Framework for Climate Change Adaptation in Hawaii

Center for Island Climate Adaptation and Policy

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Sea Grant
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UNIVERSITY OF HAWAI'I SEA GRANT COLLEGE PROGRAM
SCHOOL OF OCEAN AND EARTH SCIENCE AND TECHNOLOGY

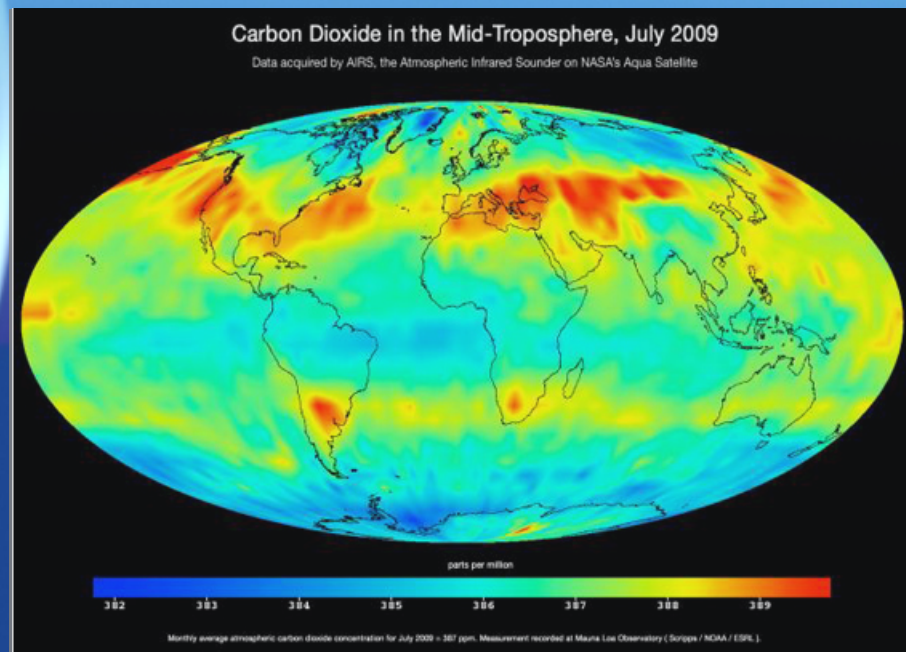
The Case for Adaptation Planning

- We cannot assume that our climate will be the same as in the past.
- GHG concentrations will result in unavoidable changes to our climate for several centuries.
- Goal: is to minimize the unavoidable impacts/cost of climate change.
- Adaptation Planning is risk management.
- Strong, focused leadership essential for effective response.

Climate Change Response Approach: Adaption vs. Mitigation

***Adaptation*:** Adjustment in natural or human systems in response to actual or expected climatic changes or their impacts, so as to reduce harm or exploit beneficial opportunities.

Mitigation: Within a climate change context, mitigation is a human intervention to actively reduce the production of greenhouse gas emissions (reducing energy consumption in transport, construction, at home, at work etc.), or to remove the gases from the atmosphere (sequestration).



Vulnerabilities

Climate change affects all sectors of the environment and economy. Virtually no one is immune.

THE GOOD NEWS: *The Sky is NOT falling*. We have time to prepare, adapt and/or mitigate.

ECONOMIC SECTORS:

- **Emergency/Disaster response systems**
- **Tourism/Economy**
- **Public Health Systems**
- **Public Infrastructure (e.g. roads, sewers, water, electric)**

ENVIRONMENTAL SECTORS:

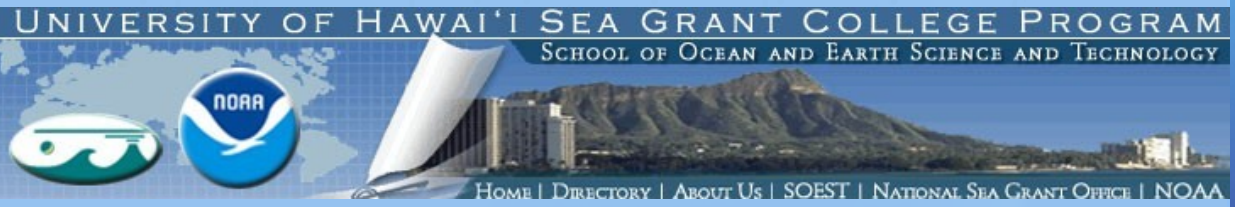
- **Freshwater Supply**
- **Coastal Resources**
- **Rainfall-Flooding**
- **Drought**
- **Ocean Acidification- reefs**

State of Hawaii's Role?

