The Nature Conservancy
Protecting nature. Preserving life.™

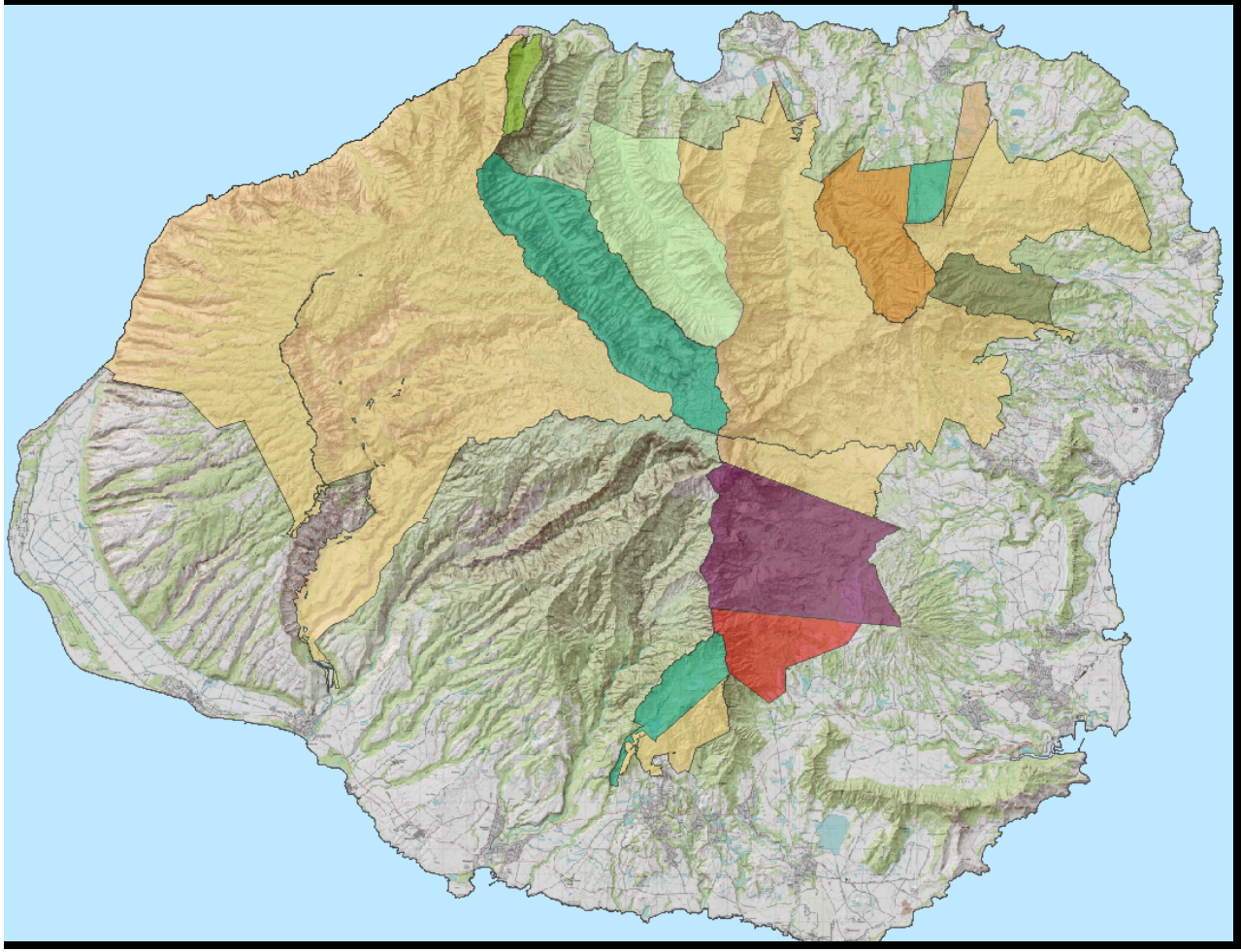
Trae Menard
Dir. Of Forest Conservation
& Kauai Program
The Nature Conservancy

Kauai Watershed Alliance Members

State of Hawaii – DLNR & DHHL

National Tropical Botanical Garden

County of Kauai – Department of Water



McBryde Sugar Co.

Kamehameha Schools

Princeville Utilities

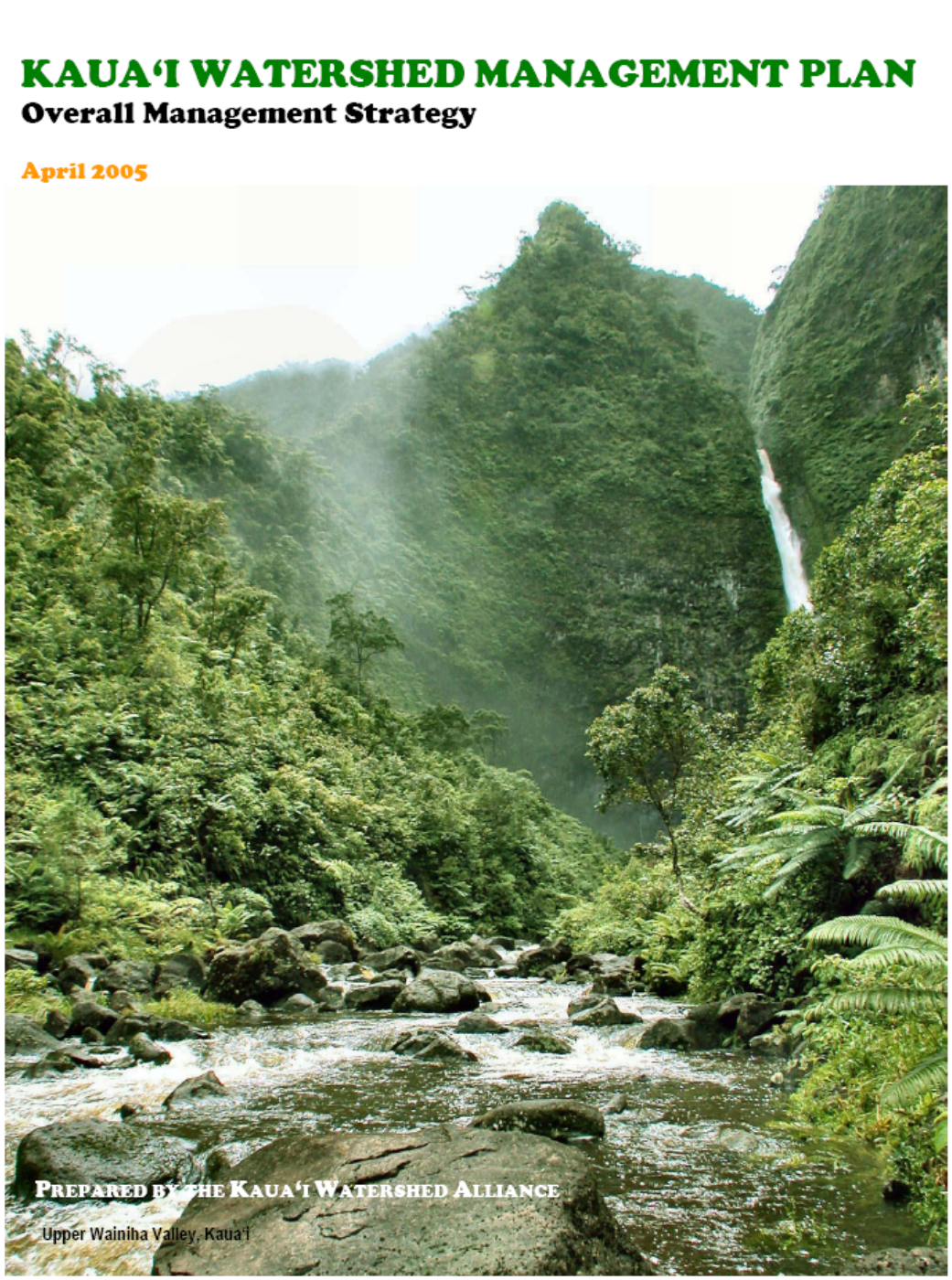
Lihue Land Company

Grove Farm Company Inc.

Namahana Farms

Kauai Ranch LLC.

