

# “ — UNACCEPTABLE COSTS

## Managing for Biological Invasions and Climate Risk in the US Pacific Islands

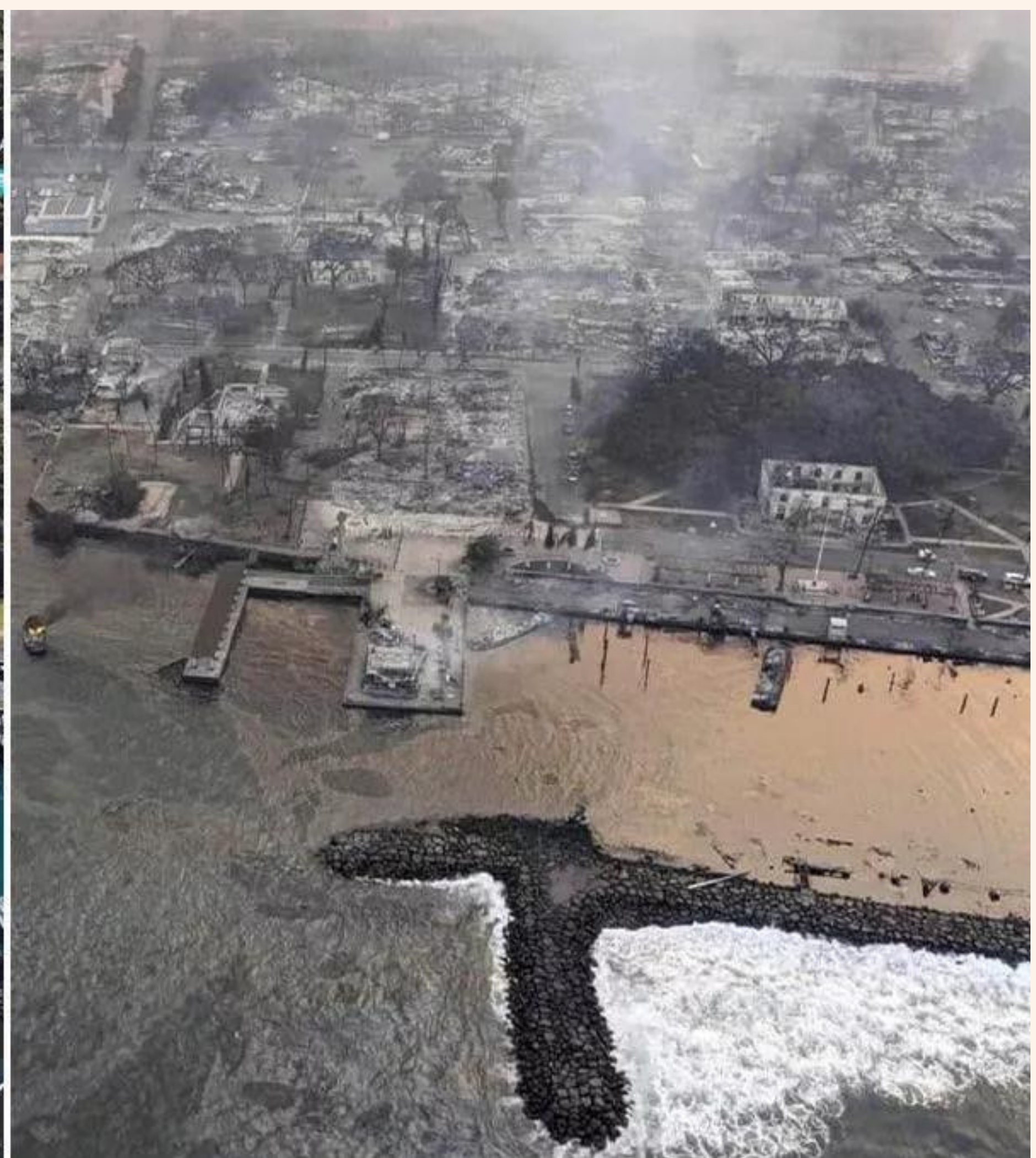
Laura Brewington | Co-Director, Pacific RISA



ASU CSPO 2023



*Credit: Twitter*



*Credit: Aaron Yoshino*



Climate

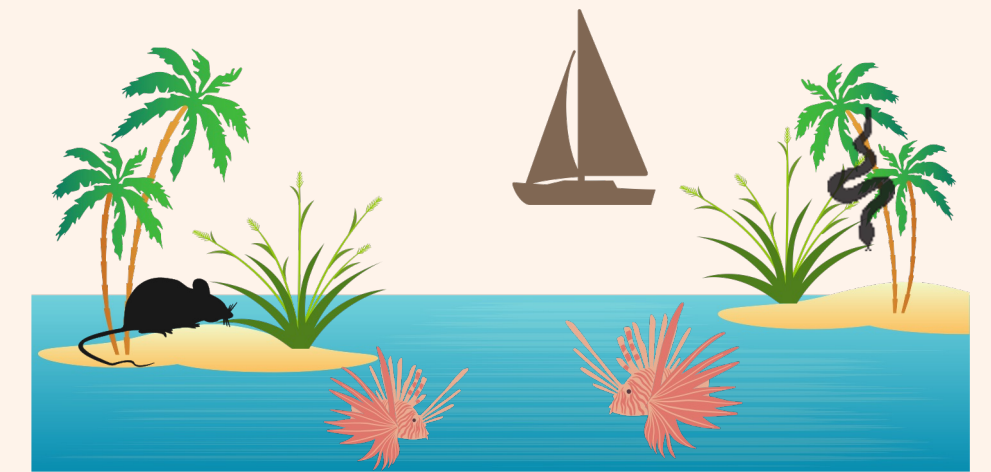
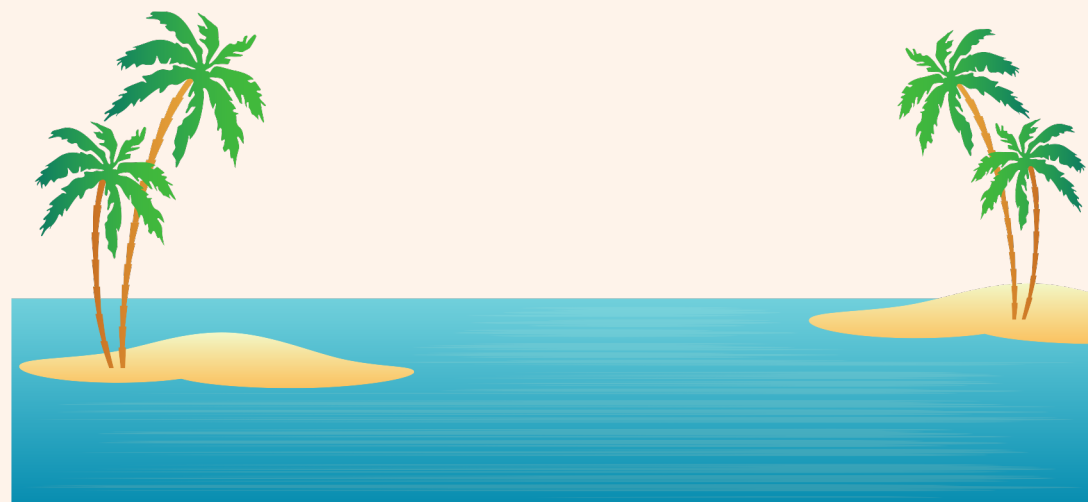
Ignitions

