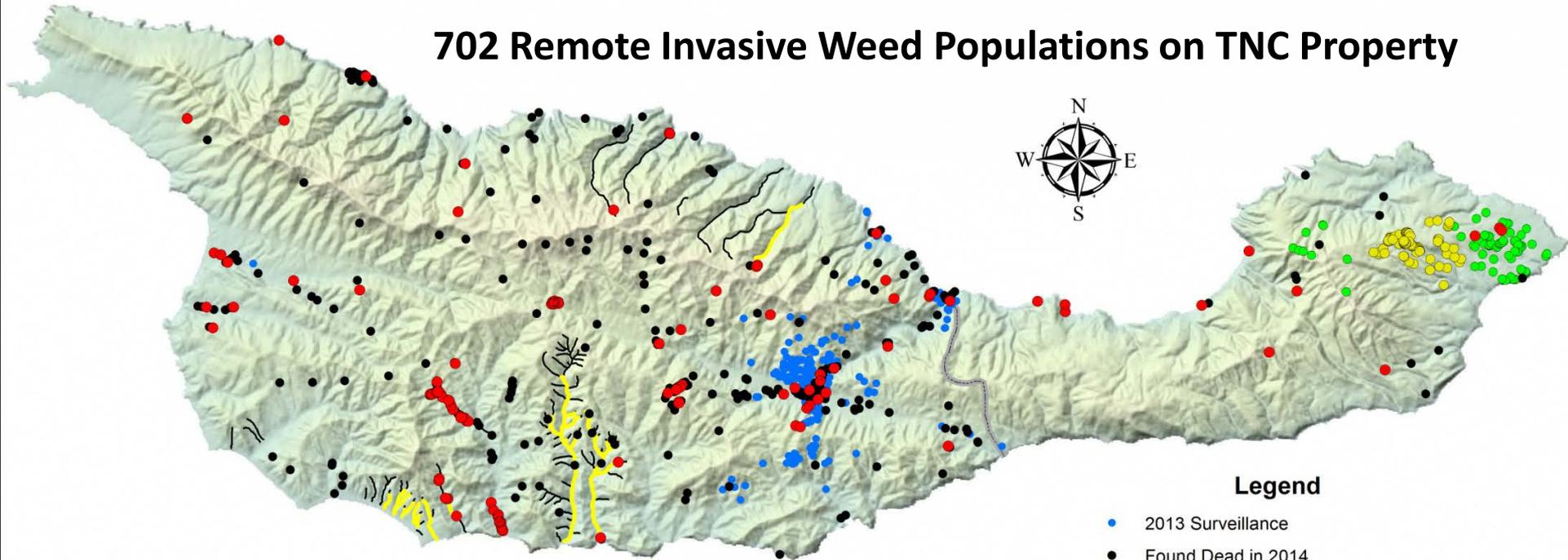


A MEANS TO AN END: a systematic approach to eradication- target detection and treatment

Presented by:
Morgan Ball, Executive Director
Wildlands Conservation Science

Santa Cruz Island Weed Treatment Map

702 Remote Invasive Weed Populations on TNC Property



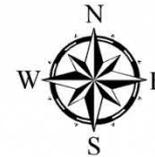
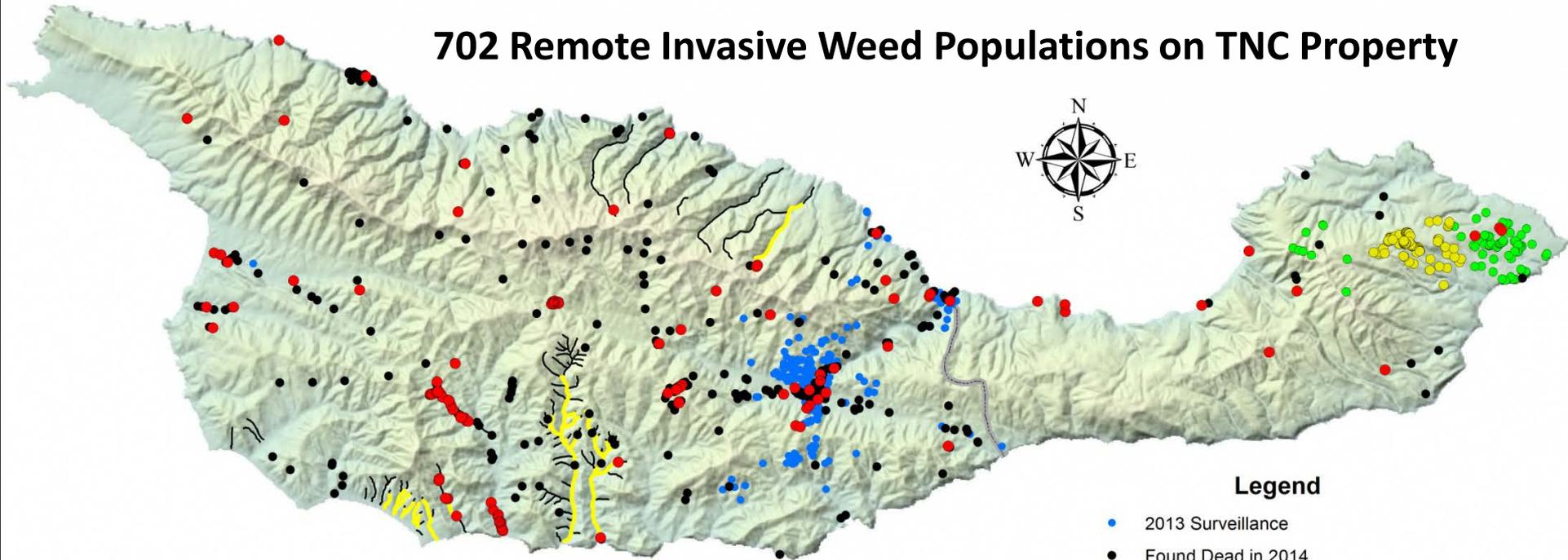
Legend

- 2013 Surveillance
- Found Dead in 2014
- Active in 2014
- Feral Olive Treated in 2014
- Feral Olive Surveyed in 2014
- Canyon Treated for Helichrysum in 2014
- Canyon Clean of Helichrysum in 2014
- TNC-NPS Boundary

0 2 4 8 Kilometers

Santa Cruz Island Weed Treatment Map

702 Remote Invasive Weed Populations on TNC Property



Legend

- 2013 Surveillance
- Found Dead in 2014
- Active in 2014
- Feral Olive Treated in 2014
- Feral Olive Surveyed in 2014
- Canyon Treated for Helichrysum in 2014
- Canyon Clean of Helichrysum in 2014
- TNC-NPS Boundary

