



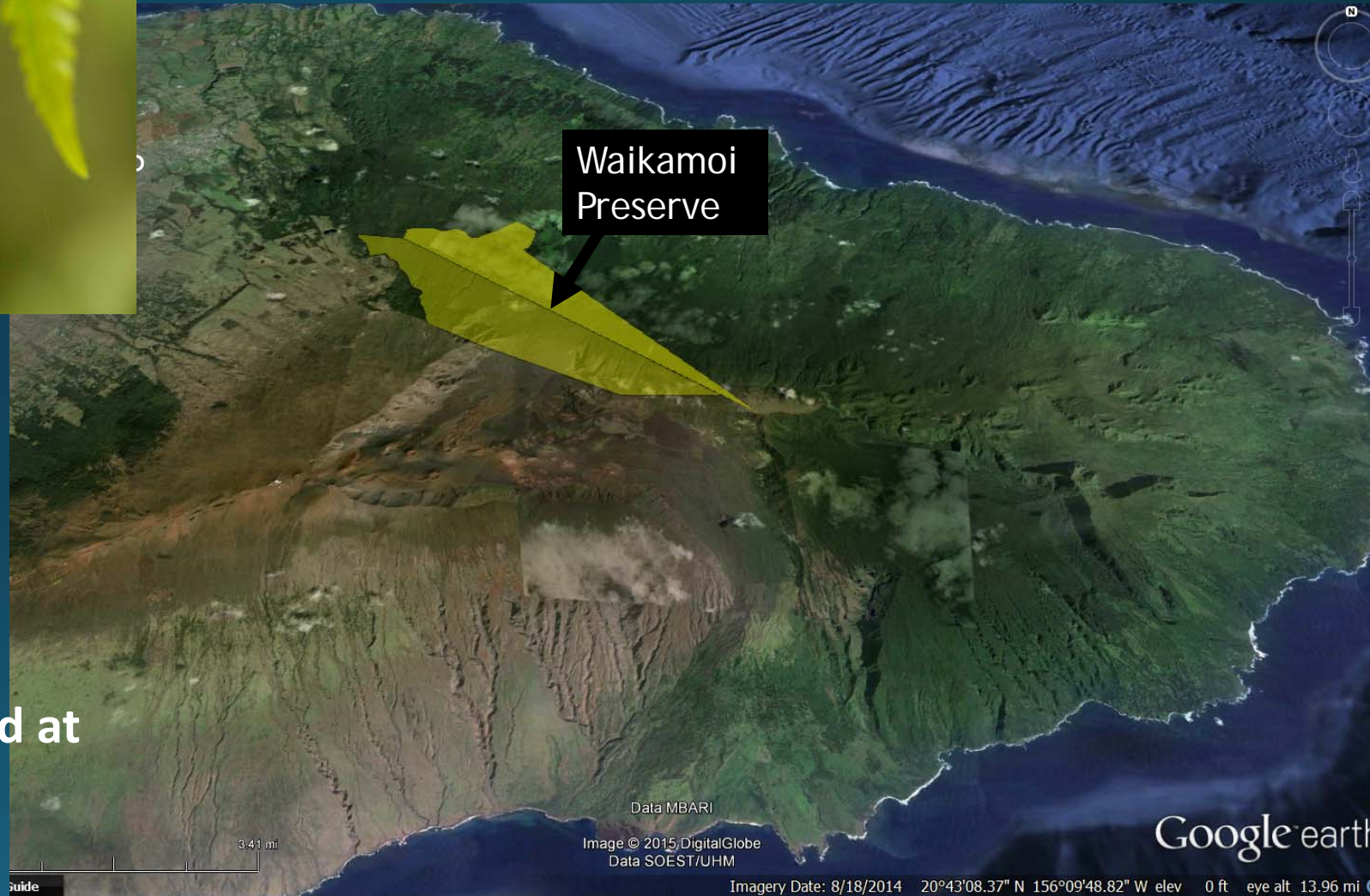
DWS Watershed Protection Grants TNC's Waikamoi & Kapunakea Preserves

