



*Supporting Elected Officials
and the Public on Climate Change Issues*

The Honorable Diane Feinstein
United States Senate
10 April 2020

Subject: Response to Terminate or Decrease fy 2021 Funding for NOAA Climate Related Projects

Dear Senator Feinstein,

We at securethefuture2100.org have reviewed climate related projects and activities that the President's budget terminated or reduced in scope as detailed in the NOAA budget (<https://www.noaa.gov/organization/budget-finance-performance/budget-and-reports>). The projects we reviewed are related to climate change mitigation, adaptation and research, extreme weather warning systems, resources and facilities for climate information, and climate gathering instruments.

We find that the termination and reduction in scope of these projects place a severe risk to the security of this nation: the proposed budget submitted by NOAA will impact the capability to prepare for and deal with the expected frequency and intensity of extreme storms, storm surges, floods, drought, temperature rise, and sea level rise from the effects of climate change. All affecting our military, infrastructure, areas of commerce, and the ability to feed this nation.

We strongly urge you to promote the continuation of funding for these projects in order to keep our country, it's citizens, and communities protected and safe from the effects if climate change. If you have questions, please e-mail or phone me:
stan@securethefuture2100.org, 408.257.6487

Sincerely,
Stanley Farkas, PhD

Philip Russell, PhD

Gary Latshaw, PhD

Anthony Strawa, PhD

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NATIONAL OCEAN SERVICE (NOS) PROGRAM

Terminate National Centers for Coastal Ocean Service -\$37,103

NOAA requests to begin the phased termination of the National Centers for Coastal Ocean Science (NCCOS). NOAA will retain \$8.9 million of funding and personnel to sustain key components of the NCCOS science portfolio; specifically, harmful algal bloom, hypoxia, and pathogen research, prevention, and forecasting; habitat and species forecasting; and marine aquaculture siting science and tool development.

Response: What is discarded are services that, using natural buffers, help protect 124 million people who live in U.S. coastal counties (~39% of the U.S. population) from sea level rise and storm surges: including children, the elderly, households where English isn't the primary language, and those in poverty. This is a cost-effective program as revealed by these specifics.

- Acting as natural buffers from storm surges, coastal wetlands prevented more than \$625 million in property damages during Hurricane Sandy in 2012 and reduced property damages throughout the Northeast by 10 percent on average – savings worth ~3 times the cost of the yearly NCCOS program.
- With more frequent and more intense storms expected with climate change this program could save countless lives and billions from government emergency funding required to repair storm damage in the future.
- NCCOS is helping communities mitigate and adapt to climate change by conducting research on detecting and assessing change in coastal ecosystems. Coastal decision makers need to understand the risks and vulnerabilities facing their communities and ecosystems in order to help them become resilient with the effects of climate change.

References: <https://coastalscience.noaa.gov/>

<https://blog.nature.org/science/2017/08/31/coastal-wetlands-prevented-625m-in-property-damage-during-hurricane-sandy/>

Eliminate NCCOS competitive funding support for research on ecological threats - \$19,000

NOAA proposes to eliminate the NCCOS Competitive Research program, which provides grants to academic institutions to conduct ecological research that advances NOAA's missions.

Response: These grants provide the critical information and predictive capabilities required to manage the nation's coastal resources in an ecosystem context supporting the NCCOS activities per above. These issues typically require multi-disciplinary research teams and a significant long-term commitment of resources because of their complexity and the effort required to reach a new level of understanding sufficient to support NOS priorities and drive future coastal management decisions.

References: <https://coastalscience.noaa.gov/>
<https://blog.nature.org/science/2017/08/31/coastal-wetlands-prevented-625m-in-property-damage-during-hurricane-sandy>

Eliminate funding support for Integrated Water Prediction -\$2,576

NOAA proposes to eliminate funding for the NOS portion of the Integrated Water Prediction (IWP) project. With this reduction, NOS will continue to engage in the NOAA Water Team, but would curtail development of new products and services for end users.

