

November 2019



# WestFAST News

682 East Vine Street / Suite 7 / Murray, UT 84107 / (801) 685-2555/ [www.westernstateswater.org/westfast](http://www.westernstateswater.org/westfast)

Chair – Patrick Lambert; Federal Liaison – Deborah Lawler

## [NOAA releases new strategies to apply emerging science and technology](#)

NOAA 11/14/19. NOAA today is announcing new strategies to dramatically expand the agency’s application of four emerging science and technology focus areas — NOAA Unmanned Systems, Artificial Intelligence, ‘Omics, and the Cloud — to guide transformative advancements in the quality and timeliness of NOAA science, products and services.

“NOAA is a pioneer with a strong track record of applying the latest science and technology and these new strategies will allow us to dramatically expand these applications across our mission areas,” said Neil Jacobs, Ph.D., acting NOAA administrator. “These detailed strategies will enable us to achieve our priorities of reclaiming and maintaining global leadership in numerical weather prediction and sustainably expanding the American Blue Economy.”

These draft strategies, open for public comment through December 16, were highlighted at a White House Summit on Partnerships in Ocean Science and Technology, which convened key players from across the ocean science and technology community including representatives of industry, academia, government, philanthropy, and the private sector. The event promoted partnerships in ocean science and technology, showcased American leadership, and engaged the community to explore the

unknown ocean, advance marine science, and promote new technologies.

“Emerging technologies like AI, unmanned systems, ‘omics, and cloud services hold incredible promise to solve our greatest challenges. The Trump Administration remains committed to unlocking this potential for the benefit of all Americans through national strategies and initiatives. NOAA’s emerging science and technology strategies demonstrate our whole of government approach to innovation and we look forward to continued collaboration and leadership,” said Michael Kratsios, Chief Technology Officer of the United States.

The strategies developed by NOAA to improve the efficiency, effectiveness and coordination of their development and usage across the agency, include:

- Unmanned Systems Strategy: In recognition of the opportunities unmanned systems presents for addressing NOAA’s mission priorities, the NOAA Unmanned Systems Strategy provides a framework to efficiently provide requirements-driven, safe, cost-effective, and compliant Unmanned Systems services across the agency; prioritize strategic investments in Unmanned Systems applications and technologies that fuel innovation and strengthen operations, and accelerate and enhance capabilities through partnerships.

•Artificial Intelligence Strategy: The overarching goal of the NOAA Artificial Intelligence (AI) Strategy is to utilize AI to advance NOAA’s requirements-driven mission priorities. Through this strategy, NOAA seeks to reduce the cost of data processing, and provide higher quality and more timely scientific products and services for societal benefits.

•Omics Strategy: In recognition of the opportunities and challenges presented by the advent of tools associated with ‘omics — a suite of advanced methods used to analyze material such as DNA, RNA, or proteins — the NOAA ‘Omics Strategy provides a framework to advance the application of ‘omics to address mission priorities. The strategy leverages NOAA’s current organizational structure to more effectively implement ‘omics through improvements in computational and analytical capacities, targeted research, technology transition, workforce proficiency, and partnerships across NOAA’s lines, federal agencies, and extramural research and commercial communities.

•Cloud Strategy: NOAA’s robust experience with cloud applications is already beginning to demonstrate significant improvements in performance and skill in areas such as satellite data products and services, numerical weather prediction, ocean models, and big data analysis, storage and dissemination. Cloud services will be further leveraged to expand benefits, such as: accelerated timeline to acquire new computing resources; increased security posture; more accessible and monetizable NOAA data to customers, such as academia and industry; reduced transition time from research to operations; scalable infrastructure that supports scientific and high performance computing requirements; and a more agile and innovative culture.

Full strategy documents are available from the NOAA Research Council.

NOAA developed these draft strategies in accordance with guidance provided by the Administration and Congress, including the Office of Science and Technology Policy FY21 Research and Development Priorities letter, the National Science and Technology Council report “Science and Technology for America’s Oceans: a Decadal Vision,” the Executive Order on Maintaining American Leadership in Artificial Intelligence, the Weather Research and Forecasting Innovation Act of 2017, the Commercial Engagement Through Ocean Technology (CENOTE) Act and the Federal Cloud Computing Strategy.

