, 2007).

⁷¹ Goal 5, *supra* note 51, at 1.

⁷² *Id.* at 2, Guideline B.2.

⁷³ Terence L. Thatcher & Nancy E. Duhnkrack, Oregon Land Use Symposium, Article, *Goal Five: The Orphan Child of Oregon Land Use Planning*, 14 ENVTL. L. 713, 716 n. 10 (1984).

⁷⁴ Matthew G. St. Amand & Dwight H. Merriam, *Defensible Moratoria: The Law Before and After the Tahoe-Sierra Decision*, 43 NAT. RESOURCES J. 703 (2003).

⁷⁵ 535 U.S. 302 (2002).

⁷⁶ Amand & Merriam, *supra* note 74, at 710 (citations omitted).

⁷⁷ Laura Hurmence McKaskle, Comment, *Land Use Moratoria and Temporary Takings Redefined After Lake Tahoe?*, 30 PEPP. L. REV. 273, 278-79 (2003) (citations omitted).

extra time “to secure water supplies, obtain financing, and construct the necessary infrastructure.”⁷⁸

Although moratoria are used at the local level, states can control the use and implementation of moratoria by enacting governing legislation. For example, Texas enacted legislation⁷⁹ in 2001 that governs development moratoria and allows municipalities to enact moratoria only if they demonstrate through written findings that a moratorium is necessary “to prevent a shortage of essential public facilities”⁸⁰ or “by demonstrating a significant need for other public facilities, including police and fire facilities.”⁸¹ The municipality must show that new development would produce need beyond the capacity of existing public facilities to provide, and the moratorium must be reasonably limited to the areas “where a shortage of essential public facilities would otherwise occur; and . . . property that has not been approved for development because of the insufficiency of existing essential public facilities.”⁸² In addition, moratoria expire after 120 days for residential property⁸³ and 90 days for commercial property⁸⁴ unless a municipality meets certain requirements to extend the moratorium for a definite limited duration.

States that enact legislation regulating the use of moratoria by municipalities may be able to decrease the likelihood that the moratoria will result in unconstitutional takings of private property by limiting the time periods and reasons for which moratoria may be enacted, as Texas has done. However, even if enabling and governing legislation is carefully crafted to avoid takings, moratoria are an imperfect means by which to manage growth or to integrate growth and water supplies unless a municipality is truly experiencing a water shortage or “can demonstrate that development poses environmental issues that need to be studied and mitigated.”⁸⁵ Accordingly, “[c]ourts have approved water service moratoria but have suggested they are valid only so long as a true supply deficit lasts; cities cannot use moratoria permanently to limit growth.”⁸⁶

1.1.B.(ii)(c) *Subdivision and Commercial-Building Requirements*

As state and local governments began to recognize the close connection between growth and water, many enacted requirements for new subdivisions in order to avoid water shortages to, or as a result of, new development. Subdivision requirements allow states and local governments to ensure that new development has access to adequate supplies of water before construction on new projects begins. “Whereas it was once presumed that new supplies would become available as needed to accommodate new homes, water supply adequacy policies require that this be

⁷⁸ Tarlock & Van de Wetering, *supra* note 5, at 56 (citation omitted).

⁷⁹ TEX. LOCAL GOVT. CODE §§ 212.131 to 212.139 (2007).

⁸⁰ *Id.* § 212.135(a).

⁸¹ *Id.* § 212.1351(a).

⁸² *Id.* § 212.135(b).

⁸³ *Id.* § 212.136.

⁸⁴ *Id.* § 212.1362.

⁸⁵ Tarlock & Van de Wetering, *supra* note 5, at 57.

⁸⁶ *Id.* (citation omitted); *see also* D. Craig Bell & Ricky S. Torrey, Western States Water Council, *Water Policy and Growth Management* (1995) (on file with WSWC) [hereinafter WSWC, *Water Policy*].

validated in advance.”⁸⁷ Requiring developers to prove that subdivisions will have an adequate supply of water is a very direct link between growth and water and provides a way for states to coordinate new development with available water supply.

For example, Arizona’s Water Adequacy Program was first established as a consumer protection measure requiring developers to obtain a determination that the developed area will have adequate water supplies.⁸⁸ Pursuant to the requirements set forth in section 45-108 of the Arizona Revised Statutes and in section R12-15 of the Arizona Administrative Code,⁸⁹ developers whose property is located outside of an Active Management Area (AMA, discussed in more detail below) must prove the adequacy of the water supply to the subdivision before marketing the lots.⁹⁰ A determination of adequacy will be given if the water supply is legally and physically available for at least 100 years and meets state water quality standards. Alternatively, if a water provider has obtained a designation of adequate supply for an entire service area, a developer is only required to acquire a written commitment of service from the provider to satisfy the requirements of the Water Adequacy Program.⁹¹ If a developer is unable to acquire a designation of adequacy, lots may still be sold as long as the developer discloses the condition of the water supply in promotional items and sale documents.⁹² In addition, the Arizona legislature recently enacted legislation that gives municipalities located outside of AMAs the authority to adopt an ordinance requiring a determination of adequate water supply before new development can commence.⁹³ Another recently enacted statute created a water development revolving fund to provide financial assistance to water providers for water development.⁹⁴ Use of the fund is available to water providers located within a locality that has adopted an adequacy requirement for new subdivisions, or for subdivisions located within an AMA.⁹⁵

Arizona’s Assured Water Supply (AWS) Program requires that new subdivisions and water providers within Active Management Areas (AMAs) prove that their water supplies are sufficient for at least 100 years.⁹⁶ The Code created five AMAs that include the major metropolitan and farming areas of Arizona.⁹⁷ In 1995, the Department of Water Resources adopted new rules governing the AWS Program to impose consistency with AMA management goals by requiring applicants to show a supply of renewable water rather than groundwater that

⁸⁷ Ellen Hanak & Margaret K. Browne, *Linking Housing Growth to Water Supply: New Planning Frontiers in the American West*, 72 J. AM. PLANNING ASS’N 154 (Spring 2006).

⁸⁸ Ariz. Dept. of Water Resources, *Water Adequacy Program Summary*, 1 (Nov. 2001) at http://www.azwater.gov/WaterManagement_2005/Content/Forms/WADSumm.pdf (last visited May 9, 2007).

⁸⁹ ARIZ. ADMIN. CODE R12-15-701 to 12-15-730.

⁹⁰ *Id.*

⁹¹ *Id.*

⁹² *Id.*

⁹³ 2007 Ariz. SB 1575; ARIZ. REV. STAT. 9-463.01.

⁹⁴ Maxine Becker, *New Arizona Legislation Provides Rural Communities the Authority to Regulate Growth Based on Water Availability*, 11 W. WATER L. & POL’Y REPORTER 249, 250 (July 2007).

⁹⁵ *Id.*

⁹⁶ Ariz. Dept. of Water Resources, *Assured Water Supply Program*, 2 (Nov. 2001) at http://www.azwater.gov/dwr/Content/Find_by_Category/Permits_Forms_Applications/Files/AssuredWaterSupply/awsbrochure.pdf (last visited May 9, 2007).

⁹⁷ *Id.* at 1.

is sufficient to meet the applicant's needs for at least 100 years.⁹⁸ The AWS Program is similar to the Water Adequacy Program in that an applicant must either acquire a certificate of AWS or a written commitment of service from a water provider serving their area that has been determined to have AWS.⁹⁹ However, in contrast to the Water Adequacy Program, a developer who is unable to acquire a certificate of AWS for his subdivision is prohibited from selling or leasing the land.¹⁰⁰

While Arizona's AWS Program seems to be helpful in reducing subdivisions with inadequate water supply within AMAs, the Water Adequacy Program has been criticized for its effect in areas experiencing growth that are not within AMAs since the determination of the Department of Water Resources under the program "has no legally binding effect."¹⁰¹ Indeed, one source reports that most projects that receive a finding of an "inadequate water supply" go forward anyway, resulting in "many subdivisions in rural Arizona [that] are constructed with tenuous and unreliable water sources."¹⁰² However, as noted above, the Arizona legislature has recently attempted to broaden the reach and effectiveness of the water adequacy laws to rural Arizona by enabling local governments to adopt an ordinance requiring water adequacy reviews for new developments.

In 2001, California enacted what are commonly referred to as the SB 221/SB 610 requirements.¹⁰³ The SB 221/SB 610 requirements tie land development to water availability for large construction projects. "SB 221 and SB 610 . . . are intended to ensure that local land use authorities will thoroughly consider the availability of water supplies before approving major new developments."¹⁰⁴ SB 221¹⁰⁵ prevents local governments from approving development agreements, parcel maps, or tentative tract maps for subdivisions with more than 500 dwelling units unless a sufficient water supply will be available after the subdivision is completed. SB 221 requires a water supplier to consider (1) the historical availability of water over a 20-year period; (2) the applicability of urban water footage contingency analysis; (3) the reduction in water supply allocated to specific water-use sectors in accordance with a resolution, ordinance or contract; and (4) the possibility of receiving other water from other water suppliers.¹⁰⁶

SB 610 requires local governments to consider water availability when considering certain development projects to determine whether water supply can satisfy the development's projected demand. These projects include (1) shopping centers or business establishments employing more than 1,000 people or containing more than 50,000 square feet of floor space; (2)

⁹⁸ *Id.* at 2.

⁹⁹ *Id.* at 3.

¹⁰⁰ *Id.* at 2.

¹⁰¹ Tarlock & Van de Wetering, *supra* note 5, at 62.

¹⁰² *Id.*

¹⁰³ These bills are also known as the Kuehl and Costa legislation, named after the respective state senators that introduced the legislation.

¹⁰⁴ Bruce Tepper, *Practice Tips: New Water Requirements for Large-Scale Developments*, 27 L.A. LAW. 18, 20 (2005).

¹⁰⁵ SB 221 and SB 610 affect numerous provisions in the California Codes. The California Department of Water Resources prepared a thorough guidebook regarding SB 221/SB 610. See CAL. DEP'T OF WATER RES., GUIDEBOOK FOR IMPLEMENTATION OF SENATE BILL 610 AND SENATE BILL 221 OF 2001 ix, vii (Oct. 3, 2003), at <http://www.water.ca.gov/nav/nav.cfm?loc=t&id=105> (last visited Jan. 21, 2008).

¹⁰⁶ Tepper, *supra* note 104, at 21.

commercial buildings employing more than 1,000 people or containing more than 250,000 square feet of floor space; (3) hotels or motels containing more than 500 rooms; and (4) industrial or manufacturing plants occupying more than forty acres or containing more than 650,000 square feet of floor area.¹⁰⁷ For these projects, cities and counties must request a water supply assessment from the water supplier most likely to service the project.¹⁰⁸

However, the water adequacy laws in Arizona, California, Colorado and New Mexico have loopholes, like most other water adequacy laws.¹⁰⁹ In these states, in subdivisions with fewer than five or six units, “[h]ouseholds are allowed to drill wells for their own use without going through the water rights application process[.]”¹¹⁰ which is obviously problematic for water supplies that are already completely appropriated. One source also notes that California’s state-imposed water adequacy review of subdivisions prior to final map approval applies only to subdivisions greater than 500 units.¹¹¹ Nevertheless, local governments have the authority to review smaller developments for water adequacy and often do so.¹¹² In addition, subdivision adequacy requirements “can help protect communities from unforeseen water shortages, but if [a subdivision requirement] is too restrictive, it can drive up home prices. If it is too lax, it won’t prevent resource depletion. The challenge is to strike a balance, to protect the resource base while keeping housing affordable.”¹¹³

1.1.B.(ii)(d) *Environmental Impact Reviews for New Development*

In addition to requiring developers of subdivisions to prove adequate water supplies before approval of a plan, some states also require projects of a certain size to undergo an environmental impact review to determine potential negative effects on the environment and natural resources. For example, in California, “almost all commercial and industrial developments, as well as residential projects that exceed a certain size[.]”¹¹⁴ are required to undertake environmental reviews under the California Environmental Quality Act (CEQA).¹¹⁵ CEQA applies to projects that will be undertaken by a state or local government agency or that require approval by these entities.¹¹⁶ A “project” is defined as an activity that has “the potential to have a physical impact on the environment and may include the enactment of zoning ordinances, the issuance of conditional use permits and the approval of tentative subdivision maps.”¹¹⁷ The agency or one of the agencies from whom the project must gain approval is required to complete an initial study of the project and determine if the impacts are significant. If the agency determines that the impacts to the environment are significant, it prepares an

¹⁰⁷ CAL. WATER CODE § 10912(a) (2007).

¹⁰⁸ *Id.* § 10911(b).

¹⁰⁹ Hanak & Browne, *supra* note 87, at 162 (citation omitted).

¹¹⁰ *Id.*

¹¹¹ *Id.* at 156; *see* CAL. GOVT. CODE § 66473.7.

¹¹² Hanak & Browne, *supra* note 87, at 156; *see* CAL. GOVT. CODE § 66473.7.

¹¹³ Hanak & Browne, *supra* note 87, at 164. *See also infra* Chapter 1, Section 3. *Domestic Well Exemptions and their Impact on Growth Management*, pages 61-65.

¹¹⁴ JANE SILBERSTEIN & CHRIS MASER, LAND-USE PLANNING FOR SUSTAINABLE DEVELOPMENT 174 (2000).

¹¹⁵ CAL. PUB. RES. CODE § 21000 to 21117 (2007).

¹¹⁶ California Resources Agency, The California Environmental Quality Act, *Summary and Overview*, at http://www.ceres.ca.gov/topic/env_law/ceqa/summary.html (last visited July 19, 2007).

¹¹⁷ *Id.*

Environmental Impact Report (EIR).¹¹⁸ The EIR must include a detailed statement discussing “[a]ll significant effects on the environment of the proposed project.”¹¹⁹

The EIR must discuss any inconsistencies between the proposed project and any general and regional plans,¹²⁰ as well as alternatives to the project, mitigation measures, and the “Growth-Inducing Impact of the Proposed Project.”¹²¹ In assessing the environmental impact of the project, the lead agency looks at many different aspects of the physical environment of the proposed project, including, among other things, “the resources involved, physical changes, alterations to ecological systems, and changes induced in population distribution, population concentration, the human use of the land . . . , health and safety problems caused by the physical changes, and other aspects of the resource base such as water, historical resources, scenic quality, and public services.”¹²²

In a recent case, *Vineyard Area Citizens for Responsible Growth, Inc. v. City of Rancho Cordova*,¹²³ the California Supreme Court set forth several principles relating to the analysis of future water supplies with which an EIR must comply in order to be adequate under CEQA. The court stated that an EIR may not ignore or assume a solution to the problem of water supply, nor may it give an analysis that is limited to water supply for only the first few years or the first stage of the project.¹²⁴ Additionally, the EIR must not rely on sources of paper water, but “must address the impacts of *likely* future water sources, and the EIR’s discussion must include a reasoned analysis of the circumstances affecting the likelihood of the water’s availability.”¹²⁵ The final principle articulated by the court is that in circumstances where uncertainty remains regarding future water supply, the EIR must discuss replacement sources of water or alternatives and their attendant environmental consequences.¹²⁶

The court clarified that while CEQA does not require certainty in the analysis of long-term water supplies at an early phase of project planning, provisions from the Water Code and the Government Code require “that ‘water supplies must be identified with more specificity at each step as land use planning and water supply planning move forward from general phases to more specific phases.’”¹²⁷ Under this framework, the court held that “[w]hile the EIR identifies the intended water sources in general terms, it does not clearly and coherently explain, using material properly stated or incorporated in the EIR, how the long-term demand is likely to be met with those sources, the environmental impacts of exploiting those sources, and how those impacts are to be mitigated.”¹²⁸ One attorney involved in the case described the court’s holding as a requirement that “an EIR must apprise decision-makers and the public of possible water

¹¹⁸ *Id.*

¹¹⁹ CAL. PUB. RES. CODE § 21100(b)(1).

¹²⁰ 14 CAL. CODE REGS. § 15125(d), available at http://www.ceres.ca.gov/topic/env_law/ceqa/guidelines/art9.html (last visited July 19, 2007).

¹²¹ *Id.* § 15126.

¹²² *Id.* § 15126.2(a).

¹²³ 40 Cal.4th 412, 150 P.3d 709 (Cal. 2007).

¹²⁴ 40 Cal.4th at 431; 150 P.3d at 720.

¹²⁵ *Id.* (citation omitted).

¹²⁶ *Id.*

¹²⁷ *Id.* at 722 (quoting amicus curiae Association of California Water Agencies).

¹²⁸ *Id.* at 713.

shortfalls and the potential environmental impacts of those shortfalls before a long-term development project is approved.”¹²⁹ Some commentators see the case as an articulation by the California Supreme Court providing a comprehensive analysis of legislative and policy provisions that require a better connection between land use planning and water planning.¹³⁰

As shown by the *Vineyard Area Citizens* case, environmental review for new development can be an effective way to integrate water concerns with growth, especially when there are concerns about the specific effects that new development will have on existing water supplies and the communities that rely upon those supplies. If, as is the case in California, the environmental review process explicitly incorporates issues of water availability and is tied to the subdivision approval process concerning water supply, it is more likely to be effective as a means to integrate water concerns with growth. Beyond these ideas gleaned from the *Vineyard Area Citizens* case, there is very limited quantitative or qualitative data on the effectiveness of environmental review to integrate water and growth.

1.1.B.(ii)(e) *Impact Fees*

New development in suburban areas, agricultural areas or other greenbelts located outside the developed area of a city or county brings with it the need to build new infrastructure to meet the needs of new residents. An impact fee is defined as “the assessment by local government of financial charges upon the owner of new land development projects needed to offset capital expenditures made by the local government on infrastructure required to serve or made necessary by the new building.”¹³¹ Local governments are increasingly turning to impact fees as a way to offset the cost of providing infrastructure for new development and to make new development pay for itself instead of becoming a burden to the surrounding community.¹³² Before local governments can levy impact fees, they may need to verify that their state statutes allow them. Many western states have enacted legislation enabling and governing impact fees.¹³³

¹²⁹ Paul Shigley, *Court emerges as CEQA enforcer: state Supreme Court rejects housing project’s water analysis*, 22 CAL. PLANNING & DEV. Rep. 1 (Mar. 2007) (citing to Stephan Volker, attorney for Vineyard Area Citizens).

¹³⁰ *Id.*

¹³¹ Ronald H. Rosenberg, *The Changing Culture of American Land Use Regulation: Paying for Growth with Impact Fees*, 59 SMU L. REV. 177, 205 (2006) (citation omitted).

¹³² Ken Snyder & Lori Bird, *Redefining Progress, Paying the Costs of Sprawl: Using Fair-Share Costing to Control Sprawl*, 18 (Dec. 1998) at <http://www.smartcommunities.ncat.org/articles/sprawl.pdf> (last visited July 25, 2007).

¹³³ These include Arizona, California, Colorado, Idaho, Montana, New Mexico, Nevada, Oregon, Texas, Utah, and Washington. See ARIZ. REV. STAT. ANN. §§ 9-463.05, 11-1101 to 11-1103 (LexisNexis 2008) (Arizona enabling statutes); CAL. GOV. CODE §§ 66000 to 66025 (LexisNexis 2008) (California enabling statutes); COLO. REV. STAT. §§ 29-1-801 to 29-1-804 (LexisNexis 2008) (Colorado enabling statutes); IDAHO CODE ANN. §§ 67-8201 to 67-8216 (LexisNexis 2008) (Idaho enabling statutes); MONT. CODE ANN. §§ 7-6-1601 to 7-6-1604 (LexisNexis 2008) (Montana enabling statutes); N.M. STAT. ANN. §§ 5-8-1 to 5-8-43 (LexisNexis 2008) (New Mexico enabling statutes); NEV. REV. STAT. §§ 278B.010 to 278B.330 (LexisNexis 2008) (Nevada enabling statutes); OR. REV. STAT. §§ 223.297 to 223.314 (LexisNexis 2008) (Oregon enabling statutes); TEX. LOC. GOV’T CODE §§ 395.001 to 395.082 (LexisNexis 2008) (Texas enabling statutes); UTAH CODE ANN. §§ 11-36-101 to 11-36-501 (LexisNexis 2008) (Utah enabling statutes); WASH. REV. CODE §§ 82.02.010 to 82.02.100 (LexisNexis 2008) (Washington enabling statutes).

In 1992, the Idaho Legislature passed the Idaho Development Impact Fee Act in order to ensure that adequate public facilities are available to serve new development, promote orderly growth and development, and establish minimum standards for impact fees.¹³⁴ The act sets minimum standards for the adoption of impact fees and requires local governments to comply with certain procedural requirements.¹³⁵ Additionally, the act requires an ordinance governing impact fees to include “a detailed description of the methodology by which costs per service unit are determined”¹³⁶ and it allows an exemption for affordable housing projects.¹³⁷ Development impact fees cannot exceed a proportionate share of the cost of system improvements.¹³⁸ In order to impose impact fees, local governments must have a capital improvements plan in place that contains, among other elements, an analysis of existing public facilities and their deficiencies, total capacity of facilities, and a description of system improvements and their costs that are necessitated by new development.¹³⁹

Impact fees that are assessed on the basis of the cost to obtain new water supplies may be more effective at integrating water and growth than those that are assessed only on the basis of the cost of constructing new infrastructure to deliver water to new development. One source asserts that “policies should encourage the development of new water supplies where these are necessary” and posits that “[a] fee-based system [or impact fees] may be the best way to streamline this process while taking advantage of scale economies.”¹⁴⁰ Impact fees may be a cheaper way for developers to provide needed water supplies for new development as opposed to requiring them to find their own water.¹⁴¹ Because impact fees can create a source of funding to obtain new water supplies while simultaneously requiring new development to internalize the cost of obtaining those supplies, they may be an effective tool to integrate water and growth.

1.1.B.(ii)(f) *Conservation Easements*

Conservation easements have become very common and relatively uncontroversial tools that enable states to manage growth while protecting the property rights of individuals and entities. According to one source, every state in the U.S. has adopted a conservation easement enabling statute allowing individuals to transfer to a government entity or private land trust a nonpossessory interest in property that imposes limitations or affirmative obligations upon the land as a means to preserve natural or open space values of the property.¹⁴² In order to encourage conservation easements, “federal tax policy provides a significant financial incentive for private landowners to grant conservation easements over their property via income tax deductions for donated easements,”¹⁴³ as long as they meet certain requirements. State laws governing the creation, legal enforceability, and tax consequences of conservation easements

¹³⁴ IDAHO CODE ANN. § 67-8202(1)-(3) (2007).

¹³⁵ *Id.* § 67-8204.

¹³⁶ *Id.* § 67-8204(16).

¹³⁷ *Id.* § 67-8204(10).

¹³⁸ *Id.* § 67-8204(1).

¹³⁹ *Id.* § 67-8208.

¹⁴⁰ Hanak & Browne, *supra* note 87, at 164.

¹⁴¹ *Id.*

¹⁴² Lawrence R. Kueter & Christopher S. Jensen, *Conservation Easements: An Underdeveloped Tool to Protect Cultural Resources*, 83 DENV. U.L. REV. 1057, 1058 (2006).

¹⁴³ *Id.* at 1057.

vary from state to state. For example, the Utah Land Conservation Easement Act defines a conservation easement as:

“[A]n easement, covenant, restriction, or condition in a deed, will, or other instrument signed by or on behalf of the record owner of the underlying real property for the purpose of preserving and maintaining land or water areas predominantly in a natural, scenic, or open condition, or for recreational, agricultural, cultural, wildlife habitat or other use or condition consistent with the protection of open land.”¹⁴⁴

Utah law provides that a conservation easement runs with the land,¹⁴⁵ and the instrument creating the easement must identify the purpose for which the easement is created and the date the easement terminates or a statement that the easement continues in perpetuity.¹⁴⁶ The holder of a conservation easement may be either a 501(c)(3) charitable organization or a governmental entity.¹⁴⁷ In addition, easements must be in writing and recorded in order to be valid.¹⁴⁸

In 2003, the Colorado Legislature amended their statute governing conservation easements to include the employment of conservation easements to restrict the use of water rights or to prohibit the alienation of water rights from the land to which it is appurtenant.¹⁴⁹ Indeed, one source asserts that it is “common practice among land trusts in the West to include language in conservation easements restricting appropriative water rights.”¹⁵⁰ In addition, conservation easements that restrict water use often contain one or more of three types of provisions, including “restricting water use, restricting transfer off the property to which the water rights are appurtenant, and compelling use so that water rights are not lost.”¹⁵¹ The use of a provision in the easement compelling use of water rights seeks to avoid the application of forfeiture or abandonment statutes. The owner of land subject to a conservation easement can continue using the water for agricultural or other pre-easement uses subject to the terms of the easement, or he can apply for a change of use with the state water agency.¹⁵² However, a failure to use the water for a beneficial use or to secure a change of use permit could lead to the forfeiture of the water right.¹⁵³

As noted above, a conservation easement could be drafted in such a way as to preclude a change in the use of the water rights attendant to land included in a conservation easement or to prohibit the transfer of water rights away from the property to which it is appurtenant.¹⁵⁴ This

¹⁴⁴ UTAH CODE ANN. § 57-18-2(1) (2007).

¹⁴⁵ *Id.* § 57-18-2(2).

¹⁴⁶ *Id.* § 57-18-4(3).

¹⁴⁷ *Id.* § 57-18-3.

¹⁴⁸ *Id.* § 57-18-4(2).

¹⁴⁹ Mary Ann King & Sally K. Fairfax, *Beyond Bucks and Acres: Land Acquisition and Water*, 83 TEX. L. REV. 1941, 1979 (2005).

¹⁵⁰ *Id.* at 1974-1975.

¹⁵¹ *Id.* at 1975.

¹⁵² *Id.* at 1979.

¹⁵³ *Id.*

¹⁵⁴ Peter D. Nichols, *Do Conservation Easements and Water Mix (in Colorado)?* 5 U. DENV. WATER L. REV. 504, 521 (2002); see also Nicole Lampe, Bruce Warren & Jim Walker, Rothberger Johnson & Lyons LLP, *Conservation Easements Motivated by Water and Tax Factors*, at

forges a link between water and growth because land is safeguarded from future development through the use of a conservation easement and the ability to use the attendant water rights for the development that might otherwise occur is subsequently foreclosed. “Just as conservation easements might be understood as preventing development on choice lands by acquisition of development rights, a conservation easement on water rights might be understood as preventing the development of water rights for residential use.”¹⁵⁵ However, two scholars state that they “are not convinced that conservation easements are an effective tool for addressing water quantity issues” because of the general problems created by conservation easements, including the seller’s control to decide the terms of the easement and the degree of protection, as well as problems of properly recording and enforcing easements.¹⁵⁶ They argue that these problems “are exacerbated when protecting water quantity is the goal[,]” but they also acknowledge that “conservation easements on water quantity strengthen the link between land and water rights.”¹⁵⁷ Therefore, conservation easements will likely be better tools for conserving both land and water resources if the terms of the easement explicitly restrict the use or transfer of water rights.

1.1.B.(ii)(g) *Purchase and Transfer of Development Rights*

Closely related to conservation easements is the idea of allowing a property owner to enter into an agreement with the local government that she will not develop her property through the purchase of development rights (PDR) or a development agreement. PDRs are very similar to conservation easements because the government purchases development rights from landowners in areas valued for open space or agriculture. PDR is a lower-cost option available to governments that want to conserve open space because they only purchase the development rights of the land as opposed to the entire fee.¹⁵⁸ In addition, it enables the government to protect open space while also keeping land in agriculture or other use.¹⁵⁹ PDR programs provide only an indirect link between growth and water supply to the extent that the purchase of development rights on agricultural or environmentally sensitive lands forecloses new development in the area and its attendant increased demand on water supplies.

In a program for the transfer of development rights (TDR), landowners in “sending areas” where development is restricted, such as agricultural areas, are allowed “to transfer densities and other development rights to landowners in areas appropriate for higher densities (or ‘receiving areas’).”¹⁶⁰ Because TDR “is not an ordinary part of the bundles or rights that accompany land ownership[,] . . . [s]tate governments must enact specific legislation to enable a local government to legalize the sending of a building right from one parcel to another.”¹⁶¹ The use of TDRs allows governments to “ameliorate the harshness of zoning restrictions” and gives them an alternative to

<http://www.rothgerber.com/showarticle.aspx?Show=664> (last visited Sept. 15, 2007) (reporting that agricultural conservation easements typically limit the use of the property to farming or ranching and could also “prohibit the separate transfer of water rights apart from the land”).

¹⁵⁵ King and Fairfax, *supra* note 149, at 1977.

¹⁵⁶ *Id.* at 1981.

¹⁵⁷ *Id.* at 1982.

¹⁵⁸ CHRISTOPHER DUERKSEN & CARA SNYDER, NATURE-FRIENDLY COMMUNITIES: HABITAT PROTECTION AND LAND USE PLANNING 65 (2005).

¹⁵⁹ *Id.*

¹⁶⁰ Freilich, *From Sprawl to Smart Growth*, *supra* note 10, at 288.

¹⁶¹ *Id.*, at 290.

purchasing the land.¹⁶² In TDR programs, developmental rights are assigned to landowners within a governmental jurisdiction based on the type of development that is authorized for that land in accordance with a master plan.¹⁶³ Before any building commences, a developer must buy additional development rights from other landowners in order to obtain enough rights required for a designated use.¹⁶⁴ Once a landowner sells her development rights, she and her heirs or transferees are barred from ever building commercial or residential developments on the land.¹⁶⁵

In 2003, New Mexico enacted a statute enabling the transfer of development rights from one parcel of land to another.¹⁶⁶ The statute authorizes municipalities or counties to enact ordinances providing for the transfer of development rights in accordance with a comprehensive plan and a zoning map that identifies areas from which development rights may be transferred and areas to which development rights may be transferred.¹⁶⁷ If a local government enacts a statute authorizing TDRs, it must provide for notice to areas where development rights may be transferred, rules to control the transfers and ensure compliance with the ordinance, the method of transfer for the development rights, joint powers agreements for TDRs across jurisdictional boundaries, and the voluntary transfer of development rights.¹⁶⁸ The purpose of the statute is to clarify the authority of and provide guidelines to municipalities and counties regarding TDRs, encourage the conservation of agricultural, ecological and historical land, and require public notification of TDRs.¹⁶⁹

TDRs can be an effective way to protect agricultural and other open space land while having the secondary effect of encouraging infill development and redevelopment. As noted in the section on conservation easements, protecting land from future development may provide an indirect link between growth and water to the extent that the water that is appurtenant to the land subject to the TDR is protected from being sold or transferred for development purposes. However, since water rights are property in themselves, transferring the development rights of property would not necessarily foreclose the property owner from selling or transferring her water rights to development that occurs on other land.

1.1.B.(iii) Water Planning Requirements

In addition to the tools discussed above, many states are also becoming more proactive with regard to the management of water resources in response to growing populations and constraints on water resources. While the water planning requirements discussed below are not typically categorized as growth initiatives per se, they are enacted by many states in an attempt to safeguard and manage their water supplies for the future because of the potential and actual consequences of growth on limited water supplies.

¹⁶² *Id.*

¹⁶³ *Id.* at 289.

¹⁶⁴ *Id.*

¹⁶⁵ *Id.* at 289-90.

¹⁶⁶ N.M. STAT. ANN. § 5-8-43 (2007).

¹⁶⁷ *Id.*

¹⁶⁸ *Id.* § 5-8-43.D.

¹⁶⁹ *Id.* § 5-8-43.A.

1.1.B.(iii)(a) *Water Plans*

It is not uncommon for a state to have a state water plan that establishes water policies and goals that the state water office attempts to implement. Most western states, and many states in other parts of the U.S., have state water plans that are updated periodically. However, state water plans are typically seen as an ineffective tool to link water and growth because they are often very general and deal primarily with water and not land use.

In addition to state water plans, some states have enacted legislation requiring regional or local water plans in accordance with the state water plan and in order to plan for water on a smaller scale. In 1987, New Mexico established regional water planning under the authority of its Interstate Stream Commission (ISC) after finding that “the future water needs of New Mexico can best be met by allowing each region of the state to plan for its water future[.]”¹⁷⁰ Under the legislation, regions are “self-defined through hydrological and political common interests” and undertake water planning at the local level under the direction and through funding provided by the ISC.¹⁷¹ Regional water planning is meant to assess a region’s current water supply, its future water demand, and how the region will meet its future demand with current supply.¹⁷² In assessing current supply, the region must obtain several measures of hydrological data for the region, including precipitation and streamflow data for surface water and geologic data and yields by aquifer for groundwater.¹⁷³ When determining demand, the region must account for present uses and future uses for a forty year period based on projections for population, future land use, and economic growth and jobs.¹⁷⁴ In preparing regional water plans, regions are directed to “presume all future water needs must be met by management of the water supply currently available to the region.”¹⁷⁵ Regional water plans must also include an analysis of the impacts of conservation on water use and potential sources of future water supply.¹⁷⁶

One source has questioned whether the regional plans can actually be implemented and also noted that “[t]here is no statutory guidance for connecting the regional water plans with the local land use and development decisions made by city councilors and county commissioners. Furthermore, local government officials are under no ‘edict’ to adopt the regional water plan or agree to conform local decision making to the ‘vision,’ goals, and policies that ultimately will find their way into the regional water plan.”¹⁷⁷ As noted with other planning requirements, regional water plans that have no impact on future development or actions taken by local governments are not as effective as they could be and may be little more than “very good tools

¹⁷⁰ *Id.* § 72-14-43.A..

¹⁷¹ ISC, *Regional Water Planning in New Mexico*, (1999), at <http://www.ose.state.nm.us/doing-business/water-plan/rwpnm-pamphlet.html> (last visited Aug. 6, 2007).

¹⁷² *Id.*

¹⁷³ ISC, *Regional Water Planning Handbook*, (1999), at <http://www.ose.state.nm.us/doing-business/water-plan/rwp-handbook.html#assumptions> (last visited Aug. 6, 2007).

¹⁷⁴ *Id.*

¹⁷⁵ *Id.*

¹⁷⁶ *Id.*

¹⁷⁷ Lora Lucero & A. Dan Tarlock, *Water Supply and Urban Growth in New Mexico: Same Old, Same Old or a New Era?*, 43 NAT. RESOURCES J. 803, 823 (2003).

for educating the public and giving members of the public a forum to express their opinions. . .
„178

In California, water districts that meet certain requirements must prepare and adopt an urban water management plan (UWMP).¹⁷⁹ The UWMP focuses mainly on issues of water supply, and it must plan for the next 20 years and be updated every 5 years.¹⁸⁰ The Urban Water Management Planning Act (Act) allows urban water suppliers to meet the requirements of the Act by preparing an individual UWMP or “by participation in areawide, regional, watershed or basinwide urban water management planning[.]”¹⁸¹ and it requires urban water suppliers to coordinate with other agencies in the area in preparing its UWMP, “including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.”¹⁸² Completion of a covered utility’s UWMP is required in order to be eligible for financial assistance from the state, but one study found that one-sixth of eligible utilities failed to submit UWMPs in 2000 as required.¹⁸³ Additionally, a UWMP that provides comprehensive information on current and future supply and demand “can serve as a basis for demonstrating adequate long-term supplies” as required for certain new development under California law, as discussed above.¹⁸⁴

While one source argues that the UWMP requirements fail to “induce coordination and collaboration between water planners and their land use counterparts[.]”¹⁸⁵ a comprehensive study conducted by the Public Policy Institute of California found that 70% of planners in California knew of at least one document projecting how growth will affect water supply, with a majority of the planners citing to utility planning documents, including UWMPs.¹⁸⁶ The study also found that “[a] significant majority of city and county land-use departments report that they participate in the planning activities of their water utilities.”¹⁸⁷ So while the Act is by no means perfect, there is evidence that it is increasing the degree of collaboration between local water management agencies and land-use planners.

1.1.B.(iii)(b) *Watershed Planning*

Watershed planning is similar to other regional or local water planning, but it is done based on the natural geographical boundaries of a watershed rather than the political boundaries of a municipality or county. While watershed management is not a new idea in the United States or in the western states, more people are recognizing the fact that water systems are intricately interconnected and “watershed-based problems . . . demand watershed-based solutions.”¹⁸⁸ One

¹⁷⁸ *Id.*

¹⁷⁹ CAL. WATER CODE § 10620(a) (2007).

¹⁸⁰ Ryan Waterman, Comment, *Addressing California's Uncertain Water Future by Coordinating Long-Term Land Use and Water Planning: Is a Water Element in the General Plan the Next Step?*, 31 ECOLOGY L.Q. 117, 163 (2004).

¹⁸¹ CAL. WATER CODE § 10620(d)(1).

¹⁸² *Id.* § 10620(d)(2).

¹⁸³ Hanak, *Water for Growth*, *supra* note 3, at 33, 49.

¹⁸⁴ *Id.* at 32.

¹⁸⁵ Waterman, *supra* note 180, at 170.

¹⁸⁶ Hanak, *Water for Growth*, *supra* note 3, at 55-56.

¹⁸⁷ *Id.* at 57 (citation omitted).

¹⁸⁸ J.B. Ruhl et al., *Proposal for a Model State Watershed Management Act*, 33 ENVTL. L. 929, 931 (2003).

way to construct and implement watershed-based solutions is to plan for water resources on a watershed basis. One state that takes this approach is Washington, in which citizens in a watershed are enabled “to join together to assess the status of the water resources in their watershed and determine how best to manage them.”¹⁸⁹ The state is split into 62 geographic areas called Water Resource Inventory Areas (WRIA) that are defined on the basis of surface water resources.¹⁹⁰ A watershed planning area must include at least one entire WRIA, and it may include several.¹⁹¹ As mentioned above, the planning process is voluntary. In order to initiate planning, all counties, the largest city, and the largest utility in a WRIA must agree to plan, and tribes with lands within the WRIA must be invited to participate.¹⁹² Once the planning process is initiated, certain processes must be followed and the resulting watershed plan must include at least a discussion of water quantity.¹⁹³ It may also include a discussion of water quality, habitat, and instream flows.¹⁹⁴ Additionally, the plan must be consistent with existing laws and other commitments, and no government or organization is bound by the plan unless it voluntarily commits to plan provisions.¹⁹⁵

As with water planning in general as a tool to more closely integrate water and land use planning, there is disagreement as to the effectiveness of watershed planning and management to integrate water and growth. One source asserts that “the efforts are ad hoc and experimental, and the jury is still out on their success. . . . If watershed protection is to become the principal vehicle for the practice of environmentally sustainable land and water management, it must overcome two barriers.”¹⁹⁶ These barriers are identified as (1) the need for inter-governmental cooperation to become the norm rather than the exception and (2) the modification of traditional water and land use rights in order to create consistency with the sustainability of watersheds.¹⁹⁷ Another source argues that “most states purporting to adopt statewide watershed management approaches omit important water resource authorities from the program, such as wetlands protection, coastal land-use regulation, water quality standards, and even nonpoint source pollution control, and fail to link watershed management with local planning and zoning decisions.”¹⁹⁸ Based on these sources, it seems that watershed planning and management programs might be more effective if they are comprehensive and corresponding institutional changes are made in order to utilize their full potential.

¹⁸⁹ Wash. Dep’t of Ecology, *The Watershed Planning Act*, (2005), at <http://www.ecy.wa.gov/watershed/misc/background.html> (last visited Aug. 6, 2007).

¹⁹⁰ Wash. Dep’t of Ecology, *Guide to Watershed Planning and Management*, Draft, ix (1999), at <http://www.ecy.wa.gov/pubs/99106.pdf> (last visited Aug. 6, 2007) [hereinafter Ecology, *Guide to Watershed Planning and Management*].

¹⁹¹ *Id.* at ES-2.

¹⁹² Municipal Research and Services Center of Washington, *Watershed Planning*, at <http://www.mrsc.org/Subjects/Planning/watershed.aspx> (last visited Aug. 13, 2007).

¹⁹³ Ecology, *Guide to Watershed Planning and Management*, *supra* note 190, at 1-5.

¹⁹⁴ *Id.*

¹⁹⁵ *Id.*

¹⁹⁶ A. Dan Tarlock, *Putting Rivers Back in the Landscape: The Revival of Watershed Management in the United States*, 6 HASTINGS W-NW J. ENV. L. & POL’Y 167, 195 (2000).

¹⁹⁷ *Id.*

¹⁹⁸ Ruhl et al., *supra* note 188, at 940 (citation omitted).

1.1.C. Options to Improve Integration of Water Management and Land Use Planning¹⁹⁹

As state and local governments, citizens, planners, and scholars have recognized the potential water supply problems associated with unregulated growth, there has been an attendant recognition of the need to more closely integrate water management and land use planning. There are several arguments for more closely integrating the two areas, with perhaps the strongest being that “unregulated growth can reduce the water available to meet local needs.”²⁰⁰ This section discusses options that have been formulated and discussed by planners and scholars for more closely integrating water management decisions with local land use planning decisions. Experts are offering “new ways to link watershed health and integrity to land development and growth” that are innovative and diverse.²⁰¹ Commentators have also noted that “a variety or mix of efforts and changes at many different levels” is the route that will most likely lead to more effective integration of land use and water supply decisions.²⁰² In light of this fact, several policy options are discussed below in an effort to give an overview of what states can do on their level and encourage on a local level to integrate water and growth. Indeed, commentators have noted that “[t]he most critical steps for mending the disconnects [between water supply and land use planning] must be taken at the state level, but clearly within a partnership role between the federal and local governments.”²⁰³

The options discussed below are in no way exhaustive, either in the number, variety, or the complexity of options. In addition, while “a growth-control strategy based solely on limiting access to water resources will likely be ineffective[.]”²⁰⁴ integrating issues of water supply into growth management and land use planning could help states or local governments that are experiencing growth in the context of limited or strained water supplies.

¹⁹⁹ While linking land use planning and water management is the general topic of this section, perhaps a preliminary question is whether states should allow local governments to actually determine how and where growth is occurring. Some states may prevent local governments from measuring growth in precisely those areas that need growth management the most. E-mail from Curt Martin, Chief, Water Rights Bureau, Mont. Dep’t of Natural Res. and Conservation to Craig Bell, Executive Director, W. States Water Council (Mar. 28, 2008 12:28:55 PM) (on file with the authors). Generally, land use and water use decisions that favor growth and change are driven largely by the preferences of individual property owners and market forces; not by government regulation. *Id.*

²⁰⁰ Barton H. Thompson, Jr., *Water Management & Land Use Planning: Is It Time for closer Coordination?*, in WET GROWTH, *supra* note 62, at 95, 113.

²⁰¹ Craig Anthony Arnold, *Polycentric Wet Growth: Policy Diversity and Local Land Use Regulation in Integrating Land and Water*, in WET GROWTH, *supra* note 62, at 393, 433 [hereinafter Arnold, Polycentric Wet Growth].

²⁰² *Id.* at 414.

²⁰³ A. Dan Tarlock & Lora A. Lucero, *Connecting Land, Water and Growth*, 54 LAND USE L. & ZONING DIGEST 3, 7 (2002).

²⁰⁴ WSWC, *Water Policy*, *supra* note 86, at 20.

1.1.C.(i) Comprehensive Watershed Planning and Management

The Watershed Approach

Generally, the watershed approach proceeds from the assumption that sound water resource management decisions depend on understanding the relationship between water use, water quality and the conditions within the watershed. A watershed is the geographic delineation of an entire water body system and the land that drains above a certain outlet point. By selecting the location of the outlet point, a watershed can be made larger or smaller; smaller watersheds can nest within larger watersheds. The watershed management zone can then be defined to match the geographic scale of the problems to be addressed. In the watershed approach, community-based partnerships between local sponsors and partners determine the focus of efforts. A government agency may assume a lead role as a result of a negotiation or in the early stages of the process while local partnerships are forming, but often the government role is typified by providing support to local sponsors and partners to guide decision making on local issues. The culmination of watershed based efforts is the implementation of regulatory and non-regulatory solutions that address local water resource problems, involving coordination and integration of various programs and activities affecting the watershed.

As noted above, watershed management is not a new concept in the United States or in the western states,²⁰⁵ and much has been written regarding its history, development and merits.²⁰⁶ Federal agencies and state governments are beginning to recognize that approaching water resources on a watershed level is a more effective way to deal with issues affecting water resources, including quantity and quality. “A watershed is a topographically delineated area that is drained by a stream system—the total land area above some point on a stream or river that drains past that point.”²⁰⁷ One source defines a watershed approach as one that is hydrologically defined, geographically focused, includes all stressors of both air and water, involves all stakeholders, and strategically addresses priority water resource goals.²⁰⁸ Another source advocates the use of eight basic management tools in watersheds to mitigate the impacts of development, including watershed planning, land conservation, aquatic buffers, better site design, erosion control, stormwater treatment practices, control of non-stormwater discharges, and watershed stewardship.²⁰⁹ Another source asserts that “[a] watershed management approach to land stewardship is a framework for more effective land-use policies”²¹⁰ because this approach makes land-use decisions after considering their potential effects and impacts on natural resources within the watershed.

While watershed management is often undertaken to protect or restore water quality, it can also be an effective way to manage water quantity. The first action that must be taken in order to manage water resources on a watershed level “is for communities to recognize that they

²⁰⁵ PETER F. FFOLLIOTT ET AL., LAND STEWARDSHIP THROUGH WATERSHED MANAGEMENT: PERSPECTIVES FOR THE 21ST CENTURY 18 (2002).

²⁰⁶ See e.g., Tarlock, *supra* note 196; see also Arnold, Polycentric Wet Growth, *supra* note 201, at 417 n. 65.

²⁰⁷ Ffolliott et al., *supra* note 205, at 2.

²⁰⁸ U.S. EPA, *A Watershed Approach*, (2007) at <http://www.epa.gov/owow/watershed/approach.html> (last visited Aug. 6, 2007).

²⁰⁹ Center for Watershed Protection, *What’s a Watershed?*, at http://www.cwp.org/whats_a_watershed.htm (last visited Aug. 6, 2007).

²¹⁰ Ffolliott et al., *supra* note 205, at 112.

are part of watersheds and aquifer systems that control the amount of water available to support development.”²¹¹ EPA and other commentators note the importance of realistic and accurate measurements of current and future supply and demand when managing water and land resources on a watershed basis.²¹² “Doing the math first on the water supply and overall watershed conditions brings a dose of reality to a basin planning process.”²¹³ Additionally, some scholars advocate for new watershed institutions to be established that have real authority to manage the watershed—rather than serving in an advisory or planning capacity—and manage the watershed based on its carrying capacity.²¹⁴ The carrying capacity of a watershed is assessed by making an honest analysis of “renewable, sustainable water supply” and “possible new sources of supply. . . .”²¹⁵ Once the carrying capacity of a watershed has been assessed, the information should be “closely linked to development and growth decisions. The most effective way will be to require land use planners to conform their decisions, including everything from zoning to infrastructure expansion to subdivision approval, to the currently available or reasonably developable water supply.”²¹⁶

Another scholar, while not necessarily advocating the establishment of new watershed institutions, likewise advocates the use of watershed carrying capacity as a determinant of local action, asserting that comprehensive plans “should incorporate as a primary policy the directive that all growth, land use, and development shall be sustainable with respect to the carrying capacity of all watersheds in which the locality is located, the health and integrity of aquatic ecosystems generally, and the conservation of water resources.”²¹⁷ Another source also takes this approach and encourages communities to “[p]lan for safe, adequate and affordable water supplies as an integral part of growth. . . .”²¹⁸ While some commentators feel that establishing entirely new watershed institutions is necessary to truly manage water resources on a watershed level, states can empower and encourage existing government institutions to take a watershed approach to managing water resources within their jurisdiction by comprehensively considering the impact that water and land-use decisions will have on any and all watersheds in a given location. In addition, effective watershed planning and management will require a greater degree of cooperation and coordination between all levels of government, including federal, state, and local government entities.²¹⁹

²¹¹ Tarlock & Lucero, *supra* note 203, at 5.

²¹² See EPA, *Handbook for Developing Watershed Plans to Restore and Protect Our Waters* (2005), at http://www.epa.gov/owow/nps/watershed_handbook/ (last visited Aug. 14, 2007); Janet C. Neuman, *Dusting Off the Blueprint for a Dryland Democracy: Incorporating Watershed Integrity and Water Availability into Land Use Decisions*, in WET GROWTH, *supra* note 62, at 119, 162.

²¹³ Neuman, WET GROWTH, *supra* note 212, at 158.

²¹⁴ See *id.* at 161; Ruhl et al., *supra* note 188, at 933.

²¹⁵ Neuman, WET GROWTH, *supra* note 212, at 161-162.

²¹⁶ *Id.* at 167.

²¹⁷ Arnold, Polycentric Wet Growth, *supra* note 201, at 423.

²¹⁸ EPA, *Growth and Water Resources: The Link Between Land Use and Water Resources*, EPA 842-4-02-008 (2005), at <http://www.epa.gov/smartgrowth/pdf/growthwater.pdf> (last visited Aug. 15, 2007).

²¹⁹ A. Dan Tarlock, *The Potential Role of Local Governments in Watershed Management*, 20 PACE ENVTL. L. REV. 149 (2002).

1.1.C.(ii) Integrated Planning Systems

Nearly every article, book, or comment dealing with the topic of water and growth describes the fundamental disconnect between state water planning and local growth management or land use planning, and many acknowledge this disconnect as the biggest or one of the biggest barriers to integrating water supply with growth.²²⁰ “The gaps between different layers of government—federal, state, and local—create a complex disconnect, which might be called ‘vertical disconnects.’ For example, a state agency may persist in issuing domestic well permits to owners of substandard-sized lots over the objections of the local government attempting to prevent development of these antiquated parcels.”²²¹ On the other hand, there may be situations in which a local agency continues to approve new development without consulting the state or local water agency or over its objections. Greater coordination between these state and local government entities, as well as coordination between federal, state, and local governments generally when regulating water and land use planning, could do a great deal to bridge the gap between water management and land use planning.

In addition, “[t]here are also conflicts between communities within the same region, or ‘horizontal disconnects.’”²²² These horizontal disconnects can result in “a shift in development from the more regulated communities to the less regulated communities, resulting in severe watershed impacts coming quickly and intensively to some places.”²²³ Therefore, greater coordination between local governments at the regional level could also help integrate water and land use planning if local governments in the region collectively consider the impact that their land use policies have on the region’s water supply. Greater coordination between different levels of government and agencies in different localities would help to establish an integrated planning system, one that “pull[s] together substantive areas (such as land use, transportation, water and natural resources, economic development, etc.) as well as each level of government so that everyone is marching to the tune of the same drummer but supporting creative solutions.”²²⁴

1.1.C.(ii)(a) Greater Coordination between Land Use Planning Agencies and Water Resources Agencies

As noted above, “different levels of government conduct land use planning and water planning”²²⁵ with local governments generally controlling land use planning and state water agencies managing water supply. In addition, there are typically different agencies at the local level that govern land use planning and water and sewer services. For example, in California, “water supply planning is further complicated by the fact that water utilities and general-purpose

²²⁰ See, e.g., Arnold, Integrating Water Controls & Land Use Controls, *supra* note 62, at 1, 9 (while citing to the existence of many examples of integrated land and water management planning, also noting “the many levels of fragmentation in American society that disconnect land and water and facilitate environmentally unsustainable land use practices[.]”).

²²¹ Tarlock & Lucero, *supra* note 203, at 4-5.

²²² *Id.* at 5.

²²³ Arnold, Polycentric Wet Growth, *supra* note 201, at 421 (citation omitted).

²²⁴ Tarlock & Lucero, *supra* note 203, at 5.

²²⁵ EPA, *Growing Toward More Efficient Water Use: Linking Development, Infrastructure and Drinking Water Policies* 15 (2006) at http://www.epa.gov/smartgrowth/pdf/growing_water_use_efficiency.pdf (last visited Aug. 2, 2007) [hereinafter EPA, *Growing Toward More Efficient Water Use*].

governments operate as separate entities, whose physical boundaries only partly overlap. City and county governments are responsible for land-use decisions . . . which critically affect water demands.”²²⁶ A solution to this problem is voiced in the simple assertion that “[w]ater and land use planners should interact because land use decisions affect water demand.”²²⁷ “To be effective at protecting groundwater aquifers and other local water supplies . . . land use planners must work closely with water officials to identify the crucial threats to the supplies and potential solutions. Only a close partnership between the two groups is likely to succeed.”²²⁸ However, rather than “legally mandating cross-boundary stewardship,” states can make “legal changes to authorize and encourage coordination of multiple, diverse efforts and policies, as well as collaborations in stewardship across political and legal boundaries.”²²⁹ Indeed, one report from California indicates that there is generally a high level of contact between water and land use planning agencies,²³⁰ so state encouragement and education regarding the need for greater coordination and collaboration would most likely facilitate an already growing trend.

1.1.C.(ii)(b) *Coordination between Federal, State, and Local Governments*

There is also a lack of coordination between federal, state, and local governments regarding which level of government is responsible for managing land use and water. “In an era of minimal national government, the states and local communities will have most of the responsibility for coordinating water supply, development, and growth. At the same time, however, the federal government actively regulates local land use (three examples are wetlands, historic preservation, and endangered species) and its involvement is not without controversy.”²³¹ In addition, while states generally control water resources management within their boundaries, the federal government also regulates water resources through such statutes as the Clean Water Act (wetlands), the Safe Drinking Water Act, and the Endangered Species Act (endangered species). Because the federal government’s involvement affects both land use planning and water management, it can impact the degree of coordination between agencies and integration of water and land use planning.²³²

Similar to the implementation of greater coordination between the various agencies that deal with water and land use planning, the increased cooperation and collaboration between the

²²⁶ Hanak, *Water for Growth*, *supra* note 3, at 3.

²²⁷ Hanak & Browne, *supra* note 87, at 163.

²²⁸ Thompson, *supra* note 200, at 115.

²²⁹ Arnold, Polycentric Wet Growth, *supra* note 201, at 417.

²³⁰ Hanak, *Water for Growth*, *supra* note 3, at 55.

²³¹ Tarlock & Lucero, *supra* note 203, at 6.

²³² Tarlock and Lucero suggest that “[t]he federal government should provide incentives for local, regional, state, and federal collaboration—including financial resources, technical assistance, and making better information and data available to the states/regions/localities to foster better decision making. The federal government needs to provide carrots and sticks to the states to encourage (and sometimes prod) them to address the disconnects with meaningful reform.” *Id.* A report from the Council on Sustainable Development recommended that the various levels of government should work together to create integrated land use planning. Council on Sustainable Development, *Natural Resources Management and Protection Task Force Report* 40 (1999), at http://clinton2.nara.gov/PCSD/Publications/TF_Reports/natural.pdf (last visited Aug. 20, 2007). The report suggests that “[t]he federal government should establish a mechanism to provide a coordinated, well-focused federal effort in support of local planning where there is a federal interest[,]” and that “[t]he effort . . . also include exercise of federal authorities in conjunction with state and local authorities to assist in meeting common goals.” *Id.*

various levels of government will be achieved more effectively through encouragement as opposed to coercion and states can provide incentives to encourage compromise.²³³ Indeed, all levels of government can facilitate greater coordination by making policy changes that promote cooperation.

1.1.C.(ii)(c) *Coordination between Local Governments through Regional Planning*

As noted above, one of the problems caused by isolated local growth management efforts is that growth can be pushed just outside the limits of the municipality or to neighboring jurisdictions that have fewer regulations. “Some localities are more water-conscious and nature-conscious in their policies and decisions, while others are less so. Nonetheless, [there are] few incentives for local governments to coordinate their land use policies and regulations, to take responsibility for total watershed health, or even to be able to influence land use patterns sufficiently to achieve significant environmental protections.”²³⁴ In the Task Force Report on Natural Resources, the Council on Sustainable Development recommended that local governments should coordinate their plans and policies “with those of their neighbors to accommodate current growth, as well as plan for future development needs.”²³⁵ In addition, the report suggests that states should provide incentives to local governments to encourage them to cooperate and collaborate with other localities within the region when planning, “ensuring that [plans] are compatible rather than competitive.”²³⁶ Incentives and encouragement at the state level for local governments to collaborate and cooperate when planning for development in their region will lead to a more unified and coherent comprehensive plan that considers region-wide impacts on regional water supplies rather than only considering local impacts on local water supplies.

1.1.C.(iii) Requiring Local Comprehensive Plans that Include a Water Resources Element

As shown in section 1.1.B.(i), above, states have different requirements regarding the existence of local, regional, and state land use plans and the elements that must be included in these documents. Although many states require or strongly encourage the creation of comprehensive plans, “most states, and consequently most local governments, are planning, regulating, and building communities under model planning enabling laws written in the 1920s for a different world with very different challenges than those we face today.”²³⁷ However, commentators have noted the importance of planning, asserting that “[p]lanning should be a mandatory responsibility of each level of government and should precede regulatory authority.”²³⁸ States can establish clear requirements and guidelines for planning on the state, regional, and local level by adopting statewide goals and “clearly set[ting] forth the ‘who, what, when, where, and how’ of planning.”²³⁹ However, this is not to say that states should overtake

²³³ Council on Sustainable Development, *supra* note 232, at 42.

²³⁴ Arnold, Integrating Water Controls and Land Use Controls, *supra* note 62, at 40.

²³⁵ Council on Sustainable Development, *supra* note 232, at 41.

²³⁶ *Id.*

²³⁷ Tarlock & Lucero, *supra* note 203, at 7 (citation omitted).

²³⁸ *Id.* at 5.

²³⁹ *Id.* at 7 (citation omitted).

local planning; rather, “planning for growth should come from the bottom-up, but occur within the planning framework established by the state. . . . Local governments, with the involvement of the residents in the community, should make the tough decisions about how, where, and when to grow.”²⁴⁰ Clear requirements and guidelines that have been updated to correspond to the modern challenges of planning for all levels of government will create a more uniform approach to land use planning within and among the states. Additionally, state leadership in this area will ensure that local governments are not “operating in a vacuum, with little guidance or assistance from the states.”²⁴¹

In addition to requiring planning in general, “[s]tate legislatures could facilitate integrated water and land use planning by strengthening the requirements for a water resources element in comprehensive plans.”²⁴² While “[n]o country, state, city, or family has prepared a plan to run out of water,”²⁴³ a failure to plan for future water use and supply can produce the same outcome as planning to run out of water in an era of increasing demand for water and over-allocation of available supply. As several states, including Arizona and California, have begun to do, states “might require that [comprehensive] plans identify the known supplies of water for future development, quantify the demand that would result from projected population growth, and analyze how demand will be met by available supplies (or what additional water will have to be obtained).”²⁴⁴

One source suggests that local and regional governments establish a water budget in land use planning processes.²⁴⁵ A water budget is basically an assessment linking local water use to water supply.²⁴⁶ A water budget at the local level “can help a community to better understand the locally available water resources and compare them to the water demand.”²⁴⁷ In addition, a water budget can “prompt communities to implement conservation measures” when there are discrepancies between supply and demand.²⁴⁸ While the source specifically directs this recommendation to local and regional governments, states could encourage or require local and regional governments to include in their comprehensive plans a water budget that has been created through extensive public involvement and input. Additionally, other commentators suggest that “[s]tates and local governments [should] prepare realistic water budgets that balance supply with present and future demands.”²⁴⁹ Creation of a state water budget and state involvement in local establishment of water budgets would enable communities to reap the

²⁴⁰ *Id.* at 8-9.

²⁴¹ *Id.* at 7.

²⁴² Sarah Bates Van de Wetering, Public Policy Research Institute, *Bridging the Governance Gap: Strategies to Integrate Water and Land Use Planning* 10 (2006), at <http://www.uwyo.edu/openspaces/docs/Draft%20policy%20report%204-30-06%20Sarah%20Van%20de%20Wetering.pdf> (last visited Aug. 13, 2007) [hereinafter PPRI, *Bridging the Governance Gap*].

²⁴³ Tarlock & Lucero, *supra* note 203, at 4.

²⁴⁴ PPRI, *Bridging the Governance Gap*, *supra* note 242, at 11-12.

²⁴⁵ EPA, *Growing Toward More Efficient Water Use*, *supra* note 225, at 18.

²⁴⁶ *Id.*

²⁴⁷ *Id.*

²⁴⁸ *Id.*

²⁴⁹ Lora A. Lucero, *Comments: Connecting Water and Land—The Challenge of Implementation*, in WET GROWTH, *supra* note 60, at 443, 447 (citing to a group of individuals in New Mexico that work on land and water issues) [hereinafter Lucero, *The Challenge of Implementation*].

benefits of water budgets while having a stronger incentive to do so, as well as providing the potential for state funding to defray the costs of planning and implementing a water budget.

If states require local governments to include some type of water resources element in their comprehensive plans, they can facilitate this process by helping local governments obtain sufficient funding for plan preparation, implementation or enforcement. In addition, states can help local governments create comprehensive plans that are more accurate and useful by providing them with sufficient data to make better land use decisions. One source points out that “[e]nvironmental agencies, research institutions, and federal agencies collect and analyze a great deal of data and information, but do not necessarily make it easily accessible to localities. Providing municipalities with this information—and the technical capacity to use it to its full benefit—can help local officials and residents make decisions about the long-term impacts of the development decisions they make today.”²⁵⁰ Lack of accurate or detailed information about local water supplies can inhibit local governments from including a helpful and guiding water resources element in the comprehensive plan. Establishing state policies that facilitate the flow of information from water resources agencies to planning agencies, and perhaps a state clearinghouse on data and information related to water, could bridge the information gap and enable local governments to create more accurate, meaningful water resources elements in their comprehensive plans.

1.1.C.(iv) Consistency and Implementation of Water and Land Use Plans

While land use planning or water planning on a state, regional or local level is a laudable goal that typically generates information and promotes citizen involvement, plans should be consistent with other plans and policies and must be connected to actions and capable of implementation in order to provide any significant public benefit. “Plans must be more than mere public relations tools. Development decisions and public expenditures must be linked to the plan. If the link is not made, development decisions most likely reflect the short-term expedient response rather than the long-term public interest.”²⁵¹ The principle of requiring actions to be linked to the plan is called the consistency doctrine. The consistency doctrine is broadly defined as “the expression of the idea that plans are documents that describe public policies that the community intends to implement and not simply a rhetorical expression of the community’s desires.”²⁵² However, the term “consistency” is also used in this section with its regular meaning of harmony or compatibility.

1.1.C.(iv)(a) Requiring Consistency among Land Use Plans and Water Plans

As mentioned above, many state water resource agencies periodically prepare and implement a state water plan in order to manage the state’s water resources in accordance with certain goals and policies. It has also been mentioned elsewhere in this report that one of the main reasons for the disconnect between water supply and land use planning is the fact that

²⁵⁰ EPA, *Protecting Water Resources with Smart Growth* 62 (2004) at http://www.epa.gov/dced/pdf/waterresources_with_sg.pdf (last visited Aug. 21, 2007) [hereinafter EPA, *Protecting with Smart Growth*].

²⁵¹ Tarlock & Lucero, *supra* note 203, at 4.

²⁵² *Id.* at 7 (internal quotation marks and citation omitted).

different agencies from different levels of government typically control these areas. One source points out that while a growing number of states require land use plans to be consistent with other local plans and regulations, “few have gone the additional step of specifically requiring land use and water plans to be consistent.”²⁵³ Another source advocates a broad view of the consistency doctrine and encourages states to consider and work toward internal consistency of plans and inter-agency consistency.²⁵⁴ For example, state and local agencies might ask themselves: (1) whether regional water plans are consistent with the state water plan; (2) whether the water resources element in the local comprehensive plan is consistent with the regional and state water plans; (3) whether the water resources element in the local comprehensive plan is consistent with growth projections and land-use assumptions found elsewhere in the comprehensive plan; and (4) whether plans adopted by private utilities and water companies are consistent with local, regional, and state plans.²⁵⁵ Regardless, whether there is a consistency requirement or not, it makes more sense for the various agencies that have expertise over water resources and land use to coordinate plans since each area affects the other. In addition, requiring plans from the various levels of government that deal with the same area, such as local, regional, and state water plans, to be consistent will result in a more coherent and uniform product that does not create conflicting plans and provisions within a jurisdiction. Consistency provisions can also “support community efforts to incorporate the water implications of new growth into long-term planning and make the development approval process more predictable.”²⁵⁶

1.1.C.(iv)(b) *Requiring Consistency between Comprehensive Plans and Ordinances and Development*

Although requiring consistency between the plans generated by different agencies and different levels of government is important, it is not as important as requiring subsequent development decisions and zoning ordinances to be consistent with the local comprehensive plan. “Without an effective consistency requirement, the argument could be made that the planning process and the comprehensive plan represent the community’s vision and goals for the future, but the subsequent decisions taken to implement the plan represent the vision and goals of the special interests that can influence the political process.”²⁵⁷ In addition, when actions and local ordinances diverge from the policies and goals embodied in the comprehensive plan, citizens may lose faith in the planning process and see it as a waste of their tax dollars. One planner asks “If there’s no commitment by the public sector to follow the plan once it’s adopted, should the private sector be asked to invest time, energy and talents in the planning process? Should financial resources be thrown towards a planning process without a serious expectation of implementation?”²⁵⁸ Another scholar states that although consistency requirements are difficult to enforce legally, they “impos[e] background expectations on decisionmakers (and perhaps even landowners and developers) that land use and development must be consistent with the plan’s content or there must be a good reason to justify amending the plan. It can make the

²⁵³ EPA, *Growing Toward More Efficient Use*, *supra* note 218, at 16.

²⁵⁴ Tarlock & Lucero, *supra* note 203, at 7.

²⁵⁵ *Id.*

²⁵⁶ EPA, *Growing Toward More Efficient Use*, *supra* note 218, at 16 (citation omitted).

²⁵⁷ Tarlock & Lucero, *supra* note 203, at 8.

²⁵⁸ Lucero, *The Challenge of Implementation*, *supra* note 258, at 443, 445.

process more thoughtful than it might otherwise be. . . .”²⁵⁹ States could facilitate the implementation of comprehensive plans and increase the likelihood that local governments would comply with them by mandating that development decisions and land use ordinances conform to the goals and policies embodied in the plan.

1.1.C.(iv)(c) Requiring the Consideration of Local and Regional Comprehensive Plans when Making Water Allocation Decisions

In addition to requiring local governments to construct plans that are consistent with other local, regional, and state plans and then act in accordance with those plans, states can also promote integrated water and land use planning by requiring state water agencies to respect local plans regarding land and water use when making water allocations. The WSWC discussed this idea in its 1995 report on growth management and water, in the 2006 Western Governors’ Association (WGA) report on water needs for a sustainable future, as well as in the following section linking the public interest and growth management.²⁶⁰ The 1995 WSWC report states, “If one assumes the state’s role is to encourage and assist local communities regarding growth management, then decisions reached by local communities should be given considerable weight in determining whether new applications to appropriate water or to transfer existing rights are in the public interest.”²⁶¹ It is unclear whether existing laws in most western states allow consideration of local growth management plans in conducting a public interest review for the allocation or transfer of a water right.²⁶² The report asserts that providing water officials with explicit authority to consider local plans when adjudicating new water rights or water transfers, as well as instream flows, “would be an appropriate step in this direction.”²⁶³ This will be discussed in more detail in the next section of this report. In any event, this objective can be achieved by enacting legislation that specifically authorizes or requires state water officials to give weight to local plans when considering whether a new water allocation, instream flow allocation, or transfer is in the public interest.²⁶⁴ In conjunction with this type of legislation, a state may want to statutorily define the public interest to include consideration of local comprehensive plans.²⁶⁵ States can also further this effort by enacting legislation that allows local governments to adopt ordinances identifying what water uses are in the public interest.²⁶⁶

²⁵⁹ Arnold, Polycentric Wet Growth, *supra* note 201, at 424.

²⁶⁰ WSWC, *Water Policy*, *supra* note 86, at 22-23; WGA, *Water Needs and Strategies for a Sustainable Future* 6 (2006), at <http://www.westgov.org/wswc/water%20needs%20and%20strategies-finalrev.pdf> [hereinafter *Water Needs and Strategies*]; D. Craig Bell & Brian Poulsen, WSWC, *Draft Report: Consideration of Growth Management Plans into the Public Interest Review and Other Statutory Mandates relative to New Water Right and Transfer Applications* (2007), on file with WSWC [hereinafter WSWC, *Growth Management & Public Interest Review*] (discussing how some states require consideration of local growth management plans in a public interest review for allocation or transfer of water rights and options of how states can enable water agencies to do so). See also *infra* Chapter 1, Section 2, *Growth Management Plans as Part of the Public Interest Review for Water Right and Transfer Applications*, pages 40-60.

²⁶¹ WSWC, *Water Policy*, *supra* note 86, at 23.

²⁶² See WSWC, *Growth Management & Public Interest Review*, *supra* note 260, at 23-37.

²⁶³ WSWC, *Water Needs and Strategies*, *supra* note 260, at 6; WSWC, *Water Policy*, *supra* note 86, at 23.

²⁶⁴ See WSWC, *Growth Management & Public Interest Review*, *supra* note 260, at 37.

²⁶⁵ *Id.* at 38.

²⁶⁶ *Id.* at 40.

1.1.C.(v) Permit Requirements for New Development

In addition to planning and consistency requirements, state and local governments can plan for safe, adequate and affordable water supplies by ensuring that new development meets certain requirements in order to obtain a permit to begin construction. States can effectively integrate water supply and land use planning by requiring new development to undergo reviews to assess its likely or potential impacts on the surrounding environment and to prove availability and adequacy of water supply. In addition, states can authorize or require local governments to attach conditions to building permits when projects meet certain requirements or will have certain impacts. States could also require or encourage local governments to provide information to homebuyers of future water availability and cost.

1.1.C.(v)(a) *Environmental Review*

As noted in section 1.1.B.(ii)(e) above, several western states have enacted statutes requiring new development that meets certain size requirements to conduct an analysis to assess likely or foreseeable environmental impacts. One source refers to these environmental review statutes as “mini-NEPAs, state environmental policy acts that establish a process for reviewing and mitigating environmental impacts before development decisions are made.”²⁶⁷ The recommendation is made that “local governments study and factor into their land use decisions the impact of new subdivisions and development projects on the environment and regions from which water must be drawn. Environmental reviews conducted in connection with land use decisions should consider such impacts on both an individual and cumulative basis.”²⁶⁸ Within the framework of a comprehensive growth management program, states could mandate that all significant development projects must undergo environmental reviews that assess all environmental impacts, including water impacts.

However, at least two sources have asserted that while existing state environmental review statutes are useful for “making better information available to decision makers and encouraging (perhaps requiring) better coordination between different agencies, different jurisdictions and different substantive areas (such as linking water and land resources in the same review document)[,]” they are also limited in their usefulness since there is no subsequent monitoring or follow-up once the project is completed.²⁶⁹ One scholar suggests that “[r]equiring at least some subsequent monitoring and reassessment would go a long way toward increasing the accuracy of our predictions and would also help us assess the cumulative impacts of multiple similar actions.”²⁷⁰ Another source advocates the creation of a mechanism within state environmental review statutes that would allow us “to learn from our mistakes, or to correct the mistakes in a timely manner,” such as “statutory requirements for mitigation monitoring, as well as requirements for local, regional, and state report cards” that measure progress toward state and local goals embodied in planning documents.²⁷¹ State environmental review statutes requiring

²⁶⁷ Tarlock & Lucero, *supra* note 203, at 8 (citation omitted).

²⁶⁸ Thompson, *supra* note 200, at 109.

²⁶⁹ Tarlock & Lucero, *supra* note 203, at 8; see Holly Doremus, “Crossing Boundaries,” in *Wet Growth*, *supra* note 62, at 271, 306.

²⁷⁰ Doremus, *supra* note 269, at 307.

²⁷¹ Tarlock & Lucero, *supra* note 203, at 8.

subsequent monitoring of projects once they are completed could help to improve the environmental review process by illustrating current deficiencies and ways that water and land use might be more effectively linked.

1.1.C.(v)(b) *Water Availability Review*

In addition to environmental review, several states have enacted statutes requiring developers to prove that there is adequate water supply available for the proposed development. However, “[l]ocal permitting and approval processes for development often do not explicitly consider available water supplies when evaluating potential development.”²⁷² States or local governments “can require developers to identify the means by which they plan to meet the water [needs] of their development, evaluate the potential impact, if any, on existing residents, and weigh this impact in deciding whether to approve the development.”²⁷³ As noted above, water availability reviews for new development are a direct way to integrate water and growth, but the challenge in crafting these policies, according to one source, is “to strike a balance, to protect the resource base while keeping housing affordable.”²⁷⁴ Water availability assessments “will be most effective if completed early in the planning process, by connecting water supply plans to comprehensive plans, as well as at the point of permitting, when the impact of a specific proposed development can be estimated.”²⁷⁵ Additionally, other sources note the importance of getting rid of low-cost loopholes, like exemptions for domestic wells,²⁷⁶ and not allowing communities to create or construe water policies that require developers to obtain additional new water supplies rather than relying on conservation or demand management in an effort to “proscribe otherwise sensible growth to preserve current water practices.”²⁷⁷ When designing a water availability or environmental review program, states may also attempt to streamline the process as much as possible in order to avoid the costly delays and years of planning that can result from review programs and raise the final cost of homes in new developments.²⁷⁸

1.1.C.(v)(c) *Conditions for Permits*

“Although planning and zoning are necessary foundations to integrating watershed considerations into local land use controls, some of the most significant impacts will result from decisions on land use permit applications and the conditions of approval for the permits.”²⁷⁹ Local government officials have a great deal of discretion in permitting decisions because “the permitting system presumes—accurately from the perspective of practical implementation and operation—that an entirely rule-based system cannot be constructed with sufficient precision and

²⁷² EPA, *Protecting with Smart Growth*, *supra* note 250, at 49.

²⁷³ Thompson, *supra* note 200, at 113.

²⁷⁴ Hanak & Browne, *supra* note 87, at 164.

²⁷⁵ EPA, *Protecting with Smart Growth*, *supra* note 250, at 49.

²⁷⁶ Hanak & Browne, *supra* note 87, at 164.

²⁷⁷ Thompson, *supra* note 200, at 113 (noting that policies requiring developers to get new water supplies can end up harming the environment or region from which the new water is taken) (citation omitted).

²⁷⁸ See Hanak, *Water for Growth*, *supra* note 3, at 96. As part of a framework requiring water availability reviews, states could also encourage localities and developers to notify homebuyers of future water availability and cost. The information obtained through environmental and water availability reviews allows local governments to give accurate and meaningful information to future homebuyers, enabling them to make decisions that will be better for them and the environment in the long run.

²⁷⁹ Arnold, *Polycentric Wet Growth*, *supra* note 201, at 427.

detail to avoid both underregulation and overregulation.”²⁸⁰ One source asserts that “[t]he conditions that planning officials . . . craft when considering an application for a land use permit . . . can make the difference between unsustainable development and sustainable development.”²⁸¹ In addition, “[d]iscretionary permit decisions, tailored to each specific land use proposal and its potential watershed impacts, are necessary and beneficial because it is difficult or even impossible to create precise, detailed rules fixing the specific mix of [best management practices] and other conditions for every conceivable land use scenario.”²⁸² States can encourage local governments to impose permit conditions that promote sustainable development and water use when a proposed development will have certain specified effects on the surrounding area and environment.

1.1.C.(v)(c)(1) Best Management Practices

One type of permit condition that local governments can impose is the mandatory use of best management practices (BMPs). BMPs can require developers to install water-saving appliances and infrastructure in new developments, use vegetation and landscaping that are not water intensive, employ principles of cluster development, reclaim and reuse water, and to use narrower streets and permeable pavements.²⁸³ With regard to pavement, many sources have noted the negative impact that sprawling land use patterns and the attendant increase in impervious surfaces has on water quality and quantity.²⁸⁴ Impervious surfaces include “any . . . impermeable covering that impedes the natural filtration of precipitation and water flows into the soils.”²⁸⁵ Because impervious surfaces can “decrease the amount of local precipitation that leaches down into underground aquifers and later can be pumped to the surface to meet the needs of the local population[,]” local governments can reduce the problems of impervious surfaces by carefully planning where growth occurs in a region.²⁸⁶ BMPs for impervious surfaces could include heightened protection of areas that are more important to aquifer recharge, encouraging infill development, use of surfaces that permit greater infiltration,²⁸⁷ and placing restrictions on the percentage of land that can be covered with impervious surfaces.²⁸⁸ The use of BMPs can be an effective way to integrate water and growth because the permitting agency can include those BMPs in the permit that fit the land use and location and will be most effective in protecting water supply and other environmental concerns.²⁸⁹

²⁸⁰ *Id.*

²⁸¹ *Id.* at 428.

²⁸² *Id.* at 430.

²⁸³ *Id.* at 428.

²⁸⁴ See, e.g., American Rivers et al., *Paving our Way to Water Shortages: How Sprawl Aggravates the Effects of Drought* (2002) at <http://www.americanrivers.org/site/DocServer/PavingOurWayToWaterShortages.pdf?docID=164> (last visited Aug. 22, 2007).

²⁸⁵ Arnold, Integrating Water Controls and Land Use Controls, *supra* note 62, at 28 (citation omitted).

²⁸⁶ Thompson, *supra* note 200, at 114-115.

²⁸⁷ *Id.* at 115.

²⁸⁸ Arnold, Polycentric Wet Growth, *supra* note 201, at 426.

²⁸⁹ *Id.* at 430.

1.1.C.(v)(c)(2) Mitigation measures

In addition to or instead of requiring BMPs when granting permits, land use authorities can impose specific mitigation measures that must be taken by the developer to offset certain impacts. “Officials may choose to deny permit approvals based on watershed health considerations, but more often than not they will approve development projects with detailed, specific conditions aimed at having the developer or landowner minimize, mitigate, or internalize harmful impacts on neighbors, the community . . . and the natural environment.”²⁹⁰ The use of mitigation measures may allow a locality to reap the benefits of a new development while minimizing its negative impacts on the community and its surrounding environment. In addition, as noted with the use of environmental review statutes, it may be helpful to require subsequent monitoring of the development once construction is complete to ascertain whether the mitigation measures that were implemented were effective or not. By assessing the effectiveness of specific mitigation measures, local officials will be able to more effectively mitigate harmful outcomes in future developments.

1.1.C.(v)(c)(3) Impact fees

As also noted above, most states have adopted enabling legislation for impact fees as a means to offset the cost of building new infrastructure and obtaining new water supplies. The EPA advocates the use of varying sewer hookup fees and development fees based on the location of the development in an effort to make new outlying development pay the higher cost that is required to provide water supplies and infrastructure to outlying areas.²⁹¹ In addition, another source reports that impact fees are advantageous because “the presence of a known fee may take some uncertainty and delay out of the development process for builders.”²⁹² “[C]ommunities restricting growth because of limited water supplies would do well to consider charging higher up-front fees to help pay for new water.”²⁹³ States can allow local communities to make the most use of impact fees by enabling them to charge higher impact fees in areas where water supplies are limited and fees would help to offset the cost of obtaining more water supplies.

1.1.C.(vi) Clarify Utilities’ Duty to Serve

A 1995 WSWC report on growth management and water policy made several recommendations for more closely integrating water policy and growth management, including a recommendation that states clarify the duty of water suppliers’ to serve new development.²⁹⁴ Another source also made this recommendation, noting both the necessity and the complexity of doing so.²⁹⁵ The 1995 WSWC report noted the growing trend in utility law veering from the traditional stance that water utilities must provide water to all who can pay for it and are under an obligation to find new supplies to meet growing demand.²⁹⁶ However, the duty to serve is not absolute, and courts in recent years have approved the authority of utilities to deny service “for

²⁹⁰ *Id.* at 428.

²⁹¹ EPA, *Protecting with Smart Growth*, *supra* note 250, at 33, 35.

²⁹² Hanak, *Water for Growth*, *supra* note 3, at 83.

²⁹³ *Id.* at 84-85.

²⁹⁴ WSWC, *Water Policy*, *supra* note 86, at 20.

²⁹⁵ EPA, *Growing Toward More Efficient Water Use*, *supra* note 218 at 17.

²⁹⁶ WSWC, *Water Policy*, *supra* note 86, at 14.

inordinate cost, growth control, or for water conservation.”²⁹⁷ Despite this shift in policy, “the law is unclear regarding the scope of this authority and, as a result, much depends on court interpretation of the appropriateness of the vehicle the provider has chosen to achieve the growth-management objective.”²⁹⁸ The WSWC report suggests that states provide guidance on “appropriate methods to manage growth by controlling access to water service” within the framework of a comprehensive state growth management plan.²⁹⁹ EPA notes that a clarification of the state law on this topic, while complicated because of the intersection between water law, property law and municipality law, “is critical to localities’ ability to plan for future growth with confidence that they will not be undermined by claims for service to new development beyond their desired boundaries.”³⁰⁰ States can facilitate comprehensive local planning that includes consideration of water supply by clarifying the duty to serve and providing appropriate guidelines and planning assistance.