Response: The Integrated Water Prediction (IWP) project will deliver a suite of more holistic water intelligence products to help communities and industries make better-informed decisions about water management and how to prepare for and respond to extreme water events. Specifics:

- IWP specifically brings together the National Weather Service (NWS) and the National Ocean Service (NOS) to transform the nation's water prediction capabilities, particularly at the coast.
- IWP will provide new information vital for decision making both during high-impact events (e.g., hurricanes, nor'easters, storm surge) and for routine water management (e.g., ecosystem health, low flow, transportation, agriculture).

Reference: <https://sab.noaa.gov/sites/SAB/.../FINAL%20Integrated%20Water%202020-report.pdf>

Eliminate Coastal Zone Management Grants -\$77,000

NOAA requests a decrease to eliminate grants within the Coastal Zone Management (CZM) Program that support actions of states and other grantees authorized under the Coastal Zone Management Act (CZMA). NOAA will continue to support states' participation in the National CZM program by reviewing and supporting implementation of states' management plans, supporting Federal consistency reviews, and providing technical assistance services.

Response: The program provides critical grants to address coastal development, water quality, public access, habitat protection, energy facility siting, ocean governance and planning, coastal hazards, and climate change. These efforts are necessary to mitigate against increasingly damaging coastal storms. Specifics:

- The Coastal Zone Enhancement Program within the CZM provides incentives to states to enhance their state programs within nine key areas: wetlands, coastal

hazards, public access, marine debris, cumulative and secondary impacts, special area management planning, ocean and Great Lakes resources, energy and government facility siting, and aquaculture.

- The program is currently run with both state and federal funding. Federal funding is requested to be terminated.

Reference: <https://coast.noaa.gov/czm/about/?redirect=301ocm>

Eliminate Federal Funding Support for National Estuarine Research Reserve System -\$27,500

NOAA proposes to discontinue NOAA grants to state agencies and academic institutions that support operations of the National Estuarine Research Reserve System (NERRS). Under this proposal, NOAA will continue to provide national-level system coordination and in-kind support to state agencies and academic institutions that choose to continue operating the reserves using state funds.

Response: The National Estuarine Research Reserve System is a network of 29 areas representing different biogeographic regions of the United States. Their work must be continued to accomplish their long-term research on: water quality, habitat monitoring, education, coastal stewardship, biophysical and social degrading impacts of increasing storms and temperatures on estuarine systems and coastal communities. Specifics:

- Estuaries and surrounding wetlands serve as important buffers against storm damage, absorbing the extra water with minimal damage to the environment.
- Estuaries and surrounding wetlands serve as spawning grounds for most fish and shellfish eaten in the United States, including salmon, herring, American shad, Atlantic menhaden, striped bass, and oysters.

References: <https://coast.noaa.gov/nerrs/research/science-collaborative.html>

<https://oceanservice.noaa.gov/ecosystems/nerrs/>

<https://www.neefusa.org/nature/water/estuaries-offer-protection-storms>

<https://ocean.si.edu/holding-tank/beaches/estuary-storm-buffer>

<https://www.neefusa.org/nature/water/estuaries-offer-protection-storms>

OCEANIC AND ATMOSPHERIC RESEARCH (OAR) PROGRAM

Climate Laboratories and Cooperative Institutes Terminate -\$5,057

This request will terminate funding for climate-related research and observations at the Atlantic Oceanographic & Meteorological Laboratory (AOML). This decrease will not close AOML however; for example, AOML's other work funded through weather and oceans PPAs includes critical research of hurricanes, ocean observation, and oceans and coastal systems will continue.

Response: Through Climate Laboratories & Cooperative Institutes PPA (Program, Project, or Activity) NOAA provides the research and technology development necessary to improve the agency's weather and climate services, solar-terrestrial forecasts, and marine services. Specifics:

- These activities provide the scientific basis for national policy decisions in key environmental areas such as climate change, disaster reduction, air quality, non-indigenous species, and stratospheric ozone depletion.

