



**Coastal Resilience and Hazard  
Mitigation in the Pacific Islands:  
Coordinating efforts to support hazard  
mitigation project implementation**





**The Coastal States Organization (CSO) represents the nation’s coastal states, territories, and commonwealths on ocean, coastal, and Great Lakes issues.**

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# 1 Executive Summary

The U.S. Pacific Islands consist of the State of Hawaii and the Commonwealth of Northern Mariana Islands, Guam, American Samoa territories and they face a unique set of challenges related to accessing federal resources to adapt to and mitigate coastal hazards. The Coastal States Organization (CSO) is collaborating with federal, state, territory, and local agencies in the Pacific Islands to support improved coordination and collaboration to achieve regional coastal hazard mitigation priorities. The goal of this effort is to identify opportunities for identifying and connecting federal hazard mitigation resources with state and territory Coastal Zone Management (CZM) programs to address coastal hazard mitigation needs.

To initiate this work, CSO conducted a series of interviews with CZM Program staff and key local partners and hosted a listening session to gather information about challenges and opportunities for federal and state/territory coordination on coastal hazards in the Pacific Islands. These discussions indicated a disconnect between federal hazard mitigation planning, funding mechanisms, and on-the-ground implementation of coastal hazard mitigation projects. Five priority areas of existing challenges and potential solutions were identified. The priority areas include: (1) Nature-Based Solutions (NBS) / Green Infrastructure, (2) Community Floodplain Management, (3) Adapting Existing Structures/Infrastructure, (4) Identifying and Filling Data Gaps, and (5) Hazard Mitigation Planning.

In addition to each of the five priority areas, we identified several overarching challenges and associated recommendations to increase federal engagement to help the Pacific Islands and territories better access federal resources, programs, and contacts across geographies and build capacity to leverage federal technical assistance and funding.

1. The Pacific Islands are not located close geographically to federal offices, and this elevates challenges for accessing consistent on the ground federal resources and support. Geographical barriers include limited flight access to the islands (further limited due to the COVID-19 pandemic), time zone differences (e.g. Guam and CNMI are 14-15 hours ahead of Washington, DC), lengthy travel to and from the jurisdictions. Pacific Island CZM programs value in-person federal support, but it is difficult to travel to the jurisdictions for a limited amount of time.
2. Pacific Island jurisdictions lack the staff capacity to fully leverage all federal resources related to coastal resilience and hazard mitigation. With the lack of capacity and frequent staff turnover, it is harder to maintain working relationships with external partners and transfer institutional knowledge.
3. Pacific Island jurisdictions lack capacity and capabilities to consistently submit competitive projects for grant programs. There is an abundance of data products, tools, and resources that are available to support Federal programs. However,

some lack access to these resources because local officials are limited in their capacity to identify all relevant data/tools and unreliable networks on the islands cause difficulties with accessing the data.

4. There is a lack of funding to meet the nonfederal match requirements for hazard mitigation funding sources. Pacific Island territories are small programs with limited budgets and are challenged with determining match for funding opportunities. Since Hawai'i is a state, there are additional challenges faced since there is not as much flexibility with match waivers as there is for the other Pacific Island jurisdictions.
5. Pacific Island jurisdictions are interested in more cross-institutional knowledge exchange of hazard mitigation strategies and best practices.

Based on the information gathered through the listening session and informational interviews, CSO has developed a set of broad recommendations to help address common challenges within each priority area. These recommendations include the following:

1. **Nature-Based Solutions:** Evaluate the current status of where CZM programs and USACE/FEMA stand in terms of prioritizing NBS over hardened infrastructure. If there is an impasse, CSO will work with Federal partners to determine what information, case studies, or other rationale is needed to further prioritize predominantly nature-based infrastructure projects with higher administration.
2. **Community Floodplain Management:** CSO will work with USACE, NOAA, and FEMA to identify all relevant communities of practice in the Pacific region and determine all current efforts to develop resources aimed at navigating the Community Rating System and NFIP. Additionally, FEMA will share its new website with best practices to address community floodplain management.
3. **Adapting Existing Structures/Infrastructure:** CSO will increase outreach from the national and regional level down to the individual CZM programs to increase understanding of technical assistance programs with USACE and FEMA. Additionally, FEMA will further promote their pre-qualified memos.
4. **Identifying and Filling Data Gaps:** CSO will follow up with NOAA OCM to determine how each Pacific Islands jurisdiction can best use Federal data, including SLR and disaster prevention data, to support and prioritize coastal adaptation projects. Additionally, NOAA OCM will determine the extent to which resources and data may be translated and made accessible to non-English speakers.
5. **Hazard Mitigation Planning:** Circulate examples of how to integrate Hazard Mitigation Plans with Climate Adaptation Strategies in each Pacific Island Jurisdiction. Additionally, re-evaluate the current pipeline to reach Federal funding programs that address mitigation and adaptation, including BRIC, and propose recommendations to improve this pipeline.

## 2 Introduction

### 2.1 Coastal Hazard Mitigation in the Pacific Islands

Sustainable development and management of coastal areas requires an understanding of natural coastal hazards and how they impact human activities. Human vulnerability to coastal hazards may be affected by human activities or management decisions including pollution of coastal waterways, reef degradation, beach erosion, and construction of hardened infrastructure (e.g., seawalls, revetments; Solomon & Forbes, 1999). The U.S. Pacific Islands and territories, including American Samoa, the Commonwealth of the Northern Mariana Islands, Guam, and Hawai'i, face a unique set of hazard-related challenges due to their relatively small area and remote location in the world's largest ocean. Each of the islands represent distinct environmental, cultural, and political identities. Throughout this region, subsistence and cash economies depend heavily on coastal resources to support tourism and recreational activities. Many traditional practices are also tied to coastal resource management. Given that a large proportion of these Islands reside within the 'coastal zone,' coastal hazards can impact the entire Island community, at least indirectly. As a result, Pacific Island jurisdictions are often challenged to develop systemic coastal resilience measures. This paper presents a detailed overview of Pacific Island coastal hazard mitigation needs and priorities and proposes recommendations to better connect federal resources with state and territory CZM programs in order to address those needs.

### 2.2 Federal Support of Hazard Mitigation and Coastal Resilience

Federal agencies, including the Federal Emergency Management Agency (FEMA), the National Oceanic and Atmospheric Administration (NOAA), and the U.S. Army Corps of Engineers (USACE), have developed a variety of programs to help states and territories build more resilient communities. These programs and related initiatives provide resources and opportunities for planning and technical assistance, funding or cost-share, and on-the-ground implementation (e.g., construction and maintenance) of coastal resilience projects. We have compiled a list of relevant programs here:

- [Federal Emergency Management Agency \(FEMA\) Programs & Resources](#)
- [National Oceanic and Atmospheric Administration \(NOAA\) Programs & Resources](#)
- [U.S. Army Corps of Engineers \(USACE\) Programs & Resources](#)

President Biden's administration has identified climate resilience and adaptation as the cornerstone of the U.S. government response to addressing increasing impacts of the global climate crisis. Administration priorities include stronger interagency coordination, building an equitable and just federal workforce, and legislation to build capacity among

federal programs to support coastal resilience efforts across the nation. In order to address these priorities, federal agencies need to strengthen interagency coordination of climate resilience activities through existing bodies as well as the creation of new programs and initiatives. For instance, one effort to align resources and expertise is the Coastal Resilience Interagency Working Group (IWG) co-led by NOAA and the Council on Environmental Quality. IWG includes FEMA, NOAA, and USACE and is intended to (1) align major federal involvement in coastal resilience activities, (2) develop grant-making and data implementation strategies to facilitate working partnerships with state, territorial, and local governments, particularly in disadvantaged communities, and (3) use the federal government's data sharing and mapping resources to improve coastal resilience investments and decision-making. As such, there is a nationwide focus on interagency coordination that is beneficial to and provides opportunities for frontline communities, such as those in the Pacific Islands.

