



Climate and Societal Interactions Division Nature-Based Solutions Webinar Series

Considerations for Integrating Nature-based Solutions in Planning

October 23, 2024

3-4 pm EST



**Climate Adaptation
Partnerships (CAP)**



AdSci
Adaptation Sciences Program





Housekeeping



- **Can you hear me?** Check that your computer audio is on, and captions are available.



- **Having technical issues?** Try rejoining the session, unfortunately we cannot assist with personal computer audio issues.



- **Have a question?** Please submit them by clicking the question icon








- **This is being recorded** - the recording will be sent to all registrants and posted on our website.





Agenda

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- I. Introduction: **Aliya Mejias**
 - II. NOAA's Climate Program Office, Climate and Societal Interactions (CSI), and Climate Adaptation Partnerships (CAP) Overview: **Genie Bey**
 - III. Adaptation Sciences Overview: **Bhaskar Subramanian**
 - IV. Identification of cost-effective, climate-informed green infrastructure adaptations to reduce flood risk in Houston's vulnerable communities: **Jessica Eisma**
 - V. Natural capital-informed decision making on Kaua'i: **Kirsten Oleson and Ann Nyambega**
 - VI. Q & A



National Oceanic and Atmospheric Administration
Climate & Societal Interactions Division's

Nature-based Solutions Webinar Series

Modeling of Nature-based Solutions for Decision Making

Sept 26 Modeling of Nature-based Solutions for Decision Making
3-4 pm ET

Oct 23 Considerations for Integrating Nature-based Solutions in Planning
3-4 pm ET

Nov 26 Building Coastal Adaptive Capacity through Nature-based Solutions
3-4 pm ET

Dec 17 Utilizing Nature-Based Solutions for the Advancement of Multiple Objectives, Co-Benefits, and Health
3-4 pm ET

Jan 23 Challenges and Opportunities of Scaling Nature-based Solutions for Climate Adaptation
1-2 pm ET



REGISTER: [BIT.LY/CSI-NBS](https://bit.ly/csi-nbs)



DOC/NOAA Organizational Structure



**National Environmental
Satellite Data and
Information Service**

National Marine Fisheries

National Ocean Service

National Weather Service



**Oceanic and Atmospheric
Research**

**Office of Marine and
Aviation Operations**

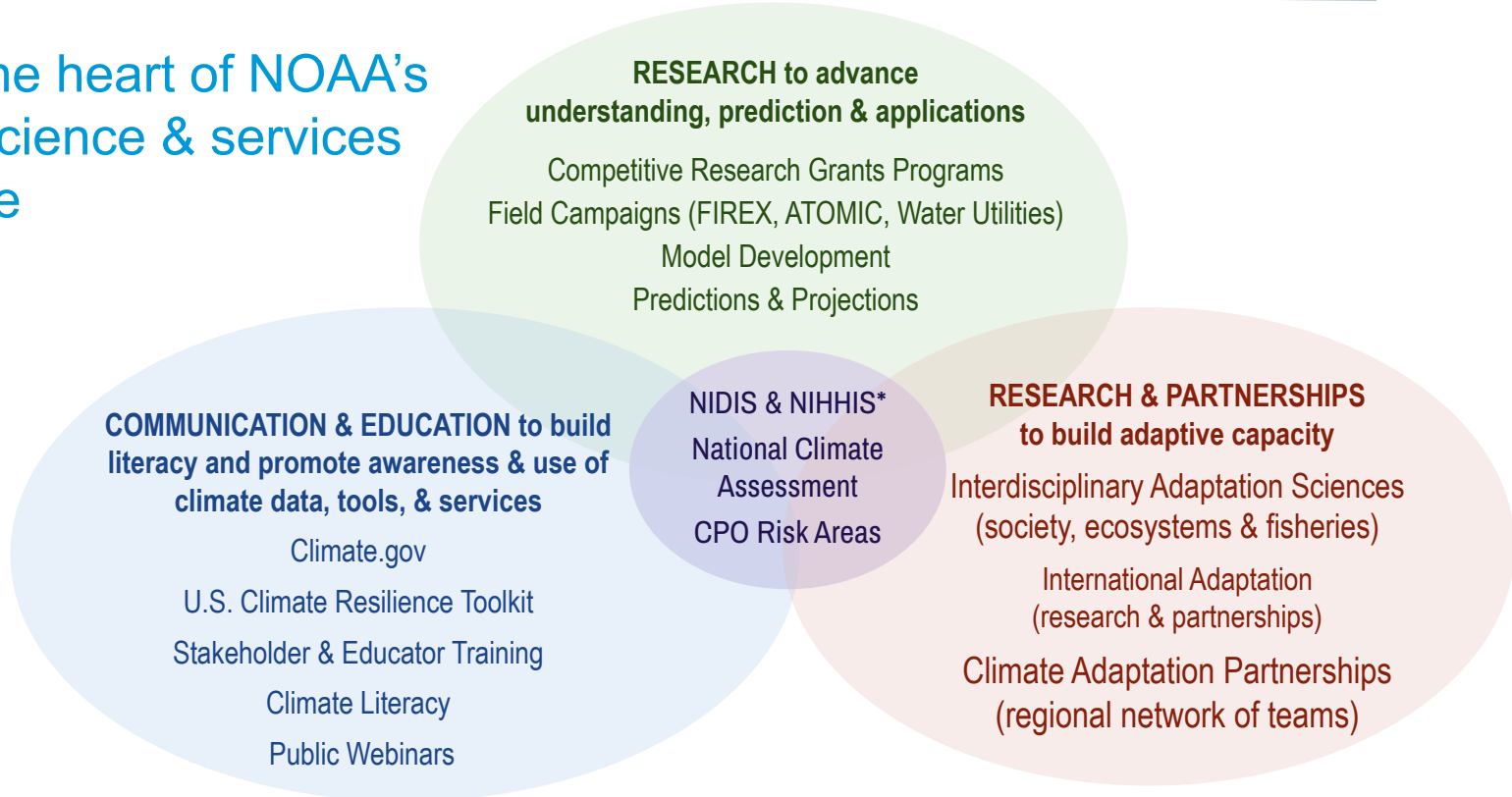
**Climate
Program
Office**

**Climate and
Societal
Interactions**



What does CPO do?