Vegetation



# BIOLOGICAL INVASION

A process that transports and introduces a species outside of its natural range, where it becomes established and spreads



1 Transport: Intentional or unintentional

2 Introduction: Arrival outside its native range

3 Establish & Spread: A viable, self-sustaining population

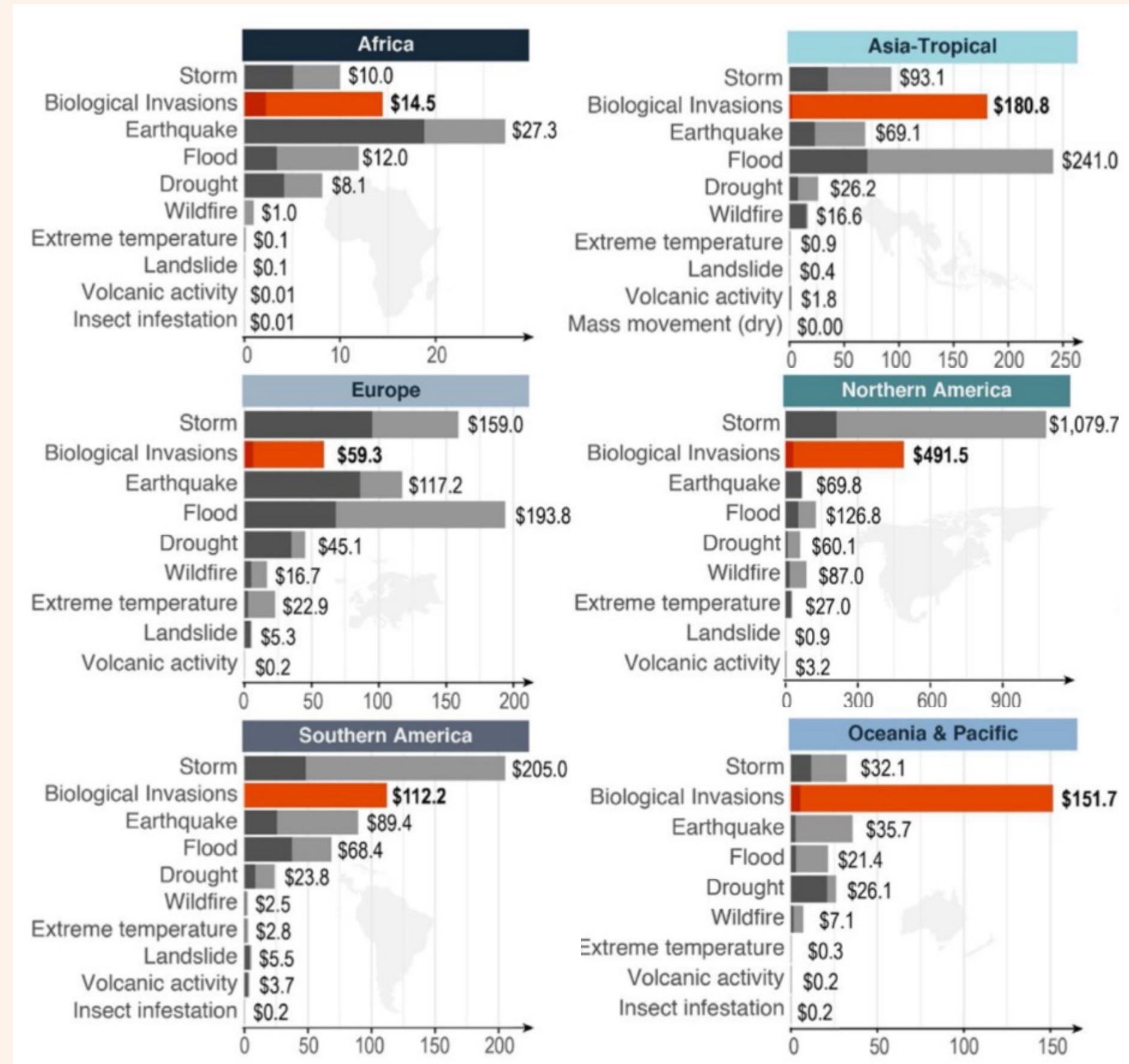
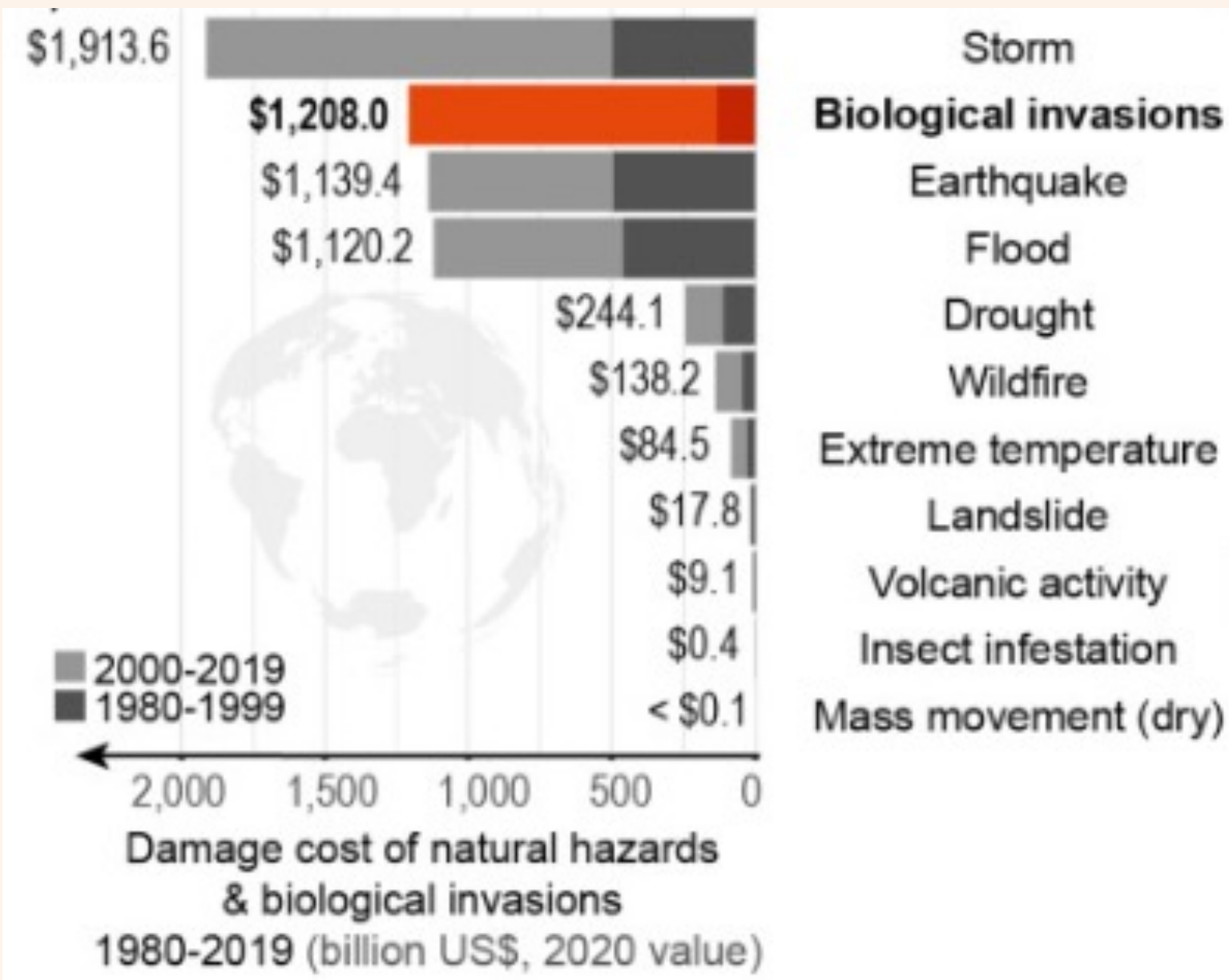
**Invasive species costs**