Additionally, the current administration also prioritizes diversity, equity, inclusion and accessibility (DEIA) across the federal government. Recent executive orders include a requirement for federal agencies to assess DEIA within their workforce and a promise to deliver 40 percent of overall benefits from federal investments in climate and clean energy toward disadvantaged communities. Pacific Island CZM programs have observed that communities on the frontline of climate impacts often have difficulty accessing funding for hazard mitigation planning and implementation. In light of this challenge, federal agencies are working to address the administration's focus on DEIA by partnering with local governments to support the flow of more resources to the Pacific Islands.

Recent passage of the Infrastructure Investment and Jobs Act of 2021 presents an array of new opportunities for federal agencies to invest in coastal resilience and hazard mitigation. Several provisions may provide support for addressing coastal resilience and hazard mitigation priorities among the Pacific Islands. These opportunities may include (but are not limited to) the following:

- Pre-hazard prevention and mitigation through FEMA Hazard Mitigation Assistance programs and the Safeguarding Tomorrow through Ongoing Risk Mitigation (STORM) Act.
- Additional USACE construction funding for coastal storm damage reduction and flood risk management projects.
- Coastal habitat restoration and infrastructure investment through the National Oceans and Coastal Security Fund (National Coastal Resilience Fund) grants, Coastal Zone Management Act Technical Assistance
- Regional coastal resource planning through [Regional Ocean Partnerships](#).

## 3 Methods

### 3.1 Background Research

We conducted an initial desktop review of hazard mitigation and coastal resilience priorities in the Pacific Islands. Information was gathered from a number of existing documents created by CSO and close partners. Overall, we used the 2020 CSO Islands Engagement Strategy report as a foundation to build upon Pacific Island hazard mitigation and coastal resilience needs as reported in the following:

- A Joint CSO - National Centers for Coastal Ocean Science (NCCOS) Research Needs Assessment,
- Coastal Zone Management Act (CZMA) Section 309 Assessment and Strategies (2012-2025) from each Pacific Island jurisdiction,
- Hazard Mitigation Plans for each Pacific Islands jurisdiction

We also consulted a series of joint CSO – NOAA Office for Coastal Management (OCM) Baseline Reports for the Pacific Islands jurisdictions. These reports were created to assess state coastal programs' hazard mitigation needs and level of engagement with federal and non-federal partners. This information served as the foundation for our conversations with relevant CZM program staff in each Pacific Island.

### 3.2 Informational Interviews

We interviewed program managers and staff within the CZM programs to (1) clarify information gathered during the desktop review and (2) fill remaining information gaps. Interviews were conducted between May and August 2021. These interviews also identified challenges in prioritizing projects, permitting, funding, and on-the-ground implementation of local hazard mitigation projects in the coastal zone.

### 3.3 Background Reports

The desktop research and interviews were synthesized into background reports that describe the highest priority needs for coastal hazard mitigation in each Pacific Island jurisdiction. The background reports (Appendix A) were used to inform the structure of the following listening session.

### 3.4 Pacific Island Coastal Resilience and Hazard Mitigation Listening Session

On October 13<sup>th</sup> (14<sup>th</sup> CHST), 2021, members of the Pacific Island CZM programs and other state-level agencies met with federal agency staff through a listening session to discuss how to improve coordination around hazard mitigation and coastal resilience to better connect coastal communities with federal support and resources. Participants

gathered into breakout rooms to discuss challenges, best practices, and potential solutions across five focus areas summarized below. In a second breakout discussion, each jurisdiction further developed the solutions presented in the first breakout according to the island's own needs. Preliminary findings of the listening session are presented below. Due to scheduling challenges American Samoa was unable to participate in the listening session. The agenda and participants list are in Appendix B and C. Participant notes were compiled into mural boards during the listening session and are in Appendix D.

## 4 Hazard Mitigation Priorities: A Summary of Findings

Through informational interviews, desktop research, and the regional listening session with CZM practitioners and partners, we have identified a range of current needs and priorities for coastal hazard mitigation, federal resources and programs that address challenges, and proposed solutions for increasing access to federal resources. Findings are organized by identified priority areas:

1. Nature-Based Solutions (NBS) / Green Infrastructure
2. Community Floodplain Management
3. Adapting Existing Structures/Infrastructure
4. Identifying and Filling Data Gaps
5. Hazard Mitigation Planning

## 4.1 Nature-Based Solutions (NBS) / Green Infrastructure

### 4.1.1 Current Efforts & Opportunities

Strong opportunities exist to align existing federal resources and priorities to overcome the challenges listed below. A wide range of federal programs and initiatives support incorporating NBS into mitigation and adaptation efforts, such as FEMA’s Building Resilient Infrastructure and Communities (BRIC) grant program, National Fish and Wildlife Foundation (NFWF) and NOAA’s National Coastal Resilience Fund, and USACE’s International Guidelines on Natural and Nature-Based Features for Flood Risk Management. Moreover, increased use of NBS is a priority for federal mitigation funders. For instance, in the national competition portion of the first BRIC funding round in FY’2020, 7 of the 22 selected mitigation projects were coastal projects that incorporated NBS. BRIC’s technical criteria provides additional points if a proposal incorporates NBS, therefore incentivizing projects to use NBS. Additionally, USACE watershed studies take a holistic approach to water resource challenges and identify a range of watershed planning processes that often include natural and nature-based features (NNBF). Various programs and funding sources are placing an emphasis on NBS, and Pacific Island jurisdictions hope to submit competitive applications with more resources geared towards their needs.

### 4.1.2 Challenges

All the Pacific Island CZM programs communicated with identified nature-based solutions and green infrastructure as a priority to protect coastal resources and buffer against coastal storm events in the Pacific Islands. Better data and technical guidance are needed for the process of prioritizing, funding, implementing, and monitoring NBS projects in the coastal zone. Specifically, the main challenges identified in Pacific Island jurisdictions include:

1. Incorporating local traditional and ecological knowledge in the planning of NBS projects.
2. Accessing examples of viable NBS project designs suitable for tropical island geomorphology and ecosystems. This includes high-energy shorelines and shallow low energy environments - many existing designs and case studies from the continental U.S. are not transferable.
3. Lacking recognition of coral reef ecosystems, dunes, and other natural infrastructure as eligible infrastructure for federal mitigation and resilience programs.
4. Lacking standards and guidance for on-the-ground implementation and long-term monitoring of NBS projects which includes performance metrics and when and how to monitor projects’ success.