1.1.D. Conclusion

As western states continue to grow, it is increasingly more likely that water will become one of the main factors influencing where the growth occurs and at what rate. Despite the fact that land use planning has typically been handled at the local level and water planning and allocation at the state level, a closer integration of the two areas should enable state and local governments to make wiser decisions concerning growth, land use, and water resources that will create long-term benefits for their communities. While many of the growth initiatives currently utilized by states forge links between land use and water supply, planners and scholars are identifying new ways in which governments may more closely align water resources and land use planning. As discussed in the following section, one possible way to do this is to consider growth management plans during the appropriation and transfer process. As states formulate different approaches based on their needs and implement those options that work best for them, they will enhance the opportunity for sustainable growth linked to water supply and protection.

²⁹⁷ *Id.* at 14 (citations omitted).

²⁹⁸ *Id.* at 20.

²⁹⁹ *Id.*

³⁰⁰ EPA, *Growing Toward More Efficient Water Use*, *supra* note 218, at 17.

Chapter 1

Section 2

Growth Management Plans as Part of the Public Interest Review for Water Right and Transfer Applications

1.2.A. Introduction*

Over the last century, growth in many western cities and counties has challenged available water resources.³⁰¹ Reservoir storage, transbasin diversions, groundwater development, and market reallocations such as water rights transfers continue to facilitate growth in western areas where local surface water supplies have been exhausted.³⁰² However, in many western areas, rapid growth is negatively impacting water resources³⁰³—in both quantity, and quality.³⁰⁴ As discussed in the preceding section, this problem is exacerbated by the relative disconnect between water, and land use planning in managing growth.³⁰⁵

The following section reviews whether states should consider growth management in the applications process for water appropriations or transfers. Section 1.2.B. analyzes how some states require considering local growth management plans while reviewing water right applications. Section 1.2.C. discusses how states that do not specifically require considering

*We would like to acknowledge Brian Poulson, who served as a law clerk with the Western States Water Council, for his significant efforts in preparing this section.

³⁰¹ Joseph L. Sax, et al., *Legal Control of Water Resources* 15-17 (3rd ed. 2000).

³⁰² *Water Needs and Strategies*, supra note 260, at 4; see also A. Dan Tarlock, *We Are All Water Lawyers Now: Water Law's Potential But limited Impact on Urban Growth Management*, in *WET GROWTH: SHOULD WATER LAW CONTROL LAND USE?* 57, 58-59 (Craig Anthony Arnold ed., 2005).

³⁰³ See generally Craig Anthony Arnold, *Integrating Water Controls and Land Use Controls: New Ideas and Old Obstacles*, in *WET GROWTH: SHOULD WATER LAW CONTROL LAND USE?* 1 (Craig Anthony Arnold ed., 2005).

³⁰⁴ See generally, Robert Adler, *Fresh Water – Toward a Sustainable Future*, 32 ENVTL. L. REP. 10167 (Feb. 2002) (recommending shifts in current legal approaches to water quality and quantity problems in the United States).

³⁰⁵ See generally Arnold, supra note 303, at 1.

local growth management plans might incorporate such consideration in the public interest review during the water appropriation or transfer process. Section 1.2.D. provides options for states wishing to ensure that state water agencies have the authority to consider local growth management plans when reviewing water rights applications.

In so doing, it should be understood that “public interest” reviews are not the exclusive means of protecting public interest values or considering growth implications in water decisions.³⁰⁶ Further, water administrators have used the public interest standard as an independent basis for decisions regarding water allocation relatively infrequently. Most often, there is no legislative or judicial guidance as to the specific criteria that are included in the “public interest.” For this reason and others, one scholar has argued that state water agencies and courts are ill-equipped to determine such matters because “the issues are non-technical and subjective,” and the debate “is essentially a philosophical-political debate.”³⁰⁷ What represents the public interest becomes especially difficult in the face of competing applications.

Nevertheless, the mandate to consider the public interest remains part of the water law of virtually every western state and it seems likely that it will become more important as pressures mount for access to increasingly limited water supplies.³⁰⁸ Unprecedented population growth in many western states is a prime reason for this additional pressure, and many states are striving to deal with this phenomenon through various growth management initiatives. This section explores the role of the public interest review in relation to these growth initiatives.

1.2.B. Statutory Requirements for Considering Local Growth Management Plans in Reviewing Water Rights Applications

Some states, like Oregon, have actually integrated consideration of local, tribal, and community growth management decisions into application reviews for new appropriations and transfers.³⁰⁹ For example, the Oregon Land Use Act of 1973,³¹⁰ requires all cities and counties to

³⁰⁶ For example, in Colorado, while there is no “public interest” standard, standing requirements to protest water applications before the administering water courts are very liberal, and instream flow mechanisms exist to protect and augment flows to improve stream conditions. Regarding growth in particular, local county commissioners must address the connection between water supply and growth needs by a number of methods. The most common is to comply with state law and submit the water supply plan for a new development to the State Engineer who must evaluate the water supply to see if a long term water supply is both physically and legally available. Citizens Guide to Colorado Water Law, Colorado Foundation for Water Education (2004).

³⁰⁷ Charles T. DuMars, *Evaluating Judicial Capacity to Determine Public Welfare Values in Water Transfers*, in MOVING THE WEST’S WATER TO NEW USES: WINNERS AND LOSERS 17-1, 17-18 (Natural Res. L. Ctr. 1990).

³⁰⁸ The public interest review requirements which exist in most every western state must be distinguished from “the public trust doctrine.” This doctrine has been applied in some states, most notably in California, to preserve water flows based on residual public ownership, and in some instances to cut back on historic diversions, in order to sustain fish and wildlife habitat and recreation. See also *infra* 4.1.C. Public Interest Criteria for Appropriating and Transferring Water Rights, notes 1423-1455 and accompanying text.

³⁰⁹ OR. ADMIN. R. 690-380-3000(22) (2006) (requiring land use information for all transfer applications, as well as “[a] listing of the names and mailing addresses of: [a]ll affected [county, city, municipal corporations, and tribal governments”).

³¹⁰ Codified as amended in OR. REV. STAT. § 197 (2006).

adopt comprehensive plans, and local land-use ordinances to implement those plans.³¹¹ The comprehensive plans require local communities to plan for population growth, while preserving agricultural areas, open spaces, and natural resources.³¹² Additionally, state agencies and special districts must comply with these local comprehensive plans, by coordinating with local, state, and federal officials to avoid land use conflicts and planning inconsistencies.³¹³ Pursuant to this requirement, Oregon's Water Resources Department (OWRD) must consider local comprehensive plans when reviewing applications for new appropriations, water right transfers, and minimum instream flows.³¹⁴ Relevant OWRD regulations provide:

Land use and water management are integrally related. Statewide planning goals require comprehensive plans to include inventories of, and mechanisms to protect, important local water resources. State water laws require the Commission to protect the public interest in all waters of the state. Recognizing the responsibilities vested in both state and local government to manage and protect water resources, the Commission places a high priority on complying with statewide planning goals and achieving compatibility with local comprehensive plans. . . . In any action pursuant to a [water appropriation or transfer application] . . . the Commission and Department shall comply with the goals and be compatible with local comprehensive plans to the greatest extent possible.
...³¹⁵

Adhering to this policy, OWRD generally requires applications for water appropriations or transfers to comply with local comprehensive plans.³¹⁶ As a result, some have called Oregon's growth management program one of the most effective in the nation.³¹⁷ On the other

³¹¹ See *id.*; Or. Dep't of Land Conservation and Dev. (ODLCD), *Statewide Planning Goals*, at http://www.oregon.gov/LCD/goals.shtml#Statewide_Planning_Goals (last visited on Feb. 12, 2007).

³¹² ODLCD, *A Summary of Oregon's Statewide Planning Goals*, at <http://www.oregon.gov/LCD/docs/goals/goalssummary.PDF> (last visited on Feb. 12, 2007).

³¹³ OR. REV. STAT. § 197.180; OR. ADMIN. R. 690-005-0010, 690-005-0055(1).

³¹⁴ OR. ADMIN. R. 690-005-0020..

³¹⁵ *Id.*

³¹⁶ OR. ADMIN. R. 690-005-0025; OREGON WATER RES. DEP'T, WATER RIGHTS IN OREGON 18, 31 (2004), <http://www1.wrd.state.or.us/pdfs/aquabook.pdf>. There are two situations where the Water Resources Department does not require compliance with the local growth management plans. First, compliance is not required if the Department determines that the plan in question does not apply to the agency's action or that the plan will not be "substantially affected by the action." OR. ADMIN. R. 690-005-0030(3)(b)-(4)(c). If the Department makes either of these determinations, the "affected local government and irrigation district" must be given notice and 30 days to respond. *Id.* It is not clear what happens if the local government does not respond to the notice. Agency regulations merely state that the local government may "request to initiate dispute resolution" within 30 days of receiving notice. OR. ADMIN. R. 690-005-0030(4)(c). However, if the agency determines that the proposed action will comply with the local comprehensive plan and the local government fails to respond, the "Director may presume that the transfer would be allowed [under the local comprehensive plan]." OR. ADMIN. R. 690-380-5100(3) (2006); see also OR. ADMIN. R. 690-005-0040 (2006) (describing the applicable dispute resolution procedures). Second, compliance with a local comprehensive plan is not required where the "existing and proposed water uses would be located entirely within lands zoned for exclusive farm use . . . , involve changes in place of use only . . . , not involve the placement or modification of structures . . . , [and] involve irrigation water uses only." OR. ADMIN. R. 690-380-3000(22).

³¹⁷ Michael C. Soules, *Constitutional Limitations of State Growth Management Programs*, 18 J. LAND USE & ENVTL. LAW 145, 151 (2002).

hand, at least one study, while complimenting Oregon's integration of water and land-use planning, questions whether Oregon's comprehensive growth plan requirements have really affected how the OWRD reviews or acts on water right applications.³¹⁸ Specifically, the study questions whether the OWRD really has the political will to deny water rights permit to municipal suppliers based upon the consideration of a local growth management plan.³¹⁹ There is no case law that answers that question.

Like Oregon, Washington has also adopted a similar comprehensive planning statute that may impose a duty on its water agency to consider local plans when reviewing water rights applications.³²⁰ In 1990, Washington State adopted its Growth Management Act (GMA) in response to dramatic growth during the preceding decade.³²¹ Some of the goals of the GMA include encouraging sustainable development while discouraging sprawl, protecting and encouraging thriving local economies, conserving critical natural resources, and protecting the quality of the environment.³²² The GMA established, as the principle mechanism for meeting these goals, that the state's fastest growing cities and counties develop comprehensive plans.³²³ These comprehensive plans required the cities and counties to plan for and address issues of land use, housing, capital financing, utilities, rural development, transportation, and protecting resources, including water quality and supply.³²⁴ The GMA also provides that "[s]tate agencies shall comply with the local comprehensive plans and development regulations and amendments thereto adopted pursuant to this chapter. . . ."³²⁵

This requirement, that all state agencies comply with the local comprehensive plans suggests that the Washington Department of Ecology (Ecology), whose job it is to review applications for water appropriations and transfers, has a duty to at least consider, whether such a water allocation decision will impact local planning. However, this needs to be qualified.

Generally speaking, the requirement that state agencies comply with comprehensive plans is viewed as confined to the siting of state facilities, like a prison for example.³²⁶ Moreover, a recent case in front of the Washington Pollution Control Hearing Board suggests that Ecology is not required to consider the local comprehensive plan when reviewing a groundwater transfer application.³²⁷ In *Harrison v. Ecology*, the city of Chelewa filed an

³¹⁸ James R. Cohen, *Water Supply as a Factor in Local Growth Management Planning in the U.S.: A Review of Current Practice, and Implications for Maryland* iii (2004), available at www.smartgrowth.umd.edu/pdf/Cohenwater.pdf (last visited Feb. 11, 2007).

³¹⁹ *Id.* at 22.

³²⁰ See WASH. REV. CODE § 90.82.130(3).

³²¹ Eric S. Laschever, *An Overview Of Washington's Growth Management Act*, 7 PAC. RIM L. & POL'Y 657, 657 (1998).

³²² WASH. REV. CODE § 36.70A.020 (2006).

³²³ *Id.* § 36.70A.040; see also Laschever, *supra* note 321, at 662.

³²⁴ WASH. REV. CODE § 36.70A.070.

³²⁵ *Id.* § 36.70A.103.

³²⁶ E-mail from Ken Slattery, Manager, Water Resources Program, Washington Department of Ecology, to Brian Poulsen, Law Clerk, Western States Water Council (Jan. 20, 2007 9:00.04 A.M.) (on file with Western States Water Council). Research revealed no case law addressing whether the section 36.70A.103 requirement that state agencies comply with local comprehensive plans is relevant only to the citing of state facilities or whether it may also be applied to affect the review of a water right application.

³²⁷ *Harrison v. Ecology*, PCHB No. 04-074, 2004 WA ENV LEXIS 52, *7.

application to transfer part of its groundwater right, changing the point of diversion.³²⁸ A citizen affected by the city's transfer application challenged the transfer after the Ecology approved the application, arguing that Ecology failed to consider whether the proposed transfer would conform to the counties comprehensive plan under the GMA.³²⁹ The Hearing Board ultimately held that "[n]o provision in [Washington's groundwater transfer statute] makes compliance with GMA a requirement of a water right change or transfer."³³⁰

While this case clearly suggests that the Department of Ecology is not required to consider local comprehensive plans when reviewing transfer application for groundwater, it may not automatically follow that Ecology is also exempt from considering such local plans when reviewing applications for new appropriations. This is because Washington's general statutory treatment of transfers is different than its treatment of new applications.³³¹ Section 90.03.290 of Washington's water code clearly requires that Ecology consider the "public interest" when reviewing applications for new water rights.³³² However, such a "public interest" review requirement is noticeably absent from section 90.03.380, which governs the review for transfer applications.³³³ In fact, the Supreme Court of Washington has noted and upheld this difference.³³⁴ As discussed below, the "public interest" review requirement may be a fertile ground upon which states may require their water resource agencies to consider local growth management plans when reviewing water rights applications.³³⁵

Aside from Washington's GMA, the state also passed its Watershed Planning Act in 1998 (WPA).³³⁶ The beginning of the WPA states:

The purpose of this chapter is to develop a more thorough and cooperative method of determining what the current water resource situation is in each water resource inventory area of the state and to provide local citizens with the maximum possible input concerning their goals and objectives for water resource management and development. It is necessary for the legislature to establish processes and policies that will result in providing state agencies with more specific guidance to manage the water resources of the state consistent with current law and direction provided by local entities and citizens through the process established in accordance with this chapter.³³⁷

³²⁸ *Id.* at *2.

³²⁹ *Id.*

³³⁰ *Id.* at *7.

³³¹ WASH. REV. CODE § 90.03.290 (procedure for reviewing application for new appropriation); WASH. REV. CODE § 90.03.380 (procedure for reviewing applications for transfers existing water rights).

³³² WASH. REV. CODE § 90.03.290.

³³³ WASH. REV. CODE § 90.03.380.

³³⁴ *See* Public Util. Dist. No. 1 v. Dep't of Ecology, 51 P.3d 744, 796 (Wash. 2002) (holding that section 90.03.380's meaning "appears plain as to what prerequisites must be met in order to obtain a change in point of diversion, and consideration of the public interest is not required").

³³⁵ *See infra* Part 1.2.C. Considering Local Growth Management Plans as part of the Public Interest Review, pages 46-57.

³³⁶ WASH. REV. CODE § 90.82.

³³⁷ *Id.* § 90.82.005.

This statement of purpose clearly establishes that local planning input is a critical component of water management in Washington.³³⁸ The WPA provides a process to allow citizens to assess the status of the water resources in their watershed and determine how best to manage them through an implementation plan.³³⁹ The WPA requires implementation plans to address water quantity by undertaking an assessment of water supply and use within the watershed.³⁴⁰ This includes recommending long-term strategies to provide water in sufficient quantities to satisfy minimum instream flows and to provide water for future out-of-stream needs.³⁴¹

It is generally understood by Ecology officials, that Ecology will act on water right applications in a manner consistent with watershed plans, especially if Ecology participated in the development of the plan and accepted obligations that the plan places on the department pursuant to the WPA.³⁴² In fact, Ecology is required in many instances where it participated in the development of the implementation plan, to adopt administrative rules to implement those plans—and it is bound to follow its own rules.³⁴³

Finally, while not as clear as Washington or Oregon, Idaho appears to be another state that has expressed intent that its water agency considers local growth management plans while reviewing some water rights applications. Idaho Code section 42-202 establishes the required elements of an application for appropriation of water in that state.³⁴⁴ That section, along with section 42-202B, provides that if a municipal provider applies for a water appropriation to meet “reasonably anticipated future needs,” such an appropriation must not be “inconsistent with comprehensive land use plans approved by each municipality.”³⁴⁵ This same requirement applies to municipalities applying for transfers.³⁴⁶ Note, however, that the requirement to be consistent with local land use plans only applies to municipal water rights or transfer applications seeking “reasonably anticipated future needs” and not all water rights applications.³⁴⁷ Some scholars have noted that this tool provides a way for the state to use a local agricultural preservation plan as a basis to deny an agricultural to municipal transfer.³⁴⁸

Oregon, Washington, and Idaho are examples of states that have imposed express statutory mandates on water rights agencies to consider local growth management concerns when reviewing applications for new appropriations and in some instances transfer applications.³⁴⁹

³³⁸ *Id.*

³³⁹ *Id.* § 90.82.043.

³⁴⁰ *Id.*; see also Wash. Dep’t of Ecology, *The Watershed Planning Act*, at <http://www.ecy.wa.gov/watershed/misc/background.html> (last visited Feb. 14, 2007).

³⁴¹ *Id.*

³⁴² WASH. REV. CODE § 90.82.130(3). However, as one official recently noted, “it gets more interesting if the state (Ecology) was not an invited party to development of the plan. . . . In this case, I believe we would have some discretion whether to follow the plan or not.” E-mail from Ken Slattery, *supra* note 326.

³⁴³ WASH. REV. CODE § 90.82.130(3); see also E-mail from Ken Slattery, *supra* note 326.

³⁴⁴ IDAHO CODE ANN. § 42-202 (2006).

³⁴⁵ *Id.* §§ 42-202, 42-202B.

³⁴⁶ *Id.* § 42-222.

³⁴⁷ *Id.* §§ 42-202, 42-202B, 42-222.

³⁴⁸ Dan Tarlock & Sarah B. Van de Wetering, *Growth Management and Western Water Law: From Urban Oases to Archipelagos*, HASTINGS W.-NW. J. OF L. AND ENVTL. POL’Y 163, 181-82 (1999).

³⁴⁹ See discussion *supra* accompanying notes 309-348.

However, states without express statutory mandates to consider local growth management concerns may nevertheless have the authority to do so.³⁵⁰ As one official from Washington noted, regardless of any express statutory authority, Ecology would consider a local watershed plan “an expression of public interest and public interest is one of the four tests we must consider when evaluating a water right application.”³⁵¹

1.2.C. Considering Local Growth Management Plans as part of the Public Interest Review

In most western states, agencies are charged with considering the impacts on the “public interest” when reviewing applications for new appropriations.³⁵² In more than half of these states, agencies must also apply the public interest review to transfer applications.³⁵³ However, it is not always clear exactly what “public interest” means, or whether local growth management concerns qualify.³⁵⁴ Some states, like Alaska, have statutorily defined “public interest,”³⁵⁵ or developed administrative rules that help reviewing agencies administer the public interest

³⁵⁰ See *infra* Part 1.2.C.

³⁵¹ E-mail from Ken Slattery, *supra* note 326 (citing WASH. REV. CODE ANN. § 90.03.290).

³⁵² See ALASKA STAT. §§ 46.15.040, .080(a) (2006); ARIZ. REV. STAT. § 45-153 (2006); CAL. WATER CODE §§ 105, 1253, 1255, 1257, 2525 (Deering 2006); CAL. CODE REGS. tit. 23 § 946 (2006); IDAHO CODE §§ 202B, 203A, 222 (2006); IDAHO ADMIN. CODE r.37.03.08.045 (2006); KAN. STAT. ANN. §§ 82a-711 (2006); KAN. ADMIN. REGS. 5-3-9 (2006); NEB. REV. STAT. §§ 46-204, -234, -289, -683, -2,107, -2,116 (2006); NEV. REV. STAT. § 533.370(5) (2006); N.M. STAT. ANN. §§ 72-5-1, -6, -7, 72-12-3(E) (Michie 2006); N.D. CENT. CODE § 61-04-06(4) (2006); OR. REV. STAT. §§ 536.410, 537.130, .150, .153, .170 (2006); S.D. CODIFIED LAWS § 46-2A-9 (2005); TEX. WATER CODE ANN. § 11.134(b)(3) (Vernon 2006); UTAH CODE ANN. § 73-3-8(4) (2006); WASH. REV. CODE §§ 90.03.250, .290, 90.44.050, .060 (2006); WYO. STAT. ANN. §§ 41-3-931, -932, 41-4-503 (2006). Colorado does not have a public interest review requirement, and Oklahoma had one, but eliminated it in 1963. Douglas L. Grant, *Public Interest Review of Water Right Allocation and Transfer in the West: Recognition of Public Values*, 19 ARIZ. STATE L. J. 681, 683 fn. 16 (1987). However, OKLA. STAT. tit. 82 § 205.12 (2006), instructs that when reviewing applications for appropriation, “the Board shall consider . . . such other relevant matters as the Board deems appropriate. . . .” In Montana, public interest criteria may apply, but only for new appropriations equal to or greater than 5.5 cubic-feet per second or 4,000 acre-feet per year. See MONT. CODE ANN. § 85-2-311(3) (2006). Given the large quantities involved, such appropriations are rare. Consequently, the public interest criteria in Montana are rarely invoked. Generally, Montana is more like Colorado in terms of its regular water use permitting as far as public interest criteria are concerned. E-mail from Curt Martin, Chief, Water Rights Bureau, Mont. Dep’t of Natural Res. and Conservation to Craig Bell, Executive Director, W. States Water Council (Mar. 28, 2008 12:28:55 PM) (on file with the authors). The only exception is when water quality concerns are raised by an objector. *Id.*

³⁵³ See Douglas L. Grant, *Two Models of Public Interest review of Water Allocation in the West*, 9 U. DENV. WATER L. REV. 485, 486 n.2 (2006) *citing* ALASKA ADMIN. CODE tit. 11 § 93.930(b) (2007); IDAHO CODE ANN. § 42-222(1) (2006); KAN. STAT. ANN. § 82a-708b(a) (2005); MONT. CODE ANN. § 85-2-402(4) (2005) (using the phrase “reasonable use” but defining it in terms of usual public interest criteria); NEB. REV. STAT. §§ 46-290, -294(1) (2006); NEV. REV. STAT. § 533.370(5) (2005); N.M. STAT. §§ 72-12-7(A), 72-12B-1 (2006); S.D. CODIFIED LAWS § 46-2A-12 (2006), TEX. WATER CODE ANN. § 11.122 (Vernon 2006), *as implemented by* 30 TEX. ADMIN. CODE § 297.46 (2006); UTAH CODE ANN. § 73-3-3 (2006); *see also* Bonham v. Morgan, 788 P.2d 497, 499-500 (Utah 1989) (interpreting a similarly worded earlier version of § 73-3-3). While not all states with a public interest review for new appropriations apply the review to transfers, there does not appear to be a great discrepancy between how the review is applied to new appropriations and transfers in the states that do apply it to both. Thus, in the analysis below, this report does not distinguish between whether the public interest review at issue involved a new appropriation or transfer.

³⁵⁴ See Douglas L. Grant, *Public Interest Review of Water Right Allocation and Transfer in the West: Recognition of Public Values*, 19 ARIZ. STATE L. J. 681, 683 fn. 16 (1987) (discussing the history and criticisms of the public interest review standard).

³⁵⁵ ALASKA STAT. § 46.15.080(b); IDAHO CODE § 42-202B; KAN. STAT. ANN. § 82a-711(b); NEB. REV. STAT. § 46-289, -2,116.

principle.³⁵⁶ Even some of the states that do statutorily define “public interest” typically do so by listing factors the agency should weigh, and include at least one open-ended factor such as “harm to other persons resulting from the proposed appropriation,”³⁵⁷ or “all other matters pertaining to such question.”³⁵⁸ Other states that require the public interest review, provide agencies with little to no statutory guidance regarding what such a review includes.³⁵⁹ Consequently, whether or not a state has statutorily defined “public interest,” some important details over the function and scope of the public interest review are left to the permitting agency and reviewing courts.³⁶⁰ The following material summarizes first, how local growth management plans may be permissible considerations in some states’ public interest review, and second, how reviewing courts and agencies have typically interpreted the public interest review.

1.2.C.(i) Incorporating Local Growth Management Planning into the Public Interest Review

California is one of the clearest examples of a state that allows, or even requires its water agency to consider some form of planning in its public interest review for new use or transfer applications—at least state level planning.³⁶¹ California Water Code section 1256 requires that in determining “public interest,” for water appropriations, “the board shall give consideration to any general or co-ordinated plan looking toward the control, protection, development, utilization, and conservation of the water resources of the State, including The California Water Plan. . . .”³⁶²

Also, the California Court of Appeals has noted that the State Water Resource Control Board (SWRCB) has authority to consider a broad array of factors that contribute to the public interest.³⁶³ Not the least of these includes, “any general or co-ordinated plan looking toward the control, protection, development, utilization, and conservation of the water resources of the

³⁵⁶ See CAL. CODE REGS. tit. 23, § 946 (2006); IDAHO ADMIN. CODE r. 37.03.08.045(01)(e) (2006); KAN. ADMIN. REGS. § 5-3-9 (2006).

³⁵⁷ ALASKA STAT. § 46.15.080(b)(6).

³⁵⁸ KAN. STAT. ANN. § 82a-711(b)(5).

³⁵⁹ Utah is one such state. Its relevant statute, Utah Code § 73-3-8, states that if the State Engineer determines that the appropriation “unreasonably affects public recreation or the natural stream environment, or will prove detrimental to the public welfare, it is his duty to withhold his approval or rejection of the application until he has investigated the matter.” Beyond this, Utah gives no other direction to the State Engineer concerning the meaning of “public welfare.”

³⁶⁰ Grant, *Two Models*, *supra* note 353, at 487 (citing *United States v. Alpine Land & Reservoir Co.*, 341 F.3d 1172, 1181-82 (9th Cir. 2003) (“By its silence, the legislature has left the task of defining ‘public interest’ to the State Engineer and, ultimately, to the Nevada courts”).

³⁶¹ CAL. WATER CODE § 1256 (Deering 2006).

³⁶² *Id.*

³⁶³ *Bank of Am. v. State Water Res. Control Bd.*, 116 Cal. Rptr. 770, 776 (Cal. Ct. App. 1974) (The Board is to consider the variety of beneficial uses which the particular water may serve and may subject the appropriation to conditions which will best develop and conserve the water in the public interest.) (citations omitted); *United States v. State Water Res. Control Bd.*, 227 Cal. Rptr. 161, 169 (Cal. Ct. App. 1986) (“As a matter of state policy, water resources are to be used ‘to the fullest extent . . . capable’ with development undertaken ‘for the greatest public benefit.’ And in determining whether to grant or deny a permit application in the public interest, the Board is directed to consider ‘any general or co-ordinated plan . . . toward the control, protection, development . . . and conservation of [state] water resources,’ as well as the ‘relative benefits’ of competing beneficial uses.”) (citations omitted).

State. . . .”³⁶⁴ Thus, considering plans that address the coordinated management of water resources, is clearly part of the public interest calculus in California. Given the implications of growth for water resource management and protection, considering local growth management plans, may also fit into this public interest calculus when reviewing water rights and transfer applications in California.³⁶⁵

Idaho is one of the few states that statutorily define “public interest.”³⁶⁶ Today, Idaho Code section 42-202B(3) defines the “local public interest,” as “the interests that the people in the area directly affected by a proposed water use have in the effects of such use on the water resource.”³⁶⁷ However, the statutory definition of the local public interest was originally broader, encompassing “the affairs of the people in the area directly affected by the proposed use.”³⁶⁸

Under the previous definition, the Idaho Supreme Court interpreted the local public interest broadly.³⁶⁹ In *Shokal v. Dunn*, the court interpreted the meaning of “local public interest” to include: fish and wildlife habitat, aquatic life, recreation, aesthetic beauty, transportation and navigation values, water quality, the proposed appropriation's benefit to the applicant, its economic effect, its effect of loss of alternative uses of water that might be made within a reasonable time if not precluded or hindered by the proposed appropriation, its harm to others, its effect upon access to navigable or public waters, and the intent and ability of the applicant to complete the appropriation.³⁷⁰ Moreover, the court noted that this was not a comprehensive list.³⁷¹ The court concluded that, “the ‘public interest’ should be read broadly in order to ‘secure the greatest possible benefit from [the public waters] for the public.’”³⁷²

After *Shokal*, administrative agencies such as the Idaho Department of Water Resources (IDWR) embraced such a broad interpretation of the local public interest.³⁷³ In one case, the Department concluded, “[t]he local public interest involves more than economic matters, including social costs, the effect the project will have on recreation, fish and wildlife resources, compliance with planning and zoning ordinances of local jurisdictions, the management of obnoxious odors, and the impact upon the people and properties in the area.”³⁷⁴ Similarly, in another case, the IDWR denied an application to divert water from a stream near a popular

³⁶⁴ CAL. WATER CODE § 1256.

³⁶⁵ *Id.*

³⁶⁶ IDAHO CODE ANN. § 42-202B(3) (“‘Local public interest’ is defined as the interest that the people in the area directly affected by a proposed water use have in the affects of such use on the public water resource.”)

³⁶⁷ IDAHO CODE ANN. § 42-202B(3).

³⁶⁸ *Chisholm v. State Dep’t of Water Res.* (In re Transfer No. 5639), 125 P.3d 515, 520 (Idaho 2005).

³⁶⁹ *Shokal v. Dunn*, 707 P.2d 441 (Idaho 1985).

³⁷⁰ *Id.* at 448-49.

³⁷¹ *Id.* at 449.

³⁷² *Id.* (quoting *Young & Norton v. Hinderlider*, 110 P. 1045, 1050 (N.M.1910)).

³⁷³ Robert L. Harris, Comment, *Narrowing the Local Public Interest Criterion in Idaho Water Right Transfers*, 39 IDAHO L. REV. 713, 719 (2003).

³⁷⁴ Application for Transfer No. 5580 in the Name of Steve and/or Darla Wybenga, 10-11 (Idaho Dep’t of Water Res. June 28, 2001) (preliminary order), available at http://www.idwr.state.id.us/about/orders_2001.htm (last visited July 5, 2006).

waterfall,³⁷⁵ stating that the proposed use failed to conform to the Forest Service's land management plan for the area.³⁷⁶ Moreover, IDWR regularly denied appropriation or transfer applications on the basis that such uses did not comply with local planning and zoning ordinances.³⁷⁷ Thus, under such a broad interpretation of "local public interest," the Department of Water Resources could almost certainly have considered local growth management plans when reviewing new uses or transfer applications.

However, interpreting the local public interest to include such a broad array of non-water related impacts later drew opposition from critics who claimed that IDWR lacks expertise in social, economic and land use issues.³⁷⁸ After IDWR denied an application based on a finding of adverse impacts to air quality; namely from dairy odor, in 2003, the Idaho Legislature responded, significantly restricting the definition of "local public interest" to include only, "the interest that the people in the area directly affected by a proposed water use have in the effects of such use on the public water resource."³⁷⁹ One scholar has noted that read literally, the revised "local public interest" excludes considering the economic benefits of using water for manufacturing or irrigation, and the public health benefits of using water for municipal supply.³⁸⁰ Under this reading, very few proposed water uses for manufacturing, irrigation, or municipal water supply would be considered under the public interest review.³⁸¹

However, a Statement of Purpose that accompanied the revised public interest bill clarifies that the legislature intended a broader reading.³⁸² The Statement declares: "The 'local public interest' should be construed to ensure the greatest possible benefit from the public waters is achieved; however, it should not be construed to require the Department to consider secondary effects of an activity simply because that activity happens to use water."³⁸³

³⁷⁵ In re Application for Permit No. 83-7060, Idaho Department of Water Resources, Memorandum Decision and Order (June 129, 1987). This decision was later appealed in an Idaho district court. On March 30, 1988, the parties stipulated to remand the case back to IDWR for further review. See Notice of Stipulation. On November 7, 1990 the IDWR issued a Notice of Pending Order Voiding Application, [order, find this in the email from Pam Skaggs], and subsequently on February 28, 1991 the IDWR issued an Order Rejecting Application. [order].

³⁷⁶ In re Application for Permit No. 83-7060, at 19-21.

³⁷⁷ See Application for Transfer No. 5580 in the Name of Steve and/or Darla Wybenga (Idaho Dep't Water Res. June 28, 2001) (preliminary order), available at <http://www.idwr.state.id.us/about/orders2001.htm>.

³⁷⁸ Harris, *supra* note 373, at 716. This issue came to a head after IDWR denied a transfer application for purposes of establishing a dairy farm. See Application for Transfer No. 5639 in the Name of K&W Dairy (Idaho Dep't Water Res. June 2002) (preliminary order on remand), available at <http://www.idwr.state.id.us/about/orders/K&W%20Remand%20Preliminary.pdf> (Last visited Mar. 1, 2007). In denying the transfer, IDWR ruled that the local public interest review under IDAHO CODE ANN. § 42-222, requires IDWR to consider impacts on air quality including odor. *Id.* at 10. IDWR also ruled that the applicant bears the burden of proving that the proposed transfer will not adversely affect the public interest. *Id.* at 9. Because the applicant dairy farmer did not introduce sufficient evidence to show that his proposed dairy operation would not "contribute to the cumulative effect of undesirable odors in the vicinity of the dairy," IDWR held that the proposed transfer was not in the local public interest. *Id.* at 10.

³⁷⁹ Act of April 7, 2003, ch. 298, 2003 Idaho Laws 806 (amending IDAHO CODE ANN. §§ 42-202B(3), 42-203A(5)(e)).

³⁸⁰ Grant, *Two Models*, *supra* note 353, at 503.

³⁸¹ *Id.*

³⁸² IDAHO HOUSE BILL No. 284, 57th Legislature, First Regular Session, available at <http://www3.state.id.us/oasis/2003H0284.html>.

³⁸³ *Id.*

Under this narrow definition of the local public interest, IDWR could conclude that it may consider growth management plans only when there is a clear nexus to water impacts.³⁸⁴ For example, Idaho maintains a comprehensive state water plan.³⁸⁵ In formulating the plan, the state is required to coordinate with local advisory groups to address local growth concerns.³⁸⁶ Indeed, the comprehensive state water plan regulations³⁸⁷ require that, “[t]he comprehensive state water plan shall contain a description of existing and planned uses, and the impact of such uses at the local, state, and regional level”³⁸⁸ for recreational opportunities, irrigation, water supply, domestic, municipal, commercial and industrial uses, “and other aspects of environmental quality and economic development.”³⁸⁹ The comprehensive state water plan law³⁹⁰ specifically states that these uses at the local, state, and regional level affect the public interest.³⁹¹ Thus, growth plans that clearly relate to state and local water uses are very likely in the local public interest calculus because they directly impact water resources, rather than having merely “secondary effects.”³⁹²

Furthermore, the revised version of Idaho’s “local public interest” review may arguably consider local growth management plans that do not have a clear connection to water resource impacts. It is noteworthy that Idaho’s Department of Water Resources still seems to view compliance with local planning and zoning ordinances as valid considerations of the local public interest, regardless of whether such ordinances deal directly with water.³⁹³ The IDWR has maintained a rule which states that criteria for determining whether the project conflicts with the local public interest includes “along with any other factor [the director] finds appropriate, . . . compliance with applicable air, water and hazardous substance standards, and compliance with planning and zoning ordinances of local or state government jurisdictions.”³⁹⁴ However, at least once, the IDWR has noted, in reference to the above mentioned regulation, that “[t]o some extent these regulations may conflict with the new statutory formula for the local public interest.”³⁹⁵

Thus, in the end, it is unclear whether IDWR may consider local growth management plans under Idaho’s revised definition of the local public interest.³⁹⁶ However, one way to possibly ensure that local, tribal, or watershed based growth management initiatives are

³⁸⁴ See discussion *infra*, accompanying notes 378-383.

³⁸⁵ IDAHO CODE ANN. § 42-1734A.

³⁸⁶ IDAHO ADMIN. CODE r37.02.01.030.

³⁸⁷ *Id.*

³⁸⁸ IDAHO ADMIN. CODE r37.02.01.030.

³⁸⁹ IDAHO CODE ANN. § 42-1734A.

³⁹⁰ *Id.*

³⁹¹ *Id.*; IDAHO ADMIN. CODE r37.02.01.030.

³⁹² IDAHO HOUSE BILL No. 284, 57th Legislature, First Regular Session, available at <http://www3.state.id.us/oasis/2003H0284.html>.

³⁹³ IDAHO ADMIN. CODE r.37.03.08.045(01)(e)(iii); see also, In The Matter of Application for Permit No. 73-11961 In the Name of Idaho Power Company, Idaho Dep’t Water Res., 2004 Ida. ENV LEXIS 1 (Jan. 9, 2004).

³⁹⁴ IDAHO ADMIN. CODE r.37.03.08.045(01)(e).

³⁹⁵ In The Matter of Application for Permit No. 73-11961 In the Name of Idaho Power Company, Idaho Dep’t Water Res., 2004 Ida. ENV LEXIS 1, 35 (Jan. 9, 2004).

³⁹⁶ IDAHO CODE ANN. § 42-202B(3).

considered in the calculus of the local public interest review is to ensure that such growth plans clearly address state and local water resources.³⁹⁷

1.2.C.(ii) States with undefined Public Interest Standards – Agency and Judicial Interpretations

Other states have not defined the public interest review so specifically, or given water agencies much guidance in determining what factors to consider in the public interest review.³⁹⁸ In these instances, determining the scope of the public interest review is an exercise in statutory interpretation, left to the water agencies and reviewing courts.³⁹⁹ One scholar has recently observed that where state laws and regulations give little guidance in interpreting the public interest standard, state water agencies and courts have tended to interpret the standard using one of two methods.⁴⁰⁰ The first method, called the “maximum-benefits model,” seeks to maximize the benefits to the community from the water resource, often looking to unwritten public policy for guidance about what should count as a community benefit or cost.⁴⁰¹ The second method for interpreting the public interest review, called the “other-laws model” looks only to other state laws, particularly water codes, to determine what is in the public interest.⁴⁰² The following material discusses these two models and how considering local growth management planning fits in to the public interest review in more detail.

1.2.C.(ii)(a) *Maximum-Benefits*

In order for an agency, or court to decide whether a proposed water use or transfer is in the public interest under the maximum-benefits model, the agency or court must first determine what the costs and benefits of the proposed use are to the community or state.⁴⁰³ This often requires making policy judgments based on written or unwritten public policy.⁴⁰⁴

For example, in *Young & Norton v. Hinderlider*, an early case from New Mexico interpreting the public interest review, two conflicting uses of water for irrigation were presented to the Supreme Court for the Territory of New Mexico.⁴⁰⁵ The court engaged in balancing the utilities of the two irrigation projects, one which was large and would have a higher per acre cost of supplying water, and the other which was small, having a lower supply cost.⁴⁰⁶ The court held that it would be economically detrimental if the large project failed, but that the cost of failure was outweighed by the benefit of irrigating so much acreage if the project succeeded.⁴⁰⁷ Thus,

³⁹⁷ See discussion *supra*, accompanying notes 381-389.

³⁹⁸ These include Nevada, New Mexico, Utah, and others.

³⁹⁹ Grant, *Two Models*, *supra* note 353, at 487.

⁴⁰⁰ *Id.*

⁴⁰¹ *Id.* at 488-89.

⁴⁰² *Id.*

⁴⁰³ *Id.* at 488; see also, *Id.* at 515-16 (discussing the difficulties in determining the geographical and temporal boundaries of “the community” for purposes of identifying the maximum benefit of a proposed water use or transfer).

⁴⁰⁴ *Id.* at 488-89.

⁴⁰⁵ 110 P. 1045 (N.M. 1910).

⁴⁰⁶ *Id.* at 1048-51

⁴⁰⁷ *Id.*

the court considered the unwritten public policy of maximizing the economic benefit of irrigated agriculture in determining which project was more in the public interest.⁴⁰⁸

Years later, a New Mexico trial court engaged in a similar exercise in *Sleeper v. Ensenada Land and Water Association (In re Sleeper)*.⁴⁰⁹ In that case, the state engineer approved a water transfer from irrigation for agriculture to use as a recreational lake in a resort and subdivision in rural New Mexico.⁴¹⁰ The court determined that such a transfer would result in little economic development to the rural community, and would negatively impact the local agrarian culture, which existed for more than a century and in which local residents took great pride.⁴¹¹ In that case, the court balanced the economic benefits and the cultural costs and determined that the proposed project was not in the public interest.⁴¹²

In both of these examples, the reviewing court considered factors not statutorily adopted as part of the public interest.⁴¹³ Rather, the court considered these factors, cultural identity, and economic benefits, as unwritten public policy concerns that were part of the public interest.⁴¹⁴ While the New Mexico courts in the above mentioned cases did not consider the issue, one scholar has questioned whether such a broad interpretation of the public interest review in the maximum benefits model violates constitutional separation of powers concerns, specifically the non-delegation doctrine.⁴¹⁵

1.2.C.(ii)(a)(1) Maximum-Benefit's Problem with the Non-Delegation Doctrine

The non-delegation doctrine prohibits a legislature from delegating power to an administrative agency unless the legislature provides adequate standards to guide the agency's discretion and enable meaningful judicial review.⁴¹⁶ Historically, state courts often invalidated state legislation that did not provide adequate direction to an administrative agency.⁴¹⁷ Many of these cases addressed the public interest standard as it applied in non-water related statutes.⁴¹⁸ Little direct authority exists for how the non-delegation doctrine affects the often vague public interest review requirements in water use and transfer statutes.⁴¹⁹ In older cases, courts often rejected arguments based on this doctrine to invalidate a state agency or state engineer's decision

⁴⁰⁸ Grant, *Two Models*, *supra* note 353, at 493.

⁴⁰⁹ No. RA 84- 53(C) (N.M. Dist. Ct. Apr. 16, 1985) reprinted in part in JOSEPH SAX, ET AL., *LEGAL CONTROL OF WATER RESOURCES: CASES AND MATERIALS* 252-53 (3rd ed. 200).

⁴¹⁰ *Id.*

⁴¹¹ *Id.*

⁴¹² *Id.* Later, the New Mexico Court of Appeals reversed the district court's decision holding that the water code in force at the time of the decision did not authorize the public interest review for water transfers. *See Ensenada Land & Water Co. v. Sleeper*, 760 P.2d 787, 790-91 (N.M. Ct. App. 1988). Thereafter, the New Mexico legislature extended the public interest review to water transfers. N.M. STAT. §§ 72-12-7(A), 72-12B-1 (2006).

⁴¹³ *See* discussion *supra* accompanying notes 405-412.

⁴¹⁴ *Id.*

⁴¹⁵ Grant, *Two Models*, *supra* note 353, at 491.

⁴¹⁶ *Id.* at 491; *see also* Gary J. Greco, *Standards or Safeguards: A Survey of the Delegation Doctrine in the States*, 8 ADMIN. L.J. AM. U. 567, 568, 578-79 (1994).

⁴¹⁷ Greco, *supra* note 416, at 578-79.

⁴¹⁸ *Id.* at 571-572.

⁴¹⁹ Grant, *Recognition of Public Values*, *supra* note 354, at 693.

to grant or deny an application.⁴²⁰ Moreover, one scholar has noted that the non-delegation doctrine has generally declined in popularity among both state and federal courts.⁴²¹ That is, many states have abandoned the old trend, and are upholding broad delegations of power, recognizing that legislatures rely on administrative agencies to solve the complex problems of modern governance.⁴²² This is especially true when states have instituted procedural safeguards to contain agency discretion.⁴²³ Thus, whether the non-delegation doctrine will prohibit a state water agency from including local growth management concerns as part of the public interest, largely depends on what kinds of guiding principles that state legislature has given the agency in determining the public interest and what kinds of procedural safeguards that state has in place to cabin administrative discretion.⁴²⁴ A recent review of how states have treated the non-delegation doctrine reveals that the western states which have generally allowed broader discretion in agency interpretations include: Oregon, Washington, California, and to a lesser extent: Wyoming, Idaho, Colorado, Kansas, Alaska, and North Dakota.⁴²⁵

1.2.C.(ii)(a)(2) *Would the Maximum-Benefits Model Consider Local Growth Management Plans as Part of the Public Interest Calculus?*

As the above cases demonstrate, the maximum-benefits model for determining the public interest often relies on unwritten public policy concerns.⁴²⁶ In such a model, it is reasonable to conclude that in some states, a court or agency might include local growth management plans in the public interest calculus, if the court or agency determines that considering the plans is not outweighed by some other factor.⁴²⁷ For example, an often-considered public policy consideration in maximizing benefits, as illustrated above in *Hinderlider*,⁴²⁸ is economic development.⁴²⁹ If a state water agency, or reviewing court determines that considering a local growth management plan will unreasonably inhibit economic development, the agency or court might choose to reject the growth management plan or at least decline to act accordingly when reviewing a water use or transfer permit.

Next, while the above mentioned examples of the maximum-benefits model considered unwritten public policies, some agencies or reviewing courts may adhere only to written public

⁴²⁰ See, e.g., *Tanner v. Bacon*, 136 P.2d 957 (Utah, 1943) (upholding the State Engineer's denial of a water appropriation application to use water for hydropower, that would have prevented a much larger appropriation for domestic and irrigation and holding that an adequate standard existed in other state statutes for applying the public interest standard).

⁴²¹ See generally Greco, *supra* note 416 (discussing the general trend away from the non-delegation doctrine in both the federal and state courts).

⁴²² *Id.* at 601.

⁴²³ *Id.* at 595-602. An example of an procedural safeguard in the federal context is section 706 of the Administrative Procedures Act, which allows judicial review of agency action to determine if such action is "arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law." 5 U.S.C. § 706 (2006).

⁴²⁴ See generally Greco, *supra* note 416 (categorizing the fifty states into three categories based upon how strictly each state has traditionally applied the non-delegation doctrine).

⁴²⁵ *Id.* at 588-600.

⁴²⁶ See discussion *supra* accompanying notes 405-412.

⁴²⁷ See *supra* discussion introducing the maximum-benefits model accompanying notes 405-412.

⁴²⁸ 110 P. 1045 (N.M. 1910).

⁴²⁹ Grant, *Two Models*, *supra* note 353, at 493.

policies while trying to maximize benefits.⁴³⁰ This may still allow the agency or court to consider local growth management plans in some states, especially those that have adopted rules or statutes to include, or have otherwise recognized local growth management as a legitimate public benefit.⁴³¹

1.2.C.(ii)(b) *Other-Laws Model*

The other-laws model for interpreting the scope of the public interest review is essentially that such review is limited to considering only other laws expressly adopted by the state in which the public interest standard is at issue.⁴³² Nevada courts have most exemplified this approach.⁴³³

In *Pyramid Lake Paiute Tribe of Indians v. Washoe County*, Washoe County sought to pump groundwater from an area inside Nevada that was adjacent to California's Lassen County and export it to Reno.⁴³⁴ Lassen County, and the Pyramid Lake Tribe, challenged the action as against the public interest because it was more costly than other methods of obtaining water for Reno.⁴³⁵ They argued that it would be more economical for Nevada to obtain additional water from the Truckee River by settling negotiations with California and various Indian tribes.⁴³⁶ The Nevada State Engineer granted the application citing thirteen provisions in the Nevada water code that, in effect, defined the public interest—economic costs not being one of them.⁴³⁷ In other words, the State Engineer, in granting the application, implied that the public interest review could not include factors beyond those contained in state water statutes.⁴³⁸ The Nevada Supreme Court upheld that view.⁴³⁹

The Ninth Circuit Court of Appeals, applying Nevada law, followed suit in *United States v. Alpine Land & Reservoir Co.*⁴⁴⁰ In that case, the Nevada State Engineer granted eight applications to transfer water from existing irrigation uses to supply water the wetlands in the Stillwater National Wildlife Refuge.⁴⁴¹ The City of Fallon and Churchill County challenged the application grants claiming that the transfer would conflict with existing rights and be detrimental to the public interest because Fallon obtained municipal water supplies from wells that were recharged by surface irrigation.⁴⁴² Fallon and Churchill County claimed that the transfers would negatively affect the surface recharge of groundwater and therefore be in violation of the public interest.⁴⁴³ The Ninth Circuit found that evidence in the record showed that the transfers would not conflict with existing rights, and then held that the Nevada

⁴³⁰ *Id.*

⁴³¹ These include, but may not be limited to, Washington, Oregon, California, and Idaho.

⁴³² Grant, *Two Models*, *supra* note 353, at 489.

⁴³³ See discussion *infra* accompanying notes 434-447.

⁴³⁴ *Pyramid Lake Paiute Tribe v. Washoe County*, 918 P.2d 697, 698 (Nev. 1996).

⁴³⁵ *Id.* at 698.

⁴³⁶ *Id.* at 698-99.

⁴³⁷ *Id.*

⁴³⁸ Grant, *Two Models*, *supra* note 353, at 506.

⁴³⁹ *Pyramid Lake*, 918 P.2d at 700.

⁴⁴⁰ 341 F.3d 1172 (9th Cir. 2003).

⁴⁴¹ *Id.* at 1175.

⁴⁴² *Id.* at 1177-78.

⁴⁴³ *Id.* at 1181.

Legislature, by its silence, “left the task of defining ‘public interest’ to the State Engineer. . . .”⁴⁴⁴ The court then cited to *Pyramid Lake*, noting that the guidelines in the Nevada water statutes adequately define the public interest and that the State Engineer’s authority is limited to considerations identified in those statutes.⁴⁴⁵ Finally, the court held that the State Engineer had adequately considered the public interest in light of the limited guidance contained in Nevada water statutes.⁴⁴⁶

These two cases exemplify the other-laws model of public interest review because in both cases, the court determined that the Nevada State Engineer had properly considered the public interest by considering only the limited guidance provided him in other Nevada water laws.⁴⁴⁷

1.2.C.(ii)(b)(1) *Would the Other-Laws Model Consider Local Growth Management Plans as Part of the Public Interest Calculus?*

As the above cases show, a court adopting the other-laws model for public interest review considers only guidance found in other state laws.⁴⁴⁸ In those cases, the Nevada State Engineer limited this inquiry to considering factors found only in Nevada water statutes.⁴⁴⁹ However, it is conceivable that the state water resources department or reviewing court might reasonably expand this inquiry to consider guidance from other state statutes or regulations including administrative regulations implementing water statutes, state water plans, and possibly other non-water related laws.⁴⁵⁰ Courts have not directly addressed this issue. However, the following examples demonstrate that considering other non-water laws may be permissible when interpreting the public interest.

First, it is notable that the Nevada State Engineer did look to other non-water laws when interpreting the public interest during the review of an application by the United States Department of Energy to appropriate water for use at the Yucca Mountain Repository for permanently storing radioactive waste.⁴⁵¹ The State Engineer denied the application, based upon consideration of a Nevada law,⁴⁵² which provides that it is unlawful for any person or government entity to store high-level radioactive waste in Nevada.⁴⁵³ On appeal, the federal district court remanded the matter back to the State Engineer, finding that Nevada’s public interest requirements did not permit reliance on other than Nevada’s water laws.⁴⁵⁴ Under the circumstances, it is evident why the Nevada State Engineer took such measures. Although reversed and remanded by a federal court, the State Engineer’s denial, nevertheless, suggests that

⁴⁴⁴ *Id.* at 1182.

⁴⁴⁵ *Id.* at 1182-83.

⁴⁴⁶ *Id.* at 1183.

⁴⁴⁷ Grant, *Two Models*, *supra* note 353, at 505-08.

⁴⁴⁸ See discussion *supra* accompanying notes 434-447.

⁴⁴⁹ *Pyramid Lake Paiute Tribe v. Washoe County*, 918 P.2d 697 (Nev. 1996); *United States v. Alpine Land & Reservoir Co.*, 341 F.3d 1172 (9th Cir. 2003).

⁴⁵⁰ Grant, *Two Models*, *supra* note 353, at 509.

⁴⁵¹ In re Applications 63263, 63264, 63265, 63266, and 63267 Filed to Appropriate Public Waters (Ruling 4848) (Nev. State Engineer, Feb. 2, 2000) [hereinafter *Yucca Mountain Denial*], available at <http://water.nv.gov/scans/rulings/4848r.pdf> (Last visited Mar. 1, 2007).

⁴⁵² NEV. REV. STAT. § 459.910.

⁴⁵³ *Yucca Mountain Denial*, *supra* note 451.

⁴⁵⁴ State Engineer Ruling No. 5307

applying the other-laws model for interpreting the public interest review will not always be confined to other water laws.

Another possible example comes from New Mexico. Shortly after the New Mexico trial court held that balancing cultural costs against economic benefits was in the public interest, the Rio Arriba County Commission, pursuant to its statutory county planning authority,⁴⁵⁵ adopted a subdivision ordinance which declared that transferring water from agriculture to subdivision or commercial use “will generally not promote the public welfare.”⁴⁵⁶ While this local ordinance did specifically deal with water, it was not part of the other-laws typically reviewed by courts or agencies when determining the extent of the public interest.⁴⁵⁷ Likewise, the ordinance was not part of a growth management plan per se. However, the ordinance declaring water transfers from agriculture to commercial use as a violation of the public interest typifies the types of concerns that a local growth management plan might address if given the statutory authority to do so. As noted above, the New Mexico court’s decision in *Hinderlider* is a better example of the maximum-benefits model.⁴⁵⁸ However, assuming New Mexico, like Nevada employed the other-laws model, the county ordinance declaring water transfers from agriculture to commercial a violation of the public interest might be a relevant factor for a state water agency to consider under the public interest calculus.

For example, in *Serpa v. County of Washoe*, Serpa submitted a proposed subdivision development plan to Washoe County.⁴⁵⁹ Pursuant to legislative authority, Washoe County had previously developed a comprehensive growth management plan, which recognized the limited water supply in the hydrographic basin of the Washoe Valley.⁴⁶⁰ The comprehensive plan required new developments to obtain water rights from outside the valley before approval.⁴⁶¹ Serpa, who had already obtained approval for water rights in the Washoe Valley, proposed that his development utilize a more efficient water supply system in order to evade the plan requirement to obtain water rights from outside the valley.⁴⁶² The Washoe County Board of Commissioners rejected his application as violating the public interest.⁴⁶³ The developer argued that the County had improperly denied his application because the Nevada State Engineer had exclusive jurisdiction over the control of water.⁴⁶⁴ The Nevada Supreme Court held that “[t]here is no state law indicating that the ruling of the State Engineer preempts a county or other governmental entity from enacting zoning laws that impose limitations on water use that are more restrictive than those of the State Engineer.”⁴⁶⁵

This case did not require the Nevada State Engineer to consider other, non-water laws in calculating the public interest. However, it clearly held that growth management plans, which

⁴⁵⁵ N.M. STAT. §§ 3-19-6, 4-37-1.

⁴⁵⁶ Rio Arriba County Land Subdivision Ordinance, art. II. (Rio Arriba County, N.M. 1997).

⁴⁵⁷ See discussion *supra* Part 1.2.C.(ii)(b).

⁴⁵⁸ See discussion *supra* accompanying notes 405-408.

⁴⁵⁹ 901 P.2d 690 (Nev. 1995).

⁴⁶⁰ *Id.* 691-92.

⁴⁶¹ *Id.*

⁴⁶² *Id.* at 692.

⁴⁶³ *Id.* at 692.

⁴⁶⁴ *Id.*

⁴⁶⁵ *Id.* at 693.

restrict water uses, enacted pursuant to state legislative authority, can preempt the State Engineer's grant of a water right.⁴⁶⁶ It stands to reason, therefore, that if a local growth management plan can trump the State Engineer's grant of a water right, then the State Engineer could consider the local growth management plan as part of the public interest standard when reviewing a water right application.⁴⁶⁷

Thus, under the other-laws method of interpreting the public interest standard, where a state has incorporated guidance which may include local growth management concerns in other water laws, rules, or administrative decisions implementing the state water laws, or has given legislative planning authority concerning water use to localities, it is likely that such growth management plans could be part of the public interest calculus.⁴⁶⁸ Some states, like California, Oregon, and Idaho may also have sufficiently shown in "other laws," that considering local growth management plans is in the public interest.⁴⁶⁹ Ultimately, however, under the other-laws model, it will require an individual analysis of relevant state law to determine whether a given state may include local growth management concerns in the public interest.

1.2.D. Options for considering Growth Management Plans

The discussion above demonstrates that only in few Western States can a water agency clearly consider local growth management plans when reviewing water rights or transfer applications.⁴⁷⁰ In most states, it is not certain whether considering local growth management plans constitutes a permissible factor when reviewing such applications.⁴⁷¹ Instead of leaving this question for state courts to decide, states may want to take action that might ensure such considerations are permissible. The following are potential options that states may wish to consider.

1. Enact legislation specifically requiring state water agencies to consider local growth management plans, including tribal, or watershed plans, while reviewing water right or transfer applications.

This legislation may include a requirement similar to the one that Oregon bestowed on its water agency to consider local growth management plans when reviewing applications.⁴⁷² This option will likely only be realistic or even desirable in states which require statewide, or local growth management planning,⁴⁷³ or have at least adopted local growth plans or provided guidance to local planners for establishing growth management plans. In such states, this is

⁴⁶⁶ *Id.*

⁴⁶⁷ *See also*, Delta Wetlands Props. v. County of San Joaquin, 121 Cal. App. 4th 128, 135 (Cal. Ct. App. 2004) (holding "state law does not preempt the zoning authority of the County as provided in the County ordinance. . . . [T]he authority granted the Water Board by the Water Code does not impair the permit authority granted by statute to other agencies over the project which makes possible the appropriation of the water.").

⁴⁶⁸ *See* discussion *supra* Part 1.2.C.(ii)(b)(1).

⁴⁶⁹ *See* discussion *supra* Part 1.2.C.(i).

⁴⁷⁰ *See* discussion *supra* Part 1.2.B. and 1.2.C.

⁴⁷¹ *Id.*

⁴⁷² OR. ADMIN. R. 690-005-0020; *see also* discussion *supra* notes 309-319.

⁴⁷³ *See, e.g.*, OR. REV. STAT. § 197.175; WASH. REV. CODE § 36.70A.

probably the most effective method to empower water agencies to consider such local growth management plans when reviewing new use or transfer applications.

2. Statutorily define the public interest to include considering local growth management plans.

Currently no western state has defined the public interest to include growth management plans.⁴⁷⁴ In California, the public interest review for water appropriations and transfers includes consideration of “any general or co-ordinated plan looking toward the control, protection, development, utilization, and conservation of the water resources of the State, including The California Water Plan. . . .”⁴⁷⁵ This language suggests that a local growth management plan which looks to control, protect, utilize, and conserve water resources may also be considered in the public interest review. Idaho also appears to allow its water resource agency to consider local growth management plans in the public interest review by including in its definition of public interest, “the interest that the people in the area directly affected by a proposed water use have in the effects of such use on the public water resource.”⁴⁷⁶ While this version of Idaho’s definition is substantially narrower than a previous definition, the Idaho legislature emphasized that the narrower definition was meant to focus on those factors which impact the water resource directly, rather than in some other secondary way.⁴⁷⁷ Since Idaho has stated in other statutes that its comprehensive water planning should be done in concert with many agencies including local entities, and that local concerns are in the public interest,⁴⁷⁸ it is possible that the public interest standard as applied to water rights applications in Idaho, includes local growth management concerns. In states like Idaho, or others where there are already administrative rules that define the public interest,⁴⁷⁹ the water agency may choose to adopt or broaden existing rules to include considering local growth management plans as part of the public interest, so long as there is sufficient statutory guidance, or other procedural safeguards to comply with the non-delegation doctrine.⁴⁸⁰

3. States that apply the public interest review to new appropriations only, should consider extending the public interest review, including the consideration of local growth management plans, to transfers as well.

In many western localities, there is little surface or groundwater that is unappropriated. As a result, the number of applications for new appropriations has slowed. On the other hand, applications for transfers are more common than ever. Water traditionally used for agricultural irrigation is increasingly being transferred to urban areas with rapidly expanding populations. In

⁴⁷⁴ See discussion *supra* 1.2.C..

⁴⁷⁵ CAL. WATER CODE § 1256 (Deering 2006).

⁴⁷⁶ Act of April 7, 2003, ch. 298, 2003 Idaho Laws 806 (amending Idaho Code §§ 42-202B(3) and 42-203A(5)(e)).

⁴⁷⁷ IDAHO HOUSE BILL No. 284, 57th Legislature, First Regular Session, available at <http://www3.state.id.us/oasis/2003H0284.html>.

⁴⁷⁸ IDAHO ADMIN. CODE r37.02.01.030 (2006); IDAHO CODE ANN. § 42-1734A.

⁴⁷⁹ E.g., CAL. CODE REGS. tit. 23 § 946; IDAHO ADMIN. CODE r.37.03.08.045; KAN. ADMIN. REGS. § 5-3-9.

⁴⁸⁰ See discussion *supra* accompanying notes 416-425.

this sense, water transfers, rather than new appropriations, is where much of the action is currently taking place.⁴⁸¹

If States wish to use the public interest review as a tool to consider local growth management plans and coordinate water and land use planning, they may wish to ensure that their public interest review applies to both applications for new appropriations and transfers.

4. Enact legislation that enables counties or other localities to adopt planning ordinances that specifically address water planning or identify what water uses are in the public interest.

Traditionally, state water agencies held exclusive control over water allocation decisions.⁴⁸² However, recent legislation and judicial decisions suggest that Western States are recognizing the value of incorporating localities into water resource decision-making.⁴⁸³ One example of this kind of legislation, enabling localities to become involved in water resource allocation, is Washington's Watershed Planning Act.⁴⁸⁴ As noted above, that act allows localities to determine how best to plan for and manage the local water resources through an implementation plan.⁴⁸⁵ Washington's water agency must consider these plans when reviewing water rights applications, especially if that agency participated in the plan's development.⁴⁸⁶

County or local enabling legislation might also resemble the planning mandate that the Nevada Supreme Court upheld in *Serpa*.⁴⁸⁷ There, the state required Washoe County to develop a comprehensive growth plan, and required local planning commissions to revise water-use plans to be consistent with Washoe County's comprehensive plan.⁴⁸⁸ Subsequently, Washoe County's adopted comprehensive plan placed heavy restrictions on water use in the Washoe Valley, limiting a developer's right to put his newly acquired water right to beneficial use by rejecting his development proposal because it did not conform to the plan's strict water use requirements.⁴⁸⁹ Of particular importance in this case is that the Nevada Supreme Court upheld the legislation and declared that nothing in Nevada law prohibited counties from imposing more stringent requirements on water use than the State Engineer.⁴⁹⁰ Courts in other states have similarly held.⁴⁹¹ These cases suggests that enacting legislation that enables counties or other

⁴⁸¹ Sax, et al., Legal Control of Water Resources, *supra* note 301, at 223-27.

⁴⁸² See generally, Tarlock & Van de Wetering, *supra* note 348 (discussing the traditional barriers to integrating water and land use planning).

⁴⁸³ *Id.*

⁴⁸⁴ WASH. REV. CODE § 90.82.

⁴⁸⁵ *Id.* § 90.82.043.

⁴⁸⁶ See discussion *supra* accompanying notes 342-343.

⁴⁸⁷ 901 P.2d 690 (Nev. 1995).

⁴⁸⁸ *Id.* at 691.

⁴⁸⁹ *Id.* at 692.

⁴⁹⁰ *Id.* at 693.

⁴⁹¹ *Delta Wetlands Props.*, 121 Cal. App. 4th at 135 (holding "state law does not preempt the zoning authority of the County as provided in the County ordinance. . . . [T]he authority granted the Water Board by the Water Code does not impair the permit authority granted by statute to other agencies over the project which makes possible the appropriation of the water."); see also *City of Colorado Springs v. Board of Comm'rs of Eagle County*, 895 P.2d 1105, 1115 (Colo. Ct. App. 1994), (holding that an entitlement to diver water "should not be understood to

localities to adopt ordinances specifically directed at water-use and growth management planning may be a way to allow state water agencies to consider such growth plans in reviewing water rights and transfer applications.

1.2.E. Conclusion

Over the past century, growth in the Western States has created challenges for water resource agencies that are charged to manage both water quality and quantity to meet present and future state needs.⁴⁹² In some places, growth has pushed local water resources to their limits.⁴⁹³ One potential tool for managing water supplies effectively to ensure both quality and quantity of water, is to consider local, tribal, or watershed growth management plans when reviewing new water rights or transfer applications.⁴⁹⁴ Some states have directed their water agencies to consider such plans when reviewing water applications.⁴⁹⁵ In other states, considering such plans might be considered part of the public interest review.⁴⁹⁶ While virtually every western state has incorporated the public interest review in granting water right applications,⁴⁹⁷ few have provided detailed guidance about the meaning of the public interest or whether growth management concerns are part of that calculus.⁴⁹⁸ In states where there is little or no concrete guidance in interpreting the public interest standard,⁴⁹⁹ courts have been faced with a number of legal challenges in addressing the scope of the public interest review.⁵⁰⁰ While some of these cases provide insights into how individual state courts might apply the public interest standard,⁵⁰¹ it is not certain whether in such states considering local growth management plans constitutes a permissible factor of the public interest review. To insure that state water agencies may properly consider such local growth management plans, states may wish to consider enacting specific legislation or regulatory guidelines that incorporate considering local growth management plans in reviewing water right and transfer applications.

carry with it absolute rights to build any diversion project.”), *cert. denied*, 1995 Colo. Lexis 443 (Colo. 1995), *cert. denied*, 116 S. Ct. 564 (1995).

⁴⁹² *Water Needs and Strategies*, *supra* note 260, at 4.

⁴⁹³ Sax, *supra* note 301, at 596.

⁴⁹⁴ *Id.*

⁴⁹⁵ See discussion *supra* accompanying notes 309-319.

⁴⁹⁶ See discussion *supra* accompanying section 1.2.C.

⁴⁹⁷ See *supra* note 351.

⁴⁹⁸ See discussion *supra* section 1.2.C.(ii).

⁴⁹⁹ E.g., NEV. REV. STAT. § 533.370(5).

⁵⁰⁰ See Grant, *Two Models*, *supra* note 353, at 498-508 (giving numerous examples of factors that challengers sought to include in the public interest review standard including land recreation, flood damage to neighboring property, cultural values, economic comparison of water supply alternatives, and cumulative effects of an applicant's program).

⁵⁰¹ E.g., *Pyramid Lake Paiute Tribe v. Washoe County*, 918 P.2d 697, 698 (Nev. 1996) (holding that the public interest review is limited to the principles expressly stated in other state laws). This case is an example of what Professor Grant calls the “other-laws” model for interpreting the public interest. See discussion *infra* section 1.2.C.(ii)(b).

Chapter 1

Section 3

Domestic Well Exemptions and their Impact on Growth Management

1.3.A. Introduction

Domestic wells offer a unique challenge in the context of water policy and growth management. Domestic well users, in many instances, are not required to receive a permit or keep track of water use. As a policy matter, there may be important reasons why domestic wells are not required to receive permits or meter use.⁵⁰² However, exempt wells may complicate growth management, particularly if they are used to circumvent growth management plans or policies that would preclude, limit, or otherwise impact development in a given area.

1.3.B. Domestic Wells in the West

In western states, unless domestic well owners bring a complaint about the diminished quality or level of the groundwater, most domestic wells are off the grid. Several western states have a statutory provision allowing homeowners in rural areas to drill a well and withdraw a de minimus amount⁵⁰³ of groundwater from the underlying aquifer without first acquiring a water right permit. Most states license water well drillers and have well construction standards, but otherwise domestic wells are often exempted from many administrative and legal requirements.⁵⁰⁴

Although the domestic wells technically have no legal priority date to protect them against other groundwater users, in nearly all states domestic use is the highest statutory priority

⁵⁰² Possible reasons may be property-rights considerations, constitutional considerations, and the potential burden licensing, permitting, or metering could impose upon poor or rural areas where alternative sources of potable water are unavailable.

⁵⁰³ Most households will use less than 1 acre-foot per year, or less than 900 gallons per day, although western states allow *significantly* more than this, up to 80 acre-feet per year. A U.S.G.S. nationwide study in 1990 showed that the average household with a domestic well uses only 0.27 acre-feet per year, or about 79 gallons per day. W. Peter Balleau & Steven E. Silver, *Hydrology and Administration of Domestic Wells in New Mexico*, 45 NATURAL RESOURCES J. 807, 815 (2005).

⁵⁰⁴ Western States Water Council, *Western State Ground Water Management* 5 (1986).

for water,⁵⁰⁵ enabling the local or state agency in charge of managing and enforcing groundwater rights to protect domestic wells against even the most senior of permitted appropriators. The primary reason for the domestic well exceptions seems to be that such wells take so little water from the aquifer and have such a trivial affect on other surface and groundwater users that it isn't worth the time and money a state would have to spend to keep track of such wells.⁵⁰⁶ In Alaska, where all water users using greater than 1,500 gallons-per-day are required to pay an annual Administrative Service Fee to maintain the extensive state database used to manage water rights, the exemptions for domestic use less than 1,500 gallons-per-day are due to the relatively insignificant amount of administrative paperwork and water taken from the aquifer.⁵⁰⁷

Relative to irrigation, municipal and industrial uses, domestic wells have historically had the most sustainable rates of use, and have had the least impact on both groundwater and hydrologically connected streams.⁵⁰⁸ However, population increases—particularly of domestic water users in rural subdivisions⁵⁰⁹—combined with the decreases in available water supplies due to prolonged drought and aquifer overdraft, have continually added stress to already-shortened supplies.⁵¹⁰ Several states have found it expedient to keep track of all wells, and in some cases, to deny permits or shut down domestic wells altogether in favor of connections to public supply.

Without a priority date or a record within the priority system, rural subdivision wells in hydrologically-stressed areas can have a substantial effect on water supplies, and those with senior rights are forced to pay the price of the reduced aquifer life, which decreases the value of their water rights.⁵¹¹ One of the costs of the reduced water supply to senior water rights users is the burden of delivering water under interstate compacts. This can lead to costly lawsuits over uncompensated takings and failure of the state to protect vested water rights through domestic well regulation.⁵¹²

⁵⁰⁵ Texas, Oklahoma, Washington, New Mexico, Montana, Idaho, and Colorado seem to have an absence of preferred uses. Alaska's preferred use is public water supply.

⁵⁰⁶ But see Balleau & Silver, *supra* note 503, at 811 (quoting the United Nations declaration that water is a fundamental human right and suggesting this as a possible reason New Mexico began freely granting domestic well permits in 1953.)

⁵⁰⁷ Alaska Department of Natural Resources, Division of Mining, Land and Water, *Water Right Administrative Service Fee Fact Sheet* (2006), available at <http://www.dnr.state.ak.us/mlw/factsht/index.htm> (last updated Apr. 19, 2007).

⁵⁰⁸ Balleau & Silver, *supra* note 503, at 833.

⁵⁰⁹ Tom Daniels, *What To Do About Rural Sprawl?*, Paper presented at the Am. Plan. Ass'n. Conf. (1999), available at Municipal Research and Services Center of Washington, <http://www.mrsc.org/Subjects/Planning/rural/daniels.aspx>.

⁵¹⁰ See Amy C. Lewis et al., *Water Supply Options in a New Mexico Water Planning Region*, 41 J. AM. WATER RES. ASS'N 635, 641 (2005).

⁵¹¹ Frank B. Titus, *On Regulating New Mexico's Domestic Wells*, 45 NATURAL RESOURCES J. 853, 854-855 (2005).

⁵¹² *Id.* at 857-58.

Requiring domestic well users to connect to the public supply and plug their wells does not reduce the amount of water consumed,⁵¹³ but rather brings previously exempt water users into the state's priority system,⁵¹⁴ which allows for better management of the same water use.

While domestic well users are not required to show that adequate water is available before they are allowed to drill, subdivision developers often must show that they have physical and legal access to water for an extended period of time.⁵¹⁵ Requiring developers to demonstrate adequate water supply guards aquifers against overdraft and protects existing users from increased costs.⁵¹⁶ A few states, including Idaho, Kansas, Nebraska, North Dakota, Oregon and Utah, require a demonstration of long-term water supplies before allowing subdivision approval.⁵¹⁷

⁵¹³ Studies have shown that public water supply users may use slightly more water than domestic well users. Balleau & Silver, *supra* note 503, at 828.

⁵¹⁴ Titus, *supra* note 511, at 854-55.

⁵¹⁵ Balleau & Silver, *supra* note 503, at 818.

⁵¹⁶ Ellen Hanak & Margaret K. Browne, *Linking Housing Growth to Water Supply: New Frontiers in the American West*, 72 J. OF AM. PLANNING ASS'N 154, 155-56 (2006).

⁵¹⁷ *Id.* at 154.

Chart Showing limits on water and acreage for domestic wells

State	Domestic Well Capacity Limit (acre-feet per year)	Domestic Irrigation Limit (acres)	Water Right Permit Exemptions
Alaska	0.56	-	Permit required for water use exceeding 500 gallons-per-day, no annual reporting
Arizona	56 (10 in AMAs post-1983)	2	Notice of intent to drill and completion report
California	-	-	Varies by local control
Colorado	5 (may be expanded up to 80)	1	Well construction permit required, other exceptions exclude subdivisions <35 acres/owner
Idaho	14	1/2	No permit required
Kansas	-	2	No permit required
Montana	10	-	File notice of completion
Nebraska	80	-	Registration required
Nevada	2	-	Permits only required in designated basins
New Mexico	1 (post-2006)	1	No permit, but must have approved well application
North Dakota	12.5	1	File notice of completion
Oklahoma	-	3	No permit required
Oregon	16.8	1/2	No permit required
South Dakota	29.1	1	No permit required
Texas	28	-	No permit for >10 acre tracts, excludes subdivisions
Utah	-	-	Permit required
Washington	5.6	1/2	No permit required
Wyoming ⁵¹⁸	40.4	1	Permit required

Other states and local authorities require a similar showing for a more limited area, particularly in over-allocated basins, such as Arizona's Active Management Areas. The New Mexico Subdivision Act⁵¹⁹ requires that the board of county commissioners in each county adopt regulations setting forth requirements in regulating subdivisions, which include quantifying the maximum water requirements of the subdivision and assessing the water availability.⁵²⁰ San Diego County, California, Santa Fe County, New Mexico, and the Front Range counties of Colorado, have low density requirements (a minimum of 10 acres per lot) to reduce the strain on local aquifers due to domestic wells.⁵²¹

Unfortunately, even in places where statutes or ordinances exist to protect water resources, legal loopholes allow subdivision developers in rural communities to take advantage

⁵¹⁸ In Wyoming, domestic wells can only provide water for three dwellings or less.

⁵¹⁹ N.M. STAT.ANN. §§47-6-1 to 47-6-29 (2003).

⁵²⁰ *Id.* at 47-6-9 (2003). Robert M. Schuster, ed., *New Mexico: Water Supply and the Land Use Connection*, 9 W. WATER L. & POL'Y REP. 317, 318 (2005).

⁵²¹ See Hanak & Browne, *supra* note 516, at 159.

of domestic well exemptions. “Wildcat” subdivisions (those with fewer than five or six units) are not subject to state adequacy laws in Arizona, Colorado, and New Mexico, allowing developers to avoid water adequacy requirements by developing at a small scale.⁵²² In New Mexico, there have been cases where subdivision developers have purchased land where the appurtenant water rights had already been severed, then provided water for the housing development through domestic wells with permits that the state engineer had been required to automatically grant without any consideration of water availability or rights priorities within the water basin.⁵²³

“Some states exempt large categories of new housing, either as a result of legislative compromises or because they leave oversight to local governments,” and enforcement in remote areas may be lax, relying on trust or self-reporting.⁵²⁴ Other states have closed such loopholes. Nevada has the local authorities submit all proposed subdivisions for review, regardless of scale, and in over-drafted basins, domestic wells have to retire equivalent groundwater rights before getting approval to drill. Local control of well permits in California prevents subdivision developers from using domestic wells to sidestep regulations.⁵²⁵ The New Mexico state engineer recently used administrative powers to restrict new domestic use to 1 acre-foot per year per household, with a maximum of 3 households and 3 acre-feet per year on one well at a time, and a maximum of 10 domestic well permits held by one developer at a time.⁵²⁶ Utah regulates domestic wells like other uses of groundwater. This is also true where a groundwater management plan is implemented.⁵²⁷

1.3.C. Conclusion

Domestic wells provide an important source of water for many western states. However, the unregulated use of domestic wells has the potential to adversely affect groundwater levels, hydrologically-connected surface flows, and raises water quality concerns.⁵²⁸ While this section provides an overview of the issues, the topic warrants further research and evaluation. WSWC staff intends to develop the issues introduced in this section in a subsequent document as part of its continuing implementation of the WGA Water Report.

⁵²² *Id.* at 162.

⁵²³ Titus, *supra* note 511, at 859.

⁵²⁴ Hanak & Browne, *supra* note 516, at 156.

⁵²⁵ *Id.* at 162 (2006).

⁵²⁶ N.M. ADMIN. CODE tit. 19, §19.27.5.9 (2007).

⁵²⁷ UTAH CODE ANN. § 73-5-15 (LexisNexis 2007).

⁵²⁸ See, e.g., John D. Leshy, *Interstate Groundwater Resources: The Federal Role*, 26th Annual ABA Water Law Conference: Twenty-first Century Water Supply, Use, and Distribution: Do the Old Rules Still Apply? (Feb. 2008); ROY C. BARTHOLOMAY ET AL., SUMMARY OF SELECTED U.S GEOLOGICAL SURVEY DATA ON DOMESTIC WELL WATER QUALITY FOR THE CENTERS FOR DISEASE CONTROL’S NATIONAL ENVIRONMENTAL PUBLIC HEALTH TRACKING PROGRAM: U.S. GEOLOGICAL SURVEY SCIENTIFIC INVESTIGATIONS REPORT (2007), available at <http://pubs.usgs.gov/sir/2007/5213/> (last visited Mar. 27, 2008).

Chapter 2

Legal and Institutional Context for Augmenting Existing Water Supplies

This Chapter was developed in response to recommendation 2.E. of the WGA Water Report.

The WSWC should explore the relative merits and obstacles related to various programs and technologies and legal and institutional means to augment existing water supplies, including water conservation and water use efficiency, demand management (including pricing structures), water and water rights transfers, water banking, water reuse, revolving following of agricultural lands, watershed protection and management, surface and ground water storage alternatives, desalination, and weather modification.

Chapter 2, by far the longest in this report, is divided into ten sections. Section 1, *Prior Appropriation in the West*, reviews elementary principles of the prior appropriation doctrine. Section 2, *Water Demand Management*, covers practices that can help moderate water consumption in the West. Section 3, *Water Storage*, explores possible means for developing additional water storage. Section 4, *Water Conservation*, reviews legislative and institutional means for reducing water use and the importance of considering third-party impacts. Section 5, *Water Reuse*, presents the legal, institutional, and societal constraints relevant to water reclamation. Section 6, *Water Right Transfers*, recognizes that reallocating water via transfers can help satisfy future water needs but that potential adverse consequences should be evaluated beforehand. Section 7, *Water Banking*, discusses the array of banking options available in western states. Section 8, *Rotating Fallowing and Dry Year Leasing*, analyzes land-use practices that can encourage conservation during drought. Section 9, *Desalination*, addresses the legal implications for disposing concentrate. Section 10, *Weather Modification*, explores liability and conflict considerations for large-scale weather modification programs.