Reference: <https://cpo.noaa.gov/Our-Work/Partnerships/Cooperative-Institutes>

Arctic Research Elimination

Arctic Research Within the Climate Laboratories & Cooperative Institutes Subactivity Elimination -\$1,940

This request will eliminate Arctic research within the Climate Laboratories & Cooperative Institutes Sub-activity. NOAA will terminate improvements to sea ice modeling and predictions and y other Arctic research products, including future scenarios for changes to Arctic Ocean sea-ice extent, eco- system and fisheries vulnerabilities, and ocean acidification.

Arctic Research Within the Regional Climate Data & Information Subactivity Elimination -\$3,745

This request will eliminate Arctic research within the Regional Climate Data & Information Sub-activity. NOAA will terminate improvements to sea ice modeling and predictions and other Arctic research products, including future scenarios for changes to Arctic Ocean sea-ice extent, ecosystem and fisheries vulnerabilities, and ocean acidification.

Response: The Arctic is close to a tipping point. The extent of Arctic sea ice has been reduced by 50% and it's volume by 75% over the last 40 years – causing the Arctic to warm twice as fast as the global average temperature and contributing to 20-40% of the global warming. Continued funding for Arctic research is critical to understand this region so we can prevent further deterioration. The Geophysical Fluid Dynamics Laboratory has developed an operational sea ice modeling and predictions system that produces seasonal Arctic sea-ice extent. Large year-to-year fluctuations occur on top of the long-term decline, such as the 1996 maximum, and the 2007 and 2012 minima. Predicting these fluctuations is critically important to improve management of ocean and coastal resources in the Arctic.

References: <https://arctic.noaa.gov/Report-Card/Report-Card-2018/ArtMID/7878/ArticleID/783/Surface-Air-Temperature>
<https://www.gfdl.noaa.gov/arctic-sea-ice-predictions/>
<https://cpo.noaa.gov/Our-Work/Partnerships/Cooperative-Institutes>

<https://arctic.noaa.gov/Report-Card/Report-Card-2018/ArtMID/7878/ArticleID/783/Surface-Air-Temperature>

Eliminate Climate Competitive Research Funding -\$22,797

This request will eliminate climate competitive research activities in the Regional Climate Data and Information Subactivity, terminating the Regional Integrated Sciences and Assessments Program (RISA) program, and eliminating NOAA's portion of the funding for the National Climate Assessment (NCA). NOAA will continue to provide support for the NCA through other PPAs.

Response to Termination of funding for the the National Climate Assessment (NCA): The National Climate Assessment (NCA) and the follow-on reports at the State level are important inputs to local decision makers. These reports are critical for local, state, and federal government decision makers for near-term and long-term mitigation and adaptation to climate change. Specifics:

- With contributions from 14 government agencies, the NCA is mandated by congress to report to the President and the Congress at least every four years the effects of global change (i.e., climate change) and how it may alter the capacity of the Earth to sustain life with projections for 25 and 100 years:
 - Temperature
 - Sea Level Rise
 - Natural environment
 - Agriculture
 - Energy production and use
 - Land, oceans, and water resources
 - Transportation
 - Human health and welfare
 - Human social systems
 - Biological diversity

Response to Termination of the Regional Integrated Sciences and Climate Assessment (RISA): NOAA's Regional Integrated Sciences and Assessments (RISA) program supports research teams that help expand and build the nation's capacity to prepare for and adapt to climate variability and change. Specifics

- RISAs work closely with applied scientists who provide predictions and projections of weather and climate, with cooperative extension and outreach professionals, and communications experts including. Services include:
 - Climate impacts training
 - Climate outlooks and outlook fora
 - Climate extension
 - Communication tools (visualization, white papers, report, etc.)
 - Decision support tools and information systems for drought, climate, water supply and availability, agriculture and other impacts

References: <https://www.globalchange.gov/about>
<https://cpo.noaa.gov/Meet-the-Divisions/Climate-and-Societal-Interactions/RISA/About-RISA>

Eliminate Climate Competitive Research Subactivity -\$43,087

This request will terminate the Climate Program Office (CPO), with the exception of the National Integrated Drought Information System (NIDIS) program. It will also reduce competitive research grants to cooperative institutes, universities, NOAA research laboratories, and other partners.