CPO is the heart of NOAA's climate science & services enterprise



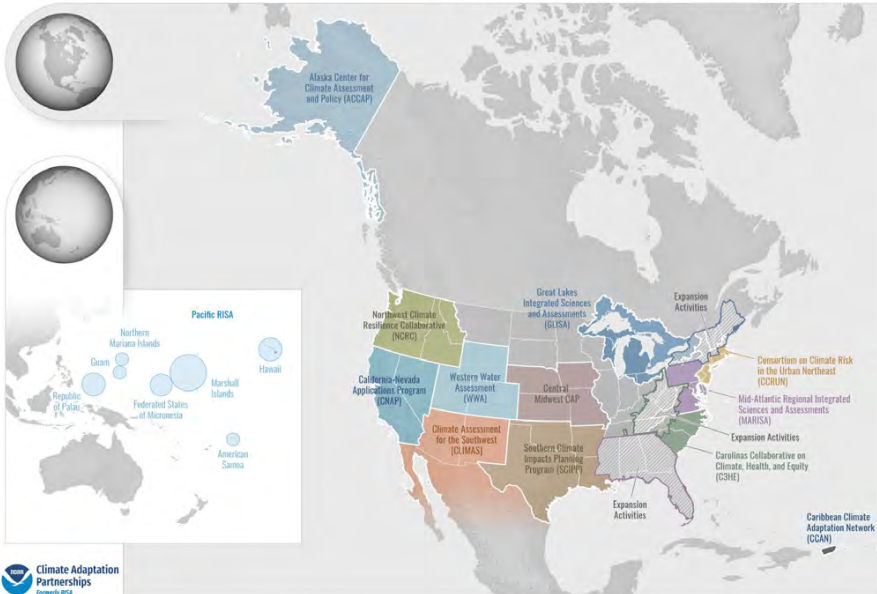
*NIDIS: National Integrated Drought Information System, NIHHS: National Integrated Heat Health Information System



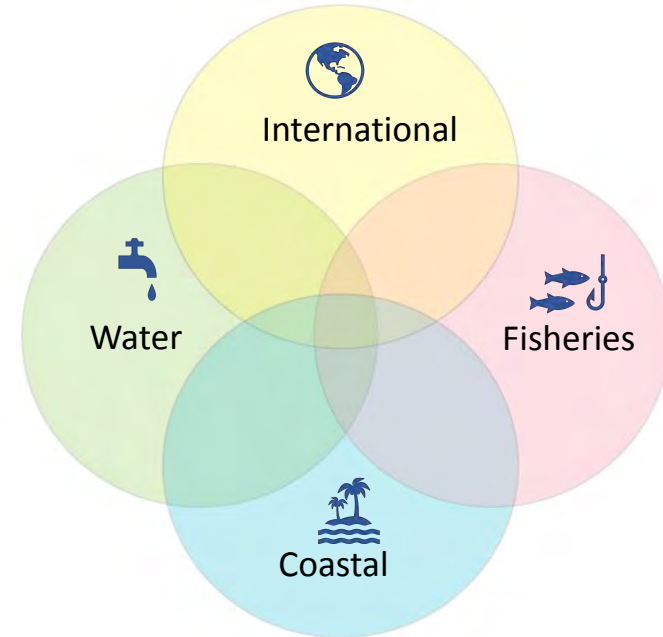
NOAA Climate and Societal Interactions (CSI) Division

Climate Adaptation Partnerships (CAP) / Regional Integrated Sciences and Assessments (RISA) Program

Currently Funded CAP/RISA Teams and Expansion Activities



Adaptation Sciences (AdSci) Program





Climate Adaptation Partnerships

Formerly RISA

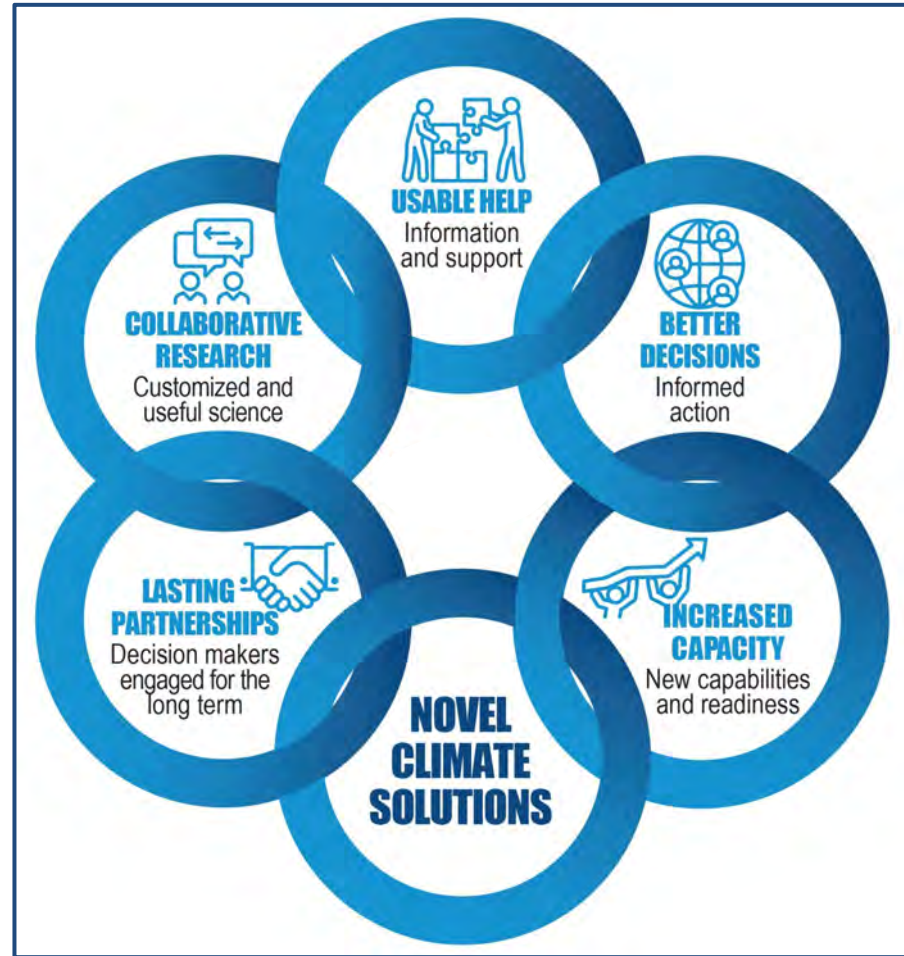
Mission

Advance equitable adaptation through sustained **regional research** and **community engagement**