**Presentation to Maui County
Water Resources Committee
December 5, 2018**

**Alison Cohan, Director
Maui Nui Program**



Waikamoi from space



**8,951 acres,
intensively managed at
the highest level of
protection**

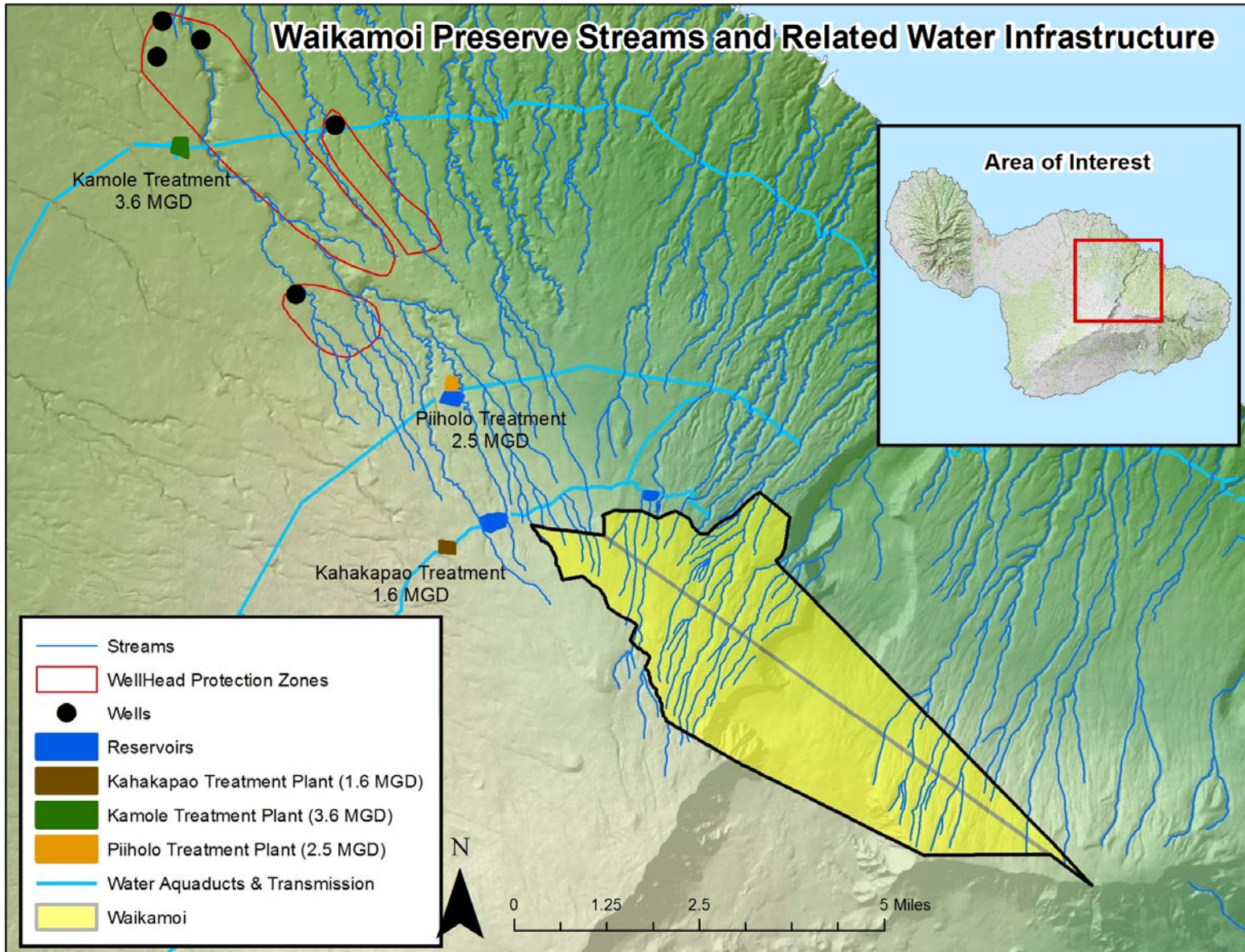
Google earth

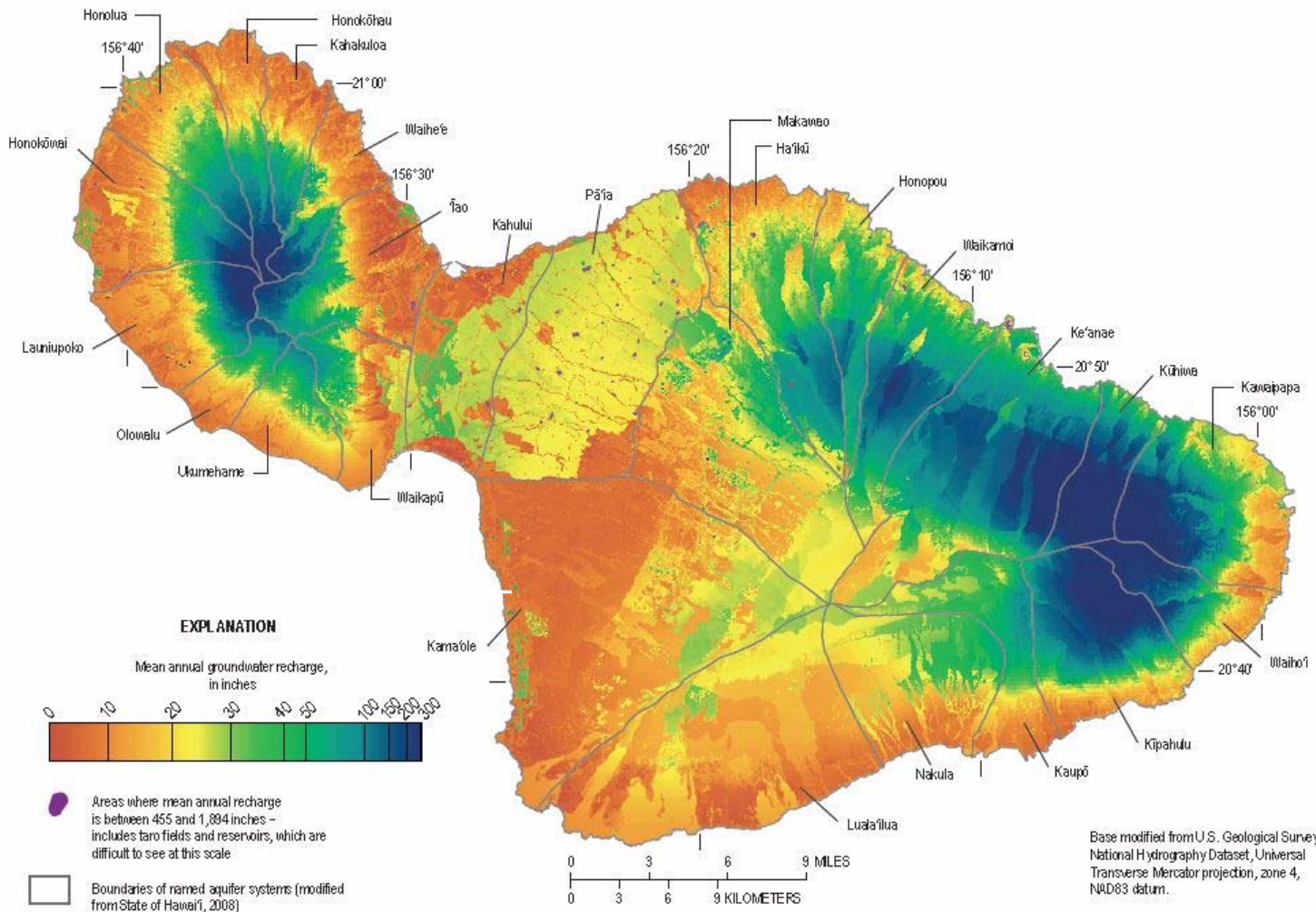
The Nature Conservancy's Waikamoi Preserve

**** the largest private nature preserve in the State ****



Waikamoi Preserve Streams and Related Water Infrastructure





Native forest on East Maui provides greater recharge than alien forest. [\[1\]](#)

Figure 10. The distribution of mean annual groundwater recharge for average climate conditions (1978–2007), Island of Maui, Hawai'i, calculated using the water-budget model.





Project Objectives

Prevent ungulate ingress into the 9,000 acre **ungulate-free** Waikamoi Preserve

Contain & suppress **priority weeds** that alter the hydrological cycle

Prevent new weeds, disease, and **nonnative pests** from establishing in Waikamoi

Conduct & support threat and resource **monitoring** to document progress

Build **public support** & increase **community engagement** for watershed protection

Collaborate with watershed partners and landowners to **leverage resources** & cross-pollinate on innovative work



Waikamoi Preserve Pig catches

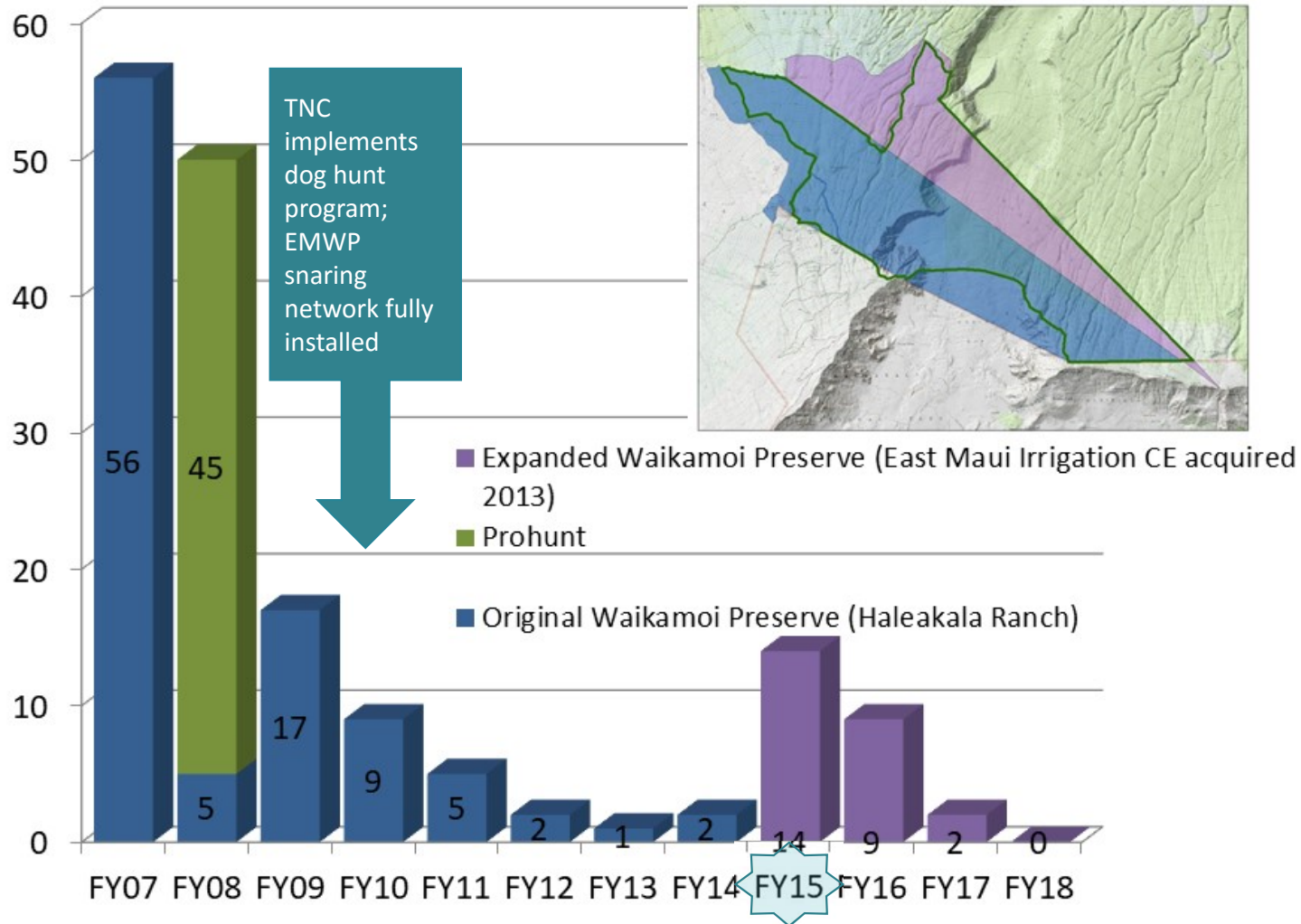
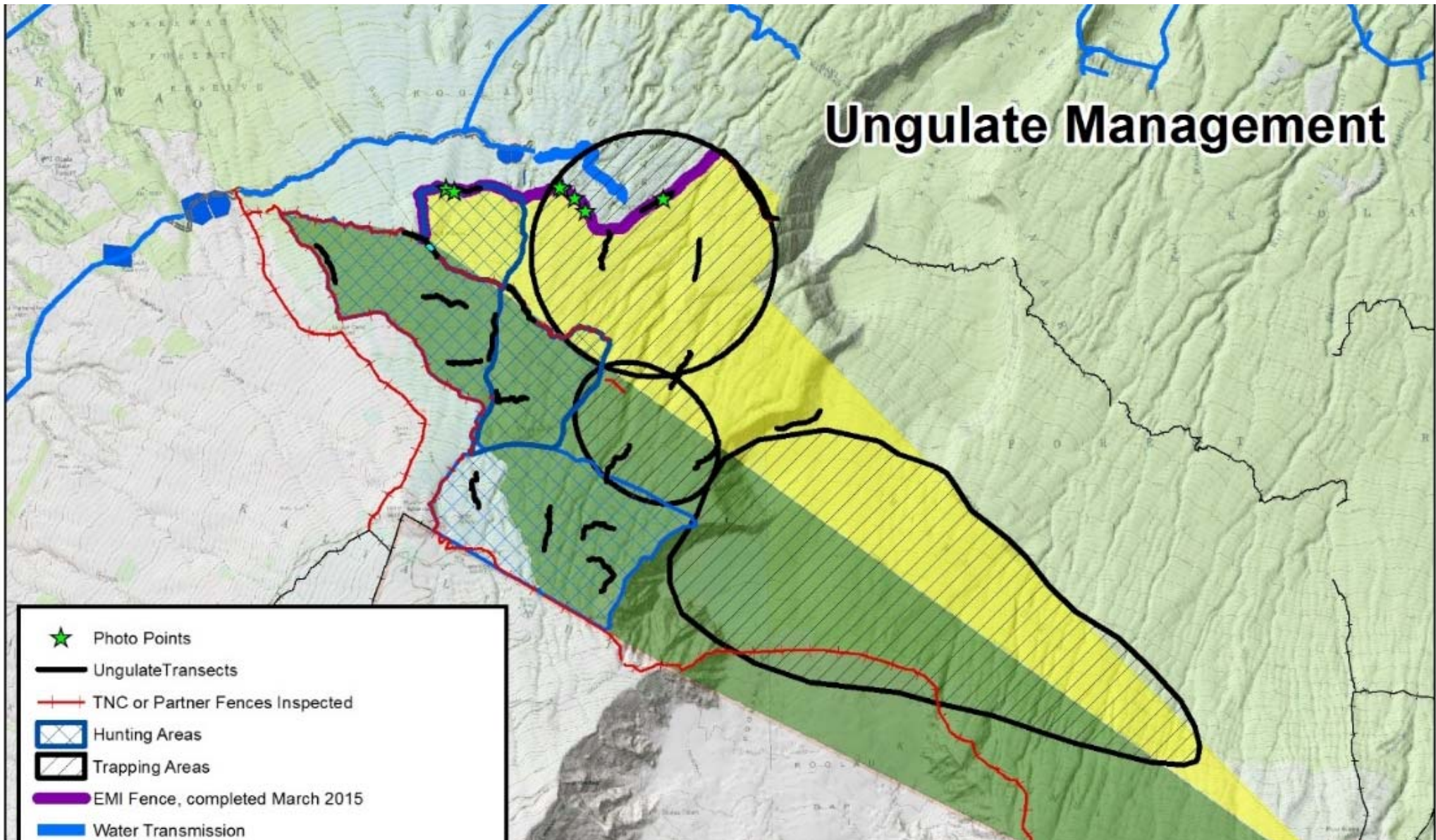


