National Oceanic and Atmospheric Administration

Equitable Climate Services Action Plan

Helping communities with climate decision making

5/1/2024

Message from the NOAA Deputy Administrator

Communities across the country are leading the fight against the climate crisis, with innovative, inclusive, community-driven solutions. To do this, they need accessible, actionable climate services – science, data, information, tools and decision support – which are critical to ensuring that they can make informed decisions in a warming world. However, historically underserved communities and Tribal and Indigenous communities – those who experience the brunt of climate impacts – also often have the least access to resources and services needed to thrive in the face of climate change. As a leading provider of climate services, NOAA plays a critical role in ensuring these resources are accessible to all communities.

Our Equitable Climate Services Action Plan is a NOAA-wide effort to provide climate services more equitably and better meet the needs of all of our nation's communities as they prepare for and respond to climate impacts. It is directly responsive to feedback we received through a Request for Information on Equitable Delivery of Climate Services. The invaluable input provided by leaders and practitioners across the country was shared across NOAA to prompt action to better partner with communities as we all work toward a resilient future. The result is a set of agency-wide commitments that builds upon years of work from dedicated NOAA staff and partners, furthering NOAA's mission to build a climate ready nation for everyone.

Now more than ever, communities across the country need robust and wide-ranging climate services as they experience increasingly intense and more frequent extreme weather events – and NOAA must meet that challenge. Yet, it can be difficult to present data in a way that is decision-relevant for so many audiences. We know that climate services are only useful if properly calibrated, validated, and tuned to the needs of communities. And the climate risks faced by many communities are often compounded by social vulnerabilities, such as an affordable housing crisis, food insecurity, and economic instability. To tackle these challenges, this Action Plan advances NOAA's continued commitment to develop and deploy climate services collaboratively across Federal agencies and local community partners to better meet people where they are at.

Thanks to all those who provided feedback and contributed to this Action Plan. I look forward to our ongoing work together toward an inclusive, prosperous, and resilient future for all.

Jainey Bavishi

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INTRODUCTION

A changing climate has implications for the safety, well-being, and resilience of our nation's communities. More than ever, communities across the country are facing the impacts of climate change, climate variability and extreme events including prolonged drought, hazardous flooding, and widespread heat waves.

Many communities – particularly historically underserved and Tribal and Indigenous communities – face disproportionate impacts from climate change based on long-standing and systemic economic, social, civic, and environmental inequities.

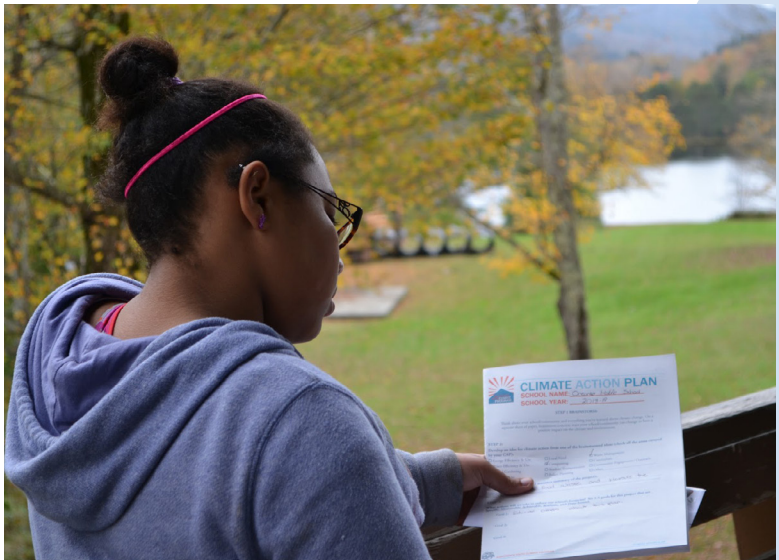
Historically, these communities have had the least access to resources that would enable them to advance their community priorities, adapt to a changing climate, and build resilience to climate-related disasters to avoid significant future damages.

The United States Department of Commerce's (DOC) National Oceanic and Atmospheric Administration (NOAA) is a leading provider of climate data, information, science, tools, and decision support; and a critical partner of

communities and decision-makers in their adaptation and resilience goals (collectively defined as “climate services” for the purpose of this document). In addition, NOAA functions as a boundary-spanner between science and society and across sectors and geographies, facilitating nationwide capacity to act on climate change.

Our vision is one in which the nation’s people, economy, and ecosystems are thriving, supported by NOAA’s equitable and actionable weather, water, and climate services.

NOAA is committed to making equity central to its mission as part of NOAA’s Strategic Plan and Climate Ready Nation (CRN) initiative. Following through on that equity commitment requires NOAA to prioritize the needs and goals of historically underserved communities and Tribal and Indigenous communities in the design and delivery of our climate services. NOAA is taking strides to increase direct benefits to these communities through initiatives like NOAA’s Climate and Equity Pilots and innovative programs supported by funding through the Bipartisan Infrastructure Law (BIL) and Inflation Reduction Act (IRA). We acknowledge there is more that NOAA can do, internally and externally, to advance equitable design and delivery of our climate services. This Action Plan aims to address our commitment to this work.



BACKGROUND

In July 2023, NOAA released a Request for Information on Equitable Climate Service Delivery (RFI) to gather feedback on how we can better serve our nation's communities as they prepare for and adapt to climate change. We focused on how NOAA is delivering climate services to users of all disciplines and backgrounds, especially historically underserved communities and Tribal and Indigenous communities. This includes how NOAA can better engage with, integrate Indigenous and local knowledge, including co-production of information and actions, into our climate services, and create an enabling environment to better partner with these communities.

The RFI collected expansive feedback regarding the needs of Tribal and Indigenous communities, climate and environmental justice communities, and constituents working on housing, public health, workforce, economic development, and with students and youth. We also heard from many of NOAA's core partners who already interact regularly with NOAA climate services, including state climatologists and adaptation professionals. Through the RFI, we heard that NOAA climate services need to:

- **Prioritize user awareness, access, application, and needs:** Many users find NOAA climate services to be inaccessible, overwhelming, disconnected from user needs, and hard to navigate and understand – or are unaware that NOAA climate services exist.

- **Support decision-making at local scales:** Climate service users need to make decisions at local or hyperlocal levels, from municipal to community level, and even for personal planning.

- **Identify connections between climate change and socioeconomic impacts:** There is a strong desire for more incorporation of socioeconomic data and the socioeconomic impacts of climate change, particularly around health and community-driven climate relocation.

- **Include meaningful community engagement and technical assistance:** There is a strong desire for NOAA to engage in more intentional outreach, training, equitable workforce development, and overall community partnership.

- **Support historically underserved, Tribal, and Indigenous communities:** Respondents expressed that NOAA is not doing enough to build trust, engage with, or include the voices and place-based knowledge of historically underserved and Tribal and Indigenous communities.

- **Prioritize NOAA's workforce diversity:** Though the RFI did not ask about equity in the context of NOAA's workforce, the comments received reflected a sense that NOAA is not prioritizing internal workforce diversity, which would broaden perspectives and deepen relationships with the communities we serve.

A full summary of the public comments NOAA received can be found in Appendix C.

ACTION PLAN ORGANIZATION

This Equitable Climate Services Action Plan (Action Plan) responds to the feedback themes above and positions NOAA's climate services to better meet the climate adaptation and resilience needs of all communities. The Action Plan is organized around five strategic priorities for programs and policies under NOAA's purview.

1. **Advance Awareness and Accessibility for Users of All Disciplines and Backgrounds**

2. **Ensure Data Equity in All Products and Services**

3. **Meet Local Data Needs**

4. **Expand Climate Services on Holistic Societal Impacts**

5. **Create an Enabling Environment**

Within each priority area are a set of actions that will ensure NOAA is better meeting the needs and enhancing the capacity of users of all disciplines and backgrounds, particularly historically underserved communities and Tribal and Indigenous communities, as they prepare for and adapt to the impacts of climate change. Some actions are designed to be immediately responsive to the feedback we heard through the RFI, while others signal for long-term future investment and institutional change. To ensure accountability, each action is also assigned to the appropriate NOAA line office/program(s) with a targeted time frame for completion.

To ensure that NOAA is institutionalizing the feedback received through the RFI, NOAA's Service Delivery Team and CRN staff will have specific responsibilities for the coordination and implementation of the Action Plan. NOAA offices that are cited or that manage activities referenced under specific actions will be responsible for specific action implementation.

Designing and delivering better, more equitable weather, water, and climate services continues to be a responsibility across all of NOAA.

NOAA's CRN staff are responsible for leading our initiative to build a Climate Ready Nation, resilient and prepared for climate change. The Action Plan is a core part of this overarching effort. To this end, the CRN staff will manage implementation of the Action Plan and will coordinate directly with NOAA's Service Delivery Team, which is composed of user engagement and service delivery experts from across the agency. The Service Delivery Team will support cross-line office coordination and ensure that a strong feedback loop is built with NOAA's internal and external users.

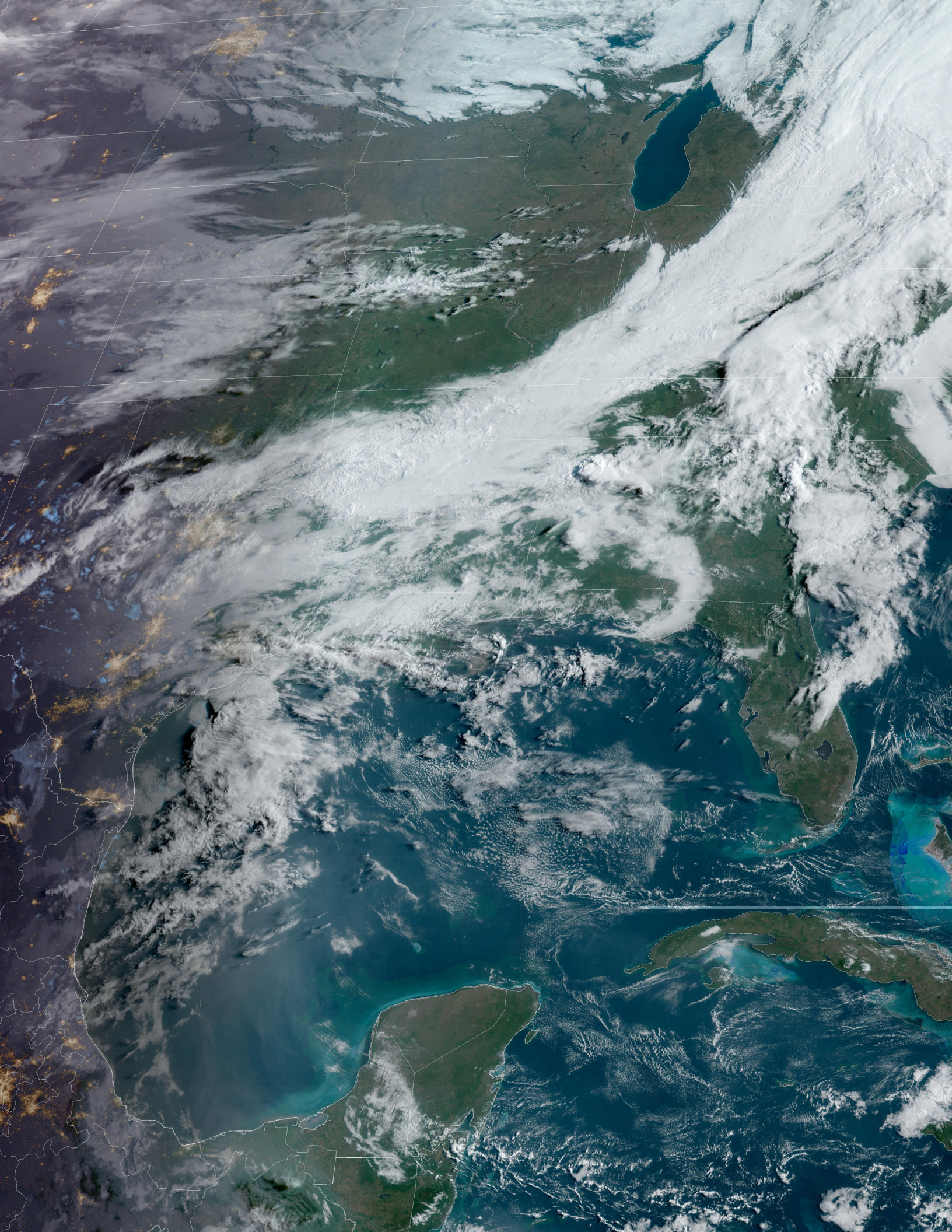
The CRN staff will create clear and measurable metrics of success for each of the below actions, and will track and report on Action Plan progress biannually. In addition to coordinating with, and participating on, the Service Delivery Team, the CRN staff will:

1. Establish a Federal Advisory Committee on Equitable Climate Services to advise NOAA on external engagement and provide feedback on NOAA's climate services;

2. Partner and coordinate across NOAA via the Service Delivery Team, and others, to regularly engage with community partners (and/or intermediaries), starting six months after the Action Plan is published; and

3. Analyze and evaluate the functioning of NOAA climate services for communities as a means to identify barriers and recommend ongoing improvements.

NOAA will revisit this Action Plan and issue a public progress report two years after its release. More information on this structure can be found in Appendix A.



Five Priorities for Advancing More Equitable Climate Services

The feedback themes identified through the RFI highlight the many ways in which NOAA's climate services have not, to date, served the diverse needs of our nation equitably. In response, this plan identifies five priority areas where NOAA will take action to make our climate services more actionable, accessible, understandable, inclusive of the socioeconomic impacts of climate change, integrated with community knowledge and needs, and capable of addressing complex hazards. NOAA will also invest in institutionalizing equity by fostering a work environment that prioritizes integration of equitable and inclusive practices into all of our climate services, from engagement to design and delivery.

The urgency of improving NOAA's climate services also stems from the rapid introduction of climate services from third parties, particularly the private sector. These providers may offer climate services that are considered more accessible, more local or more suitable for the geographical scale of need, infused with impact data, and focused on developing capacity, as compared to NOAA's services. It is important for NOAA to consider our role in the provision of trusted, scientifically-grounded climate information, as well as the role of public–private partnerships in climate service delivery, to ensure the best available climate services are produced through partnerships and with shared, open methods and clearly documented assumptions.

1

Advance Awareness and Accessibility for Users of All Disciplines and Backgrounds

For communities who are confronting the challenges of climate variability and change on a daily basis, climate services must be easy to find, understand, and use. Many of these individuals and communities do not have extensive training in climate science or the capacity to integrate disparate datasets at various spatial and temporal scales, and across multiple subject areas, to generate insights. They need ready-to-use and fit-for-purpose climate services, and they need to be able to find them.

Over 75% of the comments received through the RFI asked NOAA to do more to advance awareness and accessibility of our climate services. We heard that even when NOAA data and tools are available, they can be hard to navigate; for example, a tool may be on one page with the user guide on another, unavailable in a user's preferred language, or not in a format that is actionable for decision-making. NOAA's staff expertise should also be more accessible, whether through training, listening sessions, co-production opportunities, or community engagements. The current approach to developing climate services at NOAA is fragmented, with no shared processes for user engagement, user validation and testing, or ongoing maintenance and documentation. This has led to a vexing patchwork of services that few experts, even inside the agency, can navigate well.

To address these challenges, NOAA is working to standardize its approach to climate services. We are integrating and improving the operation of many of our most used tools and resources, while also developing more integrated starting points for discovering and accessing them. Our new model for climate services follows a "no wrong door" approach, where the interfaces between users and NOAA's climate services – whether they be websites or subject-matter experts – will be better connected to ensure that users find what they need faster, and that unmet needs are systematically documented so they can be remedied in the future. We are committed to taking a human-centered design approach with our products and services to ensure that they truly meet user needs and improve our user experience.

NOAA will also focus on building knowledge and awareness of climate services specifically for historically underserved communities to improve equitable access, thereby improving service delivery for all.

1.1. By September 2024, the Office of the Chief Information Officer's (OCIO) new Digital Engagement and Transformation Program will develop a user-friendly climate services portal on www.noaa.gov with access to NOAA's decision support data, information, science, and tools for communities preparing for climate change. The portal will host a searchable

catalog of NOAA's climate services to address the findability of existing climate services across NOAA. Additionally, guidance and training will be provided to service owners and content managers to improve some of the accessibility and usability issues of existing climate services.

1.1.1 By September 2024, OCIO will create a "no wrong door" approach to the new climate services portal by inking to and from other flagship NOAA sites, including: Weather.gov, Heat.gov, Drought.gov, Climate.gov, and the Climate Resilience Toolkit.

1.1.2 By September 2024, NOAA's Office of Performance, Risk, and Social Science will work with Forrester, an industry leader in customer experience research, to engage in interviews and user experience testing with key user groups and third-party climate services providers/designers to enhance NOAA's understanding of, and ability to meet, user needs with a focus on users without a technical science background.

1.2. By 2025, NOAA will seek additional opportunities to evaluate its climate products and services with human-centered design tools. Engagements with experts such as Lab@OPM and tools such as UserTesting/UserZoom will be deployed to conduct generative research (What should we build?), evaluative research (Are we building things correctly?), and summative research (Is the product/service working?) to improve our climate services.

1.2.1 By 2026, NOAA's flagship sites (NOAA.gov, Climate.gov, Weather.gov, Drought.gov, and Heat.gov) will undertake a unified customer experience assessment to identify three to five key historically underserved groups that rely on their information. Based on assessment findings, NOAA will develop plans to improve climate service delivery for these groups using the principles of human-centered design. Additionally, a shared framework for evaluating user engagement will be developed.

1.3. By 2026, NOAA's CRN initiative will work to assess NOAA's staff expertise and map it to our public climate service delivery interfaces to better route constituents to the correct experts to address their inquiries – advancing a "no wrong door" approach for users seeking climate services for decision-making. The CRN staff and other hazard points of contact will track inquiries and seek to meet demand for information with subject-matter expertise, identifying where new staff support is needed to serve our constituents and partners.

1.4. By 2026, NOAA's National Weather Service (NWS) will expand its current language translations to serve 10 major metropolitan, multilingual areas, and will continue to expand these capabilities by weather phenomenon, geographic location, and language to serve the ~25 million people with limited English proficiency in the United States. The NWS has already implemented Spanish translation services for weather forecast and warning products across nearly 20 NWS Weather Forecast Offices (WFOs). A limited number of these offices have deployed language translations in Simplified Chinese and Samoan. In addition, the NWS is piloting an Artificial Intelligence (AI) tool to translate weather alerts into Spanish, Simplified Chinese, Samoan, Vietnamese, and French.

1.5. By 2026, National Centers for Environmental Information (NCEI), through the IRA Industry Proving Grounds (IPG) initiative, will demonstrate substantial improvement in climate service delivery, as well as scale industry climate tools and datasets to minority-owned businesses and small businesses that may not have adequate access to climate data. These projects will rely upon and strengthen NCEI's well-established Regional Climate Service delivery network, which includes NOAA Regional Climate Services Directors, Regional Climate Centers, and state climatologists who share overlapping service areas that reach across organizations representing the needs of historically underserved communities. NCEI may also leverage expertise from federal partners like the United States Small Business Administration and the Minority Business Development Agency.

1.6. By 2026, NOAA's Education Council and NOAA Communications will increase the creation of innovative, accessible, and educational climate materials aimed at school-aged children K-12, including video series, lesson plans, visuals, and outreach to teachers and students. This could include a second season of NOAA's first cartoon series, Teek and Tom, which covers climate, weather, and ocean topics.

2

Ensure Data Equity in All Products and Services

The United States spans nine time zones, ranging from Chamorro Standard Time in Guam to Atlantic Standard Time in the U.S. Virgin Islands, as well as climates ranging from the Arctic (where temperatures can reach -80 oF), to the desert southwest, to humid tropical islands. Our nation's communities include speakers of over 350 languages, coming from diverse cultures, with needs served by varied systems of governance. This diversity in cultures and climates means that while all of our communities must be resilient to climate variability and change, the conditions they will face, as well as the appropriate approaches to manage climate risk, will vary greatly.

Many of NOAA's most popular datasets and tools do not cover all of our nation's communities. Residents of American Samoa, Guam, the Northern Mariana Islands, Puerto Rico, the U.S. Virgin Islands, Alaska, and Hawai'i frequently seek much-needed climate services, only to find that many of NOAA's offerings only cover the Continental United States (CONUS). This omission is due to systemic challenges, including limited observing system coverage in space and time; budget limitations; omissions of convenience in producing figures; and pressure to deliver products and services that meet the most common general needs rather than those serving only relatively small constituencies.

Equitable climate service delivery requires that every community has access to needed information and that no place is discounted due to size or location.

NOAA is working to improve the equity of our climate services by investing in observing systems and field campaigns to produce information outside CONUS (OCONUS). We are also exploring new methods to fill in gaps in our observations and models, including using AI and participatory science, and resetting norms within NOAA to ensure that all climate service producers recognize the importance of data equity.

2.1. By December 2024, NOAA, in collaboration with the Alaska Native Tribal Health Consortium (ANTHC), Federal Emergency Management Agency (FEMA), the Denali Commission, and the State of Alaska will support a tribally led interagency convening on a whole-of-government implementation framework to address unmet needs in Alaska's environmentally threatened communities.

2.2. By December 2024, NOAA's National Environmental Satellite, Data, and Information Service (NESDIS) will host a Science and User Engagement Workshop in Anchorage, Alaska to assess the impacts of existing satellite-derived products and services on communities and understand communities' requirements from the next generation of satellites.