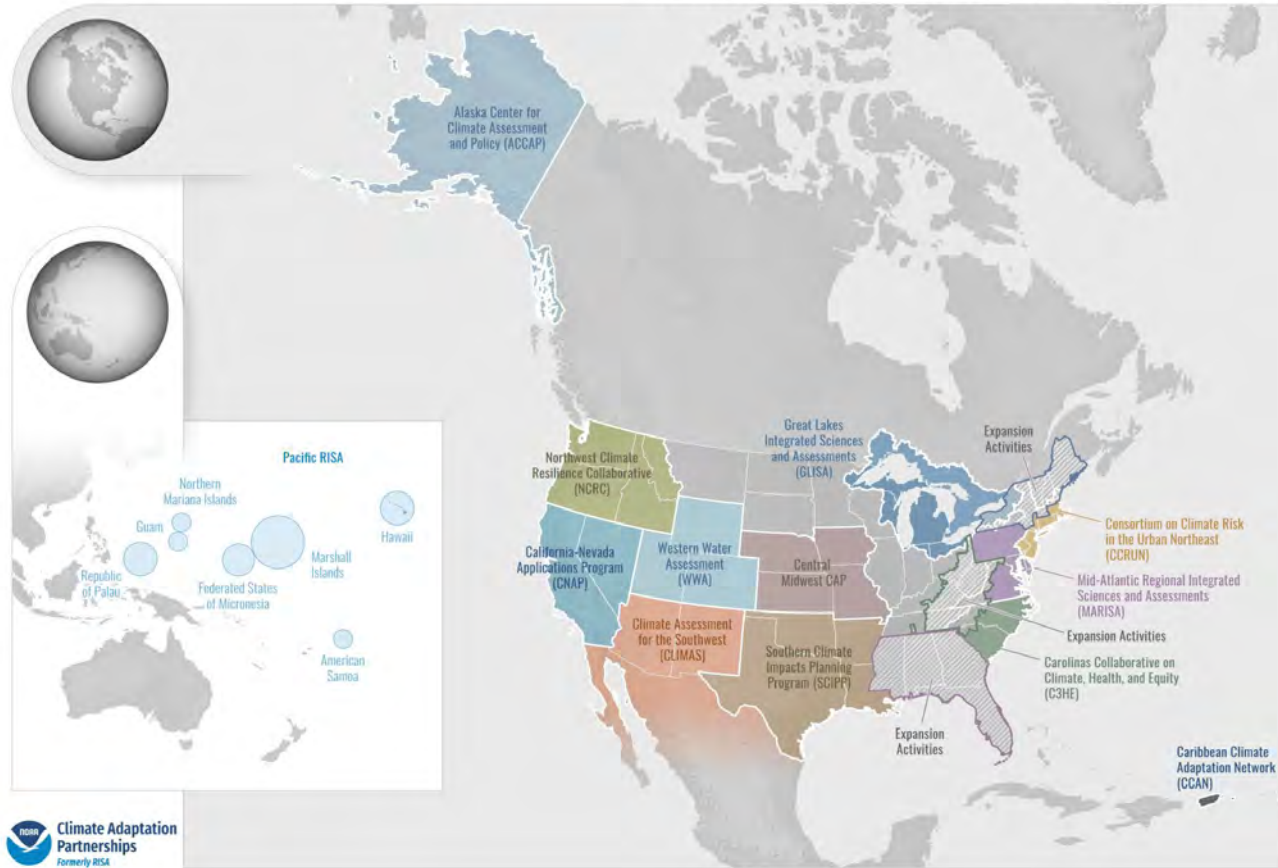
Structure

Competitively-awarded 5-year **cooperative grants** between NOAA and institutions in the applicable region.

Each core grant funds a diverse **regional team** of experts and local partners in government, nonprofits, and universities.



Currently Funded CAP/RISA Teams and Expansion Activities



CAP by the Numbers

- **1000+** partners
- **50%** of projects have equity focus
- **135** plans, policies, & actions informed yearly
- **400+** communities served
- **400+** early career professionals trained
- **350+** state and local agency partners
- **450+** private sector partners



Decision Making &
Community Planning

Trade-offs &
Co-Benefits

**CAP NbS
Contexts**

Advancing Equity &
Workforce
Development

Analysis &
Evaluation



Adaptation Sciences (AdSci) Program

- Est. 2021
- Designed to advance the knowledge, methods and frameworks needed to move society beyond incremental adaptation toward more widespread, connected, adaptive pathways, and resilience strategies with clear economic and societal co-benefits.
- The goal of the AdSci Program is to **foster adaptation and resilience by supporting research and partnerships** focused on:
 - Developing an understanding of **key drivers and conditions that shape and enable adaptation** across multiple temporal and spatial scales (e.g., socioeconomic context, adaptive behaviors, risk perception, public awareness and education); and
 - Identifying key aspects of and promoting opportunities for the use of **climate information to best support preparedness and planned adaptation** of high value to social and economic goals.



Source: Participants at Climate and Health Dialog 2020
Majuro (David Krzesni)

AdSci: Blending Research, Partnerships and Engagement

- AdSci funds external **interdisciplinary research and engagement** through competitive, peer reviewed processes, and PI communities of practice
 - **Science for adaptation** - moving toward the science OF adaptation
 - **Systems approach**- compound events and cascading impacts
- **Technical collaboration and capacity building** through leveraged funding in areas that intersect with NOAA's mission (e.g., fisheries/CAFA and coastal)
- **Partnerships/Interagency engagement** to shape and implement program priorities through participation in federal working groups and project-specific cross-agency collaboration
 - AdSci leverages Department of State funding, which includes projects such as *Island-Led Resilience 2030 (ILR2030)*, and the *Transparency through Emissions Accounting and Reporting for Wetlands (aka "NOAA's Blue Carbon Inventory Project")*
 - AdSci also co-leads NOAA's partnership with DOT called the Climate Smart Transportation





Speakers: Considerations for Integrating Nature-based Solutions in Planning



Jessica Eisma

University of Texas at Arlington



Kirsten Oleson

*University of Hawai'i at Mānoa
(Pacific RISA)*



Ann Nyambega

*University of Hawai'i at Mānoa
(Pacific RISA)*





Empowering **Communities** for Climate **Adaptation** through **Nature-based Solutions** for Stormwater Management