5. Lacking understanding and/or awareness of eligibility for NBS due to differences in culture and terminology used compared to continental U.S.
6. Lacking resources and technical assistance to submit competitive applications for funding programs that pass a benefit cost analysis.
7. Calculating a BCA to evaluate coastal infrastructure projects is often biased toward traditional hardened infrastructure over NBS alternatives, despite the range of indirect community and ecosystem benefits.

### 4.1.3 Solutions

Based on gathered input from the listening session and informational interviews, CSO recommends the following actions to the above NBS challenges to improve the accessibility of federal resources and programs in the Pacific Islands:

1. FEMA, NOAA, and USACE should coordinate and collaborate with the jurisdictions to develop design guidance for NBS alternatives, performance metrics, and maintenance information relevant to tropical island geomorphology and ecosystems, including high-energy and shallow-low shorelines and environments. Infrastructure eligibility requirements should be updated to include coral reefs as infrastructure in coordination with all island CZM programs.
2. FEMA should develop case studies of successful NBS projects that have fully leveraged federal resources and funding. Case studies should include all aspects of the projects from planning, permitting, implementation, construction, and monitoring and any lessons learned, and should specify how the project was funded. For example, FEMA could develop products similar to the [“Green Guide,” produced by the Association of State Floodplain Management \(ASFPM\) and CSO](#), which was developed to provide plain language explanation and actionable steps for FEMA’s Community Rating System (CRS) program and to highlight locally relevant elements of the CRS program and identify a standardized process for applying to and implementing the CRS with limited staffing and funding.
3. Federal partners should collaborate and consult with local resource agencies and other interest groups to develop project ideas that incorporate traditional knowledge and practices. Local traditional ecological practices should be considered when developing the full suite of NBS alternatives to hardened coastal infrastructure project designs.
4. USACE should consult with Pacific Island CZM programs to develop local [Watershed Studies](#) and aim to identify a range of watershed planning processes that include natural and nature-based features (NNBF). These types of studies are currently underway in CNMI and American Samoa and should be used as a blueprint in the future.
5. FEMA, NOAA, and USACE should identify opportunities to demonstrate pilot projects that incorporate NBS and/or address multiple uses to increase the range

of ecosystem benefits. If successful, pilot projects can be used to demonstrate the need for larger scale NBS implementation and prioritize NBS elements in future projects. This will highlight the different needs of Pacific Islands to design and implement NBS projects compared to the mainland.

6. NOAA OCM Digital Coast Program should work with Pacific Island jurisdictions to leverage existing resources and co-develop training that supports the planning, evaluation, and permitting of NBS projects including successful application of BCA. Digital Coast provides in-depth training focused on defining NBS and how to integrate NBS into projects. One example of training is *Nature-Based for Coastal Hazards* [virtual](#) and [in-person](#) training and self-guided training, [Nature-Based Solutions for Coastal Hazards: The Basics](#). Digital Coast
7. Interagency efforts should focus on using decision support tools to identify appropriate NBS opportunities in coastal resilience projects with an emphasis on hybrid “green-gray” engineering.
8. FEMA should coordinate with the Pacific Island communities to develop pre-calculated benefits on the most common NBS. This will ensure jurisdictions are providing feedback on viable options and remove the complexity of completing a BCA.

## 4.2 Community Floodplain Management

### 4.2.1 Current Efforts & Opportunities

Several federal resources and programs exist to align efforts and priorities to overcome community floodplain management barriers. For example, all Pacific Island jurisdictions have joined the NFIP to develop stronger economic resilience to flood impacts and utilize critical flood data and floodplain management information through Flood Insurance Rate Maps (FIRMs), non-regulatory mapping products, and FEMA resources and technical assistance. Many communities have also taken advantage of the USACE Planning Assistance to States (PAS) program. This program offers comprehensive planning and technical assistance for states and territories interested in developing studies focused on water and land resource issues, including those focused on coastal hazard mitigation. Federal allotments for each state and territory are limited up to \$500,000 annually with a federal/nonfederal cost share of 50 percent.

Additionally, the Pacific Risk Management 'Ohana (PRiMO) is a platform to bring together different types of organizations to work towards a common goal and increase opportunities to enhance communication across the islands. This is a distinctive community of practice dedicated to the resilience needs of the Pacific Islands and support should continue. Furthermore, Silver Jackets (SJ) teams have successfully been developed in Guam and Hawai'i. Silver Jackets is a network of state-led interagency teams that bring together state, federal, and sometimes tribal and local agencies to learn from one another and apply their knowledge to reduce the risk of flooding and other natural disasters. This is a beneficial start for communities to leverage the resources and information across local agencies to support flood risk management projects.

### 4.2.2 Challenges

Pacific Island jurisdictions are working to prevent and reduce the flood hazard and risk, resulting in more resilient communities. There is an abundance of federal resources available, but the jurisdictions are challenged with the following:

1. Lacking capacity to fully leverage, implement, and monitor the National Flood Insurance Program (NFIP) and all its benefits. It is difficult to leverage the NFIP fully with limitations in staffing therefore Pacific Island jurisdictions are not ready to adopt the CRS program. The CRS program supports reducing risk and encourages community floodplain management practices that exceed the minimum requirements of NFIP. While this a great program, it requires a tremendous amount of work to get into and requires annual recertification that poses logistical issues for Pacific Island communities.
2. Incorporating climate change and future condition into community floodplain management. NFIP FIRMs are often outdated and do not incorporate climate

change and future conditions into the mapping process. Additionally, the backlog of FEMA RiskMAP map creation continually amplifies issues with using FIRMs because it takes a long time to update them.

3. Lacking capacity to manage projects and leverage the full range of benefits offered through the USACE Planning Assistance to States (PAS) program. Additionally, these jurisdictions grapple with meeting match requirements (50-50 federal/non-federal cost share) and the program lacks flexibility for waivers.
4. Coordinating with federal partners that are not in the same time zone and jurisdiction and changing of staff causes difficulty in receiving consistent support with community floodplain management programs and decreases the continuation of the institutional knowledge.
5. Lacking parcel-level data needed to accurately identify floodplain designations during the permitting process. Pacific Island jurisdictions need more effective enforcement of floodplain ordinances.

### 4.2.3 Solutions

Based on gathered input from the listening session and informational interviews, CSO recommends the following actions to support Pacific Islands jurisdiction to provide additional support to improve community floodplain management:

1. FEMA should update NFIP mapping standards and flood data to include future conditions such as climate change impacts (e.g., sea level rise) to accurately reflect flood risk to mapped parcels at a finer resolution. [NOAA OCM's Coastal Flood Exposure Mapper](#) provides a digital look at FEMA flood zones for the jurisdictions and is annually updated based on new data.
2. FEMA should partner with Pacific Island coastal programs, academic programs, and organization to develop current maps that incorporates climate change.
3. FEMA, NOAA, and USACE should pursue efforts to strengthen the existing Pacific Island community of practice (e.g., PRiMO) to share geographically similar resources and practices and identify common funding mechanisms. Additionally, local agencies and organizations are encouraged to submit proposals for new Silver Jackets teams to coordinate flood risk management projects, like those that have been created in Guam and Hawai'i.
4. FEMA should develop specialized guidebooks for each Pacific jurisdiction modeled on the American Samoa NFIP guidebook.
5. FEMA, NOAA, and USACE should consider efforts to develop a data repository of past studies and work done to increase the continuation of knowledge and information as staffing changes at the local level.
6. FEMA, NOAA, and USACE should increase interagency coordination and collaboration with local communities and leaders to increase successful usage of available data, decision support tools, FEMA's NFIP and CRS, and USACE's PAS programs.

