Building Towards a Fire-Ready Nation

Bipartisan Infrastructure Law Wildfire Projects

February 29, 2024

Introduction

The U.S. has been devastated by recent wildfire disasters in Hawaii, California, North Carolina, Louisiana, and throughout the western U.S. In Summer 2023, major cities in the northeastern U.S. were suffocated by dangerous air quality from smoke caused by Canadian fires. Wildfires and their impacts continue to grow at an alarming rate.

Thomas Fire in Ventura, CA. Credit: USFS.

The National Oceanic and Atmospheric Administration (NOAA) plays a vital role in supporting federal, state, local,

and tribal partners to prepare for the threat of wildfires and to battle the blazes that endanger life and property. NOAA's forecast products range from short-term warnings to long-term seasonal predictions, and include air quality and smoke forecasts related to wildfires. NOAA also provides real-time fire and smoke detection using new imaging capabilities from geostationary and polar-orbiting satellites.

In FY 2023, NOAA dedicated $8.3 million for fire weather activities, and the FY 2024 President's Budget Request for NOAA maintains these funding levels. Congress, through the Bipartisan Infrastructure Law (BIL) in FY22, provided an additional $100 million to be used over several years for improving the prediction, detection, and recovery from wildfires. NOAA is investing these funds toward improved forecast models, advanced decision support capabilities, and construction of new mobile laboratories to deploy to active fires. NOAA will engage with federal, state, and county stakeholders in the new Fire Weather Testbed to accelerate the development and delivery of products, technologies, and communication strategies to users who need them.

The BIL funds will also be used to outfit Incident Meteorologists (IMETs), who deploy to major wildfires, with the latest computer technology to provide critical on-site forecasts as they help firefighters on the front lines.

"Americans are increasingly at risk from the threat of wildfires," said Secretary of Commerce Gina Raimondo. "NOAA's observations, models, outlooks, and forecasts are essential for supporting wildfire response across America. As part of President Biden's Investing in America agenda, this funding will help increase lead times for fire weather warnings, speed detection of fire starts, and provide more real-time actionable information to prevent wildfires, support firefighting crews and keep communities safe."

BIL Fire Weather Provisions

The Climate & Data Services portfolio of BIL is designed to support a collaborative Federal effort to address the climate crisis by providing critical information to decision makers through enhanced wildfire, water, and ocean observing and forecasting capabilities.

Within this portfolio, BIL Provision 5 and Provision 15 focus on wildfires, aiming to advance capabilities to anticipate unplanned fire outbreaks and keep them under control before they become deadly.

The Need

Firefighters, land management agencies, emergency managers, local officials and frontline communities need enhanced observations to detect fires early. More advanced forecasting and monitoring capabilities will help maximize lead times for fire weather warnings and real-time changes in fire weather and behavior.

NOAA scientists are addressing these concerns with a comprehensive five-part strategy for wildfire-focused projects funded through BIL.

NOAA's Five Step Implementation Strategy

1) **Engage the broader fire weather community**, including end-users, to better understand *how* to build a Fire-Ready Nation. The broader fire community will be involved in social and behavioral studies and testing and evaluation activities in the NOAA Fire Weather Testbed.

2) **Deploy new observation systems** to better monitor the environment around fires. These systems will provide powerful datasets used to better understand a range of atmospheric processes, and round-the-clock monitoring of fire and weather conditions to inform forecasting and firefighting activities.

3) **Advance early detection and prediction tools** to help keep unplanned fires small. New satellite-based fire detection algorithms will send alerts as soon as a fire starts. Improved

high-resolution weather models will predict rapidly-changing weather and how the weather will influence fire behavior.

4) **Accelerate the development of targeted decision-support tools** to improve risk assessment communication. This will improve the delivery of fire-related information and services to promote equitable societal outcomes.

5) **Equip decision-makers with new systems and technologies** to keep firefighters and communities safe. Enhanced data, visualization tools, and up-to-date weather information, all transmitted by new, state-of-the-art computing and dissemination systems, used by meteorologists in the field, will help emergency managers make timely decisions.

NOAA Collaboration

The acquisition, research, development, and deployment of NOAA's BIL Wildfire portfolio are jointly managed by leadership at the NOAA Office of Oceanic and Atmospheric Research (OAR) Global Systems Laboratory (GSL) and NOAA National Weather Service (NWS) Office of Science and Technology Integration (OSTI), with additional coordination from NOAA National Environmental Satellite, Data, and Information Service (NESDIS). This includes performing research and development, directing funds to partner Cooperative Institutes to perform research and development, and conducting competitions to fund research proposals from non-NOAA organizations. In addition, a number of other NOAA Laboratories and Offices lead the individual projects.

