

Fire and nonnative species in Hawai'i



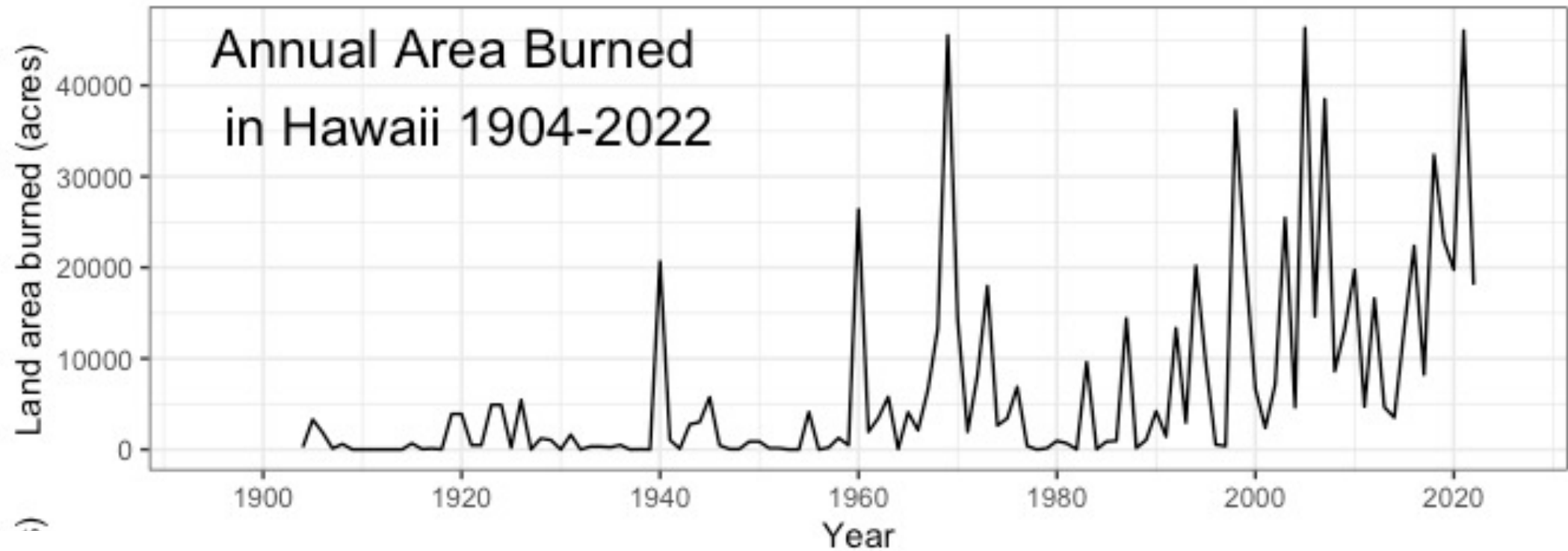
Clay Trauernicht, PhD University of Hawai'i at Mānoa



COOPERATIVE EXTENSION

UNIVERSITY OF HAWAII AT MĀNOA
COLLEGE OF TROPICAL AGRICULTURE AND HUMAN RESOURCES

Annual area burned has increased 300%

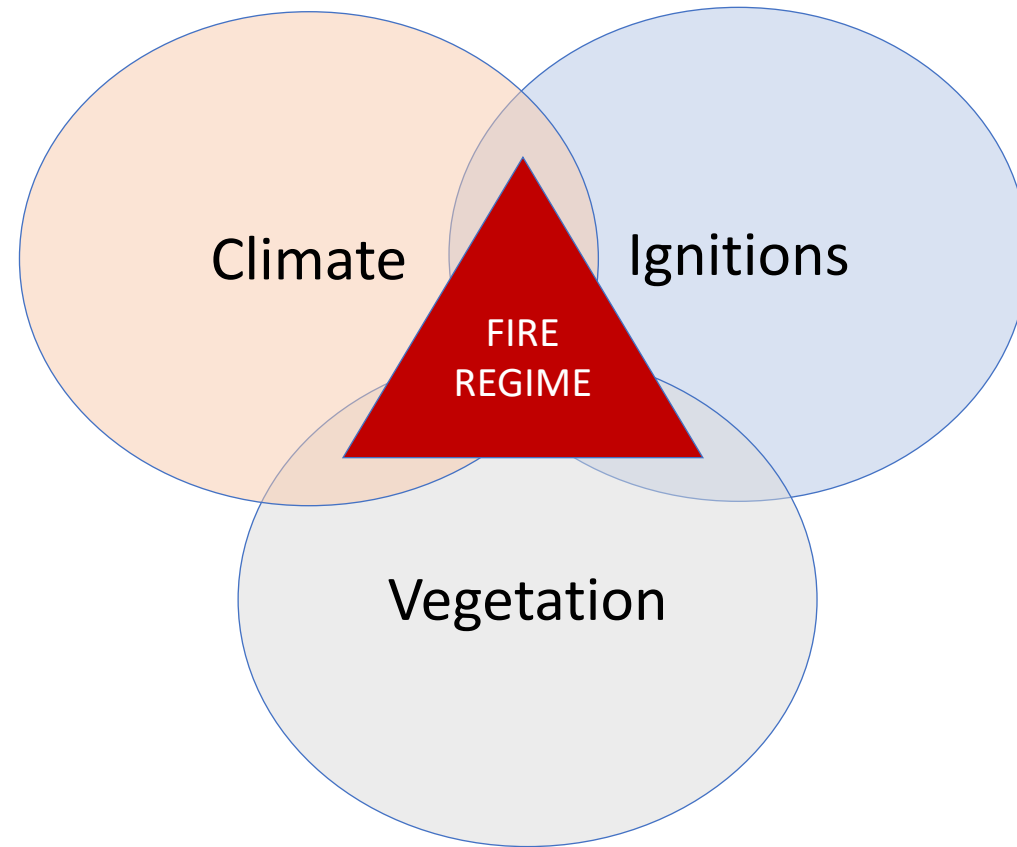






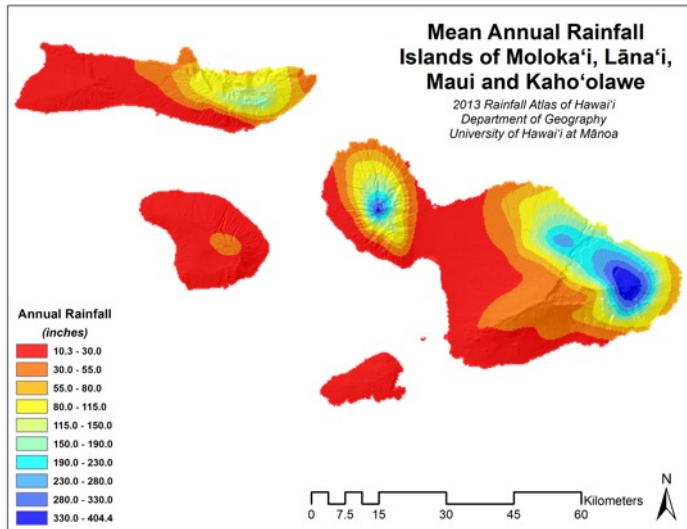
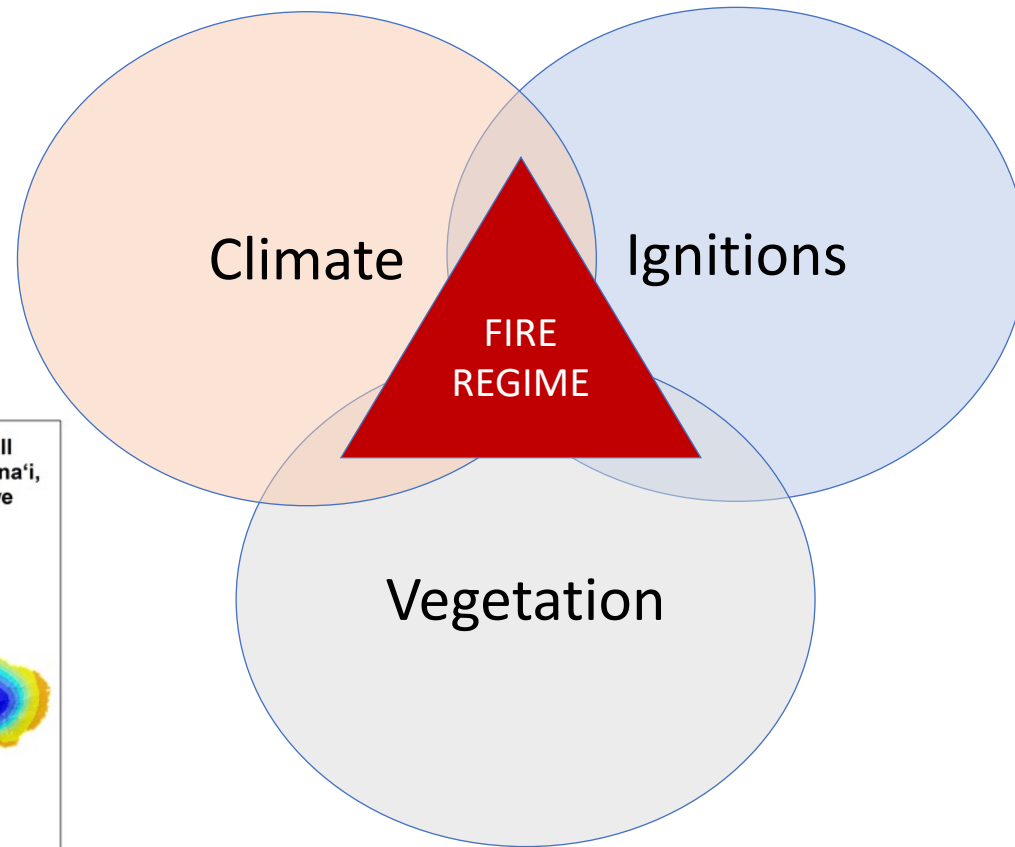


