

WATERSHED MANAGEMENT IN HAWAI‘I: How forest protection supports the mission of CWRM

Briefing to the Commission on Water Resource Management

February 18, 2025





PRESENTATION OVERVIEW

- The value of Hawai‘i’s native forests
- Who is responsible for protecting Hawai‘i’s forests?
- Why is forest protection important to CWRM?
- Specific examples of watershed protection from Maui

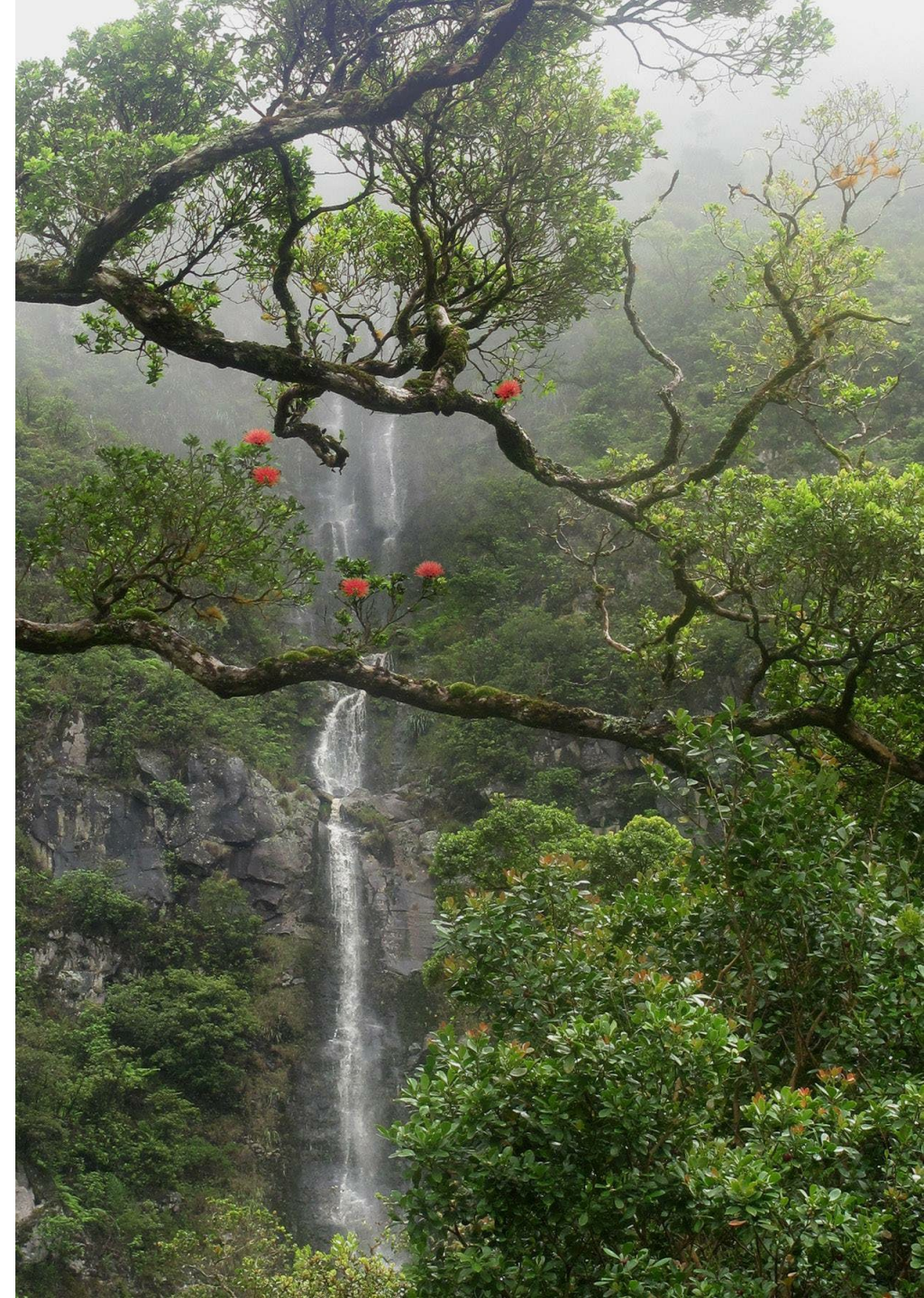




THE VALUE OF HAWAI‘I’S NATIVE FORESTS

FORESTS = WATER

- Native forests are the source of Hawai‘i’s freshwater supply
- Dense vegetation captures cloud water
- Deep roots direct water into ground efficiently
- Majority of drinking water sourced from underground aquifers
- It takes ~20 years for rainfall to replenish aquifers





**Native species capture more
water than invasive species**

An aerial photograph of a lush, green mountain valley. The terrain is covered in dense vegetation, and numerous waterfalls are visible cascading down the steep slopes. The waterfalls are white and create a stark contrast against the vibrant green of the forest. The overall scene is one of a healthy, water-rich ecosystem.

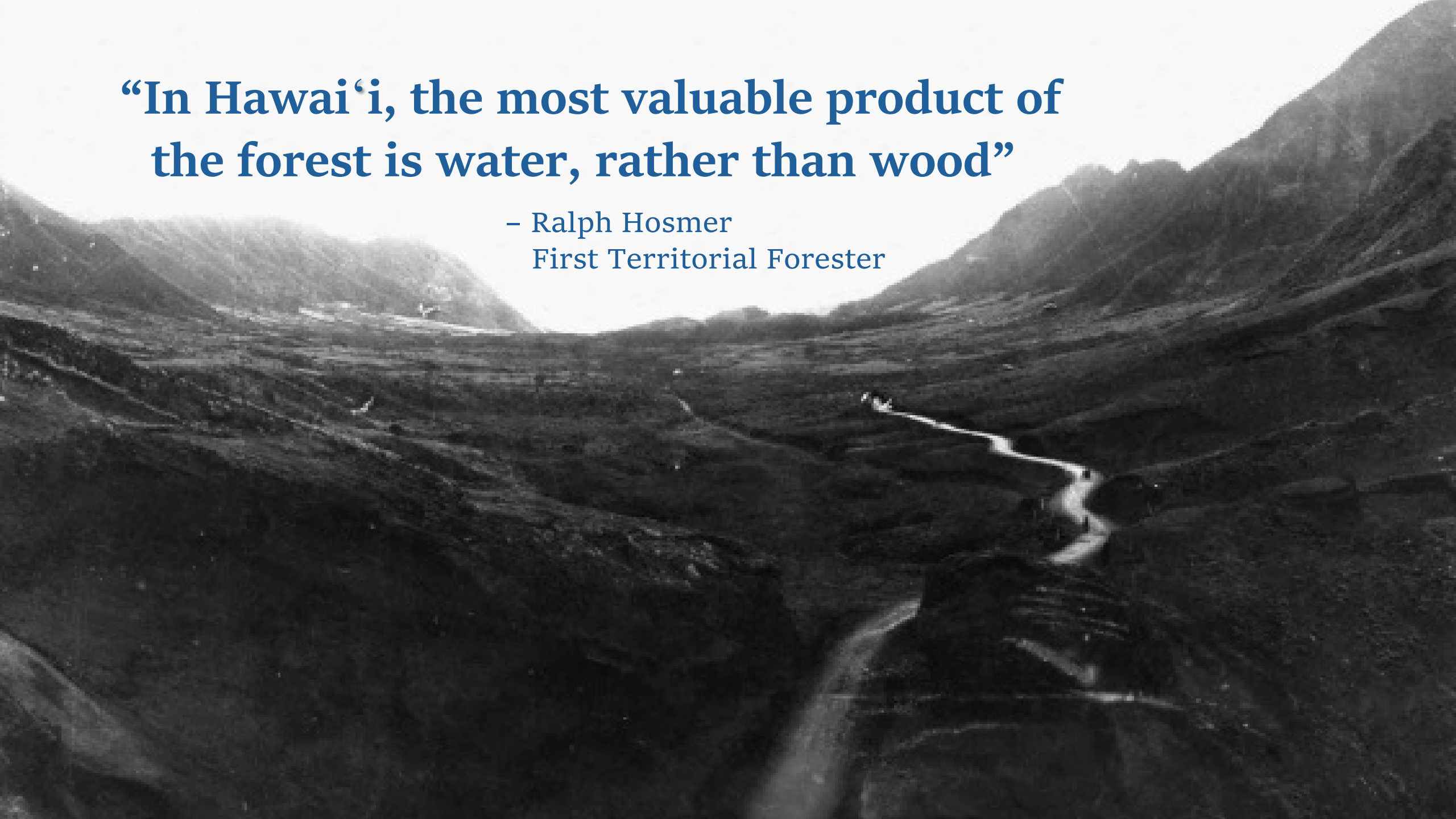
Hawaiians understood the direct connection between forests and water supply

Hahai nō ka ua, i ka ulu lā'au

(The rain follows the forest)

**“In Hawai‘i, the most valuable product of
the forest is water, rather than wood”**

– Ralph Hosmer
First Territorial Forester





**WHO IS RESPONSIBLE FOR PROTECTING
HAWAI‘I’S FORESTS?**

Revised Hawaii Drought Plan 2017 UPDATE



May, 2017

Prepared for:
State of Hawaii Department of Land & Natural Resources Commission on Water Resource Management

Prepared by:
One World One Water, LLC
Connecting Engineering and Policy

Wai Maoli
HAWAII FRESH WATER INITIATIVE
A Blueprint for Action Summary
HAWAII COMMUNITY FOUNDATION

SUSTAINABLE HAWAII INITIATIVE

Strengthening our waters, land and food for Hawaii's communities

- double local food production
100% increase in local agricultural production by 2020
- Hawaii interagency biosecurity plan
Stronger invasive species policy, infrastructure and capacity by 2027
- 30 x 30 watershed protection
30% of priority watersheds protected by 2030
- 30 x 30 marine management
30% of nearshore marine areas effectively managed by 2030
- 100% renewable energy
Complete transfer to clean, renewable energy by 2045

Aloha+ CHALLENGE

Hawaii Water Plan WATER RESOURCE PROTECTION PLAN 2019 UPDATE

State of Hawaii
Commission on Water Resource Management
Townscape, Inc.



STATE WATER PROJECTS PLAN UPDATE Hawaii Water Plan Statewide

Prepared for the:
Department of Land and Natural Resources
State of Hawaii

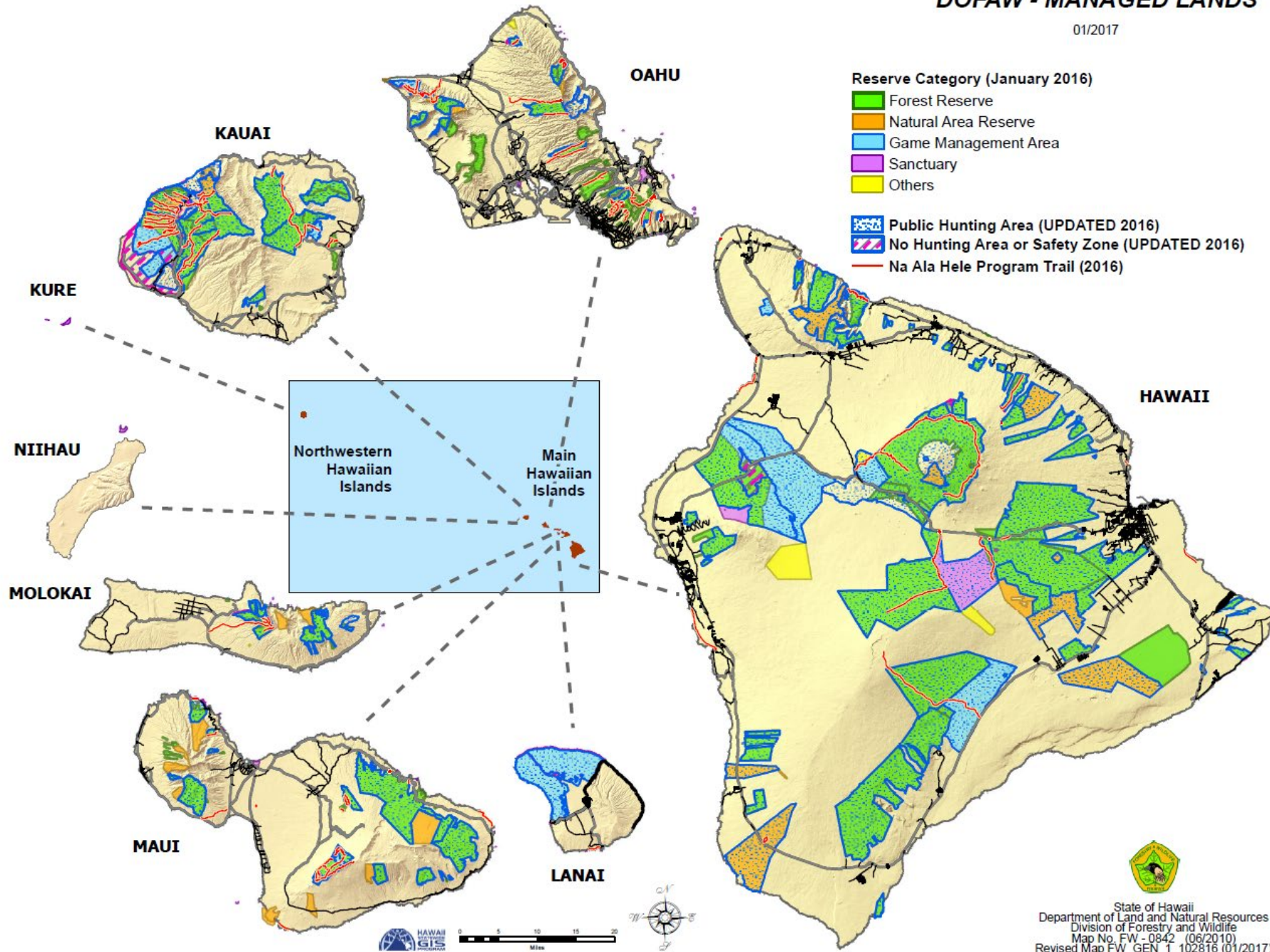
FUKUNAGA & ASSOCIATES, INC.
Consulting Engineers
1157 Kapalani Boulevard, Suite 1150
Honolulu, Hawaii 96814 • (808) 944-1821