Photo points of pig damage



Ungulate Management









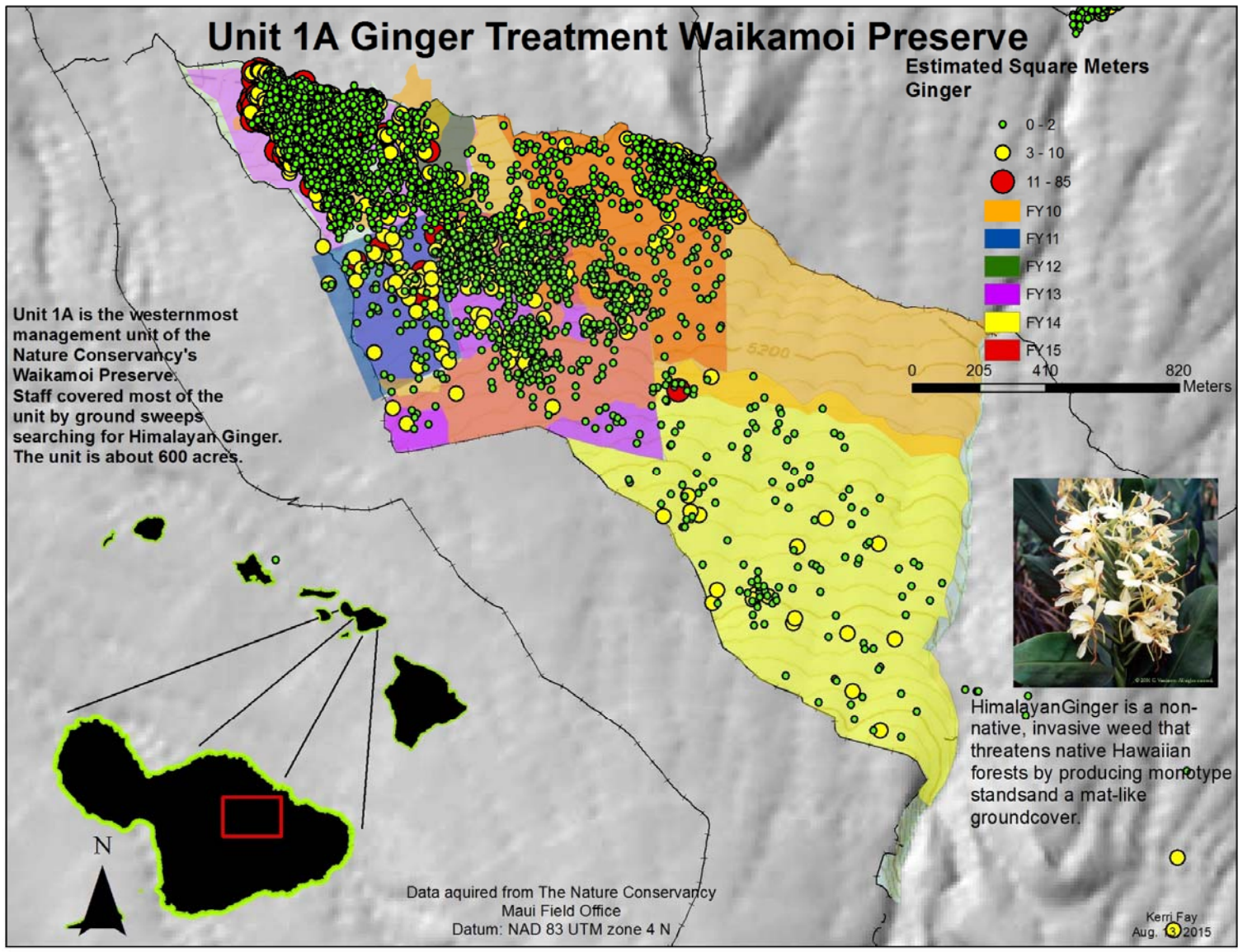
Himalayan ginger (*Hedychium gardenerium*)