Hawaiian fire regimes are changing



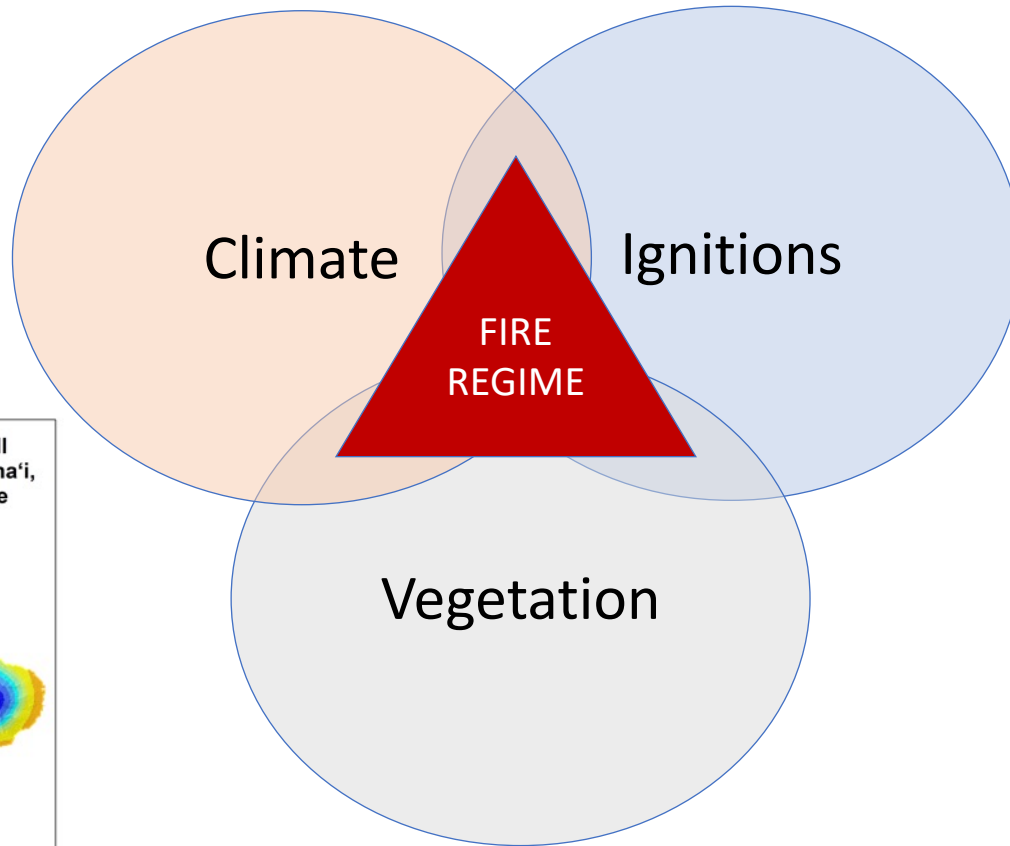
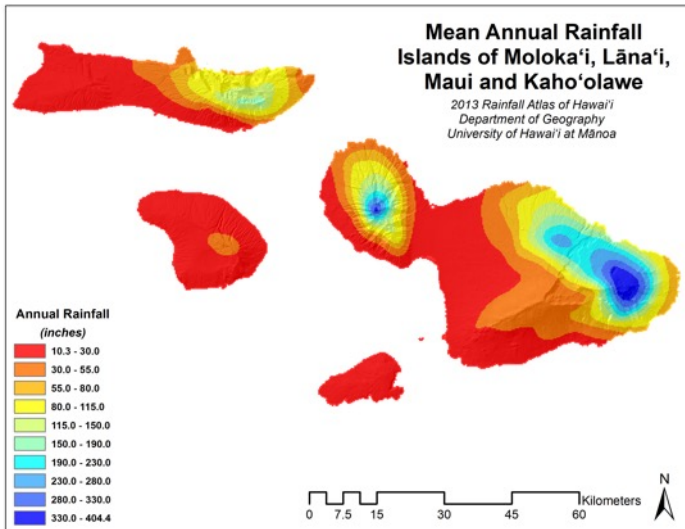
Hawaiian fire regimes are changing

Wet and dry cycles
Long-term drying trends

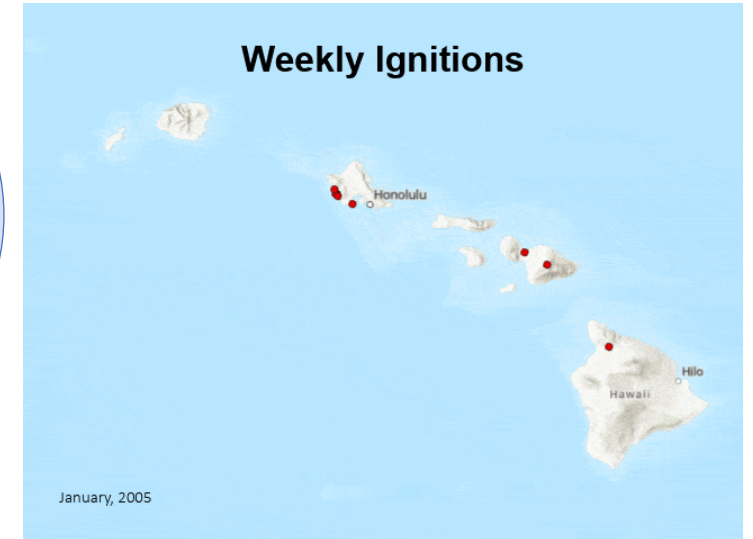


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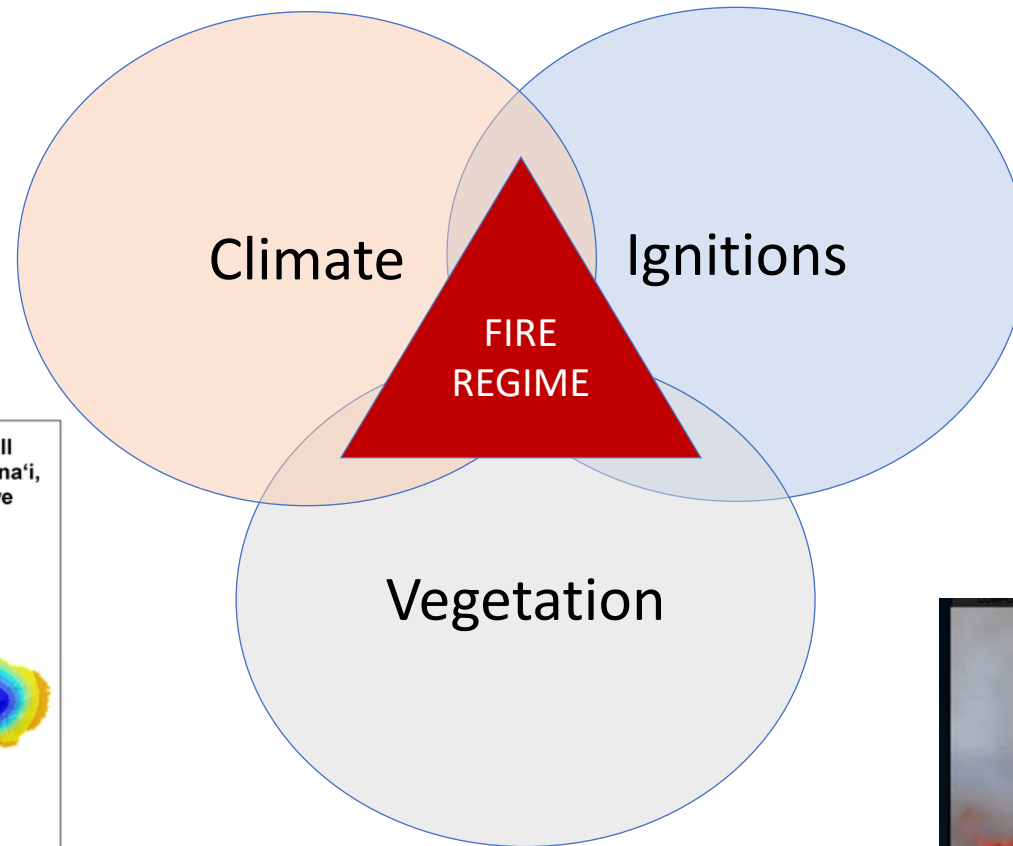
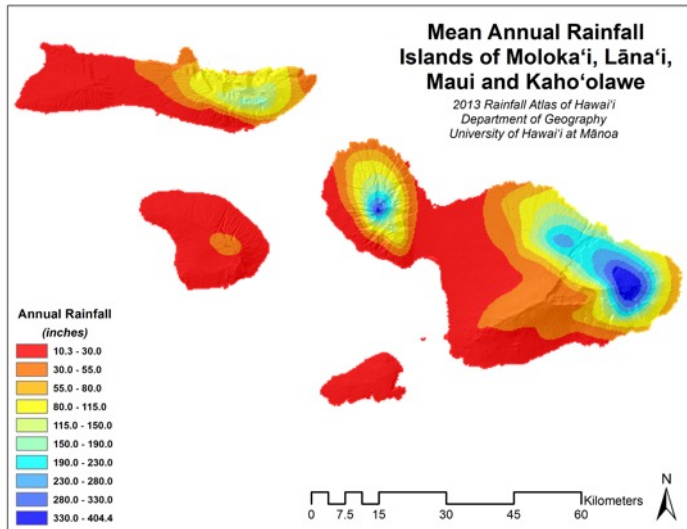