2.3. By 2025, NCEI will incorporate Hawai'ian data into its routine climate

monitoring and assessment catalog, similar to those provided for CONUS and Alaska. This will provide a more useful baseline, as well as robust long-term, routinely updated records for analyzing trends and extremes in Hawai'i, while providing meaningful climate divisions which map to Hawai'i's unique regional climate drivers.

2.4. By 2025, NOAA's Office of Education will develop and publish a strategies and recommendations document focused on engaging historically underserved communities in participatory science at NOAA. This document will address NOAA's efforts to ensure participatory science data and projects are integrated into our scientific processes as well as efforts to ensure that participatory science projects organized by NOAA are advancing equitable engagement and representation in science.

2.5. By 2025, NOAA will build the RFI feedback and data equity considerations into the next iteration of NOAA's Data Strategic Action Plan to better assess coverage of climate and weather data for historically underserved and Tribal and Indigenous communities and outline achievable goals for low-capacity areas. NOAA is also co-leading the Climate Resilience focal area in the new 2025-2028 DOC Data Strategy to better ensure NOAA's climate data is useful in real-life contexts and interoperable with social, demographic, and other data domains.

2.6. By 2025, NOAA will update relevant data management directives (such as the Data Sharing Directive for Grants, Cooperative Agreements, and Contracts) to incorporate the Findable, Accessible, Interoperable, and Reusable (FAIR) and Collective Benefit, Authority to Control, Responsibility, and Ethics (CARE) Principles. These data management approaches recognize the value of Indigenous data sovereignty and governance and acknowledge the rights of Indigenous communities to define, collect, protect, manage, and apply data in a way that respects Indigenous ethics, values, and relational responsibilities. Implementation will leverage and apply the work of the NOAA Tribal Team, as described in the NOAA Guidance and Best Practices for Engaging and Incorporating Indigenous Knowledge in Decision-Making.

2.6.1 NOAA will also create an Indigenous engagement data management plan template for NOAA programs to use when engaging with Tribal and Indigenous partners.

2.7. By the end of 2025, NOAA's Office of Coastal Management (OCM) will add Alaskan communities to the Sea Level Rise Viewer as more lidar becomes available. This work builds on OCM's continued investment in expanded coverage of Digital Coast data, tools, and guidance, such as lidar and water level data as well as a pilot of the Sea Level Rise Viewer to the very first Alaskan communities. In addition, OCM will continue to expand the staff footprint physically based in Alaska and directed to work with Tribal partners to understand and address their needs.

2.8. By 2026, NOAA's Office of Marine and Aviation Operations (OMAO) Fleet Council will, in consultation with internal NOAA stakeholders, consider the RFI feedback in their operational planning for allocation of fleet and aircraft time, with a focus on addressing data gaps for OCONUS, and other regions as appropriate.

2.9. By 2026, if funded, NOAA and partners will initiate a digital inventory of Pacific Island Climate Stories and compile a list of stories and locations on noaa.gov for easy accessibility. NOAA will then identify the types of stories that currently exist, and any gaps (e.g., sector, location, etc). In addition, the NOAA Pacific Islands Climate Regional Team, a cross-NOAA line office group, will work collaboratively to create new stories that speak to the resilience of the people of the Pacific. This inventory of stories will be a resource for communities as examples of best practices and case studies when applying for climate-related funding opportunities.

2.10. By 2027, if funded, NOAA and partners will conduct an inventory of climate and weather monitoring equipment in the US Affiliated Pacific Islands, including Guam, the Commonwealth of the Northern Mariana Islands, and American Samoa, and provide a report that identifies gaps and recommendations for new high priority site locations to expand monitoring services.

2.11. By 2030, in partnership with IRA IPG, NCEI will address the need for sub-billion dollar disaster information. Working with industry partners, NCEI will determine meaningful thresholds and prototype disaster impact information at appropriate levels. This effort will include partnership with NCEI's Regional Climate Services Directors in Alaska and in the Pacific Islands to coordinate efforts on disaster information at the million or multi-million dollar level in the region.

2.12. By 2030, NCEI will pursue resourcing to expand its Regional Climate Centers to include Alaska and the Pacific Islands for additional parity between CONUS and OCONUS capabilities, better enabling equitable outcomes in those locations.

3

Meet Local Data Needs

Communities across the United States often experience climate impacts differently than their neighbors – for example, one might be prone to flooding while another, just a few miles away, may be building resilience to extreme heat impacting their residents. This local specificity of climate impacts and available response options is based on local climate conditions and geography, but also on the local governance and socioeconomic context that shape a community's, or even an individual's, capacity to adapt and respond to the impacts of climate change. These local resilience planning contexts lead to increasing demands for climate information at the local scale – for small communities, individual project sites, business locations, and even for peoples' homes.

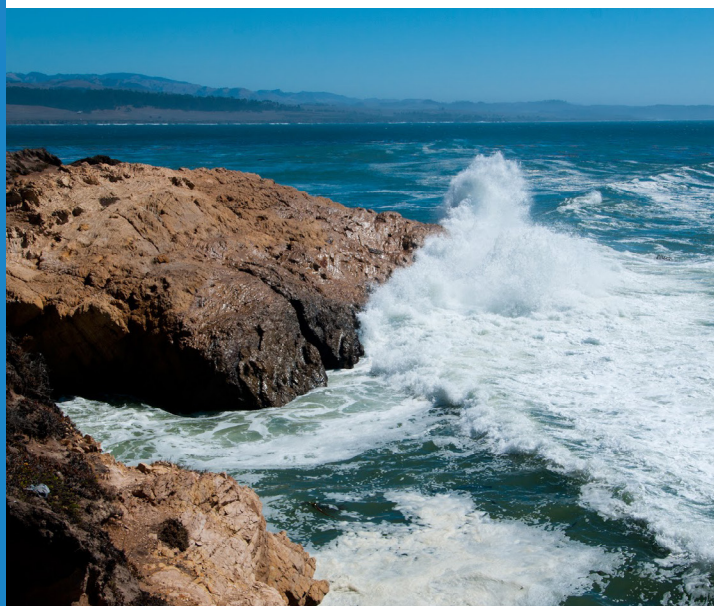
While NOAA and the broader climate research and services ecosystem are making progress in our ability to provide more granular and actionable information for local decision-making, several systemic challenges must be addressed to meet these local data needs. Even where climate data is available, obtaining or creating reliable local environmental predictions can be costly and technically complex, requiring significant capacity and expertise that puts such information out of reach for many. In addition, there is often a need for training, community engagement, extension (e.g., through Sea Grant), education, technical assistance, and co-produced research to bolster decision-makers' expertise, confidence, and capability to act.

Equitable climate service delivery means that individuals, businesses, and communities with less capital, expertise, and visibility also have access to the data and support they need to make decisions about their climate adaptation and resilience strategies.

NOAA is committed to providing foundational climate data that can be applied to support local decision-making, investing in additional technical assistance and capacity building, and working to create guidance on third-party product and service offerings. As part of this effort, NOAA will work with networks of partners, including other federal agencies, who co-produce climate services that integrate climate data with local knowledge while providing needed capacity building to build community resilience at the local level. This approach builds society's capacity and enables communities while giving NOAA experience in the delivery of climate services across diverse geographies and populations.

3.1. Across 2023-2026, NOAA will invest $12.7M in climate adaptation and resilience capacity building through the Climate Smart Communities Initiative. Also, in 2024, NOAA's Climate Ready Workforce opportunity will award between 10 to 20 grants, totalling $50M, to train and place workers in good jobs that enhance climate resilience. Each project will train at least 50 individuals, with an emphasis on benefitting historically underserved communities and individuals. Both efforts are funded by the IRA and are being coordinated to provide training to hundreds of workers and leaders who are in the best position to make decisions and take action on climate resilience.

3.2. In 2024, NOAA's Climate Resilience Regional Challenge (CRRC) will award approximately $575M to support approximately 40 collaborative projects to build regional capacity, and support planning and implementation of on-the-ground work to increase the resilience of coastal communities to extreme weather and impacts of climate change, with a focus on historically underserved communities. NOAA is also leveraging approximately $70M in IRA funding to provide technical assistance to CRRC awardees to ensure that they have the training, services, and climate information needed to plan for and implement effective resilience solutions.



3.2.1. From 2026 to 2029, NOAA will produce a series of reports providing interim assessments to date of the technical assistance delivered to CRRC awardees.

3.2.2. By 2029, NOAA will produce a draft summative evaluation of its technical assistance to CRRC awardees (with the final report by early 2030) that will include lessons learned and recommendations for how NOAA can improve our climate services to better meet the needs of historically underserved communities that are working to plan for and implement holistic solutions to reduce climate risks in communities.

3.3. By 2025, NOAA's Third Party Climate Services discussion, championed by NOAA's Chief Scientist and led by NOAA's Chief Data Officer, will result in a communications plan and a set of best practices for use when assessing non-NOAA climate services. These best practices will inform external users that are working to evaluate their use of third party products, and may also be used by private sector climate service developers to bring their products up to NOAA standards. Additionally, these practices will inform NOAA's partnerships with developers to better meet community climate resilience and adaptation needs while maintaining the integrity of the science.

3.4. By 2026, NOAA will provide a Downscaled Climate Data Consumer Reports product, which assesses several of the newest downscaled data products, to help users understand when and how to properly use these downscaled datasets to inform local decisions.

3.5. By 2026, NOAA will evaluate the climate services provided through its Cooperative Institutes, Regional Climate Centers, and other large investments (>$5M) made via grants, cooperative agreements, and contracts to ensure that they are addressing equity in local data needs where appropriate.

3.6. By 2026 and with new funding, NOAA NWS will pilot a new program called Weather Ready Communities to improve Impact-Based Decision Support Services (IDSS) in targeted community-serving organizations, such as community centers, schools, and faith-based organizations. With full appropriated funds, the NWS would scale the program to achieve two Weather Ready Communities projects per region (with six regions in total) within four years of appropriation.

3.7. By 2027, NOAA's National Marine Fisheries Service (NMFS) will complete Phase 1 of the Climate, Ecosystems and Fisheries Initiative to address the urgent need for actionable information for climate resilient marine resources and the many people and communities that depend on them. This effort provides national, regional and local decision-makers (including historically underserved communities) with robust information on expected future ocean ecosystem conditions, what's at risk, and best options to reduce impacts and increase resilience in a changing climate.

4

Expand Climate Services on Holistic Societal Impacts

Climate services are traditionally organized by scientific and operational capabilities, presented as historic or predictive information about atmospheric conditions, such as temperature or precipitation. This information has often been oriented to a relatively small, technically-savvy set of users, including state climatologists, researchers, meteorologists, emergency managers, private sector companies, and military planners.

As climate change has intensified, adapting and building resilience are increasingly relevant for every level of government, industry sector, and community to plan for a safe and prosperous future.

