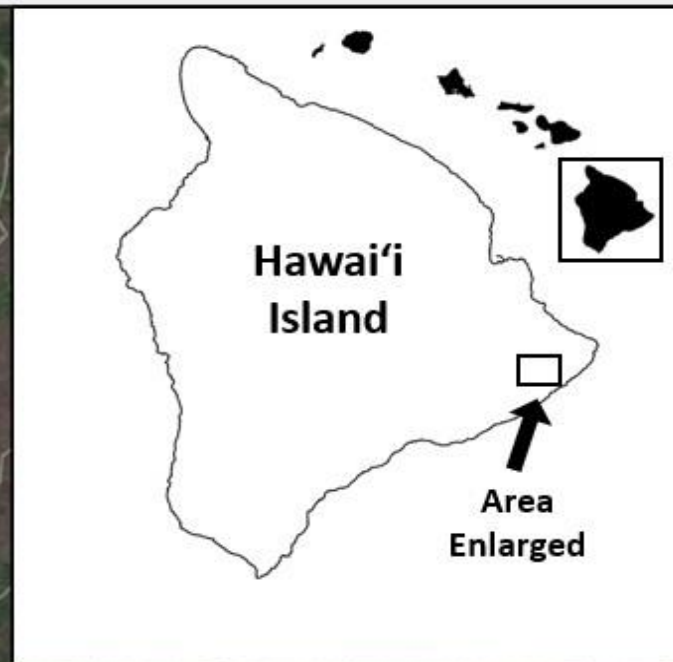
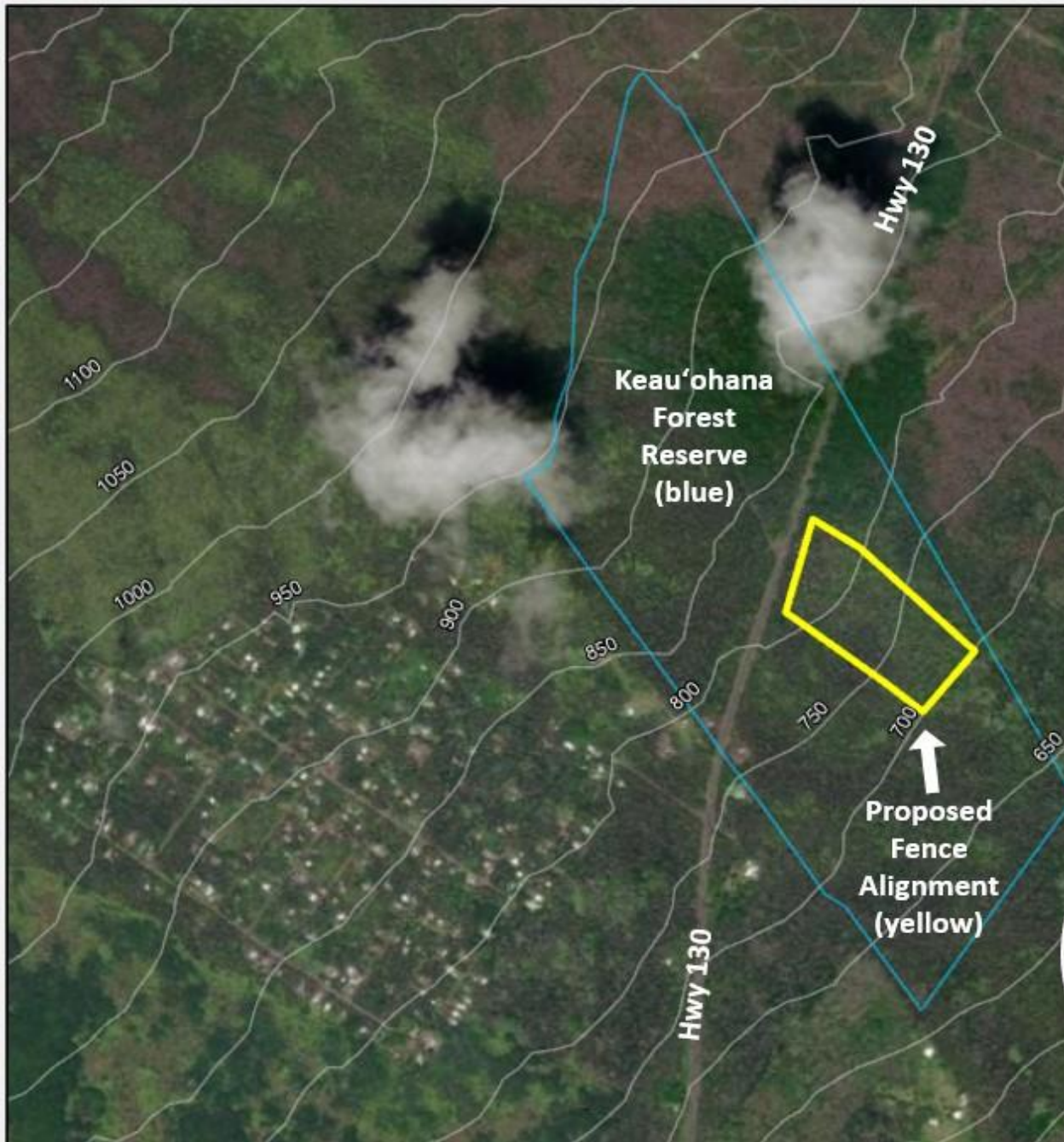