UH Centers Responding to Climate Change

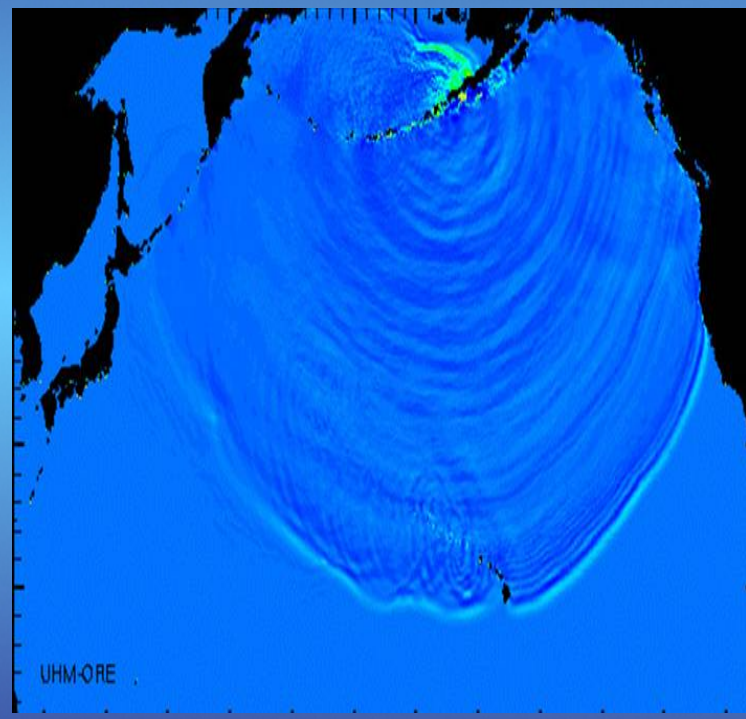
1. Sustainable Tourism
2. ICAP
3. Smart growth and Community Design
4. Marine Science Education

