Monday, March 17, 2025
Preconference Trainings and Workshops

8 to 10 a.m. | Open to the public

Resilience Hubs: Your First Year
>   **Janice Ikeda**, *Vibrant Hawaiʻi*

Since 2020, Vibrant Hawaiʻi's network of Resilience Hubs has provided 1) services and programs that build social connections and improve residents' health and well-being, 2) equitable access to resources, and 3) access to facilities and places that promote community engagement. Vibrant Hawaiʻi's hubs serve as a communication conduit to ensure accurate information flows from government agencies and residents' experiences are captured to provide real-time data for decision-making and resource allocation. Hubs ensure a coordinated response across an islandwide network of trusted, trained teams who are prepared to share resources and respond in times of disaster to support emergency response and recovery efforts. This training provides participants with a from-the-ground-up, 12-month plan to guide the formation of a hub that is able to support a community's ability to self-determine and implement hyperlocal solutions that support residents before, during, and after disruptions to their essential needs and quality of life.

1 to 5 p.m. | Open to the public

Economic Guidance for Coastal Management Professionals: Overcoming Economic Analysis Barriers to Enhance Community Resilience
>   **Polina Dineva**, NOAA Office for Coastal Management

The threat of coastal flooding in communities across the U.S. Pacific region is exacerbated by sea level rise and stronger storms. The growing frequency and severity of these hazards necessitate adaptive measures to reduce flood vulnerability and enhance community resilience. While the federal government has worked to increase funding opportunities that promote adaptation, many communities lack the capacity to develop plans or project proposals to effectively access that funding.

This session addresses a major barrier for communities developing project proposals: completing an economic analysis. Federal grants often require a benefit-cost analysis to demonstrate a project's cost-effectiveness. However, this analysis can be time-consuming and complex, requiring economic expertise that many communities do not have. In Hawaiʻi and other island systems, economic analyses are further confounded by 'intangible' connections that are integral to community well-being and deeply intertwined with local practices and perspectives. While such connections are often considered benefits, they are not always incorporated into economic analysis—or may be included in ways that do not accurately reflect their significance. By thoughtfully integrating these 'intangible' connections, economic analysis can more effectively capture their value while remaining sensitive to their overall importance.

This training session *begins* to address these barriers by:

1. Offering insights into different types of economic analyses that communities can consider based on their project goal(s) as well as their time and resource constraints;
2. Demystifying economic analysis terminology and providing key questions to ask economic consultants;
3. Highlighting considerations regarding cultural and intangible values;
4. Encouraging open dialogue between attendees and economists to better understand how NOAA and other federal agencies can meet community needs in a particular area; and
5. Exploring opportunities for follow-up technical assistance, where NOAA economists may engage with partners or communities to discuss specific economic questions related to their projects or local challenges.

8 a.m. to 5 p.m. | Open to the public

Climate Adaptation Planning for Emergency Management
> **Suzanne Frew**, National Disaster Preparedness Training Center; **Steve Wood**, National Disaster Preparedness Training Center

Building awareness of future climate hazards and impacts that the emergency services sector may face is very important. This course helps emergency services and the community better prepare for the climate adaptations necessary and systems vulnerabilities that may occur from hazard impacts. Participants will be able to describe the principles of climate adaptation planning for emergency management and existing first response processes as well as discuss the impact of weather on critical infrastructure and key resources while explaining the concurrent effects of climate change on those impacts. Participants will also gain an understanding of how to identify and apply adaptation strategies to address local emergency services sector vulnerabilities, such as capital investment and infrastructure projects to increase the resilience of critical systems, including transportation systems, critical facilities, utilities, or even entire communities.

The goal of this course is to prepare the community and the emergency services sector for the climate adaptations and systems vulnerabilities that might occur from hazard impacts and to enhance awareness of future climate hazards and impacts that the emergency services sector may face.

8 a.m. to 5 p.m. | Open to the public

Building Your Risk Communication Skills: Learn How to Have Difficult Conversations About Coastal Hazards and Their Impacts

> **Tashya Allen**, NOAA Office for Coastal Management; **Lauren Long**, NOAA Office for Coastal Management

Coastal communities are struggling with how to prepare for hazards. It can be difficult to talk about coastal hazard impacts and keep people engaged and motivated to take action. A key element of communicating effectively about risk is identifying the audience's diverse values and concerns and using that information to design a communication approach.

We'll start with developing a risk communication strategy focused on, and designed to meet the needs of, a specific audience you're trying to connect with. You'll learn how people think and make decisions about risks and practice applying social science and risk communication best practices to your conversations. You'll receive tips and hear examples about how to better communicate with a variety of audience types. This interactive session will also offer a safe place to practice some real-life situations we encounter when talking about hazards and climate change preparedness.

8 a.m. to 5 p.m. | Open to the public

Community Resilience

> **Chels Chae**, National Disaster Preparedness Training Center; **Dennis Hwang**, National Disaster Preparedness Training Center

Resilient communities are better able to plan for and take action to mitigate the risks from hazards, increase the pace of recovery from destructive events, and adapt to changing environments.

This course demonstrates how to integrate risk and community-based collaborative strategies into plans and programs and introduces tools that help communities assess individual risks and vulnerabilities as well as introduces strategies to become more resilient and better prepared for natural disasters, such as the Collaborative Approach and the Whole Community Approach.

This one-day training course provides state and local government agency staff and other stakeholder groups with background on natural hazards. In addition, the course guides an approach to (1) assess community resilience and (2) develop next steps for improved resilience. Through increased awareness of natural hazards and best practices, the course will enhance community resilience for state and local government agency staff that routinely interface with the community, private sector, and other stakeholder groups. The course will be designed for national implementation while allowing integration of local concerns through case studies and focused group exercises.

The goal of this course is to increase awareness of the meaningful actions that you and your community can take to enhance resilience to natural hazards and opportunities to incorporate resilience into professional practice.

Tuesday, March 18, 2025
Conference Day 1

9 to 9:45 a.m.

Plenary

10:15 to 11:45 a.m.

Indigenous Knowledge and Environment (IKE) Hui–Sponsored Session
Climate Change is Inevitable, Adaptation is Optional

> Moderator: **Kainoa Azama**, Olohana Foundation; Facilitator: **M. Kalani Souza**, Olohana Foundation; **Chad Wiggins**, Hui Aloha Kīholo; **Daniel Wildcat**, Haskell Indian Nations University; **Julie Maldanaldo,** National Center for Atmospheric Research–LiKEEN, National Science Foundation; **Bill Thomas**, NOAA Office for Coastal Management; **Kumu Ramsay Taum**, Sustain Hawai'i; **Jeanne Rubin**, International Institute for Indigenous Resource Management

Panelists will intentionally explore the efforts of a community-based organization (CBO) in Hawai'i to uncover contrasts and cross-correlations of impacts across four bioregions of Hawai'i, Alaska, Puerto Rico, and Louisiana—all part of the National Science Foundation–funded *Rising Voices, Changing Coasts Hub.*

The Rising Voices, Changing Coasts Hub (RVCC) takes a convergence science approach, which brings together university-trained scientists and Indigenous knowledge-holders to study the interactions between natural, human-built, and social systems in populated coastal environments. The hub works to improve our understanding of how climate change will impact four diverse coastal regions and to provide local communities with the information needed to take action and protect their lifeways, including Indigenous knowledge, climate and geospatial modeling capabilities, archeological records, socioeconomic analyses, and hazards research.

The Rising Voices, Changing Coasts Hub's goals include:

1. Developing a successful cross-cultural research framework that can be adapted by future research collaborators.
2. Improving Earth system modeling and prediction of coastal processes to provide highly usable and culturally relevant information for coastal communities.
3. Broadening participation and supporting leadership of Indigenous students and researchers in Earth system science.
4. Strengthening infrastructure for future collaborations between academic institutions and Indigenous communities.

Panelists will share bioregional insights from a spectrum of organizational perspectives to expand the investigative scope, from Indigenous-led, community-based organizations to Tribal institutes and scientific, governmental agencies. This cross-cultural impact session aims to identify convergent capacity and resilience-building strategies that may be applied across the bioregions and redefine what it means for governmental agencies and science institutions to work in-hand with community-based organizations.

10:15 to 11:45 a.m.

Health Security Hui–Sponsored Session

Community and Cultural Resilience: Health Security

Tafaimamao Tupuola, Pacific Center in Human Security; **Kanoho Hosoda**, University of Hawaiʻi

Living among the largest body of water in the world can be challenging for Pacific Islanders. The geographic isolation contributes to unaffordable and complex transportation systems (air, sea, and land), workforce shortages, limited resources, and lack of access to basic health care particularly. When natural disasters are coupled with preexisting insecurities in other aspects of life, a community experiences economic disparity, public health crises, and more. Empowering local people and the community to connect as a village is a step toward collaborative governance and community and cultural resilience driven by local solutions.

The Health Security Hui is an interactive session for participants to discuss "what health security means to you." Participants will:

1. Identify health insecurities pre-disaster, during, and post-disaster;
2. Identify root causes at the regional, territory/national, and community level;
3. Discuss the impact on communities and groups; and
4. Establish local strategies and responses.

10:15 to 11:45 a.m.

Information Access and Geospatial Technology Hui–Sponsored Session

Supporting Hawaiʻi's Disaster Preparedness, Response, and Recovery: GIS Data Needs and Requirements

Eric Yamashita, National Disaster Preparedness Training Center; **Andy McGowan**, NOAA Office for Coastal Management; **Craig Clouet,** Office of the Governor; **Asia Wassner,** Hawaiʻi Island Civil Defense; **Cassie Stelow,** Pacific Disaster Center

Since 2018, Hawaiʻi has been hit by several large disasters, including the 2018 flooding on Kauaʻi and Oʻahu, the 2018 Lower East Rift Zone volcanic eruption on the Big Island of Hawaiʻi,

and the 2023 wildfire/urban fire on Maui. After these disasters, the GIS user community was tasked to provide maps and analyses to support the response and recovery efforts. This session is presented by the Information Access and Geospatial Technology Hui. This session aims to bring together GIS users (Kauaʻi County, City and County of Honolulu, Maui County, and Hawaiʻi County) who have supported emergency management during Hawaiʻi's large disasters to discuss their experiences in GIS support during these disasters, lessons learned, data gaps and requirements, and how to best plan and prepare for the next disaster.

10:15 to 11:45 a.m.

Communications Hui–Sponsored Session

How Technology is Changing Disaster Communications
Gingerlei Porter, University of Hawaiʻi

The availability of advanced technologies and the need to access secure and accurate information have led to improved changes in the design, implementation, and capabilities of disaster communication systems. These technological advances improve capabilities, reliability, quality, and the reach of disaster communication systems. These advances further enhance how organizations, agencies, or communities can access and manage disaster communication messaging. This panel session looks at how these advances can improve our efforts prior, during, and after disasters.

11:45 a.m. to 1 p.m.

Sea Grant Lunch and Listening Session (Closed)

Hawaiʻi Sea Grant has been working on a project assessing the potential environmental and human health risks associated with militarization in the Pacific Islands. During this lunch and learn session, we look forward to connecting with colleagues from across the region to share what we have done so far, receive feedback, and identify priority areas moving forward. In particular, we are eager to understand what the response capacity may be in different locations, as well as what the most critical needs are for the future.