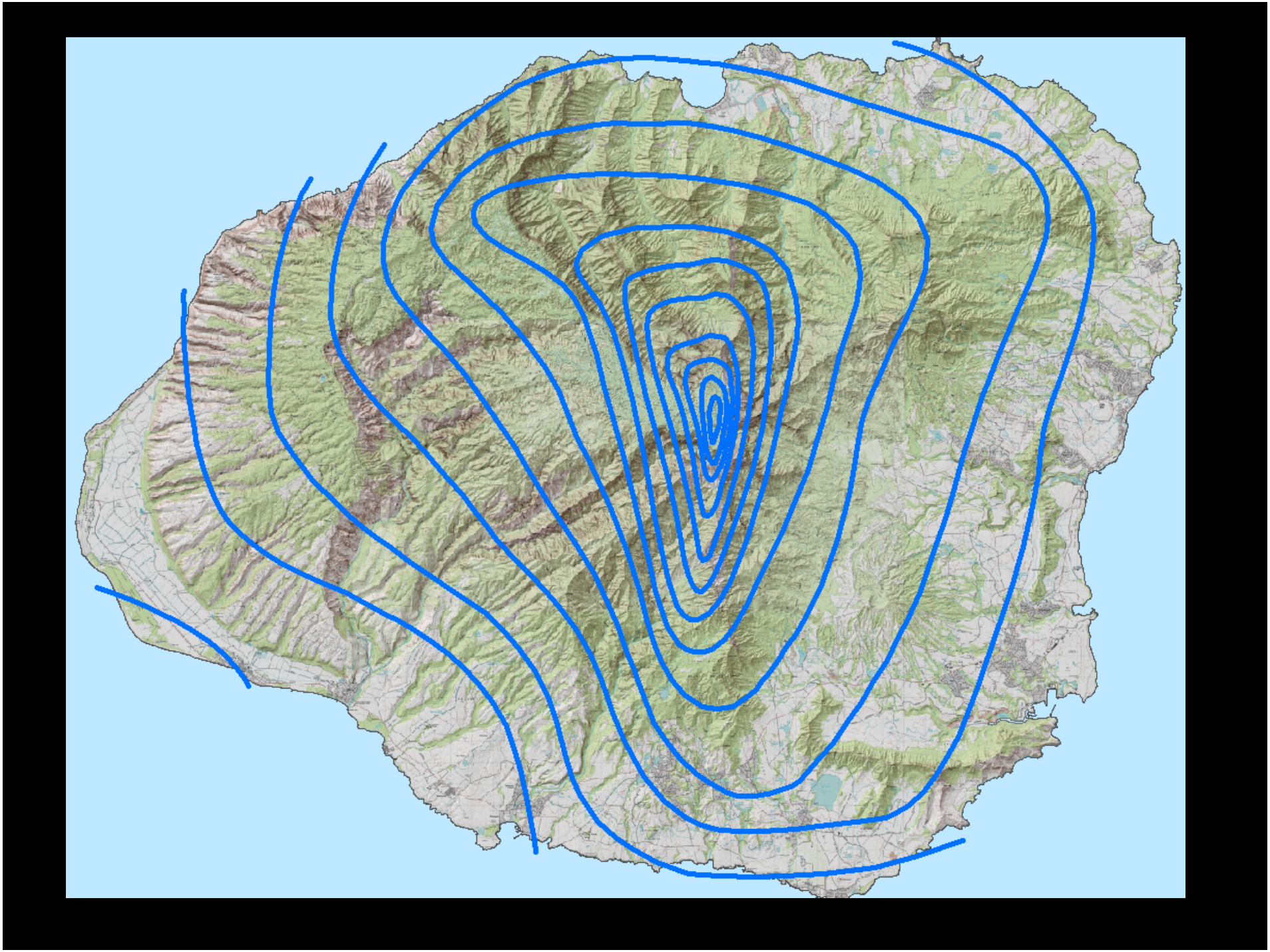
Jurrasic Kahili Ranch



Management plan completed & approved – April 05

Sets objectives & operations for 6 – 10 years

TNC selected as KWA Coordinator -April 05



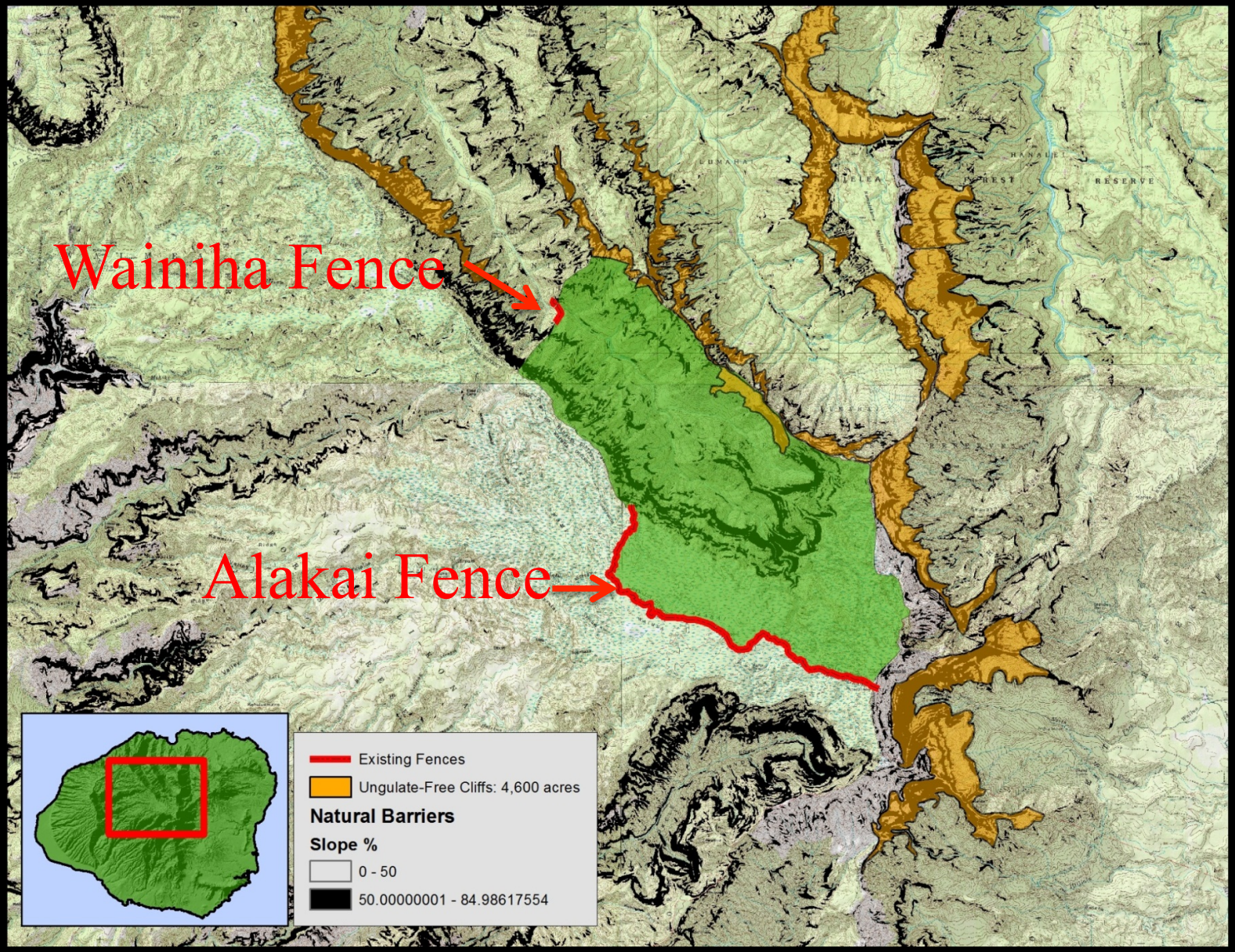
Primary Threats

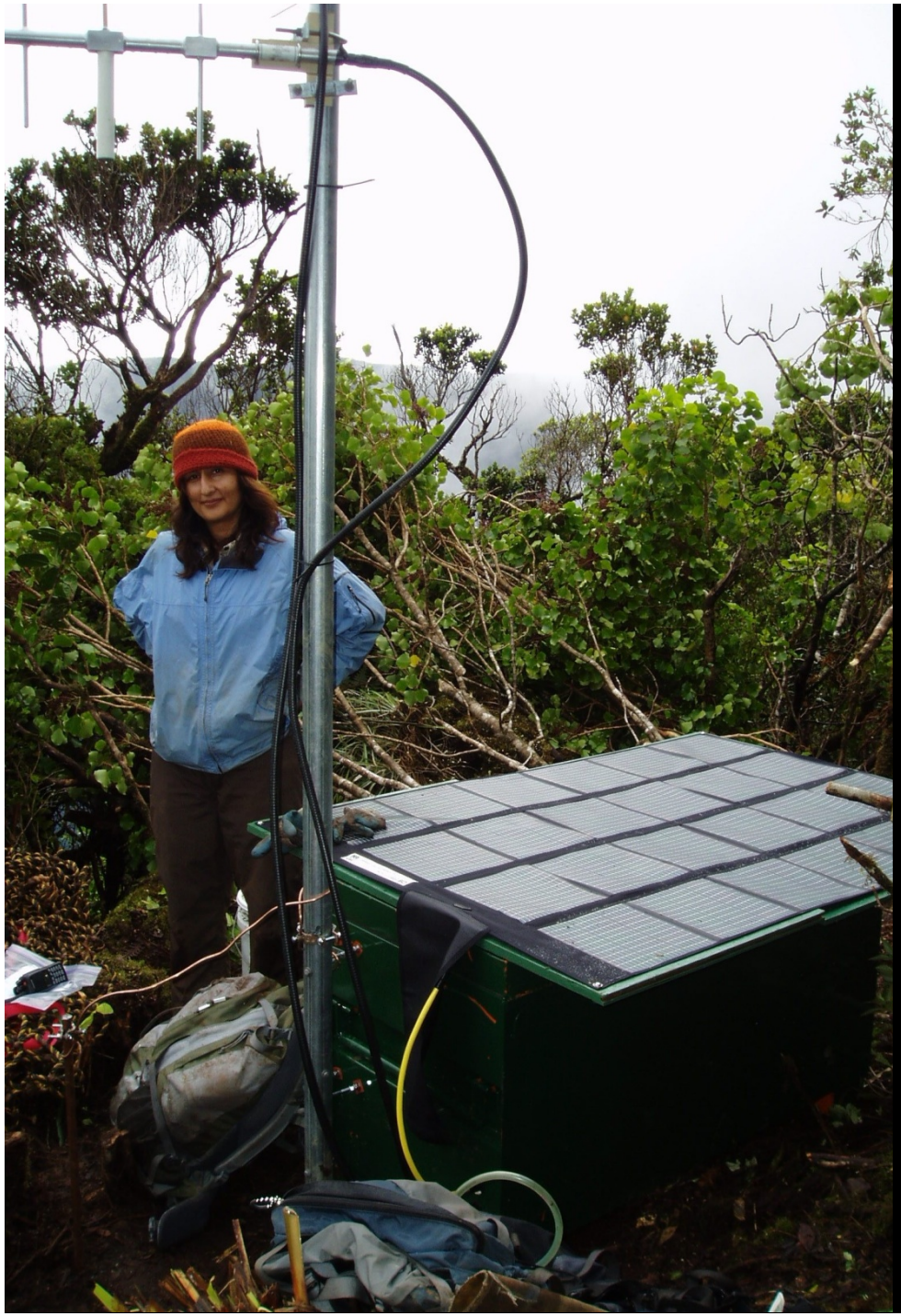
Feral Ungulates
(Pigs, Goats, Deer, Sheep)

Invasive Plants
(Strawberry guava, Himalyan ginger, Australian tree fern)


Without Pigs
With Pigs

KWA Fencing Plan






RECONYX
WIDESCREEN HD


2010-03-19 1:15:49 PM M 2/3
47°F
RC55 RAPIDFIRE
RECONYX

Firefox

Maui Sensor Data | The Nature ...

portals.intelesense.net/tnc/maui/sensors

Google

My account Log out

The Nature Conservancy

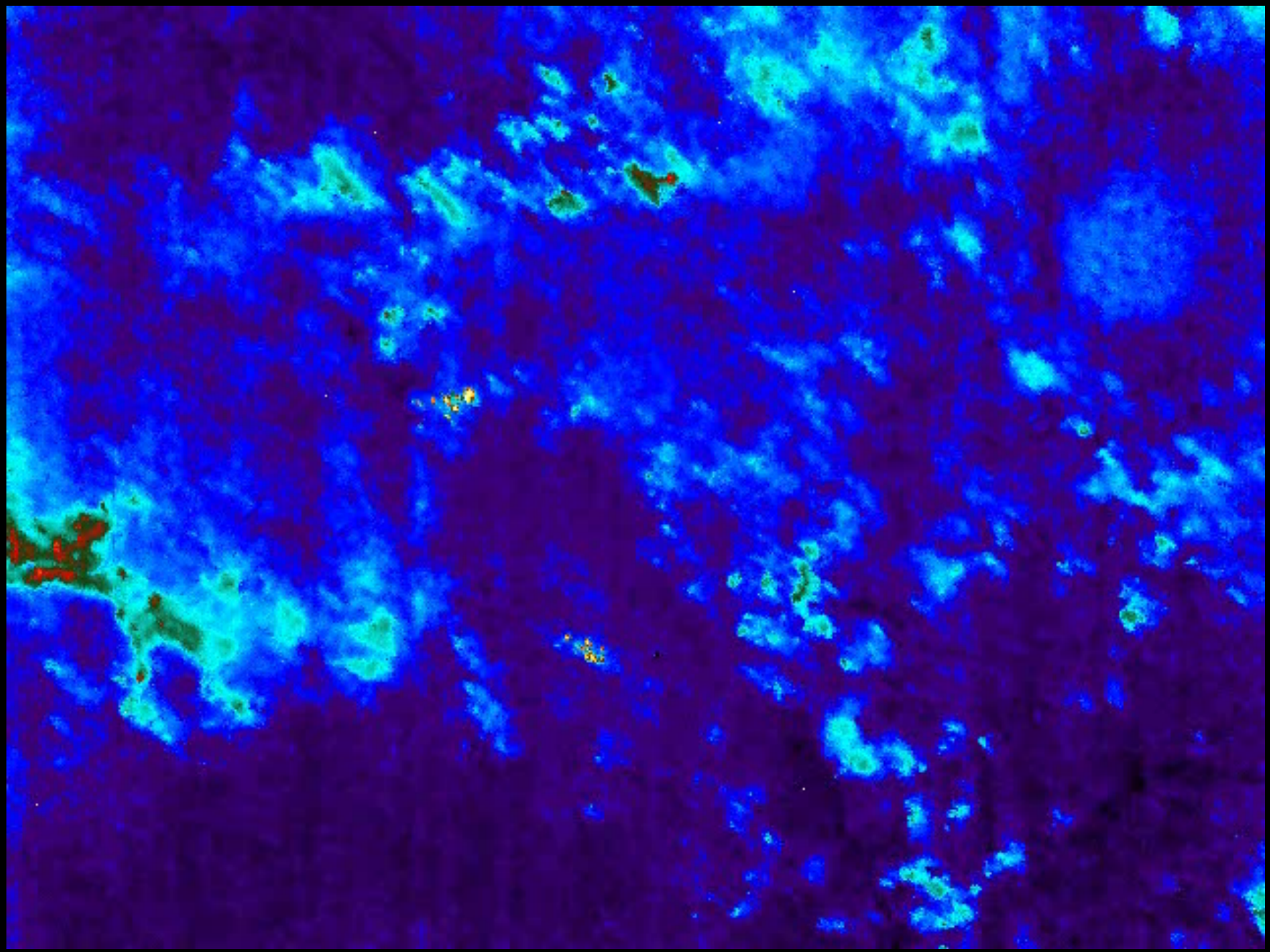
Watershed Management Portal

Home

Maui Menu

- Maui - Home
- Mapping Resources
- Sensor Data

Maui Sensor Data



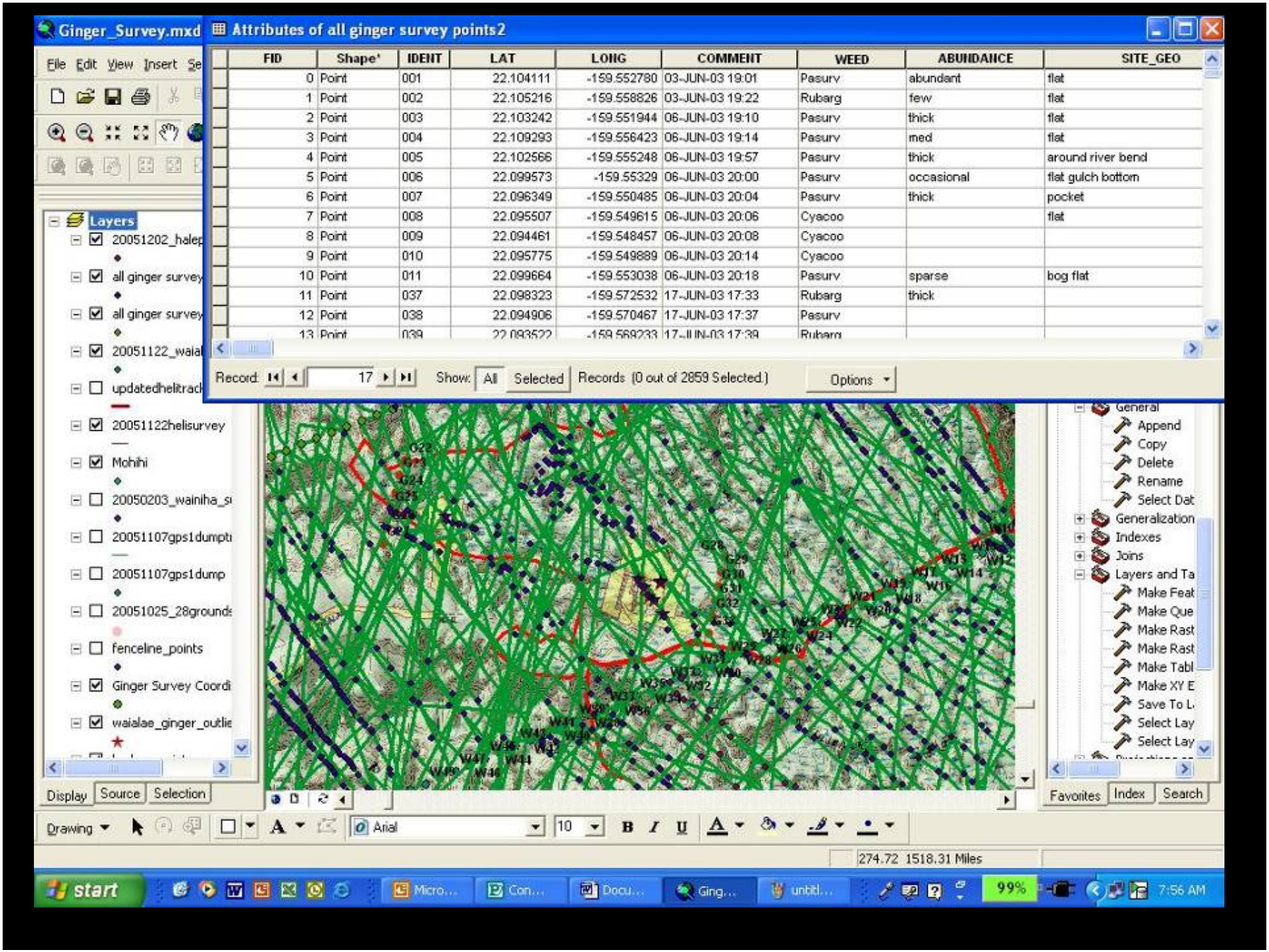
Bog Before Fence

Bog After Fence

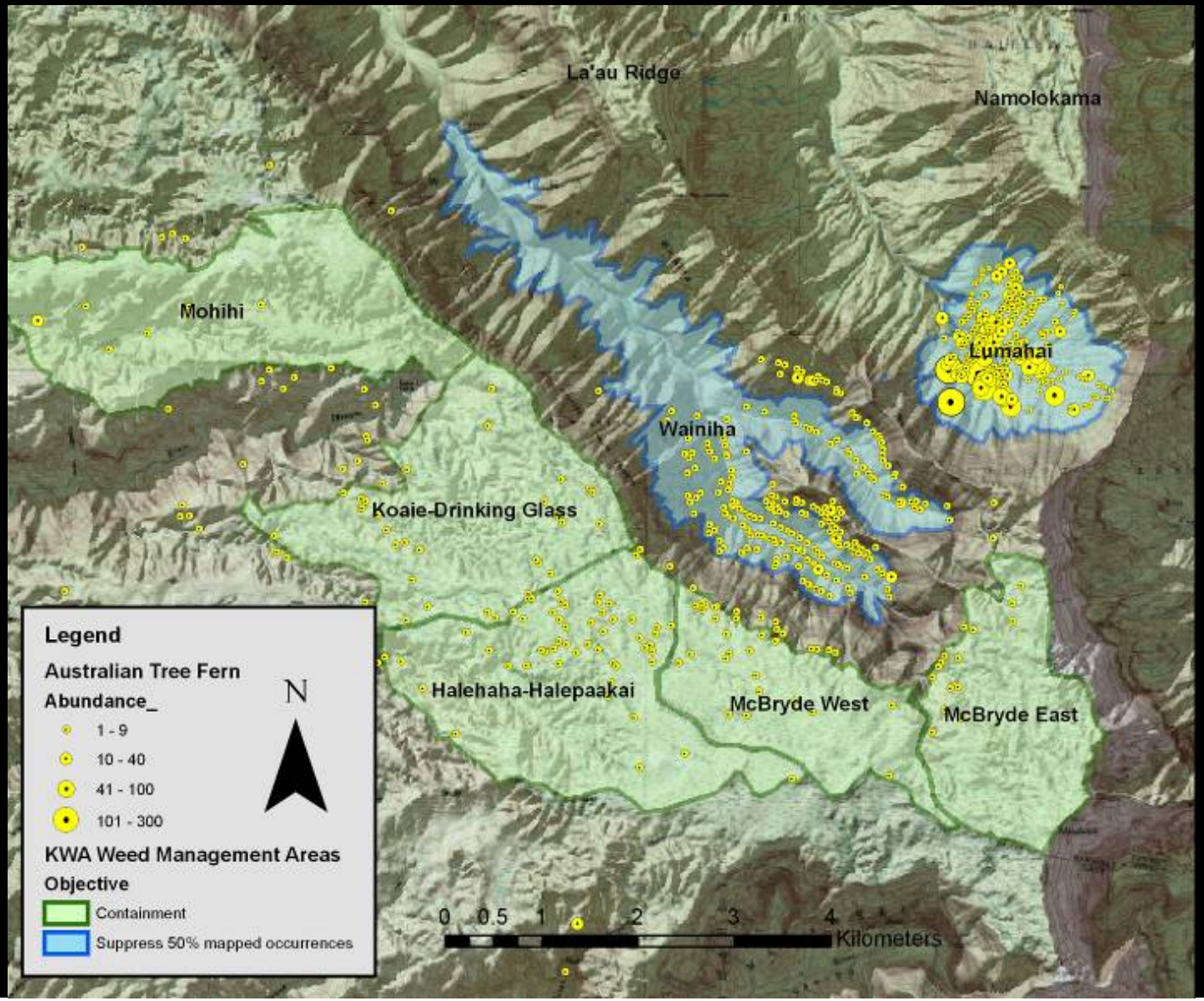
Invasive grass patch
Before Fence

Invasive grass patch
10 months after Fence

Invasive Plant Control


Ginger_Survey.mxd
Attributes of all ginger survey points2
FID Shape* IDENT LAT LONG COMMENT WEED ABUNDANCE SITE_GEO
0 Point 001 22.104111 -159.552780 03-JUN-03 19:01 Pasurv abundant flat
1 Point 002 22.105216 -159.558826 03-JUN-03 19:22 Rubarg few flat
2 Point 003 22.103242 -159.551944 06-JUN-03 19:10 Pasurv thick flat
3 Point 004 22.109293 -159.556423 06-JUN-03 19:14 Pasurv med flat
4 Point 005 22.102566 -159.555248 06-JUN-03 19:57 Pasurv thick around river bend
5 Point 006 22.099573 -159.55329 06-JUN-03 20:00 Pasurv occasional flat gulch bottom
6 Point 007 22.096349 -159.550485 06-JUN-03 20:04 Pasurv thick pocket
7 Point 008 22.095507 -159.549615 06-JUN-03 20:06 Cyacoo flat
8 Point 009 22.094461 -159.548457 06-JUN-03 20:08 Cyacoo
9 Point 010 22.095775 -159.549889 06-JUN-03 20:14 Cyacoo
10 Point 011 22.099664 -159.553038 06-JUN-03 20:18 Pasurv sparse bog flat
11 Point 037 22.098323 -159.572532 17-JUN-03 17:33 Rubarg thick
12 Point 038 22.094906 -159.570467 17-JUN-03 17:37 Pasurv
Record: 17 Show: All Selected Records (0 out of 2859 Selected.) Options
Layers
20051202_halep
all ginger survey
all ginger survey
20051122_waia
updatedhelitrack
20051122helisurvey
Mohihi
20050203_wainiha_s
20051107gps1dumpt
20051107gps1dump
20051025_28ground
fenceline_points
Ginger Survey Coordi
waialae_ginger_outlie
Display Source Selection
General
Append
Copy
Delete
Rename
Select Dat
Generalization
Indexes
Joins
Layers and Ta
Make Feat
Make Que
Make Rast
Make Rast
Make Tabl
Make XY E
Save To L
Select Lay
Select Lay
Favorites Index Search
Drawing
Arial
10
274.72 1518.31 Miles
start
Micro...
Con...
Docu...
Ging...
untitl...
99%
7:56 AM

