
EAST-WEST CENTER
Pacific RISA
a NOAA RISA team
The 4th US National Climate Assessment:
Hawai‘i and US-Affiliated Pacific Islands
Victoria Keener, PhD
Research Fellow, East-West Center
Hawai‘i Climate Change Conference
January 14, 2019 | PacificRISA.org
U.S. Global Change Research Program

The National Climate Assessment: A Congressionally-Mandated Endeavor

Global Change Research Act of 1990 (Section 106):

- The US Global Change Research Program (USGCRP) began as a Presidential initiative in 1989
- **…not less frequently than every 4 years**, the Council… shall prepare… an assessment which –
  - Will assist the nation and the world to understand, assess, predict, and respond to human-induced and natural processes of global change
  - **analyzes the effects of global change** on the natural environment, agriculture, energy production and use, land and water resources, transportation, human health and welfare, human social systems, and biological diversity
  - analyzes current trends in global change, both human- induced and natural, and **projects major trends for the subsequent 25 to 100 years.**

USGCRP: Agencies and Departments

Department of Agriculture

Department of Commerce

Department of Defense

Department of Energy

Department of Health and Human Services

Department of the Interior

Department of State

Department of Transportation

Environmental Protection Agency

National Aeronautics and Space Administration

National Science Foundation

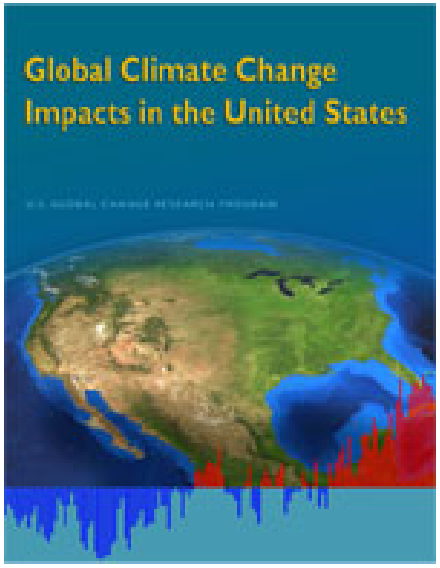
Smithsonian Institution

United States Agency for International Development

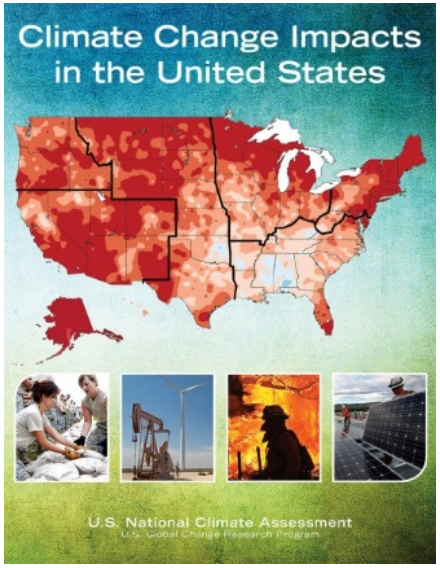
National Climate Assessment Vision

To advance an **inclusive, broad-based, and sustained** process for assessing and communicating scientific knowledge of the impacts, risks, and vulnerabilities associated with a changing global climate in support of decision-making across the United States

NCA1



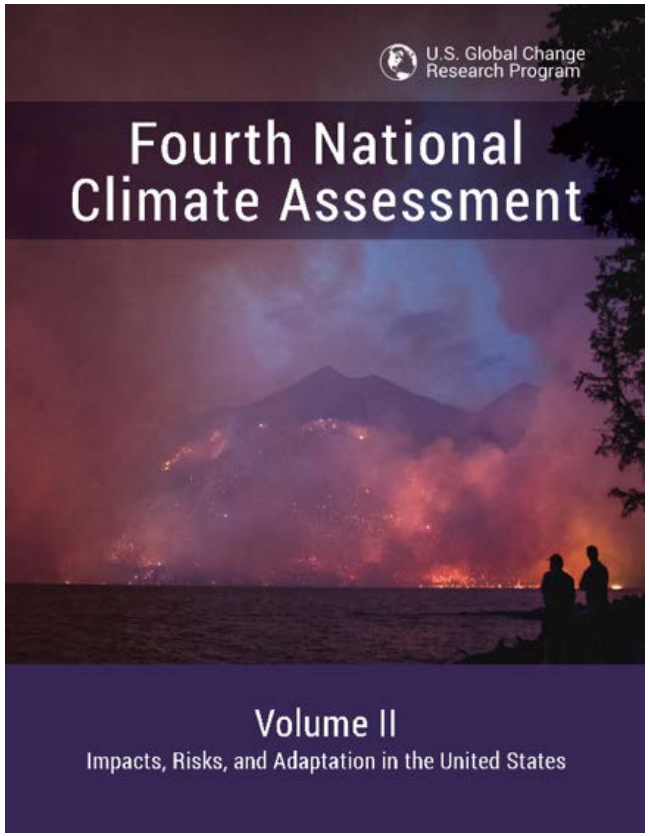
NCA2



NCA3

NCA4 Vol. 2: Released on November 23, 2018 ("Black Friday")