June 2020
Final Report

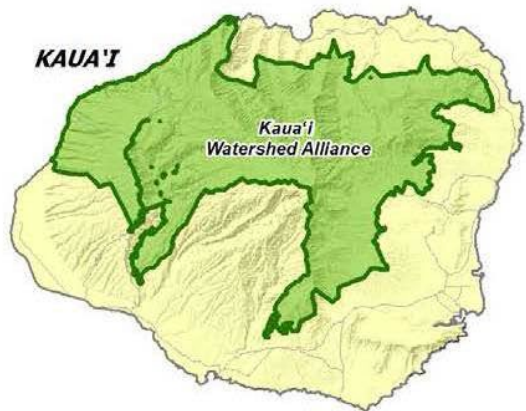
Hawai'i's water plans and initiatives acknowledge and prioritize forest protection

DOFAW - MANAGED LANDS

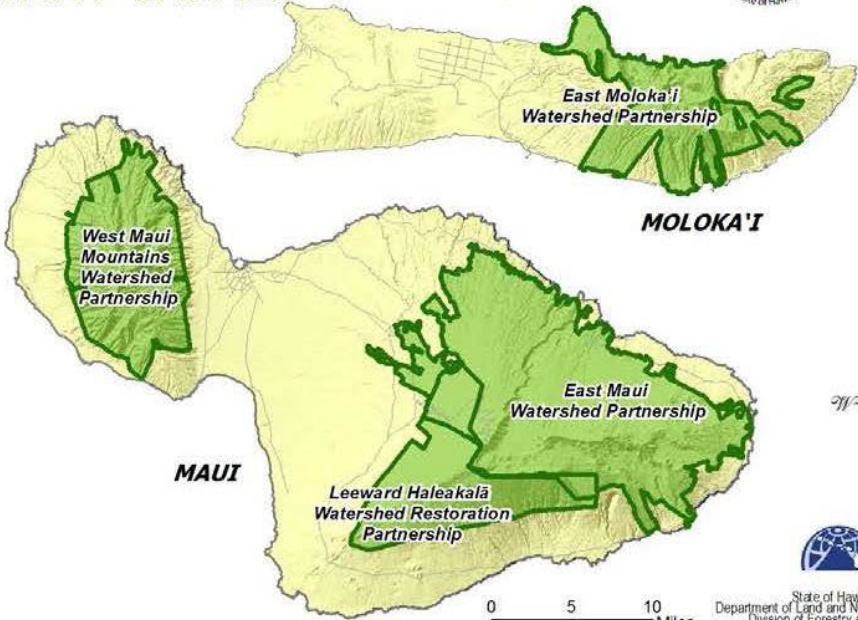
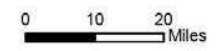
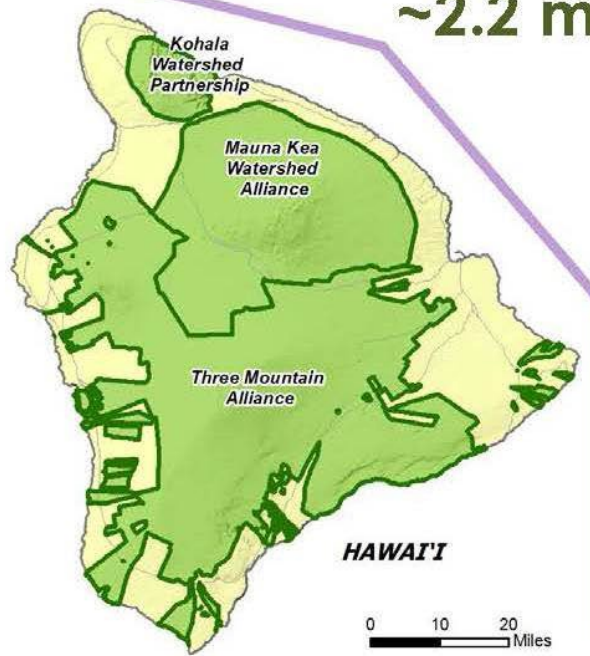
01/2017



HAWAI'I Watershed Partnerships 2015



~2.2 million acres



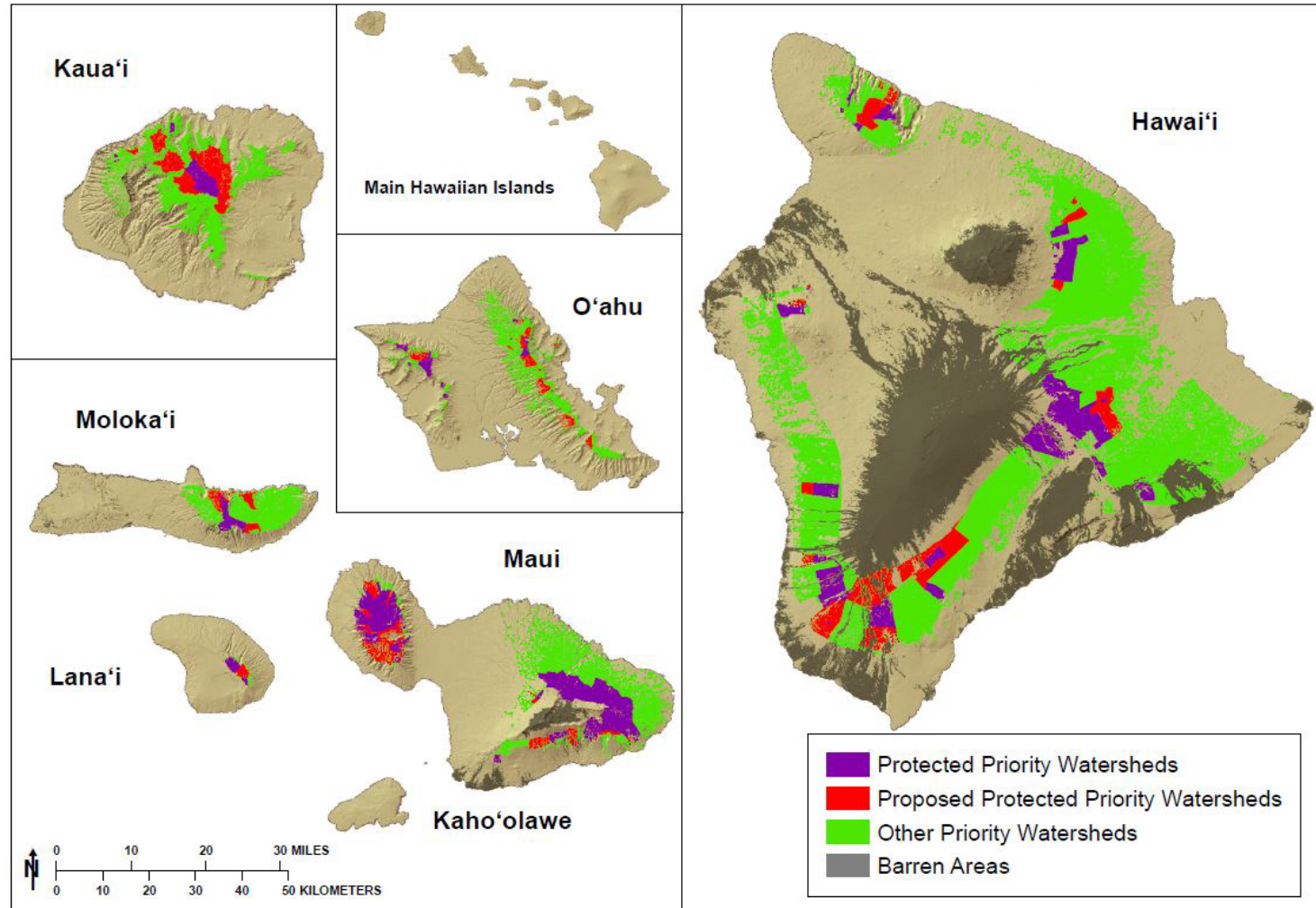
State of Hawai'i
Department of Land and Natural Resources
Division of Forestry and Wildlife
Map No. FW-1022 (11/2011), Edit 11/2015



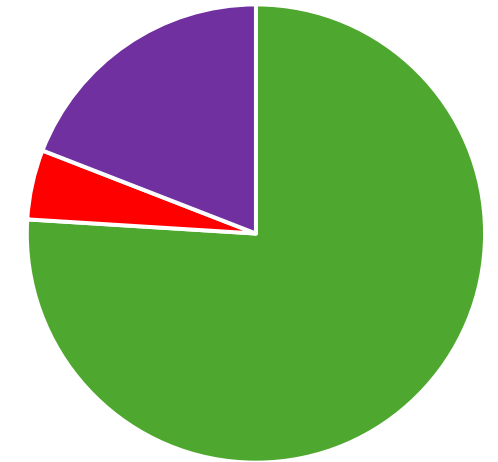


Protect 30% (253,000 acres) of Hawai'i's highest priority watershed forests by 2030

30x30 Watershed Plan



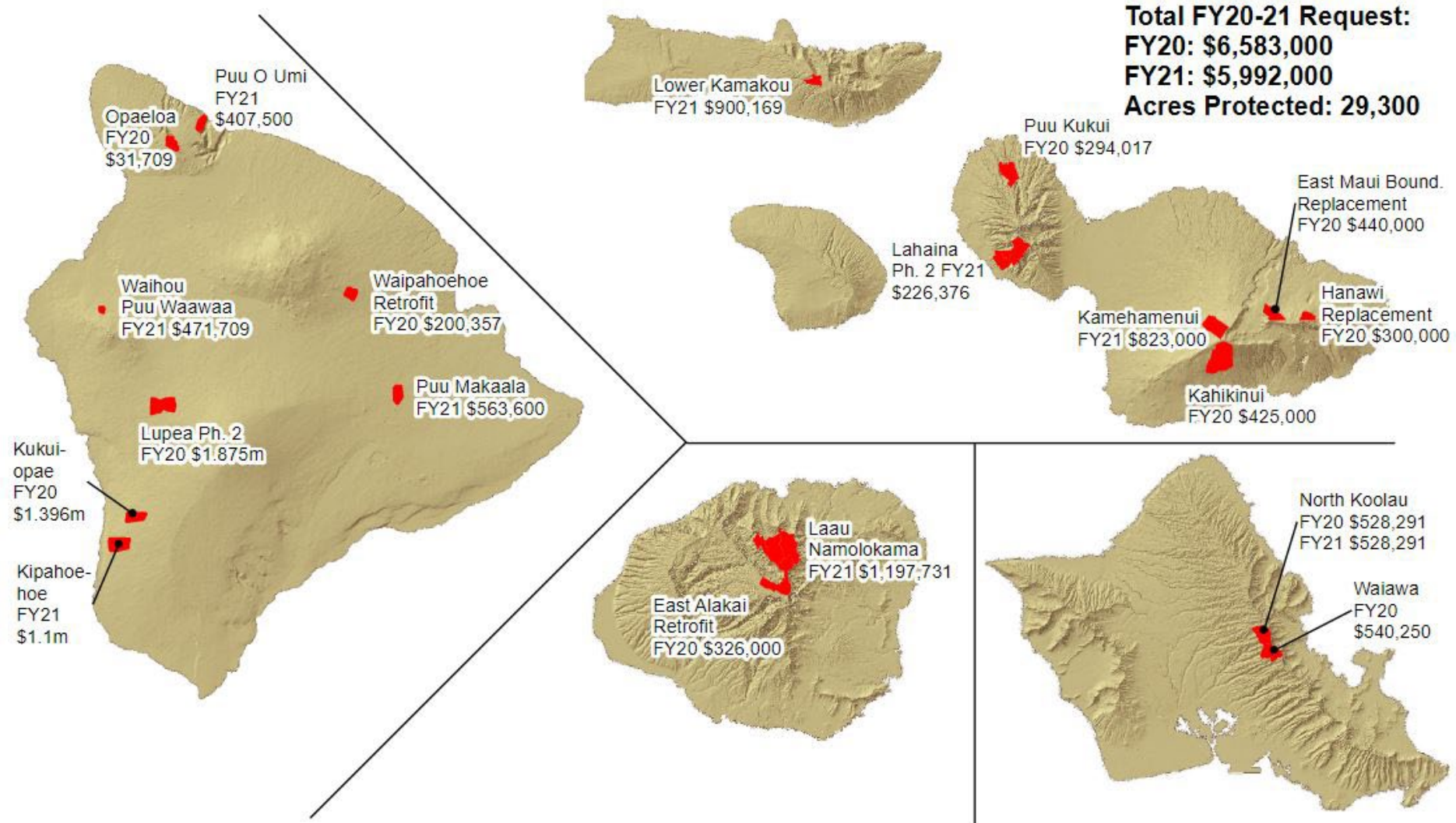
30x30 Watersheds



■ Priority ■ Proposed ■ Protected

21% currently protected

Statewide Watershed Protection FY 20-21 Capital Improvement Projects



An aerial photograph of a deep, lush green mountain valley. A river flows through the center of the valley, surrounded by dense forest. The mountainsides are steep and covered in thick vegetation. The sky is hazy, suggesting a misty or overcast day.