Australian Tree Fern Invasion

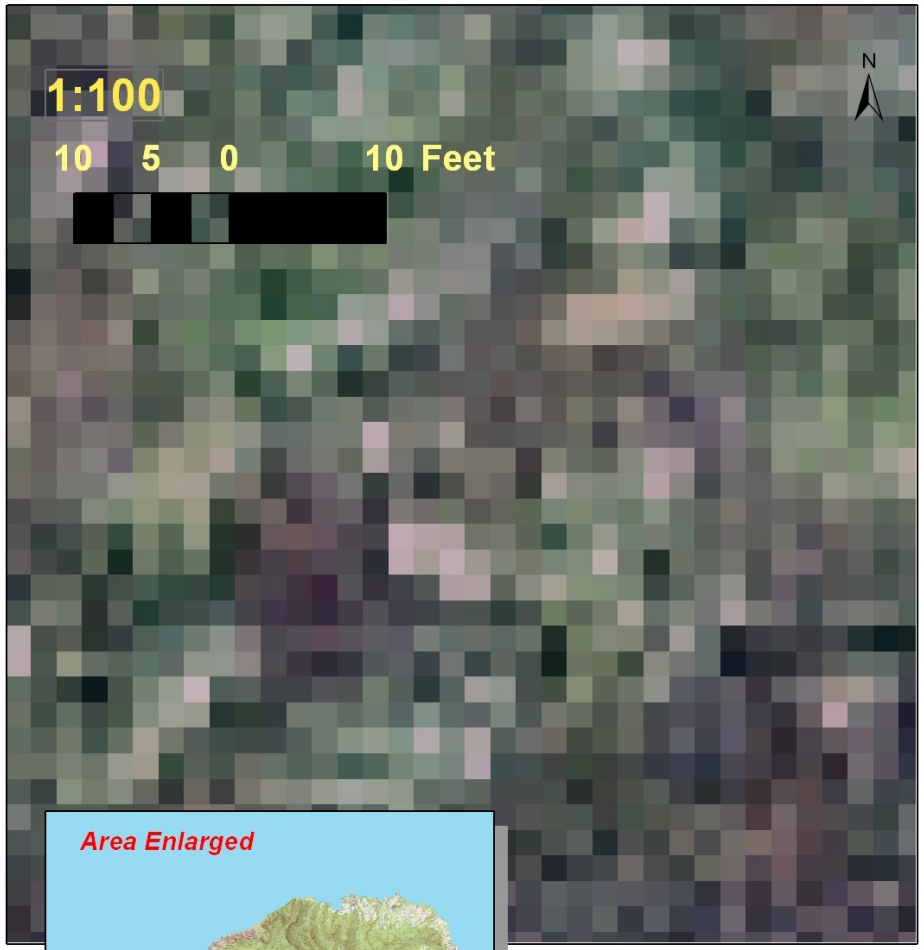


How to control a landscape-scale weed infestation

Sophisticated mapping and monitoring technique

Rapid control method applied over large areas

Ikonos Imagery



Research & Development

2006 - 2007

Mapping and Monitoring with Remote Sensing

Very high resolution multi-spectral & natural color imagery

USGS Research Contract

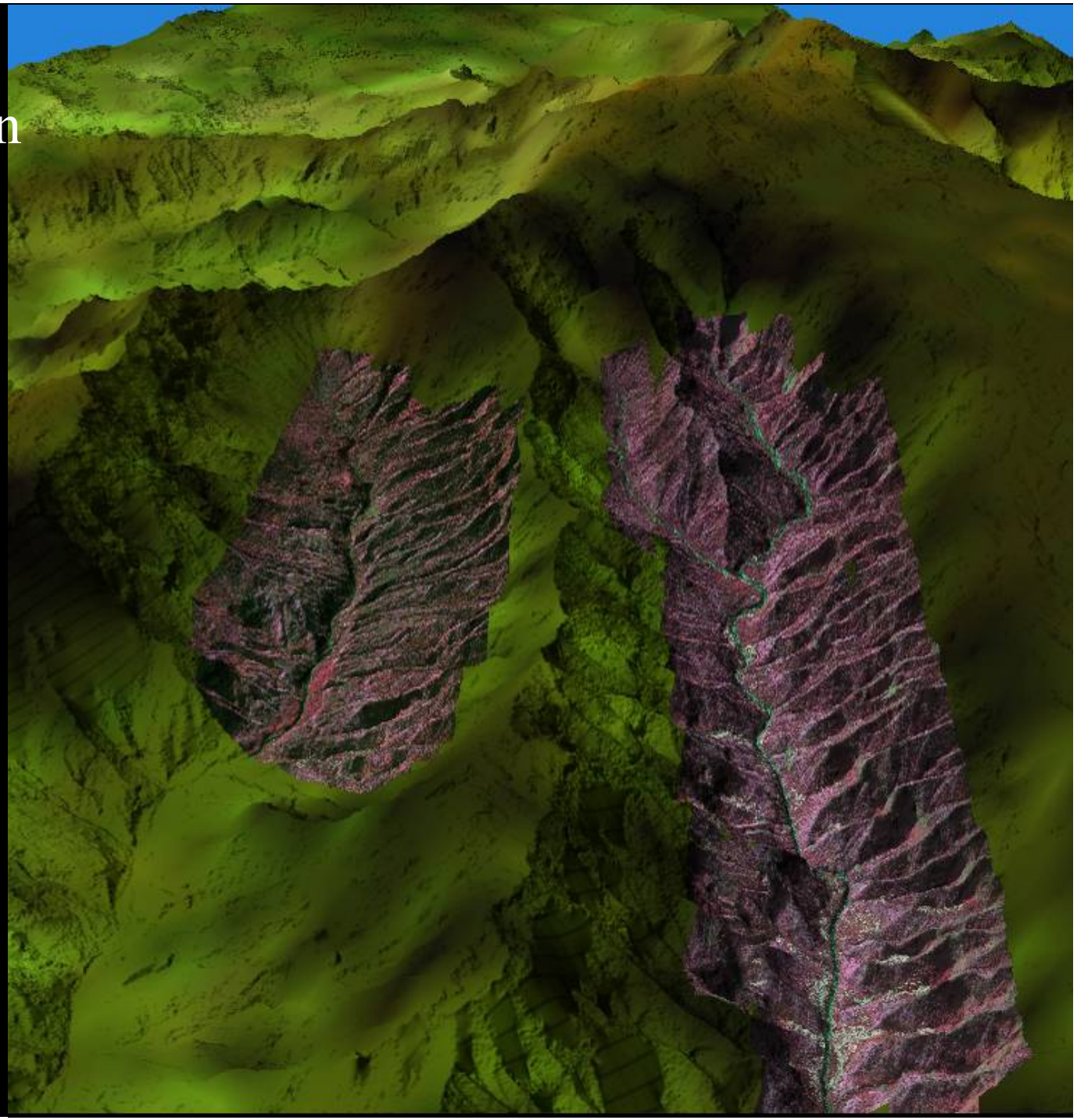
Resource Mapping

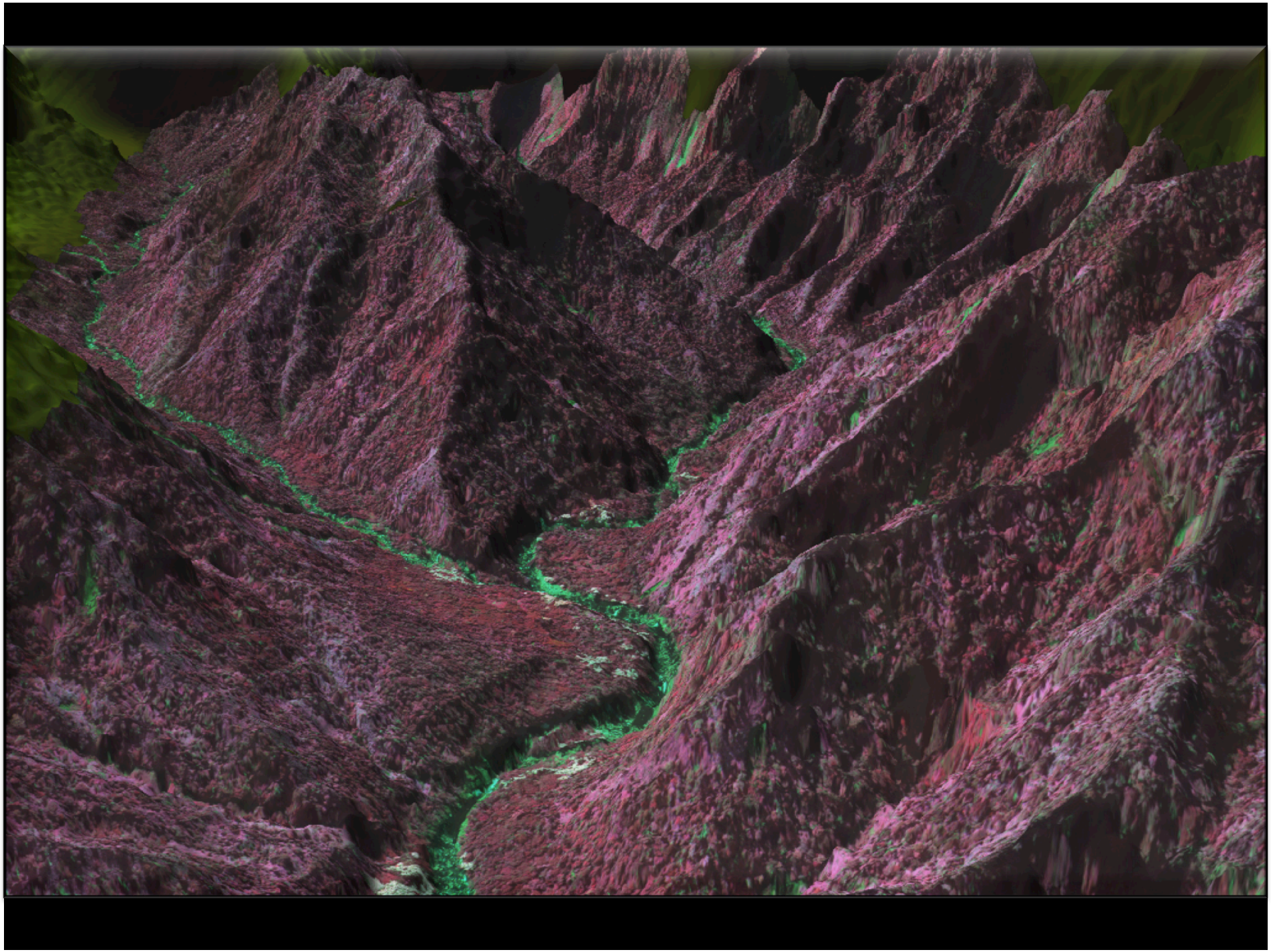
Remote Sensing and GIS for Conservation

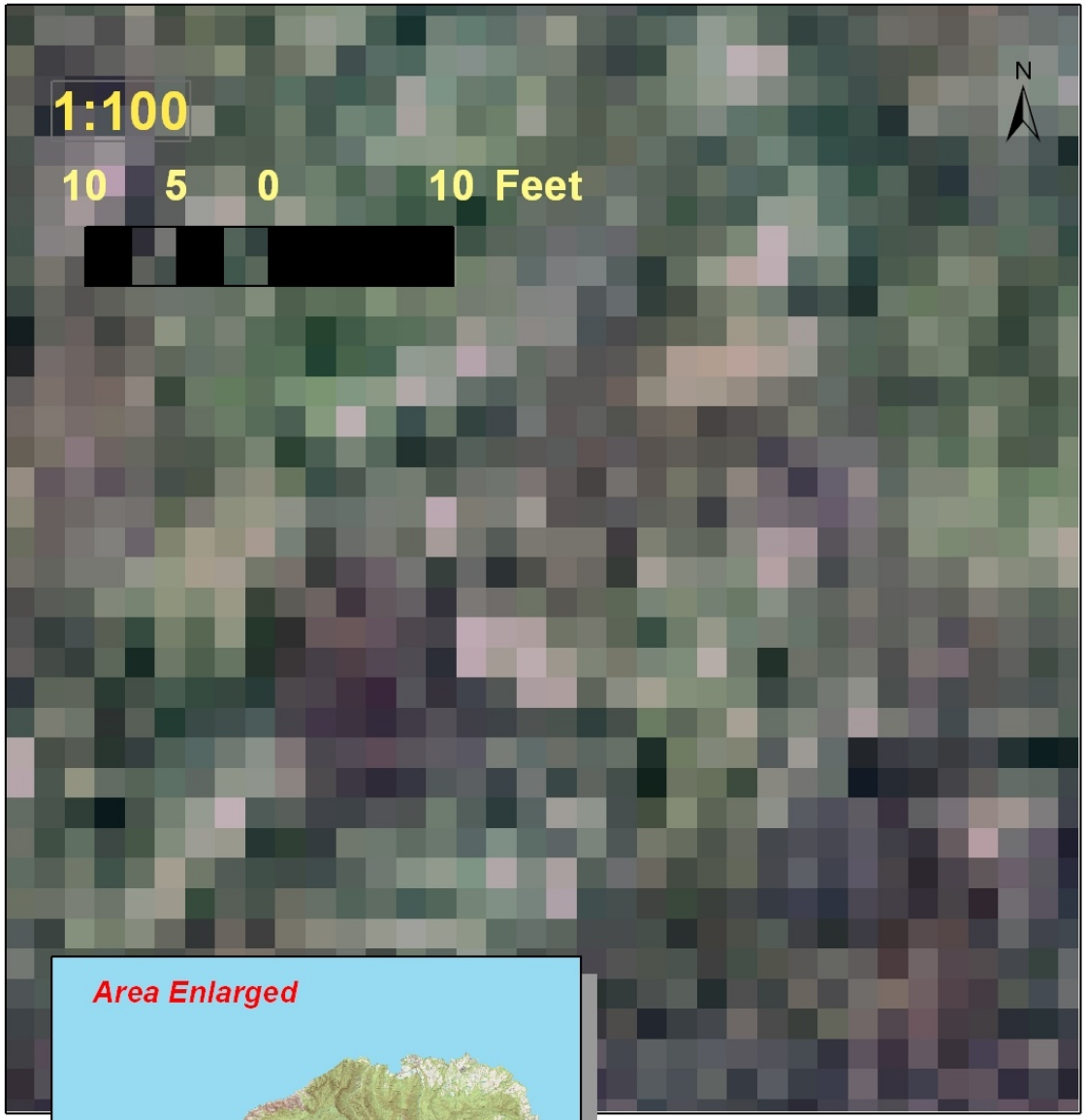
- Ultra-high resolution image-based mapping
- Weed detection over large areas

