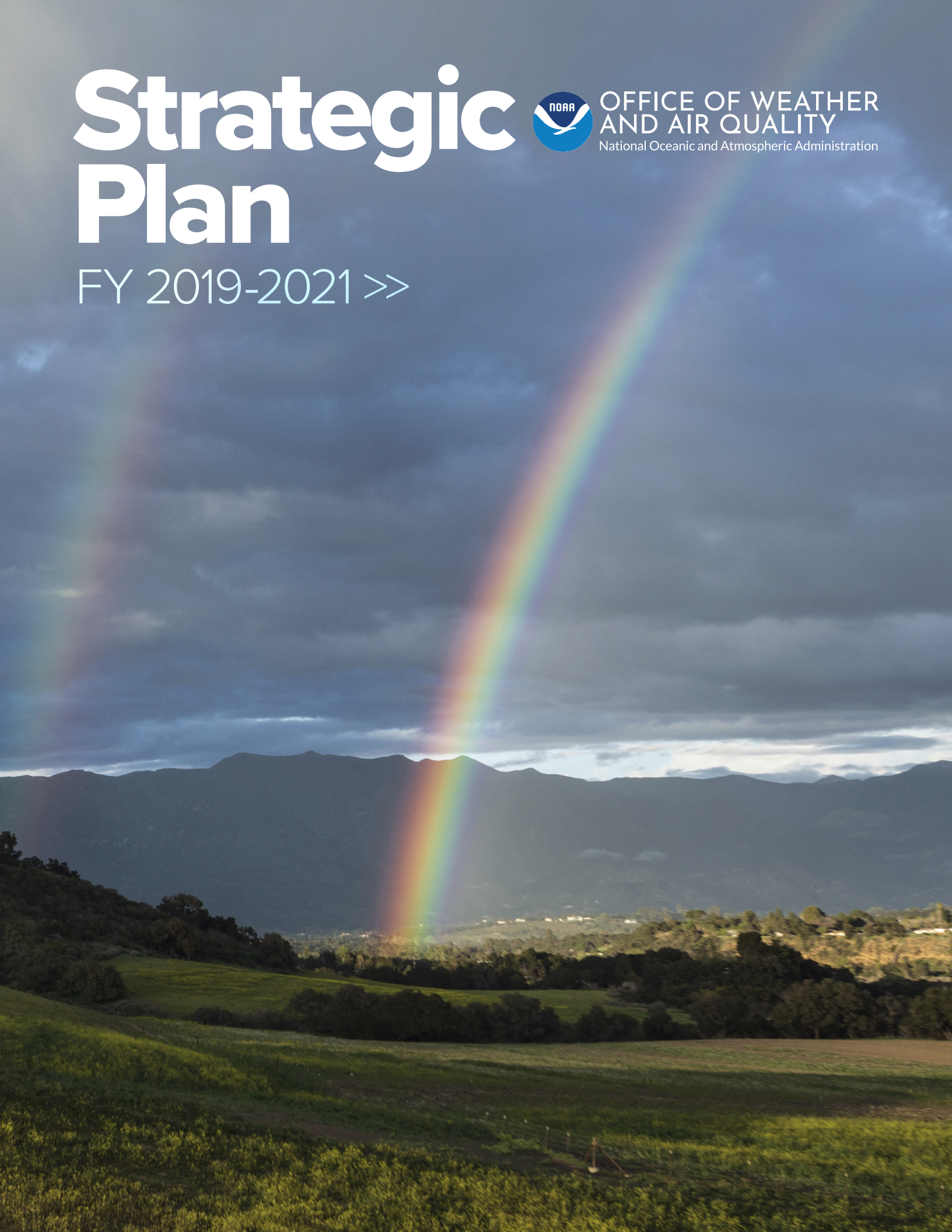


# Strategic Plan



OFFICE OF WEATHER  
AND AIR QUALITY  
National Oceanic and Atmospheric Administration

FY 2019-2021 >>



## Office of Weather and Air Quality Strategic Plan Fiscal Years 2019-2021

April 2019

Director: John Cortinas, Ph.D.

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**Notes:** (1) Unless otherwise noted, all images are courtesy of NOAA or researchers funded by NOAA. (2) Every effort was made to compile accurate data and information; OWAQ regrets any errors or omissions.

**On the front and back covers:** Rainbow over a rainstorm in the Ojai Valley, California. Image credit: File #94842063.

**VISION:** A Weather-Ready Nation informed by world-class weather research.

**MISSION:** Finding, funding, and fostering collaborative weather and air quality research to discover, develop, and transition products, tools, and services for timely and accurate weather and air quality forecasts.