For more information, contact:

Eileen Nalley, enalley@hawaii.edu
Mia Comeros, mcomeros@hawaii.edu
Beth Polidoro, Beth.Polidoro@asu.edu

1 to 2:30 p.m.

Panel

Collaborative Innovation: Building Resilience for Sustainable Communities

Mamoru Miyamoto, International Centre for Water Hazard and Risk Management; **Dong Lin,** China Meteorology Administration; **Kyoungjun Kim,** National Disaster Management Research Institute, Republic of Korea; **Sohee Lee,** National Disaster Management Research Institute, Republic of Korea

This session explores how innovative collaboration among diverse stakeholders can enhance community resilience while fostering sustainability. The session focuses on the importance of addressing emergent risks through effective Disaster Risk Reduction (DRR) strategies.

The session starts by building a shared understanding of the significance of collaborative innovation. Participants will learn how cross-sectoral partnerships—including local governments, NGOs, businesses, and community members—can leverage diverse perspectives and resources to create resilient solutions. Some successful case studies conducted in Typhoon Committee member countries will be presented, highlighting effective collaborative approaches in various contexts.

Next, the session delves into concrete, innovative disaster risk reduction strategies that enable communities to identify and prepare for emerging risks. Emphasis is placed on empowering communities to develop tailored solutions that address their local needs and circumstances.

The role of policy frameworks in supporting collaborative innovation is also high on the agenda. The session explores how policies can encourage stakeholder engagement, provide funding opportunities, and create an enabling environment for sustainable practices. Participants will gain insights into how advocacy and policy changes can amplify the impact of collaborative initiatives.

To foster interactive learning, there are open discussions where participants can share their experiences and challenges in building resilient communities through collaboration. This exchange of ideas provides valuable insights and beneficial inspiration.

By the end of the session, participants will have a comprehensive understanding of collaborative innovation and its potential to build resilience for sustainable communities. The session aims to inspire a collective movement toward fostering innovative partnerships that can address current and future challenges. Join us in exploring how collaborative innovation can empower communities to thrive sustainably in an ever-changing world.

1 to 2:30 p.m.

Panel

Navigating Community Recovery and Resilience for Fire Disasters

Moderator: **Karl Kim**, National Disaster Preparedness Training Center;
Joshua Cooper, Maui County Office of Innovation and Sustainability; **Felea'i Tau**, State of Hawai'i Governor's Office; **Mia Comeros**, University of Hawai'i Water Resources Research Center

Navigating recovery and resilience for fire disasters requires addressing challenges posed by wildfires, urban fires, and grassland fires to communities, ecosystems, economies, and transportation networks. This panel explores recovery strategies through case studies such as the 2023 Lāhainā fire disaster, California wildfires, and other events, as well as research and personal experiences. Experts in community resilience, fire management, and multi-hazard planning discuss approaches for preparing for, responding to, and recovering from fire disasters and steps to increase resilience in one's community against future hazards. This interactive session invites attendees interested or involved in community engagement, resilience planning, or fire response to share ideas and strategies for addressing climate change and the increasing frequency and intensity of fire disasters.

1 - 2:30 p.m.

Panel

Nature-Based and Community-Engaged Approaches for Coastal Dune Protection and Restoration

Wes Crile, Hawai'i Sea Grant (Maui); **Amy Wirts,** Hawai'i Sea Grant (O'ahu);
Tara Owens, Hawai'i Sea Grant (Maui); **Brad Romine**, Hawai'i Sea Grant (O'ahu);
Michael Cain, Hawai'i Department of Land and Natural Resources' Office of Conservation and Coastal Lands

This session discusses recent and ongoing nature-based efforts for dune protection and restoration around Hawai'i involving the Hawai'i Sea Grant program and community and government partners for natural and cultural resource protection and improved hazard resilience. Panelists will cover approaches for community engagement and education, resources and guidance for dune restoration in Pacific Island settings, and relations to longer-term community resilience.

Panelists will also share recent dune restoration project successes and the challenges of working in complex and varied environmental and social settings in Hawai'i. Community involvement and support are critical for dune restoration projects. Incorporating community values, vision, and specific project feedback into site plans and implementation activities are important components for dune restoration projects. The panel will share strategies and lessons

learned for community engagement and outreach, which could be as simple as signage or a project information table set up on-site or as formal as testimony, public meetings, or a project website. Panelists will share their collective experience with examples and ideas of how to provide opportunities for the community that contribute to restoration activities and site plan development.

2:30 to 4 p.m.

Individual Presentations

Developing a Custom Social Vulnerability Index for Hawai'i
Lisa Webster, National Disaster Preparedness Training Center

Hawai'i has a unique sociocultural and environmental landscape. Existing social vulnerability indices, including the widely used Centers for Disease Control and Prevention's (CDC) Social Vulnerability Index (SVI), are only available at the county- and census-tract levels. Due to Hawai'i's mostly rural population, census-tract areas are often quite large, and smaller communities' vulnerabilities are masked by surrounding areas. Because the Social Vulnerability Index does not accurately reflect many of the vulnerable populations across Hawai'i, there is consensus across state and county agencies that a need exists for higher-resolution demographic data. In response to this consensus, and following the methodology developed by the CDC for their index, a custom social vulnerability index was developed for the State of Hawai'i at the census-block level to better understand the vulnerabilities of communities in Hawai'i.

By developing a custom, census block–level social vulnerability index for Hawai'i and then applying the index to Lāhainā, researchers and planners were able to better understand some of the vulnerabilities of those most impacted by the Lāhainā fire in August 2023. The fire exposed social vulnerabilities within the Lāhainā community, revealing inequities that intensified the crisis and hindered evacuation and emergency response. The disaster highlighted critical gaps in disaster preparedness among marginalized groups, especially the elderly, underscoring the need for effective communication and timely assistance. Environmental factors, such as the area's susceptibility to wildfires, drought, and high winds, further stress the importance of disaster preparedness and the development of pre-disaster strategies to support those requiring additional assistance before, during, or after a disaster. Initial findings related to Lāhainā's SVI data indicate that areas in the community most impacted by the 2023 Lāhainā fire included higher percentages of unemployment, people living in multiunit housing, single-parent households, and people without access to a vehicle. This effort highlights the importance of having an SVI framework tailored to Hawai'i's landscape so that small but meaningful community differences can be identified, allowing for appropriate pre-disaster interventions to be implemented for those with the greatest need of support. Ultimately, this initiative seeks to foster resilience and equity, ensuring that vulnerable populations are better prepared for and supported during emergencies and contributing to a more sustainable future for all communities in Hawai'i.

This presentation focuses on the development of this custom, census-block level social vulnerability index for Hawaiʻi and the vulnerabilities identified using this tool within the areas most impacted by the 2023 Lāhainā fire.

Investigating Driver Diversion Behavior During Weather-Related Events and Emergency Evacuations

James David Fuller, Louisiana State University

Islands and coastal areas are particularly vulnerable to extreme weather events and natural disasters, and the resilience of their transportation networks may be truly tested, especially during emergency evacuations. Both commonly occurring adverse weather events and emergency evacuations are frequently characterized by traffic slowdowns and congestion, as well as an increased risk of crashes and other incidents impeding the flow of traffic. In such situations, some drivers will decide to reroute to an alternate path in order to reach their destination or at least to maneuver around the congested areas. However, the factors and influencers behind these en route diversion decisions are not yet fully understood. To improve our ability to predict and model route choices under weather-related disruptions, this study utilizes stated preference driver survey data from four countries with islands and coastal areas around the Pacific Ocean (United States, Australia, Japan, and China) to assess the most significant factors relating to diversion decisions in adverse weather and emergency evacuation scenarios. Regression models were also built to investigate the characteristics of behavior change between commonly occurring weather events and more rarely occurring natural disaster–related evacuations, as well as the most influential factors related to these changes in behavior. Developing a better understanding of how drivers will adapt their routing strategies in response to unexpected blockages and closures during severe climate-related events is critical in ensuring the ability of transportation authorities to accurately plan and orchestrate recovery efforts. Improving our ability to model route choice under such disruptive scenarios will allow us to predict the effects of a variety of disaster scenarios on traffic flow in coastal networks and work toward creating more resilient infrastructure, especially for our most vulnerable communities.

Aligning Plans for Coastal Hazard Risk Reduction

Roberto Porro, *FEMA Headquarters*; **Jesse Schofield**, *FEMA Region 9*; **Emily Breen**, *FEMA Region 9*

As natural hazard risks increase in island and coastal communities, planners play a critical role in assessing current and future risks and identifying ways to reduce them. Challenges such as data availability, disaster frequency, and planning capacity make adapting to coastal hazards, particularly in island settings, difficult. Fostering coordination across planning sectors can help overcome these challenges and maximize planning capacity. Aligning existing planning processes that would otherwise occur in distinct siloes can also minimize conflicting strategies and help make the most of available federal resources and opportunities to reduce risk. This presentation provides participants with an overview of recent research highlighting the planning challenges across islands and the resources available to help plan alignment efforts at the state, territory and local level. The presentation highlights FEMA's recently published Coastal

<u>Enhancement Strategies and Hazard Mitigation Plan Alignment Guide</u>, showcasing opportunities and examples for coordination across coastal management and hazard mitigation planning, especially in island settings.

Amerika Samoa Disaster Resilience Summit—Community Outreach Initiative

Sandi Tonumaipea, Office of Disaster Assistance and Petroleum Management

Under the directorship of Lisa Tuato'o, the Office of Disaster Assistance and Petroleum Management started the Amerika Samoa Disaster Resilience Summit in 2022. This event is our community's largest outreach event, consisting of leadership meetings, emergency stakeholders panel discussions, training sessions, and community outreach booths geared toward disaster and climate resilience. This event serves as a hub to network and share best practices, lessons learned, and empower our community with the resources to reduce the risk of loss of life and property. The success of our Disaster Resilience Summits is based on the effective collaboration among our hazard mitigation stakeholders, emergency support–function agencies, and climate change subject-matter experts. With the outpouring of support from our local community, regional leaders, and federal partners, we are planning our fourth annual Disaster Resilience Summit to keep our community engaged and informed.

2:30 to 4 p.m.

Talk Story

Rebuilding Lāhainā's Shoreline Out of Harm's Way – One Relationship at a Time: Respecting Property Rights as well as Preserving Our Coastal and Cultural Environment from Future Coastal Erosion Through a Socially-Derived, Shoreline-Rebuilding Strategic Framework

James Buika, Maui County Planning Department

The August 8, 2023, Lāhainā wildfire (FEMA-DR-4742-HI) in Maui, Hawai'i, exposed a second climate-caused hazard impact—coastal erosion—along a four-mile stretch of vulnerable shoreline exacerbated by extreme episodic winter storms and compounded by rising sea level. Approximately 166 shoreline parcels have been impacted by the wildfire over a four-mile coastal stretch that includes a destroyed, 11-parcel waterfront historic-commercial district. Our task to achieve resiliency is, at a local level, how and where do we rebuild so that in seventy years, at the turn of the century, Lāhainā town is a thriving, vibrant business and cultural center? We have an opportunity to create a resilient and thriving ecosystem while addressing the socioeconomic issues uncovered by this impactful and wide-ranging disaster.