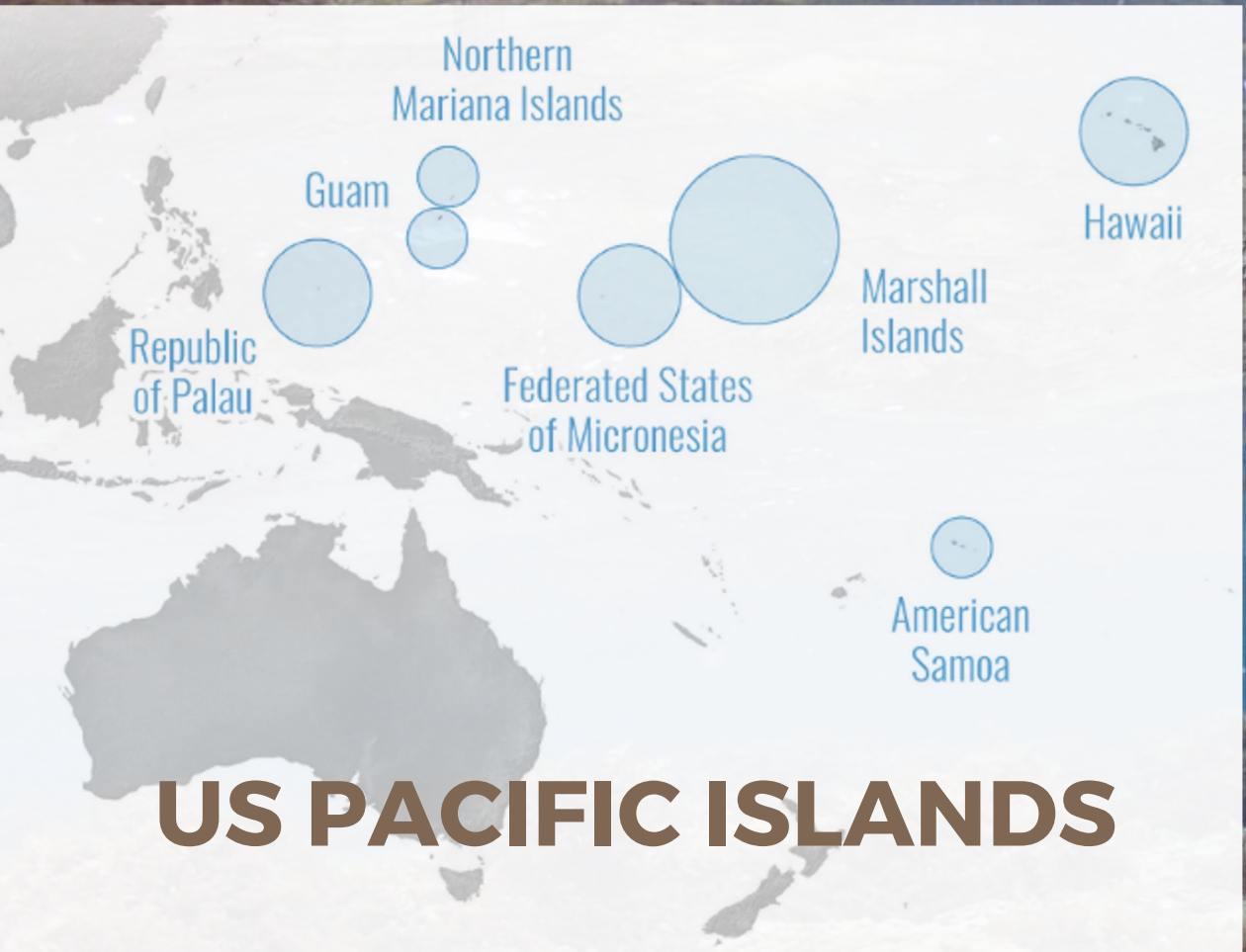


# BIOLOGICAL INVASIONS ARE AS COSTLY AS NATURAL DISASTERS

*The prevention of biological invasions merits similar precautionary investments as those applied to extreme natural hazards*

*Turbelin et al. 2023*





**\$14.9** billion

Biological invasions



**\$14.7** billion

All natural hazards combined



**x4**

*Globally, the economic costs of invasions increase fourfold each decade*

# WHEN CLIMATE CHANGE & INVASIVE SPECIES INTERSECT



1

Climate changes how species are transported

2

Climate changes where species are distributed

3

Climate makes management efforts less effective

4

Invasives reduce resilience or ability to adapt to climate change



# Invasive Japanese knotweed exacerbates flood risk

To develop and employ effective climate mitigation actions, we need to understand how different kinds of environmental change compound. Like most invasive species, Japanese knotweed is a many-sided foe.



