


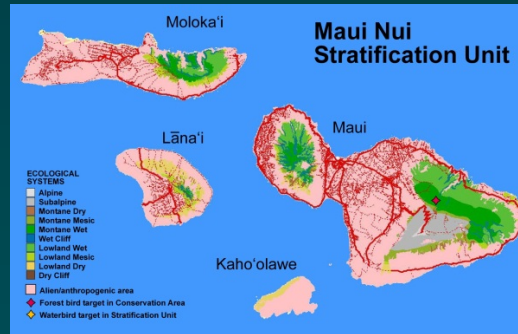
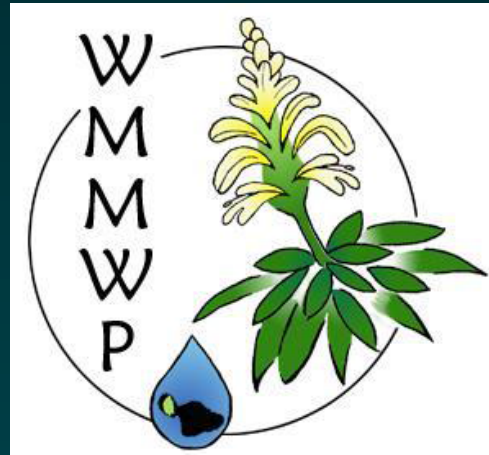
Maui Nui's Watershed Partnerships



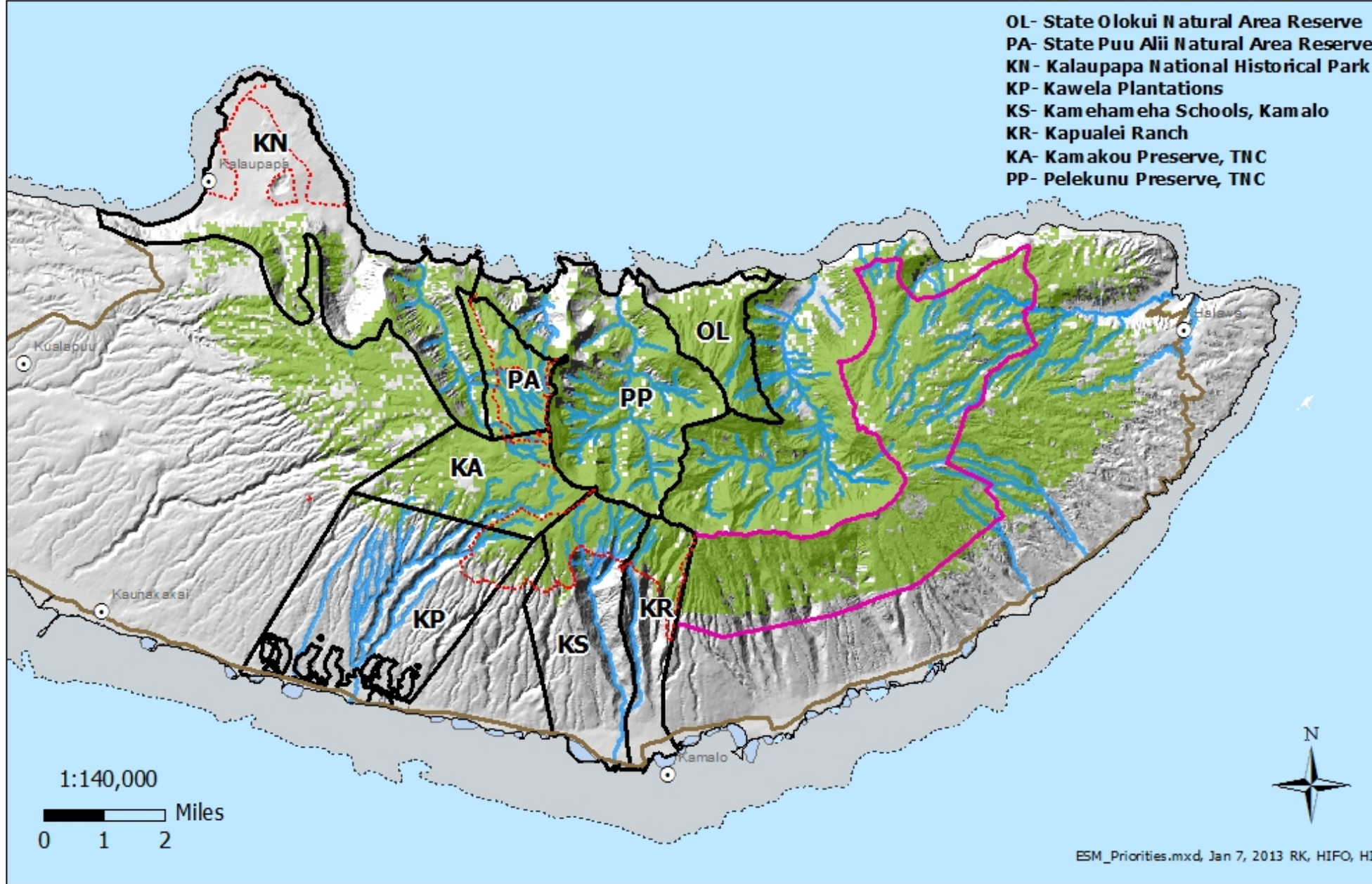
**Moloka'i
Rural
Empowerment
Zone
Application**

Submitted to:
United States Department of Agriculture
October 9, 1998

by
The Community of Moloka'i



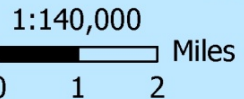
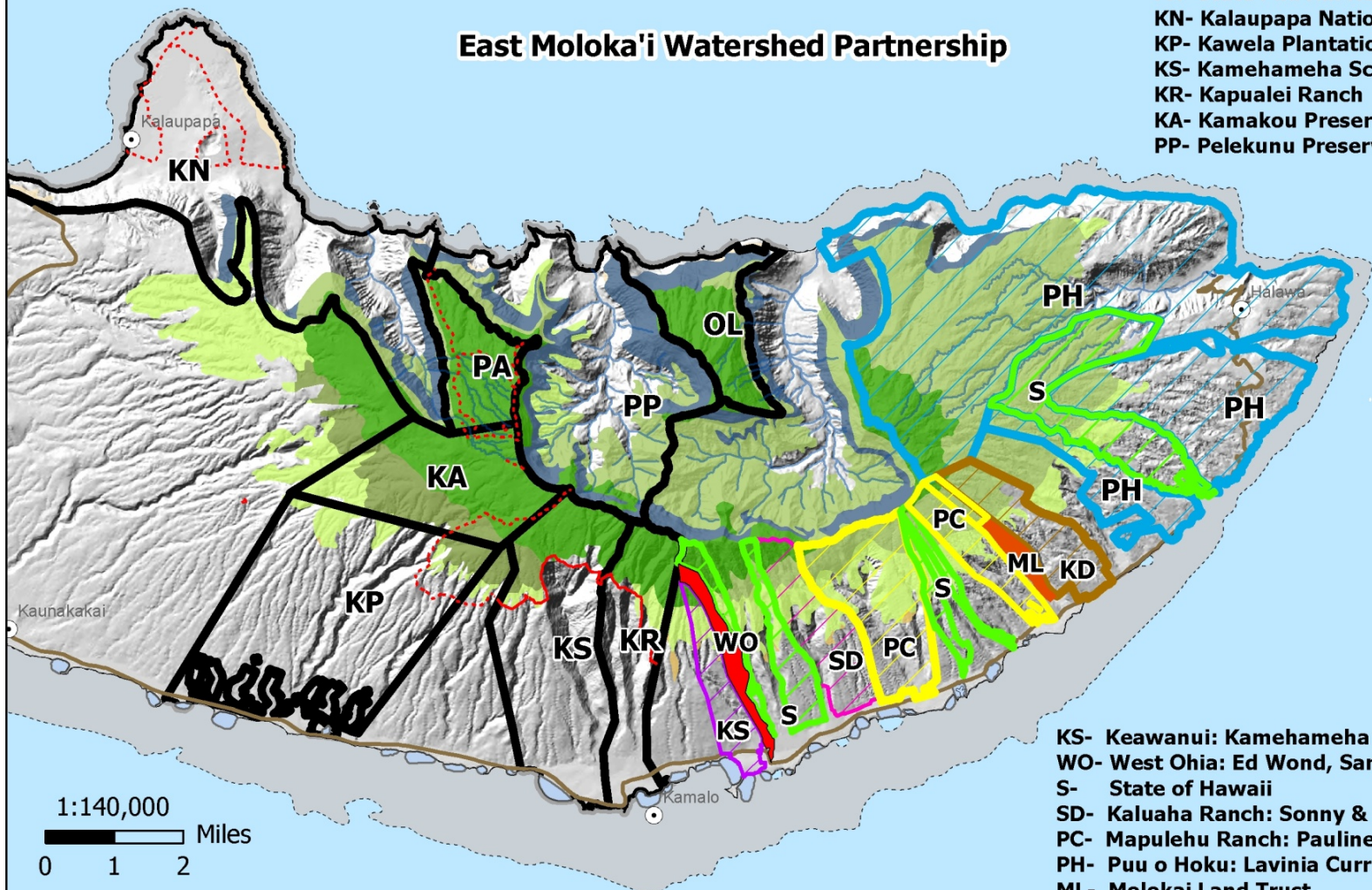
**Informational Briefing: January 11, 2011
Senate Committee on Energy & Environment**



- ⋯ Existing Fences
- Major Roads
- ~ Perennial Streams
- 2012 EMoWP: 30,000 Acres
- (New) Potential Partners: 8,200 Acres
- Watershed Protection Priority I and II Areas
- Marine Systems

East Moloka'i Watershed Partnership

- OL- State Olokui Natural Area Reserve
- PA- State Puu Alii Natural Area Reserve
- KN- Kalaupapa National Historical Park
- KP- Kawela Plantations
- KS- Kamehameha Schools, Kamalo
- KR- Kapualei Ranch
- KA- Kamakou Preserve, TNC
- PP- Pelekunu Preserve, TNC



- KS- Keawanui: Kamehameha Schools
- WO- West Ohia: Ed Wond, Sam & Leimomi Pedro
- S- State of Hawaii
- SD- Kaluaha Ranch: Sonny & Diane Dunnam
- PC- Mapulehu Ranch: Pauline Castanera
- PH- Puu o Hoku: Lavinia Currier
- ML- Molokai Land Trust
- KD- Kainalu Ranch: Kip Dunbar

	Part ownership Castanera selection selection	Target Communities		Montane Mesic Forest	
	Major Roads		Coastal		Montane Wet Forest
	Fence		Lowland Dry Ecosystems		Wet Cliff
	Perennial Streams		Lowland Mesic Forest & Shrubland		
	Marine Systems		Lowland Wet Forest & Shrubland		
	2011 EMoWP				