This session will report on the development and progress achieved with the Maui County Planning Department's Strategic Shoreline-Rebuilding Framework to rebuild the Lāhainā shoreline to respect and protect property rights as well as preserve coastal and cultural resources impacted by the wildfire to the extent practicable. This Shoreline-Rebuilding Strategic Framework is based on 1) new regulatory shoreline rules to account for rebuilding regionally

outside of an Erosion Hazard Line generated for 3.2 feet of sea level rise projected to the year 2100; 2) protecting people's property rights to avoid a takings through granting rebuilding on a minimum buildable area located on the mauka portion of vulnerable shoreline parcels; and 3) accounting for owners' rebuilding questions and unique rebuilding situations through individual interviews and one-on-one discussions to answer "what" can be rebuilt, "where" it can be rebuilt, and "how" and "when" it can be rebuilt. This social dataset is recorded continuously as lessons learned to create resilient communities for our island environments.

2:30 to 4 p.m.

Working Session

Developing and Integrating Invasive Species Protocols in Pre-Disaster Planning, Response, and Recovery to Build Pacific Island Resilience to Climate Change

> **Elliott Parsons**, Pacific Regional Invasive Species and Climate Change and Pacific Islands Climate Adaptation Science Center, University of Hawaiʻi at Mānoa; **Todd Smith**, Animal and Plant Health Inspection Service, U.S. Department of Agriculture; **MJ Mazurek**, Ecological Services Program, U.S. Fish and Wildlife Service; **Franny Brewer**, Big Island Invasive Species Committee; **Heather Kerkering**, Pacific Islands Climate Adaptation Science Center, U.S. Geological Survey; **Ashley McGuigan**, Department of Natural Resources and Environmental Management and College of Tropical Agriculture and Human Resources, University of Hawaiʻi at Mānoa and Southwest Climate Hub, Institute of Pacific Islands Forestry, U.S. Department of Agriculture; **Christopher Rosario**, Biosecurity Division, Guam Department of Agriculture; **Samuel Goldstein**, Surveillance and Emergency Response Program, National Wildlife Disease Program (Hawaiʻi/Guam/Pacific Islands)

Climate change poses a major threat to the people and ecosystems of the Pacific region in the form of extreme weather events such as severe storms. Climate change is altering the dynamics of these extreme events across the Pacific region, and their negative impacts can be exacerbated by invasive species, further reducing the resilience of Pacific Island communities. The linkages between disasters, climate change, and invasive species have not been adequately addressed; however, gaps are created in our ability to effectively prepare for, respond to, and recover from climate-change amplified disasters. The implications of these gaps are severe for Pacific Island communities, as magnified impacts from invasive species threaten food security, human health, the economy, cultural practices, and the services that healthy ecosystems provide.

In this working session, recent extreme storms are highlighted as case studies to generate lessons learned for advancing climate-related disaster planning, response, and recovery in the Pacific, especially as related to invasive species. We will review these case studies and discuss preparations taken, the risks from invasive species, and the associated disaster response, including whether responses to the storm led to the introduction, spread, or increased impacts of invasive species. Next, we present a new white paper by the National Invasive Species Council on disasters and invasive species and discuss how it can be a resource for reducing

risks from invasive species in a disaster. Finally, in small breakout groups, we generate ideas for how invasive species prevention and mitigation can be more effectively integrated into pre-disaster planning, response, and recovery.

4:15 to 5:15 p.m.

U.S. Government Panel

5:15 to 7 p.m.

Reception and Poster Session

Using Uncrewed Aerial Vehicle–RGB Imagery to Assist in Post-Wildfire Damage and Recovery Assessments for Reforestation Sites on Guam

Jonelle Sayama, University of Guam; **Keanno Fausto**, University of Guam

On Guam, wildland fires are estimated to have burned 23 percent of total land area between 2015 and 2021 (PICASC 2023). This poses significant risks for the island's vegetation systems, coastal health, and overall quality of life. Since native plants are inadequately equipped to withstand multiple, frequent burning events, much of Guam's forests are transformed into nonnative grasslands or stripped of vegetation altogether after a wildfire. The emergence of these post-fire badlands leaves the areas susceptible to erosion during heavy rainfall events, which can lead to terrestrial sediment being deposited into coastal areas, ultimately affecting coral reefs and fisheries. Due to the impacts that wildfires pose to the island and its people, it has become increasingly crucial for resource managers to continue implementing innovations that advance existing post-wildfire monitoring and recovery strategies. One key site in Guam that has experienced recurrent wildfires is the As Gadao plantation in the southern village of Malesso'. The watershed site, which is part of the Manell-Geus Habitat Focus Area, recently burned on March 15, 2024, and led to the destruction of crucial vegetation and topsoil. In response, remote pilots from the University of Guam partnered with the Guam Department of Agriculture's Forestry and Soil Resources Division to deploy uncrewed aerial systems (UAS) and capture high-resolution imagery of the burn site. This poster illustrates three high-resolution orthomosaics of the As Gadao plantation throughout its pre-fire, post-fire, and post-recovery phases. The data provides insights on total burn area and recovery assessments, specifically in visualizing the fire direction, path of the fire, and potential ignition sites. This project aims to facilitate discussions regarding collaborative approaches to fire management and how the implementation of UAVs can complement current monitoring efforts to combat the complex issues that arise from wildfire activity on Guam.

From COVID–Affected to Climate Resilient: Empowering the Next Generation of Youth from Hawaiʻi to the Pacific Through the Transcending Barriers to Success in Economics (TBSE) Program in Islandwide Resilience Hub Planning

Miku Lenentine, CERENE, Kapi'olani Community College; **Sadichchha Shrestha**, University of Hawai'i at Mānoa; **Nimue Patton**, Kapi'olani Community College

The Transcending Barriers to Success in Economics (TBSE) Program, led by the Center for Resilient Neighborhoods (CERENE), is a multifaceted initiative designed to empower underrepresented students in Hawaiʻi by addressing barriers to academic success and career pathways in economics. Supported by key partners, including the University of Hawaiʻi System, the National Science Foundation, and the U.S. Department of Education, the program integrates circular economy principles and ʻāina-based approaches into economics coursework while emphasizing the importance of supporting service learning and community engagement. The program lifts up Indigenous Knowledge systems as part of the curriculum to offer students a comprehensive foundation in economic studies while addressing pressing socioeconomic and environmental challenges related to climate change, sustainability, and resilience.

One crucial aspect of the program is its role in resilience hub planning on Oʻahu, where students actively contribute to research and leadership development in their local communities. Through the CERENE–led community engagement as part of the City of Honolulu's Action 15 initiative, students engage in hands-on efforts to plan islandwide resilience hubs that provide community-driven responses to environmental hazards such as wildfires, flooding, and storms. This involvement addresses an important challenge in resilience planning—the lack of youth engagement—and empowers the next generation to take a leading role in local climate resilience efforts while integrating a specific focus on ʻāina-based and socioeconomic resilience.

This poster explores how the program's integration of Native Hawaiian and Pacific Islander perspectives informs student-led solutions that address the cultural, environmental, and economic needs of Pacific Island communities. By aligning with PRiMO's themes of pre-disaster recovery planning, housing and infrastructure resilience, and community resilience, the Transcending Barriers to Success in Economics program demonstrates how fostering youth leadership through educational and research opportunities can close the gap in youth participation and contribute to climate-ready solutions for Hawaiʻi and the Pacific.

Steel and Carbon Fiber Reinforced Polymer–Prestressed Concrete Girders in Simulated Hydrocarbon Fire

Jun Wang, University of Hawaiʻi at Mānoa

This paper presents the implications of a hydrocarbon fire on the behavior of bridge girders prestressed with either steel strands or carbon fiber–reinforced polymer (CFRP) tendons. Stemming from a recent bridge fire that occurred in Lakewood, Colorado, numerical investigations are conducted employing a computational method called agent-based modeling to understand the intricate responses of these girders under thermomechanical loading. As the convection and radiation of surroundings are transformed to conductional thermal energy, the temperature of girder concrete rises, and the internal temperature differentials dwindle over time. Thermally induced damage in the prestressing elements is a function of distance from the

surface heat. When loaded without thermal distress, the moment-carrying mechanism of the steel- and CFRP–prestressed girders is analogous; however, with the presence of heat, the development of lever arms and tensile strains of the girders demonstrates palpable differences. The maximum usable strains of the steel and carbon fiber–reinforced polymer vary with the degree of thermal exposure thereby dominating the load-carrying capacity of the girders. From a design perspective, no evidence is noted to distinguish the performance of the steel- and CFRP–prestressed girders under service loadings, and contrary to commonplace notion, their fire ratings are found to be comparable because of sequential heat transfer.

Maui's Native Nursery Network
Barbara Payne, *FEMA Region 9*

The Maui Native Nursery Network (MNNN) is a coalition of nonprofit and community groups consisting of nurseries, gardens, and small farms that engage in agroforestry, watershed restoration, plant and tree giveaways, invasive species management, soil remediation, and educational programming for youth on ancient Polynesian subsistence farming techniques. These groups are stewards of ʻāina (land) and wai (water), accomplishing small wins for Maui's natural environment with very little funding or staff capacity. Without these groups tending to their small plots of land and stewarding Maui's forests, the island's natural environment would degrade very quickly, causing Maui to lose many endemic and canoe species of plants and trees and harshly affecting the community's cultural bond with their island heritage. For Maui and all Hawaiian islands, nature is culture and culture is nature.

Disasters, in many ways, allow us to reimagine the capabilities of communities and give the land a chance to settle and renew. Almost two years after the devastating fires of 2023, the natural and cultural resource efforts have coalesced; one of those results being the creation of the Maui Native Nursery Network. The 'member' organizations are not exhaustive as many natural and cultural resource partners indirectly support efforts with symbiotic missions (e.g., terrestrial stream monitoring for coral reefs). The network became the foundation for a larger ʻāina network developed by the Maui County Department of Agriculture to capture all natural and cultural revitalization and conservation efforts, furthering the mission of wildfire recovery while highlighting those organizations and individuals who have been leading the way for many years.

Robust *kōkua* (help) and financial support would allow each organization to expand their footprint or programming, increase their staffing capacity, and grow their inventory of equipment, supplies and materials, which would bolster the coalition's capability to achieve true resiliency through crucial collaboration. Maui's experts, from the descendants of voyagers to newly formed, Native-led nonprofit organizations, have embraced the Maui Native Nursery Network, as it is *their* network, *me ka haʻahaʻa* (with humility) presented here at the 2025 PRiMO Conference.