Response: NOAA's Regional Integrated Sciences and Assessments (RISA) program supports research teams that help expand and build the nation's capacity to prepare for and adapt to climate variability and change. Specifics

- RISAs work closely with applied scientists who provide predictions and projections of weather and climate, with cooperative extension and outreach professionals, and communications experts including. Services include:
 - Climate impacts training
 - Climate outlooks and outlook fora
 - Climate extension
 - Communication tools (visualization, white papers, report, etc.)
 - Decision support tools and information systems for drought, climate, water supply and availability, agriculture and other impacts

Reference: <https://cpo.noaa.gov/Meet-the-Divisions/Climate-and-Societal-Interactions/RISA/About-RISA>

Air Resources Laboratory Closure -\$4,979

This request will close the Air Resources Laboratory. It will eliminate ARL's research on air chemistry, mercury deposition, and atmospheric dispersion of harmful materials, as well as ARL's observational data collection that is being used to study and project effects of air chemistry on human.

Response: ARL develops and improves atmospheric dispersion and air chemistry models by collecting and analyzing essential data of surface and near surface weather and climate conditions.

- Provides high quality, reference-grade measurements of critical climate parameters.
- No information provided regarding where the program priorities and funding will be "folded" into other NOAA labs. Funding would also be required to transfer and/or purchase equipment for the target lab and the and transfer of the 34 personnel.

Reference: <https://www.arl.noaa.gov/>

The Vortex-Southeast Termination -\$4,966

NOAA will terminate Vortex-Southeast (VORTEX-SE), a project that seeks to improve tornado forecasts in the southeastern U.S.

Response: The number of killer tornadoes in the Southeastern U.S. is disproportionately large when compared to the overall number of tornadoes throughout the country. VORTEX-SE is an effort to understand how environmental factors characteristic of the southeastern U.S. affect the formation, intensity, structure, and path of tornadoes in this region. Specifics:

- This is an opportunity to learn more about tornadoes—still poorly understood in any region—and learn how people become aware of their threat and respond in ways that can protect their lives and property.

Reference: <https://www.nssl.noaa.gov/projects/vortexse/>

Weather Laboratories and Cooperative Institutes Decrease - \$4,762

NOAA will decrease the funding used to advance priority activities in its Weather Labs and CIs funding line, including High Performance Computing recapitalization of the Boulder jet supercomputer, Forecasting a Continuum of Environmental Threats (FACETs), data assimilation initiatives, and other activities that support implementation of the Weather Act.

Response: FACETs is a proposed next-generation severe weather watch and warning framework that is modern, flexible, and designed to communicate clear and simple hazardous weather information to serve the public and aid forecasters' decisions making.

- FACETs will introduce new computer-model predictions of storm-specific hazards such as tornadoes large hail, and extreme local rainfall from NOAA's Warn-on-Forecast research project
- FACETs support NOAA's Weather-Ready Nation initiative to build community resilience in the face of increasing vulnerability to extreme weather and water events

Reference: <https://www.nssl.noaa.gov/projects/facets/>

TORNADO SEVERE STORM RESEARCH/PAR DECREASE -\$1,020

This request will decrease the funding used to advance priority activities in Tornado/Severe Storm Research line. NOAA will prioritize the remaining funding to

continue evaluation of the Phased Array Radar (PAR) technology as a possible cost-effective replacement for aging weather radars.