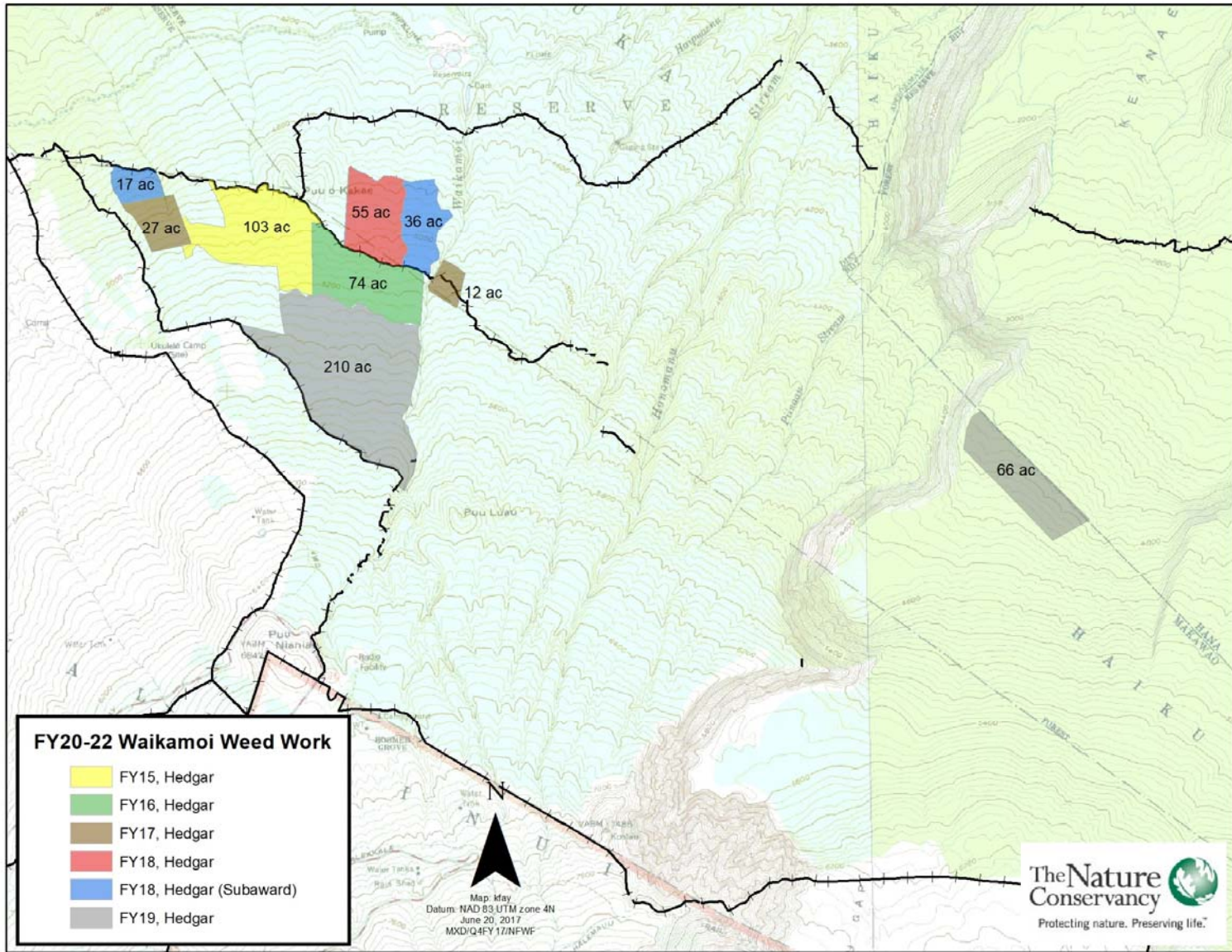
Fenceline

Koa-Ohia overstory,
Himalayan ginger
understory

Control

Unit 1A Ginger Treatment Waikamoi Preserve







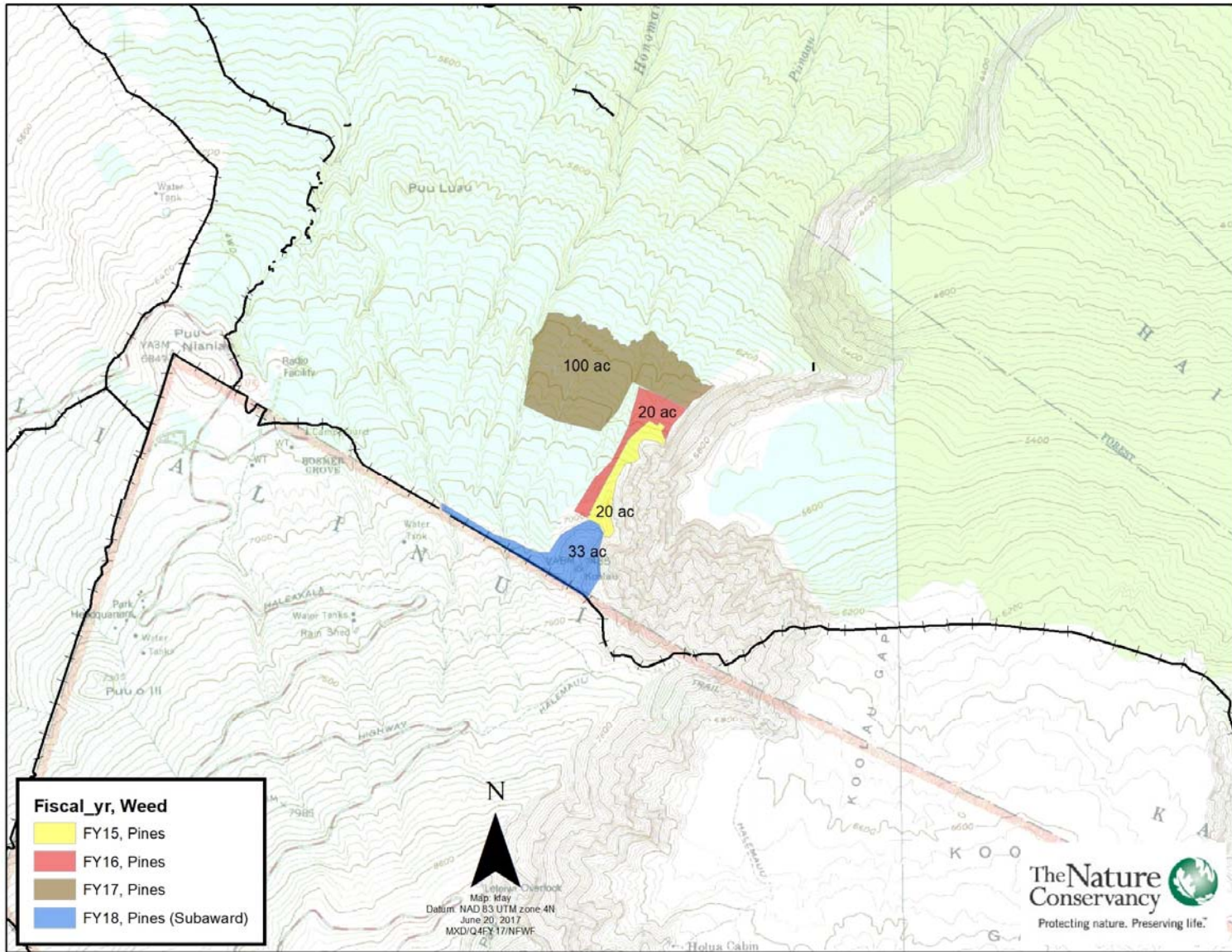
© 2016 Google

Image © 2016 DigitalGlobe

Google earth

2010

Imagery Date: 7/17/2014 20°46'09.13" N 156°13'25.76" W elev 6657 ft eye alt 15359 ft





Measuring success with UAV





June 21, 2017 Drone Im

★ Pinus patula (treated Feb. 2017)



The
Cor
Prote

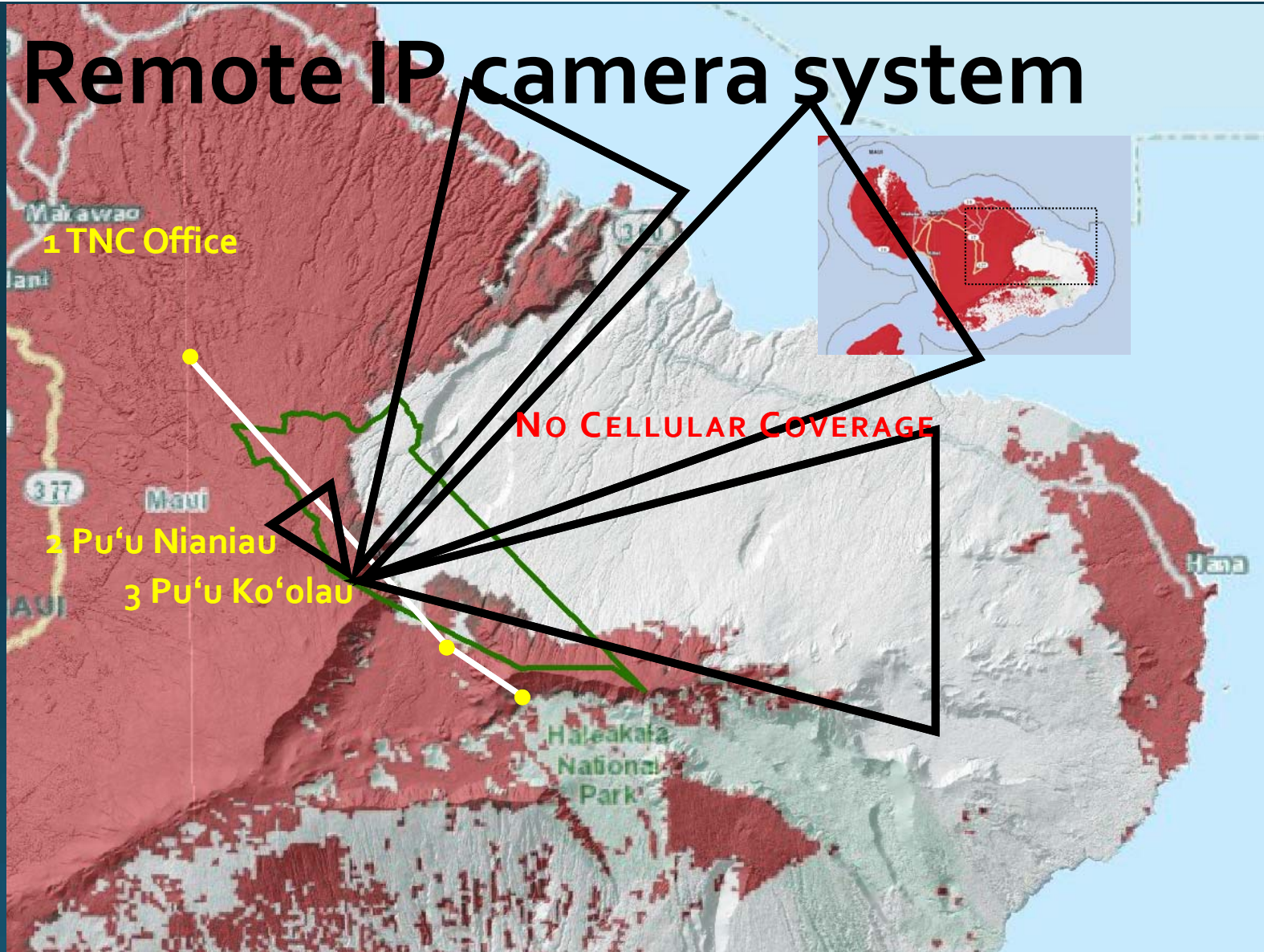
November 27, 2018 Dron

★ Pinus patula (treated Feb. 2017)