99% Human-caused ignitions



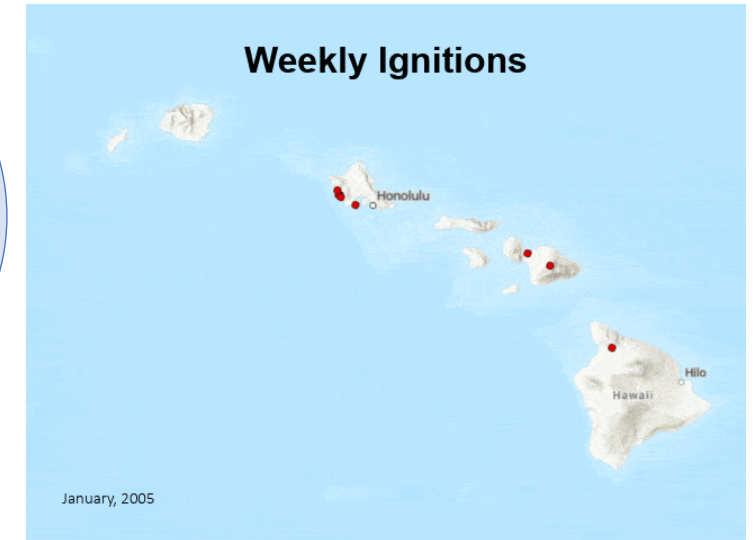
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Long-term drying trends



Unmanaged, nonnative
grasslands & shrublands

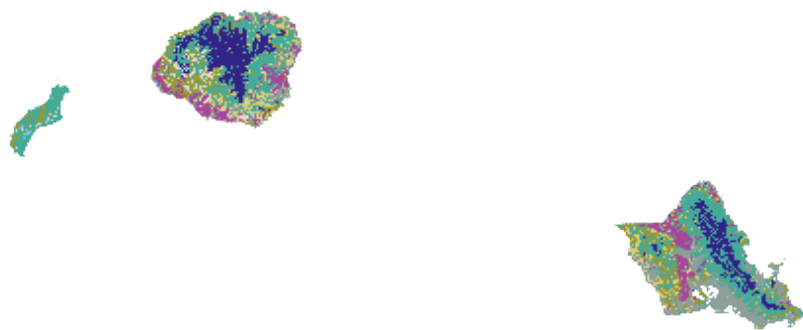
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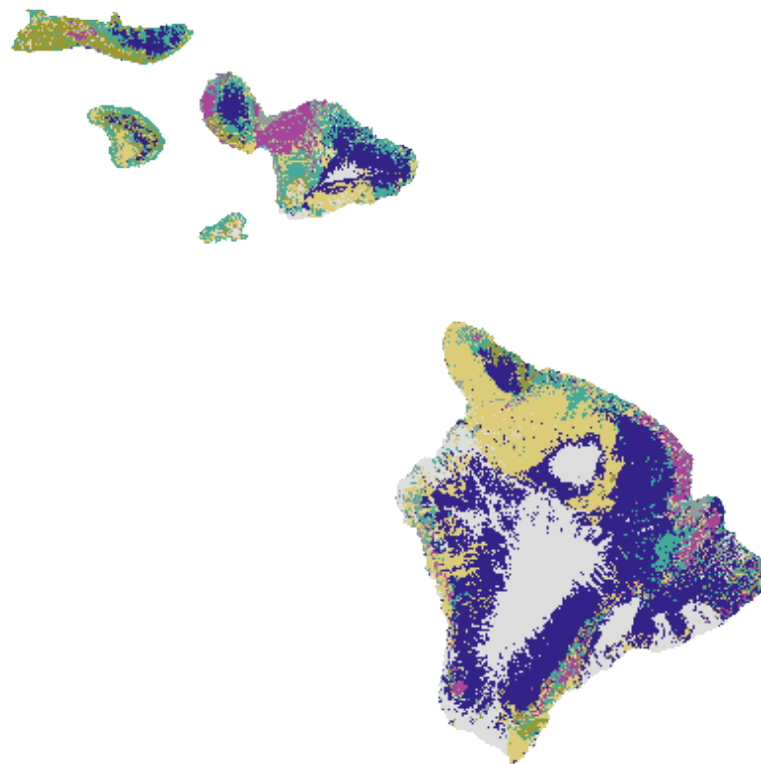
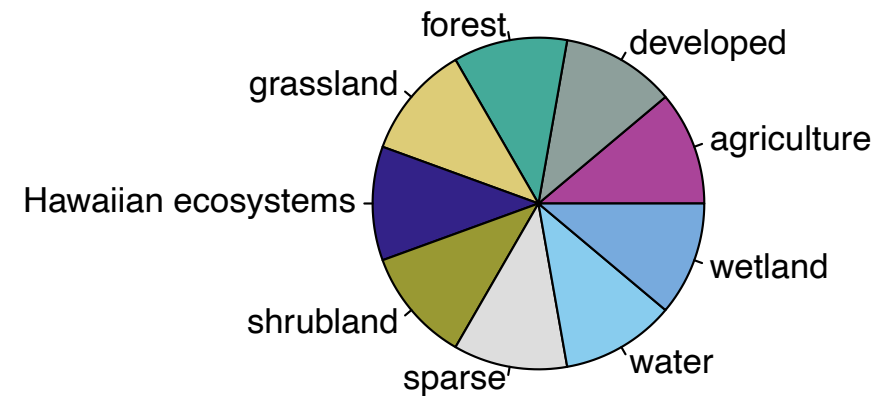


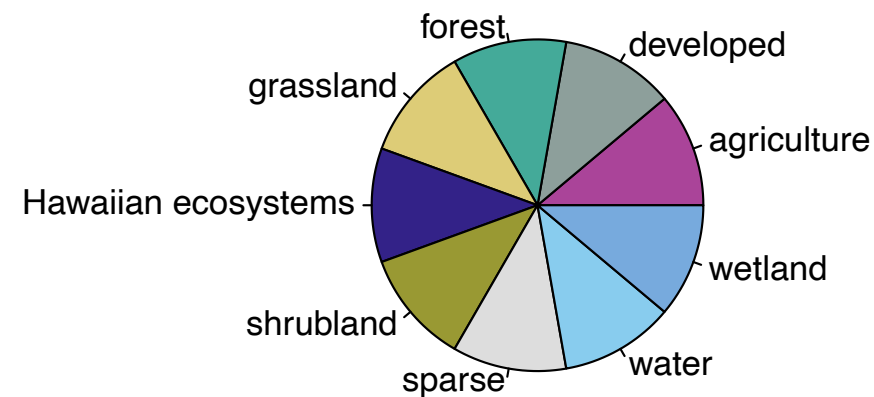
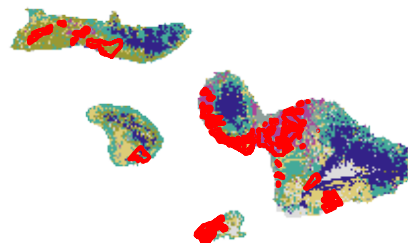
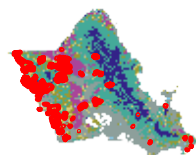
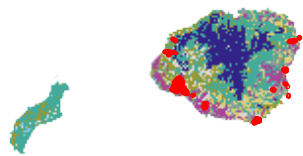
Unmanaged, nonnative
grasslands & shrublands



Hawaiian ecosystems → 1.3 million acres
Nonnative ecosystems → 1.5 million acres

>1 million acres of “grass-dominated” vegetation
(Trauernicht et al. 2015. Pacific Science)

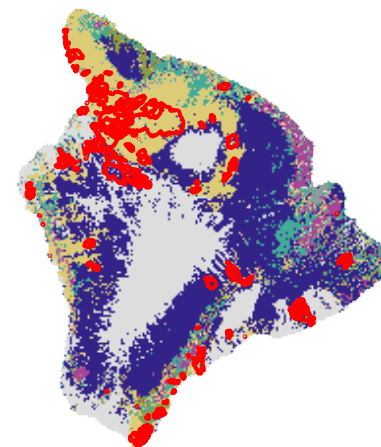




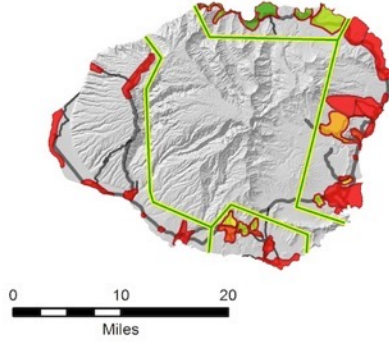
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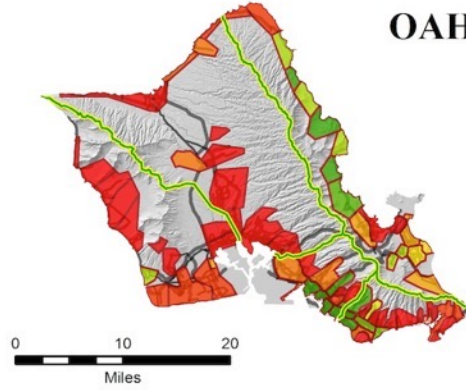
Fires!		(1999-2020)
Hawaiian ecosystems		36,000 acres
grasslands/shrublands		158,000 acres
forests		23,000 acres