### **GOAL 1. Improve effective communication of weather information to strengthen decision-making and forecasting abilities.**

- Objective 1.1: Enhance the integration of social, behavioral, and economic science (SBES) into weather research and development to strengthen the utility of weather information for decision making.
- Objective 1.2: Integrate social, behavioral, and economic science research findings into weather enterprise applications and, through engagement, identify gaps to support future SBES research priorities.

### **GOAL 2. Advance models and forecast tools to produce the best weather forecasts and warnings to build a Weather-Ready Nation.**

- Objective 2.1: Advance the development and implementation of NOAA's Unified Forecast System (UFS).
- Objective 2.2: Advance Subseasonal-to-Seasonal (S2S) forecasts.
- Objective 2.3: Improve severe weather prediction capability.

### **GOAL 3. Effectively and efficiently manage the advancement and transition of weather research into societal applications.**

- Objective 3.1: Advance the development and transition of weather research to operations (R2O).
- Objective 3.2: Ensure operations and management processes are well-documented, maintained, and refined.
- Objective 3.3: Respond in a timely and effective manner to NOAA's Congressional mandates.

### **GOAL 4. Develop and support a diverse and inclusive work environment that promotes equal access to the opportunities OWAQ offers.**

- Objective 4.1: Recruit and maintain a diverse and highly qualified workforce.
- Objective 4.2: Promote and enhance the inclusion of OWAQ's diverse workforce.
- Objective 4.3: Integrate and promote diversity and inclusion as a core consideration throughout OWAQ's funding mechanisms.



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# LETTER FROM THE DIRECTOR

**John Cortinas, Ph.D.**

Director, Office of Weather and Air Quality  
NOAA's Office of Oceanic and Atmospheric Research  
April 2019

## **Saving lives, reducing property damage, and enhancing the national economy....**

Since 1980, the United States (U.S.) has sustained 241 weather and climate disasters for which the overall damages reached or exceeded \$1 billion.<sup>1</sup> The cumulative costs for these 241 events exceed \$1.6 trillion.<sup>2</sup> In 2018, there were 14 weather and climate disaster events with losses exceeding \$1 billion each across the U.S. Combined, these drought, severe storm, tropical cyclone, wildfire, and winter storm events resulted in the deaths of 105 people and had significant economic effects. Saving lives, reducing property damage, and enhancing the national economy require effective planning and preparation informed by the latest research.<sup>3</sup>

The Office of Weather and Air Quality (OWAQ), which is part of the National Oceanic and Atmospheric Administration's (NOAA) Office of Oceanic and Atmospheric Research (OAR), works closely with the National Weather Service (NWS) and across the weather enterprise (i.e., NOAA, other Federal agencies and entities, state and local governments, academia and other not-for-profits, and the private sector) to understand the needs of people using weather information to make decisions. To develop and transition weather and air quality research, OWAQ supports the physical science and engineering efforts that lead to new scientific discoveries. Additionally, OWAQ supports social science to learn how to provide meaningful information to users and to inform engagement and communication with researchers, funders, and the public.

Congressionally-mandated research priorities include those found in the Weather Research and Forecast Innovation Act of 2017<sup>4</sup> and the Bipartisan Budget Act of 2018 - Further Additional Supplemental Appropriations for Disaster Relief Requirements Act, 2018.<sup>5</sup> Informed by these priorities, OWAQ fosters collaborations and funds research across the weather enterprise to monitor and understand Earth's weather and air quality systems.

This strategic plan sets forth OWAQ's vision and mission for Fiscal Years (FY) 2019 through 2021 and details goals, outcomes, and stakeholders. Ultimately, OWAQ's ability to develop new insights, effectively deliver essential services, promote interdisciplinary technical expertise, and fully achieve OWAQ's vision and mission is tied to the strong partnerships with OAR's laboratories, NOAA's other Line Offices, academia, non-profit research organizations, the private sector, and the OWAQ staff. Those strong partnerships are also represented in the diverse and inclusive work environment that provides fair and equitable opportunities; supports the professional development of employees; and implements practices and procedures to ensure that members of underrepresented communities have equal access to the opportunities OWAQ offers.

