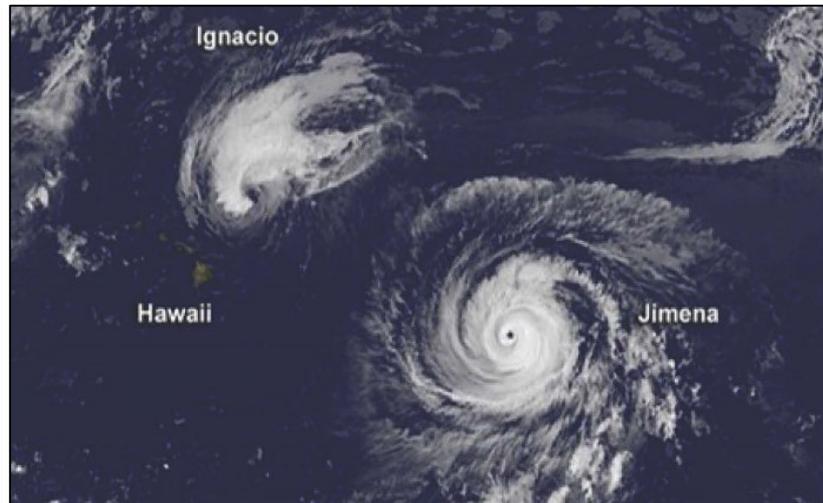
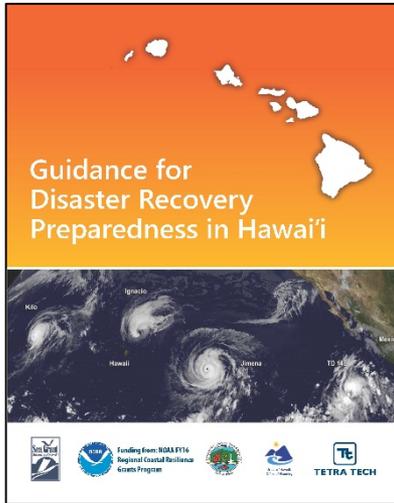


Improving Disaster Recovery Preparedness in Hawai'i

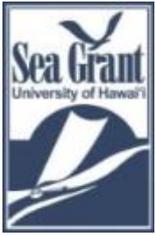


Brad Romine, PhD, Hawaii Sea Grant
Kitty Courtney, PhD, Tetra Tech, Inc.



Funding from: NOAA FY16
Regional Coastal Resilience
Grants Program





BUILDING RESILIENCE TO COASTAL HAZARDS AND CLIMATE CHANGE IN HAWAI'I

Three complementary projects building on the *Hawai'i Sea Level Rise Vulnerability and Adaptation Report* and other recent projects and initiatives:

- **Guidance for Disaster Recovery Preparedness in Hawai'i**
- Guidance for Addressing Coastal Hazards and Sea Level Rise in Community Planning
- Hawai'i Sea Level Rise Viewer (hawaii.sealevelriseviewer.org)



Funding from: NOAA FY16
Regional Coastal Resilience
Grants Program



Preparing Hawai'i for climate change must also include preparing for increasing disaster impacts

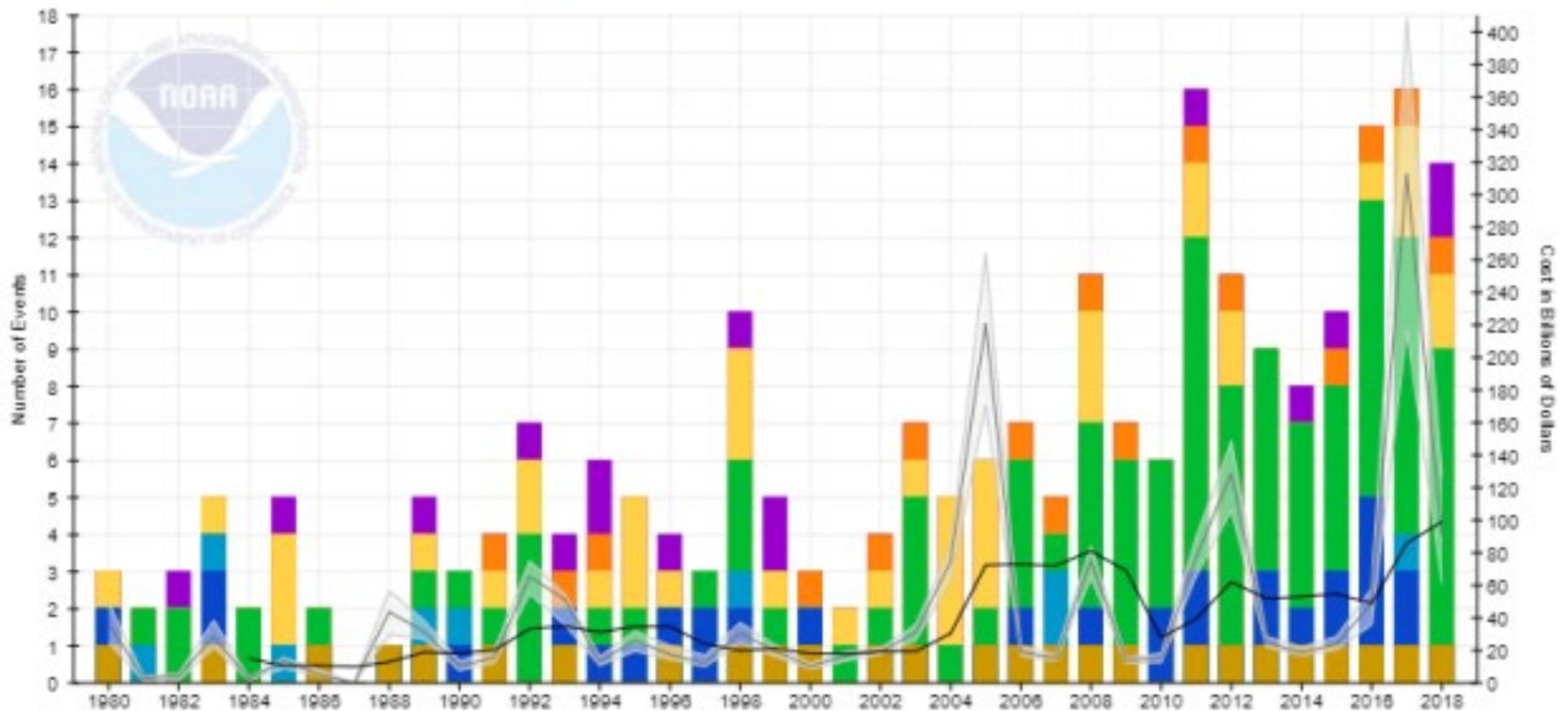
- Hawai'i Sea Level Rise Report: \$19 bil. of private land and structures and \$? bil. of public infrastructure vulnerable to chronic flooding and erosion with 3.2 feet of sea level rise
- Hurricane Maria caused \$90 - \$100 bil. in damage to Puerto Rico in one day
- Hurricane Iniki caused \$3.1 bil. in damage, destroyed 1,400 houses, took 7-8 years to recover



