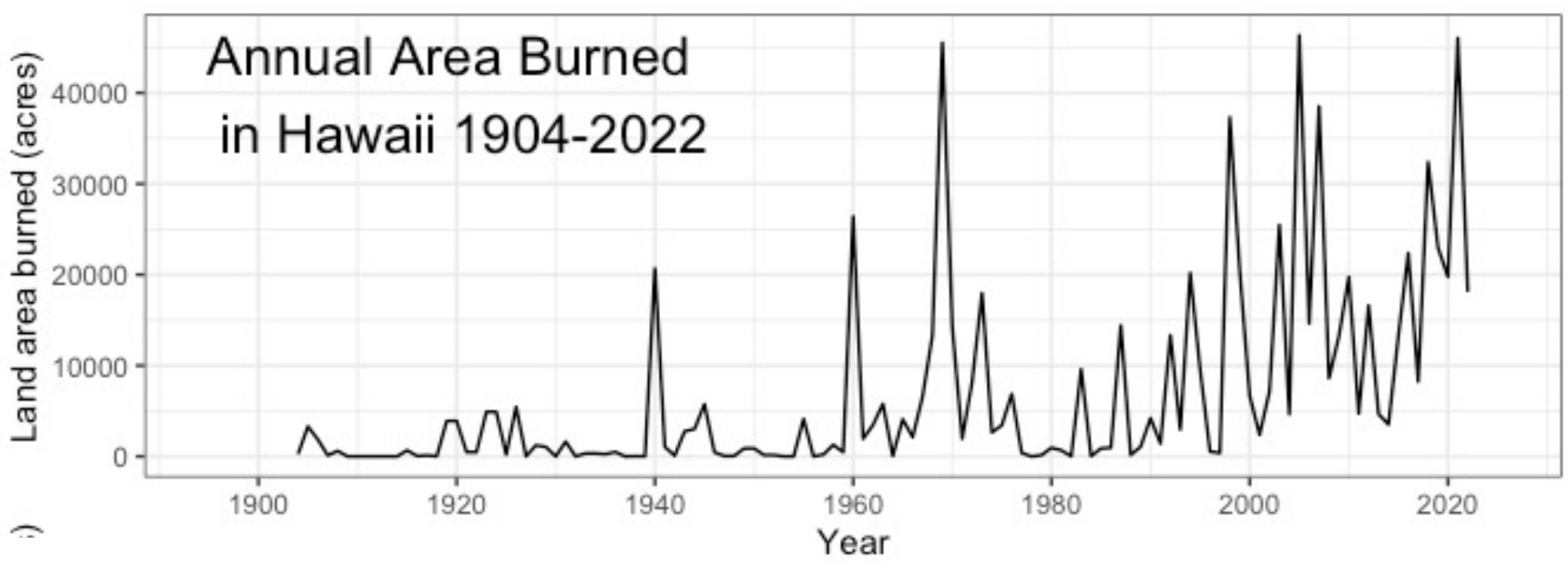
Fire and nonnative species in Hawai‘i

Clay Trauernicht, PhD University of Hawai‘i at Mānoa

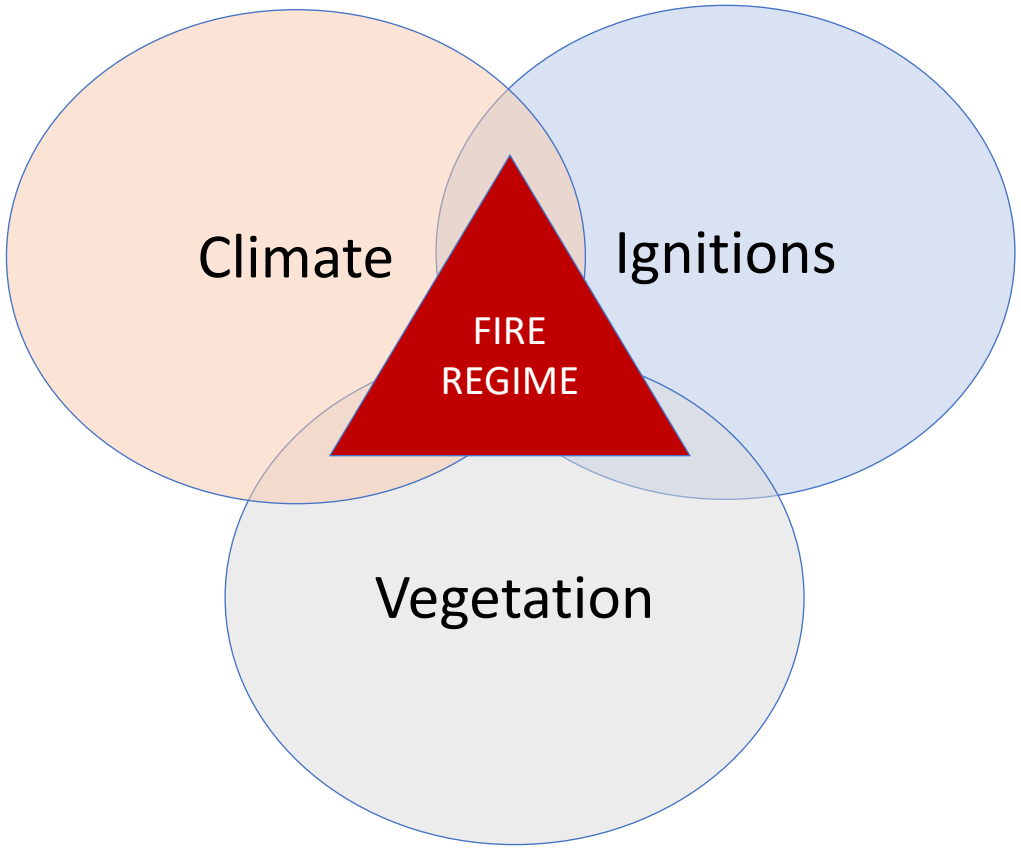
COOPERATIVE EXTENSION
UNIVERSITY OF HAWAI'I AT MĀNOA
COLLEGE OF TROPICAL AGRICULTURE AND HUMAN RESOURCES