### [USDA Invites Input on Conservation Stewardship Program Rule](#)

NRCS 11/12/19. USDA’s Natural Resources Conservation Service (NRCS) seeks public comments on its interim final rule for the Conservation Stewardship Program. CSP, the nation’s largest conservation program in terms of participating land, is designed to help farmers have more robust conservation activities. The rule – now available on the Federal Register – takes effect upon publication and includes changes to the program prescribed by the 2018 Farm Bill.

“We’re excited to roll out an updated Conservation Stewardship Program,” NRCS Chief Matt Lohr said. “We know the program is important to American farmers and ranchers, especially those who want to build on existing conservation efforts while strengthening their operations.”

*Changes to CSP include:*

Increasing payment rates for adoption of cover crop rotations.

Introducing a new supplemental payment for advanced grazing management.

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Creating one-time payment for developing a comprehensive conservation plan.

Providing specific support for organic and transitioning to organic production activities.

As part of implementing the 2018 Farm Bill, NRCS has streamlined CSP by basing contracts on funds instead of acres, bringing it in line with the agency's other large conservation program, the Environmental Quality Incentives Program (EQIP). Additionally, NRCS is aligning CSP with EQIP through common applications, contracting operations, conservation planning, conservation practices and related administrative procedures.

"These changes will result in greater efficiency in program delivery and reduced burden on producers," Lohr said.

#### *Submitting Comments*

The interim final rule becomes effective upon publication in the Federal Register. NRCS invites comments on this interim rule through January 13, 2020. Electronic comments must be submitted through [regulations.gov](https://www.regulations.gov) [offsite link image](#) under Docket ID NRCS-2019-0020. All written comments received will be publicly available on <http://www.regulations.gov>. [offsite link image](#)

NRCS will evaluate public comments to determine whether additional changes are needed. The agency plans on publishing a final rule following public comment review.

#### *Applying for CSP*

CSP is offered in all 50 states and the Pacific and Caribbean areas through continuous sign-ups. The program provides many benefits, including increased crop yields, decreased inputs, wildlife habitat improvements and increased resilience to weather extremes. CSP is for working lands including cropland, pastureland, rangeland, nonindustrial private forest land and agricultural land under the jurisdiction of an Indian tribe.

NRCS will make available \$750 million for interested producers in fiscal 2020. NRCS state offices will announce sign-up periods for CSP in the coming weeks. Additionally, CSP participants may have an opportunity to renew their contracts in the first half of the fifth year of the five-year contract.

For more information on how to sign up for CSP in your state, visit your state website from [nrcs.usda.gov](https://nrcs.usda.gov) or contact your local NRCS field office. [offsite link image](#)

### [Can we clean up, stop, or end harmful algal blooms?](#)

NOAA 11/20/19. Harmful algal blooms — often referred to as HABs for short — occur when algae produce toxic or harmful effects on people, fish, shellfish, marine mammals, birds, or other aquatic organisms. Blooms occur in marine and freshwater environments throughout the world, with damaging ecological, social, and economic effects. So why can't we clean up the algae and take care of this problem? Unfortunately, the answer is not so simple. Harmful algal blooms are a natural process. There are records of HABs from early European colonists arriving to Florida in the 1500s. However, research points to an increase in the frequency and intensity of algal blooms in modern times due to environmental changes caused by humans.

There are many examples of human activities that contribute to HABs: runoff from agriculture, dissolved chemicals introduced into water supplies via rainfall or irrigation, and effluent from sewage treatment plants all contribute to excess amounts of nutrients in our waterways. These nutrients are food for algae. In housing developments, for example, retention ponds are a common place to see freshwater HABs. All this runoff ends up in the water system, eventually making its way to the ocean.

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One of primary missions of NOAA's National Centers for Coastal Ocean Science is to empower communities to take action on HAB issues by developing detection tools and forecasts. NCCOS is involved in mitigating harmful algal blooms in a number of different ways and through several legislative measures. For example, the Harmful Algal Bloom Hypoxia Research and Control Act provides NOAA with a legal mandate to study HABS, to mitigate their effects, and to provide early warning for when and where blooms will occur. NOAA partners with other organizations throughout the country, as well, to support research through three funding opportunities:

1. *The Ecology and Oceanography of Harmful Algal Blooms* program provides funding for universities and other groups to look at the ecology and oceanography of HABS.

2. *The Monitoring of and Event Response to Harmful Algal Blooms* program focuses on a practical approach to methods for testing technologies to detect toxins in the cells of the algae and characterize their abundance.