The Budget

Operations, Research, and Facilities and Procurement, Acquisition, and Construction Funds

Congress provided NOAA with a one-time amount of $100 million through the BIL, which is being used in conjunction with funds from the 2022 Disaster Relief Supplemental Appropriations and FY23 base Congressional appropriations, to support NOAA's transformational work with wildfires. BIL's funds are distributed evenly across two provisions that support research & operations and hardware acquisition & construction projects, respectively.

- **Wildfire Provision 5** funds 14 Operations, Research, and Facilities projects worth $50,000,000.
- **Wildfire Provision 15** funds 11 Procurement, Acquisition, and Construction projects worth $50,000,000.

While the majority of the funding is for NOAA to perform the work directly, NOAA also made part of the funding available

for non-NOAA research partners through awards made to Cooperative Institutes and universities, as follows:

- Over five years, [17 total awards to six Cooperative Institutes](#), totaling approximately $34 million;
- Over three years, 7 competitively-selected projects at eight institutions, totaling approximately $3.8 million.

Explore the awards using the map below.

Esri, TomTom, Garmin, FAO, NOAA, USGS, EPA, US…   500 mi   Powered by Esri
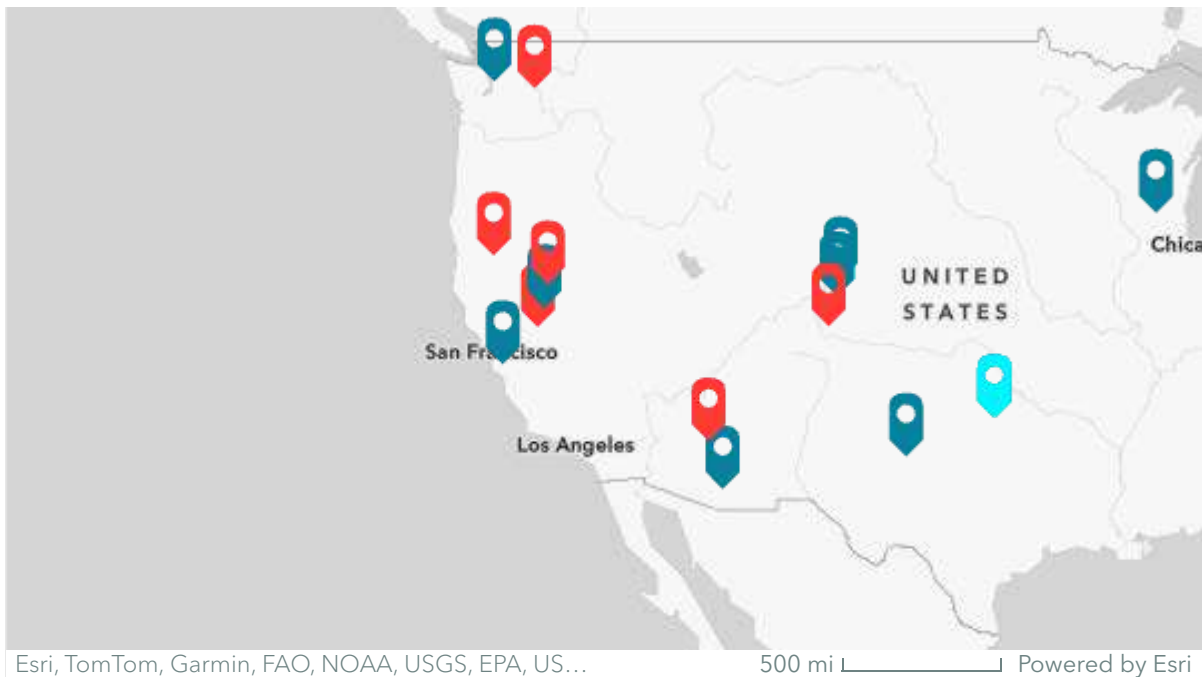
Map showing the recipient institutions of BIL Provision 5 and 15 funding awards, and study/benefit areas of BIL-funded research. Click each for more information.

The Priorities

NOAA identified five top priorities that represent the research areas that are most critical in achieving the outcomes in NOAA's five-step approach to building a Fire-Ready Nation. The strongest individual project proposals that address one or more of these priority areas were then selected to receive BIL funding.