OWAQ's goals are consistent with the strategies for each Line Office,<sup>6</sup> NOAA,<sup>7</sup> and the Department of Commerce (DOC),<sup>8</sup> and each is equally critical to OWAQ's ability to support world-class research to advance timely and accurate weather information useful in making weather-related decisions:

**GOAL 1. Improve effective communication of weather information to strengthen decision-making and forecasting abilities.**

**GOAL 2. Advance models and forecast tools to produce the best weather forecasts and warnings to build a Weather-Ready Nation.**

**GOAL 3. Effectively and efficiently manage the advancement and transition of weather research into societal applications.**

**GOAL 4. Develop and support a diverse and inclusive work environment that promotes equal access to the opportunities OWAQ offers.**

The Nation can count on OWAQ to conduct world-class research, transition research to operational products and applications, and understand how members of the public and the Federal government are receiving information and making weather-related decisions.

Sincerely,



## INTRODUCTION

### Why?

#### Save lives, reduce property damage, and enhance the national economy

NOAA's Office of Weather and Air Quality (OWAQ) supports world-class weather and air quality research to save lives, reduce property damage, and enhance the national economy.

**VISION:** A Weather-Ready Nation informed by world-class weather research.

**MISSION:** Finding, funding, and fostering collaborative weather and air quality research to discover, develop, and transition products, tools, and services for timely and accurate weather and air quality forecasts.

### How?

#### Support world-class research

OWAQ develops and supports the transitions of weather and air quality research by selecting and funding research that supports and fosters collaborations within NOAA's research laboratories and across the weather enterprise (i.e., NOAA, other Federal agencies and entities, state and local governments, academia and other not-for-profits, and the private sector). Funding national and international research also ensures outreach, linkages, and coordination across the weather enterprise.

### What?

#### Employ core principles to fulfill four goals

This strategic plan details the principles, focus areas, goals, outcomes, stakeholders, and objectives for success for Fiscal Years (FY) 2019-2021.

Five principles govern OWAQ interactions:

**INTEGRITY:** Act with honesty in all situations.

**TRUST:** Build trust in all office and stakeholder relationships.

**ACCOUNTABILITY:** Accept responsibility for all decisions.

**TRANSPARENCY:** Maintain open and truthful communications.

**VIABILITY:** Create long-term value.

Through problem-focused interdisciplinary work, OWAQ's team-based scientists are engaged in a collaborative pursuit to advance weather research that focuses concurrently in three areas—science, social science, and staff support. OWAQ continuously incorporates new information and practices that ensure progress toward these goals, outcomes, and objectives, which are consistent with the goals for each Line Office, NOAA, and the Department of Commerce (DOC).

# Goal 1. Improve effective communication of weather information to strengthen decision-making and forecasting abilities

## OUTCOMES

At the end of the plan period, Goal 1 will result in these outcomes:

- Outcome 1.1: Integrated social, behavioral, and economic sciences (SBES) into existing OWAQ funding programs.
- Outcome 1.2: Strengthened understanding of weather enterprise needs to help inform OWAQ's research and development activities.
- Outcome 1.3: Enhanced communication, understanding, and use of forecasts by decision makers.
- Outcome 1.4: Established SBES-specific funding programs within OWAQ.

## OBJECTIVES WITH STAKEHOLDERS

**Objective 1.1: Enhance the integration of social, behavioral, and economic sciences (SBES) into weather research and development to strengthen the utility of weather information for decision making.**

OWAQ will integrate SBES into OWAQ-funded weather research, which includes providing consistent funding for SBES within OAR's Weather Portfolio and existing OWAQ funding opportunities. More broadly, OWAQ will fund SBES research that will enable research-guided recommendations for use by the greater weather enterprise while also guiding physical science research needs as prioritized by the user perspective. Funding economic evaluation research will ensure that the

investments made in both physical and social science have utility and meet OWAQ's vision of a Weather-Ready Nation informed by world-class weather research. Engagement with the National Weather Service (NWS), National Science Foundation (NSF), academia, and private industry will continue to focus on connecting the value of information with the needs of society, in part by understanding and addressing the gaps between research and societal applications.

**Objective 1.2: Integrate social, behavioral, and economic science research findings into weather enterprise applications and, through engagement, identify gaps in support of future SBES research priorities.**

OWAQ will help transition research findings about information reception, interpretation, risk perception, and response for application throughout the weather enterprise. These findings and research-guided recommendations, combined with forecast advancements, will guide the improvements to overall weather enterprise communication. In addition to the partner engagements aforementioned in Objective 1.1, and to inform future societal research needs, OWAQ will improve partner engagements within NOAA (e.g., the NOAA Water Initiative Service Delivery Team) and with other Federal partners (e.g., NSF, Federal Emergency Management Agency (FEMA), the Federal Highway Administration (FHA), and the Centers for Disease Control and Prevention (CDC)).