Annual area burned has increased 300%



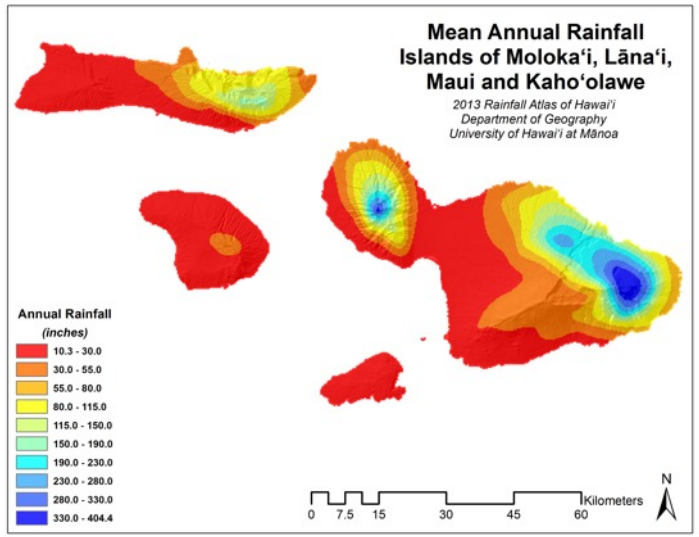

PFX
Pacific Fire Exchange

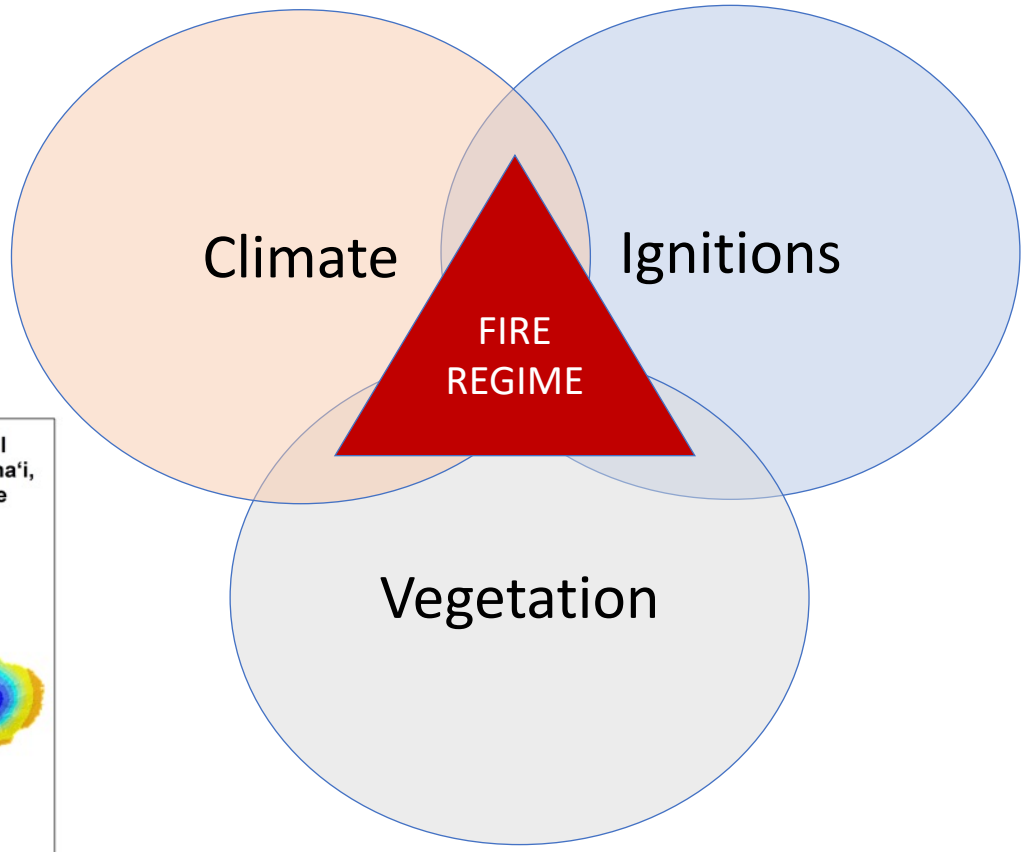
Hawaiian fire regimes are changing



Hawaiian fire regimes are changing

Wet and dry cycles
Long-term drying trends





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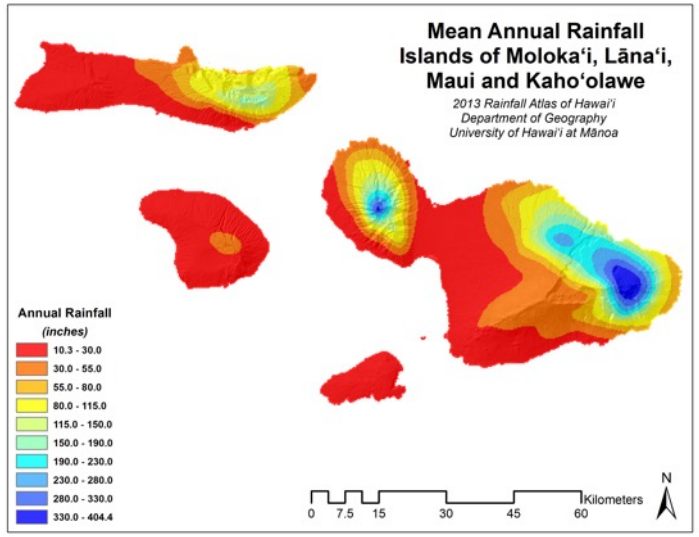
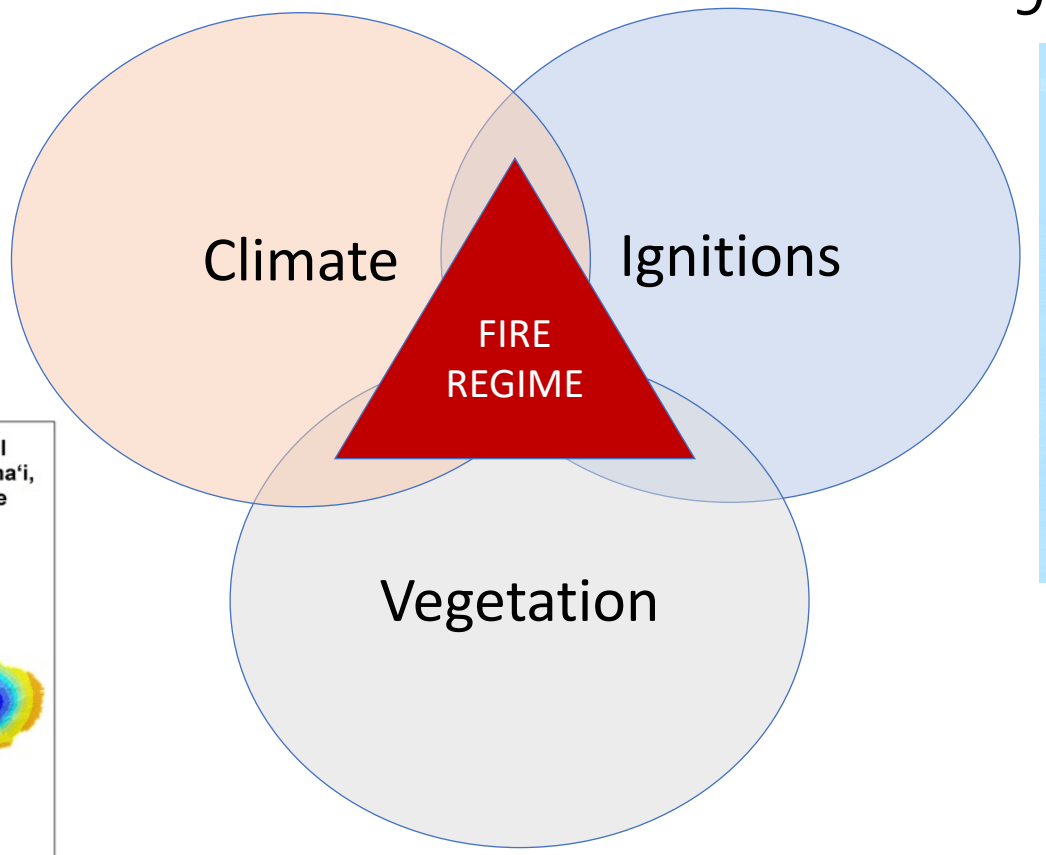
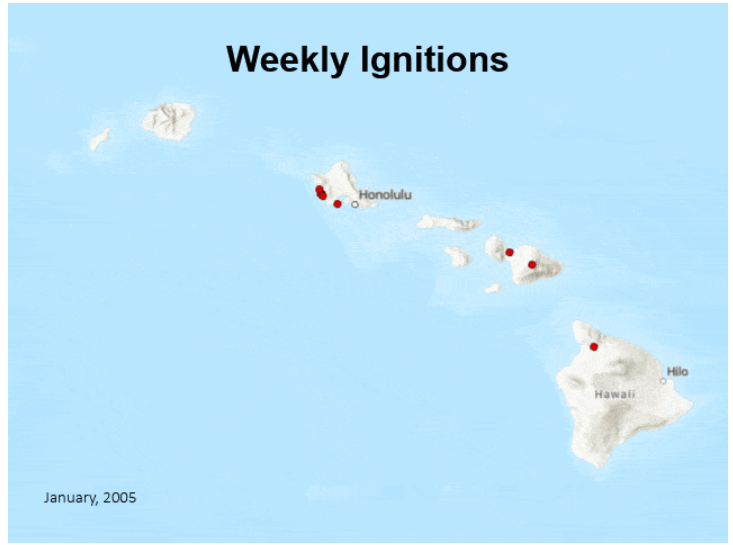