Billion-dollar disaster events are increasing

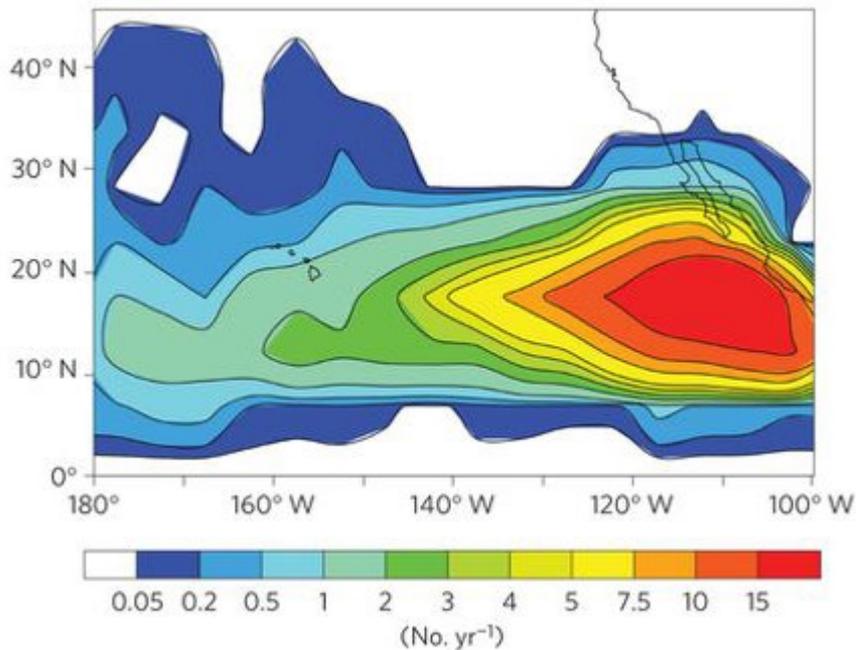
Billion-Dollar Disaster Event Types by Year (CPI-Adjusted)

Winter Storm Wildfire Trop Cycl Severe Storm Freeze
Flooding Drought Cost w/ 95% CI 5-Year Mean

