

Big Island Invasive Species Committee Meeting Agenda

- 9:00 AM Welcome and Introductions
- 9:15 Update from BIISC Partners and discussions about current and future priorities for incipient and established pests on Hawai'i Island.
 - Roles of new interns
 - Lokowaka Update (Ray McGuire, Kanoe DeRego)
- 9:45 Review of established pest plant species work (Jean Franklin, Jimmy Parker)
- 10:00 Future goals for established pests (Jean Franklin, Jimmy Parker)
- 10:15 Review of Rapid Response targets (Jean Franklin, Jimmy Parker)
- 10:30 Future goals for Rapid Response (Jimmy Parker)
- 10:45 Break
- 11:00 Early Detection future goals (Jimmy Parker)
- 11:15 Outreach update and next steps (Page Else)
- 11:30 Mapping Albizia (Julie Gaertner)
- 11:45 Discussion and public comment
- 12:00 noon Conclusion

May 23rd, 2012

DOFAW Conference Room, Hilo

Lokowaka Restoration Project: 'Alae Ke'oke'o

A black duck with a white beak is swimming in a pond. The water is dark blue with ripples around the duck. There are some rocks and debris in the foreground and background.

Raymond McGuire
Kanoë Derego

Background

- Lokowaka is an ancient fishpond in Keaukaha
- Seaside Restaurant leases from HDOA for their aquaculture
- Species of Concern: 'alae ke'oke'o is a native endangered wetland bird
- Previous bird counts showed no juvenile coots in the pond but as many as 24 adult coots





Goals

- Identify factors that potentially affect coot population:
 - Predation
 - Water quality
 - Resource availability
- Work with the community to produce an ongoing project
- Work with schools to promote science education in a local setting

Methods

- Initial observations
- Contact Keaukaha Community and Schools
- Set up camera traps to identify predators and nesting sites
- Localized observations



Lokowaka Fish Pond



0 40 80 160 240 320 Meters

Legend
 Baby Coots
 Cameras



RCX_0037.JPG



RCX09 2012/04/23 09:18:29 30.2inHg 60°F

RCX_0041.JPG



RCX09 2012/04/23 15:00:09 30.2inHg 71°F



Bushnell 05-10-2012 12:42:56



Bushnell 05-10-2012 13:06:02

Juvenile and Adult Coot





Established Pest Plant Species Work

Species

Location

Albizia:

Wao Kele O Puna

Fountain Grass:

Kapoho & Kalapana

Gorse:

Tree Planting Road & Pu'u
'O'o Ranch

Miconia:

Wao Kele O Puna &
Honokaa

Rauvolfia:

Kohala

Wax Myrtle:

Stainback & Mohouli

2012 Established Pest Control Work

Species	Location	Plants Treated
Albizia	Wao Kele O Puna	14
Fountain Grass	Kapoho, Kalapana	58
Gorse	Tree Planting Road, Puu Oo Ranch	15,913
Miconia	S. Hilo(Roadside) Panaewa Stretch	27
Rauvolfia	Kohala-KWP	
Wax Myrtle	Stainback, Mohouli	130

Field Hours Estimate

52 weeks, 40 hours/week	2080
Vacation 21 8-hour days	-168
Holidays, 14 8-hr days	-112
Sick time, one work week	-40
Actual hours worked/yr	1760
For field work, figure 20% of working hours not in field; vehicle & equipment care and preparation, paper work	
The 20% figure assumes a local commute. If it is a long commute, the "hands removing plants" time is even lower.	
Non-field work-20%	352
"Hands removing plants" hours	1408

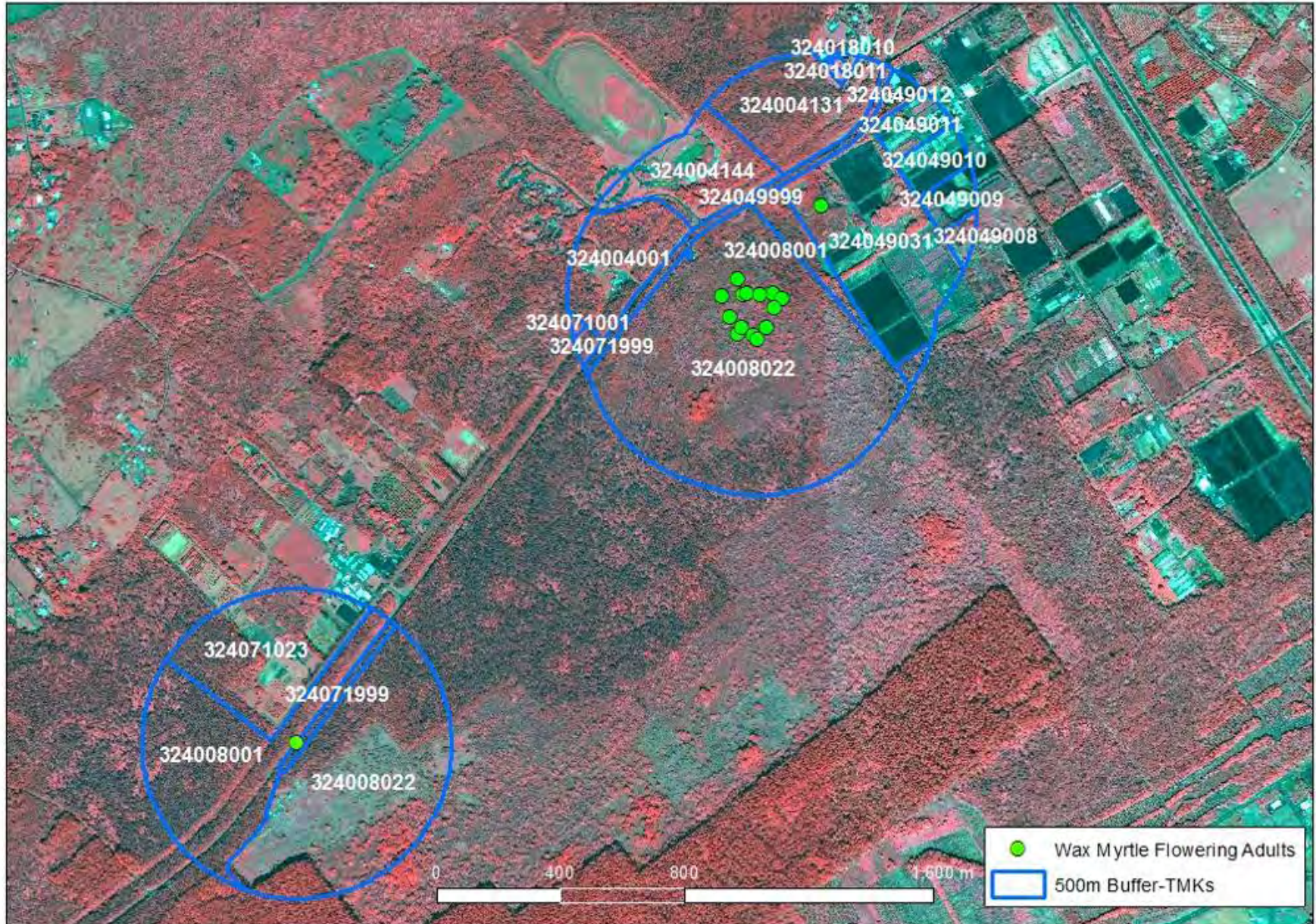
Annual duration is based on two man crew