## 4.3 Adapting Existing Structures/Infrastructure

### 4.3.1 Current Efforts & Opportunities

Given that the bipartisan Infrastructure Investment and Jobs Act has been signed into law, there are many new opportunities and funding streams to adapt pre-existing infrastructure in the coastal zone. For instance, USACE provides assistance under the Flood Control and Coastal Emergencies (FCCE) law to conduct a variety of assessments for disaster preparedness, emergency operations, and rehabilitation of coastal infrastructure. Additionally, USACE has coordinated projects with Pacific Island jurisdictions to evaluate failing infrastructure, reinforce eroding sediment, and manage dredging for navigable coastal waterways. Moreover, one of FEMA's 2018-2022 Strategic Plan goals is to Ready the Nation for Catastrophic Disasters with an objective to create FEMA Integration Team (FIT). FITs are currently in 24 states with a partnership between the state and FEMA regional office to have FEMA personnel sitting within the state to provide consistent support to the state. Pacific Island CZM programs play a key role in coordinating federally supported, state managed, and locally executed hazard mitigation and resilience initiatives on the coast and should be a steady external partner to the FIT.

### 4.3.2 Challenges

Pacific Islands jurisdictions are faced with increased risk from natural hazards and climate change impacts and look to adapt pre-existing structures and infrastructures to reduce risk from present and future conditions. Specifically, the Pacific Island jurisdictional challenges and barriers include:

1. Identifying and prioritizing at-risk properties and critical infrastructure that need adapting due to location, future climate change impacts, or current risk.
2. Identifying mitigation strategies to adapt existing structures, including adapting hardened shorelines with hybrid/NBS designs.
3. Obtaining permits to adapt existing infrastructure (e.g. critical facilities).
4. Financing capital improvement projects and coordinating between federal partners, state/territory agencies, and local governments to discuss funding opportunities and resources.
5. Increasing cost for construction and hiring of technical experts or engineers, which often come from other countries such as Japan.

### 4.3.3 Solutions

Based on gathered input from the listening session and informational interviews, CSO recommends the following actions to the above challenges to improve the accessibility of federal resources and programs in the Pacific Islands:

1. FEMA and USACE should expand the scope of allowable benefits in BCA methods to include social and environmental benefits. Pacific Island jurisdictions can then invest in community and ecosystem benefits not often considered but that still provide indirect economic value. Additionally, Federal partners should consider how to reduce the emphasis on property values in BCA that traditionally favor communities with higher property values.
2. FEMA and USACE should work with Pacific Island jurisdictions to develop Pre-Calculated Benefits guidance that reflects the most common mitigation and adaptation efforts to reduce barriers to accessing federal funding programs. This could be accomplished by supporting a Community of Practice (CoP) at PRiMO that is dedicated to identifying common mitigation actions that should be explored further.
3. USACE should work with Pacific Island CZM programs to develop proposals for new Silver Jackets teams and coordinate projects that focus on coastal and flood risk reduction in relation to low-lying, critical infrastructure (e.g., roads, highways, bridges, critical facilities).
4. Federal partners should continue to partner with Pacific Island CZM programs on outreach and prioritization of training delivery to local governments to improve community-level awareness of existing technical assistance programs across FEMA, NOAA, and USACE. For example, USACE may increase outreach and education to Pacific Island communities about the Planning Assistance to States (PAS) program.
5. FEMA, NOAA, and USACE should coordinate and develop a resource that streamlines and standardizes definitions, guidance, and standards related to the analysis of infrastructure improvements and developments in the coastal zone (i.e., sea-level analysis, BCA).
6. FEMA should expand the BRIC program to allow increased flexibility to allow for a higher funding cap for Pacific Island jurisdictions, pre-calculated BCA options, and increased funding for project scoping and capacity building. FEMA should provide more targeted guidance for nonfinancial Direct Technical Assistance section of BRIC.

## 4.4 Identifying and Filling Data Gaps

### 4.4.1 Current Efforts & Opportunities

Pacific Island jurisdictions have robust experience at working within limited capacity and funding to partner with federal, academic, and other partners to fill data gaps. For instance, the Pacific Islands Climate Adaptation Science Center (PI-CASC) is a collaborative partnership between the US Geological Survey and a university consortium hosted by the University of Hawai'i at Mānoa, with the University of Hawai'i at Hilo and the University of Guam, designed to support sustainability and climate adaptation in communities across the Pacific Islands. The Guam CZM program uses PI-CASC to fill a GIS training and support need. Additionally, the Silver Jackets team provides a CoP opportunity to share data gaps and resources where master plans including best practices for climate change developed by USACE could be explored. Despite ongoing efforts to improve information transfer and fill data gaps, there remain significant challenges.

### 4.4.2 Challenges

Accurate data is needed for the Pacific Island CZM programs to estimate risk and understand the effectiveness of different mitigation and adaptation strategies. Challenges and barriers to accessing actionable data include:

1. Lacking federal data products and decision-support tools that are applicable to the Pacific Islands and not just continental United States and supports variation of needs across the islands.
2. Lack of funding and technical assistance to capture and synthesize data including capturing high resolution data on sea level rise, wave run up and storm surge on the Pacific Islands.
3. Utilizing outdated benthic and shoreline erosion maps for risk identification, lack of tide gauge infrastructure, inconsistent or lack of historic data sets (GIS, publications, etc.) and the lack of funding and technical capacity for GIS-centered data and data management in local, under-resourced communities.
4. Documenting and transferring institutional knowledge due to frequent turnover of local resource agency staff.
5. Training needs for GIS applications to build institutional capacities around certain hazard areas or types of resilience.
6. Aligning available resources and funding across federal agencies to identify which are applicable and available for projects.

### 4.4.3 Solutions

Based on gathered input from the listening session and informational interviews, CSO recommends the following actions to address the above challenges to improve the accessibility of federal resources and programs in the Pacific Islands:

1. FEMA, NOAA, and USACE should develop plain language funding and technical guidance for data development and vulnerability assessments. NOAA OCM's Regional Coastal Resilience Grant Program funded an interactive mapping tool for the State of Hawai'i [Sea Level Rise Viewer](#) in support of the Sea Level Rise Vulnerability and Adaptation report. A detailed guide on how to achieve a similar outcome with this funding source would be helpful in assisting the jurisdictions with understanding what is possible. Federal agencies should ensure that data tools and products prioritize integrating future conditions into planning and permitting decisions, wherever possible.
2. FEMA, NOAA, and USACE should prioritize updating and enhancing the accuracy of flood hazard mapping for the entire Pacific Island region. Once developed, flood maps should be continually maintained to stay accurate.
3. FEMA, NOAA, and USACE should identify the data products and decision-support tools that currently only apply to the continental United States and strategize ways to further develop these products for the Pacific Islands.
4. The USACE Critical Infrastructure Protection and Resilience (CIPR) Program should assist Pacific Island jurisdictions with technical and planning assistance to create a local standardized management framework for conducting risk-based assessments and technical studies for critical infrastructure in the coastal zone.
5. FEMA, NOAA, and USACE, with the help of CSO and local organizations, should regularly communicate funding opportunities for local institutions and organizations to develop and implement projects. Opportunities that do not require match, include match flexibility, or provide technical assistance, should be highlighted with clear information on how to apply.
6. NOAA OCM and Sea Grant should continue to provide specialized online GIS training and include jurisdiction-specific training on other data products to increase capabilities at the local level.
7. FEMA, NOAA, and USACE should identify existing or new opportunities for Pacific Island-specific training and webinars on grant programs and highlight programs with no match or match flexibility. This will ensure that program staff are educated on what is available and can prioritize which programs to utilize.