0 2 4 8 Kilometers

May 2014, Achieved 90% Control

Helichrysum petiolare



Helichrysum petiolare

Licorice Plant



Helichrysum petiolare

Licorice Plant

Silver Bush Everlasting Flower



Helichrysum petiolare

Licorice Plant

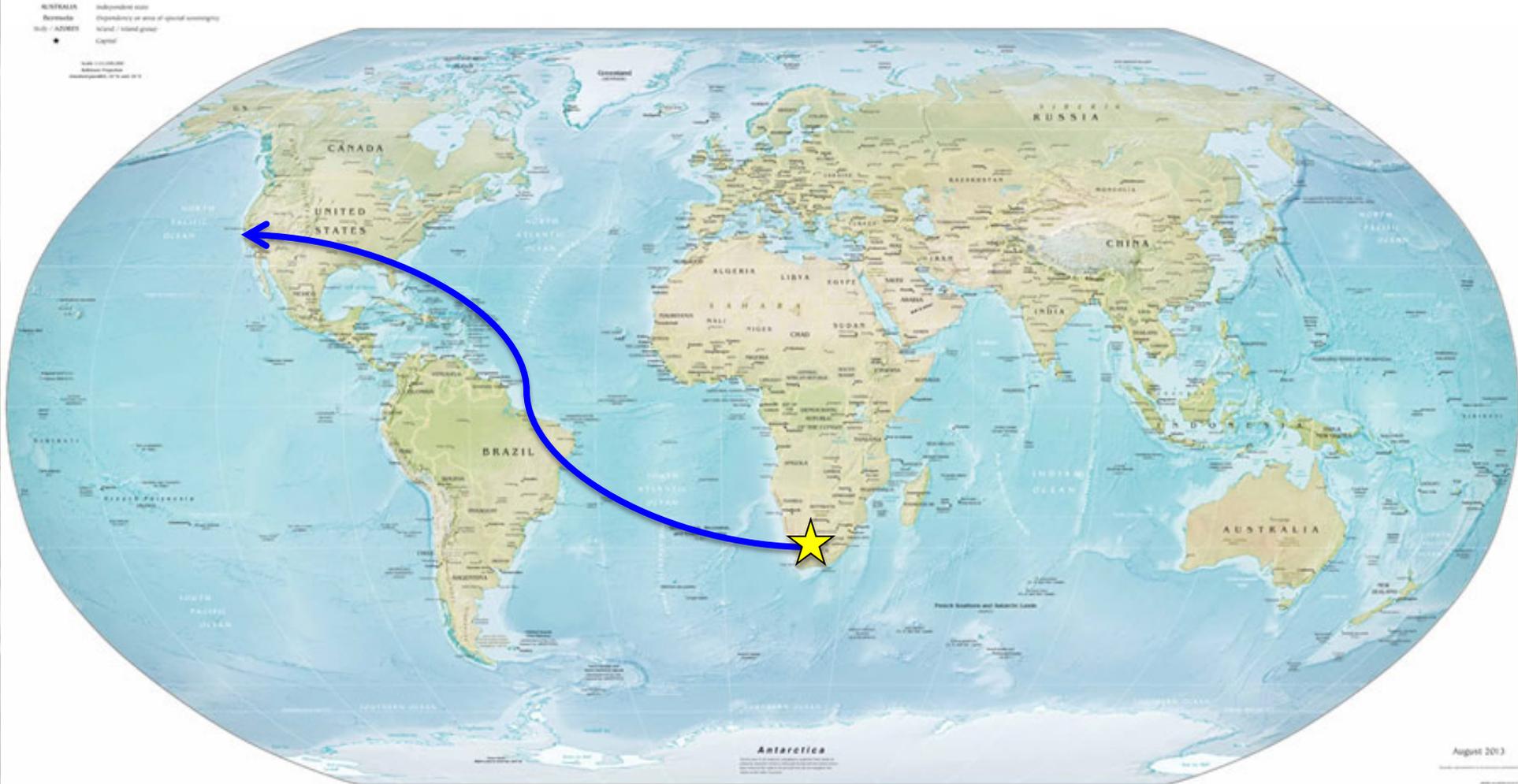
Silver Bush Everlasting Flower



Limelight

Helichrysum petiolare

Physical Map of the World, August 2013



Helichrysum petiolare



Helichrysum petiolare



Helichrysum petiolare



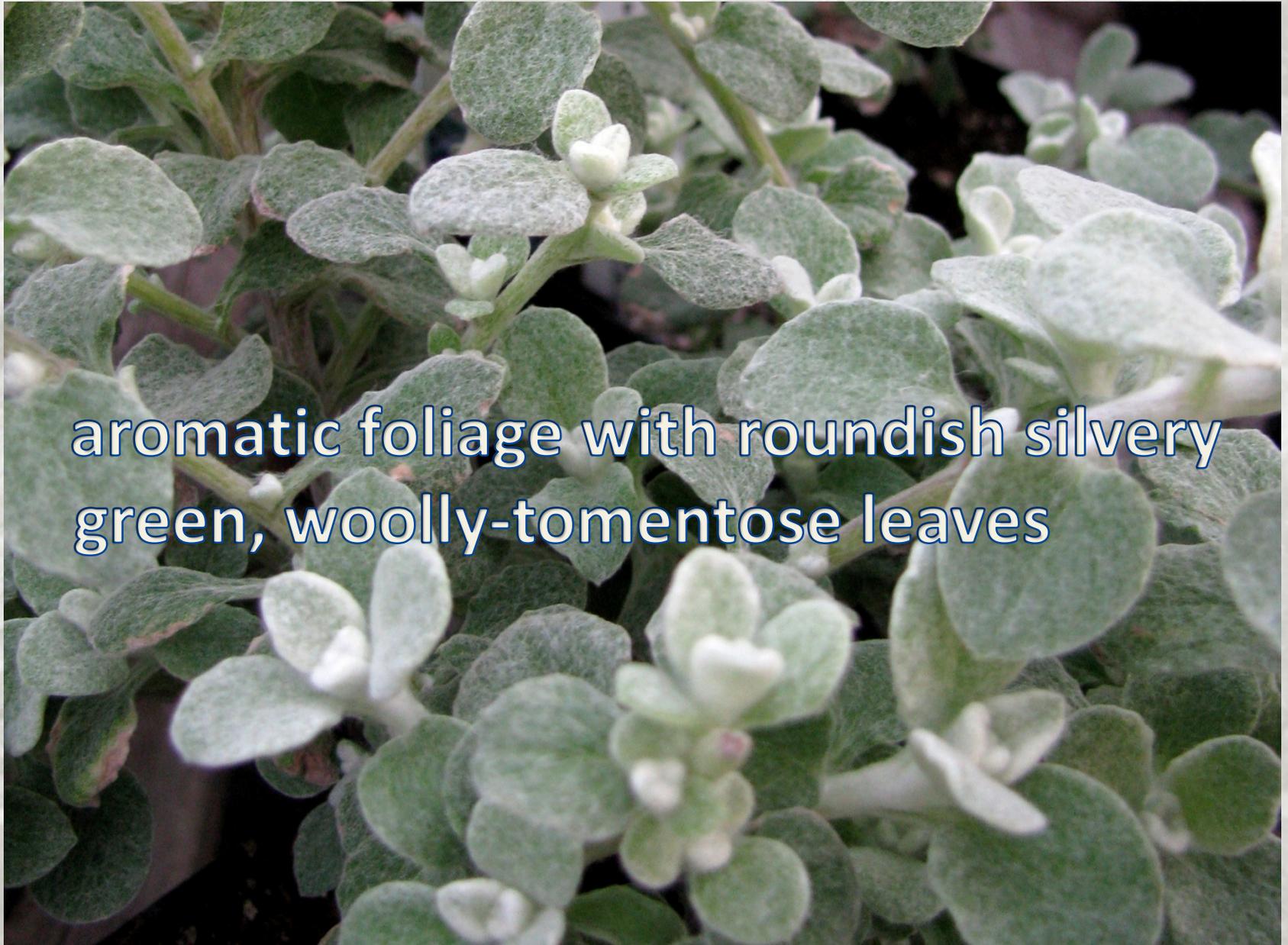
Helichrysum petiolare



Helichrysum petiolare



Helichrysum petiolare



aromatic foliage with roundish silvery green, woolly-tomentose leaves

Helichrysum petiolare



creamy white
compositae flowers

Helichrysum petiolare



dense sprawling growth habit

Riparian/Seep Habitat Association



Stream Orchid
Epipactis gigantea

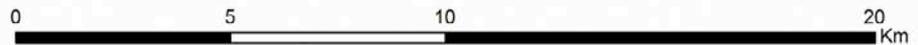
Maiden-Hair Fern
Adiantum jordanii

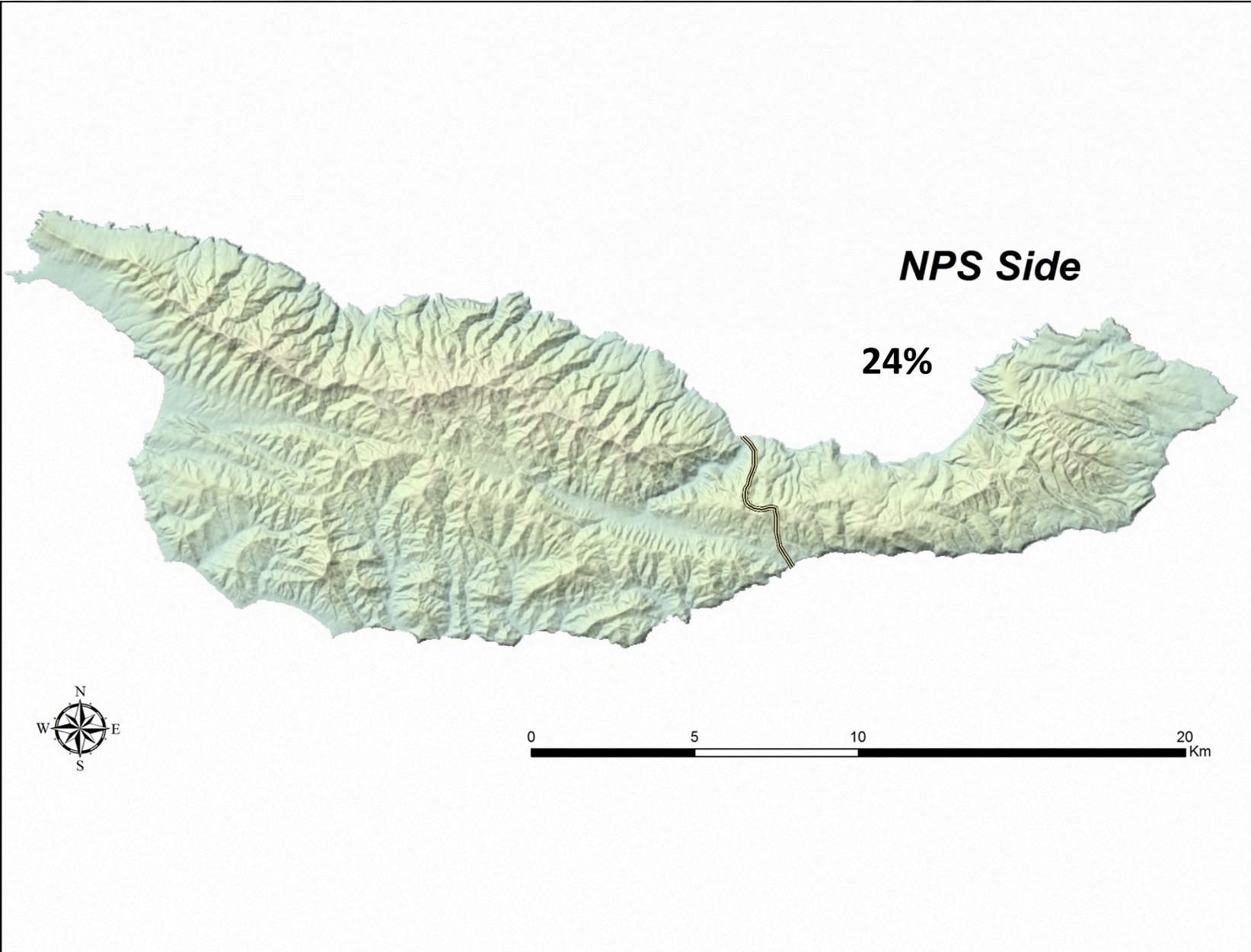
Mule Fat
Baccharis salicifolia

Willow spp.
Salix spp.