Orthorectification

Images overlayed on
Digital Elevation Model







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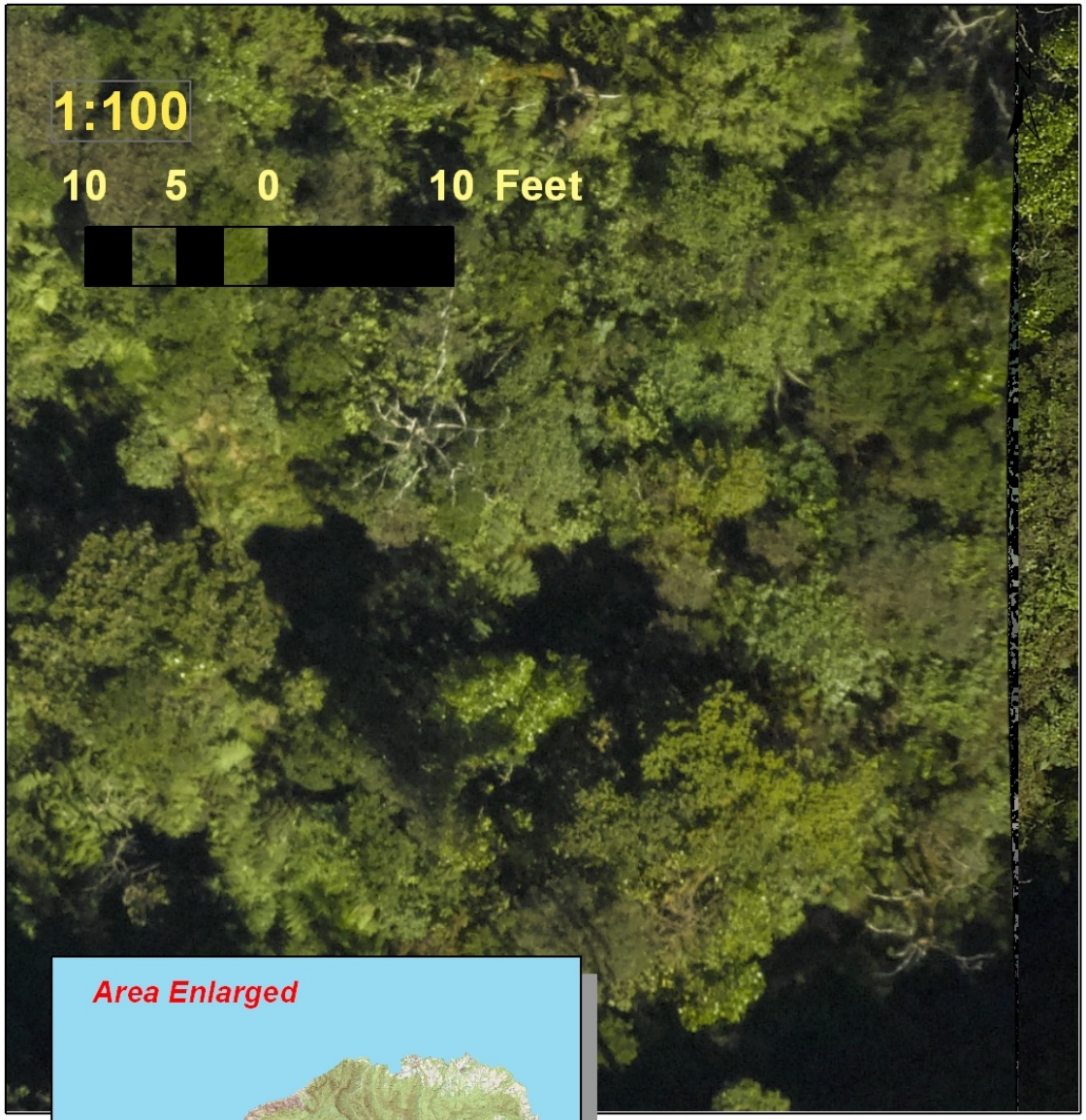

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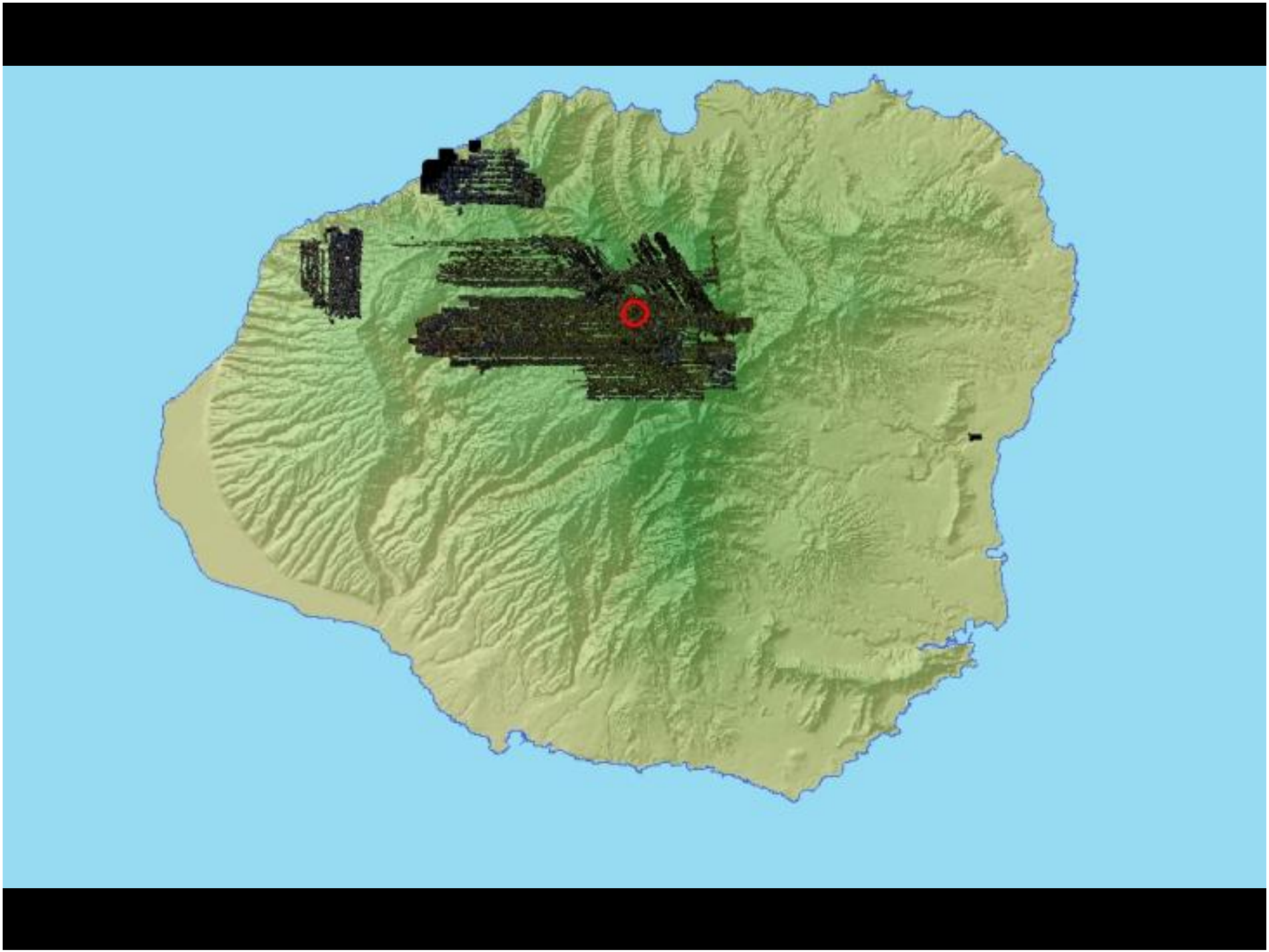