“A healthy watershed forest is no accident.
It is the result of the investment that was made in good
watershed management many decades ago...”

- Act 152, SLH 2000 “Relating to Watershed Protection”
Annual Report to the Legislature



**WHY IS FOREST PROTECTION
IMPORTANT TO CWRM?**

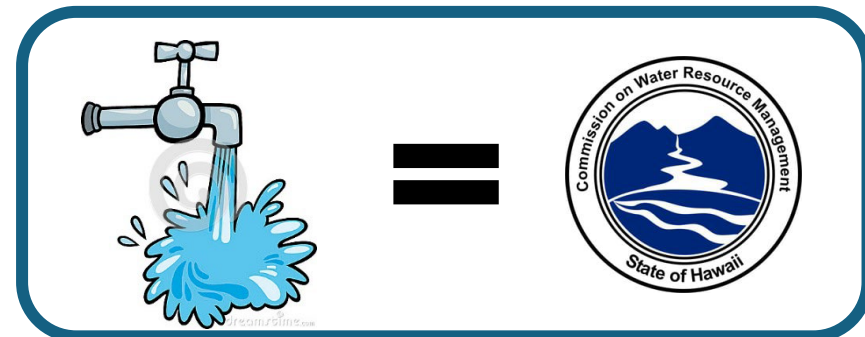
Source



Pipeline



Faucet

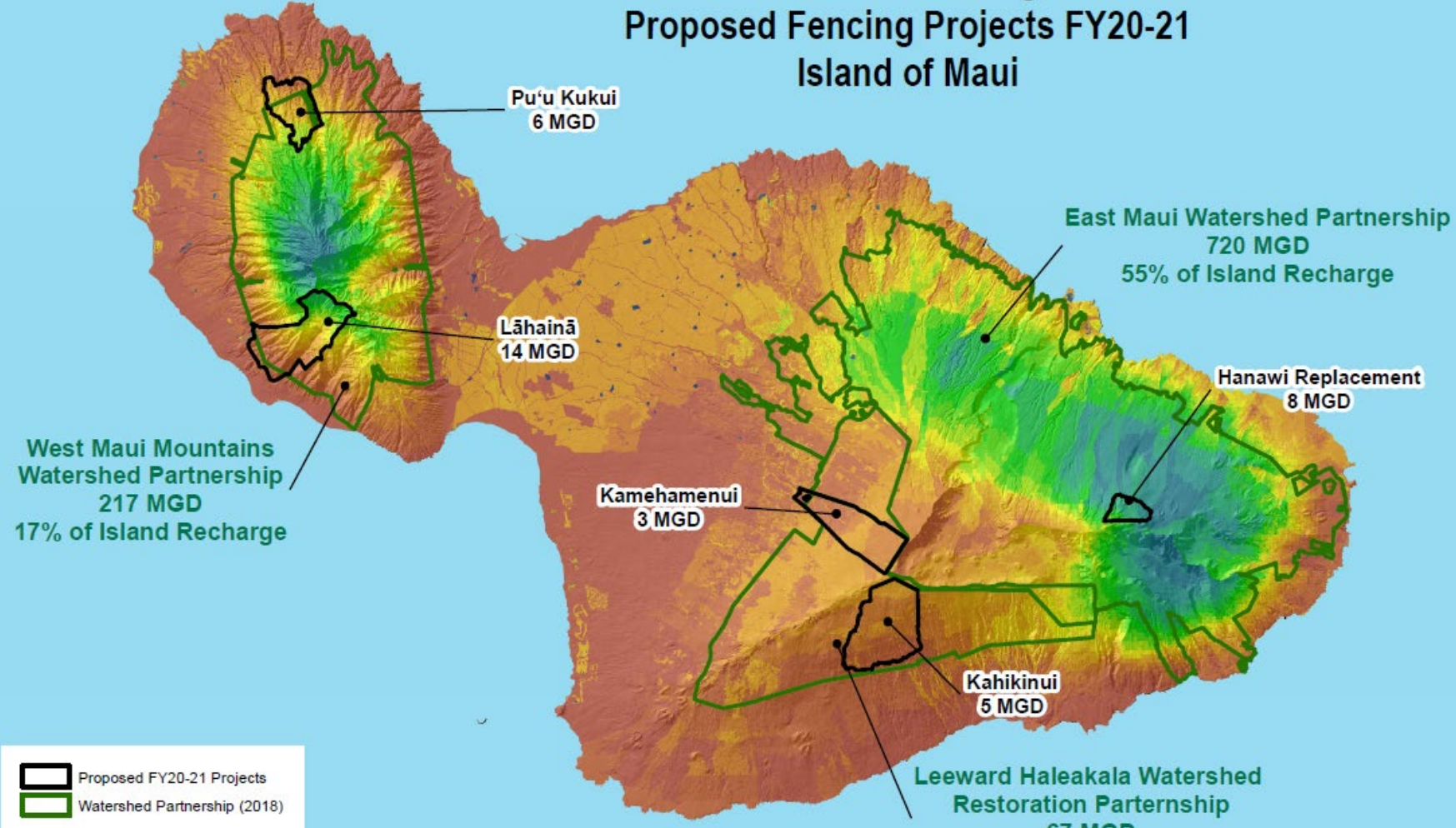


Why is forest protection important to CWRM?

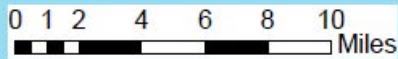
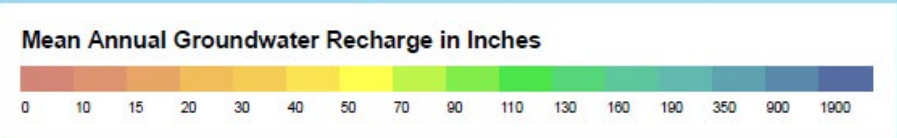
- Ensure current *and* future fresh water supplies
- Reduce conflicts over water
- Provide for public trust uses of water (ex: exercise of traditional and customary practices, DHHL, etc.)
- Help sustain and meet Interim Instream Flow Standards (IIFS)
- Improve water quality by limiting erosion and sediment



Analysis of Groundwater Recharge and Proposed Fencing Projects FY20-21 Island of Maui



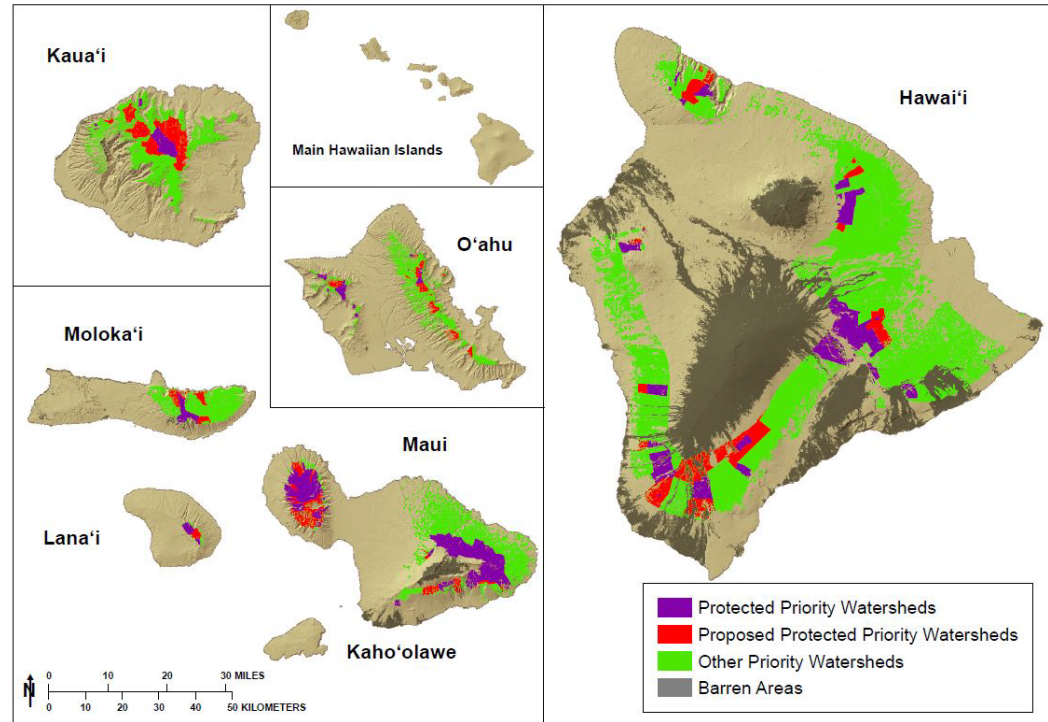
Proposed FY20-21 Projects
 Watershed Partnership (2018)



Izuka, S.K., Engott, J.A., Rotzoll, Kolja, Bassiouni, Maoya, Johnson, A.G., Miller, L.D., and Mair, Alan, 2018, Volcanic aquifers of Hawai'i—Hydrogeology, water budgets, and conceptual models (ver. 2.0, March 2018): U.S. Geological Survey Scientific Investigations Report 2015-5164, 158., <https://doi.org/10.3133/sir20155164>.

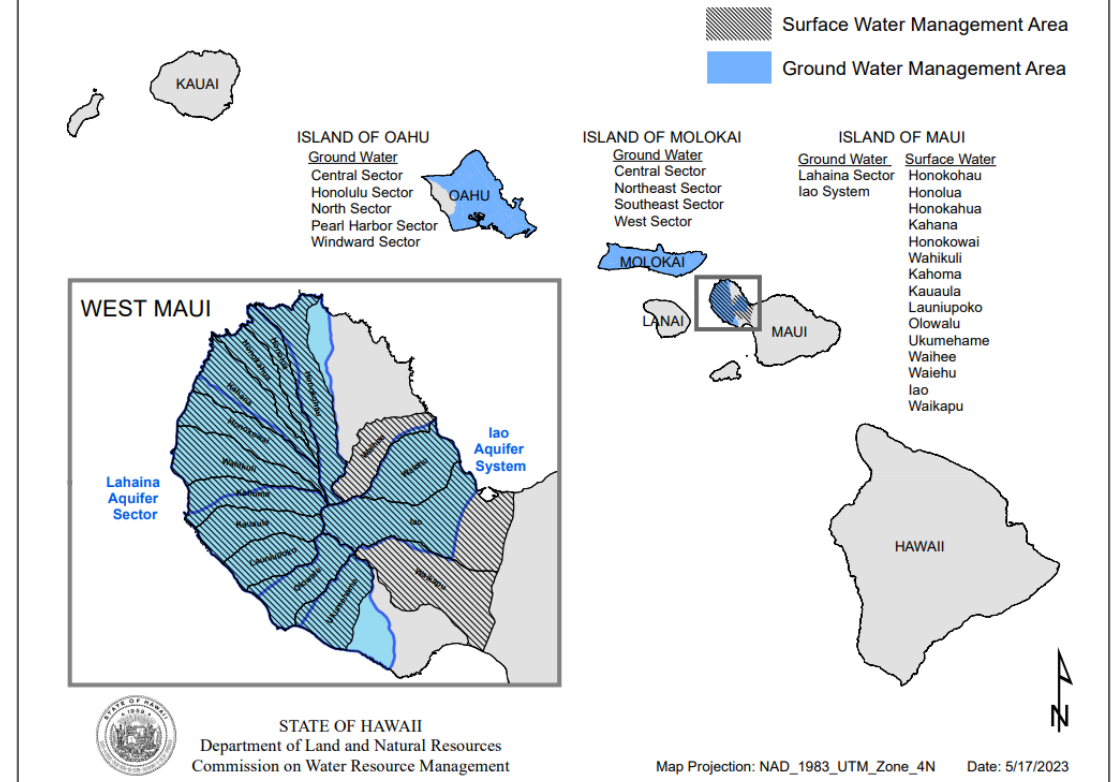
Overlapping priorities?

30x30 Watershed Plan



Features approximate and subject to change. DOFAW 587-4170.