Response: The goal of the PAR program is to provide a “quantum leap” in the accuracy of forecasts of severe weather (e.g., hurricane tracks, hurricane intensity, tornadoes, severe precipitation events) by developing an advanced airborne radar: greatly improving measurements of the atmospheric state for input to forecast models.

- Development has been a partnership between NOAA and the National Center for Atmospheric Research (NCAR), with design, hardware development, and testing conducted at NCAR, including planned use of the NSF/NCAR C-130 aircraft.
- The program has been jointly funded by NOAA and NSF and includes participation by Colorado State University and the University of Oklahoma.
- Various design and development milestones have been reported by NCAR for 2016-18.

References: <https://www.eol.ucar.edu/instruments/airborne-phased-array-radar-apar>
<https://www.geosci-instrum-method-data-syst.net/7/21/2018/gi-7-21-2018.pdf>
https://www.washingtonpost.com/news/capital-weather-gang/wp/2014/08/19/airborne-phased-array-radar-could-spur-a-quantum-leap-in-hurricane-forecasts/?utm_term=.0fc8c39db026
<https://meetingorganizer.copernicus.org/EGU2019/EGU2019-8368.pdf>

Infrasonic Weather Monitoring Research Termination -\$1,000

With this reduction, NOAA will conclude infrasonic monitoring research. NOAA has completed an evaluation of this technology using congressionally directed funding in FY 2016 through FY 2020.

Response: Advanced infrasound signal processing methodologies and studies, deployed through a network of infrasound arrays to detect tornadoes and hurricanes, have the potential to improve forecast accuracy. This program develops and deploys instruments that detect and monitor low-frequency sound generated by several processes, including hazardous geophysical phenomena in order to improve basic knowledge and early warnings. Ongoing and potential studies, often carried out in collaboration with other organizations, include methods to reduce audible noise (such as along highways) using both active and passive techniques, researching earthquake precursors, assisting with the Nuclear Test Ban treaty monitoring system, and ocean wave generated infrasound with a focus on tsunami detection.

- It has demonstrated that avalanches in the Rocky Mountains can be detected and located using an infrasonic array on the plains near Boulder, CO.

- Using a similar array, it demonstrated that tornadoes on the high plains can be detected several minutes before they touch down, thus demonstrating a valuable tool to provide advanced warning for residents in tornado-prone regions.

References: <https://www.esrl.noaa.gov/psd/programs/infrasound/>
<https://www.aip.org/fyi/2017/fy18-appropriations-bills-national-oceanic-and-atmospheric-administration>

National Sea Grant College Program Termination -\$80,198

With this reduction, NOAA will terminate the National Sea Grant College Program Base and the Marine Aquaculture Program.

Response: The National Sea Grant College Program supports the work of thousands of scientists and researchers in a wide variety of disciplines from hundreds of institutions: supporting cutting-edge research in the areas of coastal processes, hazards, energy sources, climate change, storm water management and tourism. When urgent new questions arise, Sea Grant can call on this network of scientists for information and science-based solutions.

References: <https://seagrants.noaa.gov/>
<https://research.noaa.gov/External-Affairs/Budget>

Integrated Ocean Acidification Decrease -\$5,947

This request will reduce funding for the Integrated Ocean Acidification Program. NOAA will continue to support the highest priority research within OA that improves our understanding of ocean and coastal acidification (OA) and its impacts on marine resources, coastal communities, and economies

Response: The Ocean Acidification Program (OAP) is helping mitigate economic impacts with real-time data that signal the approach of acidified seawater one to two days before it arrives, helping shellfish hatchery managers time to take action to save crops.

- Ocean acidification is progressing at record pace and has the potential to fundamentally change the ocean, its habitats, food webs, marine life (such as corals, oysters, clams, and mussels), and shell fish hatcheries.
- Efforts of OAP will help our nation begin to understand how to address this problem on a global scale and help reverse it.