Molokai Understory Monitoring (MUM) Condition, Transect 1

Legend

Structures

- Trails
- 4WD Roads
- ++++ Fences

Vegetation Types

- Wet Forest
- ▲ Mesic Forest
- Mesic Shrubland

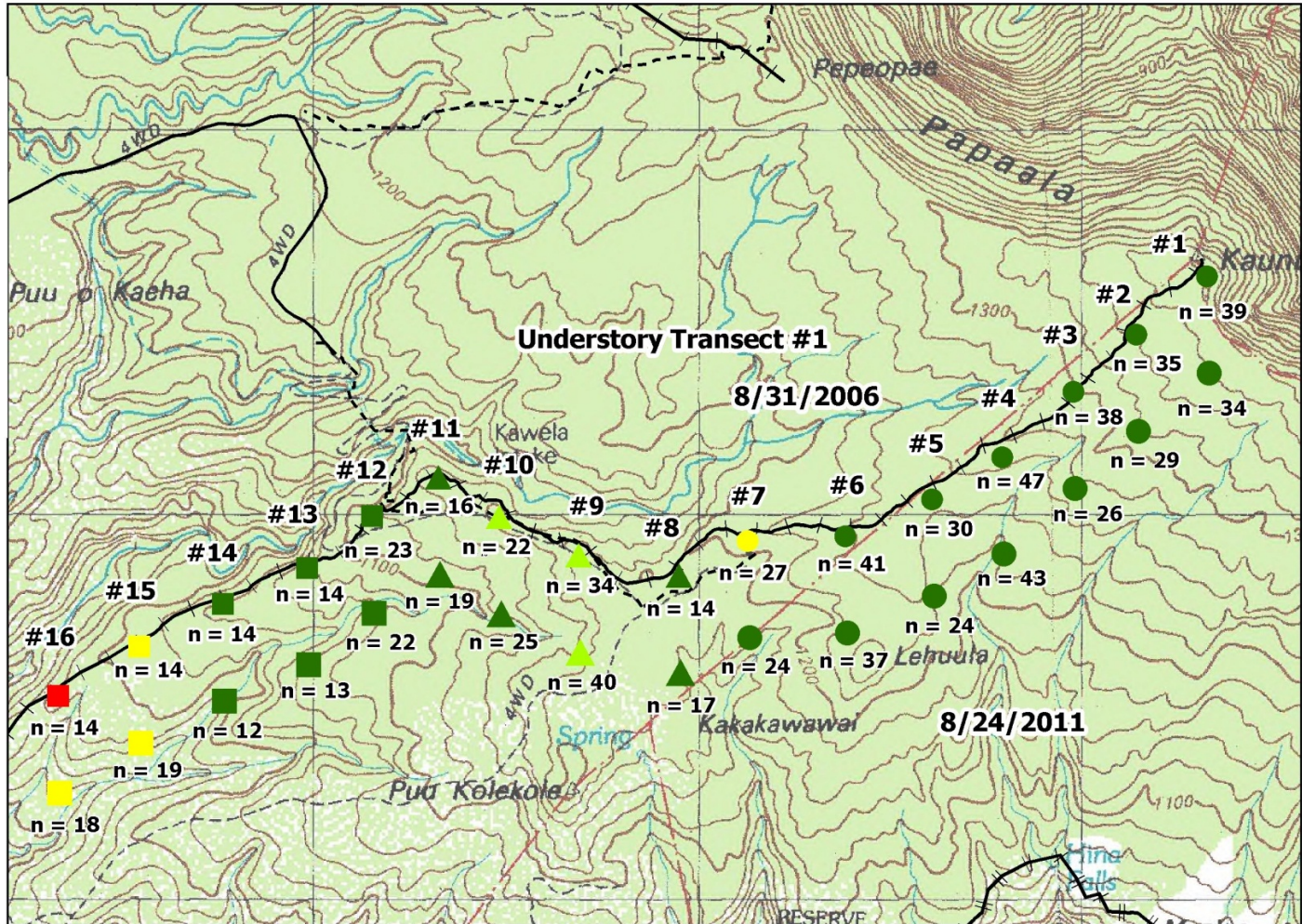
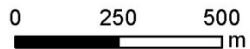
n = # native plant taxa

Created: Sept 19, 2011
 Map Scale: 1:16,000
 Data Sources: TNC Molokai
 File: UnderTR1.mxd



Map Scale
1:16,000

1 centimeter
equals 160 m



Island of Molokai



Area of Interest



INTEGRITY CRITERIA FOR TERRESTRIAL VEGETATION COMMUNITIES				
Vegetation Rank	Very Good	Good	Fair	Poor
Understory Condition	> 90% of existing cover is native	90% - 75% of existing cover is native	74% - 50% of existing cover is native	< 50% of existing cover is native
Cover composition of native plants below canopy layer	> 90% of existing cover is native	90% - 75% of existing cover is native	74% - 50% of existing cover is native	< 50% of existing cover is native

Very Good Native Hawaiian Rainforest

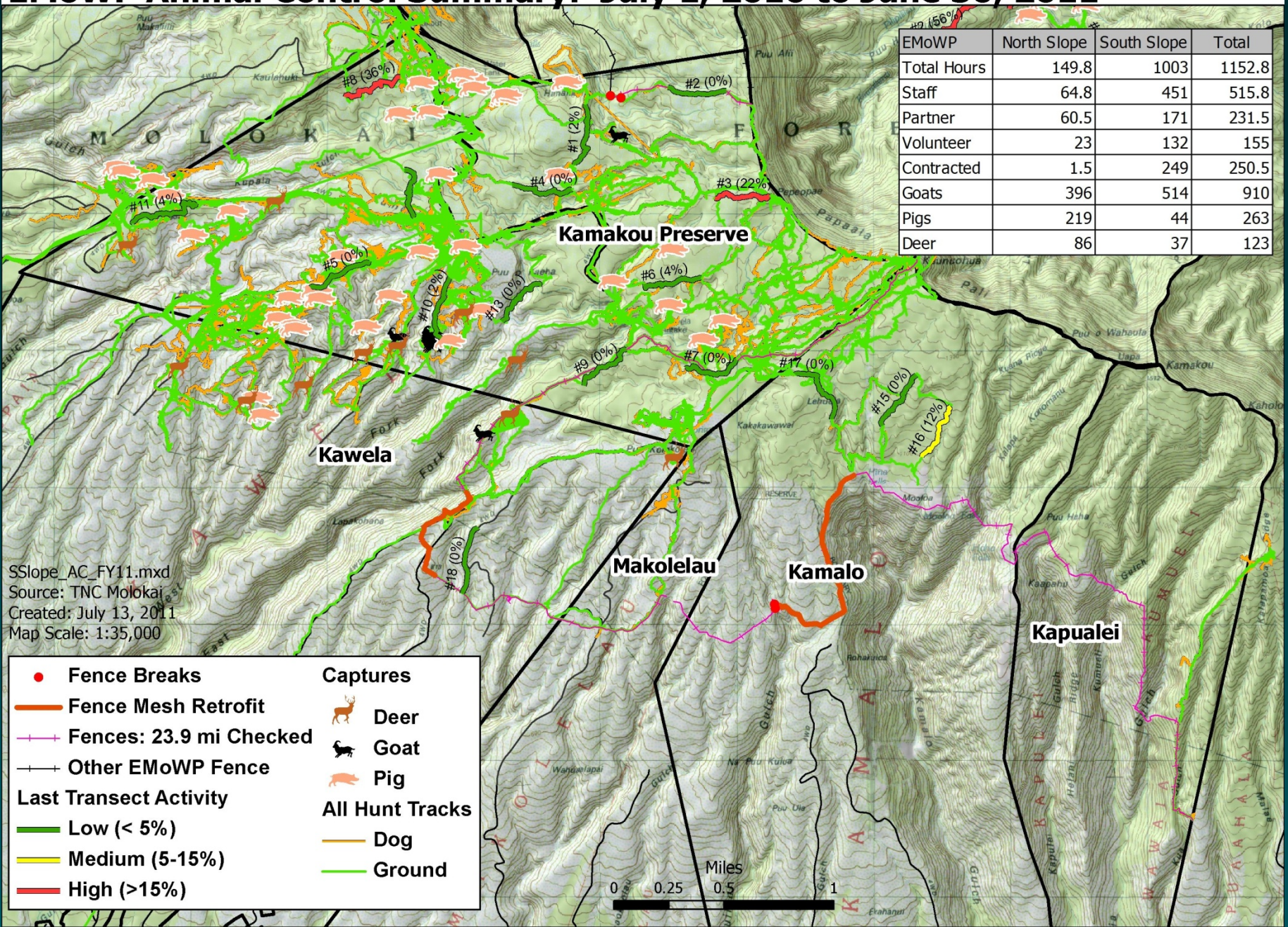


Control and or Eliminate Invasive Species-Hunt/Weed Sweeps



EMoWP Animal Control Summary: July 1, 2010 to June 30, 2011

EMoWP	North Slope	South Slope	Total
Total Hours	149.8	1003	1152.8
Staff	64.8	451	515.8
Partner	60.5	171	231.5
Volunteer	23	132	155
Contracted	1.5	249	250.5
Goats	396	514	910
Pigs	219	44	263
Deer	86	37	123



- | | |
|-------------------------------|------------------------|
| ● Fence Breaks | Captures |
| — Fence Mesh Retrofit | Deer |
| — Fences: 23.9 mi Checked | Goat |
| — Other EMoWP Fence | Pig |
| Last Transect Activity | All Hunt Tracks |
| — Low (< 5%) | — Dog |
| — Medium (5-15%) | — Ground |
| — High (>15%) | |