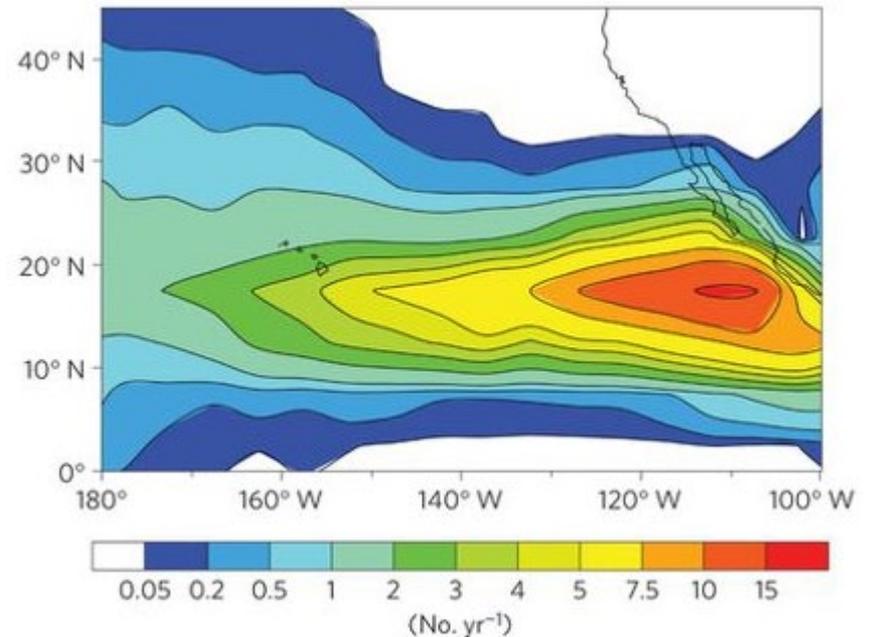


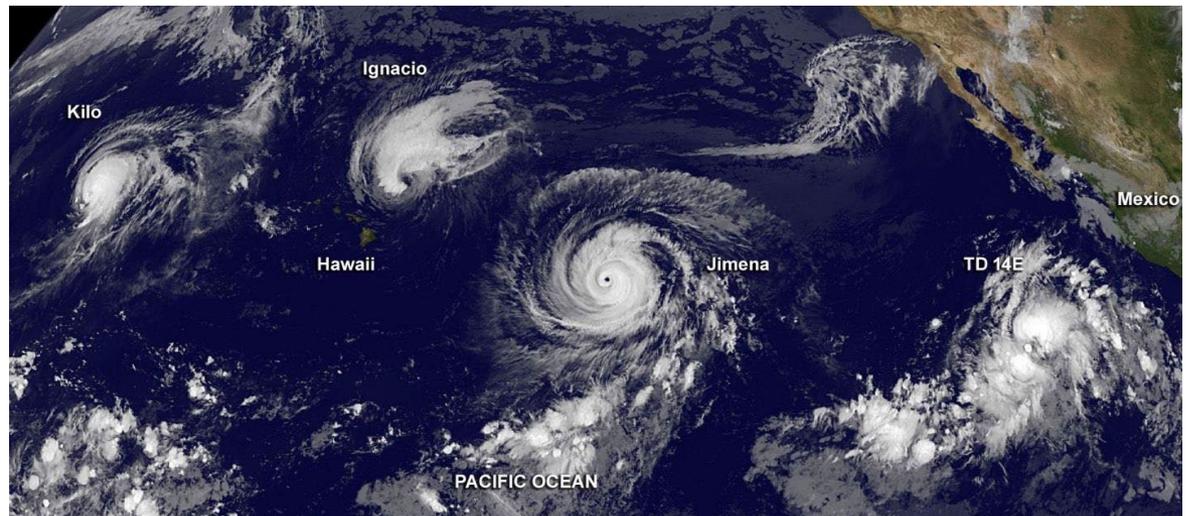
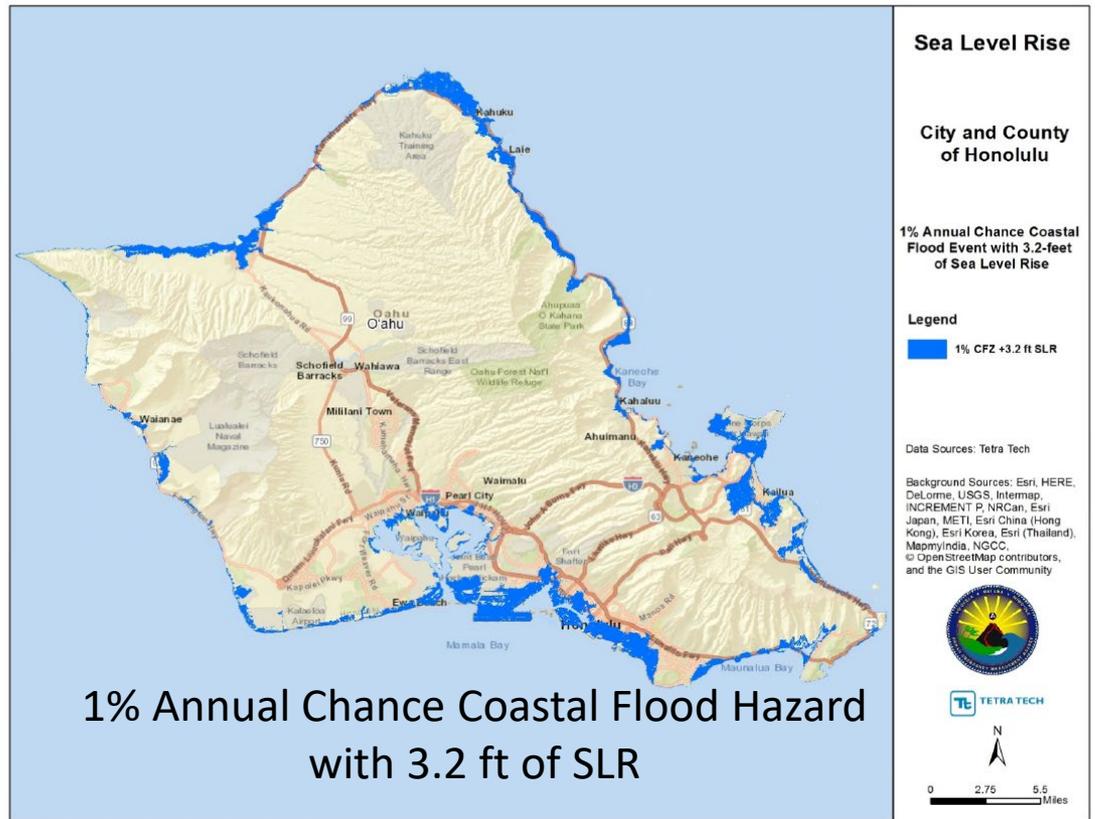
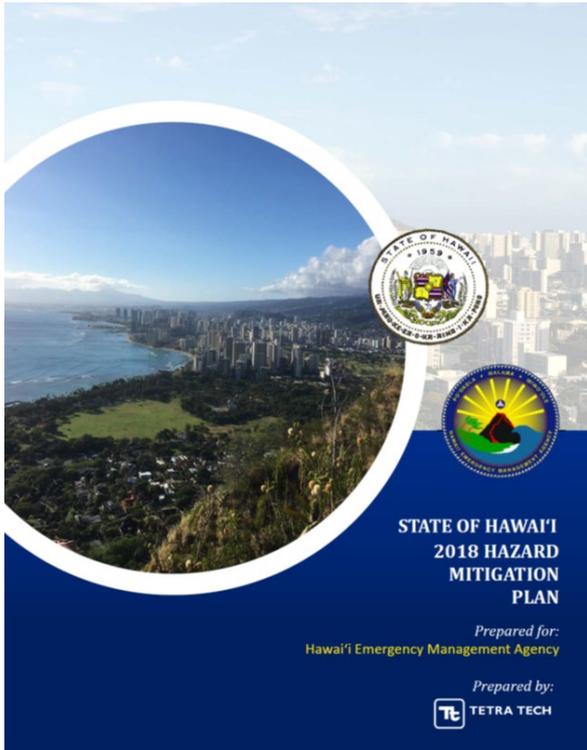
Increasing tropical cyclones near Hawaii