Santa Cruz Island

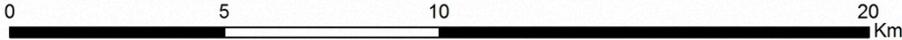
61,764.6-acres

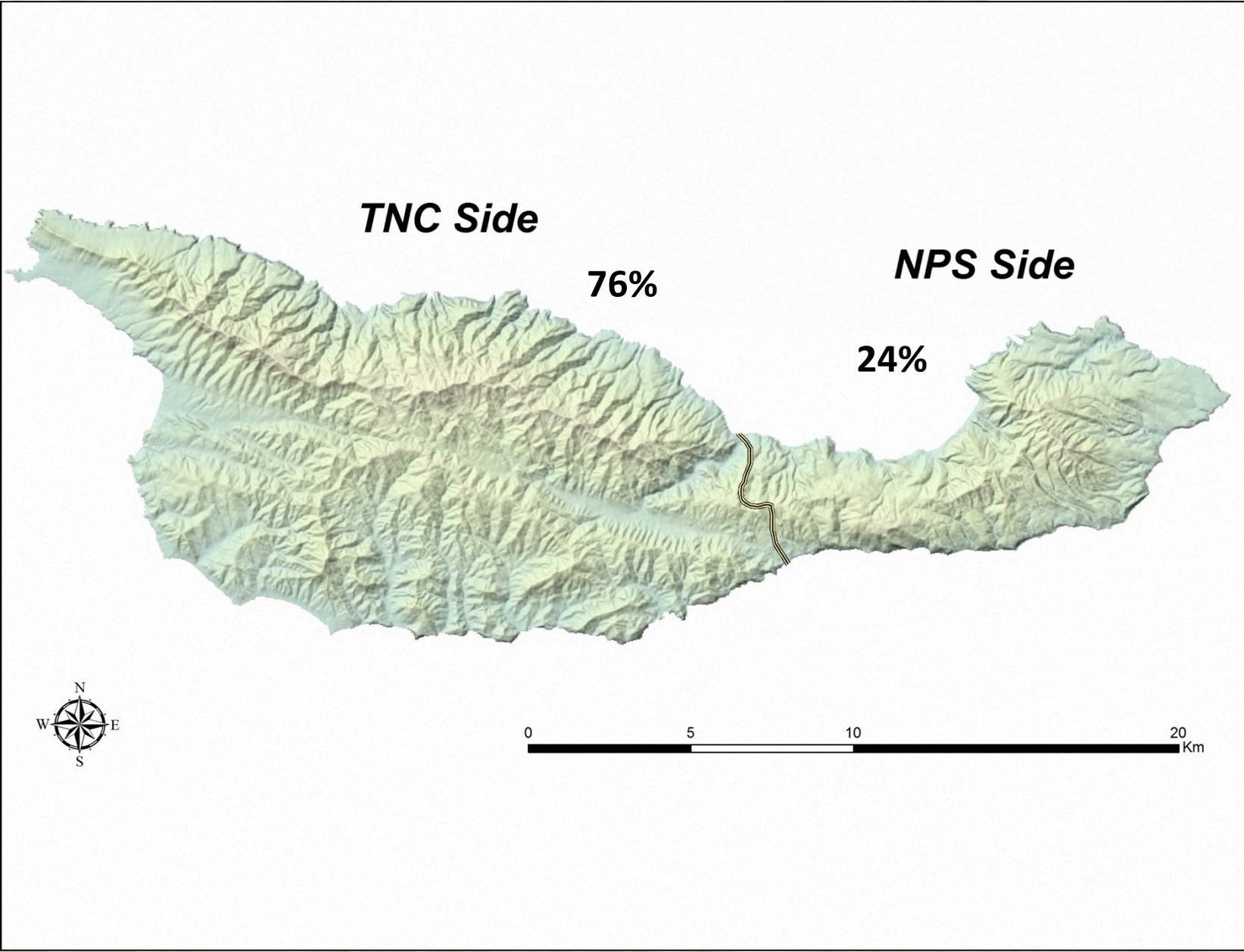




NPS Side

24%

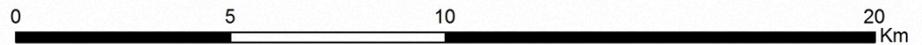




2003

TNC Side

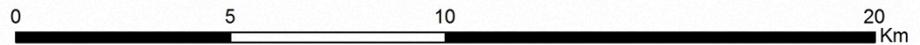
NPS Side



2003

TNC Side

NPS Side

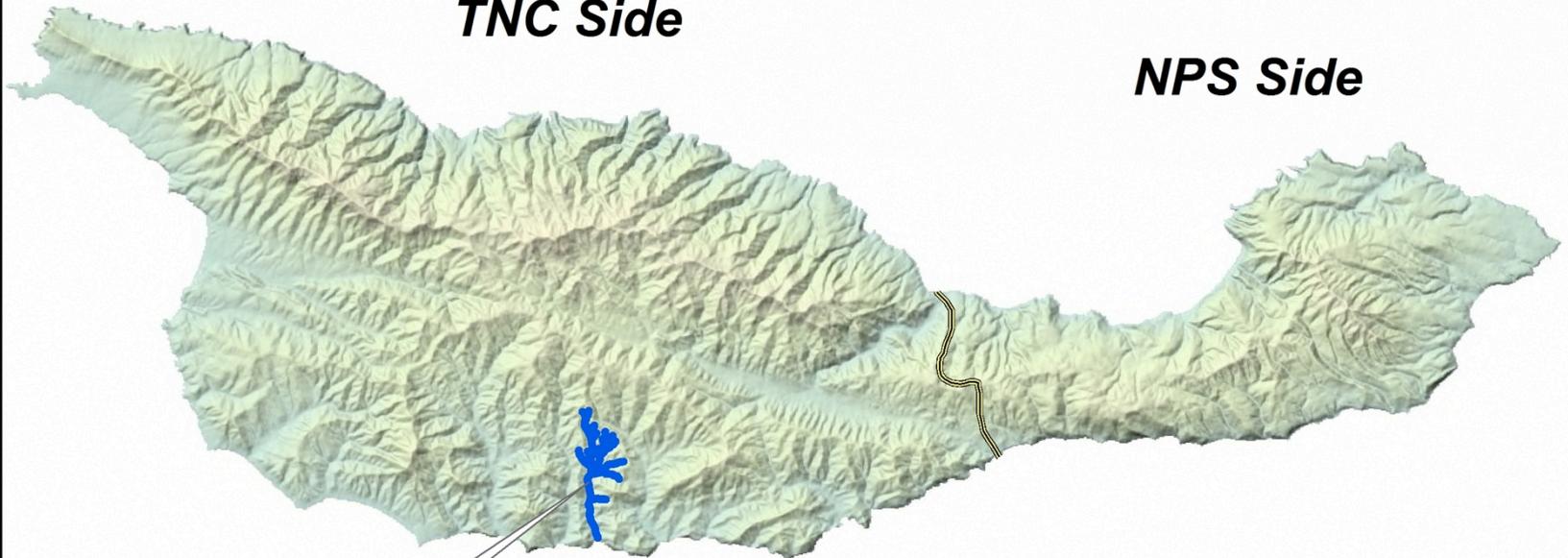


Discovery!