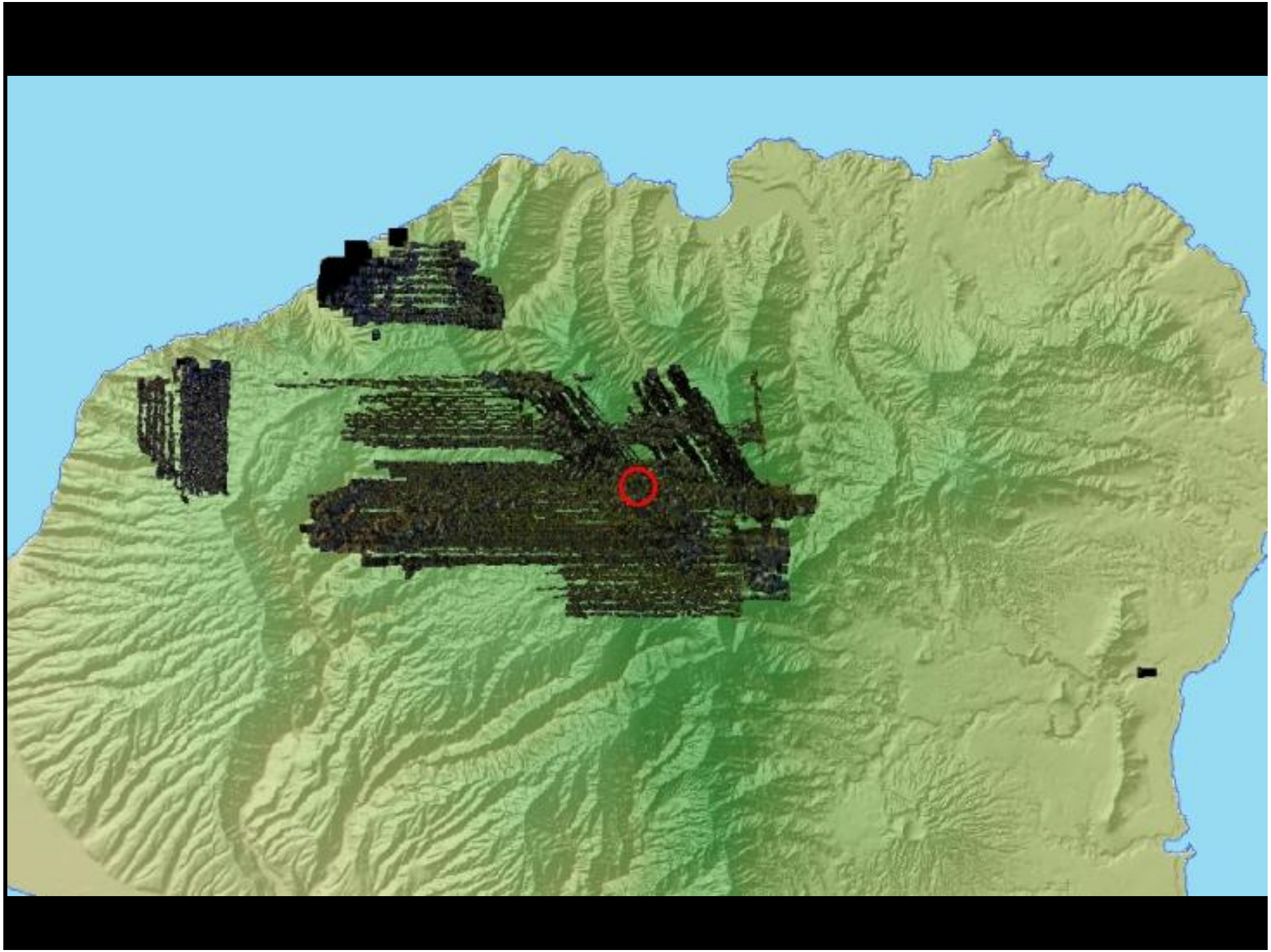
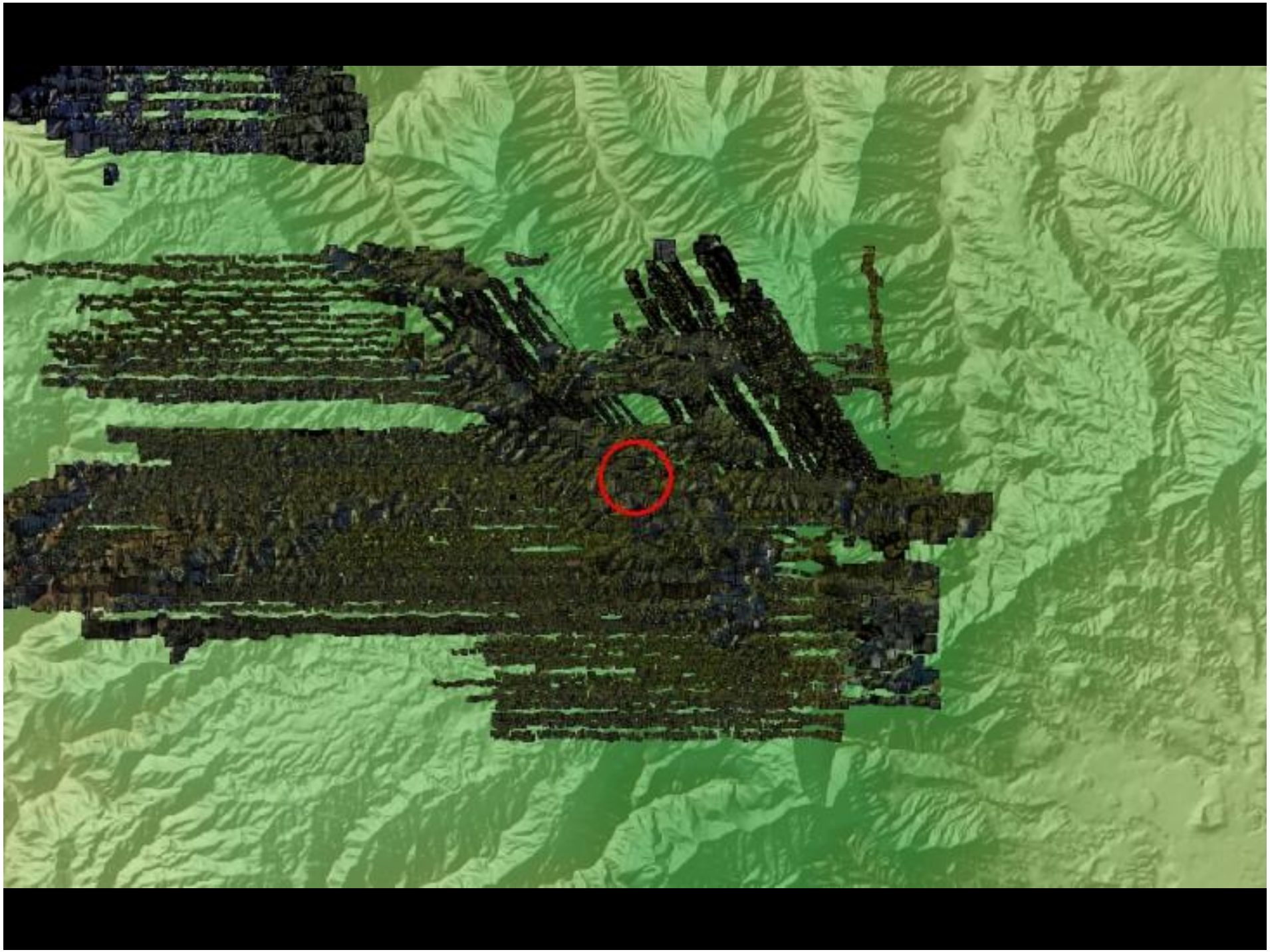
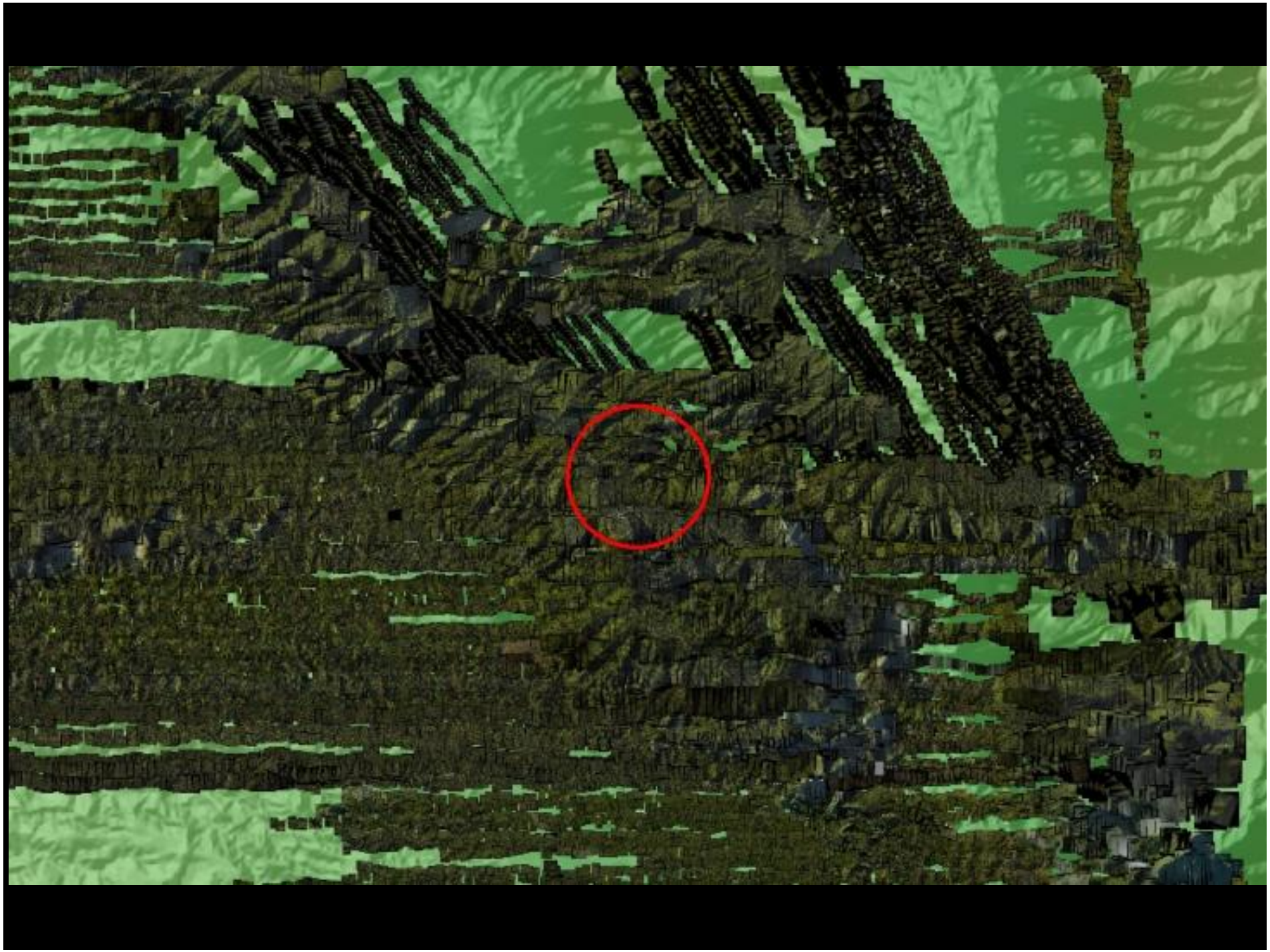
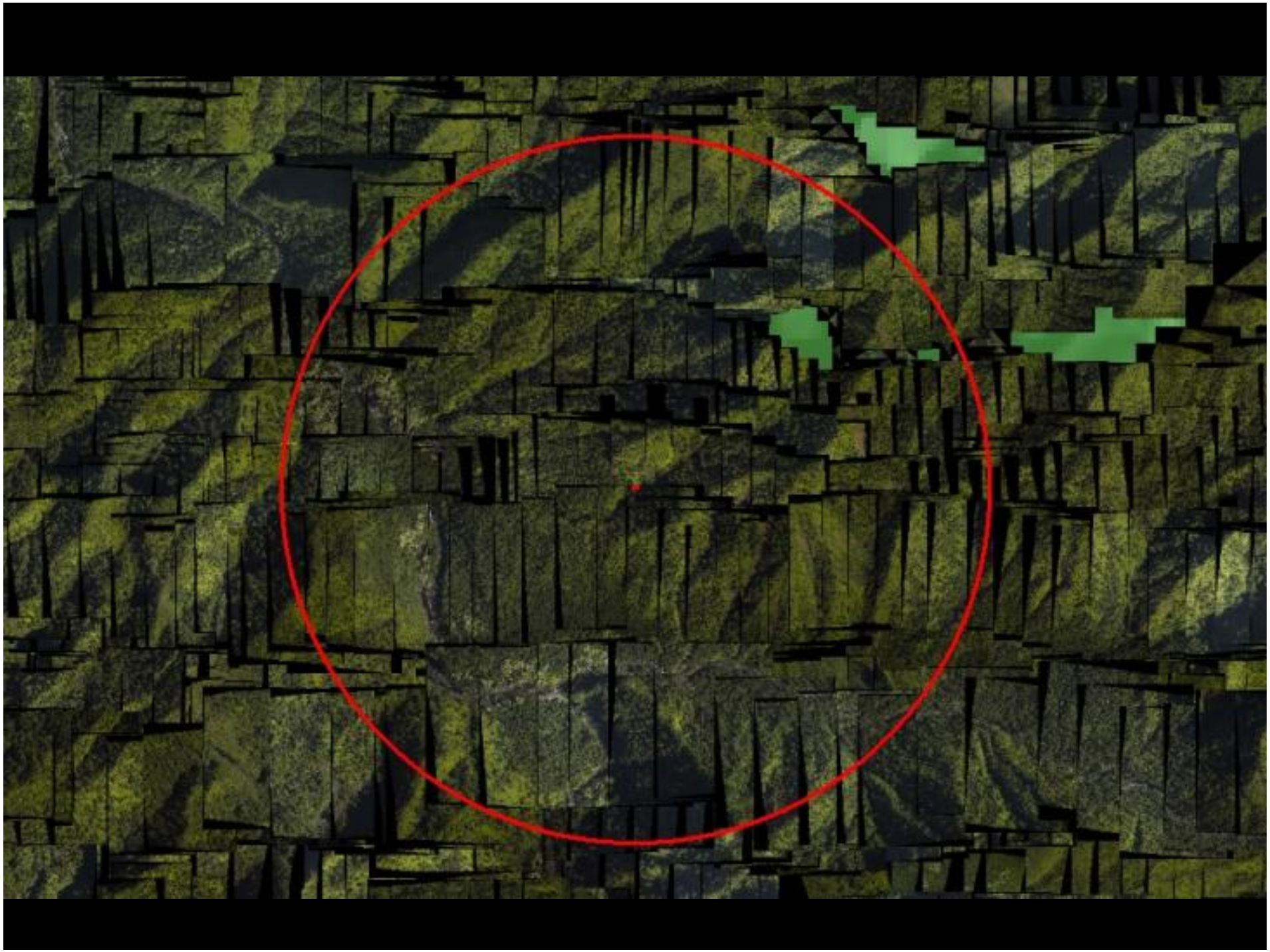
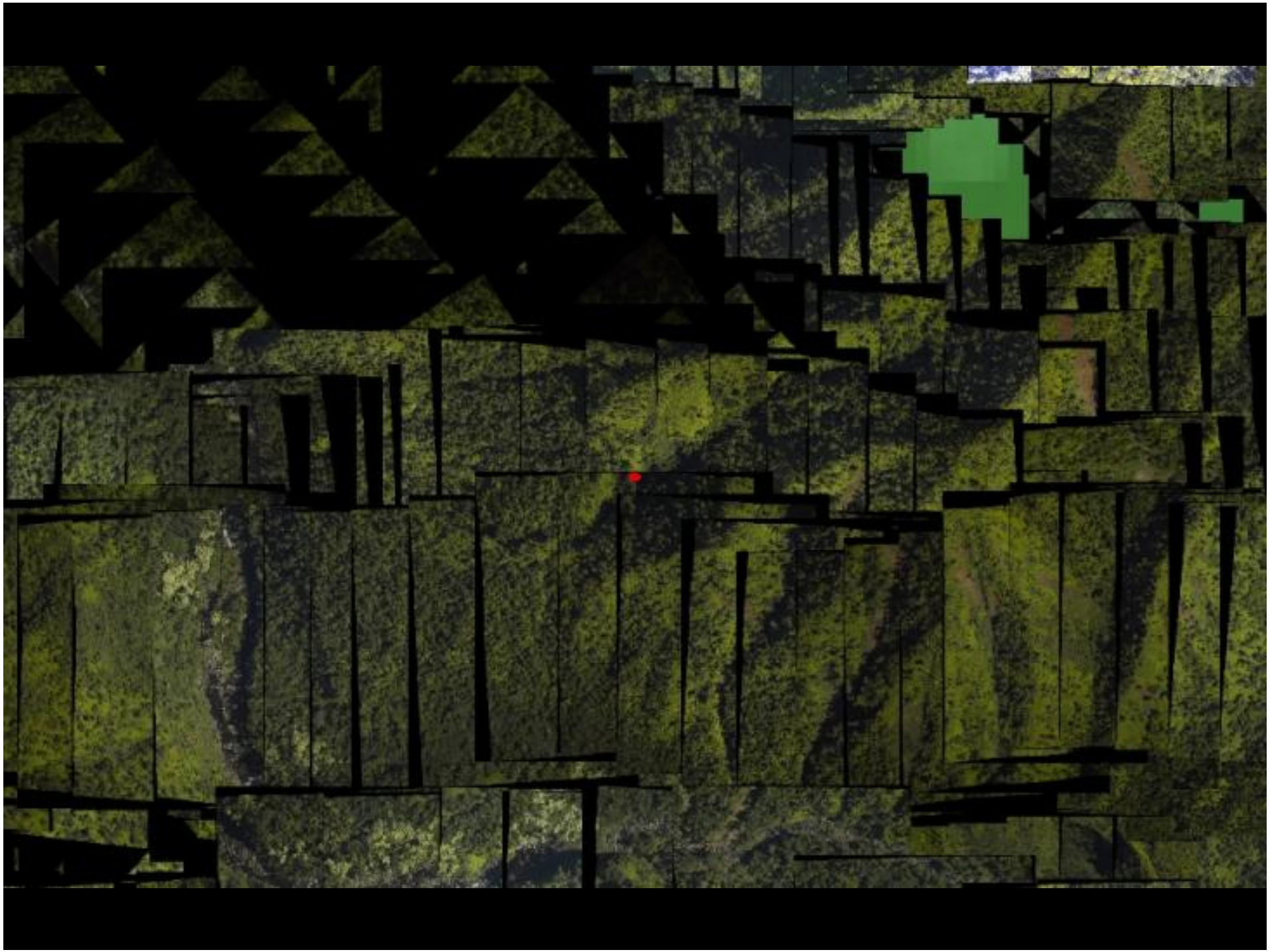