Chapter 2

Section 1

Prior Appropriation in the West

2.1.A. Introduction

Prior appropriation is the predominant method for allocating water resources in the West. Defined generally, prior appropriation is “[t]he system of water law . . . under which (1) the right to water is acquired by applying it to beneficial use, and (2) a right to water is superior to a similar right acquired later in time. Usually under modern statutes, agencies regulate the acquisition of new water rights or changes in use of the water.”⁵²⁹ Among the eighteen member states of the Western States Water Council, each follows the doctrine of prior appropriation to one degree or another.⁵³⁰ Although states may define and utilize the doctrine somewhat differently, certain elements are common to all systems. An oft-quoted passage from the California Court of Appeals summarizes some of these key elements:

To constitute a valid appropriation of water, three elements must always exist: (1) An intent to apply it to some existing or contemplated beneficial use; (2) an actual diversion from the natural channel by some mode sufficient for the purpose; and (3) an application of the water within a reasonable time to some beneficial use.⁵³¹

These elements are fundamental to understanding the prior appropriation doctrine. The authors have included this brief overview of the doctrine before delving into a more thorough exploration of the legal and institutional context for augmenting existing water supplies. The remaining sections in this Chapter presuppose the reader has a rudimentary understanding of the prior appropriation doctrine.

2.1.B. Intent to Apply Water to Beneficial Use

The first element includes two key principles: (1) an intention to apply water and (2) the intention must relate to some existing or contemplated beneficial use. Evidencing “an intention to apply water” can be shown through an act or manifestation reflecting the potential

⁵²⁹ 6 WATER & WATER RIGHTS 1223-24 (2005).

⁵³⁰ Even though all member states of the Western States Water Council follow the doctrine of prior appropriation to one degree or another, some states embrace additional water allocations such as the riparian system in parts of California and the Pueblo system in parts of New Mexico.

⁵³¹ *Simmons v. Inyo Cerro Gordo Mining & Power Co.*, 192 P. 144, 150 (Cal. App. 1920).

appropriator's *bona fide*⁵³² purposes for using the water. This requirement is designed to prevent excessive or counterproductive speculation. Excessive speculation could prevent someone else in the community from putting the water to good use who is otherwise capable of doing so.⁵³³ While "intent" is typically something that occurs in the mind, certain activities can indicate intent.⁵³⁴ Initial steps towards putting water to acceptable use can help appropriators demonstrate this intent. In the realm of water resources, acceptable purposes for using water are called "beneficial uses."

Generally speaking, beneficial uses of water are those which communities, institutions, and laws have deemed valuable and worthy of protection. Some states declare: "Beneficial use shall be the basis, the measure and the limit of all rights to use water in this state."⁵³⁵ This declaration has two important implications. First, water must be put to beneficial use, as opposed to an unbeneficial use.⁵³⁶ Second, only the amount of water put to beneficial use is granted legal protection.⁵³⁷ Due to its fundamental nature, exploring the scope of beneficial use is elementary to water law and administration.

Some states list beneficial uses of water. For example, in Montana "[b]eneficial use, unless otherwise provided, means: (a) a use of water for the benefit of the appropriator, other persons, or the public, including but not limited to agricultural, stock water, domestic, fish and wildlife, industrial, irrigation, mining, municipal, power, and recreational uses; (b) a use of water appropriated by the department for the state water leasing program . . .; (c) a use of water by the department of fish, wildlife, and parks through a change in an appropriation right for instream flow to protect, maintain, or enhance streamflows to benefit the fishery resource . . .; (d) a use of water through a temporary change in appropriation right or lease to enhance instream flow to benefit the fishery resource . . .; (e) a use of water for aquifer recharge or mitigation . . .; or (f) a use of water for an aquifer storage and recovery project. . . ."⁵³⁸

Other states have more general pronouncements of beneficial use. For example, a South Dakota statute declares that beneficial use is "any use of water within or outside the state, that is reasonable and useful and beneficial to the appropriator, and at the same time is consistent with the interests of the public of this state in the best utilization of water supplies."⁵³⁹ Similarly, a North Dakota statute reads "'[b]eneficial use' means a use of water for a purpose consistent with the best interests of the people of the state."⁵⁴⁰ Regardless of whether a statutory pronouncement

⁵³² Bona fide is defined as "[m]ade in good faith; without fraud or deceit. Sincere; genuine." BLACK'S LAW DICTIONARY 168 (7th ed. 1999).

⁵³³ 2 WATER & WATER RIGHTS 12-7 (2001).

⁵³⁴ While the ultimate activities to which water is applied are called "beneficial uses," an intent to apply can be manifest by initial steps taken towards putting water to beneficial use, and not actual beneficial use. This can include steps for making a diversion, posting a notice in the area, or taking proper administrative steps in the appropriations process, such as filing an application.

⁵³⁵ See UTAH CODE ANN. 71-1-3; ARIZ. REV. STAT. 45-141(B); NEV. REV. STAT. 533.035 (2007); N.M. STAT. 72-1-2; N.D. CENT. CODE 61-04-01.2 (LexisNexis 2008); 82 OKLA. STAT. 105.2(A) (LexisNexis 2008); OR. REV. STAT. 540.610 (LexisNexis 2008); WYO. STAT. 41-3-101 (2007).

⁵³⁶ 2 WATER & WATER RIGHTS 12-22 (2001).

⁵³⁷ *Id.*

⁵³⁸ MONT. CODE ANN. § 85-2-102(4) (2007).

⁵³⁹ S.D. CODIFIED LAWS 46-1-6(3) (2007).

⁵⁴⁰ N.D. CENT. CODE 61-04-01.1 (2007).

is general or specific, states generally recognize⁵⁴¹ the following as beneficial uses of water: (1) municipal use; (2) domestic use; (3) stock water; (4) agricultural uses, including irrigation; (5) industrial use; (6) hydropower, including hydroelectric power generation; (7) mining and mineral extraction; (8) aquifer recharge; (9) fish and wildlife; and (10) recreation.

2.1.C. Actual Diversion

“While the prior appropriation system may have started out simply that water ‘could’ be diverted and consumed, in many jurisdictions it became a requirement that water ‘must’ be diverted, although, of course it need not be consumed.”⁵⁴² Actual diversion usually requires an investment of time, work, and resources. Investing time and capital demonstrates the sincerity of the prospective water user.⁵⁴³ A diversion also provides a means of measuring the quantity of water being used.⁵⁴⁴ As a result, the quantity of an appropriator’s right is limited by the capacity of the diversion. Diversions also provide notice to subsequent users that a quantity of water is being used and not available for appropriation. In a typical scenario, a farmer would construct a ditch or canal to convey water from the free-flowing stream to the irrigated property.⁵⁴⁵ The quantity of water the farmer could divert from the stream would be based on a “water duty” (the amount of water needed per acre to irrigate the crops) multiplied by the number of acres irrigated.⁵⁴⁶ The ditch or canal then delivers that quantity to the farmer’s field.

Certain historical uses did not require a diversion but were still deemed beneficial and capable of appropriation. Streamside sawmills, flour mills, or other machines used falling water to do work. While mills do not necessarily require a diversion, mills share several key characteristics with diversions that advance the policies of early appropriation doctrine. First, building a mill requires an investment of time, work and resources. Consequently, appropriative rights for mills are not speculative and evidence intent to use water for beneficial purposes. Second, the size and purpose of the mill define the measure of the water being used. Third, mills put subsequent users on notice that at least some water was claimed and no longer available for appropriation. As a result, mills and similar machines constituted an early instream use consistent with the policies of early appropriation. While diversion remains an important part of prior appropriation, some states have modified their laws to accommodate protection for instream flows.⁵⁴⁷

⁵⁴¹ If not defined by statute, acceptable uses of water can be found in the states’ judicial and administrative records. Even if statutes delineate “beneficial use,” state courts or administrative bodies may clarify the scope of beneficial use within the state.

⁵⁴² 2 WATER & WATER RIGHTS 12-12 (2001).

⁵⁴³ Norman K. Johnson, *The Doctrine of Prior Appropriation and the Changing West* 4 (1987) (on file with authors). See also *supra*, Part 2.1.B Intent to Apply Water to Beneficial Use. This historical requirement precluded using water for instream uses. This has changed in many states. Many states now recognize instream uses such as fish, wildlife, and recreation as beneficial use in the appropriative sense. See *infra* notes 1398-1403 and accompanying text.

⁵⁴⁴ See Johnson, *supra* note 543, at 4.

⁵⁴⁵ *Id.* Of course, the use could be for a mine, a home, or any other conceivable beneficial purpose.

⁵⁴⁶ *Id.*

⁵⁴⁷ See, e.g., *infra* notes 1403-1404 and accompanying text.

2.1.D. Actual Beneficial Use

Although a potential appropriator intends to use water and constructs a diversion, she does not have a right to water unless she puts it to beneficial use in a timely manner. This requirement emphasizes the beneficial use requirement and reflects utilitarian ideals. This requirement is designed to encourage prompt, efficient use of natural resources. While intent and beneficial use are crucial, actually using the water is paramount. Excessive delay after the first two elements may jeopardize the right if someone else actually puts the water to beneficial use.

2.1.E. “First in Time, First in Right”

The ability to use water before others underscores an important point: water is a limited resource subject to competing claims. The concept of priority and the permitting system are attempts to balance competing claims to water. Priority is a chronological hierarchy developed by western Anglo water users to protect their use against subsequent users.⁵⁴⁸ Nevertheless, these early settlers were still exposed to the droughts of Mother Nature. “In times of shortage senior rights were protected up to the available supply, while junior users, who may have had plenty of water in a ‘normal year,’ received no water at all.”⁵⁴⁹ This made sure at least some water is available to some users.

Today, most water users must have a permit. The priority date is determined through the administrative permitting process.⁵⁵⁰ The priority date for permits that successfully progress through the administrative process relate back to the date the application was filed.⁵⁵¹ If an application is incomplete or otherwise deficient, the priority date may either be the date the application was initially filed or the date at which remedial action corrected the deficiency, depending on the state.⁵⁵²

2.1.F. Nature and Scope of Right

Many western state constitutions provide that the waters of the state belong to the people of the state or to the state itself.⁵⁵³ Therefore, state water rights are usufructuary in nature.⁵⁵⁴ A usufructuary water right is the legal right to use the water of the people of the state, or the state itself, for the benefit of the right holder. Water rights are considered property in every state.⁵⁵⁵

As property, water rights can be taxed, regulated, and subjected to eminent domain.⁵⁵⁶ However water’s characteristics—particularly its indispensability and potential for reuse—make

⁵⁴⁸ Johnson, *supra* note 543, at 4.

⁵⁴⁹ *Id.*

⁵⁵⁰ 2 WATER & WATER RIGHTS 12-4 (2001).

⁵⁵¹ *Id.*

⁵⁵² *Id.*

⁵⁵³ Johnson, *supra* note 543, at vi.

⁵⁵⁴ A usufruct is “a right to use another’s property for a time without damaging or diminishing it, although the property might naturally deteriorate over time.” BLACK’S LAW DICTIONARY 1542 (7th ed. 1999).

⁵⁵⁵ 2 WATER & WATER RIGHTS 12-55 (2001).

⁵⁵⁶ *Id.* at 12-56.

it different than many forms of real property. For example, sales or transfers of water rights are typically subject to administrative approval, which is not required for the majority of real property transactions.⁵⁵⁷ Also, water rights are limited to the extent of the beneficial use for which it was obtained.⁵⁵⁸

Water rights can be terminated if abandoned, forfeited, or acquired by prescription. Water law is particularly unsympathetic to nonuse. A water right is abandoned if the right holder no longer uses the right and no longer intends to use it.⁵⁵⁹ Rights that are abandoned may be claimed by another user or may revert back to public ownership.⁵⁶⁰ Generally, the right holder has the burden of proof to show that the specific conditions that led to nonuse were beyond the holder's control, thereby rendering the nonuser blameless.⁵⁶¹ In contrast, forfeiture does not require intent and may be a punitive measure for an unlawful act, such as waste.⁵⁶² Prescription is essentially adverse possession applied to water resources. To prescriptively acquire rights to water, "the use must have been actual, open and notorious on the part of the adverse claimant; adverse and hostile to the claim of the rightful owner; exclusive; continuous and uninterrupted; under claim of right, with payment of taxes whenever taxes have been levied upon the water right; and must have been made throughout the period prescribed by the statute of limitations to recover real property."⁵⁶³

2.1.G. Conclusion

States grant water rights to users if they follow the proper steps. Historically, water rights required a water user to show: (1) intent to apply water to beneficial use; (2) a diversion to convey water from the stream to the place of use; and (3) timely and beneficial use of water. Following the steps and acquiring a right give the user priority. Priority ensures that those possessing senior rights will have water if flows are inadequate to satisfy everyone's rights. The system of priority is summarized by the common law maxim "first in time, first in right." Water rights are property interests that can be taxed, regulated, or taken by eminent domain. Also, water rights can terminate if abandoned, forfeited, or prescriptively acquired by someone else. This brief introduction provides background for the following sections that discuss specific legal and institutional strategies for augmenting existing water supplies.

⁵⁵⁷ See *infra* notes 909-939 and accompanying text.

⁵⁵⁸ 2 WATER & WATER RIGHTS 12-57 (2001).

⁵⁵⁹ *Id.* at 17-11.

⁵⁶⁰ *Id.* at 17-12.

⁵⁶¹ *Id.*

⁵⁶² *Id.* at 17-14.

⁵⁶³ *Id.* at 17-16.

Chapter 2

Section 2

Demand Management

2.2.A. Introduction

With increasing demands on water supply and few practical and cost-effective methods of developing ‘new’ water supplies, governments in the United States and internationally have increasingly turned to water demand management strategies. While governments have traditionally increased the water supply to meet growing demands, demand management strategies attempt to decrease demand. Municipalities and local governments have typically administered demand management plans, but states can also be involved in the implementation of demand management strategies by encouraging or requiring local governments and municipalities to adopt demand management practices. Examples of state regulations encouraging or requiring demand management are provided. Then a brief explanation of demand management techniques and their attendant constraints is given.

2.2.B. State Statutes Mandating Water Demand Management

2.2.B.(i) Arizona

In 2005, Arizona passed a law that requires all community water systems (CWS) to provide a system water plan that includes, at the very least, a drought preparedness plan.⁵⁶⁴ Most CWS are also required to include a water supply plan and a water conservation plan in their system water plans. The statute specifies that each CWS must include “specific water supply or water demand management measures for each stage of drought or water shortage conditions” in the drought preparedness plan.⁵⁶⁵ Water conservations plans must also include both “demand and supply management measures.”⁵⁶⁶ The statute then defines demand and supply management measures to include “measures . . . to determine and control lost and unaccounted for water[.]” “[c]onsideration of water rate structures that encourage efficient use of water[.]” and “a continuing conservation education program[.]”⁵⁶⁷

⁵⁶⁴ ARIZ. REV. STAT. § 45-342 (2006).

⁵⁶⁵ *Id.* § 45-342(I)(3)(c).

⁵⁶⁶ *Id.* § 45-342(J).

⁵⁶⁷ *Id.*

2.2.B.(ii) California

California's Water Code has a similar section requiring all urban water suppliers to "prepare and adopt an urban water management plan."⁵⁶⁸ Among the items required in the plan is "a description of the supplier's water demand management measures[.]" both those that are currently being implemented, and those that will be implemented in the future.⁵⁶⁹ Demand management is defined as "those water conservation measures, programs, and incentives that prevent the waste of water and promote the reasonable and efficient use and reuse of available supplies."⁵⁷⁰ The statute identifies several demand management measures, including plumbing retrofit, system audits for detection and repair of leaks, incentive programs, education programs, prohibition of waste, and "conservation pricing."⁵⁷¹ Water suppliers are also required to complete an evaluation of those demand management measures that are not currently implemented or planned for future implementation, giving consideration to the measures that cost less than expanding existing water sources or procuring new water sources.⁵⁷²

In a separate section of the water code, the California Department of Water Resources is required to include in its update of the California Water Plan a discussion of various strategies.⁵⁷³ Among the strategies that must be included is "a discussion for the potential for alternative water pricing policies to change current and projected uses."⁵⁷⁴

2.2.B.(iii) Washington

Washington's statute requiring water demand management measures is less comprehensive than either the California or Arizona statutes. As part of an assistance account available to water drinking systems, parties must enter into a memorandum of agreement.⁵⁷⁵ Among other requirements, the memorandum of agreement requires the supplier to implement "water conservation and other demand management measures[.]"⁵⁷⁶

2.2.C. Components of Water Demand Management

2.2.C.(i) Conservation

Because demand management works to reduce demands on water, conservation measures play a large role in demand management plans. Included within the realm of conservation are measures such as incentives for installing water saving fixtures, leak detection and repair, and

⁵⁶⁸ CAL. WATER CODE § 10620 (2006).

⁵⁶⁹ *Id.* § 10631(f).

⁵⁷⁰ *Id.* § 10611.5.

⁵⁷¹ *Id.* § 10631(f)(1).

⁵⁷² *Id.* § 10631(g).

⁵⁷³ CAL. WATER CODE § 10004.5.

⁵⁷⁴ *Id.*

⁵⁷⁵ REV. CODE WASH. § 70.119A.170(4) (2006).

⁵⁷⁶ *Id.* § 70.119A.170 (4)(f).

basic reduction of excessive and needless use through various methods.⁵⁷⁷ While conservation efforts are often administered most effectively by local governments that can tailor programs to meet specific needs, states can encourage conservation by offering incentives and clarifying or changing the legal framework for conservation. However, conservation programs can be difficult to implement, and they can have adverse third party impacts. For a more detailed discussion of state conservation programs, with their attendant legal and institutional constraints, see Chapter 2, Section 4, *Water Conservation*.

2.2.C.(ii) Public Education

The success of water demand measures are dependent on public education. One source notes that “[p]ublic education and awareness is of paramount importance[,]” but awareness campaigns “often target the wrong audience[.]”⁵⁷⁸ Specifically, the public must be educated “about the critical status regarding water in terms of quality and quantity and the need to act coherently to face these challenges.”⁵⁷⁹ If the public is educated and made aware of the scarcity of water and the need to stretch its use, individuals will be more likely to reduce demand.

2.2.C.(iii) Water Recycling

Another effective way to reduce demand for water is to reuse or recycle water that has already been used. Recycled water is suitable for industrial, agricultural and landscaping uses, and is often adequate for more uses due to the high level of treatment that is required by many states. The use of recycled water can substantially reduce the amount of high quality water that is used for purposes for which lower quality water is suitable, leaving more high quality water for food preparation, bathing, drinking, and other uses with high human contact. However, public opposition to the use of recycled water often imposes a problem for agencies desiring to implement water recycling. For a more detailed discussion regarding the legal and institutional constraints relative to water reuse programs, see Chapter 2, Section 5, *Water Reuse*.

2.2.C.(iv) Efficient Water Allocation

Efficient water allocation appears to be one of the primary goals of water resource departments around the West, across the country, and around the world, as evidenced by the growing interest in facilitating water markets and voluntary transfers. At least one state identifies efficient water allocation as a motive for encouraging voluntary water transfers.⁵⁸⁰ One source identifies efficient water allocation as one of the main strategies of water demand

⁵⁷⁷ See Dennis R. Delaney, Note: *Federal Guidance: A Middle of the River Approach to Water Conservation*, 76 B.U.L. REV. 375, 387-91 (1996); see also Water Information Program, *Saving Water Indoors*, at <http://www.waterinfo.org/indcnsrv.html> (last visited July 12, 2006).

⁵⁷⁸ H.A. Bakir, Centre for Environmental Health Activities, World Health Organization, *Water Demand Management for Enhancing Water Supply Security: Concept, Applications and Innovations*, 12-13 (2004), presented at the International Water Demand Management Conference, May 30-June 3, 2004, Dead Sea, Jordan; available at http://www.wdm2004.org/new_web/technical_session/files/hamid_bakir.pdf (last visited July 12, 2006).

⁵⁷⁹ Mahmoud Abu Zeid, Minister of Water Resources & Irrigation, Egypt, *Effective Demand Management—the Way Forward for Arid & Semi-Arid Regions* 9 (2004), presented at the International Water Management Demand Conference, *supra* note 578.

⁵⁸⁰ See e.g., CAL. WATER CODE § 109(a) (2006).

management and states that it “is the main tool available for ensuring that water is used wisely and optimally in a socially beneficial manner in the public interest.”⁵⁸¹ One article states that “[p]ublic health protection is the most socially beneficial use of water[,]” while research shows that “[a]griculture is the largest water user with the least water productivity[.]”⁵⁸² As the West grows and becomes more urbanized, the incidence of agriculture-to-urban transfers highlights the growing consensus that municipal or industrial use is more efficient than agricultural use. However, states should consider the impact of water allocation decisions on agriculture and its ability to produce necessary food supplies. Efficient water allocation includes greater water productivity, which “is central to producing food and reducing competition for water as well as feeding the world’s undernourished population.”⁵⁸³ Water productivity in agriculture can be increased by “introducing shorter-duration and higher-yielding crop varieties, switching to less water-consuming crops, or improving agronomic practices.”⁵⁸⁴ As states encourage efficient agricultural water practices, there will be less competition for scarce water supplies, and more water will be available for domestic and municipal needs.

2.2.C.(v) Water Pricing

One of the most controversial aspects of demand management is the idea of pricing water to more accurately portray its cost and value. As water becomes scarcer and governments look for new sources of water, the marginal cost of obtaining water increases. Similarly, as competition for scarce water supplies intensifies, the value of water, or the price people are willing to pay, also increases. One international source attributes several problems to low water pricing and argues, “low water charges and poor cost recovery lead to declining funds available for investment in water infrastructure, poor maintenance of existing systems, inefficient water allocation, and growing conflicts between those with and without access to water.”⁵⁸⁵

Advocates of water pricing argue that higher prices curtail use, asserting that “[i]f the price of water rose, people would carefully examine how they use water, for what purposes, and in what quantity.”⁵⁸⁶ Proponents note the “perversity of encouraging wasteful water use” through the common use of flat rates or “a declining block rate structure, which rewards the highest water users with the lowest rates.”⁵⁸⁷ One source explains, “Economic theory suggests that demand for water should behave like that for any other good: other things being equal, water use should decline with rising prices.”⁵⁸⁸ However, commentators note that water pricing is

⁵⁸¹ Bakir, *supra* note 578, at 8.

⁵⁸² *Id.* at 9.

⁵⁸³ Zeid, *supra* note 579, at 8.

⁵⁸⁴ *Id.* at 9.

⁵⁸⁵ R. Maria Saleth, *Water Pricing: Potential and Problems, in Overcoming Water Scarcity and Quality Constraints*, 2020 Focus No. 9, Brief 10, ¶ 2 (Ruth S. Meinzen-Dick & Mark W. Rosegrant eds., 2001), at http://www.ifpri.org/2020/focus/focus09/focus09_10.asp (last visited Apr. 14, 2008).

⁵⁸⁶ Robert Glennon, Symposium of Waterbanks, Piggybanks, and Bankruptcy: Changing Directions in Water Law: II. Water Scarcity: An Overview: *Water Scarcity, Marketing & Privatization*, 83 TEX. L. REV. 1873, 1883 (2005).

⁵⁸⁷ Glennon, *supra* note 586, at 1883.

⁵⁸⁸ PRI Project, Sustainable Development, Synthesis Report, PH4-18/2005E-PDF, *Economic Instruments for Water Demand Management in an Integrated Water Resources Management Framework* 13 (Canada 2005) [hereinafter PRI Report].

“politically controversial”⁵⁸⁹ and more complicated than it may initially seem.⁵⁹⁰ This is partially attributable to the fact that “[w]ater is often considered to be not only a *commodity* but also a *natural resource* and a perceived human *entitlement*.”⁵⁹¹

One source notes that while “[w]ater pricing policy has the potential to mitigate water scarcity . . . the water pricing policies being pursued in most countries fail to perform these vital roles due to faulty approaches and inappropriate institutions, both of which have their roots in political economy.”⁵⁹² In practice, effective water pricing is “very difficult because water rates are expected to fulfill several incompatible objectives.”⁵⁹³ One source concludes that despite the growing interest among water utilities to implement pricing to encourage conservation, potential benefits are reduced or negated by water bills that are often incomprehensible and vague about pricing rates and structures.⁵⁹⁴ However, the research found that peak pricing—increasing prices during periods of peak use, such as summer—“give[s] a clear economic signal and can produce the desired consequences” of encouraging conservation, both in the peak period as well as the off-peak period.⁵⁹⁵ In addition, a report from the Food and Agriculture Organization of the United Nations “presents evidence from developing countries that pricing does indeed restrict water use.”⁵⁹⁶

Some commentators note that the difficulty of creating effective pricing structures may stem from the fact that because water is essential to life, demand for it is inelastic, or not highly responsive to price changes.⁵⁹⁷ Additionally, increasing prices may even create the opposite effect of that intended in that users may increase their water consumption rather than conserve because they feel they are entitled to more water as a result of paying the higher price.

Another problem with water pricing is “the inability of poor residents to pay”⁵⁹⁸ higher prices for water. One source argues that “[s]ince water service is a basic human need, equity and public health considerations provide a compelling rationale for making water available at the lowest possible cost.”⁵⁹⁹ Another source notes that “[f]or low-income households, the higher proportion of income allocated to fixed expenditures for essential goods and services—housing, food, utilities—can make paying bills more difficult.”⁶⁰⁰ In response to this potential problem,

⁵⁸⁹ Glennon, *supra* note 586, at 1883.

⁵⁹⁰ PRI Report, *supra* note 588, at 13.

⁵⁹¹ Ben Dziegielewski, *Management of Water Demand: Unresolved Issues*, WATER RESOURCES UPDATE, Winter 1999, at 4 (emphasis in original).

⁵⁹² Saleth, *supra* note 585, at ¶ 1.

⁵⁹³ Dziegielewski, *supra* note 591, at 4.

⁵⁹⁴ Jeffrey L. Jordan, *Pricing to Encourage Conservation: Which Price? Which Rate Structure?*, WATER RESOURCES UPDATE, Winter 1999, at 36.

⁵⁹⁵ *Id.*

⁵⁹⁶ Food & Agriculture Organization (FAO), United Nations, FAO Agriculture Series No. 26, *The State of Food and Agriculture*, chapter 3: Water Policies & Demand Management (1993), available at <http://www.fao.org/docrep/003/t0800e/t0800e0c.htm>.

⁵⁹⁷ Peter D. Nichols & Douglas S. Kenney, *Watering Growth in Colorado: Swept Along by the Current or Choosing a Better Line?*, 6 U. DENV. WATER L. REV. 411, 442 (2003).

⁵⁹⁸ Violeta Petrova, *At the Frontiers of the Rush for Blue Gold: Water Privatization and the Human Right to Water*, 31 BROOKLYN J. INT’L L. 577, 588 (2006).

⁵⁹⁹ Nichols & Kenney, *supra* note 597, at 443.

⁶⁰⁰ Janice A. Beecher & Peter E. Shanaghan, *Sustainable Water Pricing*, WATER RESOURCES UPDATE, Winter 1999, at 30.

proponents of water pricing advocate “sensitiv[ity] to the impact on families of modest means[,]” suggesting subsidies, assistance programs, or increasing rates only after a certain usage threshold is reached.⁶⁰¹

2.2.C.(v)(a) *Agricultural Water Pricing*

Some in the water industry in the United States suggest that many agricultural water users are provided with heavily subsidized water supplies.⁶⁰² One report notes that the growing interest in increasing the price for irrigation water is a relatively recent phenomenon, stating that in the past, “the fact that farmers were using water at subsidised rates remained largely unchallenged by other elements of society.”⁶⁰³ However, the report notes that when a water system has “reach[ed] a certain level of maturity” in a country, pressure for agricultural users to pay higher prices for their water will mount when “several forces converge.”⁶⁰⁴ These forces include competition for irrigation water, a failure to obtain funding sufficient to cover those costs that farmers do not pay for, the realization that farmers often use large amounts of water to grow crops that have low value, the link between farming and environmental damage, and a reduction in farmers’ political power.⁶⁰⁵

Regardless of the merits of the “subsidy” debate, increasing the price of irrigation water can result in a change to crops that use less water or to more efficient watering techniques. However, one source notes that markets are a better tool for efficient water allocation than increasing the price of irrigation water.⁶⁰⁶ Another source points out that while efficiency may increase with increased prices, pricing may “also induce changes in crop patterns that result in lower farm employment.”⁶⁰⁷ This may, in turn, disproportionately affect farming communities.⁶⁰⁸ Moreover, this discussion must be informed by policies regarding the desirable limits for the prices of basic foods from domestic sources.

⁶⁰¹ See Glennon, *supra* note 586, at 1884.

⁶⁰² Although some argue that agricultural water is heavily subsidized, statutes such as the Reclamation Reform Act of 1982 require greater cost-sharing by project beneficiaries. For example, “[t]he price of irrigation water delivered by the Secretary pursuant to a contract or an amendment to a contract with a district, as specified in section 203 [43 USCS § 390cc], shall be at least sufficient to recover all operation and maintenance charges which the district is obligated to pay to the United States.” 43 U.S.C.S. § 390hh (LexisNexis 2008). These include pricing water under new or amended contracts sufficient to cover current operation and maintenance charges as well as more realistic assessments for construction charges and operating deficits on water deliveries that could be made under the Reclamation Act. 4 WATER & WATER RIGHTS 41-24 to 41-25 (2004). As a result, some criticism about agricultural water subsidies may be less meritorious than presented in some literature.

⁶⁰³ Alberto Garrido, Working Party on Economic & Environmental Policy Integration, Environment Policy Committee, Organisation for Economic Co-operation & Development (OECD), ENV/EPOC/GEEI(98)11/FINAL, *Agricultural Water Pricing in OECD Countries*, 12 (1999).

⁶⁰⁴ *Id.*

⁶⁰⁵ *Id.*

⁶⁰⁶ G. Cornish et al., Food & Agriculture Organization (FAO), United Nations, FAO Water Reports 28, *Water charging in irrigated agriculture: An analysis of international experience*, ch. 6 (2004) at <http://www.fao.org/docrep/008/y5690e/y5690e09.htm> (last visited July 18, 2006).

⁶⁰⁷ California Water Plan 2005 Update, chapter 8, *Economic Incentives: Loans, Grants & Water Pricing*, 8-3 (2005).

⁶⁰⁸ *Id.*

2.2.C.(vi) Privatization

Related to the idea of water pricing is the privatization of water resources and management.⁶⁰⁹ Privatization encompasses a variety of public-private partnerships, ranging from public entities outsourcing specific responsibilities to private entities on one end, to the sale of a public water system by a public entity to a private firm on the other end.⁶¹⁰ Proponents of privatization argue that it enables better water pricing because it “depoliticizes the regulation of water[,]” and allows “governments [to] shift the responsibility for pricing onto the private sector.”⁶¹¹ Rather than water prices that cover mainly the operational costs of providing water, privatization of water utilities results in water pricing being regulated by the market. On the other hand, detractors argue that privatization turns over to a small group of people control over a public resource – often allowing significant private economic gain to occur. One source points out that while privatization of water resources promotes a more accurate pricing of water, it is at odds with the conservation ethic. He states, “under the private ownership of water industry, there will be little interest on the part of the water utilities to promote conservation as reduced demands simply translate to lower revenues and lower profits.”⁶¹²

2.2.D. Conclusion

In view of over-allocated surface water sources, diminishing groundwater supplies, and continually growing populations, a demand management plan can be a useful tool for state and local governments to meet increasing needs with the same or fewer resources. States can aid in the implementation of demand management strategies by encouraging or requiring local governments and municipalities to develop demand management plans.

⁶⁰⁹ See e.g., Craig Anthony Arnold, *Privatization of Public Water Services: The States’ Role in Ensuring Public Accountability*, 32 PEPP. L. REV. 561 569 (2005) (describing the current U.S. trend towards privatization); Petrova, *supra* note 598, at 577-581.

⁶¹⁰ Arnold, *supra* note 609, at 569-70.

⁶¹¹ Petrova, *supra* note 598, at 587.

⁶¹² Dziegielewski, *supra* note 591, at 4.

Chapter 2

Section 3

Water Storage

2.3.A. Introduction

Although construction of new dams and impoundments has become politically unpopular over the past several years,⁶¹³ an article in the October 2006 issue of U.S. Water News Online reporting on a proposed water storage study in Oregon illustrates that the issue of new storage options is not dead.⁶¹⁴ Indeed, in a 1997 report prepared by the Western States Water Council (WSWC) for the Western Water Policy Review Advisory Commission, 13 out of the 18 current WSWC member states anticipated “significant opportunities to augment supplies” through the use of storage or capital improvements to surface reservoirs.⁶¹⁵ Despite the emergence and growing acceptance of policy tools that enable more efficient water use and allocation, such as water recycling and transfers, projected growth patterns may require more water than these tools are able to procure, and states must therefore consider building new storage facilities. One source notes that buffers against water scarcity and variability “are provided by water *storage*, not just by reducing total demand or increasing the flow of supply.”⁶¹⁶ However, in contrast to traditional water projects, the Western Governors’ Association concludes that “projects for the future are more likely to be more innovative, environmentally sensitive, and smaller in scale” and will only be constructed once other methods of conserving water and stretching supply are “fully examined, and to the extent practical, implemented.”⁶¹⁷

In addition to more technologically advanced and environmentally friendly impoundments, states are also encouraging the conjunctive use of water resources, which recognizes the interconnection between surface and groundwater supplies and encourages a complementary use of both. Based on this interconnection, many projects now exist that store excess surface water in underground aquifers or use excess or recycled water to ‘recharge’ an aquifer, often one with diminishing water levels. Whether a state or local government seeks to

⁶¹³ See, e.g., Christine A. Klein, *Dams and Democracy*, 78 OR. L. REV. 641 (1999) (describing the shift in policy from dam building to potential deconstruction of dams).

⁶¹⁴ U.S. Water News Online, *Water storage study proposal could help shape Oregon farming* (Oct. 2006), at <http://www.uswaternews.com/archives/arcpolicy/6watestor10.html> (last visited Oct. 19, 2006). Governor Schwarzenager of California has made new surface water storage a cornerstone of his water policy. See Governor Calls for Agreement on Comprehensive Water Plan, <http://gov.ca.gov/issue/water-supply> (last visited Jan. 16, 2008).

⁶¹⁵ WSWC Report prepared for the Western Water Policy Review Advisory Commission, *Water in the West Today*, 24, table 2 (Feb. 1997).

⁶¹⁶ William Blomquist, Edella Schlager, & Tanya Heikkila, *Common Waters, Diverging Streams: Linking Institutions and Water Management in Arizona, California, and Colorado* 11 (2004).

⁶¹⁷ Western Governors’ Association, *Water Needs & Strategies for a Sustainable Future*, 7-8 (June 2006).

construct new impoundments for surface water or inject water into aquifers for storage or recharge, several federal and state statutes can constrain or prevent the desired result from coming to fruition. These are discussed below.

2.3.B. Barriers to Surface Water Storage

As noted above, the expansive water projects that were once the hallmark of the Bureau of Reclamation and western water supply have become more difficult because of the environmental considerations and high cost. However, there is still interest in surface water storage as a means to augmenting water supply when other measures are insufficient.⁶¹⁸ The federal and state statutes that can impose barriers to surface water storage are discussed below.

2.3.B.(i) The Clean Water Act

Section 404 of the Clean Water Act (CWA) regulates the discharging of dredged or fill material into the waters of the United States.⁶¹⁹ Permits must be acquired from the U.S. Army Corps of Engineers (Corps) for many activities, including the construction of dams or levees for water project impoundments. One source explains, “[t]he main premise of the [section] 404 regulatory program is that no discharge of dredged or fill material can be permitted if a practicable alternative exists which is less damaging to the aquatic environment or if the nation's waters would be significantly degraded.”⁶²⁰ The Environmental Protection Agency (EPA), which also administers the CWA, explains that, as an applicant, “you must show that you have, to the extent practicable: taken steps to avoid wetland impacts; minimized potential impacts on wetlands; and provided compensation for any remaining unavoidable impacts.”⁶²¹ Applicants for an individual permit must also meet certain environmental requirements that are set forth in the regulations that the EPA has promulgated regarding section 404 permits.⁶²² However, even if a project is able to meet the section 404 requirements to the satisfaction of the Corps, the EPA has a veto power, which it will exercise if it finds that a project will be detrimental to the environment.⁶²³

This is what happened with the Two Forks Project, proposed to meet the water needs of the Denver area. Despite the fact that the Corps issued the permit and “justified the permit issuance with the potential to mitigate the negative impacts[,]” the EPA vetoed the decision.⁶²⁴ The EPA said the dam “would result in unacceptable adverse effects on fishery areas and

⁶¹⁸ While building surface storage facilities can be difficult, the concept is not dead. California recently constructed Diamond Valley Lake, an 800,000 acre-foot facility that began filling in November, 1999. Likewise, California began constructing the Olivenhain Dam, a 24,000 acre-foot facility, in San Diego County in 2000.

⁶¹⁹ 33 U.S.C. § 1344.

⁶²⁰ California Wetlands Information System, *Summary of Clean Water Act, Section 404* (last modified Aug. 13, 1998) at http://ceres.ca.gov/wetlands/permitting/sec404_descrip.html (last visited Oct. 24, 2006).

⁶²¹ EPA, *Wetland Regulatory Authority: Regulatory Requirements*, at http://www.epa.gov/owow/wetlands/pdf/reg_authority_pr.pdf (last visited Oct. 26, 2006).

⁶²² *Id.*; see 40 C.F.R. pt. 230 (2007).

⁶²³ 33 U.S.C. § 1344(c).

⁶²⁴ Peter D. Nichols & Douglas S. Kenney, *Watering Growth in Colorado: Swept Along by the Current or Choosing a Better Line?*, 6 U. DENV. WATER L. REV. 411, 430 (2003).

recreational areas.”⁶²⁵ The EPA gave two independent grounds—the availability of “practicable, less environmentally damaging alternatives” and the significance of the damage that would result if the project were allowed to go forward.⁶²⁶ The Two Forks Project has not yet been revisited, despite calls by some to do so.⁶²⁷

The CWA gives the Corps and the EPA jurisdiction over “the waters of the United States,” or “navigable waters”—originally defined in case law as waters that are navigable in fact or capable of being rendered navigable, but subsequently broadened to include waters not navigable in fact or in capacity.⁶²⁸ Exactly which waters are included in this definition and subject to EPA and Corps CWA is currently the subject of much confusion as a result of the United States Supreme Court’s inability to reach a majority opinion in *Rapanos v. United States*,⁶²⁹ where a plurality of the court found that EPA and the Corps had given an overly expansive definition to “the waters of the United States,” and that the term only extended to “relatively permanent, standing or flowing bodies of water” and not “channels through which water flows intermittently or ephemerally, or channels that periodically provide drainage for rainfall.”⁶³⁰ The plurality advocated a test called the “continuous surface connection” test, where the waters in question must be significantly connected to traditional navigable waters and not simply hydrologically connected.⁶³¹ Justice Kennedy, the deciding vote in remanding the case, advocated a “significant nexus” test, in which the water in question must have a significant nexus to navigable waters in order to come under the jurisdiction of the Corps and the EPA.⁶³² Section 404 represents a significant potential constraint to the construction of surface water storage reservoirs of which those interested in water development should be aware. However, the scope of that constraint is now unclear as a result of the Supreme Court’s decision in *Rapanos*.

2.3.B.(ii) The Endangered Species Act

The Endangered Species Act (ESA), which prohibits the “take” of endangered or threatened species,⁶³³ can retard or halt the construction of a new surface water storage project which interferes with the habitat of an endangered or threatened species. One source underscores the importance of the ESA in water planning, development, and supply in general and explains that its role has evolved from being one consideration among many “to being a central consideration in almost all uses and all projects.”⁶³⁴ If a proposed project is likely to have an effect on the habitat of endangered or threatened species, the necessary permits for construction and operation will be denied. Because the ESA applies to the Corps of Engineers as a federal agency, the Corps must ensure that any actions it takes by issuing a section 404 permit

⁶²⁵ Final Determination of the Assistant Administrator for Water Pursuant to Section 404(c) of the Clean Water Act Concerning the Two Forks Water Supply Impoundments in Jefferson and Douglas Counties, CO, 56 Fed. Reg. 76 (Jan. 2, 1991).

⁶²⁶ *Id.*

⁶²⁷ Nichols & Kenney, *supra* note 624, at 419.

⁶²⁸ See *Rapanos v. United States*, 126 S. Ct. 2208, 2216 (2006).

⁶²⁹ *Id.*

⁶³⁰ *Id.* at 2225.

⁶³¹ *Id.*; see e.g., Western States Water Newsletter, Issue #1682, Environment/Litigation: Wetlands/*Rapanos* and *Carabell* (August 11, 2006) (on file at WSWC office).

⁶³² *Rapanos*, 126 S. Ct. at 2236.

⁶³³ 16 U.S.C. § 1538.

⁶³⁴ Nichols & Kenney, *supra* note 624, at 430.

do not jeopardize the existence of a threatened or endangered species.⁶³⁵ For this reason, ESA concerns are sometimes the impetus for the denial of a section 404 permit. This transforms the section 404 permit into “the vehicle for asserting the federal government’s interest in protecting endangered species.”⁶³⁶

One example of an instance in which the Corps denied a section 404 permit because of ESA concerns is the case of a dam and reservoir that was proposed to be built by the Riverside Irrigation District in Colorado on Wildcat Creek in the 1980s.⁶³⁷ The section 404 permit was denied due to “the potentially harmful effects of sand and gravel discharge during construction of the dam.”⁶³⁸ However, “[b]ehind this decision . . . was the alleged environmental impact of the water diversion on whooping crane habitat, some 250 miles downstream.”⁶³⁹ In an appeal from the decision of the district court upholding the Corps’ denial of the permit, the Tenth Circuit Court of Appeals affirmed the decision based on the adverse affects the impoundment would have on the downstream habitat of the whooping crane.⁶⁴⁰ Because the court upheld the denial of the permit by the Corps’, the dam and reservoir were not built.

As another example, Washington has enacted the Columbia River Water Resource Management Program (the Program) in response to many years of conflict and litigation regarding the declining salmon populations in the Pacific Northwest.⁶⁴¹ Due to the ongoing litigation and uncertainty regarding the minimum instream flows that were required to protect the salmon population, Washington had been unwilling and unable to appropriate new water rights within the Columbia River Basin.⁶⁴² The objective of the Program is to “allow access to the river’s resources while providing adequate protection for endangered salmon and other species.”⁶⁴³ In addition, the Program has a long-term commitment to the “[s]tudy and development of new storage on the mainstem Columbia River in a manner that provides water resources of out-of-stream use while resulting in benefits to endangered species.”⁶⁴⁴ Washington’s Program is just one example of a solution to the potential conflicts that can occur between surface storage and the ESA.

2.3.B.(iii) The Wild and Scenic Rivers Act

In 1968, Congress passed the Wild and Scenic Rivers Act (Act), in which it “declare[d] that the established national policy of dam and other construction at appropriate sections of the rivers of the United States needs to be complemented by a policy that would preserve other

⁶³⁵ *Riverside Irrigation Dist. v. Andrews*, 758 F.2d 508, 511 (1985).

⁶³⁶ D. Craig Bell & Norman K. Johnson, *State Water Laws and Federal Water Uses: The History of Conflict, the Prospects for Accommodation*, 21 ENVTL. L. 1, 46 (1991).

⁶³⁷ *Id.* at 41. (citing *Riverside Irrigation Dist.*, 758 F.2d at 511).

⁶³⁸ *Id.* (footnote omitted).

⁶³⁹ *Id.* (footnote omitted).

⁶⁴⁰ *Riverside Irrigation Dist.*, 758 F.2d at 511.

⁶⁴¹ H.B. 2860, 59th Leg., Reg. Sess. (Wash. 2006).

⁶⁴² See Wash. Dep’t of Ecology, publication number 06-01-002, *Columbia River Water Resource Management Program* (2006), at <http://www.ecy.wa.gov/programs/wr/cwp/images/pdf/crwmb.pdf> (last visited Oct. 26, 2006).

⁶⁴³ *Id.*

⁶⁴⁴ *Id.*

selected rivers or sections thereof in their free-flowing condition[.]”⁶⁴⁵ As of 2002, there were over 11,300 miles of rivers designated as wild and scenic under the Act.⁶⁴⁶ These rivers or the sections of these rivers that are protected under the Act are protected from development, including dam development.⁶⁴⁷ A report published by the National Council for Science and the Environment (NCSE) for the Congressional Research Service explains, “[t]he act provides protection for a designated river or segment by limiting the licensing of dams, reservoirs, and other water project works on, or adversely affecting, protected segments.”⁶⁴⁸ Obviously, if a federal, state, or local agency wants to build a dam on a river protected by the Act or that will affect a protected river or segments, procuring a license to build the dam will be very difficult or even impossible.⁶⁴⁹ In addition, several states have their own wild and scenic rivers acts that operate the same way and will have the same effect as the federal Act.⁶⁵⁰

2.3.B.(iv) General Environmental Protection Statutes

The National Environmental Policy Act (NEPA) requires federal agencies to prepare an environmental impact statement (EIS) for any actions that will significantly affect the environment.⁶⁵¹ One source notes that “[b]oth federal and most non-federal dams fall under NEPA, since most non-federal dams either require a permit and congressional approval or a license from [the Federal Energy Regulatory Commission].”⁶⁵² In addition, some states have enacted similar statutes that require state and local agencies to explore the potential or probable environmental effects. For example, under California’s Environmental Quality Act (CEQA), the state government shall “regulate activities . . . which are found to affect the quality of the environment . . . so that major consideration is given to preventing environmental damage.”⁶⁵³ If a project will cause environmental damage, it may be prohibited under NEPA or similar state statutes.

2.2.C. Groundwater Storage and Conjunctive Use

With the environmental concerns, public reluctance, and regulatory constraints regarding the construction of new dams and reservoirs, many agencies are turning to groundwater storage. One source notes, “while the prospects for increased surface water storage capacity in the West have dimmed, the overdrafting of ground water supplies and the lowering of water tables has *increased* the amount of available underground water storage capacity.”⁶⁵⁴ This is where the

⁶⁴⁵ 16 U.S.C. § 1271.

⁶⁴⁶ National Park Service, *River Mileage Classifications for Components of the National Wild & Scenic Rivers System* (Jan. 2002), at <http://www.nps.gov/rivers/wildriverstable.html> (last visited Oct. 23, 2006).

⁶⁴⁷ Michael P. Lawrence, *Damming Rivers, Damning Cultures*, 30 AM. INDIAN L. REV. 247, 264 (2005/2006).

⁶⁴⁸ Pamela Baldwin, Congressional Research Service, Order Code RL30809, *The Wild and Scenic Rivers Act and Federal Water Rights*, CRS-2 (updated March 23, 2006), at <http://www.ncseonline.org/NLE/CRSreports/06apr/RL30809.pdf> (last visited Oct. 23, 2006).

⁶⁴⁹ J.R. DeShazo & Jody Freeman, *Public Agencies as Lobbyists*, 105 COLUM. L. REV. 2217, n. 21 at 2224 (2005).

⁶⁵⁰ See, e.g., CAL. PUB. RES. CODE § 5093.50 to 5093.70 (2006).

⁶⁵¹ 42 U.S.C. § 4321 to 4370.f. (2006).

⁶⁵² Lawrence, *supra* note 647, at 265.

⁶⁵³ CAL. PUB. RESOURCES CODE § 21000(g) (2006).

⁶⁵⁴ Blomquist et al., *supra* note 616, at 12 (emphasis included).

concept of conjunctive use or management comes in. “Conjunctive water management involves the coordinated use of surface water supplies and storage with ground water supplies and storage.”⁶⁵⁵ Another source explains that conjunctive use “consists of harmoniously combining the use of both sources of water in order to minimize the undesirable physical, environmental and economical effects of each solution and to optimize the water demand/supply balance.”⁶⁵⁶ A further explanation of the “technical aspects” of conjunctive use states,

One captures, conserves, and distributes surface water supplies when they are available, and stores them underground when they are in surplus. One supplements surface water supplies with ground water as needed to get through peak demand periods. In very dry periods, when surface water is unavailable or devoted entirely to instream uses, one may switch over to ground water altogether.⁶⁵⁷

A noted problem with conjunctive water management is the difficulty that various interjurisdictional agencies and institutions may have in working together to manage regional surface and groundwater sources.⁶⁵⁸ Another potential obstacle to implementing conjunctive use and groundwater storage is the existence of different regulatory systems for surface water and groundwater sources, including “[d]iffering property rights bundles[.]”⁶⁵⁹ For example, this is the case with Texas, which employs appropriative rights for surface water and rights of capture for groundwater. In addition, some states have enacted statutes regulating groundwater storage and subsequent extraction.⁶⁶⁰ Because the constraints regarding groundwater storage are similar to or the same as the constraints regarding groundwater recharge, most of the obstacles that can arise with storage are discussed below in the context of recharge.

2.3.D. Groundwater Recharge

Closely related to and interconnected with groundwater storage is the practice of groundwater recharge, including aquifer storage and recovery. While aquifers are naturally recharged or replenished through surface water flows and seepage over time, the practice of groundwater recharge seeks to replenish sources of groundwater at a faster rate than would naturally occur. A simple definition of groundwater recharge is “any active and artificial means of enhancing natural recharge.”⁶⁶¹

⁶⁵⁵ *Id.*

⁶⁵⁶ Agriculture Department, Food & Agriculture Organization (FAO), United Nations, *Land and water integration and river basin management* (proceedings of informal FAO workshop, Jan. 31-Feb. 2, 1993) at <http://www.fao.org/docrep/V5400E/v5400e0c.htm#conjunctive%20use%20of%20surface%20and%20groundwater> (last visited Oct. 23, 2006).

⁶⁵⁷ Blomquist et al., *supra* note 616, at 14.

⁶⁵⁸ *Id.*

⁶⁵⁹ *Id.* at 43.

⁶⁶⁰ See, e.g., NEW MEXICO STAT. ANN. §§ 72-5A-1 to 72-5A-17 (2006) (requiring a permit and monitoring, stating that stored water is not subject to forfeiture).

⁶⁶¹ Western States Water Council (WSWC), *Ground Water Recharge Projects in the Western United States: Economic Efficiency, Financial Feasibility and Legal/Institutional Issues*, I-3 (1990) (on file with the WSWC) [hereinafter WSWC Ground Water Recharge Part I].

The existing constraints to groundwater recharge are imposed mainly by federal environmental laws and state water laws. Groundwater recharge projects may be impacted to a significant degree by the CWA, the ESA, and the NEPA. In addition, the Safe Drinking Water Act may apply to recharge projects if injection wells are used. Each of these statutes and the attendant constraints that it imposes on recharge projects are discussed below.

2.3.D.(i) The Clean Water Act

Under the Clean Water Act (CWA), it is likely that a diversion of surface water for recharge would require a section 404 permit if works are constructed.⁶⁶² Similar to the permitting of surface water storage projects, if the EPA believes that a recharge project would be detrimental to the environment, it may veto a permit issued by the Corps of Engineers. However, because the CWA does not regulate discharges to groundwater, it is not as effective in regulating potential groundwater contamination that may arise from recharge projects.

2.3.D.(ii) The Endangered Species Act

Additionally, just like construction of dams or reservoirs, if a recharge project will have an effect on endangered or threatened species, the project may be severely limited or prohibited under the Endangered Species Act (ESA). The ESA “may serve either as a serious impediment to the development of ground water recharge opportunities or as a reason to promote such development, depending on the circumstances.”⁶⁶³

2.3.D.(iii) The National Environmental Policy Act

If there is federal participation in a groundwater recharge project, the agency will be required to prepare an environmental impact statement (EIS) under the National Environmental Policy Act (NEPA) to ensure there are no significant impacts.⁶⁶⁴ Again, similar to its role in the permitting of storage projects, the NEPA can constrain the development of recharge projects because of the additional time and money that is required to prepare an EIS and conduct review of the proposed project.

2.3.D.(iv) The Safe Drinking Water Act

Because of the potential to contaminate sources of potable groundwater, recharge projects may be subject to the Safe Drinking Water Act (SDWA), which sets forth standards for water quality to ensure supplies are suitable for potable uses.⁶⁶⁵ Under the SDWA’s Underground Injection Control program, injection wells used for recharge projects, which are classified as Class V wells, are required to have a permit.⁶⁶⁶

⁶⁶² Western States Water Council (WSWC), *Ground Water Recharge Projects in the Western United States: Economic Efficiency, Financial Feasibility and Legal/Institutional Issues*, Part II, 32 (1998) (on file with the WSWC) [hereinafter WSWC Ground Water Recharge Part II].

⁶⁶³ *Id.* at 32-33.

⁶⁶⁴ *Id.*

⁶⁶⁵ *Id.* at 31.

⁶⁶⁶ *Id.*; see 42 U.S.C. §§ 300h to 300h-8.

2.3.D.(v) State Water Laws

In addition to federal constraints, there may be state statutes regulating groundwater recharge. For example, Arizona has an extensive regulatory program governing underground water storage and recharge.⁶⁶⁷ Under the program, called the Underground Water Storage, Savings and Replenishment Act (UWS Act), all storage or recharge projects must acquire a permit from the state department of water resources in order to protect groundwater quality.⁶⁶⁸ Another potential constraint to recharge projects is the operation of forfeiture statutes and the question of whether the use of a water right to recharge groundwater qualifies as a beneficial use in that state.⁶⁶⁹ Other legal questions regarding groundwater recharge that must be answered by state water laws include how to distinguish recharged surface water with naturally occurring groundwater; and when, where, and how much water can be recovered in light of the difficulties of tracking and possibly, recovering, the recharged water.⁶⁷⁰ While extensive state and federal regulation of groundwater use, storage, and recharge may be a constraint to the development of new recharge projects, regulation may actually have the opposite effect of encouraging and enabling such projects because of the greater degree of certainty under the regulatory system.

2.3.E. Conclusion

Enhancing water storage capacity will be an important consideration for western states. Building new surface storage facilities, increasing the capacity of existing structures, or utilizing space in depleted aquifers can all improve water storage capacity. Nevertheless, each of these options must anticipate and address the applicable legal issues before they can be successfully implemented. Federal statutes like the Clean Water Act, the Endangered Species Act, the Wild and Scenic Rivers Act, the National Environmental Policy Act, the Safe Drinking Water Act, and comparable state laws may bear on proposed water storage projects. While these legal considerations may present substantial difficulty, careful planning can increase the likelihood that necessary water storage can be developed.

⁶⁶⁷ ARIZ. REV. STAT. §§ 45-801.01 to 45.898.01 (2006).

⁶⁶⁸ Chad Shattuck, WSWC, *Water Reuse and Artificial Groundwater Recharge in the Western United States*, 34 (2002) (on file with WSWC) (providing a thorough state-by-state analysis of groundwater recharge statutes as of 2002).

⁶⁶⁹ See WSWC Ground Water Recharge Part II, *supra* note 662, at 27.

⁶⁷⁰ *Id.* at 28.

Chapter 2

Section 4

Water Conservation

2.4.A. Introduction

Because of the West's arid climate and booming population, water conservation has become an increasingly important issue to the western states. Even in those states where water resources appear to be relatively abundant, such as the Northwest, regulatory and societal demands to preserve instream flows for fish, wildlife, recreation and aesthetics have made providing an adequate water supply a pressing issue.⁶⁷¹ The prior appropriation doctrine with its "first in time, first in right" and "use it or lose it," principles can act as a disincentive for water conservation efforts, particularly where water users who do implement conservation measures stand to lose or forfeit the amount of water conserved.

At the same time, it is important to understand that conservation is a tool that can help ensure future water supplies and help mitigate temporary shortages, rather than serve as an end in and of itself. Further, because of potential drawbacks, principally third party adverse impacts to the environment and other uses, water conservation measures must be evaluated on a site-specific basis. Nevertheless, while every state in the West in a report to the Western Water Policy Review Advisory Commission noted the need for additional storage in meeting future demands, their report made this significant statement: "[S]tates will carefully consider opportunities to 'stretch' existing supplies of water through water conservation, reuse, and reservoir reoperation, prior to the development of new storage facilities."⁶⁷²

With this in mind, states, local governments, private individuals and organizations have set about finding ways to conserve water. State efforts have resulted in water statutes to mitigate or remove the disincentive inherent in the prior appropriation doctrine. While typically targeted at agriculture, state programs also address municipal conservation. Additionally, the states, as well as private organizations, have provided incentives to conserve water using water banks. Also, some local governments and private organizations have taken a grassroots approach, banding together as stakeholders in a watershed to conserve its water resources.

⁶⁷¹ See Western States Water Council (WSWC), *Water in the West Today: A States' Perspective: Report to the Western Water Policy Review Advisory Commission* 16 (Feb. 1997).

⁶⁷² *Id.* at ii.

2.4.B. The Legislative Approach to Encouraging Water Conservation

One of the challenges facing western states is how to encourage water conservation within the prior appropriation system, which was designed to provide for the orderly development of the resource, discourage speculative endeavors, and prohibit waste. Agricultural conservation is typically seen as the primary source of new water for other uses because agriculture is by far the largest user and often holds the most senior water rights in western states. On the other hand, municipal conservation is widely emphasized in state and local programs, and is often a prerequisite for state funding.

2.4.B.(i) Agricultural Conservation Incentives

Prior appropriation has been criticized for discouraging agricultural conservation for two reasons. First, conserving water, using less water for the same purpose, has traditionally been regarded as evidence of waste. Second, appropriative law generally prevents the expansion of the water right by “spreading” the conserved water to additional lands. In an attempt to promote agricultural water conservation, at least four western states (California,⁶⁷³ Washington,⁶⁷⁴ Montana,⁶⁷⁵ and Oregon⁶⁷⁶) have removed legal disincentives inherent in the prior appropriation doctrine.

2.4.B.(i)(a) *California*

Recognizing that potential forfeiture for non-use can discourage conservation, *Cal. Water Code* § 1011, enacted in 1979, allows water users to retain their rights to all water “saved” as a result of water conservation efforts. Conserved water can be “sold, leased, exchanged, or otherwise transferred.”⁶⁷⁷ Section 1011 specifically targets agricultural conservation by recognizing fallowing and crop rotations as conservation methods.⁶⁷⁸ “[L]and conversion from agricultural use to urban use would typically not qualify as a water conservation effort under Water Code 1011.”⁶⁷⁹

The impact of section 1011 on water consumption and conservation is difficult to quantify.⁶⁸⁰ Most water transfers authorized through section 1011 “involve conservation efforts that apparently would have occurred for other reasons. [However,] [s]ection 1011 probably has served to reduce resistance to water conservation.”⁶⁸¹ Not all water saved can be transferred, as

⁶⁷³ CAL WATER CODE § 1011 (Deering, LEXIS through 2006 Sess.).

⁶⁷⁴ WASH. REV. CODE. ANN. § 90.42.005-900 (Bender, LEXIS through 2006 Sess.).

⁶⁷⁵ MONT. CODE ANN. § 85-2-419 (LEXIS through 2006 Sess.).

⁶⁷⁶ OR. REV. STAT. § 537.455-500 (LEXIS through 2006 Sess.).

⁶⁷⁷ CAL. WATER CODE § 1011(b).

⁶⁷⁸ *Id.* § 1011(a).

⁶⁷⁹ State Water Resources Control Board (SWRCB), A Guide to Water Transfers 6-6 (1999), <http://www.waterrights.ca.gov/watertransferguide.pdf> (last visited Jan. 19, 2007).

⁶⁸⁰ Andrew H. Sawyer, *Improving Efficiency Incrementally: The Governor’s Commission Attacks Waste and Unreasonable Use*, 36 MCGEORGE L. REV. 209, 241 (2005).

⁶⁸¹ *Id.*

there are provisions to protect other water users, as well as fish and wildlife for injury and adverse effects.⁶⁸²

2.4.B.(i)(b) *Washington*

Washington also provides an incentive for water users to conserve⁶⁸³ through the “trust water rights” program (trust program) established in 1992. “Net saved water” may be acquired by the state for various uses through negotiation where a state or federal agency provides public funding for water conservation projects.⁶⁸⁴ The trust program is administered through the Department of Ecology (Ecology).⁶⁸⁵ Ecology has been particularly active in the Yakima River Basin, frequently in concert with the Bureau of Reclamation. Through the Yakima Enhancement Project the Washington State Legislature and U.S. Congress authorized federal, state, and local cost-sharing for conservation projects.⁶⁸⁶ Where state funding is provided, however, a portion of net water savings, typically proportionate to the percentage of state funds invested in the project, is acquired by contract for the trust program.⁶⁸⁷ Negotiations between the state and water right holder determine the exact amount of conserved water that will become a trust water right.⁶⁸⁸ Allocations are accomplished through transfer, lease, or other agreement. Under the trust program, rights retain the original priority date, unless the water right is split between the original user and the state, in which case the trust water right is inferior in priority.

Washington’s trust water rights program has been seen as successful.⁶⁸⁹ State and federal funding of conservation projects has been key, along with the fact that the water saver may be permitted to retain and use some of the saved water.⁶⁹⁰ Further, conserved water which is not managed through the trust program may be considered waste, subject to relinquishment.⁶⁹¹

2.4.B.(i)(c) *Montana*

Another state that allows water right holders to maintain their right to “salvaged” water is Montana.⁶⁹² Typically, Montana does not allow water users on their own initiative to spread

⁶⁸² *Id.* at 240-41 (citing S.W.R.C.B. Order No. WR 99-12, at 11-13 (Dec. 28, 1999) (holding that water conserved pursuant to CAL. WATER CODE § 1011, may only be transferred in compliance with CAL. WATER CODE § 1725)).

⁶⁸³ WASH. REV. CODE ANN. § 90.42.030; see also Janet C. Neuman, *The Inefficient Search for Efficiency in Western Water Use*, 28 ENVTL. L. 919, 956-57 (1998).

⁶⁸⁴ WASH. REV. CODE ANN. § 90.42.030.

⁶⁸⁵ *Id.*

⁶⁸⁶ WASH. REV. CODE ANN. § 43.21A.470 (Bender, LEXIS through 2006 Sess.).

⁶⁸⁷ *Id.* § 90.42.030(2).

⁶⁸⁸ *Id.* §§ 90.42.030(2)-(3); HEDIA ADELSMAN, WASHINGTON WATER ACQUISITION PROGRAM (Curt Hart ed., Wash. State Dep’t. of Ecology & Wash. Dep’t of Fish and Wildlife, March 2003) available at, <http://www.ecy.wa.gov/pubs/0311005.pdf> (last visited Jan. 5, 2007); see also E-mail from Ken Slattery, Program Manager, Dep’t of Ecology, Water Res. Prog., to Elizabeth A. Crane, Law Clerk, WSWC (June 23, 2006, 09:31:10 AM) (on file with the WSWC).

⁶⁸⁹ E-mail from Ken Slattery, Program Manager, Dep’t of Ecology, Water Res. Prog., to Elizabeth A. Crane, Law Clerk, WSWC (June 23, 2006, 09:31:10 AM) (on file with the WSWC).

⁶⁹⁰ *Id.*

⁶⁹¹ WASH. REV. CODE § 90.14.160 (Bender, LEXIS through 2006 Sess.).

⁶⁹² MONT. CODE ANN. § 85-2-419 (LEXIS through 2006 Sess.).

salvaged water to additional land.⁶⁹³ However, if the user applies to do so through a change of use permit, they may put the conserved water to beneficial use on other lands provided the water saver can demonstrate the proposed method will salvage at least the amount of water asserted – and all other change application criteria are met – including beneficial use and injury requirements, and a showing that water quality will not be adversely affected.⁶⁹⁴

While Montana’s salvage statute provides the opportunity to better use limited water resources, determining whether the conservation measures implemented actually save water can be difficult and complex. These difficulties have limited the success of Montana’s program. The Department of Natural Resources and Conservation has noted that permitting an applicant to enlarge its irrigated acreage, based on the water saved when switching from flood irrigation to a sprinkler system, may diminish return flows, thereby injuring junior appropriators or other third parties.

2.4.B.(i)(d) *Oregon*

Oregon also has a state policy of aggressively promoting conservation and its Allocation of Conserved Water Program (Program) reflects this ethic.⁶⁹⁵ Under Oregon law since 1987, a water user who has either conserved water within the last five years or who plans on conserving water may apply to use the water on additional land, sell or lease the water, or dedicate it to instream flows.⁶⁹⁶ The original water right holder has the option of fixing the new priority date as either the same or one minute after the priority of the original water right.⁶⁹⁷ At least 25-percent of the water conserved, however, must be allocated to the state, either for instream dedication or for future appropriation.⁶⁹⁸ Additionally, agencies and other state political subdivisions are authorized to purchase rights to conserved water.⁶⁹⁹ Initially the burden of proof was on the water saver to demonstrate that water saved would otherwise have been irrecoverably lost. Subsequent changes eliminated this obstacle.⁷⁰⁰

Until recently, Oregon’s Program had not met with much success.⁷⁰¹ The Program was initiated in 1988. However, by 2000 only 10 applications had been received.⁷⁰² At least part of the reason there were not more applicants was the expense of installing conservation measures that would comply with the Program’s demands. Despite the expense, however, there appears to be increasing interest in the Program.⁷⁰³ In 2005, the Oregon Water Resources agency reported

⁶⁹³ MONT. CODE ANN. §§ 85-2-419, 85-2-410 (LEXIS through 2006 Sess.).

⁶⁹⁴ *Id.* §§ 85-2-419, 85-2-402(1), 85-2-402(2)(e) (LEXIS through 2006 Sess.).

⁶⁹⁵ OR. REV. STAT. § 537.455-500.

⁶⁹⁶ Or. Water Res. Dep’t, *Allocation of Conserved Water*, [hereinafter *Allocation*] http://www.wrd.state.or.us/OWRD/mgmt_conserved_water.shtml (last visited Jan. 19, 2007).

⁶⁹⁷ OR. REV. STAT. § 537.485(1).

⁶⁹⁸ *Id.* § 537.470(3).

⁶⁹⁹ *Id.* § 537.495.

⁷⁰⁰ See H.B. 2155, 67th Leg. Assem., Reg. Sess. (Or. 1993).

⁷⁰¹ *Allocation*, *supra* note 696.

⁷⁰² *Id.*

⁷⁰³ *Id.*

that 30 new applications had been received since 2000, partially attributable to increased support for streamflow restoration.⁷⁰⁴

2.4.B.(ii) Municipal Water Conservation Incentives

In addition to encouraging efficient irrigation practices, statutory incentives have targeted municipal water use, encouraging cities to better manage their water resources and ensure sustainable supplies.⁷⁰⁵ Municipal conservation has been encouraged both through state and local action, using educational programs, planning mandates, funding incentives,⁷⁰⁶ and statutory requirements.⁷⁰⁷ While state and local incentives have largely been successful,⁷⁰⁸ there are drawbacks to municipal conservation that need to be considered. Possible problems range from “higher waste concentrations in the wastewater” to “less water available for reuse,” reduced return flows, less groundwater recharge,⁷⁰⁹ and “hardening” of demand, thereby reducing a city’s cushion during drought periods.⁷¹⁰ The following examples from Washington, California, Arizona, Nevada, and Utah illustrate some of the ways states have encouraged municipal conservation.

2.4.B.(ii)(a) *Washington*

The 2003 Municipal Water Law changed water management in Washington.⁷¹¹ Pursuant to this legislation, the Washington State Department of Health promulgated rules to improve water use efficiency.⁷¹² These rules, known as the Water Use Efficiency Rule, require all municipal-water suppliers to evaluate or implement “cost effective” conservation measures capable of meeting specific water use efficiency goals. The number of conservation measures a supplier must consider varies with the number of water connections the supplier provides; and larger suppliers must implement more conservation measures than smaller ones.⁷¹³ In addition, municipal-water suppliers must assess “distribution system leakage” on an annual basis and seek remedial measures if the calculated leakage meets or exceeds 30% of the total water produced and purchased. Regardless of whether the supplier actually implements or merely evaluates conservation measures, municipal-water suppliers servicing one thousand or more connections must prepare “a demand forecast projecting demand if the measures deemed cost-effective . . . were implemented.”⁷¹⁴ As a practical consequence, forecasting demand requirements may

⁷⁰⁴ *Id.*; See also OR. WATER RES. DEP’T, APPLYING FOR THE ALLOCATION OF CONSERVED WATER PROGRAM (Mar. 2006) available at, <http://www1.wrd.state.or.us/pdfs/conserved.pdf> (last visited Jan. 19, 2007).

⁷⁰⁵ See generally Nevada Div. of Water Planning, Nevada State Water Plan at 1A-1 – 1A-2 [hereinafter *Nevada Water Plan*], at <http://water.nv.gov/Water%20planning/wat-plan/pt3-1a.pdf> (last visited on January 19, 2007).

⁷⁰⁶ *Id.* at 1A-1 – 1A-2.

⁷⁰⁷ See WASH. REV. CODE § 90.03.330(7).

⁷⁰⁸ See Peter D. Nichols & Douglas S. Kenney, *Watering Growth in Colorado: Swept Along by the Current or Choosing a Better Line?*, 6 U. DENV. WATER L. REV. 411, 440-47 (2003).

⁷⁰⁹ *Nevada Water Plan*, *supra* note 705, at 1A-1.

⁷¹⁰ Nichols & Kenny, *supra* note 710, at 441 (noting that Denver Water “only realized eighteen percent annual savings from drought restrictions in 2002,” resulting from a previous emphasis on water conservation).

⁷¹¹ See WASH. REV. CODE § 70.119A.180 (Bender, LEXIS through 2006 Sess.).

⁷¹² See, e.g., WASH. ADMIN. CODE §§ 246-290-800 to 26-290-840.

⁷¹³ See *id.* § 246-290-810(4)(d)(i).

⁷¹⁴ See *id.* § 246-290-100(4)(d).

compel municipal-water suppliers to implement conservation measures because the public will know how their demand could be reduced if such measures were employed. Washington allows municipalities in compliance with their water conservation goals to change or transfer unperfected water rights, provided the municipality has also established instream flows and a watershed plan, and the change will not increase consumptive use. To help municipalities set and achieve conservation goals, the Department of Health (DOH) may provide technical assistance. DOH may use the “full range of compliance mechanisms available to [them],” in order to ensure municipal compliance. DOH, along with the Department of Ecology, also considers whether the municipality has implemented a conservation program when “considering development schedules for municipal water supply rights.” (Water right permits contain a development schedule that outlines when a project may begin, when it must be completed, and when the water must be fully applied to a beneficial use.)⁷¹⁵

2.4.B.(ii)(b) *California*

California’s Urban Water Management Planning Act (Act) requires all “urban water suppliers” to prepare an Urban Water Management Plan (UWMP).⁷¹⁶ Urban water suppliers must describe any conservation measures that are planned or have been implemented, including efficiency and demand management measures.⁷¹⁷ State grants and loans for various programs, as well as drought assistance, are contingent on compliance with the Act and submission of a UWMP to the Department of Water Resources every five years. Additionally, UWMPs must comply with the conservation and information requirements of both the State Water Resources Control Board (SWRCB) and the Public Utilities Commission, or any other requirement imposed by “state law, regulation, or order.”⁷¹⁸

2.4.B.(ii)(c) *Arizona*

Arizona’s 1980 Groundwater Management Act set the state on a course to achieve safe and sustainable aquifer yields through an aggressive water conservation program with specific plans and goals that require developers to demonstrate they have an assured and adequate supply of water. It also requires water providers to meet gallon per capita per day (GPCD) targets in five different Active Management Areas. At present, the target for interior water use for new residential development is 57 GPCD, with outdoor targets ranging from 178 gallons per housing unit per day (GPHUD) in Phoenix and 118 GPHUD in Tucson to 75 GPHUD in Prescott. There are also “individual user” requirements for deliveries to new large cooling users, turf-related facilities, and landscaping in public rights of way. In addition, large providers (those that serve more than 250 acre-feet per year) must limit lost and unaccounted for water to no more than 10 percent, and small providers to not more than 15 percent. While developers are not specifically subject to these requirements, water use by new developments can affect the ability of the provider to meet its requirements. Water use models for new residential development, which assume water conservation practices and devices, were developed by the Arizona Department of

⁷¹⁵ Wash. Dep’t of Ecology, *Frequently Asked Questions About Water Rights in Washington* (Feb. 2006), <http://www.ecy.wa.gov/pubs/961804swr.pdf> (last visited Jan. 11, 2007).

⁷¹⁶ CAL. WATER CODE § 10631 (Deering, LEXIS through 2006 Sess.).

⁷¹⁷ *Id.*

⁷¹⁸ CAL. WATER CODE § 10653 (Deering, LEXIS through 2006 Sess.).

Water Resources and used in determining the provider's GPCD goals. The Arizona Water Efficient Plumbing Act of 1992 requires installation of fixtures that are compatible with the Department's interior water use models.⁷¹⁹

2.4.B.(ii)(d) *Nevada*

The Southern Nevada Water Authority (SNWA) developed the Water Smart Landscapes program to encourage water conservation. Through the program, water users can receive rebates for converting “water-thirsty grass to xeriscape, a lush yet water-efficient landscape.”⁷²⁰ Participants will receive a SNWA rebate of \$1.50 for every square foot of grass removed and replaced with xeriscape.⁷²¹ The program does not cap maximum square footage for non-well users.⁷²² To qualify, conserved water must come from an SNWA agency or a groundwater well within the Las Vegas Valley Groundwater Basin and meet certain other minimum criteria.⁷²³ Perhaps one of the most important criteria is the requirement to participate in a SNWA pre-conversion site review. Beginning a project without a review disqualifies potential participants from receiving a rebate.⁷²⁴ SNWA saves roughly 55 gallons of water per year for every square foot of grass converted to xeriscape via this program. When extrapolated over the acres of lawn in the Las Vegas Valley, the potential savings are significant. Water savings are shared with consumers in the form of lower water bills.⁷²⁵

2.4.B.(ii)(e) *Utah*

Utah developed its “Slow the Flow” program to educate water users about conservation. The program developed out of an invitation by the Governor for major water wholesalers to try and reduce per capita consumption by twenty-five percent.⁷²⁶ The Governor assembled a Water Conservation Team (Team) to spearhead the effort.⁷²⁷ The Team chose to build upon the Slow the Flow campaign initiated by a municipal water district near Salt Lake City. The program now includes a number of services aimed at helping residents conserve water. These include (1)

⁷¹⁹ Ariz. Dep't of Water Res., *Application for Delivery, Analysis of Accrued Water Supply*, 28-000001, (2002).

⁷²⁰ S. Nev. Water Auth., Water Smart Landscapes Rebate, http://www.snwa.com/html/cons_wsl.html (last visited Mar. 18, 2008) [hereinafter WSL Rebate].

⁷²¹ *Id.*

⁷²² Well users are limited to the availability of special funds and to 2,500 square feet per calendar year. *Id.*

⁷²³ S. Nev. Water Auth. Program Conditions – Water Smart Landscapes, http://www.snwa.com/html/cons_wsl_conditions.html (last visited Mar. 18, 2008). Conditions include: (1) areas to be converted must be maintained lawn or permanently-installed outdoor surface water; (2) at least 400 square feet of lawn must be converted; (3) mature, fully-grown xeriscape includes 50% living plant cover; (4) drip irrigation; (5) mulching; (6) a ten-year commitment to sustain the conversion; (7) other terms and conditions and contained on the SNWA website.

⁷²⁴ *Id.*

⁷²⁵ WSL Rebate, *supra* note 720.

⁷²⁶ Jordan Valley Water Conservancy Dist., About the Utah Statewide Water Conservation Team, <http://www.slowtheflow.org/campaign/Default.aspx> (last visited Mar. 18, 2008) [hereinafter Water Conservation Team].

⁷²⁷ The Slow the Flow program is sponsored by the Governor's Water Conservation Team. The team includes Jordan Valley Water Conservancy District, Central Utah Water Conservancy District, Metropolitan Water District of Salt Lake & Sandy, Rural Water Association of Utah, Utah Division of Water Resources, Washington County Water Conservancy District, and Weber Basin Water Conservancy District.

water-use surveys, (2) the “Water Check Program;” (3) landscaping rebates; and (4) conservation-minded landscaping ideas. The online survey is an interactive way for water users to obtain conservation tips based upon their own water needs and water-use habits.⁷²⁸ After answering the questions, the computer provides a water score and makes general recommendations to improve indoor and outdoor water-use efficiency.

The Water Check Program is a free service that analyzes the efficiency of automated sprinkler systems.⁷²⁹ After scheduling an appointment, horticulture interns will visit residents’ homes to conduct various tests and provide a customized watering schedule.⁷³⁰ The tests include an assessment of soil type, grass root depth, sprinkler distribution uniformity and water pressure.⁷³¹ Perhaps recognizing the potential for reducing landscape water use, the Slow the Flow Program also includes landscaping rebates. The Central Utah Water Conservancy District offers rebates up to \$250 to home and business owners for conservation improvements made to landscape irrigation systems.⁷³² Finally, the Slow the Flow website offers a host of conservation-minded landscaping ideas.⁷³³

2.4.C. Water Banking: Depositing Conserved Water

Water banking is yet another way to promote conservation. Conservation in a water banking program lies in the ability to “deposit,” rather than forfeit or abandon, temporarily excess water.⁷³⁴ Because the creation of a water bank necessarily includes removal of the threat of forfeiture or abandonment, excess water is thereby “conserved” for alternative uses at a future date.⁷³⁵ Often, the incentive may be primarily financial—a user receives money in exchange for permanently or temporarily transferring all or a portion of their water right to the water bank.

An example of a state water bank that encouraged water conservation to provide emergency drought relief is California’s Drought Water Bank. In 1991, 1992, and 1994, California experienced severe drought conditions. To obtain water for critical needs, the Department of Water Resources (DWR) contracted with voluntary sellers to use groundwater instead of surface water, fallow their agricultural land, or sell rights to water that was being stored in reservoirs. Acting as a broker, DWR then resold most of the water to purchasers who were prioritized according to need. By all accounts, the California Drought Water Bank was successful, both for agriculture generally and the state as a whole.⁷³⁶

⁷²⁸ Water-Use Tips, <http://www.slowtheflow.org/tips/default.aspx> (last visited Mar. 18, 2008).

⁷²⁹ Water Check Program, <http://www.slowtheflow.org/watercheck/default.aspx> (last visited Mar. 18, 2008). Water Checks are available during summer months in Duchesne, Garfield, Juab, Piute, Salt Lake, Uintah, Utah, Wasatch, and Washington Counties.

⁷³⁰ *Id.*

⁷³¹ *Id.*

⁷³² Landscaping Rebates, <http://www.slowtheflow.org/programs/default.aspx> (last visited Mar. 18, 2008). See also Landscape Irrigation Product Rebates, <http://www.cuwcd.com/rebates/> (last visited Mar. 18, 2008).

⁷³³ Landscaping Ideas, <http://www.slowtheflow.org/tips/landscape.aspx> (last visited Mar. 18, 2008).

⁷³⁴ Peggy Clifford et al., Wash. Dep’t of Ecology, *Analysis of Water Banks in the Western States*, 2 (July 2004) available at, <http://www.ecy.wa.gov/pubs/0411011.pdf> (last visited Jan. 19, 2007).

⁷³⁵ *Id.*; Janet C. Neuman, Symposium on Water Law: *Beneficial Use, Waste and Forfeiture: The Inefficient Search for Efficiency in Western Water Use*, 28 ENVTL. L. 919, 929 fn. 52 (1998).

⁷³⁶ RICHARD HOWITT, NANCY MOORE, & RODNEY T. SMITH, A RETROSPECTIVE ON CALIFORNIA’S 1991 EMERGENCY DROUGHT WATER BANK 20 (1992).

Through Idaho's water banking system conserved water has been "banked" for subsequent use in augmenting instream flows to meet environmental regulatory requirements. Idaho's water banking system is comprised of the Water Supply Bank, administered by the state, and five rental pools, administered by local water districts. Water deposited or rented from any of Idaho's water banks is not subject to water right forfeiture. Although primarily used to facilitate voluntary transfers between agricultural uses, Idaho's water banking system has been adapted and expanded to meet environmental objectives and ESA requirements. The Bureau of Reclamation (BOR) has participated in the water banking system for a number of years, leasing water from the Water Supply Bank and rental pools for the benefit of endangered fish species, primarily salmon and steelhead.⁷³⁷ Of note, special state legislation was required to allow federal leasing of water.⁷³⁸

2.4.D. The Watershed Approach to Incentivize

In addition to legislative reform and water banking programs, smaller projects involving local players and state agencies have also arisen. These projects have the ability to respond quickly and to tailor their efforts to the needs of their particular watershed. Such watershed efforts have successfully encouraged water conservation, in spite of the disincentives inherent in appropriative law. Idaho's Upper Salmon Basin Watershed Project and watershed efforts in Washington's Walla Walla Basin are excellent examples of local water conservation initiatives that have seen success.