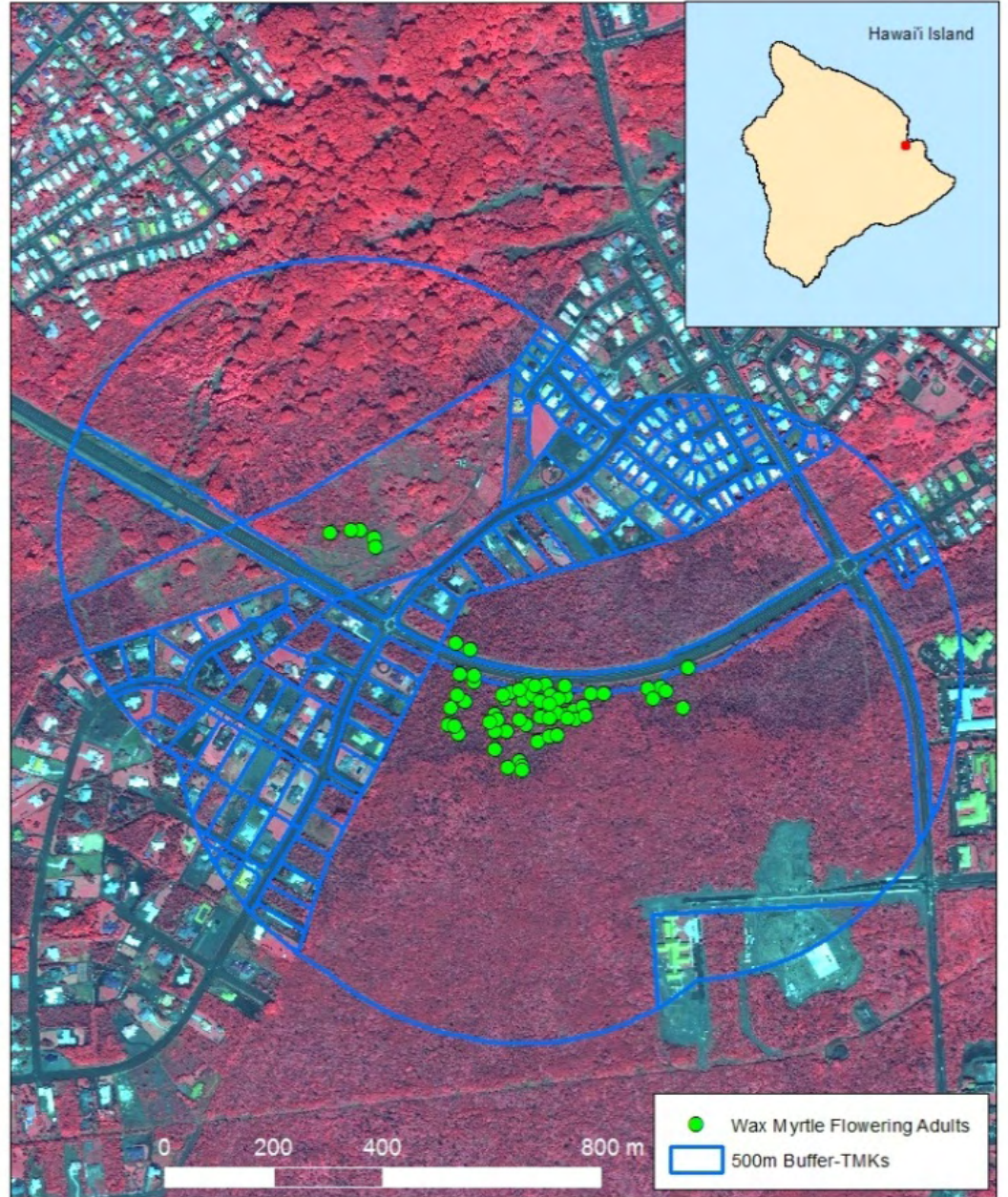
Location	Species	Acreage	Acre/hr	Hours Needed	Annual Duration
Mohouli	Wax Myrtle	426	0.16	2662	1
Stainback	Wax Myrtle	535	0.3399	1573	0.5
Wao Kele O Puna	Miconia	195	0.11	1772	1.2
Honokaa	Miconia	194	0.3	643	0.6
Honaunau	Miconia	1352	0.4	3380	1.2
Keauhou	Miconia	5493	0.28	19617	3.5

Phase	Title	General Theory
1	Initial Suppression	Focus resources and effort on infestation to quickly reduce magnitude of infestation. Revisit frequency high because; plants may be missed, fresh seed bank, stored sugars plentiful, initial control may fail
2	Control	Revisit frequency moderately high. This phase is intended to completely wipe out all emergent targets and majority of recruits from seed bank
3	Monitor	Revisit frequency low. Monitor for new recruits. Phase intended to exhaust seed bank while preventing targets from reaching maturity
4	Conclusionary	Essentially, these are the last few visits. Intended to account for biological anomalies (extra long seed life) and confirm success
*	Temporary Vigilance	Phase can be triggered by unexpected finds or unusual events, e.g. big rains. This is an optional phase that still needs discussion. Either set by user or computer if we are able to define "unexpected finds"

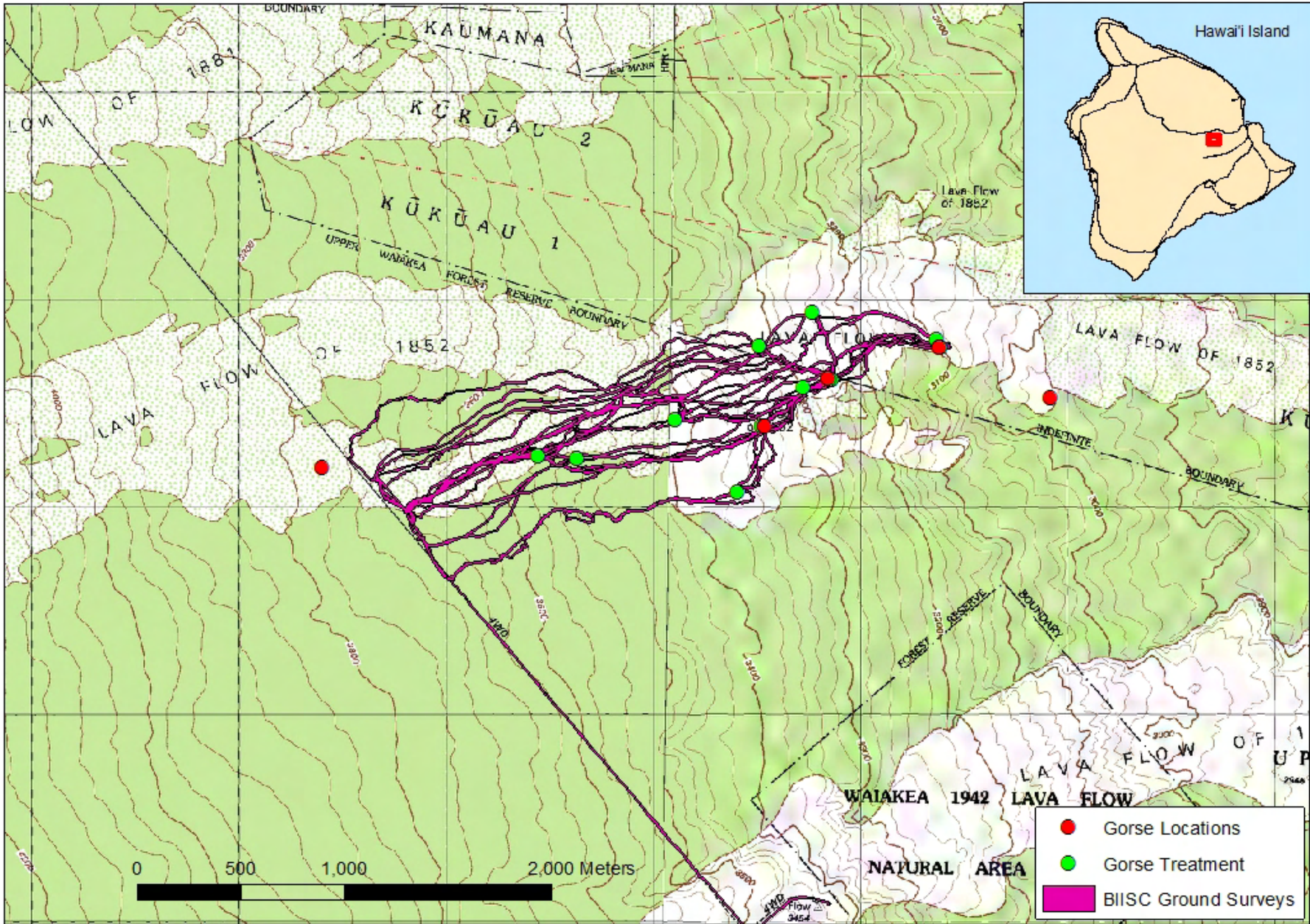
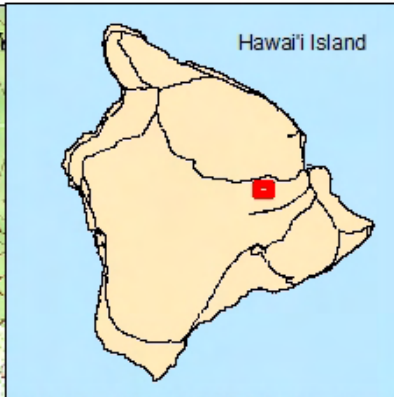
Suggested Frequencies		Phase 1		Phase 2		Phase 3		Phase 4		Phase *		Total Visits	Years Lapsed	
Taxon	Time to reproductive maturity (mo)	Seed viability (mo)	Rev Freq visit/period	Period (mo)	Rev Freq visit/period	Period (mo)	Rev Freq visit/period	Period (mo)	Rev Freq visit/period	Period (mo)	Rev Freq visit/period			Period (mo)
BudMad	?	?	3	6	2	6	1	12	2	24	1	24	8	4
CorJub	12	12	2	6	2	6	1	12	1	24	1	24	6	4
CryMad	3-6	12-121	3	6	2	6	1	12	2	24	1	24	8	4
FalMol	?	?												
MicCal	48	24-48	1	6	1	6	1	12	1	24				
MorCer	36	?	2	6	1	6	1	12	1	24	1	24	5	4
ParAcu	24	24	2	6	1	6	1	12	1	24	1	24	5	4
PauTom	96	?	2	6	2	6	1	12	1	24	1	24	6	4
PenSet	12	72-120	1	6	1	6	1	12	2	24			5	4
RauVom	24	6												
RosLae	?	?	3	6	2	6	1	12	2	24	1	24	8	4
UleEur	2	360	2	6	1	6	1	12	2	24				