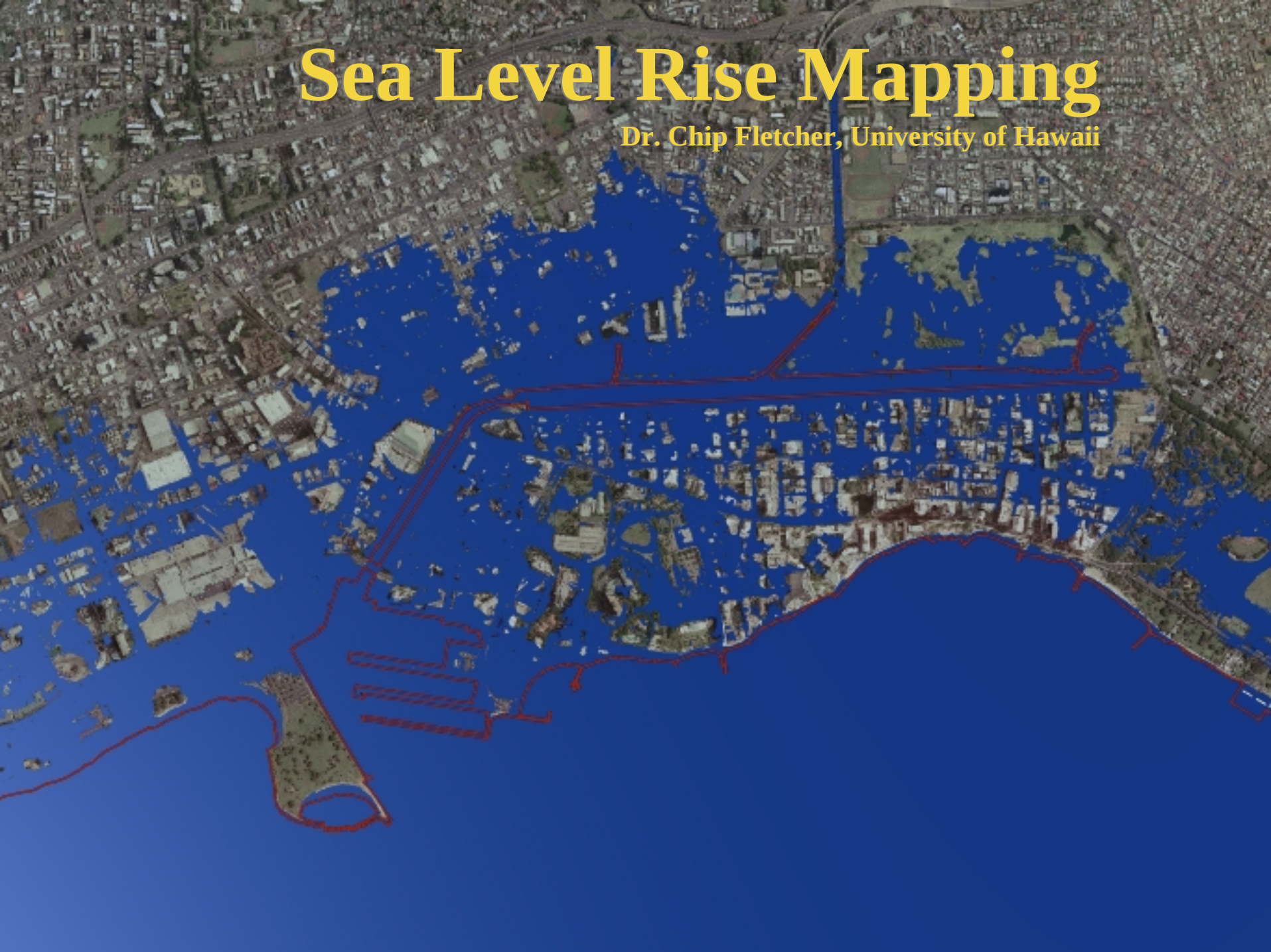
Collaborative adaptation partnerships:



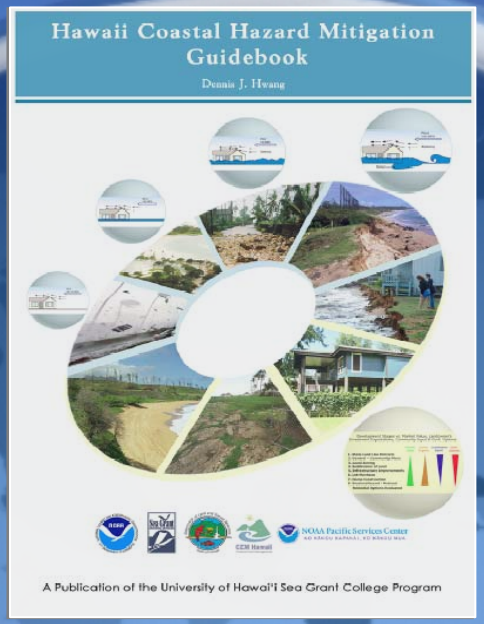
Coastal Hazard Mitigation Planning
Proactive Climate Adaptation

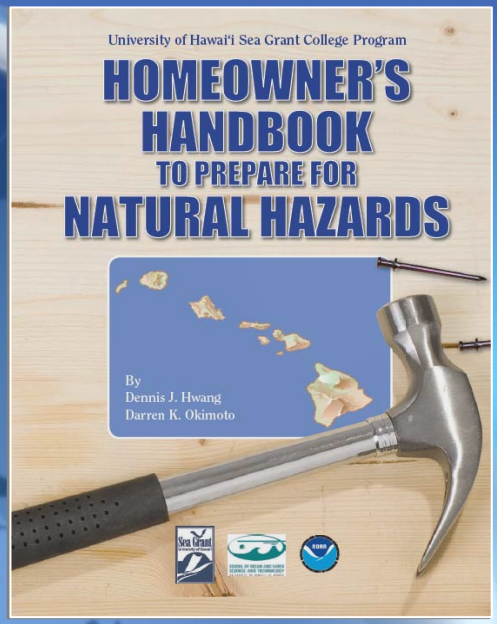
- Sea Level rise inundation research
- Shoreline erosion mapping
- Research and development for improved coastal construction setbacks.
- Development of the Hawaii Hazard Mitigation Plan
- Tsunami modeling and mapping
- Develop a Disaster Recovery Plan for the State of Hawaii
- Promote hazard mitigation in community development planning