Observed tropical cyclone formation per year (1979-2003)



Projected tropical cyclone formation per year (2075-2099)

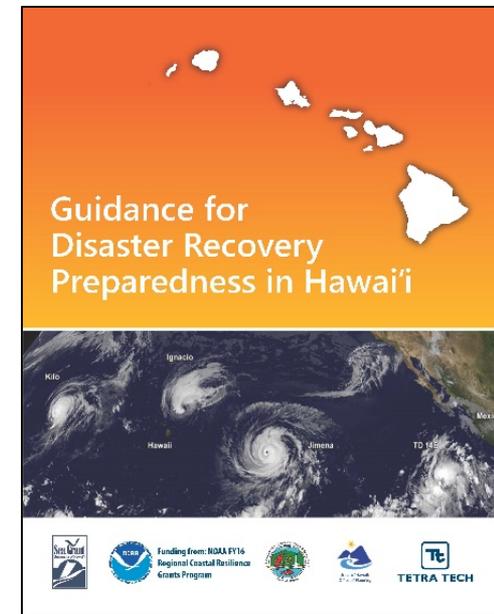




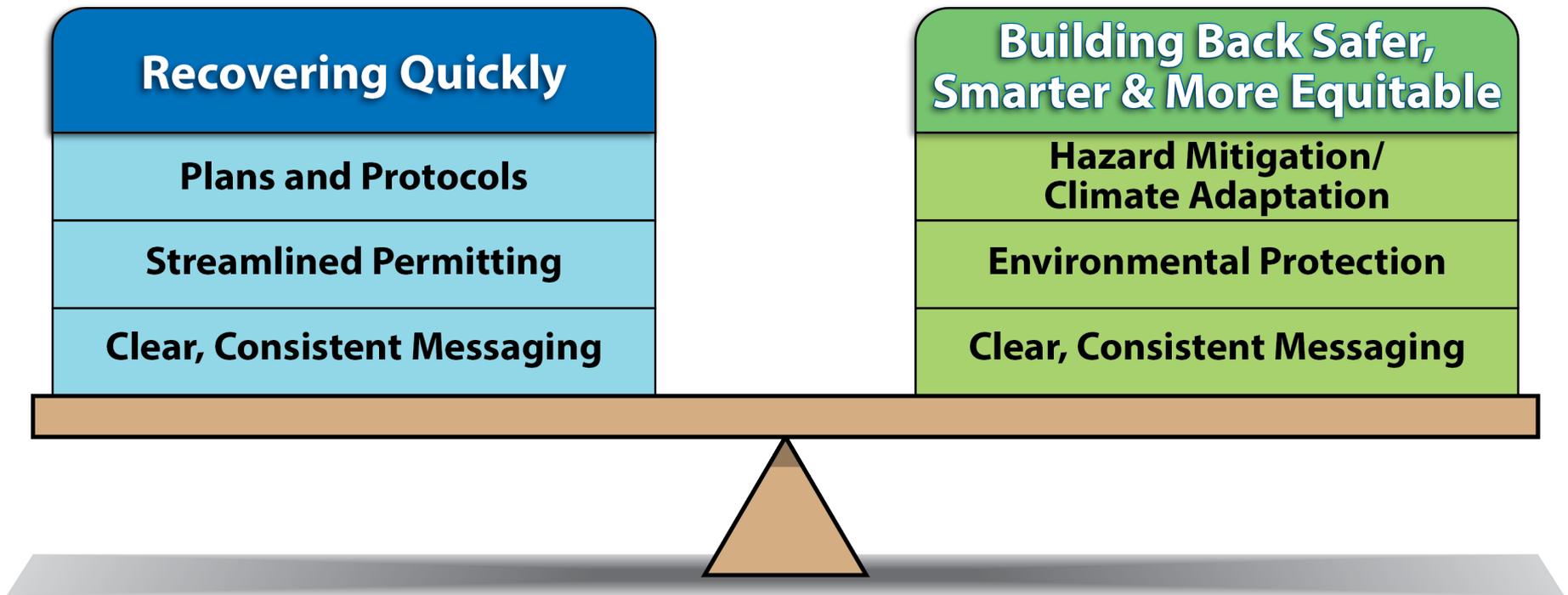
It's not if but when

Purpose of this Guidance

- Improve governance structure for recovery functions, particularly at the county level.
- Identify pathways to pursue critical disaster recovery preparedness activities to support resilient recovery and reconstruction.
- Encourage integration of disaster recovery preparedness efforts among related plans and policies.