These climate service users need more than just physical data about climate hazards – they need a better understanding of how climate change impacts local economies, critical infrastructure, unemployment, health across different populations, migration and relocation, and other socioeconomic contexts. This new context is challenging for NOAA to address with its current structure and capacity. Progress towards addressing societal impacts, co-producing decision relevant climate services, and centering equity in stakeholder partnerships is uneven across NOAA. To ensure equity, NOAA should deliberately expand its understanding of who a climate decision-maker is and provide services that fit the needs of new partners at scale, particularly in a context where social systems inequitably distribute climate impacts where there is less capacity to respond.

To address these challenges, NOAA offices and programs are improving the decision-relevance of information and services by pairing physical climate science with socioeconomic data, co-producing knowledge and products with decision-makers, prioritizing equity and giving voice to historically underserved communities, and expanding federal partnerships. Sustained engagement with key partners, including chief resilience officers, heat officers, neighborhood resilience hubs, and community-based organizations helps NOAA improve accessibility in datasets, tailored products for specific decisions, or capacity building with professional societies and intermediaries to improve their skill at applying climate information to their sector.

4.1. By 2025, NOAA NWS will make their new, experimental CONUS-wide HeatRisk tool available to OCONUS. This tool is developed in collaboration with the Centers for Disease Control and Prevention to be directly relevant to health providers seeking to prevent heat-related illness and death. The product enables WFOs to warn of dangerous weather conditions, with special consideration of groups that may have increased sensitivity to heat exposure.

4.2. By the end of 2024, the NOAA-hosted National Integrated Heat Health Information System (NIHHIS) will establish two new Centers of Excellence focused on improving community-based local observations, as well as informing heat resilience and adaptation policy and practice with the latest scientific evidence and impact data.

4.3. By the end of 2024, NOAA will revamp the NOAA Voices | Oral History program website and elevate it to noaa.gov to increase visibility, accessibility, and navigability of this critical qualitative dataset. NOAA will also advocate for and pursue resourcing to expand the work of the NOAA Voices | Oral History program to include a broader cross-section of historically underserved communities from across the United States. Gaps in existing data will be identified using an overlay of GIS maps and climate vulnerability indices. This investment will amplify local and place-based knowledge and experiences, ensuring that they are a valued part of the NOAA climate data landscape.

4.4. Building on existing partnerships across federal agencies, including NOAA's critical role in the U.S. Global Change Research Program (USGCRP), NOAA will partner across DOC and other federal agencies to advance better integration of physical risk data with socioeconomic and impact data.

4.4.1. By August 2024, NIHHIS will partner with the Department of Housing and Urban Development (HUD) and the Department of Health and Human Services (HHS) to host Urban Heat Mapping campaigns in communities across the country and internationally.

4.4.2. By 2025, NCEI, in partnership with HUD and HHS, will add a socioeconomic overlay to NOAA's next Billion Dollar Disaster Report.

4.5. By 2026, if FY25 requested funds are received, the NWS will start to transition its Advanced Weather Interactive Processing System (AWIPS) to the Cloud, modernizing the backbone of its weather forecasting service delivery. AWIPS in the Cloud will enable NOAA products beyond weather to be disseminated out to emergency managers in communities across the country for Impact-Based Decision Support Services to state, local, Tribal, and territorial governments. Products can include information on climate, air and water quality, and environmental impacts for hazardous material and oil spills.

4.6. By 2026, NOAA's Climate Adaptation Partnerships (CAP) program will expand into the Southeast and Upper Northeast regions. With additional funding, CAP will launch two new five-year teams. CAP advances equitable adaptation through sustained regional research and community engagement.

5

Create an Enabling Environment

Historically underserved communities and Tribal and Indigenous communities do not always see themselves reflected in the organizations that seek to support them in adapting and building resilience to climate change. This can make it challenging to engage with and build trust with climate service providers that do not share similar languages, cultures, lived experiences, or forms of knowledge about climate and environmental change. In addition, organizations are not always equipped internally with the tools that they need to truly embed equity in their work and effectively enact the programs, initiatives, and culture change necessary to better support and build trust with historically underserved communities and Tribal and Indigenous communities.

Through the RFI, we heard that partnering with and supporting historically underserved and Tribal and Indigenous communities requires intentionality, trust building, and support to understand and center their needs, priorities, cultural values, and knowledge. Feedback from the RFI also reflected a common perception that NOAA is not prioritizing diversity within our workforce, which would improve the success of community engagement and relationship building as well as broaden perspectives within NOAA to identify gaps and barriers to accessible and equitable climate services.

NOAA's workforce is second to none in its commitment to informing the public about our changing environment and ensuring that our nation's communities continue to thrive in the face of climate change.

To address these challenges, NOAA's workforce must also be enabled to adapt to a changing environment – to experiment with new ways of working with a focus on co-production and equity, to be exposed to new ideas and challenges, and to grow personally and professionally to best support climate service users of all backgrounds and disciplines.

While not immediately public-facing, there are critical actions that NOAA must take internally to help the agency better embed equity in our climate services and foster an environment of innovation, compassion, and excellence. NOAA has already taken steps internally to advance this enabling environment, including:

- Making equity one of the three core goals of the NOAA 2022-2026 Strategic Plan.
- Hosting our first-ever Equity and Climate Justice Forum in February 2024 to focus on how to make equity central to every facet of NOAA's mission of science, service, and stewardship, from our strategic priorities to our daily operations.
- Releasing a strong, agency-wide Equity Commitment to foster a more inclusive and equitable agency culture, and to ensure that NOAA's work addresses historical and enduring injustice, accounts

for disproportionate climate impacts, and serves all American communities broadly and equitably.

- Publishing Guidance and Best Practices for Engaging and Incorporating Indigenous Knowledge in Decision-Making to encourage the inclusion of Indigenous Knowledge, as appropriate and to the extent practicable and permitted by law, in NOAA's science, policy, and decision-making processes. The intent of this guidance is to better facilitate consultations, fulfill federal trust responsibilities, respect treaty rights, understand environmental justice concerns, inform agency decision-making, and build partnerships with Indigenous Peoples.

- Embedding the feedback heard through the RFI in NOAA's FY2026 NOAA Strategic Research Guidance Memorandum to help advance social science research for climate service equity. This memorandum is a critical driver for NOAA's research and development agenda and provides guidelines by which this research is continually reviewed, evaluated, and rebalanced in light of NOAA's evolving mission needs and the needs of the communities NOAA serves.

- Requiring that performance plans for all federal employees include a commitment to supporting a diverse workforce and creating and maintaining an inclusive work environment by providing an enabling environment for staff to support equitable service delivery.

In addition, NOAA commits to the following actions:

5.1. Starting with the inaugural summit in 2024, NOAA will host an annual Equity & Climate Justice Summit that brings together NOAA staff and community partners to share feedback and knowledge on how NOAA can better support and engage with communities, particularly historically underserved communities and Tribal and Indigenous communities, as they prepare for and adapt to climate change.

5.2. By June 2024, NOAA will release a new *Administrative Order 216-127B on Providing for a Climate Ready Nation* that directly references the feedback received through the RFI to ensure that the feedback we heard is an integral part of CRN. The NOAA Administrative Order (NAO) includes a new CRN "value chain" graphic that emphasizes equity, different sources of knowledge, continuous engagement and evaluation, and decision support for users of all backgrounds and disciplines. In addition, the NAO includes an update to NOAA's Climate Services Inventory, requires an assessment of the accessibility of our climate services, and sets NOAA-wide expectations for new and redesigned climate services.

5.3. By June 2024, NOAA will release and publish an Equity Framework that will include interrelated components associated with organizational culture, policies, programs, and products, which will help guide both internal workforce equity and external service delivery.

5.4. By September 2024, NOAA will publish an update to the NOAA Diversity and Inclusion Strategic Plan that will be informed by the feedback received through the RFI and the equity goals laid out in the 2022-2026 NOAA Strategic Plan.

5.5. By 2025, building on the work of the NWS's Climate Services Professional Development Series and the NOAA Climate Program Office Climate 101 training for the Department of Transportation, NOAA will establish a set of internal trainings to ensure key concepts are part of the knowledge bank for every NOAA staff member. At its core, this will include background on adaptation, resilience, and equity in practice. Additional concepts for a core or supplementary training include Indigenous Knowledge, community engagement, co-production of knowledge, social science methods, and environmental/climate justice.

5.6. By 2025, NOAA will enhance its existing Service Delivery Model, first established for the NOAA Water Initiative, to explicitly incorporate equity and will embed this model in more programs and projects throughout the agency. The model will be enhanced by the inclusion of measures to evaluate progress in serving low-capacity communities and/or community-based organizations. Case studies will also be added to the updated model that formalize recommendations and lessons learned from the NOAA Climate and Equity Roundtables and highlight work with key non-federal partners.

5.7. By 2026, NOAA will make new investments in additional minority-serving foundational programs and institutions, such as Cooperative Institutes and Cooperative Science Centers. These investments will empower Cooperative Institute and Cooperative Science Center Fellows to focus on continuous engagement and co-development of data, information, and tools; improve actionable risk information; enhance access and uptake of NOAA climate information; and enable more efficient and effective use to improve equitable outcomes and deliverables.

5.8. Using lessons learned from grant funding provided through the BIL and IRA, NOAA will institutionalize equitable grant funding practices that are more accessible for historically underserved communities. This includes:

5.8.1. Increasing the diversity of grant application reviewers and include training for reviewers to help them reduce/mitigate implicit bias in the review process.

5.8.2. Providing additional application assistance for historically underserved and low-capacity communities and community-serving entities, and creating small planning grants followed by larger awards.

5.8.3. Explicitly prioritizing equity and historically underserved communities in funding announcements (e.g., the Climate Resilience Regional Challenge).

5.8.4. Creating funding opportunities focused on meeting the needs of Tribal and historically underserved communities (e.g., NMFS's Tribal and Underserved Communities Coastal Habitat Restoration and Community Resilience program and Tribal Fish Passage Program).

5.8.5. Reducing administrative barriers (e.g., no match requirements) and leveraging funding pathways that increase access to funding (e.g., NOAA is working with the Bureau of Indian Affairs to make funding available to Tribes to support investments in hatcheries that are critical to recovering subsistence species, like Pacific salmon).

5.9. NOAA's Observing Systems Council (NOSC), which serves as the principal advisory body and focal point for NOAA's observing system activities, has adopted NOAA's Service Delivery Framework and the associated guidelines and best practices as an approach for ensuring equitable climate service delivery. The NOSC will embed equity in the NOSC Terms of Reference to be consistent with efforts to review observational investments to ensure commensurate resources are applied down the value chain to deliver climate services and ensure they lead to societal benefits.

5.10. The NOAA Data Governance Committee will review and incorporate the RFI feedback on data management into the new NOAA Data Management Handbook and will evaluate updates to NOAA guidance based on the comments. The Data Governance Committee will also partner with NESDIS to invest in a formal mechanism for gathering user feedback through NOAA's first-ever digital user research platform.

5.11. By 2027, NOAA will double the number of internal and interagency detail opportunities, including LANTERNs, to cross-train and diversify our workforce.