T
C
P

Remote IP camera system



Remote IP wireless camera system



Remote IP wireless camera system

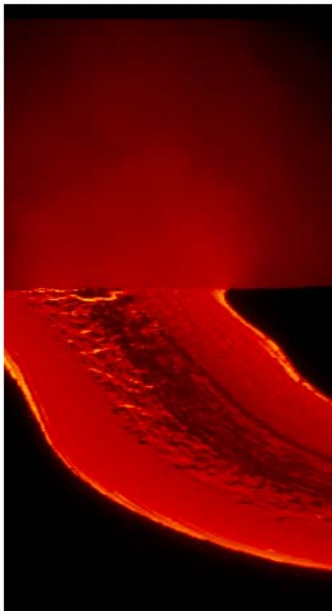




PROJECT ENVIRONMENT

ECONOMIC VALUATION OF
THE NATURE CONSERVANCY'S
WATERSHED CONSERVATION
ACTIVITIES
IN WAIKAMOI PRESERVE, MAUI

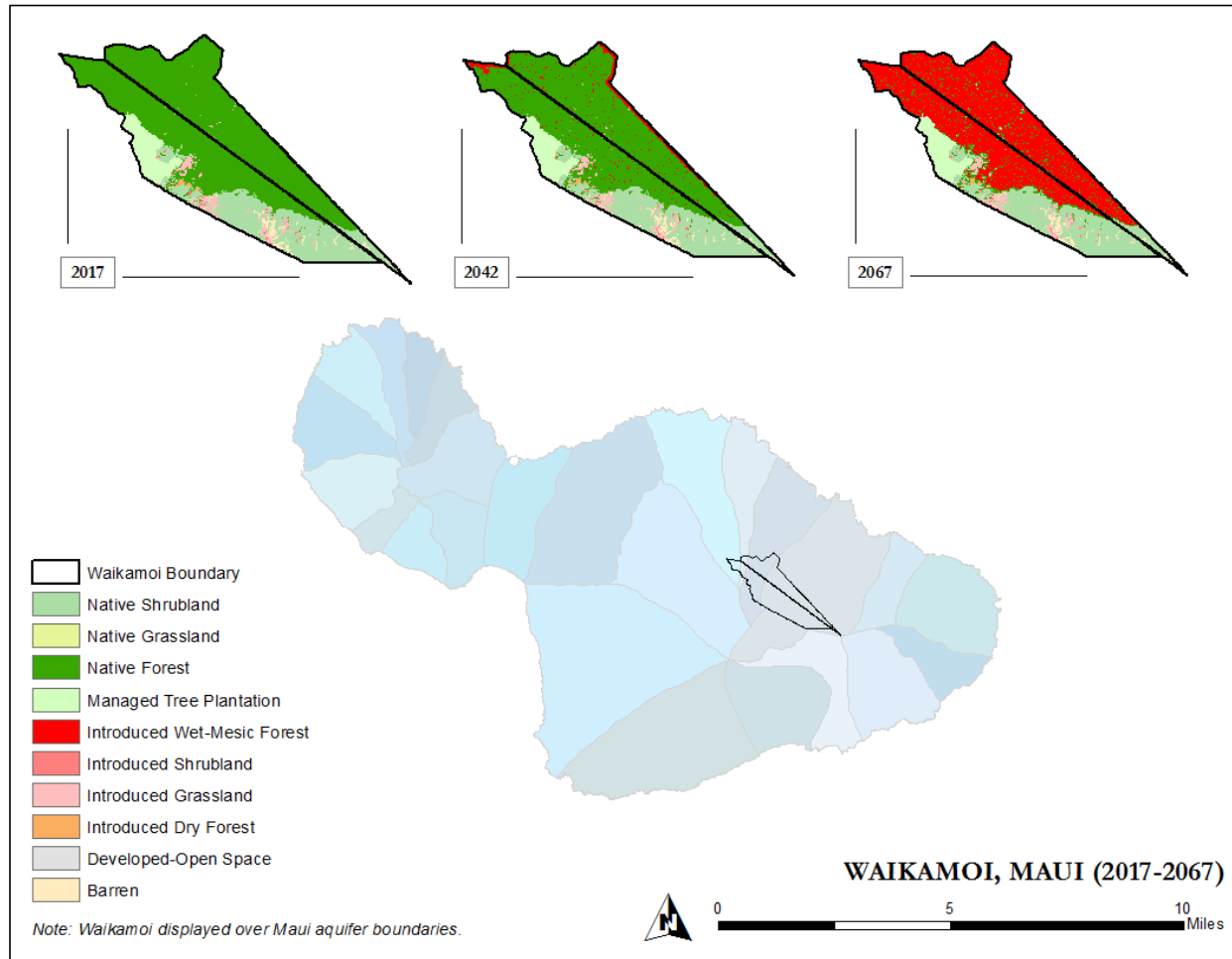
MARCH 2018



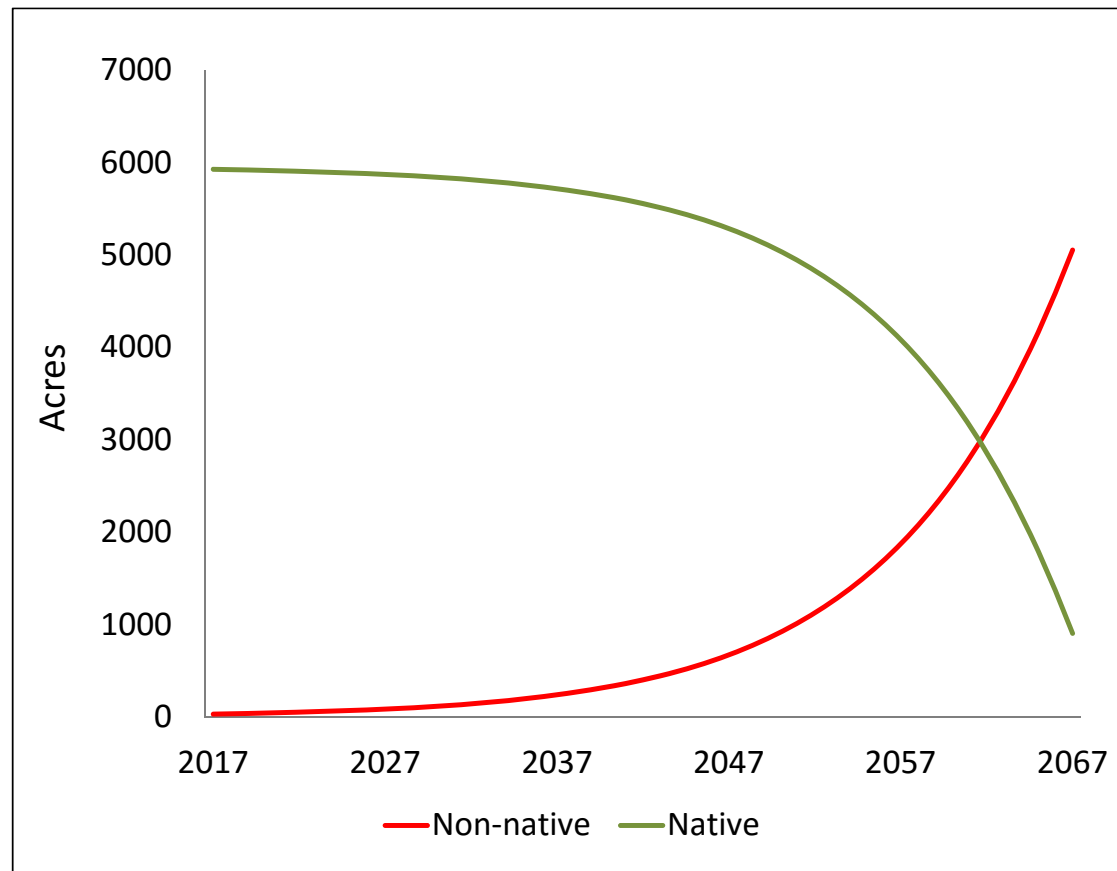
UHERO findings:

- Waikamoi conservation protects 1.1 billion gallons of freshwater yield over next 100 yrs
- By 2072, conservation activities at Waikamoi prevent 4,300 tons of sediment per year from entering the ocean
- Present value of Waikamoi's freshwater benefits-\$36.2m

Waikamoi Preserve (5,230 acres) + EMI Parcel (3,721 acres)



Total acres of native forest and non-native forest over time



Kapunakea Preserve



Kapunakea Preserve





Kapunakea Preserve management

- 1300 acres
- Also ungulate free
- Focus on ungulate trapping, fence maintenance, fence replacement, and weed control
- Strawberry guava, Tibouchina, Clidemia as priority weeds
- Biocontrol for strawberry guava
- \$75,000/yr. DWS funding; consistent