KAUAI



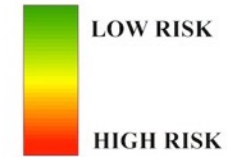
OAHU



COMMUNITIES AT RISK FROM WILDFIRES State of Hawaii

— Fire Risk Community Zoning

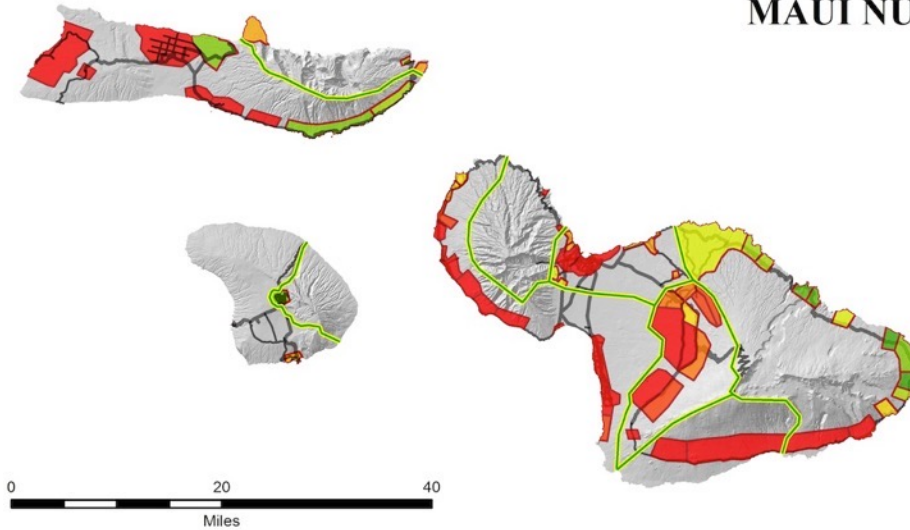
Community Fire Risk Rating



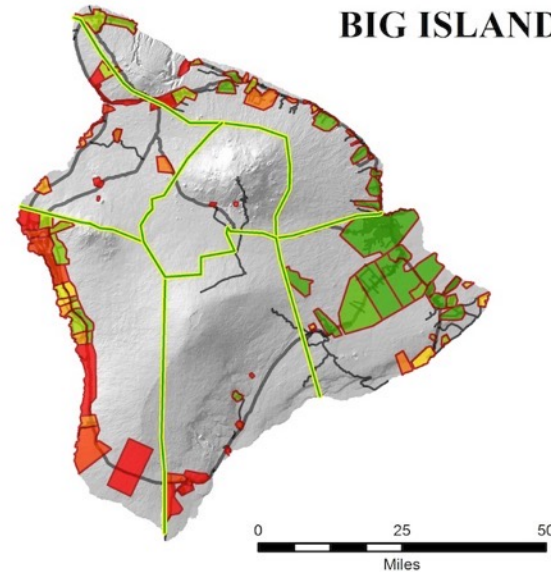
Map created by M. Wasser, 12/17/13, NAD 83 UTM Zone 45N

This publication made possible through a grant from the USDA Forest Service.
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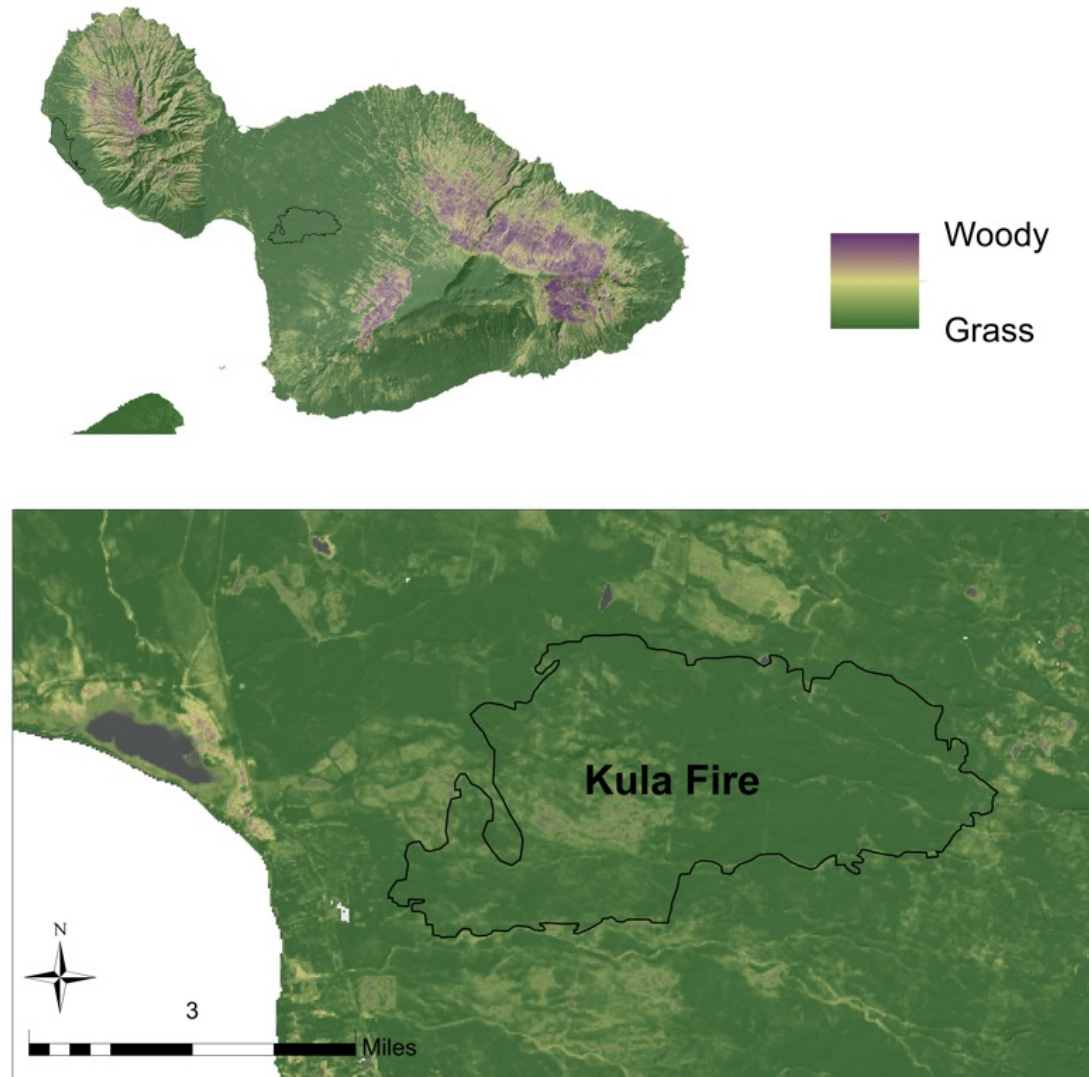
MAUI NUI