## Invasive grasses are fueling wildfires across the US

Published: December 3, 2019 7.58am EST

MAY 10, 2021

## Invasive species alters marine community, interferes in post-disaster recovery

by Tracey Peake, North Carolina State University

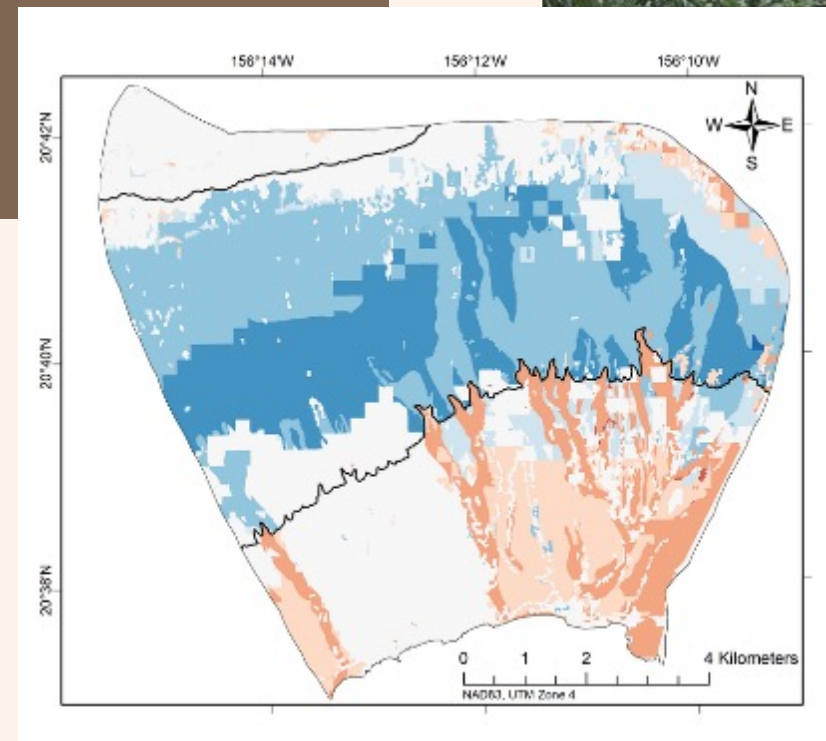
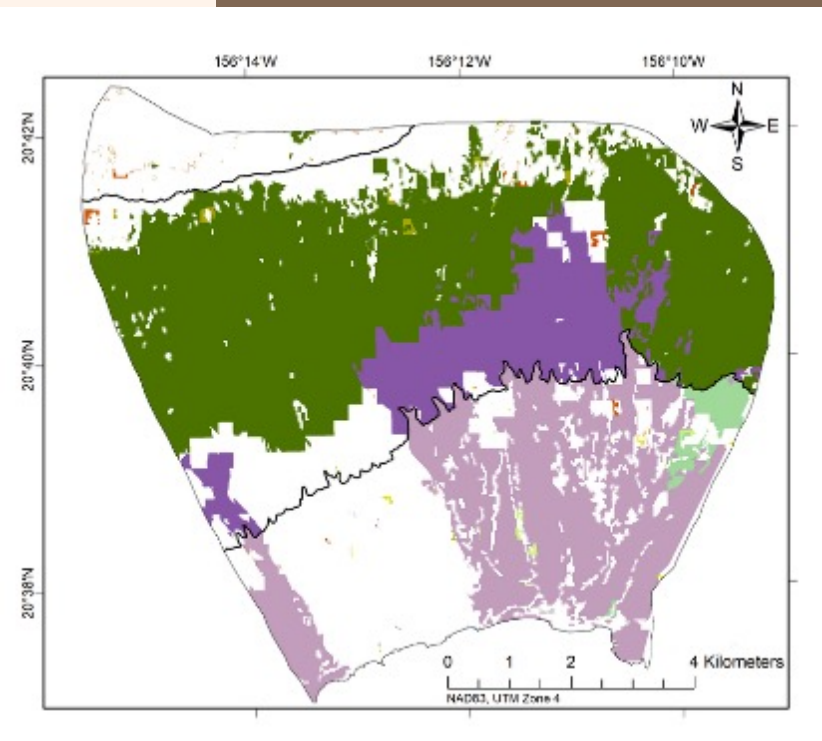
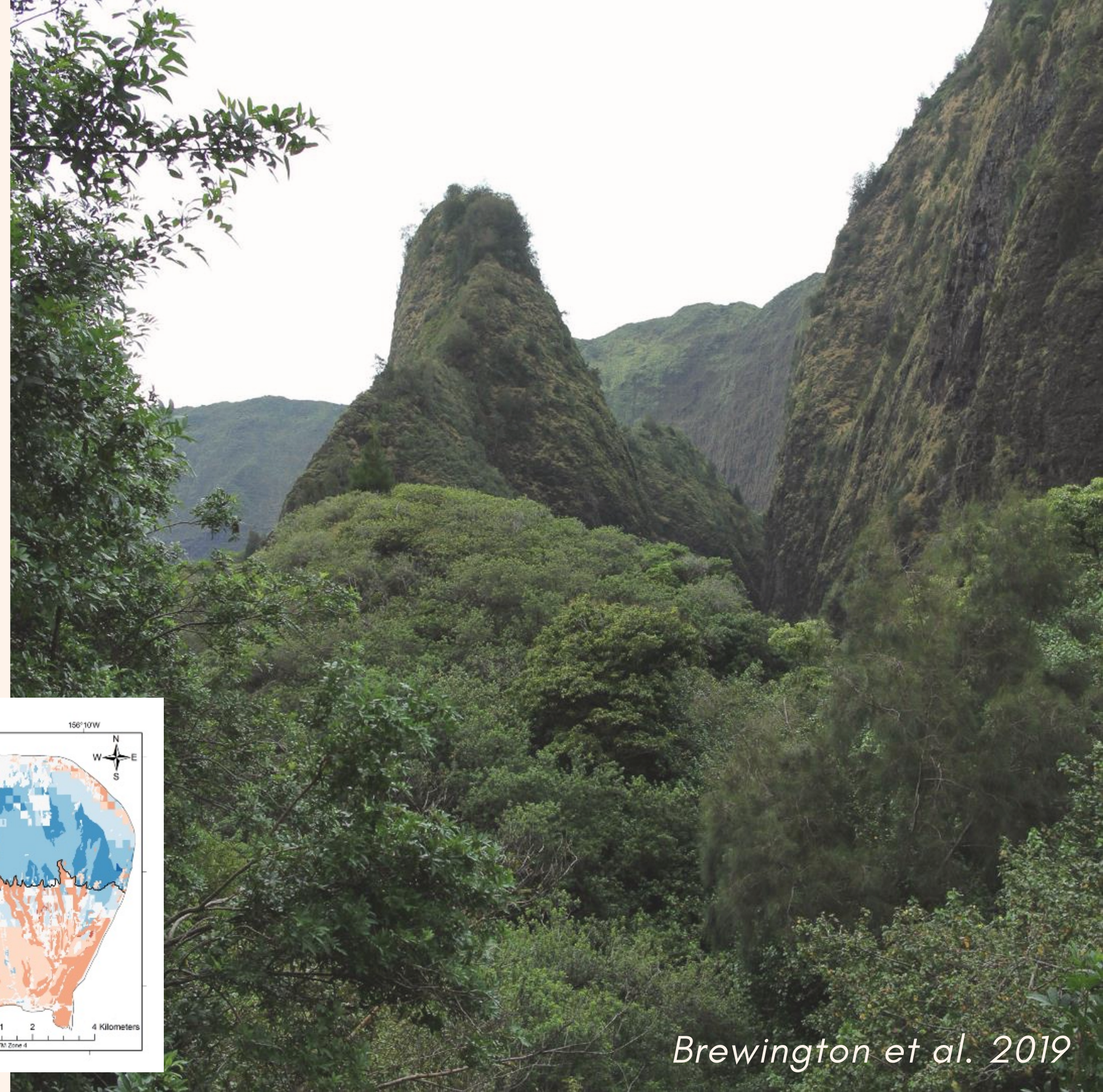