**FIGURE 1.** Eye of Hurricane Edouard taken from NOAA's Gulfstream IV aircraft. Image credit: Ching-Hwang Liu for NOAA's Atlantic Oceanographic and Meteorological Laboratory (September 2002).

## Goal 2. Advance models and forecast tools to produce the best weather forecasts and warnings to build a Weather-Ready Nation

### OUTCOMES

At the end of the plan period, Goal 2 will result in these outcomes:

- Outcome 2.1: Advanced U.S. leadership in numerical weather prediction and forecasting.
- Outcome 2.2: Advanced understanding of Subseasonal-to-Seasonal forecast capabilities for atmospheric events and impacts.
- Outcome 2.3: Enhanced extreme weather forecasting capabilities.

### OBJECTIVES WITH STAKEHOLDERS

#### **Objective 2.1: Advance the development and implementation of NOAA's Unified Forecast System (UFS).**

As the NWS continues to evolve the Next Generation Global Prediction System (NGGPS) toward a national UFS, OWAQ will maintain a critical role in observation coordination, advanced data assimilation, and model development. OWAQ's physical science programs, including the U.S. Weather Research Program (USWRP), will continue to work with appropriate stakeholders, especially the NWS, to understand the research gaps needed to bridge advancements in weather forecasting capability. NOAA Laboratories, Cooperative Institutes (CIs), and the Cooperative Science Centers (CSCs) will continue to be essential partners to deliver the needed research and development products.

#### **Objective 2.2: Advance Subseasonal-to-Seasonal forecasts.**

OWAQ's Subseasonal-to-Seasonal (S2S) Program and the National Earth System Prediction Capability (ESPC) Partnership will coordinate with NWS and other S2S stakeholders to bridge the gap between NOAA's daily and seasonal forecast capabilities through improved fidelity of earth system model components and tools across timescales. To advance the two main goals—improving the skill of S2S forecasts and enhancing the value of S2S products for stakeholders—OWAQ will focus on providing funding across the weather enterprise and readiness levels (RLs) to advance the scientific development of earth system models, understand predictability at this timescale, and improve forecast

techniques. This development includes enhancing observing systems using new technologies, advanced data assimilation, ensemble design, reanalysis and reforecasting approaches, multi-model ensembles, and statistical tools, which will be derived from investments in NOAA's community-based UFS. Through the Climate Testbed, OWAQ will continue to partner within NOAA (NWS, Labs, and CIs) and with other organizations to improve S2S forecasts.

#### **Objective 2.3: Improve severe weather prediction capability.**

In support of the DOC's Strategic Objective to "reduce extreme weather impacts" and the NWS Weather-Ready Nation program, OWAQ will continue to focus on improving NOAA's capability to forecast extreme weather events to help emergency managers and citizens prepare for impacts of destructive winds and hail, flooding, tornadoes, air quality, fires, tropical storm surge, and temperature extremes.

Working primarily with NWS and NOAA's research laboratories, CIs, and CSCs, OWAQ will continue to support severe storm and heavy precipitation research with funding through the Hazardous Weather Testbed and the Hydrometeorology Testbed. Support will focus on high-performance computing to improve model forecasts and visualization and operational simulations that pair researchers and forecasters to assess current forecasting capabilities and concepts and incorporate the SBES research findings through engagement and communication [see Objective 1.2].

Through the Joint Hurricane Testbed, OWAQ will continue to partner within NOAA (NWS, Labs, and CIs) and with other organizations to improve hurricane forecasts. OWAQ will also continue to partner with other Federal agencies (e.g., National Aeronautics and Space Administration (NASA), NSF, and Department of Defense (DoD)), private industry, and academic communities and will continue to lead the coordination for the execution and reporting of the Bipartisan Budget Act of 2018 and the Further Additional Supplemental Appropriations for Disaster Relief Requirements Act, 2018.



## Goal 3. Effectively and efficiently manage the advancement and transition of weather research into societal applications

### OUTCOMES

At the end of the plan period, Goal 3 will result in these outcomes:

- Outcome 3.1: A robust pipeline of research projects across the readiness-level continuum to ensure ongoing availability of projects for transition to operations.
- Outcome 3.2: Codified transition policies and procedures in formats that are routinely utilized by staff across OWAQ.
- Outcome 3.3: An effective office that ensures continuous business practices during staff absences and transitions.
- Outcome 3.4: Timely and effective responses to Congressional mandates for advancements in weather research.