99% Human-caused ignitions



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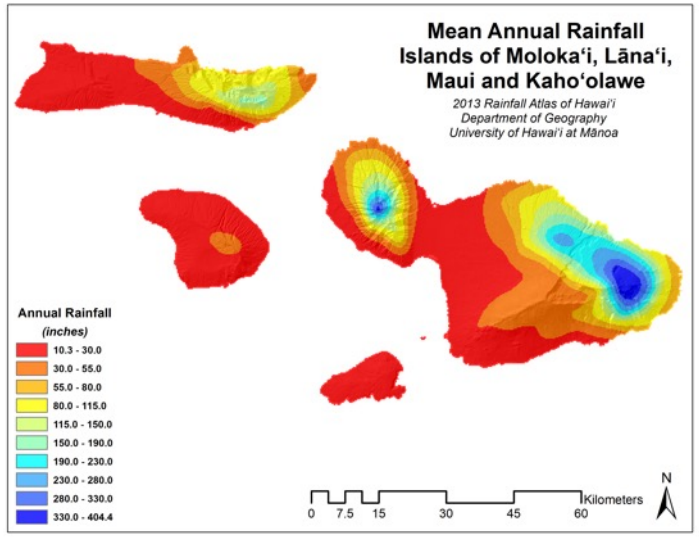

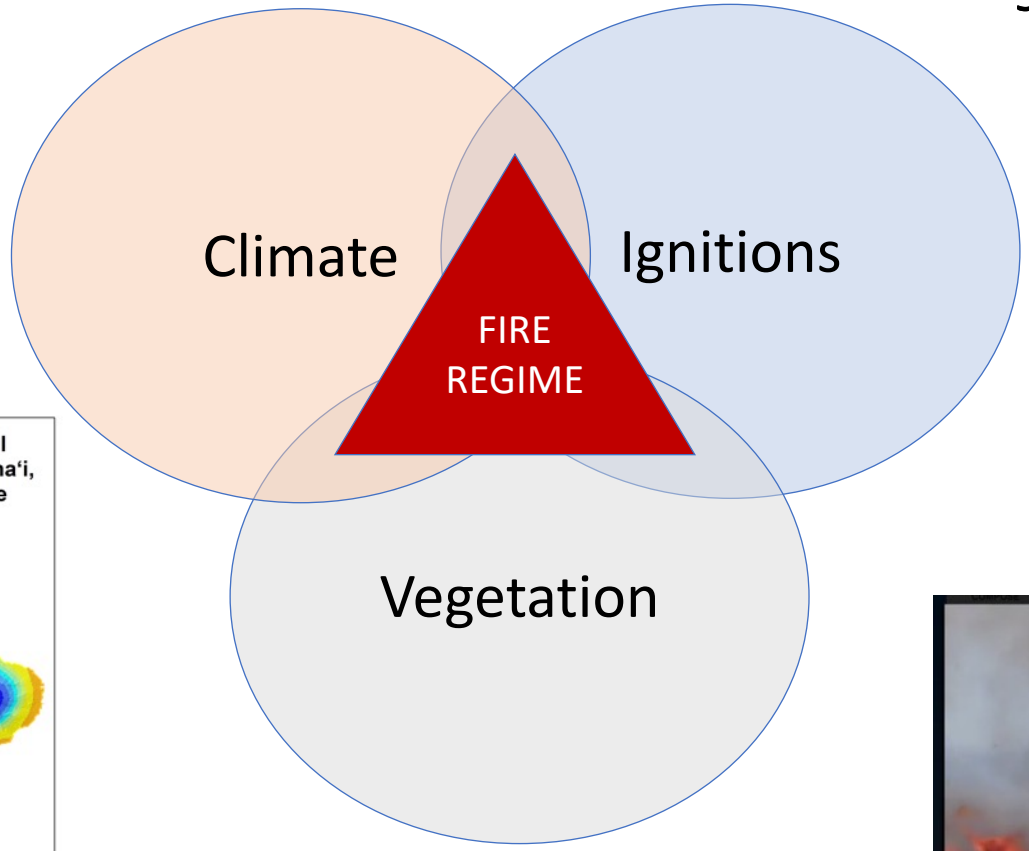

Unmanaged, nonnative
grasslands & shrublands

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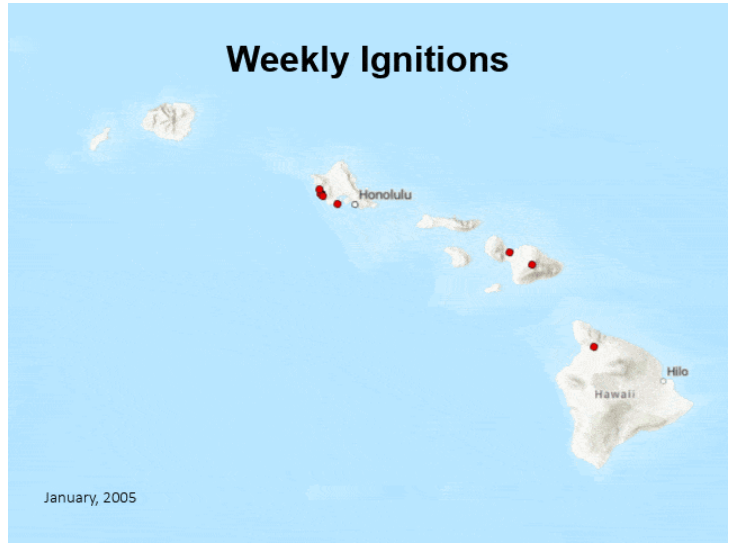

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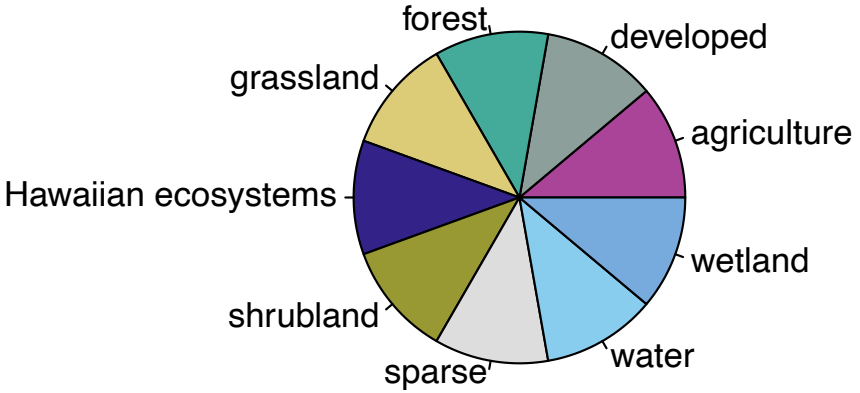
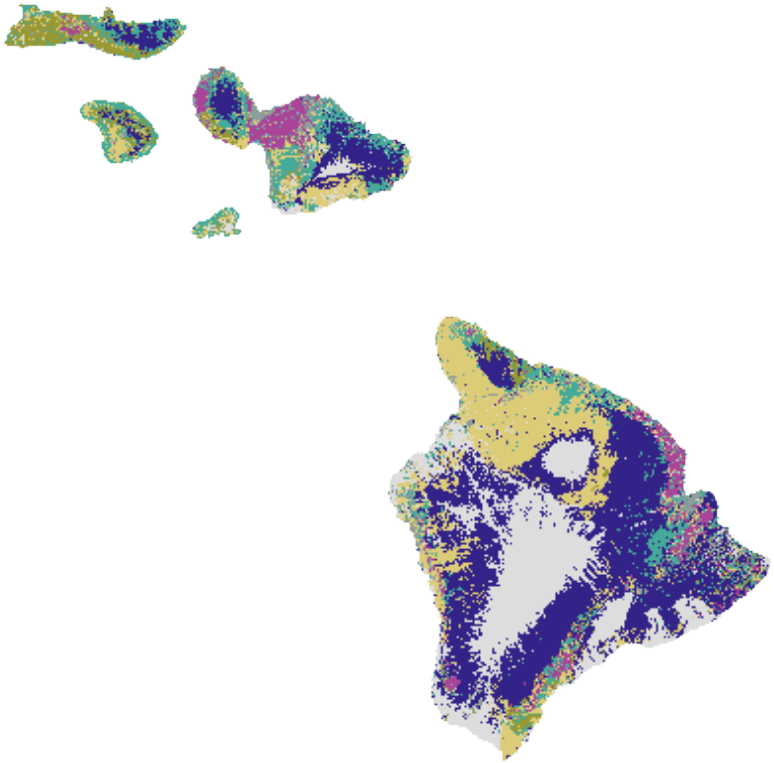
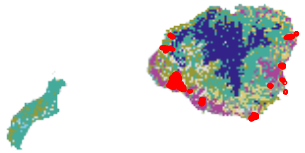
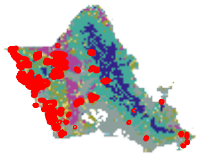