3. *The Prevention, Control and Mitigation of Harmful Algal Blooms* program focuses on what can be done to prevent people from coming into contact with HAB affects, to better inform the public and to provide more directed early warning products for harmful algal blooms.

Harmful algal bloom resources, frequently asked questions, and regional information are available via the National Ocean Service HAB portal.

### [BLM seeks public input for Whitewater River Groundwater Replenishment Facility Project environmental analysis](#)

BLM 11/21/19. The Bureau of Land Management is seeking public input on the Whitewater River Groundwater Replenishment Facility in Riverside

County. Publication of the Notice of Intent in the Federal Register initiates a 30-day public scoping period that will end on Monday, Dec. 26.

The project supports the Interior Secretary's priority, "Sustainably develop our energy and natural resources," and Presidential Memorandum, "Promoting Reliable Supply and Delivery of Water in the West." The proposed project also addresses California's need for dependable water sources for the densely-populated areas in and around Palm Springs.

Coachella Valley Water District has requested a right-of-way authorization for its existing Whitewater River Groundwater Replenishment Facility with a maximum capacity of 511,000-acre feet per year, on 690 acres of BLM-managed public lands. No new construction is proposed. The project site is located within the California Desert Conservation Area. The BLM will prepare an environmental impact statement (EIS) to analyze the site-specific impacts of the proposed right-of-way grant.

A public meeting will take place from 5-7 p.m. on Dec. 5, at University of Riverside-Palm Desert, Room B114/B117, 75080 Frank Sinatra Drive, Palm Desert.

Public input and written comments will help the BLM determine the size and scope of analysis needed, additional issues to study, and other considerations in the analysis of the proposed action. The BLM will use the comments to prepare the draft EIS that will be available for public review. The EIS will analyze the site-specific impacts on air quality, biological resources, cultural resources, water resources and other relevant issues.

The BLM is the lead Federal agency for the National Environmental Policy Act review. The U.S. Bureau of Indian Affairs, Desert Water Agency, and Agua Caliente Band of Cahuilla Indians are cooperating agencies in this review. The BLM will issue a Record of Decision after

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considering whether to grant the right-of-way across public lands for the existing facility and additional lands.

Written comments may be submitted through email at [blm\\_ca\\_whitewaterrecharge@blm.gov](mailto:blm_ca_whitewaterrecharge@blm.gov), via hand-delivery, or by mail to ATTN: Whitewater Replenishment Facility Project, Bureau of Land Management, Palm Springs-South Coast Field Office, 1201 Bird Center Drive, Palm Springs CA 92262.

Before including addresses, phone numbers, email addresses, or other personal identifying information in a comment, be aware that the entire comment—including personal identifying information—may be made publicly available at any time. While someone may ask the BLM to withhold personal identifying information from public review, the BLM cannot guarantee that it will be able to do so.

For more information, visit the ePlanning project website at <https://tinyurl.com/yyp49jrx>, or contact BLM project manager Miriam Liberatore at 541-618-2412.

### [EPA Announces Availability of \\$4.8 Million in Funding for New Research on Managing PFAS in Agriculture](#)

EPA 11/22/19. At the 2019 Annual Meeting of the New Mexico Farm & Livestock Bureau, U.S. Environmental Protection Agency's (EPA) Regional Administrator Ken McQueen will announce the availability of \$4.8 million in funding to expand research on managing per- and polyfluoroalkyl substances (PFAS) in rural America and the agricultural sector. This funding is a part of EPA's extensive efforts to help communities address the larger issue of PFAS nationwide. In a memorandum issued in February 2019, EPA Administrator Andrew Wheeler called for the agency to prioritize new federal research that will help farmers, ranchers, and rural communities by generating new scientifically-driven information on

PFAS, potential PFAS impacts in agricultural settings, and actions people can take to address PFAS in their communities.

“EPA is following through on our commitment under the PFAS Action Plan and the memo to close the gaps in the science around PFAS as quickly as possible by supporting cutting-edge research that will help manage PFAS issues in agricultural and rural economies,” said EPA Administrator Andrew Wheeler. “We want to make sure that decision makers at the federal, state, and local levels have the best science available to make informed decisions. These new research grants will help identify potential impacts of PFAS to farms, ranches and rural communities.”