## 4.5 Hazard Mitigation Planning

### 4.5.1 Current Efforts & Opportunities

Hazard mitigation plans (HMP) at the local and state level are a snapshot of a community's hazard risk and vulnerabilities and includes long-term strategies for reducing risk and impacts of disasters. Approved HMPs are necessary to apply for some of FEMA's grant programs. The State of Hawai'i and its four counties have state and local HMPs and the territories (Guam, AS, and CNMI) have one HMP each. Pacific Island CZM programs coordinates with local resource agencies to integrate jurisdictional hazard mitigation plans with climate adaptation strategies and coastal priorities to leverage federal funding to support mitigation efforts. Along with coordinating with other agencies such as, State Hazard Mitigation Offices and Economic Development Authorities, the jurisdictions are required to complete NOAA's Coastal Zone Management Act Section 309 Strategy on a five-year cycle. Hawai'i and Guam have successfully developed Silver Jackets teams in partnership with USACE to support coastal hazard risk identification and reduction. FEMA has recently developed the guidance, [FEMA Resources for Climate Resilience](#), for communities working on integrating climate resilience and hazard mitigation planning and projects. Similarly, NOAA has established an online hub with resilience resources as part of the [NOAA Achieving Hazard-Resilient Report: Resilience Resources](#) initiative. These are strong opportunities to expand further and coordinate across agencies to align existing federal resources and priorities to overcome barriers in hazard mitigation planning.

### 4.5.2 Challenges

Hazard mitigation planning reduces loss of life and property by minimizing the impact of disasters. Specific challenges and barriers to hazard mitigation plan development and implementation identified by Pacific Island jurisdictions include:

1. Coordinating between CZM programs, State Hazard Mitigation offices, and other coastal resilience stakeholders to ensure that goals are aligned, and coastal projects are included in the state hazard mitigation plan.
2. Identifying existing and planned facilities that are vulnerable to sea-level rise, flooding impacts, and other natural hazards and assessing the range of options to mitigate risks to those facilities.
3. Coordinating awareness among ongoing federal projects and efforts for pre-and post-disaster response and recovery.
4. Identifying the best grant program and funding source for a mitigation project in an efficient manner based on match, eligibility, project type, and application cycle.
5. Aligning state and local plans across multiple strategies such as capital improvement plans, hazard mitigation plans, and CZM plans.

6. Securing local capacity to prepare, develop, and implement project proposals and plans to apply for competitive grants.

### 4.5.3 Solutions

Based on gathered input from the listening session and informational interviews, CSO recommends the following actions to address the above challenges to improve the accessibility of federal resources and programs in the Pacific Islands:

2. FEMA and USACE should co-develop strategies with jurisdictional CZM programs to align local and state capital improvement plans with hazard mitigation planning offices to identify shared goals and prioritize coastal projects as a part of mitigation project put forth.
3. FEMA should develop plain language guidance to support communities to align HMPs with CZM plans that incorporate mitigation considerations in post disaster recovery planning efforts to achieve long term disaster resilience. The City and County of Honolulu have undertaken efforts to embed mitigation planning into their long-term recovery plans. These success stories should be highlighted in detail for other Pacific Island jurisdictions to complete similar efforts.
4. FEMA and USACE should consider partnering with the US Department of Housing and Urban Development (HUD) and other relevant federal hazard mitigation funders to develop a grant program crosswalk to assist communities in determining which federal funding opportunities may be the best fit for a specific project and match waiver flexibility for the nonfederal cost share requirement.
5. NOAA should continue to strengthen the coordination between federal agencies and local resources agencies to develop alternative funding solutions for implementing hazard mitigation plans. There are existing fora, such as Silver Jackets, that should be coordinated with to make space for tackling challenges and developing actions.
6. FEMA and USACE, with the assistance of CSO, should identify opportunities for ongoing interagency or federal/non-federal working groups to align resources, staff, and funding opportunities to aid on-the-ground project implementation (e.g., USACE Watershed Studies).

## 5 Conclusions

CSO has partnered with FEMA, NOAA, USACE, coastal zone management programs, and local coastal resource agencies to identify solutions to the above priorities and improve the accessibility of federal resources and programs in the Pacific Islands. CSO will continue to coordinate with the Pacific Island CZM programs to provide support and coordination to improve access to federal resources and programs. CSO proposes that federal agencies use the recommendations and next steps to coordinate with CSO, Pacific Island CZM programs and local agencies to address the challenges and barriers faced. Across the topics explored above, we identified several next steps and general solutions to tackle the cross-disciplinary needs of the Pacific Island jurisdictions. These next steps include:

1. **Nature-Based Solutions:** Evaluate the current status of where CZM programs and USACE/FEMA stand in terms of prioritizing NBS over hardened infrastructure. If there is an impasse, CSO will work with Federal partners to determine what information, case studies, or other rationale is needed to further prioritize predominantly nature-based infrastructure projects with higher administration.
2. **Community Floodplain Management:** CSO will work with USACE, NOAA, and FEMA to identify all relevant communities of practice in the Pacific region and determine all current efforts to develop resources aimed at navigating the Community Rating System and NFIP. Additionally, FEMA will share its new website with best practices to address community floodplain management.
3. **Adapting Existing Structures/Infrastructure:** CSO will increase outreach from the national and regional level down to the individual CZM programs to increase understanding of technical assistance programs with USACE and FEMA. Additionally, FEMA will further promote their pre-qualified memos.
4. **Identifying and Filling Data Gaps:** CSO will follow up with NOAA OCM to determine how each Pacific Islands jurisdiction can best use Federal data, including SLR and disaster prevention data, to support and prioritize coastal adaptation projects. Additionally, NOAA OCM will determine the extent to which resources and data may be translated and made accessible to non-English speakers.
5. **Hazard Mitigation Planning:** Circulate examples of how to integrate Hazard Mitigation Plans with Climate Adaptation Strategies in each Pacific Island Jurisdiction. Additionally, re-evaluate the current pipeline to reach Federal funding programs that address mitigation and adaptation, including BRIC, and propose recommendations to improve this pipeline.

