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National Oceanic and Atmospheric Administration (NOAA)
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Comment in response to Request for Information on Equitable Delivery of Climate Services
(Docket No. 2307014-0168)

Introduction:

Thank you for the opportunity to submit comments on this important matter. As researchers, advocates, and data scientists dedicated to fighting for climate and environmental justice, our organizations are keen to bolster and utilize NOAA's numerous efforts and resources in this space—including those that will eventually be incorporated into NOAA's forthcoming FY22-26 Action Plan. We believe that building and utilizing NOAA's considerable resources and expertise moving forward is crucial to empowering and protecting the many communities increasingly impacted by flooding, toxic waste, wildfires, drought, and heat—all challenges we know to be compounded by the climate crisis. The recommendations and comments below are intended to advance those efforts, and in our view, they align to NOAA's goals enumerated in the 7/20/2023 RFI. These include:

- Making NOAA's climate services more accessible, understandable, usable, inclusive of the social and economic impacts of climate change—and capable of addressing complex hazards
- Building capacity and support for users of all disciplines and backgrounds, particularly historically underserved communities and Tribal communities, by expanding science and data literacy and successfully applying climate services to science-based decisions about climate risk and resilience

In the sections below, we have responded to the questions most relevant for our work and the missions of our respective organizations.¹

¹ Sections and subsections throughout this comment correspond to those presented in the original RFI.

A. Enhancing Accessibility of NOAA Climate Services

Use of Climate Services

1. When and why do you seek information about climate and the environment? What are your priorities when looking for this information, and what do you want to do with the information you are seeking?

Our work involves the use of scientific information to support addressing what communities can already see with their own eyes—serious and recurring flooding and other climate impacts. We use this scientific information to support grant applications, tools, initiatives, and strategies to address these problems across a growing set of key stakeholders and communities.

In terms of our data-focused work, EPIC specializes in innovative data-driven approaches, and uses NOAA data for a variety of purposes. Whether it's accessing weather station data to better understand changes in climate over time, or using sea-level rise data to prioritize support for at-risk communities, NOAA's data services are a key building block in our work. Our priorities and recommendations for improved data access are as follows, and reflect [FAIR data principles](#):

1. The data should be easily Findable: Searching for the right dataset can be time consuming and tedious. With multiple platforms and websites, finding specific NOAA data resources can sometimes be a challenge—and not all sites are created equal. [NOAA OneStop](#) makes this process fairly easy, allowing for robust searches across datasets, time, and space. In addition, interactive mapping features and robust documentation found on the [National Centers for Environmental Information](#) helps users identify what datasets are relevant to their use case and how to access them. Both user interfaces are attractive, logical, and easy to use. While these sites are likely used by data practitioners, NOAA's general public websites for the [National Weather Service](#) and [NOAA.gov](#) only have a Google Search, lacking filters found in NOAA's more data-oriented services. While these sites are not dedicated to data, there's lots of information beyond daily weather forecasts. Lastly, expanding on—and improving—cross-platform integration (e.g., linking past weather data resources through Climate.gov in Weather.gov) would help step users move forward from general curiosity to data access in as few clicks as possible. Overall, we applaud NOAA's effort to reveal data—and urge the further prioritization and development of enhanced search features and interoperability across NOAA platforms.

2. The data should be Accessible: Accessible data can mean many things across audiences—but in our view, it primarily speaks to one best practice: making it easy for users to pull and import data into existing workflows. Being able to download data from Google or AWS, or to query it through an API—or even, to access weather data through NOAA's new [rnoaa](#) R package, for instance—are all great avenues for meeting data practitioners “where they are” in terms of accessibility. Moreover, allowing for multiple entry-points to the same data is a great approach to empowering users of different skill levels to ingest data with little to no friction.

3. The data should be Interoperable. *Interoperability* refers generally to the ability to combine one datasource with another—but doing so often requires robust documentation and support services. Overall, NOAA data is well documented, but in some instances it's not immediately available. More specifically: weather data provided through the [Climate Data Online](#) portal lacks metadata and only offers a .CSV file containing the data. Without metadata, analysts are left wondering: *Is precipitation measured in metric or standard units?* And while the metadata can be found elsewhere online, it would be helpful to include a readme.txt file containing *all relevant metadata for all datasets* accessed through NOAA. While this an exception to NOAA's standards, historical weather data is likely a frequently required data product in this context.

4. The data should be Reusable. Reusable data pertains not only to the ability to reuse data across time and uses, but also, robust metadata, APIs, and overall documentation resources. NOAA's approach to reveal data through a variety of access points dramatically reduces the barriers to entry. Furthermore, platforms like [Climate.gov](#) enhance usability by providing resources like data galleries, teaching toolkits, and narratives to enhance understanding and increase the likelihood of data being reused in forecasted and unforeseen contexts.

2. What data, information, science, and tools (“climate services”) do you use to make decisions about your risk from climate-related natural hazards (e.g., drought, heat waves, wildfires, floods, intense precipitation, extreme weather) and your preparedness, resilience, and adaptation planning and actions?