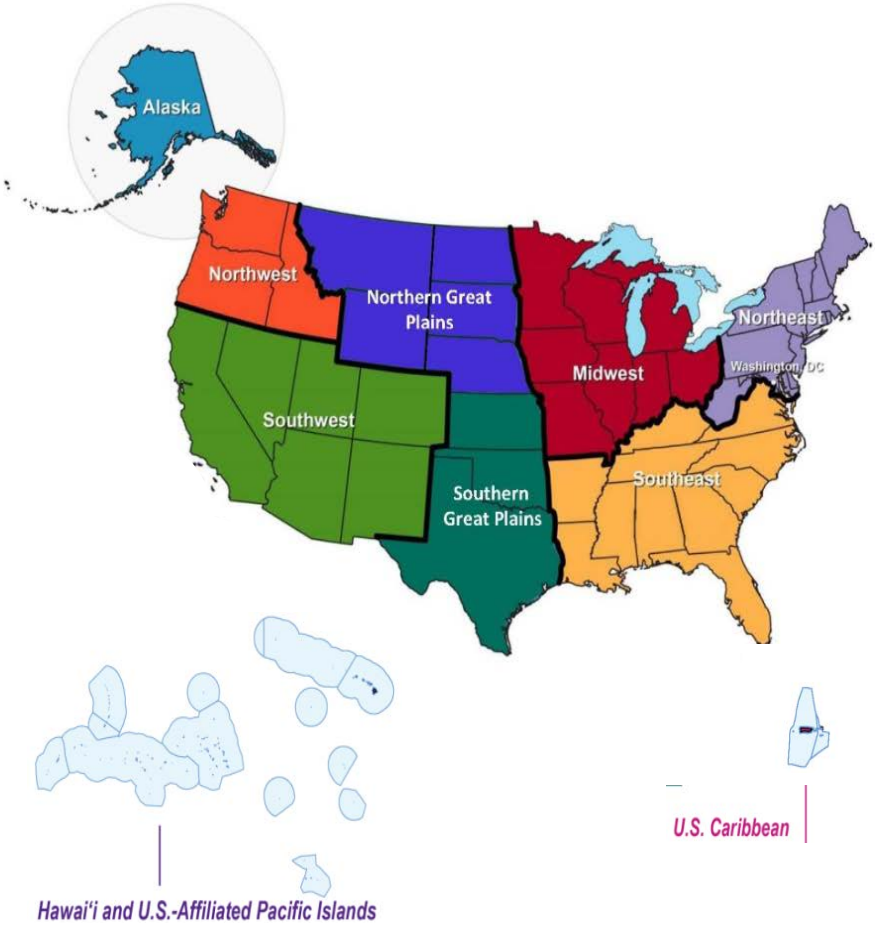
- **Policy relevant**, but not policy prescriptive
- Places a strong emphasis on **regional information and risk framing**
- Quantifies **impacts in economic** terms
- Integrates **international** considerations
- Assesses a **range of potential impacts**, helping decision makers better identify risks that could be avoided or reduced
- Uses **case studies** to provide additional context and to showcase community success stories



Read and download the report at
nca2018.globalchange.gov

10 Regional Chapters

- The “main course” of NCA4
- Key messages were determined by the regional risks and values of the people living there
- Chapters highlight options, challenges, opportunities, and success stories
  - Link climate trends to regional risks
  - Assess future climate change relevant to regional risks



Highly Influential Scientific Assessment (HISA)

White House Office of Management & Budget (OMB):

"Scientific information that will have or does have a clear and substantial impact on public policy or private sector decisions"

- Stringent peer-review requirements
- Meets legal federal guidelines for information quality
- Synthesizes multiple sources of information and bridges uncertainties
- All data, authors, & reviews must be public

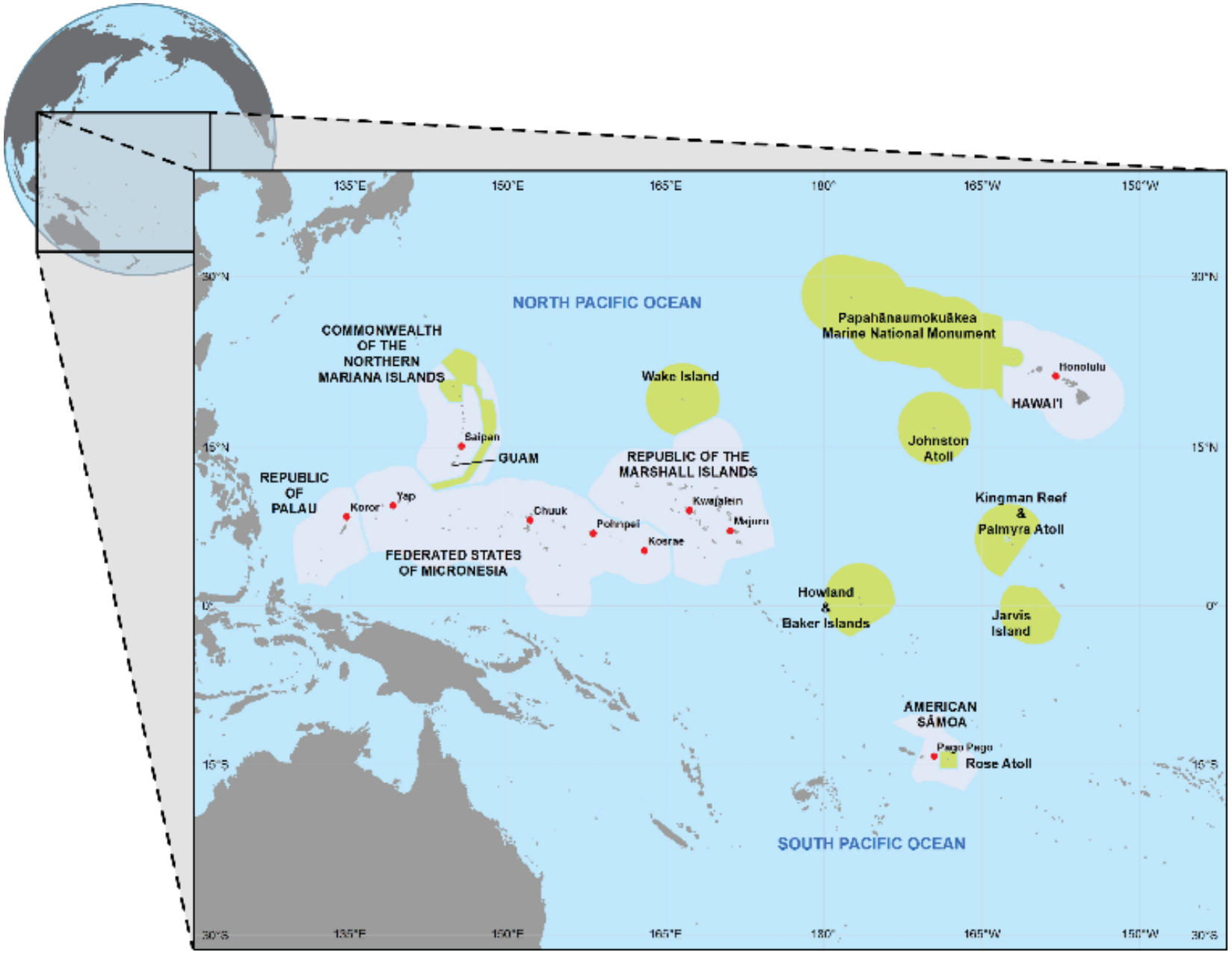
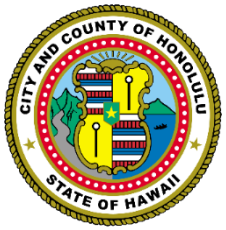


