To: State broadband offices
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Date: July 21, 2023

Subject: Climate Resilience Memo

The following memo contains updated information on how state and territory broadband offices can address the climate risk assessment and mitigation requirements in the Broadband Equity, Access, and Deployment (BEAD) Program and promote increased disaster resilience in critical telecommunications infrastructure.

Incorporating Climate Resilience in State Broadband Programs

This memo outlines the climate resiliency requirements for the Broadband Equity, Access, and Deployment (BEAD) Program, details the strategies states can use to deploy resilient broadband infrastructure, and provides resources that states should be aware of in their planning efforts.

Key takeaways:
- As a requirement of the BEAD Program, states and territory broadband offices must assess how disaster risks will affect broadband networks and develop mitigation strategies to address them.
- Existing data on past and future disaster risk can be layered over state broadband availability maps to determine where more resilient infrastructure investments are needed.
- When designing their BEAD programs, state and territory broadband offices should coordinate with other relevant state agencies to develop comprehensive mitigation strategies.
- Resiliency should also be considered within the scoring process, with flexibility to allow for higher component costs and higher construction costs when required.
- Stand-alone investments to upgrade existing networks in at-risk areas may also be needed.

Summary

The risk of damage by extreme weather events must be considered in any infrastructure project. For internet infrastructure, outages during a disaster can severely affect emergency response operations, disable critical infrastructure, and endanger individuals. Measuring disaster risk should account for the rate and severity of past incidences and forecasting for the future likelihood of disruptive events. According to the National Oceanic and Atmospheric Administration (NOAA), the United States has sustained 357 individual weather and climate disasters since 1980 where the overall cost of the damage has exceeded $1 billion. However, smaller-scale hazards also pose risk to internet infrastructure. Regardless of size, flooding, wildfires, hurricanes, hail, tornados, severe storms, and heat waves all have the potential to disrupt and damage communication networks. As a result of climate change, each of these types of disasters are increasing in both frequency and severity.

For broadband networks, resilience to these disasters is traditionally measured across several facets of the design and operation of the network, including hardened features to withstand specific disasters

(e.g., buried lines or reinforced towers) and mitigation elements such as redundant systems (e.g., backup power supply, additional network capacity, and overlapping delivery systems). These investments may result in future cost savings: Research from Pew has found that every mitigation dollar spent can save an average of $6 in post-disaster recovery costs.

The BEAD Program rules require states and territories to "demonstrate that they have sufficiently accounted for current and future weather- and climate-related risks to new infrastructure projects." Accordingly, state and territory broadband offices must identify high-risk areas and potential climate threats and detail how these risks can be mitigated over the life of a BEAD-funded network.

Fortunately, state broadband offices are not starting from square one. A variety of federal resources, including detailed assessment of current and future risk, are available for state broadband offices. Summaries of each state's climate assessment are available from the National Oceanic and Atmospheric Administration (NOAA). The Federal Emergency Management Agency's (FEMA's) National Risk Index identifies individual disaster risks in each census tract. The Infrastructure Security Division within the Cybersecurity and Infrastructure Security Agency (CISA) provides "infrastructure analysis and resilience services" to state and local leaders around areas of critical infrastructure, including telecommunications, through regional offices and an "extreme weather working group." Further, past and ongoing state efforts in other agencies to develop mitigation and resilience plans can be leveraged for broadband planning.

Incorporating these resources into each state and territory's BEAD planning and using them to develop mitigation strategies for networks their programs fund will help ensure that critical communications infrastructure in vulnerable communities can withstand a future of increasingly frequent and severe disasters.

State Mitigation Resources

Cooperation between states and the interagency level, local level, and amongst state partners has been important for states crafting climate resiliency plans. State broadband offices should look for these existing resources while drafting their plans. North Carolina, for example, tasked its North Carolina Institute for Climate Studies, an interinstitutional research institute housed at North Carolina State University, with creating the North Carolina Climate Science Report. The report provided a scientific assessment of historic climate trends and potential future impacts of climate change to inform the development of the state's Climate Risk Assessment and Resilience Plan.

California's Climate Adaptation Strategy was created by long-term interagency cooperation. Since 2009, California has been providing an update to its strategy every three years. The most recent update in 2022 brought together key elements from sector-specific plans including the Natural and Working Lands Climate Smart Strategy, the Wildfire and Forest Resilience Action Plan, the Climate Action Plan for Transportation Infrastructure, and the Water Resilience Portfolio. The interagency process for developing the state's climate resiliency plan has taken into account more than 150 climate adaptation actions laid out in existing state plans and strategies.

Existing centralized state resources, such as a chief resilience officer, can support the state broadband office. Sixteen states currently have chief resilience officers:

- California
- Colorado
- Florida
- Louisiana
- Maryland
- New Jersey
- New Mexico
- North Carolina
- Oregon
- Rhode Island
- South Carolina
- Virginia
- Washington
- West Virginia
- Wisconsin
- Wyoming

Available Federal Mapping Resources

FEMA's National Risk Index is a dataset and online tool that provides a scaled risk assessment that shows communities most at risk for 18 different types of hazards. This interactive tool offers a baseline risk measurement for every census tract.

NOAA's Disaster Cost and Frequency Map can be used to see local risks and vulnerabilities to various natural disasters and can assist states in predicting the future cost of natural disasters based on the frequency of past billion-dollar disasters. The interactive map includes data on drought, flooding, freeze, severe storm, tropical cyclone, wildfire, and winter storm risk at both the state and county level. The Climate Risk and Resilience Portal (ClimRR) was developed by the Center for Climate Resilience and Decision Science at Argonne National Laboratory in collaboration with AT&T and FEMA. This mapping tool provides more than 100 different climate visualizations. The Local Summary Tool includes a snapshot of climate projections at any given point on the map, allowing states to conduct a more in-depth risk assessment. The goals of ClimRR include both providing technical audiences with access to leading climate datasets as well as enabling nontechnical decision-makers to conduct climate-risk informed analyses.