“While our scientific understanding of PFAS continues to develop, the people of New Mexico, especially farmers and ranchers, already know how it can affect the water resources that are so critical to the state's environmental and economic wellbeing,” said Regional Administrator Ken McQueen. “With this funding, EPA is committing to finding solutions to the challenges PFAS presents and bringing relief to rural communities.”

“EPA is uniquely suited to lead and promote research on this important topic and USDA applauds EPA's focus on farmers, ranchers, and rural communities. EPA's funding of this research complements the work USDA does supporting U.S. production agriculture and ensuring a safe food supply,” said USDA Deputy Under Secretary for Research, Education, and Economics Dr. Scott Hutchins.

“NASDA appreciates the EPA's efforts to prioritize PFAS research that will help the agricultural community. As the primary stewards for the agricultural industries in their states, NASDA members will continue to work closely with the EPA as the agency implements its PFAS Action Plan. Together, we can ensure healthy communities and farms across America,” said National

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Association of State Departments of Agriculture (NASDA) CEO Dr. Barbara P. Glenn.

EPA is seeking grant applications that help improve the agency's understanding of the potential impacts of PFAS on water quality and availability in rural communities and agricultural operations across the United States. Specifically, the agency is seeking research on PFAS occurrence, fate, and transport in water sources used by rural communities and agricultural operations and new or improved PFAS treatment methods appropriate for small drinking water and wastewater systems including influents, effluents, and biosolids/residuals. Some of the questions EPA hopes to answer include:

- How do serial biosolids applications impact PFAS concentrations and accumulation over time?
- What are the impacts of factors such as soil type, crop type, and landscape traits, such as topography, that may influence PFAS concentration and accumulation?
- How do we treat and clean up PFAS from water, soil and biosolids used in agricultural settings?

EPA is accepting applications through February 11, 2020.

Additional information on the Request for Applications: <https://www.epa.gov/research-grants/national-priorities-research-pfas-impacts-rural-communities-and-agricultural>

Additional information on the PFAS Action Plan: <https://www.epa.gov/pfas>

February 27, 2019 Memorandum on prioritizing research on impacts to agriculture and rural economies:

[https://www.epa.gov/sites/production/files/2019-03/documents/pfas\\_ag\\_research\\_memo.pdf](https://www.epa.gov/sites/production/files/2019-03/documents/pfas_ag_research_memo.pdf)

### *Background*

PFAS are a large group of man-made chemicals used in consumer products and industrial processes.

In use since the 1940s, PFAS are resistant to heat, oils, stains, grease, and water—properties which contribute to their persistence in the environment.

The agency's PFAS Action Plan is the first multi-media, multi-program, national research, management and risk communication plan to address a challenge like PFAS. The plan responds to the extensive public input the agency has received over the past year during the PFAS National Leadership Summit, multiple community engagements, and through the public docket. The PFAS Action Plan outlines the tools EPA is developing to assist states, tribes, and communities in addressing PFAS.

EPA continues to make progress under its PFAS Action Plan to protect the environment and human health. To date, EPA has:

### *Highlighted Action: Drinking Water*

- The Agency is moving forward with the drinking water standard setting process outlined in the Safe Drinking Water Act (SDWA) for PFOA and PFOS.
- As a next step, EPA will propose a regulatory determination for PFOA and PFOS by the end of this year.
- The Agency is also gathering and evaluating information to determine if regulation is appropriate for other chemicals in the PFAS family.

### *Highlighted Action: Cleanup*

- On June 10, 2019, EPA concluded public comment on the draft Interim Recommendations for Addressing Groundwater Contaminated with PFOA and PFOS, when finalized it will provide cleanup guidance for federal cleanup programs (e.g., CERCLA and RCRA) that will be helpful to states and tribes.
- EPA is initiating the regulatory development process for listing certain PFAS as hazardous substances under CERCLA.

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### *Highlighted Action: Monitoring*

- EPA will propose nationwide drinking water monitoring for PFAS under the next UCMR monitoring cycle.

### *Highlighted Action: Toxics*

- The agency recently sent two actions that address per- and polyfluoroalkyl substances (PFAS) to the Office of Management and Budget for interagency review.
- Advanced notice of proposed rulemaking that would allow the public to provide input on adding PFAS to the Toxics Release Inventory toxic chemical list.
- A supplemental proposal to ensure that certain persistent long-chain PFAS chemicals cannot be manufactured in or imported into the United States without notification and review under the TSCA.