We have used a variety of platforms in the course of our work, not all of which have necessarily been NOAA-designed—including, for example, [FEMA's National Risk Index](#) (primarily to address flooding). We also use platforms such as [EJ Screen](#) to highlight disparities between underserved communities and more privileged communities. Indeed, there are so many different relevant platforms to date that it can be overwhelming for users to even consider which platform to use and for which purpose. We appreciate that NOAA has a dedicated [webpage](#) that currently displays 82 tools. It might be helpful to add, at minimum, a one-line description for each tool explaining their common usage.

Moreover, we've also noticed that data is missing from some of the more remote geographic areas of the United States. For instance, Coastal Flood Exposure Mapper does not work for the state of Alaska. The failure of Alaska's legislature to authorize participation in the Coastal Zone Management Program should not leave Alaska's coastal Native Villages without a good way to see flood exposure. It is also particularly frustrating that some tools (e.g., EJ Screen) leave out the U.S. territories altogether, since these are some of the most underserved and flood-prone parts of the United States.

Access/Accessibility

4. What obstacles or challenges have you faced in accessing NOAA climate services for decision-making around climate preparedness, adaptation, and resilience in your community?

Those of us fortunate enough to have functioning internet service have no problem getting climate service tools to appear on our screens. Many across the communities that stand to benefit from NOAA's services are not so fortunate—some do not have computers (or only have mobile phones), lack stable internet, and often work exclusively using their cell phones. For these folks, it could be helpful to have “lite” or mobile application versions of key platforms. These tools may not be as colorful or robust as their counterparts, but in our view, the information could readily be made readable on a mobile phone.

Still, for some the digital divide is simply too great. Some villages in Alaska, for instance, do not have stable internet or cell phone service at all. In such situations, it would be great to have a toll-free number to call whereby a user could request key information to be sent to them by mail.

Understanding

6. What obstacles or challenges have you faced in understanding NOAA climate services for decision-making around climate preparedness, adaptation, and resilience in your community?

Not everyone is familiar with the terminology utilized on platforms or the significance of percentiles. For all platforms, it might be helpful to have a glossary defining terms and giving concrete, straightforward examples. For instance, a glossary might explain that if a community is in the “94th percentile for flood risk,” it is more flood-prone than 94% of the other communities included in that platform.

Barriers/Opportunities for Improvement

9. Does NOAA provide climate resilience science, data, tools, and/or information that is relevant to you and in your preferred language? How has this impacted your climate preparedness and resilience planning?

One of the partners we've worked with in the past found that it was difficult to obtain information on NO₂ pollution from many platforms—but that they were able to obtain this information via NASA satellite information. It would be helpful to have a platform wherein one can enter an address and see flood insurance rate percentiles, as well as the history of floods and claims that were submitted to NFIP for the property. The Community Rating System tool available to localities should also be publicly accessible.

10. Does NOAA provide climate services that are relevant to your needs and at a scale that is useful in your decision-making around climate preparedness and resilience? Please explain your answer.

Often communities would like to get data about their particular neighborhood, but are not able to do so. Information is typically available by census data tract, yet neighborhoods span census data tract boundaries and/or share tracts with other neighborhoods. Indeed, some environmental justice communities are not able to demonstrate their low-income status because they share a

census data tract with wealthier neighbors. Tools that allow for drawing a boundary around a particular area of interest (such as EJ Screen or Model My Watershed) can surely help address this problem.

11. What climate services (science, data, tools, and/or information) would you like to have about the socioeconomic impacts of climate, such as on housing, the economy, food security, workforce, migration, etc.?

a. What would you like to be able to do with these data, tools, and/or information?

Some communities and neighborhoods we work with are considering relocation due to extreme climate change impacts. For those communities that wish to relocate together (community-driven relocation), it would be helpful to have a tool that could account for different aspects of habitability or uninhabitability, according to criteria determined *by the community*. For instance, a new tool might contain layers showing vulnerability to flooding in terms of elevation and past flood events; median costs of housing; schools, or other factors that a community might consider as they determine where they would like to live.

b. How can socioeconomic impacts of climate change be better integrated into the climate services NOAA provides?

NOAA is likely the nation's single greatest agency for public data generation. As the impacts of climate change increase in frequency and severity, the need for combining NOAA's data with other data sources will surely grow. And while data scientists will continue to develop their capacity for integrating these datasets on their own, *we believe it's vital that NOAA consider delivering climate data that is already situated alongside other data sources, in addition to providing retrospective climate data*. For example, consider this scenario: for an urban area experiencing an intense rain event, what areas of commerce might be impacted by flooding? Further, for the same area, we might ask how precipitation has changed—i.e., can we analyze historical averages alongside daily high and low forecast data on Weather.gov?

Putting climate data together with economic data can help individuals and political decision-makers with decisions such as whether and when to relocate. For example, if property values are decreasing in areas that are repeatedly flooding, then it may encourage municipal governments to invest more infrastructure in less flood-prone places (i.e., where they can reap the benefits of higher property taxes). This is an important consideration given that fears of lost property tax revenue often stymie municipal governments' efforts to facilitate community-driven relocation.