Stainback Wax Myrtle Population





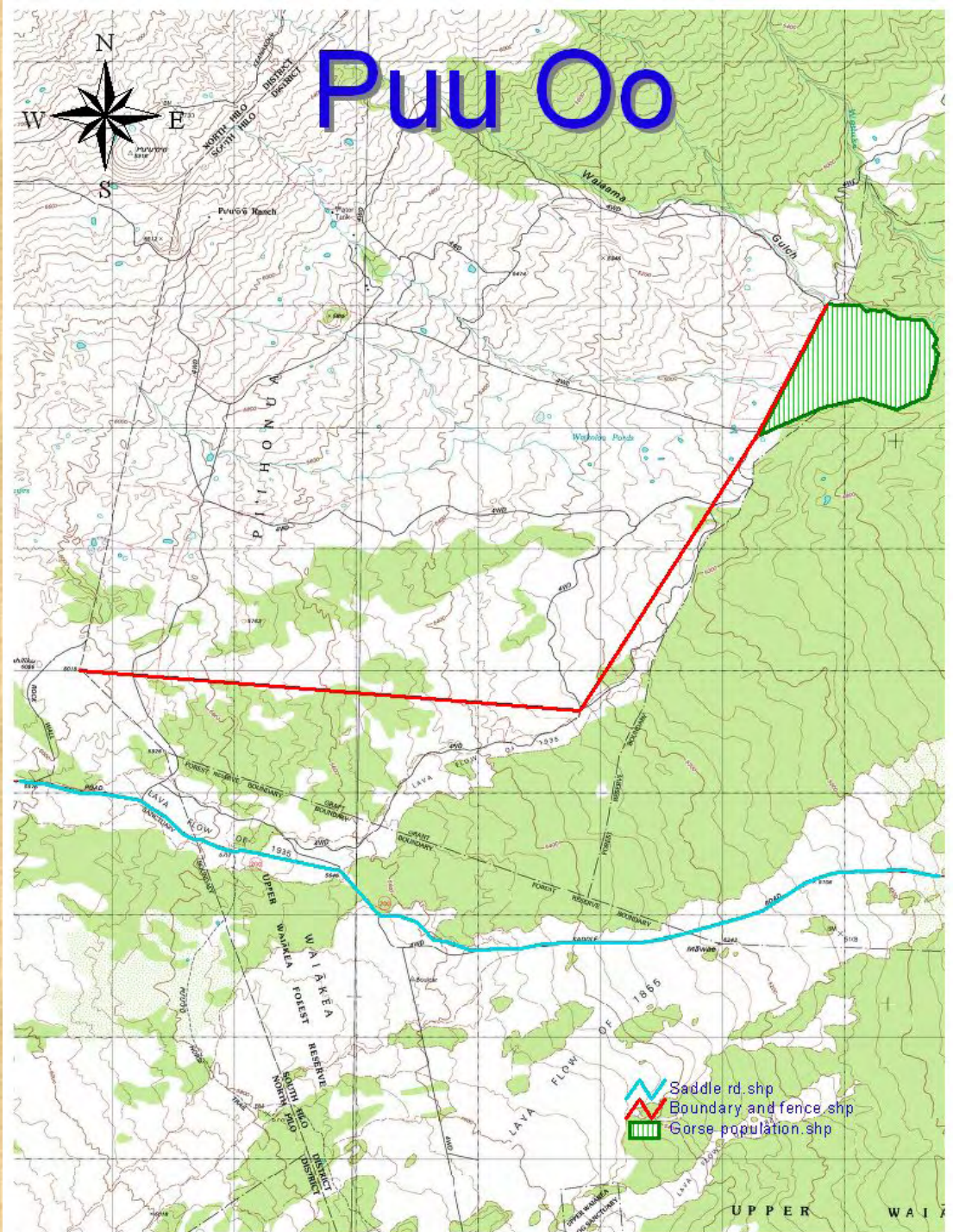
Tree Planting Road Gorse Population



- Gorse Locations
- Gorse Treatment
- BIISC Ground Surveys

Pu'u 'O'o Ranch

- Located between Saddle Road and Mana Road
- Recently came under DOFAW management
- Green Outlined Gorse population is 160 acres
- Partnering with Don Yokoyama to assist in treatment of plants by ground in coordination with their Helicopter Spray operations



Kona Miconia Aerial Surveys Past and Future

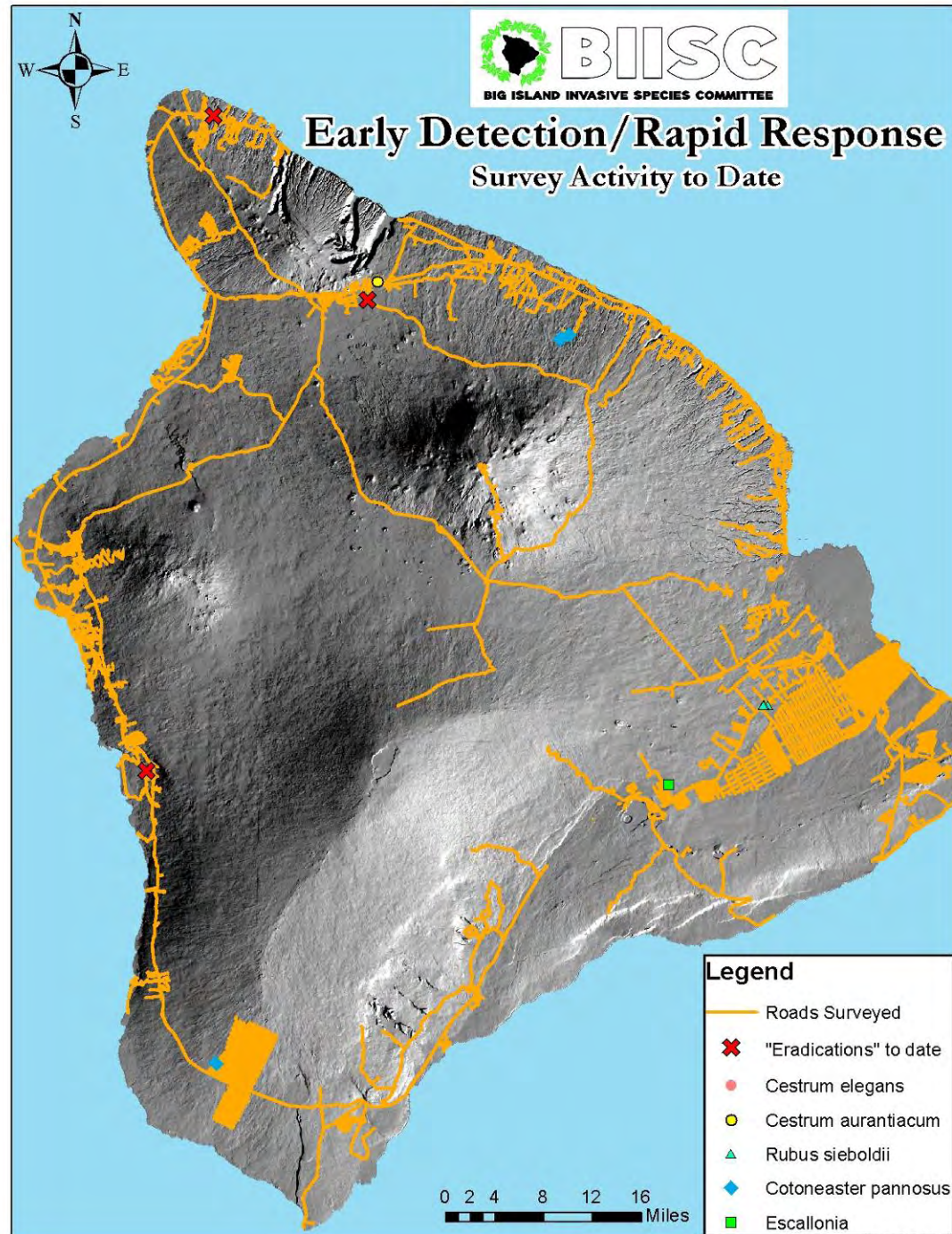
- Honaunau & Keauhou: Flown in June 2006 and April 2007
No Miconia spotted from the air
- Aerial surveys need to be re-visited
- Need to verify Kahalu'u Population