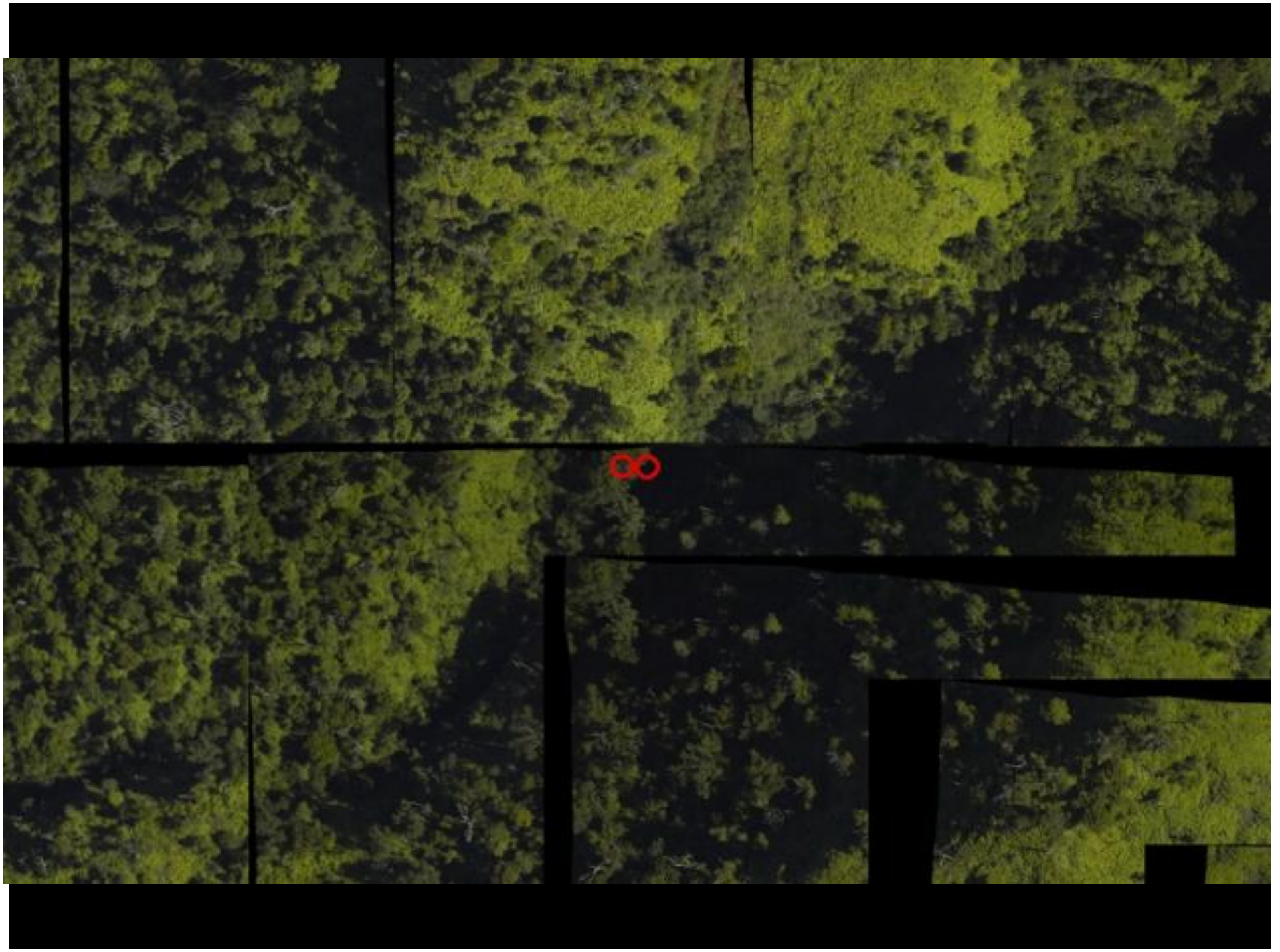




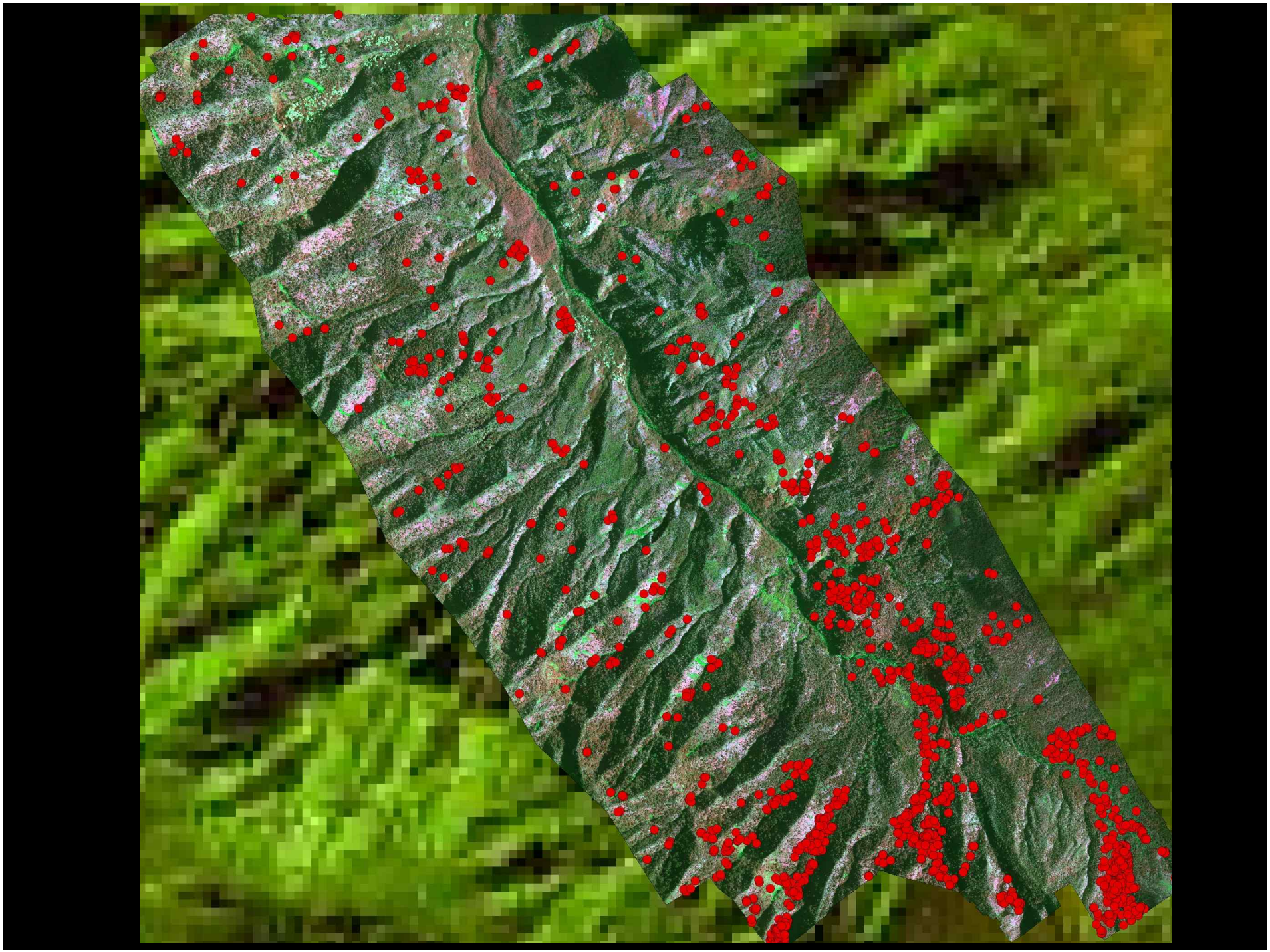









Map
X:
446449.904731
Y:
2443461.081994
meters
Projection:
UTM / GRS 1980



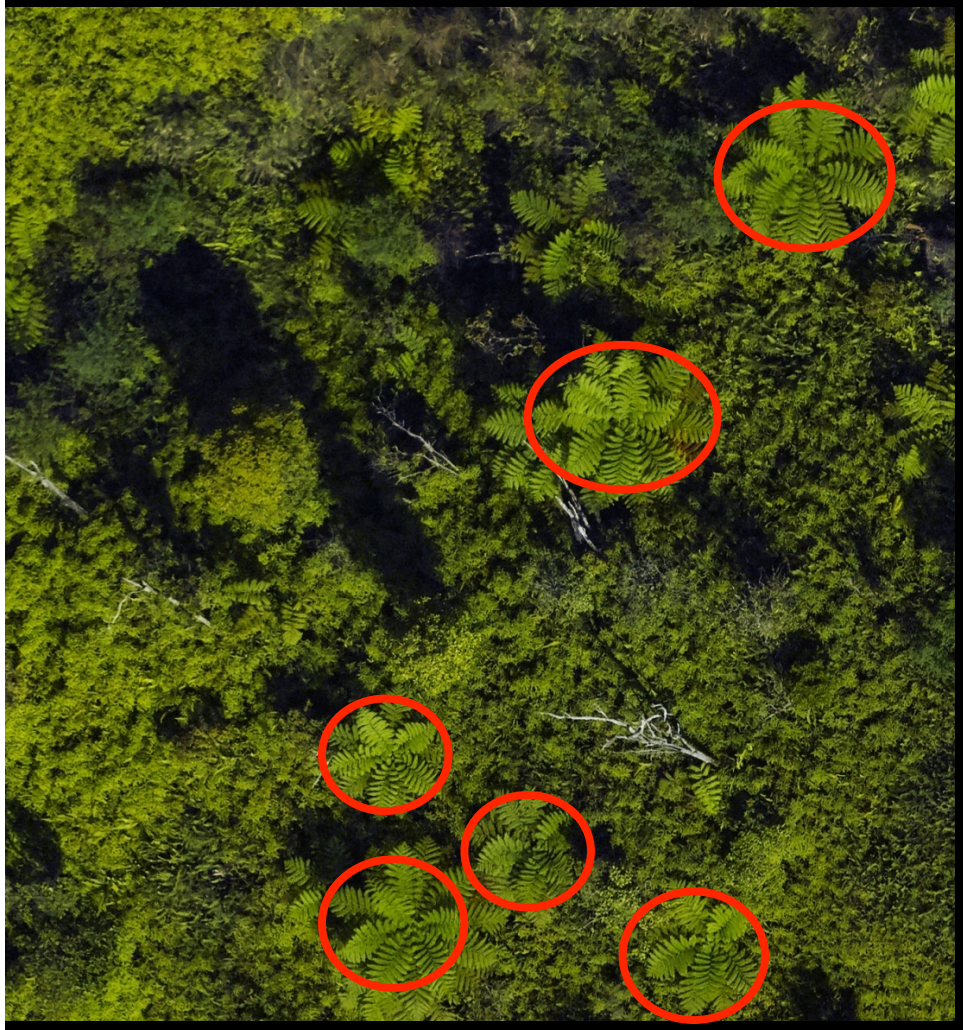
Surgical-precision Aerial Weed Control

"The Stinger"

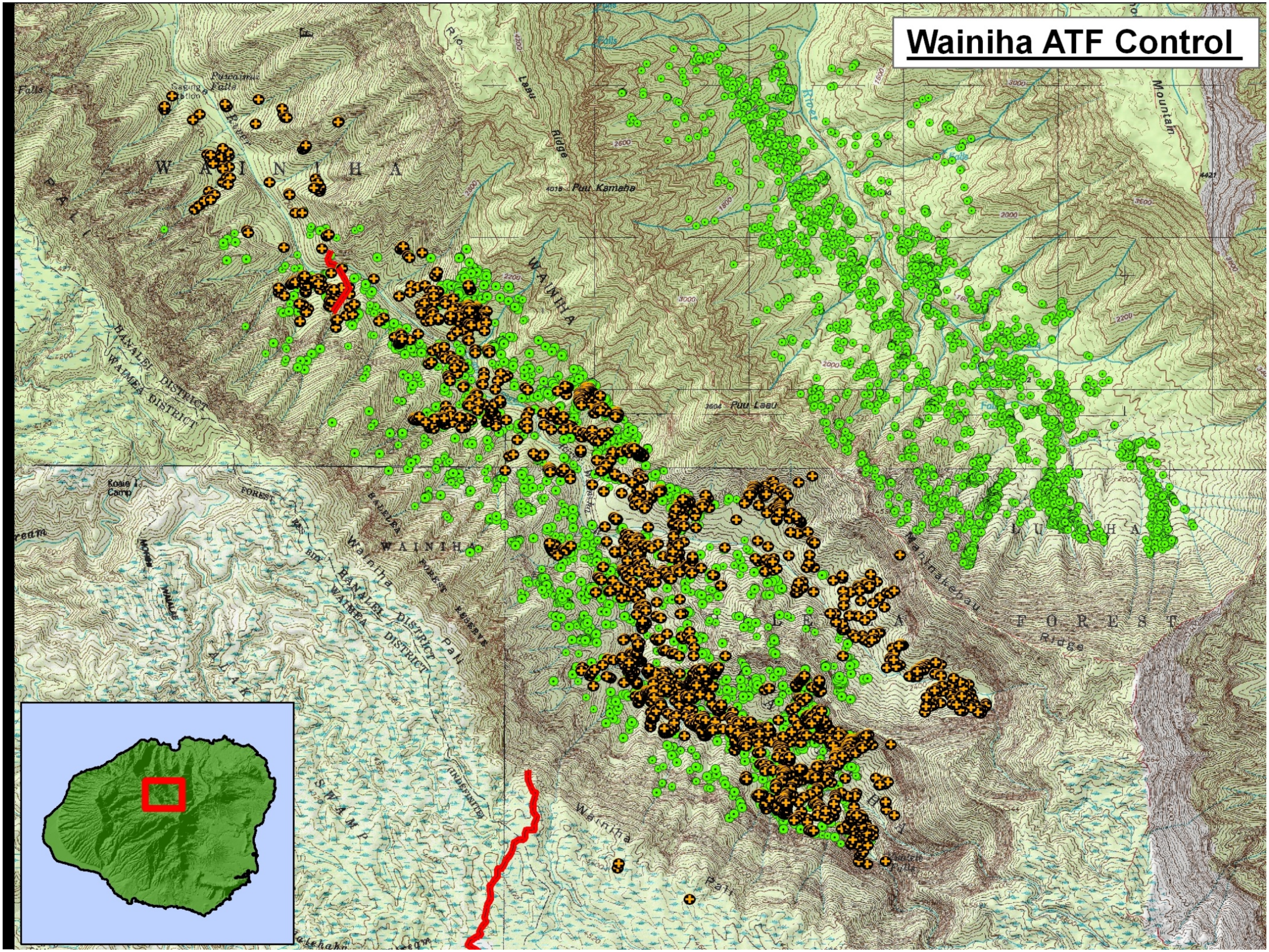
No overspray = No damage to surrounding vegetation & no runoff into streams.

Image-based Monitoring

Before treatment



After treatment

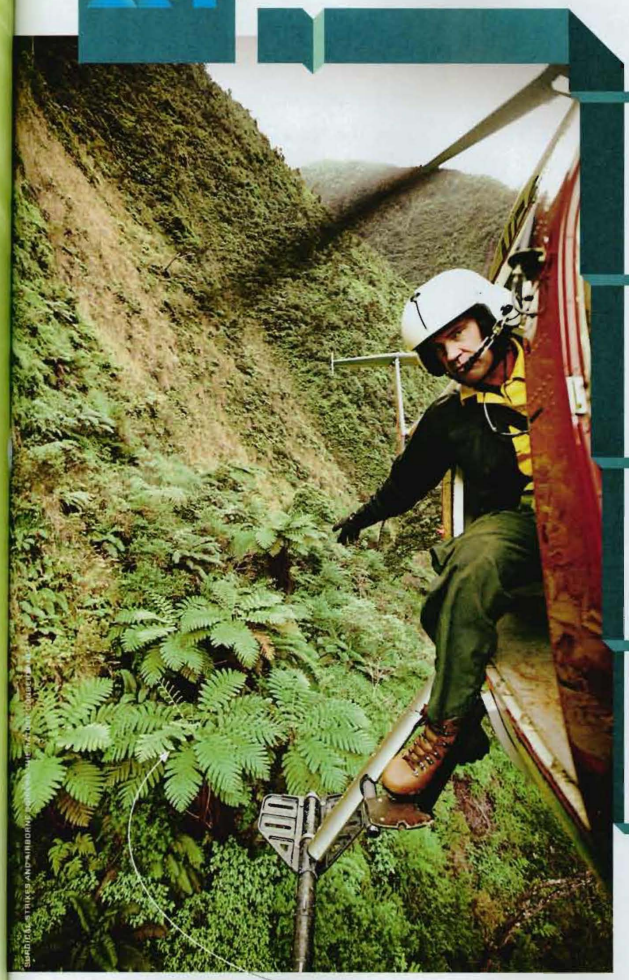

Wainiha ATF Control

Wired Magazine
February 2010

Green Avenger

HAWAII'S BOTANICAL GUARDIAN RAINS DOWN DEATH ON ALIEN FLORA.

The Kauai watershed is the world's most extreme botanical garden, a 144,000-acre cloud forest along jagged cliffs that can spike 3,000 feet in elevation over just a quarter of a mile. So when Nature Conservancy of Hawaii project director Trae Menard observed that the area had been invaded by millions of water-sucking, plant-strangling Australian tree ferns, he knew he couldn't exactly stroll around and yank them out. The terrain would make manual removal prohibitively expensive. The solution: aerial warfare with hoses and paintball guns. This spring, Menard (pictured below) will take to the sky in a helicopter to pinpoint nonnative species and pick them off with targeted blasts of herbicide. Here's the plan of attack. —BEN PAYNTER



Space invaders

PHOTOGRAPHS BY Chad Riley

HOW ECO-GEEKS WIPE OUT NONNATIVE SPECIES

RECONNAISSANCE
A Cessna 186 outfitted with digital cameras and a multispectral imager skims the canopy. The pictures are tagged with precise geographic positions.

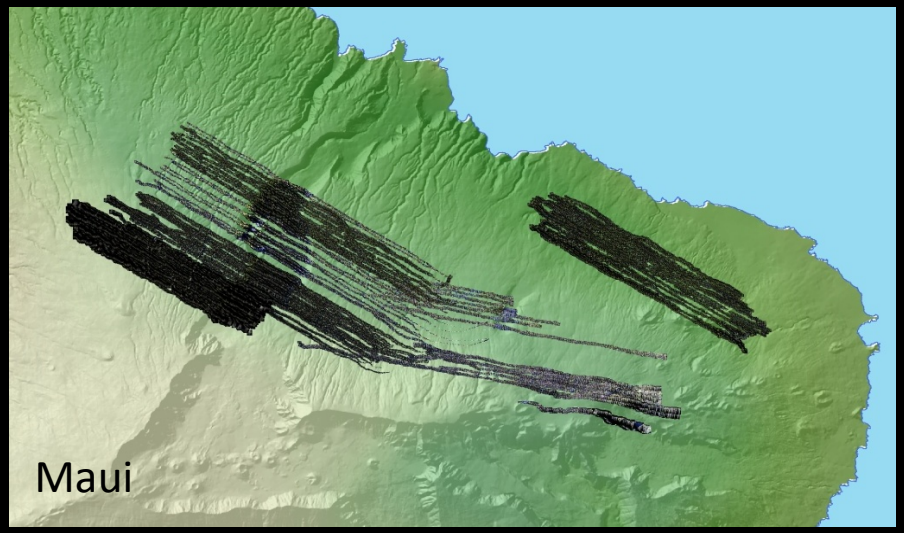
TARGET ACQUISITION
Australian tree ferns can be identified by the distinctive shape of their fronds. Volunteers inspect photos and mark plants for elimination.

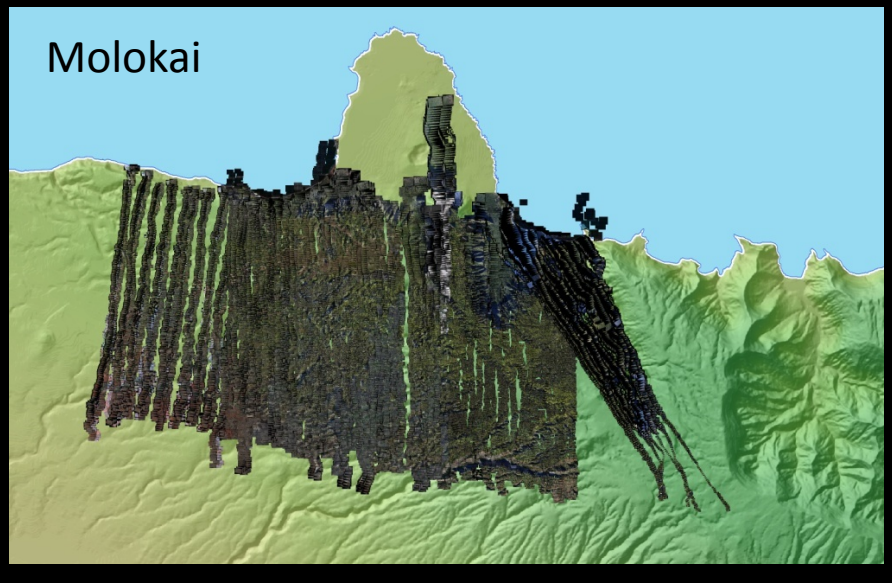
SURGICAL STRIKES
To neutralize unwanted vegetation, a helicopter is rigged with a winch system that can lower a hose up to 100 feet to spray offending plants with herbicide.