### *Highlighted Action: Surface Water Protection*

- EPA plans to develop national Clean Water Act human health and aquatic life criteria for PFAS, as data allows.
- EPA is examining available information about PFAS released into surface waters by industrial sources to determine if additional study is needed for potential regulation.

### *Highlighted Action: Biosolids*

- EPA will be developing risk assessments for PFOA and PFOS to understand any potential health impacts.

### *Highlighted Action: Research*

- EPA continues to compile and assess human and ecological toxicity information on PFAS to support risk management decisions.
- EPA continues to develop new analytical methods to test for additional PFAS in drinking water.

- The Agency is also validating analytical methods for surface water, ground water, wastewater, soils, sediments and biosolids; developing new methods to test for PFAS in air and emissions; and improving laboratory methods to discover unknown PFAS.

- EPA is developing exposure models to understand how PFAS moves through the environment to impact people and ecosystems.
- EPA continues to assess and review treatment methods for removing PFAS in drinking water.
- EPA is working to develop tools to assist officials with the cleanup of contaminated sites. EPA is evaluating the effectiveness technologies and evaluating data on methods for managing the end-of life disposal of PFAS-contaminated materials.

### *Highlighted Action: Enforcement*

- EPA uses enforcement tools, when appropriate, to address PFAS exposure in the environment and assists states in enforcement activities.

### *Highlighted Action: Risk Communications*

- EPA will work collaboratively to develop a risk communication toolbox that includes multi-media materials and messaging for federal, state, tribal, and local partners to use with the public.

## [Next Generation Water Observing System Partnership Announcement](#)

USGS 11/25/19. The U.S. Geological Survey is seeking information from industry, academia, nonprofits, and research institutions on innovative technologies that should be considered for inclusion in the USGS Next Generation Water Observing System (NGWOS) . This includes technologies that strategically enhance the temporal and spatial collection of water quantity, quality, and water-use data in surface and groundwater across the U.S. The data will be accessible through a modernized USGS National Water Information System that will offer

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advanced modeling tools to inform daily water operations, decision-making during water emergencies, assessments of past trends in water quantity and quality and forecasts of future water availability.

NGWOS aims to foster innovation and development of monitoring technologies and methodologies to make data more affordable and available more rapidly. Monitoring innovations also are expected to lead to more types of data at higher temporal and spatial frequencies. The application and benefits of these innovations will extend beyond the NGWOS watersheds and be incorporated into routine operation of USGS monitoring networks.

This Request for Information is to help identify promising technologies or interested partners who are capable of jointly developing technologies that can integrate with current USGS research and development per the Stevenson-Wydler Act (15 U.S.C. § 3710a, as amended). Responses to this RFI should briefly describe the proposed technology, including the type of data collected, potential applications for the data, and the technology readiness/product maturity level. Technologies of interest include but are not limited to:

- Non-contact sensing for velocity, stage, and water temperature,
- Long range, low power observation network technologies,
- Instrumentation for monitoring hydrologic budgets (ET, soil moisture, snowpack and water-use),
- New sensors for monitoring continuous water-quality, including sediment, nutrients, contaminants, and environmental DNA,
- Mobile autonomous underwater vehicles (AUVs) and drifters for water quality and flow monitoring,
- Webcams and drone-mounted sensors for operational and science applications,

- Innovative technologies for detecting and monitoring hazards such as spills and harmful algal blooms (HABs).

To the maximum extent possible, please submit non-proprietary information. If proprietary information is submitted, clearly mark this information as Confidential and provide a detailed explanation that the information marked as Confidential is customarily kept private or closely-held. The USGS will protect this information from disclosure if it meets the Federal FOIA exemptions.

This notice is not to be construed as a commitment by the government to award a contract nor will the government pay for the requested information. This is solely a RFI and is not a Funding Opportunity Announcement. USGS is not accepting requests for funding applications as part of this RFI. No solicitation exists; therefore, do not request a copy of the solicitation.

Responses must be submitted by Dec 31, 2019, to the following e-mail address: [gs-w\\_ngwos\\_rfi@usgs.gov](mailto:gs-w_ngwos_rfi@usgs.gov). Responses may be submitted within the body of the email or as an attachment. Questions may be addressed to [gs-w\\_ngwos\\_rfi@usgs.gov](mailto:gs-w_ngwos_rfi@usgs.gov) or to Brian Pellerin at (703) 648-6865.