DESIGNATED WATER MANAGEMENT AREAS



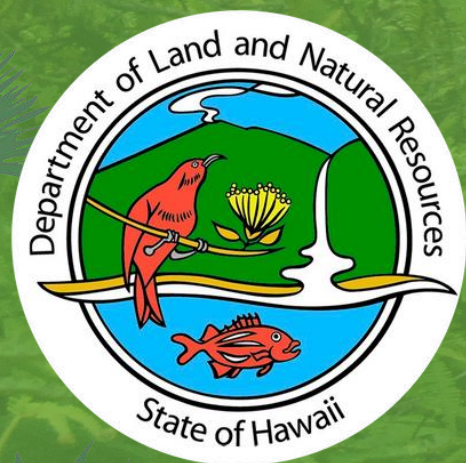
DOFAW priority watersheds vs. CWRM “hot spots”



**EXAMPLES OF WATERSHED PROTECTION
FROM MAUI**

Watershed Management

Overview and examples from Maui



Scott Fretz
Division of Forestry & Wildlife
Maui Branch
February 2025

Division of Forestry and Wildlife

Forestry

Wildlife

Native Ecosystems

Trails and Access



Forestry & Wildlife

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Managed lands ~170,000 acres

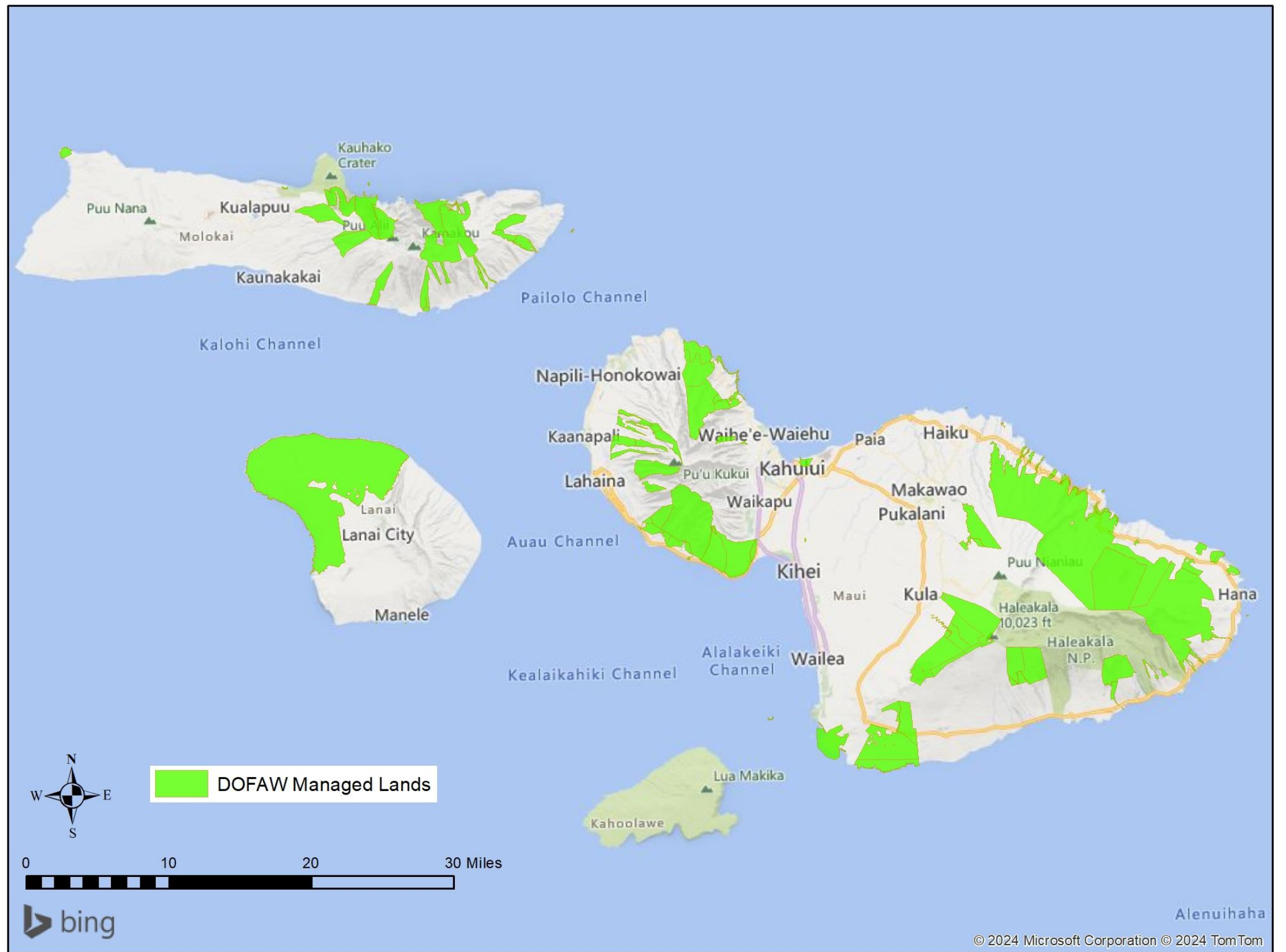
Forest Reserves

Natural Area Reserves

Wildlife Sanctuaries

Game Mgt Areas

Nā Ala Hele Trails

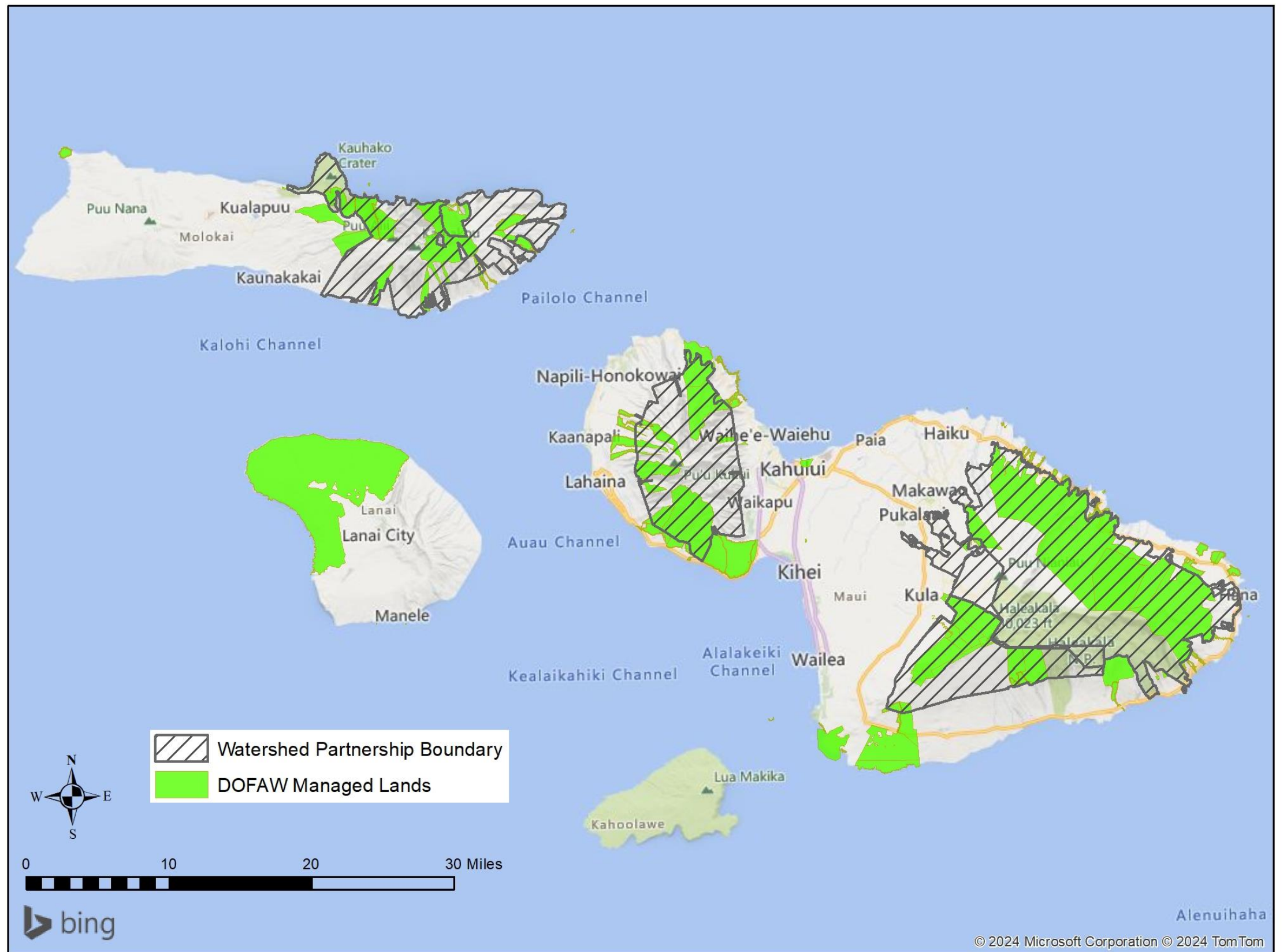


Forestry & Wildlife

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Watershed partnerships

Voluntary partnerships
Private landowners
Connect
Expand
Landscape scale



Forestry & Wildlife

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Management goals

- Watershed protection
- Native ecosystems
- Biodiversity
- Endangered species
- Habitat restoration
- Public hunting
- Public access
- Forest products



Forestry & Wildlife

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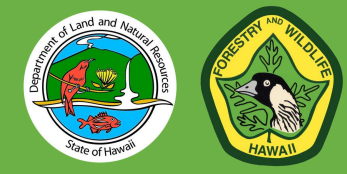
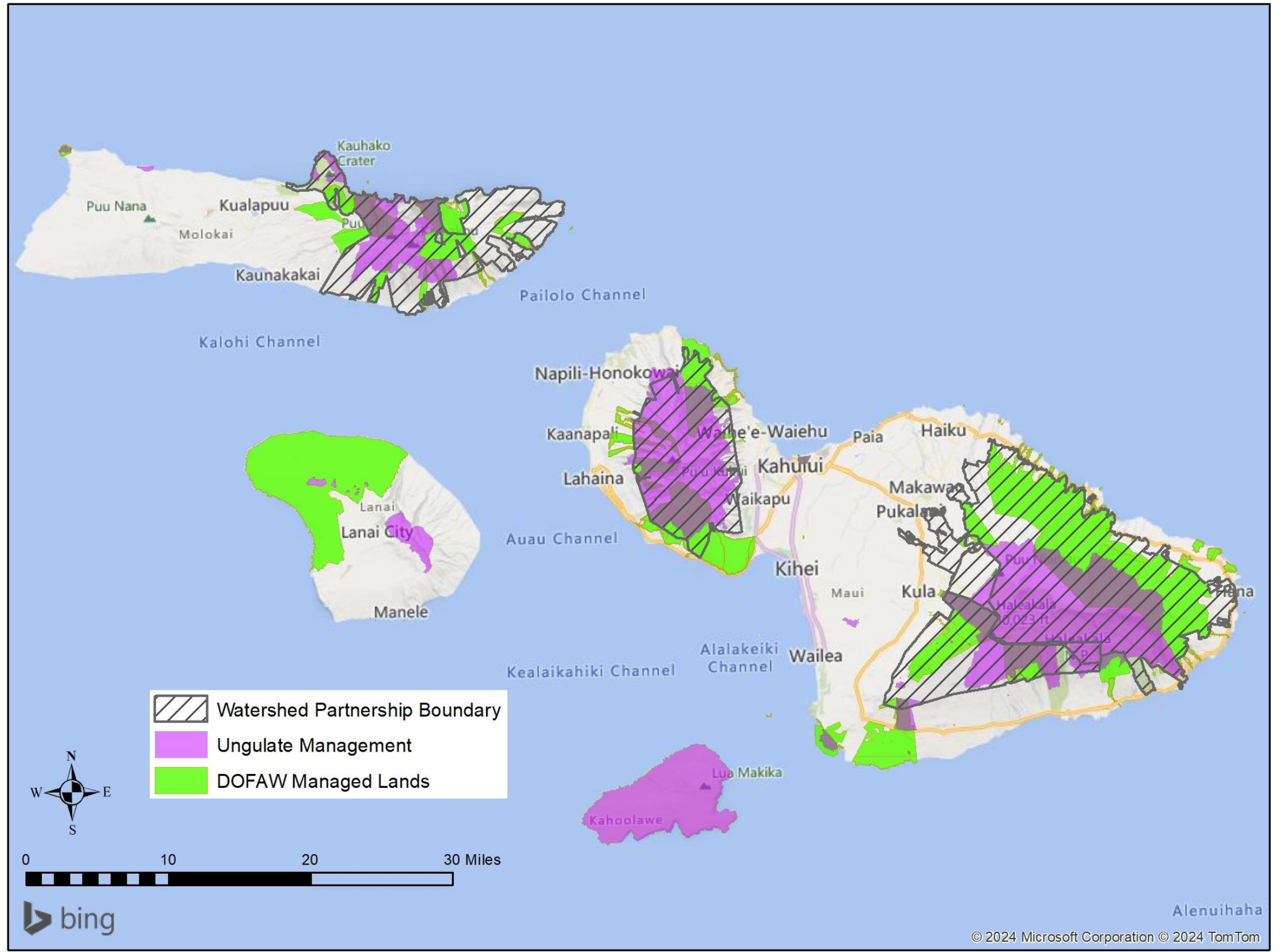
Methods

- Invasive species management
- Fencing, ungulate control
- Weed control
- Endangered species propagation
- Surveys and monitoring
- Wildland firefighting
- Predator and pest suppression
- Disease/pathogen surveillance
- Reforestation



30 x 30 Initiative

Effective management
Priority watersheds
Statewide on track
Maui ahead of targets
>50% x 2030