5.12. By 2028, NOAA intends to triple the number of individuals in exchange programs, using vehicles such as the Intergovernmental Personnel Act program, to provide federal employees including applied-science postdocs with experience in private industry, NGOs, and local governments and invite those in non-federal positions to gain experience in applied-science in the federal government arena.

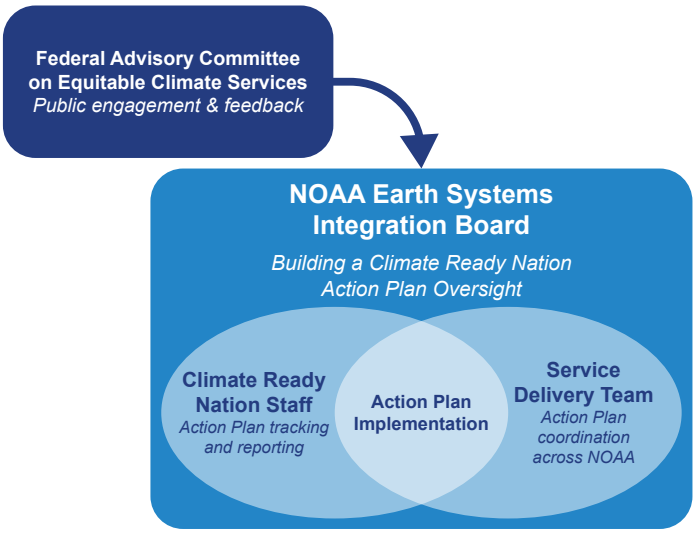
CONCLUSION

NOAA is committed to embedding equity considerations across the agency and creating stronger partnerships that enable and support all communities, regardless of capacity, as they prepare for and adapt to climate change. NOAA will continue to take significant actions based on the feedback and input received as part of this RFI, which will result in continuous improvement of NOAA's work and enhance our ability to better serve our nation's communities and advance equitable climate service delivery for all.

Please reach out to climate.input@noaa.gov with any questions.

Appendix A: Accountability and Measuring Success

Internal and external structures are critical to advancing implementation of the Action Plan and institutionalizing these changes. To this end, NOAA is creating the following accountability structure:



NOAA's Earth Systems Integration Board (ESIB), made up of and led by career NOAA leadership including Assistant Administrators, will serve as the governing body for the Action Plan. The ESIB ensures alignment and coordination of NOAA's efforts to build a Climate Ready Nation by establishing NOAA as a primary, federal authoritative provider of climate services in the whole-of-government response to tackling the climate crisis. In addition, the ESIB is responsible for coordinating and implementing NOAA's integrated climate services while ensuring equitable service delivery for the public good – two efforts for which the Action Plan is crucial. The ESIB will provide strategic guidance and oversight of Action Plan implementation and serve as the leadership champions for actions overseen by their respective line offices. The ESIB will also engage at a high level with the Federal Advisory Committee (FAC) on Equitable Climate Services.

NOAA's CRN staff is responsible for leading our Climate Ready Nation initiative to build a resilient nation, prepared for climate change. This Action Plan is central to this goal. To this end, the CRN staff will manage accountability and implementation of the Action Plan in coordination with NOAA's Service Delivery Team, a chartered subcommittee of the ESIB that is composed of user engagement and service delivery experts from across the agency. The CRN staff will be responsible for the following efforts to implement the Action Plan:

1. Establish a Federal Advisory Committee on Equitable Climate Service Delivery to advise NOAA on external engagement and provide additional accountability to NOAA's climate services;
2. Partner and coordinate across NOAA via the Service Delivery Team and others to regularly engage with community partners (and/or intermediaries), starting six months after the Action Plan is published;
3. Create metrics and deadlines for action completion;
4. Track metrics and completion of actions;
5. Report biannually to the ESIB on Action Plan implementation; and
6. Analyze and evaluate the functioning of NOAA climate services for communities as a means to identify barriers and recommend ongoing improvements.

As the Service Delivery Team serves as a forum for ensuring the coordination, communication, and collaboration across NOAA's line staff offices and supports their service delivery (internal and external to NOAA), this Team will coordinate with and advise the CRN staff in implementing the Action Plan. This enables NOAA to advance and provide equitable service delivery for the public good. To support the coordination and implementation of this Action Plan, the Service Delivery Team will:

1. Coordinate with and advise the staff from Climate Ready Nation on Action Plan implementation and tracking;

2. Serve as the cross-NOAA coordination team for Action Plan implementation, ensuring connections to the ESIB and its structure;

3. Share expertise on the user landscape and user engagement internal and external to NOAA, across geographies, hazards, and sectors;

4. Identify core players and partners, existing teams and synergies in NOAA, and overlaps and gaps across NOAA programs; and

5. Champion the engagement of historically underserved communities in the design and delivery of NOAA's climate services.

To ensure public engagement and a feedback loop that allows NOAA to adapt to and address changing climate service user needs, NOAA is committing to the creation of a new FAC that will:

1. Give feedback to NOAA on Action Plan implementation and related issues on a biannual basis;

2. Provide insights and reporting on climate service user needs, particularly for historically underserved and Tribal and Indigenous communities; and

3. Help NOAA engage with climate service users of all backgrounds and disciplines to provide continuous feedback to improve the meaningful societal impact of NOAA's climate services.

NOAA will report out to the FAC and to the public on our progress, including regular engagements with the communities we aim to better serve and a public progress report two years after the Action Plan release.

Appendix B: NOAA Resources Advancing Equitable Climate Services

There are many offices, programs, and initiatives within NOAA that are already being responsive to the feedback we heard through the RFI, including the cross-agency Climate and Equity Pilots that inspired this RFI. While this section is by no means comprehensive, below are several core examples, categorized by feedback theme, that highlight the ways in which NOAA is lifting up equitable climate services.

NOAA's Climate and Equity Pilot Projects

NOAA strives to increase its climate service delivery, community engagement resources, and knowledge sharing to fight environmental injustice and protect lives and livelihoods. In collaboration with partners in historically underserved communities that are disproportionately impacted by extreme weather and climate events, NOAA is implementing Climate and Equity Pilot Projects to develop tailored, place-based climate adaptation strategies that will enhance resilience to climate hazards. The pilots help NOAA to address needs and gaps as identified through the NOAA Regional Collaboration Climate and Equity Roundtables and respond directly to feedback received from partners during these discussions. Below are some of the examples of how these pilot projects are making a difference in the regions:

- In the Pacific Islands, NOAA and partners are working on the development and analysis of climate data to co-produce products that help the Native Hawai'ian homestead community of Pana'ewa understand how climate change could affect their Polynesian-Agroforestry efforts. The goal of this pilot project is to blend traditional knowledge with western science associated with planting and agroforestry to understand the effects of climate change, foster community resilience, and provide food security.

- In the North Atlantic region, the pilot project explored innovative ways to engage communities and improved risk communication. In collaboration with the Medical Society Consortium on Climate and Health, the team is providing resources to the thirteen physicians of color from the Climate Health Equity Fellowship, a program that trains doctors of color to address climate change impacts in historically underserved communities and become leaders in climate and health equity education, advocacy, and policy solutions.

- In Alaska, NOAA partnered with the Alaska Native Tribal Health Consortium (ANTHC) to create a framework that better connects NOAA climate-related resources to Tribal needs. The team supported the ANTHC's publication of the *Unmet Needs of Alaska's Environmentally Threatened Communities Assessment and Recommendations* Report outlining funding needs, priorities, and recommendations to support Alaska Native communities. They will continue improving "the effectiveness of federal and state government support for Alaska

communities to address climate and environmental threats," such as flood, erosion, and permafrost hazards.

- The pilot project in the Gulf of Mexico region enhances NOAA's relationships with the Pointe-au-Chien Indian Tribe in Southeast Louisiana by supporting the Tribe's specific needs with regard to information, products, and services, and ensuring that the community's most critical needs from NOAA are met. The pilot demonstrates how to build connections between resilience, traditional knowledge, culture, and language, and informs how NOAA interacts with similar communities in the future.

- In collaboration with the Cooperative Institute for Research to Operations in Hydrology through the University of Minnesota, the pilot project in the Central region is focused on better understanding the flow patterns of the upper Mississippi River to provide data on how the river will likely respond to changing climate conditions. The pilot also focuses on developing customized community engagement strategies that allow NOAA and partners to collaboratively build long-term, respectful partnerships and relationships with historically underserved communities. Overall, this work is intended to improve the understanding, interpretation, and use of these forecasts and hydrological data products and services to improve preparedness and resilience.

- The Great Lakes region partnered with the Southeast Michigan Council of Governments to develop methods for integrating equity into planning decisions and to make transportation systems in historically disadvantaged communities more resilient to flooding impacts from climate change. Currently, connections are being developed with research partners who can represent community perspectives and priorities.

- The Southeast and Caribbean and West Regional Collaboration Teams worked on a joint pilot project that sought to enhance understanding of local-scale extreme heat impacts and improve heat awareness communication and intervention across agencies and organizations in four municipalities: Charleston, South Carolina; Miami, Florida; Las Vegas, Nevada; and Phoenix, Arizona. The teams engaged local communities to collect heat data in some localities using sensors, and leveraged data from the National Integrated Heat Health Information System Urban Heat Mapping Campaign. This pilot will continue cross-locality collaboration and work closely with partners to implement recommendations that come out of this project.

1. Prioritize user access, application, and needs

Translating critical climate information and resources

NOAA NCEI has produced the Spanish version of the Fifth National Climate Assessment (NCA), which was translated by the U.S. Agency for International Development. This version of the NCA enhances access for our nation's Spanish-speaking communities. The NCA is the Federal Government's preeminent report on climate change impacts, risks, and responses. It is a Congressionally mandated interagency effort that provides the scientific foundation to inform decision-making across the United States. In addition to language translation, the NCA emphasized accessibility for readers with vision and some cognitive barriers to accessibility.

Advancing inclusive digital engagement

To address the challenges of navigating and accessing NOAA's climate services, the Office of the Chief Information Officer (OCIO) is using funding from the IRA to invest in a more accessible digital experience. This includes reviewing NOAA's websites to ensure content is easy to read, understandable, and actionable for a broad audience; identifying content requiring equitable language updates and multilingual language support; and conducting a phrase search
of NOAA websites to better define primary, authoritative sources on climate resilience and adaptation for users of all backgrounds and disciplines.

Revamping NOAA's flagship websites for accessibility and ease of understanding

In partnership with Forrester, NOAA has also recently explored opportunities to redesign the U.S. Climate Resilience Toolkit to be more accessible, understandable, and actionable for a broad set of users. The Climate Resilience Toolkit is a website designed to help people find and use tools, information, and subject matter expertise to build climate resilience. The Toolkit offers information from across the U.S. federal government in one, easy-to-use location. The website allows users to filter by tool function, region, and topic, and provides case studies for how toolkit information has been used successfully.