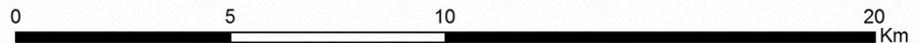
2003

TNC Side

NPS Side

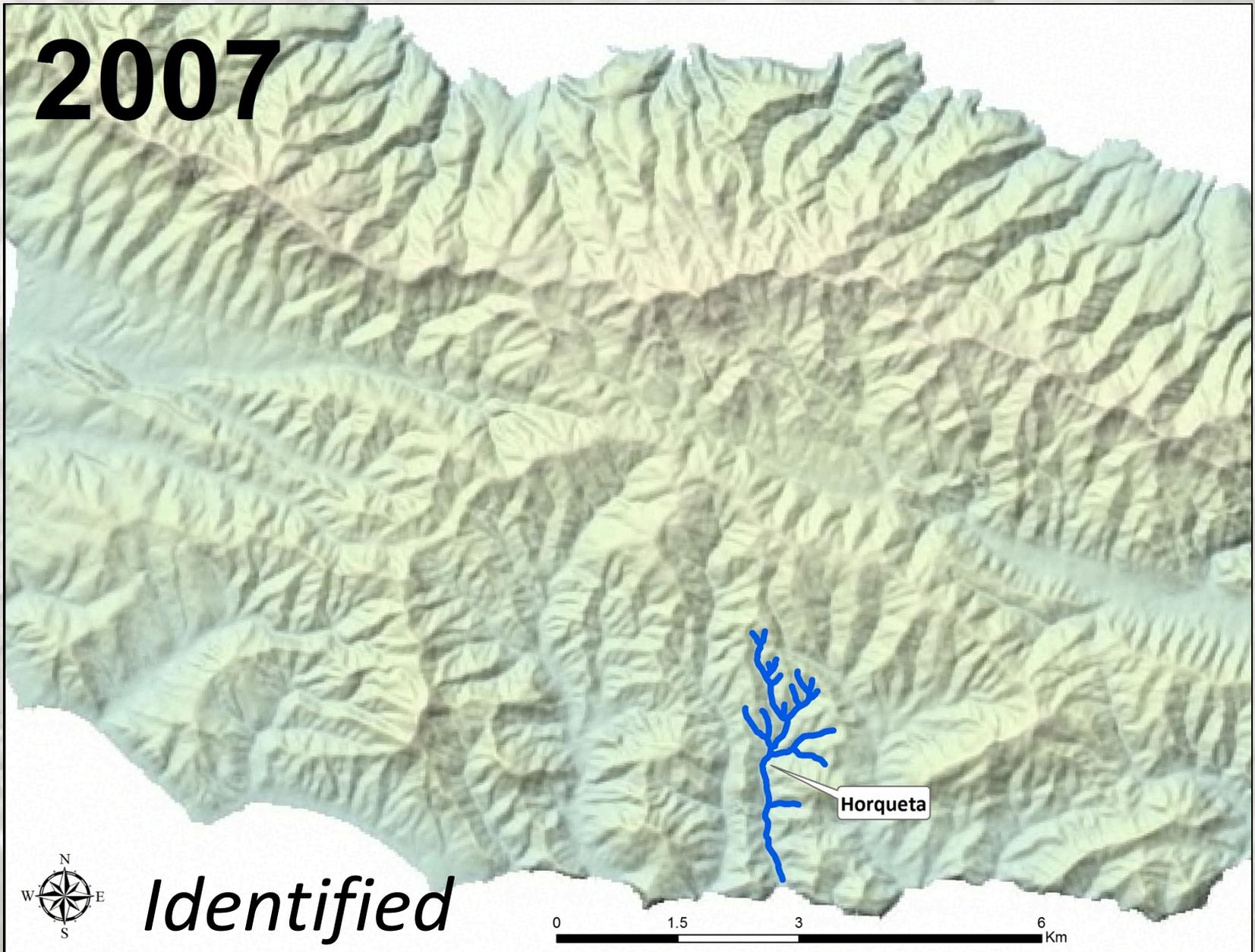


Horqueta



Discovery!

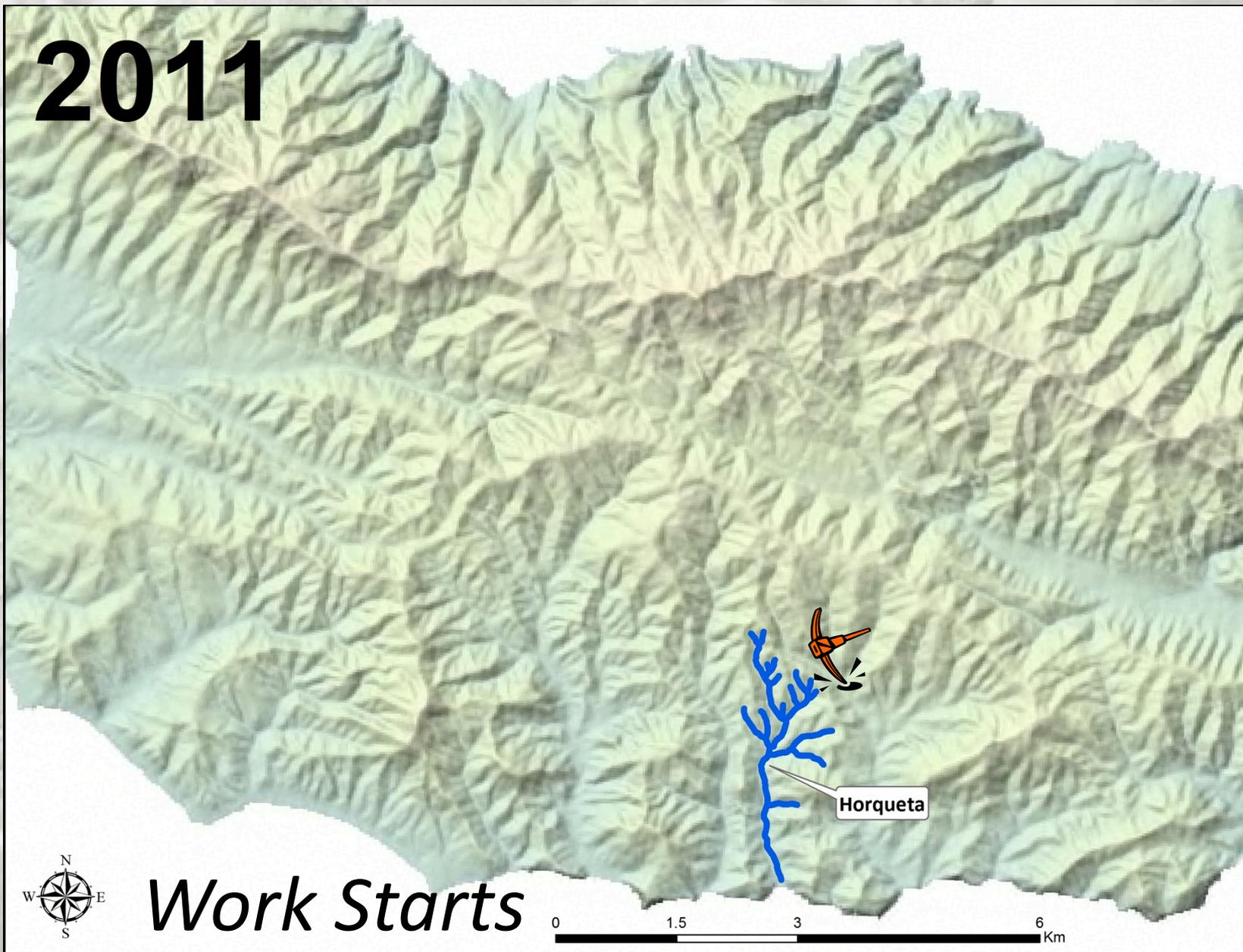
2007



Identified

0 1.5 3 6 Km

2011



Work Starts

0 1.5 3 6 Km

Upper Horqueta Canyon



Helichrysum Treatments in Upper Horqueta Canyon

2011



Lower Horqueta Canyon



Helichrysum Treatments in Lower Horqueta Canyon

2011



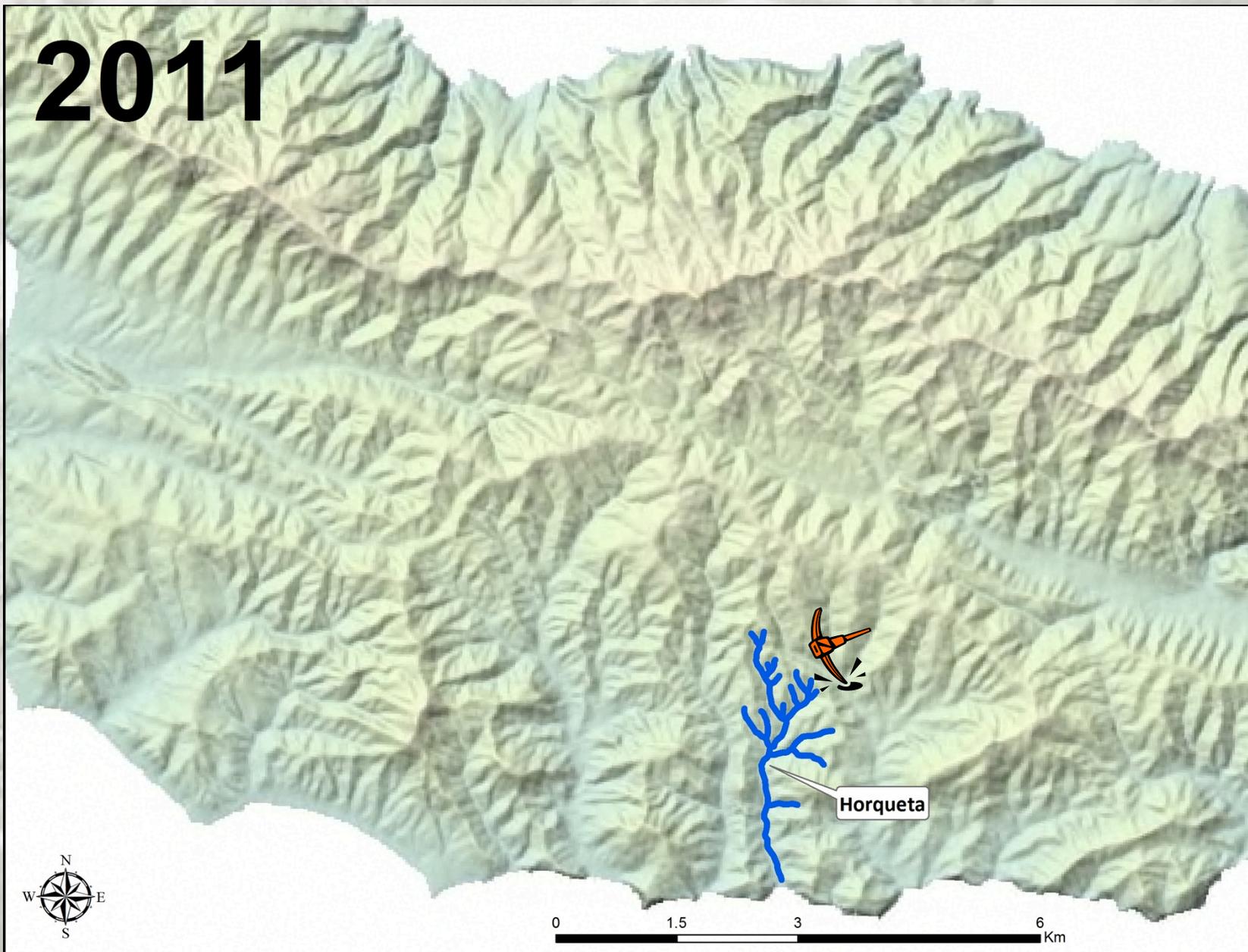
Helichrysum Treatments in Lower Horqueta Canyon