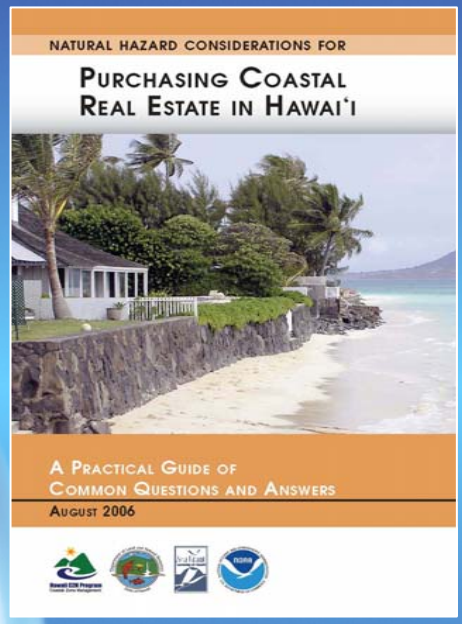


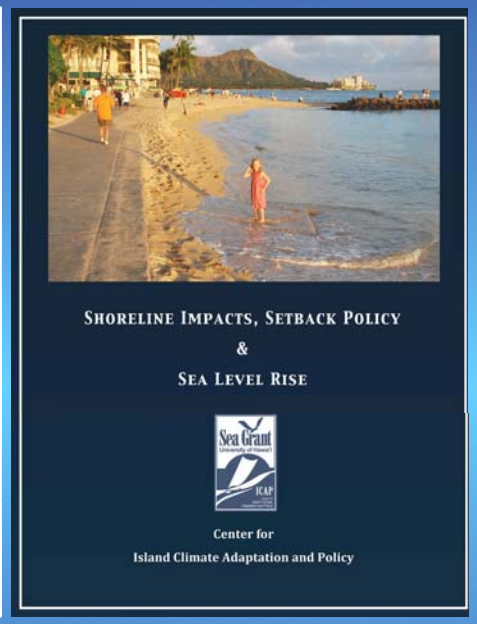

Sea Level Rise Mapping
Dr. Chip Fletcher, University of Hawaii

University of Hawaii Coastal Hazard Publications









- ✓ *Hawaii Coastal Hazard Mitigation,*
- ✓ *Development standards*
- ✓ *Erosion control & Shoreline Impacts*
- ✓ *Construction Setback Policy*
- ✓ *Sea Level Rise*