Investing in intentional user engagement

Through the new User Engagement and Needs Assessment branch in NESDIS, NOAA has established an interagency agreement with the Lab@OPM, a government center for human-centered design, to co-lead a pilot project to map out the future of NOAA's wildland fire and smoke services. The User Engagement and Needs Assessment branch also established the first-ever internal platform at NOAA for conducting usability testing and other kinds of customer research. This platform allows NESDIS to remotely test prototype products and services with their intended audiences and helps locate potential testers by a variety of demographic data.

Increasing access to real-time data and observations from our oceans

NOAA OMAO continuously collects data through research platforms that traverse the

world's oceans. A core set of sensors exist on all of NOAA's ships that continuously measure foundational data such as sea surface temperature, salinity, air temperature, humidity, barometric pressure, and wind speed and direction. These measurements are used for everything from weather forecasting and prediction models to long-term ecosystem monitoring. Over the next year, OMAO is integrating and deploying the Cruise Observations Real-time Interface and Open Live Information eXchange (CORIOLIX) to provide real-time access to data products on the ship and on shore. Users will have the ability to visualize and interact with the data, making it a valuable tool for community engagement and decision-making.

2. Support decision-making at local scales

Including OCONUS in all National Weather Service products

Not all NWS products have historically included locations beyond the Contiguous U.S. (or Lower 48) boundary. In 2023, the Alaska Region, Pacific Region, and Southern Region partnered to create a requirement that all future NWS products include Alaska, Puerto Rico, and the Pacific Islands. This initiative is crucial for supporting historically underserved communities and enabling NOAA to provide equitable service to all those living within U.S. territory.

Providing high-resolution coastal land cover data

NOAA is continuing to develop value-added datasets to address regional and local needs. NOAA's Digital Coast has made available new, high-resolution land cover data, used to document key geographic and landscape features covering the Earth's surface, for coastal communities across the country. This new data can be used to improve planning for sea level rise, protect communities from flooding, inform wetland restoration projects, and enable other activities to build climate resilience. As part of this new data product, NOAA acquired vector datasets for the three Pacific Territories and the U.S. Virgin Islands, which contain editable GIS layers that separate roads, individual buildings, pavement, and railways. The territory islands are remote and home to a majority Indigenous population for each territorial area, and often lack complete census data, with some locations even lacking established address systems. These datasets can be used as a foundation for creating modern address systems, which can help these communities with coastal emergency management, population data, and 911 emergency services. Local leaders have requested this data for decades, but the acquisition cost has been prohibitive. Funding provided through the BIL, along with public–private partnerships, have allowed NOAA to fulfill this request.

Empowering the public to address heat inequities in urban communities

During the 2023 summer, NOAA harnessed the power of the public and scientists to map the hottest parts of 18 communities in 14 states across the U.S. and in Santiago, Chile. Identifying these hotspots, called "urban heat islands," helps local decision-makers take actions to reduce the health impacts of extreme heat, which disproportionately

affect low-income populations and people of color. Local partners in each participating city led community volunteers through their neighborhoods in the morning, afternoon, and evening on one of the hottest days of the year with heat sensors mounted on their own cars and bikes. The sensors recorded temperature, humidity, time, and the volunteers' location every second to build heat island maps that help inform equitable cooling solutions for the participating communities. Cities from past campaigns have already put their heat island maps to use, implementing tree planting strategies, informing the public of where to find transit shelters for cooling relief, and making heat action plans. Urban Heat Island Mapping Campaign data are open access and available on the federal website Heat.gov.

Los Angeles County uses flood risk findings to address inequities and better manage stormwater

NOAA supported impactful research on flood risks and inequities in Los Angeles, CA, leading to the county's prompt action to improve planning for flood mitigation systems. The study examined a more comprehensive range of flood risk factors than ever before, quantifying the magnitude of flood risk and characterization of populations impacted within a 100-year flood zone in Los Angeles. The study found that between 197,000 and 874,000 people and between $36 and $108 billion in property value would be exposed to more than 12 inches of flooding within the 100-year flood zone. Risks were disproportionately higher for historically underserved communities, reinforcing socioeconomic inequities. Six weeks after the study was published, the Los Angeles County Board of Supervisors referenced the study's findings in a motion to assess and address inequities in its stormwater infrastructure and system, which was immediately and unanimously adopted. This research is a testament to the power of open science and NOAA's efforts to help transparently and equitably reduce flood risks, save lives, and protect property.

Understanding the relationship between climate and the marine environment in Alaska

The Ecosystems and Fisheries-Oceanography Coordinated Investigations (EcoFOCI) program is a unique cross-NOAA collaboration between NOAA Research Pacific Marine Environmental Lab and NOAA Fisheries' Alaska Fisheries Science Center. EcoFOCI is designed to understand the dynamic relationships between climate, fisheries, and the marine environment to ensure sustainability of Alaskan living marine resources and healthy ecosystems. Field measurements are primarily collected aboard NOAA vessels such as the Oscar Dyson. EcoFOCI provides foundational research to improve scientific understanding and provide guidance for resource managers on climate adaptation and resource management strategies in Alaska. The program communicates with a broad and diverse set of stakeholders and audiences in marine science, including researchers, Native communities, policy and resource management, teachers and students, and the interested public, primarily focused on Alaska. EcoFOCI personnel also serve as mentors for masters and Ph.D. students and other student interns (Hollings and EPP, for example) who work with data collected by the EcoFOCI program and spend time on NOAA vessels.

3. Identify connections between climate change and socioeconomic impacts

Diversifying NOAA's data sources through oral histories

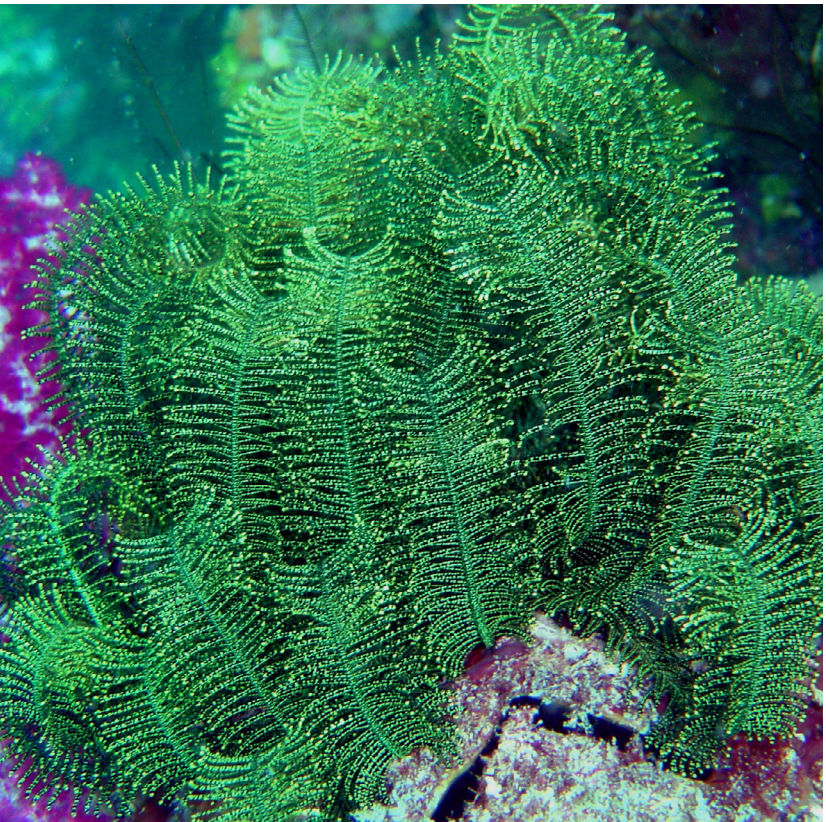
NOAA is investing in diversifying our data sources, because inclusion of social science, socioeconomic, and behavioral data are essential to identifying how climate change is impacting communities and the appropriate ways to create and implement solutions. The NOAA Voices project is an open access, qualitative data archive of oral histories that informs, educates, and furnishes primary data for NOAA staff, researchers, educators, communicators, and others seeking access to immersive and contextualized information on the human experience and the dynamics of environmental change. By engaging with local voices, we not only see a broader picture of ecosystem changes over time but also the differences between scientists and local approaches to management in practice and in understanding environments and descriptive languages.

Supporting businesses and jobs in inundated areas

Over the past decade, there have been several efforts to assess the potential negative economic impacts of inundation on a local area or region. Much of this work was conducted by consulting firms and required purchases of proprietary geolocational data, creating inequities for coastal communities

Collecting socioeconomic data through the National Coral Reef Monitoring Program

The National Coral Reef Monitoring Program conducts regular socioeconomic surveys of residents in Florida, the U.S. Virgin Islands, Puerto Rico, Hawai'i, Guam, American Samoa, and the Northern Mariana Islands. These surveys collect socioeconomic data, such as the importance of coral reefs to human health, food systems, and coastal protection, as well as residents' beliefs about how severe of a threat climate change is to maintaining those benefits. This information indicates how residents depend on coral reefs and their overall perceptions of risk to climate change and associated impacts, such as ocean acidification or coral bleaching. Currently in the second socioeconomic monitoring cycle, the survey data are starting to inform how perceptions are changing over time. In general, results suggest that climate change is becoming more recognized as an issue for residents near coral reefs.



Inclusive updates to the Billion Dollar Disaster Report

NESDIS, through NCEI, produces the Billion Dollar Weather and Climate Disaster product. This product tracks real costs of extreme weather and climate events including drought, flooding, freeze, severe storms, tropical cyclones, wildfires, and winter storms. Recent improvements to the Billion Dollar Disaster product have included the addition of Census information and Socioeconomic Vulnerability Indices. This expansion of the Billion Dollar Disaster Report allows for a better understanding of the impact of major events, especially on those communities with less ability to recover, improving response efforts in these areas.

4. Include meaningful community engagement and technical assistance

NOAA Climate Resilience Regional Challenge application technical assistance

Many communities require assistance with writing and developing funding proposals, budgets, and submitting applications for federal grants. This is especially true for small rural communities and those that have been historically marginalized, underserved, or underrepresented. Many of these communities desperately need funding for building resilience yet often lack the capacity to apply. Assistance is needed to support getting over the initial application hurdle, as well as capacity-building support so they can successfully administer the awards and associated funds. However, it is against federal regulations for representatives of federal agencies to develop budgets, write proposals, and/or submit applications on behalf of any applicant. To support applicants to the NOAA CRRC, NOAA entered into a contract with a third party to provide application development support services. These services were made available to all applicants by request throughout the competition period. Demand for application technical assistance was also high, and an evaluation of the technical assistance provided is being planned at the conclusion of the competition.