Support Field Meteorologists

NOAA deploys Incident Meteorologists (IMETs) to wildfire incident command posts at the request of emergency managers. These specially-trained and specially-equipped forecasters work closely with incident commanders to provide highly-detailed, tactical forecasts that support operational decisions and enable firefighters to safely combat wildfires. BIL will advance the capabilities of IMETs to access, interpret, and communicate key information in real time.

Support forecasters

NOAA NWS Weather Forecast Offices already have strong relationships with local and state agencies, regional land management and emergency management partners, as well as state regulatory agencies to coordinate messaging. The products, tools, and advanced technologies developed through BIL will put new and advanced technologies in the hands of the forecasters as they work with their partners.
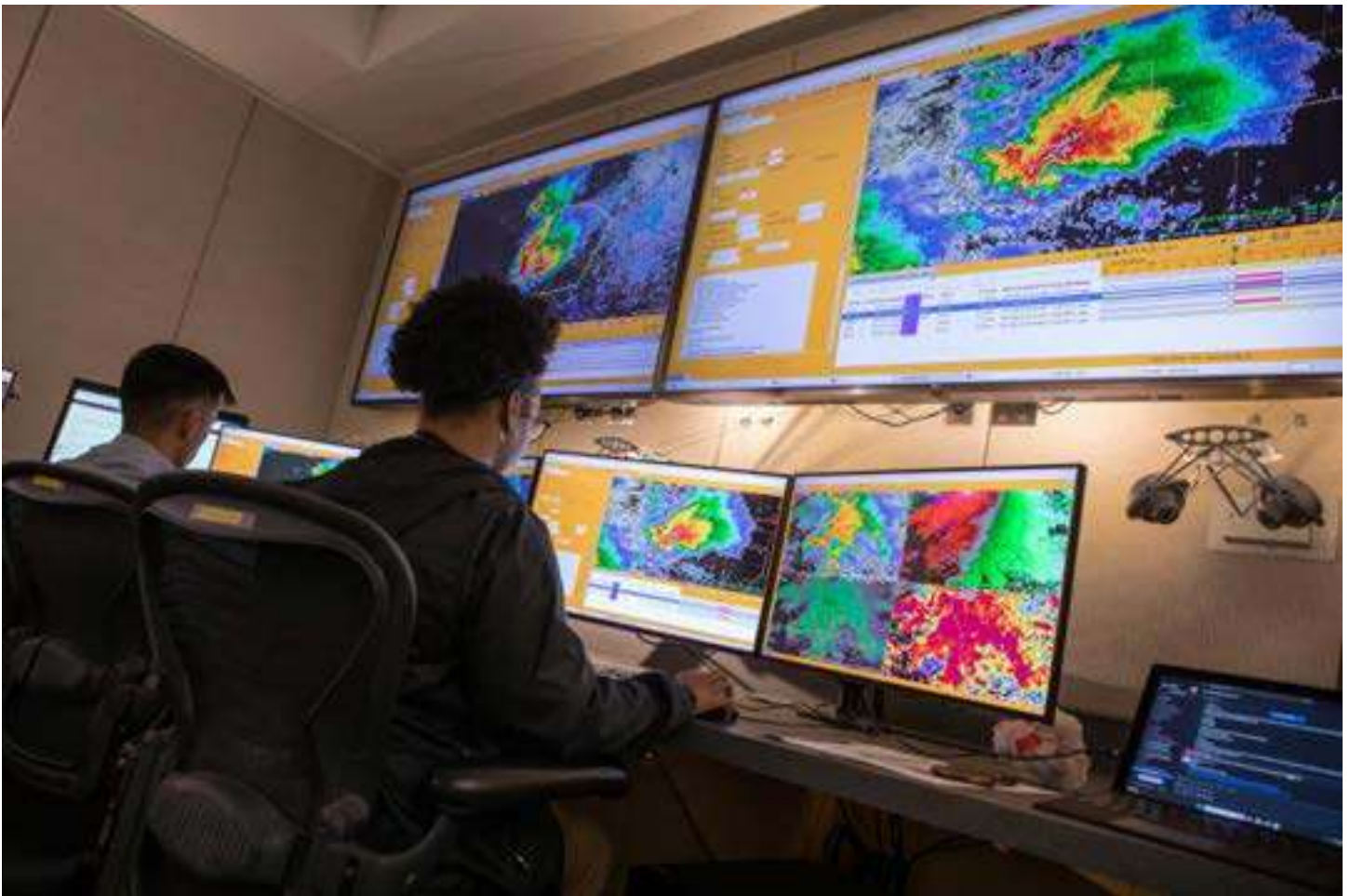
Targeted research