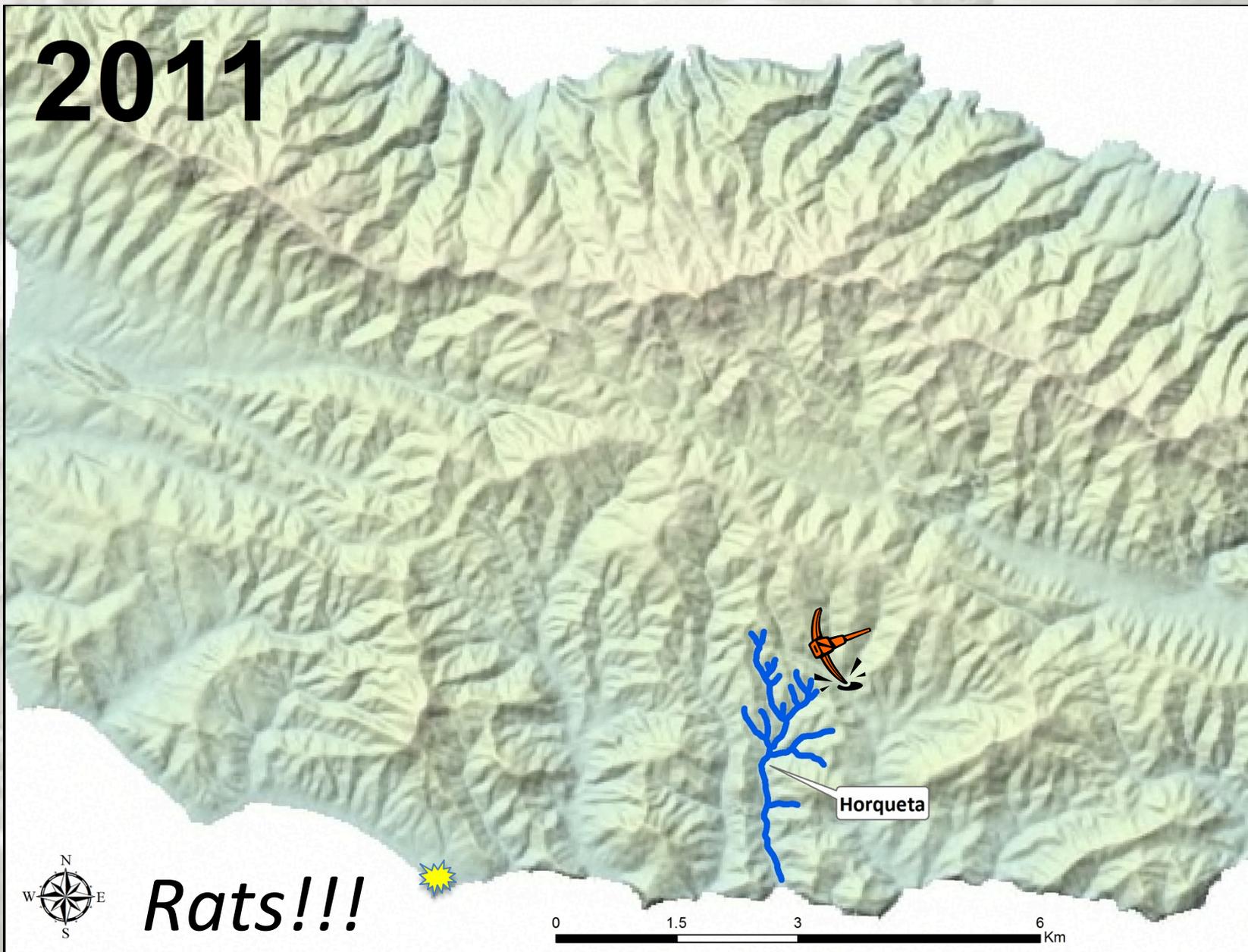
It can get dense...



2011



2011



Rats!!!