Dr. Jessica Eisma - UTA

October 23, 2024



PROJECT TEAM



Dominic Boyer
Rice University



Jessica Eisma
University of Texas at Arlington



Michelle Hummel
University of Texas at Arlington



Siddharth Saksena
Virginia Tech



David Coursey
University of Texas at Arlington



Claire Knox
University of Central Florida

PROJECT PARTNERS



Keith Downey
Kashmere Gardens



Huey German-Wilson
Trinity/Houston Gardens

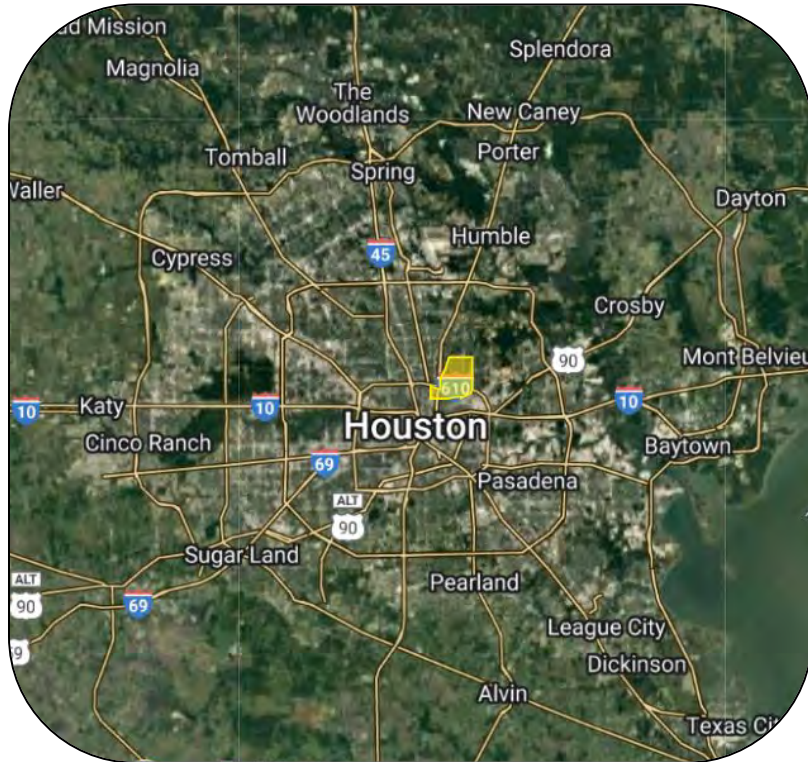


Ken Williams
Trinity/Houston Gardens

Northeast Houston
Redevelopment Council

- University of Houston
- Harris County Flood Control District
- City of Houston (Planning, Emergency Management, Resilience & Sustainability)
- Asakura Robinson

NORTHEAST HOUSTON

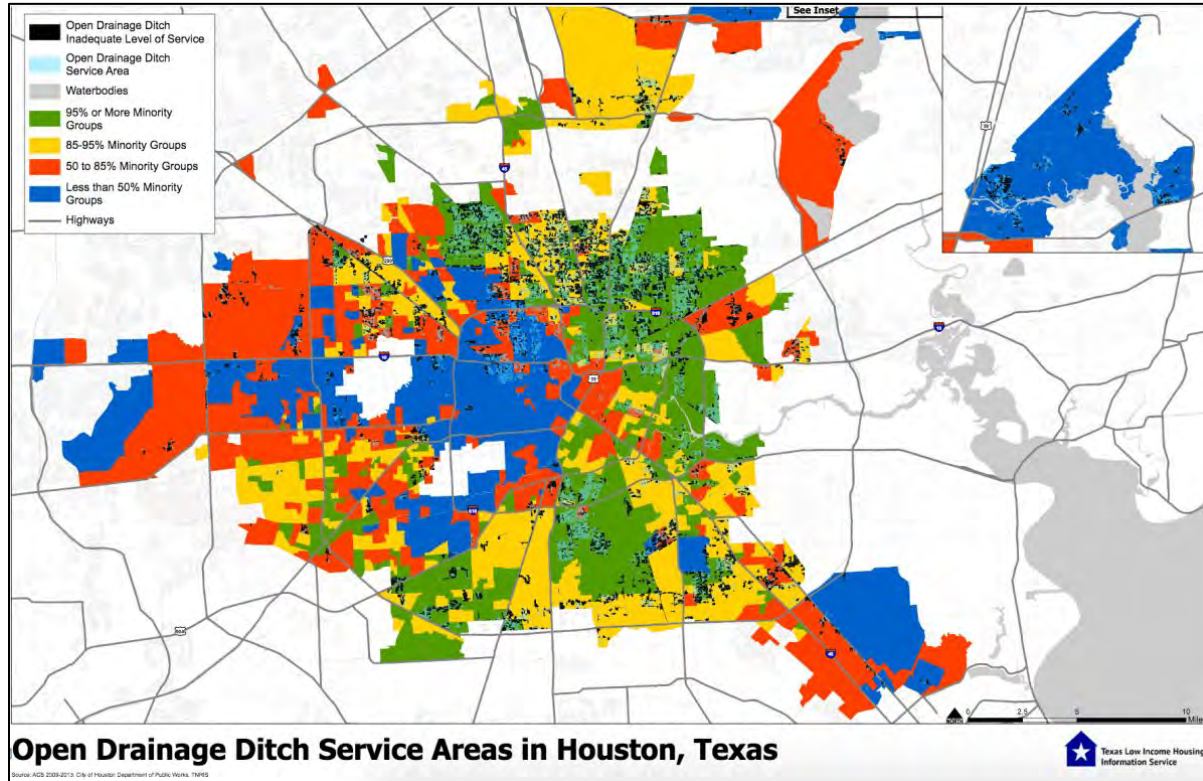


- Began developing in 1930s on the outskirts of Houston.
- Historically, an African-American community
- Forefront of fight for school integration in Houston ISD
- Well-established civic institutions

NORTHEAST HOUSTON



NORTHEAST HOUSTON



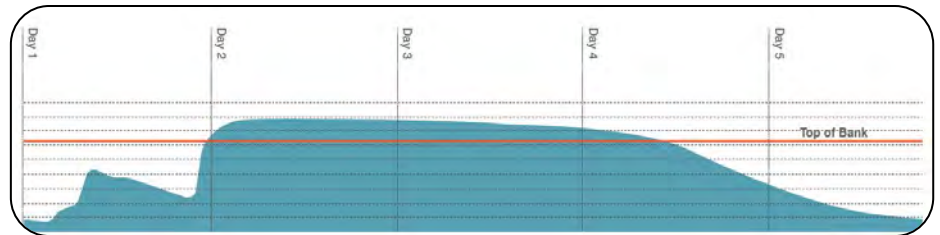
NORTHEAST HOUSTON



NORTHEAST HOUSTON



- 64% of homes flooded
- 4 days before flood receded



WHAT ARE WE TRYING TO DO?