WMMWP Overview

- Formed in 1998 in the Lahaina & Wailuku Districts

- 13 Public and Private Partners

- 47,322 acres

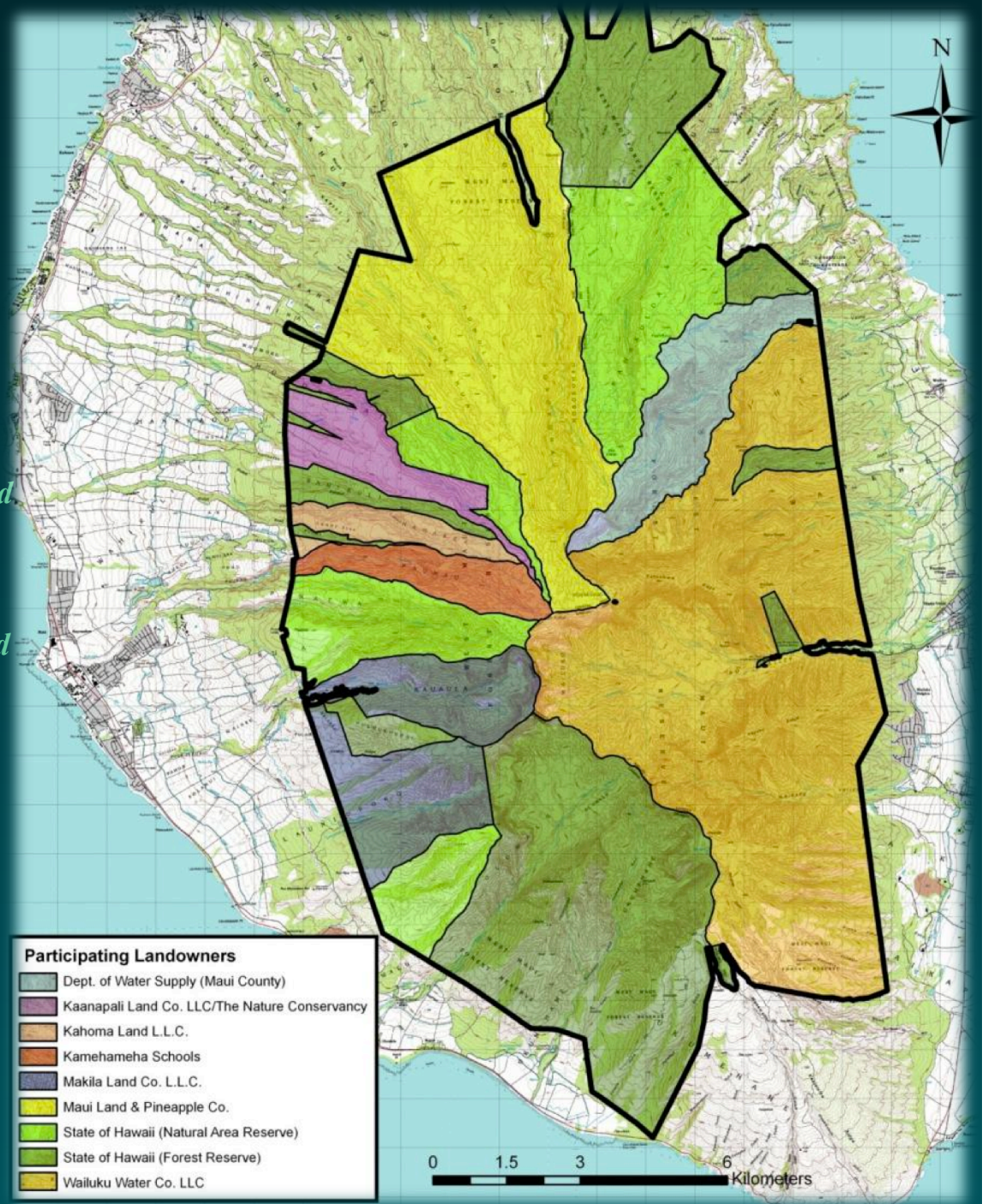
- Goals:

- Protect Essential Recharge Area

- 77% of Dept. of Water Supply water provided by its aquifers & streams,

- Protect Ecological Resources

- 70% Native Plant Dominated, 170 Endangered & Rare Elements

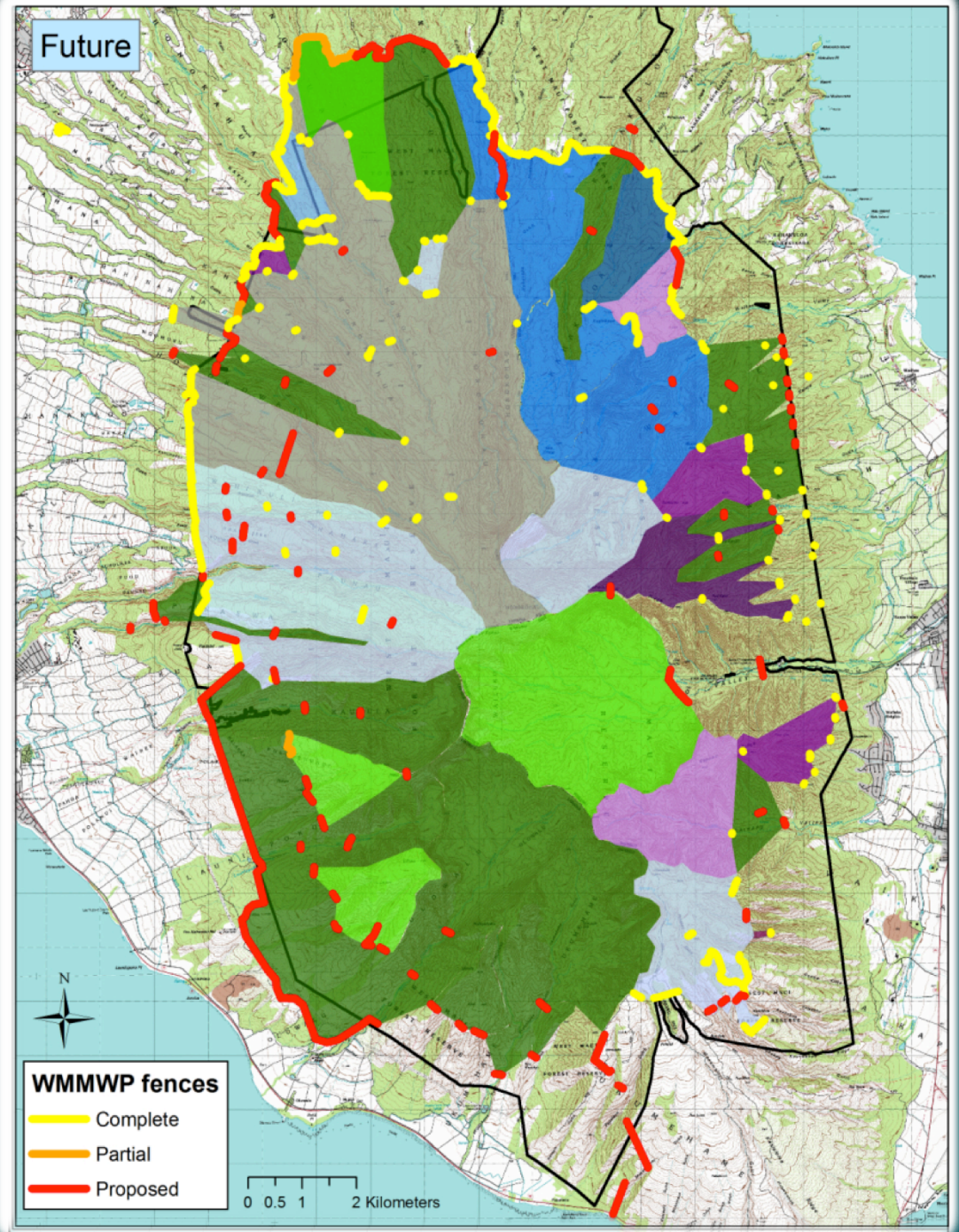


Fencing Accomplishments

- 19.6 miles to date*
- 21,084 acres fenced*
- 44% of WMMWP protected*

Goal

protect against ungulate impacts





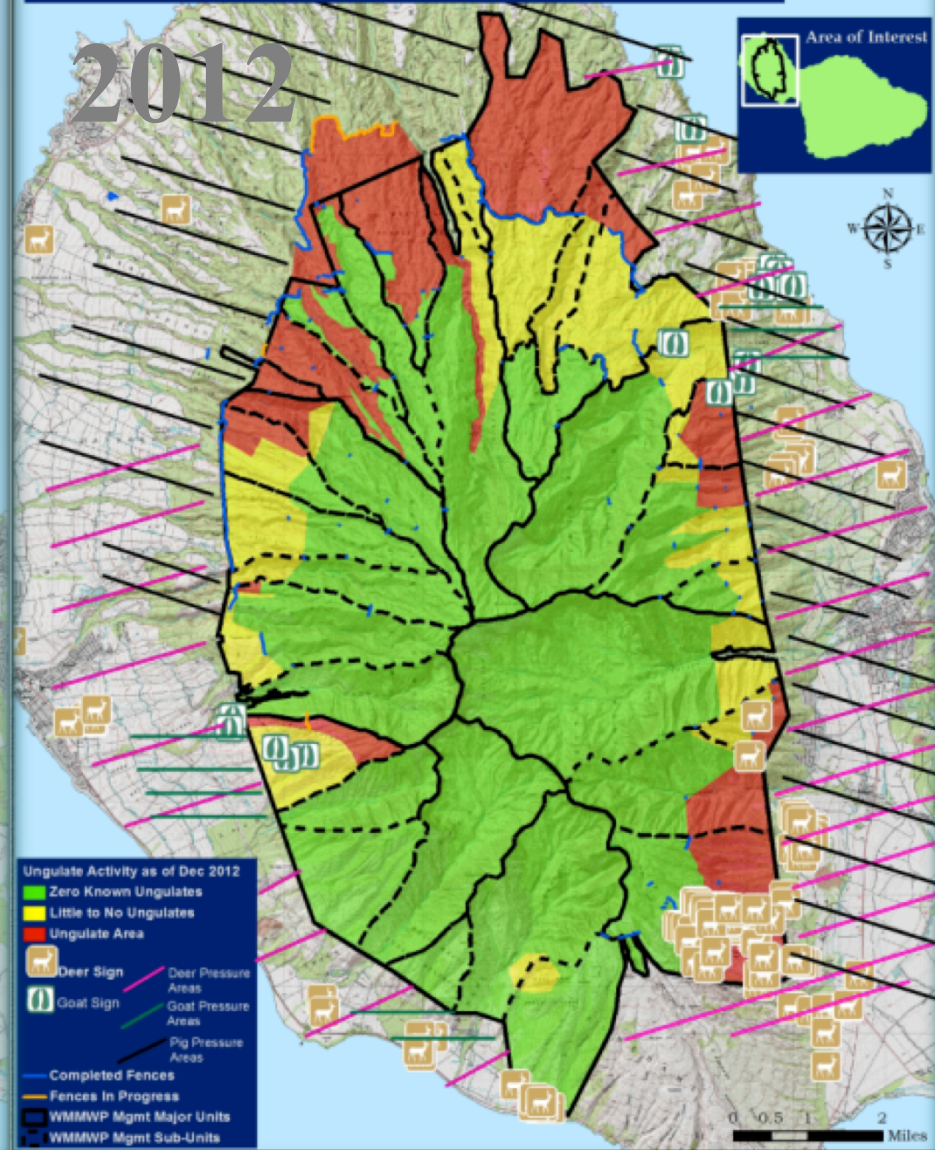
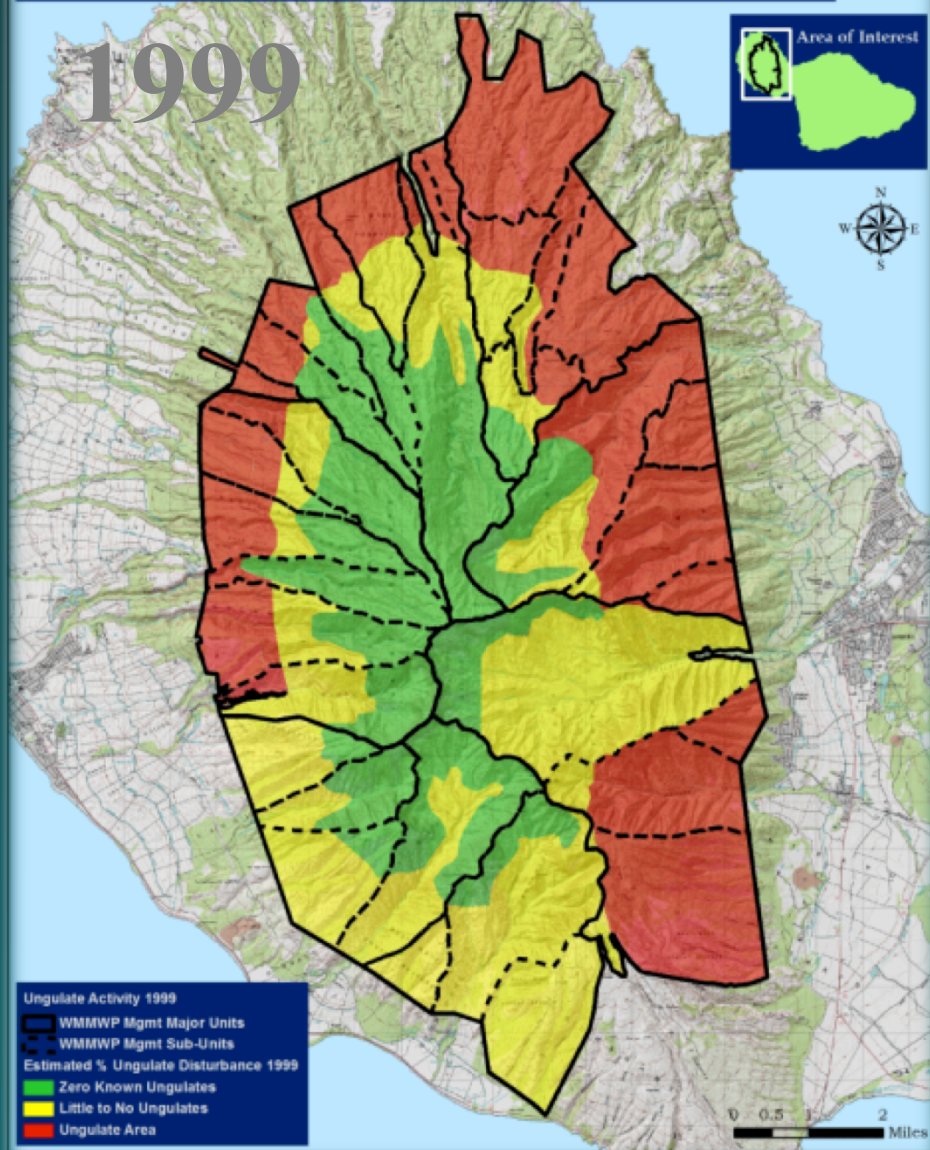
Ungulate Control Accomplishments