Rapid Response Work

- Big push recently has been against these species:
 - *Cryptostegia mad.*:
 - Controlled all but one known plant in Kawaihae
 - 8 properties left in Puako
 - ~10 properties left in N. Kona
 - 3 properties left in Hookena
 - *Buddleja mad.*:
 - Controlled all known plants in Waimea, Pa‘auilo, and Kona
 - 3 properties left in Puna District plus retreats
- Pampas grass found in very few properties but recalcitrant homeowners makes control difficult.
 - 2 properties left in Volcano
 - 3 properties left in Kona



- 3 “Eradications” to date
 - *Parkinsonia aculeata* in South Kona (Palo verde)
 - *Pereskia aculeata* in Hawi
 - (Barbadoes gooseberry, bad on Molokai)
 - *Paulownia tomentosa* in Waimea (Empress tree)
- New Rapid Response targets needing delimiting surveys
- Herbicide trials for Cherokee Rose
 - 31 properties contain plants needing control



Rubus sieboldii

- Family: Rosaceae
- Molucca Raspberry
- Sparingly naturalized in disturbed areas. Found along Hwy 11 in Mountain View.
- Seeds dispersed by birds and rodents.
- Native to Japan and southern China



Rubus sieboldii



Cotoneaster pannosus

- Family: Rosaceae
- Silverleaf Cotoneaster
- Found spreading through gulches near Kuka'iau Ranch.
- Found cultivated in Volcano and HOVE.
- Seeds dispersed by birds.
- Native to China



Cotoneaster pannosus



Cestrum aurantiacum

- Family: Solanaceae
- Orange Cestrum
- Found cultivated on one property in Waimea.
- Has the ability to invade minimally disturbed ecosystems and is considered a weed in several countries.
- Seeds dispersed by birds
- Native to Mexico



Cestrum elegans

- Family: Solanaceae
- Purple Cestrum
- Found cultivated on one property in Waimea.
- Has the ability to invade minimally disturbed ecosystems and is considered a weed in several countries.
- Seeds dispersed by birds.
- Native to Mexico



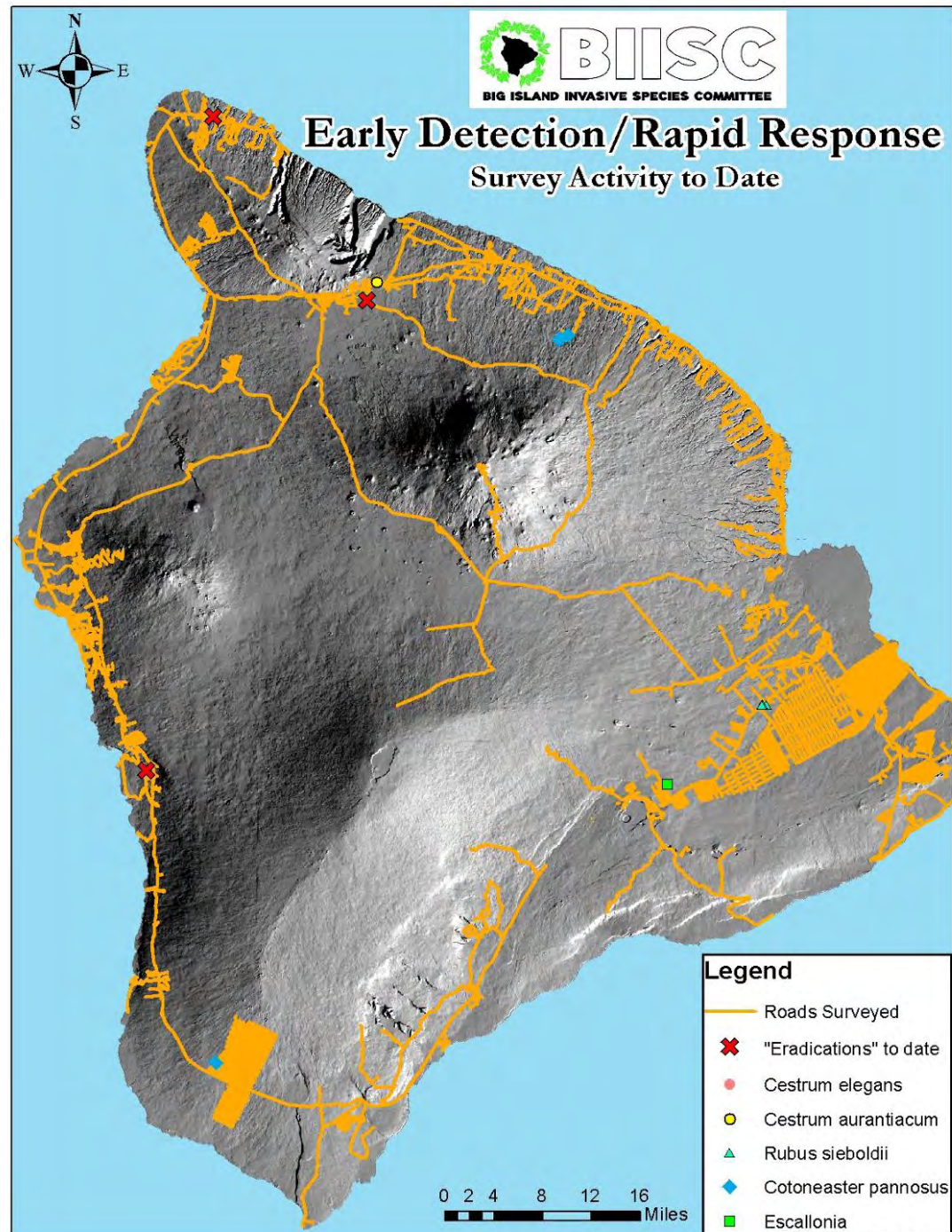
Escallonia rubra var. macrantha

- Red claws
- Family: Saxifragaceae
- One naturalized population in Volcano, invading vacant lot
- Invasive in New Zealand
- Seeds dispersed by wind and water
- Native to S. America



Early Detection

- Finished most of the island with over 3,000 survey miles since 2008
- Currently completing surveys of Hawaiian Ocean View Estates and Hilo.
- Published 60 new plant records in the upcoming HBS *Occasional Papers* (Out in June)
- Surveyed 2 Botanical Gardens and some limited nursery surveys
- Needs:
 - Gauge interest on further nursery surveys and funding opportunities
 - Waipio Valley permission to survey for Early Detection Species and Miconia
 - Delimiting surveys for new Rapid Response Targets



Nursery Surveys

- Identify parameters
 - How many nurseries? How many species?
 - Full inventory or using a list?
- A couple methods to compare
 - Starr's on Maui take full inventory
 - California Plant Right Organization uses list of 19 invasive species and randomly selects nurseries
- Big Island nurseries last surveyed by George Staples in 2007
 - 27 nurseries surveyed looking for species on list provided by committee
 - Chose nurseries from “master list” provided by BIISC
 - Surveyed all those that gave him permission (12 denied)
- Worth going after specific funding?
 - How much of BIISC general funding should be allotted to these surveys?
 - Use volunteers to make it more economical?
 - Plant Right used 143 volunteer Master Gardeners to survey 226 nurseries in 2011



Kim Starr

BIISC OUTREACH 2012




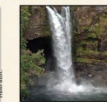


Past Accomplishments

- **New Help: Donna, Malia, Natec (videographer)**
- **Fall 2011 Conferences, posters, presentations**
- **(Oct-March 29 events, 6400 total, 2350 at booth)**
- **Pi'ihonua Albizia Control Team**
- **Improved exhibit materials (aquatic invasives, wetlands, Alula Bay)**

PROTECT OUR WETLANDS

Wetlands are areas covered by fresh, salt or brackish water for part, or all of the year. These unique ecosystems are rich with life and diversity. They filter contaminants from runoff, recharge underground aquifers and provide critical habitat for many plants and animals. On Hawai'i Island wetlands are home to many native species, including endangered birds, insects, fish, aquatic invertebrates and plants. Hawai'i's wetlands are special places worth protecting.