Resource Monitoring, Rare Plants and Research

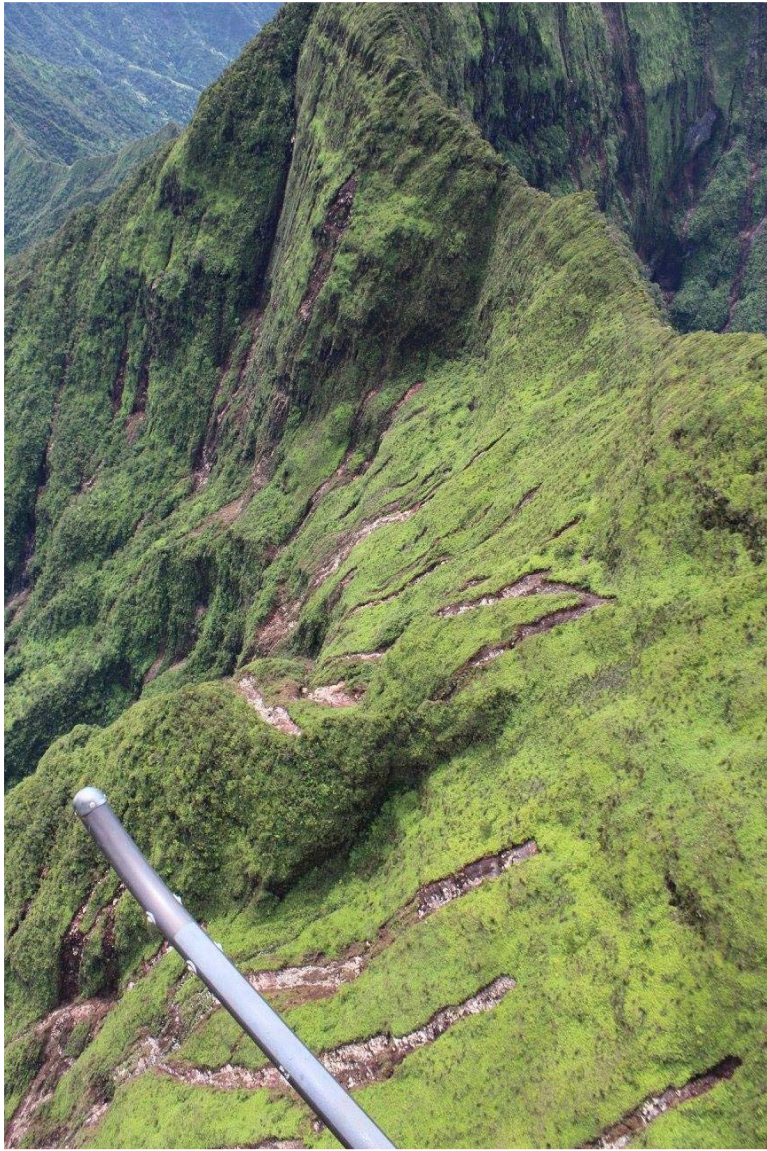
Community Outreach



DWS Waikamoi & Kapunakea Funding

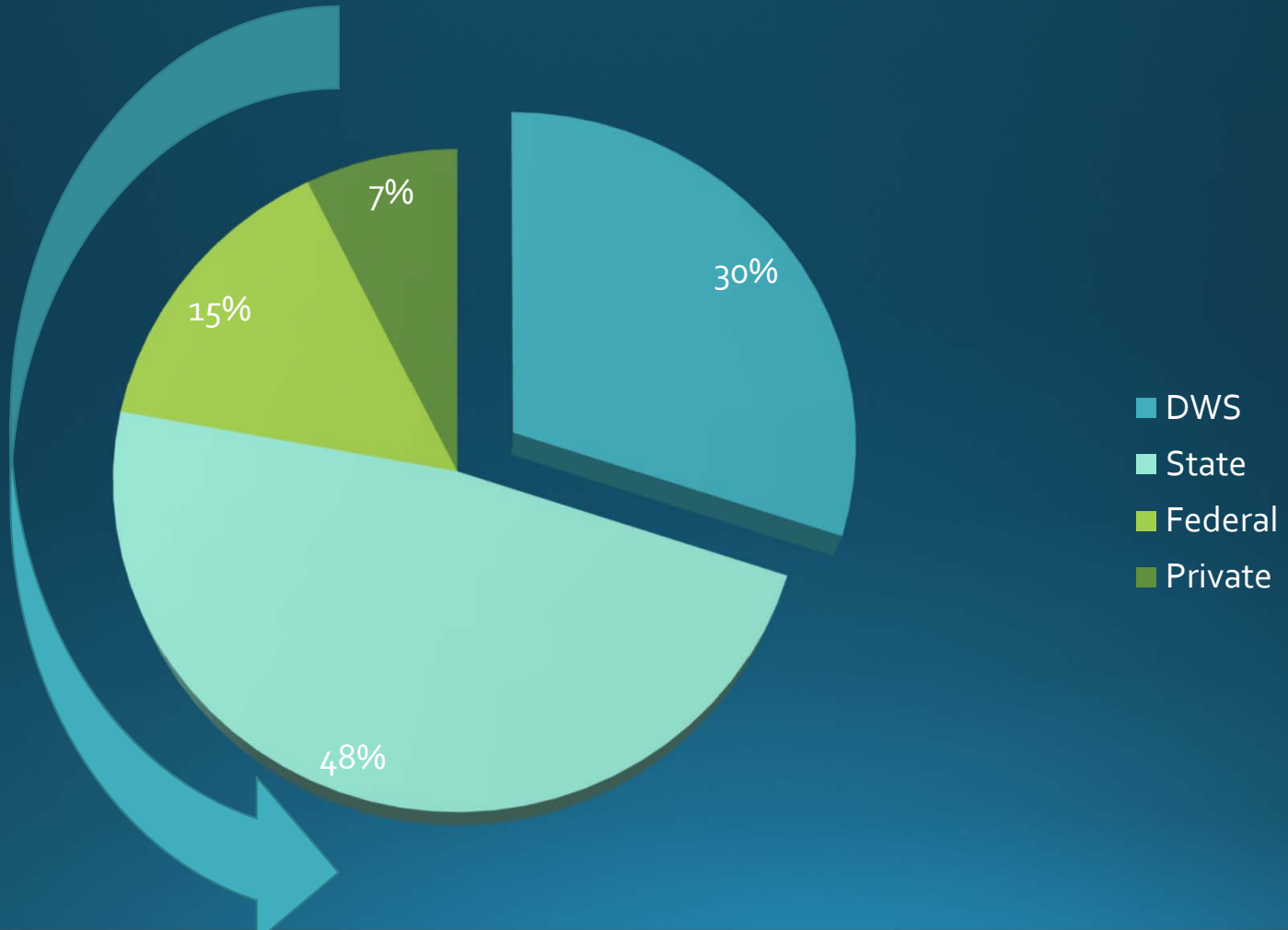
DWS fiscal year	Wai funds requested	Wai funds Received
FY17		\$200,000
FY18	\$230,000	\$204,000
FY19	\$230,000	Preaward \$220,000
FY20	\$265,000	

DWS fiscal year	Kap funds requested	Kap funds Received
FY17	\$75,000	\$65,000
FY18	\$75,000	\$75,000
FY19	\$75,000	Preaward \$75,000
FY20	\$75,000	



Waikamoi Budget FY18

Leveraged DWS funds







The Maui Forest Team – nō ka `oi



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Mahalo!