- Broadly: Develop a **community-supported** green stormwater infrastructure plan for the Gardens Super Neighborhoods
- What does this involve?
 - Working closely with **interested community members and local government** leaders to identify and incorporate their needs and wants
 - Creating a **final GSI plan with a cost-benefit analysis** that can be used to help secure funding for GSI projects in the Gardens
 - Interacting with community members (community events and **interviews**) to help **identify social barriers to adoption of GSI**

COMMUNITY ENGAGEMENT

- Attending community **outreach events**
- **Giving talks** at Super Neighborhood monthly meetings and to civic groups
- **Semi-structured interviews** with residents to understand their perceptions of GSI and barriers to its acceptance
- **Demonstration workshop**

RAIN GARDEN DEMONSTRATION PROJECT



- Where: Trinity Gardens Community Garden



Infrastructural citizenship as alternative to current practices in stormwater management



Houston Trinity Gardens Community Garden, June 11 2022



“Infrastructural citizenship” is a concept developed by geographer Charlotte Lemanski to discuss how state-society relations are often mediated by infrastructure.

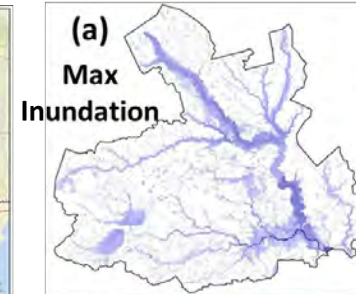
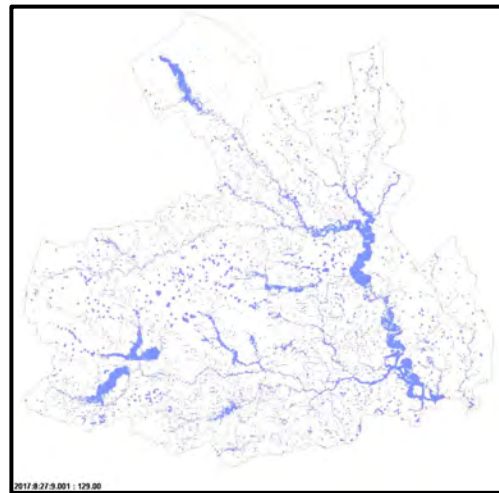
More plainly, infrastructural citizenship is what happens when people organize around and intervene in infrastructure design, creation and management in order to assert a capacity to control their own futures.



Infrastructural citizenship differs from top-down “technopolitical” approaches to infrastructure management which often transpire beyond the sphere of civil power.

Fostering greater capacity for infrastructural citizenship will be critical to navigating multiple challenges of the climate crisis.

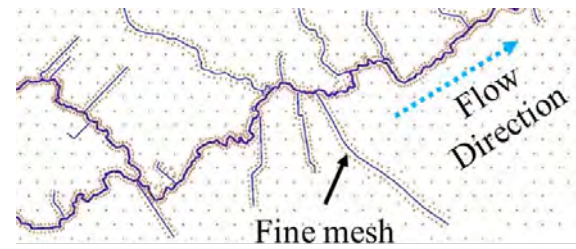
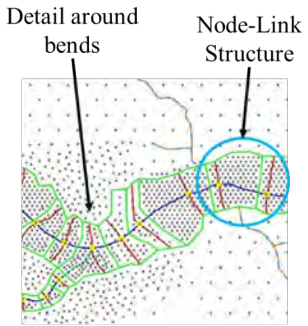
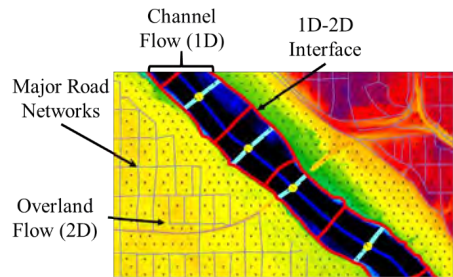
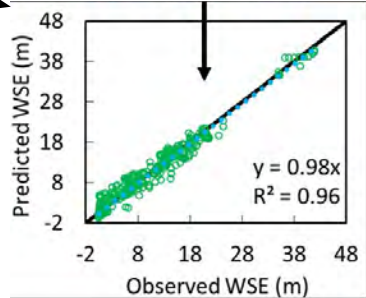
Existing large-scale model encompassing the City of Houston, TX