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# Appendix A

## Overview of Hazard Mitigation Priorities and Needs

### *American Samoa*

*Purpose: This document summarizes the existing needs and priorities for coastal hazard mitigation as identified by practitioners in the Coastal Zone Management (CZM) program and close partners. Information was gathered during informational interviews with American Samoa CZM staff and documents previously created by CSO and NOAA’s Office for Coastal Management.*

Topic	Need	Source(s)
FEMA National Flood Insurance Program and Community Rating System	<ul style="list-style-type: none"> <li>● Understand how the jurisdiction can participate in these programs, as currently these programs are not fully leveraged.</li> </ul>	NOAA OCM
FEMA RiskMAP	<ul style="list-style-type: none"> <li>● Need to make updates to and include jurisdictionally relevant data</li> </ul>	ASCMP GIS division
FEMA Mitigation Funding	<ul style="list-style-type: none"> <li>● Need to understand how to support coral restoration efforts via FEMA BRIC funding, etc.</li> <li>● Better understanding of BRIC’s process</li> <li>● Increase utilization of available funding</li> <li>● Understanding of BCA process</li> <li>● More information is needed on wave attenuation mitigation measures</li> <li>● Coral Reef considered infrastructure</li> </ul>	Discussions with AS Coral Restoration team
NBS and coastal hazards	<ul style="list-style-type: none"> <li>● Need to understand the path forward to install an NBS pilot project</li> <li>● NBS Case Studies with FEMA HMA funding implemented on a small island. The setting of AS is very different than mainland US and there’s a big gap in understanding NBS in AS</li> </ul>	CZM Section 309 Coastal Hazards Strategy

Better awareness and coordination across relevant agencies	<ul style="list-style-type: none"> <li>• Coastal hazards work involves many players (both Federal and local). There is a need to align current projects and initiatives to address common goals</li> </ul>	NOAA OCM
USACE Post-Disaster Watershed Assessments	<ul style="list-style-type: none"> <li>• Looking for updates to process and next steps</li> </ul>	NOAA OCM
Coastal Hazard Mitigation Priorities	<ul style="list-style-type: none"> <li>• Priorities include adapting existing structures with mitigation strategies, adapting existing hardened shoreline controls with hybrid designs, protecting the hazard mitigation ecosystem functions of wetlands and the coral reef system, and improving GIS data for decision making.</li> <li>• Pilot projects for similar geographies</li> </ul>	CSO Baseline Report

## *Guam*

*Purpose: This document summarizes the existing needs and priorities for coastal hazard mitigation as identified by practitioners in the Coastal Zone Management (CZM) program and close partners. Information was gathered during informational interviews with Guam CZM staff and documents previously created by CSO and NOAA’s Office for Coastal Management.*

<b>Topic</b>	<b>Need</b>	<b>Source(s)</b>
FEMA National Flood Insurance Program and Community Rating System	<ul style="list-style-type: none"> <li>● Improve NFIP implementation and increase capacity to fully leverage NFIP program before CRS enrollment</li> </ul>	CSO Baseline Report
FEMA Mitigation Programs	<ul style="list-style-type: none"> <li>● Support coral restoration efforts through FEMA funding (BRIC, etc.). There is interest but there is not a clear path forward regarding payment for benefit-cost analysis (BCA). Guam did submit other proposals for BRIC funding including non-coral projects.</li> <li>● Tried Public Assistance recovery funding program (through EDA) without success. Interested in PA and PA Mitigation funding</li> <li>● Hazard Mitigation Plan Update discussion with FEMA (planned to be updated the next year 2022)</li> </ul>	Faculty/staff at UOG Marine Lab and Guam Dept of Agriculture CSO Informational Interview
NBS and coastal hazards	<ul style="list-style-type: none"> <li>● Concern with the effectiveness of practices and integrating NBS into the CZM programmatic structure</li> <li>● Need to better understand the full range of practices and the capacity needed to address them</li> <li>● Concerns with local agency follow-through on permitting and staff turnover</li> </ul>	Feedback from NBS for Coastal Hazards virtual training registration question on challenges (NOAA OCM)

	<ul style="list-style-type: none"> <li>● Research that provides information on a portfolio of viable projects that work for tropical islands.</li> </ul>	
Better awareness and coordination across relevant agencies	<ul style="list-style-type: none"> <li>● Looking for better communication with the coral program to update benthic mapping and restoration programs for natural infrastructure</li> </ul>	CSO Informational Interview
Silver Jackets	<ul style="list-style-type: none"> <li>● Understand how the local Silver Jackets team will continue to function in light of COVID-19</li> </ul>	NOAA OCM
Data	<ul style="list-style-type: none"> <li>● Island-wide benthic habitat maps are 18 years old and need updating</li> <li>● Request for high-resolution bathymetry of nearshore systems</li> </ul>	NCCOS Report
	<ul style="list-style-type: none"> <li>● Focusing on technical planning and organizational capacity to see how programs are able to meet specific needs/functions <ul style="list-style-type: none"> <li>○ Providing training for GIS applications, including building capacities around certain hazard areas or types of resilience</li> </ul> </li> </ul>	CSO Informational Interview

## ***Commonwealth of Northern Mariana Islands***

Purpose: This document summarizes the existing needs and priorities for coastal hazard mitigation as identified by practitioners in the Coastal Zone Management (CZM) program and close partners. Information was gathered during informational interviews with CNMI CZM staff and documents previously created by CSO and NOAA’s Office for Coastal Management.

<b>Topic</b>	<b>Need</b>	<b>Source(s)</b>
NBS and coastal hazards	<ul style="list-style-type: none"> <li>● Ongoing issues with permitting and funding including delayed administrative processes, funding, and maintenance</li> <li>● Difficulties in gathering and funding material purchases due to the remote location of CNMI</li> <li>● Would like to identify the best practices to protect the natural and built environment.</li> <li>● Current interest in addressing issues of SLR, wave run-up, storm surge</li> </ul>	Feedback from NBS for Coastal Hazards virtual training registration question on challenges (NOAA OCM) 309 Strategies
Better awareness and coordination across relevant agencies	<ul style="list-style-type: none"> <li>● Better agency coordination is a need heard specifically for shoreline protection in an area of critical infrastructure experiencing erosion impacts.</li> <li>● There are conflicting priorities between the CNMI CZM program and the State Hazard Mitigation Officer (SHMO). Previous communication was focused on permitting issues. Local staff would like to engage further with SHMO and others within the CZMP to discuss techniques and hardening shorelines. It is recommended that the two organizations engage in some sort of learning exchange.</li> <li>● USACE has several projects currently underway that have a similar focus. CNMI staff would like to improve coordination across teams and projects to ensure funds are used efficiently.</li> </ul>	DCRM, PCPR, and OPD CSO Informational Interview
USACE Flood Risk Management Program	<ul style="list-style-type: none"> <li>● The CNMI government and USACE has shifted efforts to focus on a Post-Disaster Watershed Assessment in hopes that the two organizations can agree on prioritizing green infrastructure over hardened structures. CNMI officials would like to discuss updates and next steps with USACE</li> </ul>	Discussions at 2021 PRiMO Conference

<p>Coordination and knowledge exchange with other relevant agencies and Pacific Island programs</p>	<ul style="list-style-type: none"> <li>● In search of opportunities to connect with partners on similar practices and strategies to address HM challenges</li> </ul>	<p>CSO Informational Interview</p>
<p>Capacity</p>	<ul style="list-style-type: none"> <li>● Challenges with retaining personal, and having people to implement projects within CZM program and partner agencies</li> <li>● Need additional technical assistance, manpower, staff capacity, and land ownership</li> </ul>	<p>NOAA Pacific Island Liaisons</p>