BIG ISLAND



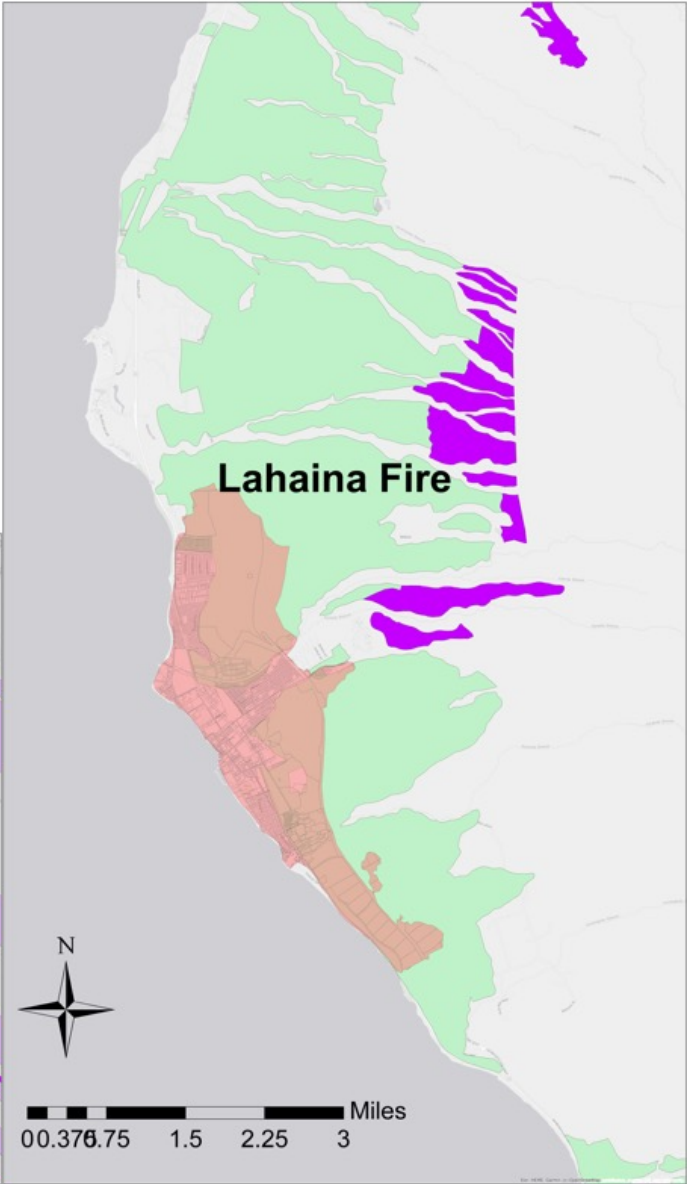
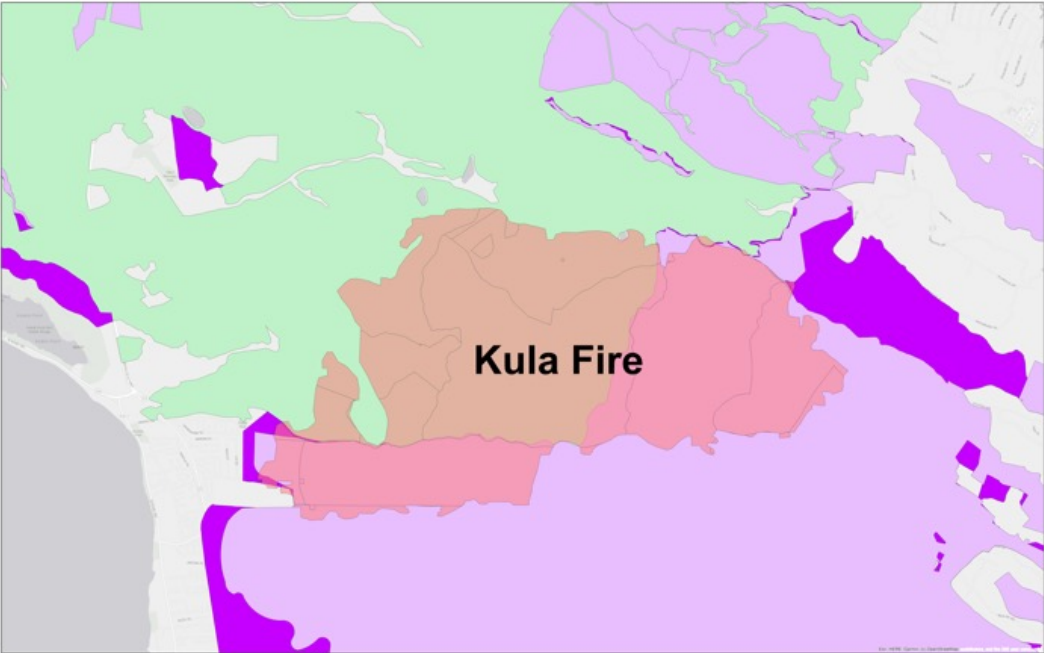
Maui Landcover: Woody and Grass Cover



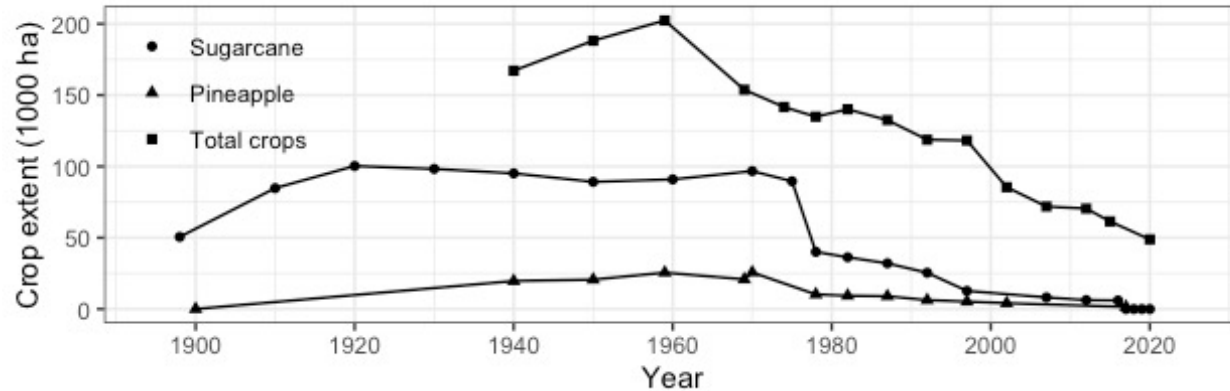
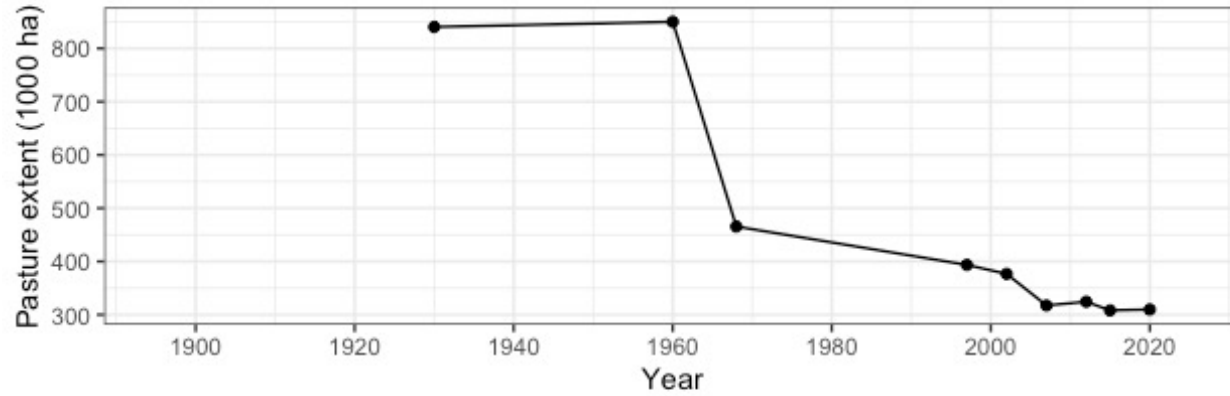
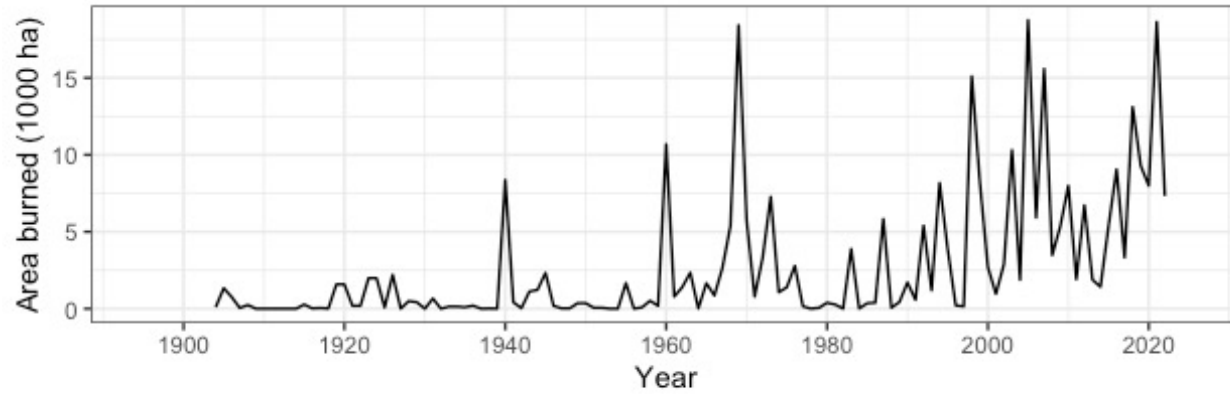
Data Source: University of Hawaii at Manoa
Inquiries @ Dr. Clay Trauernicht, trauerni@hawaii.edu

**Historic and Active Land
Use Near Maui Fires
August 2023**

- Fire Perimeter + TMKs
- Abandoned Sugarcane
- Abandoned Pasture
- Active Pasture



Why Hawai'i is burning points to systemic problems



What should land care look like?



What we have:

SOCIAL INFRASTRUCTURE

- Relationships across agencies
- Engaged communities
- Educational resources
- Community-informed plans



UPCOUNTRY MAUI
COMMUNITY WILDFIRE PROTECTION PLAN

OVERVIEW OF WILDFIRE-RELATED CONCERNS AND PRIORITY ACTIONS

Managing Hazardous Vegetation on MAUI

Reduce Wildfire Spread and Damage ❖ Increase Firefighter Safety

Why manage vegetation?

Dry plant matter ignites easily and provides **fuel** for a fire to follow.

In Hawai'i, the **amount of flammable hazardous vegetation**, or **fuel load**, can develop quickly due to rapid growth of vegetation, multiple growing seasons, and regular dry and drought cycles.

Frequent, active **vegetation management** is critical to reduce

Wildfires need **oxygen**, **ignitions (heat)**, and **fuel** to start and spread. Maui has all of these ingredients year-round and wildfire impacts are devastating and far-reaching.