### OBJECTIVES WITH STAKEHOLDERS

#### **Objective 3.1: Advance the development and transition of weather research to operations (R2O).**

Strengthened collaboration with NWS will support a robust pipeline of weather research across the continuum of readiness levels. Further R2O coordination across the weather enterprise will include: (1) developing engagement mechanisms with the U.S. private weather industry; (2) enhancing two-way planning, collaboration, coordination, and feedback between operations and research to accelerate the pace of capability improvements including operations to research (O2R); (3) supporting community modeling efforts beneficial to both operational support and research questions; and (4) guiding collaborative efforts to include both operational and research priorities in planning phases. Priorities include the research required to advance to the next research phase (R2R), and/or to enhance the accuracy and sophistication of existing operational techniques and models while bearing in mind fiscal and human operational capacities.

#### **Objective 3.2: Ensure operations and management processes are well-documented, maintained, and refined.**

The use and communication of shared resources will be expanded, especially for OWAQ's Standard Operating



**FIGURE 2.** Weather radar at sunset in Riverton, Wyoming. Image credit: Kelly Allen for NOAA's National Weather Service Forecast Office (February 2018).

Procedures (SOPs) and grants management processes. In an effort to create more efficient workflow processes that are also resilient to evolving administrative requirements and opportunities, an internal portal on the OWAQ website will be developed to increase the use and visibility of shared resources. To enable effective and efficient support in both short- and long-term workforce gaps, a succession plan will be formally established for back-up roles that provide adequate support capacity while also developing staff for continued growth.

#### **Objective 3.3: Respond in a timely and effective manner to NOAA's Congressional mandates.**

NOAA's vision for a Weather-Ready Nation is driven by Congressional research directives. These Congressional mandates (see partial list below) impact each of OWAQ's research programs and require a timely and coordinated response to requests for information:

- Weather Research and Forecasting Innovation Act of 2017 (15 U.S.C. §8501);
- Bipartisan Budget Act of 2018 - Further Additional Supplemental Appropriations for Disaster Relief Requirements Act, 2018 (P.L. 115-123); and
- Weather Service Organic Act (15 U.S.C. §313-313d, 325).



## Goal 4. Develop and support a diverse and inclusive work environment that promotes equal access to the opportunities OWAQ offers

### OUTCOMES

At the end of the plan period, Goal 4 will result in these outcomes:

- Outcome 4.1: Implemented recruitment strategies to increase diversity of candidate pools.
- Outcome 4.2: Implemented procedures to ensure equal access to the opportunities OWAQ offers, including employment, professional development, and research funding.
- Outcome 4.3: Expanded and enhanced professional development opportunities for underrepresented stakeholders/groups.

### OBJECTIVES WITH STAKEHOLDERS

#### Objective 4.1: Recruit and maintain a diverse and highly qualified workforce.

In support of NOAA's Diversity and Inclusion (D&I) vision, OWAQ will continually seek to assemble a workforce that is able to appropriately reflect, understand, and respond to OWAQ's broad and varied stakeholders. Workforce diversity will also ensure that the interdisciplinary demands for weather research and development expertise are continuously met. To achieve these considerations, OWAQ will work with the OAR Equal Employment Opportunity (EEO) Diversity Program to promote visibility through various outreach activities that bolster their short- and long-term recruiting ability. OWAQ will also strive to assemble hiring panels that reflect a diversity in age, gender,

ethnicity, and work experience to help select a highly qualified and diverse workforce.

#### Objective 4.2: Promote and enhance the inclusion of OWAQ's diverse workforce.

Consistent with NOAA's D&I Strategic Plan for FY 2017-2019, OWAQ will seek to build "a work environment that encourages open communication, provides fair and equitable opportunities, and empowers employees with the resources and support they need to advance and support our mission of science, service and stewardship."<sup>9</sup> OWAQ will work closely with OAR's Diversity and Inclusion Committee (ODIAC) to identify opportunities and strategies to build respect, equality, and acceptance within the workplace.

#### Objective 4.3: Integrate and promote diversity and inclusion as a core consideration throughout OWAQ's funding mechanisms.