## *Hawai'i*

*Purpose: This document summarizes the existing needs and priorities for coastal hazard mitigation as identified by practitioners in the Coastal Zone Management (CZM) program and close partners. Information was gathered during informational interviews with Hawai'i CZM staff and documents previously created by CSO and NOAA's Office for Coastal Management.*

<b>Topic</b>	<b>Need</b>	<b>Source(s)</b>
FEMA mitigation funding	<ul style="list-style-type: none"> <li>● Lack of capacity to apply for new funding during the FY20 but considering for FY21</li> <li>● Lack of match waiver for funding</li> <li>● Eligibility for coral reefs in funding opportunities (e.g., BRIC, etc.)</li> </ul>	Hawai'i CZM Staff
NBS and coastal hazards	<ul style="list-style-type: none"> <li>● Need to understand the effectiveness of NBS and planning for future impacts; funding for NBS; NBS design and long-term maintenance; organizational and political support and buy-in; adopting codes; community capacity to install GI; cultural NBS strategy</li> <li>● A shoreline study to determine how to best define a “landscape” region in Hawai'i-and scope strategies for managing shorelines at a regional scale.</li> <li>● Identify existing and planned facilities that are vulnerable to sea-level rise, flooding impacts, and natural hazards and assess a range of options to mitigate the impacts of sea-level rise to those facilities.</li> <li>● Need for more visible pilot projects to show success.</li> <li>● Increasing interest in using indigenous nature-based solutions for hazard mitigation like fishponds</li> <li>● Permitting challenges remain</li> <li>● Defining a landscape region. Sometimes redeveloped new developments have best practices, but then impact surrounding communities</li> </ul>	Feedback from NBS for Coastal Hazards virtual training registration question on challenges (NOAA OCM). ORMP Council meetings, CZM-CA 309
Better awareness and coordination across relevant agencies	<ul style="list-style-type: none"> <li>● Increasing engagement with NFIP county coordinators</li> <li>● Who and how to get info/to succeed across the different federal programs</li> </ul>	CSO Informational Interview

USACE Silver Jackets	<ul style="list-style-type: none"> <li>● Learning how the Silver Jacket (SJ) team will be managed and implemented moving forward?</li> <li>● How will the SJ team function in Hawaii when the new POC is HICZMP</li> </ul>	CSO Informational Interview
USACE National Shoreline Management Assessment	<ul style="list-style-type: none"> <li>● Recent distribution of the updated 80% regional assessment report. There is a need to understand how these efforts align with CZM priorities</li> </ul>	CSO Informational Interview
Local Staff Capacity	<ul style="list-style-type: none"> <li>● Not enough staff/bandwidth to address the full range of coastal issues</li> </ul>	

# Appendix B

## Coastal States Organization

### Pacific Islands Hazard Mitigation and Coastal Resilience Listening Session

*October 13th, 2021, 7:00 p.m. - 9:00 p.m. EDT*

**Listening Session Goal:** To convene and discuss how to improve coordination around hazard mitigation and coastal resilience and better connect coastal communities with federal agency support and resources. This listening session will inform the work of the Coastal States Organization (CSO) and federal partners at the National Oceanic and Atmospheric Administration (NOAA), Federal Emergency Management Agency (FEMA), and U.S. Army Corps of Engineers (USACE) to improve the delivery of federal resources, increase coastal program capacity and reach, and highlight the successes of Pacific Island coastal programs. CSO will document listening session outcomes and recommendations through a white paper to guide current and future work. This effort is in follow up to conversations already held with Pacific Coastal Program staff and builds on the work of Federal agency partners.

Before coming to the listening session, please consider your jurisdiction's hazard mitigation needs and priorities, and how CSO working with NOAA, FEMA, and USACE can help provide support and resources to meet those needs.

**MAIN SESSION (ALL TIMES EASTERN DAYLIGHT TIME)**

7:00 p.m. – 7:10 p.m.	<b>Welcomes and Logistics</b>
7:10 p.m. – 7:25 p.m.	<b>Presentation of Hazard Mitigation and Coastal Resilience Priorities</b>
7:25 p.m. – 7:30 p.m.	<b>Overview of Breakout Rooms</b>
7:30 p.m. – 8:10 p.m.	<b>Breakout #1 - Solutions to Hazard Mitigation and Resilience Challenges</b> Room 1: Nature-Based Solutions/Green Infrastructure Room 2: Community Floodplain Management Room 3: Adapting Existing Structures/Infrastructure Room 4: Identifying and Filling Data Gaps Room 5: Hazard Mitigation Planning
8:10 p.m. - 8:15 p.m.	<b>Break</b>
8:15 p.m. – 8:45 p.m.	<b>Breakout #2: Jurisdiction CZMP Specific - Federal Joint Session</b> Room 1: American Samoa Room 2: Commonwealth of Northern Mariana Islands Room 3: Guam Room 4: Hawai'i
8:45 p.m. - 8:55 p.m.	<b>Large Group Discussion</b>
8:55 p.m. – 9:00 p.m.	<b>Wrap Up and Next Steps</b>

## Appendix C

<b>Pacific Island Listening Session: Participant List</b>		
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# Appendix D

## Participant notes from the Pacific Islands Listening Session

### Hazard Mitigation Planning

American Samoa: Yellow



CNMI: Orange



Guam: Green



Hawaii: Blue



Federal: Purple



#### Challenges & Barriers

Planning coordination with SHMO	Coordination among USACE projects for better plan alignment		
Technical planning and organizational capacity to see how programs are able to meet specific needs/functions			
Identifying and prioritizing projects for the funding stream and meeting the needs of the region (e.g., BRIC, etc.)	GRANTS: Match waivers?	(FEMA) Grants: BCA	
GRANTS: collaboration on NOAA distribution, proposal writing and POC within the region	GRANTS: Eligibility for coral reefs in funding opportunities (e.g., BRIC, etc.)	Also grants, but want to see if there are coordination among and enable mitigation grant programs to occur not outside of	Need for capacity building in some jurisdictions (e.g., determine eligibility of projects)
Prioritizing coastal projects in the state hazard mitigation plan	Establishing relationships between FEMA, USACE, and NOAA to discuss mitigation and recovery		capacity "in-house" business, develop, implement project proposals, and plans



#### Best Practices / Projects

Power pole replacement project - (funding source: FEMA)			
Project and plan coordination - use Silver Jackets team			
Working toward integrating HMP and Climate Adaptation Strategy	Re-evaluating GP process to better allow mitigation opportunities and develop pipeline for BRIC		
USACE watershed project has created a workshop to provide islanders to review to their study			



#### Potential Solutions

Identify decision maker - responsible entity - no highly management, other relevant options - who has authority to change in decision?			
NOAA can help with some of the grant barriers within local communities			