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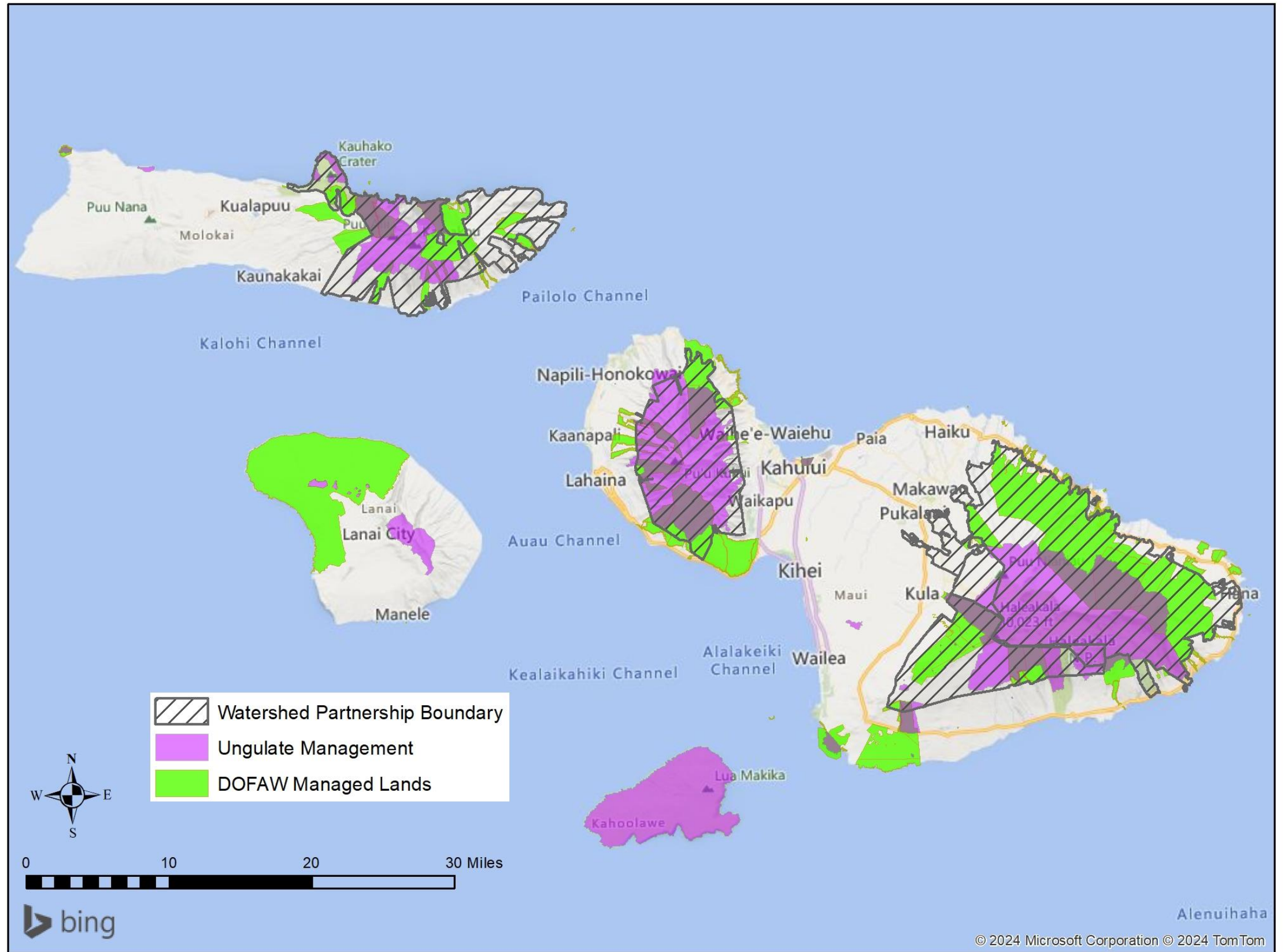
Mauka to makai

Forest Reserves est. 1903

Native ecosystems

Historical

Cost effective



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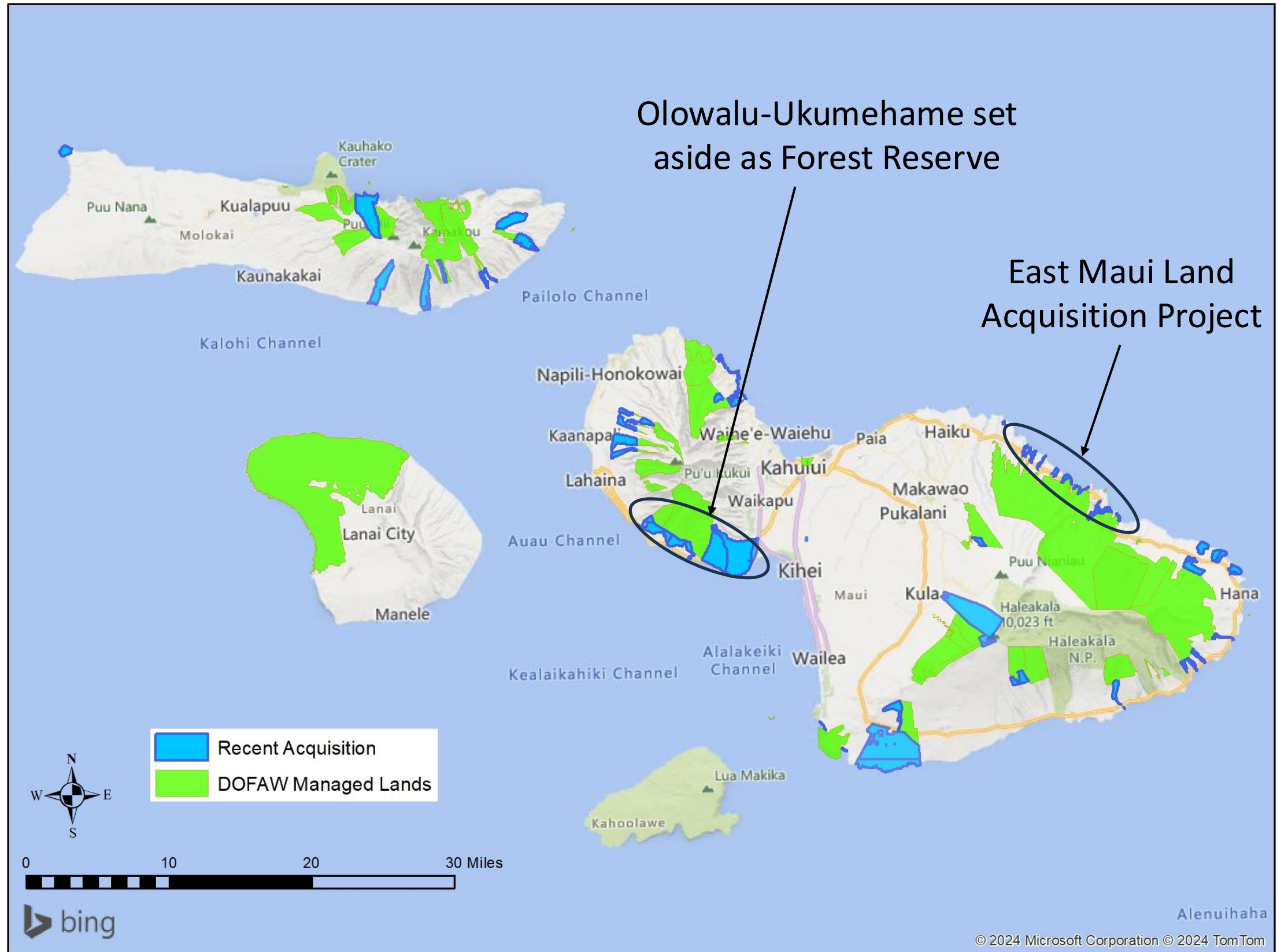
Challenges

- Hooved mammals: pigs, goats, deer, cattle
- Invasive plants: grasses, weeds
- Fire and fuels
- Erosion and sedimentation
- Impacts to marine ecosystems
- Predators: rats, mongoose, J. chameleons
- Pests: slugs, snails



Land acquisition

Set aside
Purchase
Donation
>80 parcels
~ 20,000 acres



Forestry & Wildlife

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Ko'olau Forest Reserve

Est 1905, >38,700 ac.

2 Moku, 8 Ahupua'a

30 perennial streams

Native ecosystems

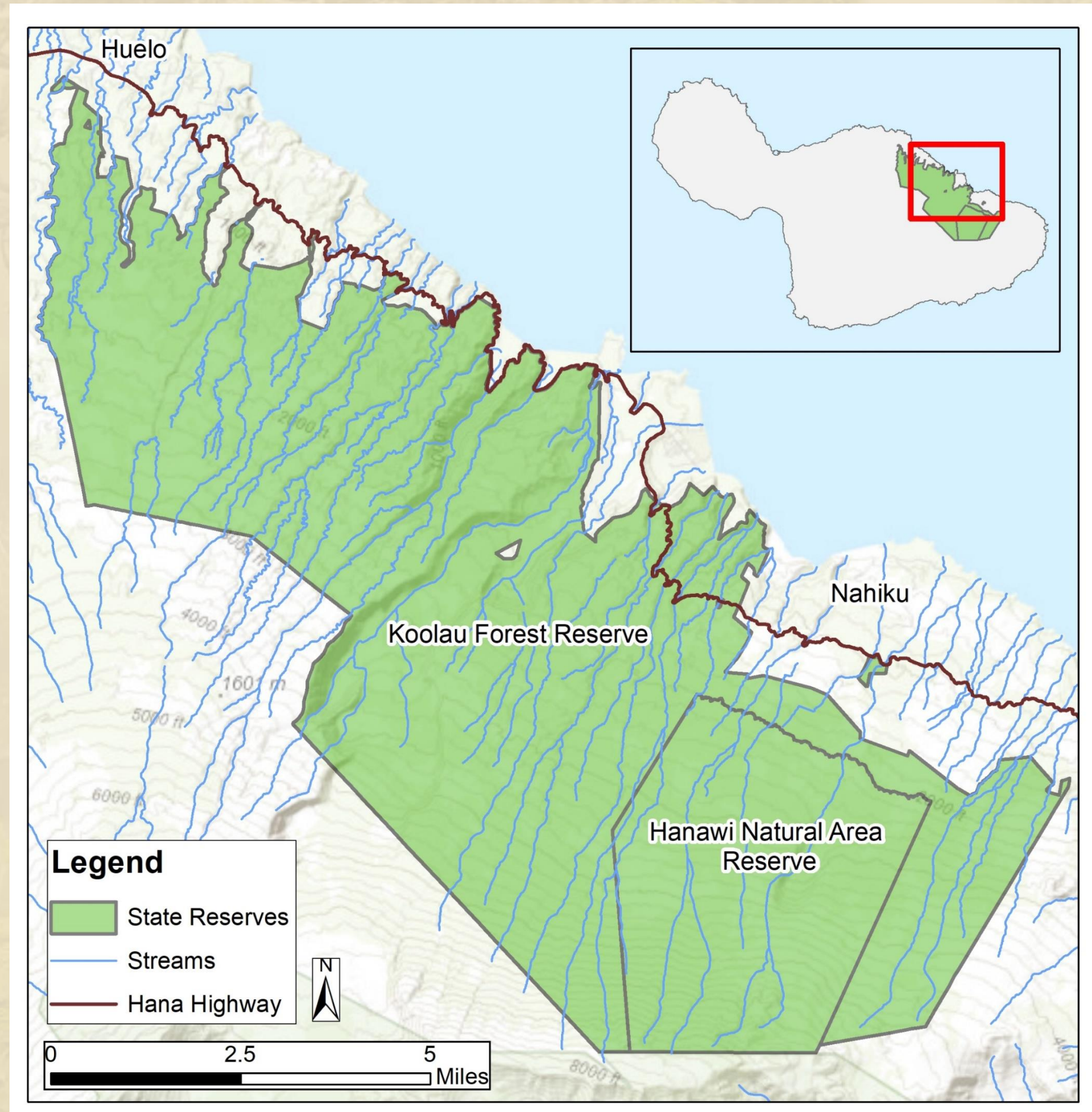
Watersheds

>100 endangered species

Subsistence, gathering,

TCP, hunting, outdoor

recreation

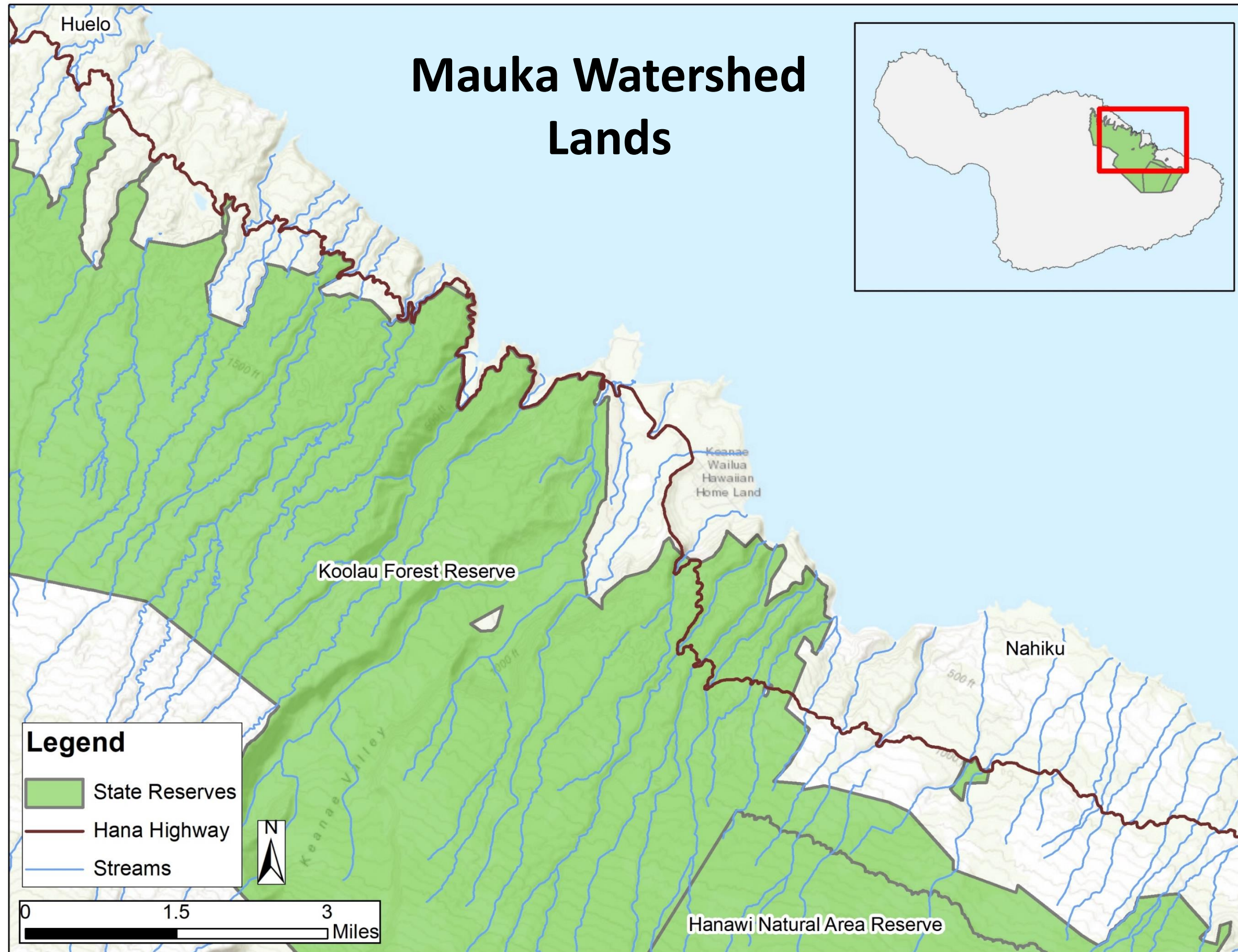
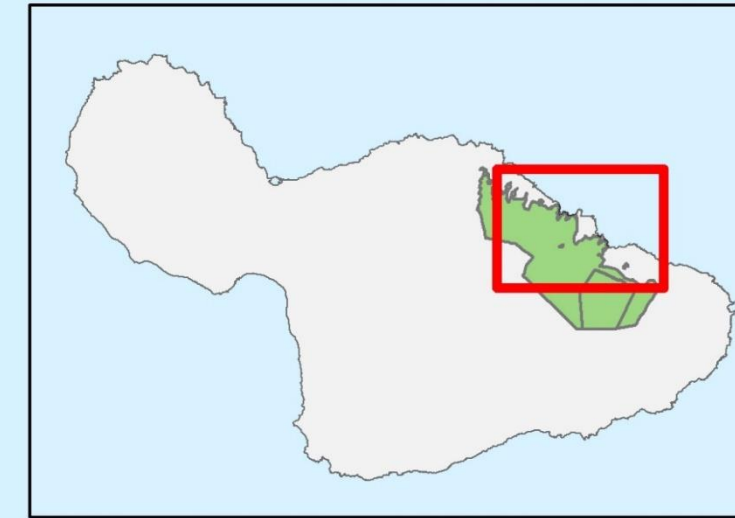