Through a new NOAA Fire Weather Testbed and consistently working with our partners (such as the Environmental Protection Agency, U.S. Forest Service, Wildland Fire Agencies, and more), community engagement will be top priority. New tools and technologies assessed in the Testbed will include a focus on the needs of underserved communities. Researchers will work with decision-makers to understand the best way to deliver targeted watches and warnings (e.g. smoke products to health warnings) and provide education tools to inform users of fire and smoke impacts and actions to take.

Community partnerships

Through our Climate Adaptation Partnerships Regional Integrated Sciences and Assessments program managed by OAR's Climate Program Office, we will implement **community-based partnerships** with frontline and underserved communities through the co-development of research products that support equitable adaptation and resiliency solutions.

Underserved and vulnerable populations

Through social and behavioral science programs established by the OAR Weather Program Office (WPO) and the NWS Office of Science and Technology Integration, our products and services will incorporate the needs of underserved and highly vulnerable communities.

The Projects

BIL's wildfire projects (described below) address the priority areas outlined in the previous section. They were designed and selected for funding to directly and significantly contribute to one or more of the five overarching outcomes of NOAA's five-step implementation strategy. Most of the following projects began work in 2022 and will continue

through no later than 2027, with some projects completing as early as 2023.

OUTCOME 1: Equip IMETs

- IMETs are NOAA's most direct connection to wildland fire operations in the field and outreach to our partners. BIL investments have made possible the following projects that will provide the needed technology to IMETs as they work with community partners for enhanced decision-making and risk assessment.

Equipping IMETs with More Reliable and Robust Web and GIS Services and Tools

Project Lead: National Weather Service (NWS) National Centers for Environmental Prediction (NCEP)

Funding: $3,500,000

The NWS "SPOT" Forecast System, an application that supports fire weather point forecasts, and NWSChat, the NWS internal communication system, are critical to communicating fire information to and between stakeholders during rapidly-changing conditions. This project is transitioning these products to a modern operating environment to provide meteorologists with more reliable and robust web-based and Geographic Information System-based tools.

Kincade Fire

NOAA NWS Geostationary Weather Satellite Antenna System (GWSAS) Server Refresh, Redesign, and Consolidation

Project Lead: National Weather Service (NWS) National Centers for Environmental Prediction (NCEP)