Ignitions + **Fuel** = **Impacts**

Ignition Density
Size of Fire

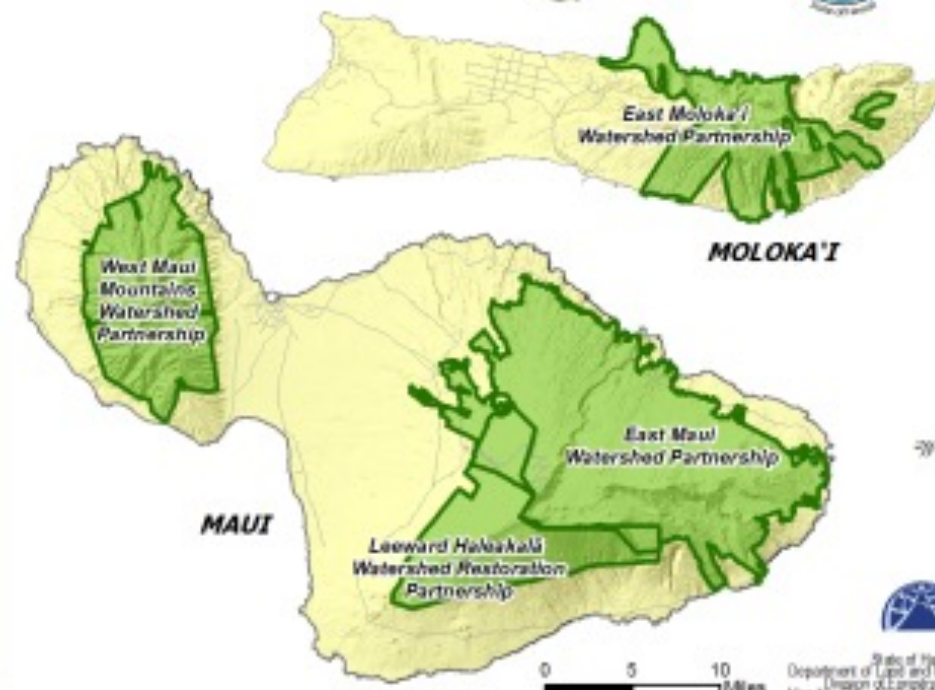
Grass Cover
Low
High

Wildfire

Lives & Safety
Tax Dollars
Drinking Water
Air
Coral
Native Forests
Tourism & Economy



HAWAII Watershed Partnerships 2015

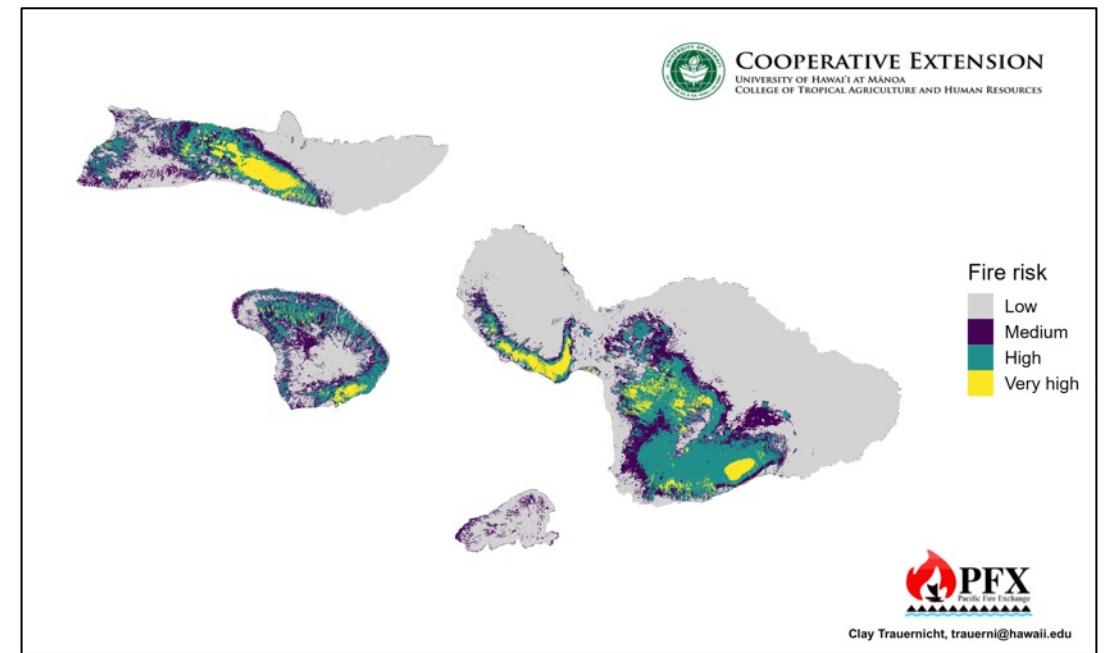


State of Hawaii
Department of Land and Natural Resources
Division of Forestry and Wildlife
Map No. FW-102 (1/2015), ERI 11/2015

What we have:

SCIENCE AND TECHNOLOGY FUNDAMENTALS:

- High resolution fire history data
- Current and Future Fire Probability Maps
- Fuels Maps
- Climate Data
- Best practices for post-fire, fuels mitigation, etc.



PFX FACT SHEET Intended Audience: land owners & land managers

Pacific Fire Exchange Research Brief Series November 2021 JOINT FIRE SCIENCE PROGRAM

Weed¹ Fire Risk Assessment for Hawai'i

Pacific islands are increasingly threatened by wildfire and its effects which negatively impact our economy, culture, and natural resources. The Pacific Fire Exchange Program's After-Fire Action Series is designed to share the results of this ongoing learning.

PFX FACT SHEET Intended Audience: Land Managers & Landowners

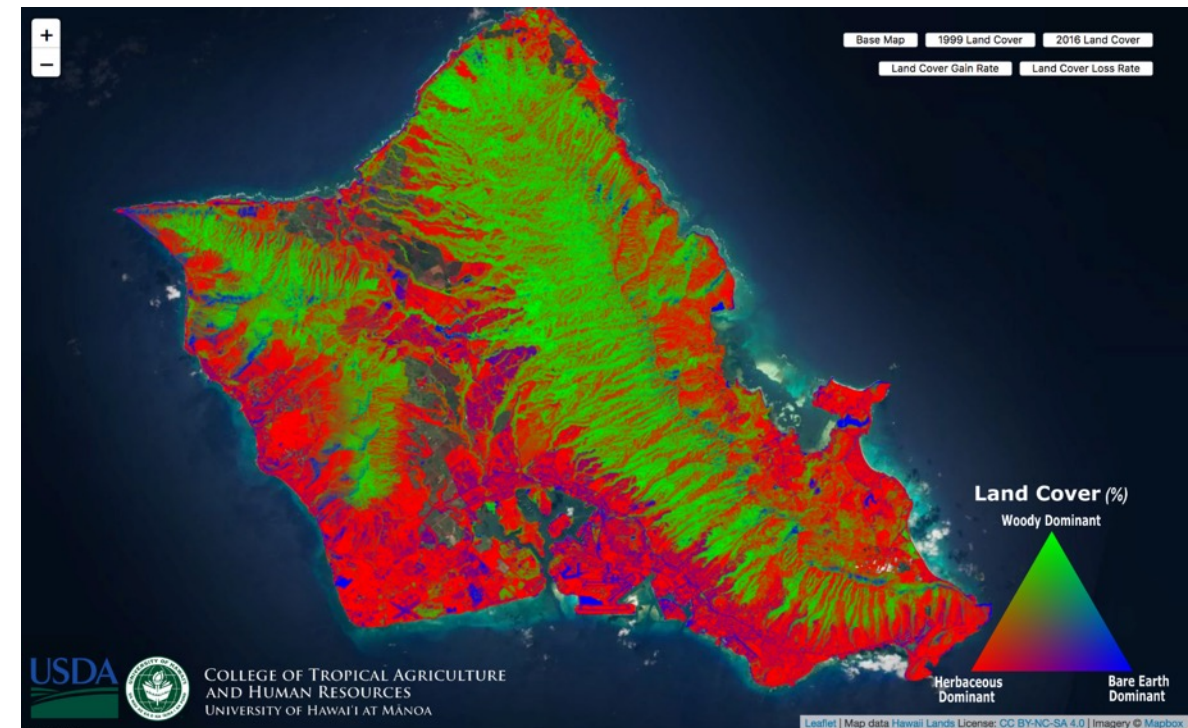
Pacific Fire Exchange After-Fire Action Series Resource 1 August 2023 JOINT FIRE SCIENCE PROGRAM

After fire, first things first.

Stabilize health, safety, property, infrastructure, and soil.

As natural resource managers, we are trained to think about the impacts fire can have on ecosystems and landscape health. Before we can start replanting or otherwise working to restore a burned area, there are immediate matters that must be considered and addressed.