Enhancing Resilience Through Collaborative Management of Ciguatera in Hawai'i

Kelsie Kuniyoshi, University of Hawai'i at Mānoa Sea Grant

Hawai'i, and the Pacific region in general, faces growing challenges in food security and ecosystem resilience due to the increasing prevalence of Harmful Algal Blooms driven by climate change. These harmful algal blooms threaten both environmental health and cultural practices relating to marine resources; one of the modes in which this occurs is through the increased abundance of dinoflagellates such as *Gambierdiscus*, which has the potential to produce ciguatoxins. These dinoflagellates grow as epiphytes on macroalgae, so ciguatoxins bioaccumulate in fish and other seafood and can cause ciguatera poisoning in human consumers. There are many data gaps surrounding ciguatera poisoning, and it is often misdiagnosed or unreported, contributing to our lack of knowledge of ciguatera poisoning. Symptoms can be chronic, lasting for months or potentially a lifetime, so many individuals choose to avoid certain fishing areas or limit consumption of certain fish. As a result, ciguatera poisoning poses severe risks to human health, local fisheries, and food systems. Our project focuses on the spatiotemporal distribution of toxin-producing dinoflagellates, mainly on O'ahu, to better understand why some areas, such as the North Shore of Kaua'i, are hotspots for ciguatera poisoning cases. We use a coalition-based approach by integrating local knowledge and collaborating with community members, practitioners, government agencies, and researchers. Previous studies have mainly focused on fish toxicity, whereas our project focuses on algae-producing ciguatoxins. Preliminary results suggest some genera, such as *Dictyota* and *Halimeda*, tend to host higher amounts of toxin-producing epiphytes than others. Based on these results, we hope to leverage community collaboration to promote environmental, cultural, and sustainable food resilience in the face of climate change and ecological degradation.

Resiliency, Recovery, Sustainable Systems Solutions – Partnering for Renewable Community Microgrids: Lesson Learned and Conversations

Suzanne Maxx, World Team Now; **Albert Boulanger**, World Team Now

In 2015, World Team Now, a nonprofit registered in California, New York, and Hawai'i, organized a strong partnership and submitted a proposal for a renewable energy community microgrid for the New York Prize. The proposal was called the "Orangetown Green Microgrid," located at the fringe of Orange and Rockland Utility in New York.

The microgrid concept grew from World Team Now's initiative to collaborate with Lamont Doherty Earth Observatory (LDEO) to use renewable energy to make its campus more resilient. It became apparent that a microgrid better addressed the shared resiliency needs of a community at the fringe of a distribution grid. The proposed microgrid had stakeholders including Rockland County, the police and fire departments, a special needs camp, a data center, libraries, the Lamont Doherty Earth Observatory, other university campuses, and several companies. The microgrid included multiple renewable energy sources.

World Team Now assembled a stellar technical partnership including expertise in microgrids, power distribution design, and modeling, building energy efficiency and deep retrofits, wind and solar energy, marine civil engineering (tidal estuary flow energy), wastewater biogas, floating solar, and data and project management.

Through two town hall meetings, the town approved the proposal along with the approval of Orange and Rockland Utilities. The proposal was submitted but not selected in the first round of the New York Prize.

This poster shares our experience with enrolling the town and stakeholder entities, building a strong technical partnership, overcoming political challenges, and sharing further experiences with Fijian outer-island tribes, clans, and local villages who considered or deployed community microgrids for renewable resilience, electricity sources, and to back up or support energy and water supplies and distribution. What happened in the past, what is possible for the future, and the gift that is the "present" opportunity in Hawai'i.

Framework for Probabilistic Risk Assessment and Resilience Enhancement of Coastal Roadways to Storm Surge Flooding

Saqib Gulzar, Colorado State University Pueblo; **Md Rashad Islam**, Colorado State University Pueblo

Coastal roadways are highly susceptible to storm surge flooding, a risk amplified by the increasing frequency and intensity of extreme weather events driven by climate change. This study proposes a comprehensive probabilistic framework to assess the risk to coastal roadways and enhance their resilience. The framework integrates hazard characterization, vulnerability analysis, and risk quantification, utilizing storm surge data modeled through a Generalized Pareto Distribution from 39 tropical cyclones and roadway-fragility models that account for distance from the shoreline and inundation duration. Further, a case study of the North Carolina shoreline is presented using the proposed framework. The analysis identifies high-risk zones and evaluates the probability of roadway failure under varying conditions, providing critical insights into the relationship between roadway design, proximity to the coast, and exposure to storm surges. These findings inform targeted strategies for enhancing infrastructure resilience, such as prioritizing reinforcement efforts in high-risk areas and revising evacuation planning based on risk profiles. This study aims to contribute to a deeper understanding of coastal roadway vulnerabilities and offers a robust foundation for stakeholders in transportation planning, disaster management, and climate adaptation. The proposed approach underscores the importance of integrating probabilistic risk assessment into infrastructure resilience planning, ensuring more effective responses to the challenges posed by climate change and extreme weather events.

CARM and Go! Bridging the Gap Between Academia and Natural Resource Management Through a Coproduction Fellowship Program

Romina King, Pacific Island Climate Adaptation Science Center, University of Guam; **John I. Borja**, Pacific Island Climate Adaptation Science Center, University of Guam

The Pacific Islands Climate Adaptation Science Center's Climate Adaptation for Resource Management (CARM) program is a novel fellowship and continuing education opportunity for natural resource professionals in Guam to bolster their professional capacity through higher learning in academia. While a traditional graduate fellowship bridges a student's education from

the undergraduate level to the graduate level, or graduate level to doctoral level, the CARM program works with natural resource agencies to seek out individuals with substantial field experience who can benefit from receiving advanced education (e.g., a bachelor of science, master of science, or master of arts degree) and further build technical capacity of the agency they serve. Selected participants translate their priority management projects into research questions related to climate change and climate adaptation, which then become the focus of their required graduate thesis. This highly efficient coproduction effort allows participants to develop and hone effective communication techniques in collaborations among scientists, natural resource management, and academia. This presentation will show how the CARM model is effectively applied between local agencies and the University of Guam, which is the only four-year college institution in the Micronesia region.

Green Growth Partnerships to Strengthen Island Resilience
Samantha Happ, Local2030 Islands Network

The Local2030 Islands Network is a platform for island-led solutions, connecting islands in new ways to address climate change and enhance resiliency. Building on the success of the Hawaiʻi Green Growth initiative, the recently launched "Green Growth Partnership Community of Practice draws on the network's core mission and unique experience in building lasting partnerships by providing a space for interested members to explore tools, pathways, and readiness support to help members in measuring Sustainable Development Goal (SDG) outcomes in locally and culturally appropriate ways. A community of practice is an interactive and member-driven network of people who come together to learn and support individual and group goals. We collaborate with diverse experts to provide targeted technical assistance on island-led priorities. Our community of practice allows the Local2030 Islands Network to connect policy and practice with concrete actions and peer-to-peer knowledge sharing.

For the network, "Green Growth" reflects a process in which an island is implementing a sustainability agenda determined through the identification of their own local goals and measures. In this context, it refers to a movement of islands working toward sustainable pathways; however, each island can determine what they call their respective partnership. The first movement toward green growth partnerships was in the creation of *Hawaiʻi Green Growth* following the 2011 Asia Pacific Economic Cooperation (APEC) meeting in Honolulu and the subsequent launch of the Aloha+Challenge, which was a political commitment toward sustainability by the state. This unique model inspired fellow Local2030 Island Network members—in particular Guam, which launched its own initiative (Guam Green Growth) in 2020, and other recent green growth partnerships in Palau and the Commonwealth of the Northern Mariana Islands with partnerships underway in other islands. Additional Pacific Islands within the network, including the Federated States of Micronesia and the Republic of the Marshall Islands, have called for the creation of such partnerships. This community of practice provides a space for these islands to share and reflect on the unique approaches being undertaken to build trust-based, public-private partnerships and community engagement and identify "right-size" priorities that will drive the agenda of this community of practice going forward with an aim to amplify ambitions toward planning for and achieving a more sustainable Island Earth. You can learn more about this community of practice and others, as well as processes and tools to visualize goals and track progress, at this poster session and online at www.islands2030.org.

Local2030 Islands Network – Achieving a More Resilient Future for Island Earth
Samantha Happ, Local2030 Islands Network

The Local2030 Islands Network is a collaborative platform for island-led solutions, connecting islands in new ways to address climate change and further sustainability priorities. The Network provides demand-driven, virtual learning and sharing opportunities through facilitation of communities of practice and events and webinars, highlighting "best practice" island examples, and tailored support for implementation of the global sustainable development goals through locally driven, culturally informed solutions. Launched during the 74th U.N. General Assembly, the network builds on a legacy of islands addressing local, regional, and global challenges. With continued support from the U.S. Department of State and technical assistance from key U.S. departments, agencies, and programs, including NOAA, Sea Grant, NOAA's Climate Adaptation Partnership Regional Integrated Sciences and Assessments program, the National Renewable Energy Laboratory, the U.S. Department of Energy, the U.S. Department of the Interior, the U.S. Agency for International Development, the U.S. Environmental Protection Agency, and others, the network facilitates and supports both capacity building and the delivery of technical assistance in U.S. islands and Small Island Developing States globally. This poster provides a high-level overview of the Local2030 Island Network and emphasizes engagement opportunities relevant to PRiMO's audience, theme, and ongoing work to build resilience in the Pacific region—outcomes that also further ambition for and support progress toward a more sustainable Island Earth.

The network's portfolio spans three themes: localization, regeneration, and resilience-building and implements these cross-cutting initiatives through various activities, including communities of practice for knowledge exchange, the coordination of technical assistance, and the creation of public-private partnerships that anchor sustainable development goal dashboards in islands. The communities of practice are a platform to share experiences and knowledge in a peer-to-peer way while tailoring engagement to ensure inclusive and place-based cultural and contextual experiences. Our approach emphasizes building top-down and bottom-up engagement for systems-based solutions planning and implementation, as well as measuring data-driven policy progress through localized sustainable development goal dashboards. You can learn more about these approaches, processes, and tools to visualize goals and track progress, as well as opportunities to engage in the network's five communities of practice, at this poster session and online at www.islands2030.org.

Development of the Red Hill Registry
Lisa Webster, Red Hill Registry; **Mia Comeros**, Water Resources Research Center, University of Hawaiʻi at Mānoa; **Tara Sutton**, Office of Strategic Health Initiatives, University of Hawaiʻi; **Rosana Weldon**, Office of Strategic Health Initiatives, University of Hawaiʻi; **Catherine Pirkle**, Thompson School of Social Work and Public Health, University of Hawaiʻi; **Kaeo Tam**, University Health Partners of Hawaiʻi

The Red Hill Bulk Fuel Storage Facility, located between the Moanalua and Waimalu aquifers, contains 20 fuel tanks, each measuring 250 feet tall with a capacity of 12.5-million gallons of jet fuel per tank and a combined total capacity of 250-million gallons. The tanks are situated approximately 100 feet over the aquifer, 75-plus years old, beginning to fail, and the concrete

surrounding them is porous and cracking. The first reported major leak occurred in 2014, with 27,000 gallons of jet fuel spilled. The most recent spill, in November 2021, saw over 5,000 gallons of jet fuel leaking into the ground and contaminating drinking water.

The U.S. Navy operates the facility, and there are numerous federal, state, and county agencies working to address issues related to these spills and prepare plans to close the facility. Several grassroots organizations are also involved. This Navy water system serves approximately 9,600 households, and the workforce and resident population is estimated to be 93,000 people.

This poster shares one effort to address community concerns regarding exposure to jet-fuel-contaminated drinking water, namely the Red Hill Registry. The University of Hawaiʻi (UH) entered into a five-year cooperative agreement with the National Center for Disaster Medicine and Public Health to create this registry for individuals impacted by the Red Hill water crisis. The goals include 1) connecting the community to health and social services; 2) developing targeted educational materials and programs; and 3) tracking participant health status and gathering information on how fuel exposure may impact health. Beginning in mid-2025, the Registry will seek to enroll Department of Defense employees as well as civilian community members who were impacted by the Red Hill water crisis.