Agriculture

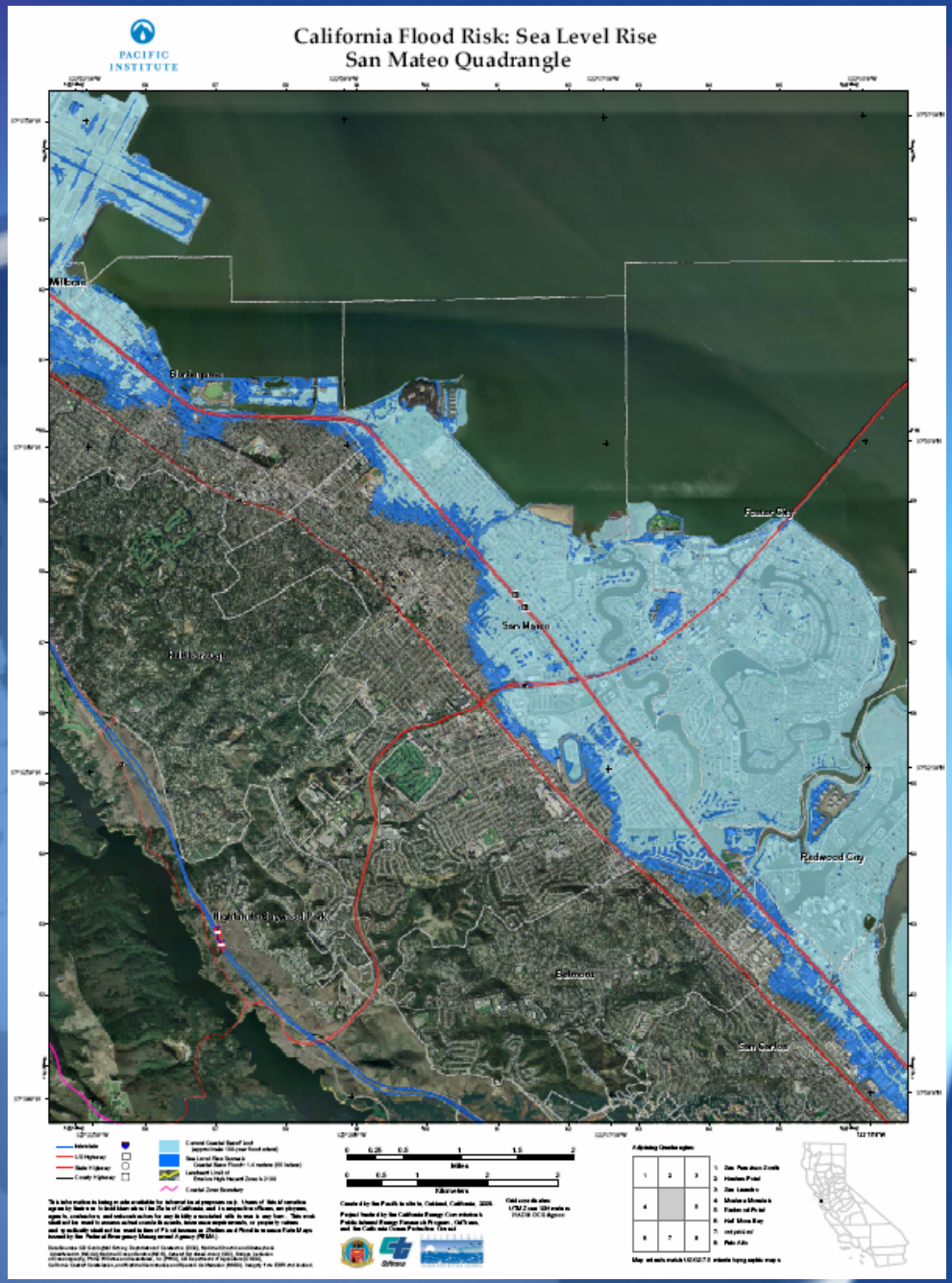
Climate Change impacts:

1. Rainfall variability
2. Drought
3. Temperature trends
4. Invasive species
5. Sustainability/yield

Transportation

Climate Change Impacts:

- **Highways**
- **Airports**
- **Low elevation roadways**
- **Population and density**
- **Rail?**



California

- State planning for 1.4 m SLR
- 480,000 people,
- $100 billion in property
- 140 schools,
- 34 police and fire stations,
- 55 healthcare facilities,
- 330 EPA hazardous waste sites,
- 3500 miles of roads and highways,
- 280 miles of railroads,
- 30 power plants,
- 28 wastewater treatment plants.