At a higher level, climate change will continue to affect entire regions and countries; forcing migrations and displacements and putting agriculture at risk—among other challenges that are difficult to address at the hyper-local scale. Providing climate data along with insights on how those changes will impact norms and processes like planting and harvest times, monsoon seasons, etc., will be incredibly useful for large-scale efforts to mitigate climate change impacts. NOAA is uniquely positioned to find, develop, share, and deliver insights from such data.

B. Capacity Building, Education, and Technical Assistance

1. Do you have capacity in your organization or community to use NOAA climate data, information, science, and tools (“climate services”) in preparedness, adaptation, and resilience planning? Please explain your answer—what additional capacity or resources would be helpful and why?

We do have capacity—in a variety of contexts—to use NOAA climate services, especially around data-driven mitigation or preparedness planning. However, many of the partner organizations operating in this space (many of whom we collaborate with across initiatives, tools, and advocacy efforts) have no full-time employees and rely on volunteers that may not have a background in climate or data science, technology, or even use of online platforms. Hence, we believe that in addition to data- or tool-based services, “live,” interactive e-learning sessions convened by NOAA could be useful—especially if they cater to learners who come with different knowledge levels (including those who have never used a computer platform).

5. How can NOAA climate services be better used to advance climate and environmental justice and prioritize underserved communities?

NOAA could ensure that it coordinates with those who are already assisting underserved communities through grant-writing and other measures. For example, NOAA could coordinate with the EPA’s new Environmental Justice Thriving Communities Technical Assistance Centers Program to ensure those working across Centers understand NOAA’s tools and can assist communities in using them. In addition, we see continuing—and bolstering—partnerships with agencies and offices working on environmental justice tools (e.g., CEQ, FEMA, EPA, DOE, and DOT) as crucial. For example, a key metric missing from many of these tools is the likelihood of intense heat events and, more broadly, changes in the frequency of watches, warnings, advisories, etc. (something much of the public is acutely aware of). By providing this data around past occurrences developers and users might be better able to see or use predicted changes in tools developed by other agencies. Lastly, NOAA data could help prioritize community investment efforts linked to the Justice40 Initiative, in effect meaningfully delivering benefits to the communities most at risk of increased climate impacts.

C. Community Outreach, Engagement, and Co-Production of Climate Services

3. Are there partnerships that have enhanced your access to or understanding of climate change and/or potential preparedness, adaptation, and resilience solutions? Are there partnerships NOAA should invest in to enhance and sustain community access and understanding? Please explain your answer.

NOAA could establish a program where devices (e.g., tablets/iPads) are provided to schools and organizations, who in turn provide the devices to individuals in underserved communities. The devices would have prepaid data plans that allow access to online databases or offline versions of databases. In this scenario, there would be a curriculum that each individual issued a device would

complete to learn how to use the services; and upon completion, the individual would get to keep the device.

4. How can NOAA more meaningfully integrate your organization or community, including individuals with lived expertise, in the co-production of climate services?

We welcome the opportunity to partner with NOAA in many aspects, from hosting webinars to demonstrating the utility of climate tools, to enlisting NOAA representatives and officers as partners in grant applications for funding to underserved communities. NOAA-affiliated Sea Grant offices, for instance, have been particularly helpful in this endeavor. These offices can serve as a bridge to connect academia and federal agencies with communities that stand the most to benefit from improved services and more robust resources.

5. How can Indigenous Knowledge, local, place-based knowledge, and other ways of knowing be included meaningfully into the climate services that NOAA provides, particularly for climate preparedness, adaptation, and resilience?

Perhaps the best way to bridge local community and Indigenous knowledge with “Western scientific” knowledge is to ensure that Indigenous and local knowledge holders are employed in some capacity with NOAA’s various climate program offices.

Conclusion:

NOAA’s team of scientists have invested millions of dollars and thousands of hours to establish extensive databases on every dimension of climate. What may be missing are: (1) ways to effectively connect end-users with this data, particularly when end-users are in underserved communities with limited access or training opportunities; and (2) ways to meaningfully compile this data with other data—particularly data related to economic and social issues—such that individuals and communities can make better-informed decisions.

These comments have suggested ways to bridge the gaps between underserved communities and the agencies and scientists that hold and maintain data. We have also emphasized the importance of *co-producing* knowledge using not only so-called “Western” or “hard” science approaches, but also social sciences and traditional, local, and Indigenous knowledge. The more opportunities that NOAA scientists take to proactively seek out input from diverse stakeholders, the more robust and useful its data will be. As we have underscored, it is that task—to seek out, improve, maintain, and provide meaningful access to this data—that will be decisive in NOAA’s [efforts](#) to “ support the needs of our nation’s communities as they prepare for the impacts of climate change.”

Thank you for your time—and we are eager to answer any questions you may have on these comments and this subject.

Sincerely,

Gabe Watson, Christopher Putney, and Barrett Ristroph