Wetlands on Hawai'i Island

 <p>Marine Wetland Marine wetlands include tidpools, tidal flats and algae beds. They are found at the coast and are connected to the ocean. These rich saltwater environments are important habitat for many marine and coastal species of fish, invertebrates and shorebirds. Marine wetlands can be found along many coastal areas of Hawai'i Island.</p>	 <p>Azhulaine Pool Azhulaine pools are brackish pools connected to tidal flows through porous lava rock. They all occur near the coast, but are generally landlocked. They are the main habitat for the tiny native 'opae 'ula shrimp. These pools are found on the younger islands, and the largest concentration is located on Hawai'i Island's, Kona Coast.</p>	 <p>Estuarine Wetland Estuarine wetlands are found where springs, streams or rivers meet the coast. These wetlands are brackish, and host a rich diversity of species, including both marine and freshwater aquatic animals. They also provide vital habitat for native shore birds. On Hawai'i Island these are fairly rare due to lack of permanent streams and rivers.</p>	 <p>Riverine Wetland Riverine wetlands are found along the banks of Hawai'i's rivers and streams. These periodically flooded areas are home to many unique native species of fish, aquatic invertebrates, insects and birds. Hawai'i Island is a young island with relatively few rivers and streams, so these habitats are especially important to preserve.</p>	 <p>Montane Bog Montane bogs are rare wetland types found at high elevations. They are fed only by rainfall, and are home to associations of plants found nowhere else. They may take many centuries to develop. On Hawai'i Island montane bogs can be found high on the slopes of Mauna Kea, Mauna Loa and Koolau Mountain.</p>	 <p>Aquacultural Wetland Aquacultural wetlands are fresh water wetlands which have been modified by people to grow food, such as taro or rice. Since these areas remain wet for at least part of each year, they still function as habitat for many native species. Waip'o Valley contains one of Hawai'i's largest concentrations of aquacultural wetlands.</p>
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Native Species

 <p>Alae ke'oke'o - Hawaiian Coot Hawai'i Island's wetlands are home to many native plants and animals which depend on these special ecosystems to survive. Many of our wetland species are endangered, the victims of shrinking habitats and new alien predators and invasive plants. Some wetland plants, like the Ku'u silversword, have a very small population and are found only in an extremely limited area. Wetland birds like the endangered 'alae ke'oke'o (Hawaiian coot) and the 'alae (Hawaiian stil) can now only be found in a few places on the island. The 'alae ke'oke'o, is famed in Hawaiian mythology for knowing the secret of making fire. The demigod Maui caught the 'alae and made her tell him the secret so that humans could have fire.</p>	 <p>Alanihihina - Ku'u Silversword Makaloa, a fibrous sedge found in wetlands has been traditionally used by Hawaiians to weave very fine mats. Another wetland sedge, 'ahu'awa, was used as a strainer for the culturally important drink made of the root of the 'ava plant.</p>	 <p>Ahu'awa - Umbrella Sedge</p>	 <p>Ponae'ula - Hawaiian Damselfly</p>	 <p>A'ua - Water Hyacinth</p>
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Nihoaia i ka wai ka moku o ka puna - Umbrella by the water on the face of the flower. Flowers thrive where there is water, as thriving people are found where conditions are good.

Threats to Hawai'i's Wetlands

He ke'eno ka 'alae a Hina - A warning by Hina's medicine
A warning of trouble. The cry of a mudhen at night is a warning of distress.

Wetlands on Hawai'i Island are threatened by many factors including development, pollution, invasive species and climate change.

Invasive plants like the red mangrove choke out native vegetation and harm coral by creating shade and decomposing muck which smother's live coral polyps.

Alien predators like the mongoose and feral pets threaten ground nesting wetland birds like the 'alae (Hawaiian stil) and the 'alae ke'oke'o (Hawaiian coot). Higher temperatures, rising sea level and changes in rainfall due to climate change can also harm wetlands.

Invasive Red Mangroves
Efforts to restore Hawai'i Island's precious wetlands are currently underway in every district. In South Hilo, Lokowaka Pond, an important habitat for the endangered 'alae ke'oke'o (Hawaiian coot), is being studied to determine how to increase nesting success.

Alula Bay
Alula Bay in Puna, invasive red mangroves are being removed to protect coral, increase water quality for native species and improve habitat for native plants. This effort, by the local environmental group Maama O Puna, has been sponsored by the US Fish and Wildlife Service and the Hawai'i Tourism Authority.

Restoring Fragile Ecosystems

Lokowaka Pond, South Hilo District
In Waip'o Valley, Hāmānūka District, local taro farmers have worked to restore the flow of water to traditional kalo (taro) or flooded taro patches, in the valley. The taro function in much the same way as the wetlands previously found there, providing habitat for many native plants and animals, including some endangered species like the native stream dwelling fish, the 'ōpae.

Honu'āpo - Kā'i'a District
In Kā'i'a a major project to restore Honu'āpo wetland is ongoing. This project, spearheaded by the grassroots group Ka Ohana O Honu'āpo, and sponsored by a grant from the US Fish and Wildlife Service aims to restore the wetland's hydrology and improve habitat for native species.

Waip'o Valley - Hāmānūka District
What you can do to help:

- Find out more about Hawai'i's wetlands and the unique native species that depend on them.
- Volunteer to help restore a wetland near where you live with a community or environmental group.
- Don't abandon your pets. Feral pets are a major cause of wetland bird decline.
- Never release fish or aquatic plants into the ocean, rivers or streams. Instead, call your local Hawaii Department of Agriculture for drop-off locations.
- Learn to recognize invasive species in wetlands and report them to DLNR (Hawaii Department of Land and Natural Resources).

Alula Bay - Kā'i'a District
O' Honu'āpo aku no in o ka hōi a ka 'ahu'awa - That is Honu'āpo where the 'ahu'awa grows
A Kā'i'a saying about disappointment. The 'ahu'awa was much used as a filter for straining 'ava. A 'play on 'hōi' (to strain) or to be disappointed.)