The Upper Salmon Basin Watershed Project is Idaho's largest watershed project located off of federal lands.⁷³⁹ Financed by state agencies, the Lemhi and Custer water conservation districts, and the Bonneville Power Administration, the Watershed Project is led by an advisory committee that represents many stakeholders, including private, state, federal, tribal, and other local interests.⁷⁴⁰ One of the primary endeavors undertaken by the Watershed Project is to encourage and assist the surrounding irrigators to implement more efficient irrigation systems.⁷⁴¹ These conservation measures allow more water to remain in streams, providing more spawning and rearing habitat, as well as eliminating passage barriers.⁷⁴²

The Walla Walla Basin provides another example of a local watershed conservation initiative. 2001 marked two significant water supply events—water contracted for delivery under Reclamation contract was cut off for irrigation use in favor of meeting ESA requirements during a drought year, and Walla Walla Basin stakeholders took drastic steps to respond.⁷⁴³ As a result, the Walla Walla River flowed continuously for the first time in over 100 years.⁷⁴⁴

⁷³⁷ Clifford et al., *supra* note 734, at 61-64.

⁷³⁸ See IDAHO CODE § 42-1763B(2) (LEXIS through 2006 Sess.).

⁷³⁹ See Northwest Power and Conservation Council, *Fish & Wildlife Success Stories – Upper Salmon River Basin Watershed Restoration*, <http://www.nwccouncil.org/fw/stories/uppersalmon.htm> (last visited Jan. 4, 2007).

⁷⁴⁰ *Id.*

⁷⁴¹ Upper Salmon Basin Watershed Project, *Projects*, <http://www.modelwatershed.org/Projects2.html> (last visited Jan. 4, 2007).

⁷⁴² *Id.*

⁷⁴³ Matthew Preusch, *Walla Walla Basin Sidesteps a Water War*, HIGH COUNTRY NEWS (Aug. 19, 2002).

⁷⁴⁴ *Id.*

Voluntary efforts by the local agricultural community received funding assistance from the Walla Walla Basin Watershed Council.⁷⁴⁵ Water conservation measures, including replacing dirt diversion canals with piping, were implemented to provide the instream flows.⁷⁴⁶ The success of the watershed effort is evident in that the annual bull trout and steelhead salmon rescues are no longer necessary—the fish can now navigate the river unaided by bucket or truck.⁷⁴⁷

2.4.E. Legal and Policy

In evaluating conservation measures on a case-by-case basis, one must realize that unless consumptive use is reduced, “conservation has limited impacts to overall water supply.”⁷⁴⁸ Additionally, state public interest criteria and federal laws such as the Endangered Species Act may limit the implementation of conservation measures.⁷⁴⁹

2.4.E.(i) Third Party Impacts

Preventing water conservation measures from injuring third parties can be difficult. Leveling agricultural fields, lining irrigation ditches, and installing ultra-low flush toilets may reduce the amount of water diverted from a river, but do not necessarily result in net benefits. “Many of the wetlands and wildlife habitat areas . . . have developed due to the use of irrigation water.”⁷⁵⁰ As a result, the impacts of conservation, at least from agricultural uses, need to be carefully examined.⁷⁵¹ For example, agricultural conservation measures implemented in the area overlying the Eastern Snake Plain Aquifer reduced the aquifer’s recharge rate.⁷⁵² The aquifer is hydraulically connected to the Thousand Springs area of the Snake River. As a result, discharges into Thousand Springs have also declined, negatively impacting trout farms with senior surface water rights.⁷⁵³

2.4.E.(ii) “Public Interest” Review

The history of the Salton Sea in California illustrates other issues that may arise from water conservation—namely, the potential for conflict with the public interest. Irrigation diversion losses and return flow runoff from water delivered by the Imperial Irrigation District (IID) both created and maintain the Salton Sea.⁷⁵⁴ In 2003, the IID entered a long term water conservation and transfer agreement with the San Diego County Water Authority.⁷⁵⁵ In its final

⁷⁴⁵ BRIAN WOLCOTT, *DIRECTOR’S UPDATE: BASIN ESA ACCORD 1* (Aug. 2006), <http://wwbwc.org/Media/WWBWC-newsletter-2006-08.pdf> (last visited Jan. 5, 2007).

⁷⁴⁶ Preusch, *supra* note 743.

⁷⁴⁷ *Id.*

⁷⁴⁸ See WSWC, *supra* note 671, at 26.

⁷⁴⁹ Nichols & Kenny, *supra* note 710, at 430.

⁷⁵⁰ WSWC, *supra* note 671, at 26.

⁷⁵¹ *Id.*

⁷⁵² WSWC, Administration Update/Water Resources, Special Report #1517 (June 13, 2003) (on file with the WSWC).

⁷⁵³ *Id.*

⁷⁵⁴ Imperial Irr. Dist., *Salton Sea*, http://www.iid.com/Water_Index.php?pid=600 (last visited Jan. 5, 2007).

⁷⁵⁵ In the Matter of IID, WRO 2002 – 0013 Revised (Oct. 28, 2002) *available at*, <http://www.waterrights.ca.gov/hearings/WaterRightOrders/WRO2002-13Revised.pdf> (last visited Jan. 5, 2007); see also Aaron Ralph, *Drain the Water and Pull the Plug on the Economy of One Community So that Another*

order reviewing the transfer application, the State Water Resources Control Board (SWRCB) concluded that the transfer was subject to public interest review, and weighed the potential impacts to fish and wildlife, and the surrounding economy.⁷⁵⁶ SWRCB approved the transfer after weighing the public and private costs and benefits, and after imposing several conditions to minimize and mitigate the potential adverse environmental and socio-economic impacts.

2.4.E.(iii) Endangered Species Act

Adding to potential state law complications are federal laws such as the Endangered Species Act.⁷⁵⁷ The ESA may be implicated by water conservation measures in at least two ways. First, as in the Lemhi and Walla Walla Basins, compliance with the ESA may be the driving incentive to conserve water. Alternatively, the ESA may inhibit water conservation measures if they reduce return flows and thereby take critical habitat.⁷⁵⁸ For example, conservation measures implemented by the IID reduced farm runoff and increased the salinity of the Salton Sea, making the water body less habitable for endangered species.⁷⁵⁹

2.4.E.(iv) A Colorado River Basin Perspective

In a study recently released, a committee assembled by the Water Science and Technology Board of the National Research Council took note of the steadily increasing population and urban water demands in the Colorado River region and found that “increasingly costly, controversial, and unavoidable trade-off choices” would need to be made.⁷⁶⁰ In looking at the various options for dealing with these challenges, the committee examined the prospects of both urban and agricultural water conservation. While acknowledging inefficiencies in agricultural water applications, the committee also noted the potential adverse ecological effects of improved efficiencies. Further, in looking at all options, the committee concluded as follows: “Technological and conservation options for augmenting or extending water supplies, although useful and necessary – in the long run will not constitute a panacea for coping with the reality that water supplies in the Colorado River basin are limited and that demand is inexorably rising.” A similar conclusion could be reached after examining the other major river basins of the West.

2.4.F. Conclusion

In conclusion, given the increasing pressure on the western appropriative system, conservation will continue to be an important management option for the state in their effort to

Community Can Brim Over with Economic Development: Is It Any of the State Water Resource Control Board's Business?, 34 MCGEORGE L. REV. 903, 914-15 (2003) (internal citations omitted).

⁷⁵⁶ *Id.*

⁷⁵⁷ Endangered Species Act of 1973 (ESA), 16 U.S.C. §§ 1531-1544 (2006).

⁷⁵⁸ DWR, *Salton Sea Ecosystem Restoration Program*, <http://www.saltonsea.water.ca.gov/> (last visited Jan. 5, 2007); *see also* Imperial Irrigation Dist., *Salton Sea*, http://www.iid.com/Water_Index.php?pid=600 (last visited Jan. 5, 2007).

⁷⁵⁹ In the Matter of IID, WRO 2002 – 0013 Revised at 2, 20 (noting that IID’s conservation project “has the potential to ‘take’ certain threatened and endangered species), *available at* <http://www.waterrights.ca.gov/hearings/WaterRightOrders/WRO2002-13Revised.pdf> (last visited Jan. 5, 2007); *see also* Border Power Plant Working Group v. DOE, 260 F. Supp. 2d 997 (S.D. Cal. 2003).

⁷⁶⁰ NATIONAL RESEARCH COUNCIL OF THE NATIONAL ACADEMIES, COLORADO RIVER BASIN WATER MANAGEMENT – EVALUATING AND ADJUSTING TO HYDROCLIMATIC VARIABILITY 53 (Feb. 21, 2007).

provide sustainable water supplies for the future. To this end, some western states have removed the traditional disincentive for agricultural water conservation, in addition to encouraging municipal water use efficiency. Further, water banking programs and watershed groups have encouraged water conservation efforts. However, conservation is not an end unto itself. Rather, it is important that each project be evaluated individually to ensure it actually results in net benefits. Where such net benefits exist, water conservation measures will be seen as a top priority in meeting the increasing demands for this vital resource.

Chapter 2

Section 5

Water Reuse

2.5.A. Introduction

As water supplies are increasingly stretched to meet growing demands, many states and local governments have expressed interest in reusing water to meet future water needs. Due to the scarcity of fresh water sources, the abundance of wastewater created by burgeoning populations, and increasingly stringent wastewater discharge standards, water reuse is becoming more practical and cost-effective for many states and municipalities. One source states that effluent “has undergone a dramatic transformation from a little-appreciated and under-utilized resource to an increasingly valuable water source.”⁷⁶¹ Although interest in water reuse has grown in recent years, there are still legal uncertainties regarding it, as well as institutional and societal constraints. One source concludes, “[b]efore society rallies around the idea that graywater recycling can solve all of our water shortage problems, it would be wise to investigate potential hazards associated with the practice, as well as review some of the current permitted applications.”⁷⁶² Accordingly, this section investigates and reviews the legal, social, and institutional constraints to the use of recycled water.

2.5.B. Legal Constraints

2.5.B.(i) Federal Regulations

Some reuse programs are formed partly because it may be cheaper to sell treated wastewater than to meet certain discharge standards. One source notes that as “discharge standards become stricter, more people probably will become interested in reusing reclaimed water.”⁷⁶³ The discharge standards referred to are those implemented by the National Pollutant Discharge Elimination System (NPDES) within the Clean Water Act (CWA). Under the NPDES permitting program, any point source—broadly defined as discrete conveyances such as pipes or man-made ditches—that discharges pollutants into the waters of the United States is required to obtain a permit for that discharge under the NPDES.⁷⁶⁴ One source notes that the NPDES discharge standards “indirectly encouraged effluent reuse by making it cheaper for municipalities

⁷⁶¹ Ginette Chapman, Note, *From Toilet to Tap: The Growing Use of Reclaimed Water and the Legal System's Response*, 47 ARIZ. L. REV. 773 (2005).

⁷⁶² Marilyn Noah, Guest Commentary, *Graywater Use Still a Gray Area*, 64 J. ENVTL. HEALTH 22 (2002).

⁷⁶³ Robert Bastian, *The Future of Water Reuse*, 47 BIOCYCLE 25 (May 2006).

⁷⁶⁴ See NPDES, Office of Water, EPA, *National Pollutant Discharge Elimination System: Overview* (2006), at <http://cfpub.epa.gov/npdes/>.

to comply with the standards for the sale of effluent than with the more stringent discharge standards.”⁷⁶⁵

The Bureau of Reclamation’s Title XVI water recycling program encourages the reclamation of wastewater and allows the Bureau to partially fund eligible programs and feasibility studies.⁷⁶⁶ In 2003, the Bureau had “undertaken planning, design, and engineering activities on 18” of its 27 authorized projects, with funding obligations for three projects “largely completed.”⁷⁶⁷ However, one commentator on the Title XVI program notes that “to date the States have been the most active players in pursuing water reuse technologies[,]”⁷⁶⁸ presumably because of the “primary responsibilities of the States and local interests in developing water supplies for domestic, municipal, industrial, and other purposes[.]”⁷⁶⁹

The National Environmental Policy Act (NEPA) “requires an assessment of environmental impacts for all projects receiving federal funds, and then the mitigation of all significant impacts.”⁷⁷⁰ The EPA notes that NEPA, in conjunction with similar state laws, requires those planning water reclamation projects to undertake “the careful assessment of any negative impacts” of the planned projects.⁷⁷¹ Because water recycling projects could potentially be detrimental to the environment, environmental regulations may constrain the implementation of these projects.

One source notes that while “[f]ederal regulations do not directly govern wastewater reuse,” reclaimed water may be indirectly regulated “under the authority of laws that set general standards for water, such as the Safe Drinking Water Act.”⁷⁷² However, the regulations that most often directly govern water reuse are those enacted by state and local governments.

2.5.B.(ii) State Regulations

Many states have statutes regulating the quality of recycled water. Some require reclaimed water to meet certain biochemical oxygen demand (BOD), total suspended solids (TSS), or coliform count standards. These standards may depend on the uses to which the water will be put, with varying standards for different uses. For example, Nevada requires treated effluent to meet one set of standards for those uses in which public contact is likely, and another

⁷⁶⁵ Chapman, *supra* note 761, at 777.

⁷⁶⁶ 43 U.S.C. § 390h to 390h-23 (2006); see Congressional Research Service, The Library of Congress, CRS Report for Congress, Order Code RL30478, *Federally Supported Water Supply and Wastewater Treatment Programs*, CR6-9 (Updated March 31, 2006); *Water Supply & Reliability: The Role of Water Recycling: Oversight Hearing Before the Subcomm. on Water & Power of the House of Representatives Committee on Resources*, 108th Congress 6, at 5-10 (2003) (testimony of Betsy A. Cody, Specialist in Natural Resources Policy, Congressional Research Service).

⁷⁶⁷ *Id.* at 6.

⁷⁶⁸ *Id.*

⁷⁶⁹ 43 U.S.C. § 390b.

⁷⁷⁰ U.S. Environmental Protection Agency (EPA), EPA/625/R-04/108, *Guidelines for Water Reuse*, 182 (2004) [hereinafter EPA Guidelines].

⁷⁷¹ *Id.*

⁷⁷² Chapman, *supra* note 761, at 786.

for those uses in which public contact is less likely.⁷⁷³ Many states also have regulations governing the technical requirements of water reuse systems⁷⁷⁴ and the use of treated wastewater for aquifer recharge.⁷⁷⁵

In addition, many states have environmental regulations similar to the National Environmental Policy Act (NEPA). For example, California's Environmental Quality Act⁷⁷⁶ (CEQA) provides that those undertaking government projects and private projects that involve government participation, financing or approval must first file an environmental impact report (EIR).⁷⁷⁷ The EIR must identify potential, significant environmental effects of the proposed project, as well as alternatives to the proposed project and ways to mitigate or avoid the potential environmental effects.

Overall, however, many western states have regulations and guidelines that encourage water reuse and regulate it for safety, rather than acting as barriers to the development of water reuse projects. The EPA states, "[t]he objective in these states is to derive the maximum resource benefits of the reclaimed water while protecting the environment and public health."⁷⁷⁸

2.5.B.(iii) Rights to Effluent

Closely related to the subject of state regulations governing water reuse is the question of who has rights to use treated wastewater. One source notes, "[s]ince the wide-scale use of reclaimed water is a relatively recent development, the ownership and use of effluent are relatively new issues in water law."⁷⁷⁹ The EPA Guidelines state, "it is important to understand who retains control of the reclaimed water among the discharger, water supplier, other appropriators, and environmental interests."⁷⁸⁰ Because western state water systems are built on the doctrine of prior appropriation, junior appropriators' rights may consist substantially or entirely of return flow from a senior appropriator's right. In these situations, a junior appropriator may be unable to exercise his water right if the senior appropriator reuses the water that was previously returned to the stream for downstream use. It therefore becomes important to understand who has legal rights to that water.

The EPA Guidelines note that "state law can either promote or constrain reuse projects depending on how its system of water rights regards the use and return of reclaimed water. In general, the owner of a wastewater treatment plant that produces effluent is generally considered to have first rights to its use and is not usually bound to continue its discharge."⁷⁸¹ The Arizona Supreme Court's decision in *Arizona Public Service Co. v. Long* embodies this idea and states,

54. ⁷⁷³ See *infra* section 2.5.C.(ii) Health Risks, at pages 105; see also EPA Guidelines, *supra* note 770, at 153-

⁷⁷⁴ See EPA Guidelines, *supra* note 770, at 3.

⁷⁷⁵ *Id.* at 161-62.

⁷⁷⁶ CAL. PUB. RES. CODE §§ 21000 to 21177 (2006).

⁷⁷⁷ See 14 CAL. CODE REGS. §§ 15000 to 15387 (2006).

⁷⁷⁸ See EPA Guidelines, *supra* note 770, at 149.

⁷⁷⁹ Chapman, *supra* note 761, at 776.

⁷⁸⁰ EPA Guidelines, *supra* note 770, at 176.

⁷⁸¹ *Id.* at 177.

No appropriator can compel any other appropriator to continue the waste of water which benefits the former. If the senior appropriator, through scientific and technical advances, can utilize his water so that none is wasted, no other appropriator can complain. The junior appropriator, using waste water, “takes his chance” on continued flow. To hold otherwise and require the Cities to continue to discharge effluent would deprive the Cities of their ability to dispose of effluent in the most economically and environmentally sound manner.⁷⁸²

A recently enacted chapter in the Utah Code states that a public agency owning a water right may reuse the water if the reuse is consistent with the underlying water right, the right is a municipal water right, and the public agency receives approval from the State Engineer for the reuse.⁷⁸³ It further provides that a public agency may reuse water from water rights held by another if a contract for reuse is entered into with the holder of the right.⁷⁸⁴

Washington law provides that facilities may reclaim water only if downstream rights are not impaired, or compensation or mitigation for the impairment is agreed to by the holder of the impaired right.⁷⁸⁵ This is obviously a more restricted legal right to the reuse of effluent than the position taken by Arizona and Utah, and it provides greater protection to downstream appropriators that have relied on a facility’s discharge of effluent into surface waters. As states and municipalities continue to develop and implement water reuse programs, the degree of legal control over effluent that is granted to treating facilities will likely correspond to the importance that a state places on water reuse as a tool within its water management system.

2.5.B.(iv) Reuse of Irrigation Water

The reuse of agricultural water is an area in which the extent of the water right and the possible infringement upon the rights of downstream users are also problematic. One source identifies the general rule that the “secondary water right” or “the carriage right” cannot be reused by a water right holder, but “the water actually applied to irrigation . . . may be used by that owner to the fullest extent possible.”⁷⁸⁶ The irrigator may not reuse the entire amount of his water right because, for the part of the right that is lost in transportation, he “never had any claim or expectation to those waters except for carriage, and when they are no longer needed for carriage, they are freed of the claim” and become return flow.⁷⁸⁷ In addition, if the water that was initially subject to recapture “finds its way back to its source,” it then becomes return flow and is “subject to the call of the stream.”⁷⁸⁸ Thus the general rule, as articulated by the Washington State Department of Ecology, is that “[w]ater users may capture their irrigation water return flows at the lower end of their fields and reuse the water for irrigating the same

⁷⁸² 773 P.2d 988, 996-97 (1989) (internal citations omitted).

⁷⁸³ UTAH CODE ANN. § 73-3c-201 (2006).

⁷⁸⁴ *Id.* § 73-3c-202.

⁷⁸⁵ REV. CODE WASH. § 90.46.130 (2006).

⁷⁸⁶ 2 WATERS & WATER RIGHTS 13-14 (Robert E. Beck ed., 1991 ed. 2001).

⁷⁸⁷ *Id.*

⁷⁸⁸ *Id.*

fields.”⁷⁸⁹ Harm to downstream users is averted or minimized by limiting the amount that may be reused to the water that runs off the water user’s fields and prohibiting the user from enlarging his right by irrigating additional land with the captured water.

Despite the potential problems that agricultural water reuse can cause to downstream users, several states encourage farmers to reuse their irrigation water. California enacted a statute in 2002 that calls for “integrated on-farm drainage management” to further several goals, including a reduction in the demand for irrigation water and the prevention of water pollution caused by discharging irrigation water to local water bodies.⁷⁹⁰ The statute describes an “integrated on-farm drainage management system” as accomplishing several tasks, including the collection and reuse of agricultural drainage water “to irrigate successive crops until the volume of residual agricultural drainage water is substantially decreased.”⁷⁹¹ In addition, in order “to encourage local agencies and private enterprise to implement potential water conservation and reclamation projects[.]”⁷⁹² California provides financial assistance for certain projects, including tailwater recovery systems and other improvements to “on-farm irrigation systems.”⁷⁹³ Although the statute does not define a “tailwater recovery system,” the U.S. Department of Agriculture defines it as “[a] planned irrigation system in which all facilities used for the collection, storage, and transportation of irrigation tailwater for reuse have been installed.”⁷⁹⁴ Similarly, Kansas authorizes grants to be made for tailwater recovery irrigation systems and other conservation practices.⁷⁹⁵

Nebraska law encourages farmers to use irrigation water reuse pits and exempts those who do so from the requirements of acquiring certain use permits.⁷⁹⁶ Washington explicitly exempts from permitting requirements “facilities to recapture and reuse return flow from irrigation operations” as long as only one farm is served and the acreage allowed to be irrigated under the water right is not increased.⁷⁹⁷ In a publication issued in 1991, the Washington Department of Ecology (Ecology) stated that it “identifies the capture and reuse of irrigation water as a limited right of water right holders.”⁷⁹⁸ Ecology further explained that water users can only capture “irrigation return flows from the fields” and not other natural surface water or return flows that have become “public water” as a result of flowing “outside the boundaries of the authorized place of use.”⁷⁹⁹

⁷⁸⁹ Wash. State Dep’t of Ecology, *Focus Sheet: Capture and Reuse of Irrigation Water*, F-WR-92-108, 1 (Nov. 1991) at <http://www.ecy.wa.gov/biblio/fwr92108.html> (last visited Sept. 12, 2006).

⁷⁹⁰ CAL. HEALTH & SAF. CODE § 25209.10 (2006).

⁷⁹¹ *Id.* § 25209.11(c)(2).

⁷⁹² CAL. WATER CODE § 11952 (2006).

⁷⁹³ *Id.* § 11962.

⁷⁹⁴ Natural Resources Conservation Service, U.S. Dept. of Agriculture, Conservation Practice Standard, *Irrigation System, Tailwater Recovery*, 447-1 (Oct. 2002) at <http://efotg.nrcs.usda.gov/references/public/AL/tg447.pdf> (last visited Sept. 12, 2006).

⁷⁹⁵ KAN. STAT. ANN. § 2-1915 (2006).

⁷⁹⁶ NEB. REV. STAT. ANN. §§ 46-283 to 46-287 (2006).

⁷⁹⁷ REV. CODE WASH. § 90.03.370(7) (2006).

⁷⁹⁸ Wash. Dep’t of Ecology, *supra* note 789, at 1.

⁷⁹⁹ *Id.* at 1-2.

2.5.C. Institutional/Societal Constraints

2.5.C.(i) Public Acceptance

Although many water users get their supply from water bodies in which effluent has been discharged upstream, most people remain averse to direct potable reuse of effluent.⁸⁰⁰ Direct potable reuse occurs when treated effluent “is used directly after treatment, with no intervening recharge to groundwater aquifers.”⁸⁰¹ Through indirect potable reuse, water is discharged to surface waters or underground aquifers before being reused. Indirect potable reuse is generally preferred to direct potable reuse due to the natural cleaning processes that treated effluent undergoes when discharged to surface waters or aquifers.⁸⁰²

One source states that “the early approach to implementing water reuse projects often viewed public acceptance as the principal ‘obstacle’ to implementing any recycling projects.”⁸⁰³ Some people worry about the “unknown safety risks” of reusing effluent for either direct or indirect potable use, while “[o]thers simply prefer to avoid exposure to what they consider to be former human wastewater.”⁸⁰⁴ In addition to these reasons, one report lists several more factors that may influence public acceptance of reuse, including the sources of water to be recycled, the uses of the recycled water, environmental justice issues, the cost of recycled water, and socio-demographic factors, just to name a few.⁸⁰⁵ The report notes that while people can often see the logic in using recycled water and support it in theory, these considerations often make them reluctant to actually reuse water or support reuse projects.⁸⁰⁶ The report also noted that public acceptance of reused water is highest for uses on golf courses, parks and industries, while it was lowest for use inside the home.⁸⁰⁷

Rather than attempting to change public opinion through marketing or persuasion—which has been, for the most part, largely ineffective⁸⁰⁸—those wishing to implement water reuse programs have been encouraged to participate in studies addressing the safety of direct and indirect potable reuse, as well as nonpotable reuse.⁸⁰⁹ However, due to the many uncertainties regarding the reuse of effluent for potable uses and the resulting public opposition to it, water reuse programs will likely continue to focus on reuse for nonpotable uses such as irrigation and industry.

⁸⁰⁰ Bastian, *supra* note 763, at 25.

⁸⁰¹ Chapman, *supra* note 761, at 780.

⁸⁰² *Id.*

⁸⁰³ Murni Po et al., Australian Water Conservation and Reuse Program, *Literature review of factors influencing public perceptions of water reuse*, 10 (Aus. 2004).

⁸⁰⁴ Bastian, *supra* note 763, at 25.

⁸⁰⁵ Po et al., *supra* note 803, at 10.

⁸⁰⁶ *Id.*

⁸⁰⁷ *Id.* at 12.

⁸⁰⁸ *Id.* at 9 (stating that it is “generally accepted that social marketing or persuasion is ineffective in influencing people to use recycled water”); *see also id.* at 6-8 (describing various U.S. and Australian water reuse projects that were opposed despite campaigns to elicit public support).

⁸⁰⁹ Bastian, *supra* note 763, at 25.

2.5.C.(ii) Health Risks

In states that allow the reuse of wastewater, regulations are usually enacted to ensure that treated wastewater does not come into contact with potable water.⁸¹⁰ Many state regulations require reused effluent to meet specific water quality requirements for biochemical oxygen demand (BOD), total suspended solids (TSS), and coliform counts. Because of the possible health risks associated with treated wastewater, more stringent requirements must be met “where there is a greater chance of human exposure to the water.”⁸¹¹

For example, for unrestricted urban use—use where public exposure is likely—Nevada allows a maximum level of 23/100ml of fecal coliform in any 30-day period. In contrast, for restricted urban use where public exposure to the water is controlled, Nevada allows a maximum level of 240/100ml of total coliform in any 30-day period.⁸¹² Levels of coliform “are generally used as indicators to determine the degree of disinfection.”⁸¹³ However, one source notes that while wastewater treatment plants (WWTPs) effectively remove pathogens whose presence is indicated by coliform levels, “treatment systems do not fully remove toxic industrial and organic chemicals.”⁸¹⁴ Another source gives a list of substances that may be in surface waters and which current treatment standards may not remove, including metals, drugs, carcinogenic organic substances, and endocrine-disrupting compounds.⁸¹⁵ Because treated wastewater has been used only rarely to directly supply drinking water to humans, the effects of these and other substances on the body are unknown.

One source notes that while extensive studies have been performed on animals and crops grown with reclaimed water to ensure there are no harmful effects, more studies need to be performed on new issues in reuse, such as emerging pathogens, residual total organic carbon, and hormone-mimicking compounds, among others.⁸¹⁶ The EPA recommends continued testing on “emerging pollutants of concern” (EPOC), to prevent potential illnesses that could be caused by EPOC in treated wastewater.⁸¹⁷

2.5.C.(iii) Environmental Effects

Commentators have noted that some reuse programs were started not with the primary purpose of supplementing the water supply, but as a way to “avoid or reduce the need for the costly nutrient removal treatment processes”⁸¹⁸ that are necessary to meet increasingly stringent discharge standards. Using lower quality, partially contaminated water for non-potable uses

⁸¹⁰ See EPA Guidelines, *supra* note 770, at 3.

⁸¹¹ Water Division Region IX, U.S. EPA, EPA 909-F-98-001, *Water Recycling: The Environmental Benefits*, 2 (2006) [hereinafter EPA Region IX].

⁸¹² EPA Guidelines, *supra* note 770, at 153-54, table 4.3 and 4.4.

⁸¹³ *Id.* at 153.

⁸¹⁴ Chapman, *supra* note 761, at 782.

⁸¹⁵ Ian R. Falconer et al., *Endocrine-Disrupting Compounds: A Review of their Challenge to Sustainable and Safe Water Supply and Water Reuse*, 21 ENVTL. TOXICOLOGY 181, 182 (2006) (internal citation omitted).

⁸¹⁶ Bastian, *supra* note 763, at 26.

⁸¹⁷ EPA Guidelines, *supra* note 770, at 172.

⁸¹⁸ *Id.* at 3.

rather than discharging it into streams or oceans is generally beneficial to the environment since pollution is averted.⁸¹⁹

Additional environmentally friendly effects of effluent reuse include the creation of new habitats and a decreased need for diversions of water from sensitive ecosystems and stressed groundwater aquifers.⁸²⁰ One source notes that the use of recycled water “can free considerable amounts of water for the environment and increase flows to vital ecosystems.”⁸²¹ Conversely, when a stream has been made up largely of effluent and effluent reuse results in lower instream flows, ecosystems may be adversely affected simply because there is less water. Also, when effluent is reused in irrigation or other land applications, the nutrients that are still contained in the water, such as salt, could accumulate in the treated land over time.⁸²² It is also possible for contamination to occur when treated wastewater is used to recharge aquifers.⁸²³ In addition, effluent reuse can cause harm to the environment indirectly by allowing growth and development in areas that would otherwise have insufficient water supplies to support such growth.⁸²⁴

2.5.C.(iv) Cost

Another formidable institutional barrier to the use of recycled water is the cost of implementing water reuse systems. One source notes “[a]s with many water supply options . . . considerable capital investment will be required for water recycling facilities.”⁸²⁵ Another source says “[w]hile water recycling is a sustainable approach and can be cost-effective in the long term, the treatment of wastewater for reuse and the installation of distribution systems can be initially expensive compared to such water supply alternatives as imported water or ground water.”⁸²⁶

Compounding the cost of water recycling systems is the fact that “[g]overnments . . . face many demands on their budgets[,]” and “[p]otential projects in urban and irrigation water supply compete with many other demands on the public purse.”⁸²⁷ For instance, the California Recycled Water Task Force estimated in 2003 that “an investment of \$11 billion would be needed” to develop a recycled water system that would help to meet the needs of California’s growing population.⁸²⁸ Likewise, in October 2005, \$43.1 million was set aside in Florida to fund 80 water development projects, mostly for programs that will recycle treated sewage and brackish groundwater.⁸²⁹ The EPA Guidelines identify financial resources that are available to help with the cost of water reuse systems, including local government tax-exempt bonds, grants and state revolving fund (SRF) programs, capital contributions, reclaimed water user charges, property

⁸¹⁹ EPA Region IX, *supra* note 811, at 5.

⁸²⁰ *Id.*

⁸²¹ *Id.*

⁸²² *See* Noah, *supra* note 762, at 23.

⁸²³ Chapman, *supra* note 761, at 780.

⁸²⁴ *Id.* at 783; *see also* Chapter 1, Section 1 *Growth Management and Water in the West*, at pages 2-44.

⁸²⁵ California Recycled Water Task Force, *Water Recycling 2030: Recommendations of California’s Recycled Water Task Force*, 13 (2003), at <http://www.owue.water.ca.gov/recycle/docs/TaskForceReport.htm>.

⁸²⁶ EPA Region IX, *supra* note 811, at 8.

⁸²⁷ D. Hatton MacDonald et al., *The Economics of Water: Taking Full Account of First Use, Reuse and the Return to the Environment*, 54 IRRIGATION & DRAINAGE 93, 94 (2005).

⁸²⁸ California Recycled Water Task Force, *supra* note 825, at 5.

⁸²⁹ Bastian, *supra* note 763, at 27.

taxes, and a public utility tax, among others.⁸³⁰ Another potential source of funding for water reuse projects comes from the federal government through the Bureau of Reclamation's Title XVI water recycling program, referenced above.⁸³¹ The Title XVI program provides both technical and financial assistance for the development of water reuse facilities if localities meet certain requirements.⁸³²

However, as the cost of developing new water supplies through other means continues to escalate and discharge standards become more restrictive, reuse systems will increasingly become a more cost-effective option. One source notes that the use of reclaimed water, while it may be expensive, eliminates or reduces the costs of mitigating or repairing the harmful effects of groundwater pumping or diversions from surface waters.⁸³³ An additional factor that may enhance the value of water recycling relative to other methods of water development is that water recycling allows the entity treating the water to bypass the strict discharge standards, meet lower standards for the sale of effluent, and sell the water, rather than simply discharging it to the surrounding environment.⁸³⁴ One source concludes that "while the economic efficiency of using reclaimed water is likely to increase as water supplies become scarcer and more costly, the costs of reusing effluent remain a barrier."⁸³⁵

2.5.D. Conclusion

In its 2004 Guidelines, the EPA notes the growing importance of water reuse and states, "water reclamation and reuse have almost become necessary for conserving and extending available water supplies. Water reuse may also present communities with an alternate wastewater disposal method as well as provide pollution abatement by diverting effluent discharge away from sensitive surface waters."⁸³⁶ As federal, state, and local governments continue to experiment with water reuse programs, corresponding legal changes can be expected at the various levels of government, which will provide greater certainty. As part of this process, states should consider whether defining rights and acceptable uses of effluent can promote water reuse while simultaneously assuring interstate obligations and junior water rights dependent on returnflows.⁸³⁷ Improving legal certainty will likely encourage both public and private development of safe and effective water reuse systems. In addition, state and federal governments may encourage and fund further scientific studies on the use of reclaimed water on edible products and animals, as well as the direct and indirect potable use of reclaimed water. To the extent that studies validate the safety of certain uses of reclaimed water, public acceptance of water recycling as an effective water supply supplement will grow. Preparing this report also

⁸³⁰ EPA Guidelines, *supra* note 770, at 200-206.

⁸³¹ 43 U.S.C. § 390h to 390h-23.

⁸³² *Id.* § 390h-2; *see also Water Supply & Reliability Oversight Hearing*, *supra* note 766, at 6.

⁸³³ Chapman, *supra* note 761, at 781.

⁸³⁴ *Id.* at 776-77.

⁸³⁵ Chapman, *supra* note 761, at 784-85.

⁸³⁶ EPA Guidelines, *supra* note 770, at 1.

⁸³⁷ WSWC Staff suggests that an evaluation of effluent rights and acceptable uses be one of the "Next Steps" in implementing the 2006 WGA Water Report.

revealed the need to look into the disparity between individual state reuse standards and consider whether or not federal treatment standards are needed.⁸³⁸

⁸³⁸ Comparing the individual state reuse standards is one of the “Next Steps” identified in the progress report. During this process, WSWC will look to partner with EPA to compare the disparity between state reuse standards and consider whether federal treatment standards are necessary.

Chapter 2

Section 6

Water Right Transfers

2.6.A. Introduction

Since at least the early 1970s, water right transfers⁸³⁹ have been promoted as a means of procuring needed water through more efficient reallocation from lower valued uses to higher valued uses.⁸⁴⁰ Indeed, one source reports that “transferring 5 percent of agricultural water to municipal uses would meet estimated urban demands in the western United States for the next twenty-five years.”⁸⁴¹ However, over the past several decades, advocates of water marketing have noted that certain “components of appropriative water rights are often incompatible with and can deter market activities[,]”⁸⁴² while others are concerned about the negative consequences that can result from transfers.⁸⁴³ As water transfers gain a more prominent role in augmenting water supplies in the West, states grapple with the barriers to transfers that are imposed by existing systems, as well as the implementation of needed regulation of transfers. The potential legal and regulatory problems relating to water transfers are discussed in detail below.

2.6.B. Legal Constraints

2.6.B.(i) Beneficial Use

Anyone who is familiar with the doctrine of prior appropriation knows that for a water right to be perfected, water must be diverted and put to a beneficial use. One source notes that the ‘use’ component of the phrase might have been more important initially than the requirement that the use be beneficial, stating, “[t]he greater waste was letting unused water run ‘to the sea.’” Thus, the idea of use itself was perhaps even more important than the addition of a term like valuable, reasonable, necessary, or beneficial was.”⁸⁴⁴ Many states have statutes or case law that require or allow the decision maker to consider whether the water proposed to be transferred has

⁸³⁹ While this section talks in terms of water “rights,” it encompasses other means whereby existing water uses are connected to new uses.

⁸⁴⁰ See e.g., National Water Commission, Final Report to the President and the Congress of the United States, *Water policies for the future* (1973).

⁸⁴¹ Terry L. Anderson & Peter J. Hill, *Introduction: Taking the Plunge*, in WATER MARKETING—THE NEXT GENERATION xi, xii-xiii (Terry L. Anderson & Peter J. Hill eds., 1997).

⁸⁴² Barton H. Thompson, Jr., *Water Markets and the Problem of Shifting Paradigms*, in WATER MARKETING, *supra* note 841, at 7.

⁸⁴³ See e.g., NATIONAL RESEARCH COUNCIL, WATER TRANSFERS IN THE WEST: EFFICIENCY, EQUITY, AND THE ENVIRONMENT (1992) [hereinafter NRC].

⁸⁴⁴ 2 WATERS & WATER RIGHTS 12-25 (Robert E. Beck ed., 1991 ed. 2001).

been put to a beneficial use.⁸⁴⁵ One source notes that the practice of “inquiring into past beneficial use may discourage or lessen the efficiency of an otherwise useful reallocation” because “a determination of waste or misuse may result in a reduced water right in a reallocation proceeding.”⁸⁴⁶ In addition, a transfer may be denied if the proposed new use is not considered beneficial or is considered less beneficial than the current use.⁸⁴⁷

2.6.B.(ii) Forfeiture and Abandonment

Forfeiture and abandonment relate to the beneficial use requirement and may apply where a water right has not been put to beneficial use. Abandonment is a common law doctrine in which nonuse must be coupled with intent in order for an appropriator to lose his water right. In contrast, forfeiture is a statutory creation in which no intent is required, and the appropriator loses her water right if it is not beneficially used for a specific period of time.⁸⁴⁸ In response to the increasing interest in facilitating water transfers, many states have adopted statutes that explicitly protect leased or transferred water from a presumption of forfeiture.⁸⁴⁹ However, despite these statutory changes, one source states, “water users have often hesitated or refused to transfer water rights for a limited period of time out of fear that a court or administrative agency will later decide either that the transfer shows they did not really need, and thus do not have a legitimate right to, the transferred water, or that they have lost the transferred water through forfeiture.”⁸⁵⁰ The author further explains,

If the legislature provides that water leases will not constitute grounds for forfeiture, fears still remain that leases will result in a loss of the underlying right under the law of abandonment or some other related legal doctrine. . . . No matter what the legislature now says, water users thus often assume the rules will change in the future to meet practical demands.⁸⁵¹

In addition to a potential finding of forfeiture or abandonment after the transfer has ended, some water rights holders may be dissuaded from engaging in transfers initially if there is a possibility of an administrative agency or court finding that a right has been abandoned or forfeited prior to a proposed transfer. For example, in *Jenkins v. Department of Water Resources*, the Idaho Supreme Court upheld the decision of the Idaho Department of Water Resources denying Mr. Jenkins’ application to change the point of diversion on the basis of

⁸⁴⁵ See e.g., CAL. WATER CODE § 480 (2006) (the department shall only facilitate transfers in which water has been diverted for a beneficial use or conserved); NEV. REV. STAT. ANN. § 533.400 (2006) (requiring applicant to submit a statement that includes a measurement of the amount of water put to beneficial use).

⁸⁴⁶ 2 WATERS & WATER RIGHTS, *supra* note 844, § 14.04(b), at 14-38.

⁸⁴⁷ See e.g., NORTH DAKOTA CENT. CODE § 61-04-15.1 (2006) (a change in use may only be permitted “for a superior use as determined by the order of priorities contained in section 61-04-06.1”); WYO. STAT. ANN. § 41-3-103 (2006) (requiring change of use to conform with “order of preference”).

⁸⁴⁸ See, 2 WATERS & WATER RIGHTS, *supra* note 844, §§ 17.03(a)-(b).

⁸⁴⁹ See e.g., IDAHO CODE ANN. § 42-223(5) (2006); for further discussion of forfeiture and abandonment within the context of water banking specifically, see *infra* Chapter 2, Section 7 *Water Banking*, at pages 123-135.

⁸⁵⁰ Thompson, *supra* note 842, at 7.

⁸⁵¹ *Id.*

forfeiture since the right had not been used for 18 years.⁸⁵² Thus, fear of a finding of forfeiture or abandonment of a right may curtail some users from entering into transfer agreements.

On the other hand, ignoring non-use in the transfer process may allow transfer of invalid water rights. This has both market implications and third-party impacts, such as impairment of other rights caused by the exercise of a right that had not been used for decades prior to the attempted transfer. Thus, non-use issues may represent a significant challenge to water right transfers.

2.6.B.(iii) District Constraints on Transfers

Local water districts influence water right transfers. In its 1992 report on water transfers, the National Research Council (NRC) explained that while many types of entities control the development and distribution of water to individual users, “the largest and most influential types of public entities that exercise water rights in the West are irrigation and conservancy districts.”⁸⁵³ Districts often provide flexibility to members, enabling informal transfers or exchanges within the district that may not be provided for in state law.⁸⁵⁴ However, one scholar notes that water districts or institutions “are coming to be seen more as market barriers” to water transfers because they “often block or impede transfers of water from within their jurisdiction to users outside.”⁸⁵⁵ Although the districts “have a legitimate interest in ensuring that transfers do not impose negative externalities on them or their members[,] . . . [they] may also hinder extrajurisdictional transfers because of structural impediments or because of more benighted reasons” such as “managerial self-interest and the desire of members to keep the price of water artificially low[.]”⁸⁵⁶

In addition, the desire to protect local areas of origin has resulted in laws like that of Arizona, where the consent of the district must be obtained before water can be transferred outside the district’s boundaries, giving water districts a veto power over proposed transfers.⁸⁵⁷ The NRC points out the difficulty of expecting water districts to “represent the social, economic, and ecological interests of a region” in regulating water transfers when they were never intended to do so.⁸⁵⁸ The report concludes that districts “cannot be expected to exercise their potential powers over transfers to accomplish other goals” unless district responsibilities are broadened to include more “than simply ensuring water supply.”⁸⁵⁹ Another source concludes, “[g]iven the significance of institutional obstacles to major interbasin transfers, institutional rather than legal reform may have the greatest impact on the future growth of water markets.”⁸⁶⁰

⁸⁵² 647 P.2d 1256 (1982).

⁸⁵³ NRC, *supra* note 843, at 71.

⁸⁵⁴ See e.g., NRC, *supra* note 843, at 72 (citing the Northern Colorado Water Conservancy District, “which maintains a robust market, annually trading contractual rights to use district water among district members”).

⁸⁵⁵ Barton H. Thompson, Jr., *Institutional Perspectives on Water Policy and Markets*, 81 CAL. L. REV. 671, 677 (1993).

⁸⁵⁶ *Id.*

⁸⁵⁷ ARIZ. REV. STAT. § 45-172 (2006).

⁸⁵⁸ NRC, *supra* note 843, at 72.

⁸⁵⁹ *Id.*

⁸⁶⁰ Thompson, *supra* note 855, at 677.

2.6.B.(iv) State Restrictions on Interbasin and Interstate Transfers

While statutes expressly prohibiting certain types of transfers are generally no longer valid for political, constitutional or policy reasons, many states have extensive regulations or procedures in place for certain transfers—including interbasin and interstate transfers—that may have the effect of significantly restricting those transfers. One reason for restricting interbasin water transfers is because certain transfers “could improve the efficiency of water use but could hurt fish and wildlife inhabiting the stretch of river below the diversion point.”⁸⁶¹ Another motive for restrictions on interstate or interbasin transfers may be “pure economic protectionism, to prefer local development, to save the water for future, possibly less productive, in-state [or in-basin] uses.”⁸⁶² Building on this idea, another scholar states that “attitudinal barriers” to interstate or interbasin transfers “are usually rooted in a shortsighted patriotism” that leads people to object to exportation of water, “even when such resource protectionism is to the detriment of the public welfare in their state or nation.”⁸⁶³ While resource protectionism “sometimes reflects an effort to preserve cultural traditions, it is often the product of misguided efforts to gain economic advantage in relation to other states.”⁸⁶⁴

Some states have statutes that expressly limit interbasin transfers. For example, with a few exceptions, Oregon requires express legislative consent for all diversions that will be used outside of the boundaries of the basin.⁸⁶⁵ In contrast, Nebraska’s statute does not require legislative approval of an interbasin transfer, but does require the Director of the Department of Natural Resources to consider several factors, including, but not limited to, seven specific factors.⁸⁶⁶ “The application shall be deemed in the public interest if the overall benefits to the state and the applicant’s basin are greater than or equal to the adverse impacts to the state and the basin of origin.”⁸⁶⁷ One type of restriction on interbasin transfers that is becoming more prevalent is an area of origin protection statute. In addition, one of the main reasons for restrictions on interbasin transfers is to mitigate the negative effects on third parties and the environment.

The issue of interstate water transfers is very complicated in the western United States. Several different sources of law are involved in interstate transfers, including case law, state

⁸⁶¹ Congressional Budget Office, Congress of the United States, *Water Use Conflicts in the West: Implications of Reforming the Bureau of Reclamation’s Water Supply Policies*, 15 (Aug. 1997) [hereinafter CBO Study 1997].

⁸⁶² Frank J. Trelease, *State Water and State Lines: Commerce in Water Resources*, 56 U. COLO. L. REV. 347 (1984-1985).

⁸⁶³ James L. Huffman, *Institutional Constraints on Transboundary Water Marketing*, in WATER MARKETING, *supra* note 841, at 32.

⁸⁶⁴ *Id.*

⁸⁶⁵ ORE. REV. STAT. § 537.810 (2006).

⁸⁶⁶ NEB. REV. STAT. ANN. § 46-289 (2006). ((1) The economic, environmental, and other benefits of the proposed interbasin transfer and use; (2) Any adverse impacts of the proposed interbasin transfer and use; (3) Any current beneficial uses being made of the unappropriated water in the basin of origin; (4) Any reasonably foreseeable future beneficial uses of the water in the basin of origin; (5) The economic, environmental, and other benefits of leaving the water in the basin of origin for current or future beneficial uses; (6) Alternative sources of water supply available to the applicant; and (7) Alternative sources of water available to the basin of origin for future beneficial uses.)

⁸⁶⁷ *Id.*

water law, and interstate water compacts. Most scholars and practitioners are familiar with the landmark 1982 case *Sporhase v. Nebraska ex rel. Douglas*,⁸⁶⁸ in which the United States Supreme Court, among other things, struck down a provision of a Nebraska statute that required reciprocity in order for an interstate transfer to be granted. The court found that the requirement was a barrier to interstate commerce, of which water is a part.⁸⁶⁹

Sporhase and subsequent case law on the issue of interstate transfers restrict the power of states to prohibit interstate exports outright, although a state is allowed to “invoke a limited preference for public welfare concerns other than economic ones” when preferring its own citizens over other citizens in the utilization of water resources.⁸⁷⁰ One source explains that “the most common state approach to regulating water export is legislation modeled after the portion of the Nebraska statute that was upheld in *Sporhase*” which required a withdrawal for export to be “(a) reasonable, (b) not contrary to the conservation and use of groundwater, and (c) not otherwise detrimental to the public welfare.”⁸⁷¹ Similar to statutes regulating interbasin transfers and transfers in general, many statutes regulating interstate transfers require a public interest or welfare analysis to be undertaken.

Another potential problem that may arise with interstate water transfers is whether water that is allocated to a state subject to an interstate compact may be transferred to another state. On this issue, one scholar notes,

Interstate compacts are designed to protect states of origin, but they may also be a source of constraints on voluntary transfers by a compact beneficiary state. Interstate compacts allocate water among states, but there is increasing pressure on headwater states to sell or lease their interstate allocation. Opponents of transfers argue that interstate compacts restrict state shares to uses within the state. A compact may bar interstate transfers, and congressional approval may be treated as a waiver of the Dormant Commerce Clause. However, absent an express prohibition, advocates of water marketing argue that a state is free to use its share as it chooses so long as it fulfills its compact obligations to other states.⁸⁷²

2.6.B.(v) Federal Restrictions on Transfers

Despite the federal government’s continued espousal of deference to state water law, the necessity of federal development, environmental and commercial regulation, and policing of interstate waters, disputes, and agreements requires a certain degree of federal policy and law that inevitably intersects, and may conflict, with state water law. While the federal government

⁸⁶⁸ 458 U.S. 941 (1982).

⁸⁶⁹ *Id.* at 957.

⁸⁷⁰ 4 WATERS & WATER RIGHTS, *supra* note 844, § 48.03(b) at 48-28.

⁸⁷¹ *Id.* § 48.03(c)(1) at 48-29.

⁸⁷² A. Dan Tarlock, *Reconnecting Property Rights to Watersheds*, 25 WM. & MARY ENVTL. L & POL’Y REV. 69, 109 (2000) (footnotes omitted).

generally supports voluntary water transfers in theory,⁸⁷³ there are regulations or policies in place that can hinder a proposed transfer in practice.

2.6.B.(v)(a) *Bureau of Reclamation*

The Congressional Budget Office (CBO) estimates that agriculture uses approximately 74% of water in the West.⁸⁷⁴ The Bureau of Reclamation (BOR) estimates that it provides 20% of western farmers, or approximately 140,000 farmers, with irrigation water to irrigate 10 million acres of farmland.⁸⁷⁵ One source estimates that “[o]ne in every five acres in the seventeen [western] states obtains at least some its water from the Bureau.”⁸⁷⁶ In light of this information and the fact that many, if not most, water transfers are from agriculture to municipal uses, it is not surprising that the BOR has a policy supporting voluntary transfers of water made available through Reclamation projects.

In a 2001 policy statement (2001 Policy), the BOR stated that it “has been, and continues to be, supportive of voluntary transfers and conversions of project water in accordance with State and Federal law from existing to new users and/or uses.”⁸⁷⁷ The policy statement expounds on and clarifies the Department of the Interior’s *Principles Governing Voluntary Water Transactions That Involve or Affect Facilities Owned or Operated by the Department of the Interior*, dated December 1988 (1988 Principles).⁸⁷⁸ For transfers to be valid under the 2001 Policy they must conform with the 1988 Principles and must be used for an authorized purpose, be approved by the BOR, protect project purposes and contractors, and be in compliance with federal, state, tribal, and local laws.⁸⁷⁹ Additionally, the 1988 Principles state that DOI will not approve transfers that create adverse third-party consequences, and that DOI will consider efforts to mitigate adverse environmental effects caused by the proposed transfer.⁸⁸⁰

2.6.B.(v)(a)(1) *Ownership of Water Right*

In practice, several potential difficulties may arise in a proposed transfer of BOR project water apart from environmental and other third-party effects. One regards the ownership of the right to project water, since only the owner can lease or transfer the water right. One source asserts that a question of ownership “is a complicated legal question requiring case-by-case analysis” due to the presence of at least three complicating factors, including shared ownership (among the BOR, the state, the local irrigation district, and the end user), varying rights and responsibilities under the contracts and federal or state statutes with respect to project water, and

⁸⁷³ See Bureau of Reclamation (BOR), Department of Interior (DOI), Policy WTR-P02, *Voluntary Transfers of Water* (2001); Congressional Budget Office (CBO), Congress of the United States, Pub. No. 2589, *How Federal Policies Affect the Allocation of Water* (August 2006).

⁸⁷⁴ *Id.* at 1.

⁸⁷⁵ BOR, DOI, *Bureau of Reclamation- About Us*, at <http://www.usbr.gov/main/about/>.

⁸⁷⁶ Reed D. Benson, *Whose Water Is It? Private Rights and Public Authority Over Reclamation Project Water*, 16 VA. ENVTL. L.J. 363, 364 (1997).

⁸⁷⁷ BOR, Policy WTR-P02, *supra* note 873, at ¶ 1.

⁸⁷⁸ DOI, *Principles Governing Voluntary Water Transactions That Involve or Affect Facilities Owned or Operated by the Department of the Interior*, (December 16, 1988).

⁸⁷⁹ BOR, *supra* note 873, ¶ 5(A)-(E).

⁸⁸⁰ DOI, *supra* note 883, ¶¶ 3, 7.

“the context of the inquiry[.]”⁸⁸¹ A 1997 CBO Study on the implications of reforming the BOR’s water supply policies explains that although water rights are obtained by the BOR through the state in which the project is located, the rights are vested in the water user, either the irrigation district or the farmer.⁸⁸² In addition, under 1956 amendments to the Reclamation Project Act of 1939, water users have the right to renew their contracts as long as they agree to pay current water charges, and “[o]nce project costs have been repaid, water delivery rights become permanent.”⁸⁸³ One scholar concludes,

These provisions of Reclamation Law reinforce the notion that long-term property rights are conferred to federal water contractors. The use of voluntary water transfers recognizes such contractual rights and seeks to facilitate efficient water use by further clarifying these rights and by relying on the economic incentives for trading between water users.⁸⁸⁴

Although contrary opinions exist, and site-specific laws must be examined, a 1997 CBO Study agrees with this conclusion and states, “Those provisions created an expectation that water deliveries would continue indefinitely. Transfers of water by districts or farmers (that is, sales to non-contractors) are consistent with that expectation.”⁸⁸⁵

2.6.B.(v)(a)(2) Profitability of Transfer

Because water supplied by the BOR to farmers may be subsidized,⁸⁸⁶ a second issue that may arise with the transfer of BOR water is whether an irrigation district or an individual irrigator, or both, may profit from the transfer. One source notes, “[o]ther than contracts under the Warren Act, no provision of the Reclamation Act directly addresses the issue of whether the seller of a project right may profit from a reallocation transaction. Nor are there any generic regulations governing profits from a reallocation.”⁸⁸⁷ In addition, specific contracts may contain provisions limiting profits from a transfer, although most contracts are silent regarding profits.⁸⁸⁸ In light of the BOR’s “inconsistent record with respect to the question of profits,”⁸⁸⁹ one source suggests that the BOR “could adopt a policy that would allow the increased income from transfers to be used by water districts, so long as the currently established financial obligations of Reclamation law are met[.]”⁸⁹⁰ and again that it “could develop standardized contract language that would permit a water district to receive any additional income from the resale or lease of the

⁸⁸¹ Benson, *supra* note 876, at 367.

⁸⁸² CBO Study 1997, *supra* note 861, at 17.

⁸⁸³ RICHARD W. WAHL, MARKETS FOR FEDERAL WATER: SUBSIDIES, PROPERTY RIGHTS, AND THE BUREAU OF RECLAMATION 130 (1989).

⁸⁸⁴ *Id.*

⁸⁸⁵ CBO Study 1997, *supra* note 861, at 17.

⁸⁸⁶ See *supra* note 602 (discussing the Reclamation Reform Act of 1982 and the requirement for paying for operational and maintenance costs in delivery contracts). Consequently, not all water deliveries are subsidized to the degree sometimes suggested in the literature. See, e.g., footnotes 603, 606.

⁸⁸⁷ 4 WATERS & WATER RIGHTS, *supra* note 844, §41.06(e) at 41-91.

⁸⁸⁸ *Id.* at 41-90.

⁸⁸⁹ *Id.*

⁸⁹⁰ WAHL, *supra* note 883, at 168.

water it currently has under contract, provided that the United States recovers its project costs.”⁸⁹¹

2.6.B.(v)(a)(3) The Warren Act

The Warren Act,⁸⁹² mentioned above, allows individuals holding private water rights under state law to contract for storage rights in a federal project.⁸⁹³ Under a section 1 contract, storage rights are based on availability, and the water must be used within the project boundaries.⁸⁹⁴ Because of the limited and temporary nature of the storage rights procured under a section 1 contract,⁸⁹⁵ rights under such a contract are unlikely to be transferred.⁸⁹⁶ Under a section 2 contract, on the other hand, a user acquires “a fixed right in the project facilities” not limited as to place of use.⁸⁹⁷ Storage rights acquired under a section 2 contract are therefore “quite conducive to reallocation.”⁸⁹⁸ In addition, because the private right was appropriated under state law, the water right itself may be transferred pursuant to state law “free from entanglement with the federal project.”⁸⁹⁹

2.6.B.(v)(a)(4) Appurtenancy Requirement and Project Boundaries

Although the Reclamation Act contains a provision stating that project water rights “shall be appurtenant to the lands irrigated,” scholars agree that the provision “may be less restrictive than it appears.”⁹⁰⁰ Another scholar asserts “it is generally held that numerous subsequent acts providing for reclamation water for nonirrigation purposes, such as the Reclamation Project Act of 1939 and the Water Supply Act of 1958, have repealed by implication the appurtenancy requirement.”⁹⁰¹

Another question that may arise is whether BOR project water may be transferred outside of the project boundaries that are established by the project’s authorizing statutes.⁹⁰² One scholar “has suggested that a reallocation that results in a diversion to an area outside of the project boundaries may necessitate an administrative expansion of project boundaries and congressional approval.”⁹⁰³ Another asserts that because “[t]here is no clear authority under existing legislation for allowing project water users to sell or lease water for uses and locations not envisioned in

⁸⁹¹ *Id.* at 169.

⁸⁹² 43 U.S.C. §§ 523-524 (2006).

⁸⁹³ 4 WATERS & WATER RIGHTS, *supra* note 844, § 41.06(f) at 41-92.

⁸⁹⁴ *Id.*

⁸⁹⁵ 43 U.S.C. § 523.

⁸⁹⁶ Richard Roos-Collins, *Voluntary Conveyance of the Right to Receive a Water Supply from the United States Bureau of Reclamation*, 13 *ECOLOGY L.Q.* 773, 838 (1987) (stating that “any project right held under such contract would accommodate only a temporary conveyance” because the right is “contingent upon the availability of excess capacity and cannot extend beyond the surplus”).

⁸⁹⁷ 4 WATERS & WATER RIGHTS, *supra* note 844, § 41.06(f) at 41-92.

⁸⁹⁸ *Id.*

⁸⁹⁹ Roos-Collins, *supra* note 896, at 839.

⁹⁰⁰ *Id.* at 851.

⁹⁰¹ WAHL, *supra* note 883, at 149.

⁹⁰² 4 WATERS & WATER RIGHTS, *supra* note 844, § 41.06(c) at 41-83.

⁹⁰³ *Id.* (citing Bruce Driver, *Sources of Water II: Federal Water Projects—For Whose Benefit, in MOVING THE WEST’S WATER TO NEW USES: WINNERS AND LOSERS*, Natural Resources Law Center, 11th Annual Summer Program, at 26-18 (June 6-8, 1990) [hereinafter *Moving the West’s Water to New Uses*]).

project authorizations[,] . . . either the bureau has to be involved in such transactions by contracting for water delivery for the new use or location . . . or legislative action must be solicited to facilitate such transfers.”⁹⁰⁴

However, a third source notes that “[i]n actual practice, reallocation[s] outside project boundaries have occurred under the [Miscellaneous Water Supply Act of 1920], as well as the Reclamation Project Act of 1939.”⁹⁰⁵

2.6.B.(v)(a)(5) Transfer of Title to Project Works

After a contractor has made sufficient payments, the BOR can transfer the management and operation of the project facilities to the district.⁹⁰⁶ However, title to the facilities remains with the federal government “until otherwise provided by Congress.”⁹⁰⁷ One scholar concludes, “[w]hile title to project works does not relate to water transfers as directly as some of the other provisions examined, it is probably safe to say that water transfers would be easier for districts if the districts had clear title to their facilities at project payout.”⁹⁰⁸

2.6.B.(v)(a)(6) Beneficial Use and Consumptive Use

In addition to potential problems that are unique to transfers of BOR water, such transfers are also subject to some of the same problems encountered by those attempting to transfer water that is appropriated under state law by an individual, including the requirement that the water be put to a beneficial use and limited to the user’s historic consumptive use. However, because the potential problems that arise regarding these requirements are essentially the same for federal and non-federal water, they are discussed in more detail in separate sections of this report.

2.6.C. Third Party Impacts

In states where water transfers are becoming more common and state governments encourage and facilitate transfers, one of the most vexing problems encountered by participants, policymakers, and affected parties is third party impacts with their attendant legal and public policy ramifications. One author stated in 1988 that “third party effects . . . represent a significant impediment to the development of water markets[,]”⁹⁰⁹ a statement which is still very true today. Third party impacts are those impacts that affect those who are not parties to a transfer transaction, such as other water rights holders, the surrounding community, the general public, and the environment. One reason third party impacts are so troublesome for policymakers is that equity dictates the negative impacts be confronted and mitigated, while efficiency argues that barriers to transfers be eradicated or minimized. Because of these conflicting objectives, solutions to mitigating third party impacts often end up encumbering transfers. One source explains that “[a] goal of modern western water policy . . . is both to

⁹⁰⁴ Wahl, *supra* note 883, at 153.

⁹⁰⁵ 4 WATERS & WATER RIGHTS, *supra* note 844, § 41.06(c) at 41-84.

⁹⁰⁶ 43 U.S.C. § 498.

⁹⁰⁷ *Id.*

⁹⁰⁸ Wahl, *supra* note 883, at 153.

⁹⁰⁹ George A. Gould, *Water Rights Transfers and Third-Party Effects*, 23 LAND & WATER L. REV. 1 (1988).

streamline the systems that impose superfluous restrictions, costs, and delays on the transfer process and, at the same time, to devise new ways to account for important interests that are now left out.”⁹¹⁰ Both the legal and the public policy problems contained within third party impacts are discussed below, with more discussion devoted to the legal third party impacts created by water transfers.

2.6.C.(i) No Injury Rule

One well-known and widely-used tool to protect water users is the requirement that transfers may not impair other holders of water rights. Because “appropriators have a vested right to have stream conditions maintained substantially as they existed at the time of their appropriations[,]” any change in a water right must not result in significantly altered stream conditions that injure other users.⁹¹¹ Additionally, most states require an applicant to show the absence of injury before approving a transfer. If other water rights holders protest the transfer, the cost and time required to obtain the transfer will increase and the transfer may be denied.⁹¹² The cost of proving the absence of injury and the potential for protests may dissuade some parties from entering into transfer transactions.

2.6.C.(i)(a) Historical or Consumptive Use

Another requirement of the no injury rule is that appropriators may only transfer the amount of water they have beneficially consumed, even though this may be less than the amount to which they are entitled under their water right. For example, one source reports that the consumptive use of water in flood irrigation is 40-60% of the amount diverted, and 80-95% of the amount diverted for sprinkler and drip irrigation systems.⁹¹³ In addition to the method of irrigation used, estimations of historic consumption take into account the types of crops grown, climate, soil type, and seasonal water use. However, there are many methods of calculating the historical consumptive use, and the calculation may result in an over- or under-estimation of the actual consumptive use. One source concludes,

Inadequate analysis of historical utilization or ambiguity in the law as to how that historical use should be measured can lead to uncertainty and confusion in the administration of the transfer system. This uncertainty in the system may dissuade creative transfer proposals and thereby ultimately stand as an impediment to the efficient allocation of water.⁹¹⁴

2.6.C.(ii) Public Interest Reviews

Public interest reviews are now required by statute, administrative rules, or case law in most states. Many prohibit transfers that are detrimental to the public interest and may be

⁹¹⁰ NRC, *supra* note 843, at 53.

⁹¹¹ 2 WATERS & WATER RIGHTS, *supra* note 844, § 14.04(c), at 14-42.

⁹¹² NRC, *supra* note 843, at 32.

⁹¹³ 2 WATERS & WATER RIGHTS, *supra* note 844, § 14.04(c)(1), at 14-53 (citing Leonard Rice & Michael D. White, Engineering Aspects of Water Law 127-28 (Krieger Publ’g Co. 1991)).

⁹¹⁴ James N. Corbridge, Jr., *Historical Water Use and the Protection of Vested Rights: A Challenge for Colorado Water Law*, 69 U. COLO. L. REV. 503, 504 (1998).

considered an extension of the no injury rule.⁹¹⁵ However, despite the protection that public interest requirements impart to previously unprotected interests, they can “discourag[e] reallocations and water marketing because one cannot safely predict whether an administrator will determine that a particular reallocation is in the public interest.”⁹¹⁶ This is due in part to the lack of legislative or judicial definition of the public interest criteria.⁹¹⁷ For example, many states have a statute like South Dakota’s, which simply requires a change may be granted only if it does not impair existing rights, “is for a beneficial use[,] and in the public interest.”⁹¹⁸ When the “public interest” is not defined, state water agencies and state courts are left to decide “what constitutes a threat to the public interest.”⁹¹⁹ One scholar has argued that state water agencies and courts are ill-equipped to determine whether a transfer is detrimental to the public interest because “the issues are non-technical and subjective” and the debate “is essentially a philosophical-political debate.”⁹²⁰

In contrast, some statutes that require a public interest review provide factors that must be considered by the state water authority when transfers are reviewed. For example, Nebraska’s statutory framework for approving interbasin transfers requires the Natural Resources Director to consider seven factors, including “economic, environmental and other benefits of the proposed interbasin transfer and use,” adverse impacts of the transfer, and alternative sources of water.⁹²¹ The statute declares that transfers in which “the overall benefits to the state and the applicant’s basin are greater than or equal to the adverse impacts to the state and the basin of origin” shall be deemed to be in the public interest.⁹²² Additionally, the order granting or denying the transfer must include a discussion of each of the seven factors.⁹²³ When decision-makers must consider specific factors in a public interest review, there is likely to be more uniformity in resulting transfer decisions. Uniformity among results enables potential transferors and transferees to have “reliable guides for future reallocations” and plan accordingly.⁹²⁴ A reduction of uncertainties within public interest reviews therefore encourages and facilitates transfers.

2.6.C.(iii) Area-of-Origin Protection Statutes

Closely related to general public interest reviews are area-of-origin statutes, whose “general purpose . . . is to assure that water agencies will give some consideration to local public interests when considering appropriation or reallocation applications that will move water out of the area of origin.”⁹²⁵ Several commentators have noted that while many transfers cause little economic harm statewide and may even provide benefits, there are often “significant local and

⁹¹⁵ See *supra* Section 2.6.C.(i) *No Injury Rule*, notes 911-914 and accompanying text. Third parties do not own the rights being considered for transfer, but do bear some of the impacts, such as the surrounding community or the environment.

⁹¹⁶ 2 WATERS & WATER RIGHTS, *supra* note 844, § 14.04(d)(1), at 14-62.

⁹¹⁷ NRC, *supra* note 843, at 59.

⁹¹⁸ S.D. CODIFIED LAWS § 46-2A-12 (2006).

⁹¹⁹ *United States v. Alpine Land & Reservoir Co.*, 341 F.3d 1142, 1181 (9th Cir. Ct. App. 2003).

⁹²⁰ Charles T. Dumars, *Evaluating Judicial Capacity to Determine Public Welfare Values in Water Transfers*, in *MOVING THE WEST’S WATER TO NEW USES*, *supra* note 307, at 17-18.

⁹²¹ NEB. REV. STAT. ANN. § 46-289 (2006).

⁹²² *Id.*

⁹²³ *Id.*

⁹²⁴ 2 WATERS & WATER RIGHTS, *supra* note 844, § 14.04(d)(1), at 14-62.

⁹²⁵ *Id.* § 14.04(d)(2), at 14-63.

regional impacts in the rural communities of the area of origin.”⁹²⁶ Area-of-origin statutes attempt to protect the local community from harmful effects of transfers when the effects for the larger area or the state may be beneficial as a whole. However, one source concludes that “[t]he amount of protection actually provided by these statutes varies greatly from state-to-state and ranges from little more than requiring the water agency to pay some lip service to local concerns to real protection from injury.”⁹²⁷ Depending on the degree of protection afforded by a particular area of origin statute, parties may be dissuaded from entering into transfer transactions if there is likelihood for increased expenditures of money and time due to the operation of the statute, or even denial of the application. Because the areas of origin are often rural or agricultural areas, this issue is discussed further in the section on rural communities below.

2.6.C.(iv) Environmental Effects

Another troublesome third-party impact of water transfers is detrimental environmental effects that can occur when water is transferred and instream flows, return flows, and seepage are reduced. In the past several years, environmental concerns have been raised in response to proposed water transfers across the country. One of the more well known examples of this occurrence is the outcry over the Salton Sea and the harm it would sustain from the Imperial Irrigation District-San Diego County Water Authority transfer agreement that was finalized in 2003. Environmentalists argued that the transfer would increase the salinity of the Salton Sea and result in ecological harm, so the parties were required to undertake mitigation measures.⁹²⁸

Some states prohibit or condition those transfers that have negative environmental effects, such as section 1725 of the California Water Code, which states that temporary transfers shall “not unreasonably affect fish, wildlife, or other instream beneficial uses.”⁹²⁹ In its 1992 report, the National Research Council concluded that “[a]s water is transferred, both the quantity and quality of the water delivered to . . . wetlands are likely to diminish.”⁹³⁰ The report also underscored the economic and other losses associated with insufficient instream flows and stated, “[f]ailure to consider the whole array of instream and environmental consequences may make a transfer proposal seem much more attractive than it would be if all costs were accounted for. This can result in transfers that actually reduce the economic benefits generated by regional water resources.”⁹³¹ The 1997 CBO study identified the “great difficulty” that “environmental uses may have . . . competing in a water market with uses that carry a high economic value, such as municipal and industrial uses.”⁹³²

As explained above, another potential environmental hurdle for water transfers is the Endangered Species Act (ESA). Some transfers may be substantially delayed or even prohibited if they interfere with species habitat protected by the ESA.

⁹²⁶ Charles W. Howe & Jeffrey K. Lazo, *Economic and Social Impacts of Agriculture-to-Urban Water Transfers: The Arkansas Valley of Colorado*, in MOVING THE WEST’S WATER TO NEW USES, *supra* note 920, at 16.

⁹²⁷ 2 WATERS & WATER RIGHTS, *supra* note 844, § 14.04(d)(2), at 14-64.

⁹²⁸ See e.g., Christina Almeida, *Study Outlines Problems in California’s Salton Sea*, Associated Press Financial Wire (May 16, 2006).

⁹²⁹ CAL. WATER CODE § 1725 (2006).

⁹³⁰ NRC, *supra* note 843, at 40.

⁹³¹ *Id.* at 42.

⁹³² CBO Study 1997, *supra* note 861, at 16.

2.6.C.(v) Effects on Rural Communities

Public interest reviews and area-of-origin protection statutes were developed at least partially in response to the concern over the short and long-term effects of transfers on rural and farming communities. Scholars disagree on the significance and even the presence of adverse effects on rural communities. One reason, however, for the disagreement on this issue is because “no consensus exists within our society about the value of these communities.”⁹³³ Additionally, while impacts “may be small in relation to a state’s entire economy, they are significant to area-of-origin residents.”⁹³⁴

For example, one scholar points out that although water transfers from the Arkansas River Valley in Colorado in the 1980s resulted in fewer lost jobs and lost income per acre than previous transfers, the overall negative impacts were larger than previous transfers because the water was taken outside the Arkansas River Valley economic area.⁹³⁵ While transfers can benefit both the rural community exporting the water and the receiving community,⁹³⁶ very often the rural community endures losses that “tend to be concentrated in particular areas and can seriously impair the viability of small, rural communities, which may lack the economic strength and diversity to respond to such rapid changes.”⁹³⁷ The difficulty in protecting rural communities from adverse transfer-related effects stems from a conflict between “an elegiac view of the past”⁹³⁸ which values the rural lifestyle, and the desire to put water to its highest use, enable economic progress, and “allow declining industries and firms to be displaced by growing firms and industries.”⁹³⁹ Because some states place greater value on agriculture and rural communities than others, rural communities and their way of life will receive varying degrees of protection.

2.6.E. Conclusion

As states turn to alternative means of firming and stretching water supplies to meet future needs, transfers will become an increasingly important way to move water to higher valued or more efficient uses. However, traditional western water law imposes barriers on transfers. In addition, states’ efforts to mitigate the negative effects of transfers on third parties and the environment may impose additional barriers. The role of the federal government and relevant

⁹³³ NRC, *supra* note 843, at 34. However, the federal government must consider environmental justice in minority and low-income populations. See Exec. Order No. 12,898 (Feb. 11, 1994) (“Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations”). The concept of environmental justice embraces two principles: (1) fair treatment of people regardless of race, color, nation of origin, or income and (2) meaningful involvement of people in communities potentially affected by program action.

⁹³⁴ *Id.*

⁹³⁵ Charles W. Howe, *Protecting Public Values in a Water Transfer Setting: Improving Water Markets to Increase Economic Efficiency and Equity*, 3 U. DENV. WATER L. REV 357 (2000).

⁹³⁶ See e.g., Michael J. Clinton, *Water Transfers: Can They Protect and Enhance Rural Economies?*, in MOVING THE WEST’S WATER TO NEW USES, *supra* note 920, at 1 (identifying transfers in which the parties and the surrounding communities benefited).

⁹³⁷ NRC, *supra* note 843, at 36.

⁹³⁸ *Id.* at 34.

⁹³⁹ *Id.* at 37.

federal statutes can also impede transfers, particularly in the absence of clear guidance to and cooperation with state governments.

Chapter 2

Section 7

Water Banking

2.7.A. Introduction

Since most, if not all, water in the West is fully appropriated, new mechanisms are being developed to optimize water use. More efficient storage and use of water allows more public benefit from it. One such method is water banking. One source defines water banking as “the ‘deposit’ of a water use entitlement with a person or entity that makes it available for withdrawal by the depositor or another person or entity, either at the same time and place or later in time or at another place.”⁹⁴⁰ Another source asserts that almost every western state utilizes or has proposed the use of some form of water banking to facilitate transfers, store and save unused water for future use, or both.⁹⁴¹ In the Department of Interior’s (DOI) *Water 2025*, the importance of water banks as a tool to meet growing water needs is touted.⁹⁴² The report states, “[w]ater banks and markets are essential to avoiding crises in critical areas of the West.”⁹⁴³

Among the states that have water banks, there are many variations in purpose, structure, and operation. As noted above, water banks can be used to facilitate transfers or to save unused water. Some states have also used water banks as a mechanism to procure water for instream uses in order to comply with ESA requirements or to further other environmental objectives.⁹⁴⁴ A fairly new use of water banking that may become more common in the future is the Oregon COWBank’s use of leased water rights to mitigate the effects and potential third-party impacts of transfers and new groundwater permits. Administration of banks varies as well. Water banks can be administered under a market system by bringing willing buyers and sellers together, or they can be administered with the government or agency storing excess water and setting the price. Another variation is the time during which banks operate. Some water banks only function during years of drought, while others operate continuously. Finally, the duration and nature of the “deposited” water right can vary with the particular banking system and the purpose of the deposit. Some water right deposits are temporary⁹⁴⁵ while others—such as donations to a

⁹⁴⁰ Round Table Associates, *Water Banking in the Yakima River Basin*, ¶ 5, at <http://www.roundtableassociates.com/ywe/ywe.htm>.

⁹⁴¹ Peggy Clifford et al., Wash. Dep’t of Ecology & WestWater Research, LLC, Publication # 04-11-011, *Analysis of Water Banks in the Western States 2* (July 2004).

⁹⁴² U.S. DEP’T OF INTERIOR, *WATER 2025* (May 5, 2003).

⁹⁴³ *Id.* at 16.

⁹⁴⁴ See *infra* 4.1.D.(vi) Water Banking and notes 1515-1527.

⁹⁴⁵ See, e.g., *infra* footnote 960 and accompanying text.

water trust⁹⁴⁶—can be permanent. Because there are so many components to a water bank, states and local water agencies can tailor local, regional, or statewide banks to fit the needs of those they serve.

One common legal obstacle to water banking programs is the possibility of forfeiture or abandonment. One author describes abandonment as “a common law concept” that requires intent to relinquish the water right as well as nonuse.⁹⁴⁷ In contrast, forfeiture is a statutory creation, and if a person owning a water right does not use that right for the amount of time specified in the statute, the right will be forfeited.⁹⁴⁸ Most states have replaced the common law doctrine of abandonment with forfeiture statutes.⁹⁴⁹ Because participation in a water banking program may result in the apparent nonuse of a water right, the creation of a water bank should also include provisions tolling forfeiture or abandonment laws. The statutory framework of each water banking program is discussed below, including amendments to or exemptions from state forfeiture or abandonment law.

2.7.B. Water Banking Programs by State

2.7.B.(i) Arizona

In 1996, the Arizona State Legislature and the governor of Arizona created the Arizona Water Banking Authority (AWBA) as a means to store unused Arizona Colorado River water. The declaration of policy in the governing statutes gives several reasons for the use of the bank, including drought protection, better use of Arizona’s allotment of Colorado River water, guarding against future shortages, implementation of Indian water rights, facilitating water storage by entities that do not have the resources to do so themselves, and assisting California and Nevada in better utilization of their Colorado River water by storing it for them.⁹⁵⁰

The main purpose of the AWBA is not to facilitate transfers among willing buyers and sellers, but rather to store unused water for future needs. The AWBA works in conjunction with the Central Arizona Project (CAP). After other water rights have been fulfilled, any excess water is delivered to the CAP. The AWBA can purchase CAP water and store it in CAP facilities for future use in dry years. The AWBA stores water in underground storage facilities or groundwater savings facilities located in several counties.

As noted above, the AWBA was created in 1996 by statute. Statutes were also passed at that time detailing the specifics of storing Arizona’s Colorado River water, with amendments passed in 1999 that enlarged its capabilities to include storage of effluent, distribution of long-term storage credits, and the ability to perform other banking services.⁹⁵¹ The statutory

⁹⁴⁶ See, e.g., *infra* notes 1021-1025, 1035-1037 (discussing the Oregon and Texas water trusts, respectively).

⁹⁴⁷ Janet C. Neuman, Symposium on Water Law: *Beneficial Use, Waste and Forfeiture: The Inefficient Search for Efficiency in Western Water Use*, 28 ENVTL. L. 919, 929 fn. 52 (1998).

⁹⁴⁸ *Id.*

⁹⁴⁹ *Id.*

⁹⁵⁰ ARIZ. REV. STAT. §45-2401 (2006).

⁹⁵¹ See AWBA, *Background*, ¶ 5, at [http:// www.awba.state.az.us/backgrnd/exec_sum.html](http://www.awba.state.az.us/backgrnd/exec_sum.html) (last visited Sept. 14, 2006).

framework has been amended throughout the years to meet the state's changing needs, including the increasing presence of Indian water rights settlements.⁹⁵²

The AWBA has been very successful in meeting its objectives, specifically, helping Arizona use its full Colorado River entitlement. In 2002, the AWBA recharged approximately 345,000 acre-feet of water and enabled Arizona, for the first time since entering into the Colorado River Compact, to use 2.8 million acre-feet of water.⁹⁵³ Since 1998, the AWBA has recharged an average of 272,000 acre-feet per year⁹⁵⁴ in underground storage facilities or groundwater savings facilities, with a low of 213,000 acre-feet in 2003 and a high of 345,000 acre-feet in 2002. Since 2002, the AWBA has also stored water for the Southern Nevada Water Authority (SNWA), which will help to meet Las Vegas' water needs. Pursuant to a rule promulgated by the Department of the Interior (DOI) that was finalized in late 1999, lower basin states Nevada and California may store Colorado River water for each other.⁹⁵⁵

2.7.B.(ii) California

2.7.B.(ii)(a) Drought Water Banks

Perhaps one of the better known examples of water banking in the western states is the California drought water bank that began in 1991 to address the impact of continuous drought. In response to far-below-average precipitation and water storage levels, Governor Wilson issued Executive Order W-3-91 establishing the Drought Action Team and the Drought Water Bank. California's Department of Water Resources (DWR) administered the bank and obtained water for the state's "extreme critical needs" through voluntary transfers by contracting with sellers who agreed to use groundwater instead of surface water, fallow their agricultural land, or sell rights to water that was being stored in reservoirs.⁹⁵⁶ The DWR entered into 351 contracts that provided over 820,000 acre-feet of water for the state's critical needs.⁹⁵⁷ The DWR then sold the majority of the water to purchasers that were prioritized according to need. The state purchased the remaining water and delivered it to contractors in 1992.⁹⁵⁸

After Governor Wilson issued Executive Order W-3-91 that initially established the Drought Water Bank, the California legislature enacted two emergency bills to streamline the process of transferring water rights. One bill allowed water transfers by a supplier outside of the

⁹⁵² See ARIZ. REV. STAT. § 45-2401 to 45-2491 (2006).

⁹⁵³ AWBA, *Annual Report*, 3-4 (2002) at http://www.awba.state.az.us/pubs/final_report_2002_wo_ten_year_plan.pdf (last visited Sept. 14, 2006).