Hawaii Environmental Restoration (HER)



Restoration of Keau'ohana Rainforest Since 2014



Currently completing 9th pass of consolidated 20 acre site (1pass/year)

Environmental Challenges:



Keau'ohana endured hurricane damages *Isele* 2014

Rapid Ohi'a Death (ROD) -- subsequent to Iselle 2015



Feral pig activity



Fencing in 2014 by USFWS



Main strategy:

Hand pulling and composting of invasive species



Managed over time – flipping top layer of regrowth on next pass, prior to reloading

Including Waiawi Piles

Treated separately from other weeds
due to extreme propagule qualities



Worse Pests:



Strawberry guava
(waiawi)





Control treatment of all larger waiawi stems/ Garlon 4

Herbicide:

Garlon 4 (Triclopyr/ oil based),
but Glyphosate is also effective for comeback phenomenon 1 year later



17" folding saw

Selective foliar treatments



Garlon 3A Triclopyr / Recent discovery G4 better



Clidemia hirta
(Koster's Curse)



If properly managed, weeds hold a key to sustainability

- Avoid transporting invasive weed seeds/propagules
- Make efficient compost piles with weeds in localized area
- Chippings or coppicing provides mulch and compost for healthy gardens and trees.
- Larger stems and stumps can be used in Hugelkulture



Permaculture – Grow Food!

Albizia fall-- Hurricane Iselle Mid-2014

Before – Sept 2014



After – Jan 2015



Albizia fall-- Hurricane Iselle Mid-2014

Hügelkultur -- bed preparation



Taro and pineapple 2018

Before -- 2015



After -- 2018



Species-Specific Herbicidal Treatments

INJECTION

Glyphosate (Aquamaster or Round Up)

Very effective

waiawi- 1ml/1" diameter (also cut stump), trema- <0.5 ml/1" diameter, ironwood –1½ ml/1" diameter, melochia-1 ml/4" diameter, banyan, albizia

African tulip

Moderately effective

clusia

Not effective

miconia (cut stump)

Triclopyr (Garlon 3A or Brush-B-Gone)

Very effective

cecropia- 0.5 ml BBG per 1" diameter (also cut stump), albizia- 0.5 ml BBG per 1" diameter (also cut stump), miconia (injection and cut stump).

Moderately effective

melochia (also cut stump), trema (also cut stump), Java plum

Not effective

Ironwood, clusia, waiawi

Triclopyr (Garlon 4 or Remedy)

Very effective for waiawi / circumference cut or cut stump (cambium layer).

Milestone (lowest toxicity level designated by EPA but collateral damage)

It is Aminopuralid salt -- particularly good against legumes / broad leaf

Very effective

Albizia, clusia, banya, Java plum, cecropia, waiawi, ironwood, African tulip

Moderately effective

Melochia, trema

FOLIAR SPRAY

Glyphosate

Moderately effective

Clidemia (6% Roundup accord. to Brezinsky), Polynesian yam (*Dioscorea pentaphylla*) (requires second app).

Triclopyr (Garlon 3A)

Very effective at 0.5 %

Clidemia, miconia, desmodium (the one that tears skin), maile pilau, thimbleberry, watabe fern

Moderately effective at 0.5%

waiawi

Triclopyr (Garlon 4)

Very effective 50ml/gallon = 200ml for 4g backpack

Clidemia, Polynesian yam, erichtites, melastoma, kukae maile

Not effective on lantana

Imazapyr

Very effective (0.3% Habitat)

Clidemia, melastoma

grasses in general

Moderately effective

wedelia (0.3% Habitat)

Not effective

waiawi (0.5% Arsenal AC or Habitat)

maile pilau

legumes in general

Fusilade

Monocot specific/ for grasses 25ml/gallon = 100ml per backpack sprayer

(with **Certainty** product for greater effectiveness, but can kill some flowering plants)

Questions?



Mahalo Nui Loa!

Support Your Local Rainforest:

- Participate in quarterly volunteer events to restore rainforest
- Coordinate a separate volunteer work-group opportunity
- Sign up to work with the crew on a regular workday
- Send in donation for ***Keauohana Native Rainforest Restoration***
- Purchase an e-book copy, or Sign up for a printed copy of :
“ Hawai‘i Plant World Essentials ”
A guide to Wise Plant Choices

Visit: www.malamaopuna.org/keauohana

or contact: **Jaya C. Dupuis** dupuis@hawaii.edu