BIISC
BIG ISLAND INVASIVE SPECIES COMMITTEE

Six Month Goals

- **Maintain presence festivals, media, Facebook**
- **DOT roadside worker training, Feral Pet**
- **Education on climate change & invasive species dual impacts & interactions**
- **Improvements to Website**
 - Watershed awareness, native plants, green industry tools, vertebrates, ED RR species info
 - **VIDEOS**

Change Detection and Distribution of Albizia (*Falcataria moluccana*) on Hawaii Island



Julie Gaertner

University of Hawaii at Hilo

Tropical Conservation Biology & Environmental Science Graduate Program

Ecosystem processes, composition and structure

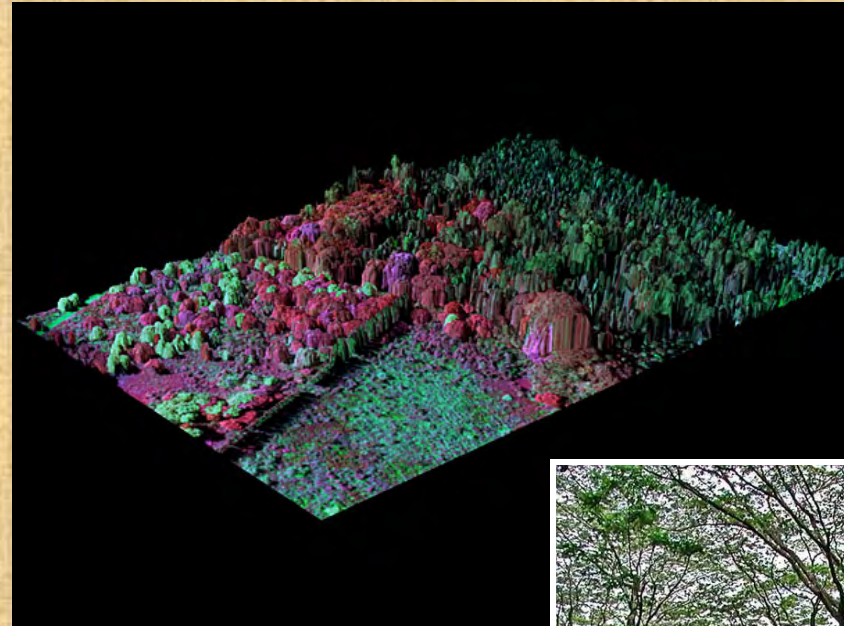
Albizia increases biomass, availability
and cycling of nutrients



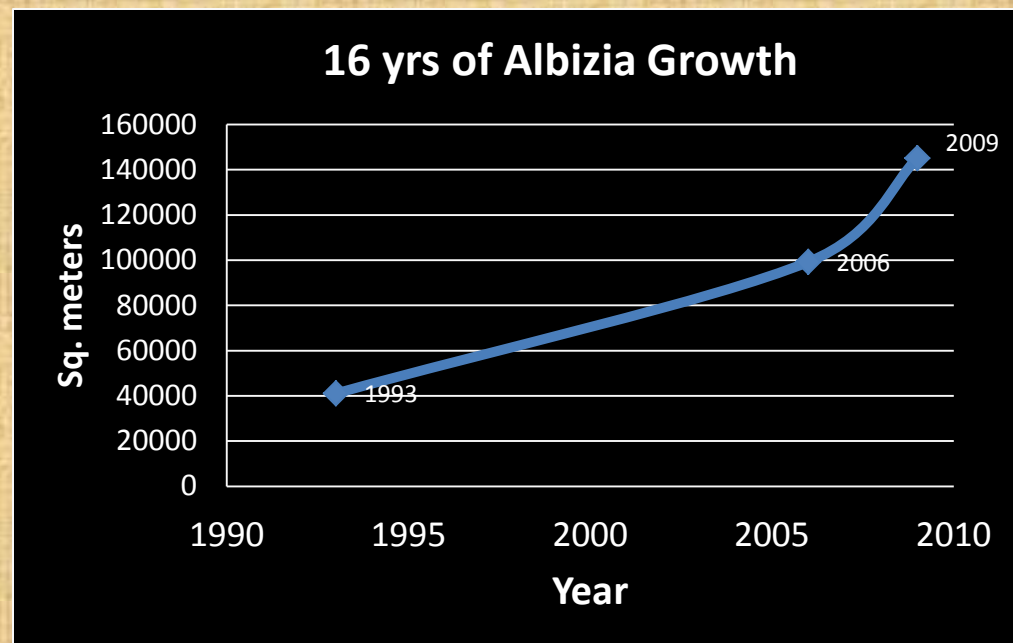
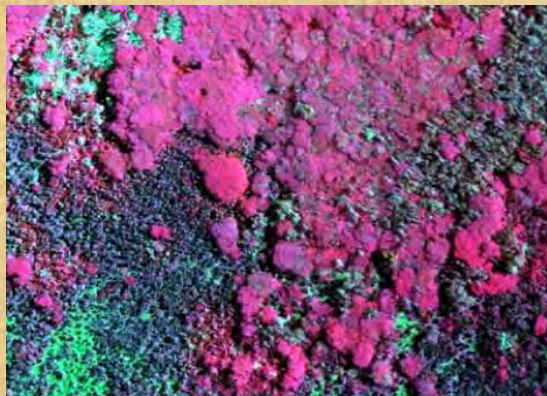
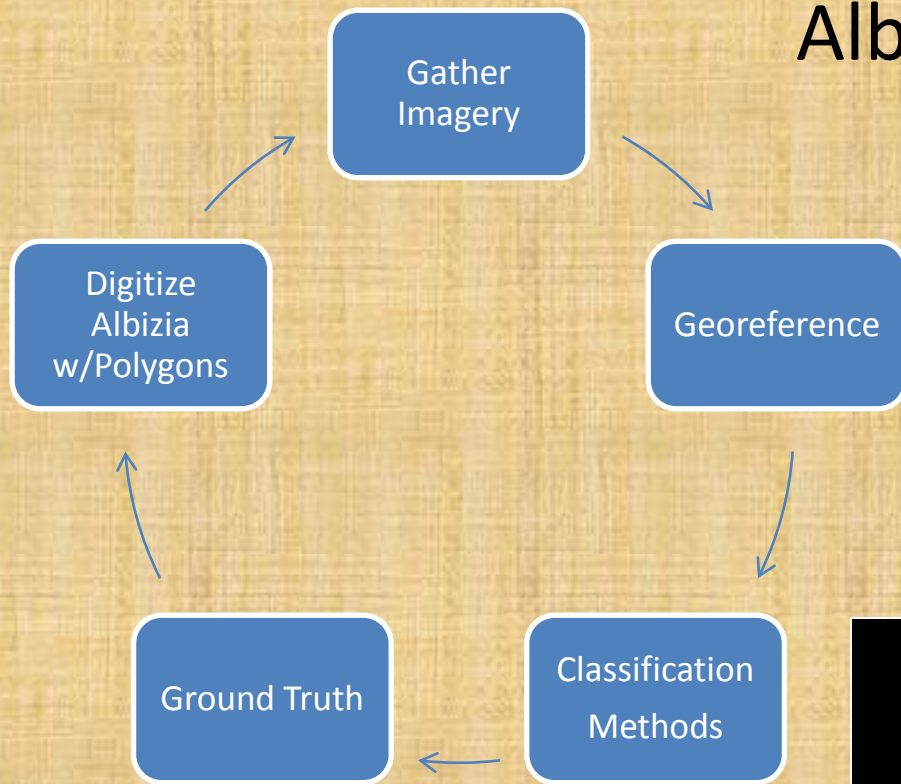
N:P ratio,
biomass, soil
N, soil P



C:N, C:P ratio,
light



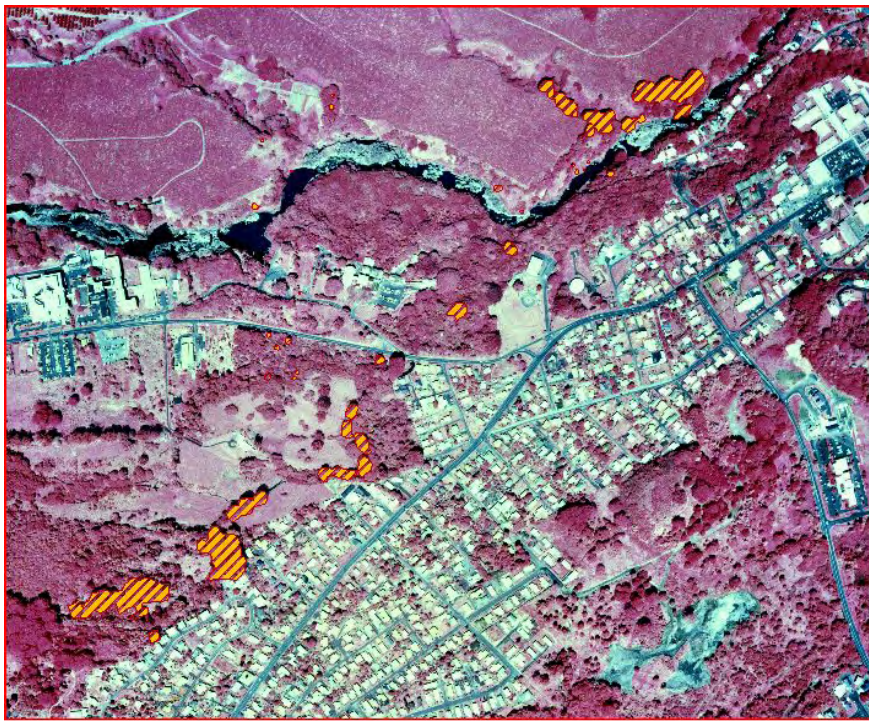
Albizia Identification Method and Results



Rainbow Falls, Wailuku River, Hilo, Hawaii.