### [NASA Embarks on Five U.S. Expeditions Targeting Air, Land and Sea](#)

NASA 11/26/19. NASA is sending five airborne campaigns across the United States in 2020 to investigate fundamental processes that ultimately impact human lives and the environment, from snowstorms along the East Coast to ocean eddies off the coast of San Francisco.

Science teams will embark by land, sea and air as part of multi-year campaigns funded by NASA's Earth Venture program. This is NASA's third series of competitively selected Earth Venture suborbital investigations.

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NASA uses the vantage point of space to increase our understanding of our home planet, improve lives and safeguard our future. To gain a more complete picture of how and why our planet is changing, the agency also sponsors intensive field campaigns targeting critical science issues that can benefit from a deeper look by taking advantage of NASA's capabilities in airborne science.

Campaigns will conduct science on a variety of platforms. High-altitude aircraft will observe chemistry in the stratosphere, far beyond the reach of commercial planes, to study the impact of intense storms that breach the troposphere, where most weather occurs. A flotilla of autonomous gliders and floats will take to the Pacific Ocean to measure temperature and salinity at and below the water's surface to better understand the exchange of heat between ocean and atmosphere. Researchers will descend on wetlands by foot and boat to study how sea level rise is affecting delta ecosystems.

The five new Earth Venture integrated airborne and surface field campaigns begin their first year of field work in 2020, running from January through October.

### *Intense Snowfall Events*

On the densely populated U.S. East Coast, winter snowstorms are both frequent and disruptive. Snowstorms can shut down roads and close businesses and are hazardous for anyone caught in them. The storm and cloud processes responsible for snowstorms are often inaccurately reproduced by forecast models and are difficult to measure from space, resulting in poor snowfall predictions.

The Investigation of Microphysics and Precipitation for Atlantic Coast-Threatening Snowstorms, or IMPACTS, airborne study of these snowstorms, which heads into the field in January, aims to get a better handle on how snow is distributed in the clouds.

"People see pictures of these big swaths of clouds and think they're snowing everywhere, but they're

not," said IMPACTS principal investigator Lynn McMurdie at the University of Washington in Seattle. "Inside the clouds are these long narrow regions of more intense snow bands. We're trying to understand why they form and how they evolve with the developing storm. If we can understand the processes in the clouds, we can better predict how they distribute snowfall to us on the ground."

IMPACTS is the first major field campaign to study East Coast snowstorms in 30 years. The instrumentation that will fly on NASA's ER-2 high-altitude aircraft and P-3 cloud-sampling aircraft is a significant advancement since then, making now an opportune time to close the knowledge gap on snowstorms and help scientists improve how they interpret satellite data and incorporate them into weather forecasting models. The ER-2 will fly out of Hunter Army Airfield in Savannah, Georgia, and the P-3 will fly out of NASA's Wallops Flight Facility in Virginia.

### *Ocean-Atmosphere Heating*

Circular currents of water called eddies play an important role in climate and ocean ecology, as they facilitate the exchange of heat between the ocean and the atmosphere and the vertical transport of nutrients, oxygen, and dissolved gases in the upper ocean. Some eddies are hundreds of kilometers in diameter, while others, called sub-mesoscale eddies, range in size from 1 to 10 kilometers, too small for current ocean-monitoring satellites to observe in detail.

In April, researchers with the Sub-Mesoscale Ocean Dynamics Experiment, or S-MODE, will venture 200 miles off the coast of San Francisco to make those critical observations. Three science aircraft—NASA's King Air and Gulfstream V, in addition to a leased Twin Otter—the ocean research vessel *Oceanus* and an array of autonomous platforms will be fitted with instrumentation for measuring temperature, salinity, and ocean velocity across various time and spatial scales. Flights will originate from Moffett Federal Airfield at NASA's

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Ames Research Center in California's Silicon Valley.

Computer simulations indicate that these eddies have important long-term effects on the upper ocean, but their predictions are sensitive to relatively small details in how the simulations are implemented. The resolution and detail of these simulations have surpassed our ability to observe them with spaceborne or in situ sensors.

"These seemingly small factors matter when we simulate the climate system on long timescales," said principal investigator Thomas Farrar, a physical oceanographer at Woods Hole Oceanographic Institution. "Measurements from S-MODE can help us understand how well these processes are represented in models and how to improve their representation."