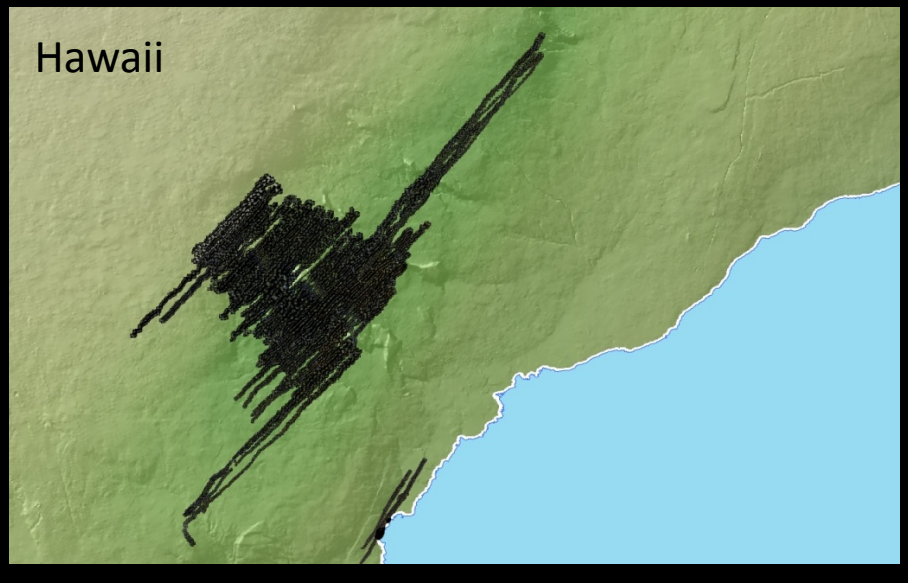
AIRBORNE SNIPERS
Menard's team has also tested high-pressure paintball guns for shooting special herbicide pellets developed by University of Hawaii weed ecologist James Leary.

MOPPING UP
Six months later, a flyover is dispatched to search for surviving tree ferns and monitor other threatening species—like the dreaded Kahili ginger.

Taking the mapping system statewide







Strawberry Guava

Kahili ginger

African tulip

Albizzia

New Plane

New Mapping System

Improved Resolution

2 cm resolution imagery
(2008 – 2010)

1 cm resolution imagery
(2012)

Improved Weed Detection Capability

The Rain Follows The Forest

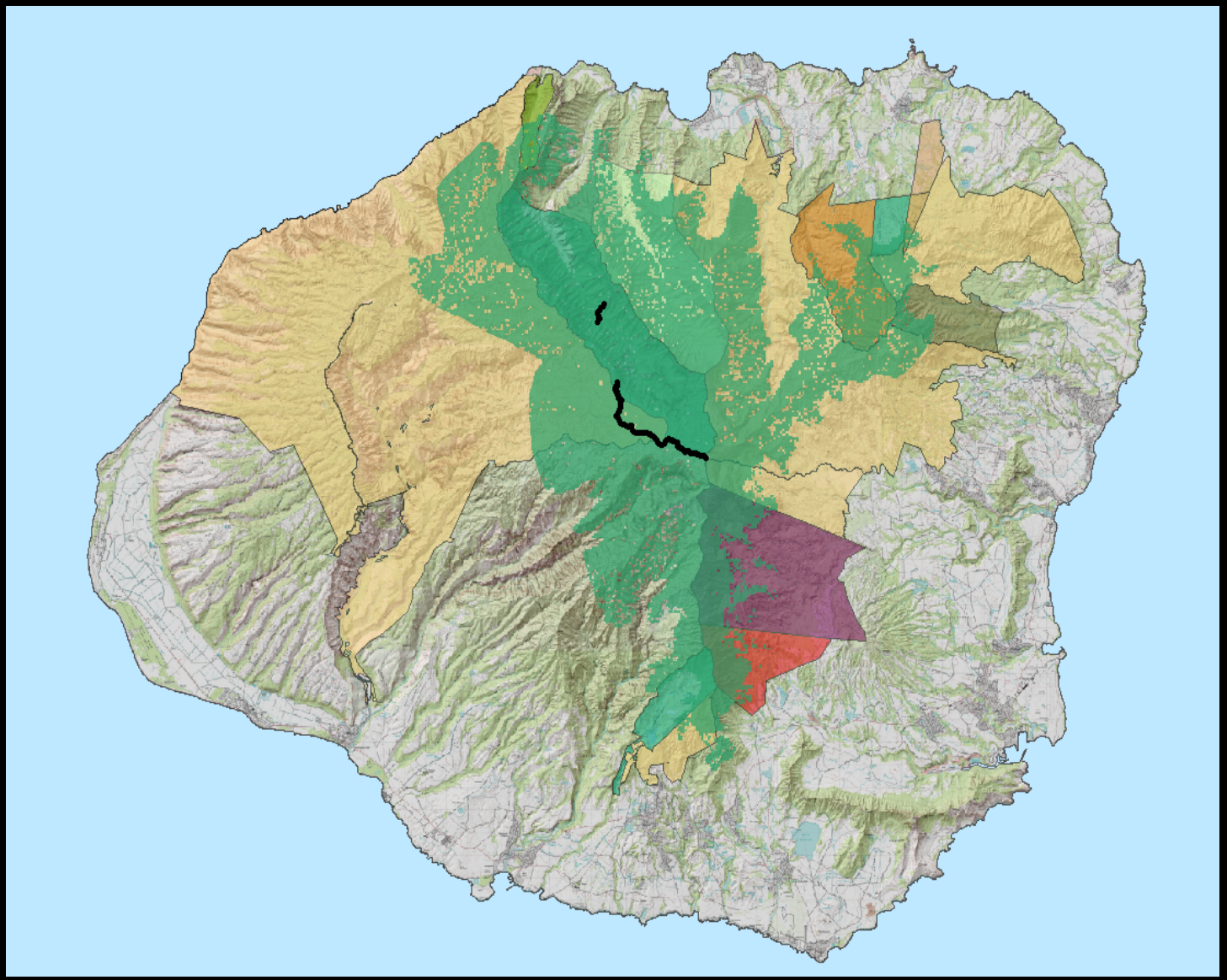
Hahai no ka ua i ka ululā`au

A Plan to Replenish Hawaii's Source of Water

Department of Land and Natural Resources - State of Hawai`i

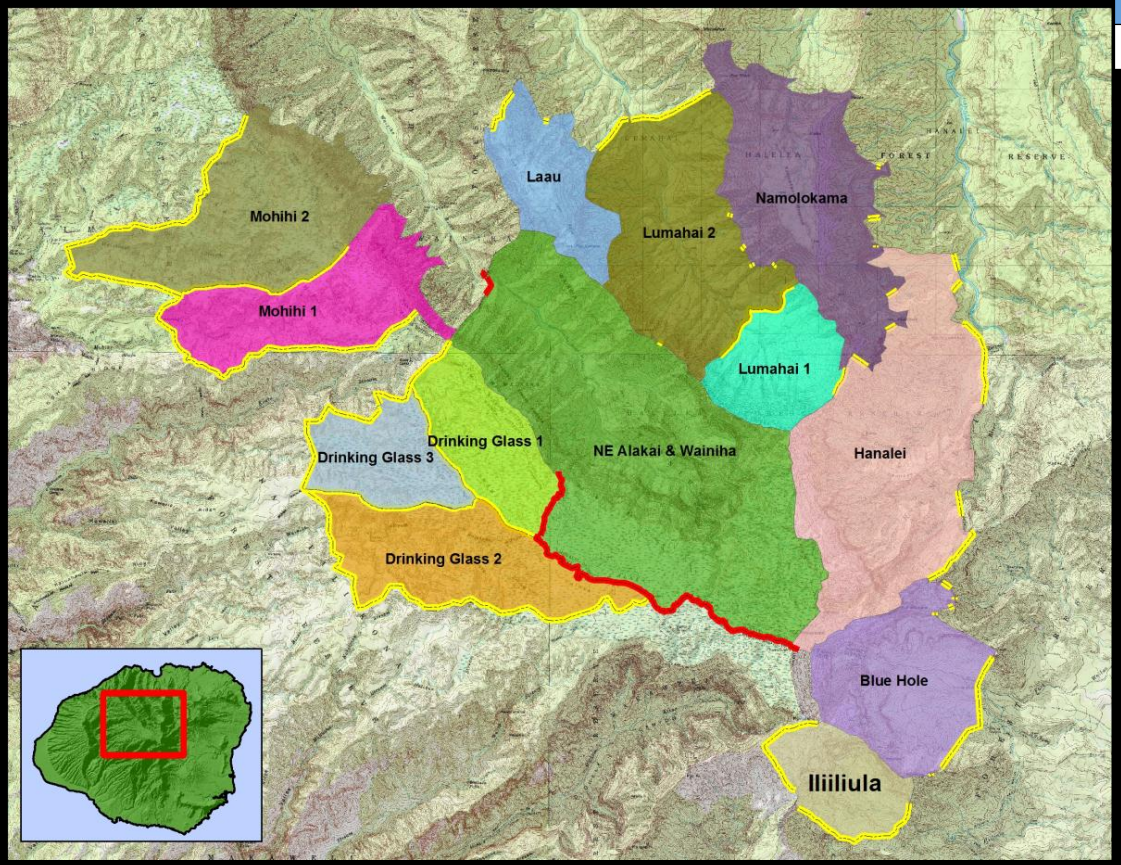
November 2011

10-year goal: 25,000 acres



10-yearPlan

FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20	FY21	FY22
741,600	741,600	741,600	741,600	741,600	741,600	741,600	741,600	741,600	741,600
	602,745	140,000	180,000	230,000	180,000	70,000	70,000	70,000	70,000
	$1,344,345	1,519,130	65,000	195,000	235,000	235,000	185,000	80,000	80,000
		$2,400,730	508,210	140,000	180,000	230,000	180,000	70,000	70,000
			$1,494,810	1,076,915	115,000	235,000	225,000	215,000	155,000
				$2,383,515	928,785	235,000	225,000	215,000	155,000
					162,900	35,000	32,500	32,500	32,500
					$2,543,285	349,155	170,000	220,000	240,000
						368,160	260,000	280,000	280,000
						$2,498,915	297,450	90,000	90,000
							550,670	275,000	295,000
							$2,937,220	431,110	185,000
								$2,720,210	570,060
									$2,964,160



25,337 acres new fenced acres

$20,337,475 10-year total

$824,000 annual ongoing management cost

Pau

Wainiha Valley – Longest Valley in Hawaii

Invasive Species Control: Mauka to Makai

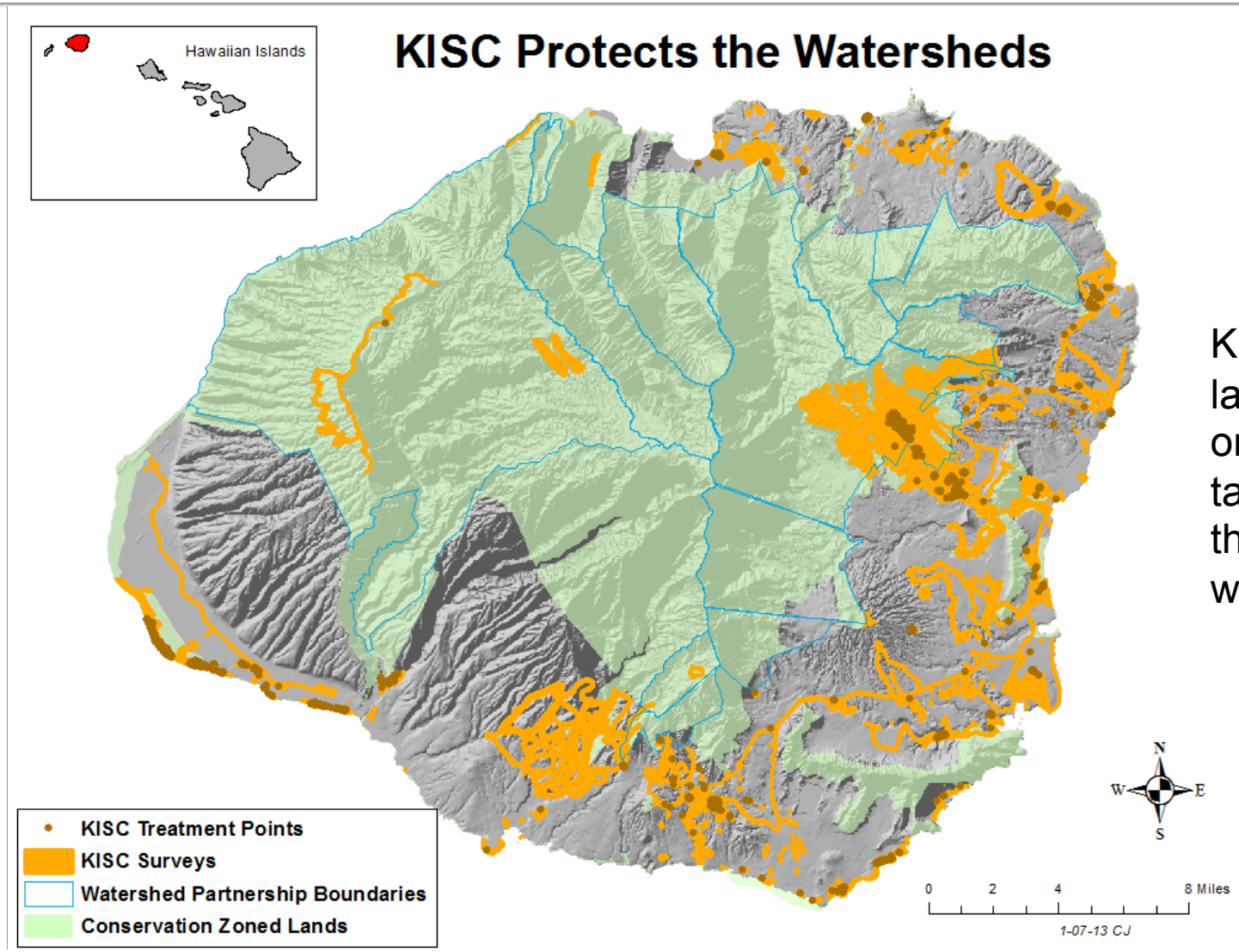
Kaua`i Invasive Species Committee

Informational Briefing

The Twenty-Seventh Legislature

January 11, 2013

KISC Protects the Watersheds



KISC works on a landscape-level on priority targets that threaten the watershed


UGA1624047

Miconia (*Miconia calvescens*)