*Cary Institute of Ecosystem Studies,  
The Conversation, NCSU*

# PRIORITIZING NATIVE FOREST CONSERVATION

**77%** increase in recharge

Protecting Hawaii's native forests can mitigate climate impacts on freshwater





**PREVENTING THE  
LOSS OF  
MANGROVES**

**\$65** billion dollars  
saved/year

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Mangrove forests can save coastal households billions in flood damages by blunting storm surge



## WEED CONTROL IN FLOODPLAINS

**124:1** benefit-to-cost ratio

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The benefits of water hyacinth management for flood risk, livelihoods, and health greatly exceed research and control costs

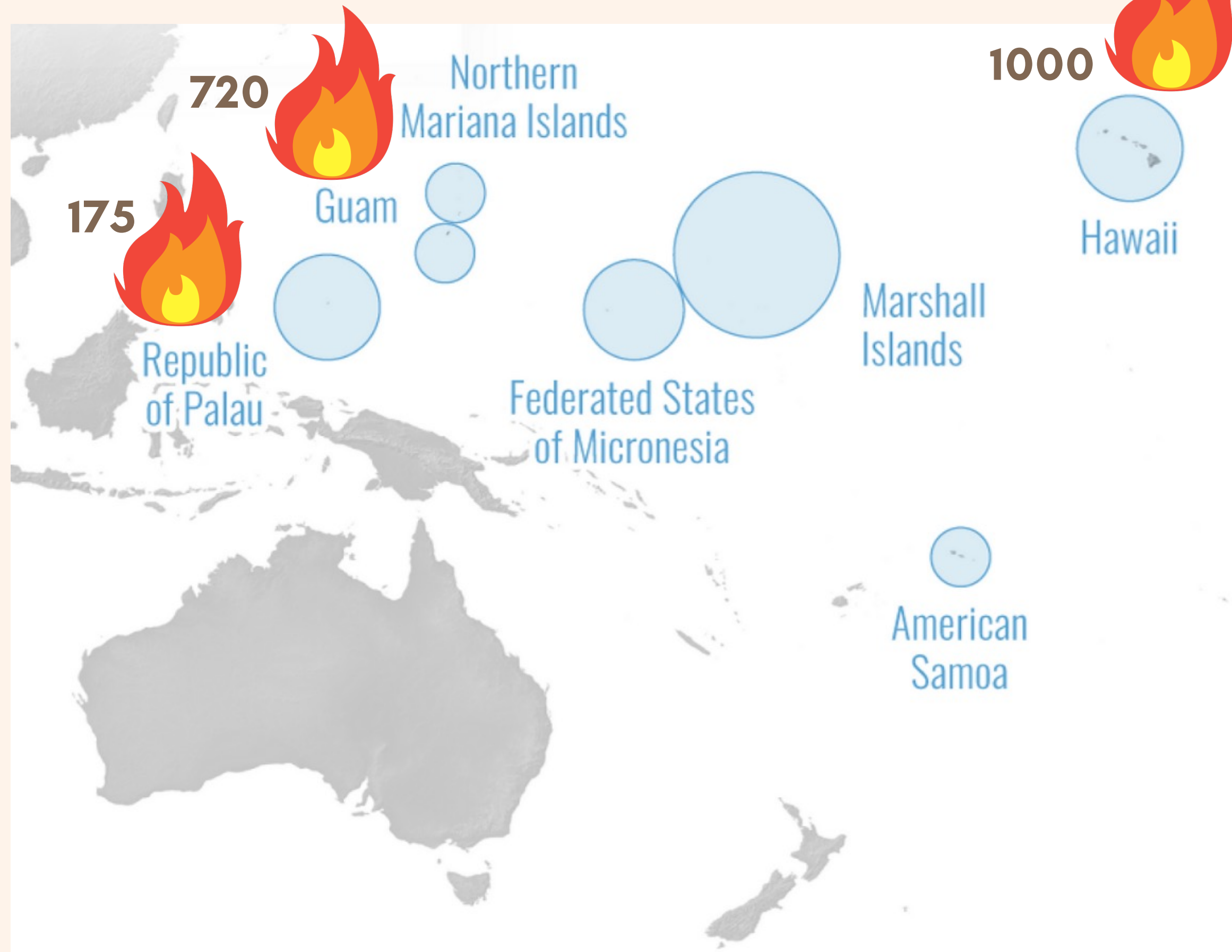
*De Groote et al. 2003*  
*Wainger et al. 2018*