Forestry & Wildlife

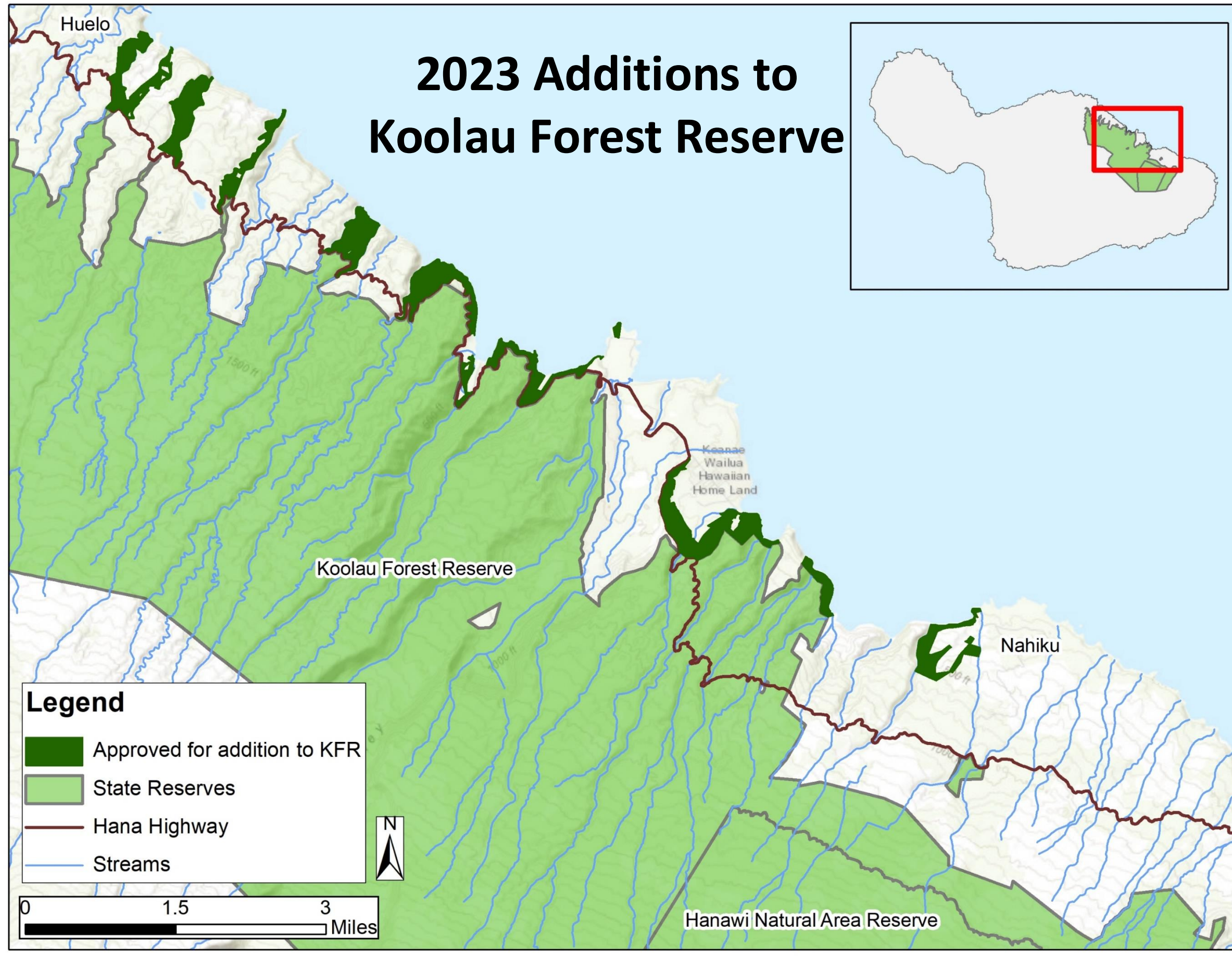
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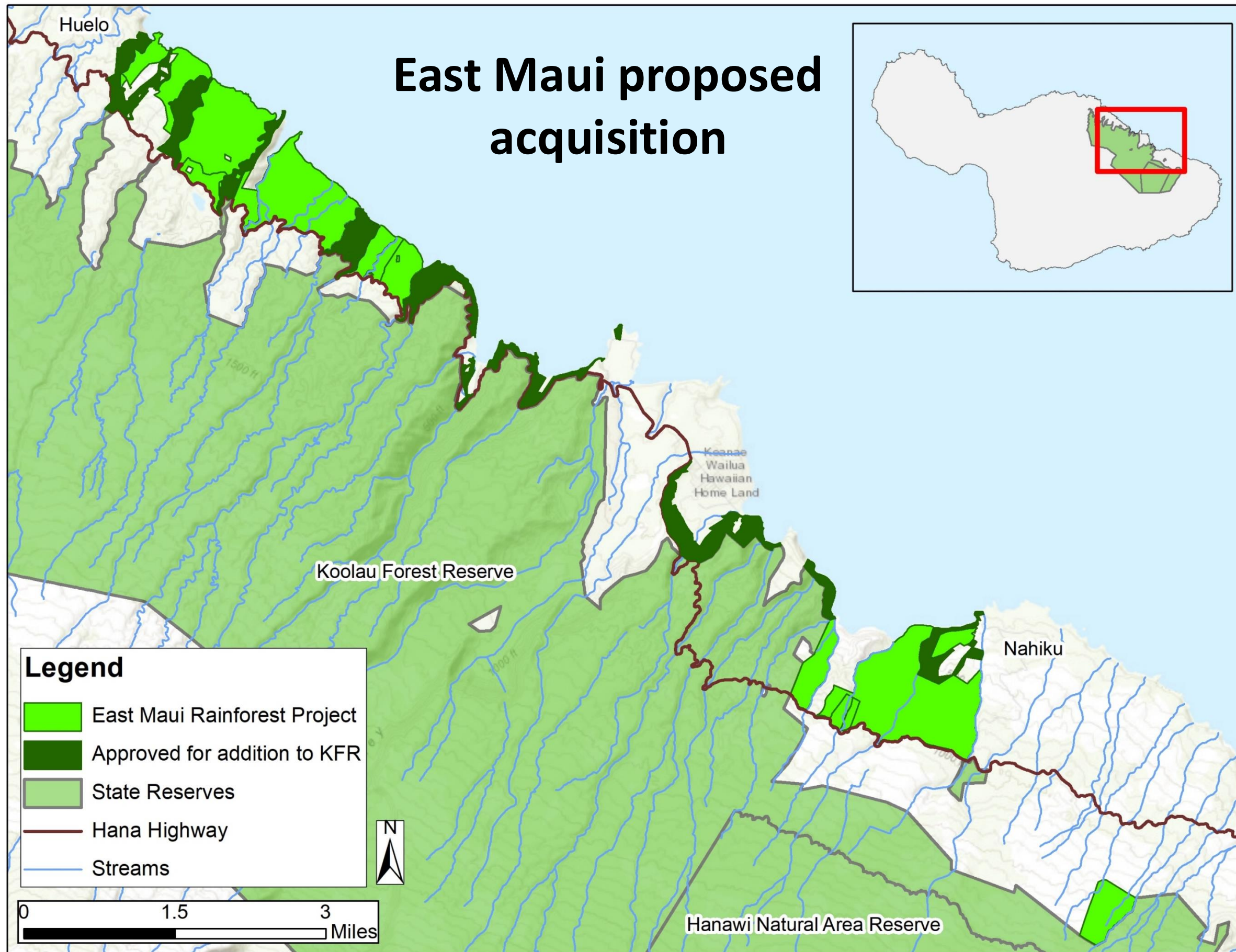
Mauka Watershed Lands



2023 Additions to Koolau Forest Reserve



East Maui proposed acquisition



High Threat of Conversion

- Landowner plans to sell
- Supportive of state purchase but want to sell on a short timeline.
- High threat of subdivision & development



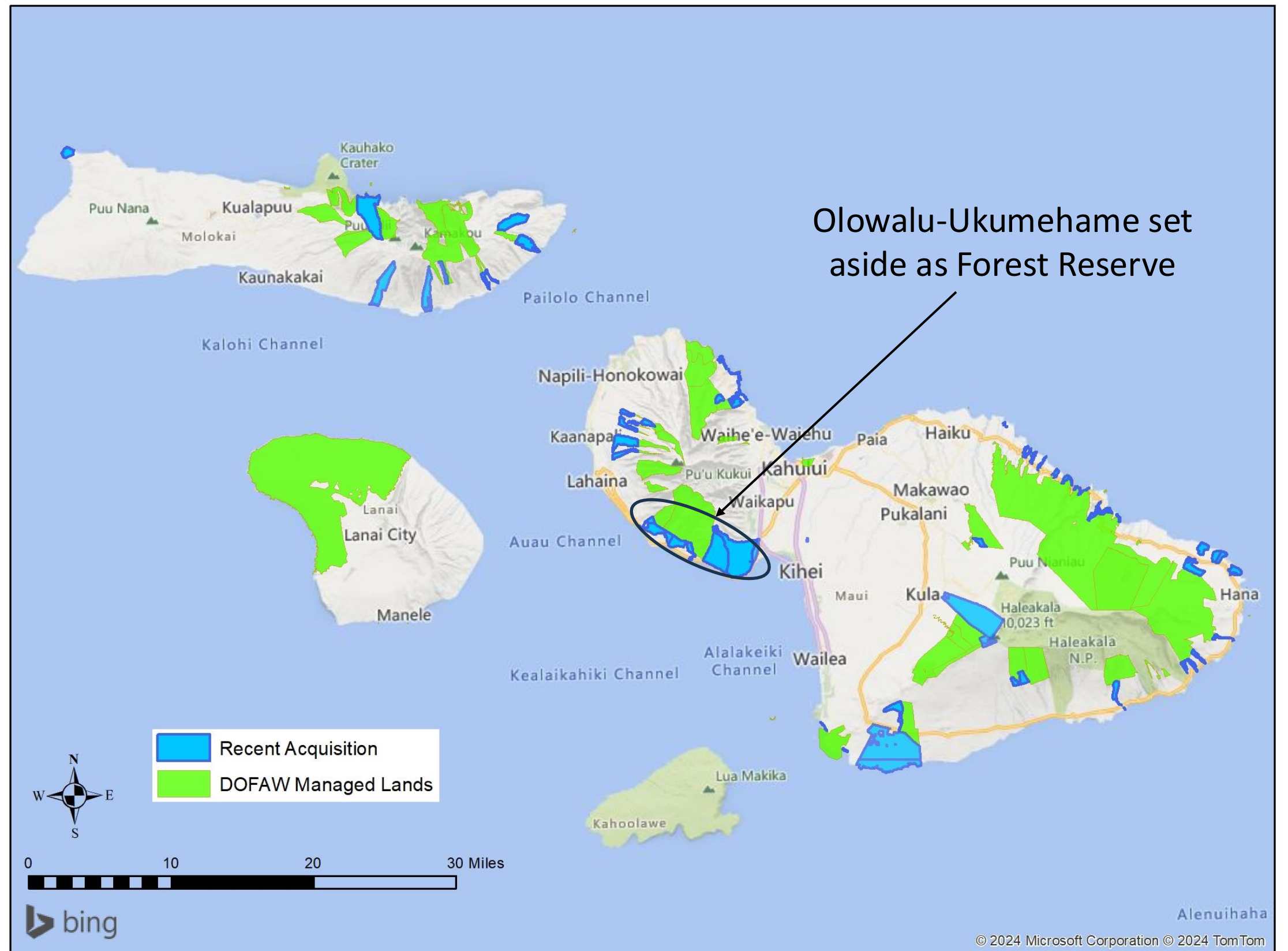
Project objectives

- Purchase or receive by donation fee title for 20 parcels
- Place the lands into the public trust
- Designate as forest reserve
- Manage for public benefits
- Protect and restore natural resources
- Improve connectivity of managed lands and streams mauka to makai
- Extend network of public trust lands