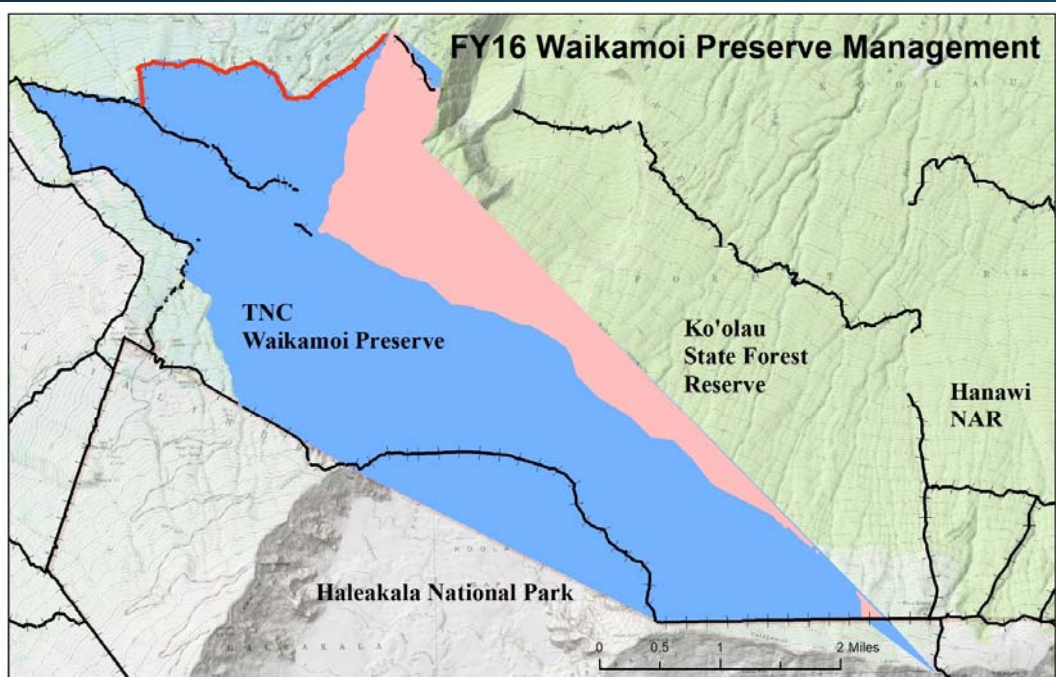




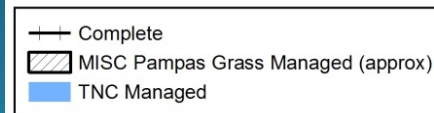
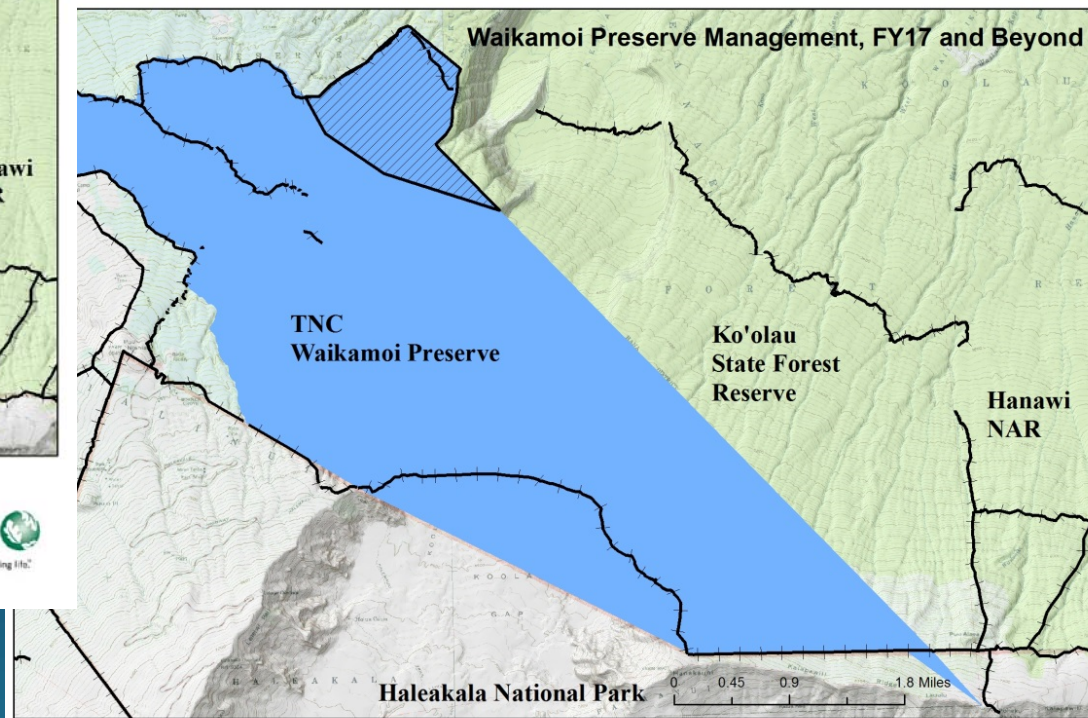
Questions?

Come join us on
a hike into
Waikamoi!

Historical vs. FY2017 management lead by agency and area



Prior to FY2015



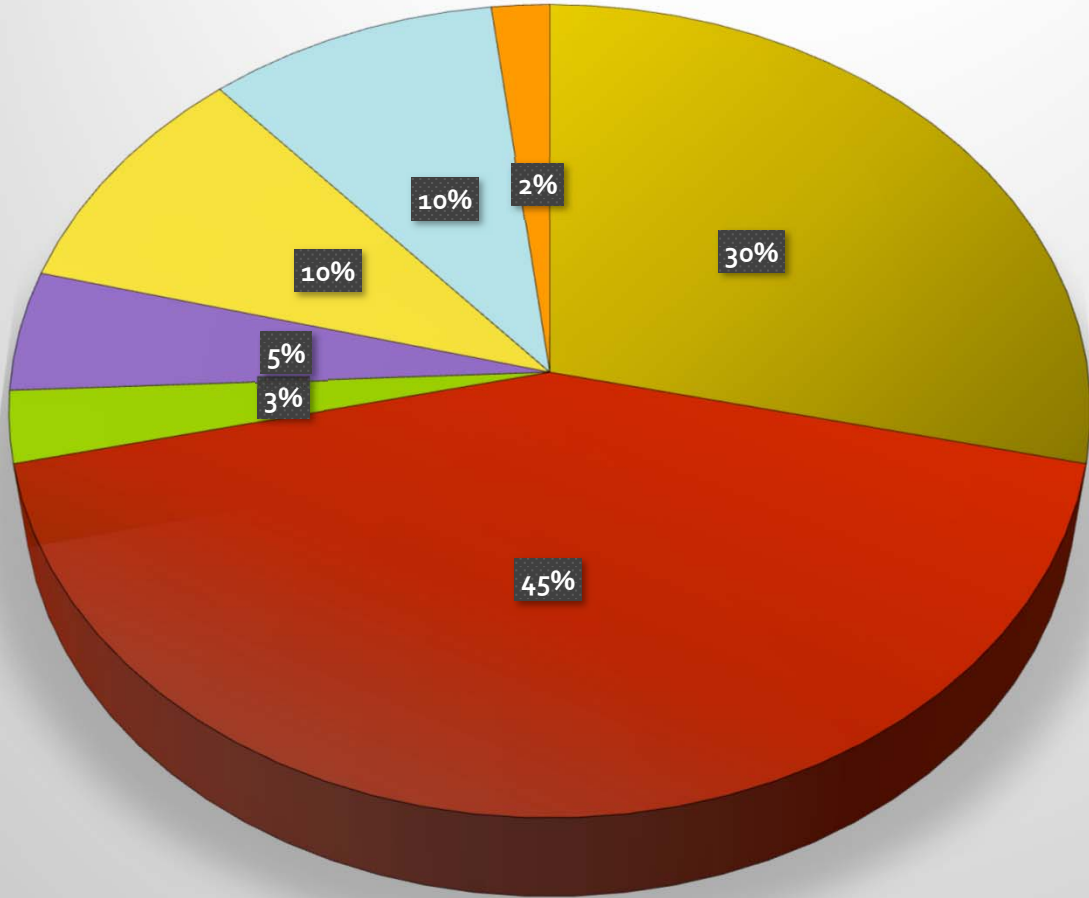
Beginning FY2017

Other threats

- Other Invasives – coqui frog, little fire ant, small mammals, new introductions
- Pathogens
- Wildfire
- Climate change

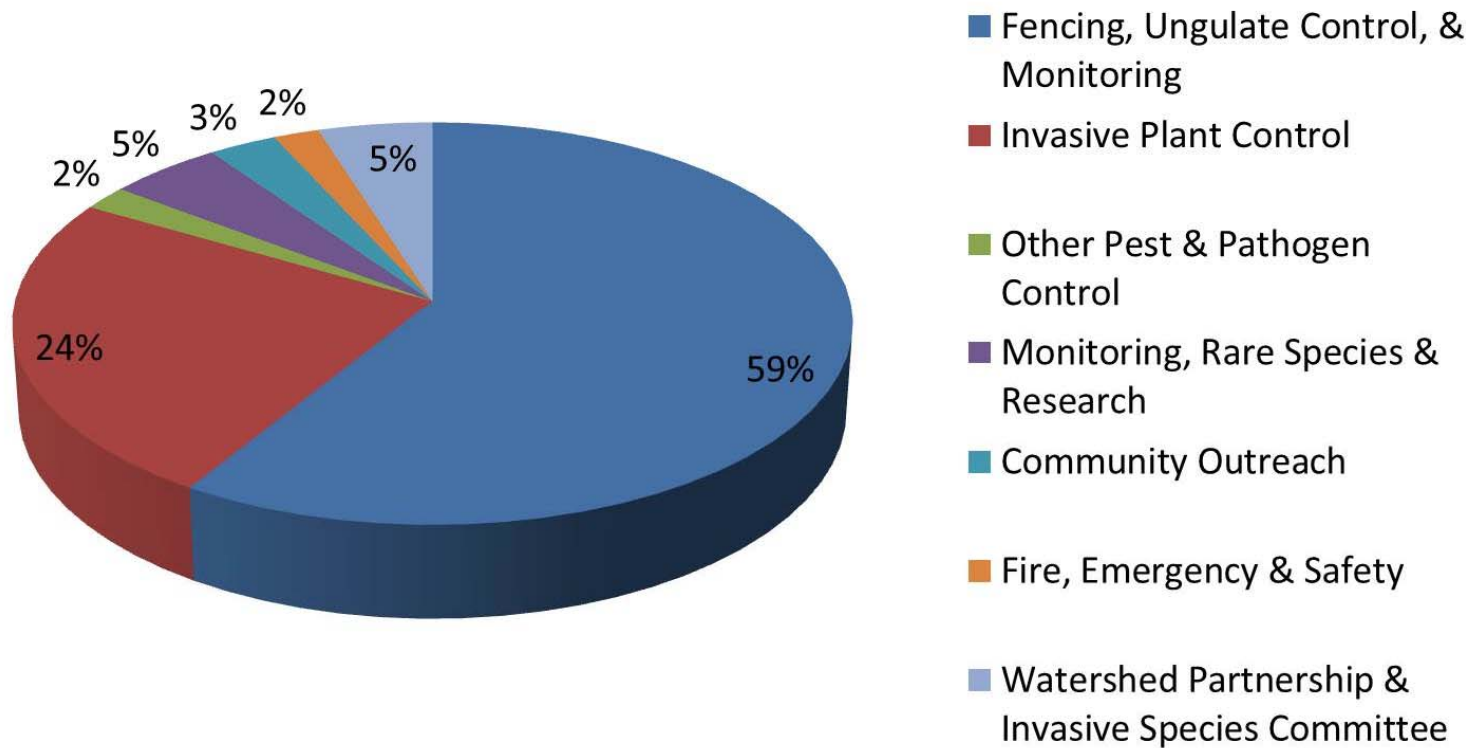


Waikamoi Preserve FY2019-FY2024 Budget Allocations

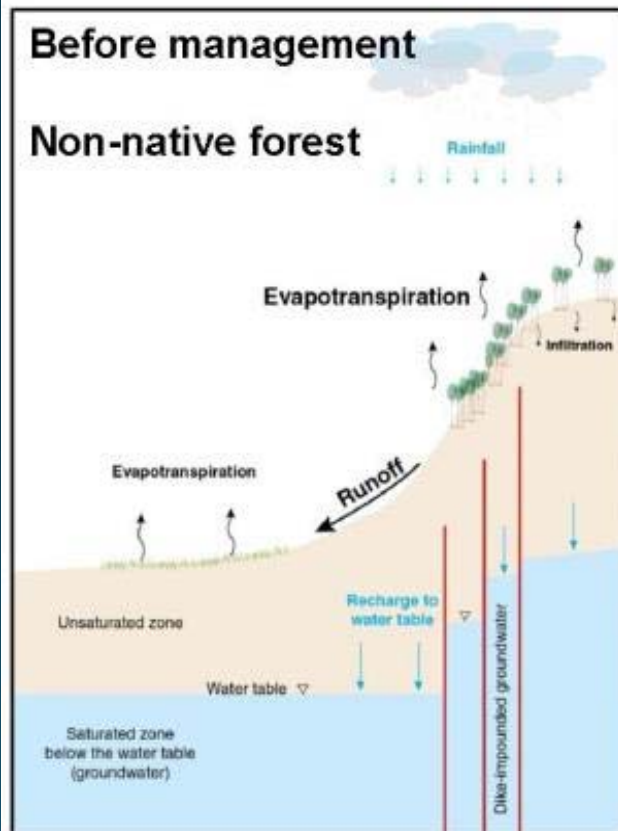


- Fencing & Ungulate Control
- Weed Control
- Other Pest & Pathogen Control
- Monitoring, Rare Species & Research
- Innovation
- Partnerships & Outreach
- Fire, Emergency & Safety