To enhance the overall diversity within the weather enterprise, OWAQ will strengthen engagement with underrepresented groups, particularly with Historically-Black Colleges and Universities, Hispanic-Serving Institutions, Tribal Colleges and Universities, and NOAA's CSCs. Across each of the OWAQ funding mechanisms, OWAQ will seek to provide opportunities in weather research and development for underrepresented groups.



**FIGURE 3.** Storm between Stratford, Texas and Spearman, Texas. Image credit: Hannah Masterson for NOAA's National Severe Storms Laboratory (May 2016).

# Evaluation and Other Next Steps

## Evaluation throughout the Strategic Plan Period (FY 2019-2021)

At the end of each fiscal year covered by this strategic plan, OWAQ staff members will assess progress toward achieving the outcomes for each goal so that objectives and activities may be refined as needed. At the end of the strategic plan's term, OWAQ staff members will assess overall success in achieving the goals and meeting the outcomes.

Throughout each fiscal year, several mechanisms of evaluation will be used to track project performance, report on the status of scientific and programmatic activities, and gauge the progress toward achieving the goals of this strategic plan. These mechanisms include: (1) semi-annual progress reviews; (2) performance reports; (3) OAR's Annual Operating Plan; (4) management oversight boards; and (5) an OWAQ program review that is consistent with NOAA and OAR requirements.

## Toward the Next Strategic Plan (FY 2022-2024)

The FY 2022-2024 Strategic Plan will be informed by the preceding assessment of the FY 2019-2021 Strategic Plan. Based on this assessment, unfulfilled goals may be refined and included in the next plan and new goals may be identified based on social needs, Congressional mandates, Administration priorities, and the internal vision for OWAQ.

The timeline for developing the FY 2022-2024 Strategic Plan follows:

**STEP #1.** Planning for the next strategic plan will begin with an all-hands meeting to consider progress to-date and to begin determining goals, outcomes, and objectives for the next plan.

**STEP #2.** Small groups will meet to consider specific focus areas for the plan. The plan will be drafted, staff feedback will be gathered, and the plan will be refined to reflect staff feedback.

**STEP #3.** The final assessment of the FY 2019-2021 plan will be conducted, that output will be incorporated into the new plan, and staff and partners will review the new plan. The plan will be reviewed by OAR leadership and other partners.

**STEP #4.** The new strategic plan will be adopted.

## Endnotes

- 1 Including the Consumer Price Index adjustment to 2018.
- 2 National Oceanic and Atmospheric National Centers for Environmental Information (NCEI) 2018. U.S. Billion-Dollar Weather and Climate Disasters. <https://www.ncdc.noaa.gov/billions/>.
- 3 National Weather Service. 2018. "NWS StormReady Program." [nws.noaa.gov/stormready/](https://nws.noaa.gov/stormready/).
- 4 Weather Research and Forecasting Innovation Act of 2017. 2017. 15 U.S.C. Chapter 111 (see §8512(b)(4) for JTTI and §8514 for the hurricane forecast improvement program).
- 5 Bipartisan Budget Act of 2018 - Further Additional Supplemental Appropriations for Disaster Relief Requirements Act, 2018. 2018. (P.L. 115-123), <https://go.usa.gov/xEJDn>.
- 6 National Weather Service. 2018. "Draft Strategic Plan."

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- 7 National Oceanic and Atmospheric Administration. NOAA Administrative Order 216-115 A, "Research and Development in NOAA," <https://go.usa.gov/xEJDW>.
- 8 U.S. Department of Commerce. 2018. "U.S. Department of Commerce Strategic Plan | 2018-2022: Helping the American Economy Grow."
- 9 National Oceanic and Atmospheric Administration. 2015. "NOAA Diversity and Inclusion Strategic Plan—FY 2017–2019," <https://www.eeo.noaa.gov/d&i/NOAA%20Diversity%20and%20Inclusion%20Strategic%20Plan.pdf>.



## Summary

NOAA's Office of Weather and Air Quality provides the outreach, linkages, and coordination across the weather enterprise that help NOAA develop and access critical weather and air quality research capabilities. In short, OWAQ exists to find, fund, and foster collaborative weather and air quality research to discover, develop, and transition products, tools, and services for timely and accurate weather and air quality forecasts.

**FIGURE 4.** A Colorado rainbow and rainshaft. Image credit: Jared Rackley, Weather in Focus Photo Contest 2015 (May 2014) from NOAA's Photo Library.





# Strategic Plan FY 2019-2021 >>



**OFFICE OF WEATHER  
AND AIR QUALITY**

National Oceanic and Atmospheric Administration