Land acquisition

Set aside to Forest Reserve in 2023



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Olowalu- Ukumehame

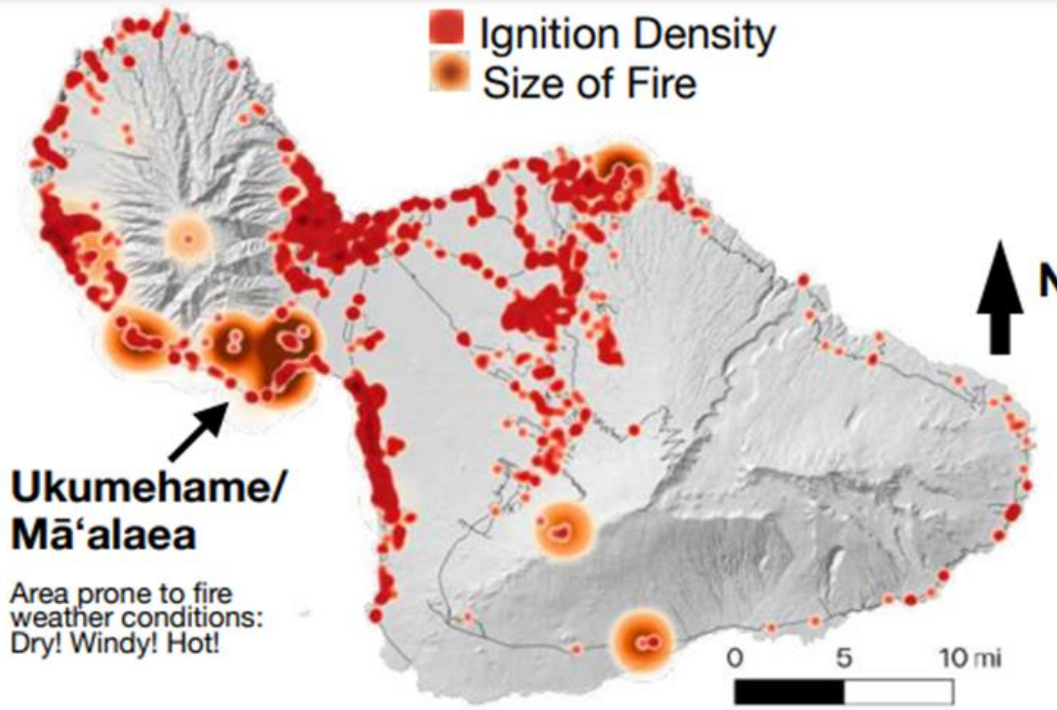
- Upper watersheds managed
- Coastal and lowlands unencumbered
- Dry areas, highly modified
- Threats and degradation



Primary threats

- Feral ungulates
- Habitat destruction
- Invasive species
- Fire and fuel cycles
- Erosion and sedimentation

Maui Fire History 2002-2012



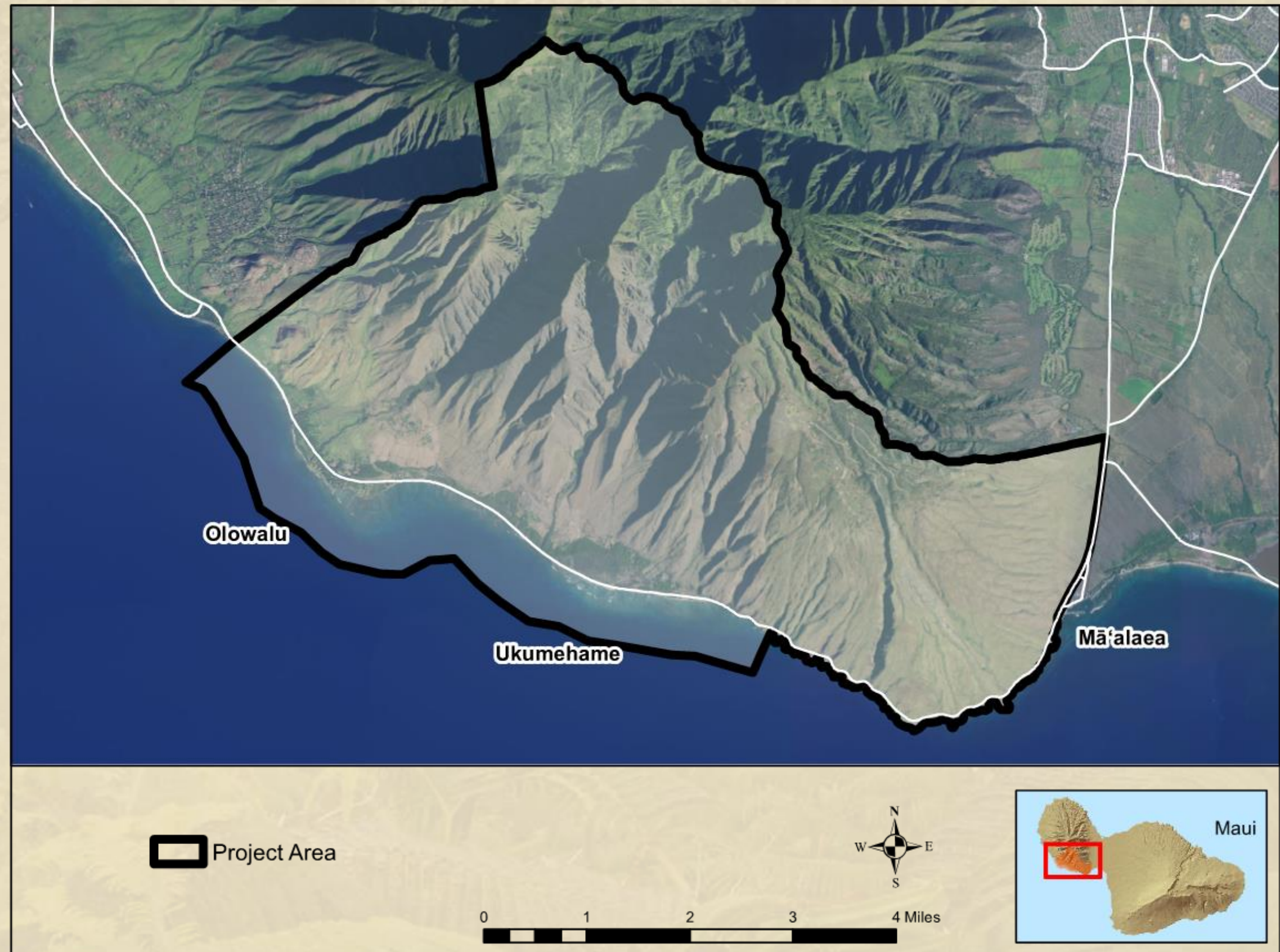
Goals

- Restore native ecosystems
- Break fire-fuel cycle
- Enhance watershed and wetland function
- Increase landscape and coral reef resilience
-



Strategy

- Comprehensive
- Integrated
- Summit to reef
- Partnerships
 - Terrestrial
 - Marine
 - Community
 - Agency
 - Landowner



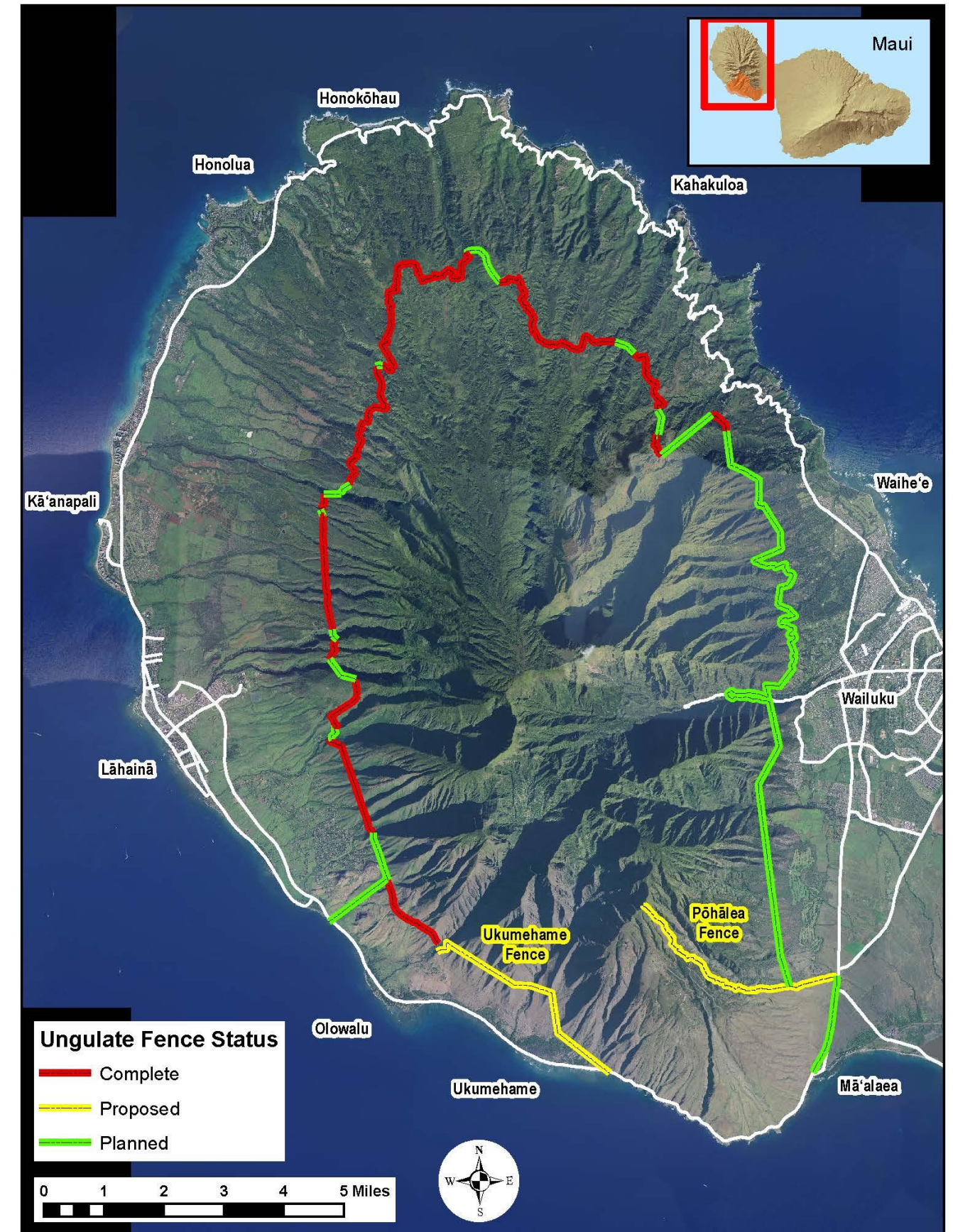
Objectives

- Fencing ungulate control
- Upland habitat restoration
- Wetland and riparian restoration
- Dip tanks
- Fire breaks, green breaks
- Sediment detention
- Marine ecosystem monitoring