Total Building Points = 66,786

True Positive	False Positive	False Negative
97.1%	0.7%	2.2%

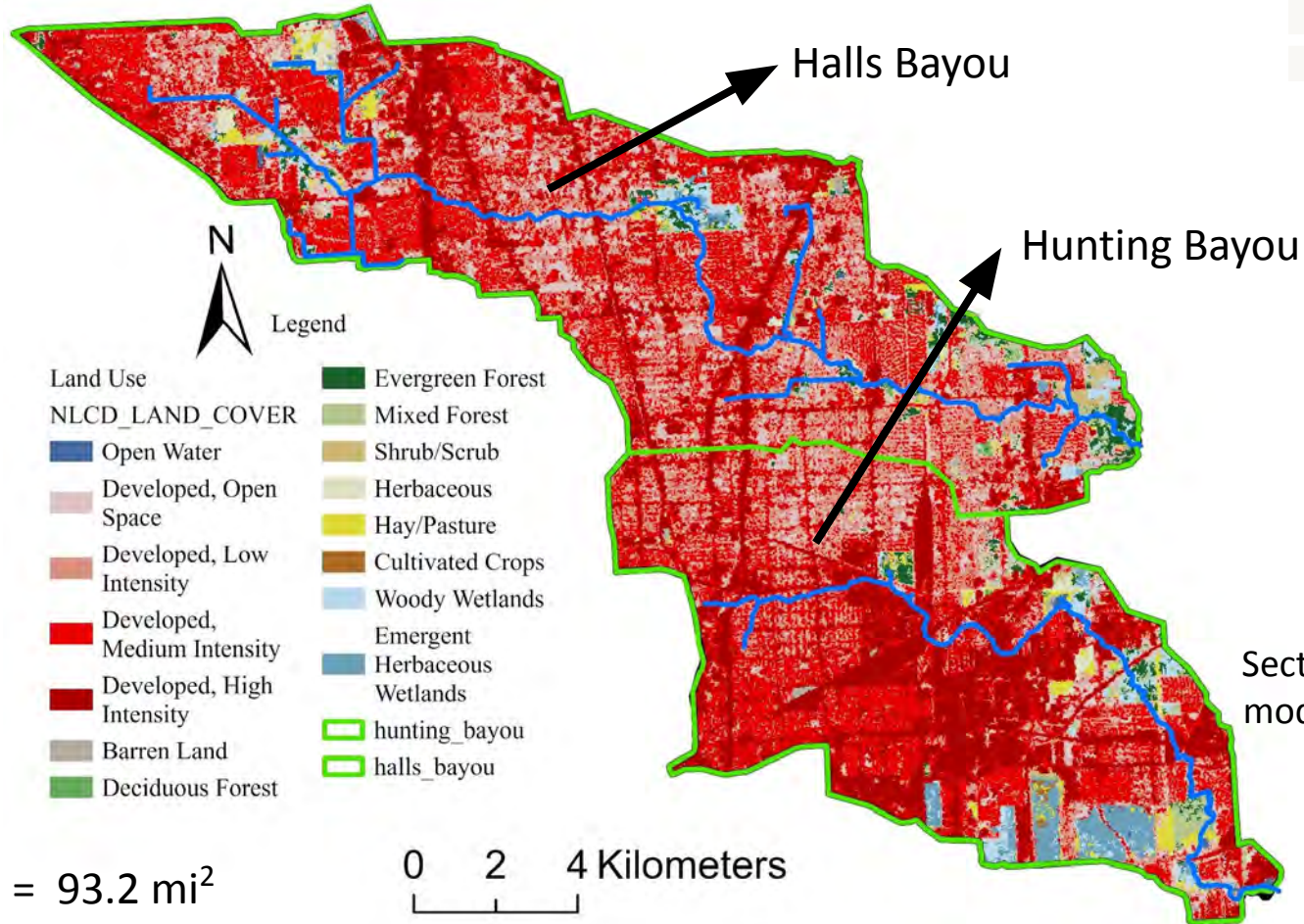
Model calibrated using Hurricane Harvey



Hybrid model construction



Study Area for Model Development



Drainage Area = 93.2 mi²

SIMULATIONS

- **24-hr**, 3-day, 7-day design storms for:
 - 2, 5, 10, 25, 50, 100, 500-year return periods
 - Climate change scenarios: current, 2050, 2100
- Four implementation levels:
 - No GSI, 25%, 50%, 100%

CONCLUSIONS & RECOMMENDATIONS

- Vulnerable communities are **interested** in adaptation planning and GSI but are **skeptical** that real change can occur.
 - Engagement with communities needs to **start** with respected community leaders at the **proposal-writing stage**. Follow the advice of the community leaders! They know best.
- GSI planning with community leaders ensured selected GSI types would be welcome by the residents, but the most effective GSI types were not selected
 - The selected GSI types will reduce flood risk, but **additional measures are necessary**.
 - Recommend combining small-scale GSI for development of **infrastructural citizenship** coupled with higher impact GSI like constructed wetlands

QUESTIONS/COMMENTS?

- Jessica Eisma (jessica.eisma@uta.edu)

Speakers: Considerations for Integrating Nature-based Solutions in Planning



Jessica Eisma

University of Texas at Arlington



Kirsten Oleson

*University of Hawai'i at Mānoa
(Pacific RISA)*

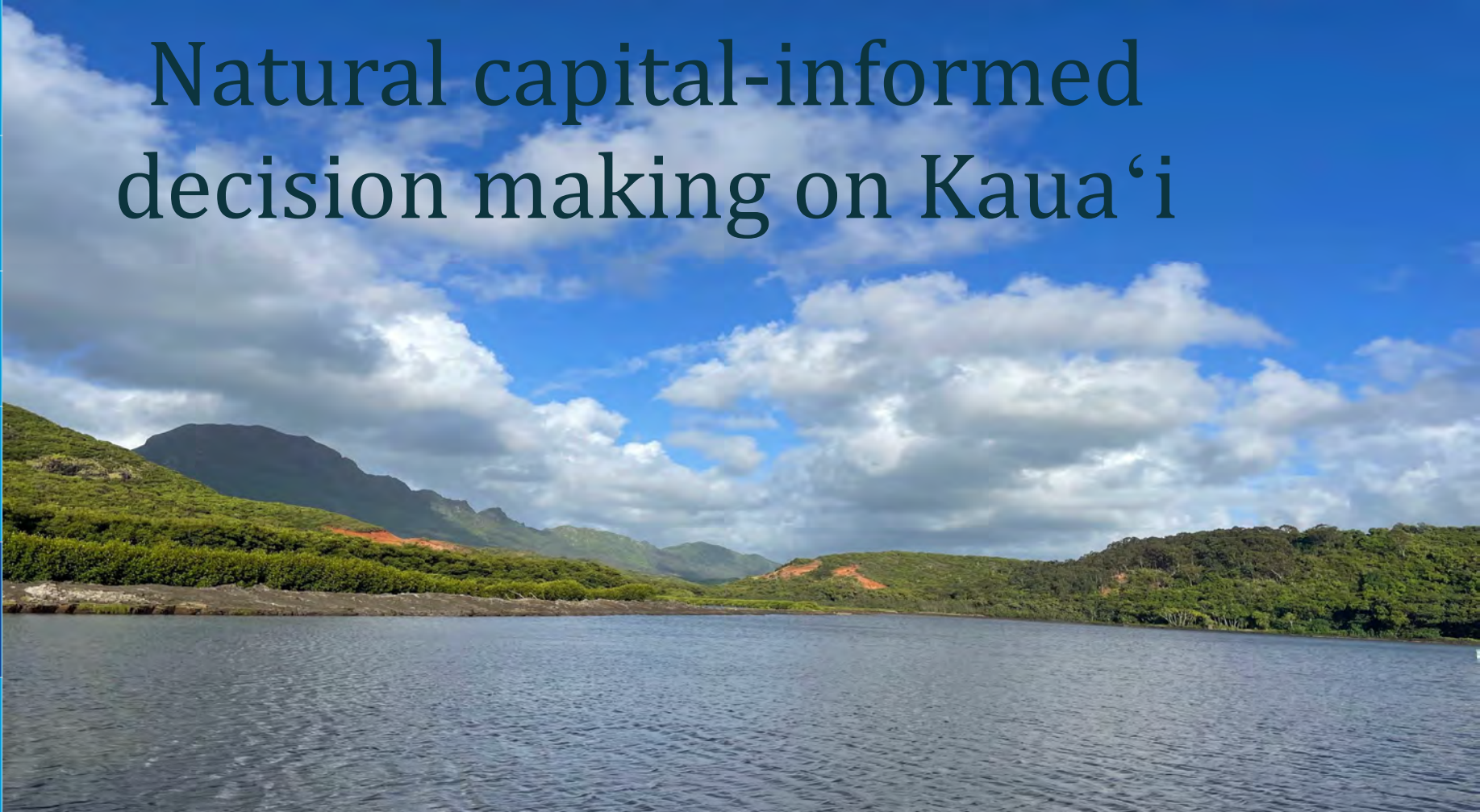


Ann Nyambega

*University of Hawai'i at Mānoa
(Pacific RISA)*



Natural capital-informed decision making on Kaua‘i



Project Team

Dr. Kirsten Oleson (PhD) - koleson@hawaii.edu

Ann Nyambega (MSc) - annkn@hawaii.edu

Lysbeth Koster (MSc)