Fig. 27.1 Hawaii and the U.S.-Affiliated Pacific Islands Region

- Over 2000 islands, ~1.9 million people
- Varied governance: U.S. State, U.S. Territories (Organized and Unorganized), Commonwealth, and Freely Associated States
- Max. elevations ranging from 33 ft (RMI) to 13,800 ft (HI)
- GDP per capita ranges from $3,400 (FSM, 2017 est.) to $51,155 (HI, 2016 est.)
- US Marine National Monuments, military installations
- National downscaling efforts have not previously extended to HI, and still do not extend to USAPI

pirca

PACIFIC ISLANDS REGIONAL CLIMATE ASSESSMENT



Survey Results – Focal Areas

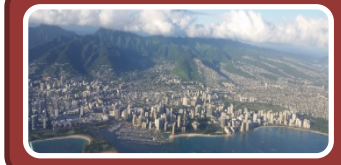
Ocean and Marine Resources (46%)

Ecosystems, Ecosystem Services and Biodiversity (45%)

Coastal Effects (37%)

Indigenous Communities (29%)

Freshwater Resources (27%)



CUMULATIVE IMPACTS & ADAPTATION

Inclusivity: Outreach and Participation

Sector Survey (Sept-Oct 2016) – 136 respondents

Webinars (Oct 2016)– 35 participants

Sectoral Workshops (Mar 2017) – 75 participants, 2 days

Honolulu Town Hall (Mar 2017) – ~70 participants

Guam Satellite Town Hall (Apr 2017) - ~40 participants

11 volunteer authors

Over 350 people engaged in HI and Pacific Islands chapter alone

Honolulu Town Hall

Sectoral Workshops

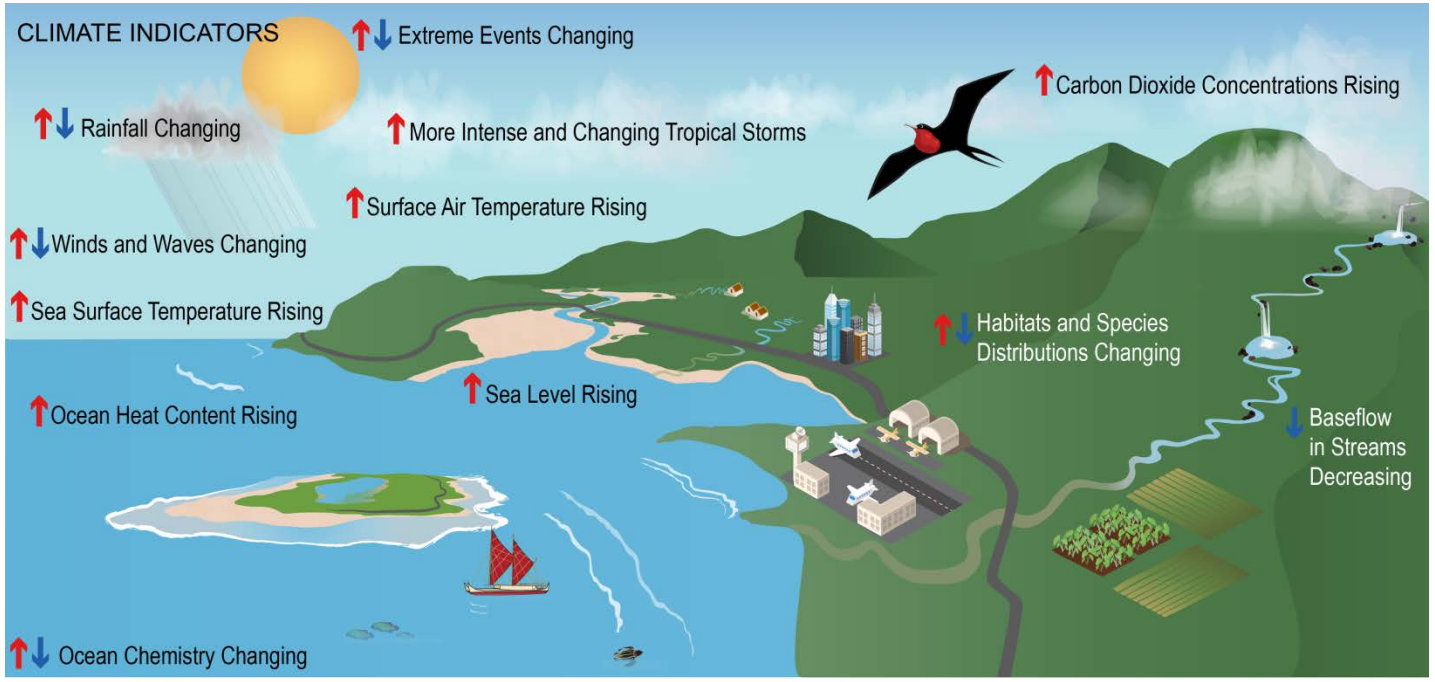
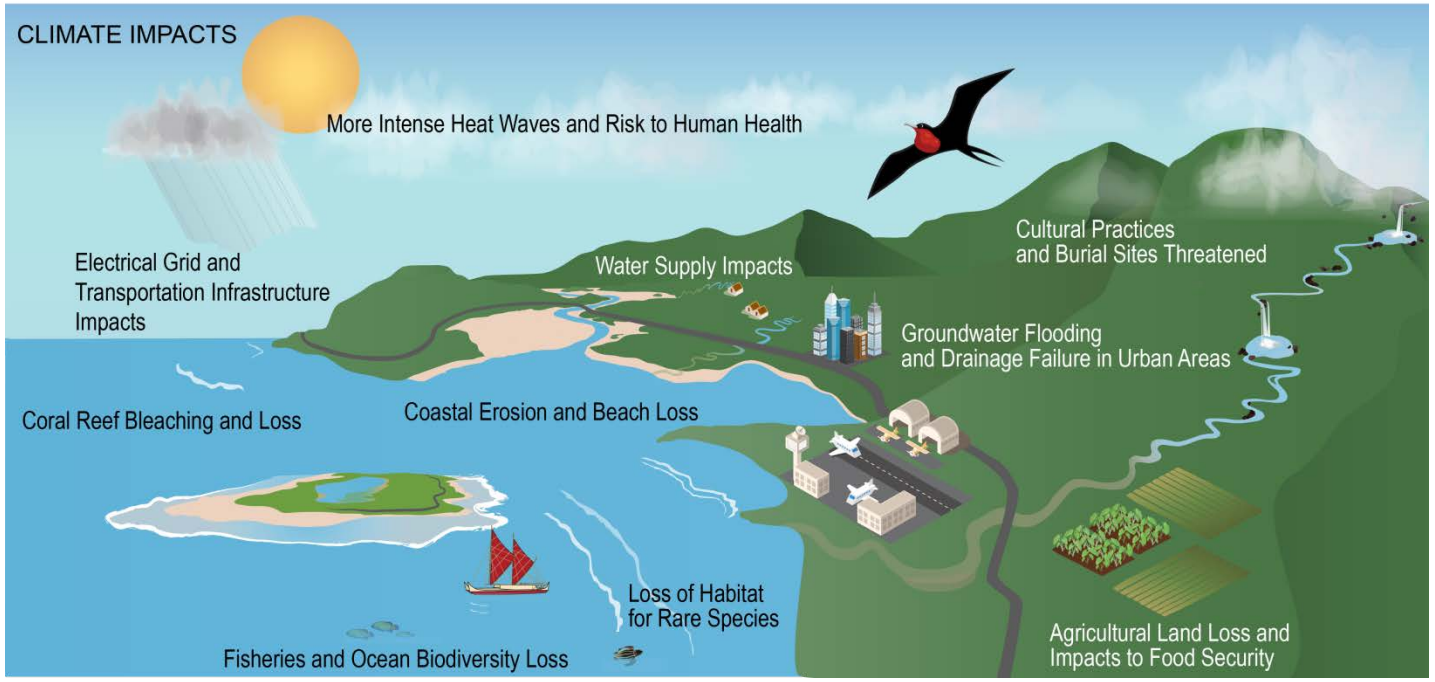
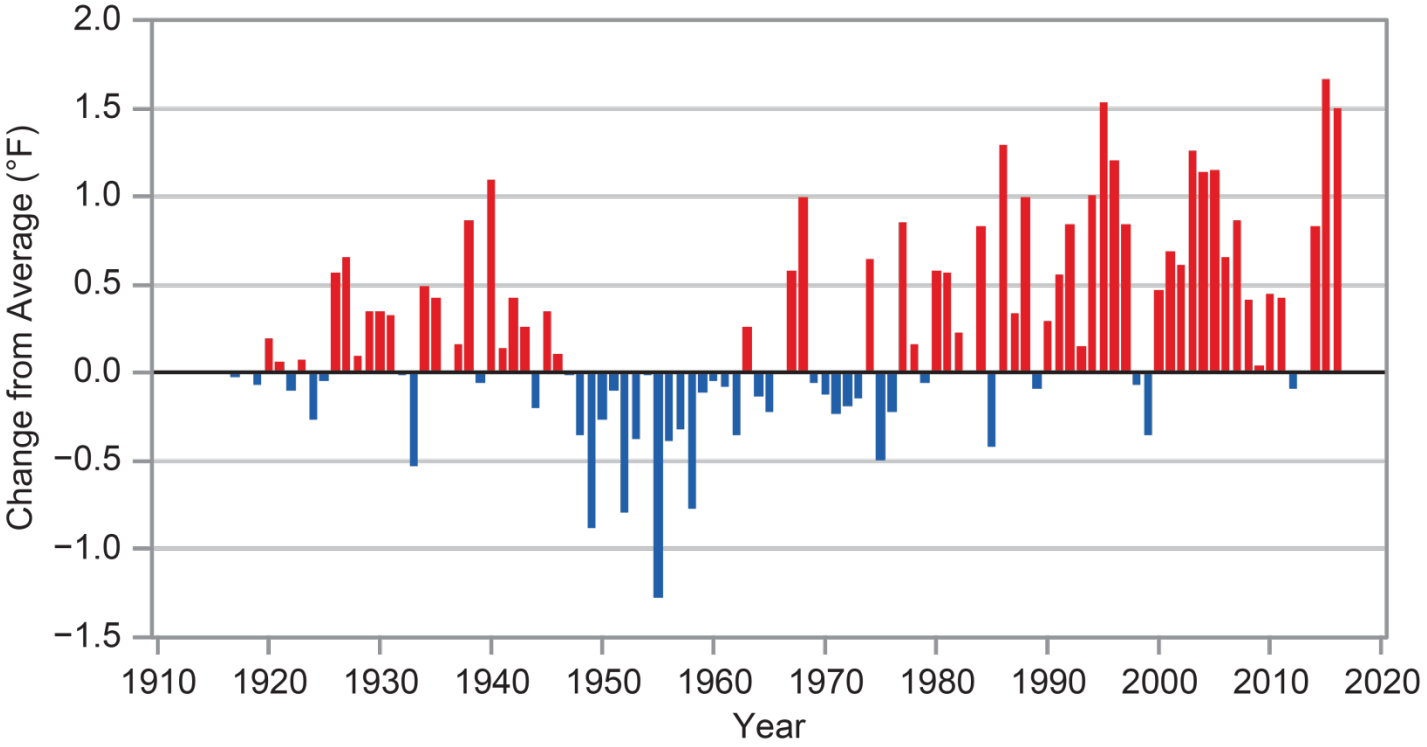