⁹⁵⁴ This figure was reached by averaging the amounts given in each AWBA yearly report from 1998 through 2004. The reports are available at <http://www.awba.state.az.us/pubs/> (last visited Sept. 14, 2006).

⁹⁵⁵ Bureau of Reclamation (BOR), DOI, *Offstream Storage of Colorado River Water; Development & Release of Intentionally Created Unused Apportionment in the Lower Division States; Final Rule*, 43 CFR pt. 414 (Nov. 1, 1999).

⁹⁵⁶ See Richard Howitt, Nancy Moore, & Rodney T. Smith, A report prepared for the California DWR, *A Retrospective on California's 1991 Emergency Drought Water Bank*, 6, (1992); Clifford et al., *supra* note 941, at 41.

⁹⁵⁷ Clifford et al., *supra* note 941, at 41.

⁹⁵⁸ *Id.* at 42.

supplier's service area,⁹⁵⁹ and the other protected the water rights of transferors by stating that "[n]o temporary transfer . . . shall affect any water rights."⁹⁶⁰

A 1992 report to the DWR concluded that the 1991 Drought Water Bank "generated substantial benefits for both agriculture generally and the state as a whole."⁹⁶¹ Another source asserts that the Drought Water Bank was a success "by virtually all accounts."⁹⁶² In 1992, the California legislature enacted legislation regulating supplier contracts between the water bank and water suppliers.⁹⁶³ This legislation includes a section providing that "[n]o transfer of water pursuant to this article or any other provision of law shall cause a forfeiture, diminution, or impairment of any water rights."⁹⁶⁴ Further, "[a] transfer that is approved pursuant to this article or any other provision of law is deemed to be a beneficial use by the transferor under this code."⁹⁶⁵

2.7.B.(ii)(b) *Dry Year Water Purchase Programs*

In addition to the Drought Water Banks that were operative in the early 1990s, California has another water banking program called the Dry Year Water Purchase Program (DYWPP). These programs were used in 2001 and subsequent years to procure water when precipitation was below normal. Similar to the Drought Water Banks, the DYWPPs enable the DWR to enter into contracts with potential buyers and sellers to buy water to meet demand. In 2001, the DWR secured 138,800 acre-feet of water to alleviate shortages throughout the state. In 2002, it secured 22,000 acre-feet, which was distributed to four water agencies.⁹⁶⁶ The DWR prepared to operate the DYWPP in 2005, but it was unnecessary due to normal amounts of rain. The program continues to exist for use in future dry years.

2.7.B.(ii)(c) *Groundwater Banks*

Local water agencies in California have programs similar to the Arizona Water Banking Authority where water districts operate water banks to store excess groundwater for future use. This type of water banking is also referred to as "conjunctive use," which means the storing of excess surface water underground for use in dry years.⁹⁶⁷ Unlike the drought banks and the dry-year purchase programs, however, groundwater banks in California are administered by local water districts rather than the state. One source states that as of 2005, there were at least twelve conjunctive use groundwater banks in operation in California, with many more on the way.⁹⁶⁸

⁹⁵⁹ 1991 Cal. AB 9; Stats. 1991 ch. 1X; see Clifford et al., *supra* note 941, at 38.

⁹⁶⁰ 1991 Cal. AB 10; Stats. 1991 ch. 2X; see Clifford et al., *supra* note 941, at 38.

⁹⁶¹ Howitt et al., *supra* note 956, at 20.

⁹⁶² Brian E. Gray, *The Market & the Community: Lessons from California's Drought Water Bank*, 1 WEST-NORTHWEST 17, 24 (1994).

⁹⁶³ CAL. WATER CODE § 1745 to 1745.11 (2006).

⁹⁶⁴ *Id.* § 1745.07 (2006).

⁹⁶⁵ *Id.*; see also Brian E. Gray, *The Modern Era in California Water Law*, 45 HASTINGS L.J. 249, 273 (1994).

⁹⁶⁶ California DWR, News Release, *DWR Announces 2003 Dry Year Water Purchase Program*, ¶ 2 (Nov. 15, 2002), at <http://www.oww.water.ca.gov/newsreleases/2002/11-15-02dryyear.doc>.

⁹⁶⁷ Clifford et al., *supra* note 941, at 47.

⁹⁶⁸ *Id.* at 488.

Conjunctive use groundwater banks are seen as an effective means of renewing groundwater sources and promoting comprehensive management strategies of both surface and groundwater.

2.7.B.(iii) Colorado

In 2001, the Colorado General Assembly created a water banking pilot program in the Arkansas River basin scheduled to sunset in July 2007.⁹⁶⁹ Two years later, a bill was introduced that gave each water district the power to request a water bank in its division.⁹⁷⁰ The legislative purposes for developing a water banking program were to simplify transfers, reduce costs, increase information, and give farmers and ranchers the ability to lease their water rights without severing the rights from their land.⁹⁷¹ One source asserts that while water banking itself is new to Colorado since 2001, Colorado has had a statute “on the books” since 1899 that allows temporary, informal water loans, which are the basis of water banking.⁹⁷² In 2005, the legislation governing abandonment of water rights was amended to include a provision that nonuse will not result in abandonment of a water right if the nonuse is due to participation in a water conservation program, a fallowing program, or a water banking program.⁹⁷³

The Arkansas River Basin Water Bank is structured as a “clearinghouse” type of water bank, meaning one in which prices are determined by the market as sellers post available water rights and their asking price, and buyers bid for the opportunity to purchase them.⁹⁷⁴ The original legislation allowed out-of-basin transfers, but there was opposition, so amendments enacted in 2003 prohibited out-of-basin transfers.⁹⁷⁵ One source asserts that water banking in Colorado has been limited, and the Arkansas River Basin Water Bank “has not affected a single transaction.”⁹⁷⁶ The same source concludes that the restriction on out-of-basin transfers “is believed to have limited the interest in the Colorado water banking program.”⁹⁷⁷

2.7.B.(iv) Idaho

Idaho’s water banking system is comprised of a water bank administered by the state as well as rental pools operated by local water districts. The water banking system primarily facilitates voluntary transfers, but it has been adapted in recent years to meet environmental objectives and ESA requirements. Idaho’s water banking system operates under a statutory framework that includes a provision stating that water rights deposited in or rented from the bank are not subject to forfeiture.⁹⁷⁸

⁹⁶⁹ H.B. 01-1354.

⁹⁷⁰ H.R. 03-1318, 64th Gen. Assem., 1st Reg. Sess., sec. 1 (Colo. 2003) (codified as COLO. REV. STAT. § 37-80.5-104.5 (2005)).

⁹⁷¹ COLO. REV. STAT. § 37-80.5-102 (2005).

⁹⁷² Melinda Kassen, *Statutory Expansion of State Agencies’ Authority to Administer & Develop Water Resources in Response to Colorado’s Drought*, 7 U. DENV. WATER L. REV. 47, 57 (2003).

⁹⁷³ COLO. REV. STAT. § 37-92-103(2)(b).

⁹⁷⁴ Clifford et al., *supra* note 941, at 8.

⁹⁷⁵ COLO. REV. STAT. §§ 37-80.5-102, 37-80.5-104.5 (2005); *see* Clifford et al., *supra* note 941, at 56.

⁹⁷⁶ Clifford et al., *supra* note 941, at 56.

⁹⁷⁷ *Id.*

⁹⁷⁸ IDAHO CODE ANN. § 42-1764 (2006).

2.7.B.(iv)(a) *State Water Supply Bank*

Idaho's Water Supply Bank came into existence in 1979 and is the oldest formally established water bank in the western states. Informal water banks have operated in Idaho since the 1930s, but the system was not formalized until 1979. Idaho created a water bank to use its water more efficiently, provide water for new uses, and create a source of funding for improving water system efficiency and facilities.⁹⁷⁹

The Idaho Water Supply Bank (IWSB) operates as a clearinghouse by bringing together willing buyers and sellers of temporary excess water. The IWSB recommends a price—currently \$11 per acre-foot—but sellers are free to ask for more or less.⁹⁸⁰ Ten percent of the lease price is allocated to the IWSB to cover administrative costs and create funds for improvements to the water system.⁹⁸¹ Idaho's water banking system distinguishes between natural flow water and stored water, with the lease and sale of natural flow water governed by the IWSB.⁹⁸² The statutory framework of the IWSB protects water deposited in the bank from forfeiture and states that depositing a water right in the IWSB is a substitution for transfer requirements found elsewhere in the code.⁹⁸³ Although the IWSB was officially established in 1979, activity did not begin until 1995.⁹⁸⁴ The IWSB plays an important role in Idaho's water market and has facilitated transfers that may not have been undertaken otherwise. Since 1995, participation in the bank has, for the most part, grown each year as knowledge of the bank becomes more widespread.

2.7.B.(iv)(b) *Local Rental Pools*

Local water districts administer five rental pools in Idaho. The Idaho Code allows the water resource board to delegate responsibility over stored water to local committees.⁹⁸⁵ Prices for water rights leased or sold in the rental pools do not necessarily reflect market price.⁹⁸⁶ The Bureau of Reclamation (BOR) participates in Idaho rental pools and leases stored water for environmental purposes.⁹⁸⁷ The Lemhi River Rental Pool (LRRP) was created in 2001 to increase instream flows in order to aid downstream salmon recovery efforts. Because the state's minimum flow requirement is subordinate to other senior existing water rights, the LRRP was developed as a mechanism to meet the critical flow level established by the National Marine Fisheries Service (NMFS) and avoid regulatory action.⁹⁸⁸ The LRRP is the only rental pool that can lease natural flow water rights, which it procures from farmers or other landowners and

⁹⁷⁹ *Id.* § 42-1761.

⁹⁸⁰ Clifford et al., *supra* note 941, at 64.

⁹⁸¹ *Id.*

⁹⁸² Idaho Water Resource Board (IWRB), *Idaho Water Supply Bank: Purpose*, ¶¶ 4-5 (2006), at <http://www.idwr.idaho.gov/waterboard/water%20bank/waterbank.htm> (last visited Sept. 14, 2006).

⁹⁸³ IDAHO CODE ANN. § 42-1764.

⁹⁸⁴ Clifford et al., *supra* note 941, at 64.

⁹⁸⁵ IDAHO CODE ANN. § 42-1765.

⁹⁸⁶ Clifford et al., *supra* note 941, at 68.

⁹⁸⁷ IDAHO CODE ANN. § 42-1763B(2).

⁹⁸⁸ Clifford et al., *supra* note 941, at 72-73.

leases to BOR.⁹⁸⁹ Idaho and BOR have used the LRRP to obtain water for fish that are on the ESA list.⁹⁹⁰

2.7.B.(iv)(c) *Shoshone-Bannock Water Bank*

The Shoshone-Bannock Water Bank was created by the Shoshone-Bannock Tribe in 1994 pursuant to a 1990 settlement agreement approved by Congress. In contrast to both the IWSB and the rental pools, the Shoshone-Bannock Water Bank recognizes instream flows as a beneficial use.⁹⁹¹ The tribe rents its water to willing lessees, and Fort Hall Reservation water users have a first right to rent any water deposited in the bank by the tribe.⁹⁹² Activity in the tribal water bank has been low, with only one completed transaction.⁹⁹³

2.7.B.(v) Kansas

In 2001, Kansas adopted legislation authorizing two pilot water banks.⁹⁹⁴ Included in the legislation is a section providing that depositing a water right in the bank for rental purposes or in a safe deposit account “shall constitute due and sufficient cause” under the abandonment statute, thereby precluding a finding of abandonment when water is deposited in the bank.⁹⁹⁵ In accordance with the legislation, rules have also been promulgated detailing the specifics on the workings of the bank.⁹⁹⁶ The Central Kansas Water Bank, a groundwater bank, was authorized in August 2005 and functions as a clearinghouse water bank, bringing together willing buyers and sellers. The state started the water banking program to promote efficient use and save excess water for future needs.⁹⁹⁷ Of the water that is deposited in the bank, 10% must remain in the bank, and water may only be leased to those who can draw it from the same aquifer or groundwater.⁹⁹⁸ In addition to making transfers easier, the Central Kansas Water Bank will offer “safe deposit accounts.” These accounts make it possible for a holder of water rights to deposit unused water rights in the bank during a year of excess in order to use them in a year of need.⁹⁹⁹ Because the program is still in its infancy, there is no data on its effectiveness.

2.7.B.(vi) Montana

In the Fort Belknap-Montana Compact that was entered into in 2001, Article IV(C)(8) establishes the Milk River Water Bank that is only to be implemented in “years of significant

⁹⁸⁹ *Id.* at 73.

⁹⁹⁰ See *infra* note 1420 and accompanying text. See also Chad Shattuck, Report Compiled by Western States Water Council (WSWC), *State “Tools” to Provide Water for Endangered Species*, 26 (2003) (on file with WSWC).

⁹⁹¹ IDAHO ADMIN. CODE, IDAPA 37.02.04.010.05 (2005).

⁹⁹² Clifford et al., *supra* note 941, at 75.

⁹⁹³ *Id.*

⁹⁹⁴ KAN. STAT. ANN. §§ 82a-761 to 82a-773 (2006).

⁹⁹⁵ *Id.* § 82a-768.

⁹⁹⁶ KAN. ADMIN. REGS. 5-17-1 to 18 (effective Aug. 2004).

⁹⁹⁷ U.S. Water News Online, *Kansas starts pilot program on water banking*, ¶ 1 (Aug. 2005), at <http://www.uswaternews.com/archives/arconserv/5kansstar8.html> (last visited Sept. 14, 2006).

⁹⁹⁸ *Id.* at ¶¶ 7-8.

⁹⁹⁹ *Id.* at ¶ 9.

short term water storage.”¹⁰⁰⁰ The bank is activated when the Bureau of Reclamation (BOR) informs any of the governing entities that deliveries will be restricted due to a critical water shortage caused by temporary delivery system outage, requirements for fish or wildlife of special concern, or low precipitation.¹⁰⁰¹ Once the BOR notifies the governing bodies, the Milk River Coordinating Committee (MRCC) publishes notices in local newspapers of the availability of grants to purchase water rights to alleviate shortages.¹⁰⁰² Once it acquires water from voluntary transfers, the MRCC can store the water, market or allocate it to alleviate shortages, or use it for critical environmental, water quality, or irrigation needs.¹⁰⁰³ However, the MRCC has not yet been formed, and no water banking has taken place in the Milk River Basin. Although water banking has been discussed in Montana, no additional water banking programs have been formed to date.

2.7.B.(vii) Nevada

As discussed above, the Southern Nevada Water Authority (SNWA) has entered into an agreement with the Arizona Water Banking Authority (AWBA) in which the AWBA stores water for the SNWA in its underground storage facilities or groundwater savings facilities. When Nevada’s Colorado River water is stored by the AWBA, the SNWA receives credits for the stored water. Then, when the SNWA wants to redeem or use those credits, it simply extracts that quantity of Arizona’s Colorado River water from Lake Mead, and Arizona extracts the same quantity from its Water Bank storage facilities.¹⁰⁰⁴

In addition to its interstate water bank system, Nevada’s Truckee Meadows Water Authority manages its groundwater rights as a bank pursuant to an order from the State Engineer. However, this is not the type of ‘water bank’ that has been discussed in the context of the other states. The Truckee Meadows Water Authority manages its groundwater as a bank simply to the extent that in some years it is allowed to extract more than its permitted allotment based on other years in which it extracts less than its permitted allotment.¹⁰⁰⁵ Current information is lacking, but one would assume that this system would allow for more efficient groundwater use, with more water available in dry years because of “credits” from wetter years.

2.7.B.(viii) New Mexico

In 2002, legislation was passed by the New Mexico legislature ordering the Interstate Stream Commission (ISC) to propose rules governing a water bank.¹⁰⁰⁶ The legislation identifies the facilitation of compliance with the Pecos River Compact as the impetus for a pilot water banking program in the lower Pecos River Basin.¹⁰⁰⁷ Laws were passed in 2003 that would have

¹⁰⁰⁰ MONT. CODE ANN. § 85-20-1001 (2005).

¹⁰⁰¹ *Id.* Art. IV(C)(8)(a).

¹⁰⁰² *Id.* Art. IV(C)(8)(b).

¹⁰⁰³ *Id.* Art. IV(C)(8)(d).

¹⁰⁰⁴ SNWA, *Arizona Water Bank*, ¶¶ 9-10 (2006), at http://www.snwa.com/html/wr_colrvr_azbank.html (last visited Sept. 14, 2006).

¹⁰⁰⁵ R. Michael Turnipseed, State Engineer, State of Nevada, Order 1161, *Groundwater Banking Order: Truckee Meadows Groundwater Basin*, ¶ 3 (May 16, 2000); see Clifford et al., *supra* note 941, at 85.

¹⁰⁰⁶ N.M. STAT. ANN. § 72-1-2.3(B) (2006).

¹⁰⁰⁷ *Id.* § 72-1-2.3(A), -(C).

repealed the pilot program, but the 2003 laws were repealed in 2005.¹⁰⁰⁸ Therefore, the legislation is still in effect. In the rules and regulations proposed by the ISC to govern the water bank, the water bank will only become operative if the governor issues a priority call that causes certain water rights to be curtailed. However, the rules and regulations have not yet been promulgated by the State Engineer.¹⁰⁰⁹

2.7.B.(ix) Oregon

In the past several years, Oregon's water banking programs have mainly been developed to provide water for instream flows and environmental objectives. One tool that aids in Oregon's pursuit of greater instream flows is a statute providing that the use of a water right under a temporary transfer order does not apply toward forfeiture of that right.¹⁰¹⁰

2.7.B.(ix)(a) Central Oregon Water Bank

The Deschutes Water Alliance was created in 2004 by the Deschutes River Conservancy and local irrigation districts, tribes, and cities. The Alliance made a grant proposal in 2004 under the Department of Interior's (DOI) Water 2025 program to establish a water banking pilot project.¹⁰¹¹ The goals of the program are to "increase carryover storage, provide enhanced protection during periods of drought, improve reliability of water supply for the various uses in the basin and improve stream flow and water quality."¹⁰¹² The Central Oregon Water Bank (COWBank) enables the basin to meet these goals by "facilitat[ing] short-term, long-term and permanent reallocation of existing water rights on a willing buyer, willing seller basis."¹⁰¹³

The COWBank (formerly operating as the Deschutes Water Exchange) has been responsible for administering a state-chartered groundwater mitigation bank, in which people seeking new groundwater permits must mitigate the effects of their proposed use on surface water by temporarily or permanently reducing another use of water. One way applicants may mitigate their proposed use is to buy temporary groundwater mitigation credits from the bank, which are acquired through the COWBank's leasing program.¹⁰¹⁴ Under the leasing program, participants donate or lease their water rights to be used as instream flow rights, which can then be used to mitigate the effects of new groundwater withdrawals.¹⁰¹⁵ Since its inception in 2003, the groundwater mitigation bank has sold an increasing number of groundwater mitigation credits each year. In 2006, 762 credits were sold to applicants, and it is estimated that approximately 1,183 credits will be sold in 2007.¹⁰¹⁶ The leasing program of the COWBank has

¹⁰⁰⁸ S.B. 800 (2005 Regular Session); repealing Laws 2003, ch. 54, § 3, and Laws 2003, ch. 132, § 3.

¹⁰⁰⁹ E-mail correspondence with Dr. Bhasker Rao, Pecos River Basin Manger, New Mexico Interstate Stream Commission, June 9, 2006.

¹⁰¹⁰ OR. REV. STAT. § 540.523(4) (2006).

¹⁰¹¹ See Deschutes Water Alliance, *A Proposal to the Bureau of Reclamation for Water 2025 Challenge Grant Program* (2004), at <http://www.swalley.com/DWA.pdf> (last visited Sept. 14, 2006).

¹⁰¹² *Id.* at 4.

¹⁰¹³ Bruce Aylward, Deschutes River Conservancy, Preliminary Draft, *Central Oregon Water Bank (COWBank): Origins, Objectives and Activities*, 3 (June 2006).

¹⁰¹⁴ *Id.* at 15.

¹⁰¹⁵ *Id.*

¹⁰¹⁶ *Id.*

also been successful in obtaining water rights for instream flows. The number of participants and the volume of water leased have increased since the leasing program began in 1998.¹⁰¹⁷

In addition to the groundwater mitigation and leasing programs, the COWBank enables irrigation districts to permanently acquire water rights from landowners that can then be transferred to new users through its Reserves Program.¹⁰¹⁸ The COWBank also attempts to lessen the detrimental third-party effects of ag-to-urban transfers by enabling irrigation districts to impose exit fees on water that is transferred away from the district.¹⁰¹⁹ The exit fees are imposed to protect “the financial health of the irrigation districts” and thus “prevent harm to remaining patrons.”¹⁰²⁰

2.7.B.(ix)(b) *Oregon Water Trust*

The Oregon Water Trust (OWT) is a non-profit organization whose objective is to lease or buy water rights for instream flows to benefit fisheries and aquatic ecosystems. The OWT was established to combat depleted streamflows “by using cooperative free-market solutions.”¹⁰²¹ The OWT functions under legislation passed in 1987 that recognizes instream uses as a beneficial use and allows for the lease or sale of water rights to be converted to instream flow rights.¹⁰²² Since it was founded in 1993, the OWT has entered into agreements with over 300 landowners to transfer their consumptive water rights to instream uses.¹⁰²³ Holders of water rights can sell, lease, or donate their water rights to the OWT, which then converts the rights to instream water rights and transfers the rights to the state to be held in trust.¹⁰²⁴ As of 2005, the OWT had transferred nearly 150 cubic feet per second to instream flows from a combination of short and long-term transactions across the state.¹⁰²⁵

2.7.B.(ix)(c) *Bureau of Reclamation Klamath Basin Water Bank*

In addition to the water banking programs administered by Oregon, the BOR administers the Klamath Basin Water Bank (KBWB) in order to meet instream flow levels required by a 2002 Biological Opinion by the National Marine Fisheries Service (NMFS).¹⁰²⁶ The Klamath Basin covers southern Oregon and northern California. The KBWB is described by one source as an “acquisition bank,” or one in which “water is purchased by a single buyer from multiple

¹⁰¹⁷ *Id.* at 13.

¹⁰¹⁸ *Id.* at 15.

¹⁰¹⁹ *Id.* at 18.

¹⁰²⁰ *Id.*

¹⁰²¹ OWT, *2005 Annual Report*, ii (2005), at <http://www.owt.org> (last visited Sept. 14, 2006).

¹⁰²² OR. REV. STAT. §§ 537.334(1), 537.348(1) (2005); see also Janet C. Neuman, *The Good, the Bad, and the Ugly: The First Ten Years of the Oregon Water Trust*, 83 NEB. L. REV. 432, 438 (2004).

¹⁰²³ OWT, *supra* note 1021, at 1.

¹⁰²⁴ Mary Ann King, Recent Development: *Getting Our Feet Wet: An Introduction to Water Trusts*, 28 HARV. ENVTL. L. REV. 495, 506 (2004).

¹⁰²⁵ OWT, *supra* note 1021, at 4.

¹⁰²⁶ BOR, Department of Interior, *Klamath Basin Pilot Water Bank*, ¶ 1 (2006), at http://www.usbr.gov/mp/kbao/pilot_water_bank/index.html (last visited Sept. 14, 2006).

sellers for a specific use.”¹⁰²⁷ In this case, BOR buys water from farmers and other landowners to raise instream flow levels and meet the requirements imposed by NOAA-Fisheries and the ESA.¹⁰²⁸ Participants in the bank must either leave their land fallow or meet water needs through groundwater substitution.¹⁰²⁹ The KBWB has enabled BOR to meet its instream flow obligations and enhance stream habitats from 2002 through 2004.¹⁰³⁰ However, “there is uncertainty regarding the extent of [the bank’s] impacts on river diversions and groundwater use,” especially since the bank’s reliance on groundwater as a substitute for BOR irrigation water seems to have impacted groundwater levels in nearby aquifers.¹⁰³¹

2.7.B.(x) Texas

2.7.B.(x)(a) Texas Water Bank

The Texas Water Bank (TWB) was established in 1993 to facilitate voluntary transfers of water rights to provide adequate water supplies for Texas.¹⁰³² The TWB is structured as a clearinghouse, bringing together willing buyers and sellers. The statutory framework provides that water deposited in the bank is not subject to cancellation for nonuse under the cancellation statute.¹⁰³³ In addition to the statutory framework governing the TWB, administrative rules were adopted by the Texas Water Development Board (TWDB) that detail the requirements for participation in the Water Bank.¹⁰³⁴ Participation in the TWB has been limited, partly because many parties are already entering voluntary water transactions independent of the bank.

2.7.B.(x)(b) Texas Water Trust

In 1997, the Texas Water Trust was established within the Texas Water Bank to acquire water rights dedicated to environmental needs.¹⁰³⁵ These environmental needs include instream flows, fish and wildlife habitat, water quality, or bay and estuary inflows.¹⁰³⁶ The water rights placed in the Trust can be donated, leased, or sold, and they may be held in perpetuity or for a term specified in the contract. However, since its inception, only two deposits have been made to the Trust.¹⁰³⁷

¹⁰²⁷ U.S. Geological Survey, *Assessment of the Klamath Project Pilot Water Bank: A Review from a Hydrologic Perspective*, 9 (2005), at http://www.usbr.gov/mp/kbao/docs/Final_USGS_Assessment_of_Water_Bank.pdf (last visited Sept. 14, 2006).

¹⁰²⁸ BOR, *supra* note 1026, at ¶ 5.

¹⁰²⁹ *Id.* at ¶ 6.

¹⁰³⁰ See U.S. Government Accountability Office (GAO), Report to Congressional Requesters, No. GAO-05-283, *Klamath River Basin* (2005).

¹⁰³¹ *Id.* at 6.

¹⁰³² TEX. WATER CODE § 15.702 (2005).

¹⁰³³ *Id.* § 15.704.

¹⁰³⁴ 31 TEX. ADMIN. CODE § 359.1 to 359.13 (LexisNexis 2008).

¹⁰³⁵ TEX. WATER CODE § 15.7031(a).

¹⁰³⁶ *Id.*

¹⁰³⁷ See Clifford et al., *supra* note 941, at 118; TWDB, *Texas Water Trust: Water Trust Deposits*, at <http://www.twdb.state.tx.us/assistance/WaterBank/wtrust.asp> (last visited Mar. 31, 2008).

2.7.B.(x)(c) *Edwards Aquifer Authority Groundwater Trust*

The Edwards Aquifer Authority (EAA) issues permits for withdrawals from the Edwards Aquifer. The EAA Groundwater Trust is structured as a clearinghouse to bring together willing buyers and sellers of groundwater rights.¹⁰³⁸ Permits issued by the EAA can be transferred within the boundaries of the aquifer. Potential sellers submit an information sheet to the EAA, who then posts the offering to inform potential buyers. However, one source reports that the trust has not facilitated any transfers, but acts “more like a bulletin board service” between buyers and sellers.¹⁰³⁹

2.7.B.(xi) Washington

2.7.B.(xi)(a) *Yakima River Basin Water Exchange*

Similar to the California Drought Water Banks, Washington’s water banking program in the Yakima Basin grew out of drought. In 1994, Congress passed phase two of the Yakima River Basin Water Enhancement Project, designed to remedy the severe decrease in the number of fish and stabilize the water for irrigation during drought.¹⁰⁴⁰ The legislation attempted to do this by making water supply more flexible, and it recommended consideration of water transfers and water banking.¹⁰⁴¹

In 2001, state and federal government agencies in Washington acted on the recommendations of the federal legislation and created a temporary transfer program—the Yakima Basin Water Transfer Program—to alleviate the severe drought conditions.¹⁰⁴² Although it was not developed as a ‘water bank,’ it accomplished many of the same objectives, namely, to facilitate and expedite temporary water transfers.¹⁰⁴³ At the same time the transfer program began, legislation was passed that exempted from relinquishment those water rights that are converted into trust water rights and transferred water rights that are put to beneficial use.¹⁰⁴⁴ In 2003, the Washington legislature amended the Trust Water Rights program to include its use in the Yakima River basin for water banking purposes.¹⁰⁴⁵ However, in contrast to the type of water banks utilized by Arizona and others, the legislation explicitly stated that water banking could not be used to allow carryover of stored water from one year to another year.¹⁰⁴⁶

In conjunction with this legislation, the Washington Department of Ecology was asked to do a report on water banking in Washington.¹⁰⁴⁷ The report concluded that water banking in the Yakima Basin would enable the Department of Ecology to increase and protect instream flows

¹⁰³⁸ Clifford et al., *supra* note 941, at 119.

¹⁰³⁹ *Id.*

¹⁰⁴⁰ P.L. 103-434, Title XII (1994); see Peggy Clifford, Wash. Dep’t of Ecology, 2004 Report to the Legislature, Publication No. 04-11-030, *Water Banking in Washington*, 2 (2004).

¹⁰⁴¹ Clifford, *supra* note 1040, at 2.

¹⁰⁴² Clifford et al., *supra* note 941, at 126-27.

¹⁰⁴³ *Id.* at 127.

¹⁰⁴⁴ REV. CODE WASH. § 90.14.140 (2006).

¹⁰⁴⁵ *Id.* § 90.42.100.

¹⁰⁴⁶ *Id.* § 90.42.100(3)(d).

¹⁰⁴⁷ Round Table Associates, *supra* note 940, at ¶ 4.

for fish and wildlife and provide water for new and existing off-stream uses.¹⁰⁴⁸ The report also highlighted the ability of a water bank to facilitate transfers and act as a clearinghouse to willing sellers and buyers.¹⁰⁴⁹ The department submitted its report to the legislature in December 2004, but no action has yet been taken on establishing legislation for water banking or implementing it throughout the state.

2.7.B.(xi)(b) *Salmon Creek Water Lease Bank*

The Washington Water Trust (WWT), a non-profit organization dedicated to streamflow restoration, began the Salmon Creek Water Lease Bank in 2000 as a way to increase instream flows to benefit fish populations. The WWT negotiated with the Okanogan Irrigation District to set the price for which water would be leased, and then interested members of the district were able to lease their water to the WWT if they so desired.¹⁰⁵⁰ In 2002, the program was able to obtain 1,900 acre-feet of water for instream flows.¹⁰⁵¹

2.7.C. Conclusion

As the financial and environmental constraints for procuring new water sources continue to grow, water banking will grow in importance as a potentially less costly and more environmentally friendly means to procure water. However, the success of a particular water bank will depend on many factors, including knowledge and acceptance of the bank, the social and political climate in which the bank operates, the regulatory framework supporting the bank, and its specific operative details. While there may be institutional and legal constraints to water banking that are specific to a particular region, most states have addressed the traditional legal constraints of forfeiture and abandonment on temporary transfers and water banking. As states continue to experiment with water banks, they will be able to form banking systems that serve the needs of the regions in which they are located, whether those needs are more efficient allocation of water, specific environmental standards and goals, or a combination of both.

¹⁰⁴⁸ Clifford, *supra* note 1040, at 8.

¹⁰⁴⁹ *Id.* at 9.

¹⁰⁵⁰ Clifford et al., *supra* note 941, at 131.

¹⁰⁵¹ *Id.* at 132.

Chapter 2

Section 8

Rotating Fallowing and Dry Year Leasing

2.8.A. Introduction

Traditionally, both rotating fallowing and dry year leasing have been prohibited by the prior appropriation doctrine, which confines a water user to the original quantity, place of diversion and use specified in the original appropriative permit or decree. Moreover, under the “use it or lose it” principle, a water user’s failure to put their entire water right to beneficial use, even for a short period of time, may result either in the forfeiture or abandonment of that water right. However, several states have altered the traditional doctrine through statute, permitting individual irrigators within a group of irrigators to fallow a percentage of their fields on a yearly basis, with no single irrigator permanently retiring his fields (rotating fallowing). Additionally, some states have statutorily authorized water users to contract for use of another’s water right during drought years (dry year leasing).

Fallowing, where a farmer does not irrigate a field he would normally apply water to, is one of the basic ways water can be freed up for transfer.¹⁰⁵² However, the permanent fallowing of fields, like the permanent transfer of water, can have a devastating effect on local communities.¹⁰⁵³ Traditionally, however, once a field is fallowed and the water sold, the water is sold and the land fallowed forever (unless, of course, the farmer purchases a new water right or transfers an existing water right back to that field). However, a new concept, referred to as rotating fallowing, revolving fallowing, or rotational crop management, may offer a solution. Rotating fallowing refers to the temporary fallowing of irrigated fields, on a rotating basis. In this manner, agricultural water can be freed up for sale, without permanently retiring farmland and devastating local communities. In an attempt to free up agricultural water for transfer and minimize the effects on local communities, water agencies in a few states, including California, Colorado, and Kansas have adopted rotating fallowing programs.

Another concept that is similar to rotating fallowing, although relegated to drought years, is dry year leasing. A dry year lease is a contract between a governmental entity or public corporation and another water user for use of their water right during drought years, contingent

¹⁰⁵² See e.g. California Dep’t of Water Res., *Water Transfers in California* (Nov. 1993), <http://www.swpao.water.ca.gov/transfers/> (last visited October 22, 2006).

¹⁰⁵³ See *supra* Chapter 2, Section 6. *Water Right Transfers*.

either upon the governor or a water agency's declaration of a drought.¹⁰⁵⁴ Two examples of dry year leasing programs are California's Dry Year Water Purchase Program and Oregon's dry year option or agreement program.¹⁰⁵⁵

2.8.B. California

California has both rotating fallowing and dry year leasing programs. One example of a rotating fallowing program is the Palo Verde Irrigation District (PVID) program. The Metropolitan Water District of Southern California (Metropolitan) and the PVID agreed to a thirty-five year land fallowing, crop rotation and water supply program.¹⁰⁵⁶ The program will help California meet its water needs and reduce the state's use of Colorado River water to its basic apportionment of 4.4 million acre-feet per year.¹⁰⁵⁷ This program is particularly important because Palo Verde Valley has one of the oldest water rights on the Colorado River.¹⁰⁵⁸

Under the agreement, Palo Verde farmers refrain from irrigating lands upon Metropolitan's request.¹⁰⁵⁹ Lands that are not irrigated remain fallow. The agreement limits the amount of farmland that can be fallowed to twenty eight percent, or 25,947 acres.¹⁰⁶⁰ Fallowed lands are maintained with accepted soil and water management plans and rotated every one to five years. Water that would have been used for irrigation is made available to urban Southern California.¹⁰⁶¹ In exchange, participating farmers receive financial compensation. Participants receive a one-time signup payment equal to \$3,170 per enrolled acre and \$602 annually per acre, adjusted upward for inflation.¹⁰⁶² The program improves flexibility because it enables Metropolitan to acquire water when needed.¹⁰⁶³

The PVID program is considered to be mutually beneficial because it provides money to the Palo Verde Valley economy while simultaneously improving the flexibility, affordability, and reliability of municipal supplies to Southern Californians.¹⁰⁶⁴ Farmers can use the steady flow of income on farm-related investments, purchases and debt repayment.¹⁰⁶⁵ Furthermore,

¹⁰⁵⁴ See e.g. OR. REV. STAT. § 536.720 – 536.780 (2006); OR. ADMIN. R. 690-019-0080 (2006).

¹⁰⁵⁵ California Dep't of Water Res. (DWR), News Release, *DWR Announces 2003 Dry Year Water Purchase Program*, ¶ 2 (Nov. 15, 2002), at <http://wwwowe.water.ca.gov/newsreleases/2002/11-15-02dryyear.doc> (last visited October 23, 2006); Oregon Water Resources Dep't (WRD), *Drought Watch*, http://www.wrd.state.or.us/OWRD/WR/drought_overview.shtml#Water_Resources__Role (last visited October 23, 2006).

¹⁰⁵⁶ Metro. Water Dist. of S. Cal., *Palo Verde Land Management, Crop Rotation and Water Supply Program*, at <http://www.mwdh2o.com/mwdh2o/pages/news/news01.html>. (then follow "Palo Verde Fact Sheet" hyperlink) (last visited Mar. 10, 2008). The anticipated duration of the program will extend from January 1, 2005 until July 31, 2040.

¹⁰⁵⁷ *Id.*

¹⁰⁵⁸ *Id.* The Palo Verde Valley filed its water right claim in 1877.

¹⁰⁵⁹ *Id.*

¹⁰⁶⁰ *Id.*

¹⁰⁶¹ *Id.*

¹⁰⁶² *Id.* Metropolitan also makes \$6 million available for investment in local community improvement programs.

¹⁰⁶³ *Id.*

¹⁰⁶⁴ *Id.*

¹⁰⁶⁵ *Id.*

agricultural users retain their water rights and fallowing preserves prime agricultural lands.¹⁰⁶⁶ Fallowing can also improve crop yields once lands are placed back into production.

In addition to the rotating fallowing program, California has a dry year leasing program called the Dry Year Water Purchase Program (DYWPP). This program was used in 2001-2003 to procure water for California's water banks when precipitation was below normal. The DYWPPs enabled the California Department of Water Resources (DWR) to enter into contracts with potential buyers and sellers in order to buy water to meet demand. In 2001, the DWR secured 138,800 acre-feet of water to alleviate shortages throughout the state. In 2002, it secured 22,500 acre-feet, which was distributed to four water agencies throughout the state.¹⁰⁶⁷ The quantities for 2003 and 2004 totaled 11,355 acre-feet and 535 acre-feet, respectively.¹⁰⁶⁸ The DWR prepared to operate the DYWPP in 2005, but it was unnecessary due to normal amounts of rain. The program continues to exist for use in future dry years.

2.8.C. Colorado

Colorado recently authorized water judges to approve rotating fallowing agreements, termed "rotational crop management contracts," in order to free up water for sale to cities without permanently retiring farmland and reeking havoc on local economies.¹⁰⁶⁹ Pursuant to the new law, an owner or groups of owners of irrigation water rights may enter into a rotational crop management contract, fallowing their historically irrigated lands on a rotating basis.¹⁰⁷⁰ A water judge "shall" approve a rotational crop management contract, as long as no other user is injured.¹⁰⁷¹ Furthermore, a party to a rotational crop management contract will not lose their historical consumptive use if they fail to use the full amount of water decreed for rotational land use.¹⁰⁷²

Before the Colorado Legislature authorized rotational crop management contracts, it was an all or nothing situation for farmers.¹⁰⁷³ They could either permanently retire their farmland and sell the attached water right, or continue their historical use.¹⁰⁷⁴ As a result, between 1997 and 2002, around 1.2 million acres of farmland were permanently retired in Colorado.¹⁰⁷⁵ It is hoped that rotational crop management contracts will facilitate the sale of agricultural water to growing municipalities without causing the massive retirement of agricultural land that occurred during those years.

¹⁰⁶⁶ *Id.*

¹⁰⁶⁷ California DWR, News Release, *DWR Announces 2003 Dry Year Water Purchase Program*, ¶ 2 (Nov. 15, 2002), <http://www.water.ca.gov/newsreleases/2002/11-15-02dryyear.doc>.

¹⁰⁶⁸ E-mail from Jeanine Jones, Interstate Res. Manager, Cal. Dep't of Water Res., to Craig Bell, Executive Dir., W. States Water Council (Dec. 5, 2007, 14:47 MST) (on file with authors).

¹⁰⁶⁹ H.R. 1124, 65th Gen. Assem., Reg. Sess. (Colo. 2006) (enacted); *See e.g.* Joey Bunch, *Bill Makes Water a Cash Crop*, DENV. POST., Jan. 17, 2006, http://www.denverpost.com/news/ci_3409075 (last visited Oct. 20, 2006).

¹⁰⁷⁰ COLO. REV. STAT. §37-92-103(10.6) (2006).

¹⁰⁷¹ *Id.* § 37-92-305(3).

¹⁰⁷² *Id.* § 37-92-305(3)(IV).

¹⁰⁷³ *See e.g.* Joey Bunch, *Bill Makes Water a Cash Crop*, DENV. POST., Jan. 17, 2006, http://www.denverpost.com/news/ci_3409075 (last visited October 20, 2006).

¹⁰⁷⁴ *See id.*

¹⁰⁷⁵ *See id.*

2.8.D. Kansas

Kansas also authorizes a form of rotating fallowing, but of water use rather than land.¹⁰⁷⁶ Specifically, Kansas allows water users who receive their water from a “canal, ditch, conduit or reservoir, or any lateral or distributing conduit,” to contract in writing for the rotation of water, provided they do not thereby injure other users.¹⁰⁷⁷ A copy of a rotation contract must be delivered to the “superintendent of the ditch, conduit, reservoir, or lateral,” who in turn delivers water pursuant to the contractual terms.¹⁰⁷⁸ Contracts for more than a year must be recorded in “the office of the register of deeds,” in the county where the “head gate” is located.¹⁰⁷⁹ Deliveries pursuant to the contract must cease if another user is injured.¹⁰⁸⁰ A complaint of injury must be filed with the judge of the county district court, and reasonable notice of the complaint must be given to all parties to the contract.¹⁰⁸¹

2.8.E. Oregon

To facilitate water transfers during drought conditions, Oregon has statutorily empowered the Water Resources Department (Water Resources) to authorize dry year leasing agreements.¹⁰⁸² Dry year leases permit a governmental entity or public corporation to contract with another user for use of their water right during drought years.¹⁰⁸³ Dry year leases allow institutions to better prepare for water shortages and quickly transfer water pursuant to the agreement when drought occurs.¹⁰⁸⁴ Given that temporary transfers normally take Water Resources two to three years to process, provided no objections are made,¹⁰⁸⁵ dry year leases infuse considerable flexibility into Oregon water management. Additionally, the Water Resources Commission is authorized by Oregon statute to enter into dry year leases to provide water for instream values.¹⁰⁸⁶

2.8.F. Conclusion

¹⁰⁷⁶ KAN. STAT. ANN. §§ 42-341 – 347 (2006); KAN. ADMIN. REGS. § 5-5-11 (2006). The statutes and regulation do not require land that is not currently irrigated to be fallowed. On the non-irrigated cycles, land can be dryland farmed or, in the case of land watered by ditch rights, it could be irrigated from another lawful source (e.g., an appropriation right). What is being rotated is the use of water for irrigation within the authorized place of use, not fallowing of the land. It is also worth noting that relatively few irrigators use this type of rotation: of 26,829 active irrigation water rights, only 115 (0.4%) are authorized for rotation under KAN. ADMIN. REGS. section 5-5-11. A slightly more popular approach is the 5-year allocation (also addressed in KAN. ADMIN. REGS. section 5-5-11), which is more flexible than rotation. At present 150 irrigation water rights (0.6%) use the 5-year allocation approach.

¹⁰⁷⁷ KAN. STAT. ANN. § 42-341.

¹⁰⁷⁸ *Id.* § 42-343.

¹⁰⁷⁹ *Id.* § 42-347.

¹⁰⁸⁰ *Id.* § 42-344.

¹⁰⁸¹ *Id.* § 42-344.

¹⁰⁸² Or. WRD, *Drought Watch: Water Resources' Role*, http://www.wrd.state.or.us/OWRD/WR/drought_overview.shtml (last visited June 21, 2006).

¹⁰⁸³ *Id.*

¹⁰⁸⁴ *Id.*

¹⁰⁸⁵ Or. WRD, *Water Right Transfers and Real Property Transactions* 3-4 (2006), www1.wrd.state.or.us/pdfs/Transfer-PropertyTransactions.pdf (last visited October 23, 2006).

¹⁰⁸⁶ Or. WRD, *Drought Watch: Water Resources' Role*, http://www.wrd.state.or.us/OWRD/WR/drought_overview.shtml (last visited June 21, 2006).

In sum, both rotating fallowing and dry year leasing are tools that provide water for transfer. Dry year leasing is effective at providing water for the highest uses during drought, as evidenced by California's Dry Year Water Purchase Program. On the other hand, rotating fallowing is not contingent upon drought conditions, and offers the possibility of freeing up a percentage of the water used by agriculture, without destroying local communities and permanently retiring farmland. However, many of the issues presented by water conservation and water transfers, such as injury to other users, may still arise as a result of rotating fallowing. Moreover, because only a small number of states have implemented the practice, two very recently, and there is relatively little information on rotating fallowing available, long term successes remain uncertain.

Chapter 2

Section 9

Desalination

2.9.A. Introduction

Experts disagree on the role desalination can and will play in meeting societal water needs in the future. For example, at least one commentator posits that desalination will not be a major means of procuring water internationally in the future due to its high costs.¹⁰⁸⁷ Another source conjectures that desalination will “contribute significantly” to safe and affordable water sources in the U.S. in the future.¹⁰⁸⁸ Despite these disagreements, desalination will likely remain at least a possible means for supplementing freshwater supplies.

Technological advances have decreased the energy requirements associated with traditional distillation techniques. Developments in reverse osmosis, electrodialysis, and microfiltration are all alternatives to traditional distillation that help lower the energy costs of desalination.¹⁰⁸⁹ Though important, the technical advantages and disadvantages of the various desalination methods are discussed in the literature and are not repeated in this report.¹⁰⁹⁰

Desalination can provide many benefits and may become a more attractive water-supply option in the future. First, the ability to convert seawater to potable water has obvious appeal to coastal regions currently constrained by existing freshwater supplies. Second, recent developments in technology have reduced its costs and make it a competitive alternative to acquiring freshwater from other sources.¹⁰⁹¹ Third, some regions in the West see desalination as a way to provide a more reliable supply of water during drought.¹⁰⁹² Fourth, coastal communities

¹⁰⁸⁷ See James E. Miller, Sandia National Laboratories, *Review of Water Resources and Desalination Technologies*, 13 (2003), at http://www.sandia.gov/water/docs/MillerSAND2003_0800.pdf (citing S.L. Postel et al, *Science* 271, 785 (1996)).

¹⁰⁸⁸ Bureau of Reclamation (BOR), Department of the Interior (DOI), *Desalination & Water Purification Research & Development Program Report 95, Desalination & Water Purification Technology Roadmap*, 4 (2003), at <http://www.usbr.gov/pmts/water/media/pdfs/roadmapreport.pdf>.

¹⁰⁸⁹ Aaron Schwabach, *Using International Law to Prevent Environmental Harm from Increased Use of Desalination*, 34 TEX. INT’L L.J. 187, 191-95 (1999).

¹⁰⁹⁰ *Id.* See also CAL. COASTAL COMM., SEAWATER DESALINATION AND THE CALIFORNIA COASTAL ACT 31-33 (Mar. 2004) [hereinafter Cal. Coastal Desalination]; U.S. Bureau of Reclamation & Sandia Nat’l Laboratories, *Desalination and Water Purification Technology Roadmap - A Report of the Executive Committee* (Jan. 2003), available at <http://www.sandia.gov/water/desal/> (last visited Mar. 17, 2008).

¹⁰⁹¹ Cal. Coastal Desalination, *supra* note 1090, at 9.

¹⁰⁹² *Id.*

view seawater desalination as a means to reduce dependence on water imports from inland areas.¹⁰⁹³

Nevertheless, desalination does have drawbacks. Many of these drawbacks relate to direct impacts desalination can have on the local environment. Seawater desalination raises concerns about the effects on marine life, water quality, public access, and other coastal resources.¹⁰⁹⁴ In addition, poorly designed seawater desalination facilities may have a cumulative impact on marine resources when added to the existing adverse effects of pollution and overfishing.¹⁰⁹⁵ Finally, desalination must dispose of the byproducts of desalination—often called “concentrate” or “brine.”

In addition to the direct impacts, desalination can also have indirect impacts. The California Coastal Commission (CCC) cited growth inducement as the most significant indirect impact of desalination. According to the CCC, “[i]f desalination removes the limits imposed on growth along the coast due to the current limited supply of water, the degradation of coastal resources could increase beyond sustainable levels.”¹⁰⁹⁶ While this report does not judge the desirability of growth inducement, the potential for growth beyond sustainable levels raises serious policy considerations.¹⁰⁹⁷

This section discusses some of the legal and regulatory implications of desalination with a focus on two related subparts: (1) coastal seawater desalination and (2) inland brackish-water desalination. Coastal seawater desalination facilities are subject to legal and regulatory provisions aimed at protecting coastal resources. This includes environmental issues relating to facility location, water intake and concentrate discharge. The discussion on inland brackish-water desalination largely focuses on concentrate disposal.

2.9.B. Seawater Desalination Issues

Using ocean water for desalination raises three principal regulatory issues: (1) locating the facility; (2) water intake and (3) concentrate disposal. The CCC addressed these issues in a comprehensive report released in 2004. Many of the issues discussed in this section are derived from that report.¹⁰⁹⁸ While the CCC presents the issues from California’s legal and regulatory perspective, many issues are germane to seawater desalination generally.

2.9.B.(i) Locating a Seawater Desalination Facility

New desalination facilities must comply with federal and state environmental statutes before construction begins. These include the administrative review processes required under

¹⁰⁹³ *Id.*

¹⁰⁹⁴ *Id.*

¹⁰⁹⁵ *Id.*

¹⁰⁹⁶ *Id.* at 12.

¹⁰⁹⁷ This section encourages decision makers to assess the relationship between desalination and growth as part of its comprehensive growth management strategy. *See supra* Chapter 1, Section 1. *Growth Management and Water in the West.*

¹⁰⁹⁸ *See* Cal. Coastal Desalination, *supra* note 1090.

NEPA¹⁰⁹⁹ and state analogs, such as California’s CEQA.¹¹⁰⁰ Depending on the design, location, and capacity of the facility, these environmental statutes will require an Environmental Assessment or Environmental Impact Statement, in addition to a state assessment like an Environmental Impact Report.

Given the difficulties associated with constructing a new desalination facility, new desalination operators may choose to co-locate with existing facilities such as coastal power plants. Co-locating allows developers to use much of the existing infrastructure needed for a desalination plant, such as parking and security.¹¹⁰¹ Furthermore, many desalination facilities are likely smaller than power plants, making the visual impacts less apparent.¹¹⁰² While co-locating may reduce some difficulties, it may create others.¹¹⁰³ These include analyses regarding the incremental and cumulative impacts of dual operations, especially those associated with entrainment, impingement, and discharge.¹¹⁰⁴

In addition to NEPA and its state analogs, at least one state has additional laws that impact locating and building a desalination facility. The California Coastal Act (Coastal Act) impacts the location and construction of new desalination facilities in a number of ways. The Coastal Act requires new “development” within the Coastal Zone—including desalination plants—to obtain a permit.¹¹⁰⁵ Some of the permit requirements that relate to facility location include environmental policies,¹¹⁰⁶ public access and recreation,¹¹⁰⁷ erosion,¹¹⁰⁸ and scenic resources.¹¹⁰⁹ The environmental policies associated with locating a desalination facility are discussed more thoroughly in sections 2.9.B.(ii) and 2.9.B.(iii).

Development cannot interfere with the public’s right of access to the sea unless public access is (1) inconsistent with public safety; (2) inconsistent with protecting fragile coastal resources; (3) unnecessary due to adequate alternative access; or (4) detrimental to agriculture.¹¹¹⁰ In addition, new facilities must not compromise structural and geologic stability or contribute “significantly” to erosion.¹¹¹¹ This means certain structurally instable sites may be off limits, even if other factors would make them attractive for desalination. Finally, permitted

¹⁰⁹⁹ See 42 U.S.C.A. §§ 4321-70f (LexisNexis 2008).

¹¹⁰⁰ See CAL. PUB. RES. CODE §§ 21000 to 21117 (2005). In California, developing and constructing a desalination facility will likely require consulting with numerous federal, state, and local agencies. These include: the Army Corps of Engineers, Coast Guard, National Marine Fisheries Service, National Oceanic & Atmospheric Administration, U.S. Fish & Wildlife Service, California Coastal Commission, California Department of Fish & Game, California Department of Health Services, California Department of Parks & Recreation, California Department of Transportation, California Department of Water Resources, California Public Utilities Commission, California State Lands Commission, California State Water Resources Control Board, local utilities, and local water management districts. Cal. Coastal Desalination, *supra* note 1090, at 90.

¹¹⁰¹ See Cal. Coastal Desalination, *supra* note 1090, at 80.

¹¹⁰² *Id.*

¹¹⁰³ *Id.* at 7.

¹¹⁰⁴ *Id.*

¹¹⁰⁵ CAL PUB RES. CODE § 30106 (2008).

¹¹⁰⁶ *Id.* §§ 30230-21, 30240.

¹¹⁰⁷ *Id.* §§ 30210-14, 30220-24 (discussing access policies and recreation policies, respectively).

¹¹⁰⁸ *Id.* § 30253.

¹¹⁰⁹ *Id.* § 30251.

¹¹¹⁰ *Id.* § 30212(a).

¹¹¹¹ *Id.* § 30253.

developments, including desalination facilities, must be located and designed to protect views to and along the ocean and scenic coastal areas.¹¹¹² In “highly scenic areas,” new development “shall be subordinate to the character of its setting.”¹¹¹³

2.9.B.(ii) Water Intake Issues for Seawater Desalination

Impingement and entrainment are two significant environmental issues that coastal seawater desalination facilities must address during the permitting process. “Impingement occurs when fish or larger marine animals are pulled into a seawater intake and are trapped against screens within the intake.”¹¹¹⁴ These animals die or are injured from the water pressure, abrasion, and thermal effects.¹¹¹⁵ “Entrainment occurs when an intake draws in small organisms such as plankton, larvae, fish eggs, and other animals along with seawater. These organisms are small enough to be pulled through the intake screens, and they are heated or crushed as they are drawn through the facility.”¹¹¹⁶

Impingement and entrainment can be reduced or eliminated by proper design, siting, and operation.¹¹¹⁷ In California, applicants for desalination projects are encouraged to use subsurface intakes, such as beach wells or infiltration galleries so long as they will not cause adverse impacts to beach topography or potable groundwater supplies.¹¹¹⁸ Subsurface intakes substantially reduce the effects of impingement. Mitigating the impacts of entrainment are often more difficult because entrainment relates more often to intake volume instead of intake location.¹¹¹⁹ Projects using an open-intake design should expect to provide information about likely effects on marine organisms during the permitting process.¹¹²⁰ Facilities located in areas with fewer marine organisms have the obvious advantage of having fewer biological impacts.

2.9.B.(iii) Concentrate Disposal Issues for Seawater Desalination

Likewise, concentrate discharge can also adversely affect marine life. Industry experts point out that “concentrate” and “brine” are not interchangeable as descriptors of the waste produced by desalination plants. “Brine” is water that has double the salinity of seawater, while “concentrate” generically describes the waste water that is created in the process of desalination.¹¹²¹ It is possible for concentrate to be brine, especially when the original water source is seawater, but not all concentrates are brine.

¹¹¹² *Id.* § 30241.

¹¹¹³ *Id.* Highly scenic areas include those designated in the California Coastline Preservation and Recreation Plan prepared by the Department of Parks and Recreation and by local government.

¹¹¹⁴ *See* Cal. Coastal Desalination, *supra* note 1090, at 66 n. 23.

¹¹¹⁵ *Id.*

¹¹¹⁶ *Id.*

¹¹¹⁷ *Id.* at 66.

¹¹¹⁸ *Id.* at 13, 70-72.

¹¹¹⁹ *Id.* at 72-73.

¹¹²⁰ *Id.* at 13.

¹¹²¹ *See* American Membrane Technology Association (AMTA), *Disposal of Desalting By-Product*, 1, at http://www.membranes-amta.org/amta_media/pdfs/concentrate.pdf.

In California, applicants are expected to ensure the adverse effects of discharge to marine life, including the effects of increased salinity, are minimized to the maximum extent feasible. While normal seawater can vary in salinity by up to 10‰, very few organisms are likely adapted to salinity levels roughly 100‰ greater than normal.¹¹²² Even in instances where increased salinity is not lethal, the effects can stress marine organisms.¹¹²³

2.9.C. Inland Disposal Methods

Many commentators agree that one of the major potential problems for inland desalination facilities is the disposal of waste concentrate,¹¹²⁴ comprised of salts and other minerals that have been removed from the original water source.¹¹²⁵ One source explains that concentrate can have only the salts and minerals that occur in the original source, although they will be in concentrated form.¹¹²⁶ He also asserts that the “vast majority” of desalination facilities in the United States that use reverse osmosis technology will have concentrate discharges that are not brine.¹¹²⁷

A variety of disposal options are available for discharges, depending on the level of total dissolved solids (tds) in the discharge and the area in which the desalination facility is located. There is no consensus among commentators on the number of disposal practices now in use in the industry. The most commonly recognized methods include discharge to the ocean or other body of surface water, sewer discharge, discharge with other water, evaporation or solar ponds, injection wells, irrigation, and zero liquid discharge.¹¹²⁸

2.9.C.(i) Discharge to Surface Water

One writer concludes that almost 50% of desalination facilities discharge their concentrate to surface waters or the ocean, in part because of the cost-effectiveness of this disposal method.¹¹²⁹ This method is well-suited for coastal desalination facilities, rather than facilities located inland. Industry commentators identify the potential for this method to harm the environment due to the increased amounts of salt and other minerals that will be added to the receiving ecological system.¹¹³⁰ However, in a report published in 1988 by the Congressional Office of Technology Assessment (OTA), the authors conclude that disposal in coastal marine environments is often less of a problem than disposal elsewhere because the concentrate

¹¹²² See Cal. Coastal Desalination, *supra* note 1090, at 76.

¹¹²³ *Id.* See also *infra* notes 1129-1135.

¹¹²⁴ See Lincoln Bates, *Water issues prompt new look at desalination*, American City & County, ¶ 29 (1995), at http://americancityandcounty.com/mag/government_water_issues_prompt/.

¹¹²⁵ See American Membrane Technology Association (AMTA), *Disposal of Desalting By-Product*, 1, at http://www.membranes-amta.org/amta_media/pdfs/concentrate.pdf.

¹¹²⁶ John E. Potts, *Residuals from Desalting*, in *DESALTING AS AN ENVIRONMENTALLY FRIENDLY WATER TREATMENT PROCESS*, 3-23, at 3-25 (O.K. Buros ed., DOI, 1994); available at <http://www.usbr.gov/pmts/water/media/pdfs/report013.pdf>.

¹¹²⁷ *Id.*

¹¹²⁸ See AMTA, *supra* note 1125, at 1; Potts, *supra* note 1126, 3-25; and BOR, *supra* note 1088, 34-35.

¹¹²⁹ Michael C. Mickley, BOR, DOI, Desalination & Water Purification Research & Development Program Report 69, *Membrane Concentrates Disposal: Practices & Regulations*, 4 (DOI, 2001), at <http://www.usbr.gov/pmts/water/media/pdfs/report069.pdf>. (last visited Apr. 14, 2008).

¹¹³⁰ See Miller, *supra* note 1087, 29.

typically becomes diluted throughout the area as it is discharged.¹¹³¹ The report also notes that potential adverse environmental effects can be avoided by using a diffuser so the concentrate does not collect in one area.¹¹³² Dr. John Largier, a physical oceanographer and coastal ecologist, concurs with this conclusion and states that if the concentrate is adequately diluted, the effect is no different from the natural hydrological cycle.¹¹³³ However, if concentrate is discharged into surface water other than the ocean, it may create salinity or other mineral problems for downstream users.

The ability of desalination facilities to discharge their concentrate into surface water or the ocean may be inhibited by EPA classification of the discharge as industrial waste, requirement of a National Pollution Discharge Elimination System (NPDES) permit, state water quality standards, local water quality standards and toxicity testing.¹¹³⁴ One source warns that this method of disposal will become increasingly more difficult as more stringent environmental regulations are created.¹¹³⁵

2.9.C.(ii) Discharge to Sewers

Another very common and cost-effective disposal method is to discharge to sewer systems. As of 2001, the number of facilities using this method has nearly doubled compared to facilities operating in 1992.¹¹³⁶ For a desalination facility to discharge into a sewer system for treatment by a wastewater treatment plant (WWTP), several requirements must be met. Although a desalination facility that discharges into a sewer system is not required to obtain an NPDES permit, it must comply with National Pretreatment Standards promulgated by the EPA.¹¹³⁷ Also, the WWTP operates under an NPDES permit, and it may impose additional requirements upon the desalination facility to meet the requirements of the NPDES permit.¹¹³⁸ In cases where the discharge of concentrate would impair the ability of the WWTP to meet the requirements, it may not allow the desalination facility to discharge into the sewer system.

2.9.C.(iii) Discharge with Other Water

Related to discharging both to surface waters and to sewers is the method of discharging concentrate with other water. As noted above, if the facility discharges to surface water, an NPDES permit is required, but if it discharges to a WWTP, the WWTP is required to have a permit and not the desalination facility. The idea of discharging with other water is to mix the concentrate with a quantity of water that dilutes the concentrate to an acceptable level. If a

¹¹³¹ OTA, U.S. Congress, *Using Desalination Technologies for Water Treatment*, 32, OTA-BP-O-46 (Government Printing Office, 1988), at <http://www.wws.princeton.edu/ota/disk2/1988/8842/8842.PDF>.

¹¹³² *Id.* at 33.

¹¹³³ John Largier, *Brine Disposal in Oceans*, in DESALTING AS AN ENVIRONMENTALLY FRIENDLY WATER TREATMENT PROCESS, 4-17, at 4-17 (O.K. Buross ed., DOI, 1994); available at <http://www.usbr.gov/pmts/water/media/pdfs/report013.pdf>.

¹¹³⁴ Potts, *supra* note 1126, 3-27.

¹¹³⁵ BOR, *supra* note 1088, 34.

¹¹³⁶ Mickley, *supra* note 1129, 4.

¹¹³⁷ Michelle Chapman-Wilbert et al., BOR, DOI, Water Treatment Technology Program Report 29, *The Desalting & Water Treatment Membrane Manual*, 7.6 (2d ed., DOI, 1998).

¹¹³⁸ *Id.*

desalination facility is discharging to surface water, one way to “minimize the toxic effects” of the concentrate is to mix it with a quantity of the surface water before discharging it in order to ensure that the concentrate becomes sufficiently diluted.¹¹³⁹ One industry commentator notes that the suggestion to blend fresh water with concentrate in order to dilute the concentrate negates the desalination effort somewhat, since the fresh water could have been used as drinking water itself.¹¹⁴⁰ However, another source suggests blending the concentrate with treated sewage or storm water runoff.¹¹⁴¹ As examples, the authors state that blending concentrate from seawater with treated sewage would result in a level of total dissolved solids (TDS) similar to that of ambient seawater, and blending treated sewage with concentrate from brackish water would make the resulting solution suitable for inland surface water.¹¹⁴²

2.9.C.(iv) Evaporation or Solar Ponds

Discharge of concentrate to solar or evaporation ponds is a less often used disposal method, perhaps because, as one commentator notes, it is “land intensive.”¹¹⁴³ Many areas that are experiencing water shortages do not have access to sufficient amounts of inexpensive land, but for arid inland areas in which there are tracts of land that are relatively inexpensive, ponds can be a good option for disposal.

2.9.C.(iv)(a) Evaporation Ponds

Evaporation ponds have several advantages over other disposal methods if the area in which the desalination facility is located has the requisite land available. The ponds are easy to construct and, once built, require little maintenance.¹¹⁴⁴ Also, because ponds are usually constructed and lined to prevent discharges or leakage to surface or groundwater, desalination facilities are not required to obtain a permit for evaporation ponds.¹¹⁴⁵

There are also disadvantages to using evaporation ponds. One source notes that evaporation ponds are practical mainly for small-scale desalination facilities because there is little economy of scale.¹¹⁴⁶ Another source criticizes the use of evaporation ponds because they “result in a significant loss of the basic water resource.”¹¹⁴⁷ (Technically, the water is not lost since it stays in the atmosphere and returns to the earth as rain or snow.¹¹⁴⁸) Further, the solid waste that remains after the evaporation of the water must be removed periodically and disposed of according to federal, state, and local rules.¹¹⁴⁹

¹¹³⁹ Abdul Ahmadi, *Potential Impacts of Desalting on the Environment*, in DESALTING AS AN ENVIRONMENTALLY FRIENDLY WATER TREATMENT PROCESS, 3-33, at 3-35 (O.K. Buros ed., DOI, 1994); available at <http://www.usbr.gov/pmts/water/media/pdfs/report013.pdf>.

¹¹⁴⁰ Potts, *supra* note 1126, 3-29.

¹¹⁴¹ Wilbert et al., *supra* note 1137, 7.4.

¹¹⁴² *Id.*

¹¹⁴³ AMTA, *supra* note 1125, 2.

¹¹⁴⁴ Mickley, *supra* note 1129, 121.

¹¹⁴⁵ Chapman-Wilbert et al., *supra* note 1137, 7.9.

¹¹⁴⁶ Mickley, *supra* note 1129, 121.

¹¹⁴⁷ BOR, *supra* note 1088, 35.

¹¹⁴⁸ Mickley, *supra* note 1129, 121.

¹¹⁴⁹ Chapman-Wilbert et al., *supra* note 1137, 7.10.

2.9.C.(iv)(b) *Solar Ponds*

Solar ponds are engineered to trap heat from the sun in the sodium-dense bottom layer of the pond. Because the salinity of that layer is concentrated to be ten times the salinity of seawater, the water is extremely dense. Due to its density, the heat from the sun is unable to escape into the environment, as it does in normal ponds. The captured heat can then be used to generate electricity or to desalt water.¹¹⁵⁰ The 1988 OTA report describes experimental work that was then in progress to learn whether it was feasible to try to generate electricity from solar ponds.¹¹⁵¹ In a BOR manual on desalinization treatment published in 1993, the authors reported on a solar pond in El Paso, Texas, which was the first solar pond in the United States to produce electricity in 1986.¹¹⁵²

Brine from desalination facilities with seawater as their original water source can be used for the brine layer on the bottom of solar ponds. However, because facilities that desalt seawater normally recover only 30 to 40 percent of the water, the salinity of the resulting brine is not as concentrated as a solar pond requires.¹¹⁵³ Therefore, methods have been developed using electricity, irrigation, or other methods to further concentrate the brine to the requisite level.¹¹⁵⁴ Because solar ponds use brine from desalination facilities and can also produce the power necessary to run the facilities, they are a potential solution to the problem of concentrate disposal.¹¹⁵⁵

2.9.C.(v) *Injection Wells*

Injection wells are another option available to desalination facilities that are located inland. The regulatory process to build an injection well is burdensome, to say the least, but one commentator asserts that once the well is built, the discharge of the concentrate into the well is not itself regulated.¹¹⁵⁶ Others assert that this option can be economical compared to other options, depending on the geologic characteristics of the site and the amount of testing that is required.¹¹⁵⁷ Additionally, the use of injection wells can be more environmentally friendly if they can adequately contain the concentrate and keep it from contaminating the environment. At least one commentator suggests this method as an alternative to surface water discharge because it spares the potentially negative effects on marine environments.¹¹⁵⁸ For a facility to use injection wells, the area in which it is located must meet certain geological requirements, including location of the well over an aquifer that is confined, unsuitable for drinking water, and

¹¹⁵⁰ *Id.*

¹¹⁵¹ OTA, *supra* note 1131, 32.

¹¹⁵² Michelle Chapman-Wilbert, BOR, DOI, Water Treatment Technology Program Report 1, *The Desalting & Water Treatment Membrane Manual*, 71 (DOI, 1993).

¹¹⁵³ *Id.* at 73.

¹¹⁵⁴ Chapman-Wilbert et al., *supra* note 1137, 7.12.

¹¹⁵⁵ *Id.* at 7.13.

¹¹⁵⁶ Potts, *supra* note 1126, 3-26.

¹¹⁵⁷ See OTA, *supra* note 1131, 32; Mickley, *supra* note 1129, 105.

¹¹⁵⁸ Robert E. Mace et al., Texas Water Development Board & Bureau of Economic Geology, BOR, DOI, Desalination & Water Purification Research & Development Program Report XX, *Please Pass the Salt: Using Oil Fields for the Disposal of Concentrate from Desalination Plants*, 4 (DOI, 2005).

below all aquifers in the vicinity that are used for drinking water.¹¹⁵⁹ Also, wells cannot be located in areas prone to earthquakes, nor in areas with recoverable mineral resources.¹¹⁶⁰

Injection wells are heavily regulated by EPA and state requirements because of their potential to malfunction and lead to a leak that contaminates groundwater. The EPA has divided injection wells into five classes. Class I includes deep wells used for industrial or hazardous wastes; Classes II through IV are for specific injections, including fluids related to oil and gas extraction and storage of hazardous or radioactive waste in shallow wells; and Class V wells include anything not covered by the other classes.¹¹⁶¹ Some commentators in the water industry claim that Classes I and V both apply to concentrate,¹¹⁶² others state that only Class V applies,¹¹⁶³ and still others assert that only Class I applies.¹¹⁶⁴ The classification applied to concentrate is important because different EPA and state requirements are associated with the permit for each classification. The classifications have different fees, testing, and structural requirements in order to obtain a permit. For example, one source states that the process takes one year and may require nearly \$6,000 in fees to obtain a Class I permit.¹¹⁶⁵ In addition, due to the extensive testing required for Class I wells, costs can end up being millions of dollars.¹¹⁶⁶ In contrast, a permit need not be obtained for Class V wells unless specifically required to protect drinking water.¹¹⁶⁷ Regulation of injection wells is shared by the EPA and states.

A Texas report has proposed that Texas statutes governing the injection-well permitting process be amended to enable the injection of concentrate into Class II wells, which are used for liquids brought to the surface when oil or gas is extracted.¹¹⁶⁸ The report asserts that injecting concentrate into Class II injection wells that already exist in oil fields will save desalination facilities time and money, and will therefore make the desalination process more affordable.¹¹⁶⁹

2.9.C.(vi) Irrigation

One conservation-minded use of concentrate is to irrigate salt-tolerant plants with it.¹¹⁷⁰ This is usually accomplished by blending the concentrate with other water that has low TDS, or the water may be used alone if its TDS is low enough for plants.¹¹⁷¹ Concentrate may likewise be used to irrigate salt-tolerant grasses found on golf courses. However, if concentrate is used to irrigate, whether it is mixed with another source of water or not, an NPDES permit is required if it is possible for the water to discharge to surface water.¹¹⁷² Additional state and local

¹¹⁵⁹ Chapman-Wilbert et al., *supra* note 1137, 7.9.

¹¹⁶⁰ Mickley, *supra* note 1129, 102.

¹¹⁶¹ Mace et al., *supra* note 1158, 6.

¹¹⁶² *See id.*

¹¹⁶³ *See* OTA, *supra* note 1131, 32.

¹¹⁶⁴ *See* Mickley, *supra* note 1129, 70; Chapman-Wilbert et al., *supra* note 1137, 7.9.

¹¹⁶⁵ Mace et al., *supra* note 1158, 12.

¹¹⁶⁶ *Id.*

¹¹⁶⁷ *Id.* at 15.

¹¹⁶⁸ *Id.* at 5.

¹¹⁶⁹ *Id.*

¹¹⁷⁰ Salt-tolerant plants are also known as halophytes, or halophytic plants.

¹¹⁷¹ Chapman-Wilbert et al., *supra* note 1137, 7.7.

¹¹⁷² *Id.*

regulations will apply to prevent potential contamination of groundwater or excessive salinity in the soil.¹¹⁷³

2.9.C.(vii) Zero Liquid Discharge

The most expensive option available for concentrate disposal is zero liquid discharge. This method, as its name explains, extracts the liquid from the waste concentrate through evaporation and reduces it to solid waste.¹¹⁷⁴ This is the most expensive disposal method because it requires large amounts of energy.¹¹⁷⁵ There are several different varieties of zero liquid discharge methods, varying in the type of energy used to create the steam. Zero liquid discharge methods are often one of the only options available to inland facilities where stringent regulatory regimes inhibit other disposal methods. However, because of the prohibitive costs of these methods, they may substantially limit the feasibility of desalination in those areas.

2.9.D. Conclusion

Although concentrate disposal is one issue that makes desalination problematic, potential solutions have been identified by experts in the field. The best option for a particular desalination facility will depend on its size, the type of technology it uses, the area in which it is located, the type of water it uses as a source, and various other factors. If technology advances and desalination supporters find a friendlier permitting environment, the cost of concentrate disposal and therefore, desalination in general, will decrease. If this happens, desalination will become a more attractive and valuable option to augment existing water supplies.

¹¹⁷³ *Id.*

¹¹⁷⁴ Mickley, *supra* note 1129, 167.

¹¹⁷⁵ *Id.*

Chapter 2

Section 10

Weather Modification

2.10.A. Introduction

Today, virtually all water in the West is appropriated. Increasing challenges, such as a changing climate and a booming population, have magnified pressures on already variable western water supplies. Within this context, weather modification programs offer the possibility of augmenting precipitation, particularly in watersheds. Currently, there are dozens of operating weather modification programs throughout the West. However, the potential water supply contribution from weather modification is still debated and potentially complex and largely unanswered legal issues have been raised both within and outside of the United States.¹¹⁷⁶ Weather modification has the potential to raise more liability and legal issues for western states in the future.¹¹⁷⁷ While the lack of recent case law suggests that weather modification is infrequently litigated, it is probably still worthwhile to flag the legal issues identified in earlier literature.¹¹⁷⁸ This section addresses (1) whether states have a right to the natural precipitation falling from clouds, such that they have influence over weather modification activities outside of their borders; (2) tort and takings claims raised by individual plaintiffs; and (3) weather modification affecting designated wilderness.¹¹⁷⁹

¹¹⁷⁶ Western States Water Council (WSWC), Water Resources: Colorado River/Weather Modification, Newsletter #1676 (June 30, 2006) (on file with the WSWC).

¹¹⁷⁷ BD. ON ATMOSPHERIC SCIENCES AND CLIMATE, NAT'L ACAD. OF SCI., CRITICAL ISSUES IN WEATHER MODIFICATION RESEARCH 27 (The Nat'l Academies Press 2003).

¹¹⁷⁸ See, e.g., Ray J. Davis, *Weather Modification Interstate Legal Issues*, 15 IDAHO L. REV. 555 (1978-1979); James M. Corbridge, Jr., *Weather Modification: Law and Administration*, 8 NAT. RESOURCES J. 207 (1968); Donald Frenzen, *Weather Modification: Law and Policy*, 12 B.C. INDUS. & COM. L. REV. 503 (1970-1971); Rodney Gerik, *Legal Aspects of Weather Modification in Texas*, 25 BAYLOR L. REV. 501 (1973); Jamie Harris, *Law and Technological Change: The Case of Weather Modification*, 3 YALE REV. L. & SOC. ACTION 27 (1972-1973); Gregory A. McKenzie, *Weather Modification: A Review of the Science and the Law*, 6 ENVTL. L. 387 (1975-1976). While the authors of this section do not predict the probability that weather modification will lead to litigation, the authors feel that *if* litigation arises, it will likely relate to the issues discussed in this section. However, nothing in this section is intended to discourage the use of weather modification to augment water supplies. Furthermore, nothing in this section should be construed as an argument against pursuing or engaging in weather-modification activities.

¹¹⁷⁹ See Note, *Who Owns the Clouds?*, 1 STAN. L. REV. 43, 43-63 (1948).

2.10.B. What is Weather Modification?¹¹⁸⁰

Weather modification refers both to intentional and inadvertent human-induced precipitation changes. The impacts of inadvertent weather modification are complex and not entirely clear.¹¹⁸¹ For example, pollution may lead to changes in cloud physics and inhibit precipitation.¹¹⁸² On the other hand, studies have also shown that large cities with populations over 1 million “influence warm-season clouds and increase precipitation by 10%-20%, with a lesser effect on precipitation in cold seasons.”¹¹⁸³ Further, agricultural areas that have been overgrazed or deforested may experience a net loss of precipitation.¹¹⁸⁴ This section does not focus on inadvertent weather modification, but rather on the legal issues states and local entities may encounter from intentionally modifying the weather.¹¹⁸⁵

Since 1946, weather modification has been explored as a means to provide water during drought and to alleviate bad weather, including hail, fog, and hurricanes.¹¹⁸⁶ Weather modification consists of seeding clouds, usually with silver iodide, dry ice, or ground-based propane generators, in order to aid in the formation of precipitation or dissipate fog and hail.¹¹⁸⁷ Current cloud seeding operations are all located in the West, “sponsored by local, state, or private entities.”¹¹⁸⁸ In 2003, the National Academy of Sciences (NAS) described the current state of weather modification in the United States:¹¹⁸⁹

[T]he number of precipitation enhancement and hail suppression programs has varied over the course of the past several decades, while the number of fog dissipation projects has remained nearly constant throughout this time (with the primary example being the program sponsored by Delta Airlines at Salt Lake City International Airport). In the last few years there has been an increase in operational weather modification activities in the United States, with approximately 66 programs (for hail suppression and snow or rain enhancement) being conducted in 2001, according to activities reported to the NOAA. . . . No federal funding currently supports any project.

¹¹⁸⁰ See generally Edith Brown Weiss, *Management of Weather and Climate Disputes*, 3 UCLA J. ENVTL. L. & POL'Y, 275 (1983).

¹¹⁸¹ BD. ON ATMOSPHERIC SCIENCES AND CLIMATE, *supra* note 1177, at 34.

¹¹⁸² *Id.*

¹¹⁸³ American Meteorological Society (AMS), *Planned and Inadvertent Weather Modification* (1992), <http://www.ametsoc.org/policy/wxmod.html#3> (last visited July 12, 2006).

¹¹⁸⁴ *Id.*

¹¹⁸⁵ See Ray Jay Davis, *Law and Urban-Induced Weather Change*, 25 U. TOL. L. REV. 379, 383 (1994) (emphasizing the difficulty of proving a defendant violated a duty and caused damage to property or life through inadvertent modification of the weather).

¹¹⁸⁶ BD. ON ATMOSPHERIC SCIENCES AND CLIMATE, *supra* note 1177, at 9.

¹¹⁸⁷ See U.S. DEP'T OF INTERIOR, BUREAU OF RECLAMATION, AUGMENTATION POTENTIAL THROUGH WEATHER MODIFICATION 3-4 (1975); Ray Jay Davis, *Text and Commentary for Weather Modification Control Law* 2-3 (1976).

¹¹⁸⁸ BD. ON ATMOSPHERIC SCIENCES AND CLIMATE, *supra* note 1177, at 23.

¹¹⁸⁹ *Id.*

The actual precipitation and dissipation benefits provided by cloud seeding is an issue currently being debated.¹¹⁹⁰ In its report, the NAS found evidence of the benefits cloud seeding programs provide inconclusive: “Cloud-seeding experiments have shown mixed results, but many operational cloud-seeding programs continue, based on what is seen as circumstantial or indirect evidence of positive results.”¹¹⁹¹ The NAS concluded by calling for more research.¹¹⁹²

Others are more optimistic, particularly about augmenting snowpack in watersheds through winter orographic cloud seeding operations.¹¹⁹³ The Weather Modification Association, World Meteorological Organization, American Meteorological Society (AMS), and the North American Interstate Weather Modification Council (NAIWMC) believe that “that there is strong evidence” cloud seeding can augment snowpacks.¹¹⁹⁴ Both the AMS and the NAIWMC assert that cloud seeding can increase snowpack by perhaps 10% or more based on studies out of Colorado, Montana, and Australia.¹¹⁹⁵

The political climate on weather modification is also uncertain. In 2005, legislation was introduced into both the Senate (S. 517) and the House (H.R. 3445), referencing the NAS conclusions and proposing “to establish a Weather Modification Operations and Research Board” (S. 517).¹¹⁹⁶ The legislation was reintroduced in the 110th Congress as S. 1807 and again as H.R. 3445 “*to develop and implement a comprehensive and coordinated national weather mitigation research policy and a national cooperative Federal and State program of weather mitigation research and development.*”¹¹⁹⁷ In response to S. 517, the Director of the Office of Science and Technology Policy (OSTP) sent a letter to Senator Kay Bailey Hutchison, a Texas Republican who introduced S. 517, detailing the Administration’s concerns.¹¹⁹⁸ The Director raised several issues surrounding weather modification, specifically noting “small scale weather modification (e.g. cloud seeding) may promote rain in one area to the detriment of another [and] could result in interstate . . . litigation or private citizen litigation against the modification programs.”¹¹⁹⁹ He also raised concerns regarding international treaties and

¹¹⁹⁰ See WSWC, Water Resources: Colorado River/Weather Modification, Newsletter #1676 (June 30, 2006) (on file with the WSWC) (reporting on the 2006 Colorado River Basin Weather Modification Workshop, where topics ranged from a possible Seven Basin States’ agreement to utilize weather modification to augment Colorado River flows, to the uncertainties and possible negative effects of cloud seeding, such as “[t]he natural variability inherent in precipitation patterns[,] . . . changes in the atmosphere, climate and thermodynamics, [as well as] increasing air pollution and related aerosols.”).