Heavy Activity Little to Moderate Ungulate Free



Ungulate Activity in West Maui - 1999 Management Plan Map

Ungulate Activity in West Maui - DRAFT December 2012

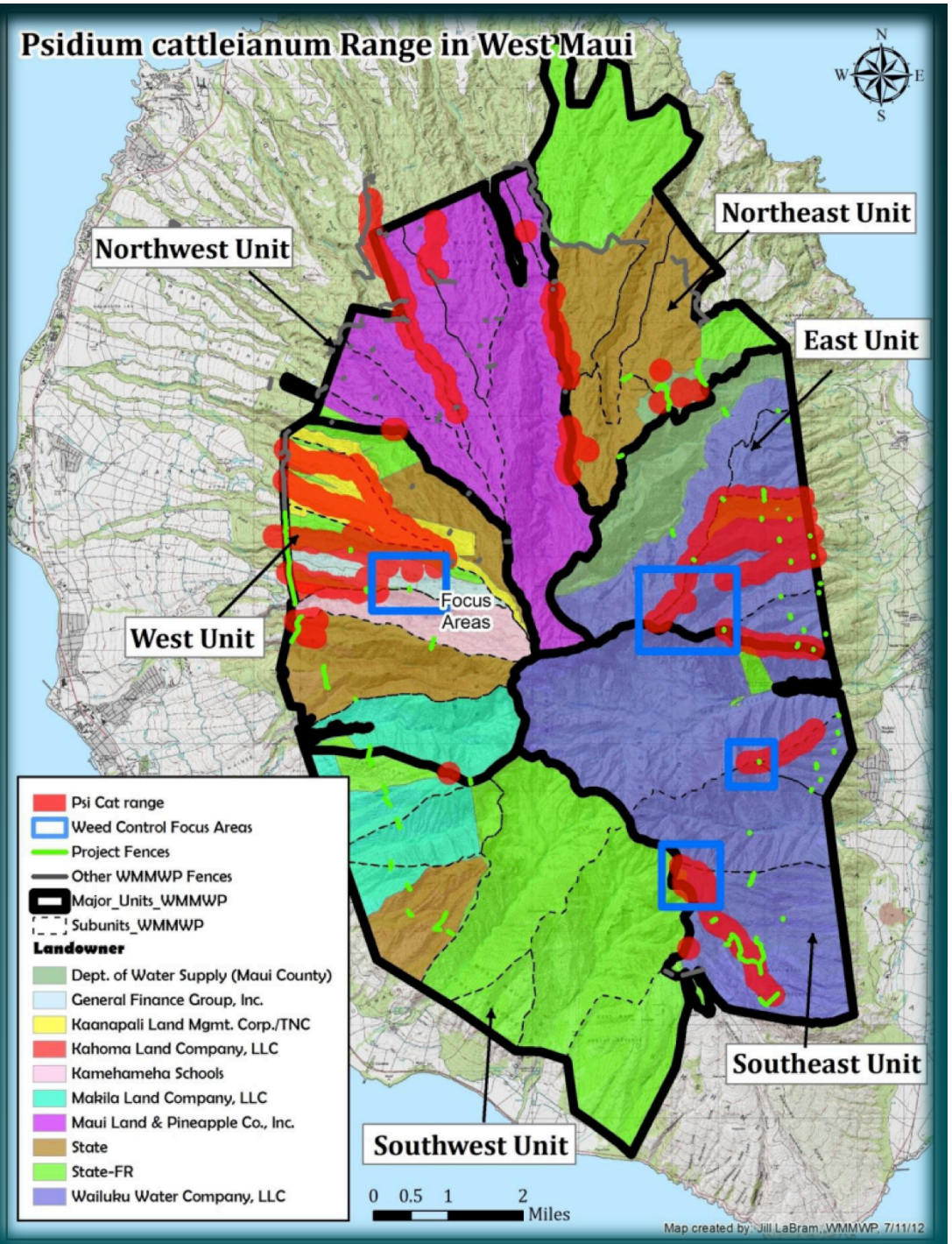


Controlling Our Worst Established Weeds Species

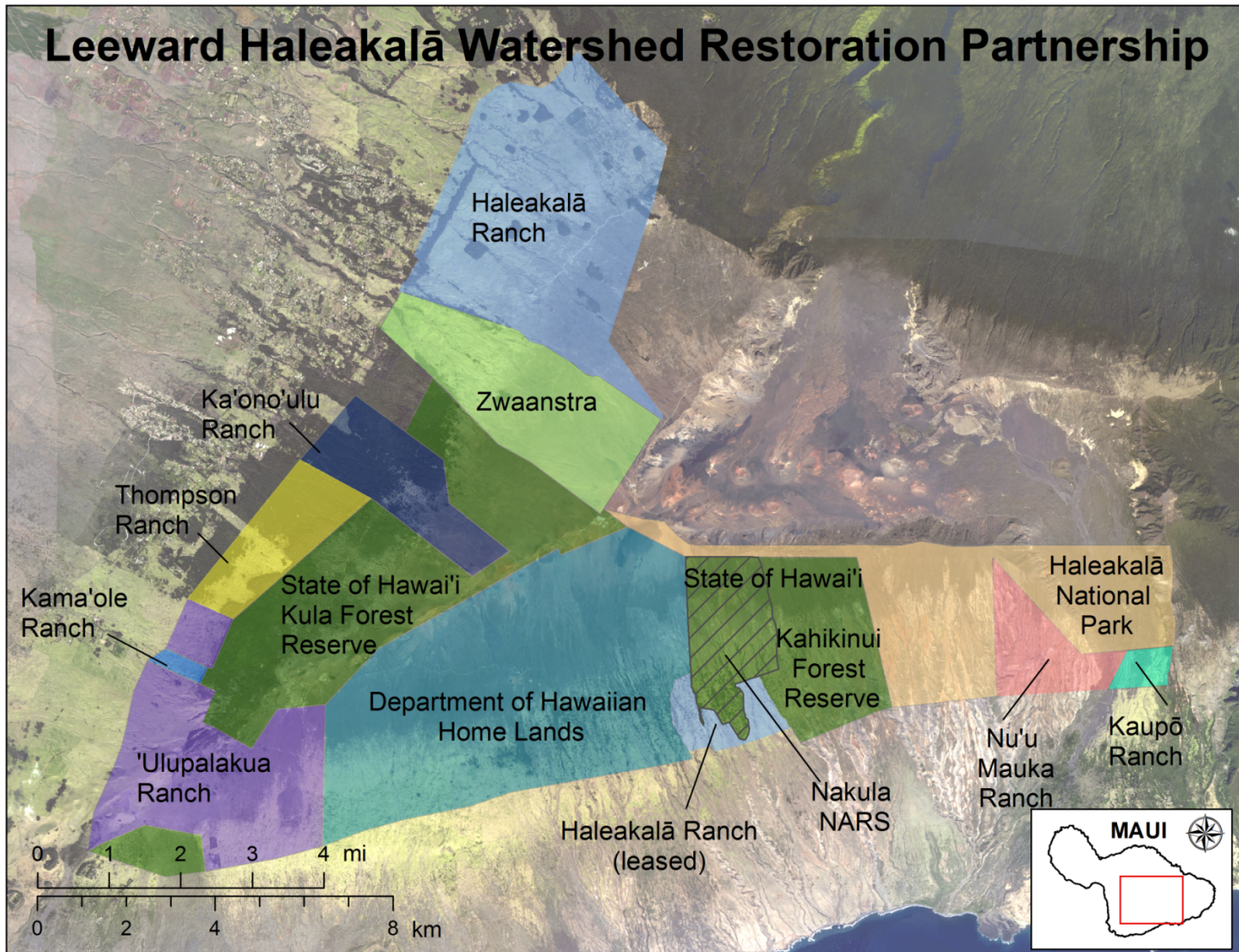
- New 5 Year Weed Management Plan
 - Top Down Strategy to Control
- Preserve 15,000 Acre Core Watershed
 - Bio- Control Needed
- Using New Technology like HBT & Remotely Sensed Imagery, and Databases

Example

Strawberry Guava: (Psidium cattleianum)
Threatens water quality, quantity & ecology



Leeward Haleakalā Watershed Restoration Partnership



Working together to restore the native forests of leeward Haleakalā to benefit our biological, cultural, economic and water resources.