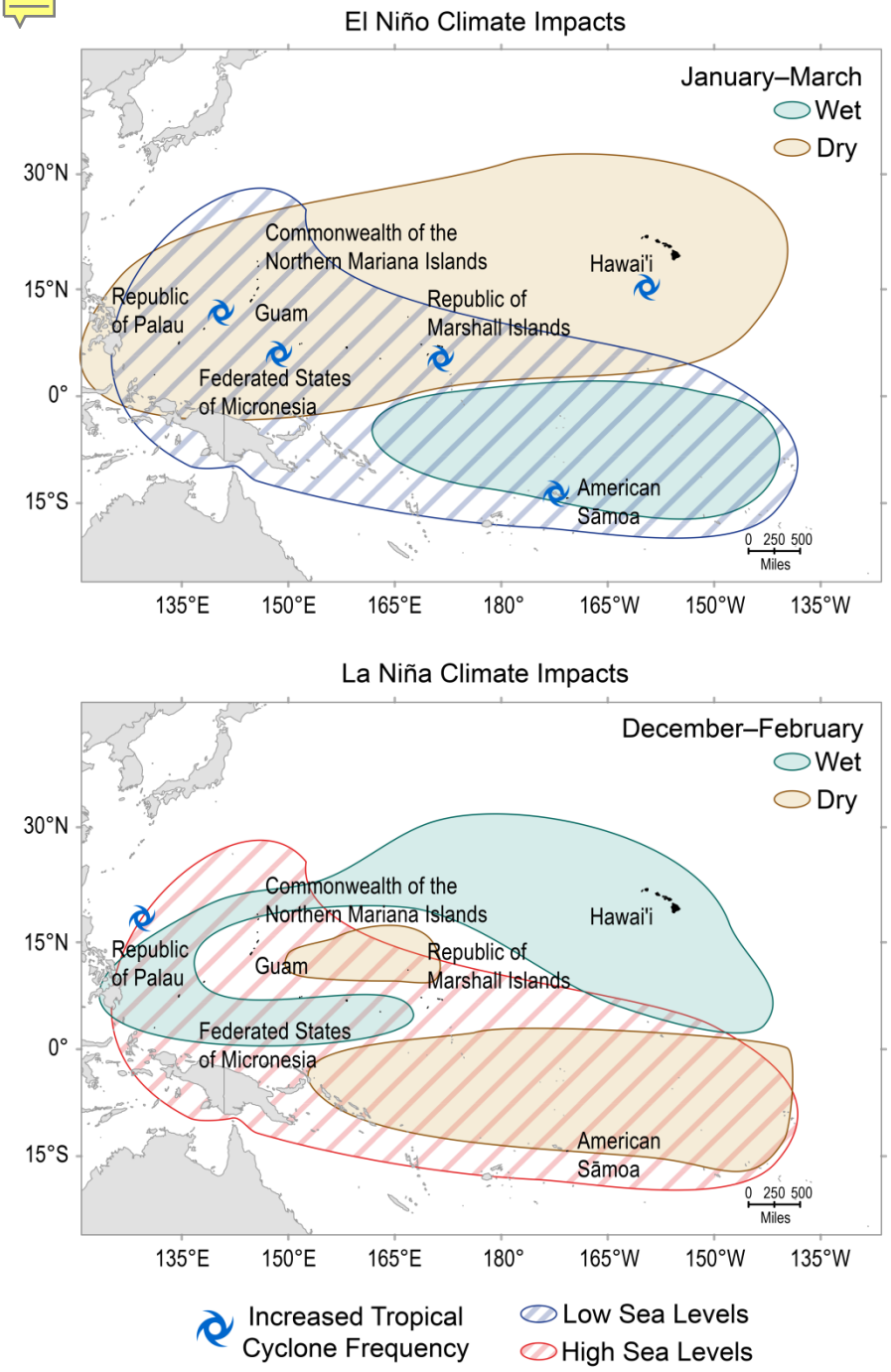
Fig. 27.2: Indicators and impacts of climate change in the Pacific



KM1: Freshwater supplies for communities and ecosystems are threatened



- Rising air temperatures
- Changing rainfall patterns
- Drought and flooding
- Saltwater contamination
- Food security



The El-Niño Southern Oscillation

- Main source of year-to-year variability
  - EN = heat waves (summer), drought (Jan-Mar), tropical cyclones
  - LN = wet (Dec-Feb)
- Can obscure gradual long-term trends

Rainfall Trends in Hawai‘i (1920 to 2012)