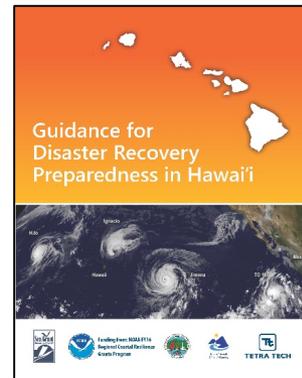


Balance recovering quickly with building back safer, smarter, and more equitable

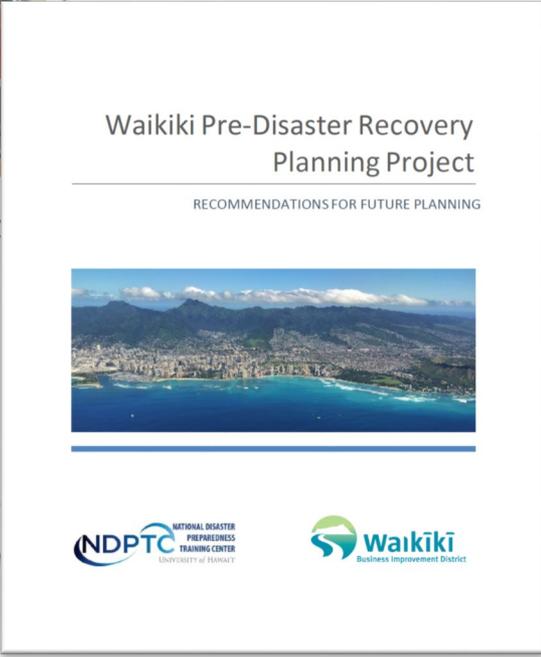
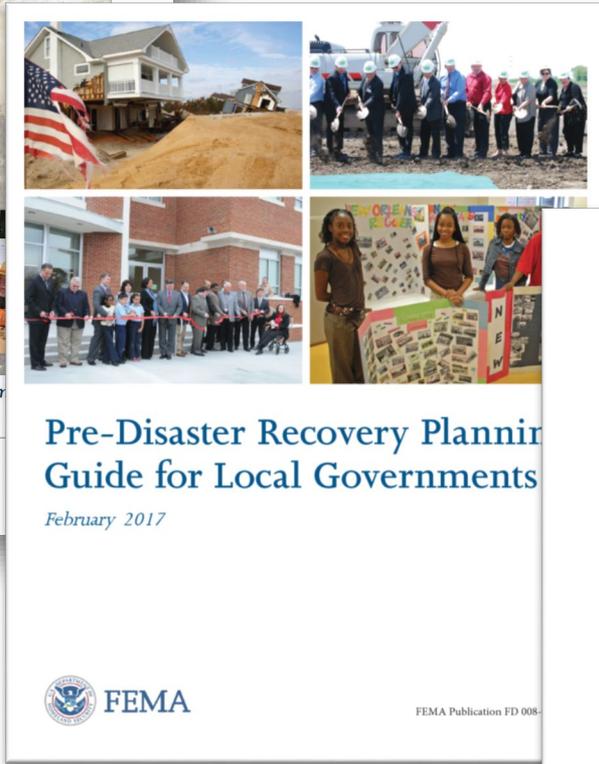
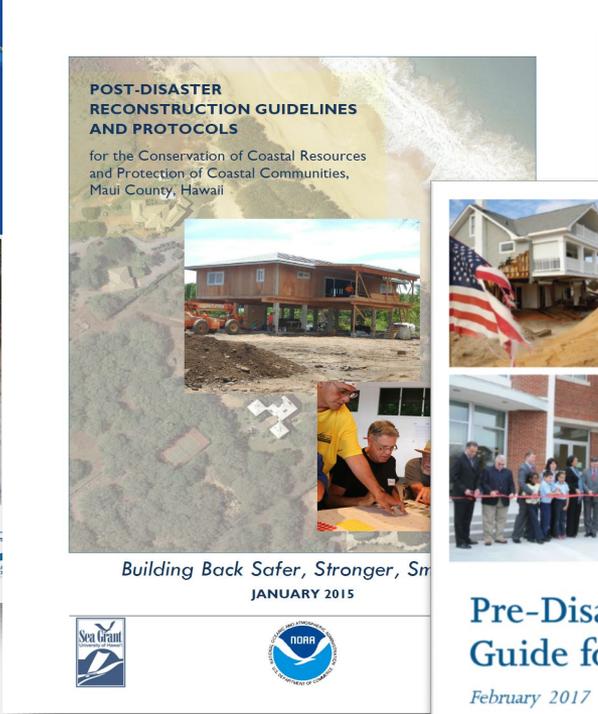
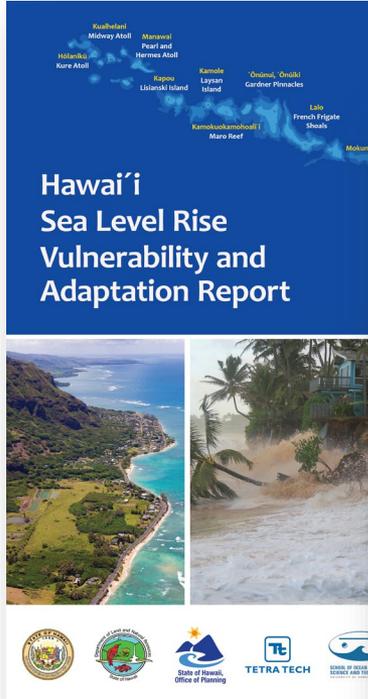


Objectives

- Defining an organizational structure and developing capacity before a disaster
- Establishing protocols to manage the increased burden on county permitting agencies post-disaster
- Reinforcing linkages with hazard mitigation plans, community plans, CIP/functional plans, etc.
- Balancing expedited reconstruction with sustainable and more equitable recovery considering public safety, ecosystem health, and changing hazard risks