¹¹⁹¹ BD. ON ATMOSPHERIC SCIENCES AND CLIMATE, *supra* note 1177, at 23.

¹¹⁹² *Id.* at 24.

¹¹⁹³ North American Interstate Weather Modification Council (NAIWMC), *Answers to Frequently Asked Questions About Cloud Seeding to Augment Mountain Snowpacks* (2006), http://www.naiwmc.org/NAIWMC/WXMOD_winter_FAQ_NAIWMC_final2.pdf (last visited July 12, 2006).

¹¹⁹⁴ *Id.*

¹¹⁹⁵ *Id.* (citing Arlin B. Super & James A. Heimbach, *Evaluation of the Bridger Range Winter Cloud Seeding Experiment Using Control Gages*, 22 J. APPLIED METEOROLOGY 1989-2011 (1983)); B.F. Ryan & W. D. King, *A Critical Review of the Australian Experience in Cloud Seeding*, 78 BULL. AMER. METEOR. SOC. 239-354 (1997); P. W. Mielke et al., *A Statistical Reanalysis of the Replicated Climax I & II Wintertime Orographic Cloud Seeding Experiments*, 20 J. APPLIED. METEOROLOGY 643-659 (1981).

¹¹⁹⁶ S. 517, 108th Leg. (2005).

¹¹⁹⁷ *Id.* (emphasis added).

¹¹⁹⁸ Letter from John H. Marburger, III, Director, Office of Sci. and Tech. Policy, to Kay Bailey Hutchison, U.S. Senator (Dec. 13, 2005), *available at* <http://www.legislative.noaa.gov/newviewsletters.html>.

¹¹⁹⁹ *Id.*

agreements. H.R. 3445 was introduced by Congressman Mark Udall of Colorado, a Democrat.¹²⁰⁰ Proponents are working to support such legislative action to restore a federal research role, but Congress has not taken any major action on either bill.

2.10.C. “Cloud Rustling:” The Potential for Interstate Conflict

While the possibility of substantial interstate conflict referred to by the OSTP Director has not yet materialized, common law, state statutes, and a few cases shed some light on the issues. Under the common law, landowners may have a right to the natural precipitation from clouds over their land.¹²⁰¹ For example, the Texas Supreme Court upheld a temporary injunction against a hail suppression program, based on the appellate court’s ruling that the plaintiff rancher had a right to any precipitation that might naturally fall from the sky, until the merits of the case could be fully developed.¹²⁰²

In addition, Colorado expressly claims an interest or ownership of the moisture in clouds within its boundaries,¹²⁰³ and several states require cloud seeding operators to have a license¹²⁰⁴ and/or a permit before engaging in weather modification activities.¹²⁰⁵ State programs are designed to assure adequate safeguards to minimize risks to property, health, safety and welfare and to maximize the scientific and economic benefits to the people of the state.¹²⁰⁶

State authority over the moisture in clouds not yet inside of their borders has not been directly addressed by either state statute or case law. The closest case on point came out of Montana in 1992 when a district court ordered a Montana agency to issue permits to a North Dakota agency seeking to seed clouds in Montana.¹²⁰⁷ North Dakota sued the Montana Board of Natural Resources and Conservation (the Board) for denying North Dakota’s weather modification permits.¹²⁰⁸ North Dakota had applied for permits to conduct cloud seeding within Montana’s border.¹²⁰⁹ Based on Montana’s general welfare requirement for seeding permits,¹²¹⁰ the Board denied North Dakota’s application, finding that “the potential adverse impact of the

¹²⁰⁰ H.R. 3445, 109th Cong. (2007).

¹²⁰¹ *Sw. Weather Research, Inc. v. Duncan*, 319 S.W.2d 940 (Tex. Civ. App. 1959); *Sw. Weather Research, Inc. v. Rounsaville*, 319 S.W.2d 211 (Tex. Civ. App. 1959), *combined and affirmed* 160 Tex. 104, 327 S.W.2d 417 (1959); *but see* *Slutsky v. City of New York*, 97 N.Y.S.2d 238, 239 (Sup. Ct. 1950) (holding that property owners have no property in the moisture in clouds that cross their land).

¹²⁰² *Sw. Weather Research*, 160 Tex. at 110.

¹²⁰³ *See*, COLO. REV. STAT. § 36-20-103 (2006).

¹²⁰⁴ COLO. REV. STAT. § 36-20-109 (2006); 3 PA. CONS. STAT. ANN. §§ 1105-06 (2005); S.D. CODIFIED LAWS § 46-3A-15 (2006).

¹²⁰⁵ COLO. REV. STAT. § 36-20-112(1)(d) (2006); S.D. CODIFIED LAWS §§ 46-3A-21 (2006).

¹²⁰⁶ Letter from Joe Busto, Chairman, N. Am. Interstate Weather Modification Council to Craig Bell, Executive Director, W. States Water Council (Mar. 24, 2008) (on file with authors). All western states have rules to establish criteria for licenses, criteria for permits, public notice for seeding operations, requirements for public comment, provisions for liability insurance, and operational safeguards.

¹²⁰⁷ *North Dakota Atmospheric Resources Board v. Board of Natural Resources and Conservation*, 1992 Mont. Dist. LEXIS 60 (1992).

¹²⁰⁸ *Id.*

¹²⁰⁹ *Id.* at *2.

¹²¹⁰ *Id.* at *3 (finding the requirement in ARM §36.20.307(2)(e), that “the operation has the potential of producing benefits . . . is not expected to result in serious adverse impacts . . . and the anticipated benefits of the operation outweigh the potential adverse impacts,” had not been met).

proposed operation is that seeding of the clouds in Montana could cause the rain that would otherwise fall in Montana to fall in North Dakota.”¹²¹¹ Additionally, the Board found that “the anticipated benefits to North Dakota were outweighed by the potential adverse impacts to Montana.”¹²¹² The Montana District Court overturned the Board’s findings as erroneous, ordering the Board to issue the permits in time for the next cloud seeding season.¹²¹³ While North Dakota felt that its permit application was not properly handled by the Board, rules were in place to resolve potential disputes.

While the issue of a states’ authority over weather modification activities outside their border that affect atmospheric moisture within their border remains unclear,¹²¹⁴ potential future legal problems can be mitigated. In 1980, the Sierra Ecology Project published “An Overview of Societal and Environmental Responses to Weather Modification” (the Overview). Even though the Overview did not definitively answer the question of who is entitled to atmospheric water, it did suggest “several methods for reducing interstate conflicts.”¹²¹⁵ These included “reciprocal legislation, congressional allocation, Federal management, and interstate . . . compacts.” Of the western states that permit weather modification today, Colorado, Montana, Oklahoma, Texas, and Washington expressly authorize interstate compact negotiations on weather modification.¹²¹⁶

2.10.C.(i) Possible Liability and Other Issues

In addition to the potential for interstate conflict over “cloud rustling,” weather modification may also prompt litigation over flooding, as illustrated by citizen tort and inverse condemnation suits claiming flood damage caused by cloud seeding.¹²¹⁷ To prevail on a tort claim, plaintiffs must prove the defendant had a duty of care, which the defendant breached, and that this breach caused damage to the plaintiff.¹²¹⁸ However, causation has been difficult to prove in weather modification cases.¹²¹⁹

Additionally, inverse condemnation proceedings have been brought against the government for cloud seeding. Inverse condemnation is a constitutionally guaranteed remedy for Fifth Amendment takings claims, applied to the states through the Fourteenth Amendment.¹²²⁰ These suits are brought by private individuals to redress the uncompensated taking of property

¹²¹¹ *Id.* at *6.

¹²¹² *Id.* at *9.

¹²¹³ *Id.* at ***6, 9, 11.

¹²¹⁴ Berg, Neil H. & James L. Smith, *An Overview of Societal and Environmental Responses to Weather Modification*, in 5 THE SIERRA ECOLOGY PROJECT 57 (1980) (on file with the WSWC).

¹²¹⁵ *Id.* at 57.

¹²¹⁶ COLO. REV. STAT. § 36-20-108(4)(a) (2005); MONT. CODE ANN. § 85-3-103(5) (2005); 82 OKLA. STAT. ANN. §§ 1087.3(7) – 1087.3(10) (2005); TEX. AGRIC. CODE § 301.056 (2005); WASH. REV. CODE § 43.37.030(7) (2006).

¹²¹⁷ *Lunsford v. United States*, 570 F.2d 221 (8th Cir. 1977).

¹²¹⁸ Mark Klock, *Financial Options, Real Options, and Legal Options: Opting to Exploit Ourselves and What We Can Do About It*, 55 ALA. L. REV. 63, 96 (2003).

¹²¹⁹ See *Pa. Natural Weather Ass’n v. Blue Ridge Weather Modification Ass’n*, 44 Pa. D. & C.2d 749, 1968 WL 6708 (Pa.Com.Pl. 1968); see also Matthew Bender & Company, Inc., *State and Local Regulations: State Regulation of Agriculture*, 12-114 AGRICULTURAL LAW § 114.10(4)(a)-(b) (LexisNexis 2005).

¹²²⁰ *First English Evangelical Lutheran Church of Glendale v. County of Los Angeles*, 482 U.S. 304, 315 (1987).

by the government.¹²²¹ “When the government takes property without initiating condemnation proceedings, it ‘shifts to the landowner the burden to discover the encroachment and to take affirmative action to recover just compensation.’”¹²²² The following three cases are examples of tort and takings challenges that have been brought against cloud seeding programs for flood damage.

Tort claims are one mechanism plaintiffs have used in an attempt to redress flood damage allegedly caused by cloud seeding, as illustrated by two cases—*Lunsford v. United States* in 1977¹²²³ and *Saba v. Counties of Barnes* in 1981.¹²²⁴ In *Lunsford*, the plaintiffs brought a class action suit under the Federal Tort Claims Act,¹²²⁵ alleging that the government had seeded clouds, causing a flood that claimed 238 lives.¹²²⁶ The plaintiffs asserted that the “cloud seeding program was inherently dangerous,” and the U.S. therefore had a “nondelegable duty . . . to supervise . . . the program. Furthermore, the plaintiffs argued that the government breached its duty by cloud seeding during adverse weather conditions.”¹²²⁷ The Eighth Circuit, however, declined to reach the merits of the case, and dismissed based on procedural grounds and governmental immunity.¹²²⁸ In *Saba*, the plaintiffs also brought a class action suit, this time for property damage allegedly caused by several counties who negligently seeded clouds over Bismark, thereby causing a flood.¹²²⁹ The North Dakota Supreme Court refused to certify the class, because even if the plaintiffs could prove the counties had acted negligently by seeding clouds, each individual defendant would still have to prove that negligence was the proximate cause of their property damage, requiring individual lawsuits.¹²³⁰ It is worth noting that the opinions in *Lunsford* and *Saba* failed to address the merits of the plaintiffs’ tort claim, and instead disposed of the cases on other grounds.¹²³¹

The Fifth Amendment to the Constitution is another legal vehicle at least one plaintiff has used against cloud seeders who allegedly caused a flood. In *First English Evangelical Lutheran Church of Glendale v. County of Los Angeles*, the plaintiffs brought forth two causes of action.¹²³² First, plaintiffs brought an inverse condemnation action against the County because the County enacted a temporary ordinance that prohibited construction in the affected watershed.¹²³³ Second, plaintiffs brought a tort claim against the County for engaging in cloud seeding activity during a storm that caused flood damage to the plaintiff’s property.¹²³⁴ The lower court dismissed both the tort and inverse condemnation claims.¹²³⁵ The U.S. Supreme

¹²²¹ *City of Monterey v. Del Monte Dunes*, 526 U.S. 687, 711-12 (1999).

¹²²² *Id.*

¹²²³ *Lunsford v. United States*, 570 F.2d 221 (8th Cir. 1977).

¹²²⁴ *Saba v. Counties of Barnes*, 307 N.W.2d 590 (ND 1981).

¹²²⁵ 28 U.S.C. §§ 2671 to 2680 (2006).

¹²²⁶ *Lunsford*, 570 F.2d at 222.

¹²²⁷ *Id.* at 222-23.

¹²²⁸ *Id.* at 230.

¹²²⁹ *Saba*, 307 N.W.2d at 592.

¹²³⁰ *Id.* at 594.

¹²³¹ *See supra*, notes 1228, 1230 and accompanying text.

¹²³² *First English Evangelical Lutheran Church of Glendale v. County of Los Angeles*, 210 Cal. App. 3d 1353 (1989).

¹²³³ *Id.* at 1357.

¹²³⁴ *Id.* at 1357.

¹²³⁵ *Id.* at 1357-58, 1375.

Court upheld the dismissal of the tort claim, to the extent the claim relied on a strict liability theory.¹²³⁶ However, it reversed with regard to whether an inverse condemnation action could be maintained against the Flood Control District, and remanded to the lower court.¹²³⁷ In further proceedings, the California Court of Appeals held in 1989 that a related land-use restriction in the affected watershed did not amount to a “taking” under the constitution and that the plaintiff failed to state a cause of action.¹²³⁸

Regardless of whether plaintiffs chose to pursue a tort claim or a “takings” claim, no claimant has successfully litigated a weather modification lawsuit to date. Nevertheless, the possibility of future lawsuits remains. In future tort cases, proving that weather modification caused the alleged damage will likely remain a substantial legal hurdle for claimants.¹²³⁹

2.10.D. Weather Modification Affecting Federally Designated Wilderness

The Wilderness Act of 1964¹²⁴⁰ may preclude or limit weather-modification activities on certain designated federal lands. Because the Act defines wilderness as “land . . . without permanent improvements or human habitation,”¹²⁴¹ some weather-modification activities that would require permanent structures may be curtailed. Wilderness lands are generally administered by “by the Department and agency having jurisdiction thereover immediately before its inclusion in the National Wilderness Preservation System. . . .”¹²⁴²

The U.S. Forest Service (USFS) and Bureau of Land Management (BLM) have specific policies to regulate weather modification in wilderness areas. Wilderness designations may impact ground operations and activities that significantly modify precipitation patterns over wilderness.¹²⁴³ USFS policy states: “Do not permit long-term weather modification programs that produce, during any part of successive years, a repeated or prolonged change in the weather directly affecting wilderness areas.”¹²⁴⁴ However, “[s]hort-term weather modification activities that produce only occasional, incidental, temporary, or transitory changes in the weather with carryover ground effects that last only a few days beyond the actual cloud-seeding period may be permitted.”¹²⁴⁵ To carry out weather modification over wilderness areas administered by USFS, operators must satisfy certain criteria and obtain a permit.¹²⁴⁶

¹²³⁶ First English Evangelical Lutheran Church of Glendale v. County of Los Angeles, 482 U.S. 304, 309 n.3 (1987).

¹²³⁷ *Id.*

¹²³⁸ First English Evangelical Lutheran Church v. County of Los Angeles, 210 Cal. App. 3d 1353, 1374 (1989), *rehearing denied*, 1989 Cal. App. LEXIS 639 (1989), *cert. denied*, 493 U.S. 1056 (1990).

¹²³⁹ See *supra*, note 1185.

¹²⁴⁰ 16 U.S.C.A. §§ 1131-36 (LexisNexis 2008).

¹²⁴¹ *Id.* § 1131(c).

¹²⁴² *Id.* § 1131(b).

¹²⁴³ This may include the use or location of monitoring devices, structures, or operational equipment.

¹²⁴⁴ U.S. FOREST SERVICE, FOREST SERVICE MANUAL § 2323.45 (2007) (“Weather Modification Over Wilderness”).

¹²⁴⁵ *Id.*

¹²⁴⁶ *Id.* “Approve wilderness as a target area for weather modification only when: (1) The proponent can provide scientifically supportable evidence that the activities will not produce permanent, substantial changes in natural conditions. (2) The proposal includes no feature that will visibly alter or otherwise impact the wilderness

BLM policy for weather modification over wilderness largely mirrors that of USFS.¹²⁴⁷ “State directors gather necessary information [about the proposed activity] and make recommendations to the Director on any activity or application. The Director approves activities or installations relative to weather modification affecting wilderness.”¹²⁴⁸ As with USFS, applications for weather modification affecting BLM wilderness areas must meet certain criteria.¹²⁴⁹

Unlike USFS and BLM, the National Park Service (NPS) does not have any specific guidance regulating weather modification over wilderness areas. However, NPS general policy for scientific activities in wilderness may provide a basic framework for considering the impacts.¹²⁵⁰ Specific projects must be coordinated with appropriate NPS authorities.

2.10.E. Conclusion

In sum, both the viability of weather modification programs to provide a significant new source of water, as well as potential interstate issues, remain uncertain. While tort liability does not pose a serious threat, the states’ property rights to moisture in clouds outside of their borders is still an unanswered question.¹²⁵¹ This potential for conflict increases the desirability of interstate agreements and negotiations as a way to circumvent future legal and policy issues before they arise.

In addition, federally-designated wilderness areas may limit weather modification in some instances. Potential weather modification projects that propose to use or affect wilderness areas must coordinate all activities with the appropriate administering agency. Federal land management agencies should adopt consistent policies and practices to allow permitted weather modification that result in minimal impacts to protected resources.

environment. (3) The proposal includes no feature that is likely to reduce the value of wilderness for recreation, scientific, educational, conservation, or historical use.”

¹²⁴⁷ BUREAU OF LAND MGMT., BLM MANUAL § 8560.36 (1983).

¹²⁴⁸ *Id.*

¹²⁴⁹ The criteria that must be satisfied are: “(a) The proponent can provide reasonable, scientifically supportable assurance that the activities will not produce permanent, substantial changes in natural conditions. (b) The proposal does not include any features that might reasonably be expected to produce conditions incompatible in appearance with the wilderness environment or reduce its value for recreation, scenic, scientific, education, conservation, or historical use.” *Id.* Cf. USFS policies, *supra*, note 1246.

¹²⁵⁰ NATIONAL PARK SERVICE, NPS MANAGEMENT POLICIES § 6.3.6.1 (2001) (discussing general policies for scientific activities in wilderness).

¹²⁵¹ Matthew Bender & Company, Inc., *State and Local Regulations: State Regulation of Agriculture*, 12-114 AGRICULTURAL LAW § 114.10(4)(a) (“[O]nce attempts are made to modify the weather, the potential for conflict is created.”).

Chapter 3

Preparations for Climate Change Impacts

Scientific reports suggest that average temperatures in the West have increased 2-5° F during the twentieth century. Models further suggest that warming is unlikely to abate in the near future. The prospects of climate change could have serious impacts on western water supplies, particularly in areas that receive a majority of their annual precipitation as snow. Warming could lead to smaller snowpack and earlier snowmelt in many western mountain ranges. Other water-related impacts may also result. The specific effects of climate on water resources may vary state to state, or even region to region within a state. Resource managers need administrative flexibility in order to prepare for the challenges of climate change.

Recommendation 5.C.(4) in the WGA Water report reads: “States should evaluate and revise as necessary the legal framework for water management to the extent allowable to anticipate and respond to climate change.” This chapter explores the legal and institutional opportunities and constraints relative to such flexibility. In large measure, these opportunities and constraints were thoroughly discussed in Chapter 2. Legal and Institutional Context for Augmenting Existing Water Supplies.¹²⁵² This chapter identifies possible impacts of climate change on water resources and reviews how existing legal and institutional tools can be adapted to provide flexibility for water resource administrators.

¹²⁵² See *supra*, Chapter 2. Legal and Institutional Context for Augmenting Existing Water Supplies, at pages 65-157.

Chapter 3

Section 1

Preparations for Climate Change Impacts

3.1.A. Introduction

Global climate has been changing throughout history. Over the span of geologic time, certain periods have been relatively wet, others dry; some cold and some warm.¹²⁵³ These variations are part of Earth's natural history. However, scientific evidence suggests the Earth's climate is warming due to anthropogenic¹²⁵⁴ causes and that warming is likely to continue into the foreseeable future.¹²⁵⁵ A warming climate can potentially affect water supplies in the West.¹²⁵⁶

There is considerable uncertainty about how severely climate change will impact water resources. As one prominent economist wrote: “[B]oth the science and the economics [regarding climate change] are changing, disputed, and based on contentious assumptions for which small changes make large differences. . . .”¹²⁵⁷ This statement is equally true for the impact of climate change on water resources. Nonetheless, we can anticipate the types of consequences that will likely occur even if the magnitude of those effects remains uncertain.

¹²⁵³ UTAH DIV. OF WATER RES., DROUGHT IN UTAH: LEARNING FROM THE PAST—PREPARING FOR THE FUTURE 47 (2007), available at <http://www.water.utah.gov> (last visited Nov. 11, 2007) [hereinafter Drought in Utah]. See also NATIONAL RESEARCH COUNCIL, COLORADO RIVER BASIN WATER MANAGEMENT: EVALUATING AND ADJUSTING TO HYDROCLIMATIC VARIABILITY 99-102 (2007) (discussing tree-ring data as a means of reconstructing past hydrologic variability).

¹²⁵⁴ Anthropogenic is defined as “of, relating to, or influenced by the impact of man on nature.” WEBSTER’S NEW COLLEGIATE DICTIONARY 48 (G. & C. Merriam Co., 1981).

¹²⁵⁵ Kathleen A. Miller, *Climate Change and Water in the West: Complexities, Uncertainties, and Strategies for Adaptation*, 27 J. LAND RESOURCES & ENVTL. L. 87, 87 (2007). See also Intergovernmental Panel on Climate Change, *A report of Working Group I of the Intergovernmental Panel on Climate Change – Summary for Policymakers* (Feb. 2007), available at <http://www.ipcc.ch/ipccreports/ar4-wg1.htm> (last visited Dec. 10, 2007).

¹²⁵⁶ Miller, *supra* note 1255, at 87. While climate change may impact other resources, such as forests, and forest fires, this report focuses on the water-related impacts of climate change.

¹²⁵⁷ Cass R. Sunstein, *The Complex Climate Change Incentives of China and the United States* 5 (U. of Chicago Law & Economics, Olin Working Paper No. 352), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1008598.

First, as temperatures increase, the duration of the snow season in mountainous regions will decrease.¹²⁵⁸ Consequently, seasonal streamflows will peak earlier in the year with possible reductions in late season flows.¹²⁵⁹ Recent trends in Intermountain states indicate that this is already occurring. For example, seasonal flows in snowmelt-fed rivers in the West were occurring one to four weeks earlier by 2002 than in 1948.¹²⁶⁰ Second, climate change may also affect the quantity—as well as the timing—of spring runoff. The majority of models forecasting flows in the Colorado River project 10-40% reductions in runoff over the next fifty years.¹²⁶¹ The past decade may be an early reflection of this prediction. As of 2007, inflows to Lake Powell have been below historically “normal” flows for eight of the past nine years.¹²⁶²

Third, warmer temperatures will increase atmospheric moisture and increase global precipitation by 1-2% per degree Celsius.¹²⁶³ However, greater precipitation will not necessarily increase water availability because higher temperatures also lead to higher evaporation and transpiration rates.¹²⁶⁴ Fourth, rainfall intensity is expected to increase but the number of days between precipitation events is also expected to increase.¹²⁶⁵ Consequently, precipitation may result in greater flooding rather than greater infiltration, recharge, and storage. Fifth, sea levels will likely rise and jeopardize coastal resources.¹²⁶⁶ Finally, climate change may directly or indirectly impact water temperatures; plant and animal life; hydroelectric power generation;¹²⁶⁷ recreation; water quality; soil moisture; groundwater; and ecosystems.¹²⁶⁸ While these outcomes are by no means certain inevitabilities, should they occur, they would reduce water supplies for all beneficial uses. Water resource managers should anticipate and plan for these possibilities.¹²⁶⁹

¹²⁵⁸ Miller, *supra* note 1255, at 88.

¹²⁵⁹ *Id.*

¹²⁶⁰ *Id.* See also Daniel R. Cayan et al, *Changes in the Onset of Spring in the Western United States*, 82 AM. METEOROLOGICAL SOC'Y 399, 410-12 (2001) (noting biological indicators and spring pulse in snow-fed streamflows suggest a one to three week shift toward an earlier spring since the 1970s); Iris T. Stewart et al., *Changes toward Earlier Streamflow Timing across Western North America*, 18 J. Climate 1136, 1140 (2005) (“Widespread trends toward both an earlier onset of the snowmelt spring pulse and earlier [timings of the center of mass of the annual flows] are observed for snowmelt dominated gauges . . . throughout western North America for the 1948-2002 period.”).

¹²⁶¹ Katharine Jacobs, Executive Dir., Ariz. Water Inst., Speaker at the Western States Water Council: Adaptations to Improve Supply Reliability Under Climate Change (Nov. 15, 2007).

¹²⁶² *Id.*

¹²⁶³ Miller, *supra* note 1255, at 90.

¹²⁶⁴ *Id.* at 91.

¹²⁶⁵ *Id.* at 88.

¹²⁶⁶ *Id.* While the rise in sea level has obvious consequences to coastal property, an increase in sea level can also adversely affect freshwater resources. An increase in sea level can cause salt water intrusion in coastal aquifers. Rising sea levels can also affect freshwater intake facilities along coastal rivers. If sea levels rise, more seawater could potentially mix with freshwater near municipal intake structures and contaminate municipal supplies.

¹²⁶⁷ Using current technology, reductions in annual flows will result in corresponding reductions in the quantity of hydroelectric power dams and other facilities can generate.

¹²⁶⁸ CAL. DEP'T OF WATER RES., CALIFORNIA WATER PLAN UPDATE 2005 19-2 (2005) [hereinafter Cal Plan].

¹²⁶⁹ While the impacts of climate change could cause populations to relocate throughout the country, should conditions become severe, this scenario is beyond the scope of this report. Instead, this report encourages water administrators to plan for and anticipate the five possibilities introduced in this section, namely (1) earlier snowmelt; (2) reduced runoff; (3) greater evapotranspiration; (4) more intense, though less frequent precipitation events; and (5) the impact of rising sea level, including the impact on coastal aquifers.

3.1.B. Legal and Institutional Tools for Managing Water during Climate Change

As water resource managers anticipate and plan for the potential impacts of climate change, increasing the flexibility in water administration will be vital. The remainder of this report describes legal and institutional mechanisms or “tools” that may help provide such flexibility.

Most western states have not passed statutes to directly address the water-related impacts of climate change, with some notable exceptions. For example, Washington has stated that one purpose for its reclaimed water program is to ameliorate potential supply reductions caused by climate change.¹²⁷⁰ Likewise, California is actively considering a water measurement database to assess the impacts of climate change.¹²⁷¹

However, several western states have statutorily voiced their concern over climate change.¹²⁷² Some statutes define climate change¹²⁷³ and others express concern about the impact climate change will have on water resources.¹²⁷⁴ Recent legislative activity aimed at reducing

¹²⁷⁰ See WASH. REV. CODE § 90.46.005 note (a) (LexisNexis 2007). Washington has also noted “[s]tate programs to improve water use efficiency should focus on those areas . . . most likely to be affected by global warming,” among others. WASH. REV. CODE § 90.54.180(5) (LexisNexis 2007) (“Water use efficiency and conservation programs and practices”).

¹²⁷¹ California recently enacted legislation requiring administrative agencies to report on the feasibility of a coordinated water measurement database. 2007 Cal. Ad. Legs. Serv. 675 (LexisNexis 2007). Such a database would be used, in part, to “provide information to address impacts related to climate change mitigation and adaptation.” *Id.* While monitoring creates useful information, it is only an initial step in addressing the impacts of climate change upon water resources.

¹²⁷² Washington notes that “[g]lobal warming has reduced the volume of glaciers in the North Cascade mountains to between eighteen to thirty-two percent since 1983;” “[m]ountain snow pack has declined virtually every measurement location in the Pacific Northwest, reducing the proportion of annual river flow to Puget Sound during summer months by eighteen percent since 1948;” and “[g]lobal warming has also shifted peak stream flows earlier in the year in watersheds covering much of Washington state, including the Columbia river basin, jeopardizing the state’s salmon fisheries.” WASH. REV. CODE § 90.46.005 note (a) (LexisNexis 2007).

See also TEX. HEALTH & SAFETY CODE ANN. § 382.0205 (Vernon 2007); 2007 Or. Laws page no. 907 § 1(4) (LexisNexis 2007); N.M. STAT ANN. § 75-4-3(B) (LEXISNEXIS 2007) (noting the duties of the state climatologist shall include, among others, “coordinating climate impact studies and programs to improve the understanding of climate processes, natural and man-induced, and of the social and economic implications of climate change”); N.D. CENT. CODE § 17-01-01 (LexisNexis 2007) (“Increasing America’s renewable energy use will . . . clean up the air and reduce urban smog and address global warming issues.”).

¹²⁷³ “‘Climate change’ means a change of climate attributed directly or indirectly to human activity that alters the composition of global atmosphere.” WASH. REV. CODE § 28B.30.640(3) (LexisNexis 2007).

“‘Global warming’ means an increase in the average temperature of the Earth’s atmosphere that is associated with the release of greenhouse gases.” 2007 Or. Laws page no. 907 § 3(1) (LexisNexis 2007).

¹²⁷⁴ “The potential adverse impacts of global warming include . . . a reduction in the quality and supply of water to the state from the Sierra snowpack, a rise in sea levels resulting in the displacement of thousands of coastal businesses and residences [and] damage to marine ecosystems and the natural environment. . . .” CAL. HEALTH & SAFETY CODE §§ 38501(a) (Deering, LexisNexis 2007) (Legislative findings and declarations)

“Reduced snowpack, changes in the timing of stream flows, extreme or unusual weather events, [and] rising sea levels . . . could significantly impact the economy, environment and quality of life in Oregon.” 2007 Or. Laws page no. 907 § 1(4) (LexisNexis 2007).

the causes of climate change is noteworthy¹²⁷⁵ but for the most part, state legislatures have not yet added to the number of available legal and institutional tools in order to increase flexibility to deal with the potential impacts of climate change. Nevertheless, there are a number of tools that exist in the western states that can be adapted to address the possible consequences that have been identified. These mechanisms vary from state to state. This chapter is not designed to judge the adequacy of any state's laws and institutions regarding these mechanisms. Rather, these tools are discussed so that each state can evaluate and consider its capacity to respond to potential climate change impacts.

As water administrators grapple with these challenges, conducting an initial vulnerability analysis for watersheds may be valuable.¹²⁷⁶ Likewise, adaptive management¹²⁷⁷ can be a powerful approach to help administrators put the available tools to effective use. The rest of this chapter reviews existing tools and other ideas that may prove useful.

3.1.B.(i) Demand Management

Managing demand is particularly important because climate change may not only reduce water supply, but will likely lead to an increase in water demand.¹²⁷⁸ Higher temperatures lead to greater domestic and agricultural demand in part because of higher evaporation and transpiration rates. To complicate matters, western populations are growing, further stressing an already tenuous dynamic. The dual prospects of reduced supply and increased demand heighten

"The legislature . . . finds that climate change is expected to have significant impacts in the Pacific Northwest region in the near and long-term future." WASH. REV. CODE § 43.325.005(2) (LexisNexis 2007). Water-related effects include "[i]ncreased temperatures, declining snowpack, more frequent heavy rainfall and flooding, receding glaciers, rising sea levels . . . and increased drought. . . ." *Id.*

¹²⁷⁵ California has enacted the "Global Warming Solutions Act of 2006" in an effort to reduce emissions to 1990 levels by 2020. See CAL. HEALTH & SAFETY CODE §§ 38500-38599 (Deering, LexisNexis 2007). In May 2007, Washington passed legislation to reduce overall greenhouse gas emissions to 1990 levels by 2020 and twenty-five percent below 1990 levels by 2035. See WASH. REV. CODE §§ 80.80.005 to 80.80.080 (LexisNexis 2008).

¹²⁷⁶ Vulnerability analysis is the process of measuring the susceptibility of system failure once it is exposed to potentially threatening natural phenomena. See *Basics of Vulnerability Analysis* 10, available at <http://www.paho.org/English/Ped/nd-chapter2.pdf> (last visited Nov. 29, 2007). In this instance, the natural phenomena are global, regional, or local climate change. Effective vulnerability analysis generally includes examining (1) watershed characteristics; (2) water allocation; (3) the ratio of stored water versus runoff; (4) the diversity of the available water supply; (5) flood management; (6) water-related infrastructure; and (7) environmental water requirements.

¹²⁷⁷ Adaptive management is "an iterative, incremental decisionmaking process built around a continuous process of monitoring the effects of decisions and adjusting decisions accordingly." J.B. Ruhl, *Regulation by Adaptive Management - Is It Possible?*, 7 MINN. J.L. SCI. & TECH. 21, 28 (2005). Said differently, "[u]nder adaptive management, regulators use models of natural resource systems to develop performance measurements and initial policy choices, but they build into the regulatory implementation framework a process for continuous monitoring, evaluation, and adjustment of decisions and practices." J.B. Ruhl, *Taking Adaptive Management Seriously: A Case Study of the Endangered Species Act*, 52 KAN. L. REV. 1249, 1249 (2004). One of the key advantages of adaptive management is the ability to adjust current approaches in light of new data in order to achieve management objectives.

¹²⁷⁸ Jacobs, *supra* note 1261. Managing water demand presupposes administrators can accurately quantify current demand. If water providers cannot accurately track water use, developing the capacity to do so seems like a natural starting point.

the need to effectively manage demand because controlling demand may prove easier than increasing supply.¹²⁷⁹

States can manage water demand in various ways. Some states have enacted demand management provisions.¹²⁸⁰ Examples of state provisions include accounting for lost water,¹²⁸¹ considering rate structures to increase conservation,¹²⁸² educating the public about the importance of conservation,¹²⁸³ plumbing retrofits,¹²⁸⁴ and prohibiting waste.¹²⁸⁵ Most every demand management program includes a conservation component and an education component.¹²⁸⁶ Other possibilities include voluntarily retiring water rights through incentive programs, converting irrigated agriculture to dryland agriculture, or converting some farmland to crops that consume less water.¹²⁸⁷ More controversial possibilities include water pricing¹²⁸⁸ and water privatization.¹²⁸⁹ Undoubtedly, additional means to manage demand will develop in the future.

3.1.B.(ii) Increasing or “Stretching” Existing Supplies

Increasing water supply is possible but challenging. Additional water can be derived via desalination, water reuse, increased storage, conjunctive management, weather modification, and system reoperation. Currently, desalination is expensive and disposing of “concentrate” presents its own set of concerns.¹²⁹⁰ Nevertheless, desalination may become an increasingly viable option as technology improves.

Water reuse can help supplement existing supplies by treating effluent and rendering it suitable for non-potable purposes.¹²⁹¹ Federal laws bear directly upon water reuse, as some (like the discharge standards of the CWA) facilitate its use¹²⁹² while others (like the Safe Drinking Water Act and NEPA) may retard its use.¹²⁹³ Likewise, state laws regulating biochemical

¹²⁷⁹ See *infra* notes 1290-1329 and accompanying text.

¹²⁸⁰ See *supra* notes 564-576 and accompanying text (discussing enacted provisions in Arizona, California, and Washington).

¹²⁸¹ See *supra* note 567 and accompanying text.

¹²⁸² See *supra* notes 567, 571 and accompanying text.

¹²⁸³ See *supra* note 567 and accompanying text.

¹²⁸⁴ See *supra* note 571 and accompanying text.

¹²⁸⁵ See *supra* note 571 and accompanying text.

¹²⁸⁶ See *supra* notes 577-579 and accompanying text.

¹²⁸⁷ E-mail from Paul Graves, Assistant Chief Eng’r, Kan. Dep’t of Agriculture, to Jeff Taylor, Legal Counsel, W. States Water Council (Jan. 15, 2008, 17:21:06 MST) (on file with the authors). See also *infra* note 1346 (discussing agricultural conservation practices).

¹²⁸⁸ See *supra* notes 585-607 and accompanying text.

¹²⁸⁹ See *supra* notes 609-612 and accompanying text.

¹²⁹⁰ See *supra* Chapter 2, Section 9. *Desalination*, at pages 141 to 150.

¹²⁹¹ See *supra* Chapter 2, Section 5. *Water Reuse*, at pages 97-107.

¹²⁹² See *supra* notes 763-765 and accompanying text. While this may seem counterintuitive at first, the standards imposed by the CWA may make it more cost-efficient for potential dischargers to sell effluent for reuse rather than to treat it to the degree required under the CWA for discharge. See *id.* The purchaser could then treat and utilize the reclaimed water for its own purposes, including its sale.

¹²⁹³ See *supra* notes 770-772 and accompanying text. NEPA requires a careful assessment of any reuse project receiving federal funds. Likewise, the Safe Drinking Water Act sets general standards for water and may

oxygen demand (BOD), total suspended solids (TSS), or coliform may also affect water reuse.¹²⁹⁴ Other obstacles confronting water reuse include uncertainties about the right to use wastewater,¹²⁹⁵ agricultural impacts of agricultural reuse,¹²⁹⁶ public aversion to water reuse,¹²⁹⁷ potential health risks,¹²⁹⁸ environmental impacts,¹²⁹⁹ and costs.¹³⁰⁰ Still, water reuse remains an important way to stretch existing supplies, as demonstrated by effective programs in California and Arizona.¹³⁰¹

Traditionally, water storage has been synonymous with dams and reservoirs. However, financial and environmental costs make constructing the large, expansive dams of yesteryear less likely in today's world.¹³⁰² Some states are considering more upstream storage facilities to capture early runoff and minimize stress on downstream infrastructure.¹³⁰³ New storage facilities will probably be smaller and more environmentally sensitive than earlier ones. States considering new surface storage facilities will have to navigate the gauntlet of applicable federal and state laws such as the CWA,¹³⁰⁴ ESA,¹³⁰⁵ NEPA,¹³⁰⁶ and others.¹³⁰⁷ In contrast, modifying existing storage facilities can augment storage capacity at relatively lower cost and with fewer environmental challenges.¹³⁰⁸ Sediment dredging may be used to reclaim lost storage capacity in older reservoirs, although this can be expensive and technologically challenging.¹³⁰⁹ Likewise, raising existing dams can increase storage capacity and might be feasible in some circumstances.¹³¹⁰

While new surface water storage may yet prove an invaluable source of additional water, water managers also recognize the potential to store water underground. Groundwater pumping during the past century has created space for groundwater storage that managers can utilize if

affect a reuse program, particularly if reuse could potentially impact potable supplies. Complying with the federal statutes may make reuse more difficult, or even unfeasible, in less populated areas with fewer resources.

¹²⁹⁴ See *supra* notes 773-778 and accompanying text.

¹²⁹⁵ See *supra* notes 779-785 and accompanying text.

¹²⁹⁶ See *supra* notes 786-799 and accompanying text.

¹²⁹⁷ See *supra* notes 800-809 and accompanying text.

¹²⁹⁸ See *supra* notes 810-817 and accompanying text.

¹²⁹⁹ See *supra* notes 818-824 and accompanying text.

¹³⁰⁰ See *supra* notes 825-835 and accompanying text.

¹³⁰¹ Water suppliers in Arizona are reporting up to 40% water savings in new subdivisions that are piped for reuse. E-mail from Joan Card, Director, Water Quality Div., Ariz. Dep't of Env'tl. Quality, to Jeff Taylor, Legal Counsel, W. States Water Council (Jan. 15, 2008, 09:57:54 MST).

¹³⁰² See *supra* note 617 and accompanying text. See also NATIONAL RESEARCH COUNCIL, *supra* note 1253, at 133-35. However, California's Diamond Valley Lake, with a storage capacity of 800,000 acre-feet, is a notable exception.

¹³⁰³ For example, California is considering using more of these upstream storage facilities to capture early spring runoff. See Nicolas A. Jacobs & J. Canger, *Climate Change and Water in California*, 12 W. WATER L. 37, 39 (2007).

¹³⁰⁴ See *supra* notes 618-632 and accompanying text.

¹³⁰⁵ See *supra* notes 633-644 and accompanying text.

¹³⁰⁶ See *supra* notes 651-652 and accompanying text.

¹³⁰⁷ Other statutes may include the federal Wild and Scenic Rivers Act and state environmental statutes. See *supra* notes 645-650, 653 and accompanying text.

¹³⁰⁸ E-mail from Paul Graves, *supra* note 1287.

¹³⁰⁹ *Id.*

¹³¹⁰ *Id.*

economically and environmentally feasible.¹³¹¹ Coordinating groundwater storage, groundwater use, surface storage, and surface use is central to conjunctive management. Conjunctive management can give water administrators added flexibility.¹³¹² Arizona, for one, has a robust aquifer recharge, storage and recovery program implemented by its Department of Environmental Quality and Water Resources.

Weather modification may also provide additional water. Weather modification uses man-made means—usually silver iodide, dry ice, or ground-based propane generators—to increase precipitation over certain areas.¹³¹³ Like other means of increasing supplies, weather modification is not without controversy. Potential conflict may arise if one region or party aggressively modifies precipitation patterns to the detriment of others.¹³¹⁴ Nevertheless, weather modification remains an intriguing possibility for augmenting supplies.

Finally, system reoperation may help improve water use efficiency in ways that effectively increase water supply. “System reoperation means changing existing operation and management procedures for such water facilities as dams and canals to meet multiple beneficial uses.”¹³¹⁵ Reoperation may improve existing efficiency or may emphasize one use over another.¹³¹⁶ Sometimes, a facility needs physical modifications before reoperation is possible.¹³¹⁷

Increased coordination through reoperation can improve water deliveries for consumptive and environmental purposes.¹³¹⁸ Reoperation can also reduce conflicts between competing beneficial uses and provide additional flexibility to respond to extreme hydrologic events.¹³¹⁹ Potentially, reoperation can integrate multiple resource management strategies such as surface storage, conveyance facilities, conjunctive management, water-dependent recreation, and ecosystem restoration.¹³²⁰

Successful examples of system reoperation in California include: (1) changes in timing or volume of reservoir water storage and releases to accommodate changing priorities; (2) using temperature control devices to permit water to be released from variable depths to control water temperature and water quality downstream for ESA purposes while maintaining hydroelectric generation; (3) increasing storage and flood retention capacity of reservoirs by conveying reservoir water to groundwater banks before the refill season; (4) coordinating and

¹³¹¹ See *supra* notes 654-670 and accompanying text.

¹³¹² If geographic, geologic, hydrologic, and other factors allow it, water managers can store surplus surface water underground and potentially reduce evapotranspirative losses or the need to develop additional surface storage. However, water resource managers should be mindful of the energy costs required to pump stored water from the ground once it is needed. See *infra* notes 1326-1329 and accompanying text (discussing the “water-energy nexus”). It may be useful to consider potential fluctuations and forecasts in future energy costs—either higher or lower—when conducting this analysis.

¹³¹³ See *supra* notes 1181-1182 and accompanying text.

¹³¹⁴ See *supra* notes 1201-1237 and accompanying text.

¹³¹⁵ Cal Plan, *supra* note 1268, at 19-1.

¹³¹⁶ *Id.*

¹³¹⁷ *Id.*

¹³¹⁸ *Id.* at 19-2.

¹³¹⁹ *Id.* at 19-3.

¹³²⁰ *Id.*

interconnecting water storage, conveyance, and delivery systems within a watershed to improve benefits to the local area; (5) balancing water supply and delivery forecasts with the economic and environmental risks that water users and regulatory agencies may be willing to accept if full deliveries are not met.¹³²¹

Nevertheless, system reoperation has certain costs. First, performing state and federal environmental analyses can be time consuming and expensive.¹³²² Second, reoperation may require significant capital expenditures for infrastructural modifications, removals, or improvements.¹³²³ Third, reoperation may result in lost revenue from reduced hydroelectric power generation.¹³²⁴ Fourth, reoperation may increase maintenance or operation costs.¹³²⁵

While increasing supply may ultimately prove necessary, it is important to acknowledge what scholars call “the water-energy nexus.”¹³²⁶ The water-energy nexus recognizes the interdependence between new sources of water and the energy required to develop those sources.¹³²⁷ For example, pumping groundwater, inter-basin transfers, desalination, cloud seeding, and water reclamation all require significant quantities of energy.¹³²⁸ Therefore, our ability to supplement existing sources of water with energy-intensive ones may be limited by our current supplies of energy.¹³²⁹

3.1.B.(iii) Conservation

Conservation will likely be an important component of managing the water-related effects of climate change.¹³³⁰ Several states have enacted statutes to promote agricultural and municipal conservation measures.¹³³¹ Some agricultural measures eliminate the risk of abandonment or forfeiture by allowing the right holder to use at least a portion of the conserved water for her own use.¹³³² Consequently, agricultural water users have an incentive to conserve. California, Washington, Montana and Oregon have all enacted such statutes.¹³³³ Also, rotating

¹³²¹ *Id.* at 19-1.

¹³²² *Id.* at 19-4.

¹³²³ *Id.*

¹³²⁴ *Id.*

¹³²⁵ *Id.*

¹³²⁶ See Jacobs, *supra* note 1261. For more introductory information discussing the water-energy nexus, see 6 SW. HYDROLOGY 16-32 (2007), available at <http://www.swhydro.arizona.edu/> (last visited Dec. 18, 2007).

¹³²⁷ *Id.* The converse is also true; producing energy frequently requires significant quantities of water. See Bruce Hallin, Speaker at the Western States Water Council: The Water & Power Nexus & Future Considerations (Nov. 15, 2007), available at <http://www.westgov.org/wswc/155%20council%20meeting.html> (last visited Dec. 18, 2007). Given the interrelationship between water and energy, promoting energy conservation indirectly promotes water conservation. As a result, promoting water conservation in tandem with energy conservation will yield greater results than promoting water conservation alone.

¹³²⁸ *Id.*

¹³²⁹ *Id.*

¹³³⁰ See generally Craig Bell, *Promoting Conservation by Law: Water Conservation and Western State Initiatives*, 10 U. DENV. WATER L. REV. 313 (2007).

¹³³¹ See *supra* notes 673-733 and accompanying text. See also KAN. STAT. ANN. § 82a-733 (LexisNexis 2008) (discussing implementation of conservation plans and practices in Kansas).

¹³³² See *supra* notes 673-704 and accompanying text (discussing statutes relating to agricultural conservation in California, Washington, Montana, and Oregon, respectively).

¹³³³ Bell, *supra* note 1330, at 315-18.

fallowing and dry-year leasing can be used to free-up agricultural water for non-agricultural uses.¹³³⁴

The scope of municipal conservation measures is broader and includes educational programs, planning mandates, funding incentives, and statutory requirements.¹³³⁵ Washington, California, and Arizona are examples of states that enacted requirements pertaining to municipal conservation.¹³³⁶ Washington requires municipalities to evaluate “cost effective conservation measures.”¹³³⁷ Municipalities that implement such measures are afforded certain privileges that may not otherwise be available.¹³³⁸ California requires “urban water suppliers” to prepare an Urban Water Management Plan.¹³³⁹ Suppliers that fail to comply may be ineligible for certain grants, loans, or drought assistance.¹³⁴⁰ As part of Arizona’s Groundwater Management Act, municipal providers must meet gallon per capita per day targets in five different Active Management Areas.¹³⁴¹ Furthermore, providers must limit lost or unaccounted for water.¹³⁴² In Utah, water providers cannot receive low-interest loans from state water funding boards without valid water conservation plans.¹³⁴³ Furthermore, Utah water funding boards require petitioners seeking funds to adopt a time-of-day watering ordinance and implement a water rate structure that provides an incentive to conserve water.¹³⁴⁴ These examples provide a flavor of municipal conservation measures states may promote. However, these specific measures may not be viable options in every state.¹³⁴⁵

Educational and other outreach programs can encourage water users to conserve. Citizens may choose to voluntarily reduce consumption if they understand the benefits. Simple land use and irrigation practices can substantially reduce consumption without seriously compromising crop quality or yield.¹³⁴⁶ Similarly, changes in landscaping, including xeriscaping,¹³⁴⁷ can significantly reduce outdoor household and business consumption.¹³⁴⁸

¹³³⁴ See *supra* notes 1052-1086 and accompanying text. Rotating fallowing allows individual irrigators within a group of irrigators to fallow a fraction of their fields annually, with no single irrigator permanently retiring her fields. In contrast, dry year leasing refers to the statutorily authorized contracts that allow an entity to lease another’s water during drought years. See also *infra* notes 1368-1371 and accompanying text (discussing the advantages of temporary transfers over permanent transfers).

¹³³⁵ See *supra* notes 705-733 and accompanying text.

¹³³⁶ Bell, *supra* note 1330, at 319-21.

¹³³⁷ WASH. REV. CODE ANN. § 70.119A.180(4)(A) (LexisNexis 2006). The Washington Department of Health may provide technical assistance to help municipalities comply with the statute. The Department of Health and the Department of Ecology considers whether a municipality has conservation measures when considering development schedules for municipal supply rights. See *id.* § 70.119.180(4)(c)(ii).

¹³³⁸ See Bell, *supra* note 1330, at 319 (including a change or transfer of unperfected water rights if the change meets certain criteria).

¹³³⁹ CAL. WATER CODE § 10631 (LexisNexis 2007).

¹³⁴⁰ See Bell, *supra* note 1330, at 319-20.

¹³⁴¹ See *id.* at 320.

¹³⁴² *Id.*

¹³⁴³ E-mail from Dennis Strong, Director, Utah Div. of Water Res., to Jeff Taylor, Legal Counsel, W. States Water Council (Jan. 7, 2008, 15:07 MST) (on file with the authors).

¹³⁴⁴ *Id.*

¹³⁴⁵ Again, the purpose of this chapter is to review state mechanisms that may prove valuable as water resource managers adapt to the impacts of climate change. Each state is encouraged to draw from the practices of others only as much as they will help it meet its own water-related objectives.

¹³⁴⁶ Simple practices include (1) conservation tillage (leaving plant residue on the soil surface) to increase soil moisture and reduce evaporative losses; (2) conservation practices that reduce runoff and encourage infiltration;

Nevertheless, administrators should consider all consequences of agricultural and municipal conservation programs before implementing either of them. Both can result in potentially troublesome, though unintended consequences that impact third parties. Municipal conservation measures may cause higher concentrations of contaminants in wastewater, reduce available water for reclamation, and lead to a “hardening”¹³⁴⁹ of demand, which can reduce flexibility during drought.¹³⁵⁰ Agricultural conservation measures may result in a loss of wetlands, loss of wildlife forage, and a loss of wildlife habitat.¹³⁵¹ Both municipal and agricultural measures may reduce return flows and groundwater recharge.¹³⁵²

3.1.B.(iv) Water Banking

Water banking allows water users to sidestep the “use-it-or-lose-it” component of the prior appropriation doctrine by “depositing” surplus water into banks for later use.¹³⁵³ Historically, “depositing” water in a water bank could expose the underlying right to claims of forfeiture or abandonment. However, some states have statutorily eliminated the risk of forfeiture and abandonment for deposited rights.¹³⁵⁴ States that statutorily exempt “deposited” rights from forfeiture or abandonment reduce the risks for otherwise willing participants.

Many western states have banking programs.¹³⁵⁵ While water banking in the generic sense seems straightforward, the organization, administration, and purposes for creating banks

(3) soil moisture monitoring to increase irrigation efficiency; (4) maintaining riparian buffers near streams and other water sources; (5) planting suitable crops during times of drought; (6) early season watering to avoid late summer evaporative losses; (7) installing water measurement devices to track water uses; and (8) installing efficient irrigation systems (like switching from flood irrigation to wheel lines, pivot lines, or K-Lines ®). *See* Drought in Utah, *supra* note 1253, at 86-87. Efficient irrigation measures can also reduce municipal water use for landscaping. In some areas, state or federal funds may be available to help agricultural water users install more efficient irrigation systems.

¹³⁴⁷ Xeriscaping uses plants that require relatively less water than traditional ornamentals to beautify our homes and businesses. *See generally* DENVER WATER, XERISCAPE PLANT GUIDE (Fulcrum Publishing 1996).

¹³⁴⁸ Landscaping irrigation accounts for the majority of the seven billion gallons of water used for commercial and residential outdoor uses each day. Env'tl. Prot. Agency, <http://epa.gov/watersense/pubs/whatsnext.htm> (last visited Dec. 10, 2007).

¹³⁴⁹ Water-demand hardening refers to the process of water users limiting consumption to those uses deemed required or essential. Demand “hardens” because water users have already eliminated discretionary water uses, thereby making additional reductions during periods of drought more difficult.

¹³⁵⁰ Bell, *supra* note 1330, at 319.

¹³⁵¹ These habitats would include irrigated lands which do not qualify as wetlands, such as pastures, fields, or comparable lands.

¹³⁵² Municipal measures to conserve water may affect groundwater recharge, particularly in states that use reclaimed water to recharge local or regional aquifers.

¹³⁵³ Many states have statutorily removed the legal risks of forfeiture and abandonment which may lurk in a water banking program. *See supra* Chapter 2, Section 7. *Water Banking*, at pages 123-135.

¹³⁵⁴ *See, e.g.*, IDAHO CODE ANN. § 42-1764 (LexisNexis 2008); KAN. STAT. ANN. 82a-768 (LexisNexis 2008). *See also supra* note 948 and accompanying text.

¹³⁵⁵ Arizona, California, Colorado, Idaho, Kansas, Nevada, New Mexico, Oregon, Texas, and Washington all have banking programs in one form or another.

are quite varied, both within and between states.¹³⁵⁶ Banking programs have successfully “banked” surface water and groundwater to provide drought protection;¹³⁵⁷ flexibility for efficient water administration;¹³⁵⁸ additional resources for implementing Indian water rights;¹³⁵⁹ instream flows for endangered species preservation;¹³⁶⁰ and instream flows to meet other environmental objectives.¹³⁶¹ Banking has also been used to mitigate adverse effects of water transfers and new groundwater permits. Water banking has the potential to provide water managers needed flexibility as they administer water resources in the future.

3.1.B.(v) Water Transfers

Voluntary water transfers can potentially shift available water from “lower” valued uses to “higher” valued ones.¹³⁶² If climate change affects water resources, permanent and temporary water transfers may help augment municipal supplies. However, legal and environmental considerations may prohibit certain transfers, particularly if the proposed transfer would be permanent.

Local, state, and federal restrictions can derail potential transfers. Conservancy districts can be an important part of the transfer process but may block transfers they do not support.¹³⁶³ Some states restrict interbasin and interstate transfers, thereby precluding certain transfers.¹³⁶⁴ Similarly, interstate water compacts can complicate some transfers.¹³⁶⁵

Federal restrictions may also come into play. For projects administered by the Bureau of Reclamation (BOR), valid transfers must be for an authorized purpose, be approved by the BOR, protect project purposes, protect project contractors, and comply with applicable laws.¹³⁶⁶ Additional federal issues may also crop up during the course of a transfer proceeding.¹³⁶⁷ In light of these difficulties, some scholars suggest utilizing temporary transfers, where legally available, to address periodic drought-induced shortages.¹³⁶⁸

Temporary dry-year transfers have several advantages. First, temporary transfers generally have lower transaction costs because owners are generally more willing to part with their rights temporarily as opposed to permanently.¹³⁶⁹ Second, third-party impacts are limited to

¹³⁵⁶ See *supra* notes 940-1051 and accompanying text; see also Peggy Clifford et al., Wash. Dep’t of Ecology, Publ’n No. 04-11-011, *Analysis of Water Banks in the Western States* 61 (2004), available at <http://www.ecy.wa.gov/biblio/0411011.html> (last visited Dec. 7, 2007).

¹³⁵⁷ See *supra* notes 950, 956-962 and accompanying text.

¹³⁵⁸ See *supra* note 950 and accompanying text.

¹³⁵⁹ See *supra* notes 950, 991-993 and accompanying text.

¹³⁶⁰ See *supra* notes 988-990, 1026-1031 and accompanying text.

¹³⁶¹ See *supra* notes 1012, 1021-1025, 1035-1037, 1050-1051 and accompanying text.

¹³⁶² See *supra* notes 840-843 and accompanying text.

¹³⁶³ See *supra* notes 854-856 and accompanying text.

¹³⁶⁴ See *supra* notes 865-867 and accompanying text.

¹³⁶⁵ See *supra* note 872 and accompanying text.

¹³⁶⁶ See *supra* note 879.

¹³⁶⁷ See *supra* notes 881-939 and accompanying text.

¹³⁶⁸ See Jacobs, *supra* note 1261.

¹³⁶⁹ *Id.*

the duration of the temporary transfer.¹³⁷⁰ Third, temporary transfers typically arouse less local opposition than permanent transfers.¹³⁷¹ However, water users may be reluctant to transfer their rights temporarily if the transaction raises concerns about forfeiture or abandonment.¹³⁷² As with water banking, statutory assurances that specifically address these concerns may facilitate dry-year transfers.

3.1.B.(vi) A Caution

While the legal and institutional tools discussed in the Report offer flexibility to managers, implementing them can have adverse or unintended consequences. Resource managers can avoid some headaches if they carefully consider environmental impacts and other third-party impacts beforehand. For example, some decisions may impact agricultural communities, open space, and rural life particularly hard. Likewise, some decisions may have unanticipated environmental impacts. Climate change will likely create ecosystem vulnerabilities. Certain decisions, coupled with climate change, may exacerbate existing challenges such as managing invasive species and maintaining instream flows in key habitats.¹³⁷³ Furthermore, certain changes can affect third parties in ways that have legal ramifications.¹³⁷⁴

3.1.C. Conclusion

As temperatures increase, climate-induced changes will likely reduce supplies and increase demand. It may be wise to increase monitoring, data collection, and regional responsiveness to local climate trends because these steps will improve early warning systems.¹³⁷⁵ As states consider the impacts of climate change on water resources, they may wish to evaluate the tools discussed in this Report and assess their capacity to deal with potential impacts.

Likewise, prospectively addressing matters on a regional level may be beneficial because water-related impacts may span several states. Given the possible breadth of impact, water managers may want to deal with potential issues on an interstate, water-basin scale. This is particularly true if shared resources are involved. Agreements allocating shared resources (such as interstate water compacts) may prove inadequate if climate change significantly impairs long-term yields. Addressing the possibilities now can avoid future uncertainty and conflict.

Recent Colorado River management guidelines¹³⁷⁶ address future concerns on an interstate, water-basin scale. The decision implements new interim operation guidelines to meet

¹³⁷⁰ *Id.*

¹³⁷¹ *Id.*

¹³⁷² See *supra* notes 848-852 and accompanying text. This may be particularly true if the dry-year transfer is devoted to instream use.

¹³⁷³ *Id.*

¹³⁷⁴ See *supra* notes 750-753, 909-939 and accompanying text (discussing the legal implications of third-party impacts in light of conservation measures and water transfers, respectively).

¹³⁷⁵ Jacobs, *supra* note 1261.

¹³⁷⁶ U.S. Dep't of the Interior, Record of Decision, Colorado River Interim Guidelines for Lower Basin Shortages and the Coordinated Operations for Lake Powell and Lake Mead (Dec. 13, 2007), available at <http://www.usbr.gov/lc/region/programs/strategies.html> (last visited Dec. 12, 2007).

the challenges of current and future drought,¹³⁷⁷ including those related to climate change. The Secretary of the Interior acknowledged that the agreement is an innovative example of cooperation among the upper and lower basin states to proactively manage future drought.¹³⁷⁸ The agreement streamlines regional management decisions during drought because many difficult distribution decisions have already been made. Agreements like this one can prevent contentious litigation.

One scholar offered four insightful recommendations as we plan for climate change. First, do not assume that the future will be like the past.¹³⁷⁹ Scientists cannot precisely see future hydrologic changes, “but we can usefully explore the possibilities.”¹³⁸⁰ Second, examine the whole system.¹³⁸¹ It may be useful to understand how the various elements and uses of water are interconnected before decision makers evaluate the consequences of policy choices.¹³⁸² Third, “[e]mbrace uncertainty, or at least acknowledge it and deal with it explicitly.”¹³⁸³ Formal decision analysis can help plan for a future rife with uncertainty.¹³⁸⁴ Fourth, recognize that adapting will be a long ongoing process.¹³⁸⁵ Fortunately, policy makers and resource administrators do not need to make all of the decisions right now. However, it is important to develop a responsible approach for evaluating risk, incorporating new information, and improving adaptive capacity.¹³⁸⁶

¹³⁷⁷ See U.S. Dept’ of the Interior, Secretary Kempthorne Signs Historic Decision for New Colorado River Management Strategies (Dec. 13, 2007), available at <http://www.usbr.gov/lc/region/programs/strategies.html> (last visited Dec. 12, 2007). First, the new guidelines establish rules for shortages, specify who will take reductions, and delineate the conditions under which reductions will occur. Second, the rules allow Lake Powell and Lake Mead to rise and fall in tandem, thereby better sharing the risk of drought across the entire river basin. Third, the guidelines establish rules for distribution during times of surplus. Fourth, the new rules encourage new initiatives for water conservation.

¹³⁷⁸ *Id.*

¹³⁷⁹ Miller, *supra* note 1255, at 95.

¹³⁸⁰ *Id.*

¹³⁸¹ *Id.*

¹³⁸² *Id.*

¹³⁸³ *Id.* at 96.

¹³⁸⁴ *Id.*

¹³⁸⁵ *Id.*

¹³⁸⁶ *Id.*

Chapter 4

Coordination and Cooperation in Protecting Instream Flows

The sixth heading of the WGA Water Report is titled “Coordination and Cooperation in Protecting Aquatic Species under the Endangered Species Act.” While endangered species remain an important part of the equation, this chapter expands the breadth of the discussion to include protecting instream flows generally. Like Chapter 3, Chapter 4 explores legal and administrative possibilities for providing water to meet a specific objective, namely instream flows. While many of the principles discussed in this chapter are common to those discussed in Chapter 2, some legal and administrative principles are unique to instream flows.

This Chapter developed from recommendation 6.B. of the WGA Water Report. It reads: “Identify tools under western state water law that can be used to provide water for threatened and endangered species.” As noted, we’ve expanded upon this recommendation. A more accurate description for this Chapter would read: “Identify tools under western state law that can be used to provide water for instream flows.” Consequently, this Chapter focuses on state tools to provide water for instream flows as opposed to federal tools. While federal tools may be an important element to preserve instream flows, an in-depth discussion is beyond the scope of this Chapter.

The WGA Water Report suggested analyzing: “(1) the use of public interest standards/criteria as a means to protect water for species; (2) state approaches to using instream flow laws as a tool to provide water for aquatic species; (3) other instream protection strategies, such as flow release conditions, or the creation of state wild and scenic rivers; (4) water “banking” and market approaches; (5) an analysis of cooperative state and federal efforts in reservoir operations to provide water for species; and (6) the merits of federal action to help expedite state general stream adjudications as a means to enhance the protection of species.” This Chapter attempts to address the first five of these suggestions.

Chapter 4

Section 1

State Tools to Preserve Instream Flows

4.1.A. Introduction

Instream use is defined as “[a]ny use of water that does not require diversion or withdrawal from the natural watercourse, including in place uses such as navigation and recreation as well as power generation that requires a continuous flow.”¹³⁸⁷ An instream flow is defined as “[a]ny quantity of water flowing in a natural stream channel at any time of year.”¹³⁸⁸ In an academic sense, an “instream use” recognizes the benefits and utility of an “instream flow.” However, this distinction is mostly semantic and for purposes of this chapter, the two terms are largely synonymous.

Instream flows are beneficial for many reasons. They provide habitat for wildlife, opportunity for recreation, and aesthetic beauty. They are part of the hydrologic cycle and are necessary for a healthy environment. If navigable, instream flows can be a source of transportation and facilitate commerce.

A seemingly insatiable thirst for water threatens instream flows in many western states. Increased water use has increased the need to manage instream flows, requiring western states to balance the tension inherent in managing any indispensable yet finite resource. The consequences are serious because water availability affects economic development, municipal development, agricultural interests, environmental quality, recreational opportunity, wildlife habitat, and the quality of life for individuals and communities.

In their role as water resource managers, states have used various “tools” (laws, regulations, and programs within state regimes) to provide needed water for instream use.¹³⁸⁹ While these tools differ from state to state, it is important for western states to consider various approaches for obtaining water necessary for instream use. Depending on the particular state and

¹³⁸⁷ 6 WATER & WATER RIGHTS 1311 (2005).

¹³⁸⁸ TOM ANNEAR ET AL., INSTREAM FLOWS FOR RIVERINE RESOURCE STEWARDSHIP 217 (Instream Flow Council, rev. ed. 2004) [hereinafter RIVERINE RESOURCE STEWARDSHIP].

¹³⁸⁹ Federal tools such as the Conservation Reserve Enhancement Program (CREP), statutes, licensing and permitting requirements, and regulations can preserve instream flows. However, this section emphasizes state tools as opposed to federal tools.

instream needs, individuals, states, state agencies, the federal government, federal agencies, and private organizations may be able to utilize state tools to preserve instream flows.¹³⁹⁰ For example, the federal government and its agencies can use state tools to preserve instream flow for species protected under the Endangered Species Act or to regulate water flows under the Wild and Scenic Rivers Act. This is not to suggest that federal tools should not be utilized. These represent national expressions of law and policy which should be seen as part of the arsenal of tools to preserve and enhance instream flows. It is to suggest that, more than ever before, these federal interests can be accommodated under state water law and institutions and distinct advantages can accrue from first attempting to rely on such laws and institutions.

This section discusses the availability of various state tools for providing water for instream use. Though this section identifies several tools by which water for instream use can be obtained or preserved, it is not an exhaustive analysis. Undoubtedly, methods and approaches to using water resources will change as demands continue to increase. The section begins with a description of the current context of state water management in the West. It then contains an analysis of: (1) the use of public interest criteria to protect instream flows; (2) other tools to protect instream flows; (3) legal mechanisms for protecting instream flow for western states; and (4) examples of cooperative instream flow efforts.

4.1.B. Legal Context for Preserving Instream Flows¹³⁹¹

4.1.B.(i) Traditional Prior Appropriation

In our federal system, the legal framework regulating water rights includes both state and federal components. Western water planning, development, and management have traditionally been carried out under the auspices of state law. Most western states utilize the doctrine of prior appropriation, in full, or in large part,¹³⁹² to allocate water. The doctrine of prior appropriation is an application of the common law maxim “first in time, first in right.” It posits that individuals that make use of water before others should have the right to continue doing so. To secure legally cognizable rights under the doctrine of prior appropriation, applicants have historically needed to show (1) an intention to divert water; (2) actual diversion of water; and (3) application of the diverted water to a “beneficial use.” Early examples of “beneficial use” include irrigation, mining activities, and hydro-mechanical power, among others.

¹³⁹⁰ See *infra*, Section 4.1.E. Individual State Laws for Preserving Instream Flows, pages 194-217.

¹³⁹¹ Preserving instream flows in western states is an interdisciplinary endeavor. The arena is dynamic and the various influences will change over time. To be effective, proponents of instream use must understand the interface between science, the public, and our legal system. Although an extensive discussion of riverine ecology is beyond the scope of this report, a stream’s physical and biological properties affect wildlife, water quality, recreation, fisheries, and other criteria commonly recognized and regulated under state law. As a result, a rudimentary understanding of riverine ecosystems is helpful when using legal means to protect instream flows. Also, the public’s attitude towards, exposure to, and appreciation of instream flows affect the level of political attention given to instream-use issues. Finally, the legal framework provides the mechanism to preserve water for instream use, whether the use is for the public, the riverine ecosystem, or both. Due to the nature of this report, this section focuses on the public and legal contexts and leaves the ecological discussion to the scientists.

¹³⁹² While the eighteen member states of the Western States Water Council all recognize the doctrine of prior appropriation for surface waters, California also recognizes some aspects of the riparian system and the Pueblo system for surface waters.

The doctrine of prior appropriation is a heritage of our western culture and has served the West well for over 150 years. There are reasons it has endured. An important characteristic of the appropriative water right is that once vested, it becomes a constitutionally protected property interest which can be devised, sold, leased, or otherwise alienated. Property protections provide investment security. As property, water rights can be taxed, regulated, and subjected to eminent domain.¹³⁹³ However, water rights can be terminated if abandoned, forfeited, or acquired by prescription.¹³⁹⁴ Water law is particularly unsympathetic to nonuse and waste.

4.1.B.(ii) Prior Appropriation Adapts to Preserve Instream Values

The prior appropriation doctrine has often been criticized as outdated, inflexible, or otherwise unable to meet current water resource management needs, particularly the protection of “public values.” For example, in 1975 the National Water Commission reported that state laws were, “in many instances . . . inadequate to protect important social uses of water.” Not all observers would concede that this view was accurate in the early 1970’s. But in any event, all would agree that states have since modified the appropriation doctrine to enhance public interest protection. The evolution of state laws and institutions has direct relevance to this Report because many developments significantly enhance instream flows. Developments in public interest review; the concept of “beneficial use;” the diversion requirement; and instream flow appropriation all reflect this change.

Traditionally, protecting the public interest was synonymous with maximizing economic benefit.¹³⁹⁵ However, since these early times, western states have increased the breadth of public interest values to include environmental, aesthetic, and other factors that are not purely economic in nature.¹³⁹⁶ State legislatures and state courts have established and defined public interest criteria that must be met when an application to appropriate water—or to transfer a vested water right—is considered.¹³⁹⁷

Another significant development in the prior appropriation doctrine can be seen in the expansion of “beneficial use” to include instream uses. The legislative history in Arizona provides a good example. The Arizona Legislature enacted the surface water code in 1919.¹³⁹⁸ In 1941, the Arizona Legislature added “wildlife, including fish” to the list of beneficial uses.¹³⁹⁹ In 1962, “recreation” was added to the list.¹⁴⁰⁰ Wildlife and recreation were different than traditional beneficial uses because neither required a diversion. Thus, the idea of an *in situ* appropriation was born, as later confirmed some fourteen years later by the Arizona Court of

¹³⁹³ See *supra* Section 2.1.E. “First in Time, First in Right,” at page 70.

¹³⁹⁴ See *supra* notes 559-563 and accompanying text.

¹³⁹⁵ See *infra* notes 407-408 and accompanying text.

¹³⁹⁶ Aesthetics, recreation, environmental quality, ecological integrity, and quality of life all have economic value, though their respective economic value may be more difficult to ascertain than those for other uses of water. See generally Robert N. Stavins, *Economic Analysis of Global Climate Change Policy: A Primer*, in CLIMATE CHANGE: SCIENCE, STRATEGIES, AND SOLUTIONS 2 (2000), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=240389 (last visited Nov. 20, 2007).

¹³⁹⁷ See *infra* section 4.1.C. Public Interest Criteria for Obtaining and Transferring Water Rights, page 181.

¹³⁹⁸ Herb Dishlip, *Instream Flow Water rights: Arizona’s Approach*, in INSTREAM FLOW PROTECTION IN THE WEST, REVISED EDITION 1993 10-1 (Lawrence J. MacDonnell et al. eds., 1993).

¹³⁹⁹ *Id.* at 10-3.

¹⁴⁰⁰ *Id.*

Appeals.¹⁴⁰¹ This general expansion of “beneficial use” has repeated itself in many western states, though each state has acted in its own way and on its own schedule. Currently, many western states recognize instream uses as “beneficial” in the appropriative sense.¹⁴⁰²

Like “beneficial use,” diversion has been a longstanding requirement under the appropriation doctrine. However, some states have relaxed or otherwise modified the diversion requirement to allow instream use. For example, Colorado passed a unique statute to satisfy the diversion requirement when appropriating water for recreational purposes. Colorado recognizes recreational in-channel diversions (RICDs), which are the minimum amount of stream flow as it is diverted, captured, controlled, and put to beneficial use between specific points, “defined by control structures,” for recreational purposes.¹⁴⁰³ Counties, municipalities, cities, and water districts can apply for RICDs to provide “a reasonable recreation experience” for periods between April 1 and Labor Day.¹⁴⁰⁴

Early appropriation law encouraged out-of-stream use because allowing water to flow to the sea was considered wasteful. This view has softened as states have recognized the value of instream flows. Every western state provides legal mechanisms to protect instream values. Some states even allow appropriations and reservations for instream flows. For example, the Nevada State Engineer issued appropriative water rights to the United States Bureau of Land Management and Forest Service for recreation, fishery, and wildlife watering, including instream flow rights. He did so even though the statutory basis for granting the rights did not clearly define the uses as “beneficial” and the appropriation contained no specific authority recognizing instream flow rights. The Nevada Supreme Court upheld the appropriation despite contrary arguments by the state Department of Agriculture.¹⁴⁰⁵

Developments in public interest review, “beneficial use,” the diversion requirement, and instream appropriations show that the doctrine of prior appropriation is not static. Rather, these changes reveal how states have modified the doctrine to accommodate instream use. Increasingly, state law can be used to satisfy various instream concerns, including federal interests.

4.1.B.(iii) Federal Statutes, Resource Management, and Instream Flows

No contextual discussion of instream use in the West is complete without mentioning federal statutes. The Clean Water Act of 1972,¹⁴⁰⁶ the Endangered Species Act of 1973

¹⁴⁰¹ McClellan v. Jantzen, 547 P.2d 494, 496 (Ariz. Ct. App. 1976).

¹⁴⁰² See *infra* Section 4.1.E. Individual State Laws for Preserving Instream Flows, pages 194-217.

¹⁴⁰³ COLO. REV. STAT. § 37-92-103(10.3) (LexisNexis 2007). The concept of recreational in-channel diversions was first recognized by the Colorado Supreme Court in 1992. See *City of Thornton v. City of Fort Collins*, 830 P.2d 915 (Colo. 1992). RICDs remain controversial and additional legal challenges have followed. See, e.g., *Colo. Water Conservation Bd. v. Upper Gunnison River Water Conservancy Dist.*, 109 P.3d 585 (Colo. 2005). See generally, Joshua Mack, *The Evolution of Colorado’s Recreational In-Channel Diversions*, 10 U. DENV. WATER L. REV. 73 (2006-2007).

¹⁴⁰⁴ COLO. REV. STAT. § 37-92-103(10.3) (LexisNexis 2007). It is worth noting that this period often coincides with periods of reduced flow due to high water use and seasonal patterns.

¹⁴⁰⁵ *Nevada v. Morros*, 766 P.2d 263 (Nev.1988).

¹⁴⁰⁶ 33 U.S.C. §§ 1251-1387 (LexisNexis 2007).

(ESA),¹⁴⁰⁷ the National Forest Management Act of 1976,¹⁴⁰⁸ the Federal Land Policy and Management Act 1976,¹⁴⁰⁹ and the Safe Drinking Water Act¹⁴¹⁰ were created in the space of a few years. These statutes can bear directly upon state water administration and policy. Now, more than ever, states and federal agencies must cooperate to satisfy their respective obligations and objectives.

This is not to suggest that conflicts dominate the state and federal relationship as it relates to water resources.¹⁴¹¹ Nevertheless, competing objectives can impede the efficient and effective use of the West's limited water resources.¹⁴¹² Some disagreement is inevitable because the federal government is a major landowner and water purveyor while the states have primary authority for allocating water.¹⁴¹³ However, when disagreements give rise to open conflicts, the situation can be debilitating.¹⁴¹⁴ Reducing conflicts through increased cooperation is a major impetus for this Report.

State and federal agencies frequently pursue parallel water resource objectives. However, sometimes the means federal agencies use to pursue their objectives conflict with those chosen by states. Nowhere is this more readily apparent than in the context of ESA enforcement. In the Klamath Basin during the summer of 2001, deliveries of UBBR's Klamath Project water to contractors in Oregon and California were curtailed because water was withheld under the ESA. Water deliveries within the Klamath Basin were shut off after conflicting biological opinions by the National Marine Fisheries Service (NMFS) and the United States Fish and Wildlife Service (FWS) determined that low stream flows in the Klamath River jeopardized endangered sucker fish and threatened Coho salmon.¹⁴¹⁵ Subsequently, a National Academy of Sciences report concluded that the federal assessment not to deliver water was unsupported by available science.¹⁴¹⁶ However, an additional National Academy report concluded that additional flows were needed for the salmon.¹⁴¹⁷

The controversy over the Rio Grande's endangered silvery minnow further illustrates the problem that arises when federal and local water demands diverge. On September 18, 2002, U.S. District Court Judge James Parker ordered the FWS and the Bureau of Reclamation (BOR) to

¹⁴⁰⁷ 16 U.S.C. §§ 1531-1544 (LexisNexis 2007).

¹⁴⁰⁸ 16 U.S.C. §§ 1600-1687 (LexisNexis 2007). This legislation is also known as the Forest and Rangeland Renewable Resources Planning Act of 1974.

¹⁴⁰⁹ 43 U.S.C. §§ 1701-1785 (LexisNexis 2007).

¹⁴¹⁰ 42 U.S.C. §§ 300f to 300j-26 (LexisNexis 2007).

¹⁴¹¹ D. Craig Bell & Norman K. Johnson, *State Water Laws and Federal Water Uses: The History of Conflict, the Prospects for Accommodation*, 21 ENVTL. L. 1, 3 (1991).

¹⁴¹² *Id.*

¹⁴¹³ *Id.*

¹⁴¹⁴ *Id.*

¹⁴¹⁵ See *Western States Water #1407* (On file at Western States Water Council).

¹⁴¹⁶ See *Scientific Evaluation of Biological Opinions on Endangered and Threatened Fishes in the Klamath River Basin Before the H. Comm. on Res.*, Mar. 13, 2002 (statement of Dr. William M. Lewis, Jr., Chairman, Comm. on Endangered and Threatened Fishes in the Klamath River Basin), available at http://www7.nationalacademies.org/ocga/testimony/Endangered_Fish_Klamath_River_Basin.asp (last visited Nov. 19, 2007).

¹⁴¹⁷ NAT'L RESEARCH COUNCIL, *ENDANGERED AND THREATENED FISHES IN THE KLAMATH RIVER BASIN: CAUSES OF DECLINE AND STRATEGIES FOR RECOVERY* (2004).

release stored water to provide flows in the Rio Grande for the silvery minnow. Due to extreme drought, hydrologists predicted that a 170-mile stretch of the Middle Rio Grande would dry-up by month's end, unless BOR released more water from the San Juan-Chama Project.

According to a September 12, 2002, Biological Opinion (BiOp), the FWS did not want to release more water, even though not doing so would have likely killed many silvery minnow. The FWS argued that it was more important to retain water in storage for use during the following spring when the fish spawn. However, Judge Parker ruled later that month that the BiOp was arbitrary and capricious. Even though water in storage was already under contract for delivery to farmers and municipalities, Judge Parker ruled that BOR had the power to release the water to increase stream flow in spite of the contracts.¹⁴¹⁸ Despite these recent conflicts, there are viable alternatives to the litigation and hard feelings that can arise when the federal government asserts interests outside the traditional framework of state law.

4.1.B.(iv) Possibilities Exist for Federal Accommodation Under State Law

As outlined in section 4.1.B.(ii), the appropriation doctrine has evolved in the West to provide enhanced protection of public interest values. Former Secretary of Interior Gale Norton recognized this in remarks at the 2003 American Bar Association's annual water law conference. After noting an exception for Indian water rights, she stated that federal interests can be protected under state law in the same way as other water users. The Secretary noted that thirty years ago things were different, but now most states have instream flow laws and public interest standards that are compatible with federal objectives. Consequently, there is no reason for the federal government and the states to litigate their differences. States "have found innovative ways to work with the federal government to protect endangered species," she noted. "Accordingly," she said, "we hope to explore a variety of ways to resolve water issues with states, and we hope to avoid protracted litigation."¹⁴¹⁹

For example, in the Lehmi Basin in Idaho, the Bureau of Reclamation acquired water for endangered salmon through the state's water banking system.¹⁴²⁰ In addition to appropriation under state law, federal interests may be satisfied by purchasing and transferring state water rights. Some states have simplified such transfers by establishing water banks. Most states recognize instream flows as a beneficial use to which water may be transferred, although some states only allow state agencies to transfer a water right to an instream right. Using state-law based approaches recognizes the concept that:

¹⁴¹⁸ See *Western States Water* #1477; *Rio Grande Silvery Minnow v. Keys*, 356 F. Supp.2d 1222 (D.N.M. 2002). The Tenth Circuit later heard the appeal but dismissed the matter as moot. See *Rio Grande Silvery Minnow v. Keys*, 355 F.3d 1215 (10th Cir. 2004) (stating "As of today, the parties agree all provisions of the injunction either have been met or were never invoked."). Later, the district court dismissed the suit. See *Rio Grande Silvery Minnow v. Keys*, 469 F. Supp. 2d 1003 (D.N.M. 2005). Senator Pete Domenici of New Mexico helped secure over \$28 million for the Bureau of Reclamation's Middle Rio Grande Project in 2006, including \$12.9 million for cooperative projects associated with the silvery minnow and \$2 million to construct a minnow sanctuary near Albuquerque. See *Western States Water* # 1653 (2006).