This effort is a community-driven collaboration, facilitated by the UH System through various units, including the UH System's Office of Strategic Health Initiatives, John A. Burns School of Medicine, Water Resources Research Center, Thompson School of Social Work and Public Health, and University Health Partners of Hawaiʻi.

Guam SandFest: Leveraging Partnerships for Sustainable Tourism and Environmental Stewardship

Steven Dierking, Bureau of Statistics and Plans, Guam Coastal Management Program

The inaugural Guam SandFest 2024 successfully demonstrated the power of leveraging partnerships and creating strategic added value by transforming the annual Guam International Coastal Cleanup event into a vibrant tourism attraction. This event generated economic benefits for the island while fostering a strong sense of community ownership and environmental stewardship.

By seamlessly integrating art, culture, and environmental education, Guam SandFest attracted both residents and international visitors. It showcased a coastal- and marine-themed Sand Sculpting Competition, where teams, schools, corporate groups, and community organizations used their creativity and skills to build intricate sand sculptures. Professional, off-island sand sculptors also provided on-site demonstrations and workshops, inspiring attendees to connect with nature and express themselves artistically.

Guam SandFest also provided a platform for local businesses, nonprofit organizations, government agencies, and artisans to showcase their outreach projects, food, and locally made products, which generate revenue streams, support the local economy, and raise awareness about the delicate balance of Guam's coastal ecosystems.

Leveraging federal funding and the support of local businesses, community organizations, and government agencies, Guam SandFest fostered strong partnerships that amplified the event's

impact. These collaborations ensured community-wide participation, enhanced event logistics, and facilitated the development of sustainable tourism initiatives. Guam SandFest aims to solidify its position as a signature event and will continue to inspire and empower the community to become active stewards of their coastal environment.

The Puerto Rico Disaster Research Network: Bringing Scholars Together to Strengthen the Disaster Risk Reduction Efforts on the Island

Fernando I. Rivera, Puerto Rico Research Hub, University of Central Florida; **Sara Belligoni**, Puerto Rico Research Hub, University of Central Florida; **Deyaneira Hernandez Mendez**, Puerto Rico Research Hub, University of Central Florida; **Elian Morales**, Puerto Rico Research Hub, University of Central Florida

This research project aims to comprehensively catalog the scholarly literature related to disasters in Puerto Rico, motivated by the attention given to the island's vulnerability following Hurricane Maria in 2017. The team conducted an extensive search for scholarly articles published between 2014 and 2024 using key terms such as hurricane, landslides, tsunami, earthquakes, flooding, and natural disasters (although the team prefers the term "natural hazards" or "disasters," they acknowledged the continued use of "natural disasters" in scholarly work). The search resulted in the construction of a detailed database containing pertinent articles, each reviewed and selected based on the team's expertise and reading of the articles themselves to ensure relevance to the theme.

The database includes critical information for each article, including title, authors list, affiliations, and contacts, year of publishing, journal, abstract, summary, language, database, source, and any relevant notes. Through this process, the team identified scholars and institutions with a strong focus on disaster research in Puerto Rico. As a result, 216 articles were included for the hurricane keyword, 4 for tsunami, 40 for natural disasters, 51 for earthquakes, and 43 for flooding. The University of Puerto Rico (UPR) and RAND Corporation were also identified as the main institutions contributing to literature in this field.

Despite growing interest in Puerto Rico's vulnerability to disasters, significant gaps remain in literature. Much of the existing research focuses on short-term, post-disaster assessments, often neglecting long-term recovery processes and the socioeconomic impacts of recurring disasters and compound crises. Additionally, a lack of comprehensive studies exist that integrate multiple types of natural hazards, such as hurricanes, flooding, and earthquakes, in the context of the island's unique geographic and sociopolitical conditions. Moreover, interdisciplinary studies that can bridge environmental and disaster science with policy, community resilience, and local, community-led responses and adaptation strategies are underexplored.

The project culminates in the creation of the Puerto Rico Disaster Research Network, which is designed to foster interdisciplinary collaborations and networking opportunities for researchers. This initiative aims to enhance future research and response strategies for disaster management in Puerto Rico by connecting experts and facilitating collaborative efforts across institutions and disciplines.

Greenways for Disaster Recovery and Resilience

Dingyi Liu, University of Hawaiʻi at Mānoa; Cuong Tran, National Disaster Preparedness Training Center; Ethan Daniel Santiago, University of Hawaiʻi at Mānoa; Eric Yamashita, National Disaster Preparedness Training Center; Karl Kim, University of Hawaiʻi at Mānoa

Greenways are transportation systems designed to improve physical, social, environmental, and economic health. This paper examines greenways as a strategy to support disaster recovery, mitigation, and adaptation. Greenways can be used to support community resilience in the face of climate change and other hazards. Design criteria for greenways are evaluated and applied to the community of Lāhainā, which experienced a devastating fire disaster in August 2023. An online, nationwide survey of emergency managers and community development subject-matter experts was conducted to examine criteria surrounding fire safety, coastal hazards, recreation, and proximity to activity generators. Roughly 157 valid responses were received, and participants provided individual rankings of the four criteria. Using the Analytic Hierarchy Process multi-criteria, decision-analysis method by Goepel (2018), proximity to activity generators was calculated to have the most significant importance in terms of weight at $34.9 \pm 10.9\%$, followed by safety from fires ($29.4 \pm 10.3\%$), safety from coastal hazards ($23.2 \pm 6.0\%$), and recreational amenities ($13.2 \pm 2.8\%$). The findings highlight the importance of community involvement, local resources, and long-term benefits in greenway designs, emphasizing hazard mitigation in fire and coastal zones to transform vulnerabilities into assets. This research provides a framework for designing greenways that serve recreational purposes and enhance community resilience and adaptability to future challenges. The Lāhainā fire disaster is a valuable case study for resilient greenway design for municipalities to prevent future loss of life and property. The West Maui Greenway Plan should incorporate resilient measures in support of Lāhainā's recovery.

Toward an Autochthonous, Community-Centric Approach to Disaster Risk Reduction: A Framework for Engaging with Communities in Research Collaborations

Jenniffer M. Santos-Hernández, Disaster Research Center, University of Delaware; Francisco Vidal Franceschi, University of Puerto Rico-Río Piedras; Isaura Cortés Rodríguez, University of Puerto Rico-Río Piedras; Gianni Rodríguez Roque, University of Puerto Rico-Río Piedras

Approaches to community engagement for disaster risk reduction vary widely, with growing interest among governments and emergency management organizations in integrating these efforts to promote disaster resilience and risk reduction. Community engagement has the potential to enhance measurement validity, reduce social vulnerability to disasters, and cocreate effective disaster mitigation and climate change adaptation solutions through convergence science. However, there is a need for a deeper understanding of community capacities, the challenges they face, and the means to build and sustain respectful, reciprocal relationships. This poster discusses some of the key challenges that led to our collaboration in the Rising Voices, Changing Coasts: Earth and Indigenous Science Puerto Rico Hub. It highlights our shared relevance and the practice of convergence science, which merges ideas, approaches, technologies, and knowledge to drive innovation and discovery that is meaningful,

autochthonous, and inclusive of the perspectives of residents, government officials, and private-sector representatives from the outset and throughout the scientific process.

Wednesday, March 19, 2025
Conference Day 2

9 to 10:15 a.m.

Panel

Coastal Protection, Emergency Response, and Coral Reefs in Hawaiʻi
> **Paulo Maurin**, NOAA Office for Coastal Management; **Eric Conklin**, The Nature Conservancy; **Lara Noren**, University of Hawaiʻi at Mānoa; **Honor Weber**, Hawaiʻi Coral Reef Initiative; **Ryan Okano**, Hawaiʻi Division of Aquatic Resources; **Kelsey Yamanaka**, HIEMA; **Janan Reily**, FEMA

Coral reefs are part of the natural critical infrastructure and a provider of food security to many island jurisdictions in the Pacific region, and several island jurisdictions have declared their reefs to be part of their critical infrastructure along with FEMA's growing recognition of the role coral reefs play to safeguard many island societies. Climate change is making reefs both more vulnerable *and* more critical than ever before. In Hawaiʻi, there have been major efforts to proactively plan coral restoration in response to natural disasters and for long-term coastal protection. This panel session provides an overview of three separate but complementary ongoing collaborative planning processes:

1. Funding disaster response: Discussion about obtaining an insurance policy for coral reefs and the role of emergency response funds in funding emergency restoration after a natural disaster
2. Creating a response network: Creating and preparing a distributed emergency response network to respond to damaged coral reefs after major storms and planning exercises for finding organizational gaps
3. Planning Restoration for Coastal Protection: A development plan for long-term coral restoration to increase coastal protection by working with local stakeholders. This plan will be released in early 2025. This plan includes site and project evaluation metrics, restoration goals and objectives, and an overview of nascent pilot projects.

9 to 10:15 a.m.

Working Session

Navigating Ocean Observations: PacIOOS Empowers Ocean Users with Data Tools and Services

> **Lauren Kaiser**, Pacific Islands Ocean Observing System

The Pacific Islands Ocean Observing System (PacIOOS) is dedicated to empowering ocean users and communities through the provision of accessible data tools and services. This session aims to familiarize participants from across the Pacific region with the system's comprehensive suite of oceanographic and environmental data resources. Attendees will gain hands-on experience with the PacIOOS Voyager, an interactive mapping tool that provides access to a wide range of data including weather, wave conditions, water quality metrics, and shoreline dynamics. The session guides users through the process of accessing, downloading, and utilizing data for their specific needs. Emphasis will be placed on demonstrating the application of interactive tools for visualizing sea level rise scenarios and wave-driven flooding events. Participants are encouraged to bring their own laptops to fully engage with the hands-on aspects of the tools. This session not only aims to enhance participants' proficiency in utilizing existing PacIOOS resources but also seeks to foster dialogue on future data service needs by inviting input from regional partners to shape the evolution of PacIOOS offerings. During this session, participants will be equipped with the knowledge and skills to leverage PacIOOS data tools effectively, supporting informed decision-making and community resilience in the face of environmental challenges.

9 to 10:15 a.m.

Panel

Pili Nā Moku: Aligning Holistic Environmental Stewardship, Community Resilience, and Disaster Risk Reduction

> **Darren Lerner**, *Hawaiʻi Sea Grant*; **Katy Hintzen**, *Hawaiʻi Sea Grant*; **Brad Romine**, *Hawaiʻi Sea Grant*; **Kevin Chang**, Kuaʻāina Ulu ʻAuamo (KUA); **Emma Yuen**, *Division of Forestry and Wildlife, Hawaiʻi Department of Land and Natural Resources*

Funded through NOAA's Climate Resilience Regional Challenge, the recently initiated project *Pili Nā Moku* will invest $68.5 million in ʻāina restoration through community governance to advance climate resilience in the Hawaiian Islands. The five-year project, initiated in October 2024, is focused on community-based resilience for Hawaiʻi and centered on *moku* or regions chosen because of their high potential to promote community-centered stewardship and cultural practices in areas that have lacked historic climate-adaptation investments.