#### *River Deltas and Sea Level Rise*

Millions of people rely on services provided by coastal deltas like the Mississippi River Delta. Those services include acting as nurseries for fish, crustaceans and other animals, in addition to protecting our infrastructure against hurricanes and tsunamis. However, most major deltas around the world are sinking under sea level rise and disappearing, taking the livelihoods and ecological services they provide with them.

The Delta-X mission will study the Mississippi River Delta to understand which parts of the region are likely to disappear and which will survive. The deltas may be able to keep up with sea level rise if enough sediment is deposited and if plants are healthy enough to grow roots. Delta-X scientists will use airborne remote sensing instruments aboard NASA's King Air and Gulfstream aircraft, with flights originating from Lakefront Airport in New Orleans and NASA's Johnson Space Center, and field measurements of water flow to determine where sediment transported by that water will get deposited. The scientists will also quantify how

much organic soil is created from the decomposition of plants.

"These new data will help us to understand and mitigate the impact of sea level rise on the very important coastal resources found in deltas," said Delta-X principal investigator Marc Simard from the Jet Propulsion Laboratory in Pasadena, California.

#### *Aerosols Changing Clouds*

The Aerosol Cloud Meteorology Interactions Over the Western Atlantic Experiment, or ACTIVATE, will look at the critical role marine boundary layer clouds play in Earth's energy balance and water cycle. This type of cloud covers large stretches of the planet's oceans. How cloud systems change continues to be one of the biggest remaining uncertainties in models that look at global warming.

The campaign, which begins in February, will focus on the western North Atlantic Ocean, where researchers will measure a broad range of aerosol, cloud and meteorological conditions. Researchers will conduct science flights on two aircraft—a NASA Falcon and King Air—that will fly in a coordinated fashion while outfitted with a host of remote sensing and in-situ instruments. Flights will originate from NASA's Langley Research Center in Hampton, Virginia.

"Despite many prior field campaigns, we don't have comprehensive measurements under a variety of conditions to draw definite conclusions about the effects of these interactions between aerosols, clouds and meteorology on climate," said Armin Sorooshian, ACTIVATE principal investigator from the University of Arizona. "With this study, we intend to address that issue and provide data the international science community can use for years and decades to come."

#### *When Strong Storms Punch into the Stratosphere*

In June, Dynamics and Chemistry of the Summer Stratosphere, or DCOTSS, will investigate intense

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storms that form over the central United States during the summer months. When these storms grow tall enough, they overshoot the troposphere, the lowest layer of Earth's atmosphere, and can inject water vapor and pollutants into the stratosphere above, significantly altering its chemical composition. They may even negatively affect stratospheric ozone, which absorbs harmful ultraviolet light from the sun.

The scientists will target these overshooting storms using data from weather satellites and ground-based radar and will collect measurements with NASA's ER-2 high-altitude aircraft, which will fly up to 70,000 feet, significantly higher than most research aircraft can go. Flights will originate from Salina, Kansas.

“DCOTSS is the first science mission specifically designed to observe material lifted into the stratosphere by intense thunderstorms,” said Ken Bowman, DCOTSS principal investigator from Texas A&M University. “By directly measuring storm outflow with the ER-2 aircraft, we can learn how these storms affect today's stratosphere, and how their impacts might change as the atmosphere changes in coming decades.”

The public is invited to follow this journey of exploration online through NASA's social media channels and the Earth Expeditions webpage, which will feature regular video, photo and blog posts from these missions.

To follow all the NASA Earth Expeditions, visit: <http://www.nasa.gov/earthexpeditions>

## Upcoming Meetings

[Western Governors Association 2019 Winter Meeting](#)

Las Vegas, NV

December 13-14, 2019

[Western Governors Association 2020 Annual Meeting](#)

Medora, ND

June 29-July 2, 2020

[WSWC Spring \(192<sup>nd</sup>\) Meetings](#)

Washington, DC

March – April, 2020

[WSWC Summer \(193<sup>rd</sup>\) Meetings](#)

Cody, WY

July 2020

## Upcoming Events

[Association of California Water Agencies Conference](#)

San Diego, CA

December 3-6, 2019

[American Geophysical Union Meeting – NASA WWAO Science to Action Session – Enabling Science and Data Driven Water Decisions](#)

San Francisco, CA

December 9-13, 2019

[WestFAST Webinar: October 19, 2018, Presidential Memorandum on Promoting the Reliable Supply and Delivery of Water in the West.](#)  
RESCHEDULED to January 29, 2020, 10AM Mountain