Health ▲ Physical injuries and breathing impacts. It is common for people to sustain physical injuries during



What we have:

LOCAL KNOWLEDGE FOR FUELS MANAGEMENT

Traditional agriculture

Ecosystem restoration

Plant propagation

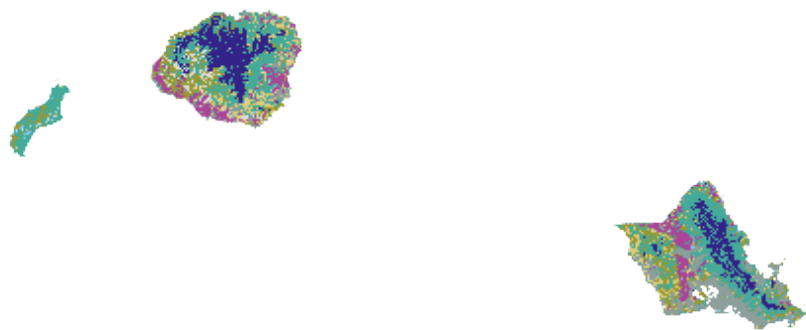
GRAZING



Weeds vs Resources

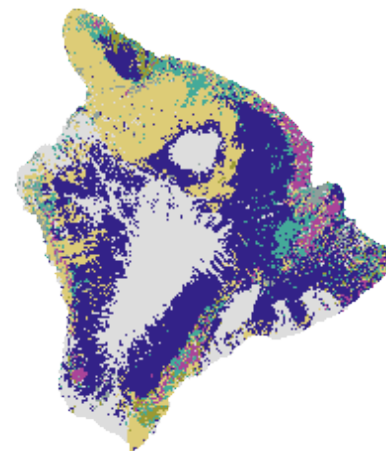
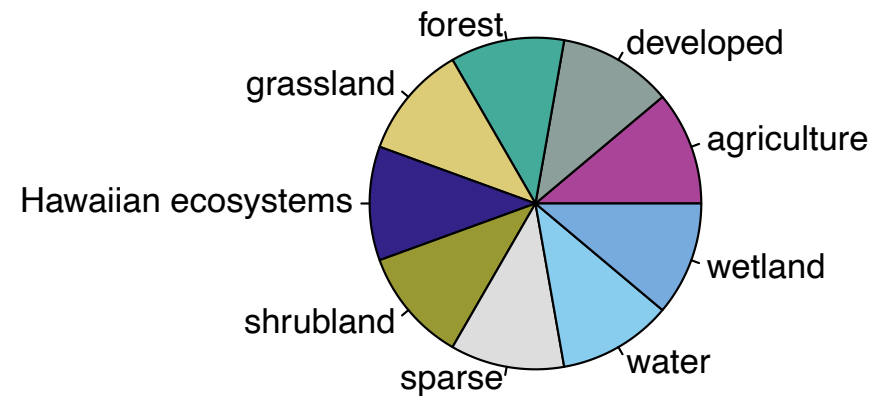
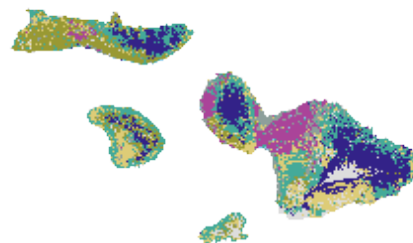


Bulla laea's farm



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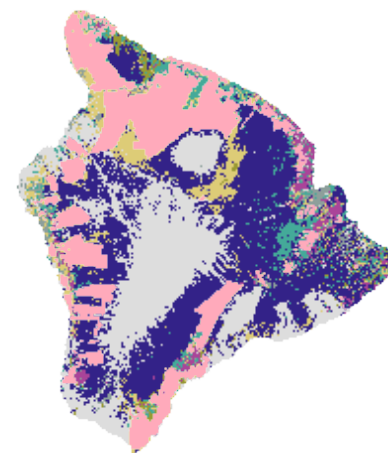
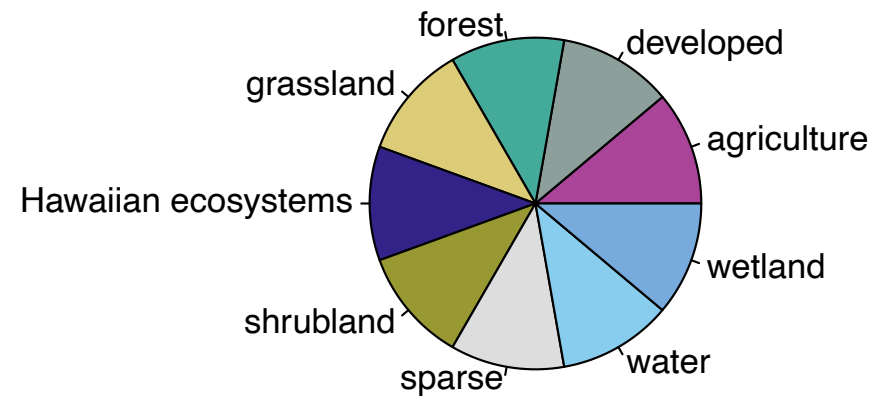
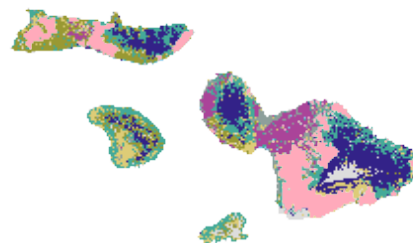




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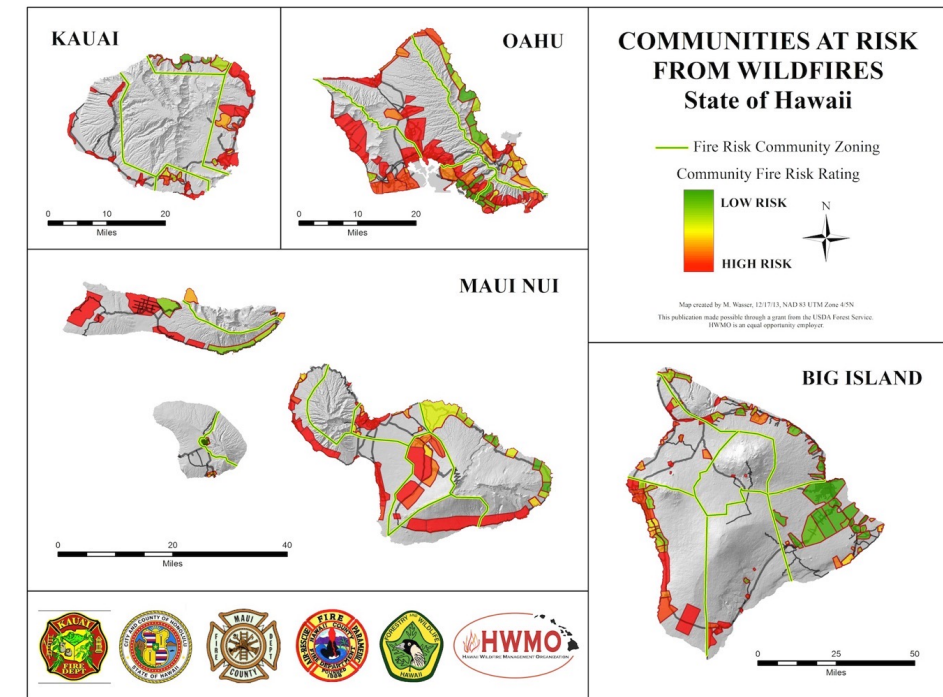
Active ranchlands → 750,000 acres



What we need

“FIRE-ADAPTED COMMUNITIES”

<u>COMMUNITY ACTIONS</u>	<u>EFFECTIVENESS</u>	<u>SPEED</u>	<u>COST</u>	<u>OTHER BENEFITS</u>
Improving ingress/Egress	HIGH	SLOW	HIGH	All hazards
Retrofitting/hardening homes	MED	SLOW	HIGH	
Updated Vulnerability Assessment	MED	FAST	LOW	
Landscaping codes/standards	MED	FAST	LOW	



What we need

“Fire-Resilient Landscapes”

<u>LANDSCAPE ACTIONS</u>	<u>EFFECTIVENESS</u>	<u>SPEED</u>	<u>COST</u>	<u>OTHER BENEFITS</u>
Agricultural expansion/ restoration	HIGH	MED	MED	Jobs, Food security
Green breaks/ Reforestation	HIGH	SLOW	MED	Biodiversity, Ecosystems
Watershed/stream restoration	HIGH	MED	HIGH	Biodiversity, Farming
Grazing	MED	FAST	LOW	Jobs, Food security
Fuel break networks	MED	FAST	MED	



What we need

“Fire-Resilient Landscapes”