0 1.5 3 6 Km



2011-09-13 5:54:52 PM

M 1/1

68°F



HC500 HYPERFIRE



2011-09-13 5:54:52 PM

M 1/1

68°F

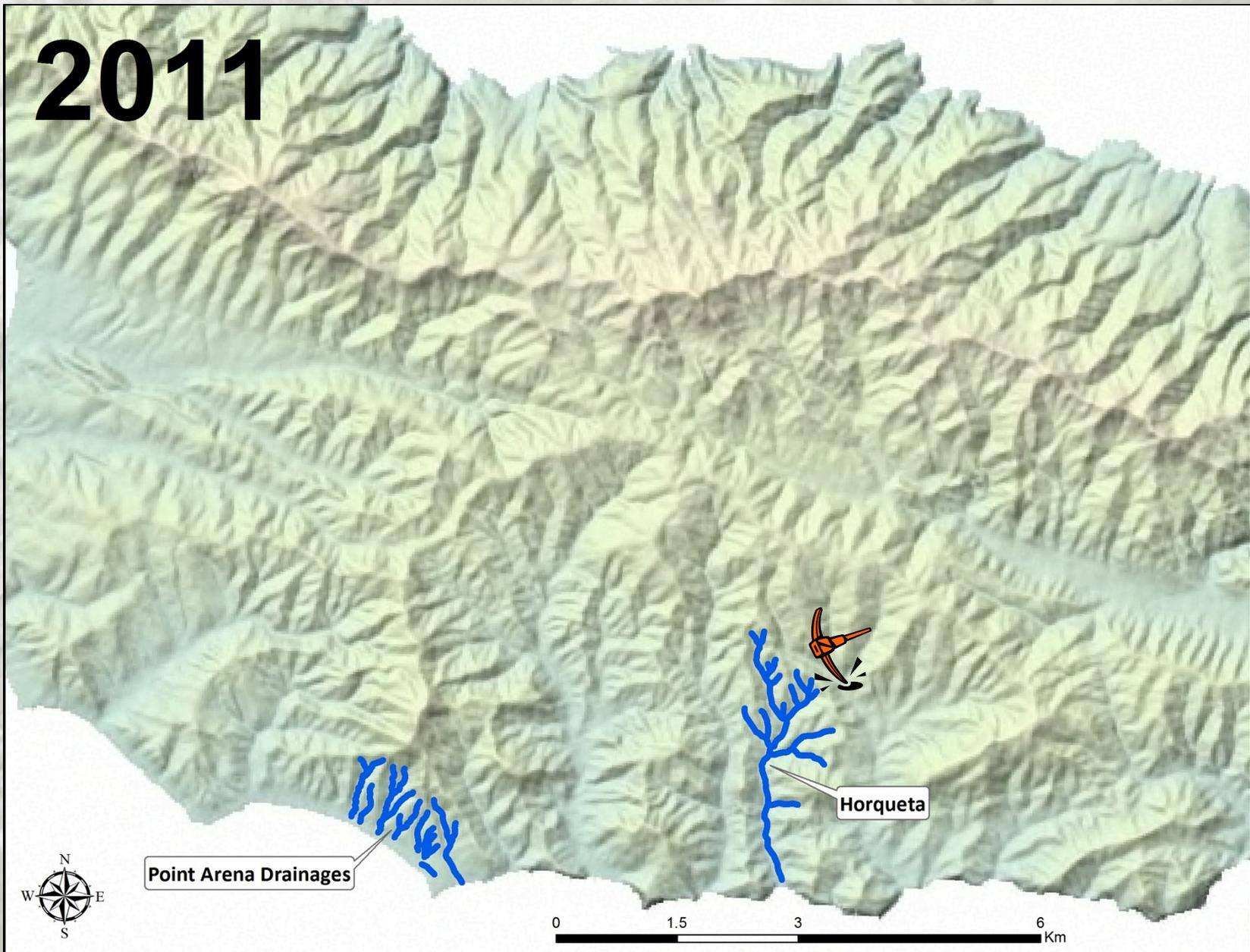


HC500 HYPERFIRE

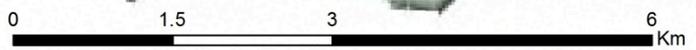


SEPT 2011

2011



Point Arena Drainages



Horqueta

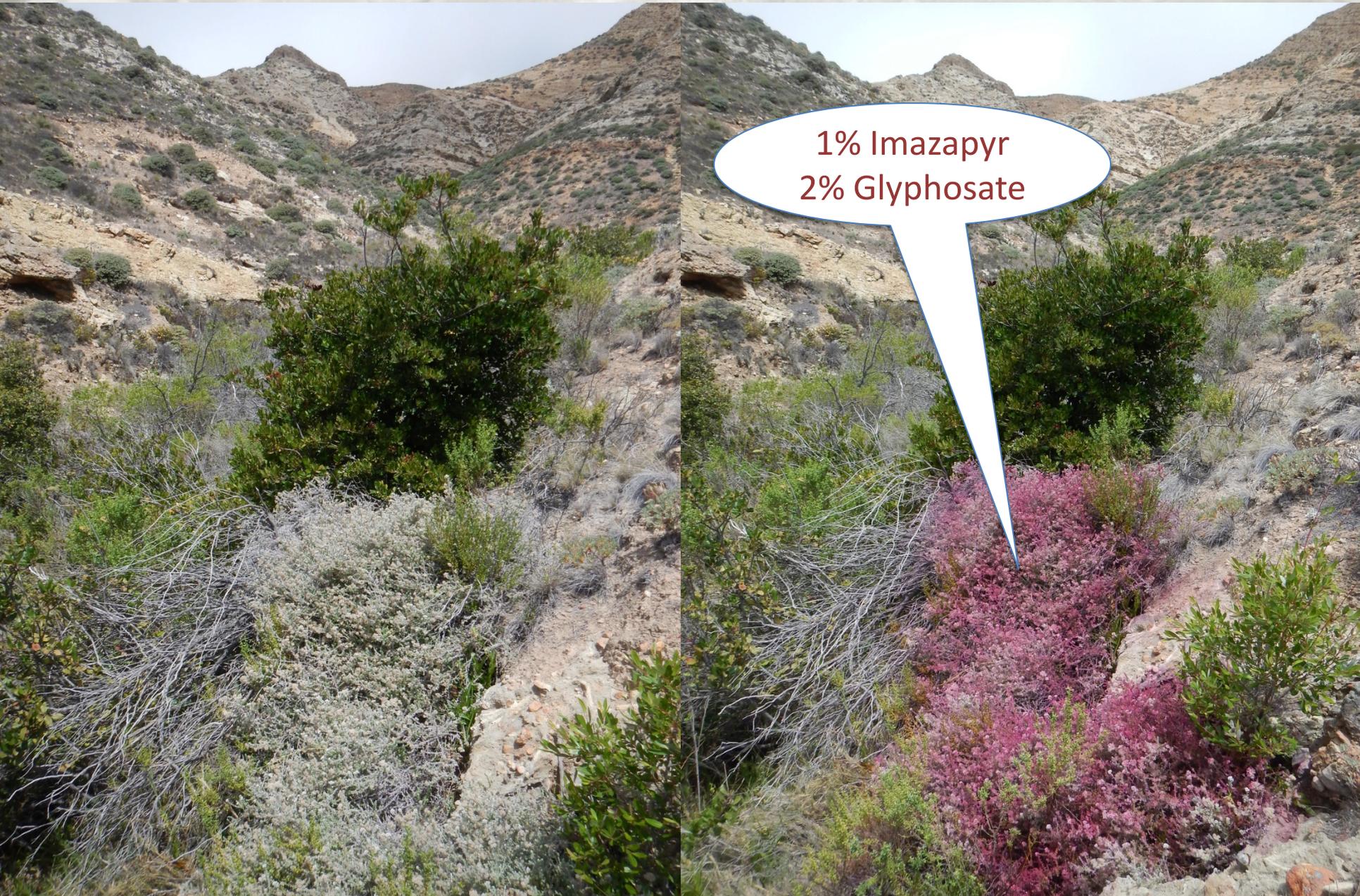
***Helichrysum* Survey/Treatments in the Point Arena Area**



Growth Habit



Helichrysum Survey/Treatments in the Point Arena Area



1% Imazapyr
2% Glyphosate

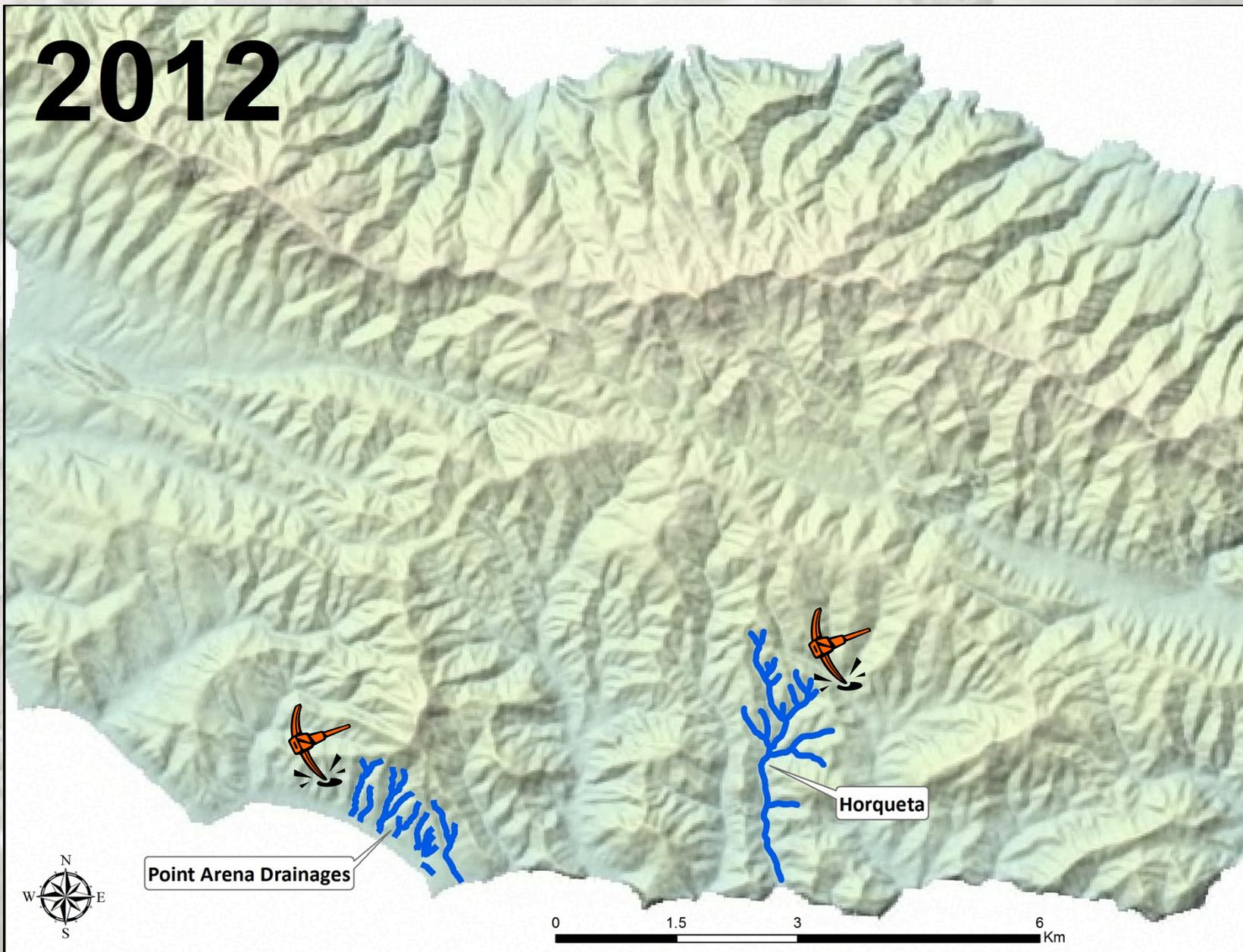
***Helichrysum* Survey/Treatments in the Point Arena Area**