Interagency restoration of leeward Haleakalā watershed forests

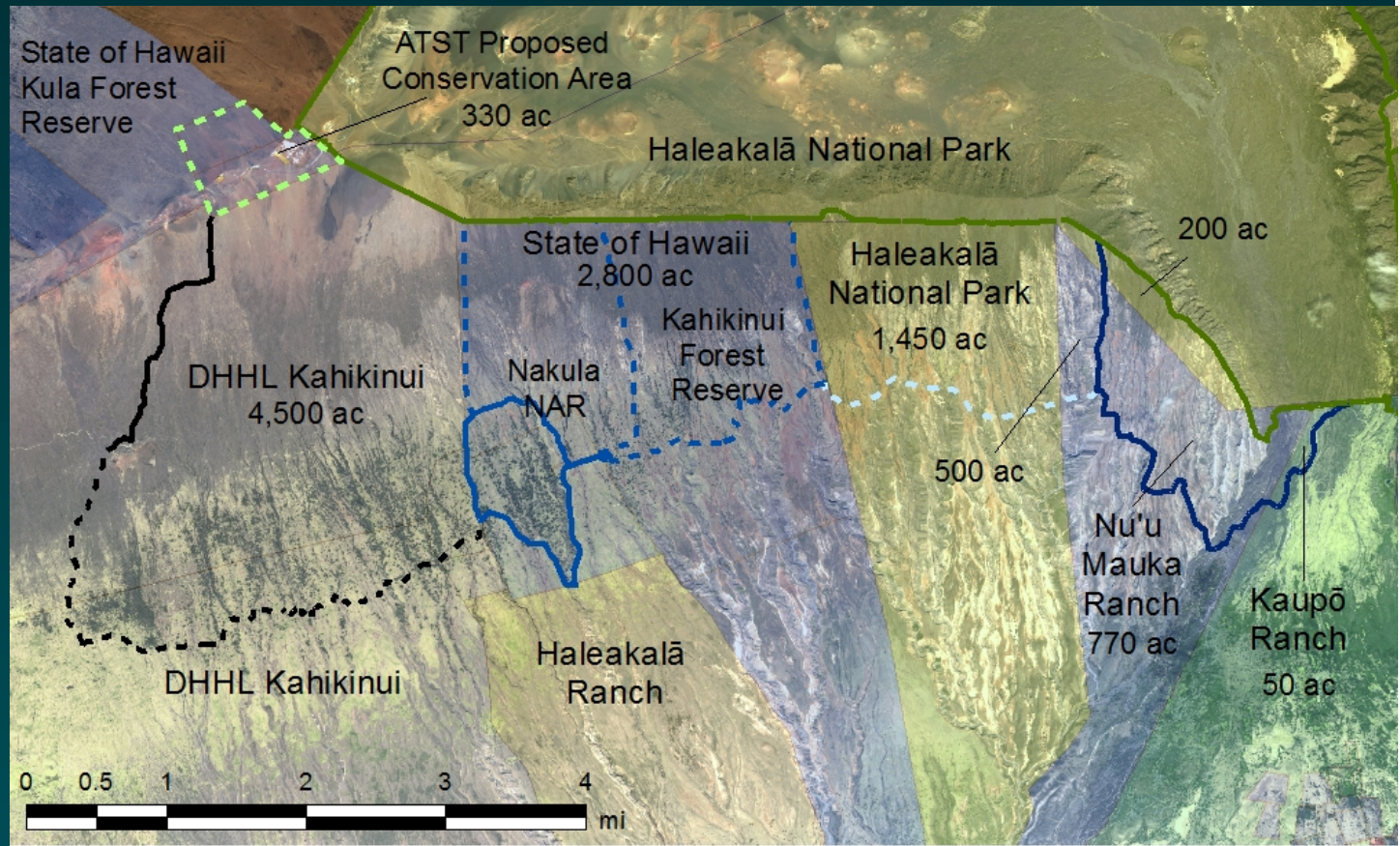


Kahikinui watershed forest protection - fencing underway and degraded *koa* forest restoration planned



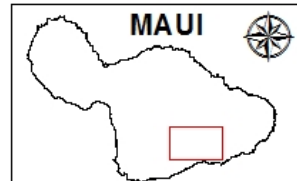
Watershed protection fencing and ungulate exclusion

- 21 miles of fence built protecting 1,733 acres
- 6.4 miles of fence under construction to protect 6,233 acres
- Final south slope watershed fencing will protect 10,600 acres



Southern Haleakalā
Forest Restoration Project
10,600 total acres

— existing fences
- - - - proposed fences
note: all acreages approximate





Watershed restoration technique development and evaluation

- Develop regional restoration techniques
- Evaluate effects of restoration on hydrologic function





Volunteer program – engaging the public in watershed protection

- 4,430 volunteers
- 32,478 volunteer hours contributed
- 110,217 native seedlings planted
- 49 acres of native forest restored & resistant to invasive species