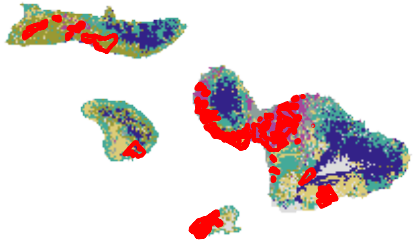
Hawaiian ecosystems → 1.3 million acres
Nonnative ecosystems → 1.5 million acres

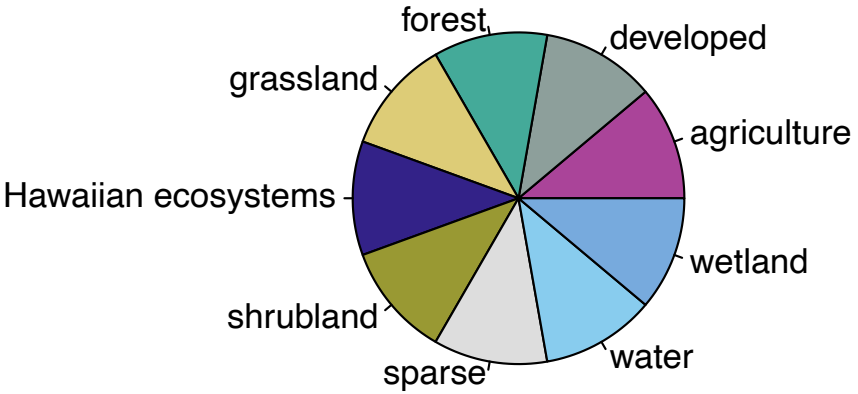
>1 million acres of "grass-dominated" vegetation
(Trauernicht et al. 2015. Pacific Science)









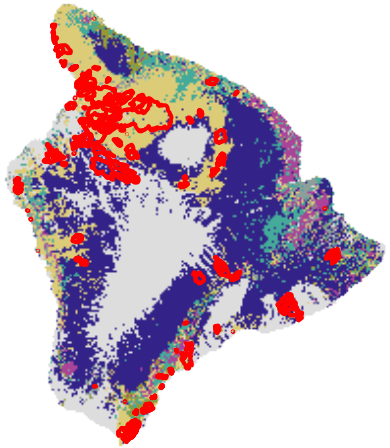


Hawaiian ecosystems → 1.3 million acres
Nonnative ecosystems → 1.5 million acres

>1 million acres of "grass-dominated" vegetation

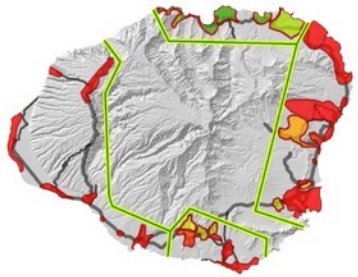
Fires! (1999-2020)

Hawaiian ecosystems	36,000 acres
grasslands/shrublands	**158,000 acres**
forests	23,000 acres



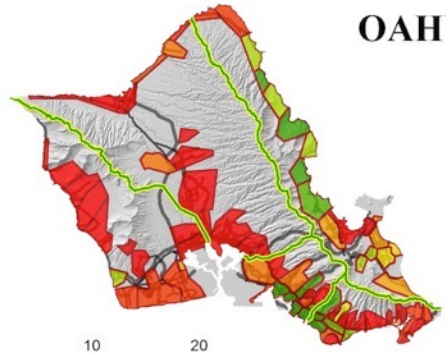
COMMUNITIES AT RISK FROM WILDFIRES
State of Hawaii

KAUAI



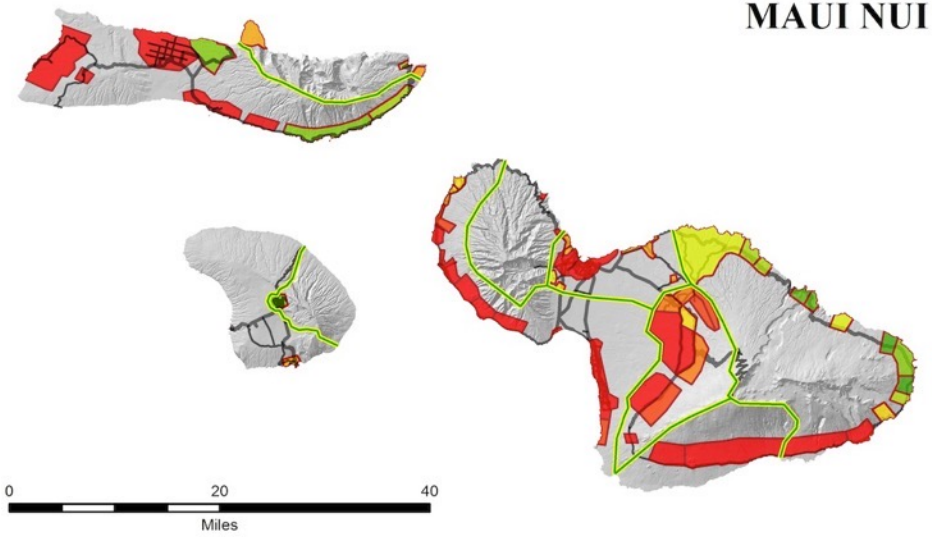
0 10 20
Miles

OAHU



0 10 20
Miles

MAUI NUI



0 20 40
Miles

Fire Risk Community Zoning

Community Fire Risk Rating

LOW RISK

HIGH RISK

N

Map created by M. Wasser, 12/17/13, NAD 83 UTM Zone 4/5N

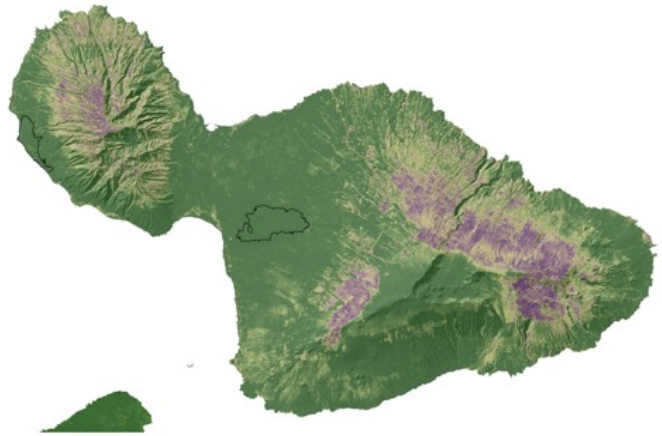
This publication made possible through a grant from the USDA Forest Service.
HWMO is an equal opportunity employer.

BIG ISLAND

0 25 50
Miles

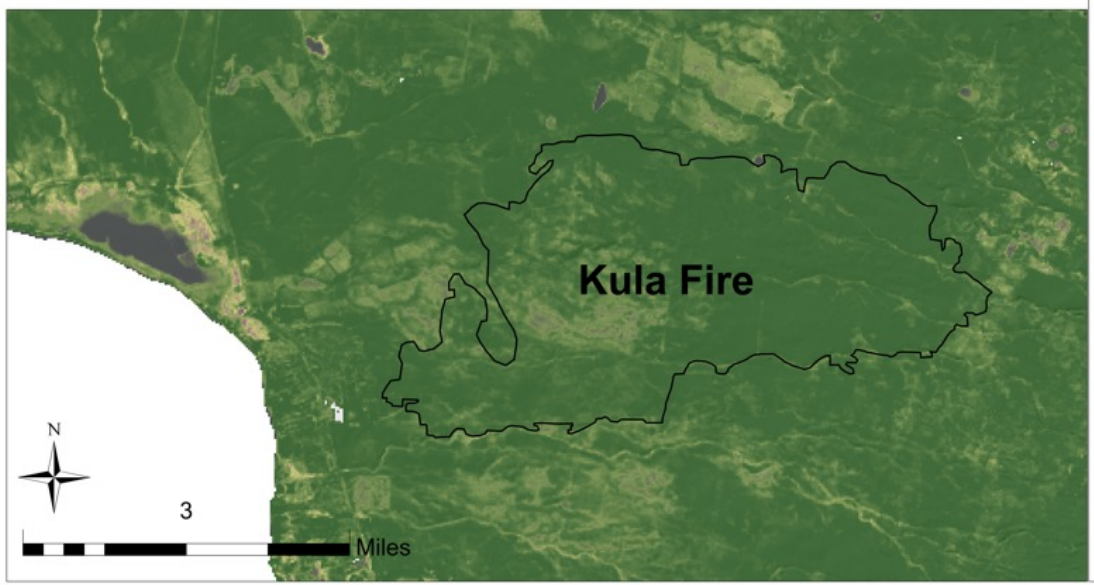
HWMO
Hawai'i Wildfire Management Organization