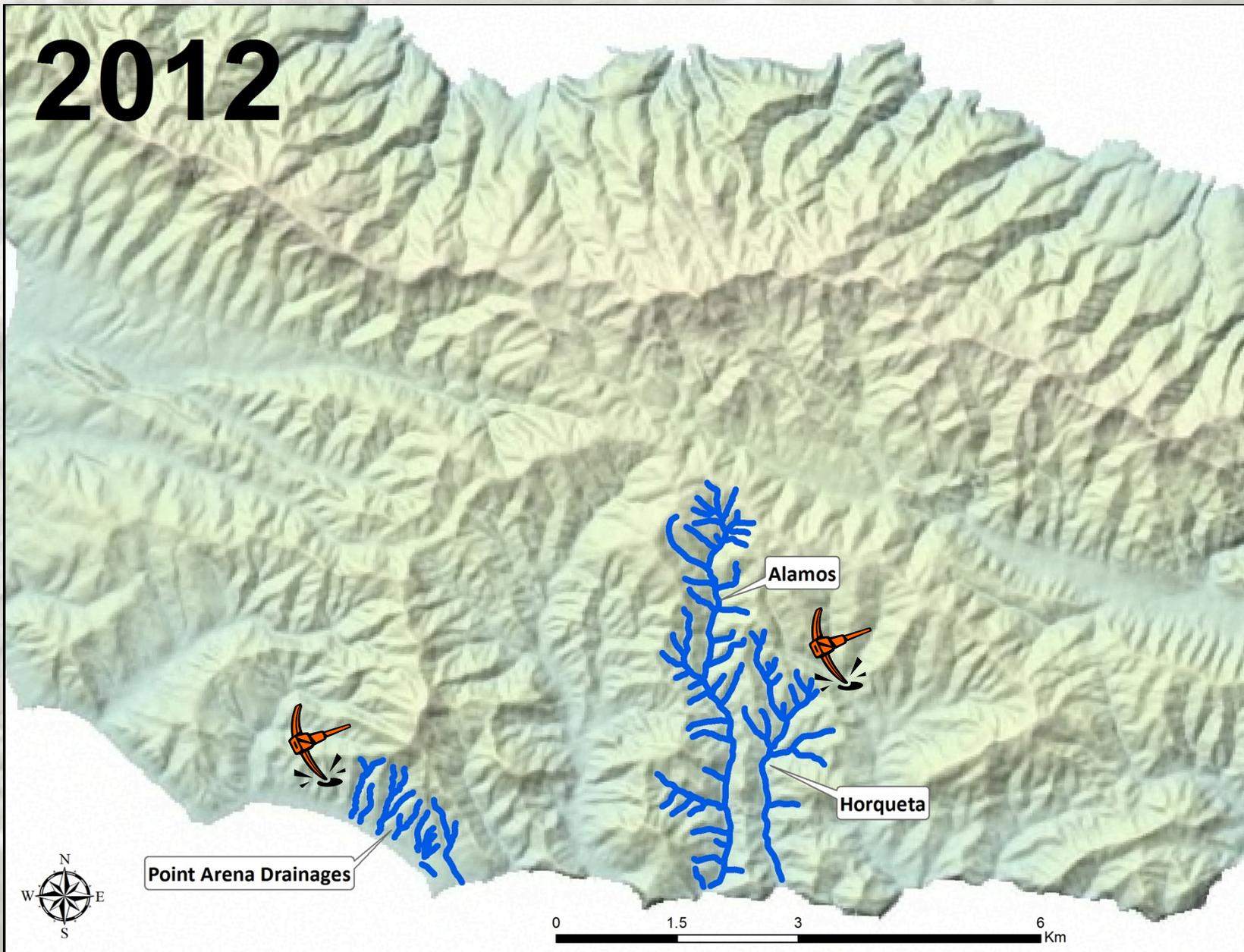
***Helichrysum* Survey/Treatments in the Point Arena Area**