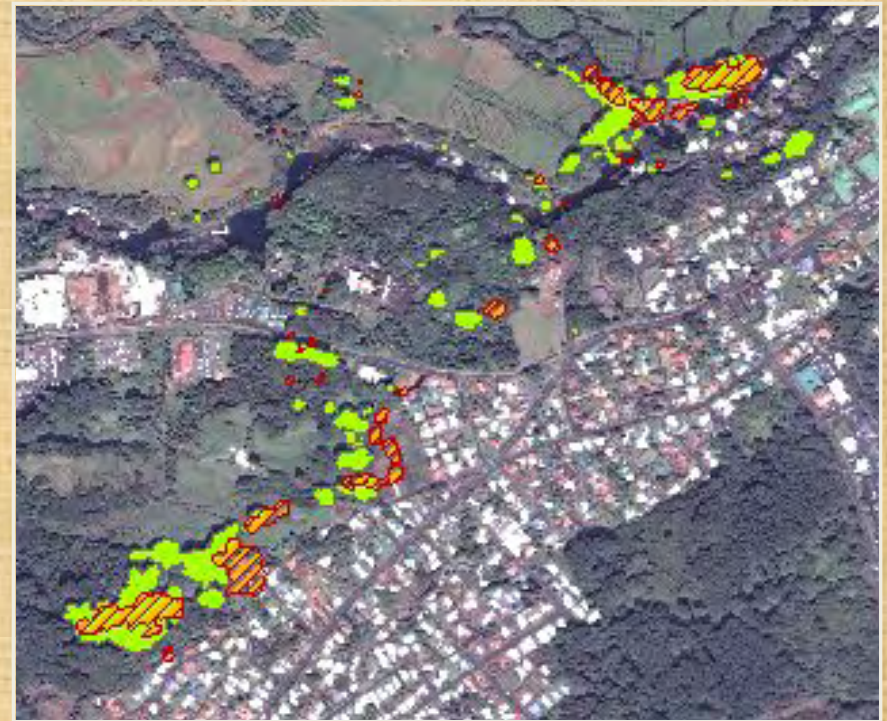
Study area: 2.2 km²

13 yr net increase of 141%



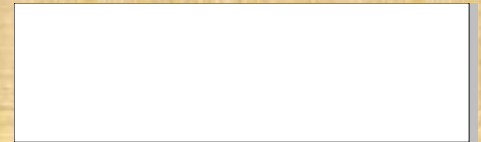
41,050 m² of albizia in 1993

1993 Aerial Photo Credit: Department of Fish & Wildlife



99,227 m² of albizia in 2006

Quickbird 2006 satellite imagery: Big Island Invasive Species Committee

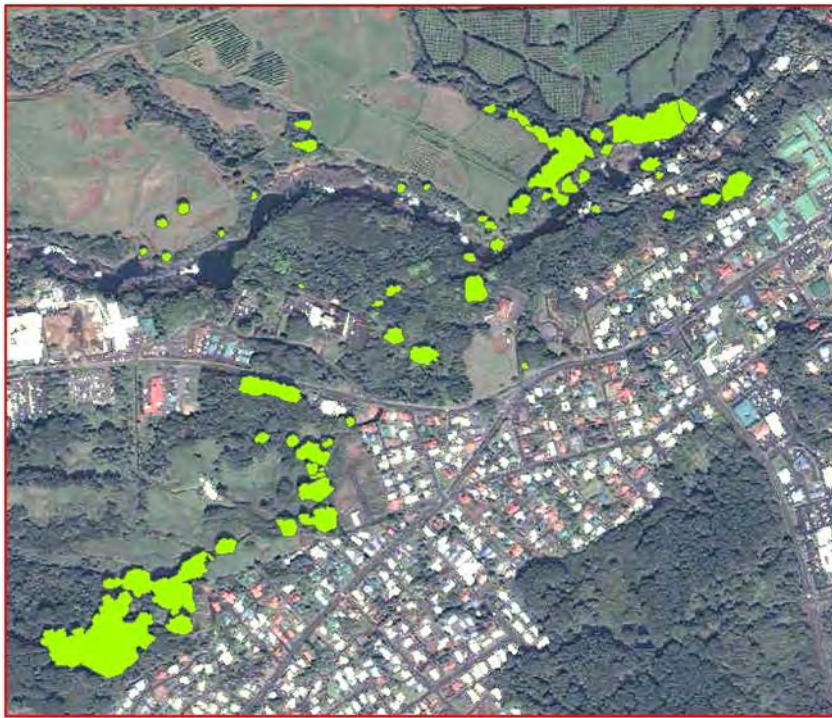




Rainbow Falls, Wailuku River, Hilo, Hawaii.