Maui Landcover:
Woody and Grass Cover



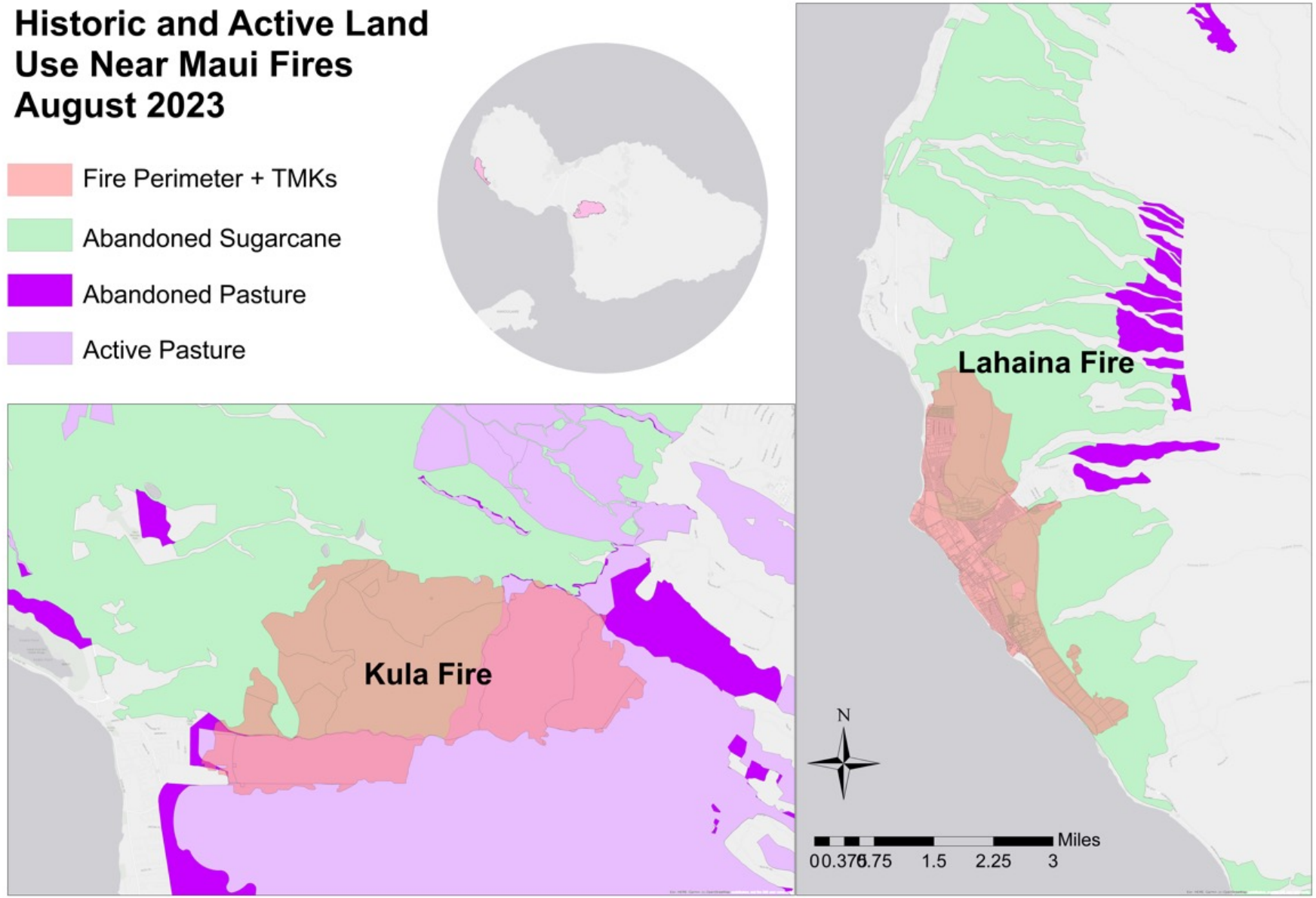
Woody

Grass

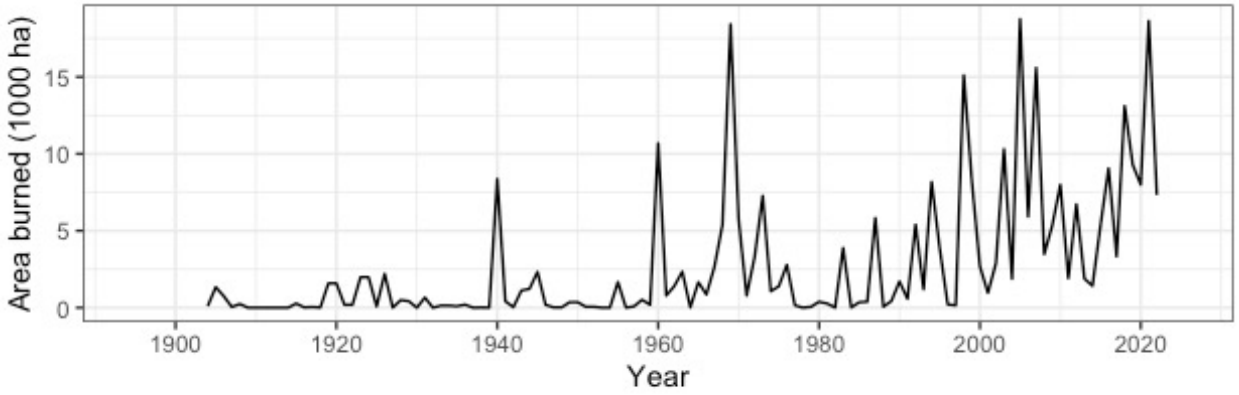


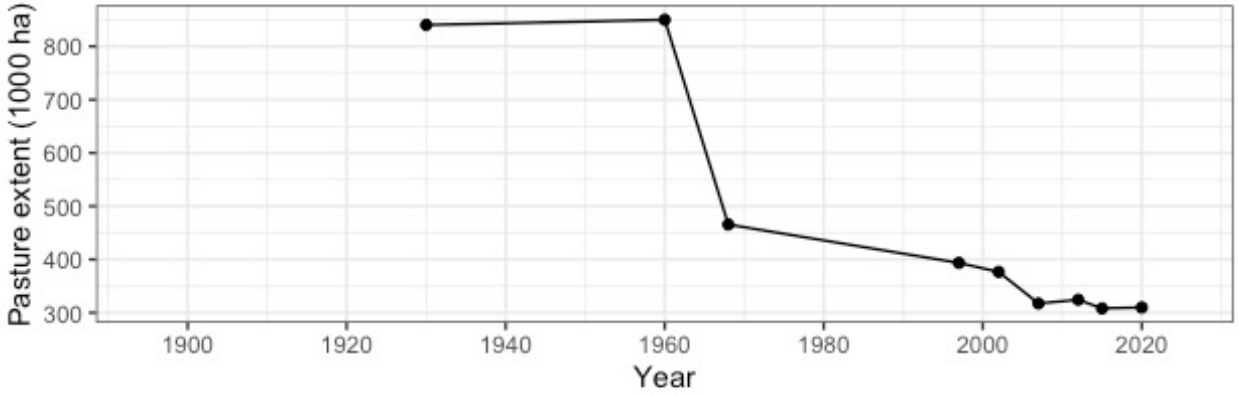
Data Source: University of Hawaii at Manoa
Inquiries @ Dr. Clay Trauernicht, trauerni@hawaii.edu