¹⁴¹⁹ Address, Gale Norton, Secretary of Interior, given Feb. 20, 2003, at the American Bar Association Annual Water Law Conference.

¹⁴²⁰ See Peggy Clifford et al., Wash. Dep't of Ecology, Publ'n No. 04-11-011, *Analysis of Water Banks in the Western States* 61 (2004), available at <http://www.ecy.wa.gov/biblio/0411011.html> (last visited Nov. 1, 2007).

State government is the pivotal level for leadership, authority, and accountability in water resource management. The state role includes allocation of water supplies, administration of water rights, implementation of water quality protection programs, and protection of public water resource values. States are in the best position to integrate related aspects of water management, such as surface water and groundwater, water quantity and quality, and economic development and environmental protection, and to balance water uses. Further, states should assist and enable watershed groups to solve complex problems at the watershed, or problemshed, level.¹⁴²¹

The importance of state involvement in protecting endangered and threatened species was stressed in a 1998 policy resolution of the Western Governors' Association (WGA). Supporting state conservation agreements, the position recognizes that state efforts are necessary for the success of the ESA. It states in part:

Two primary purposes of the [ESA] are to provide a program for the conservation of endangered and threatened species and to provide a means for the conservation of the ecosystems upon which those species depend. The Act declares that a key to its success will be encouraging states and other interested parties to develop and maintain conservation programs through financial assistance incentives.

[M]ost declining species can be restored to health only through federal/state partnerships that involve private landowners and interested parties in decision making and that provide them with technical assistance, guidance, and resources to support their efforts.¹⁴²²

If interested parties recognize the importance of the state role, as well as the utility of approaches that favor cooperative partnerships, recent experience has shown that there are opportunities to settle conflicts through negotiation rather than litigation. Successful negotiations have occurred in several western states. Cooperative agreements have great potential to resolve conflicts—whether they are state/federal conflicts or otherwise. Considering the adverse effects and the drawbacks of other alternatives for resolving such conflicts, efforts to reach such agreements are clearly worthwhile.

4.1.C. Public Interest Criteria for Appropriating and Transferring Water Rights

Public interest criteria developed because water resources are held in trust to benefit the public and must be managed accordingly. This idea stems from the common law concept of the public trust doctrine. The public trust doctrine, at least in the realm of water resources, is

¹⁴²¹ D. Craig Bell et al., *Retooling Western Water Management: The Park City Principles*, 31 LAND & WATER L. REV. 303, 307-08 (1996).

¹⁴²² *Id.*

“traditionally defined in terms of navigation, commerce, and fisheries.”¹⁴²³ However, it has expanded to include “the right to fish, hunt, bathe, swim, to use for boating and general recreation purposes the navigable waters of the state, and to use the bottom of the navigable waters for anchoring, standing, or other purposes.”¹⁴²⁴ While the public trust doctrine is theoretically related to public interest criteria, this section focuses on the prospective application of public interest criteria in the appropriations process and not the retroactive application of public trust principles to vested water rights.¹⁴²⁵

Given the increased attention to public interest values in water management, many state legislatures and state courts have established public interest criteria that must be satisfied before applications to appropriate or transfer water rights are approved. Nevertheless, these criteria vary from state to state. Among the member states of the Western States Water Council, every state except Colorado and Oklahoma¹⁴²⁶ includes some public interest provisions in statutes governing new appropriations. Most states also require agencies to consider public interest factors in determining whether to approve a proposed water transfer of a vested right. However, it is not always clear what “public interest” means.

Some state legislatures define public interest by statute. The rest of the states rely on their courts to define public interest. Grouping public interest by statutory construct or judicial decision provides structure for discussing public interest criteria and emphasizes whether public interest review is primarily controlled by statute, by courts, or some combination of both. The following discussion illustrates public interest criteria in western states but does not discuss public interest criteria in every state. Instead, this section is designed to provide a flavor for the concept and concludes with examples of using public interest criteria for conservation.

In 1929, Oregon became the first state to define its public interest criteria in its water permit statute.¹⁴²⁷ Currently, Oregon’s water permit statute requires the commissioner to consider the following when conducting public interest review: (1) conserving the highest use of the water for all purposes; (2) the maximum economic development of the waters involved; (3) control of the waters of this state for all beneficial purposes, including flood control; (4) the quantity of water available for appropriation; (5) preventing wasteful, uneconomic, impracticable or unreasonable use of the waters; (6) vested and inchoate rights to the waters which may be impaired; and (7) the state water resources policy.¹⁴²⁸

Alaska followed suit and defined its public interest criteria in 1966. Prior to the state’s

¹⁴²³ *Marks v. Whitney*, 491 P.2d 374, 380 (Cal. 1971). See also *infra* notes 1561-1564 and accompanying text (discussing *Nat’l Audubon Soc’y v. Super. Ct. of Alpine County*, also known as the Mono Lake case). See also *supra* notes 553-555 and accompanying text. (discussing public nature and common ownership of state water resources).

¹⁴²⁴ *Marks*, 491 P.2d at 380.

¹⁴²⁵ A famous and controversial retroactive application of public trust principles occurred in the Mono Lake case. See also *infra* notes 1561-1564 and accompanying text.

¹⁴²⁶ Although Oklahoma does not require the issuing agency to consider public interest criteria during the appropriation process, in water adjudications, “the Attorney General shall intervene on behalf of the state in any suit for the adjudication of rights to the use of water if notified by the Board that the *public interests* would be best served by such action.” OKLA. STAT. tit. 82, § 105.5 (LexisNexis 2007) (emphasis added).

¹⁴²⁷ *Id.* at 495 (citing Act of Feb. 28, 1929, ch. 245, §1, 1929 Or. Laws 252-53).

¹⁴²⁸ OR. REV. STAT. § 537.170(8) (LexisNexis 2007).

Instream Flow Law of 1980, the public interest criteria were the primary tools for protecting instream flows. Under the current statute, the commissioner “shall consider” the economic activity resulting from the proposed appropriation, “the effect on fish and game resources and on public recreational opportunities,” “the effect on public health,” and “the effect on access to navigable public waters,” among others.¹⁴²⁹ Other states have defined public interest to one degree or another.¹⁴³⁰ North Dakota’s public interest criteria largely mirror Alaska’s but do not require the commissioner to consider the effect on public health or the effect upon access to navigable or public waters.¹⁴³¹ In Kansas, public interest review requires considering (1) the established minimum desirable stream flow requirements; (2) the area, safe yield and recharge rate of the appropriate water supply; (3) the priority of existing claims of all persons to use the water of the appropriate water supply; (4) the amount of each claim to use water from the appropriate water supply; and (5) all other matters pertaining to such question.¹⁴³²

Statutory public interest criteria have evolved to encompass instream uses in many western states. In Oregon, the initial public interest criteria in 1929 required considering “the highest use of the water for all purposes, including . . . public recreation, protection of commercial and game fishing and wildlife . . . or any other beneficial use to which the water may be applied for which it may have a special value to the public.”¹⁴³³ Oregon has since added “scenic attraction,” a criterion that arguably relates to instream values, to the list.¹⁴³⁴ Likewise, Alaska’s public interest criteria require the commissioner to consider fish and game resources, public recreational opportunities, and access to navigable waters—all of which relate to instream use. A Utah statute requires the state engineer to determine whether approving an application will unreasonably affect “public recreation,” the “natural stream environment,” or “will prove detrimental to the public welfare.”¹⁴³⁵ In such instances, the state engineer must withhold approval or reject the application until the state engineer has investigated the matter.

In the absence of statutorily defined public interest criteria, states rely upon administrative agencies and state courts to determine the scope of public interest review. In *Shokal v. Dunn*,¹⁴³⁶ the Idaho Supreme Court interpreted the term “public interest” broadly. The court held that Idaho law requires administrators to consider numerous variables including assurance of minimum streamflows, encouragement of conservation, protection of aesthetics and the environment, and the effect of the appropriation upon vegetation, fish, and wildlife.¹⁴³⁷ The court added that this list was not exhaustive and quoted the New Mexico Supreme Court: “As observed long ago by the New Mexico Supreme Court, the ‘public interest’ should be read broadly in order to secure the *greatest possible benefit* from [the public waters] for the

¹⁴²⁹ ALASKA STAT. § 46.15.080 (LexisNexis 2007).

¹⁴³⁰ See Douglas L. Grant, *Two Models of Public Interest review of Water Allocation in the West*, 9 U. DENV. WATER L. REV. 485, 496 (2006).

¹⁴³¹ N.D. CENT. CODE § 61-04-06(4) (LexisNexis 2007).

¹⁴³² KAN. STAT. ANN. § 82a-711(b) (LexisNexis 2007).

¹⁴³³ Grant, *supra* note 1430, at 495-96.

¹⁴³⁴ OR. REV. STAT. § 537.170(8)(a) (LexisNexis 2007).

¹⁴³⁵ UTAH CODE ANN. § 73-3-8 (LexisNexis 2007).

¹⁴³⁶ *Shokal v. Dunn*, 707 P.2d 441 (1985).

¹⁴³⁷ *Id.* at 449.

public.”¹⁴³⁸ While subsequent legislation has narrowed the breadth of public interest review in Idaho,¹⁴³⁹ *Shokal* is consistent with the public interest values because the benefits are primarily public or environmental in nature.

The evolution of public interest criteria to include instream values has increased the opportunity for agencies to deny new applications to appropriate water.¹⁴⁴⁰ Depending on the state, an issuing agency could deny an application if the new appropriation would adversely impact (1) economic development; (2) flood control; (3) the quantity of water available for appropriation; (4) the efficient use of water; (5) vested and inchoate rights; (6) state water resources policy; (7) aesthetic beauty; (8) fish and game resources; (9) wildlife; (10) vegetation; (11) public recreational opportunities; (12) access to navigable public waters; (13) public health; (14) public welfare; (15) the environment; (16) conservation; or (17) established minimum instream flows.¹⁴⁴¹ While these public interest criteria may not all directly relate to instream use, denying new appropriations for any reason reduces the strain on existing instream flows.¹⁴⁴² Importantly, courts have upheld application denials on the basis of public interest criteria.

The following examples are judicial decisions affirming administrative denials to appropriate water on the basis of public interest criteria. *State Engineer of Nevada v. Morris*¹⁴⁴³ involved an application to appropriate water for a proposed residential subdivision in Clark County, Nevada.¹⁴⁴⁴ The Engineer denied the application because “approval . . . would aggravate a basin-wide overdraft and would interfere with existing rights and therefore be detrimental to the public interest.”¹⁴⁴⁵ The Engineer relied upon various surveys and reports regarding the groundwater in the surrounding area.¹⁴⁴⁶ The court found that the Engineer’s decision to deny the application was based on “substantial evidence” and should be upheld.¹⁴⁴⁷

In *Doherty v. Oregon Water Resources Director*,¹⁴⁴⁸ landowners sought review of the Water Resources Director’s amended order declaring 274 square miles in Umatilla and Morrow

¹⁴³⁸ *Id.* (quoting *Young & Norton v. Hinderlider*, 15 N.M. 666, 110 P. 1045, 1050 (N.M.1910)) (emphasis added).

¹⁴³⁹ Currently, local public interest review is defined as “the interests that the people in the area directly affected by a proposed water use have in the effects of such use on the public water resource.” IDAHO CODE ANN. § 42-202B (LexisNexis 2007). The statutory change limits public interest review by location and resource.

¹⁴⁴⁰ The same may be true for applications to transfer or change existing uses. This will also vary by state.

¹⁴⁴¹ While this expansive list of public interest criteria does not come from a single state, it is a composite list of statutory public interest criteria from several states.

¹⁴⁴² A comprehensive analysis of using public interest criteria to deny applications to protect instream flows may be difficult because much information is not readily accessible. Many application denials are made by means of unpublished administrative orders. Under some circumstances, applications may be rejected even more informally. Because of the potential widespread impact, water reservations are almost certainly tabulated and listed in the state’s appropriation records system. Instream appropriations, by their very nature, are maintained as an integral part of the appropriation records system. Nevertheless, quantifying the exact reasons why water appropriations are approved or denied may not be readily ascertained from the record.

¹⁴⁴³ 819 P.2d 203 (Nev. 1991).

¹⁴⁴⁴ *Id.* at 204.

¹⁴⁴⁵ *Id.* (emphasis added).

¹⁴⁴⁶ *Id.*

¹⁴⁴⁷ *Id.* at 206.

¹⁴⁴⁸ 783 P.2d 519 (Or. 1989).

counties a critical groundwater area.¹⁴⁴⁹ The order precluded the Oregon Water Resources Commission from issuing new appropriations or modifying existing uses.¹⁴⁵⁰ Specifically, the Director concluded:

*In the interest of the public welfare, health and safety . . . it is necessary that adequate and safe supplies of ground water be maintained in the basalt ground water reservoir . . . for domestic and livestock and other beneficial uses of water, within the capacity of the resource. Therefore, it is necessary that the critical ground water area be closed to any further appropriation and that careful monitoring of water use occur.”*¹⁴⁵¹

The court upheld the Director’s order because the Director entered findings of fact sufficient to satisfy the statutory conditions for designating a critical groundwater area and had rationally related factual findings to the statutory conditions.¹⁴⁵²

In Arizona, the Arizona State Land Department (the predecessor to the Arizona Department of Water Resources for reviewing applications to appropriate water) used public interest criteria to deny an application which, if granted, would have resulted in the loss of 1.7 percent of the total recharge of one of Arizona’s groundwater basins.¹⁴⁵³ The State Land Department determined that it would not have been in the public interest to place additional strain on a source of groundwater supply experiencing substantial overdraft. The Arizona Court of Appeals upheld the denial of the application. It emphasized that, in a water short area, even a small reduction in recharge might cause substantial injury to the public welfare, particularly if followed by additional reductions.

These cases highlight two important points. First, public interest criteria can provide a basis for denying future applications to appropriate water. While protecting existing rights, sustained use, or recharge may be the primary reasons for denying an application, denials may secondarily preserve water for instream use. This power may be utilized with greater frequency in the future. However, preserving instream flows by limiting or conditioning new appropriations by administrative means depends upon the administrators involved and is only available to the extent administrators—such as state engineers—choose to make it available. Second, decisions by administrative officers are subject to a deferential standard of review. As the *Morris* court stated, “neither the district court nor this court will substitute its judgment for that of the State Engineer . . . [rather, we will] limit ourselves to a determination of whether substantial evidence in the record supports the State Engineer’s decision.”¹⁴⁵⁴ This makes it more difficult to overturn an engineer’s decision to deny a permit on the basis of public interest criteria.¹⁴⁵⁵

¹⁴⁴⁹ *Id.* at 520.

¹⁴⁵⁰ *Id.*

¹⁴⁵¹ *Id.* at 523 (emphasis added).

¹⁴⁵² *Id.* at 528.

¹⁴⁵³ *Ariz. Game & Fish Dep’t v. Ariz. State Land Dep’t*, 24 Ariz. App. 29, 535 P.2d 621 (1975).

¹⁴⁵⁴ *State Eng’r of Nev.*, 819 P.2d at 205.

¹⁴⁵⁵ The opposite is true as well. If administrative agencies make decisions that contravene instream values, a deferential standard of review will make it more difficult to promote instream values than if the judicial court were hearing the matter in the first instance.

4.1.D. Other Tools to Protect Instream Flows¹⁴⁵⁶

Public interest criteria allow administrative agencies to condition or deny new applications to appropriate water if the new appropriation would be harmful. This section discusses additional tools for preserving instream flows, including (1) flow-release conditions; (2) statutory protections of specific rivers; (3) instream appropriations and reservations; (4) water markets; (5) water transfers to instream use; (6) water banking; (7) incidental instream-flows; and (8) basin closures and moratoria. While the availability of these tools varies from state to state, most states have at least one of these tools.¹⁴⁵⁷ Each is discussed in turn.

4.1.D.(i) Flow-Release Conditions

Reservoir releases can be an important potential source of instream flows. The network of federal reservoirs, as well as smaller state and private retention structures, are designed to moderate seasonal periods of excess and scarcity on a regional scale. Reservoirs can capture waters otherwise lost and store them for release later. Reservoir releases can supplement stream flows and benefit fish and wildlife. This approach can be particularly effective for moderating annual periods when water would otherwise be unavailable.¹⁴⁵⁸

Both state and federal agencies have long conditioned new appropriations and approvals on minimum flow release conditions. However, integrating state and federal reservoir operations with instream flow protection programs is still incomplete. Nevertheless, negotiating reservoir operations that impact flow conditions has been a major part of resolving conflicts between federal agencies charged with endangered species enforcement and state water managers. Indeed, some states see reservoir flow releases as a desirable instream-flow protection strategy because it causes fewer disruptions to existing uses than other strategies.¹⁴⁵⁹

4.1.D.(ii) Protective State Legislation (Wild and Scenic Rivers Acts)

While protective legislation can preserve instream flows, this “tool” is not readily available. Only legislatures can pass statutes to protect specific waterways. Nevertheless, protective state legislation can protect instream values after a legislature designates specific stretches of streams and rivers.

¹⁴⁵⁶ The section on current strategies is a modified version of Dan Tarlock, *Future Issues In Instream Flow Protection in the West*, in *INSTREAM FLOW PROTECTION IN THE WEST* 8-3 to 8-9 (Lawrence J. MacDonnell & Teresa A. Rice, eds., 1993 ed. Natural Resources Law Center, University of Colorado School of Law).

¹⁴⁵⁷ For more information on the availability of these tools to preserve instream flows in western states, *see infra* Individual State Laws for Preserving Instream Flows.

¹⁴⁵⁸ While this can occur during any time of the year, water can regularly become scarce late in the summer when demand is high and runoff has ceased.

¹⁴⁵⁹ Some states specifically authorize constructing reservoirs or other impoundments to provide instream flows for fish and game. While the number of these structures actually built is unknown, state budgetary constraints likely limit their development. Other alternatives, like purchasing existing rights, may be more cost-effective. Existing water rights may be expensive, but may be less expensive than building extensive water storage capacity. The effectiveness of building water storage facilities or purchasing existing rights may rest largely upon the ability of policy makers to convince legislatures that the expenditure is worth the investment.

Protective state legislation can take different forms. Several states have patterned protective legislation after the federal Wild and Scenic Rivers Act,¹⁴⁶⁰ which seeks to preserve the free-flowing condition of unique streams.¹⁴⁶¹ At least four western states, California, Oklahoma, Oregon, and South Dakota, protect the free-flowing character of streams for recreation and wildlife this way.¹⁴⁶² In designating these rivers, these states require legislators to consider fish and wildlife,¹⁴⁶³ and all four states prohibit “detrimental” construction, such as dams, impoundments, and other obstructions.¹⁴⁶⁴ Oregon provides a direct method of protecting instream flows in designated rivers whereas instream-flow protection in California, Oklahoma, and South Dakota is more indirect.¹⁴⁶⁵

¹⁴⁶⁰ 16 U.S.C. §§ 1271-1287 (LexisNexis 2007).

¹⁴⁶¹ 16 U.S.C. §§ 1271 (LexisNexis 2007). *Cf.* OKLA. STAT. tit. 82, § 1452 (LexisNexis 2007); S.D. CODIFIED LAWS § 46A-1-16 (LexisNexis7) (statements of purpose in *haec verba*).

¹⁴⁶² CAL. PUB. RES. CODE §§ 5093.50 to 5093.70 (Deering, LexisNexis 2007); OKLA. STAT. tit. 82, §§ 1451 to 1471 (LexisNexis 2007); OR. REV. STAT. §§ 390.805 to 390.925 (LexisNexis 2007); S.D. CODIFIED LAWS §§ 46a-1-3 to 46a-1-16 (LexisNexis 2007).

¹⁴⁶³ CAL. PUB. RES. CODE § 5093.50 (Deering, LexisNexis 2007); OKLA. STAT. tit. 82, § 1452 (LexisNexis 2007); OR. REV. STAT. § 390.835(1) (LexisNexis 2007); S.D. CODIFIED LAWS § 46A-1-16 (LexisNexis 2007).

¹⁴⁶⁴ CAL. PUB. RES. CODE § 5093.55 (Deering, LexisNexis 2007); OKLA. STAT. tit. 82, § 1453 (LexisNexis 2007) (stating that once designated “[t]he stream or river shall not be impounded by any large dam or structure. . . .”); OR. REV. STAT. § 390.835(1) (LexisNexis 2007) (“No dam, or reservoir, or other water impoundment facility shall be constructed on waters within scenic waterways.”); S.D. CODIFIED LAWS § 46A-1-15 (LexisNexis 2007) (stating “no development shall occur which is detrimental to the natural and scenic beauty of the designated river”). However, it should be noted that legislatures retain the ability to modify these statutes and some restrictions do not apply during times of emergency.

¹⁴⁶⁵ DAVID M. GILLILAN & THOMAS C. BROWN, *INSTREAM FLOW PROTECTION: SEEKING A BALANCE IN WESTERN WATER USE* 158 (Island Press 1997).

In addition, Alaska has designated six rivers as “Recreation Rivers” and “Recreation River Corridors.”¹⁴⁶⁶ Alaska’s legislation protects specific stretches of each designated river and provides a direct means for preserving instream flows. Similarly, Nebraska, New Mexico, and North Dakota have statutorily designated individual rivers as “Scenic Rivers.”¹⁴⁶⁷ Although these statutory designations are not completely analogous to the federal Wild and Scenic Rivers Act, they do suggest an increasing number of states recognize the value of free-flowing waterways. Idaho,¹⁴⁶⁸ Washington,¹⁴⁶⁹ and Montana¹⁴⁷⁰ also afford protections for specific streams and rivers. In states where direct instream-flow protections are absent, protecting the free-flowing nature of streams and rivers may indirectly preserve beneficial instream flow patterns. In many instances, the protections relate more to prohibiting dams and regulating land use than in prohibiting withdrawals.

4.1.D.(iii) Instream Appropriations and Reservations

Water can be appropriated for instream use in some states. Instream appropriations have withstood arguments that a physical diversion is necessary, that instream use is not “beneficial,” and that such appropriations violate the constitutional guarantee of the right to divert.¹⁴⁷¹ However, instream rights are typically junior and the appropriation may fail to provide “wet” water for instream purposes, particularly during severe or prolonged periods of drought. Nevertheless, even junior appropriators have standing to challenge senior appropriators attempting to make changes to upstream diversions.¹⁴⁷² Consequently, junior appropriators can intervene during the administrative process. In states that limit ownership to state entities, third-party agreements have been fashioned to protect priority.¹⁴⁷³ Some states integrate instream-flow protection into their drought management plans.

A reservation for instream use has the same practical effect as an instream flow appropriation although the means are different. Rather than appropriating a quantity of water for instream use, a reservation withdraws a quantity of water which would otherwise be available for appropriation. The power to withhold water from appropriation is strictly within the purview of the state. One key difference between a reservation and an appropriation is the legal doctrine

¹⁴⁶⁶ See ALASKA STAT. § 41.23.400 to 41.23.510 (LexisNexis 2007).

¹⁴⁶⁷ See NEB. REV. STAT. § 72-2004.1 (LexisNexis 2007) (containing the Niobrara Scenic Act); N.M. STAT. ANN. § 16-4-1 (LexisNexis 2007) (designating El Rio Chama as a scenic river); N.D. CENT. CODE § 61-29-01 (LexisNexis 2007) (designating the Little Missouri River as a scenic river).

¹⁴⁶⁸ Idaho can designate protected rivers in the state water plan as either natural or recreational rivers. See IDAHO CODE ANN. § 42-1734A(4) (LexisNexis 2007). If a river is designated a natural river, the water resources board shall prohibit constructing or expanding dams; constructing hydropower projects; constructing water diversions; dredge or placer mining; alterations of the stream bed; and mineral, sand, or gravel extraction within the stream bed. *Id.* These provisions are comparable to those provided in state Wild and Scenic Rivers legislation.

¹⁴⁶⁹ Washington began a Scenic Rivers Program in 1977. DAVID M. GILLILAN & THOMAS C. BROWN, INSTREAM FLOW PROTECTION: SEEKING A BALANCE IN WESTERN WATER USE 159 (Island Press 1997). As of 1997, only the Skykomish River and the Little Spokane River have been designated. *Id.*

¹⁴⁷⁰ *Id.*
¹⁴⁷¹ The leading case is *Idaho Dep’t of Parks v. Idaho Dep’t of Water Admin.*, 96 Idaho 440, 530 P. 2d 924 (1974).

¹⁴⁷² See Tarlock, *supra* note 1456 at 8-3.

¹⁴⁷³ See Lori Potter, *People Preserving Rivers: The Public’s Role in the Acquisition and Enforcement of Instream Flows*, in INSTREAM FLOW PROTECTION IN THE WEST (Lawrence J. MacDonnell & Teresa A. Rice, eds., 1993 ed. Natural Resources Law Center, University of Colorado School of Law).

from which the concept derives: an appropriation is subject to the constraints of “beneficial use” while a reservation is not. Therefore, reservations can be advantageous if a state does not recognize instream use as “beneficial.” However, unlike an appropriation, a reservation is not a property right and may be subject to legislative or administrative modification.

Montana law illustrates how an instream flow reservation operates.¹⁴⁷⁴ Montana allows the state, state agencies, the federal government, and federal agencies to apply for and acquire “a state water reservation for existing or future beneficial uses or to maintain a minimum flow, level, or quality of water throughout the year or at periods or for a length of time that the department designates.”¹⁴⁷⁵ Reservations to maintain minimum flows are limited to a maximum of 50% of the average annual flow of record on gauged streams.¹⁴⁷⁶ The priority date of a minimum stream flow reservation stems back to the filing date of the application.¹⁴⁷⁷ Instream reservations are discussed in greater depth in the section titled Individual State Laws for Preserving Instream Flows.

4.1.D.(iv) Water Markets

A market approach that brings willing buyers and sellers together can be a successful strategy for preserving instream flows.¹⁴⁷⁸ While existing water markets may not operate as true “free” markets,¹⁴⁷⁹ the concept of using market principles to acquire water for environmental purposes has merit. As used in this section, water markets include the administrative or private use of economic and other incentives that “facilitate the transfer of water from one user to another.”¹⁴⁸⁰ An obvious, though key component of water markets is the voluntary nature of the transaction. Water market transactions may be permanent or temporary and can take the form of a purchase, lease, or donation.¹⁴⁸¹ Leases can be short-term,¹⁴⁸² long-term,¹⁴⁸³ or split-season.¹⁴⁸⁴

¹⁴⁷⁴ See also *infra* notes 1623-1638 and accompanying text.

¹⁴⁷⁵ MONT. CODE ANN. § 85-2-316(1) (2005).

¹⁴⁷⁶ *Id.* § 85-2-316(7). Reservations for ungauged streams lie within the discretion of the Montana Department of Natural Resources and Conservation.

¹⁴⁷⁷ *Id.* § 85-2-316(9).

¹⁴⁷⁸ BRANDON SCARBOROUGH & HERTHA L. LUND, SAVING OUR STREAMS: HARNESSING WATER MARKETS 1 (PERC 2007) [hereinafter SAVING OUR STREAMS].

¹⁴⁷⁹ Some in the legal community have argued that the term “water markets” is used imprecisely and that the nature of water resources and the legal constructs of water administration are not conducive for establishing “true” markets. See generally Joseph W. Dellapenna, *The Importance of Getting Names Rights: The Myth of Markets for Water*, 25 WM. & MARY ENVTL. L. & POL’Y REV. 317 (2000). See also, Christine A. Klein, *On Integrity: Some Considerations for Water Law*, 56 ALA. L. REV. 1009, 1013 (2005) (“The concept of water markets is ill-defined, inconsistently articulated, and highly dependant upon the water laws of the relevant state.”).

¹⁴⁸⁰ See Dellapenna, *supra* note 1480, at 321, 360.

¹⁴⁸¹ For more information on water transfers, see *supra* notes Chapter 2, Section 6. *Water Right Transfers*, pages 107-121.

¹⁴⁸² Short-term leases generally leave water instream for one or two years. See MONT. WATER TRUST, *Options for Landowners*, at <http://www.montanawatertrust.org/services.html> (then follow “Landowner Options” hyperlink) (last visited Feb. 1, 2008).

¹⁴⁸³ Long-term leases generally last five or more years. See *id.*

¹⁴⁸⁴ Split-season leases allow irrigation early in the season and leases late-season water for other use. See *id.*

In the early 1990s, finding willing buyers was often challenging. The process usually involved telephone calls to farmers and ranchers to assess their willingness to sell their water rights.¹⁴⁸⁵ Other early approaches included public meetings aimed at educating rights owners about acquisition programs.¹⁴⁸⁶ More recently, state and local posting and bulletin services, including web-based services, provide a forum where willing sellers can make information available to potential buyers.¹⁴⁸⁷ WaterBank is an online commercial “brokerage and investment banking house” that provides comparable information.¹⁴⁸⁸

Federal and state governments are usually the buyers in water markets and account for roughly 90 percent of all expenditures.¹⁴⁸⁹ This may be particularly relevant in the context of water markets and instream flows because some states limit ownership of instream rights to state or federal entities.¹⁴⁹⁰ The BOR has played an important role to meet instream flow requirements for endangered species.¹⁴⁹¹ State agencies in California and Idaho acquire water for instream use, typically through short-term leases.¹⁴⁹² At least one state has charged its agencies with exploring and pursuing a “variety of market approaches” to fill the gaps between current instream flows and needed flows.¹⁴⁹³ In some states, private groups can participate in the market as well. Groups like Trout Unlimited, the Nature Conservancy, and private water trusts have played an important role in preserving instream flows.¹⁴⁹⁴

Currently, Colorado, Montana, Oregon, and Washington all have water trusts in one form or another. Water trusts are private nonprofit organizations that acquire water rights for instream use.¹⁴⁹⁵ The Mission Statement of the Colorado Water Trust sums up the essence of private water trusts nicely: “The Colorado Water Trust is a private, non-profit conservation organization, which acquires, or assists others in acquiring, water rights or interests in water rights, using voluntary approaches from willing owners, for conservation benefits.”¹⁴⁹⁶

¹⁴⁸⁵ *Id.* at 21-22.

¹⁴⁸⁶ *Id.* at 22.

¹⁴⁸⁷ *Id.* See also *infra*, notes 1518-1520 and accompanying text.

¹⁴⁸⁸ See WaterBank, <http://waterbank.com> (last visited Feb. 1, 2008).

¹⁴⁸⁹ SAVING OUR STREAMS, *supra* note 1478, at 20.

¹⁴⁹⁰ Some conservation groups in the Rocky Mountain States feel that the public ownership requirement prevents them from participating in the instream flow market. See *id.* at 7.

¹⁴⁹¹ *Id.*

¹⁴⁹² *Id.*

¹⁴⁹³ See *infra*, note 1721 and accompanying text.

¹⁴⁹⁴ *Id.* at 21.

¹⁴⁹⁵ Mary Ann King, *Getting Our Feet Wet: An Introduction to Water Trusts*, 28 HARV. ENVTL. L. REV. 495, 495 (2004).

¹⁴⁹⁶ COLO. WATER TRUST, *Introducing the Colorado Water Trust*, at <http://www.coloradowatertrust.org> (last visited Sept. 1, 2007). Other water trusts have made comparable statements. The mission statement for the Montana Water Trust is as follows: “Our mission is to work cooperatively with farmers, ranchers, and other landowners to develop incentive-based agreements that benefit landowners, streamflows, and communities.” See MONT. WATER TRUST, *Welcome to the Montana Water Trust Website*, at <http://www.montanawatertrust.org> (last visited Sept. 1, 2007). See also OR. WATER TRUST, *Cooperative Solutions, Healthy Streams*, at <http://www.owt.org> (last visited Sept. 1, 2007) (“The Oregon Water Trust mission is to restore surface water flows for healthier streams in Oregon by using cooperative, free-market solutions.”); WASH. WATER TRUST, *Mission*, at http://www.thewatertrust.org/whoware/whoware_mission.html (last visited Sept. 1, 2007) (“[The Washington Water Trust] works to benefit water quality, fisheries and recreation in Washington’s rivers and streams by acquiring existing rights from willing sellers through purchase, lease, or gift.”).

In instances where parties are interested in leasing or purchasing rights, negotiating a price can be difficult. Seeking the help of a professional appraiser to determine the value of water rights may help.¹⁴⁹⁷ Factors that affect the price of the water right include (1) transferability; (2) water availability; (3) water quality; (4) water quantity; (5) the duration for which the right is being acquired; and (6) the characteristics of the right, including priority date, annual quantities, flow rates, and current use.¹⁴⁹⁸ Common methods for appraising or negotiating a price include the (1) sales comparison method; (2) land price differential method; (3) income capitalization method; and (4) the replacement cost method.¹⁴⁹⁹ Each method is briefly discussed in turn.

The sales comparison method compares the subject water right with similar rights that have been leased or purchased.¹⁵⁰⁰ This method presupposes purchase and lease information for comparable water rights is available, which may not always be the case.¹⁵⁰¹ The land price differential method subtracts the value of agricultural land with water rights from land without water rights.¹⁵⁰² The income capitalization method estimates the agricultural value of water in its current use by determining the contribution of irrigation water to net revenue from agricultural production.¹⁵⁰³ This method allows parties to determine the foregone agricultural revenue due to the reduction of available water.¹⁵⁰⁴ The replacement cost method, as its name suggests, determines the cost users are willing to pay to develop alternate water supplies, such as drilling a well.¹⁵⁰⁵

Water markets have some limitations, particularly in the realm of conservation and instream flows. Purchasing water for instream flows may be unlikely unless the purchaser is a philanthropist, a resource agency, or a conservation group. In economic terms, it makes little sense for individuals to bear the cost of acquiring an instream flow if the instream flow benefits everyone.¹⁵⁰⁶ The dilemma is particularly acute when discussing endangered species preservation. Using water markets to protect endangered species may prove difficult because market demand for out-of-stream use may exceed market demand for species protection. The dynamics are further complicated by the inherent difficulty in assessing the monetary value of instream flows relative to other uses. While market-based conservation presents certain problems, opportunities are available. For example, the BOR has acquired water “withdrawals” to provide needed flows for protected salmon.¹⁵⁰⁷

¹⁴⁹⁷ SAVING OUR STREAMS, *supra* note 1478, at 26. WestWater Research LLC is one such organization that appraises water rights. See WestWater Research, <http://www.waterexchange.com> (last visited Feb. 1, 2008).

¹⁴⁹⁸ SAVING OUR STREAMS, *supra* note 1478, at 26-27.

¹⁴⁹⁹ *Id.* at 27-28.

¹⁵⁰⁰ See MONT. WATER TRUST, *Options for Landowners*, at <http://www.montanawatertrust.org/services.html> (then follow “Valuation” hyperlink) (last visited Feb. 1, 2008).

¹⁵⁰¹ *Id.*

¹⁵⁰² *Id.* (“The difference in value between irrigated and non-irrigated land represents the incremental value attributable to the water rights.”).

¹⁵⁰³ *Id.*

¹⁵⁰⁴ *Id.*

¹⁵⁰⁵ *Id.*

¹⁵⁰⁶ The phenomenon of certain individuals receiving a benefit from something paid for by others is known as the free-rider problem. The free-rider problem presents issues of fairness and equity.

¹⁵⁰⁷ Clifford, *Analysis of Water Banks*, *supra* note 1515, at 61.

Despite challenges, buyers and sellers in water markets can create win-win solutions. For example, landowners can avoid forfeiture provisions by leasing water rights, receive monetary compensation, or receive improvements to irrigation systems that promote efficient use in exchange for leaving water instream.¹⁵⁰⁸ In contrast to administrative or judicial proceedings, water markets look for willing participants. In this way, water markets can reduce the resentment that may develop if water rights holders are made unwilling parties to environmental litigation or administrative proceedings.

An encouraging example is illustrated by a recent split-season agreement between the Oregon Water Trust and a ranching family on the Middle Fork of the John Day River.¹⁵⁰⁹ The family agreed to permanently shorten their irrigation season for an undisclosed amount of money.¹⁵¹⁰ In return, beginning July 21 every year, 6.5 million gallons per day remain instream that normally would have been diverted from the middle fork of the John Day River.¹⁵¹¹ This agreement leaves water instream during late summer when Chinook salmon and summer steelhead need it most.¹⁵¹²

4.1.D.(v) Water Transfers¹⁵¹³ to Instream Use

Water may also be obtained for instream flows by acquiring existing rights. A key advantage of water transfers over instream appropriations relates to priority date. Because many instream appropriations are relatively recent, many senior appropriators have priority. Water transfers can obviate this dilemma if senior water appropriators are willing to transfer their rights to instream use, as these transferred rights retain the senior priority date. Although other states do not explicitly address sale or purchase of rights for instream purposes, whether by individuals or by the state, such sales take place.¹⁵¹⁴ However, given the administrative nature of these transactions, information regarding their frequency and terms are not readily accessible. In any event, given the increasing and conflicting demands for water, more states may address the issue of purchasing rights in the future.

4.1.D.(vi) Water Banking¹⁵¹⁵

Broadly defined, water banking is “an institutional mechanism that facilitates the legal

¹⁵⁰⁸ King, *supra* note 1495, at 512.

¹⁵⁰⁹ SAVING OUR STREAMS, *supra* note 1478, at 1.

¹⁵¹⁰ *Id.*

¹⁵¹¹ *Id.* at 2.

¹⁵¹² *Id.*

¹⁵¹³ For a more detailed discussion about water transfers, see *supra* Chapter 2, Section 6. *Water Right Transfers*, pages 107-121.

¹⁵¹⁴ While water rights are alienable property rights, a sale of rights for instream use may expose the underlying claim to forfeiture or abandonment proceedings. This may inhibit willing purchasers from buying rights for instream use. See *infra* notes 1679-1688, 1706-1707 and accompanying text (noting that North Dakota, Oklahoma, and South Dakota do not have transfer programs to facilitate purchases for instream use).

¹⁵¹⁵ For an excellent resource on water banking in the West, see Peggy Clifford et al., Wash. Dep’t of Ecology, Publ’n No. 04-11-011, *Analysis of Water Banks in the Western States* (2004), available at <http://www.ecy.wa.gov/biblio/0411011.html> (last visited Nov. 1, 2007) [hereinafter Clifford, *Analysis of Water Banks*].

transfer and market exchange of various types of surface, groundwater, and storage entitlements.”¹⁵¹⁶ Water can be stored—or “deposited”—in reservoirs, pools, tanks, or underground. Water banking can provide opportunities to dedicate water resources for instream uses and has proven a successful tool for providing water for conservation purposes, including instream use.¹⁵¹⁷

Water banks have many potential benefits. First, water banks can provide a central source for information about water availability and water need.¹⁵¹⁸ Information regarding water availability and water need reduces the costs associated with matching up willing buyers and willing sellers.¹⁵¹⁹ Furthermore, access to individuals having technical understanding of the hydrologic, economic, and legal impacts and economic externalities that accompany changes in water use could be effective in negotiating cost-effective and resource efficient transactions.¹⁵²⁰ Second, water banks promote conservation by allowing water-right holders to deposit excess water in the banks.¹⁵²¹ Allowing users to deposit surplus water can reduce the incentive to use water inefficiently during periods of excess. Third, banking increases water availability during dry years by increasing reserves.¹⁵²² Fourth, banking can ensure a water supply for municipal, agricultural, and instream use.¹⁵²³ Fifth, banking can alleviate certain inequities between groundwater and surface-water users.¹⁵²⁴ Finally, banking provides sources of water which can be used to satisfy interstate and intrastate obligations for instream flows.¹⁵²⁵ Banking can take several forms,¹⁵²⁶ and states adjust their water banks to suit their resource needs and policy objectives.

Despite its virtues, water banking is arguably underutilized. The number of water banks has increased significantly over the past ten years. However, actual water banking—measured by the number of transfers and the quantity of water transferred—has not.¹⁵²⁷ Nevertheless, instream-flow proponents may utilize water banking with greater frequency as they gain more exposure to, experience with, and confidence in state and local water banks.

¹⁵¹⁶ *Id.* at ii. As one scholar noted, some water banks do not facilitate the transfer or lease of water rights in exchange for some pecuniary or other incentive. *See* Dellapenna, *supra* note 1479, at 359-60 (“One must use considerable care in discussing ‘water banks’ for the phrase is used in widely differing senses in the several states [and may have] little or nothing in common with the idea of using financial incentives to facilitate the transfer or water from one use to another.”).

¹⁵¹⁷ *See supra* notes 987-990 and accompanying text.

¹⁵¹⁸ JAY M. BAGLEY ET AL., FEASIBILITY STUDY OF ESTABLISHING A WATER RIGHTS BANKING/BROKERING SERVICE IN UTAH 29 (1980).

¹⁵¹⁹ Even though water banking can reduce certain transaction costs, others will remain. Individual participants will need to receive some assurance that the underlying right is valid and subject to banking. Conceivably, this could be done by insurance or legal opinion. This cost, and others, will be borne by the parties.

¹⁵²⁰ *See* BAGLEY ET AL., *supra* note 192, at 29.

¹⁵²¹ Clifford, *Analysis of Water Banks*, *supra* note 1515, at ii.

¹⁵²² *Id.*

¹⁵²³ *Id.*

¹⁵²⁴ *Id.*

¹⁵²⁵ *Id.*

¹⁵²⁶ *Id.* at 5-11.

¹⁵²⁷ *Id.* at 5-11.

4.1.D.(vii) Incidental Instream Flows

Sometimes, instream flows are preserved inadvertently. While incidental flow is not a “tool” as otherwise used in this section, it is a factor that resources managers must be aware of as they evaluate the impacts of particular resource-management decisions. Steve Reynolds, the renowned New Mexico State Engineer wrote:

The streamflow required at various points in the State is governed by interstate compacts, international treaties, federal court decrees, water rights conferred by the state . . . and legislation authorizing federal water development projects. In many situations, an incidental effect of these institutional constraints is an instream flow having important value in terms of recreation, fish and wildlife habitat, and aesthetics. Furthermore, in many areas of the state the geography and public land ownership patterns adequately protect instream values. Mountain streams generally do not provide favorable sites for conservation, storage, and beneficial use of water.¹⁵²⁸

This observation describes the incidental “base-line” of instream flows.¹⁵²⁹ The breadth of his comments extend beyond New Mexico, as this concept affects any state subject to interstate compacts, international obligations, judicial decrees or any institutional or geographical limitations that prevent water from being diverted for off-stream use. The same is true of early-priority downstream rights and other comparable mechanisms; these mechanisms keep water in streams and amount to *de facto* instream flow protection. This attenuated consequence of resource-management decisions can have significant impacts on instream flows in affected states.¹⁵³⁰

4.1.D.(viii) Basin Closures and Moratoria

Closing river basins to further appropriation can reduce the strain on instream flows in areas that are over or near fully appropriated. Montana has closed several river basins to additional water appropriations. These include closures on parts of the Teton, Upper Clark Fork, Jefferson, Madison, Upper Missouri, and Bitterroot rivers.¹⁵³¹ Basin closures can include numerous exceptions to which the closure does not apply, including permits for certain groundwater appropriations, nonconsumptive uses, domestic uses, stock uses, surface water by or for municipalities, applications to store water during high spring flows, and to appropriate waters for natural resource restoration, among others.¹⁵³² Nevertheless, basin closures can limit future demands on instream flows in basins with no or little unappropriated water. Temporary

¹⁵²⁸ Tim DeYoung, *Protecting New Mexico's Instream Flows*, in *INSTREAM FLOW PROTECTION IN THE WEST*, REVISED EDITION 1993 17-9 (Lawrence J. MacDonnell et al. eds., 1993) (quoting Memorandum from Steven E. Reynolds, re: S. 491, 4 (Feb. 16, 1989) (State Engineer Files, Santa Fe, NM)).

¹⁵²⁹ D. Craig Bell & Norman K. Johnson, *State Water Laws and Federal Water Uses: The History of the Conflict, the Prospects for Accommodation*, 21 ENVTL. L. 1, 11 (1991).

¹⁵³⁰ For example, these incidental instream-flow provisions are important in Utah. Personal communication from Norman K. Johnson, Assistant Attorney General for the State of Utah (Nov. 2007) (on file with author).

¹⁵³¹ See MONT. CODE ANN. §§ 85-2-330, -336, -342, -344 (LexisNexis 2008).

¹⁵³² See *id.* § 85-2-343 (discussing basin closure exceptions within the Upper Missouri River basin).

basin moratoria exercised by state administrative agencies can also be utilized during periods of drought. Moratoria can suspend appropriations and reduce demands on streamflow resources during periods of extreme or unusual environmental conditions. Moratoria can be lifted once conditions improve.

While these tools can be used to preserve instream flows, interested parties must tailor their strategies to the particular state in which the instream flow is sought. The following section discusses specific laws relating to instream flow appropriations, instream flow reservations, water transfers, and water banking in western states.

4.1.E. Individual State Laws for Preserving Instream Flows

All western states have laws that allow for some type of instream flow protection. While many states statutorily authorize the appropriation or creation of an instream flow right, New Mexico, North Dakota, Oklahoma, and South Dakota deal with instream flows indirectly. Instream-flow laws are of recent origin. As a result, they only protect streamflows against rights which are relatively junior. Some states protect flows further by putting conditions on new permits to prevent the permittee's use of water in ways which would adversely affect instream values. Obviously, the majority of older permits do not contain such restrictions.

It is worth noting that public interest criteria for each state are not included in the following synopses.¹⁵³³ Instead, this section focuses on state law recognition of instream appropriations, instream flow reservations, water transfers for instream use, and water banking. These mechanisms are briefly discussed as they relate to the following states:¹⁵³⁴

4.1.E.(i) Alaska

Authorized in 1980, Alaska's instream-flow statute allows "[t]he state, an agency or political subdivision of the state, an agency of the United States or a person" to apply for the right "to reserve sufficient water to maintain a specified instream flow or level of water at a specified part of a stream, throughout the year or for specified times" for a variety of instream uses.¹⁵³⁵ These uses include: the protection of fish and wildlife habitat, migration purposes, propagation purposes, recreational and park purposes, navigation and transportation purposes, and sanitary and water quality purposes. In order to obtain a Certificate of Reservation for an instream flow, there must be unappropriated water sufficient for the reservation, the rights of prior appropriators may not be affected by the reservation, and the applicant must demonstrate a need for the reservation.¹⁵³⁶ Applicants can also specify the temporal scope of the reservation. For example, an instream reservation can be year-round or can be limited to annual periods or events, such as during spawning or wildlife migrations.¹⁵³⁷

¹⁵³³ A sampling of public interest criteria was discussed earlier. *See supra* notes 1423-1454 and accompanying text.

¹⁵³⁴ Portions of the instream flow information for the western states were reprinted with permission of the University of Denver Water Law Review. *See* Cynthia F. Covell, *A Survey of State Instream Flow Programs in the Western United States*, 1 U. DENV. WATER L. REV. 177 (1998).

¹⁵³⁵ ALASKA STAT. § 46.15.145 (LexisNexis 2007).

¹⁵³⁶ *Id.* § 46.15.145(a) (LexisNexis 2007).

¹⁵³⁷ *Id.*

Instream reservations are subject to procedural requirements not required for diversionary appropriations.¹⁵³⁸ The instream flow reservation is subject to review every ten years to verify the purpose of the reservation continues to be valid, that the need for the reservation continues to exist, that there remains unappropriated water sufficient to fulfill the reservation, and that the rights of prior appropriators continue to be unaffected.¹⁵³⁹ Instream flow review is also subject to public and agency notice requirements.¹⁵⁴⁰

The application process for instream flow reservations also requires an application-processing fee of \$1,500.¹⁵⁴¹ In addition to the information mentioned above, the application must include the location for the reservation, the quantity to be preserved (measured in cubic feet per second, cubic feet, acre feet, or elevation), the method used to quantify the requested flow or lake level, and data substantiating the request.¹⁵⁴² It is important the applicant completes the form properly because the priority date for the reservation relates back to the date and time the Alaska Department of Natural Resources (ADNR) accepts an application and deems it complete.¹⁵⁴³ If the ADNR requests additional data and the applicant can obtain the data within three years, the application is complete and the priority date is the date of acceptance, despite ongoing data collection.¹⁵⁴⁴ Priority dates may prove important in developing areas, in areas where water is otherwise being rapidly appropriated, or where water resources are near fully appropriated.

4.1.E.(ii) Arizona

Arizona law allows instream flow appropriations to be made in the same manner as other water appropriations. The Arizona Surface Water Code states that “[a]ny person, the State of Arizona or a political subdivision thereof may appropriate unappropriated water for . . . stock watering . . . recreation, wildlife, [and] including fish. . . .”¹⁵⁴⁵ Properly submitted applications must be approved unless the application for the proposed use “conflicts with vested rights, is a menace to the public safety, or is against the interest and welfare of the public.”¹⁵⁴⁶ Unlike many western states, water appropriations in Arizona do not require a diversion, which can be an otherwise common hurdle. When multiple applications are under consideration, the statute also provides a hierarchy of uses as between two or more pending applications if water supplies are insufficient to satisfy all of them. In the hierarchy of values, recreation and wildlife rank fourth out of five recognized uses. Recreation and wildlife are preceded by domestic and municipal uses, irrigation and stock watering uses, and power and mining uses.¹⁵⁴⁷ It should be noted,

¹⁵³⁸ *Id.*

¹⁵³⁹ *Id.*; ALASKA ADMIN. CODE tit. 11, §§ 93.080, 93.147(b)(3), 93.145 (LexisNexis 2007) (stating that notice will be given in a newspaper of general circulation in the vicinity of appropriation and on the Alaska Online Notice System).

¹⁵⁴⁰ ALASKA ADMIN. CODE tit. 11, § 93.147(d) (LexisNexis 2007).

¹⁵⁴¹ See ALASKA DEP’T OF NATURAL RES., *Reserving Water For Instream Use*, at http://www.dnr.state.ak.us/mlw/factsht/wtr_fs/instream.pdf (Feb. 2006).

¹⁵⁴² ALASKA ADMIN. CODE tit. 11, § 93.142 (2007).

¹⁵⁴³ *Id.*

¹⁵⁴⁴ *Id.* tit. 11, § 93.146(e).

¹⁵⁴⁵ ARIZ. REV. STAT. § 45-151(A) (LexisNexis 2007).

¹⁵⁴⁶ *Id.* § 45-153.

¹⁵⁴⁷ *Id.* § 45-157.

however, that these priorities apply only to pending applications and not to rights previously appropriated.

Arizona statutes neither expressly authorize nor expressly preclude “instream” appropriation. However, the Arizona Court of Appeals determined that “in 1941 when ‘wildlife, including fish’ and in 1962 when ‘recreation’ were added to the purposes for appropriation, the concept of *in situ* appropriation of water was introduced it appeared to us that these purposes could be enjoyed without a diversion.”¹⁵⁴⁸ Having no statutory guidelines, the Arizona Department of Water Resources (ADWR) needed to determine how to evaluate instream flow applications. An instream-flow task force, organized in 1986, developed information that enabled the ADWR to issue a guide to filing applications for instream flow rights, thereby providing useful assistance to those seeking to appropriate instream flows. The ADWR has issued permits to appropriate water for instream use. For example, in April 1983 it issued two permits to the Nature Conservancy and in March 1989 it, it issued another permit to the Bureau of Land Management.¹⁵⁴⁹

The Arizona Court of Appeals recently addressed whether the ADWR has authority to approve instream appropriations or whether the legislature must expressly authorize the ADWR to do so.¹⁵⁵⁰ The court reaffirmed an earlier decision, holding that wildlife, fish, and recreation are beneficial uses for which appropriations are available, reasoning that the legislature’s twenty-nine year silence since the initial decision amounted to tacit legislative approval.¹⁵⁵¹ The opinion confirms that the ADWR has the authority to appropriate water for instream use.

A successful instream-flow applicant must comply with several procedural requirements after the ADWR approves the application. The applicant must submit at least one year of streamflow measurement data before the ADWR will issue a permit.¹⁵⁵² The streamflow measurement report must include the methodology used to derive the data. After approval, the water user has four years to demonstrate that the appropriation is being used for purposes consistent with instream use.¹⁵⁵³ After the applicant submits proof of appropriation, the ADWR will issue a Certificate of Water Appropriation (CWA). The priority date of the CWA relates back to the date of application. Like other rights in Arizona, instream use appropriations are subject to abandonment and forfeiture.¹⁵⁵⁴

¹⁵⁴⁸ McClellan v. Janzten, 547 P.2d 494 (Ariz. Ct. App. 1976).

¹⁵⁴⁹ Letter from Kathleen Ferris, Director, Arizona Department of Water Resources to Norman K. Johnson (Jun. 20, 1986) (copy on file at the Western States Water Council office). Telephone conversation between Laurence Linser, Arizona Department of Water Resources and Norman Johnson (Dec. 19, 1989). See also Norman K. Johnson, *The Doctrine of Prior Appropriation and the Changing West* 19 (1987) (on file with the authors).

¹⁵⁵⁰ Phelps Dodge v. Ariz. Dep’t of Water Res., 2005 Ariz. App. LEXIS 108, review denied 2006 Ariz. LEXIS 33.

¹⁵⁵¹ *Id.* at * 22-23.

¹⁵⁵² ARIZ. DEP’T OF WATER RES., *Surface Water – Answers to Frequently Asked Questions*, at www.azwater.gov (then click the “Surface Water Rights” link, followed by the “More” link adjacent to “Applications for Permit to Appropriate Public Water of the State of Arizona Instream Flow Maintenance”) (last visited Apr. 10, 2008).

¹⁵⁵³ *Id.*

¹⁵⁵⁴ *Id.* Though technically possible, it is unlikely the ADWR would invalidate an instream flow appropriation for abandonment or forfeiture once the applicant receives a CWA.

Arizona also allows water users to transfer water for instream use.¹⁵⁵⁵ The water user can request the director of the ADWR to transfer water to the state for recreation and wildlife purposes.¹⁵⁵⁶ After the director approves the transfer, the state holds the water right in trust for instream purposes. The transferred right retains the priority date of the original appropriative right so long as certain criteria are satisfied.¹⁵⁵⁷ One important criterion is that the right must be transferred to the state or a subdivision of the state.¹⁵⁵⁸

In 1994, the Arizona legislature adopted the Underground Water Storage Savings and Replenishment (UWS) Act, which recodified and integrated previously-adopted recharge projects into a single, comprehensive program¹⁵⁵⁹. This state program covers water reuse, groundwater recharge and water banking. Just like the California water banking program, Arizona's UWS program can be used to meet the needs of instream use. Since 1996, the Water Bank has stored over approximately one million acre-feet of water in the State of Arizona.¹⁵⁶⁰

4.1.E.(iii) California

Case law and statutes are both important to California's instream flow laws. The most notable case is *National Audubon Society v. Superior Court of Alpine County*,¹⁵⁶¹ which emphasized the state's public trust responsibilities over water resources. The public trust doctrine "is an affirmation of the duty of the state to protect the people's common heritage of streams, lakes, marshlands and tidelands, surrendering that right of protection only in rare cases when abandonment of that right is consistent with the purposes of the trust."¹⁵⁶² The doctrine applies to tidal waters, navigable lakes, streams, and their tributaries.¹⁵⁶³ While the public trust doctrine does not create a right to water per se,¹⁵⁶⁴ it may provide a theoretical basis for the statutory provisions which were subsequently enacted.

In 1991, California enacted legislation that allows an appropriator to dedicate water previously used for other out-of-stream use to instream use. The statute enables "[a]ny person entitled to the use of water, whether based on an appropriative, a riparian, or other right" to petition for a change of the water right "for purposes of preserving or enhancing wetlands

¹⁵⁵⁵ ARIZ. STAT. § 45-172 (LexisNexis 2007).

¹⁵⁵⁶ *Id.*

¹⁵⁵⁷ *Id.* (transfers affecting a watershed or drainage area for irrigation purposes require consent from the irrigation district and the agricultural improvement district; the transfer must not adversely affect existing rights; and the application for transfer shall be filed with the director and is subject to public notice requirements).

¹⁵⁵⁸ *Id.* § 45-172A. Some feel that this may be a limitation because the requirement may hinder conservation organizations from pursuing this as an option.

¹⁵⁵⁹ *Id.* §§ 45-801.01 to 45-898.01 (LexisNexis 2007).

¹⁵⁶⁰ *Id.*

¹⁵⁶¹ 658 P.2d 709 (Cal. 1983). To date, only the California Supreme Court has held that the public trust doctrine may be used to retroactively modify a vested appropriative water right. See Johnson, *supra* note 1549, at 23.

¹⁵⁶² See *Nat'l Audobon Society*, 658 P.2d at 724.

¹⁵⁶³ See *id.* at 720-21.

¹⁵⁶⁴ However, the public trust doctrine may provide a basis for denying an application to appropriate to preserve instream flows. See *id.* at 726 ("Although the courts have refused to allow the board to appropriate water for in-stream uses, even those decisions have declared that the board has the power and duty to protect such uses by withholding water from appropriation."). In this sense, the public trust doctrine in California may be a judicially-created analog of the public interest criteria. See *supra* notes 1440-1442 and accompanying text.

habitat, fish and wildlife resources, or recreation in, or on, the water.”¹⁵⁶⁵ The California statute requires that the proposed change meet certain requirements: it must not increase the amount of water available under the original appropriation, and it must “not unreasonably affect any legal use of water.”¹⁵⁶⁶ Water transfers are also subject to environmental laws such as the National Environmental Policy Act and the California Environmental Quality Act.¹⁵⁶⁷ Water transfers are useful in preserving “wet water,” as the transferred right retains the priority date of the underlying right.¹⁵⁶⁸ As permitted rights, instream flow transfer rights are one of the strongest forms of instream flow protection because they are legally defensible property interests.¹⁵⁶⁹

In addition to water transfers, the appropriation process also affords opportunity for instream flow protection. The State Water Resources Control Board, in acting on applications to appropriate water, shall consider streamflow requirements proposed for fish and wildlife purposes pursuant to Sections 10001 and 10002 of the Public Resources Code. The board may establish such streamflow requirements as it deems necessary to protect fish and wildlife as conditions in permits and licenses in accordance with these requirements.¹⁵⁷⁰ While these statutes do not create a water right in the appropriative sense, they provide a statutory basis to establish minimum flow levels aimed to “assure the continued viability of stream-related fish and wildlife resources.”¹⁵⁷¹

Dam owners must allow minimum flows to pass through a fishway, “around or through the dam, to keep in good condition any fish that may be planted or exist below the dam.”¹⁵⁷² This provision applies to both native and non-native species. No future dam will be approved for construction unless it complies with this provision.¹⁵⁷³

4.1.E.(iv) Colorado

In 1973, the Colorado legislature responded to concerns about protecting aquatic habitat by creating an instream flow program. The instream flow program limits owning and appropriating instream-flow rights to the Colorado Water Conservation Board (CWCB).¹⁵⁷⁴ The

¹⁵⁶⁵ CAL. WATER CODE § 1707 (Deering, LexisNexis 2007). *See also* CAL. WATER CODE §§ 470-484 (Deering, LexisNexis 2007) (discussing water transfers generally).

¹⁵⁶⁶ *Id.*

¹⁵⁶⁷ CAL. DEP’T OF WATER RES., *FAQ’s Related to Water Transfers in California*, at <http://www.watertransfers.water.ca.gov/faqs/index.cfm#p1>.

¹⁵⁶⁸ CAL. ENVTL. PROT. AGENCY, STATE WATER RES. CONTROL BD., A GUIDE TO WATER TRANSFERS 5-1 (July 1999), available at <http://www.watertransfers.water.ca.gov/faqs/index.cfm> (last visited Oct. 26, 2007).

¹⁵⁶⁹ *See generally* James H. Davenport & Craig Bell, *Governmental Interference with the Use of Water: When do Unconstitutional “Takings” Occur?*, 9 U. DENV. WATER L. REV. 1 (2005).

¹⁵⁷⁰ CAL. WATER CODE § 1257.5 (Deering, LexisNexis 2007).

¹⁵⁷¹ CAL. PUB. RES. CODE § 10001 (Deering, LexisNexis 2007).

¹⁵⁷² CAL. FISH & GAME CODE § 5937 (Deering, LexisNexis 2007).

¹⁵⁷³ *Id.* § 5946.

¹⁵⁷⁴ COLO. REV. STAT. § 37-92-102(3) (LexisNexis 2007) (stating “the Colorado water conservation board is hereby vested with the exclusive authority . . . to appropriate . . . such waters of natural streams and lakes as the board determines may be required for minimum stream flows”). In order to deal with the relatively new concern over the ability of individuals to change existing senior water rights to instream-flow rights, the instream-flow law was altered in 2002 by SB 156 to explicitly name the state as the sole owner of the instream flow rights. As noted below, municipalities, cities, water districts, and counties can appropriate water for recreational purposes by

CWCB may appropriate “such water, water rights, or interests in water in such amount as the board determines is appropriate for stream flows or . . . natural lakes to preserve or improve the natural environment to a reasonable degree.”¹⁵⁷⁵ In doing so, CWCB must determine (1) that the natural environment will be preserved to a reasonable degree by the water available; (2) that there is a natural environment that can be preserved to a reasonable degree with the Board’s water right, if granted; and (3) that such environment can exist without material injury to existing water rights.¹⁵⁷⁶

Colorado instream-flow rights are subject to senior decreed water rights, undecreed water uses, and exchanges or “water practices” in existence when the instream flow appropriation is made. The CWCB can acquire existing water rights for instream-flow purposes by “grant, purchase, bequest, devise, lease, exchange or contractual agreement,” thereby enabling the CWCB to acquire senior rights.¹⁵⁷⁷ Over the years, some older water rights have been changed to instream-flow uses by donation to the state.¹⁵⁷⁸ Through appropriation and acquisition, nearly two thousand minimum instream flows have been established.¹⁵⁷⁹ However, given the relatively recent nature of instream flow law, most of the instream rights are quite junior in the state’s appropriative system.¹⁵⁸⁰

Colorado prioritizes potential instream flow and lake-level appropriations in an annual work plan.¹⁵⁸¹ Any person or entity can suggest the CWCB include certain streams or lakes in the state’s instream-flow program. All recommendations or requests for appropriation must be in writing and will be considered at the beginning of each year.¹⁵⁸² Although the schedule is subject to change, it provides a general framework for when the process of instream-flow rights is initiated, processed, and completed. The procedure provides the public ample notice to comment, protest, or otherwise participate in the instream-use appropriations process.¹⁵⁸³

installing “recreational in channel diversions.” See *infra* notes 1403-1404 and accompanying text. However, these rights are not instream rights in the traditional sense of Colorado water law.

¹⁵⁷⁵ *Id.* Formerly, the law gave the state the ability only to prevent the loss of aquatic life, but with passage of SB 156, the state may appropriate instream flows to “preserve or improve” aquatic ecosystems. See *Western Water Law and Policy Reporter* Volume 6, Number 8, June 2002.

¹⁵⁷⁶ COLO. REV. STAT. § 37-92-102(3) (LexisNexis 2007).

¹⁵⁷⁷ *Id.* The original 1973 version did not explicitly preclude CWCB from acquiring existing rights but the legislative amendments certainly encouraged the CWCB to do so.

¹⁵⁷⁸ Colorado is the only state where a donor may retain some control over the administration, monitoring, or enforcement of the right. See Sasha Charney, DECADES DOWN THE ROAD: AN ANALYSIS OF INSTREAM FLOW PROGRAM IN COLORADO AND THE WESTERN UNITED STATES 81 app. B (2005) [hereinafter DECADES DOWN THE ROAD] (citing DAVID M. GILLILAN & THOMAS C. BROWN, INSTREAM FLOW PROTECTION: SEEKING A BALANCE IN WESTERN WATER USE 125-26 (Island Press 1997)). See, e.g., *infra* notes 1754-1760 and accompanying text.

¹⁵⁷⁹ See *id.* at 82 (noting that 1,926 appropriations have been made, protecting approximately 8,549 miles of stream). In addition, the state has acquired at least forty six water rights and has established minimum lake levels in at least thirty-six bodies of water. See COLO. WATER CONSERVATION BD., *Public Records*, at <http://cwcb.state.co.us/Streamandlake/imaging.htm>.

¹⁵⁸⁰ See 2 COLO. CODE REGS. § 408-2 (LexisNexis 2007) (“The Board may select an appropriation date that may be no earlier than the date the Board declares its intent to appropriate”).

¹⁵⁸¹ See 2 COLO. CODE REGS. § 408-2(5) (LexisNexis 2007).

¹⁵⁸² *Id.*

¹⁵⁸³ *Id.*

4.1.E.(v) Idaho

Instream flow protection in Idaho generally takes one of two forms: instream flow appropriation or water acquisition via the state water bank. The first minimum lake levels were created by legislative enactment in 1925 to preserve the scenic beauty of certain lakes. Idaho's first instream-flow program developed in the early 1970s. In 1971, the legislature allowed the Idaho Department of Parks to appropriate instream flows in Malad Canyon.¹⁵⁸⁴ This enactment was challenged on the ground that the state constitution required a physical diversion for all water appropriations, including an instream-flow appropriation. The Idaho Supreme Court was not persuaded and found that an instream-flow appropriation without a diversion was permissible under the state constitution.¹⁵⁸⁵ In 1978, the legislature passed the Minimum Stream Flow Act.

Under the current statutory scheme, the Idaho Water Resources Board (IWRB) may file applications for minimum stream-flow water rights with the Director of the Idaho Department of Water Resources (Idaho Director).¹⁵⁸⁶ If approved, the IWRB holds the water right in trust for the people of Idaho.¹⁵⁸⁷ Flows may be appropriated “for the protection of fish and wildlife habitat, aquatic life, recreation, aesthetic beauty, transportation and navigation values and water quality.”¹⁵⁸⁸ “Minimum stream flow” means exactly that—“the minimum flow of water in cubic feet per second of time or minimum lake level in feet above mean sea level required to protect” the aforementioned interests.¹⁵⁸⁹ “Minimum stream flow” is not “the ideal or most desirable flow or lake level.”¹⁵⁹⁰

The application must include the name of the stream and the legal description of the location of the proposed appropriation; the proposed minimum stream flow; the purpose of the minimum flow proposal; and the time or season during which the proposal would apply.¹⁵⁹¹ The Idaho Director must provide public notice and receive public comments, and also must provide notice to specific state agencies.¹⁵⁹² An instream-flow appropriation will not be approved unless it (1) will not interfere with any senior water rights; (2) is in the public interest, as opposed to a private interest; (3) is necessary to protect one of the statutorily-recognized beneficial uses; (4) seeks only to establish the minimum stream flow necessary to protect these uses; (5) can be maintained, as determined by flow or water-level records.¹⁵⁹³ If approved, the priority date for an instream flow appropriation is “the date of receipt in the office of the director of a complete application.”¹⁵⁹⁴

¹⁵⁸⁴ See DECADES DOWN THE ROAD, *supra* note 1578, at 83 (citing Josephine P. Beeman, *Instream Flows in Idaho*, in *INSTREAM FLOW PROTECTION IN THE WEST*, REVISED EDITION 1993 (Lawrence J. MacDonnell et al. eds., 1993)).

¹⁵⁸⁵ State Dep't of Parks v. Idaho Dep't of Water Admin., 530 P.2d 924, 927 (Idaho 1974).

¹⁵⁸⁶ IDAHO CODE ANN. § 42-1503 (LexisNexis 2007).

¹⁵⁸⁷ See *id.*; DECADES DOWN THE ROAD, *supra* note 1578, at 84.

¹⁵⁸⁸ IDAHO CODE ANN. § 42-1501 (LexisNexis 2007).

¹⁵⁸⁹ *Id.* § 42-1502.

¹⁵⁹⁰ *Id.* § 42-1503.

¹⁵⁹¹ *Id.*

¹⁵⁹² *Id.*

¹⁵⁹³ *Id.*

¹⁵⁹⁴ *Id.* § 42-1505.

Although the IWRB formally makes instream flow requests to the Idaho Director, any person, municipality, or agency may petition the Board to formally apply for an instream flow of unappropriated water.¹⁵⁹⁵ If the Department of Water Resources approves an application, the permit is sent to the legislature for ratification. The legislature may ratify the permit either through express approval or by default if it fails to act upon a list of minimum stream flows provided by the IWRB.¹⁵⁹⁶ Interestingly, the legislature states minimum flows established pursuant to statute “shall be prior in right to any claims asserted by any other state, government agency, or person for out of state diversion.”¹⁵⁹⁷

At least one river in Idaho has received instream flow protection directly by statute. In 2001, the legislature enacted instream flow protection specifically for the Lemhi River.¹⁵⁹⁸ The legislation provides for a minimum flow of thirty-five cubic feet per second throughout the year so long as certain criteria are met.¹⁵⁹⁹ As of 2007, Idaho had 293 licensed or permitted water rights for minimum stream flows, and 3 for minimum lake levels.¹⁶⁰⁰ These rights cover 724 miles of stream, which represents less than 1% of the total stream miles in the state.¹⁶⁰¹

Water may also be “withdrawn” for instream use through the state’s water banking system. Unlike many other western states, water banking is nothing new in Idaho. In fact, the Idaho Legislature formally authorized the creation of a water bank in 1979.¹⁶⁰² Idaho operates a statewide water supply bank, including local rental pools for storage water.¹⁶⁰³ Water right holders can deposit water rights for future withdrawals by purchasers.¹⁶⁰⁴ To remove the risk of forfeiture, Idaho statutes specifically exempt water bank “deposits” from forfeiture provisions.¹⁶⁰⁵

Though Idaho’s water bank was formally established in 1979, an informal bank has been active since the 1930s and its utilization is increasing.¹⁶⁰⁶ In addition to uses for irrigation, the transferred water has been used to enhance instream flows for migrating salmon and

¹⁵⁹⁵ *Id.* § 42-1504. Since water for instream-flow protection is only available if unappropriated quantities remain, Idaho’s Minimum Stream Flow Act largely fails to protect waterways in southern Idaho, south of the Salmon River drainage, because much of the water is already overappropriated. *See* DECADES DOWN THE ROAD, *supra* note 1578, at 84.

¹⁵⁹⁶ IDAHO CODE ANN. § 42-1503 (LexisNexis 2007).

¹⁵⁹⁷ *Id.* § 42-1501.

¹⁵⁹⁸ *Id.* § 42-1506.

¹⁵⁹⁹ *Id.* (The minimum flow appropriation is valid so long as fifteen cubic feet per second are subordinated to all diversions authorized under the Lemhi river basin decree).

¹⁶⁰⁰ IDAHO WATER RES. BD., *Minimum Streamflows*, http://www.idwr.idaho.gov/waterboard/planning/Minimum%20Stream%20Flow/minimum_stream_flow.htm (last visited Nov. 1, 2007). The website also provides a list of the specific waterways and the amount of water or streamflow protected under these rights.

¹⁶⁰¹ *Id.*

¹⁶⁰² IDAHO CODE ANN. §§ 42-1761 to 42-1766 (LexisNexis 2007) (wherein the legislative history notes that the legislation was enacted in 1979).

¹⁶⁰³ *See* LAWRENCE J. MACDONNELL ET AL., WATER BANKS IN THE WEST 2-3 (Univ. Of Colo. School of Law 1994).

¹⁶⁰⁴ IDAHO CODE ANN. §§ 42-1762 to 1765 (LexisNexis 2007).

¹⁶⁰⁵ *Id.* § 42-1764.

¹⁶⁰⁶ MACDONNELL ET AL., *supra* note 1603, at 2-19 to 2-22.

hydroelectric power production, as well as for aquifer recharge.¹⁶⁰⁷ Though local rules for transfers were tailored to irrigation, a significant quantity of the water in the local banks has been used for environmental purposes.¹⁶⁰⁸

One scholar suggested water may be permanently donated for instream purposes.¹⁶⁰⁹ Presumably, this would occur pursuant to existing water-transfer statutes.¹⁶¹⁰ Section 42-222 allows “[a]ny person . . . entitled to the use of water . . . who shall desire to change the point of diversion, place of use, period of use or nature of use of all or part of the water” to apply for a water transfer with the Idaho Department of Water Resources. Arguably, a permanent water transfer for instream use is a change in the “nature of use.” However, language in the current statute does not specifically discuss transfers to instream use and any attempt to do so may be challenged on legal grounds.¹⁶¹¹ It is unclear whether transferring an existing right to an instream right would withstand such a challenge. Furthermore, the process might be limited to the consumptive use portion of the water right and the right may lose its original priority date.¹⁶¹² The legal mechanisms for a donation are not developed and no such actions have occurred.¹⁶¹³ This uncertainty may deter potential donors from making a transfer. For now, instream appropriations and water “withdrawals” from the water bank are the most legally conservative ways of acquiring water for instream use.

4.1.E.(vi) Kansas

In the early 1980’s, Kansas enacted minimum stream flow laws that allow the legislature to reserve instream flows.¹⁶¹⁴ Kansas states that, “minimum desirable stream flows to preserve, maintain, or enhance base flows for in-stream water uses relative to water quality, fish, wildlife, aquatic life, recreation, general aesthetics, and domestic uses and for the protection of existing water rights,” is one of several desirable policy criteria for its long-term, water-related goals and objectives.¹⁶¹⁵

¹⁶⁰⁷ *Id.* at 2-6.

¹⁶⁰⁸ *Id.*

¹⁶⁰⁹ *See* DECADES DOWN THE ROAD, *supra* note 1578, at 85.

¹⁶¹⁰ *See* IDAHO CODE ANN. §§ 42-108, 42-222 (LexisNexis 2007)

¹⁶¹¹ *See id.* § 42-222.

¹⁶¹² *See* DECADES DOWN THE ROAD, *supra* note 1578, at 85.

¹⁶¹³ *Id.*

¹⁶¹⁴ Kansas’s minimum desirable flow laws—title 82a, sections 703a, 703b, and 703c—were initially enacted in 1980, 1984, and 1985, respectively.

¹⁶¹⁵ *See id.* § 82a-928(i).

Once the Kansas legislature establishes a minimum desirable stream flow,¹⁶¹⁶ the state's Chief Engineer is authorized to "withhold from appropriation that amount of water deemed necessary to establish and maintain for the identified water course the desired minimum stream flow."¹⁶¹⁷ Instead of a blanket pronouncement listing all protected waterways, the legislature can choose which waterways to protect as the need arises. The amount of water to be reserved in any particular stream system is negotiated by key water agencies for the State of Kansas and is based on the needs of the stream ecosystem and the actual availability of water.¹⁶¹⁸

Water rights with a priority date after April 12, 1984,¹⁶¹⁹ "shall be subject to any minimum desirable streamflow requirements identified and established pursuant to law on or before July 1, 1990."¹⁶²⁰ If additional minimum desirable streamflows are legislatively established after July 1, 1990, only permits issued after that enactment will be subject to minimum-desirable-streamflow requirements.¹⁶²¹ The Kansas Department of Agriculture's Division of Water Resources monitors streams with minimum desirable flows and can notify the chief engineer if flows fall below enacted levels when necessary.¹⁶²²

Unlike the instream flow laws of many states, Kansas's Minimum Desirable Flow Act does not actually appropriate water for instream flow use. Rather, it authorizes the state engineer to withhold new appropriations if new appropriations would jeopardize established minimum desirable flows. While many states allow administrative agencies to appropriate water for instream use, Kansas relies upon the initiative of the legislature to establish minimum desirable flows and the ability of the chief engineer to enforce the enactment.

4.1.E.(vii) Montana

Montana's constitution recognizes water rights for "any beneficial use."¹⁶²³ "Beneficial use' means a use of water for the benefit of the appropriator, other persons, or the public, including but not limited to agricultural (including stock water), domestic, fish and wildlife, industrial, irrigation, mining, municipal, power, and recreational uses."¹⁶²⁴ Montana first initiated efforts to protect instream flows in 1969 with legislation allowing the then Fish and Game Commission to appropriate instream flows to preserve fish and wildlife habitat on a number of the state's blue ribbon trout streams. Before that legislation expired, it successfully

¹⁶¹⁶ See *id.* § 82a-703c.

¹⁶¹⁷ *Id.* § 82a-703a.

¹⁶¹⁸ Agencies that helped negotiate and recommend minimum desirable flows included the Kansas State Board of Agriculture (now the Kansas Department of Agriculture), Division of Water Resources; the Kansas Water Office; the Kansas Department of Health and Environment; and the Kansas Department of Wildlife and Parks. Although it is anticipated that these same agencies would be involved in future considerations on minimum flow rates, if any, this is not established in statute.

¹⁶¹⁹ This restriction does not apply for "use of water for domestic purposes."

¹⁶²⁰ *Id.* § 82a-703b. As of July 1, 1990, the legislature established minimum desirable streamflows at thirty-three gages in the state. See *id.* § 82a-703c.

¹⁶²¹ In other words, new minimum desirable streamflows will not be retroactive or acquire an April 12, 1984 priority date.

¹⁶²² E-mail from Paul Graves, Assistant Chief Engineer, Kansas Dep't of Agriculture, Division of Water Resources (Dec. 14, 2007) (on file with the Western States Water Council).

¹⁶²³ MONT. CONST. art. IX, § 3 (2005).

¹⁶²⁴ MONT. ADMIN. R. § 36.16.102(4) (LexisNexis 2007).

resulted in instream flow “Murphy Rights” in twelve streams. Subsequent legislation in 1973 provided for the reservation of instream flows. Now both federal and state agencies may request a reservation on any stream for instream flows as well as for future consumptive uses in the basin where it is reserved.¹⁶²⁵

State instream-flow reservations are limited to a maximum of fifty percent of the average annual flow of the stream for which the application is submitted, as shown by stream gauge records.¹⁶²⁶ The reservation applicant must establish the purpose of the reservation, the need for the reservation, the amount of water necessary for the purpose of the reservation, and state that the reservation is in the public interest.¹⁶²⁷ Water reservations have been successfully completed under this law in the Yellowstone, Upper, and Lower Missouri River Basins for fish, wildlife, water quality purposes, future municipal use, and future irrigation uses. As part of a political compromise, requested water reservations were not enacted¹⁶²⁸ in the Clark Fork Basin.¹⁶²⁹

Water reservations are subject to review and modification. Instream flow reservations, unlike conventional appropriations, are subject to mandatory review every ten years.¹⁶³⁰ Under certain circumstances, the Montana Department of Natural Resources and Conservation (DNRC) may order that a state water reservation be subordinated to water use permits or certificates for groundwater development. Upon review, instream flow reservations may be extended, modified, or eliminated if the DNRC decides their original purpose is no longer being met. If a reservation is modified, others may appropriate excess water no longer held in reserve.¹⁶³¹

Furthermore, if the DNRC finds that the original reservation is no longer required for the original purposes, and that the need for reallocation outweighs the need for the original reservation, an instream flow may be modified to reallocate the reservation or a portion thereof to another qualified reservation.¹⁶³² In other words, since state water reservations may be made for consumptive uses, an instream flow could theoretically be reallocated to future municipal needs. Reallocation of any particular reservation may occur only once every five years.¹⁶³³ Conversely, because a state water reservation may be transferred from one authorized reservation to another, a reservation originally made for consumptive purposes could perhaps be transferred to instream flow uses.

¹⁶²⁵ MONT. CODE ANN. § 85-2-316 (2005) (examples of future consumptive uses include irrigation, municipal, and storage needs).

¹⁶²⁶ *Id.* § 85-2-316(6).

¹⁶²⁷ *Id.* § 85-2-316(4a). In addition to the materials mentioned in the statute, an applicant must pay a \$100 application fee, provide analysis supporting the need, provide analysis justifying the amount requested and whether it is available, include information supporting the reservation is in the public interest, and author a management plan. *See* MONT. ADMIN. R. 36.16.104 (LexisNexis 2007).

¹⁶²⁸ MONT. ADMIN. CODE § 85-2-336 (4) (2005). However, reservations were filed, and if the basin closure is lifted, the reservations will become active. E-mail from Kathleen Williams, Executive Director, Instream Flow Council, to Craig Bell, Executive Director, Western States Water Council (Jan. 14, 2008, 13:37:44 MST).

¹⁶²⁹ MONT. ADMIN. CODE § 85-2-336 (1) (2005).

¹⁶³⁰ *Id.* § 85-2-316.