Reference: <https://ioos.noaa.gov/project/ocean-acidification/>

Sustained Ocean Observation and Monitoring Decrease -\$8,107

This request will reduce external grant funding for the global ocean observing system.

Response: The Ocean Observing and Monitoring Division (OOMB) addresses a wide range of needs for climate and environmental information to understand past and present conditions, as well as foundational information for predicting future changes. Specifics:

- OOMB's activities also contribute significantly towards fulfilling the requirements of key international programs to provide essential ocean, Arctic, and climate observations and information to enable effective decisions on the part of resource managers and decision/policy makers.

Reference: <https://cpo.noaa.gov/Meet-the-Divisions/Ocean-Observing-and-Monitoring>

NATIONAL WEATHER SERVICE (NWS) PROGRAM

Reduce Marine Observations Tropical Atmosphere Ocean Platform -\$1,300

NOAA proposes this reduction to the Tropical Atmosphere Ocean Platform. This decrease will reduce the 55-buoy array by 15 while maintaining 80 percent availability for the remaining network.

Response: The TAO/TRITON Array was designed to better understand and predict climate variations related to El Niño and the Southern Oscillation (ENSO). Identifying the onset is critical in preparing the nation for ENOS events, which will save property losses and lives. Specifics

- ENSO events significantly disrupt normal patterns of weather variability, affecting agriculture, transportation, resource management, energy production, and the lives of millions of people around the globe and affects Pacific marine ecosystems and commercially valuable fish stocks such as tuna and anchovy.
- A delay in recognition of the onset of ENSO events would impact the preparation for these events.

Reference: <https://www.pmel.noaa.gov/gtmba/pmel-theme/pacific-ocean-tao>

Reduce Upper Air Observations 0 Positions / -\$1,655

NOAA will reduce the geographic scope and purchase of observations performed by aircraft and will eliminate the aircraft observations over other parts of the oceans and in

other continents. NOAA will reduce the number of reserve radiosondes, to an amount needed for daily operations only.

Response: The National Weather Service (NWS) Upper-air Observations Program oversee the operation of 92 Radiosonde stations in North America and the Pacific Islands and supports the operation of 10 stations in the Caribbean. Radiosondes provide upper-air data that are essential for weather forecasts and research. Along with the Aircraft Based Observation (ABO) Dataset (from measurements made on commercial aircraft in airlines covering the globe), this program provides critical upper-air data that are essential for global weather forecasts and research.

- More than 600,000 wind and temperature observations are available per day, 450,000 of which are over the continental United States.
- These data come from approximately 5,000 aircraft from both domestic and international airlines including: American, Delta, Federal Express, Northwest, United, United Parcel Service, South West Airlines, and Mesaba, BA, KLM, Air France, SAS, Lufthansa, Qantas, Air New Zealand, South African Air, Air Namibia, AeroMexico and LATAM Airlines.

References: https://madis.noaa.gov/madis_acars.shtml

<https://www.weather.gov/upperair/>

<https://aerospaceamerica.aiaa.org/features/danger-in-the-air/>

Slow Advanced Hydrologic Prediction System Expansion - \$2,000

NOAA will slow the expansion of new technology at AHPS forecast locations, reducing training and implementation support. NOAA will delay/forgo aspects of research and development efforts to address limitations in HEFSv1.

Response: These graphical products are useful planning tools for economic and emergency managers and enable government agencies, private institutions, and individuals to make informed decisions about risk-based policies and actions to mitigate the dangers of floods and droughts and water reservoir regulation.

Specifics:

- The AHPS web site displays information regarding the magnitude and uncertainty of the occurrence of floods or droughts, from hours to days and months in advance.