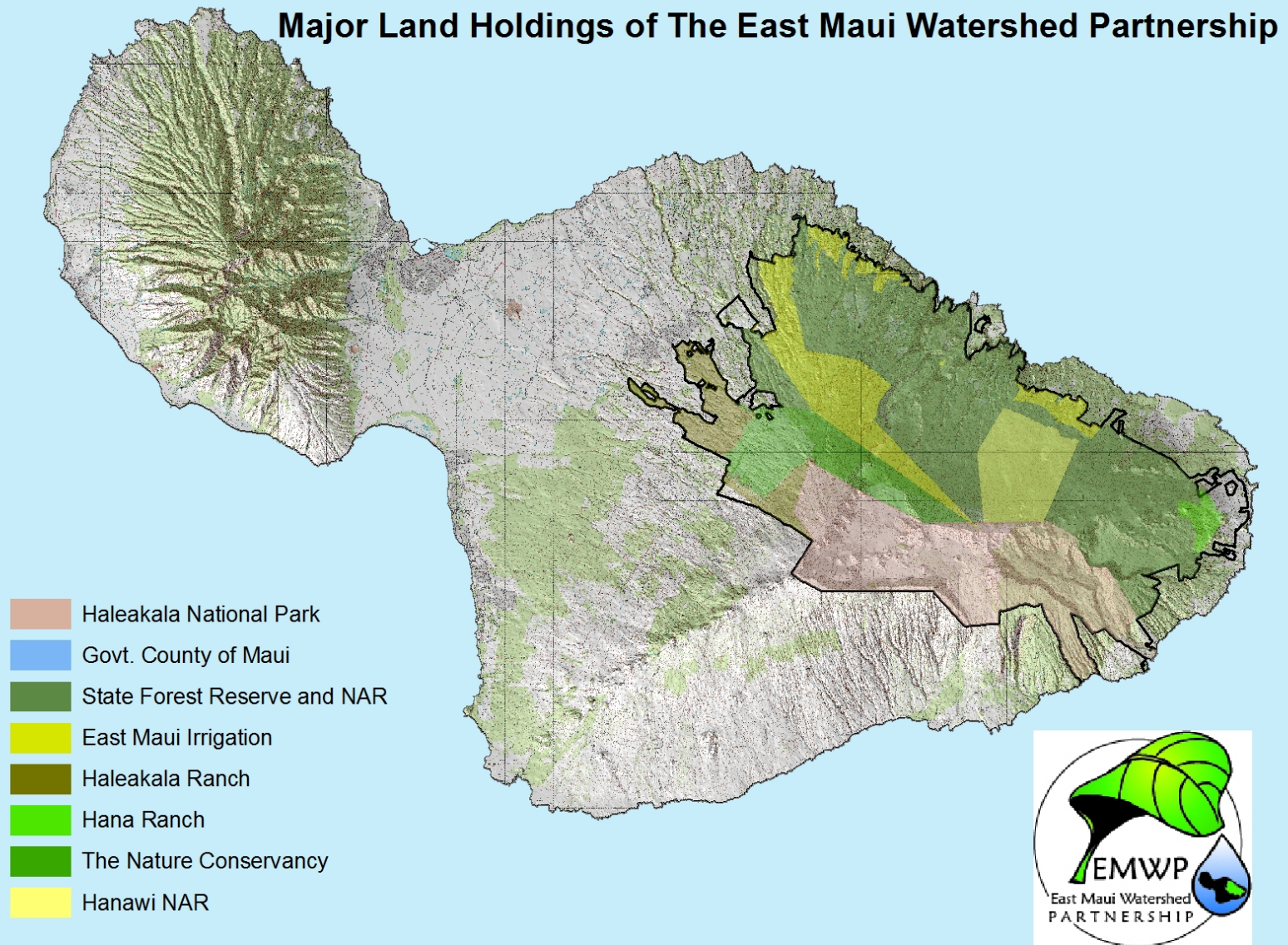
East Maui Watershed Partnership

Est. 1991

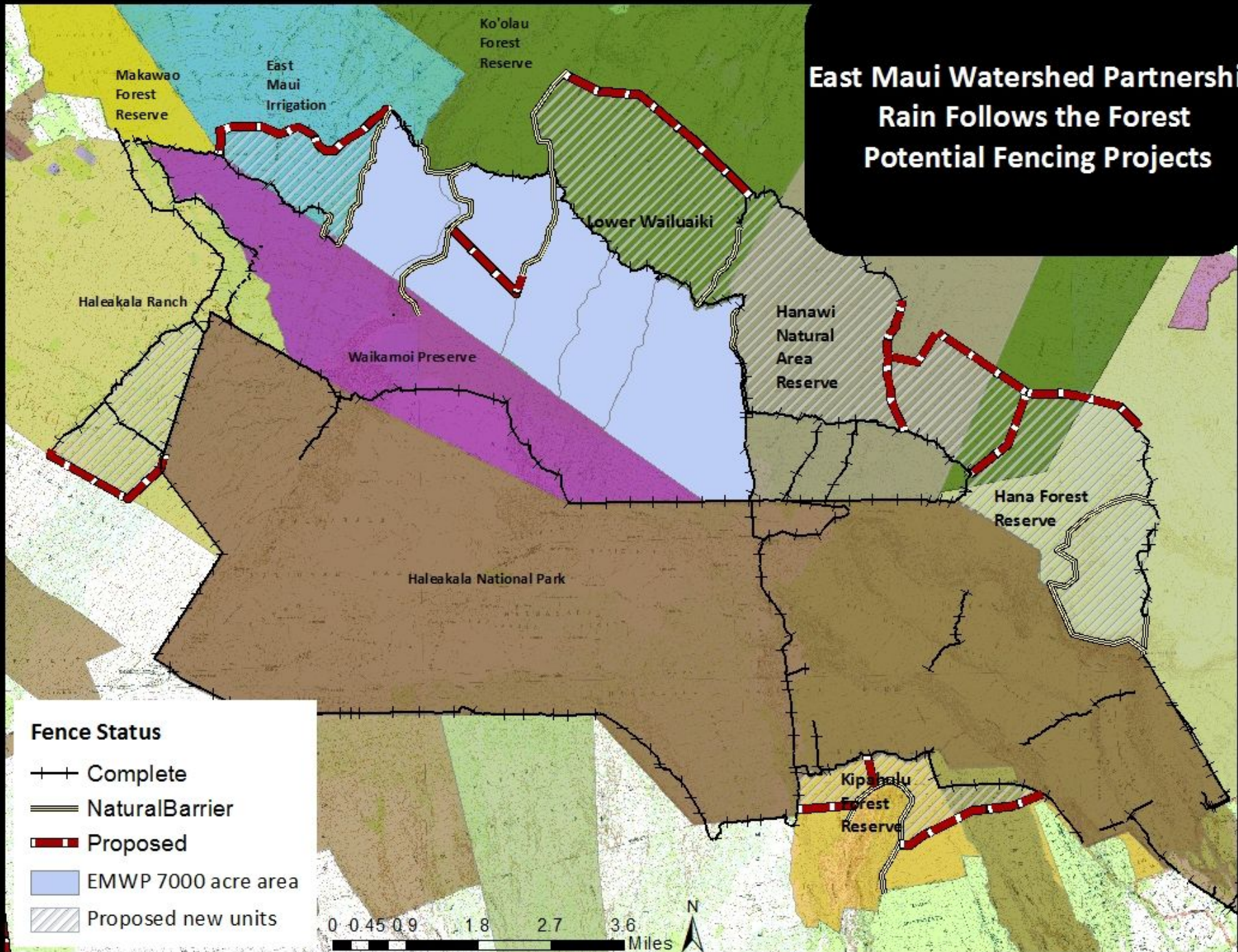
119,000
acres

Average of
65 mgd
output for
agricultural
& domestic
water use

Major Land Holdings of The East Maui Watershed Partnership



East Maui Watershed Partnership Rain Follows the Forest Potential Fencing Projects



Fence Status

- Complete
- Natural Barrier
- Proposed
- EMWP 7000 acre area
- Proposed new units

0 0.45 0.9 1.8 2.7 3.6 Miles

Priority Fencing Project

Upper Hana Forest Reserve

- 3.1 miles to date
- approx. 3,200 acres to be protected

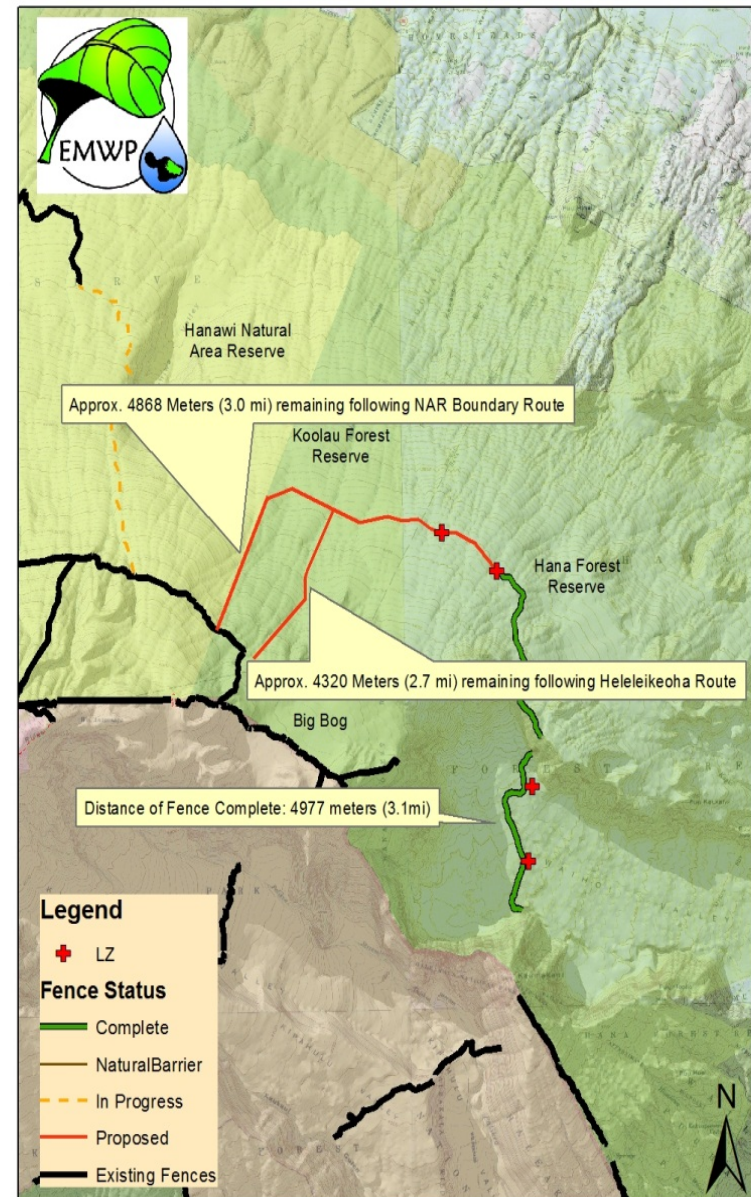
Goal

protect against ungulate impacts

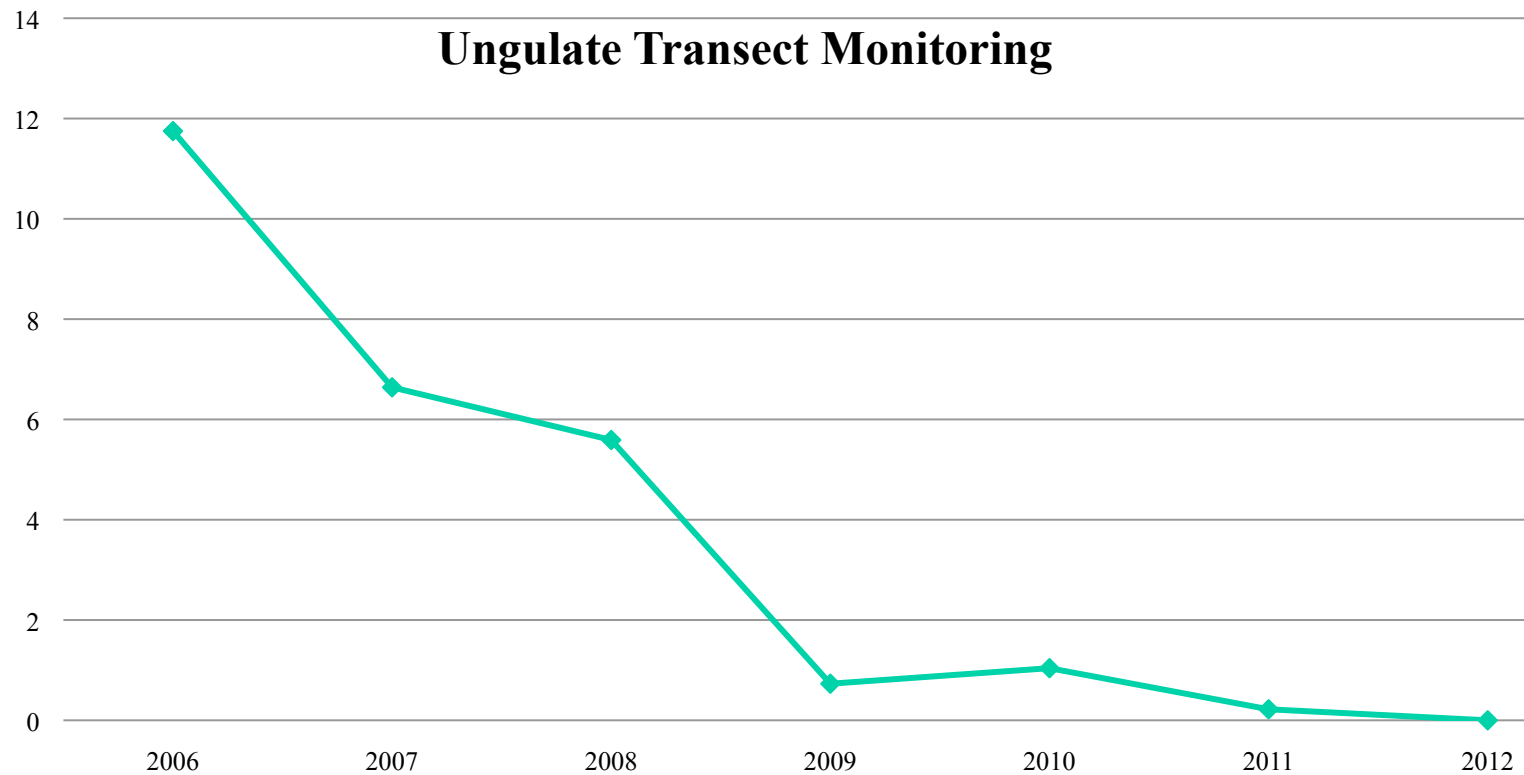


Typical weather conditions & terrain

EMWP Fence Construction in Hana Forest Reserve



Feral Ungulate Control Success



◆ % Disturbance



Maui Nui Watershed Partnerships

Goals

- **Complete fences to exclude ungulates & protect existing watersheds**
- **Restore degraded watershed forests**
- **Continue control of incipient invasive species**
- **Continue community outreach**
- **Continue restoration technique development**

Challenges

- **Funding and training for core staff**
- **Funding for long-term facilities and equipment**
- **Biological control for priority invasive species**
- **Threats from long-term drought and wild-land fire**
- **Limitation of regional native seed sources**

Maui Nui Watershed Partnerships

Mahalo Nui Loa



Maui Invasive Species Committee Moloka'i Invasive Species Committee



Informational Briefing: January 11, 2013
Senate Committee on Energy & Environment

Invasive Species don't care about boundaries:

- legal**
- traditional**
- watersheds**
- jurisdictional**

Whether they start in a backyard...



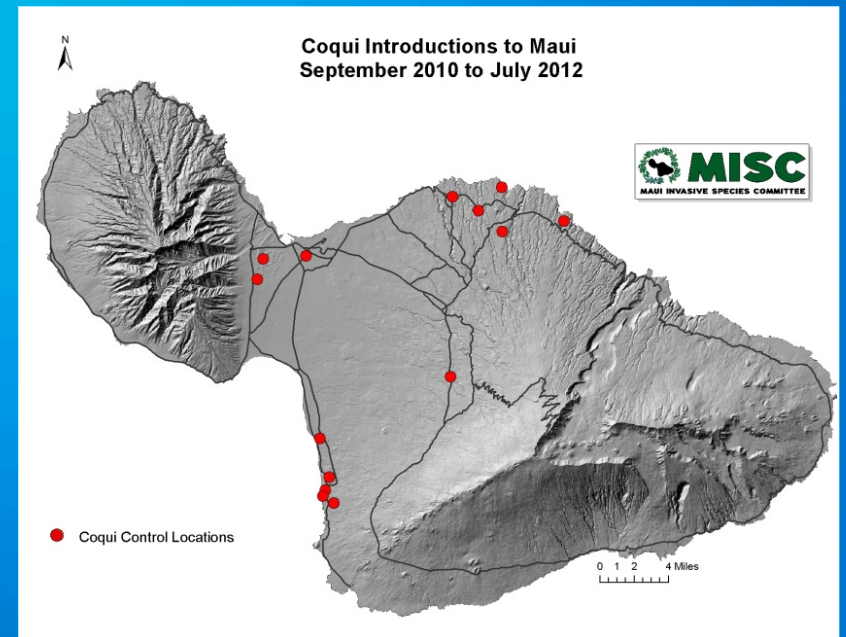
... or end up in pristine natural areas



Arrive in a plant shipment...