## REMOVING INVASIVE GRASSES

Reduce  
**10%** land burned  
each year

Land management and education can save lives, and billions of dollars, by preventing wildfires

## Average # of fires per year



*Pacific Fire Exchange*

*USFS Institute for Pacific Islands Forestry*

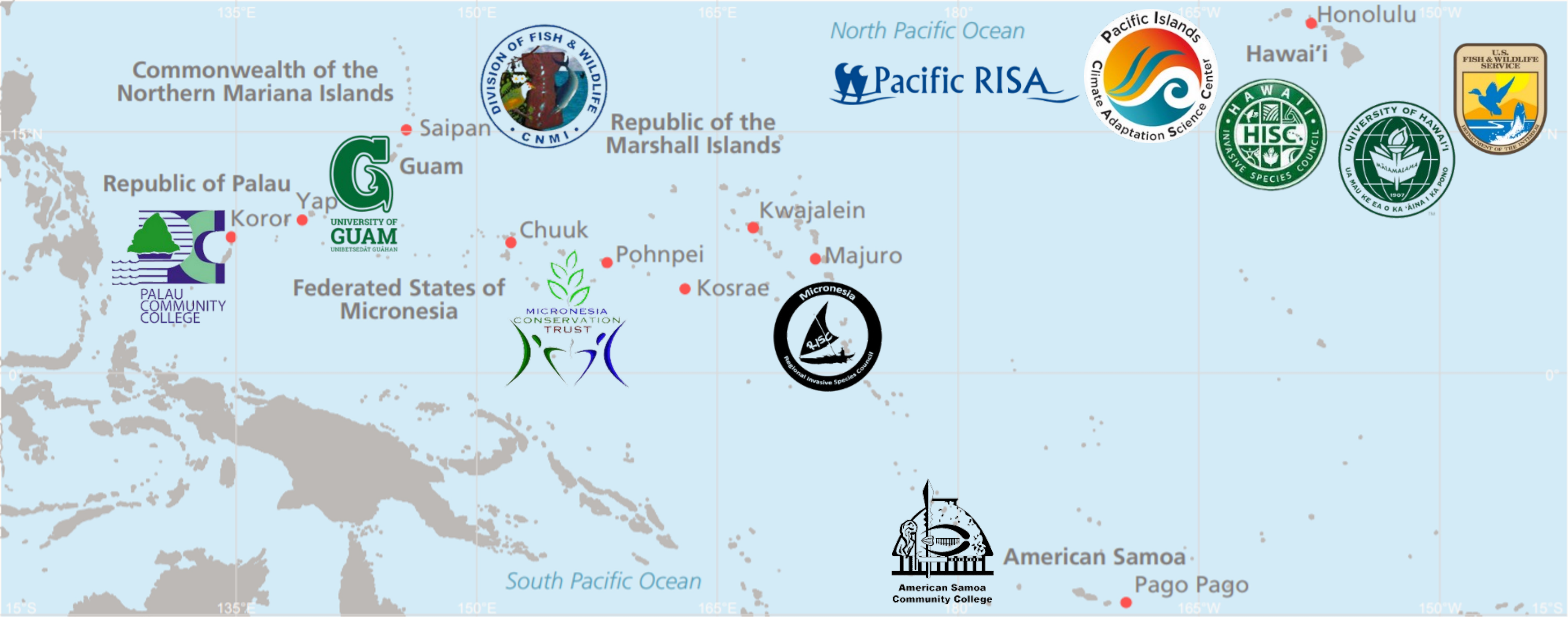
# THE RISCC MANAGEMENT NETWORKS



[www.RISCCnetwork.org](http://www.RISCCnetwork.org)

Reducing the joint effects of climate change and invasive species by:

- Synthesizing the relevant science
- Sharing the needs and knowledge of managers
- Building stronger scientist-manager communities
- Conducting priority research



Building Pacific Island resilience to climate change by preparing for and preventing invasive species impacts

[www.PacificRISCC.org](http://www.PacificRISCC.org)



# GROWING THE PACIFIC RISCC

>450  
members

## Phase 1

Survey and report  
Webinar series  
Listserv



PACIFIC RISCC MANAGEMENT NETWORK

2021

WHEN INVASIVE  
SPECIES & CLIMATE  
CHANGE INTERSECT



SURVEY OF HAWAII'S NATURAL RESOURCE MANAGERS

How do invasive species and typhoons affect  
endemic species populations in the Northern Mariana  
Islands, and how do we mitigate potential impacts?

BIG TROUBLE ON  
LITTLE ISLANDS

Challenges for species  
conservation in the  
Northern Marianas

MAY 11, 2022 | 2:00 - 3:00 PM HST | ON ZOOM

A Webinar by the Pacific Regional Invasive  
Species & Climate Change Management Network