Reference: <https://toolkit.climate.gov/tool/advanced-hydrologic-prediction-service>

Consolidate Climate Prediction Center/Weather Prediction Center Functions - \$1,200

NOAA will consolidate functions at the National Centers for Environmental Prediction (NCEP) Climate Prediction Center (CPC) and Weather Prediction Center (WPC). The consolidation will result in creating one national center that will span the continuum of prediction services through existing sub-seasonal and seasonal time domains, eliminate overlap between the transition at the weather and climate scale domains, improve efficiency, promote consistency in presenting data and forecast information, and base products on monthly and seasonal predictions of temperature and precipitation.

Response: Per the 2020 NOAA budget, consolidating these 2 centers will limit some of NOAA's products and services such as climate prediction products with domains over hemispheres other than North America/Arctic. If this is the intent with the 2021 budget then these services must be included in any consolidation. The US presence is throughout the globe. These predictions are critical for humanitarian and military exercises. They have been and are being used by military commanders in hotspots throughout the globe. By not including climate and weather prediction information for other hemispheres outside of North America, information may not be available for decision makers regarding US global interests (commercial, private, government).

Reduction to Office of Water Prediction Center Staffing Support -\$1,500

NOAA will maintain the current staffing levels within the Water Prediction Operations Division (WPOD) at the Office of Water Prediction (OWP) located at the National Water Center (NWC). This decrease will delay meeting Full Operating Capability (FOC) as previously directed in the Consolidated Appropriations Act, 2020.

Response: Delaying Full Operating Capacity presents a national security issue. The Office of Water Prediction (OWP) collaboratively researches, develops and delivers state-of-the-science national hydrologic analyses, forecast information, data, decision-support services and guidance to support and inform essential emergency services and water management decisions. The National Water Model is a major product of OWP and supports decision makers when flooding is threatened: from short-range forecasts executed hourly, medium-range forecasts out to 10 days, and long-range forecast to 30-day. Weather has and is becoming more extreme with major flooding and droughts. Full operating capacity is needed as soon as possible to analyze and forecast these weather extremes.

- In partnership with NWS national, regional, and local offices, the OWP coordinates, integrates and supports consistent water prediction activities from global to local levels.
- The NWM will provide complementary hydrologic guidance at current National Weather Service (NWS) river forecast locations and significantly expand guidance coverage and type in underserved locations.

References: <https://water.noaa.gov/about/nwm>
<https://water.noaa.gov/>

Terminate Hydrology and Additional Water Resources -\$6,000

NOAA proposes to terminate the external grants, which supported collaboration with external academic partners to improve fine and large-scale measurements of snow depth and soil moisture data that can be used to expand and improve the National Water Model (NWM).

Response: The National Water Model is a major product of Office of Water Prediction (OWP) and supports decision makers when flooding is threatened: from short-range forecasts executed hourly, medium-range forecasts out to 10 days, and long-range forecast to 30-day. The OWP collaboratively researches, develops and delivers state-of-the-science national hydrologic analyses, forecast information, data, decision-support services and guidance to support and inform essential emergency services and water management decisions.

- In partnership with NWS national, regional, and local offices, the OWP coordinates, integrates and supports consistent water prediction activities from global to local levels.
- The NWM will provide complementary hydrologic guidance at current National Weather Service (NWS) river forecast locations and significantly expand guidance coverage and type in underserved locations.

References: <https://water.noaa.gov/about/nwm>
<https://water.noaa.gov/>

NATIONAL ENVIRONMENTAL SATELLITE SERVICE (NESDIS) PROGRAM

National Centers For Environmental Information (NCEI) (-10,589)

Regional Climate Services Termination -\$6,000

NOAA will terminate Regional Climate Services, to include termination of the Regional Climate Centers.

NCEI External Grant Reduction -\$4,589

NOAA will reduce grants provided to the Cooperative Institutes at the University of Colorado in Boulder, University of Maryland at College Park, North Carolina State University, and Mississippi Sea Grant. This decrease will limit NCEI's science

innovation efforts, reducing the quantity of products and services, and impacting users particularly in the business sectors.