The project's resilience vision is based in the *moku* system, a framework for traditional Hawaiian land tenure and biocultural stewardship. Through extensive partnerships, we envision a reinvigorated *moku* system, applied in a contemporary context to build a resilient future for the Hawaiian Islands. This requires investing in both the functionality of interconnected ecosystems *mauka* to *makai* (from mountain to sea) and of governance systems that balance local place-based knowledge and stewardship with centralized decision-making.

The project activities are led by an initial collaborative of twelve partners spanning state and county government agencies, academia, national and local nonprofit organizations, and collectives of Indigenous and local stewards. Our intent is to work together to expand the list of partners and build an enduring program that will support vital community governance and environmental stewardship long beyond the five-year funding provided by NOAA.

The session provides an overview of the project goals and planned activities and features representatives from the Hawaiʻi Sea Grant project leadership team, select project partners, and NOAA. Discussion between the panel and audience will focus on the intersection of holistic environmental stewardship and community resilience, including for disaster risk reduction and addressing barriers to community-centered restoration and resource stewardship.

9 to 10:15 a.m.

Talk Story

Equitable, Resilient, and Climate-Adaptive Housing Ideas and Innovation Lab
      Nicole Boothman-Shepard, AECOM; **Karl Kim,** National Disaster Preparedness Training Center; **Sarah Harris,** City and County of Honolulu

This session features use cases of sustainable, resilient, and climate-adaptive housing solutions. Single and multifamily use cases will act as a platform for idea generation of pre- and post-disaster housing solutions that are designed to absorb stresses and shocks, improve quality of life and natural ecosystems, and intended for the unique contexts faced in remote island communities.

10:30 a.m. to 12 noon

Panel

Partnering with Nature: Funding for Nature-Based Solutions Using FEMA's Hazard Mitigation Grants
      Janan Reilly, *FEMA*

With increasing impacts from disasters and climate change, a demand exists for more innovative and nature-based solutions to adapt and reduce risk for communities. FEMA's

hazard mitigation grant programs support this need by updating programs and policies and prioritizing projects with nature-based solutions and climate change considerations for funding. This session highlights recent changes to FEMA's hazard mitigation grant programs to promote and support nature-based solutions, examples of recently funded projects, and tips and tricks for grant applications with nature-based solutions. Speakers will discuss opportunities for island communities to leverage FEMA and other federal opportunities to support nature-based solutions and highlight some recent partnerships including coral reef restoration for risk reduction.

10:30 a.m. to 12 noon

Panel

Achieving Disaster Resilience: Strengthening Communities

Moderator: **Karl Kim**, National Disaster Preparedness Training Center; **Nicole Boothman-Shepard**, AECOM; **Van Romero**, New Mexico Institute of Mining and Technology; **Hilary Nixon**, Mineta Transportation Institute; **Ruben Pena**, ENSCO; **Haizhong Wang**, Oregon State University

Recent climate-related disasters, including the 2023 Lāhainā fire disaster, highlight the need for comprehensive resilience strategies addressing community needs and critical infrastructure. This session explores practical approaches to enhance preparedness, response, and recovery, focusing on transportation resilience alongside broader disaster risk reduction strategies. Participants will learn about community-focused and actionable frameworks integrating traditional knowledge and modern technologies and examine global case studies showcasing effective, inclusive planning processes. The session provides insights into fostering partnerships, mobilizing resources, and developing localized solutions. Attendees will leave with tools and strategies from a panel of experts to build resilient systems for their communities.

10:30 a.m. to 12 noon

Panel

Beyond the Hub: An Ecosystem of Community Resilience in Hawai‘i

Moderator: **Miku Lenentine**, Kapi‘olani Community College and O‘ahu Islandwide Resilience Hub Network; **Gail Suzuki Jones,** Hawai‘i State Energy Office; **Ramona Mullahey,** U.S. Department of Housing and Urban Development; **John Vierra**, Hawai‘i Emergency Management Agency; **Colton Ching**, Hawaiian Electric Company; **Hale Takazawa,** Ferraro Choi Architecture and Planning; **Kathleen Pahinui**, Board of Water Supply and Neighborhood Board #27 (North Shore); **Renise Bayne,** American Red Cross, Hawai‘i Chapter; **Rachael Carrell**, Hawai‘i Food Bank

Community resilience in Hawai'i and the Pacific extends far beyond the efforts of individual hubs—it is the collective work of a diverse and interconnected ecosystem. From government agencies and nonprofits to utilities and educational institutions, these "spokes" form the support network that sustains and strengthens the critical work of individual resilience hubs serving their communities. Together, hubs and spokes address chronic stressors, such as housing crises and cultural preservation, prepare for acute challenges, like natural disasters and climate change impacts, and provide year-round support for resilience.

This session explores definitions of *resilience hubs and beyond* to examine how resilience hubs serve as localized anchors of preparedness and adaptation while their supporting ecosystem enables broad, sustainable impact. Panelists will highlight evolving roles and diverse configurations of hubs and related models—such as nodes, food hubs, and centers of resilience—and discuss how partnerships enhance their effectiveness. Drawing on culturally informed strategies and place-based planning, this conversation will demonstrate how collaboration ensures robust, adaptable, and community-driven solutions across Hawai'i and the Pacific.

Attendees will leave with greater clarity and insight into the vital connections between hubs and their broader networks, learning how this emerging ecosystem fosters resilience, empowers local leadership, and drives long-term community well-being.

1:30 to 3 p.m.

Individual Presentations

Restorative Aquaculture Options for Hawai'i
Todd Low, Hawai'i Department of Agriculture

The Hawai'i Department of Agriculture (HDOA) has integrated restorative aquaculture into its Aquaculture Development Strategy and will share its efforts to expand this untapped segment of aquaculture. The department's approach focuses on Indigenous seaweed production and nearshore rewilding that offer numerous benefits for both the environment and communities. The key advantages of this strategy are land-based production, nearshore ecosystem restoration, carbon sequestration, and biodiversity enhancement. The department will share several current and planned initiatives that can support and enhance existing conservation efforts.

The Valuation of Green Infrastructure for Wildfire Mitigation
Kiyomi Kawamoto, University of Hawai'i; **Masafumi Morisugi**, Meijo University; **Eric Yamashita**, University of Hawai'i

This study examines residents' value of green infrastructure to mitigate and prevent wildfires while considering community-based management. The risk of wildfire has been increasing in Hawai'i due to climate change. The 2023 Maui wildfire in Hawai'i, an event affected by complex

climate and infrastructure factors, reminded us of the importance of preparing for wildfires while considering the local environment. Green infrastructure measures are one of the nature-based solutions for climate mitigation using local natural resources. Conversely, green infrastructure needs to be maintained more frequently, because it needs to be managed within the local ecological system. To what extent will residents embrace green infrastructure and its management?

This study conducted a web-based survey in December 2023 for Hawai'i residents, and 267 valid samples were collected. The contingent valuation method (CVM) was used to evaluate citizens' values on implementing green infrastructure to protect lives from future wildfires. People derive their willingness to pay (WTP) for these services. The values and maintenance participation in green infrastructure development, such as shaded fuel breaks, greenbelts, and native fire-resistant grasses in open spaces, were analyzed. Although residents rely on gray infrastructure, such as fire-resistant metal poles, a higher willingness to use green infrastructure was determined. In addition, it was shown that the residents' social-capital factors affect the values of green infrastructure and community-based management. Finally, the management and funding to install and maintain green infrastructure are discussed.

Preparing for a Warming Island: Sharing Heat Risk and Planning Resources for O'ahu

Claire Rossi de Leon, Honolulu Office of Climate Change, Sustainability and Resiliency; **Alexander Yee**, Honolulu Office of Climate Change, Sustainability and Resiliency

As O'ahu faces rising temperatures due to climate change, understanding local heat trends and sharing relevant resources has never been more critical. In this session, the Climate Adaptation Team from the City and County of Honolulu's Office of Climate Change, Sustainability and Resiliency will provide an overview of and share findings from two recently concluded projects focused on heat.

This presentation begins with a discussion of recent heat trends and issues relevant to O'ahu, highlighting the urgency of heat management and mitigation strategies tailored to the unique environment on O'ahu. We will then present outcomes and geospatial data from a recent study by Urban Adapt, LLC that demonstrated the cooling potential of urban tree canopy and other approaches and identified the populations most vulnerable to heat on O'ahu by mapping exposure to extreme air temperatures, health impacts at the neighborhood scale, and household adaptive capacity.

Finally, drawing on lessons learned from "Keep Cool O'ahu," a contract with G70 International, we will discuss strategies for engaging at-risk communities and promoting awareness about heat-related health risks. Participants will have the opportunity to view communication materials developed through this contract, which can serve as models for their own outreach efforts. Through this presentation, we aim to foster awareness about heat as a risk in Hawai'i and encourage discussion about heat planning and mitigation.

Advancing Natural Infrastructure Solutions in the Northern Marianas: From Idea to Implementation in the Saipan Lagoon
>   **Robbie Greene**, Pacific Coastal Research and Planning

The island of Saipan's Beach Road Corridor and adjacent lagoon were identified as one of the highest-ranking resiliency hubs in the 2020 Northern Mariana Islands Coastal Resilience Assessment. The two-mile stretch of shoreline is a focal point for adaptation planning and has been highlighted in a variety of studies, reports, and local interagency efforts as one of the most vulnerable features and important community assets in the Northern Marianas. In response, a Shoreline Enhancement Plan for the Beach Road Corridor and lagoon shoreline was produced in 2022 with support from the National Fish and Wildlife Foundation's Coastal Resilience Fund. The plan identified a series of design principles for promoting natural infrastructure along the coast and a range of sites where plan implementation could be pursued. In the process of transferring planning principles to site-specific conceptual designs, several inquiries arose pertaining to feasibility of nature-based solutions along Saipan's beaches. What does a living shoreline look like in the Micronesia region? Do we have enough sand to create storm buffers? Where would it come from? The community seems attached to vegetation that destabilizes the shoreline. Can we replace it? Over the past two years, a project team led by the Saipan-based Pacific Coastal Research and Planning and Horsley Witten Group has attempted to resolve some of these inquiries while advancing site designs into pilot implementations. The tandem process has yielded a variety of insight that is illuminating a broader portfolio of shoreline resiliency options for the Saipan Lagoon and some unexpected lessons. This presentation showcases the full evolution of the shoreline resiliency effort along the Saipan Lagoon, highlighting site designs and lessons for incorporating community engagement and context. A case is made for the significance of pilot projects in small island settings as precedent-setters, despite calls for more impactful, large-scale implementations of nature-based solutions at the national level.

1:30 to 3 p.m.

Panel

Strengthening Community Resilience: Achieving Early Warnings for All Through Communications, Outreach, and Partnership
>   **John Bravender**, NOAA National Weather Service - Hawai'i; **Landon Aydlett**, NOAA National Weather Service - Guam; **Chihun Lee**, National Disaster Management and Research Institute; **Shinya Takegawa**, International Center for Water Hazard and Risk Management

This session focuses on ways the weather, climate, and emergency management enterprise can leverage community partnerships and outreach opportunities to engage the community in areas of preparedness and resilience. Ideally focused for villages and cities, session discussions can be expanded to include larger regions, including Pacific island nations.