Foundation for Disaster Recovery Preparedness Guidance



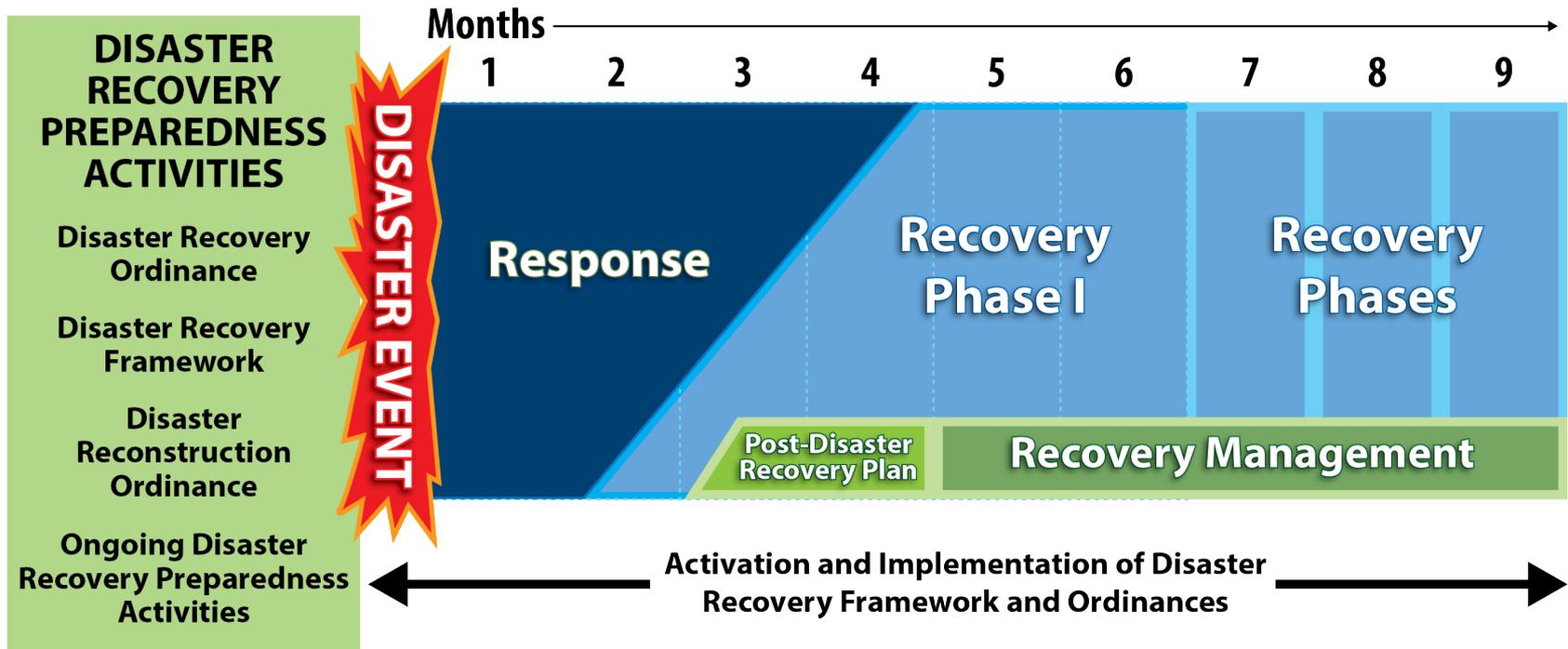
- APA Model Recovery Ordinance
- Recovery preparedness efforts of other counties in the US

Emerging Lessons-Learned in Disaster Recovery Preparedness

- Disasters provide windows of opportunity for improving resilience
- Pre-disaster recovery planning makes a difference in mitigating risk before and after a disaster
- Development of disaster recovery scenarios improves efficiency and quality of post-impact decision-making



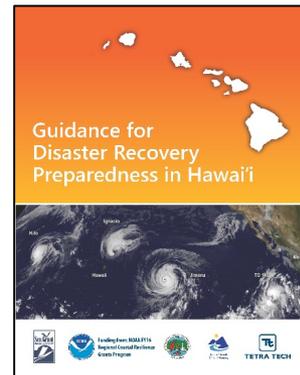
Disaster Recovery Preparedness Activities to Support Post-Disaster Recovery



Disaster Recovery Preparedness Activities (model resources) -

1. Disaster Recovery Ordinance

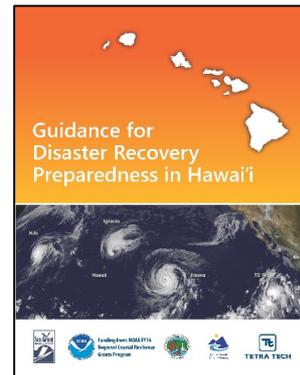
- Emergency powers to protect public health and safety
- Provides legal authority to expedite recovery
- Provides for the establishment of a Recovery Management Organization (RMO)
- Guides preparation of recovery plans
- Emergency powers for expediting repairs
- Emergency powers for addressing areas of catastrophic damage



Disaster Recovery Preparedness Activities (model resources) -

2. Disaster Recovery Framework

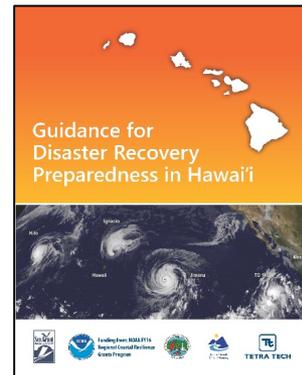
- A.k.a., a Pre-Disaster Recovery Plan
- Guides disaster preparedness and long-term disaster recovery
- Pre-defines roles and capabilities, and organizational frameworks for recovery
- Aligned with FEMA's disaster recovery framework
- Strategies and priorities for governance and coordination post-disaster



Disaster Recovery Preparedness Activities (model resources) -

3. Disaster Reconstruction Ordinance

- Adopted pre-disaster
- Standard operating procedures for review and permitting repairs on private property
- Establishes authority and protocols for:
 - **Expedited permitting** of minor repairs on private property
 - **Identifying and capturing critical opportunities for increasing resilience** to future disasters while protecting environmental resources