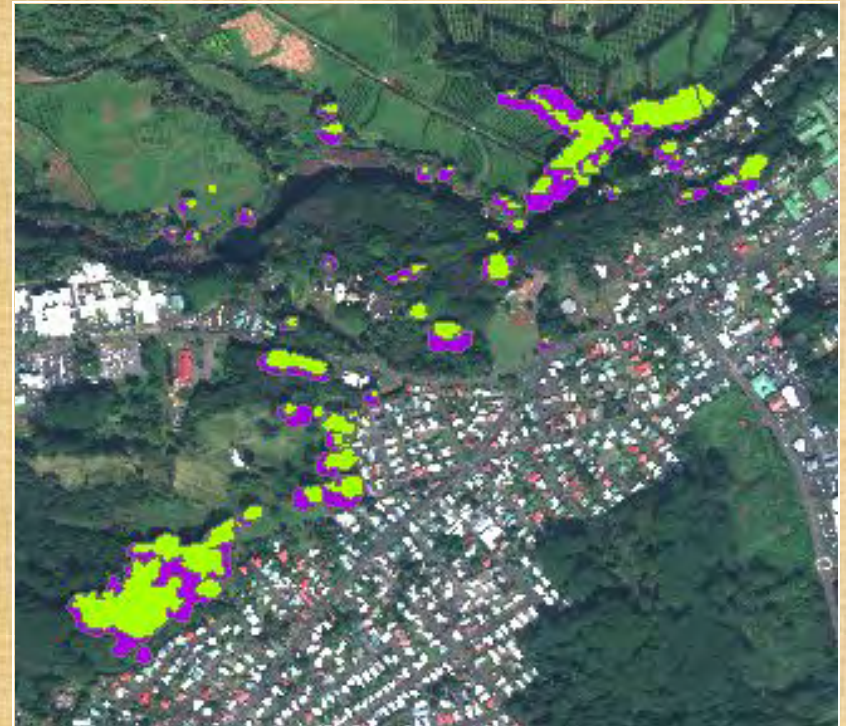
Study area: 2.2 km²

3 yr net increase of 46%



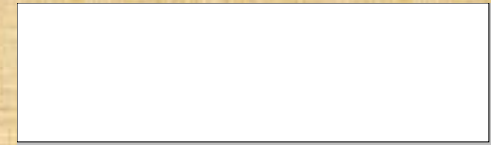
99,227 m² of albizia in 2006

Quickbird 2006 satellite imagery credit: Big Island
Invasive Species Committee



145,106 m² of albizia in 2009

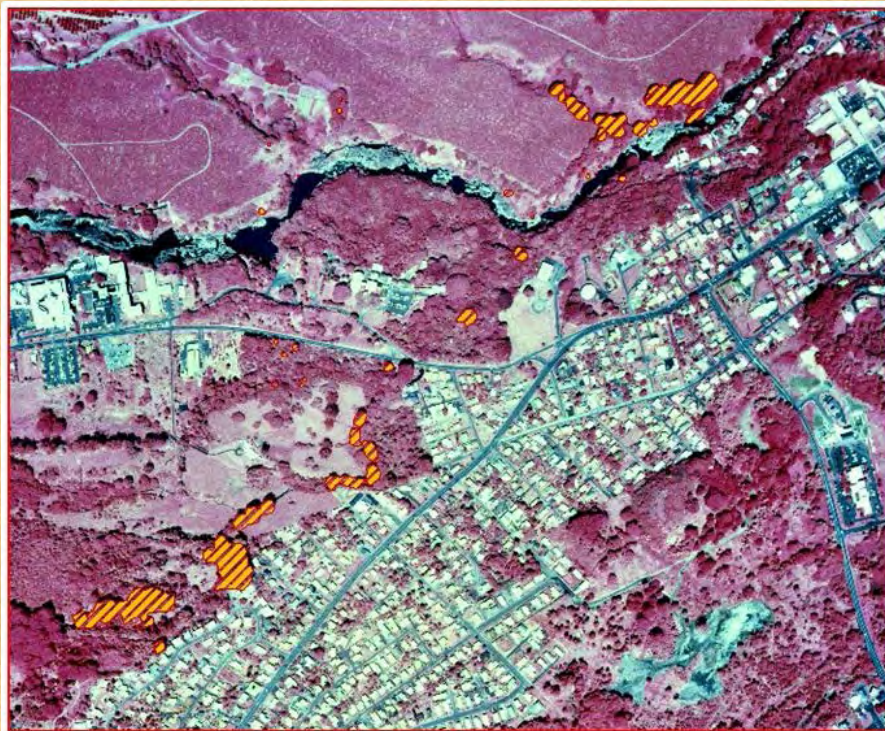
Worldview2 2009 satellite imagery credit: UH Hilo



Rainbow Falls, Wailuku River, Hilo, Hawaii.

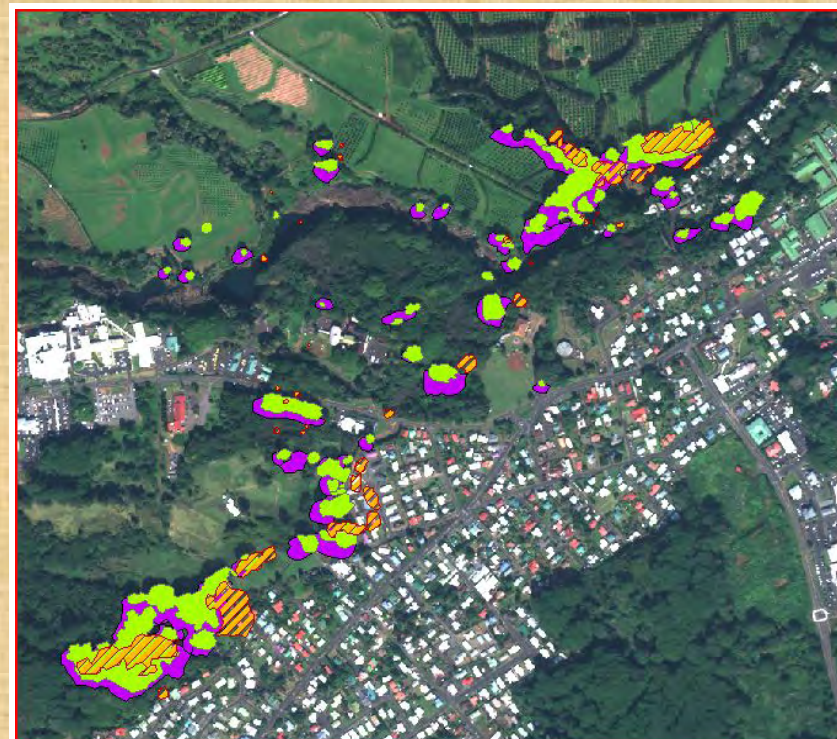
Study area: 2.2 km²

16 yr net increase of 253%



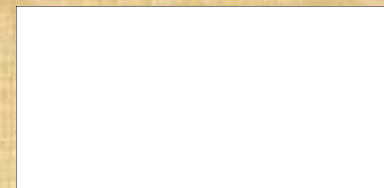
41,050 m² of Albizia in 1993

1993 Aerial Photo Credit: Department of Fish & Wildlife



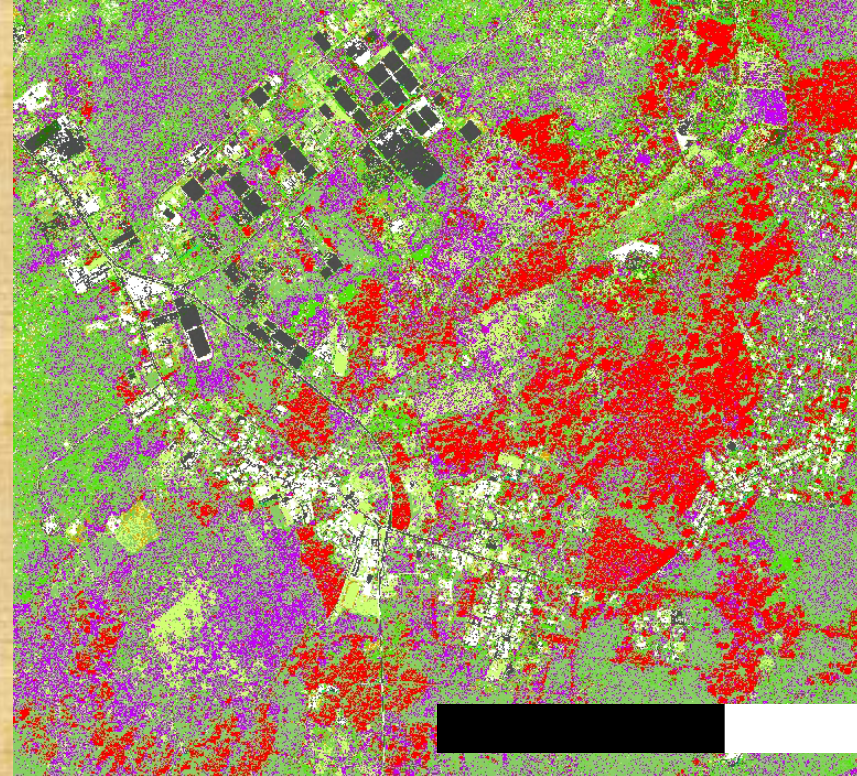
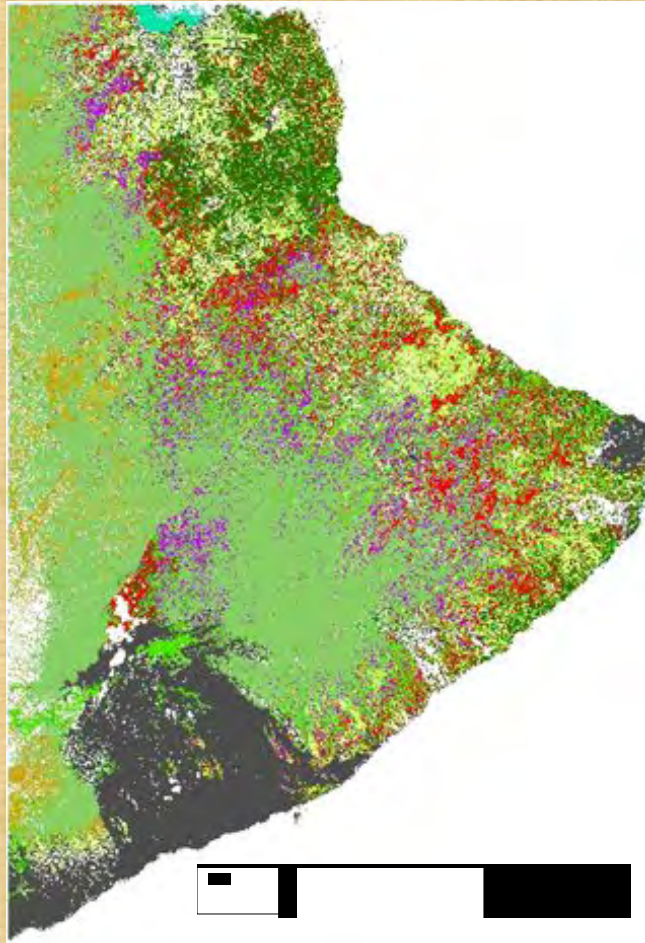
145,106 m² of Albizia in 2009

Worldview2 Satellite Imagery: UH Hilo



Classification in ArcGIS 10

Study Area: Puna and S. Hilo Districts of Hawaii Island
Worldview2 2009 Satellite Imagery



Acknowledgements: Remote
Sensing work

Jonathan Price
Flint Hughes

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