Assisting the Native Village of Shishmaref on climate risk assessment

NOAA's Office for Coastal Management (OCM) takes a regional approach to technical assistance, which allows staff to marry NOAA's national products and services with community scale needs. A key component of ensuring NOAA reaches communities is through developing long-term relationships with local partners, understanding local needs holistically, and taking a flexible approach to determining how to meet needs. This approach is critical to working with Alaska Native villages, including a collaboration between OCM and the Native Village of Shishmaref (NVS). The NOAA OCM Alaska Regional Geospatial Coordinator works directly with NVS staff to evaluate contracted assessments of flooding, erosion, and sea level rise and incorporate risk assessment results into community planning. The work with NVS has also led to developing engineering guidance for all Alaska Native villages on coastal flooding and erosion risk assessments with considerations unique to rural Alaska. Involvement in these projects ensures that NOAA's authoritative climate data and services are used consistently for community scale projects, and that western science and Indigenous Knowledge can continue to contribute to data-driven decision-making and help communities adapt to what lies ahead.

Communicating changing sea ice conditions in Alaska

The National Weather Service - Alaska Region has begun a project to improve communication of seasonal to subseasonal guidance information for sea ice and freshwater ice evolution to historically

underserved Alaska communities. Changing sea ice conditions represent a major climate-related environmental risk for coastal communities in Alaska, impacting subsistence, transportation, and search and rescue. We engage regional hub communities (e.g., Kotzebue and Utquiagvik) to develop a deeper understanding of community-level decision contexts, preferences, and priorities. The focus of this project is to improve the format and delivery of information on sea and freshwater ice to Alaska communities in a way that is accessible and understandable, so that these communities can better plan future activities. The first-year focus of this project is to gain a better understanding of how Alaska communities make travel decisions based upon ice conditions, their informational needs, and the best pathways and means to communicate this information. For year two, pending funding, information from year one will be used to develop and/or improve tools and methods of communicating information with these communities.

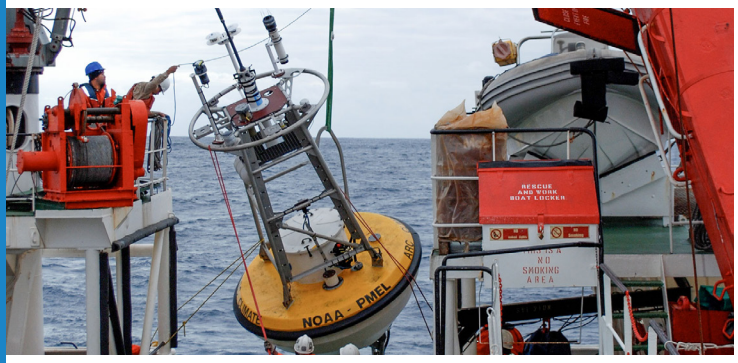
Creating a feedback loop with historically underserved communities

The National Weather Service's Central Region Headquarters has overseen several initiatives for Central Region field offices over the last three years to improve awareness, outreach, and engagement for local climate services. They include developing an inventory of historically underserved climate-focused partners and groups at the local and regional levels; leveraging this inventory to aid local offices in increasing and improving engagement and sharing of climate information; completing a needs assessment for improved local climate services; and developing a plan for better leveraging climate subject-matter experts (within and outside of the NWS) to communicate climate information. Additionally, several local climate services leads have shared success stories of their local climate services to various partners via NWS employee webinars, climate services training programs, and other informational resources.

Investing in participatory science in historically underserved communities

NOAA's National Weather Service Eastern Region has recognized the need for continued and better monitoring of climate observations in the region and has trained staff on recruitment for citizen science observers for its Cooperative Observer Program. This has helped to better recruit in data-sparse areas and highlighted best practices to get observers in historically underserved communities to enhance community engagement and awareness. In New York City, for example, a new weather station was set up in Lower Manhattan as part of the cooperative observer network to enhance climate monitoring and community engagement and increase access to data. In December 2023, NWS recognized three sites in the greater New York City area – in New York City, New York, Hudson County, New Jersey, and in Passaic County, New Jersey – that are providing volunteer long-term climate observations. Recognition of these sites helped publicly spotlight their role in tracking climate in their community, citizen involvement, and the continued intentional engagement of NWS in these communities.

5. Support historically underserved, Tribal, and Indigenous communities



Training a Climate Ready Workforce

Through a new IRA-funded grant competition and technical assistance called Climate Ready Workforce, NOAA is awarding $50M to meet the emerging and existing needs of employers while helping workers find good jobs that enhance climate resilience. The workforce training will focus on climate resilience concepts, principles, techniques, and implementation. The program emphasizes training that benefits historically underserved communities.

Equity and environmental justice for fishery communities

The National Marine Fisheries Service (NMFS) recently released an Equity and Environmental Justice (EEJ) Strategy to ensure the services they provide – making fisheries sustainable and productive, providing safe seafood, conserving protected resources, and maintaining healthy ecosystems – are available to everyone so that no community is underserved. NMFS Regional Offices created engagement plans and are now preparing Office and Regional EEJ Implementation Plans tailored to the needs of the historically underserved communities they serve. These plans will include metrics describing EEJ actions, and progress will be publicly reported annually.

Backyard Buoys: A promising practice for interagency collaboration on equitable climate service delivery

Climate change is creating a more unpredictable ocean by influencing waves, sea level, temperature, and other factors, profoundly impacting remote coastal communities. The Backyard Buoys project, funded through the National Science Foundation's Convergence Accelerator program and implemented by a NOAA-Integrated Ocean Observing System partnership, seeks to get oceanographic data into the hands of Indigenous communities in a way that takes advantage of existing lower cost wave buoy technology and enables sustained community-led stewardship of the buoys. Through co-design, the team aims to provide new tools and new connections that will provide critical safety information at a locally relevant scale. This project is making significant progress in collaboration with Indigenous communities to deploy buoys and prototype information delivery tools. Thanks to additional IRA funding, NOAA will assess lessons learned and provide recommendations and support to other partners interested in similar community-based monitoring and information sharing projects.

NOAA aircraft support of the NWS snow survey project assisting remote Alaskan communities

Many remote Alaskan Tribal communities are adversely impacted by spring snowmelt and associated flooding. The forecasting of these floods can be challenging, as many of these communities are only reachable by small aircraft and on-site snow cover survey measurements are incredibly difficult and time-consuming. In 2022, thanks to the extended range of the new NOAA King Air N67RF, NOAA OMAO was able to complete 100% of requests from the local Alaskan River Forecasting Centers. In 2023, after additional OMAO real-time river monitoring successes, a local elder in Bethel, Alaska, sent a message to the forecasters, thanking the flight crews for their support: “We can’t prevent the flooding, but your efforts help us communicate to Alaskans the flood threat and provide them with information so that they can protect lives and property.” Another Native community in Buckland, Alaska, is prone to ice jams and river breakup flooding with no on-site snow measurement or observation capabilities. After major flooding in 2021 and 2022, the River Forecasting Center requested OMAO aircraft to aid in the monitoring of the snowpack in this region. With the addition of the new King Air 350CER and its extended range fuel tanks, OMAO was able to reach this region and meet the Tribe’s needs.

Improving weather forecasts and storm response with uncrewed aircraft systems

NOAA is building a Weather Ready Nation by providing better weather and climate information to protect life and property. Multiple NWS WFOs have been funded by the OMAO UxS Operations Center to develop uncrewed aircraft systems to provide better weather information to rural and Tribal communities. For example, the Louisville WFO flew an uncrewed aircraft to survey damage from tornado outbreaks in central and southern Kentucky during late 2021 and early 2022. By using an uncrewed aircraft, the Louisville WFO was able to survey remote and heavily wooded regions that are inaccessible on foot and perform damage surveys safely and efficiently. In 2023, the Tulsa WFO and their academic partners, Oklahoma State University, Virginia Tech, and Ronin Institute, were funded for two years to operationalize the use of small uncrewed aircraft systems to improve weather forecasting and situational awareness. The team intends to collaborate with the Choctaw and Osage Nations of Oklahoma to identify and enhance NWS tools for communities. These uncrewed aircraft systems enable more individuals across often unsurveyed areas to benefit from accurate and timely data.

6. Prioritize NOAA's workforce diversity

Investing in education through NOAA's Physical Science Laboratory

The NOAA Physical Science Laboratory's research cruises often include ship tours for students, teachers, professors, and local diplomats. These educational "open-houses" on the NOAA or University-National Oceanographic Laboratory System ships happen every three to five years, usually in smaller countries across the tropical Atlantic, Pacific, and Indian Oceans. In these locations (rural Taiwan, Philippines, and Barbados, most recently), the visiting K-12 schools and universities need capacity building and network connections among professors and NOAA scientists. Students also need more access to high-quality science and technology education, as well as hands-on learning experiences in the oceanic and atmospheric sciences. NOAA helps run these open houses with an eye toward relationship-building with our in-country partners. NOAA research cruises also often include a student intern, most recently an EPP/MSI Ph.D. student intern who came from a Minority Serving Institution. He remarked that taking on responsibility for the research cruise, which took place on the NOAA Sette Ship, was the highlight of his research internship and made him feel confident and prepared to be a NOAA employee.

Advancing diversity, equity, inclusion, and accessibility for NOAA's workforce

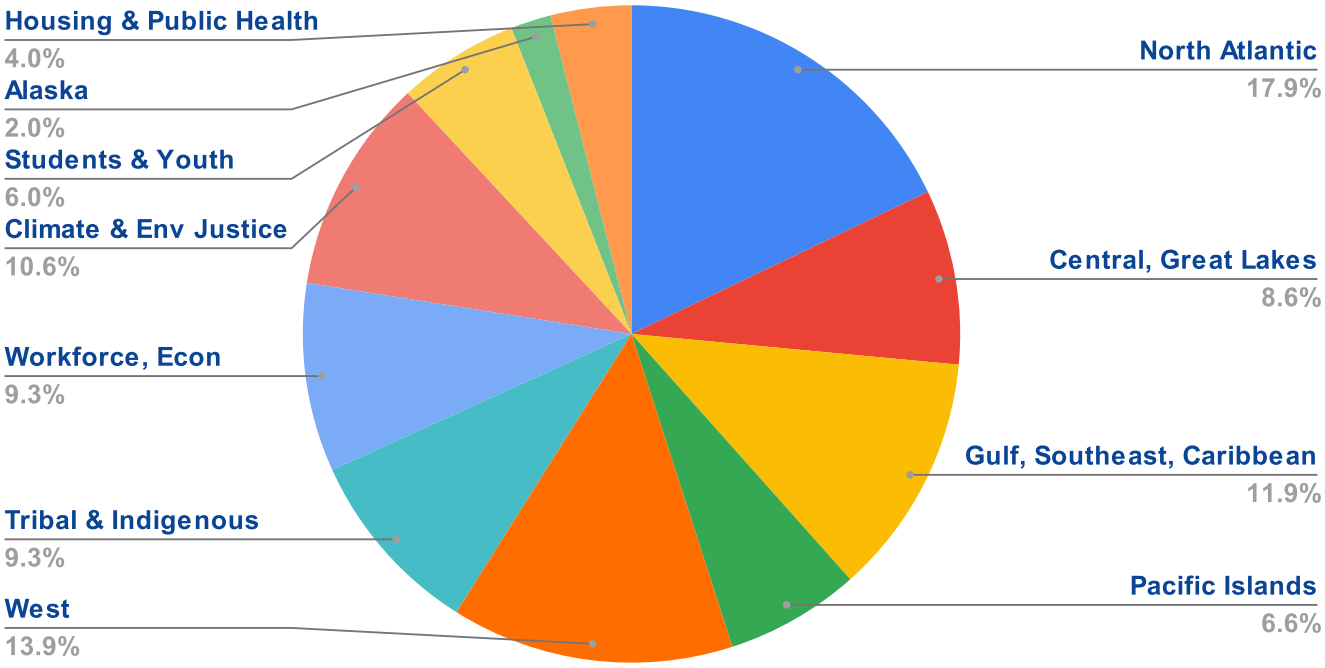
The NOAA Office of Human Capital Services (OHCS) and the NOAA Office of Inclusion and Civil Rights (OICR) work in tandem to advance inclusive recruitment and hiring practices and to elevate the need for robust equal employment opportunity, diversity, and inclusion programs that meet the needs of our federal employees, contracted staff, prospective employees, and partners. OHCS has developed a Strategic Recruitment and Outreach Plan, targeting NOAA's engagement and recruitment initiatives, in alignment with the principles of diversity, equity, inclusion, and accessibility. OHCS has also worked with NOAA's internal Veterans Employee Resource Group on career development workshops; led virtual career events for students, veterans, and individuals with disabilities; and participated in the White House Historically Black Colleges and Universities Recruitment Event. OICR works across NOAA to encourage the use of diverse hiring panels to ensure that NOAA's workforce reflects the diversity of our nation, per Executive Orders (EO) 13985 and EO 14035. In addition, OICR has eight sponsorships and partnership agreements with minority-serving organizations, including, but not limited to, Black Engineer of the Year, Federal Asian Pacific American Council, and the Hispanic Association of Colleges and Universities.