Climate Mapping for Resilience and Adaptation is an integrated mapping tool that pulls information from across the federal government to help people consider their local exposure to climate-related hazards. It includes real-time mapping of where people may be actively exposed to hazards, including active wildfires, drought, inland flooding, coastal flooding, and extreme heat.

The Council on Environmental Quality's Climate and Economic Justice Screening Tool is designed to help states target Justice40-related programs, which provide funding to communities that are marginalized, underserved, and overburdened by pollution. Data is shown at the census tract level, and a census tract is considered burdened if it is at or above the threshold for one or more environmental, climate, or other burdens, or if it is at or above the threshold for an associated socioeconomic burden. Census tracts that are surrounded by disadvantaged communities and have a high proportion of low-income households are also considered burdened. Tracked burdens include climate change, energy, health, housing, legacy pollution, transportation, water and wastewater, and waste management criteria.

Federal Funding Resources

Beyond the federal funding for broadband deployment, additional federal funding is available to increase the resilience of critical infrastructure. Ongoing state investments through these programs should be coordinated with and leveraged. Several key programs to consider are:

- FEMA's Hazard Mitigation Assistance grants provide funding for eligible mitigation measures that reduce disaster losses. State, local, tribal, and territorial governments are eligible to apply for funding. Programs include:

- o [Building Resilient Infrastructure and Communities](#)
- o [Flood Mitigation Assistance](#)
- o [Hazard Mitigation Grant Program](#)
- o [Hazard Mitigation Grant Program Post Fire](#)
- o [Pre-Disaster Mitigation Grant Program](#)
- o [Safeguarding Tomorrow Revolving Loan Fund Program](#)

- The Department of Energy [Grid Resilience State/Tribal Formula Grant Program](#) provides funding to states, territories, and Tribal lands over five years to assist them in modernizing their power grids against wildfires, extreme weather, and natural disasters. States, territories, and Tribes distribute funds to individual projects, with priority given to projects that will increase clean, affordable, and reliable energy.

- Department of Transportation [PROTECT grants](#) provide funding for surface transportation resilience to hazards including climate change, sea-level rise, flooding, extreme weather events, and other natural disasters. This program includes both planning grants and competitive resilience improvement grants. States, metropolitan planning organizations, local governments, special purpose districts or public authorities with a transportation function, Tribal governments, and federal land management agencies (when applying jointly with states) are eligible to apply for a combined $1.4 billion annually available until 2026.

- Department of Housing and Urban Development Community Development Block Grants includes two subprograms for climate resilience:
  - o [CDBG Mitigation Program (CDBG-MIT)](#) can be used in areas affected by recent disasters to carry out mitigation strategies to reduce future losses.
  - o [CDBG Disaster Recovery (CDBG-DR)](#) are special appropriations in the event of a major disaster that can provide funds to the most impacted areas for disaster relief, long-term recovery, restoration of infrastructure, housing, and economic revitalization.

Strategies for State Broadband Offices

As state and territory broadband offices craft BEAD programs and overall strive to increase the resiliency of network infrastructure, they should consider the following strategies:

Inventory and incorporate existing state and federal resources: Existing state resources, such as those that may be available from a state's chief resilience office, department of transportation, or department of emergency management, along with the available federal resources listed above, such as FEMA's National Risk Index, will be vital tools for state broadband offices. These resources identifying disaster risk should be layered overtop each state and territory's map of broadband serviceable locations.

Local university partners with resources dedicated to studying disasters and mitigation strategies may also be key partners for state efforts. The National Hazards Center maintains a list of university-based [hazard and disaster research centers](#) across the country.

Incentivize mitigation investments for projects in at-risk areas: Once the disaster risks of a proposed project have been identified, state broadband offices must consider how those disaster risks can be mitigated by alternative network design decisions.

Based on the resilience needs of each state and territory, the broadband office can incentivize mitigation practices and directly award grant funds to increase the resilience of proposed networks. Mitigation investments in power and network redundancy and in higher construction standards may be needed depending on the specific project and the specific area's disaster risk. Grant-scoring systems should be designed to allow for additional cost-per-passing for mitigation-designated investments, such as increased underground deployment in a wildfire- or hurricane-risk area, without lowering the proposal's overall score.

Depending on the scope of risk and available funding, stand-alone programs specifically targeted to increase the resilience of at-risk areas through upgrades to existing networks should also be considered.

Develop monitoring and assessment tools: Data collection efforts by the broadband office or another relevant agency to track the performance of networks during future disasters and identifying causes for any disruption will further inform how state programs should be adjusted to respond to where mitigation investments will have the greatest impact and which strategies prove most effective. Historically, federal investments in mitigation provide a [$6 benefit](#) of each $1 invested. States and territories should track the BEAD-funded mitigation strategies to not only demonstrate cost effectiveness but to improve future decisions.

Additional Resources

Consulting experts in the field of climate mitigation and resilience, emergency management, and communication network design can further help inform state strategies. National organizations such as the [Georgetown Climate Center](#), the [American Flood Coalition](#), and the [National Emergency Management Association](#) may also have relevant resources and information for state officials. For more information specifically on flooding, the most common and most costly type of disaster in the U.S., visit Pew's former [flood-prepared communities](#) project.

For additional information, contact Pew for access to past BETI memos on [Broadband Network Disaster Resilience](#) and on [State Broadband and Transportation Coordination Efforts](#).