Waikamoi Preserve Approximate Budget Allocations

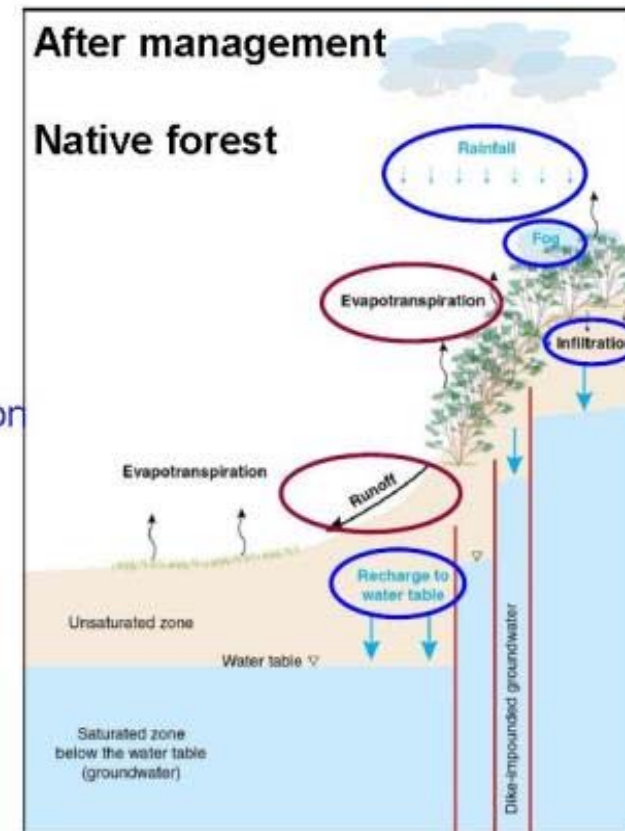


Watershed Management & Restoration Projects May Affect Several Hydrologic Processes



- Goal is to **increase or improve:**
- Rainfall
 - Cloud-water interception
 - Net precipitation
 - Infiltration
 - Groundwater recharge

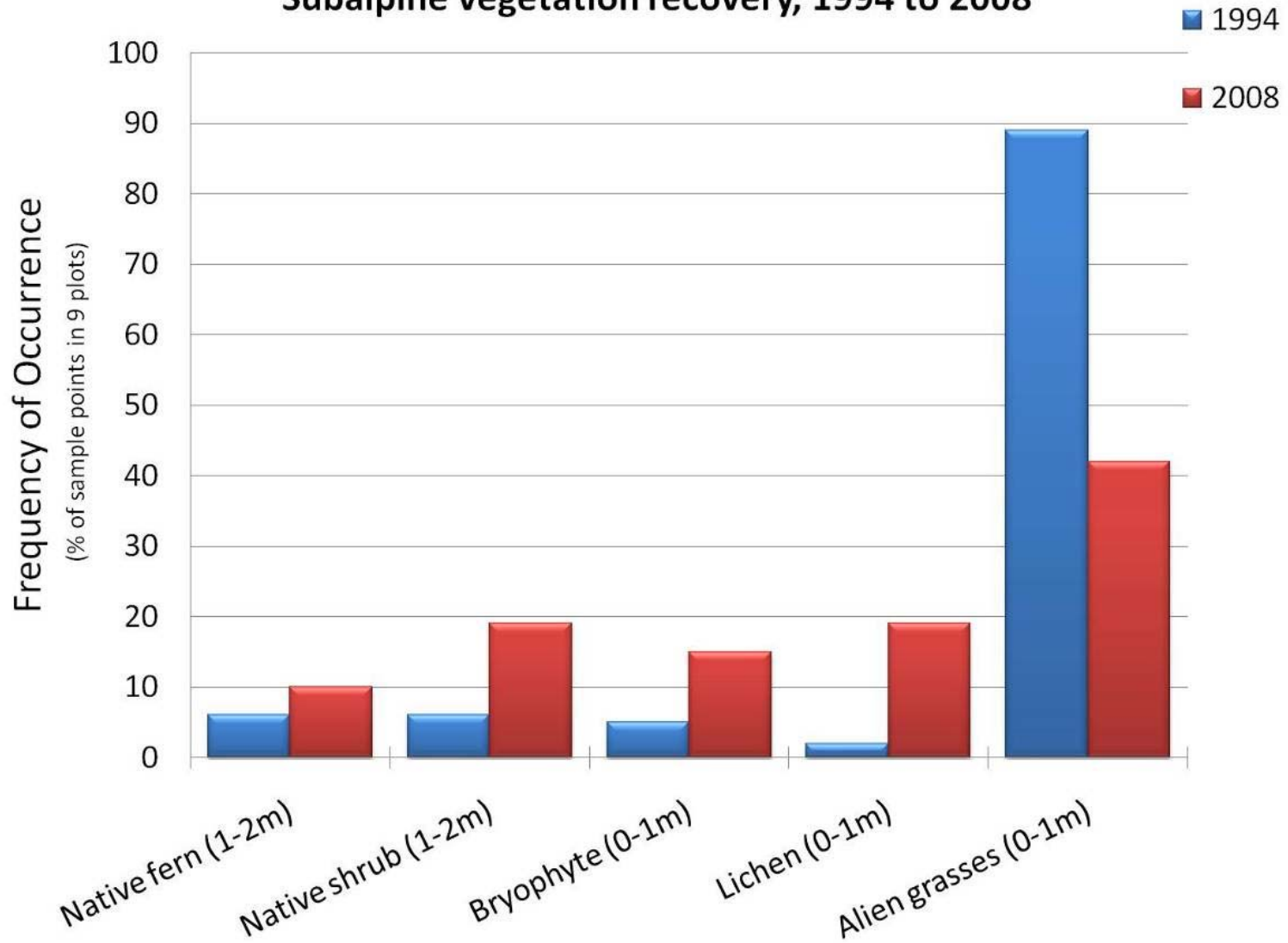
- Goal is to **decrease or lessen:**
- Storm runoff
 - Evapotranspiration

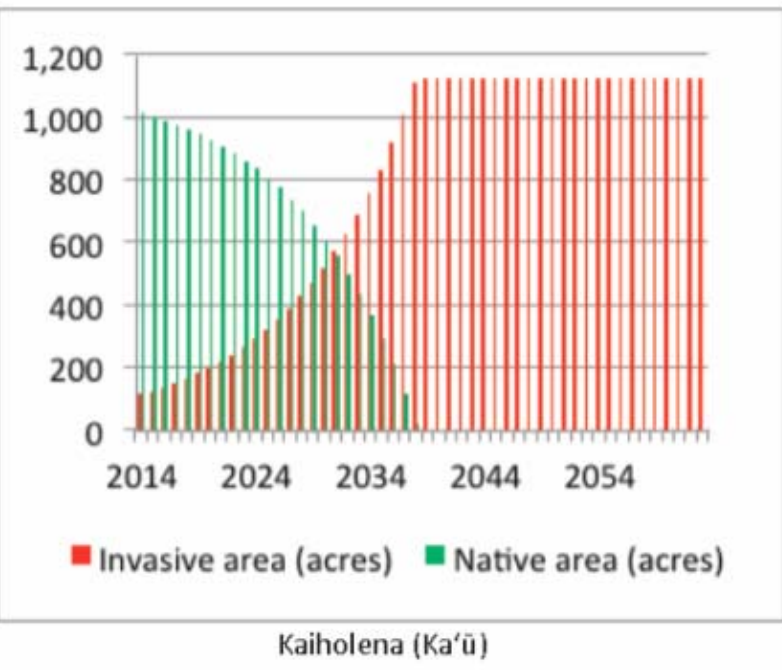






Subalpine vegetation recovery, 1994 to 2008





Projected changes in landcover over time in Kaiholena, Hawaii island **if current watershed conservation activities ceased**. From Burnett et al. 2014 (UHERO).

Watershed conservation return on investment analysis, **depicting groundwater recharge benefits (freshwater volume) generated from conservation activities** at Kaiholena, Hawaii Island. From Burnett and Wada 2015 (UHERO).