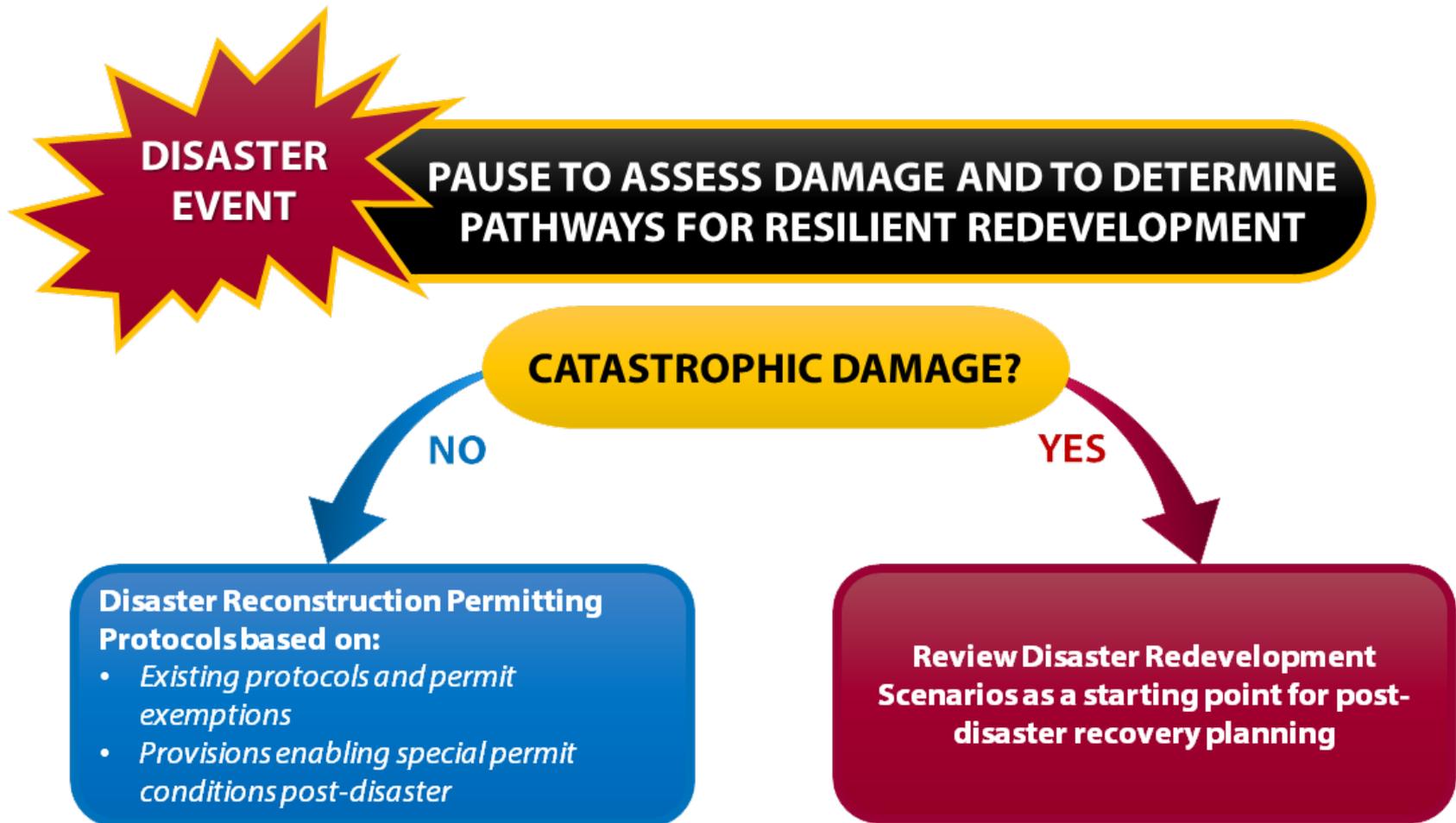


Recovery Preparedness Activities Integrated in the Recovery Planning Cycle

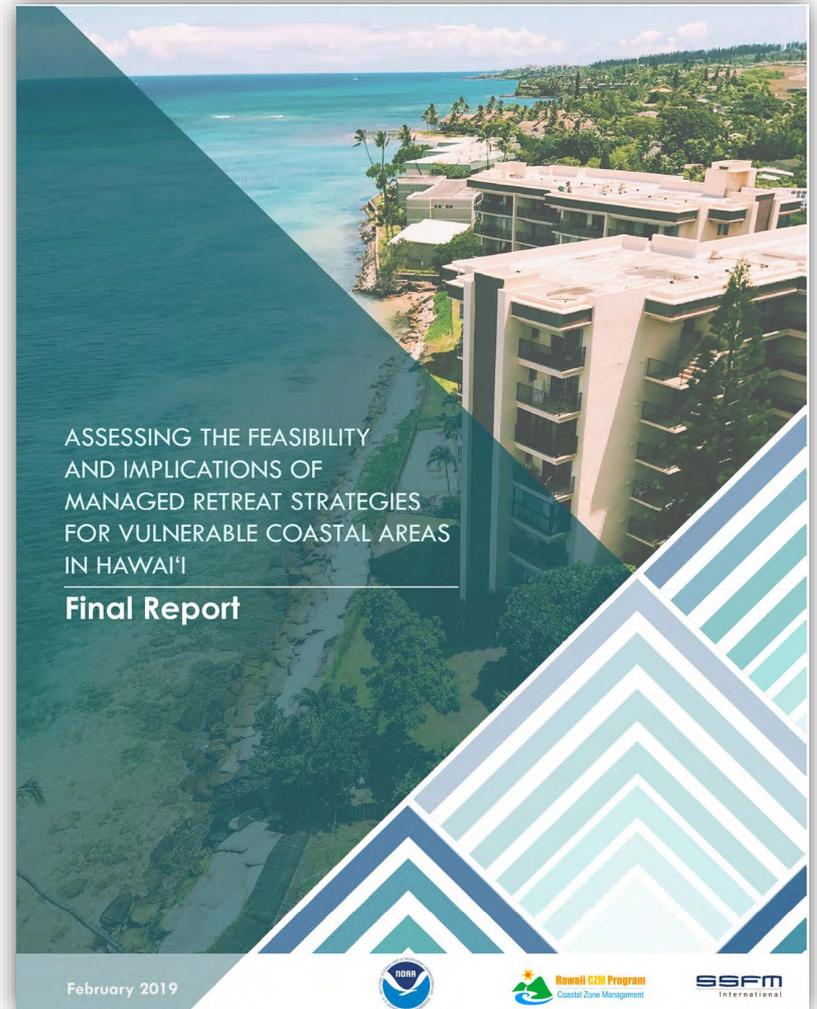


A Pause to Consider Pathways for Resilient Redevelopment

(Disaster Reconstruction Ordinance)