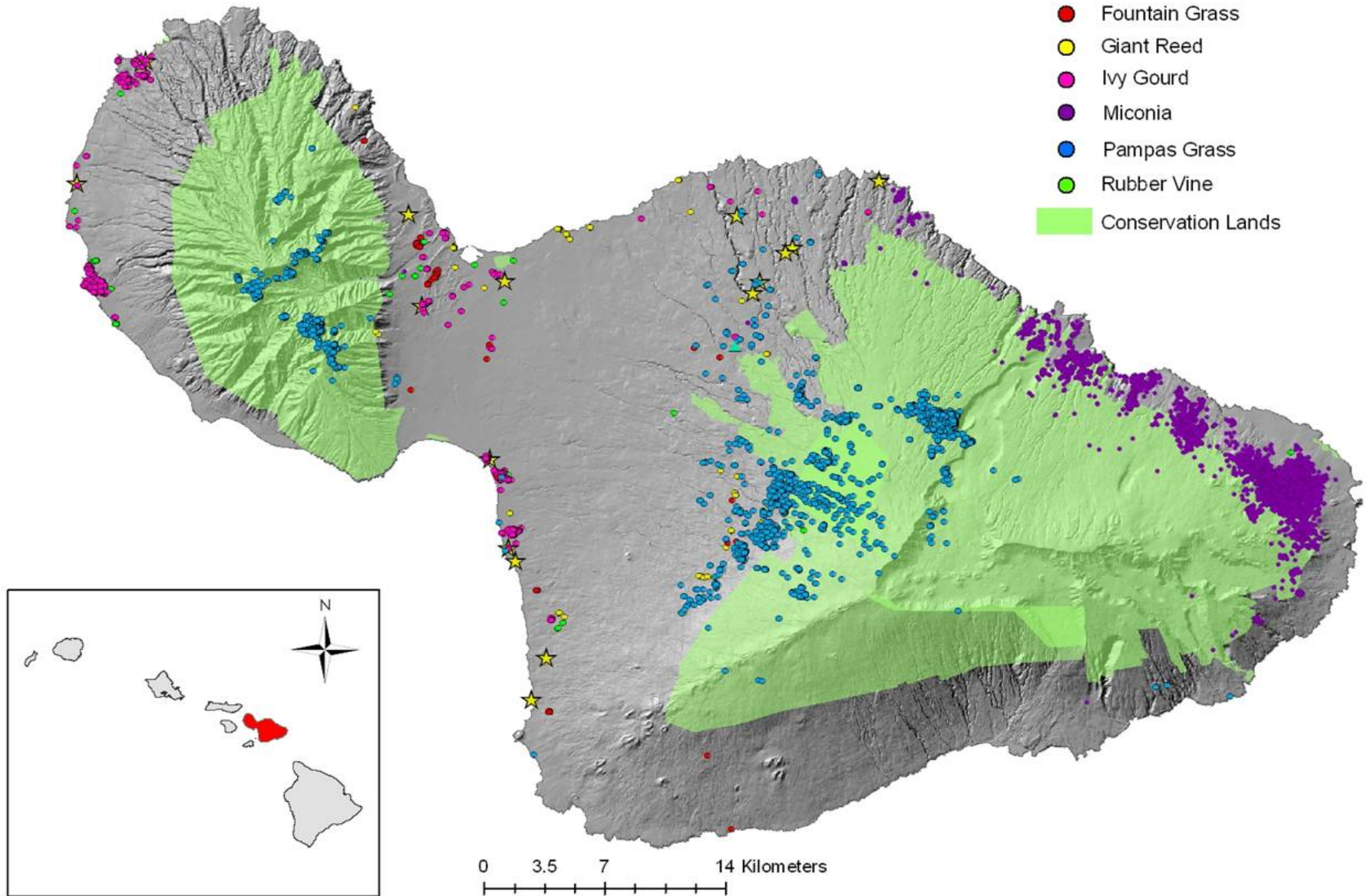
... or spread across an island



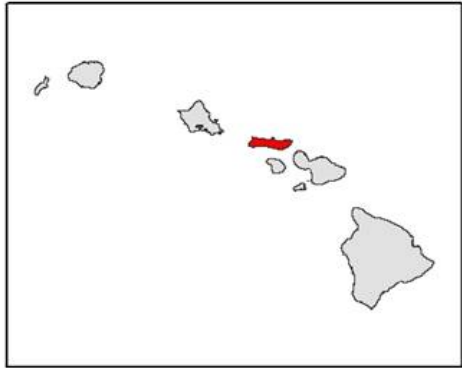
Target Species & Conservation Lands on Maui

MISC Target Species

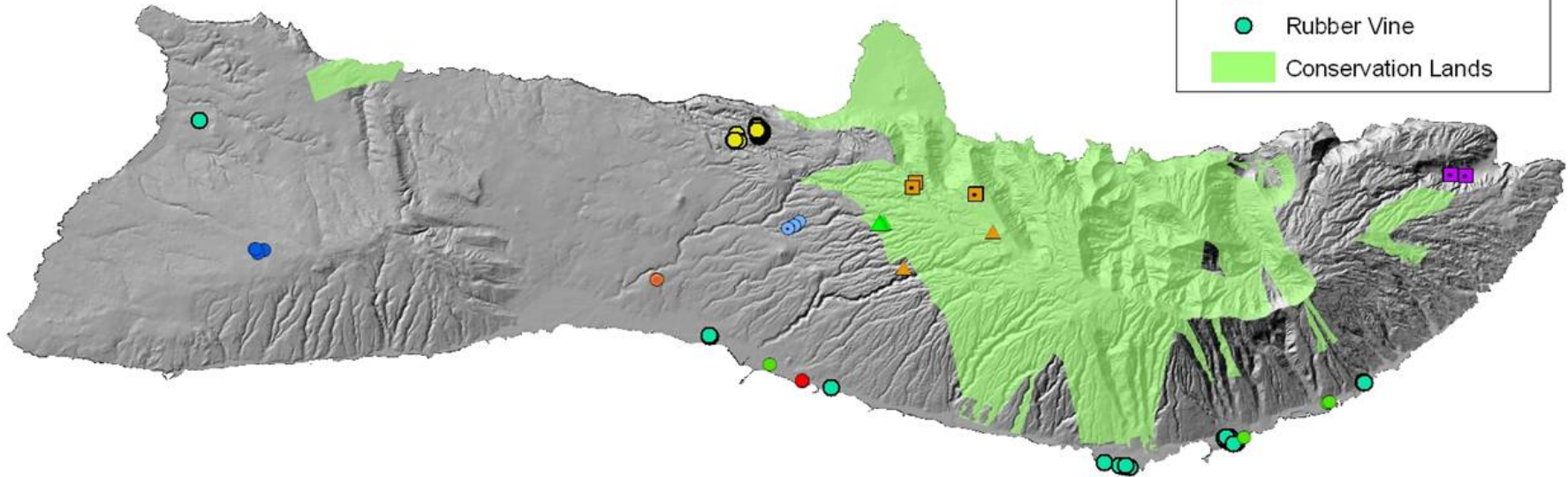
- ★ Coqui Frog
- ▲ Veiled Chameleon
- Fountain Grass
- Giant Reed
- Ivy Gourd
- Miconia
- Pampas Grass
- Rubber Vine
- Conservation Lands



Target Species & Conservation Lands on Moloka'i



- ### MoMISC Target Species
- Albizia
 - Tumbleweed
 - Australian Tree Fern
 - Barbados Gooseberry
 - Cat's Claw
 - Giant Reed
 - ▲ Gorse
 - New Zealand Flax
 - Pampas Grass
 - ▲ Woodrose
 - Rubber Vine
 - Conservation Lands



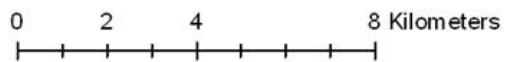
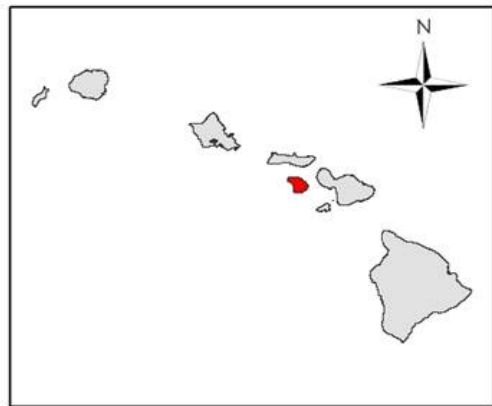
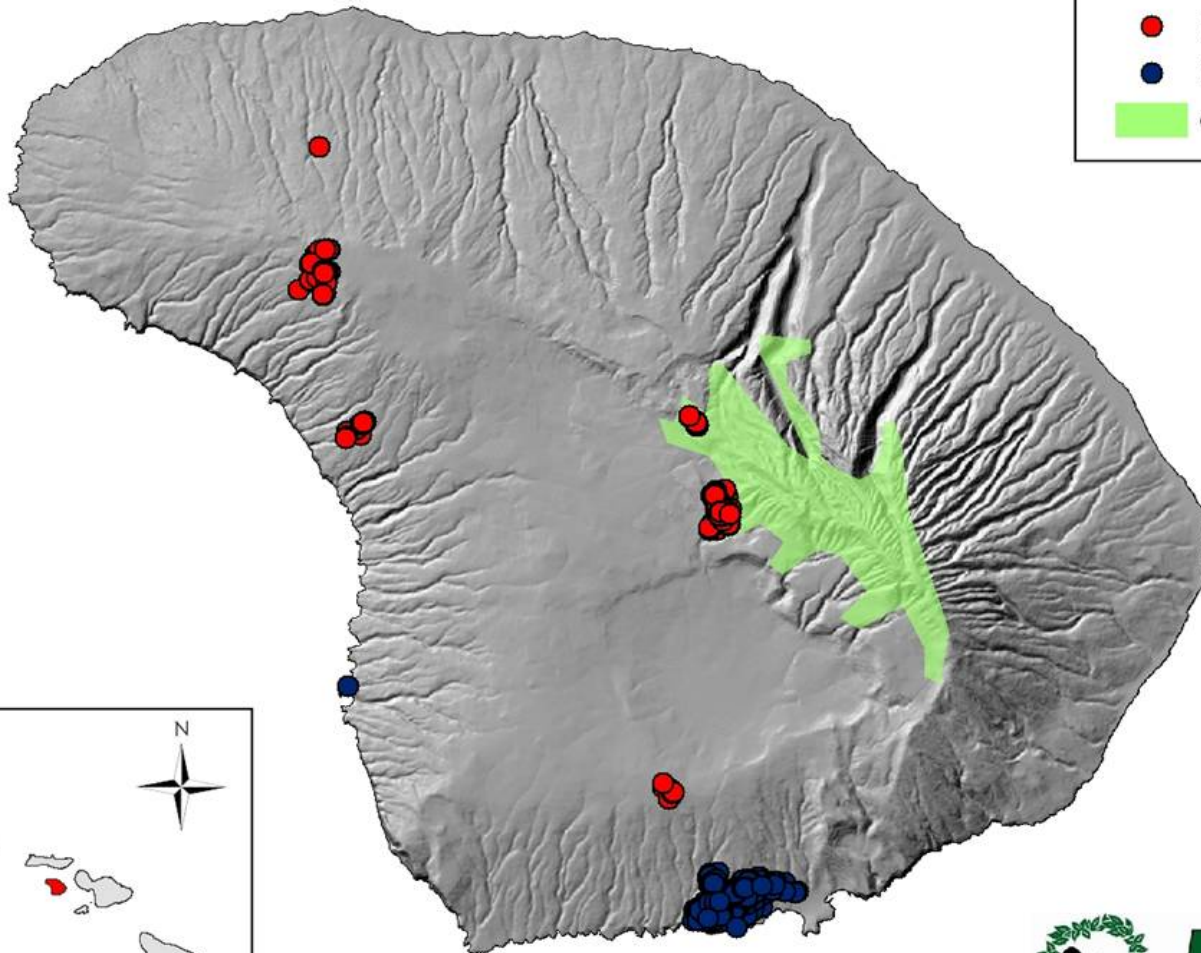
0 2 4 8 Kilometers