Sea Level Rise- Waikiki High tide July, 2008

Economic Costs of Inaction

- Climate change will have wide ranging impacts on key resources.
- Hawaii must be positioned to meet these unavoidable challenges.
- Economic costs of these impacts are significant.
  - 1-5% of GDP (IPCC, 2007)
  - Federal climate adaptation funding opportunities
- The worst impacts can be avoided through proactive planning

Hawaii Strategic Planning

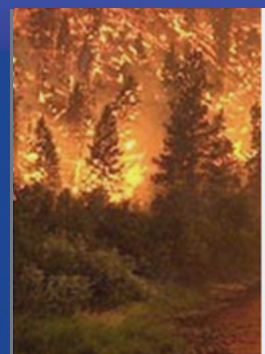
Each agency conduct:

- Asses climate sensitive assets for each sector
- Engage key stakeholders
- Develop adaptation strategies
- Prioritize efforts
- Establish action plan
- Cross-jurisdictional collaboration

Sector-Specific Plans

Coordinate Multi-Agency Effort

- Water Resources
- Land Use
- Human Health
- Coastal Management
- Emergency Management
- KEY PRIORITY IS TO IDENTIFY OVERLAPPING SECTORS

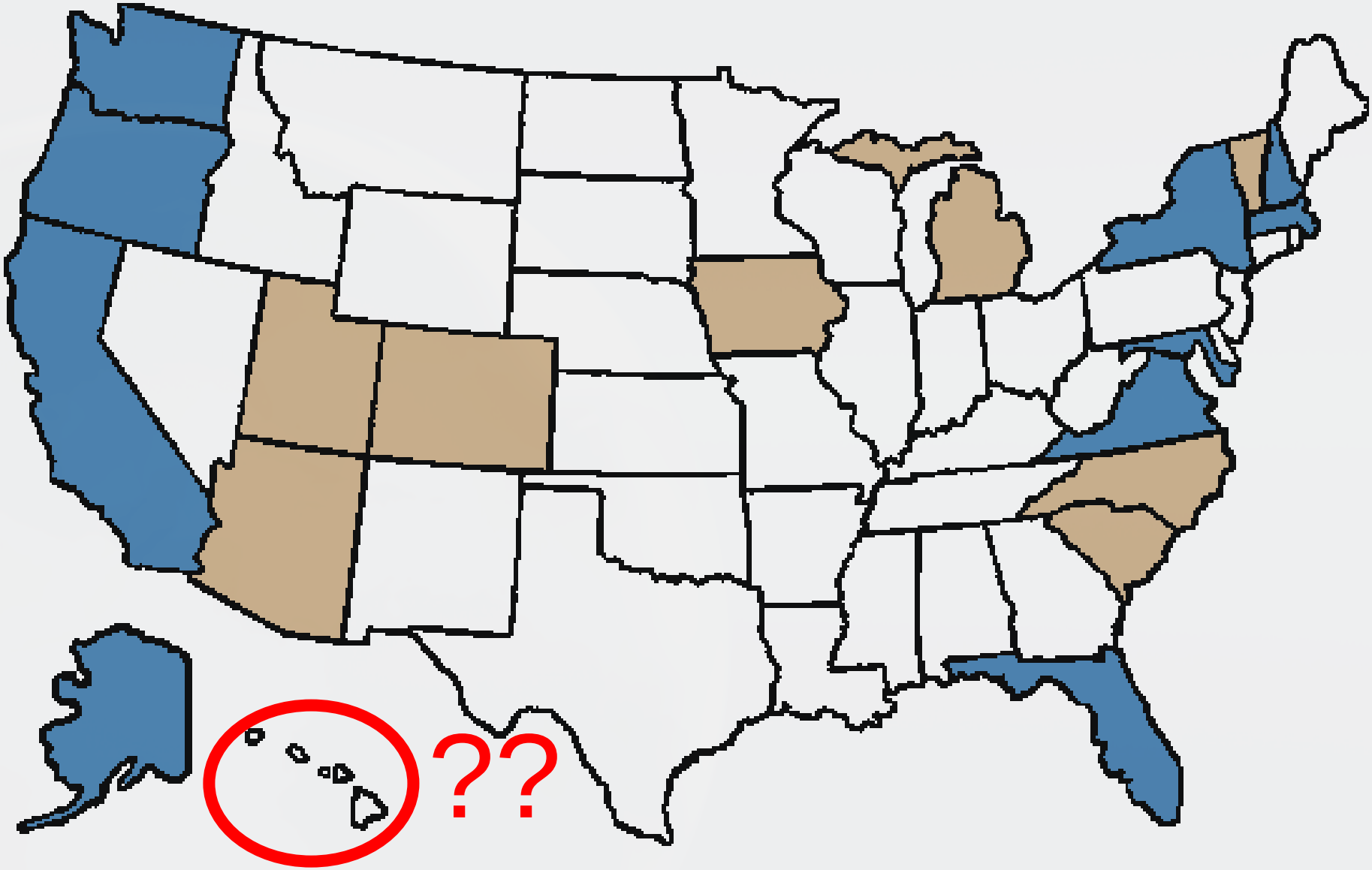


Top Priorities

- ✓ Inventory climate sensitive planning areas.
- ✓ Asses vulnerabilities and risks
- ✓ Develop long and short term adaptation strategies.
- ✓ Coordinate relevant stakeholders
- ✓ Identify opportunities for collaboration.

Federal Opportunities

- Waxman-Markey H.R. 2454 - American Clean Energy and Security Act of 2009
  - Passed in the House
  - Adaptation planning scaled funding 3% up to 12% of Cap and trade by 2050.
- Addresses domestic climate change adaptation
- Funding for State's with complete adaptation plans
  - States must have completed a climate adaptation plan to qualify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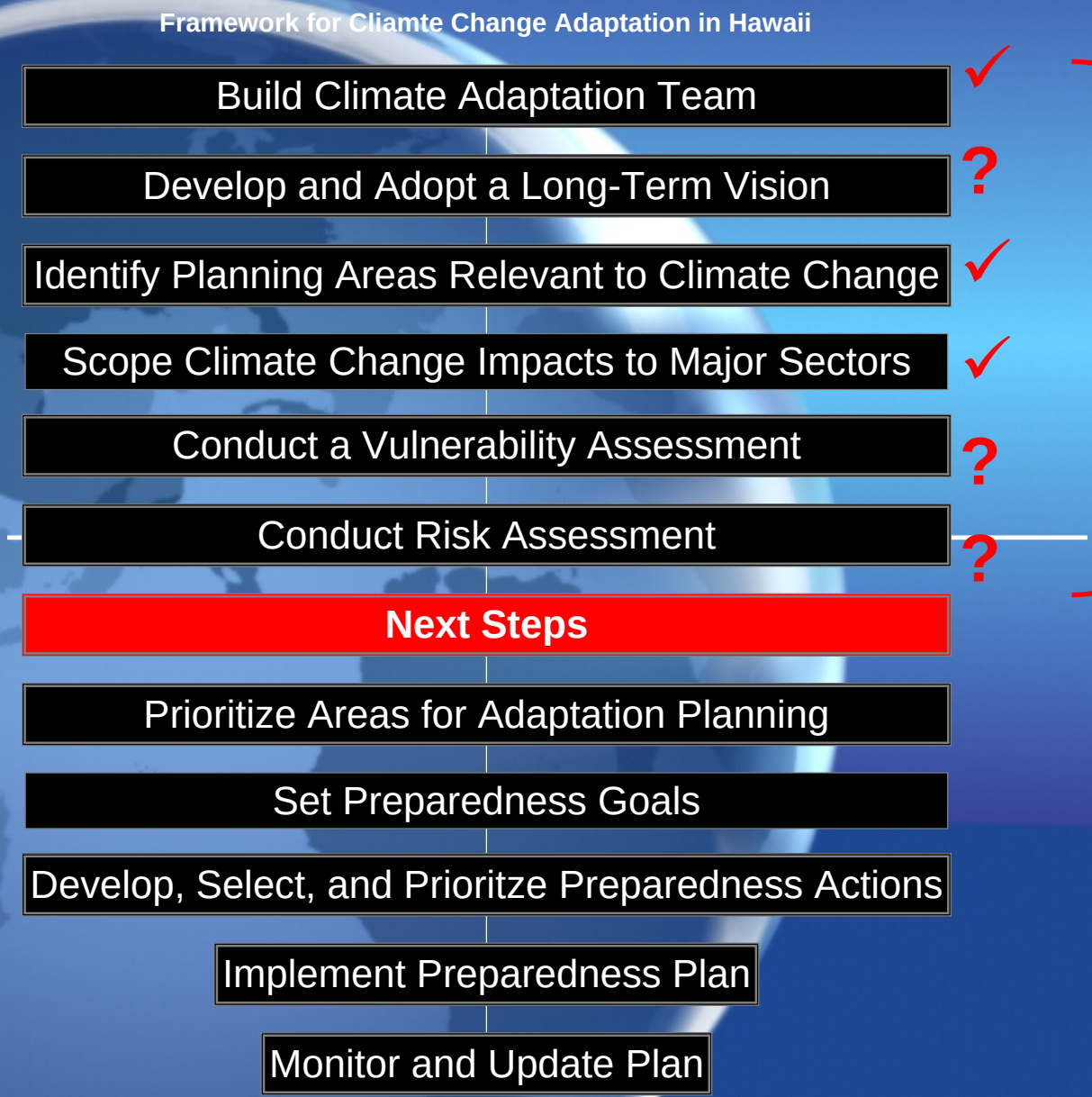
Adaptation Plan in Progress or Completed
Adaptation Plan Recommended in C.A.P.*