Project Funding: $1,508,322

This project will refresh and optimize data servers to process and disseminate satellite data to eliminate gaps in wildfire data. NOAA's operations depend heavily on data transmitted by its Geostationary Operational Environmental Satellites (GOES), and its Geostationary Weather Satellite Antenna Systems across the U.S. receive, process, and disseminate the data for forecasters. This project will refresh satellite communication servers as they approach the end of their expected service life, and will upgrade their design.
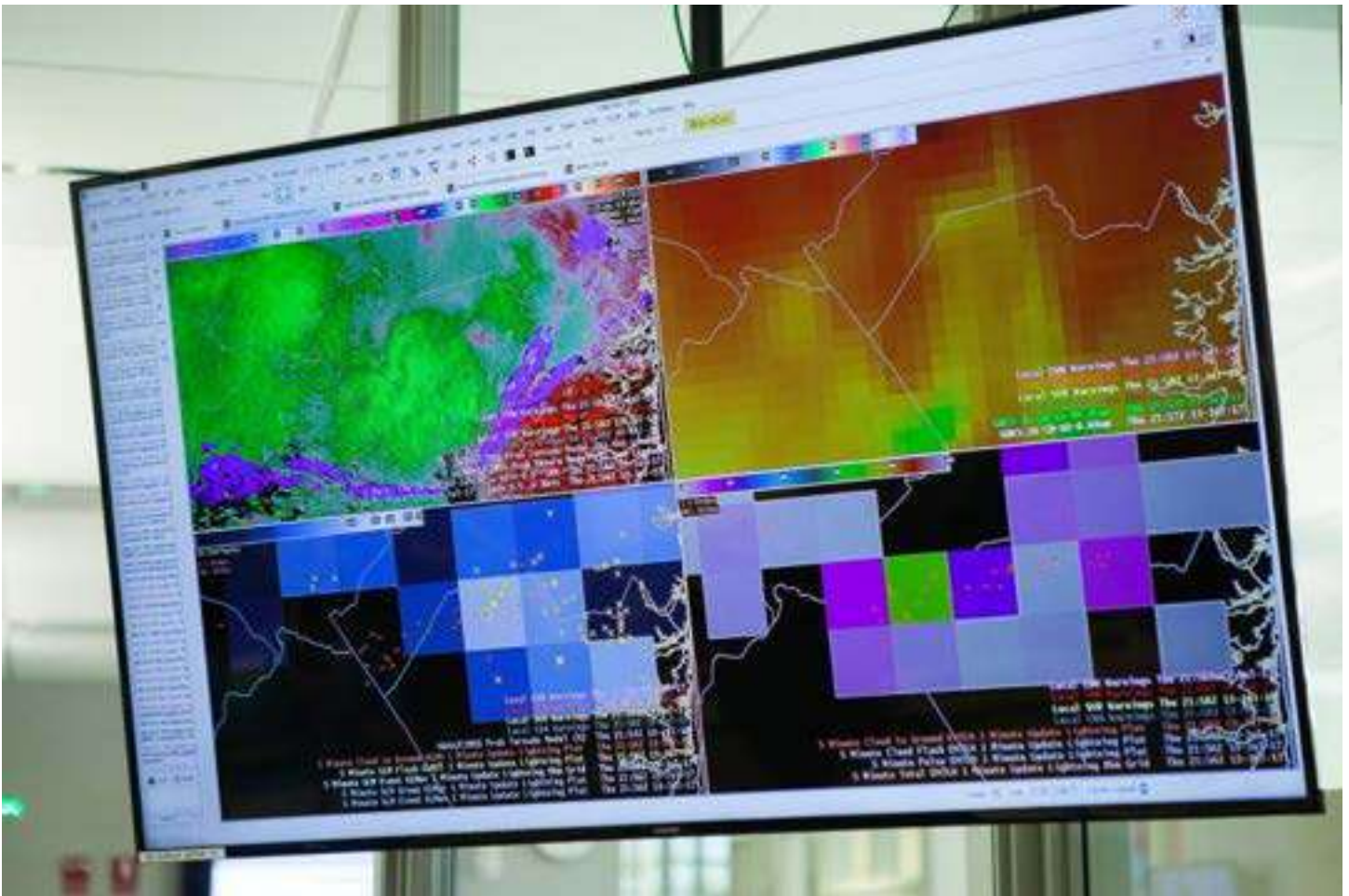
Transforming NWS Forecast Infrastructure to the Cloud

Project Lead: National Weather Service (NWS)

Project Funding: $10,400,000

The NOAA NWS Advanced Weather Interactive Processing System is the foundation of NWS forecast operations, allowing meteorologists to access thousands of various data types. This project will develop an innovative cloud-based prototype, allowing forecasters to access data and create forecasts while embedded remotely with front-line partners.

Integrated Dissemination Program Infrastructure Hardware Refresh

Project Lead: NOAA National Weather Service (NWS)

Project Funding: $4,000,000

This project entails a comprehensive hardware refresh for mission-critical computing machines that support NWSChat and "SPOT." Certain existing hardware, integral to NOAA NWS operations, has either exceeded its anticipated life expectancy or is incompatible with the current operating systems within the virtual environment. Under BIL, this initiative aims to enhance performance, efficiency, and reliability by installing new, state-of-the-art hardware.

OUTCOME 2: Deploy new observing systems

Observing systems are crucial to detecting and monitoring wildfires and their impacts. Systems such as radars and lidars measure smoke and other particles in the air. Fixed-site observing stations can monitor weather and soil conditions for early warnings of high-risk conditions. New technologies such as uncrewed aerial systems can provide new capabilities to make observations in difficult-to-reach locations such as in very rough terrain or near fires.

New Mobile Observing Systems

Project Leads: NOAA/OAR Global Systems Laboratory (GSL) and NOAA/OAR National Severe Storms Laboratory (NSSL)

Project Funding: $5,880,000

Many of the most wildfire-susceptible areas of the U.S. are in remote, inaccessible regions, such as dense forests and/or extreme terrain. These areas often lack Doppler radar coverage or nearby weather stations, making it difficult to measure and map precipitation and atmospheric conditions. These two projects address this issue.

Mobile Boundary Layer Observations: NOAA will build up to two new mobile remote sensing stations to be deployed to measure thermodynamics, winds, chemistry, and turbulence near active wildfires.