Target Species & Conservation Lands on Lānaʻi

MISC Target Species

- Fountain Grass
- Ivy Gourd
- Conservation Lands



MISC & MoMISC are taking it on... whether it's

a huge tree...



tiny insect





...or entire gulch

2012 Achievements

- **Controlled or prevented establishment of miconia, pampas grass, coqui frogs and a suite of other invasive plants and animals**
- **Coqui intercepted on Molokai**
- **Veiled chameleons at below-detectable levels on Maui.**
- **Little fire ant surveys and outreach**
- **Comprehensive outreach and education program to inform and engage the public and youth on invasive species issues.**

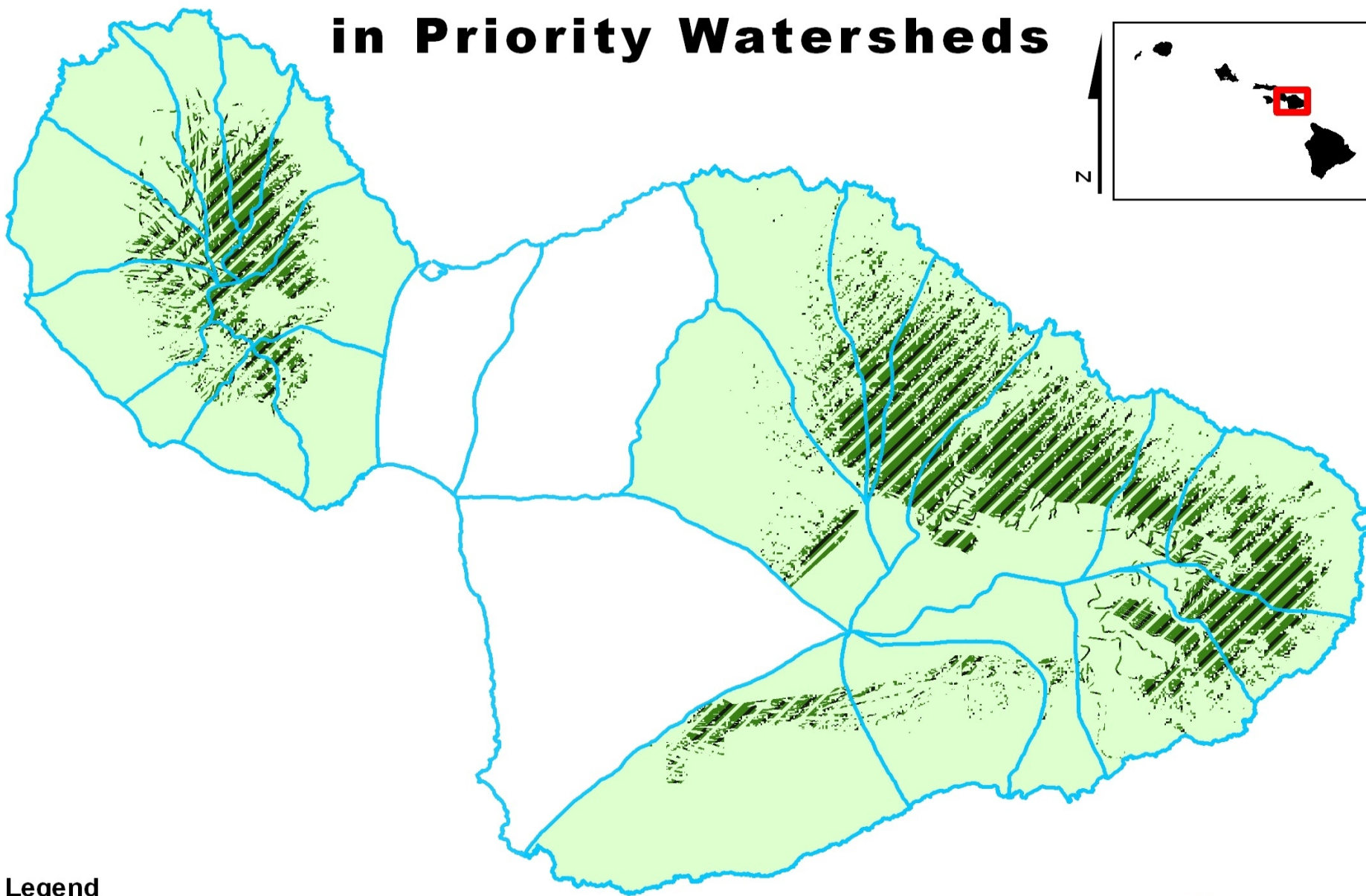
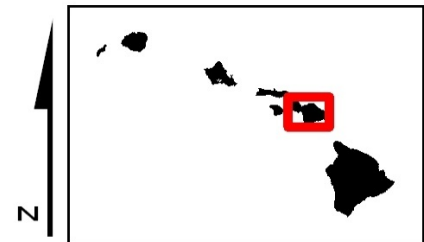


Challenges



- recalcitrant landowners
- inter-island movement of pest species
- stable, adequate, long-term funding
- inadequate regulation to stop introduction of new invasive plants



Invasive Plant Work in Priority Watersheds



Legend

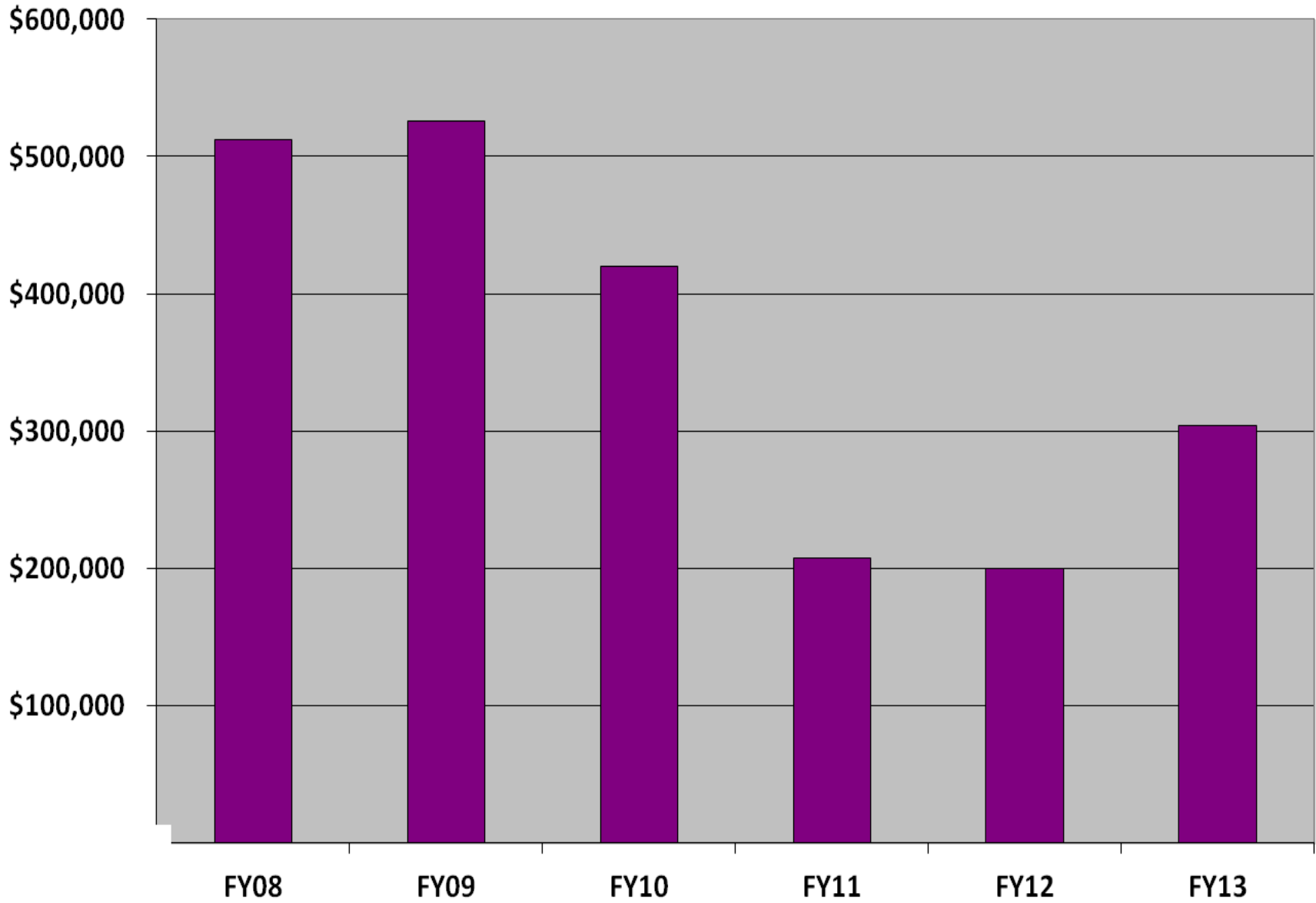
-  MISC Survey & Control Work in Watershed Priority Forests
-  Groundwater aquifers Benefitting from Proposed Projects

0 2.5 5 10 15 20
Kilometers



Map by BVM 03/29/2012

State Funding for MISC & MoMISC
All Sources: FY08-FY13



Our future....



Effective Partnerships = Key to Success



MISC & MoMISC are projects of the
Pacific Cooperative Studies Unit – University of Hawai‘i



Mahalo nui!