¹⁶³¹ *Id.*

¹⁶³² *Id.*

¹⁶³³ *Id.*

Montana enacted statutes for instream flow leasing in 1989¹⁶³⁴ and amended them in 1995.¹⁶³⁵ The 1989 statute created a temporary leasing program that allowed Montana's Department of Fish, Wildlife and Parks (DFWP) to lease rights to maintain or enhance fisheries. The 1995 amendment expanded the ability to lease rights to individuals and private groups. Every individual or entity that leases rights for instream use must follow the process provided by the DNRC. Unlike the reservation system, leased or changed-use rights retain the priority date of the underlying appropriative right. Instream flow leasing can last up to thirty years if water conservation or storage is involved. Otherwise, the instream flow lease or temporary change can be for ten years, with an opportunity to renew for another ten.¹⁶³⁶ DFWP has found that the instream flow leasing statutes are most effective on small streams with large senior rights at the mouth. As of 2004, Montana has approved 431 instream flow reservations on 347 streams, two lakes, and one wetland.¹⁶³⁷ Currently, Montana's instream-flow program relies heavily on water leasing.¹⁶³⁸

4.1.E.(viii) Nebraska

Nebraska adopted its instream flow program in 1984 in an attempt to accommodate water development and environmental interests.¹⁶³⁹ In its current form,¹⁶⁴⁰ the legislation authorizes the Nebraska Game and Parks Commission or a Nebraska Natural Resources District to obtain an instream appropriation.¹⁶⁴¹ An "instream appropriation" is defined as "the undiverted application of the waters of a natural stream within or bordering upon the state for recreation or fish and wildlife purposes."¹⁶⁴²

It is the duty of the Game and Parks Commission and each Natural Resources District to identify specific stream segments possessing "a critical need for instream flows."¹⁶⁴³ Each study must quantify the instream flow needs in identified stream segments. Although these two specific agencies are charged with this responsibility, they are encouraged to work with other state environmental agencies and research institutions.¹⁶⁴⁴ Following notice and a public hearing, the Game and Parks Commission, or a Natural Resources District, may file with the Director of Natural Resources an application for a permit to appropriate water for instream flows in waterways identified in the studies.¹⁶⁴⁵

¹⁶³⁴ *Id.* §§ 85-2-436 to 85-2-439 (The scope for water leasing is broader than the scope for temporary changes, since temporary changes can only be made to "benefit the fishery resource").

¹⁶³⁵ *Id.* § 85-2-408.

¹⁶³⁶ *Id.* § 85-2-436.

¹⁶³⁷ See *DECADES DOWN THE ROAD*, *supra* note 1578, at 94.

¹⁶³⁸ See *infra* Water Banking.

¹⁶³⁹ Environmental litigation in the 1970's under NEPA and ESA led Nebraska to adopt an instream-flow protection program. See *DECADES DOWN THE ROAD*, *supra* note 1578, at 96 (citing David J. Aiken, *Nebraska Instream Appropriation Law and Administration*, in *INSTREAM FLOW PROTECTION IN THE WEST*, REVISED EDITION 1993 (Lawrence J. MacDonnell et al. eds., 1993)).

¹⁶⁴⁰ NEB. REV. STAT. §§ 46-2, 107 to 46-2, 119 (LexisNexis 2007).

¹⁶⁴¹ *Id.* § 46-2, 108 (stating these entities may appropriate only "that amount of water necessary for recreation or fish and wildlife")

¹⁶⁴² *Id.*

¹⁶⁴³ *Id.* § 46-2, 109.

¹⁶⁴⁴ *Id.* (stating "[a]ny district or the Game and Parks Commission may request the assistance of the Conservation and Survey Division of the University of Nebraska, the Game and Parks Commission, the Department

Before approving an instream appropriation, the Director of the Division of Water Resources must find that there is unappropriated water available for appropriation, that the requested instream appropriation is necessary to maintain the instream use or uses for which the appropriation has been requested, that the appropriation will not interfere with any senior surface water appropriation, that the rate and timing of the flow is the minimum necessary to maintain the instream use for which the appropriation has been requested, and that the instream appropriation is in the public interest.¹⁶⁴⁶ In making the public interest determination, the Director must consider the following factors: (1) The economic, social, and environmental value of the instream use or uses including but not limited to recreation, fish and wildlife, induced recharge from municipal water systems, and water quality maintenance; and (2) The economic, social, and environmental value of reasonably foreseeable alternative out-of-stream uses of water that will be foregone or accorded junior status if the appropriation is granted.¹⁶⁴⁷ Instream flows in Nebraska are identified by stream reaches and times of the year, and are limited to “a reasonable and necessary amount of water.”¹⁶⁴⁸ The Director of Water Resources must modify existing instream appropriations or pending applications to avoid interfering with other water right applications that have been deemed more important by the legislature.

Although the phrase “reasonable and necessary” sounds somewhat meager, the Supreme Court of Nebraska has interpreted “necessary” to mean more than the bare minimum.¹⁶⁴⁹ Rather, the term “necessary” must be viewed in light of “the nature of the use for which the appropriation is requested.”¹⁶⁵⁰ Therefore, the Director of Water Resources may properly approve an application for instream flow that not just ensures survival, but that avoids degradation as well.¹⁶⁵¹

In 2006, the legislature amended the review process for instream flow appropriations. Currently, instream flow appropriations are reviewed every fifteen years.¹⁶⁵² Notice of a pending review is published for three consecutive weeks in a newspaper of general circulation and on the department’s website. Such notice invites interested individuals to file written comments and to request a hearing to present evidence at the review. If no one requests a hearing and the director is satisfied with the information provided by the appropriator, the director can issue an order stating that the appropriator continues to use water for a beneficial use. If a hearing is requested, the purpose of the hearing is to receive evidence regarding whether the water appropriated under the permit still provides the beneficial uses for which the permit was granted and whether the permit is still in the public interest. The hearing proceeds under the rebuttable presumption that

of Environmental Quality, the Department of Natural Resources, or any other state agency in order to comply with this section”).

¹⁶⁴⁵ *Id.* § 46-2, 110.

¹⁶⁴⁶ *Id.* § 46-2, 115.

¹⁶⁴⁷ *Id.* § 46-2, 116.

¹⁶⁴⁸ *Id.* § 46-2, 118.

¹⁶⁴⁹ In re Application A-1662, 463 N.W.2d 591 (Neb. 1990).

¹⁶⁵⁰ *See id.* at 610.

¹⁶⁵¹ *Id.* (stating, for example, “[i]f, however, the use is to provide for the maintenance of the fishery at its present habitat quality, then the minimum necessary flow is the lowest flow rate which would assure no degradation in the quality of the habitat, and the director's determination is correct if supported by the evidence”).

¹⁶⁵² NEB. REV. STAT. § 46-2, 112 (LexisNexis 2007).

the appropriation continues to provide the beneficial uses for which the permit was granted and that the appropriation is in the public interest. After the hearing, the Director may, by order, modify or cancel, in whole or in part, the instream appropriation.

Beginning in 1997, the Director of Water Resources must find, with regard to applications pending or filed after January 1, 1997, that there is unappropriated water available to provide the approved instream flow rate at least twenty percent of the time during the period requested.¹⁶⁵³ The Director must also find that the appropriation is necessary to maintain the existing recreational uses or needs of existing fish and wildlife species. Finally, the statute makes clear that the application may be granted for a rate of flow that is less than that requested by the applicant or for a shorter period of time than requested by the application.

In addition to instream flow appropriations, a recent statutory development allows water transfers to instream use. The department may approve a transfer to instream use if the purpose is “to augment the flow in a specific reach for any instream use that the department has determined, through rules or regulations, to be a beneficial use. . . .”¹⁶⁵⁴ Beneficial use includes “support and propagation of fish, and other aquatic life; recreation in and on the **water**; and aesthetics.”¹⁶⁵⁵ The department requires a report at least every five years while instream-flow transfers are in effect. “The purpose of such report shall be to indicate whether the beneficial instream use for which the flow is augmented continues to exist.”¹⁶⁵⁶ However, failing to provide a written report does not result in forfeiture, as the right merely reverts back to the transferor.¹⁶⁵⁷ As of 2005, nine instream-flow appropriations have been made within three sets of water rights.¹⁶⁵⁸ This includes 247 miles of streams and rivers.¹⁶⁵⁹

4.1.E.(ix) Nevada

Nevada’s appropriation statute contains a general statement that “[s]ubject to existing rights, and except as otherwise provided in this section, all water may be appropriated for beneficial use as provided in this chapter and not otherwise.”¹⁶⁶⁰ The statute goes on to state “[t]he use of water, from any stream system . . . for any recreational purpose, is hereby declared to be a beneficial use.”¹⁶⁶¹ Any person or organization—including a private individual—can apply for an instream flow appropriation with the State Engineer.¹⁶⁶²

¹⁶⁵³ *Id.* § 46-2, 115.

¹⁶⁵⁴ NEB. REV. STAT. § 46-290 (LexisNexis 2007).

¹⁶⁵⁵ NEB. ADMIN. CODE tit. 117, ch. 1 (LexisNexis 2007).

¹⁶⁵⁶ NEB. REV. STAT. § 46-290 (LexisNexis 2007).

¹⁶⁵⁷ *Id.*

¹⁶⁵⁸ *See* DECADES DOWN THE ROAD, *supra* note 1578, at 98.

¹⁶⁵⁹ *See* Sandra B. Zellmer, Instream Flow Legislation, at <http://watercenter.unl.edu/WRRI/WRRIWaterResearchPapers.asp> (then follow “Instream Flow Legislation” hyperlink under “Law Policy”) (last visited Feb. 2, 2008).

¹⁶⁶⁰ NEV. REV. STAT. § 533.030 (LexisNexis 2007).

¹⁶⁶¹ *Id.*

¹⁶⁶² *Id.* § 533.325.

Unlike some western states that have statutory instream flow programs, Nevada's instream flow program developed largely through case law. In 1988, the Nevada Supreme Court held that Nevada law recognizes the recreational value of wildlife and the need to provide wildlife with water.¹⁶⁶³ The Court said: "Applications by the United States' agencies to appropriate water for applications to beneficial uses pursuant to their land management functions must be treated on an equal basis with applications by private landowners."¹⁶⁶⁴ Thus, instream rights were provided for use on federal lands under state regulatory authority, not federal proprietary claims.¹⁶⁶⁵ These rights will enjoy the protection of state law and will be integrated into the regimen of rights administered by the State Engineer. As of 2003, approximately eleven instream flow rights have been secured on the Truckee River and its tributaries.¹⁶⁶⁶

While Nevada statutes do not explicitly permit the transfer of water to instream use, the Nevada State Engineer has granted applications to change the manner of use from out-of-stream use to instream use. This was reaffirmed August 21, 2007 when the Engineer granted a change-of-use application to Washoe County and the Cities of Reno and Sparks for instream purposes in the Truckee River.¹⁶⁶⁷

4.1.E.(x) New Mexico

In New Mexico, "[a]ll natural waters flowing in streams and watercourses . . . belong to the public and are subject to appropriation for beneficial use."¹⁶⁶⁸ "Beneficial use shall be the basis, the measure and the limit of the right to the use of water. . . ."¹⁶⁶⁹ However, New Mexico statutes do not explicitly list wildlife, recreation, or any other purpose typically associated with instream flow appropriation as a beneficial use. Instead, New Mexico's instream flow law developed largely from the position of the State Engineer and through a legal opinion by the New Mexico Attorney General.

For many years, the New Mexico State Engineer took the position that an actual out-of-stream diversion of water was legally required in order to appropriate a water right in New Mexico; so there could be no valid instream water rights. Since then, the State Engineer determined that under limited circumstances, an existing water right can be changed to instream uses if statutory criteria for a change are met. In 1998, the New Mexico Attorney General issued an opinion (Opinion) in which he concluded that New Mexico law "permits the State Engineer to afford legal protection to instream flows for recreational, fish or wildlife, or ecological purposes."¹⁶⁷⁰ The Opinion is carefully reasoned and addresses only changes of water rights from traditional diversionary uses to instream flows, noting that since New Mexico's surface waters are already fully appropriated, issuing appropriations for instream flow uses need not be

¹⁶⁶³ Nevada v. Morros, 766 P.2d 263 (Nev. 1988).

¹⁶⁶⁴ *Id.* at 268.

¹⁶⁶⁵ The fact that a federal agency acquired an instream flow right is not particularly noteworthy. Rather, this particular federal right is significant because the litigation that stemmed from this application led to Nevada's first legal recognition of an instream right.

¹⁶⁶⁶ See DECADES DOWN THE ROAD, *supra* note 1578, at 100.

¹⁶⁶⁷ 11 W. WATER L. & POL'Y REP. 308, 308-10 (Oct. 2007).

¹⁶⁶⁸ N.M. STAT. ANN. § 72-1-1 (Michie 2007).

¹⁶⁶⁹ *Id.* § 72-1-2.

¹⁶⁷⁰ 98-01 Op. N.M. Att'y. Gen. (1998).

addressed. The Opinion concludes that New Mexico's Constitution and statutes do not require actual diversion or impoundment in order to validly appropriate a water right and distinguishes several cases that had been the basis of the previous State Engineer's contrary opinion. Moreover, the Opinion asserts the Attorney General's position that a court will recognize recreational, fish and wildlife, and "ecological" uses as proper beneficial uses of water.

Although the New Mexico statutes governing applications for new appropriations appear to contemplate construction of dams, ditches, or other "works," the Opinion determines that this condition would be satisfied by imposition of the State Engineer's announced requirement of "accurate and continuous gauging" of instream flows throughout the permitted stream reach. Since the State Engineer indicated that such gauging would be a requirement of any change to instream-flow uses, the Opinion assumes that such measuring devices will be required. It does not address other sorts of "works" that might also meet the statutory requirement.

Recent legislative amendments have indirectly affected the possibility of dedicating water for instream use. For example, in 2005, the legislature created an Interstate Stream Commission to establish a strategic water reserve.¹⁶⁷¹ The Interstate Stream Commission can purchase or lease water for the strategic water reserve to fulfill legislative objectives. In part, the strategic water reserve was created "for the benefit of threatened or endangered species or in a program intended to avoid additional listings of species."¹⁶⁷² Presumably, any such program would include an instream flow component. Similarly, a recent modification reduces the risk of forfeiture for water users willing to increase instream flows as part of a water conservation program. "Periods of nonuse when water rights are acquired and placed in a state engineer-approved water conservation program . . . shall not be computed as part of the four-year forfeiture period."¹⁶⁷³ To date, there are no permanent water rights for instream use but two permits have been issued for emergency use to meet endangered species flow requirements on the Rio Grande and Pecos Rivers.¹⁶⁷⁴

As with other western states, New Mexico's Legislature has been prompted on many fronts to create innovative approaches to free up additional water supplies. The water banking system along the Pecos River in eastern New Mexico was one such piece of inventive legislation passed in 2002.¹⁶⁷⁵ Like other river systems in the state, new appropriations on the Pecos River have seen a significant increase over the last fifty years. Increasing appropriations have made it essentially impossible to deliver promised water to Texas, as outlined in the Pecos River Compact of 1948. This led to a United States Supreme Court ruling in 1987 that chastised New Mexico for its deficient river regulations and ordered the State to pay economic reparations to Texas.¹⁶⁷⁶ Along a 200-mile stretch of the Pecos River, a water-banking pilot project allows farmers to lease their water rights at current market prices into a bank without the usual prerequisite of a lengthy hearing before the state engineer's office and the appeals process that often follows, and without forfeiting their long-term rights. Since the state legislature

¹⁶⁷¹ See N.M. STAT. ANN. § 72-14-3.3 (Michie 2007).

¹⁶⁷² *Id.*

¹⁶⁷³ See *id.* §§ 75-2-28, 75-12-8.

¹⁶⁷⁴ See DECADES DOWN THE ROAD, *supra* note 1578, at 104.

¹⁶⁷⁵ See N.M. STAT. ANN. § 72-1-2.3 (LexisNexis 2007).

¹⁶⁷⁶ See *Texas v. New Mexico*, 482 U.S. 124 (1987).

appropriated the necessary funds to compensate the farmers along the Pecos for their leased water rights, a substantial amount of available water can help satisfy New Mexico's delivery obligations pursuant to the Pecos River Compact.¹⁶⁷⁷

New Mexico also has a Water-Use Leasing Act, which allows a water right owner to lease all or part of the right, and the owner's water right will not be affected by the use under the lease.¹⁶⁷⁸ Upon termination of the lease, the water use and location of use revert to the original owner's use and location.

4.1.E.(xi) North Dakota

North Dakota follows the doctrine that a diversion is required for a water right to exist. Currently, North Dakota has no statutory provision for establishing instream flows. However, North Dakota statutes suggest that fish, wildlife, and "other recreational uses" constitute beneficial uses.¹⁶⁷⁹ These uses are consistent with instream values. While North Dakota does not currently have an instream flow program, there are indirect mechanisms to protect instream flows. The State Engineer may deny a permit on grounds that the appropriation may conflict with public interest criteria, but this does not create a right to water.¹⁶⁸⁰ Likewise, stock watering rights may also preserve instream flows in some instances.

4.1.E.(xii) Oklahoma

Oklahoma provides little, if any, direct protection for instream flows.¹⁶⁸¹ Although Oklahoma lacks a legislative or administrative process for protecting instream flows,¹⁶⁸² it does recognize legal rights which may indirectly protect instream flow. For example, the state analog to the Federal Wild and Scenic Rivers Act can indirectly protect instream flows in listed waterways.¹⁶⁸³ Similarly, minimum flows for domestic and stock-watering purposes may also indirectly protect instream flows.¹⁶⁸⁴ New appropriations cannot interfere with domestic uses and can be conditioned to protect water-quality standards, although water quality is not considered a beneficial use and an appropriation for that purpose would not be possible. However, the utility of these indirect approaches to protect instream flow is probably limited.

The Oklahoma legislature implicitly recognized "fish and wildlife" as beneficial uses by including them in a list of purposes for which water storage facilities may be developed.¹⁶⁸⁵ Furthermore, the legislature explicitly recognizes recreation as a valid beneficial use.¹⁶⁸⁶

¹⁶⁷⁷ 6 W. WATER LAW & POLICY REPORTER No. 11, 314-15 (Sept. 2002).

¹⁶⁷⁸ N.M. STAT. ANN. §§ 72-6-1 to 72-6-7 (LexisNexis 2007).

¹⁶⁷⁹ See N.D. CENT. CODE §§ 61-04-02, 61-04-06.1 (LexisNexis 2008).

¹⁶⁸⁰ See, e.g., *id.* § 61-04-06(4). Like many states, the State Engineer must consider "[t]he effect on fish and game resources and public recreational opportunities," when evaluating the public interest. See *id.*

¹⁶⁸¹ See DECADES DOWN THE ROAD, *supra* note 1578, at 107.

¹⁶⁸² Though Oklahoma currently lacks an explicit instream-flow protection statute, the Oklahoma Attorney General does not believe state law prohibits the creation of an instream flow right. See *id.*

¹⁶⁸³ See *infra* Wild And Scenic Rivers.

¹⁶⁸⁴ See DECADES DOWN THE ROAD, *supra* note 1578, at 107 (citing DAVID M. GILLILAN & THOMAS C. BROWN, INSTREAM FLOW PROTECTION: SEEKING A BALANCE IN WESTERN WATER USE 143 (Island Press (1997))).

¹⁶⁸⁵ See OKLA. STAT. tit. 82, § 110.2 (LexisNexis 2007).

¹⁶⁸⁶ See *id.* tit. 82, § 1085.40(B)(2).

Although Oklahoma recognizes beneficial uses which are often associated with instream flow protection, it has not yet afforded a method to appropriate or transfer water for these purposes.

Oklahoma law does not require a diversion to establish a water right, but it does encourage development of water resources “to the maximum extent feasible for the benefit of Oklahoma so that out-of-state downstream users will not acquire vested rights therein to the detriment of [Oklahoma] citizens.”¹⁶⁸⁷ The question of whether riparian landowners may claim an instream flow use is not yet settled in Oklahoma, as a statute passed to abolish riparian rights was found unconstitutional by state court.¹⁶⁸⁸

4.1.E.(xiii) Oregon

One of the older state statutory schemes, Oregon’s current statute reaffirms its early policy stating that “[t]he maintenance of minimum perennial stream flows sufficient to support aquatic life, to minimize pollution and to maintain recreational values shall be fostered and encouraged if existing rights and priorities under existing laws will permit.”¹⁶⁸⁹ Under a 1955 law, these minimum perennial stream flows were established administratively based on applications by state agencies.

Additional protection of instream-flow values in Oregon is now provided by the In-Stream Water Rights statute enacted in 1987.¹⁶⁹⁰ An instream flow in Oregon is the minimum quantity of water necessary to support the requested use.¹⁶⁹¹ An instream flow right is “a water right held in trust by the Water Resources Department for the benefit of the people of the State of Oregon to maintain water in-stream for public use.”¹⁶⁹² Public use includes, but is not restricted to, recreation, navigation, water quality, aesthetics, and for the “conservation, maintenance and enhancement of aquatic and fish life, wildlife and fish and wildlife habitat.”¹⁶⁹³ Although the Oregon Water Resources Department ultimately holds the right in trust, the Department of Fish and Wildlife, the Department of Environmental Quality, and the State Parks and Recreation Department can recommend and apply for instream flow rights.¹⁶⁹⁴ Like many states, the Oregon Water Resources Department must provide notice to interested individuals and give them an opportunity to comment on the proposal.¹⁶⁹⁵ Once a certificate is issued, an instream flow

¹⁶⁸⁷ See *id.* tit. 82, § 1861.1(A)(4).

¹⁶⁸⁸ See *Franco-Am. Charolaise, Ltd. v. Oklahoma Water Res. Bd.*, 855 P.2d 568 (Okla. 1990).

¹⁶⁸⁹ OR. REV. STAT. § 536.310(7) (LexisNexis 2007).

¹⁶⁹⁰ The 1987 instream-flow legislation required conversion of the minimum perennial stream flows to instream flow rights but retained the priority date of the original minimum perennial stream flow. OR. REV. STAT. § 537.332-360 (1997); see also OR. ADMIN. R. 690-077-054 (2007).

¹⁶⁹¹ OR. REV. STAT. § 537.332 (LexisNexis 2007).

¹⁶⁹² *Id.*

¹⁶⁹³ *Id.* See also *id.* § 537.336.

¹⁶⁹⁴ See *id.* § 537.336. Interestingly, although each of these agencies may request an instream right, the scope of their respective requests is limited to the purpose for which the agency was established. For example, the Department of Fish and Wildlife is limited to requesting flows for “fish life, wildlife and fish and wildlife habitat,” whereas the State Parks and Recreation Department is limited to requests which relate “to recreation and scenic attraction.” Although these limitations appear in the text of the statutes, the purpose for a request will rarely be so discrete as to fall solely within the purview of a single agency.

¹⁶⁹⁵ OR. ADMIN. R. 690-077-0031 (2007).

right has the same status as any other right for which a certificate has been issued.¹⁶⁹⁶

Instream flows may also be protected by transferring an existing water right to instream use.¹⁶⁹⁷ Oregon allows “[a]ny person [to] purchase or lease all or a portion of an existing water right . . . for conversion to an in-stream water right.”¹⁶⁹⁸ Instream transfers must show that no injury to other water rights will occur and that a beneficial use will be made of the water, such as fishery habitat or flow augmentation for diluting contaminants or pollution.¹⁶⁹⁹ Water-right holders may also lease all or a portion of their water rights to instream purposes. The water right that is leased and converted to an instream water right during the term of the lease carries the priority date of the unexercised out-of-stream water right.¹⁷⁰⁰ One important difference between leases and transfers relates to their duration. Transfers are deemed permanent while leases are limited to five years with an option to renew.¹⁷⁰¹ Oregon also has a program for allocating conserved water that provides an incentive for water right holders to implement conservation measures. Water right holders participating in this program are able to utilize a portion of the conserved water for new uses but are required to permanently dedicate a minimum of twenty-five percent of the conserved water to an instream water right.¹⁷⁰²

Like the instream-flow rights in many other states, Oregon’s originally appropriated instream flow rights can be subordinated. Instream-flow rights can be subordinated for the right to use water for multipurpose storage projects, municipal uses by municipal applicants, or hydroelectric projects.¹⁷⁰³ Subordination does not apply to instream rights obtained by conversion of minimum perennial stream flows or to instream rights obtained by conversion of other rights. Oregon has seen substantial instream flow protection. As of 2005, these protections include approximately 1,550 permanent appropriations; thirty instream transfers; fifteen allocations of conserved water; and 280 instream leases.¹⁷⁰⁴

4.1.E.(xiv) South Dakota

Like its northern neighbor, South Dakota does not have specific statutory provisions for appropriating water for instream use. South Dakota’s instream flow law developed administratively through the Water Management Board. The Water Management Board granted a permit to the Division of Wildlife, Game, Fish and Parks for aesthetic and wildlife purposes.¹⁷⁰⁵ The Board has also granted change-of-use requests for instream-flow purposes. These decisions received judicial confirmation in *Dekay v. United States Fish and Wildlife*

¹⁶⁹⁶ OR. REV. STAT. § 537.350 (LexisNexis 2007).

¹⁶⁹⁷ *Id.* § 537.348; *see also infra* Water Transfers To Instream Use.

¹⁶⁹⁸ OR. REV. STAT. § 537.348 (LexisNexis 2007).

¹⁶⁹⁹ OR. ADMIN R. 690-077-0033, 690-077-0070 (2007).

¹⁷⁰⁰ *Id.*

¹⁷⁰¹ *See* DECADES DOWN THE ROAD, *supra* note 1578, at 112.

¹⁷⁰² *Id.* at 111.

¹⁷⁰³ OR. REV. STAT. § 537.352 (LexisNexis 2008)

¹⁷⁰⁴ *See* DECADES DOWN THE ROAD, *supra* note 1578, at 113.

¹⁷⁰⁵ *See* DECADES DOWN THE ROAD, *supra* note 1578, at 115. The Board has also granted what are essentially instream flow rights to the South Dakota Parks and Wildlife Foundation, the U.S. Fish and Wildlife Service, and the Tacoma Park Association.

Service.¹⁷⁰⁶ In addition, South Dakota may indirectly protect instream flows by recognizing and administratively enforcing domestic use and stock-watering rights.¹⁷⁰⁷

4.1.E.(xv) Texas

Texas instream flow laws emphasize healthy rivers, bays, and estuaries. Texas distinguishes freshwater inland waters and those that reach the sea. Generally, “instream flows” refer to inland waters whereas “inflows”¹⁷⁰⁸ refer to waters that empty into the ocean. For purposes of this discussion, both “instream flows” and “inflows” are called “instream flows.”¹⁷⁰⁹

Recent legislation has substantially altered the statutory landscape of Texas’s instream flow laws.¹⁷¹⁰ The Texas Commission on Environmental Quality (TCEQ) is largely responsible for implementing the changes.¹⁷¹¹ Under these new statutes, TCEQ “shall adopt appropriate environmental flow standards for each river basin and bay system . . . to support a sound ecological environment. . . .”¹⁷¹² The TCEQ establishes environmental flow standards only after reviewing specific criteria.¹⁷¹³ The changes also allow “set-asides” for instream use¹⁷¹⁴ and applications to dedicate an existing permit to instream use.¹⁷¹⁵ “Set-asides” appear to function similarly to instream flow reservations.¹⁷¹⁶ Notably, “set-asides” are mandatory only if

¹⁷⁰⁶ 524 N.W.2d 855 (S.D. 1994). In *Dekay*, the Supreme Court of South Dakota held that water for aquatic plant growth for wildlife propagation is a beneficial use and affirmed the appropriation. *Id.* at 859.

¹⁷⁰⁷ See *DECADES DOWN THE ROAD*, *supra* note 1578, at 116 (citing DAVID M. GILLILAN & THOMAS C. BROWN, *INSTREAM FLOW PROTECTION: SEEKING A BALANCE IN WESTERN WATER USE* (Island Press 1997)).

¹⁷⁰⁸ “Beneficial inflows” are “a salinity, nutrient, and sediment loading regime adequate to maintain an ecologically sound environment in the receiving bay and estuary system that is necessary for the maintenance of productivity of economically important and ecologically characteristic sport or commercial fish and shellfish species and estuarine life upon which such fish and shellfish are dependent.” TEX. WATER CODE ANN. § 11.147 (LexisNexis 2008). Texas reserves water for instream and estuarine purposes when state funds are used to build water storage projects within 200 miles of the coast. *See id.* §§ 15.3041, 16.1331. If state funds are used to finance such ventures, five percent of the “annual firm yield of water” is appropriated to the Parks and Wildlife Department in order “to make releases to bays and estuaries and for instream uses.” *Id.* The TCEQ determines the procedures for such permits but is statutorily required to issue them.

¹⁷⁰⁹ Texas maintains a website for its Instream Flow Program. It can be accessed at <http://www.twdb.state.tx.us/instreamflows/> (last visited Jan. 7, 2008).

¹⁷¹⁰ The Texas Legislature enacted Senate Bill No. 3 in 2007. The bill significantly changed the state’s instream-flow protection laws.

¹⁷¹¹ However, the Texas Parks and Wildlife Department and the Texas Water Development Board, as well as other state and federal agencies may be instrumental in carrying out the purposes of these statutes.

¹⁷¹² TEX. WATER CODE ANN. § 11.1471(a)(1) (LexisNexis 2008).

¹⁷¹³ *Id.* § 11.1471(b).

¹⁷¹⁴ *Id.* § 11.1471(a)(2) (discussing environmental flow standards and set-asides). On its face, a Texas instream flow “set-aside” appears similar to an instream flow reservation. Legislative findings support this conclusion: “The Legislature finds that in those basins in which water is available for appropriation, the [TCEQ] should establish an environmental set-aside below which water should not be available for appropriation.” *Id.* § 11.0235(d-3)(1). However, since these statutes are quite new, only time will tell whether “set-asides” function like reservations in practice. It is also worth noting that “set-asides” do not create a right to water and are not entitled to permits for appropriation. *See id.* § 11.0237(a) (“The commission may not issue a new permit for instream flows dedicated to environmental needs or bay and estuary inflows.”).

¹⁷¹⁵ *Id.* § 11.0237(a). This statute could be characterized as a statute allowing for a transfer to instream use inasmuch as it allows water users to change the existing use of a valid permit from out-of-stream use to instream use.

¹⁷¹⁶ *See supra* note 1714.

unappropriated water is available.¹⁷¹⁷ If water is available, TCEQ shall establish an amount “to be set aside to satisfy the environmental flow standards to the maximum extent reasonable when considering human water needs.”¹⁷¹⁸ An environmental set-aside “must be assigned a priority date corresponding to the date the [TCEQ] receives environmental flow regime recommendations. . . .”¹⁷¹⁹

Perhaps recognizing the limited availability of unappropriated waters, Texas allows water permit holders to apply “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.”¹⁷²⁰ Furthermore, the Legislature found “in those basins in which the unappropriated water that will be set aside for instream flow and freshwater inflow is not sufficient to fully satisfy the environmental flow standards established by the [TCEQ], a variety of market approaches, both public and private, for filling the gap must be explored and pursued.”¹⁷²¹ The Environmental Flows Advisory Group, an organization designed to help implement Texas’s instream flow laws, “shall specifically address appropriate methods to encourage persons voluntarily to convert reasonable amounts of existing water rights to use for environmental flow protection temporarily or permanently.”¹⁷²² Interestingly, “[t]he legislature recognizes that effective implementation of . . . protecting instream flows and freshwater inflows will require more effective water rights administration and enforcement systems than are currently available in most areas of the state.”¹⁷²³ To date, it is not entirely clear how recognizing this limitation will impact instream flow administration in Texas but it does suggest some changes may need to occur.

Although environmental set-asides and transfers are significant developments, it is also worth noting the importance of environmental considerations during the appropriations process itself. TCEQ must always consider, when evaluating applications to appropriate water, whether “the proposed appropriation considers any applicable environmental flow standards established [by statute].” This ensures TCEQ considers environmental concerns before granting any additional appropriation that could adversely affect instream flows.

¹⁷¹⁷ However, most of Texas’ surface water is already allocated and little water remains for environmental flows. *See, e.g.,* Ronald Kaiser, *Water Concerns in Texas: A Problem in Search of a Solution*, 67 TEX. B.J. 188, 190 (2008). For example, rivers are fully appropriated in stretches of the Canadian, Red, Cypress, Sabine, Neches, Trinity, Brazos, Colorado, Guadalupe, San Antonio, Nueces, and Rio Grande Rivers. *Id.* at n.12 (citing Tex. Natural Res. Conservation Comm’n, *A Regulatory Guidance Document for Applications to Divert, Store or use State Water* 26 (1995)).

¹⁷¹⁸ TEX. WATER CODE ANN. § 11.1471(1)(2) (LexisNexis 2008).

¹⁷¹⁹ *Id.* § 11.1471(e). There is an exception for the middle and lower Rio Grande River. Environmental set-asides in these sections, if available, would not have a priority date corresponding to the date the TCEQ receives environmental flow regime recommendations.

¹⁷²⁰ *Id.* § 11.0237(a). It is worth noting that “[t]he legislature has determined that existing water rights that are amended to authorize use for environmental purposes should be enforced in a manner consistent with the enforcement of water rights for other purposes as provided by the laws of this state governing the appropriation of state water.” *Id.* § 11.0235(d-1). This may help alleviate some concerns that amending a right to allow instream use would expose the underlying permit to disparate treatment.

¹⁷²¹ *Id.* § 11.0235(d-3)(2).

¹⁷²² *Id.* § 11.0236(i)(2).

¹⁷²³ *Id.* § 11.0235(f).

In a related effort, Texas has created a water trust designed to hold water rights donated for environmental purposes, including instream use. The water trust is a subset of the banking system. “The Texas Water Trust is established within the water bank to hold water rights dedicated to environmental needs, including instream flows, water quality, fish and wildlife habitat, or bay and estuary inflows.”¹⁷²⁴

In contrast, the purpose of the water bank is to allow entities to buy, sell, and lease water rights. The bank can facilitate typical water transactions, like transfers, but can also serve as an information center, providing water information to potential buyers and sellers. While the bank is not designed to facilitate environmental transfers, it is conceivable that entities could purchase rights through the banking program and then donate them to the water trust for instream or comparable environmental purposes.

4.1.E.(xvi) Utah

In Utah, water transfers are the only way to dedicate water for instream use. Utah allows the Division of Wildlife Resources or Division of Parks and Recreation¹⁷²⁵ to file applications for permanent or temporary¹⁷²⁶ changes “for the purpose of providing water for instream flows, within a designated section of a natural stream channel or altered natural stream channel, necessary within state for the propagation of fish; public recreation; or the reasonable preservation or enhancement of the natural stream environment.”¹⁷²⁷ These rights can be secured in one of three ways. First, changes may be filed on perfected water rights owned by the respective agency.¹⁷²⁸ Second, an agency may apply for changes in perfected rights purchased by the agency, or otherwise acquired by lease, agreement, gift, exchange, or contribution for the purpose of providing water for instream flows.¹⁷²⁹ However, the agency may only purchase water rights for instream flow purposes with funds specially given by the legislature for such purchases. Third, an agency may apply for changes in appurtenant water rights acquired with real property.¹⁷³⁰ Section 73-3-3(11)(c) makes clear that an actual diversion is not required to implement a change to an instream flow use. In Utah, instream flow rights may not be appropriated from unappropriated water.

Changing a water right to an instream flow right does not allow an enlargement of the base water right, and the change may not impair any vested water right.¹⁷³¹ The application for change must include a legal description of the stretch of waterway for which the instream flow is sought; appropriate studies, reports, or other information as required by the State Engineer to

¹⁷²⁴ *Id.* § 15.7031.

¹⁷²⁵ Utah also recognizes some water rights that list “irrigation for wildlife propagation” as the beneficial use, which allows application of water to preserve wetlands and other waterfowl habitat. These rights are held by both the Division of Wildlife Resources, and in some instances, by private waterfowl organizations. While these rights are not instream flow rights per se, they do promote wildlife habitat, a common instream value. Personal communication from Norman K. Johnson, Assistant Attorney General for the State of Utah (Nov. 2007) (on file with author).

¹⁷²⁶ Temporary periods are periods not exceeding one year.

¹⁷²⁷ UTAH CODE ANN. § 73-3-3(11) (1989 & Supp. 2006).

¹⁷²⁸ *Id.*

¹⁷²⁹ *Id.*

¹⁷³⁰ *Id.*

¹⁷³¹ *Id.*

demonstrate the necessity for the instream flow; and the projected benefits to the public that will result from the change.¹⁷³² As of 2005, Utah currently recognizes five instream flow rights.¹⁷³³

4.1.E.(xvii) Washington

Washington began enacting instream flow legislation in 1949.¹⁷³⁴ It originated from concerns that reduced stream flows adversely affected Washington's commercial fishing industry. Over time, through a series of legislative acts, instream-flow protection broadened in scope. In 1967, Washington created its minimum-flow program.¹⁷³⁵ Washington's Department of Ecology has exclusive authority¹⁷³⁶ to set minimum stream flow levels for the purposes of protecting fish, game, birds, or other wildlife resources, or recreational or aesthetic values of public waters whenever it appears to be in the public interest to do so.¹⁷³⁷ In an expansive statement, the legislature has declared "[p]erennial rivers and streams of the state shall be retained with base flows necessary to provide for preservation of wildlife, fish, scenic, aesthetic and other environmental values, and navigational values."¹⁷³⁸ Water quality may also be protected.

Before a minimum flow can be established, notice of a hearing to consider the matter is published in a newspaper of general circulation in the counties where the waterway or lake is located.¹⁷³⁹ All such flows are available in the "Minimum Water Level and Flow Register" kept by the Department of Ecology.¹⁷⁴⁰ Statutes have encouraged state agencies to prioritize which waterways need greatest protection in studies and reports.¹⁷⁴¹ Many of Washington's minimum stream flow laws are part of its broader watershed planning program.¹⁷⁴²

Like other states, Washington has created water banks and water trusts, which increase the number of tools through which water can be acquired for instream purposes.¹⁷⁴³ In particular, the water trust provides resources to facilitate voluntary transfers to instream use. Under the current legislative scheme, the Department of Ecology prefers to establish instream flows by rulemaking, but can, when necessary, deny or condition water rights to preserve

¹⁷³² *Id.*

¹⁷³³ See DECADES DOWN THE ROAD, *supra* note 1578, at 124.

¹⁷³⁴ WASH. REV. CODE § 77.57.020 (LexisNexis 2008) ("The director of ecology may refuse to issue a permit if, in the opinion of the director of ecology, issuing the permit might result in lowering the flow of water in a stream below the flow necessary to adequately support food fish and game fish populations in the stream.").

¹⁷³⁵ See *id.* at 125.

¹⁷³⁶ WASH. REV. CODE § 90.03.247 (LexisNexis 2007). Though conferred with this exclusive authority, the Department of Ecology is encouraged to "consult with, and carefully consider the recommendations of, the department of fish and wildlife, the department of community, trade, and economic development, the department of agriculture, and representatives of the affected Indian tribes." *Id.*

¹⁷³⁷ *Id.* § 90.22.010.

¹⁷³⁸ *Id.* § 90.54.020(3)(a).

¹⁷³⁹ *Id.* § 90.22.020.

¹⁷⁴⁰ *Id.* § 90.22.030.

¹⁷⁴¹ See *id.* §§ 90.22.060, 90.82.085. These studies are part of Washington's watershed planning, which is required by statute.

¹⁷⁴² See *id.* § 90.82.080. The watershed planning program is a systematized effort to prepare for the future water needs of the state. See generally *id.* §§ 90.82.005 to 90.82.902.

¹⁷⁴³ See *id.* §§ 90.42.130, 90.42.080 (addressing water banking and water trusts, respectively).

instream flows for fish even where rules have not been adopted.¹⁷⁴⁴ As of 2007, over 217 streams in Washington have minimum flows.¹⁷⁴⁵ Also, as of 2005, the water trust has received an estimated 9,800 acre-feet through donations, 75,313 acre-feet through leases, and 348,369 acre-feet through purchases.¹⁷⁴⁶

4.1.E.(xviii) Wyoming

Wyoming's statute allows instream-flow appropriations to establish or maintain new or existing fisheries.¹⁷⁴⁷ Appropriations for such instream-flow uses may be made from unappropriated waters of the state "if such use does not impair or diminish the rights of any other appropriator in Wyoming."¹⁷⁴⁸ The state engineer cannot regulate the stream to protect instream flows unless present or future injury to the fishery has been shown.¹⁷⁴⁹ The amount of water that can be appropriated for fisheries is the minimum amount necessary to establish or maintain fisheries or, in the case of existing fisheries, the minimum amount necessary to maintain or improve such fisheries. The statute includes a complicated methodology for determining where and how much water can be appropriated for instream flows. The instream flow applies only to the specific stream or river segment for which the flow was appropriated, thereby subjecting the flow to reappropriation once the segment ends.¹⁷⁵⁰

The state is the only entity allowed to appropriate instream flows. Applications are filed by the Water Development Commission in the name of the state and are based on recommendations by the State Game and Fish Commission. The priority date of the appropriative right is the date of the Commission's application. Water commissioners regulate the watercourse to provide water for the instream use on the basis of its priority. The state may acquire rights for instream flow by gift or transfer for the purpose of instream flows, which will be administered by the state engineer.¹⁷⁵¹ However, statutes explicitly deny authority to condemn existing rights or to claim abandoned water for instream use.¹⁷⁵² As of 2005, approximately 420 miles of river have protective instream flows.¹⁷⁵³

4.1.F. Cooperative Instream Flow Efforts

While individual state laws can help, managing instream flows in western states is still difficult. Put simply, our ability to put water to "beneficial use" exceeds our supply. Environmental and demographic factors are formidable constraints. Populations are increasing,

¹⁷⁴⁴ *Id.* §§ 90.03.570, 90.22.010, 90.54.020(3)(a).

¹⁷⁴⁵ E-mail from Kathleen Williams, Executive Director, Instream Flow Council, to Craig Bell, Executive Director, Western States Water Council (Jan. 24, 2008, 13:37:44 MST) (on file with authors).

¹⁷⁴⁶ *Id.*

¹⁷⁴⁷ WYO. STAT. ANN. § 41-3-1001 (LexisNexis 2007).

¹⁷⁴⁸ *Id.*

¹⁷⁴⁹ *Id.* § 41-3-1008. Furthermore, "[t]he state engineer shall not regulate the stream to protect the instream flow right . . . if the call for regulation is a futile call; or if the call for regulation will impair senior water rights." *Id.*

¹⁷⁵⁰ *Id.* § 41-3-1002.

¹⁷⁵¹ *Id.* § 41-3-1007.

¹⁷⁵² *Id.* §§ 41-3-1009, 41-3-1010. Although rights may not be condemned for instream purposes, instream rights can be condemned for municipal purposes. *See id.* § 41-3-1013.

¹⁷⁵³ *See* DECADES DOWN THE ROAD, *supra* note 1578, at 132. The miles of stream protected—approximately 420—equals approximately 1.9 % of the state's total 21,643 miles of waterways.

droughts are frequent, and water supplies are limited. Few western states have unappropriated water available to satisfy growing demand. The specter of climate change and its impact on water resources exacerbates these constraints. Human dynamics add yet another layer of complexity. Philosophical differences between landowners—state, federal, and private—as well as other interested parties can make cooperation seem like distant fantasy. In spite of these obstacles, creative individuals, agencies, and organizations have made efforts to address instream-flow problems. The following examples illustrate the ability of disparate stakeholders to build consensus and actively address instream-use issues within existing state laws.

The first example involves a significant water right for the Gunnison River in the Black Canyon area of Colorado.¹⁷⁵⁴ Colorado law limits the ownership of instream rights to the Colorado Water Conservation Board (CWCB).¹⁷⁵⁵ The Nature Conservancy is an organization dedicated to protecting ecologically important lands and waters,¹⁷⁵⁶ including waters in the West.¹⁷⁵⁷ It acquired a water right for the Gunnison River with a 1965 priority date and wanted to donate the right to the CWCB for instream use.¹⁷⁵⁸ The parties used creative drafting to come to an agreement. The CWCB and the Nature Conservancy specifically agreed how the instream right will be enforced against large junior water rights just upstream from Black Canyon.¹⁷⁵⁹ Furthermore, the agreement gives the Nature Conservancy a contractual remedy if the CWCB fails to enforce or defend the instream right.¹⁷⁶⁰

The instream right for the Black Canyon stretch of the Gunnison River has three layers of legal protection. First, the right is protected by the doctrine of prior appropriation to the extent of its 1965 priority date. Second, the water right is directly enforceable by the CWCB as against infringing users. Third, the Nature Conservancy retained a contractual remedy against the CWCB if CWCB fails to defend or enforce the right, which it could either enforce or use as leverage in the event CWCB breaches the terms. This example illustrates how interested organizations and agencies can work within the limits of state law to preserve instream flows. In this case, the Nature Conservancy relied upon the doctrine of prior appropriation, statutory provisions regarding instream flow rights, and general principles of contract law to fashion an agreement. Senior water rights holders are not adversely affected and the right promotes instream values like recreation, wildlife, and aesthetics.

The next three examples discuss instream flow protection in the context of endangered species preservation. Extinction can be a sobering and irreversible consequence of inadequate stream flows. The ESA has increased endangered-species awareness for states, conservation

¹⁷⁵⁴ COMM. ON W. WATER MGMT., NAT'L RESEARCH COUNCIL, WATER TRANSFERS IN THE WEST: EFFICIENCY, EQUITY, AND THE ENVIRONMENT 64-65 (1992).

¹⁷⁵⁵ See *supra* notes 1574 and accompanying text.

¹⁷⁵⁶ The Nature Conservancy, *About Us*, at <http://www.nature.org/aboutus/?src=t5> (last visited Nov. 11, 2007).

¹⁷⁵⁷ COMM. ON W. WATER MGMT., NAT'L RESEARCH COUNCIL, WATER TRANSFERS IN THE WEST: EFFICIENCY, EQUITY, AND THE ENVIRONMENT 64-65 (1992).

¹⁷⁵⁸ *Id.* at 65.

¹⁷⁵⁹ *Id.*

¹⁷⁶⁰ *Id.* While the nature of the contractual remedy was not disclosed, the agreement shows how creative drafting can provide additional assurance to a concerned party if statutory or other legal assurances appear inadequate.

groups, and federal agencies. Traditional water use and water-storage development in the West have pushed some species to the brink of extinction, including species of fish, amphibians, and birds. In some instances, historical water use has endangered species on a broad geographic scale. These broad problems can affect endangered species across many states. In the context of complex multistate challenges, reservoir reoperation is a common component of collaborative approaches. Two examples involve the Platte River and the Colorado River.

There are four threatened and endangered species that depend upon the Central Platte River: the whooping crane, which migrates through the Central Platte in the spring and fall; the piping plover and interior least tern, which both hatch their young in the Central Platte; and the pallid sturgeon, a fish that lives primarily in the Missouri and Mississippi Rivers. Formal ESA Section 7 consultation requirements are triggered by myriad federal actions in the basin, such as federal hydropower project licensing, Clean Water Act Section 404 permits for diversion works, and U.S. Forest Service special use permits. Any of these actions have the potential to impose substantial burdens on individuals and projects through consultations to protect endangered species and their habitat, sometimes hundreds of miles downriver.

As a result, the governors of Colorado, Nebraska, and Wyoming initiated discussions that resulted in formation of the Platte River Endangered Species Partnership and an agreement with the FWS to develop a plan that would comprise a Reasonable and Prudent Alternative (RPA) to any jeopardy opinion on permitted development and ongoing project operations. The FWS long-term goal is to provide an additional 29,000 acres of habitat and increase average annual flows by 417,000 acre-feet of water—with actions focused on the Big Bend area near Grand Island in central Nebraska.

Finding such a goal too ambitious for some of the Platte River partners, a phased incremental approach is being used to secure 130,000 to 150,000 acre-feet of water for endangered wildlife. The agreement seeks to increase water flow and habitat in and around the Central Platte River by releasing additional water during the spring from upstream dams and other water projects within the states of Colorado, Nebraska, and Wyoming, and by purchasing land from willing sellers along the river.

Each state is taking a slightly different approach to reaching the interim goals. Wyoming and the BOR are looking to increase storage at Pathfinder Dam and use uncontracted water in Glendo Reservoir, both on the North Platte River, to increase flows. Colorado plans to use groundwater recharge opportunities to change the timing of discharges to the South Platte River to help meet target flows. Nebraska plans to use water stored in Lake McConaughy behind Kingsley Dam on the North Platte, together with habitat acquisition (including some 2,650 acres already purchased), to help meet the goals. Additional actions will be needed to achieve FWS long-term goals. In addition to funding and water and land acquisition challenges, there are hurdles to overcome with respect to the integrated management of surface and groundwaters, concern over impacts on the local tax base, potential third party impacts, and other issues. Nevertheless, the agreement provides a basis for optimism that solutions will be found which will serve all of the interests in the basin, including the endangered species.

The Upper Colorado River Endangered Fish Recovery Program provides another

example of a successful cooperative approach to provide water for endangered species. This program also relies upon changes in dam operation.¹⁷⁶¹ A coalition of agencies and organizations came together in 1988 to improve the condition of endangered Colorado River basin fish. The program involves federal, state, and private organizations and agencies in Colorado, Utah, and Wyoming.

An important component of the program is providing adequate instream flows. According to a FWS report, “[t]his strategy seeks to mimic more natural flow patterns, providing high flows during natural spring runoff, and lower, more stable flows the rest of the year. Large volumes of water carve out the riverside nooks and crannies, or ‘backwaters and side channels,’ which endangered fish need to feed, grow, and survive.”¹⁷⁶²

To this end, the program manages the releases of 30,000 acre-feet of surplus water from Green Mountain Reservoir and coordinated releases from Ruedi and Woford Mountain Reservoirs. Colorado State Parks, the Colorado Water Conservation Board, and the U.S. FWS reached an agreement to release up to 3,300 acre-feet of water annually from Steamboat Lake for endangered fish in the Yampa River. Agreements have been signed with the Colorado River Water Conservation District and the Denver Water Board to coordinate water releases from several Colorado reservoirs to benefit the endangered fishes. The BOR has altered the timing and magnitude of releases from Flaming Gorge Dam on the Green River and the Aspinall Unit dams on the Gunnison River. This will help researchers determine habitat requirements of the endangered fishes downstream of these dams and will be used in preparing new biological opinions on dam operations and in determining future dam operations.

The Utah State Engineer has established water rights policy for the Green River to protect releases from Flaming Gorge Reservoir for endangered fish. Pursuant to this policy, river flows will be protected from Flaming Gorge Dam downstream to the Duchesne River for endangered fish. New water right requests will be considered in this stretch, but only after these flows have been maintained for endangered fish.

The 2001 Conservation Agreement in the Lemhi River Basin in Idaho represents a recent example of successful cooperative efforts to obtain water for instream use, including use of the state’s water banking system. Specifically, the agreement obtained water for endangered species protection. It was entered into by Idaho’s Office of Species Conservation, Department of Water Resources (IDWR), Department of Fish and Game (IDFG), the Upper Salmon Basin Watershed Project (Project), the Lemhi Irrigation District, Water District No. 74, the NMFS, and the FWS. The agreement includes provisions to enhance instream flow in the Lemhi River and Hayden Creek, as well as to increase planning and monitoring. Non-federal water users provide rental water to ensure a minimum of twenty cubic-feet per second flow in the Lemhi River, and an average of eight cubic-feet per second in Hayden Creek. Participants use the state water supply bank on a willing-lessor, willing-lessee basis.

The parties further committed to “participate in the negotiation of a long-term

¹⁷⁶¹ The information in this summary was provided primarily by the USFWS. For more information, see their web site: <http://coloradoriverrecovery.fws.gov/Crrpovvu.htm>.

¹⁷⁶² *Id.*

agreement for the conservation of ESA-listed fish species in the Lemhi River Basin.” The agreement addresses enhancing instream flows by way of water banking and other mechanisms to identify and implement projects to improve fish migration, and other enhancement measures. The agreement has received wide-ranged praise from federal agencies, state water resource personnel, farmers, and other interest groups.

The final example of a cooperative instream flow solution, like the endangered species examples, is management oriented. In some circumstances, resource management can eliminate the need to resort to legal tools to preserve instream flows. The example of Muddy Creek shows that this approach can benefit the entire watershed, including instream flows.

Muddy Creek is a stream in southeastern Wyoming that eventually runs into the Little Snake River of northeastern Colorado. As its name suggests, Muddy Creek can be very turbid and carry high sediment loads. Historically, Muddy Creek has been a principle source of sediment in the Colorado River drainage.¹⁷⁶³ In an effort to improve the Muddy Creek watershed, the Wyoming Department of Agriculture spearheaded the Muddy Creek Coordinated Resource Management Project (Muddy Creek CRM). A combination of thirty-five landowners, state agencies, federal agencies, private organizations and energy developers have participated in the Muddy Creek CRM.¹⁷⁶⁴ As a group, the Muddy Creek CRM established several goals that relate to instream flows and water quality. First, reestablish the Colorado River cutthroat to headwater streams.¹⁷⁶⁵ Second, improve water quality by reducing erosion and sedimentation.¹⁷⁶⁶ Third, restore riparian habitats to desired condition, including visible and measurable changes in plant community, stream channels, and hydrologic regimes.¹⁷⁶⁷

Restoring the George Dew Meadows provides the clearest of example of how management practices can preserve instream flows, particularly late in the year. Sometime in the 1960s, the original dike broke, and active head cutting began draining the meadowlands.¹⁷⁶⁸ The Muddy Creek CRM organized labor, engineering, and funding to rebuild the original dike as well

¹⁷⁶³ Jim Thompson, MUDDY CREEK COORDINATED RESOURCE MANAGEMENT PROJECT, CARBON COUNTY, WYOMING, 1 (Red Lodge Clearinghouse Oct. 2001), *available at* <http://www.redlodgclearinghouse.org/stories/muddycreek.pdf> (last visited Nov. 5, 2007) [hereinafter MUDDY CREEK CRM].

¹⁷⁶⁴ *Id.* at 32. The majority of the fifteen landowners are involved in livestock production. Participants also included five federal agencies (BLM, EPA, NRCS, USDI, USFWS), eight state and local agencies (Carbon County Commissioners, Carbon County Cooperative Extension Service, Little Snake River Conservation District, Central Utah Project Completion Act, Wyoming Department of Agriculture, Wyoming Department of Environmental Quality, Wyoming Game and Fish Department, Wyoming Water Development Commission), five private conservation organizations (Ducks Unlimited, National Fish and Wildlife Foundation, Rocky Mountain Elk Foundation, Wyoming Outdoor Council, Wyoming Riparian Association), and one energy developer (Snyder Oil Company). *Id.* The diversity among the members shows that cooperative solutions are possible, even if the participants don’t always see eye-to-eye.

¹⁷⁶⁵ *Id.* at 9.

¹⁷⁶⁶ *Id.*

¹⁷⁶⁷ *Id.* Restoration efforts included developing stream structures to control gradient and stream velocity; and planting woody vegetation such as willows.

¹⁷⁶⁸ *Id.* at 13.

as to construct eight additional dikes and two new diversions.¹⁷⁶⁹ The George Dew Meadows now contains a 13,000-acre mosaic of wetlands and irrigated meadows.¹⁷⁷⁰ In 1987, stream gauges recorded 10,000 acre-feet of stored water in these meadows, which has enhanced vegetation growth and improved late season flows into the stream.¹⁷⁷¹

In the fall of 2001, resource management officials successfully reintroduced Colorado River cutthroat in the headwaters of Muddy Creek, thereby accomplishing one of the group's primary goals.¹⁷⁷² The Muddy Creek CRM committee's work and accomplishments relied profoundly upon the interactions and relationships among the members.¹⁷⁷³ Furthermore, according to one assessment, the Muddy Creek CRM succeeded because the Wyoming government strongly embraced the program and provided critical technical and financial support.¹⁷⁷⁴ Participants feel that the Muddy Creek CRM shows managers and politicians that the key to success is local people working together using principles of commitment, communication, cooperation, and consensus.¹⁷⁷⁵

Several important lessons can be gleaned from these examples. First, instream-flow problems can be addressed without litigation. Second, interested parties can try and solve instream-flow problems within the framework of state water law and general legal principles. Third, instream flow preservation through water transfers and water banking is compatible with the doctrine of prior appropriation. Fourth, collaborative resource management can preserve, moderate, enhance, or maintain instream flows. Fifth, creating a cooperative environment with willing, voluntary participants can increase the likelihood of resolving instream flow problems.

4.1.G. Conclusion

In summary, managing instream flows in the arid West is difficult and sometimes controversial. These challenges will likely continue into the foreseeable future. These challenges are sometimes exacerbated by conflicts between federal laws and interests and state water laws and institutions. This section of the Report does not suggest that various federal laws policies should be subjugated within state water law frameworks. Indeed, such federal "tools" are an important expression of national law and policy in support of instream flows. It does suggest a sequencing which first attempts to utilize state frameworks for two reasons: (1) federal interests can increasingly be accommodated within state water laws and (2) utilizing such state laws will provide distinct advantages for the protection and preservation of instream flows.

¹⁷⁶⁹ *Id.* The project improved hydrologic processes by decreasing stream width, reducing water temperatures, increasing sediment flushing, dissipating potentially destructive energy, and promoting the recovery of streamside vegetation.

¹⁷⁷⁰ *Id.* at 12. The George Dews Meadows is the biologically richest area in the Muddy Creek watershed and hosts 105 species of birds, six species of fish, several species of reptiles and amphibians, mule deer, antelope, and numerous small mammals.

¹⁷⁷¹ *Id.*

¹⁷⁷² RED LODGE CLEARINGHOUSE, *Update: Muddy Creek* (May 2003), at http://www.redlodgclearinghouse.org/stories/muddycreek_update.html (last visited Nov. 11, 2007). *See also* EPA, *Muddy Creek Coordinated Resource Management Project: Cattle Ranches and Trout Streams Can Coexist*, at <http://www.epa.gov/region8/water/nps/wymuddycr.pdf> (last visited Nov. 11, 2007).

¹⁷⁷³ MUDDY CREEK CRM, *supra* note 1763, at 8.

¹⁷⁷⁴ *Id.* at 5 (citation omitted).

¹⁷⁷⁵ *Id.* at 25.

In this context, and considering the existence of various relevant federal laws and policies, it will be important for each state to examine the adequacy of its state tools to protect and enhance flows. Specifically, each state should identify and endeavor to meet instream flow objectives. Each state has different instream flow needs, problems, and goals. Likewise, each state has different tools to protect instream flows. This chapter is not intended to critique the availability of these tools in any particular state. Rather, this chapter encourages decision-makers to review and assess instream flow needs within their state. After doing so, it may be worthwhile to consider whether existing tools enable agencies to address those needs. If an evaluation of available tools suggests additional mechanisms may improve the likelihood of meeting instream flow objectives, states are invited to consider possible options. Examining tools from other states could be a useful starting point for exploring the possibilities.

Western states have developed tools that may be useful in addressing instream-flow concerns. These tools can provide water for instream use either directly or indirectly. Tools that can directly provide water for instream use include: (1) instream flow reservations;¹⁷⁷⁶ (2) instream flow appropriations;¹⁷⁷⁷ (3) water right transfers to instream use;¹⁷⁷⁸ (4) temporary water right leases for instream use;¹⁷⁷⁹ (5) water bank “withdrawals” for instream use;¹⁷⁸⁰ (6) and conservation measures that dedicate a fraction of the conserved water to instream use.¹⁷⁸¹ Tools that can indirectly provide water for instream use include: (1) using public interest criteria to deny applications to appropriate or transfer water that would be detrimental to instream values;¹⁷⁸² (2) legislative protections for streams and rivers, including “Wild and Scenic Rivers” legislation;¹⁷⁸³ (3) stock watering rights;¹⁷⁸⁴ (4) other factors or circumstances that incidentally prevent diversion or withdrawal;¹⁷⁸⁵ and (5) river basin closures or temporary moratoria.¹⁷⁸⁶ Though potentially useful, none of these tools is a panacea for instream-flow related problems.

Instream-flow concerns can result in litigation or regulatory supervision if they persist. This chapter encourages interested parties to first consider available tools under state law before resorting to litigation. If the particular state does not have a tool to address the instream-flow concern at issue, parties are encouraged to negotiate a compromise. At times, parties may

¹⁷⁷⁶ See *supra* notes 1535-1544, 1614-1622, 1625-1633, 1714-1719, 1735-1742 and accompanying text (discussing reservations or analogous processes in Alaska, Kansas, Montana, Texas, and Washington, respectively).

¹⁷⁷⁷ See *supra* notes 1548-1554, 1574-1580, 1586-1597, 1641-1651, 1663-1665, 1690-1696, 1747-1750 and accompanying text (discussing instream appropriations in Arizona, Colorado, Idaho, Nebraska, Nevada, Oregon, and Wyoming, respectively).

¹⁷⁷⁸ See *supra* notes 1555-1558, 1565-1568, 1577-1578, 1654-1657, 1667, 1670, 1697-1702, 1720, 1725-1733, 1743, 1751 and accompanying text (discussing water right transfers to instream use in Arizona, California, Colorado, Nevada, New Mexico, Oregon, Texas, Utah, Washington, and Wyoming, respectively).

¹⁷⁷⁹ See *supra* notes 1634-1636, 1672, 1743-1746 and accompanying text (describing water right leases for instream use in Montana, New Mexico, and Washington, respectively).

¹⁷⁸⁰ See *supra* notes 1559-1560, 1602-1608, 1675-1678, 1724 and accompanying text (discussing water banking systems in Arizona, Idaho, New Mexico, and Texas and their capacity to provide water for instream use generally).

¹⁷⁸¹ See *supra* note 1702 and accompanying text.

¹⁷⁸² See *supra* notes 1440-1454 and accompanying text.

¹⁷⁸³ See *supra* notes 1460-1470 and accompanying text.

¹⁷⁸⁴ See *supra* notes 1684, 1707 and accompanying text.

¹⁷⁸⁵ See *supra* notes 1528-1530 and accompanying text.

¹⁷⁸⁶ See *supra* notes 1531-1532 and accompanying text.

choose to negotiate even if state tools could potentially resolve the concern. In conflicts between federal and state governments, successfully negotiating a compromise may include reservoir reoperation and water “withdrawals” from water banks. If states find themselves litigating numerous instream-flow related claims, it may be worthwhile to evaluate whether expanding the availability or number of state tools could provide interested parties options for expressing their concerns, and thereby reduce the number of claims brought to court.

Index

-A-

Abandonment, 70

- Agricultural Conservation, Relation to, 167
- Conservation Easements, Relation to, 19
- Rotating Fallowing, Risk of, 136
- Statutory Remedy, Colorado, 127
- Statutory Remedy, Kansas, 129
- Water Banking, Relation to, 94
- Water Banking, Risk of, 124
- Water Transfers, Risk of, 110

Agriculture

- Conservation Easements, 19
- Conservation Incentives, 88
- Conservation, California, 88
- Conservation, Montana, 89
- Conservation, Oregon, 90
- Conservation, Washington, 89
- Irrigation Water, Reuse of, 102
- Lands in Oregon, Protection of, 8
- Purchase of Development Rights (PDR), 20
- Rotating Fallowing, 136
- Third Party Effects of Transfers, 121
- Transfer of Development Rights (TDR), 20
- Urban Growth Boundaries, 10
- Water Pricing, 77
- Water Reuse, 74

Alaska

- Comprehensive Land-Use Planning, 5
- Domestic Wells, 62
- Instream Flows, 194
- Public Interest Criteria Defined, 46
- Public Interest Review, Relation to Instream Flows, 181
- Recreation River Corridors, 187

Area-of-Origin Protection Statutes. *See* Water Right Transfers

Arizona

- Active Management Areas, 64
- Adequate Water Supplies, Commercial Development, 13
- Assured Water Supply Program, 13
- Conjunctive Use, 166
- Conservation, 92
- Demand Management, 72
- Domestic Wells, 64
- Effluent, Right to, 101
- Instream Flows, 195
- Land-Use Planning, General Plans, 6
- Prior Appropriation, Accommodating Instream Flows, 176
- UWS Act, 86
- Water Banking, 124
- Water Transfers, District Consent, 111

Arizona Water Banking Authority, 124, 126, 130

Assured Water Supply Program. *See* Arizona

-B-

Banking. *See* Water Banking

Basin Closure

- Instream Flows, 193

Beneficial Use

- Actual Beneficial Use Required, 70
- General Concept, 67
- Instream Flows, Accommodating, 176
- Water Banking, California Example, 126
- Water Right Transfers, Consideration in, 109

Best Management Practices. *See* Land Use and Water Use, Integrating Both

-C-

California

Agricultural Conservation Incentives, 88
Assured Water Supply, Commercial Development, 14
California Coastal Act, 143
California Coastal Commission, 142
Climate Change Database, 162
Demand Management, 73
Desalination, 142
Domestic Wells, 64, 65
Instream Flows, 197
Instream Flows, Use of Short Term Leases, 189
Irrigation Management, 103
Land-Use Planning, General Plans, 6
Municipal Conservation, 92
Palo Verde Irrigation District, 137
Public Interest Review, Relation to Growth Management, 47, 58
Reservoir Reoperation, Strategy for Climate Change, 166
Rotating Fallowing, 137
Urban Water Management Plan (UWMP), 23
Water Bank, Drought, 94
Water Banking, 125
Water Reuse, Costs, 106
Wild and Scenic Rivers, State Analog, 186

California Coastal Act. *See* California, Desalination

California Coastal Commission. *See* California

California Environmental Quality Act. *See* CEQA

CEQA

Desalination, Relation to, 143
Growth Management, Relation to, 15
Surface Storage, Relation to, 83
Water Reuse, 101

Clean Water Act

Ground Water Recharge, Impact on, 85
Surface Storage, Impact on, 80
Water Reuse, Relation to, 99

Climate Change, 159, 160

Anticipated Effects, 161
Colorado River Baseflows, Predictions, 161

Climate Change, Tools for Greater Flexibility

Conjunctive Use. *See* Water Storage
Conservation, 167, *See* Conservation
Demand Management, 72, 163
Desalination. *See* Desalination
Increasing Water Supply, 164
Rotating Fallowing. *See* Rotating Fallowing
Water Banking, 123, 169
Water Reuse. *See* Reuse
Water Right Transfers, 109, 170, *See* Water Right Transfers
Weather Modification. *See* Weather Modification

Colorado

Conservation Easements, 19
Domestic Wells, 64
Growth Management, Master Plans, 5
Gunnison River, Instream Flows, 218
Instream Flows, 198
Recreational In-Channel Diversions (RICDs), 177
Rotating Fallowing, 138
Surface Storage, ESA Implications, 82
Water Banking, 127
Water Transfers, Third-Party Impacts, 121
Water Trust, 189
Weather Modification, 153

Colorado River

2007 Management Guidelines, 171
Arizona Water Banking Authority, 124, 130
Climate Change, Effects of, 161

Conservation, Relation to, 97
Endangered Species, Instream Flows, 219
Palo Verde Irrigation District, 137

Concentrate. *See* Desalination

Conjunctive Use. *See* Water Storage

Conservation, 87

Agricultural Incentives, Legislation, 88
Demand Management, 73
Endangered Species Act, 97
Legislation, 88
Municipal Incentives, 91
Public Interest Review, 96
Third-Party Impacts, 96
Water Banking. *See* Water Banking
Watershed Approach, 95

Conservation Easements. *See* Land Use
Planning Tools

-D-

Dams. *See* Water Storage

Demand Management, 72

Agricultural Water Pricing, 77
Arizona, 72
California, 73
Conservation, 73
Efficient Allocation, 74
Privatization, 78
Public Education, 74
Washington, 73
Water Pricing, 75
Water Recycling, 74

Desalination, 141

California Coastal Act, 143
Entrainment, 144
Impingement, 144
Inland Discharge, Evaporation Pond, 147
Inland Discharge, Injection Wells, 148
Inland Discharge, Irrigation, 149

Inland Discharge, Solar Ponds, 148
Inland Discharge, Zero Liquid Discharge,
150

Inland Disposal, Discharge to Other
Water, 146

Inland Disposal, Discharge to Sewer, 146

Inland Disposal, Discharge to Surface
Water, 145

Inland Disposal, Solar Ponds, 147

Seawater Issues, 142

Seawater, Concentrate Disposal, 144

Seawater, Facility Location, 142

Seawater, Water Intake, 144

Domestic Well Exemptions. *See* Land Use
and Water Use, Integrating Both
Chart of Limitations and Permit
Requirements, 64

Dry Year Leasing. *See* Rotating Fallowing

-E-

Edwards Aquifer, 134

Effluent, Right to Use. *See* Reuse

Endangered Species

Colorado River Fishes, 219
Instream Flows, 173
Interior Least Tern, Platte River, 219
Pallid Sturgeon, Platte River, 219
Piping Plover, Platte River, 219
Salmon, Idaho, 95, 128, 179, 220
Salmon, Klamath, 178
Salmon, Washington, 82
Silvery Minnow, New Mexico, 179
Water Banking, Use of in Klamath, 132
Whooping Crane, Platte River, 219

Endangered Species Act

Conservation, 97
Groundwater Recharge, Consideration of,
85
Instream Flows, 173

Instream Flows, Federal Legislation
Affecting, 177
Surface Storage, Relation to, 81
Third Party Impacts, Impact of, 96, 120
Water Banking, Use of, 127

Entrainment. *See* Desalination

Evaporation Ponds. *See* Desalination

-F-

Flow-Release Conditions. *See* Instream
Flows

Forfeiture, 70

Agricultural Conservation, Relation to,
167
Conservation Easements, Relation to, 19
Conservation, Relation to, 88
Rotating Fallowing, Risk of, 136
Water Banking, Risk of, 94, 124
Water Transfers, Relation to, 110

-G-

Ground Water Recharge. *See* Water
Storage

Growth Management, 2

Land Use Planning Tools. *See* Land Use
Planning Tools
Water Planning Requirements. *See* Water
Planning Requirements

Growth Moratoria. *See* Land Use Planning
Tools

Gunnison River. *See* Colorado

-I-

Idaho

Conservation, Water Banking, 95
Domestic Wells, 64
ESA, Lemhi River, 220
Growth Management, Public Interest
Review, 45
Impact Fees, 18
Instream Flows, 200
Instream Flows, Use of Short Term
Leases, 189
Local Public Interest Review, 50
Public Interest Review, 48
Scenic Rivers, 187
State Water Plan, 50
Water Banking, 127
Water Banking, Lemhi Basin, 179
Water Supplies, Subdivision Approval, 63
Watershed Conservation, 95

Impact Fees. *See* Land Use Planning Tools

Impingement. *See* Desalination

Injection Wells. *See* Desalination

Instream Flows, 173

Alaska, 194
Appropriations for Instream Flows, 187
Arizona, 195
Basin Closure, 193
California, 197
Central Platte, Efforts to Restore, 219
Colorado, 198
Colorado River, Efforts to Restore, 219
Endangered Species, 179
Federal Statutes, Relation to, 177
Flow-Release Conditions, 185
Gunnison River, 218
Idaho, 200
Kansas, 202
Lemhi River, Efforts to Restore, 220
Montana, 203
Moratoria, 193
Nebraska, 205
Nevada, 207
New Mexico, 208
North Dakota, 210

Oklahoma, 210
Oregon, 211
Prior Appropriation, Relation to, 175
Public Interest Criteria, 180
Reservations for Instream Flows, 187
South Dakota, 212
Texas, 213
Transfers to Instream Use, 191
Utah, 215
Washington, 216
Water Banking, 191
Water Markets, 188
Wild & Scenic Rivers Legislation, State
 Versions of, 185
Wyoming, 217

Instream Use. *See* Instream Flows

Interbasin Transfers. *See* Water Right
 Transfers

Interstate Transfers. *See* Water Right
 Transfers

-K-

Kansas

Comprehensive Plans, Growth
 Management, 4
Conservation, Irrigation Improvements,
 103
Domestic Wells, 64
Instream Flows, 202
Public Interest Criteria, 182
Rotating Fallowing, 139
Water Banking, 129
Water Supplies, Subdivision
 Requirements, 63

Klamath River

ESA Regulation, 178
Water Banking, 132

-L-

Land Use and Water Use, Integrating Both, 25

Best Management Practices, 37
Comprehensive Watershed Planning, 26
Consistent Implementation of Plans, 32
Coordination between Federal, State, and
 Local Governments, 29
Coordination between Land Use and
 Water Agencies, 28
Domestic Wells, 61
Integrated Planning Systems, 28
Permit Requirements for New
 Development, 35
Public Interest Review, 40
Coordination Between Local
 Governments, 30
Requiring Local Plans to Include Water
 Element, 30
Utilities' "Duty to Serve", 38
Water Availability Review, 36

Land Use Planning Requirements

Effectively Integrating Water and
 Growth, 9
Local Planning, 4
Regional Planning, 6
Statewide Planning, 7

Land Use Planning Tools

Conservation Easements, 18
Environmental Impact Reviews, 15
Growth Moratoria, 11
Impact Fees, 17
Purchase and Transfer of Development
 Rights, 20
Residential and Commercial Building
 Requirements, 12
Urban Growth Boundaries, 10

Lemhi River. *See also* Endangered Species

Endangered Salmon, 128, 220
Instream Flows, Protection for, 201

-M-

Montana

- Basin Closure, 193
- Beneficial Use, Scope of, 68
- Comprehensive Plans, Growth Management, 4
- Conservation, Agricultural, 89
- Domestic Wells, 64
- Instream Flows, 203
- Instream Flows, Reservations for, 188
- Moratoria, Instream Flows, 193
- Scenic Rivers, State Protection, 187
- Water Banking, 129
- Water Trust, 189
- Weather Modification, 153

Moratoria

- Instream Flows, 193

-N-**National Environmental Policy Act. *See***

- NEPA
- Water Storage, Relation to, 83

Nebraska

- Domestic Wells, 64
- Instream Flows, 205
- Interbasin Transfers, 112
- Irrigation Water, Reuse of, 103
- Platte River, ESA Protection, 219
- Scenic Rivers, 187
- Water Supplies, Subdivision Requirements, 63

NEPA

- Desalination, 143
- Groundwater Recharge, Relation to, 85
- Instream Flows, Water Right Transfers, 198
- Water Reuse, 100

Nevada

- Conservation, Municipal Programs, 93
- Domestic Wells, 64, 65

- Instream Flow Appropriations to Federal Agencies, 177
- Instream Flows, 207
- Public Interest, Judicial Interpretation of, 54
- Regional Planning, Growth Management, 6
- Water Banking, 130
- Water Reuse, 100

New Mexico

- Domestic Wells, 64
- Instream Flows, 208
- New Mexico Subdivision Act, 64
- Scenic Rivers, 187
- Silvery Minnow, 179
- Transfer of Development Rights, 21
- Water Banking, 130
- Water Planning, Interstate Stream Commission, 22

North Dakota

- Beneficial Use, Scope of, 68
- Domestic Wells, 64
- Instream Flows, 210
- Water Supplies, Subdivision Requirements, 63
- Weather Modification, 154

-O-**Oklahoma**

- Domestic Wells, 64
- Instream Flows, 210
- Planning Commissions, Growth Management, 6
- Weather Modification, 155
- Wild and Scenic Rivers, State Analog, 186

Oregon

- Conservation, Agricultural, 90
- Domestic Wells, 64
- Instream Flows, 211
- Interbasin Transfers, 112

- Land Use Planning, 7, 8, 9
- Oregon Land Use Act, 41
- Oregon Water Trust (OWT), 189, 191
- Public Interest Criteria, Relation to
 - Instream Flows, 182
- Public Interest Review, Growth Management, 57
- Public Interest Review, Relation to Growth Management, 41
- Rotating Fallowing, 139
- Urban Growth Boundaries, 10
- Water Banking, 131
- Water Supplies, Subdivision Requirements, 63
- Water Trust (OWT), 132
- Wild and Scenic Rivers, State Analog, 186

-P-

Palo Verde Irrigation District. *See* California

Prior Appropriation, 67

- Abandonment, Relation to Water Transfers, 110
- Diversion Requirement, 69
- Forfeiture, Relation to Water Transfers, 110
- Instream Flows, Adaptations to Preserve, 176

Priority

- First in Time, First in Right, 70

Public Interest Review

- Consideration of Growth Management Plans, 40
- Impacts for Conservation, 96
- Instream Flow, Relation to, 180
- Non-statutory Consideration of Growth Management Plans, 46
- Statutory Methods for Allowing Consideration of Growth Management Plans, 57

- Statutory Requirements for Considering Growth Management Plans, 41
- Water Right Transfers, 118

Purchase of Development Rights. *See* Land Use Planning Tools

-R-

Reservoir Reoperation

- Climate Change, Strategy for, 166

Reuse

- Cost, 106
- Demand Management, 74
- Effluent, Right to, 101
- Environmental Effects, 105
- Federal Regulations, 99
- Generally, 99
- Health Risks, 105
- Irrigation Water, 102
- Public Acceptance, 104
- State Regulations, 100

Rotating Fallowing, 136

- California, 137
- Colorado, 138
- Kansas, 139
- Oregon, 139

-S-

Solar Ponds. *See* Desalination

South Dakota

- Beneficial Use, 68
- Domestic Wells, 64
- Instream Flows, 212
- Public Interest Review, Water Right Transfers, 119
- Wild and Scenic Rivers, State Analog, 186

-T-

Texas

- Domestic Wells, 64
- Growth Moratoria, Growth Management, 12
- Injection Wells, Desalination, 149
- Instream Flows, 213
- Pecos River Compact, 209
- Solar Pond, Desalination, 148
- Water Banking, 133
- Water Trust, 133
- Weather Modification, 154, 155

Third Party Impacts, 96, 171

- Consumptive Use, 118
- Environmental Effects, 120
- Historical Use, 118
- No Injury Rule, 118
- Public Interest Review, 118
- Rural Communities, Effect on, 121
- Water Right Transfers, Relation to, 117

Transfer of Development Rights. *See* Land Use Planning Tools

Transfers. *See* Water Right Transfers

Trusts. *See* Water Banking

-U-

Utah

- Comprehensive Land-Use Planning, 5
- Conservation Easements, 19
- Domestic Wells, 64, 65
- Effluent, Right to, 102
- Instream Flows, 215
- Municipal Conservation, 93
- Public Interest Review, Relation to Instream Flows, 182
- Water Supplies, Subdivision Requirements, 63

-W-

Warren Act, The. *See* Water Right Transfers

Washington

- Climate Change, Legislation to Address Impacts, 162
- Columbia River Water Resource Management Program, 82
- Conservation, Agricultural Incentives, 89
- Conservation, Watershed Approach, 95
- Demand Management, 73
- Domestic Wells, 64
- Effluent, Right to, 102
- Growth Management Act, 43
- Instream Flows, 216
- Municipal Conservation, 91
- Reuse, Irrigation Water, 102
- Scenic Rivers, State Protection, 187
- Urban Growth Areas, 10
- Water Banking, 134
- Water Trust, Washington (WWT), 135, 189
- Watershed Planning Act, 44
- Watershed Planning, Growth Management, 23
- Weather Modification, 155

Water Banking, 123

- Abandonment, Risk of, 94
- Arizona, 124
- California, 125
- Colorado, 127
- Idaho, 127
- Instream Flows, 191
- Kansas, 129
- Montana, 129
- Nevada, 130
- New Mexico, 130
- Oregon, 131
- Texas, 133
- Washington, 134

Water Conservation. *See* Conservation Water Markets

- Instream Flows, 188

Water Planning Requirements, 21

Water Plans, 22

Watershed Planning, 23

Water Pricing

Demand Management, 75

Water Reuse. *See* Reuse**Water Right Transfers, 109**

Area-of-Origin Protection Statutes, 119

District Constraints, 111

Environmental Effects, 120

Federal Restrictions, 113

Instream Flows, 191

Interbasin and Interstate Transfers, 112

Legal Constraints, Beneficial Use, 109

Rural Communities, Effect on, 121

Third Party Impacts, 117

Warren Act, The, 116

Water Rights

Water Rights as Property Interest, 70

Water Storage, 79

Conjunctive Use, 83

Ground Water Recharge, 84

Legislation Affecting Surface Storage, 80

Legislation Affecting Surface Storage,
Clean Water Act, 80

Legislation Affecting Surface Storage,
Endangered Species Act, 81

Legislation Affecting Surface Storage,
Federal and State Environmental Policy
Acts, 83

Legislation Affecting Surface Storage,
Wild & Scenic Rivers Act, 82

Water Transfers

Abandonment, 110

Forfeiture, 110

Water Trusts. *See* Water Banking**Watershed Planning.** *See* Land Use and
Water Use, Integrating Both**Weather Modification, 151**

Interstate Conflict, Potential for, 154

Liability, Potential for, 155

Wild and Scenic Rivers

Instream Flows, 185

Wyoming

Domestic Wells, 64

Instream Flows, 217

Muddy Creek, 221

Platte River, ESA Protection, 219

-Z-**Zero Liquid Discharge.** *See* Desalination