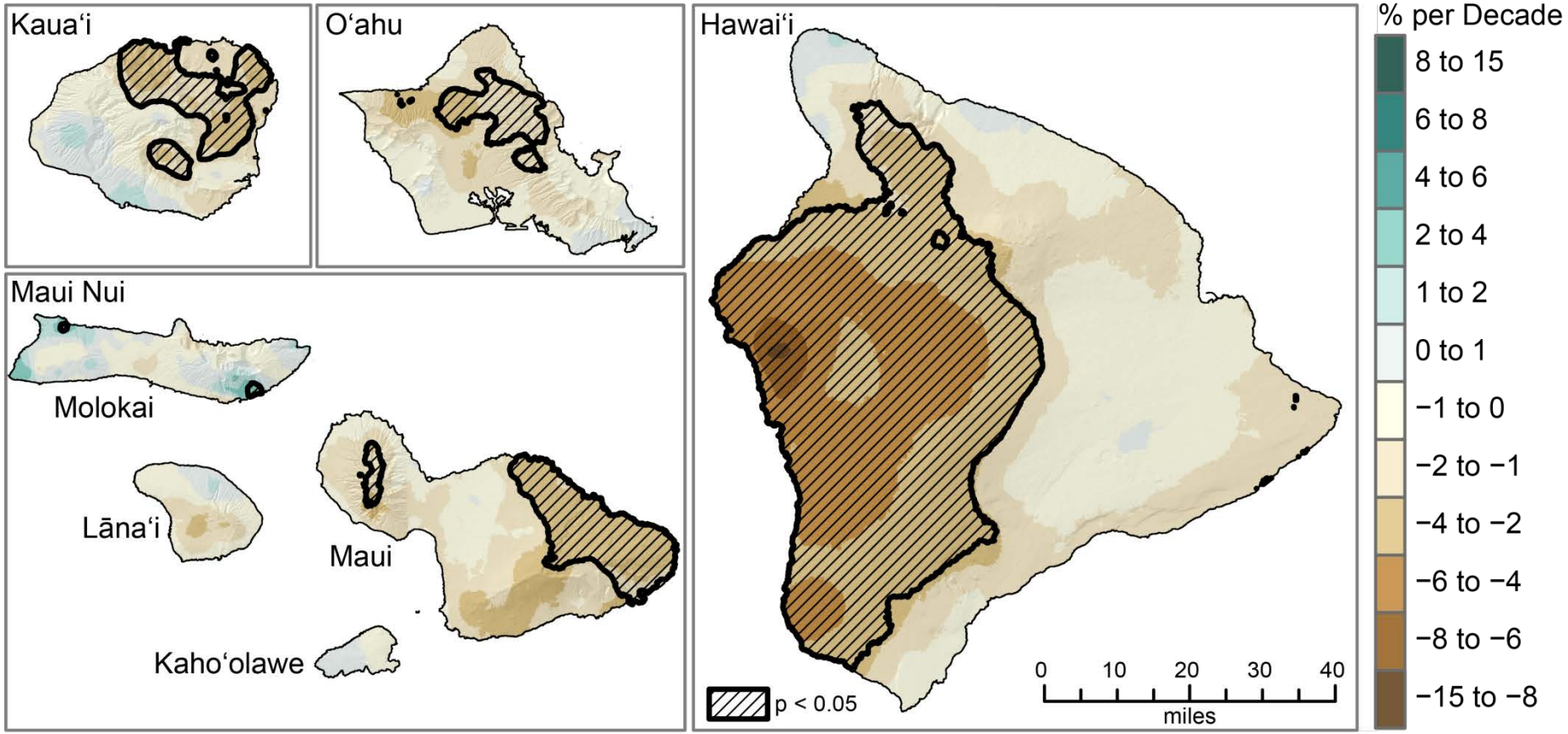


Fig. 27.6

- Statewide drying trend with more consecutive dry days AND wet days
- Increased extreme rainfall events (1940-2010)

KM2: Climate change threatens terrestrial ecosystems, species, and services

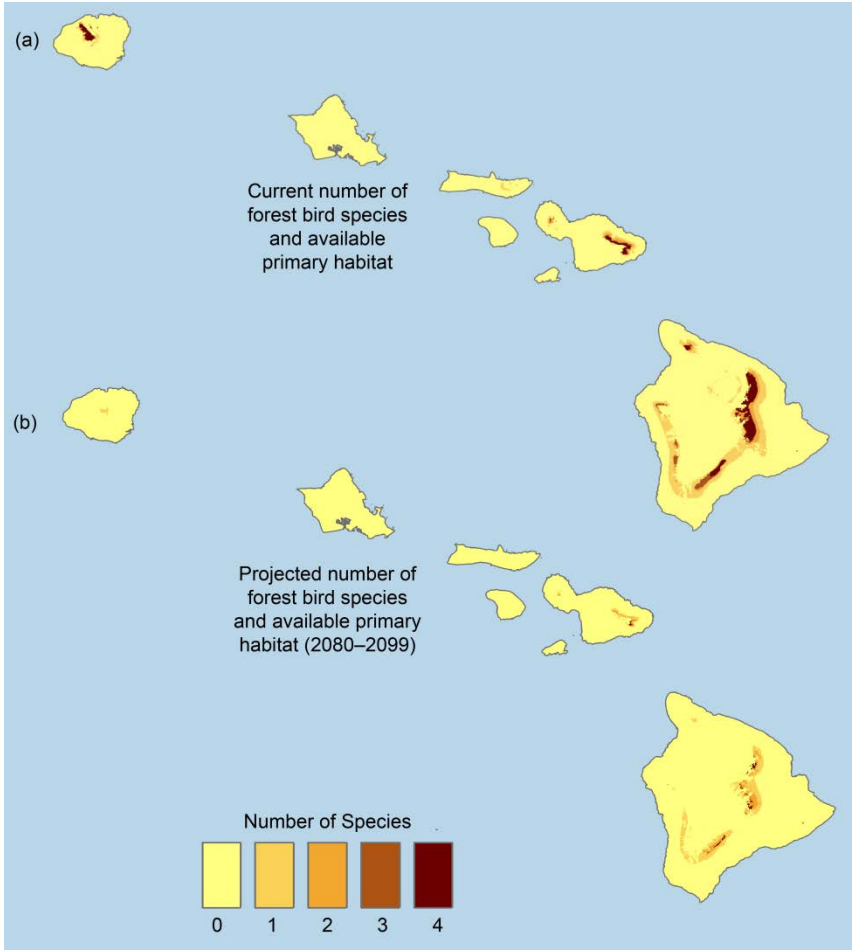


Fig. 27.7 - Modeled number of native Hawaiian forest bird species for (a) current and (b) 2100 climate conditions.

- 90% of native terrestrial species are endemic
- SLR will affect nesting seabirds, turtles, and seals
- The main HI islands have >1,000 native plant species
  - By 2100, >350 will no longer be in their optimal growing range

KM3: Sea level rise will increasingly impact coastal infrastructure, transportation, ecosystems, and communities

- The rate of global SLR has accelerated, but the ultimate timing and magnitude of the increase is uncertain
  - Coastal erosion; Flooding, storm surge; Inundation; Saltwater intrusion
- In 2017, the State of Hawai'i adopted SLR planning projections of 3.2 feet by 2100
  - Regular plan updates needed