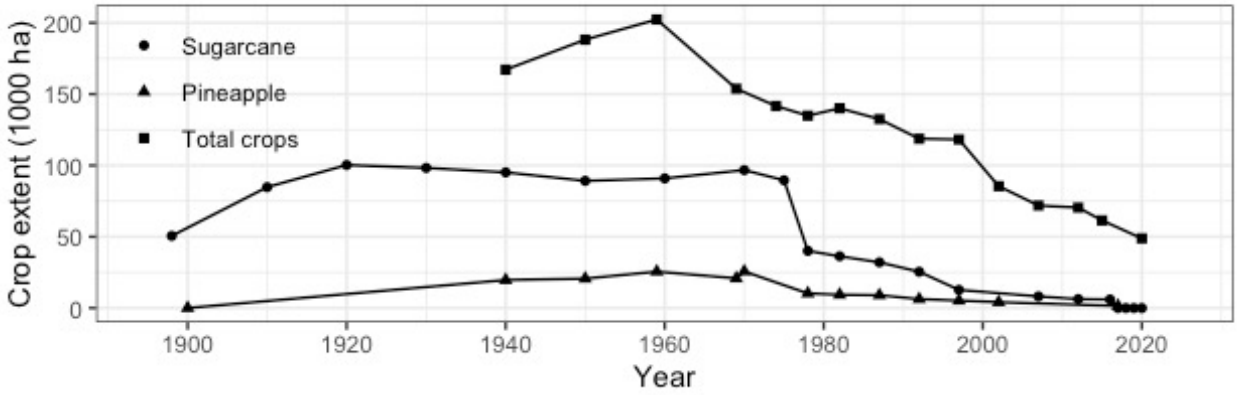
Historic and Active Land Use Near Maui Fires August 2023



Why Hawai‘i is burning points to systemic problems







What should land care look like?

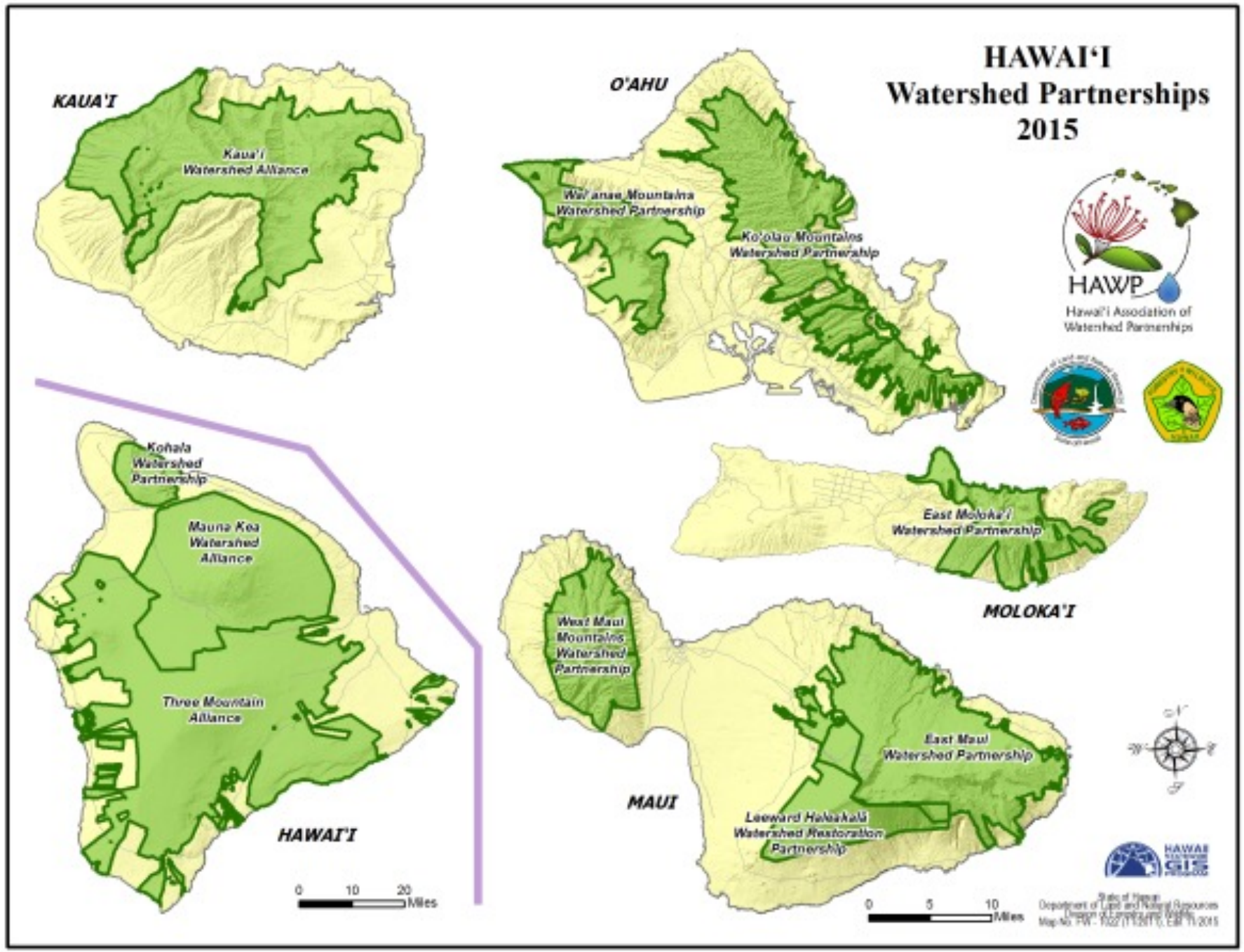
What we have:

SOCIAL INFRASTRUCTURE

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

HWMO
HAWAII WILDFIRE MANAGEMENT ORGANIZATION

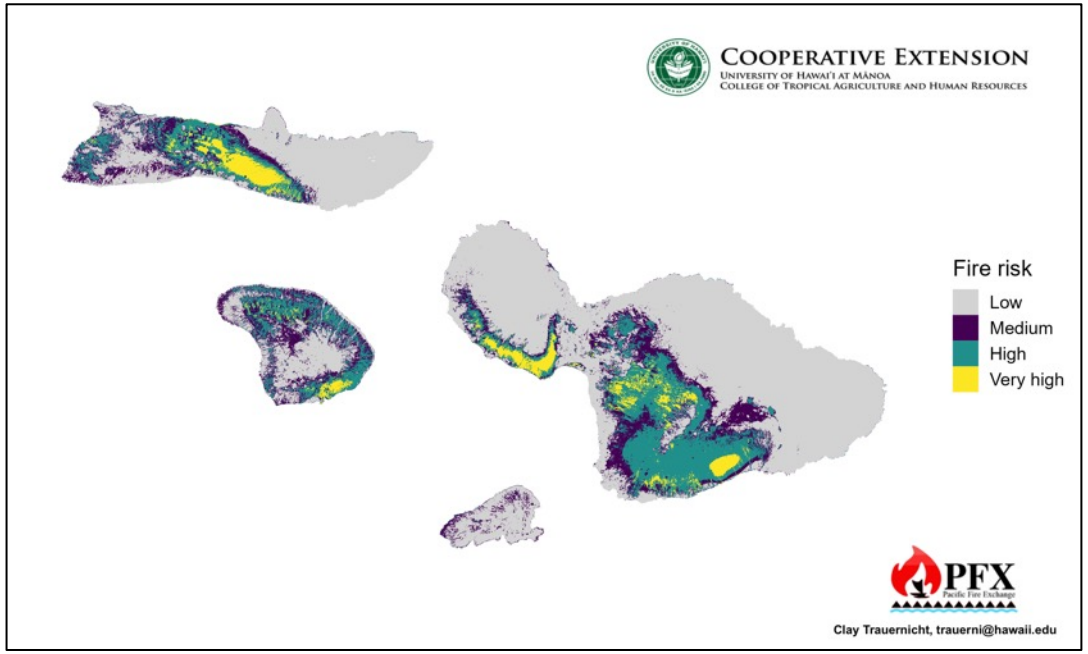
www.hawaiiwildfire.org

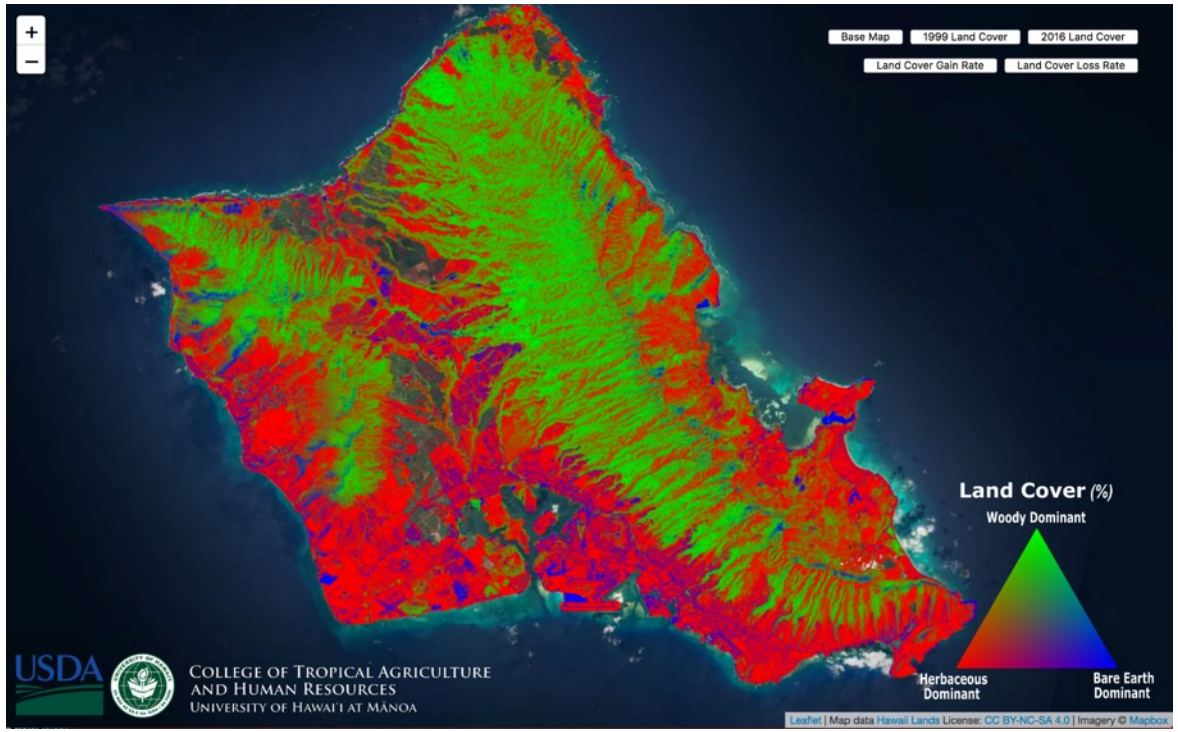

HAWAI'I
Watershed Partnerships
2015
KAUA'I
Kaua'i
Watershed Alliance
O'AHU
Wai'anae Mountains
Watershed Partnership
Ko'olau Mountains
Watershed Partnership
HAWP
Hawai'i Association of
Watershed Partnerships
East Moloka'i
Watershed Partnership
MOLOKA'I
Kohala
Watershed
Partnership
Mauna Kea
Watershed
Alliance
Three Mountain
Alliance
HAWAI'I
West Maui
Mountains
Watershed
Partnership
East Maui
Watershed Partnership
MAUI
Leeward Haleakalā
Watershed Restoration
Partnership
0 10 20
Miles
0 5 10
Miles

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.





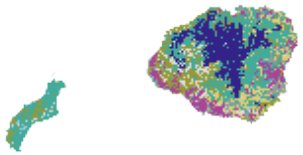
What we have:

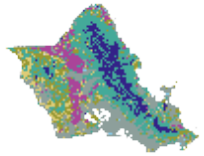
LOCAL KNOWLEDGE FOR FUELS MANAGEMENT

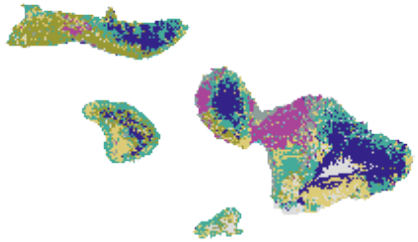
- Traditional agriculture
- Ecosystem restoration
- Plant propagation
- **GRAZING**

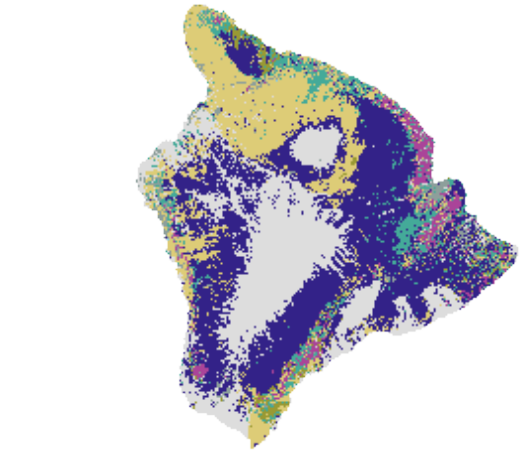
Weeds vs Resources

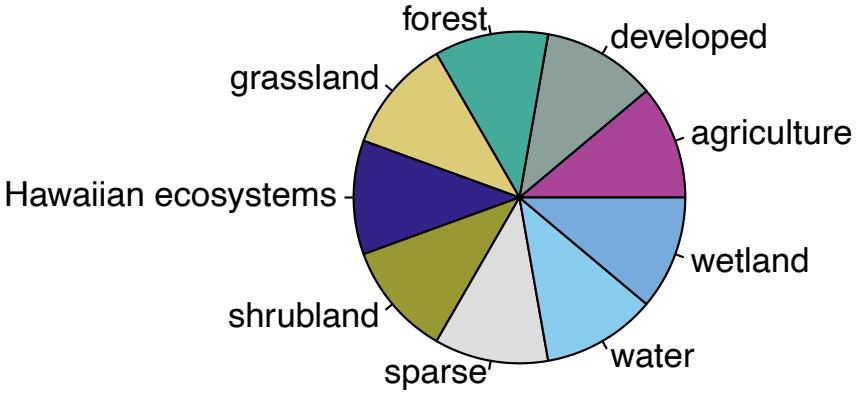
Bulla Iaea’s farm











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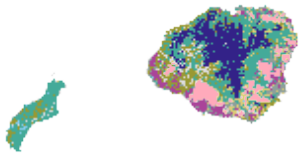