Preparedness and resilience efforts span the calendar year for many communities, focusing on a variety of hazards, with the goal of mitigating loss of life and property. However, when disasters strike, sometimes with little or no warning, people remain unprepared.

This session includes a mix of presentations and a town hall–like discussion to encourage dialogue between panelists and audience members to discuss warning and preparedness gaps within their communities and potential solutions to meeting the needs of the public. Case studies will include a look at the strengths and weaknesses of community preparedness related to Typhoon Mawar on Guam in May 2023 and the catastrophic Maui wildfires in August 2023, with discussions focused on a full-community approach, one in which no one is left behind. This includes underserved and vulnerable populations, such as those living in difficult circumstances, the homeless, or those with special needs.

Panelists will provide perspectives from across the Asia-Pacific region, encouraging audience participation to discuss problem areas and potential solutions within the framework of knowledge sharing and capacity building among people from different islands, regions, and cultures. By the end of this session, participants should have new ideas about how to engage their community, as well as how to seek those in the community who may be left behind.

1:30 to 3 p.m.

Working Session

Community Resilience Tools Café

John Marra, National Centers for Environmental Information, NOAA; **Laura Cagigal Gil**, Universidad de Cantabria; **Julia Kannberg**, University of Hawaiʻi at Mānoa; **Ayesha Genz**, National Centers for Environmental Information, NOAA; **Audra Luscher**, NOAA Center for Operational Oceanographic Products and Services; **Heidi Stiller**, NOAA Office for Coastal Management; **Gwen Shaughnessy**, NOAA Office for Coastal Management; **Doug Marcy**, NOAA Office for Coastal Management; **William Brooks**, NOAA Office for Coastal Management; **Ryan Longman**, University of Hawaiʻi; **Tom Cercere**, U.S. Geological Survey; **Brandon Bukunt**, National Weather Service; **Bridget Smith**, National Centers for Environmental Information, NOAA; **Joelle Godwin**, National Centers for Environmental Information, NOAA

This session is an opportunity for practitioners whose resilience work intersects or is impacted by extreme precipitation to explore available tools and datasets that could enhance their projects. This tools café invites participants to visit three different, themed selections of tools to learn about innovative climate resilience work and how they might apply these tools.

After attending the tools café, attendees will be able to:

- Describe the functionality of NOAA tools built to assist those in the climate space to address challenges of extreme precipitation and flooding and its impacts.

- Envision how the tools discussed fit into the landscape of tools available (and in development) which are designed to address the specific climate challenges of the Pacific region.
- Understand how to engage with the tools on their own, how they can provide feedback for each, and what that feedback might inform in future versions of the tools.

The focus areas of this session are:

- **Building Capacity to Deliver Climate Information**. Tools at this table focus on strategies to develop a curated Pacific Islands code and product repository to streamline and standardize the development and delivery of information about our changing climate to inform policy and decision-making. Participants will learn about the work currently underway in Hawai'i to mitigate coastal flooding and erosion, hazard assessment and alleviation, project planning and program development, and scientific and technical capacity development.
- **Tools and Resources to Monitor Sea Level Rise and Long-Term Flood Prediction.** This table will demonstrate a suite of tools developed by NOAA and discuss how these tools are being used to mitigate and plan for sea level rise and its impacts, such as flooding. In addition, participants will enhance NOAA's understanding about what kind of information is necessary to support community planning and risk assessment.
- **Tools and Resources to Track and Forecast Extreme Precipitation.** This table will showcase the work of local scientists and explore current and future extreme precipitation tools available in Hawai'i and the Pacific Islands, including the Hawai'i Climate Data Portal, the Hawai'i mesonet, the Pacific Drought Knowledge Exchange (PDKE), NOAA's Atlas 15, and National Land Imaging. Discussions will focus on gaps in monitoring and assessing extreme precipitation risk in the region.

3:30 to 5 p.m. | Open to the public

Individual Presentations

The University of Guam Drone Corps – Fostering a Network of Skilled Drone Pilots and a Repository of Geospatial Data for Micronesia

Keanno Fausto, NASA Guam Space Grant, University of Guam; **Jonelle Sayama**, NASA Guam EPSCoR, University of Guam

Pacific islands in Micronesia are increasingly vulnerable to a range of environmental threats, including natural disasters, coastal erosion, invasive species, and wildfires. Traditional data collection methods, such as low-resolution satellite imagery and costly crewed aerial surveys, often fail to provide resource managers with immediate high-resolution data needed to make timely decisions regarding these risks. Uncrewed aerial vehicles (UAVs or drones), in comparison, have emerged as a cost-effective, accessible, transformative solution to address these gaps, delivering efficient data that can be tailored to the unique needs of local resource managers. In response, the University of Guam's Drone Corps has built a network of Federal

Aviation Administration Part 107b–certified drone pilots who are trained in remote operations, local airspace regulations, and environmental considerations. Since its launch in 2021, the program has certified over 40 drone pilots from the University of Guam and Guam Community College, representing a cadre of experienced local pilots across university programs, ready to mobilize for various local surveying and research needs, including vegetation health assessments, coral reef monitoring, and post-disaster imagery.

This presentation showcases the Drone Corps model, highlighting the program's course structure and collaborative nature. Through partnerships with local agencies, remote pilots from the program participate in missions to gain training experience with the acquisition of geospatial data (e.g., RGB orthomosaics, Normalized Difference Vegetation Index, LIDAR, greenhouse gas emissions). The gathered datasets are post-processed, augmented with metadata that complies with Federal Geographic Data Committee standards, and published in an online repository, supplying resource managers with readily accessible imagery that can guide long-term environmental monitoring. Upon completion of the program, students are granted career opportunities to intern with these organizations. This presentation will describe how the Drone Corps fosters regional cooperation, sharing its expertise with colleges in Saipan and Palau to help them establish their own drone training programs. Finally, the presentation concludes with an outlook on its future, including plans to increase capacity by introducing new technologies and broadening its collaborations with partners throughout Micronesia.

Innovating Coral Reef Mapping with Drones and NASA Fluid Lensing Technology in the Face of Coral Bleaching Events

Romina King, NASA Guam Space Grant, NASA Guam EPSCoR, University of Guam

Coral reefs on Guam serve important roles for the island's ecology and economy, contributing to the island's fisheries, tourism, coastal protection, education, and cultural histories. Despite their immense value, the resilience of these marine ecosystems is threatened by an array of climate change–induced stressors, including ocean acidification and coral bleaching. In April 2024, the National Oceanic and Atmospheric Administration confirmed the world's fourth mass coral bleaching event, with alert systems predicting the effects to reach Guam's shores in September 2024. In response, a team from the University of Guam launched a large-scale coral reef mapping campaign to monitor priority reef sites throughout Micronesia using drone technology. The team, consisting of researchers and remote pilots funded by the U.S. Geological Survey, Pacific Islands Climate Adaptation Science Center, NASA Guam EPSCoR, and NASA Guam Space Grant, has been conducting drone-based missions to capture high-resolution imagery of priority coral reef sites across Guam and Saipan. Their efforts aim to gather baseline data on coral reefs before and after the bleaching event, providing resource managers with essential information regarding response and recovery. A central feature of the mapping campaign is the use of NASA's fluid lensing technology, developed by Chirayath (2019). This technology combines uncrewed aerial systems (UAS), off-the-shelf technology, and machine learning algorithms to create detailed coral reef maps by filtering out distortions caused by light and ocean waves, resulting in clear, high-resolution imagery. By leveraging this innovative technology, researchers and resource managers can analyze more coral over a greater geospatial extent, supporting current in-situ long-term monitoring efforts and informing long-term conservation strategies. This presentation outlines the collaborative efforts between the

University of Guam and regional partners, demonstrating how drones and fluid lensing technology are innovating coral reef monitoring efforts. It explores how the collected data can help local resource managers make informed decisions regarding coral reef management and showcase coral reefs to the general public, ultimately transforming how local communities can contribute to coral reef resilience.

Deploying Uncrewed Aerial Vehicle (UAV) Technology to Assess Intense Typhoon Impacts in Vulnerable Communities in Guam

Romina King, Pacific Island Climate Adaptation Science Center, University of Guam; **John I. Borja**, Pacific Island Climate Adaptation Science Center, University of Guam; **Keanno Fausto**, *NASA Guam Space Grant, University of Guam*; **Jonelle Sayama**, *NASA Guam EPSCoR, University of Guam*

The U.S. territory of Guam is threatened annually by high-intensity storms and typhoons due to its location in the western Pacific Ocean. The island's infrastructure—buildings, roads, and utilities—bear the brunt of typhoon damage, which in turn affects public health, the economy, and natural resources. Traditionally, these impacts have been observed via satellite, radar, and official weather stations. Damages are assessed in the aftermath of the typhoon with a manual, on-the-ground approach led by the National Weather Service. This is often exhaustive and time-consuming for the assessment team. Observations from the ground can inadvertently create data gaps on damage assessments due to inaccessible areas caused by vegetative and construction debris and flooded roads and pathways. This practice may not capture many impacts eligible for local or federal assistance.

To address these data gaps and augment damage assessments, the University of Guam Drone Corps program aims to assist local and federal government agencies (e.g., utility companies, public health services, emergency services, and natural resource management) by collecting high-resolution aerial imagery to help prioritize and allocate limited resources. This high-resolution drone imagery can enhance communities' understanding of natural disaster risks by providing immediate post-disaster visual data of storm damages, which can illustrate typhoon impact patterns, assist recovery efforts, and raise awareness of dangerous areas.

This presentation highlights the results of this novel collaboration of the University of Guam, National Weather Service, Guam Homeland Security (GHS), and Office of the Governor of Guam in the creation of the damage assessment of Typhoon Mawar, which ravaged Guam on May 24 and 25, 2023. Following the typhoon, the University of Guam worked with the National Weather Service to identify and capture imagery of vulnerable sites (also informed by Paulino et al. 2021) that were heavily impacted. This presentation will also share how theDrone Corps' data was disseminated among other agencies as supplemental data for natural disaster recovery efforts, further illustrating how the translation of complex disaster information into accessible visuals allows local communities to better understand the scope of the typhoon's damages. The presentation concludes with a summary of the Drone Corps program model as a resource for developing resilience strategies for vulnerable island communities using advanced and emerging technologies.

Geospatial Products and Tools for Disaster Response Planning and Assistance
      David Brostuen, U.S. Geological Survey

Geospatial products and tools are invaluable components of disaster risk reduction programs during planning and response phases. The technology is increasingly sophisticated and accessible, and there are a variety of approaches that can be applied during phases of disaster planning, response, and recovery. In this talk we discuss a variety of airborne imagery systems (e.g., satellite, fixed-wing aircraft, drone) and the value of the data in a variety of disaster planning and response scenarios.