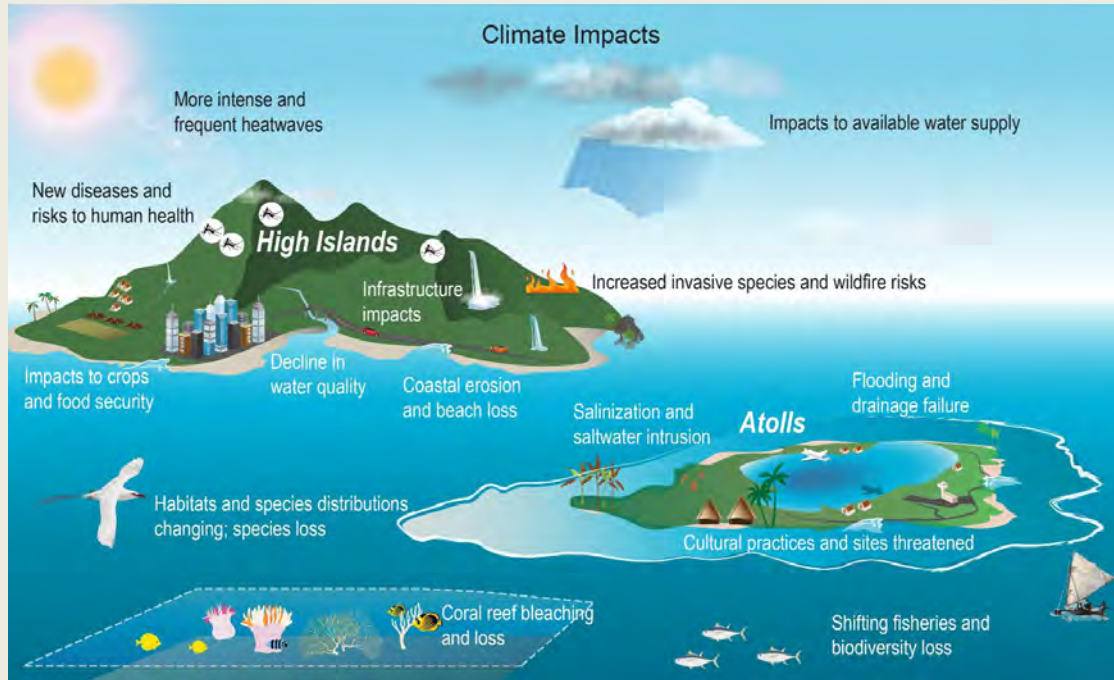
Marion Graftieux (MSc)



Natural capital-informed decision making on Kaua'i

Objectives:

1. Co-develop evaluation plans
2. Co-produce knowledge on monitoring & evaluation of EbA
3. Inform adapt management for on-ground EbA practices



Climate Change Impacts in the Pacific Islands (USGCRP et. al., 2023)



What is Ecosystem-based Adaptation (EbA)?



EbA
A subset of nature-based solutions that integrates the use of biodiversity and ecosystem services into climate adaptation strategies, and is informed by both local knowledge and modern science.

Scoping sites; Determining eval needs

Interviewed EbA organizations:

1. **Kaua'i Sea Farm**
 2. **Mālama Hulēi'a**
 3. **Waipā Foundation**
 4. Hanalei Initiative
 5. Manā Plain
 6. UHM Food Systems
 7. Pacific Birds Habitat Joint Venture
 8. Mālama Kua'aina
- + Kaua'i County Planning Department



3 partners with different needs

Needs Assessment:

- Interviews
- Workdays
- Literature reviews
- System mapping





Nōmilu Fishpond



Biogeochemical dynamics and aquaculture production

(Ms. project- Lysbeth Koster)

Dr. Craig Nelson- department of microbial oceanography

Dave Anderson - Kauai Sea Farm

Lysbeth Koster

MS project- Biogeochemical dynamics and aquaculture production

Challenge: Observed decrease in growth and survival of clams and oysters during the winter months (October-February)

Activities:

- Series of water sampling and testing
- Trained and build water quality sampling protocol for the pond managers with support by Dr. Craig Nelson



Findings



Key findings:

1. Wind- induced water mixing improves nutrient distribution in the pond
2. During winter, productivity of the pond declines due to poor mixing dynamics caused by climate change impacts on wind patterns

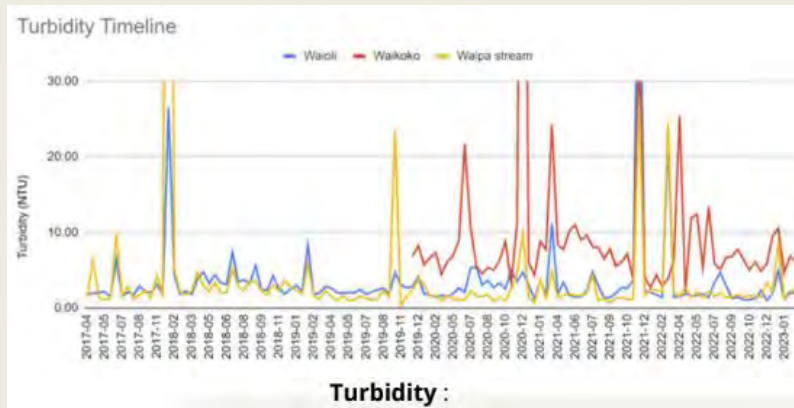
Recommendation:

Enhance mixing dynamics by implementing aerators and jet streams to improve intercolumn and spatial mixing dynamics.