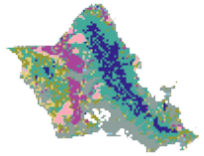

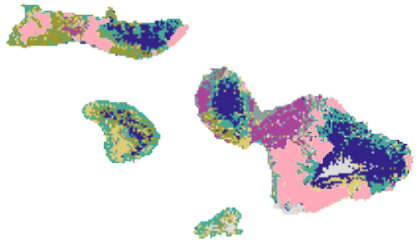

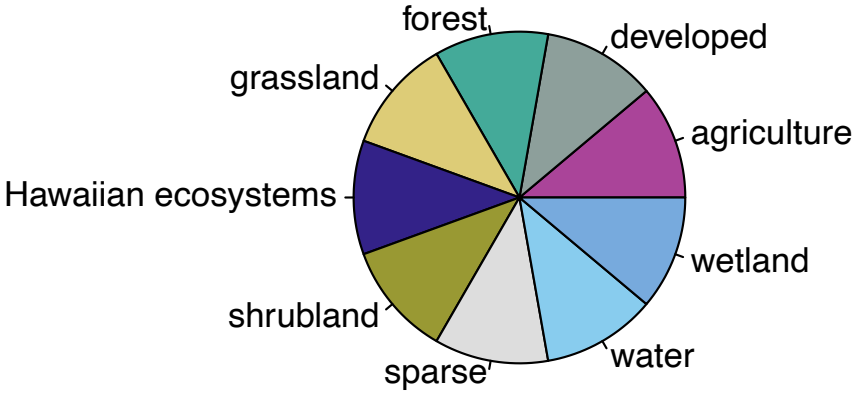

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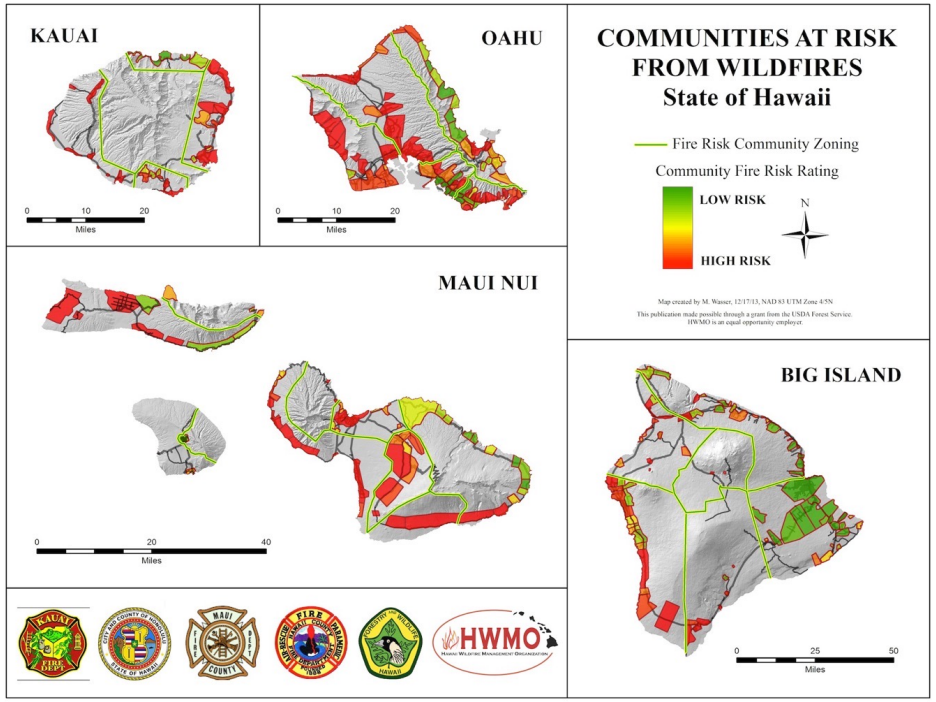
Active ranchlands → 750,000 acres

What we need

“FIRE-ADAPTED COMMUNITIES”

COMMUNITY ACTIONS	EFFECTIVENESS	SPEED	COST	OTHER BENEFITS
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”

LANDSCAPE ACTIONS	EFFECTIVENESS	SPEED	COST	OTHER BENEFITS
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

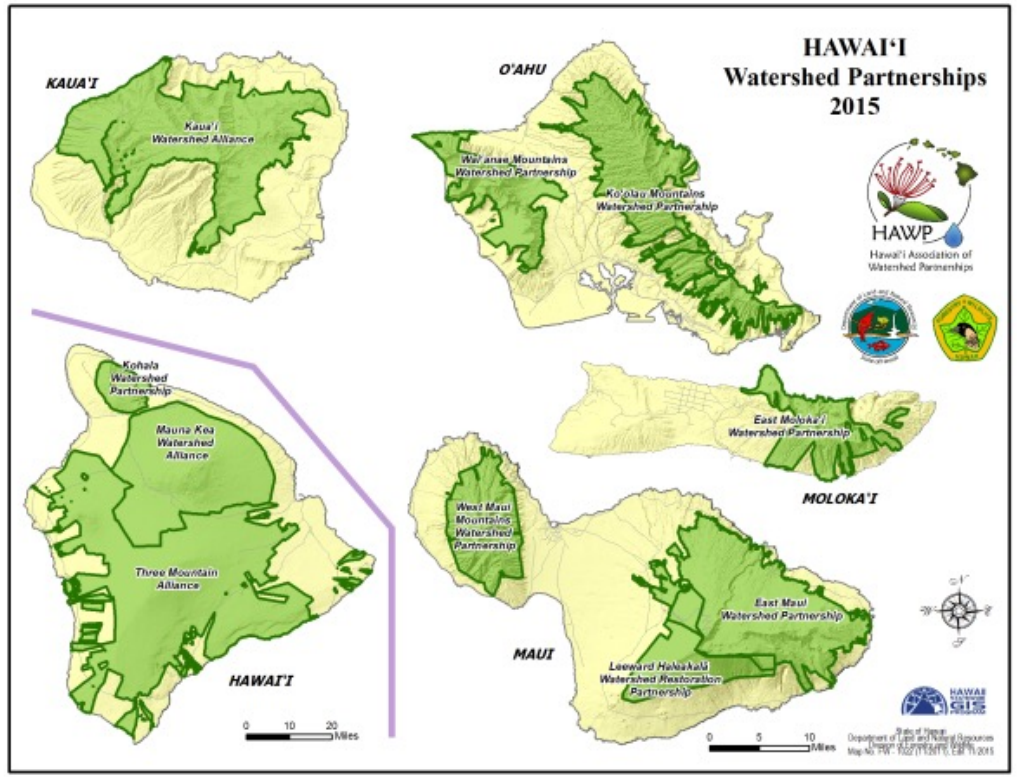
“Fire-Resilient Landscapes”

UTILITY ACTIONS	EFFECTIVENESS	SPEED	COST	OTHER BENEFITS
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

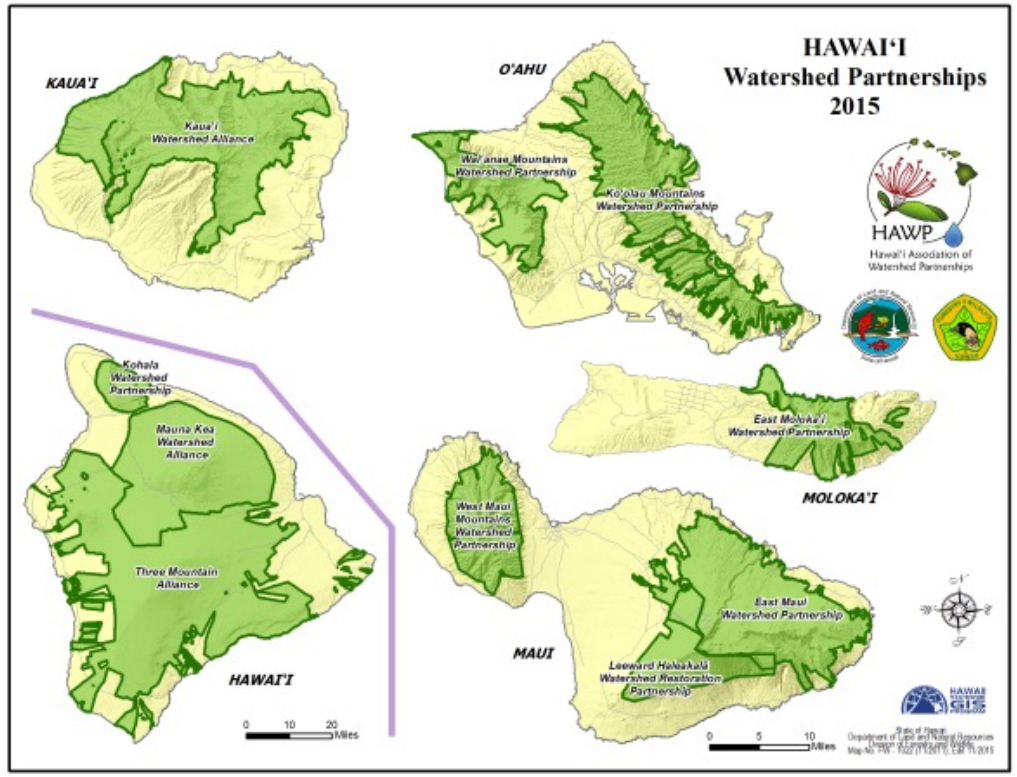
REGULATION/LEGISLATION	EFFECTIVENESS	SPEED	COST	OTHER BENEFITS
Resources for enforcement	HIGH	MED	MED	Revenues?
State Fuels Mitigation Fund	HIGH	FAST	MED	Matching funds
Updated codes/statutes	HIGH	FAST	LOW	Revenues?
State Post-fire Response Fund	MED	MED	MED	Matching funds



What we need

Dedicated Fire and Land Care Programs

PROGRAMMATIC ACTIONS	EFFECTIVENESS	SPEED	COST	OTHER BENEFITS
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/