Response: NCEI is responsible for preserving, monitoring, assessing, and providing public access to the Nation's treasure of climate and historical weather data and information. Preservation and access these data are required to develop weather and climate models. The Regional Climate Centers (RCCs) provides climate services tailored to the specific needs of the region within which it is located. RCCs respond to emerging issues, such as droughts and floods and each RCC is located at six universities and research institutions that are responsible for managing the RCC resources from NOAA and non-NOAA sources alike. The RCCs computer-based infrastructure, tools and programs integrate data from the National Center for Environmental Information (NCEI) with regional non-NOAA data; providing climate information to decision makers from various sectors, state climatologists, and the public. NCEI updates and archives NOAA climate data but does not have the software, tools, and programs to provide these services.

- The western United States consists of complex terrain, where local precipitation and temperature can vary dramatically across short distances, which in turn impacts local drought conditions. The Western Regional Climate Center West Wide Drought Tracker (WWDT) provides climate datasets with fine-scale drought monitoring and climate to help inform decisions on issues such as drought early warning, water management, and energy usage.
- The Vegetation Impact Program (VIP) provides current susceptibility and climate-related impacts on vegetation.
- The RCC developed Applied Climate Information System (ACIS) provides users throughout the country with precipitation, temperature, heating and cooling degree days, and a standardized precipitation index over various time intervals and spatial scales.
- The Climate Annual Comparison Tool is designed to let users compare the current year's accumulated precipitation, maximum temperature, and minimum temperature with up to three previous years. Data can be chosen for a specific zip code, city or county.
- The Automated Weather Data Network provides climate information within the High Plains Region to stakeholders in agriculture and related fields.
- Other products include frost/freeze monitoring tools as well as stress degree-days that monitor heat stress to corn and chilling hours that impact dormant season recovery of small fruits gridded data values.

Examples of data products include:

- When to Expect Your Last Spring Freeze: based on 30 years of climate records, our map shows when you can expect to see temperatures dip to 32°F or below for the last time
- Value of the Data: U.S. Drought Monitor: cattle ranchers and federal agencies manage drought impacts using NOAA NCEI data via the U.S. Drought Monitor.

Reference: <https://www.ncdc.noaa.gov/customer-support/partnerships/regional-climate-centers>
<https://www.ncei.noaa.gov/news/last-spring-freeze>
<https://www.ncei.noaa.gov/news/value-of-data-USDM>
<https://www.ospo.noaa.gov/Organization/About/mission.html>
<https://www.ncdc.noaa.gov/>

OFFICE OF MARINE AND AVIATION OPERATIONS (OMAO) PROGRAM

Atmospheric Rivers -\$1,500

NOAA requests a decrease to reduce additional congressionally-directed funds provided in FY 2020 for the monitoring of atmospheric rivers.

Response: Atmospheric rivers (ARs) are narrow conveyor belts of water vapor in the atmosphere that can extend thousands of miles and are responsible for delivering much of the water vapor associated with major storms along the West Coast – particularly California. These storms can contain the large amounts of water vapor and the strongest winds can create extreme rainfall and floods, often by stalling over watersheds vulnerable to flooding. The combined air, ship, and land-based measurements will help researchers understand the scientific ingredients that contribute to atmospheric rivers: improving our understanding of atmospheric rivers to help us produce better forecasts of where they will hit and when, and how much rain and snow they will deliver.

- These measurements can be used to improve short- and long-term predictions of precipitation, and to develop decision support tools for extreme precipitation events, hazard response, and water supply for more effective water resource management.
- In California, it's critical to understand if precipitation will arrive as snow—often good news, because it can "store" water in slow-melting mountain snowpack—or rain, which can increase flood risk.

References: <https://www.esrl.noaa.gov/psd/news/2015/011615.html>
<https://www.noaa.gov/stories/what-are-atmospheric-rivers>