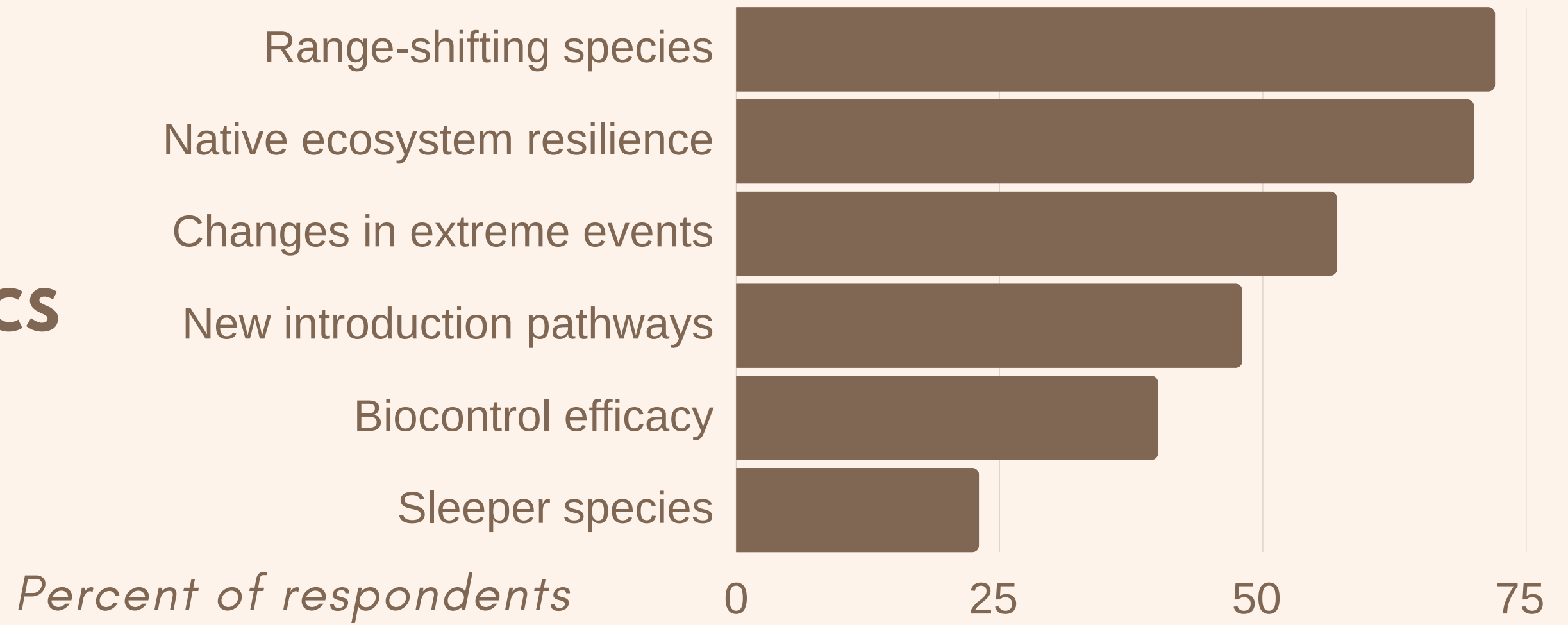
REGISTRATION LINK: <https://bit.ly/3q4R8Mo>





# URGENT PRIORITIES

## CLIMATE RESEARCH TOPICS



# DECISION-MAKING NEEDS

## **More Climate Projections**

Over a range of useful scales  
(rainfall projections at the refuge or  
watershed scale)

## **Collaborative Research**

Co-developed research projects  
with managers for information  
they can use

## **Better Communication**

Between managers and the climate  
science community to support  
decision making

## **Understand Uncertainty**

In future climate projections to  
make informed management  
decisions

# 19 webinars

How do invasive species and typhoons affect endemic species populations in the Northern Mariana Islands, and how do we mitigate potential impacts?



## BIG TROUBLE ON LITTLE ISLANDS

Challenges for species conservation in the Northern Marianas

**MAY 11, 2022 | 2:00 - 3:00 PM HST**

A Webinar by the Pacific Regional Invasive Species & Climate Change Management Network

Pacific RISCC May 2023 Webinar:

## Prioritization of Restoration Needs for Seabirds in the US Tropical Pacific






L. Young Pacific Rim Conservation

Pacific RISCC PFX-Pacific RISCC Joint Webinar:




## Changing Climate and Wildfire in Hawai'i



The climate in Hawai'i is changing. How will this affect the risk of wildfire, along with potential impacts to people and Hawai'i's unique ecosystems? Please join us to learn more!

Wednesday, April 12, 2-3:30 PM HST






Mike Walker  
Fire Protection Forester, DLNR  
Division of Forestry and Wildlife

Dr. Clay Trauernicht  
Extension Specialist, NREM  
University of Hawai'i at Mānoa

Emma Yuen  
Native Ecosystems Program Manager,  
DLNR, Division of Forestry and Wildlife

Webinar Schedule: 2 PM Start, Introductions 2:00-2:10.  
Mike: 2:10-2:25, Current Conditions, Observations & Suppression Efforts  
Clay: 2:25-2:45, The Intersection of Climate Change and Wildfire in Hawai'i  
Emma: 2:45-3:10, Values at Risk & Implications for Management  
Q&A: 3:10-3:30 PM, Discussion & Audience Participation

REGISTRATION [LINK](#)



Threaten seabirds in the U.S. size management and what look like?



# 8 manager research summaries



Fire-adapted non-native & invasive grasses are closely linked with wildfire in



impacted by climate change. **Left:** A student in a field of [Guinea grass](#) on 19-22, from [Cram et al. 2013](#), "Fire and 19-22. **Right:** Hawai'i Volcanoes National Park pointing out [fountain grass](#), credit: seeking volunteers to help remove 2. Both grasses are native to African in Hawai'i, and along with non-native er of Hawai'i's land, or a million acres

Biological invasions are not often thought of as a type of natural disaster or hazard (e.g., floods, wildfires, or storms), but they are comparable in cost and reflect an enormous and increasing burden on societies worldwide. Top left shows flooding in Bingley, United Kingdom, top right a wildfire near Lowell Oregon, USA, bottom left a hurricane near Yemen, and bottom right, *Miconia calvescens*, a noxious weed in the Pacific region whose uncontrolled growth can overwhelm wet forest ecosystems. Photo credits: Forest & Kim Starr/Hawaii DLNR (*Miconia*), and *Unsplash*.

THURS 5/6/2021 | 2:00 - 3:30 PM HST Held Virtually

An upcoming webinar by Pacific Regional Invasive Species & Climate Change Management Network