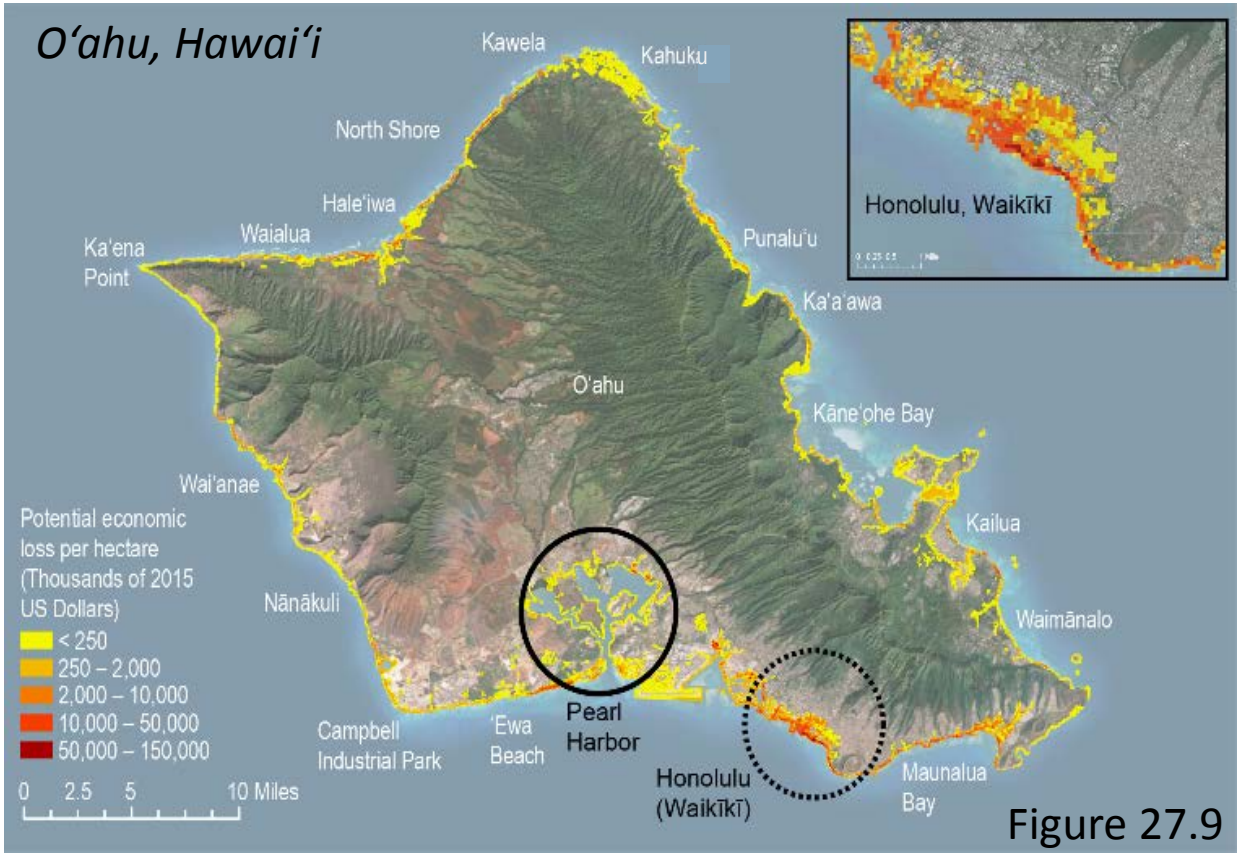


Figure 27.9

Economic Impacts & Decision Making

- More than $19 billion of losses are projected statewide
- 550 Hawaiian cultural sites lost
- More than 6,500 structures and 25,800 acres of land would be unusable or lost
- ~20,000 displaced residents in need of homes
- State of Hawai‘i and City of Honolulu created advisory “Climate Commissions”

Fig 27.8 North Shore Flooding, Oahu

Hawai‘i imports nearly 90% of its food at a cost of more than $3 billion per year (in 2004–2005 dollars)

KM4: Rising ocean temperatures and acidification threaten fisheries, coral reefs, and the livelihoods they support