Objectives

Fencing ungulate control

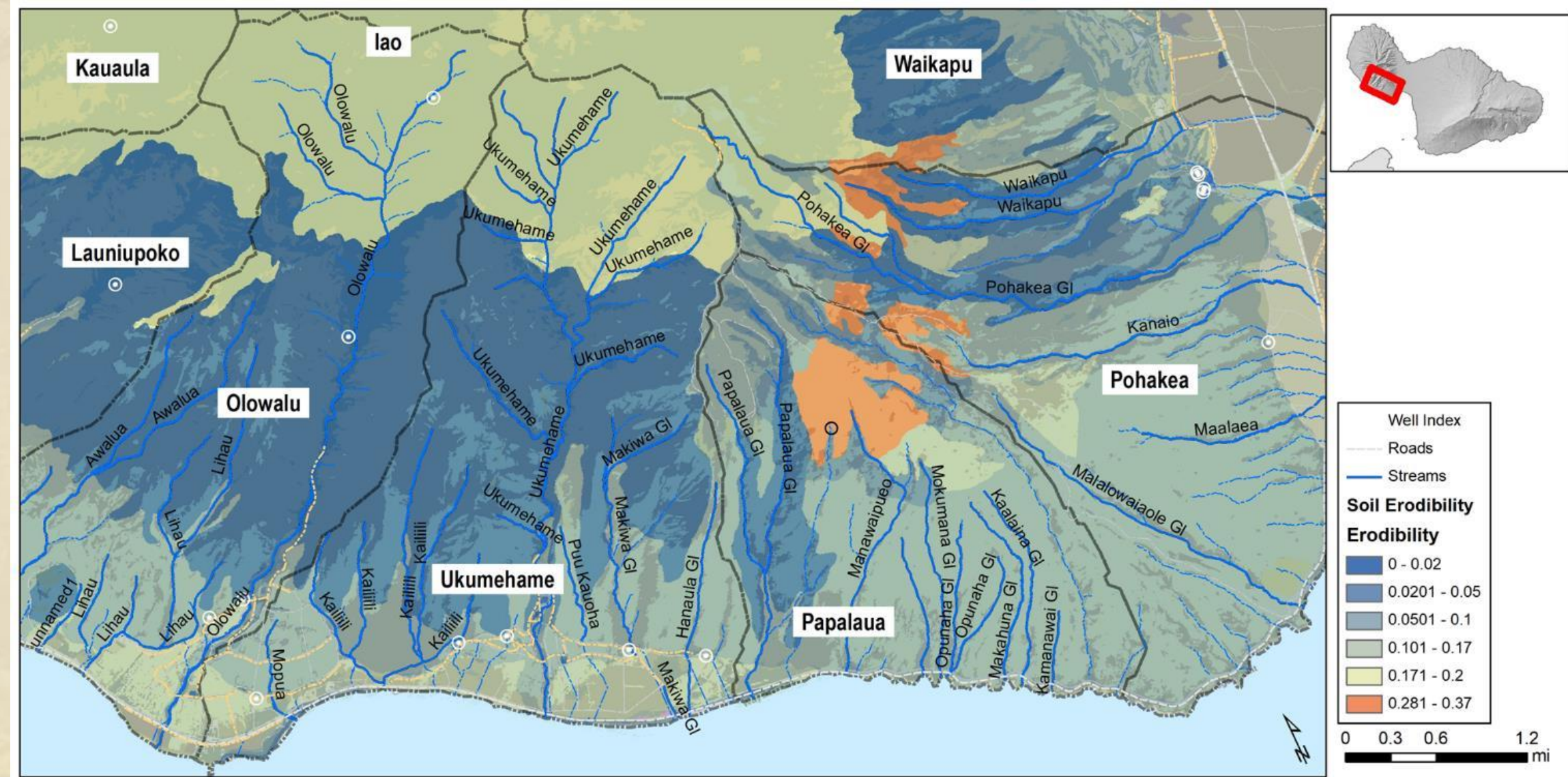


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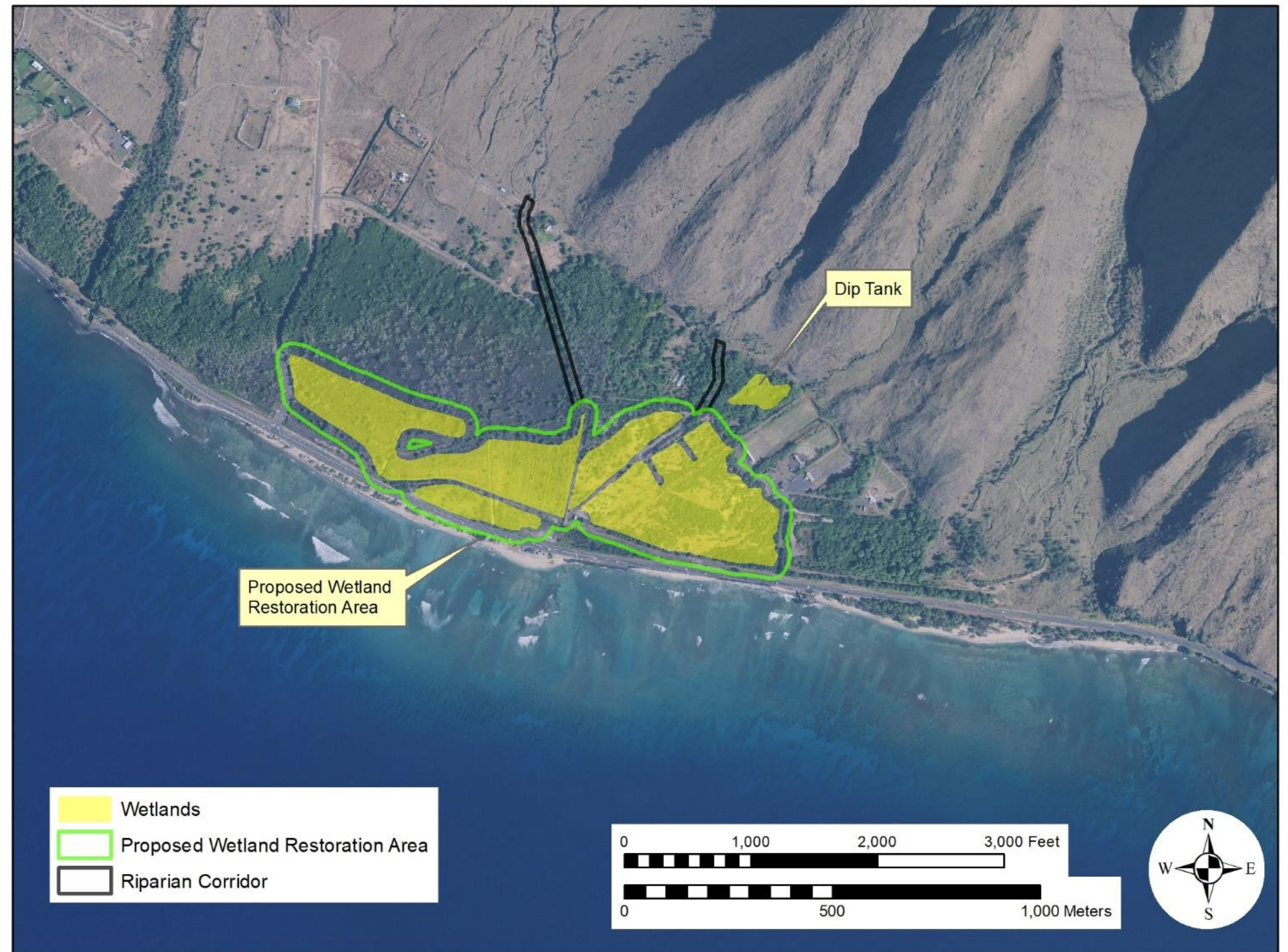
Objectives

- Upland forest habitat restoration
- Soil stabilization



Objectives

- Wetland habitat restoration
- Capture soils
- Filter and store water
- Recharge aquifers



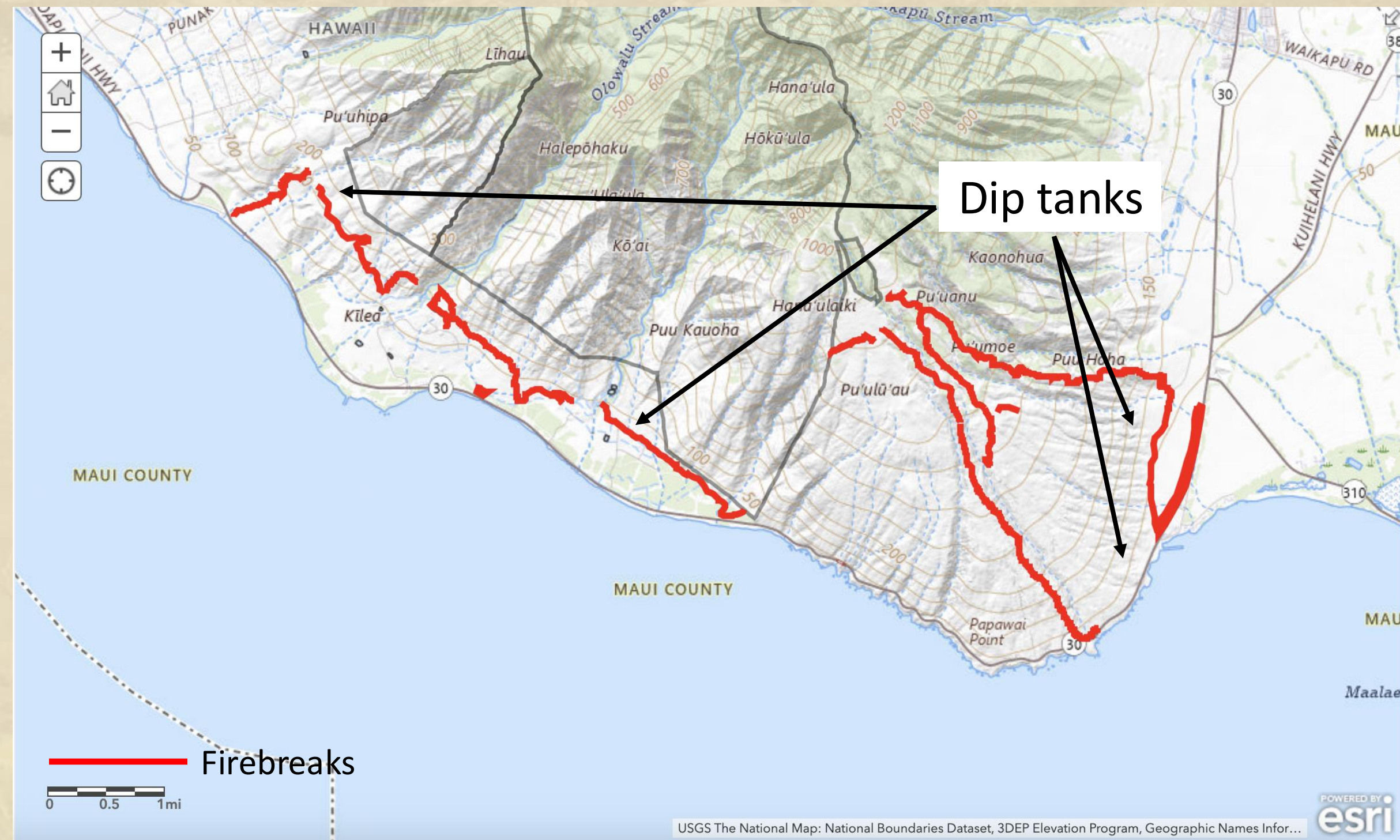
Objectives

- Riparian habitat restoration
- Ukumehame and Kipuka Olowalu
- Stabilize soils
- Green breaks for fire prevention



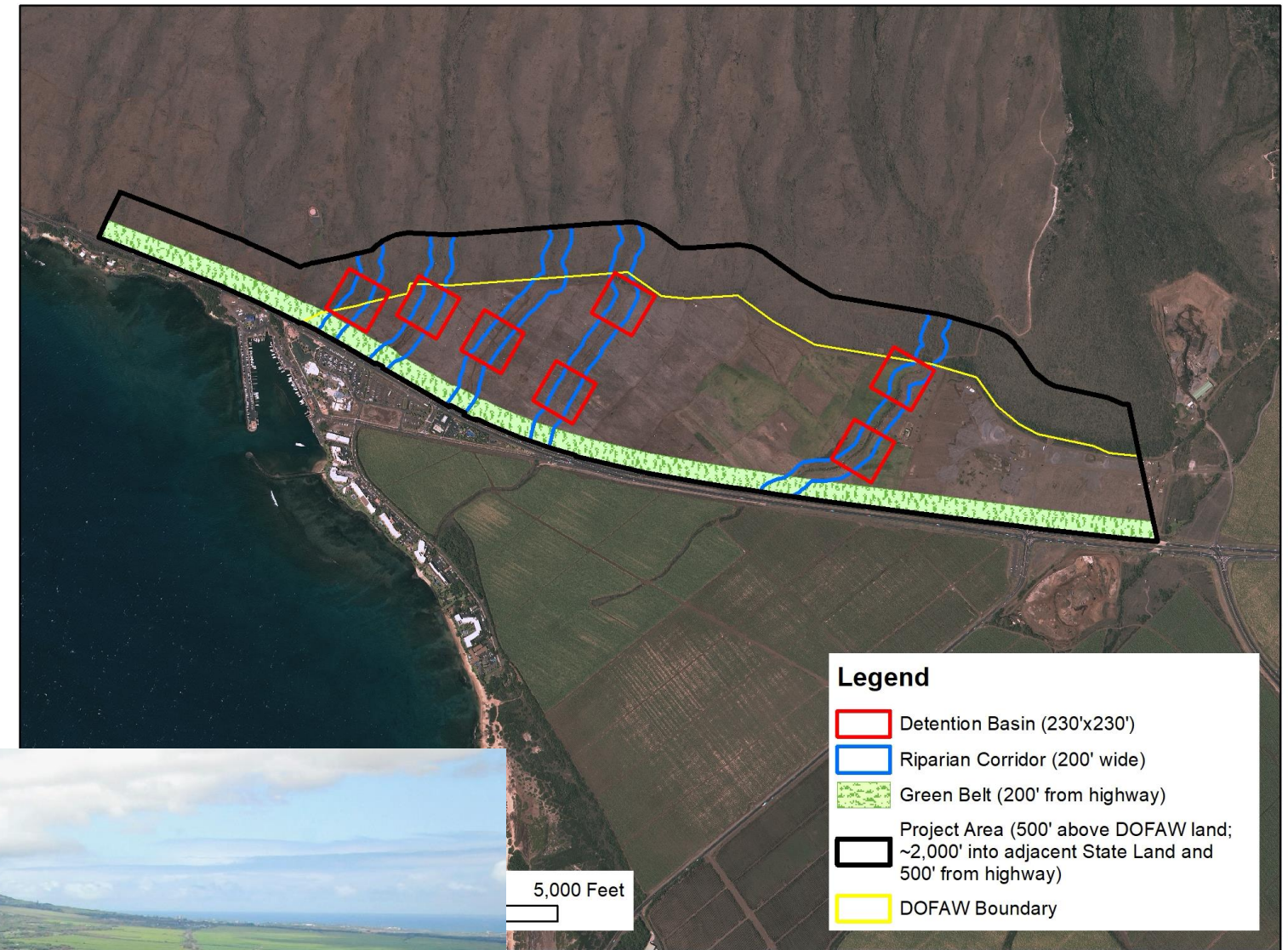
Objectives

- Fire prevention and suppression
- Fire breaks
- Green breaks
- Dip tanks



Objectives

- Sediment detention
- Capture and removal
- Structural design
- Prevent sediments from entering the ocean



Mahalo!