### Identifying and Filling Data Gaps

American Samoa: Yellow



CNMI: Orange



Guam: Green



Hawaii: Blue



Federal: Purple



#### Challenges & Barriers

Request for info on wave attenuation data and mitigation measures	Improve use and communication of GIS for decision making	Lacking in basic tide gauge infrastructure	Travel to locations is more expensive and time consuming
Gather higher tech data on SLR, wave run-up, and storm surge	Need more tech assistance to synthesize data	Lack of funding and sometimes technical capacity	Inconsistent or lack of historic data sets (GIS, publications)
Providing training opps for GIS applications	Island wide benchmarking maps are outdated	Whole community collaboration and buy-ins	Leveraging existing sources to address various related projects
Defining a landscape region - what is the zone of impact from wave overwash?	Lots of federal products and tools only cover the lower 48	Local community does not have enough decision-making power in shape, development, data collection or release, data of relevance release	lack of repository for data consistent formatting, transferability (town data types)
Education on the economic benefits of updated codes and standards	GIS limited capacity at local mgmt agencies	Lot of variation of needs across the islands	find more ways to make Cost Analysis, address unusual hazards - Tsunami
			Theresa here ->
			Policies that are "stale" and lack coordination - Rhonda Fields



#### Best Practices / Projects

LIDAR and other data sets from other partners			
Guam Silver Jackets and other collaborative working groups			
PI-CASC GIS training and support			
NOAA has been able to meet local mgmt agency in providing targeted GIS training (Palo)			Hawaii Sea Level Viewer
We create master plans that include best practices for climate change - Rhonda Fields	Silver Jackets team meetings provide opportunity to share data gaps in a regular forum	Estimate data gathering for sea level rise and storm surge - GIS data - Rhonda Fields, USACE	



#### Potential Solutions

Open source data	Better advertising and incentive for employment opportunities	Building internal capacity to empower CNM residents	Encourage more STEM education in the schools	Expand educational opportunities within the CNM to avoid "brain drain"
Community outreach and public education campaign	Mitigation strategy and planning	Workshops, training and technical assistance		Develop ways to communicate with the local community through outreach (cultural, language barriers)
Formal relationships and agreements to share and integrate data	More training to share best practice of "weathered grants" like BRIC	tie in green infrastructure with Hazard Mitigation projects	Robust HAZUS and developing partnerships for data	Look at this great Hawaiian idea - name
Recruit or support about outreach and engagement plans. Don't assume that "you build it they will come"	Have a hard time getting BRIC funding because our building codes are so old.	Coordinate grants training to federal agencies - EPA partners with a university to provide grant support.		
Create a central dashboard to access available data from each agency - Rhonda Fields	Helping communities with small grants without match req'd	Built in equity distribution in policy on all levels.		FMS interagency projects bring multiple entities together to look at PM Solutions. State USACE can apply through USACE.



# Nature Based Solutions / Green Infrastructure Breakout Session

**American Samoa:**  
Yellow

**CNMI:**  
Orange

**Guam:**  
Green

**Hawaii:**  
Blue

**Federal:**  
Purple

## Challenges & Barriers

Many shorelines are already degraded and the physical setting is not conducive to new solutions	Coral reefs as infrastructure	Difference between mainland vs. island strategies	Challenges related to coordination across all the required entities	
Improve coordination of resources among similar projects	Remote location - hard time gathering materials	No beach nourishment plan in place	Conflicting priorities: NBS vs Gray infrastructure	Information to support Cost benefit Analysis
Identifying coral reefs as NBS for FEMA funding	How to incorporate NBS strategies into CDM programmatic structure	Uncertainty of DCA approach		
How to address long term persistence of NBS	Incorporating cultural values into NBS strategies			
Identifying challenges in implementing and projects, taking to appropriate agencies and developing existing resources	Identifying NBS projects and funding sources	Developing case studies for cost/benefit analysis	Ridge-to-reef stormwater management / green infrastructure planning	

## Best Practices / Projects

Training and education to increase awareness AS, but lacking implementation	Some implementation of shoreline revegetation projects			
Coral reef restoration - development of nurseries	Green roof	Replanting projects	Raingardens	Permeable pavement and parking
protection of native species and habitat				

## Potential Solutions

Need more and detailed assistance from higher agencies for funding opportunities	Statutory implementation of Green Infrastructure/NBS Policies	Data and information management - Centralization of data and information sharing	Support for education and awareness building & community engagement	
Feasibility assessments	Decision support tools w/ geospatial integration	Guidance/Technical assistance on permitting and environmental compliance		
Sediment budget study identifying potential sources captured by USACE for beach nourishment	Liaisons for ALL Federal agencies	Better knowledge of traditional management practices and cultural practices on the agency side	Pilot projects to demonstrate processes and solutions.	Case studies that include the sticky above

# Community Floodplain Management

**American Samoa:**  
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**Federal:**  
Purple

## Challenges & Barriers

fully leveraging the NFIP Program and its benefits				
Fully implementing NFIP and match waivers and eligibility assistance	capacity needed to fully leverage NFIP program	Effective enforcement, Edwin	Desire to build and disagreements on flood impacts, Edwin	
Time - waiting for funding approvals (Elizabeth)	A need for adaptation in the face of climate change beyond 50 yrs out	CRS Program is difficult to get into (Elizabeth)	hard to provide good training online due to location and act of representatives in region (very slow, do not know how to get online training you see?)	Changing staffing at territory level. Lost institutional knowledge
Coordinating and implementing projects	Implementing community-scale mitigation projects	Taking advantage of match waivers and technical assistance - highlighting feasibility	USACE relies on economic, real estate, and other benefits should be taken into account	CRS requires special recognition. Difficult for some communities

## Best Practices / Projects

convening meetings, Edwin	Silver Jackets teams have been successful (Elizabeth)	Hazard Outreach via Watershed University Flood Preparedness Weeks, etc. (Elizabeth)	Michael H - conducted extensive NFIP trainings recently	Michael H - Suggested CRS Newsletters for ideas
			Add capacity support, institution and will	Michael H - specialized guidebook to the NFIP for specific jurisdictions. Did one for American Samoa

## Potential Solutions

mapping	Increase institutional capacity - Edwin	Increase communication among communities on how they can improve - Edwin	FEMA should have satellite office in Region	Scoping, institution for capacity support and will to support
			Elizabeth - better data repository. Ability to look back on past studies	Communities of Practice to share information - Brian T
			Brian T - FEMA is developing a Region specific website with Best Practices	Develop a Region specific "Green Guide" for CRS
				Michael H - specialized guidebook to the NFIP for specific jurisdictions

# Adapting Existing Structures/Infrastructure

**American Samoa:**  
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**CNMI:**  
Orange

**Guam:**  
Green

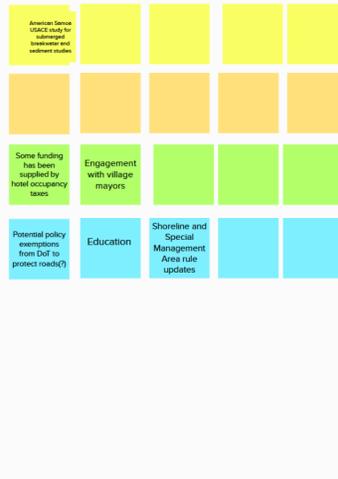
**Hawaii:**  
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**Federal:**  
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## Challenges & Barriers



## Best Practices / Projects



## Potential Solutions