When Climate Change and Invasive Species Interact

## The Pacific Drought Knowledge Exchange:

What co-production can look like

REGISTER FOR THIS WEBINAR:  
<https://tinyurl.com/8d96rr9b>

# GROWING THE PACIFIC RISCC

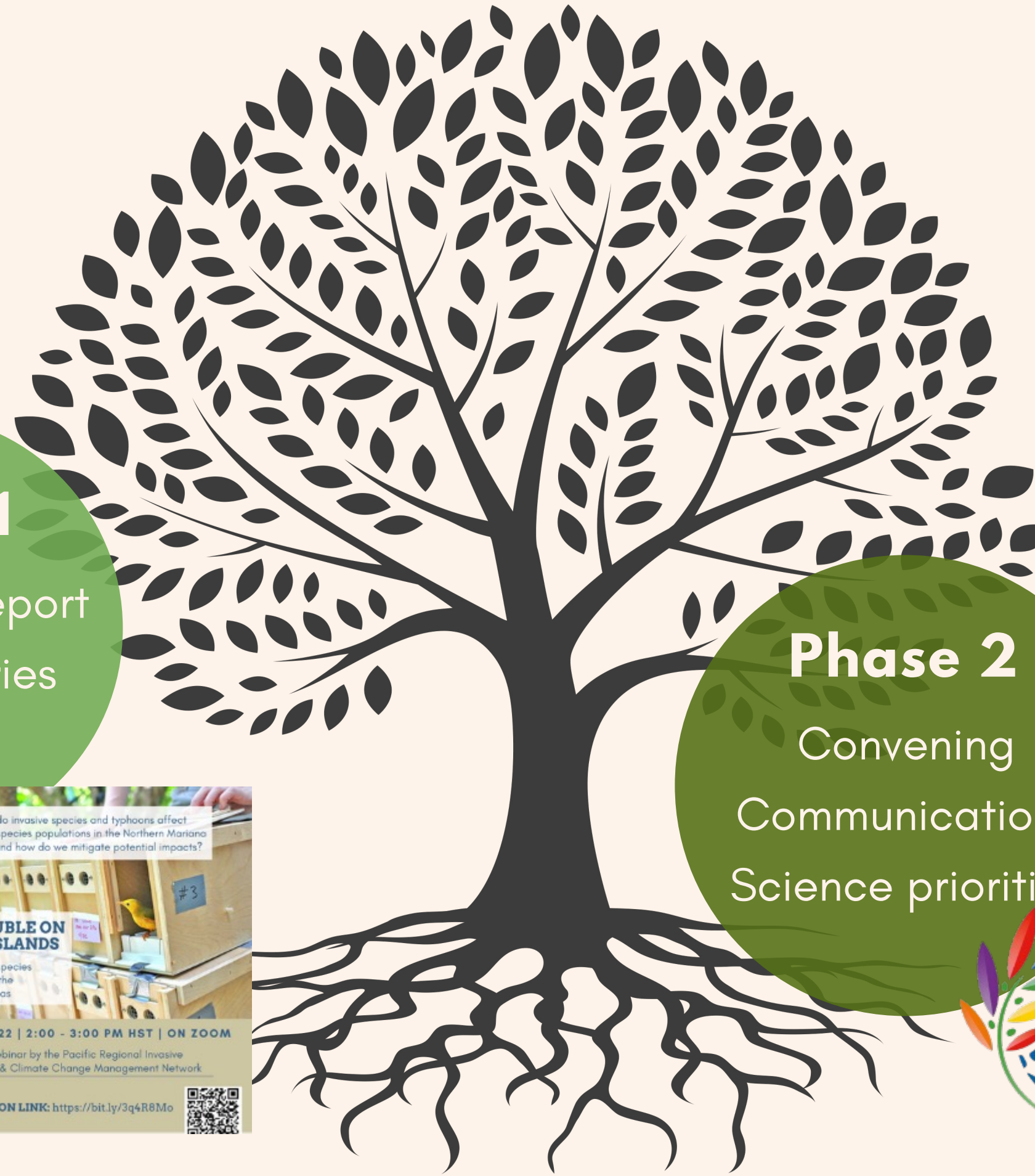
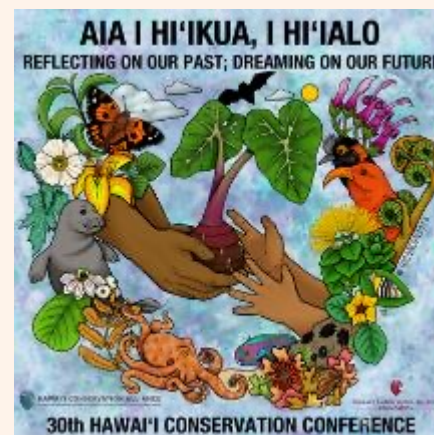
>450  
members

## Phase 1

Survey and report  
Webinar series  
Listserv

## Phase 2

Convening  
Communications  
Science priorities



**>100**  
**PARTICIPANTS**

**14**  
**PACIFIC ISLAND**  
**COUNTRIES &**  
**TERRITORIES**

**3**  
**STRATEGIC**  
**ACTION PLANS**



# GROWING THE PACIFIC RISCC



## Phase 3

Partnerships  
Research  
Capacity



*Recognize the critical importance of invasive species work...to climate resilience*

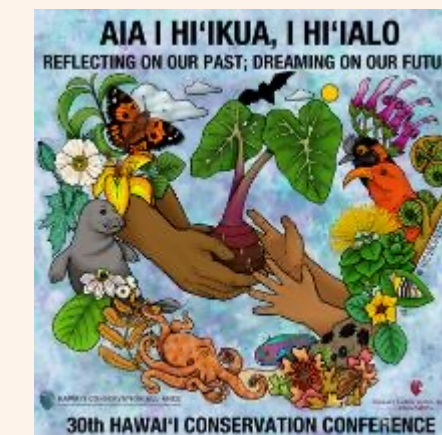
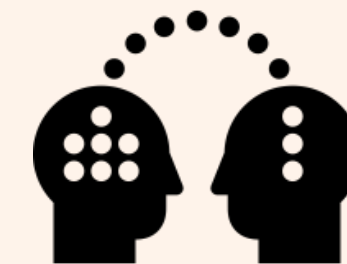
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## **SPREP & SPC: Regional Architecture**

Formalize PESC outcomes, elevate to leaders, and revitalize collaborations

## **Association of Pacific Island Legislatures**

Resolution passed to cooperate to stop the spread of LFA and CRB

## **US Government Investments**

Training programs, INDOPACOM ISF, RISC coordinator position, 3 in 3 for the WIN

## **Micronesian Islands Forum**

Leaders endorsed all recommendations by the Regional Invasive Species Council



## Micronesia Conservation Trust and Pacific RISA Announce New Regional Research Coordinator

# ISAC

INVASIVE SPECIES ADVISORY COMMITTEE

ANNOUNCEMENT

## EWC Researcher Named to Invasive Species Advisory Council

JAN 4, 2023

ENVIRONMENT & CLIMATE UNITED STATES, HAWAII

SHARE







*Credit: LA Times*

# OPPORTUNITIES

1

Map and track invasive species distributions and risks



2

Incentivize invasive species management

3

Promote win-win solutions for climate and invasive species resilience



4

Utilize information networks and develop new financing mechanisms to manage costs

# MAHALO NUI

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