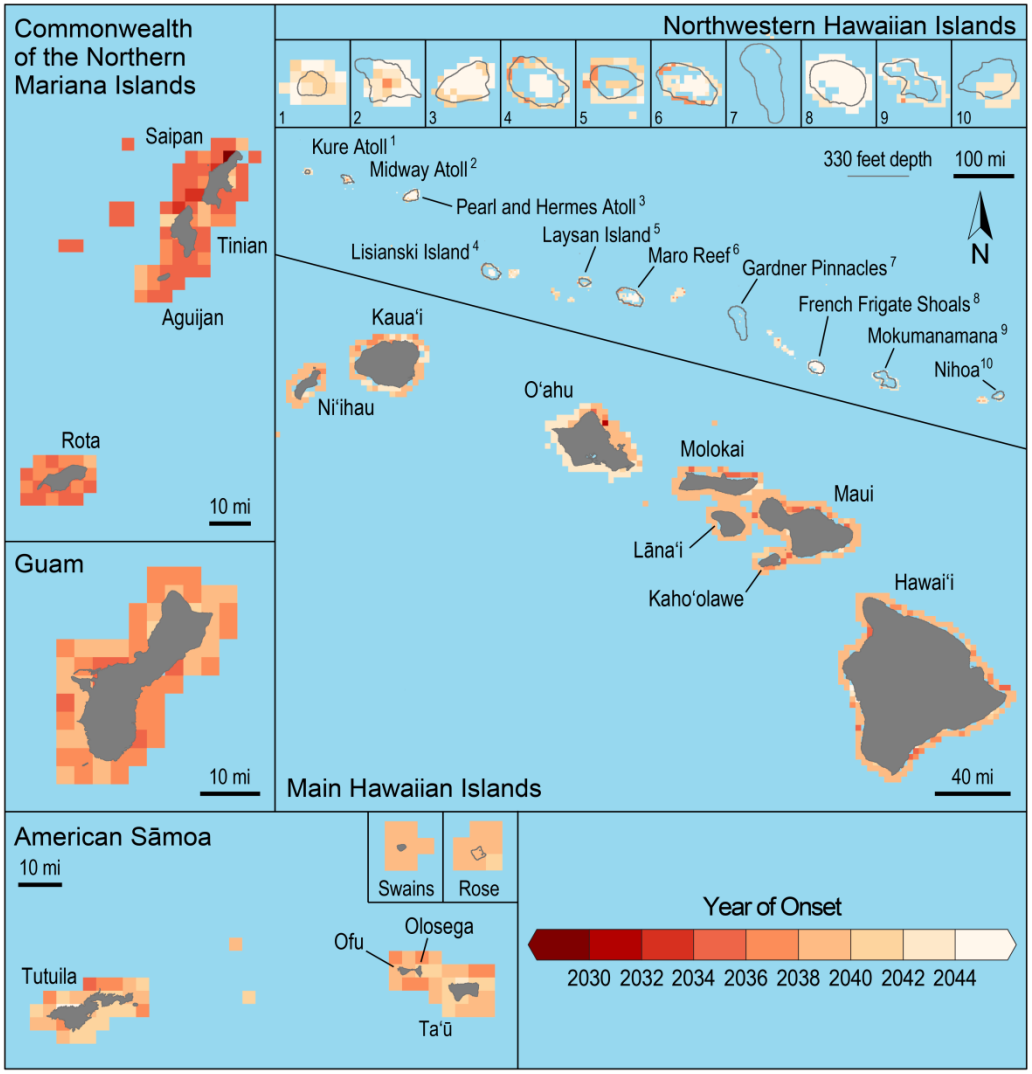


Fig. 27.10

- Coral reefs add ~$364 million in goods and services annually
  - 2015 bleaching resulted in 50% mortality in western HI
- Reefs are projected to bleach annually by 2040
- Landings from the pelagic longline fisheries add over $100 million annually
  - Projected declines in tuna and billfish yields by ~2-5%/decade

KM5: Climate change affects the health, well-being, and modern livelihoods of Indigenous peoples of the Pacific

- Cultural heritage of interconnectedness with the environment
  - SLR impacts agriculture, coastal communities, food security, livelihoods, disaster mgmt, cultural practices (salt cultivation, fishpond maintenance)
- From 2011-15, avg. of 12.5% of the Native Hawaiian population worked in tourism industries


Fig. 27.11


Fig. 27.12

KM6: Compounding climate impacts mean that early interventions and adaptations will be more effective

- Compounding impacts amplify risks on small and isolated islands
- Recovery becomes increasingly difficult
- Repeated shocks amplify stressors
- Impacts with large uncertainty: public health, mental health, human migration, national security, conflict
- Early action and social cohesion will help increase climate resilience

Collaboration!!

Regional Information Empowers Cities and States to Act

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DLNR NEWS RELEASE – STATE CLIMATE COMMISSION ENCOURAGES URGENT ACTIONS TO COMBAT EMISSIONS

Posted on Nov 28, 2018 in Latest News

Supports Legislation to Establish A Carbon Fee Program

(Honolulu) – Hawaii's Climate Change Mitigation and Adaptation Commission, meeting yesterday in Honolulu recognized that ground transportation contributes significantly to Hawaii's share of greenhouse gas emissions. The Commission supports mechanisms to reduce overall vehicle miles traveled as well as converting all remaining vehicle-based ground transportation to renewable, zero-emission fuels and technologies.

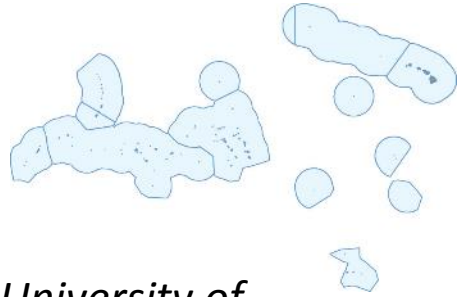
The Commission believes that putting a price on carbon is the most effective single action that will achieve Hawaii's ambitious and necessary emissions reduction goals. This view is also supported by expert global and local institutions:

- The Intergovernmental Panel on Climate Change reports that a price on carbon is central to prompt mitigation, and global emissions of CO2 need to f
- The International Monetary effective than other mitigat
- State of Hawai'i's *Report of t* the state tax structure.
- State of Hawai'i's *Transporta* actions to support clean en fuel in the barrel tax.

DLNR news release November 28, 2018 (top); Honolulu Mayor Kirk Caldwell, NCA4 Authors, and CRO Stanbro November 26, 2018 (OCCSR) (bottom)

- Cities and states need authoritative climate projections
- Legitimate debate about how best to adapt to impacts, make tradeoffs
- Regional chapters provide examples of communities and organizations across the country adapting

27 Chapter Author Team



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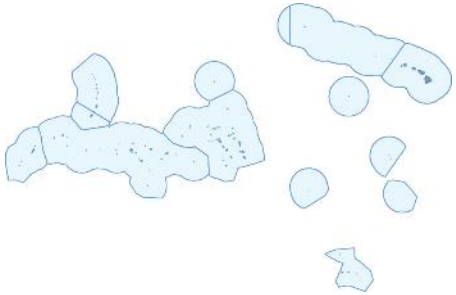

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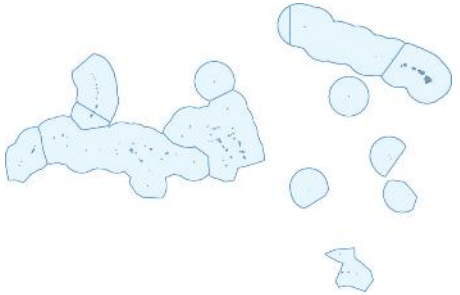

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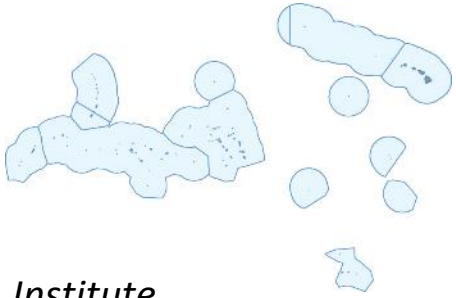

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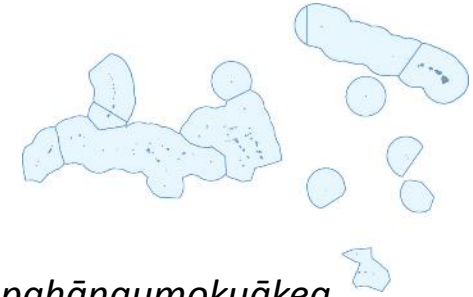

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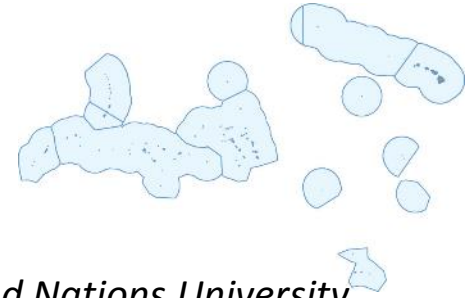

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