Appendix C: Summary of RFI Comments

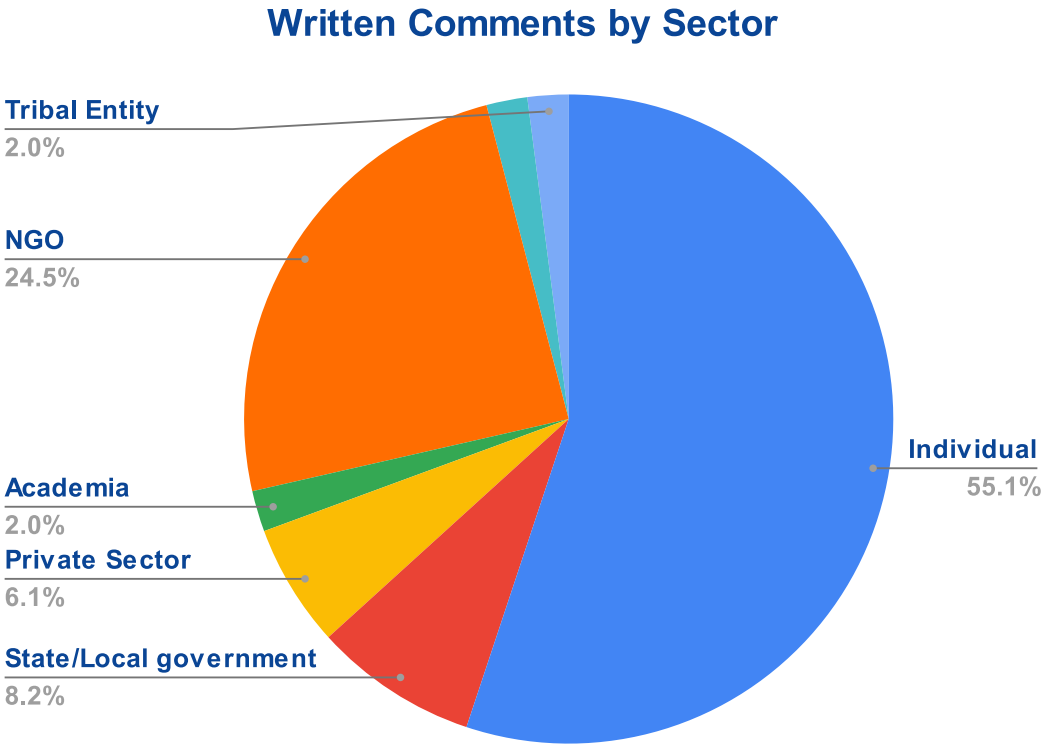
The RFI asked a series of questions across three focal areas: 1) Enhancing Accessibility of NOAA Climate Services; 2) Capacity Building, Education, and Technical Assistance; and 3) Community Outreach, Engagement, and Co-Production of Climate Services.
During the 90-day comment period, NOAA accepted written and recorded comments in English and Spanish via email and through the Federal Register.

During the comment period, NOAA also hosted 13 listening sessions across regions and sectors to gather comments in real time from users of all disciplines and backgrounds, particularly those that NOAA may not engage with on a regular basis. With over 170 attendees from across the country, the RFI listening sessions facilitated the collection of a diverse array of feedback, including from Tribal and Indigenous communities, climate and environmental justice communities, housing and public health, workforce and economic development, and students and youth.

Listening Session Attendees



In addition to the feedback received through the 13 listening sessions, NOAA received 48 written comments, over half of which were from individuals and non-governmental organizations. Other written comments came from state and local government agencies, the private sector, academia, elected officials, and Tribal entities.



NOAA identified six recurring high-level themes that were emphasized by respondents across all three focal areas of the RFI.

1. Prioritize user access, application, and needs

Comments emphasized that NOAA climate services include many useful tools and data, but that the accessibility and usability of those tools could be improved with more easily navigable directories and guidance to support users in identifying which to use, for what purpose, and how to apply them. The comments also highlighted that different users have different information needs depending on their goals and background and that NOAA's climate services could be improved by keeping the user needs in mind and allowing more flexibility in the way that users interact with NOAA. Comments also included general suggestions for improving NOAA's data management, interoperability, and access.

2. Support decision-making at hyper-local scales

Comments about the scale of climate services focused on gaps in data availability and the challenges of capacity and lack of resources available to make data usable. These comments highlighted spatial gaps in data that perpetuate inequities, especially in rural Alaska and island territories, as well as temporal gaps in projections and forecasts. Comments also emphasized that, where data is available, downscaling global data to meet regional and local needs requires significant capacity such as time, funding, and expertise. Other challenges of scale mentioned included compounding factors, such as a mismatch between political boundaries and climate vulnerability, population density, and historical inequities.

3. Identify connections between climate change and socioeconomic impacts

Comments included a strong signal that climate service users would benefit from NOAA more explicitly communicating and facilitating the connections between climate risks and human vulnerabilities. These comments largely focused on a request for data integration between physical data and socioeconomic data to facilitate understanding of climate impacts on specific communities. Specific sectors and demographics that were mentioned repeatedly included: health, insurance, agriculture, infants, children, pregnant people, aging populations, unhoused populations, and migration or relocation.

4. Include meaningful community engagement and technical assistance

When asked about how NOAA can support capacity building in communities a majority of the comments centered on lowering the barrier to access through direct engagement with NOAA through outreach, technical assistance, workforce development, and partnership to provide actionable decision support to communities adapting to climate change. Comments also highlighted the importance of engaging with trusted partners in communities and the need for more effective utilization of the numerous existing capacities that NOAA has to support communities and deliver climate services.

5. Support historically underserved, Tribal, and Indigenous communities

Comments received emphasized that partnering with and supporting historically underserved and Tribal or Indigenous communities requires intentionality, trust building, and support. The comments included recommendations for more accessible formats, in-person engagement with NOAA staff, connecting with existing organizations and efforts so as not to increase burdens on communities, investing in relationship building and co-production, including providing compensation for time and expertise, and working to understand and center the needs, priorities, cultural values, and knowledge of the communities.

6. Prioritize NOAA's workforce diversity

Connected with recommendations for providing more equitable climate services was a common perception that NOAA is not prioritizing diversity within our own workforce. These comments highlight that having a diverse workforce could improve the success of community engagement and relationship building as well as broaden perspectives within the agency to help identify gaps and barriers to accessible and equitable climate services.
The written and verbal feedback received through the RFI amounted to over 1300 ideas shared about the needs and priorities of climate service users as well as the successes and areas for improvement in embedding equity in NOAA's climate service delivery. All written comments are publicly available on regulations.gov.

Appendix D: Relevant Documents and Acronyms

The RFI and subsequent Action Plan have been built on years of work across NOAA and federal agencies. Below is a non-comprehensive list of documents that the RFI and Action Plan have built upon and reference.

- A Federal Framework and Action Plan for Climate Services
- A Model of Service Delivery for the NOAA Water Initiative: A Proven Method for Integrating Decision Support and Service Delivery
- Alaska Native Tribal Health Consortium Unmet Needs Report
- Building a Climate Ready Nation: NOAA FY22-26 Strategic Plan
- December 2021 Executive Order on Transforming Federal Customer Experience and Service Delivery to Rebuild Trust in Government
- NOAA Equity Commitment
- NOAA Service Equity Assessments Final Report
- Opportunities for Expanding and Improving Climate Information and Services for the Public
- The Fifth National Climate Assessment
- U.S. Department of Commerce Learning Agenda 2022-2026

Acronym	Definition
AI	Artificial Intelligence
ANTHC	Alaska Native Tribal Health Consortium
AWIPS	Advanced Weather Interactive Processing System
BIL	Bipartisan Infrastructure Law
CAP	Climate Adaptation Partnerships
CONUS	Continental United States
CORIOLIX	Cruise Observations Real-time Interface and Open Live Information eXchange
CRN	Climate Ready Nation
CRRC	Climate Resilience Regional Challenge
DOC	Department of Commerce

Acronym	Definition
EcoFOCI	Ecosystems and Fisheries-Oceanography Coordinated Investigations
EEJ	Equity and Environmental Justice
ESIB	Earth Systems Integration Board
FAC	Federal Advisory Committee on Equitable Climate Service Delivery
FEMA	Federal Emergency Management Agency
HHS	Department of Health and Human Services
HUD	Department of Housing and Urban Development
IDSS	Impact-Based Decision Support Services
IPG	Industry Proving Grounds
IRA	Inflation Reduction Act
NAO	NOAA Administrative Order
NCA	National Climate Assessment
NCEI	National Centers for Environmental Information
NESDIS	National Environmental Satellite, Data, and Information Service
NIHHIS	National Integrated Heat Health Information System
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NOSC	NOAA Observing Systems Council
NVS	Native Village of Shishmaref
NWS	National Weather Service
OCIO	Office of the Chief Information Officer
OCM	Office for Coastal Management
OCONUS	Outside Continental United States
OHCS	Office of Human Capital Services
OICR	Office of Inclusion and Civil Rights
OMAO	Office of Marine and Aviation Operations
RFI	Request for Information
USGCRP	U.S. Global Change Research Program
WFO	Weather Forecast Office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Equitable Climate Services Action Plan

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