DANGER

KISC Helps to protect agriculture

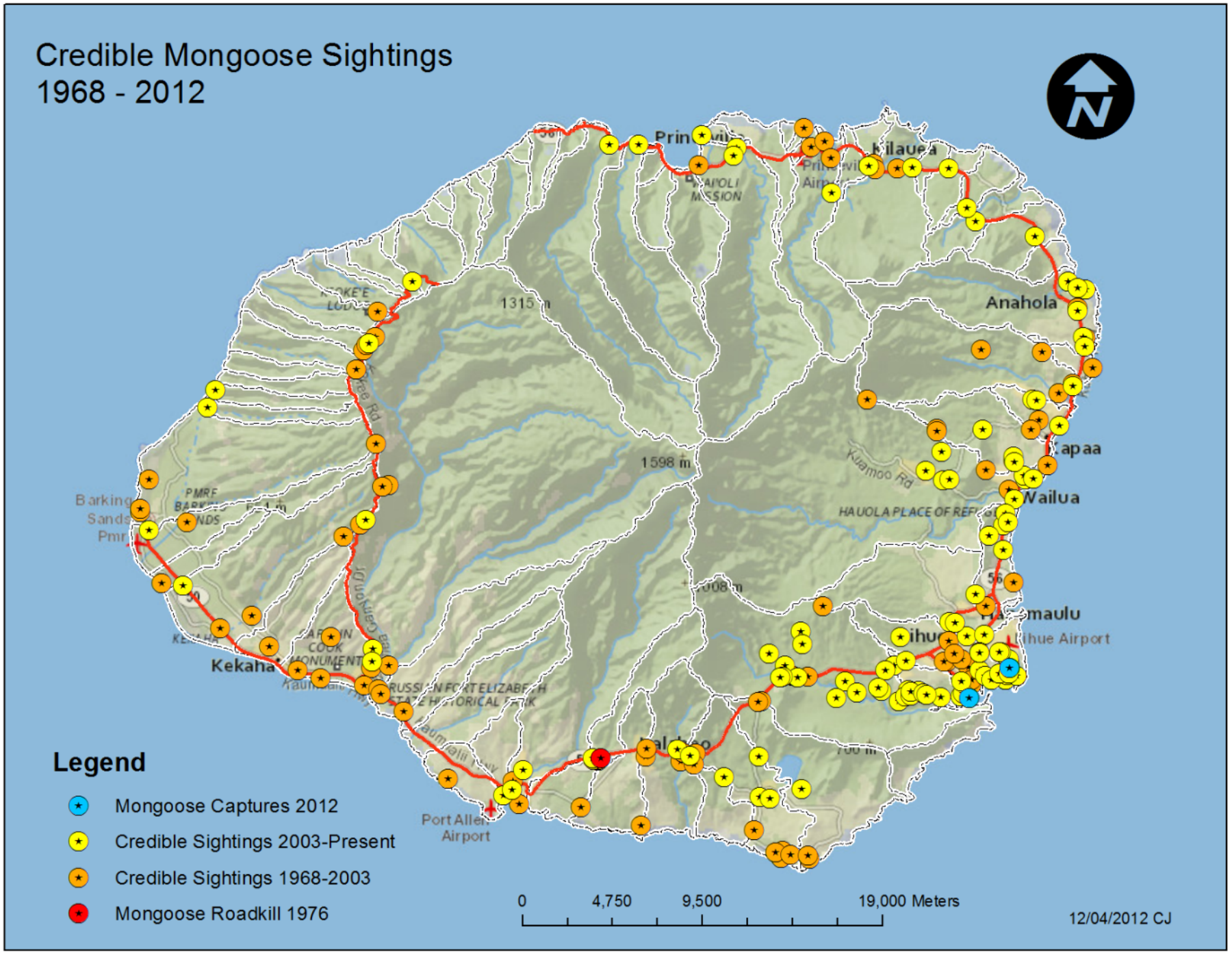

LISTEN UP KAUAI!
D CREW


THIS SIDE UP
VEGETABLE OIL
SKIPPY
KCSC
SPECIES COMMITTEE
Crop Production Services


MASTER
Resistant Sprayer
OUTPUT
Spray Pattern
ARANTEE

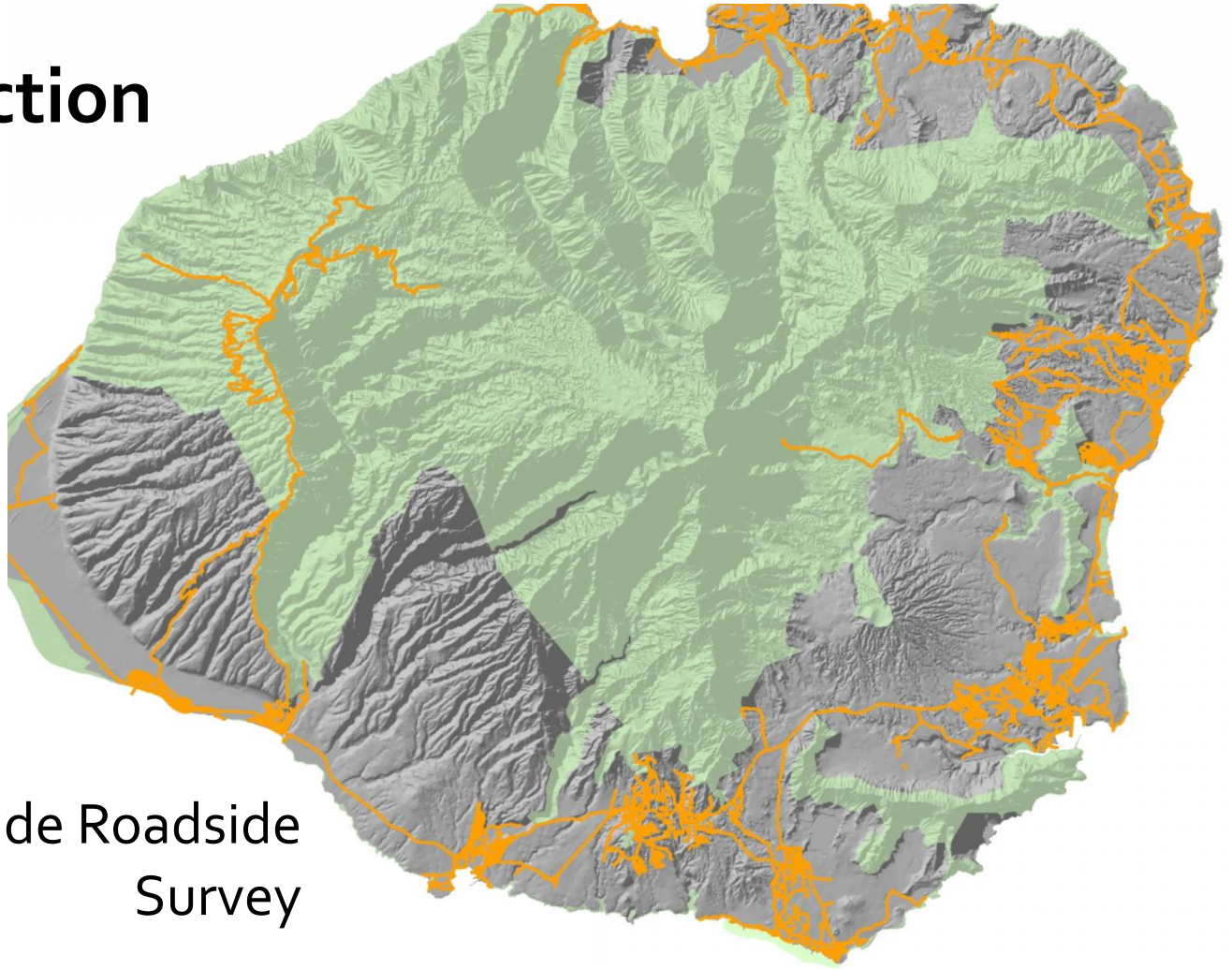

ENFORCER
KISC

KISC Helps to protect natural resources


Credible Mongoose Sightings
1968 - 2012
Anahola
Kilauea
Kapaa
Wailua
Kekaha
Port Allen Airport
Lihue Airport
1315 m
1598 m
Kuamoo Rd
HAUOLA PLACE OF REFUGE
Legend
Mongoose Captures 2012
Credible Sightings 2003-Present
Credible Sightings 1968-2003
Mongoose Roadkill 1976
0
4,750
9,500
19,000 Meters
12/04/2012 CJ

KISC Fills the gap between agencies

Early Detection



2010 Island-wide Roadside Survey

Rapid Response

Wax Myrtle and bingabing detected and eliminated

KISC Works toward island-wide eradications

Successfully eradicated fireweed on Kauai from two infestation sites.


Successfully eradicated coqui frogs
from Kauai’s one wild-land
infestation

KISC Collaborates with partners

KISC
KAUA'I INVASIVE SPECIES COMMITTEE

Kukui'ula
KAUA'I'S LIVING GARDEN

APHIS


200


CITRIC ACID ANHYDROUS
BBCA
Manufacturer:BBCA
Origin: Chin
G.W.: 50.3 LB
N.W.: 50 LB(22.68KG)
BATCH NO:

KISC helps to increase partner capacity

KISC Educates and Informs

Little Fire Ant

Impacts to Hawai'i

Quality of life: LFA deliver a powerful sting caus large, painful welts. Welts can last days, followed an intense itching sensation. These stinging ants infest yards, gardens, and homes.

Domesticated animals: Stings to pets livestock can lead to blindness.

COQUI PATROL

Whistle While You Work

KISC
KAUAI INVASIVE SPECIES COMMITTEE

Kia'i Moku

guarding the island

2012

WHAT'S INSIDE?

Volume 5 Issue 1

KAUA'I O

By Keren Gunder

In 2001, coqui frog valley in Lāwa'i after introduced two w undetected for a was able to estab covering about what was be that time less males. The this infestat vegetation, access issu effective t

Luckily Departm Animal Inspect Servic (USD an a as a th

Mongoose up page 10

Coqui News

Kauai Invasive Species Committee

Work Notification April 9-13

Work commences at infestation site in Lawai

Activities at the Coqui infes tion site will resc ing T

heduled nd Thurs-

be to sities entire

ing ay-

Hand-captured Coqui frog.

POSTED: Thursday, April 5, 2007

In this issue:

Contact Phone Numbers:

- **KISC**: 246-0684 (from 7:00 am to 4:00 pm)
- **Crew Supervisor**: 651-8781
- **Hawaii Department of Agriculture**: 274-3069
- **Pest Hotline**: 643-PEST

The map to the left shows the entire infestation area. This area has been broken into management units, and numbered accordingly.

Work at the site will reference these numbers.

f you hear call- ng frogs in an ea near you, ase contact office so that can schedule ment in that

Tidbit

Experts believe the first frog — or frogs — hitched a ride to Hawaii in a plant shipped from Puerto Rico or Florida. Hawaii's year-round temperate weather and open space provided the coqui with an ideal environment in which to reproduce.

Kaua'i Mongoose Monitor

KISC KAUA'I INVASIVE SPECIES COMMITTEE

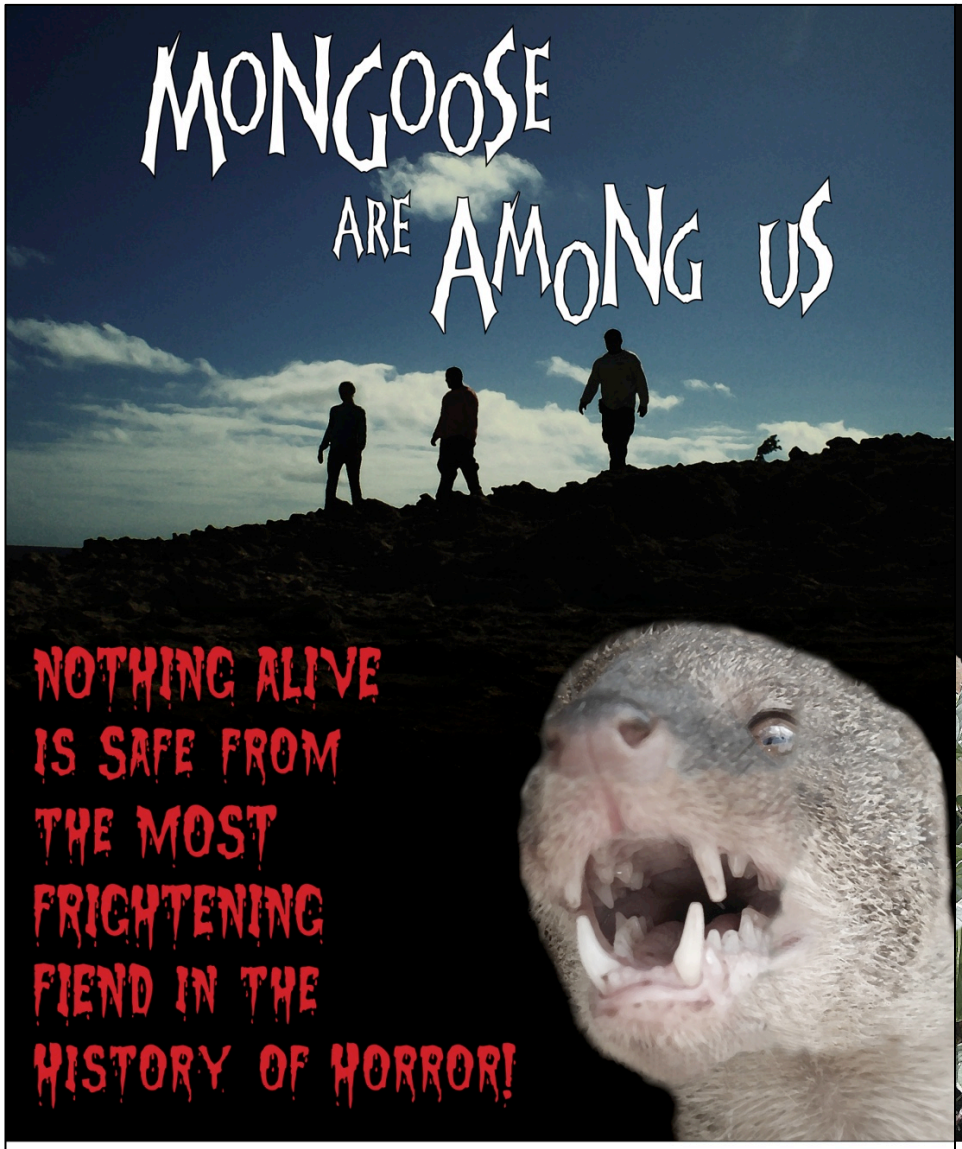
November 2012

Working Hard for the Money

The hardworking mongoose response crew works 5 days per week responding to mongoose reports, setting and checking traps, and conducting outreach and education with the public everywhere they go. Matt Kirk (pictured below), worked his last day on November 16, as a temporary hire with KISC, after completing his term. Jamie Harris (pictured on the next page) is an emergency hire with DLNR's Division of Forestry and Wildlife, supervised by Thomas Kaiakapu. Pat Gmelin, the KISC Mongoose Response Project Leader is heading up and coordinating this work and with his team they decide priority trapping areas, bait rotation, and constantly look for new ways to trap mongooses.

To give this work perspective, collection and trapping data is outlined on the next page. It is labor-intensive, and mostly unrewarding work (as far as mongoose captures go). This team has been doing an outstanding job and they are much appreciated for their enthusiasm and diligence. Kudos to this work force!

Mongoose are Among Us



NOTHING ALIVE IS SAFE FROM THE MOST FRIGHTENING FIEND IN THE HISTORY OF HORROR!

Starring Small Indian Mongoose and The KISC Crew • Opportunistic feeders that Prey on the Eggs and Hatchlings of Native Ground Nesting Birds and Endangered Sea Turtles • Hitchhikes between islands on Cargo Shipments • Active During the Day • First Live Capture on Kauai May 23, 2012 in Lihue

Attack of the Killer Ants

6 Legs, A Stinger and An Attitude !

BE AFRAID !
BE VERY AFRAID !

Starring the Little Fire Ant and The KISC Crew • speck-sized, slow-moving ant • named after its Powerful stings that feel Fire-Like • one colony fits in a Macadamia Nut • Lives in holes in potted plants, leaf litter, trees or clothing • Sneaks to Kauai from invested areas on Big Island

Community Impacts

- **Loss of ecosystem services**
  - No water= no agriculture, no tourism, no economy
- **Decreased biodiversity**
  - Loss of native flora and fauna
- **Increased health risks**
  - Diseases spread by invasive animals and insects
- **Threatened way of life**
  - Stinging ants, loud calls from coqui

Needs and challenges

- Funding for ground and aerial operations
  - Funding shortages hamper work effort and effectiveness
- Consequence for recalcitrant owners
- Funding for partner agencies for DNA and toxicant studies
- Inter-island biosecurity plan and involvement from all stakeholders

What we protect today, we will have for tomorrow

- Healthy watersheds
- Intact native ecosystems
- Unique natural resources
- Sustainable agriculture
- Community awareness
- Green jobs for Hawai‘i residents

...and more

The ISCs can continue to protect Hawai`i
with dedicated funding and continued political support.

KISC
KAUA‘I INVASIVE SPECIES COMMITTEE