Hawaii Climate Change Framework



State Adaptation Planning stages to qualify for Federal funding

Timeframe

One year to produce long term and short term adaptation strategies for the State of Hawaii

- Assess risks and cost associated
- ID priority planning areas
- ID barriers to implementation

Stakeholders

Academic/Research

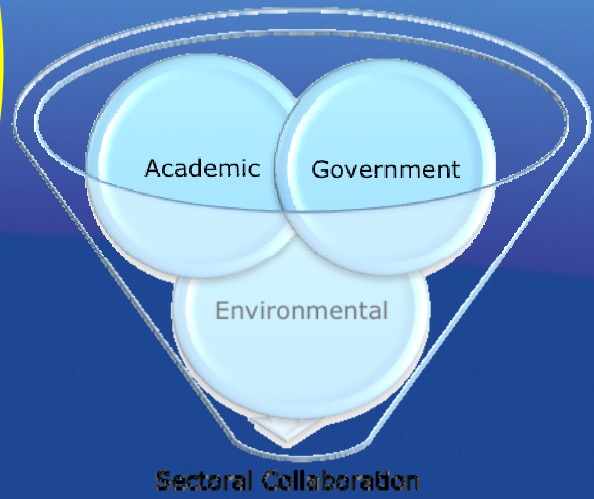
- University of Hawaii System
- UH Sea Grant -ICAP
- PRIMO
- Blue Planet Foundation

Government

- DLNR
- NOAA
- CZM/OP
- Civil Defense
- County Government
- OHA
- DOT (Harbors & Roads)
- Emergency Management Agencies
- Hawaii Hazard Mitigation Forum
- EMS-First Responders

NGO/Environmental

- Nature Conservancy
- Hawaii Conservation Alliance
- Kauai Land Trust
- Maui Coastal Land Trust
- North Shore Community Land Trust
- Sierra Club
- Surfrider Foundation
- Waikiki Improvement Association
- Waikiki Business Improvement District
- HTA



Aloha and Mahalo!

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ICAP Accomplishments

- "A Framework for Addressing Climate Change in Hawaii"
- "Climate Update Hawaii"
- "Sea Level Rise in the Federated State of Micronesia; Food and Water Security, Risk Management, and Adaptive Strategies"
- "Climate Change Effects on Ocean and Coastal Resources"
- "Takings Law and Coastal Retreat"
- "Enhancing Hawaii's Coastal Resiliency to Climate Change through Environmental Impact Assessments"
- "Shoreline Impacts, Setback Policy and Sea Level Rise"
- "Understanding Attitudes, Beliefs and Preparedness for Climate Change Impacts and Other Coastal Hazards"

ICAP Accomplishments

- Climate Adaptation Speaker Series
- PRiMO Public Perceptions of Climate Risk Workshop
- Successful Shoreline Model
- Hawaii Coastal Hazard Mitigation Guidebook
- Addressing Inundation Concerns to Wastewater Treatment Facility
- Technical Support Provided to the State Department of Land and Natural Resources
- Handbook Developed for Hawaii Residents on How to Prepare for Natural Hazards
- Review of the Hawaii State Hazard Mitigation Plan