Wāipa

Marion Graftieaux

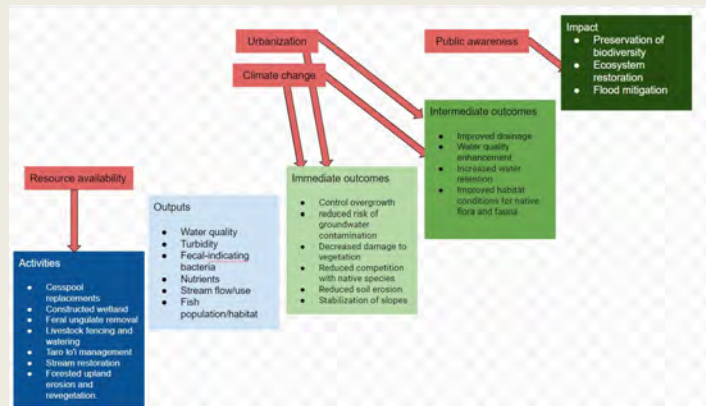
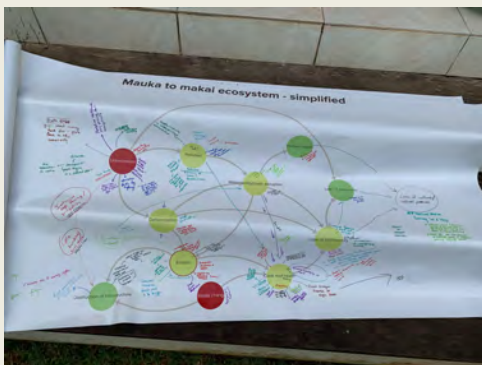
MS project



Preliminary Findings:

Reduced turbidity and fecal bacteria after restoration

Fluctuations observed due to external factors (rainfall, land use)



Next steps:

Continue M&E to understand external drivers and improve outcomes



Alakoko Fishpond

Before
restoration



7 yrs in
restoration



Ann Nyambega

MS. Thesis - M&E focused

Alakoko Past Issues:

Mangroves and other invasive species choking life out of the pond

Mālama Hulē`ia: local non-profit that employs biocultural restoration to restore Alakoko

Challenge: effectively monitor, evaluate and communicate the outcomes of their restoration work for securing funding and engaging broader community



Alakoko Fishpond

Challenges:

1. Gaps in place-based resilience indicators for NbS
2. Lack of simplified structured monitoring frameworks that meet on-ground realities
3. Untapped potential of existing data. What do we measure/monitor?

Moving forward:

Collect narratives from community

Improve monitoring plans to better track co-benefits (social & ecological)



Conclusions

- Restoration orgs. prioritized ecological data monitoring
 - Expand **social indicators**
- Traditionally rigid M&E frameworks vs. highly adaptive socio-ecological systems.
 - Need for **decolonized, flexible and responsive M&E principles** that adapt and respect local knowledge systems and reflect on-ground complexities
 - Formalize existing local and cultural ways of data collection
- **Training** and capacity building
 - Monitoring design, data collection & analysis
- **It takes time to build trust and engage with community!**

Thank you!

Questions, remarks, or feedback?

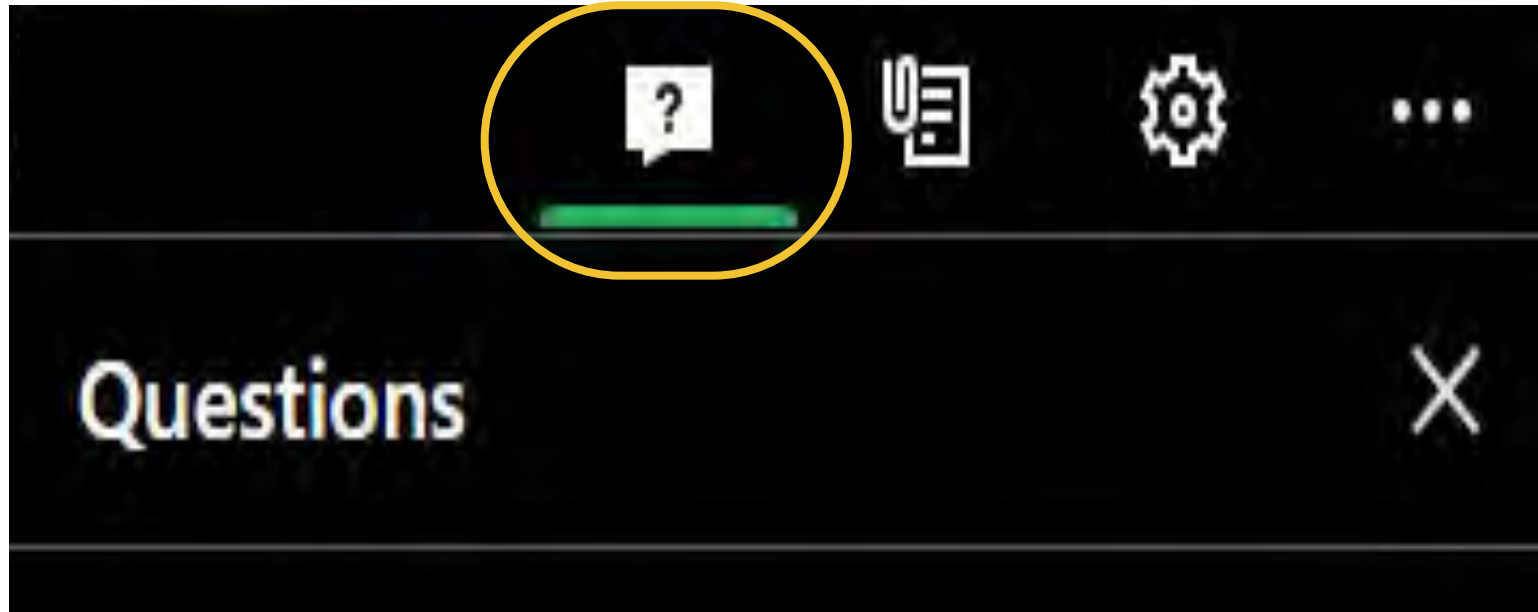
Contact information:

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koleson@hawaii.edu

Ann Nyambega (MSc)
annkn@hawaii.edu



Submit questions



Questions/Comments: Aliya Mejias, Knauss Fellow, aliya.mejias@noaa.gov, Genie Bey, Program Specialist, genie.bey@noaa.gov,
Bhaskar Subramanian bhaskar.subramanian@noaa.gov

National Oceanic and Atmospheric Administration

Climate & Societal Interactions Division's

Nature-based Solutions Webinar Series

Episode 3

Building Coastal Adaptive Capacity through Nature-based Solutions

Nov 26

3-4 pm ET

FEATURED PROJECTS



Increasing Massachusetts Coastal Adaptive Capacity and Community Resilience to Sea Level Rise



Evaluating Nature-Based Solutions for Coastal Adaptation in Southern California

FEATURED SPEAKERS



Sara Grady
Senior Coastal Ecologist, Mass Audubon



Tom Corringham
Research Economist, Scripps Institution of Oceanography (CNAP)

REGISTER: bit.ly/CSI-NbS3