3:30 to 5 p.m. | Open to the public

Panel

Sea Level Rise: Preparing for the Inevitable
      Moderator: **Shellie Habel**, University of Hawaiʻi Climate Resilience Collaborative and University of Hawaiʻi Sea Grant; **Matthew Widlansky**, University of Hawaiʻi Sea Level Center; **Denise Antolini**, University of Hawaiʻi at Mānoa; **Tara Owens**, University of Hawaiʻi Sea Grant; **Diana Felton**, Hawaiʻi State Department of Health; **Barry Usagawa**, Honolulu Board of Water Supply; **Maya Hayden**, Pacific Coastal and Marine Science Center, U.S. Geological Survey

Sea level rise is no longer a distant concern for future generations; its impacts are already manifesting in both expected and surprising ways. This panel session examines current and emerging challenges related to sea level rise, as well as management strategies in Hawaiʻi and across the Pacific. Topics include updated sea level rise projections for the region, the environmental and legal implications of ongoing coastal erosion, contaminant transport driven by elevated groundwater interacting with historical land use, and the effects of rising sea levels on public infrastructure. The session draws on recent research, data, and management efforts, highlighting the work of scientists and policymakers addressing these critical issues. Featuring insights from experts tracking sea level rise trends and practitioners implementing adaptive responses, the panel offers a concise overview of strategies being employed to manage sea level rise impacts and foster coastal resilience.

3:30 to 5 p.m. | Open to the public

Individual Presentations

Aloha Safe Homes – Whole Community
      Dennis Hwang, Hawaiʻi Sea Grant

The Aloha Safe Homes - Whole Community project is a three-year Hazard Mitigation Assistance grant project with FEMA and the Hawaiʻi Emergency Management Agency. The purpose is to

attempt to reach the whole community through top-down and bottom-up education so that three different behavioral groups in the community are more prepared with regard to: 1) understanding hazard risks, 2) having sufficient supplies of emergency food and water, 3) creating scientifically based emergency evacuation plans, 4) taking steps to mitigate risks to homes through retrofit, 5) having insurance, and 6) helping others. This talk identifies the behavioral groups as proactive, receptive, and unreceptive and the strategies to reach them through the benefit of numerous social science studies and lessons learned from over 450 education and outreach events in Hawai'i.

Community Resilience Hubs: Reflections on a Decade of Planning in Hau'ula

Dotty Kelly-Paddock, Hui 'o Hau'ula; **Dolores Foley**, University of Hawai'i; **Juliette Budge**, University of Hawai'i; **Micah Fisher**, University of Hawai'i

Building a community resilience hub does not happen overnight nor does it happen without constant attention, care, and correctives. In this presentation, we revisit a decade of Hui o Hau'ula's efforts to cultivate a community resilience hub in the northeast of Oahu. Although the hub began through the awareness and sense of need for hazard preparedness, emergency response, and recovery, the community recognized over time that resilience hubs are most effective when they can at once address day-to-day community concerns. Resilience is also not static nor geographically bounded, changing over time due to changing conditions. It is in this light that we have come to reexamine resilience in ways that are locally responsive through support services based on need, while also taking steps toward longer-term planning. We draw from lessons during the early stages of conceptualization through the deliberative planning processes and their inflection points, especially recoiling and resetting processes that set a new course during the pandemic. We critically assess the current approaches and their inherent vulnerabilities relative to funding streams, networks of support, and more. We describe ways that the idea of a community resilience hub leans on, learns from, collaborates, and constantly repositions through the strength of its networks. Finally, we connect these reflections with broader lessons across research from around the world, comparing some of the more widely studied and understood principles and challenges of community resilience hubs elsewhere. In the process, we describe the intersectional and geographically situated perspectives that take place at different scales as a means for understanding resilience and building meaningful and lasting resilience in a rural, coastal island community.

City and County of Honolulu's Long-Term Disaster Recovery Plan

Madeline Kruger, Office of Climate Change, Sustainability and Resiliency; **Sarah Harris**, Office of Climate Change, Sustainability and Resiliency

The City and County of Honolulu developed the Long-Term Disaster Recovery Plan in a proactive effort to increase our community's resilience against natural disasters. City, state, and local community-based organizations, businesses, and residents have established robust and active disaster management networks and developed strategies for building resilience across the island. This plan represents the missing piece of long-term recovery and builds upon the expertise and experience of these networks.

Honolulu recognizes disaster impacts occur on a local scale, so recovery must be organized accordingly. This plan integrates best practices of long-term disaster recovery with the socioeconomic, cultural, and governmental structures unique to the island of Oʻahu. The plan is a critical step toward establishing a local long-term recovery framework for Oʻahu before a future destructive event strains the resources and capacity of the city and Oʻahu's communities. This plan proposes an operational framework that will support equitable and efficient long-term recovery and island-wide resilience. Additionally, the plan details potential roles and responsibilities and compiles resources that can assist in the months to years following a disaster event. The plan is designed to be both scalable and flexible, recognizing that each disaster necessitates a tailored recovery approach and varying levels of participation based on severity.

Stakeholder participation, input, and buy-in are critical for a feasible and equitable recovery plan that meets the needs of Oʻahu's communities. Recognizing this, the city of Honolulu developed this plan through extensive consultation, discussion, and workshops with city government departments, community-based organizations, and recovery stakeholders.

In the presentation, we share the key elements of the Long-Term Disaster Recovery Plan and discuss the collaborative efforts of various stakeholders—including government agencies, local organizations, businesses, and residents—highlighting how their input shaped the plan and the importance of community engagement for proactive disaster recovery planning. We also share lessons learned during this planning process and the recommended next steps for O'ahu to increase resilience island-wide.

Harnessing the Power of "Islanded Communities" to Support Climate Adaptation and Risk Reduction

Stephen T. Gray, Alaska Climate Adaptation Science Center, U.S. Geological Survey; **Mari-Vaughn Johnson**, Pacific Islands Climate Adaptation Science Center, U.S. Geological Survey; **Katherine L. Smith**, Southeast Climate Adaptation Science Center, U.S. Geological Survey

Multiple factors ranging from a lack of baseline data and local capacity to the exorbitant cost of equipment and materials greatly increase the challenges of implementing climate adaptation and associated risk-reduction strategies in locations outside the contiguous United States. However, as different as regions like Alaska, Puerto Rico, and the Pacific Islands might appear to be, they also share many of the same barriers to adaptation and, in turn, potential for developing and exchanging solutions to address these challenges. This talk focuses on strategies for how "islanded" communities throughout the United States and its affiliated territories can work together to develop new approaches and technologies tailored to both the on-the-ground realities and advantages that come with being disconnected from the mainland. In particular, we emphasize the importance of efforts to incorporate local, cultural perspectives and knowledge across scientific, management, and adaptation processes, while also highlighting how the Climate Adaptation Science Centers are responding to these challenges through cross-regional research, cultural engagement, and synthesis. Taken together, we hope to show how partners across island communities with vastly different geographies and climates can work collaboratively to develop novel ways for local peoples, adaptation practitioners, risk

managers, scientists, and students to exchange knowledge and support community-based climate adaptation.

5 to 7 p.m. | Open to the public

Community Night

This event is open to the public and will feature an exhibit hall showcasing opportunities for community members to learn more about climate change resilience, disaster preparedness, and community action; engage with various organizations; and become part of the solution! Experts will be available to teach participants how to use the latest tools to address sea level rise, extreme precipitation, flooding, and other hazards. Check out innovative research happening in the Pacific Islands and view our resilience *artivsm* (art and activism) exhibit.

Community Night Tools Café

Community Night Tools Café

> **Audra Luscher**, NOAA Center for Operational Oceanographic Products and Services; **Heidi Stiller**, NOAA Office for Coastal Management; **Gwen Shaughnessy**, NOAA Office for Coastal Management; **Doug Marcy**, NOAA Office for Coastal Management; **William Brooks**, NOAA Office for Coastal Management; **Ryan Longman**, University of Hawai'i; **Tom Cercere**, U.S. Geological Survey; **Brandon Bukunt**, National Weather Service; **Bridget Smith**, National Centers for Environmental Information, NOAA; **Joelle Godwin**, National Centers for Environmental Information, NOAA

This is an opportunity for the public to interact with practitioners whose resilience work intersects or is impacted by extreme precipitation to explore available tools and datasets and discuss how they enhance their projects. This tools café invites participants to visit two different, themed selections of tools to learn about innovative climate resilience work and how they might apply these tools.

After attending the tools café, attendees will be able to:

- Describe the functionality of NOAA tools built to assist those in the climate space to address challenges of extreme precipitation and flooding and its impacts.
- Envision how the tools discussed fit into the landscape of tools available (and in development) which are designed to address the specific climate challenges of the Pacific region.
- Understand how to engage with the tools on their own, how they can provide feedback for each, and what that feedback might inform in future versions of the tools.

The two focus areas of the session are:

- **Tools and Resources to Monitor Sea Level Rise and Long-Term Flood Prediction.** This table will demonstrate a suite of tools developed by NOAA and discuss how these tools are being used to mitigate and plan for sea level rise and its impacts, such as flooding. In addition, participants will enhance NOAA's understanding about what kind of information is necessary to support community planning and risk assessment.
- **Tools and Resources to Track and Forecast Extreme Precipitation.** This table will showcase the work of local scientists and explore current and future extreme precipitation tools available in Hawai'i and the Pacific Islands, including the Hawai'i Climate Data Portal, the Hawai'i mesonet, the Pacific Drought Knowledge Exchange (PDKE), NOAA's Atlas 15, and National Land Imaging. Discussions will focus on gaps in monitoring and assessing extreme precipitation risk in the region.

Navigating Ocean Observations: PacIOOS Empowers Ocean Users with Data Tools and Services

Lauren Kaiser, Pacific Islands Ocean Observing System

The Pacific Islands Ocean Observing System (PacIOOS) is dedicated to empowering ocean users and communities through the provision of accessible data tools and services. This session aims to familiarize participants from across the Pacific region with the system's comprehensive suite of oceanographic and environmental data resources. Attendees will gain hands-on experience with the PacIOOS Voyager, an interactive mapping tool that provides access to a wide range of data including weather, wave conditions, water quality metrics, and shoreline dynamics. The session guides users through the process of accessing, downloading, and utilizing data for their specific needs. Emphasis will be placed on demonstrating the application of interactive tools for visualizing sea level rise scenarios and wave-driven flooding events. Participants are encouraged to bring their own laptops to fully engage with the hands-on aspects of the tools. This session not only aims to enhance participants' proficiency in utilizing existing PacIOOS resources but also seeks to foster dialogue on future data service needs, inviting input from regional partners to shape the evolution of the system's offerings. During this session, participants will be equipped with the knowledge and skills to leverage PacIOOS data tools effectively, supporting informed decision-making and community resilience in the face of environmental challenges.

Follow the Drop

Cyrus Howe, Hawai'i Green Growth; **Lauren Roth**, 3Rwater

This is an opportunity for the public to learn about Hawai'i Green Growth's project to develop green stormwater infrastructure (GSI) in the Ala Wai watershed and the Follow the Drop app to perform a rainwater assessment on a property of their choice. The app quantifies a properties' rainwater "footprint" to inform the best type and size of green stormwater infrastructure (e.g., rain barrel, rain garden, permeable pavement) to consider for optimally collecting water before it escapes. Participants will leave the session with a report that shows how much runoff their selected property experiences and how to efficiently capture up to 89 percent.

Thursday, March 20, 2025
Conference Day 3

9 to 10:10 a.m.

Plenary

10:20 to 11:30 a.m.

Pre-disaster Recovery Planning Interactive Session