## Other Federal News

USBR 11/4/19. [Reclamation awards nearly \\$1 million for water purification and desalination pilot projects](#)

NRCS 11/06/19. [USDA, Bureau of Indian Affairs Partner to Spur Economic Development, Strengthen Tribal Communities in Indian Country](#)

NOAA 11/06/19. [October 2019 was coolest in 10 years as U.S. continued its wettest year to date](#)

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NOAA 11/08/19. [Last Millennium Reanalysis now at NOAA's National Centers for Environmental Information, marking major milestone](#)

WHITE HOUSE 11/9/19. [President Donald J. Trump Amends 2012 New Mexico Disaster Declaration](#)

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USBR 11/12/19. [Bureau of Reclamation awards \\$2 million to ten projects to develop water marketing strategies](#)

NOAA 11/13/19. [What Does Flash Drought Look Like in Your Region?](#)

USBR 11/13/19. [Notice of Intent To Prepare an Environmental Impact Statement and Public Scoping Comment Period for the Eastern North Dakota Alternate Water Supply Project, Burleigh, Kidder, Sheridan, and Wells Counties, North Dakota](#)

EPA 11/13/19. [EPA takes actions to reduce impacts on impaired waters in Oklahoma](#)

NOAA 11/14/19. [Climate.gov tweet chat: Talk with a sea level rise expert about past and future risk of high-tide flooding on U.S. coasts](#)

NOAA 11/15/19. [NOAA steps up effort to move new ideas from lab to marketplace](#)

NOAA 11/15/19. [Calculating the Cost of Weather and Climate Disasters. 7 things to know about NCEI's U.S. billion-dollar disasters data](#)

WHITE HOUSE 11/18/19. [President Donald J. Trump Approves South Dakota Disaster Declaration](#)

EPA 11/18/19. [EPA recognizes South Dakota projects for excellence and innovation in clean water and drinking water infrastructure. City of Dell Rapids and Rapid City receive recognition for sustainability and protection of public health](#)

EPA 11/18/19. [EPA Recognizes Excellence and Innovation in Clean Water and Drinking Water Infrastructure](#)

NOAA 11/18/19. [Globe had its 2nd-hottest October and year to date on record. Arctic sea ice coverage also shrank to a record low last month](#)

NOAA 11/18/19. [NOAA monthly climate call scheduled for November 21. Experts recap October and provide outlooks through February](#)

NOAA 11/18/19. [NOAA, NFWF announce \\$30 million in grants to support coastal resilience efforts across nation. Second round of grants builds on success of new program](#)

EPA 11/19/19. [EPA Administrator Wheeler addresses global water technology leaders in Tel Aviv](#)

EPA 11/19/19. [EPA Recognizes Excellence and Innovation in Southern California Clean Water Infrastructure Project](#)

USDA/Rural Development 11/19/19. [USDA Invests in Drinking Water Quality and Wastewater Management for 784,000 Rural Residents and Businesses in 42 States](#)

NOAA 11/19/19. [Climate Change: Global Sea Level. Global mean sea level has risen about 8–9 inches \(21–24 centimeters\) since 1880, with about a third of that coming in just the last two and a half decades.](#)

EPA 11/20/19. [EPA honors innovative and sustainable water infrastructure projects in Alaska, Idaho and Washington](#)

EPA 11/20/19. [EPA Grant of More Than \\$157,000 Will Help Cherokee Nation Improve Water Quality](#)

EPA 11/20/19. [Kansas Water Infrastructure Projects Recognized by EPA for Excellence and Innovation](#)

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DOI 11/21/19. [In Case You Missed It: Constructive collaboration: Improving infrastructure at our National Parks](#)

EPA 11/25/19. [U.S. EPA settles with Hopi Tribe for Safe Drinking Water Act violations](#)

NRCS 11/26/19. [USDA Announces Awards to Put Conservation Innovation to Work on U.S. Farms](#)

NOAA 11/26/19. [NOAA Research scientists named AAAS Fellows](#)

NOAA 11/26/19. [Warming of the Indo-Pacific Ocean is changing global rainfall patterns. U.S. West and East Coast could see decline in rainfall](#)

USGS 11/29/19. [USGS Researcher Michael Dettinger Named 2018 American Association for the Advancement of Science Fellow. Dr. Dettinger's, work has contributed greatly to the understanding of the interconnectedness of climate and water supplies in the Western U.S.](#)

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