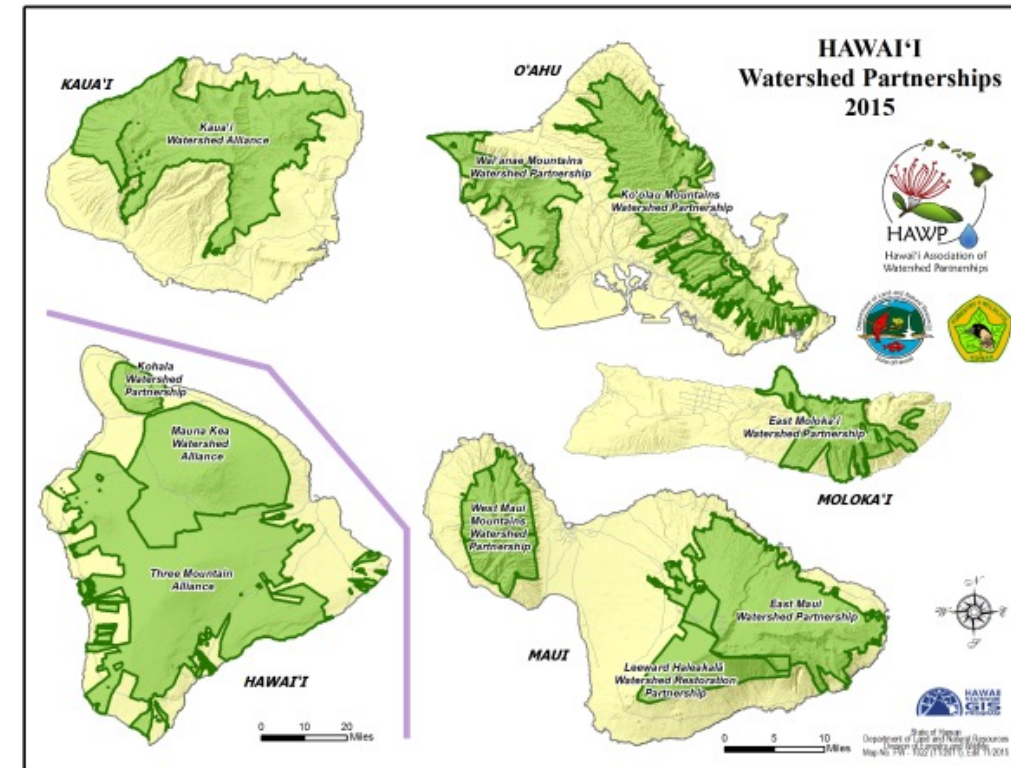
<u>UTILITY ACTIONS</u>	<u>EFFECTIVENESS</u>	<u>SPEED</u>	<u>COST</u>	<u>OTHER BENEFITS</u>
Underground utilities	HIGH	SLOW	HIGH	All Hazards
Diptank expansion	HIGH	MED	LOW	Multi-use
Reservoir restoration	MED	MED	HIGH	Multi-use
Depowering protocols	LOW	FAST	LOW	



What we need

Regulation, Enforcement, Funding

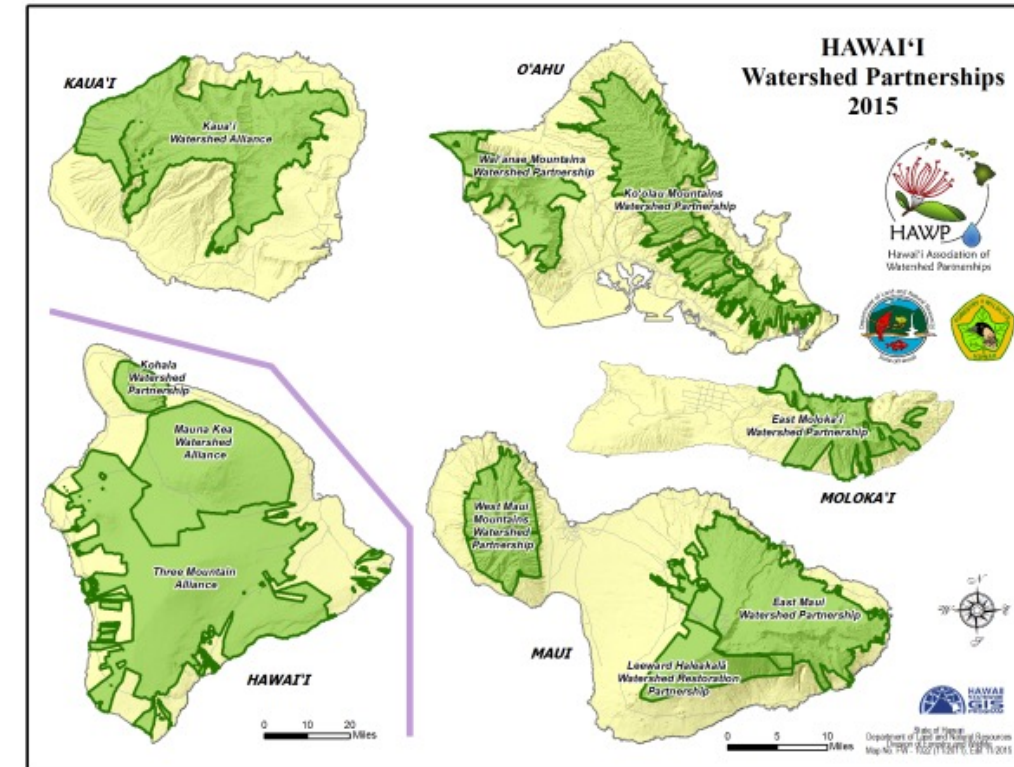
<u>REGULATION/LEGISLATION</u>	<u>EFFECTIVENESS</u>	<u>SPEED</u>	<u>COST</u>	<u>OTHER BENEFITS</u>
Resources for enforcement	HIGH	MED	MED	Revenues?
State Fuels Mitigation Fund	HIGH	FAST	MED	Matching funds
Updated codes/statutes	HIGH	FAST	LOW	Revenues?
State Post-fire Response Fund	MED	MED	MED	Matching funds



What we need

Dedicated Fire and Land Care Programs

<u>PROGRAMMATIC ACTIONS</u>	<u>EFFECTIVENESS</u>	<u>SPEED</u>	<u>COST</u>	<u>OTHER BENEFITS</u>
Cross-boundary planning	HIGH	MED	LOW	All Hazards
Land Care Program Funding (HAWP, DOFAW, ISCS)	HIGH	MED	MED	Jobs, All Hazards
Public education	MED	MED	LOW	School curricula
Increased firefighting resources	MED	MED	MED	



What we need

SCIENCE TECHNOLOGY ACTIONS	NEED	SPEED	COST	BENEFITS
Water resources assessment	HIGH	FAST	LOW	Agriculture
Plant Materials Capacity assessment	HIGH	FAST	LOW	Underway
Seed production/storage	HIGH	MED	MED	Biodiversity, Ecosystems
Green Break Trials	HIGH	MED	MED	
Fire Assessment/Mapping	MED	FAST	LOW	Existing capacity

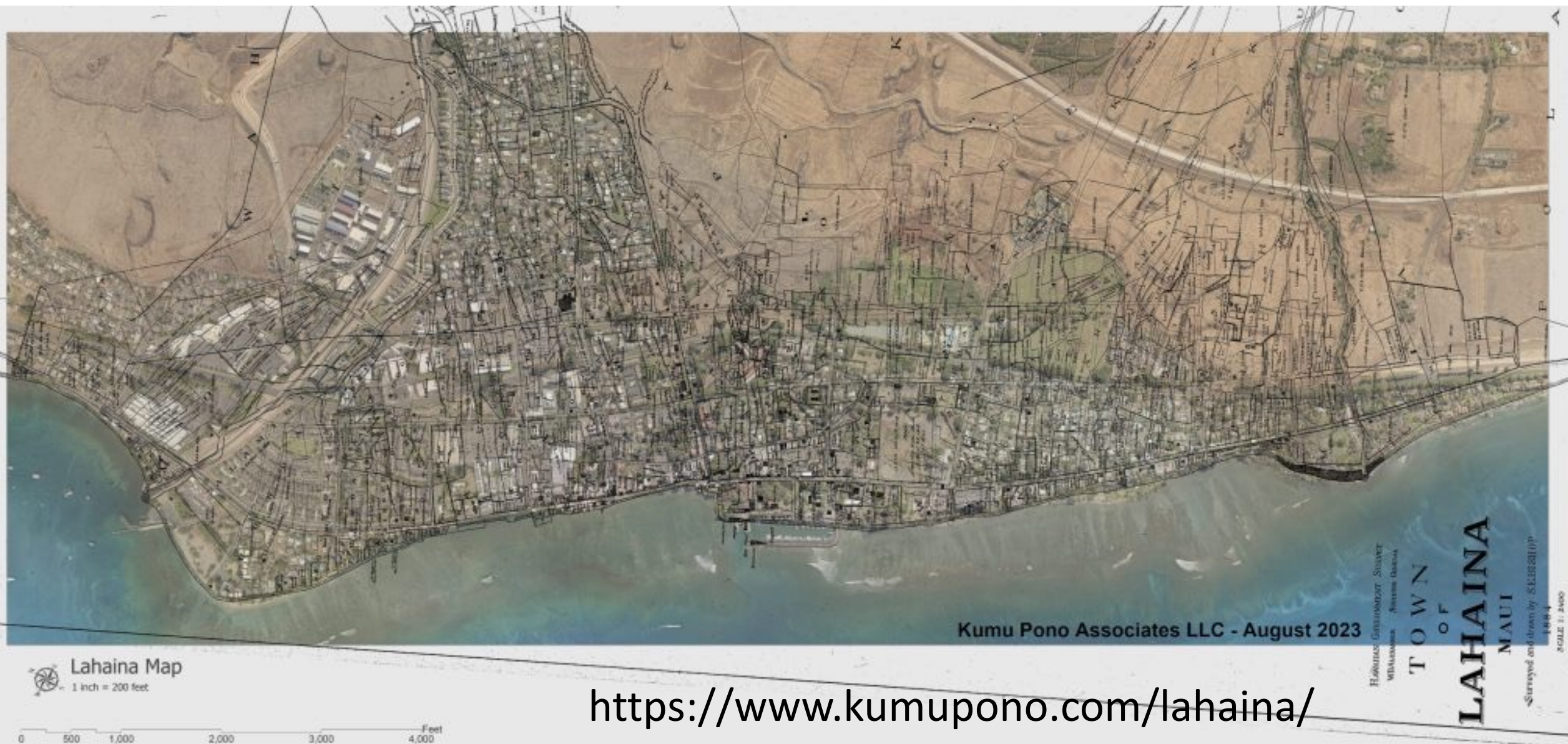


What should land care look like?

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<https://www.kumupono.com/lahaina/>