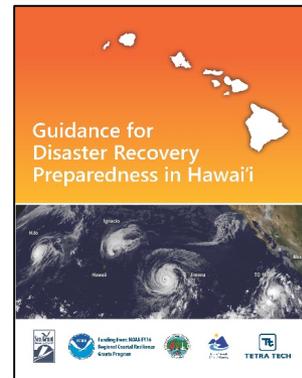
Disaster Events as Opportunities to Adapt to Sea Level Rise



February 2019



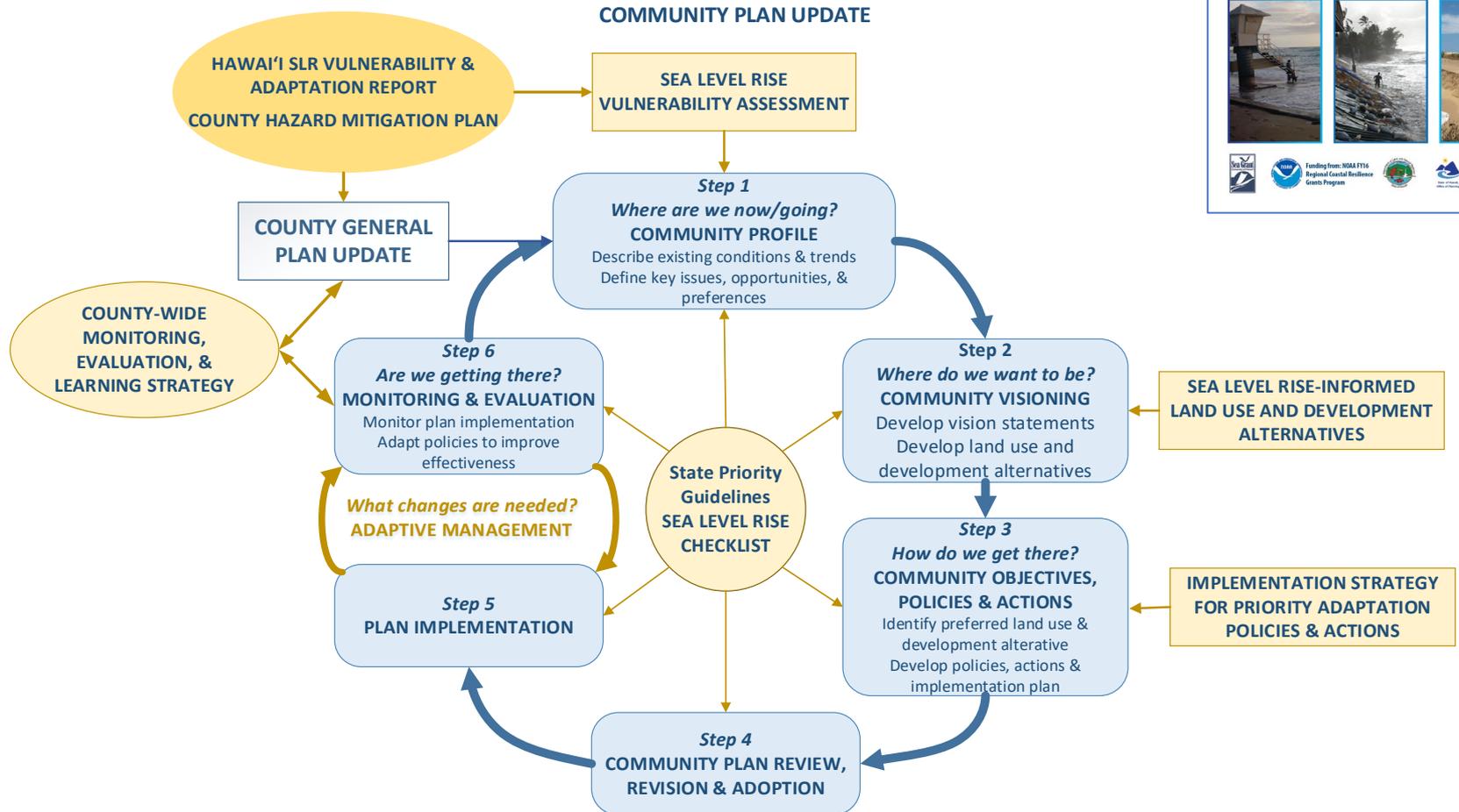
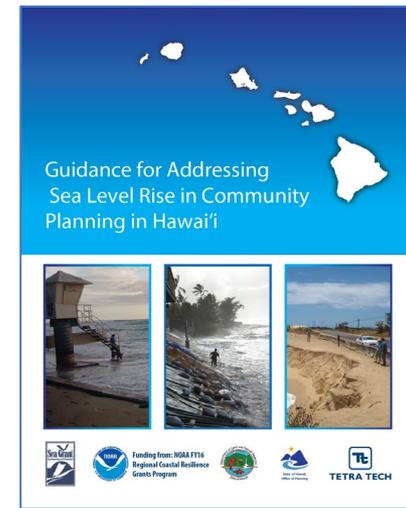
Other Disaster Recovery Preparedness Activities



- **Communication:** Developing a two-way communication and public messaging strategy
- **Practice:** Exercising the disaster recovery framework and ordinances with partners and the public
- **Plan Integration:** Updating plans, policies, and ordinances incorporating information and strategies across related plans to improve overall resilience
- **GIS:** Updating and maintaining the county's geographic information system database and permitting system with key information needed for disaster recovery
- **County-State Partnerships:** Working with state partners to support county disaster recovery preparedness efforts



Guidance for Addressing Sea Level Rise in Community Planning in Hawaii



Funding from: NOAA FY16
Regional Coastal
Resilience Grants Program

Mahalo to:

- Kauai County Planning Department
- Honolulu C&C DPP, EMA, and OCCSR
- Maui Planning and EMA
- Hawaii County Planning Department
- Hawaii State EMA
- National Disaster Preparedness Training Center (NDPTC)
- Subject matter experts from around the country

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