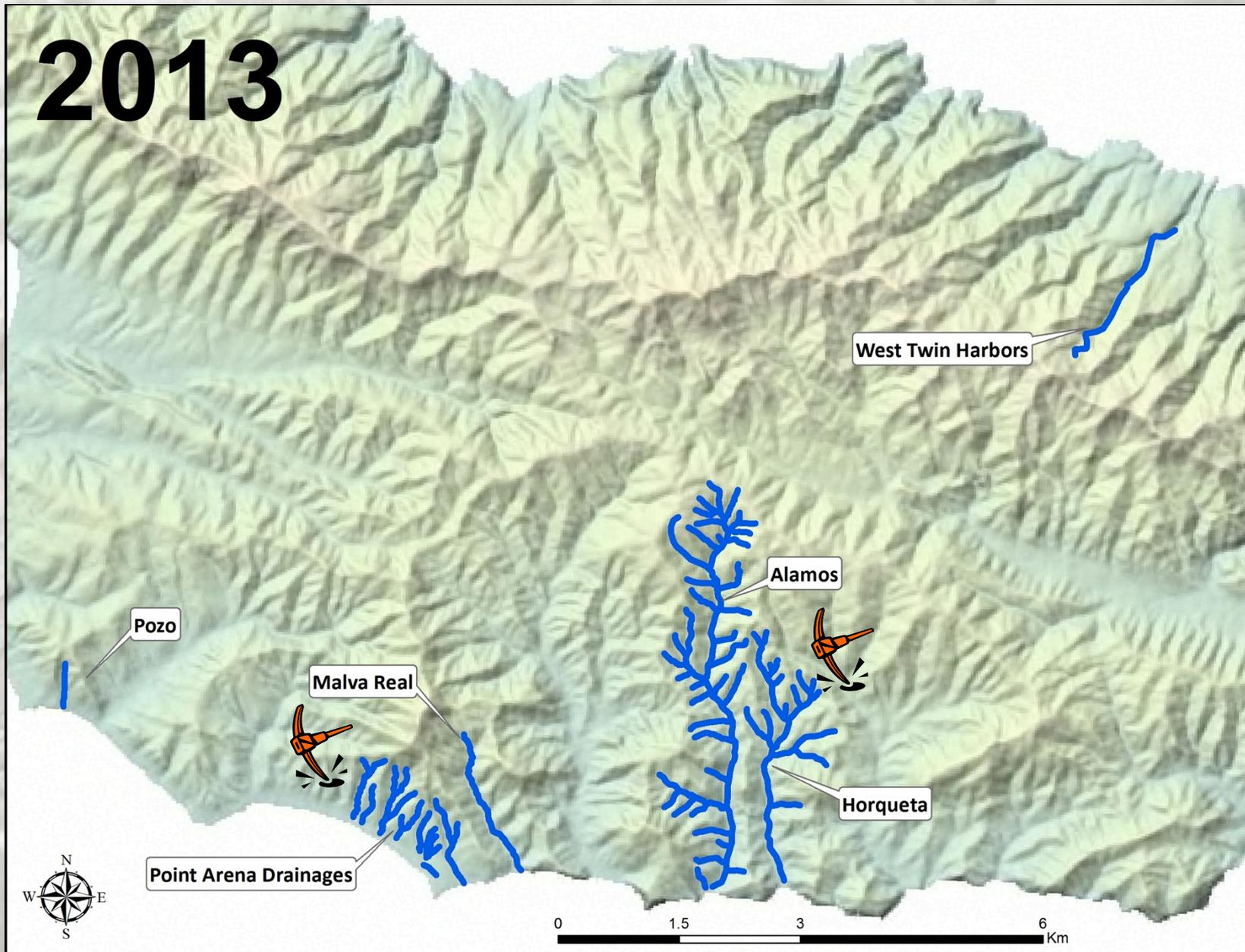
2012



2012



2013



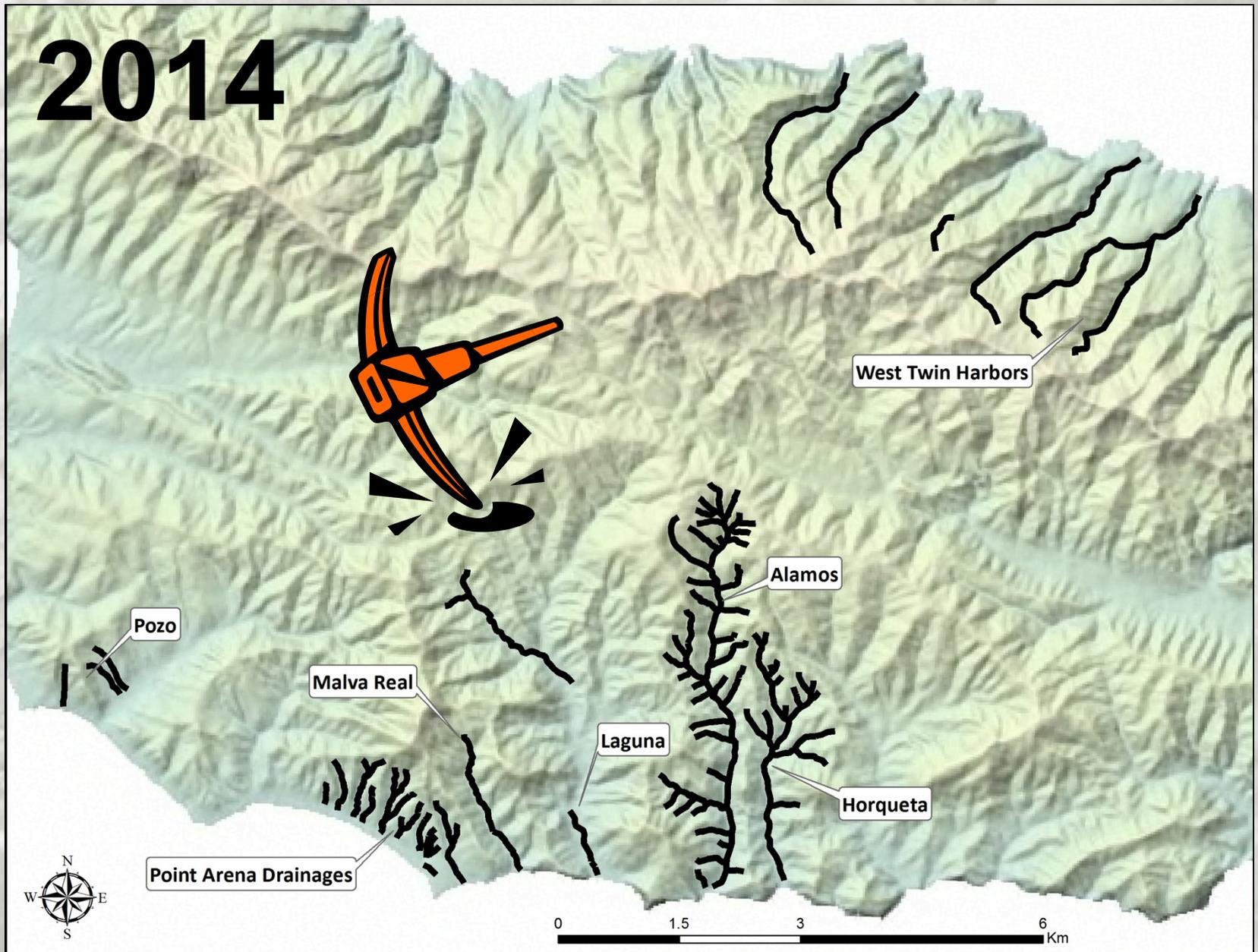
Malva Real Canyon- South Coast



West Twin Harbor Canyon- North Coast



2014



Pozo

Malva Real

Laguna

Alamos

West Twin Harbors

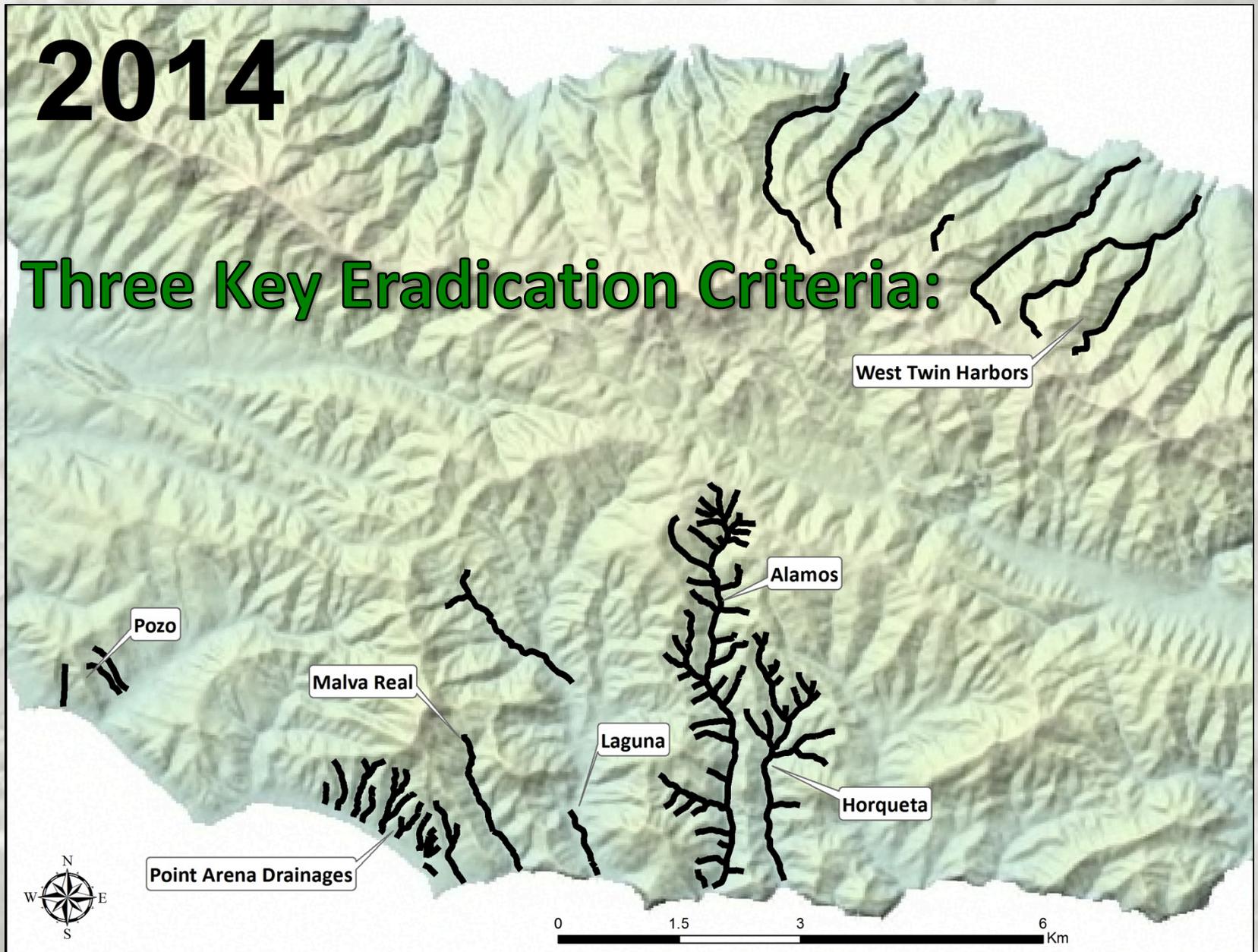
Horqueta

Point Arena Drainages

0 1.5 3 6 Km

2014

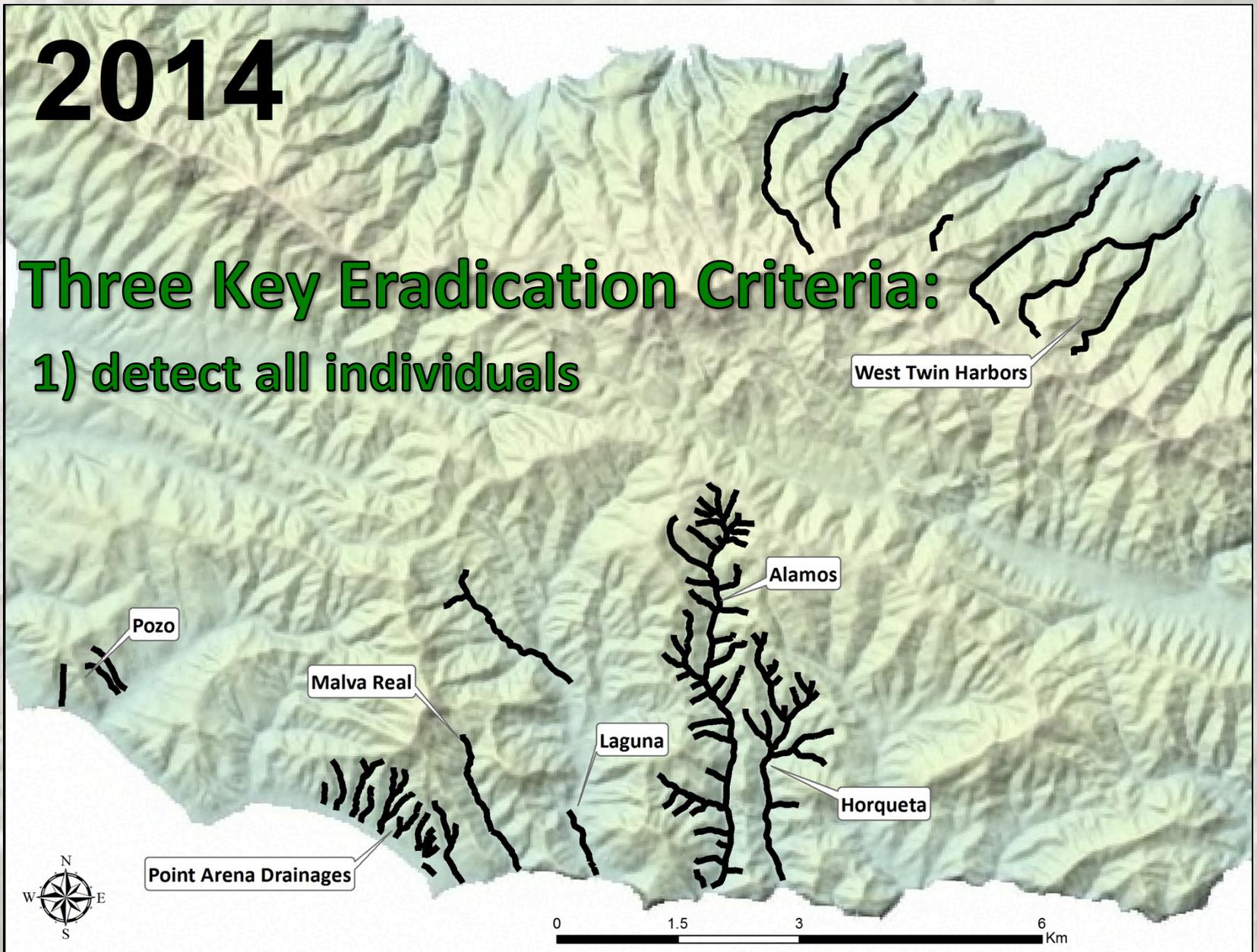
Three Key Eradication Criteria:



2014

Three Key Eradication Criteria:

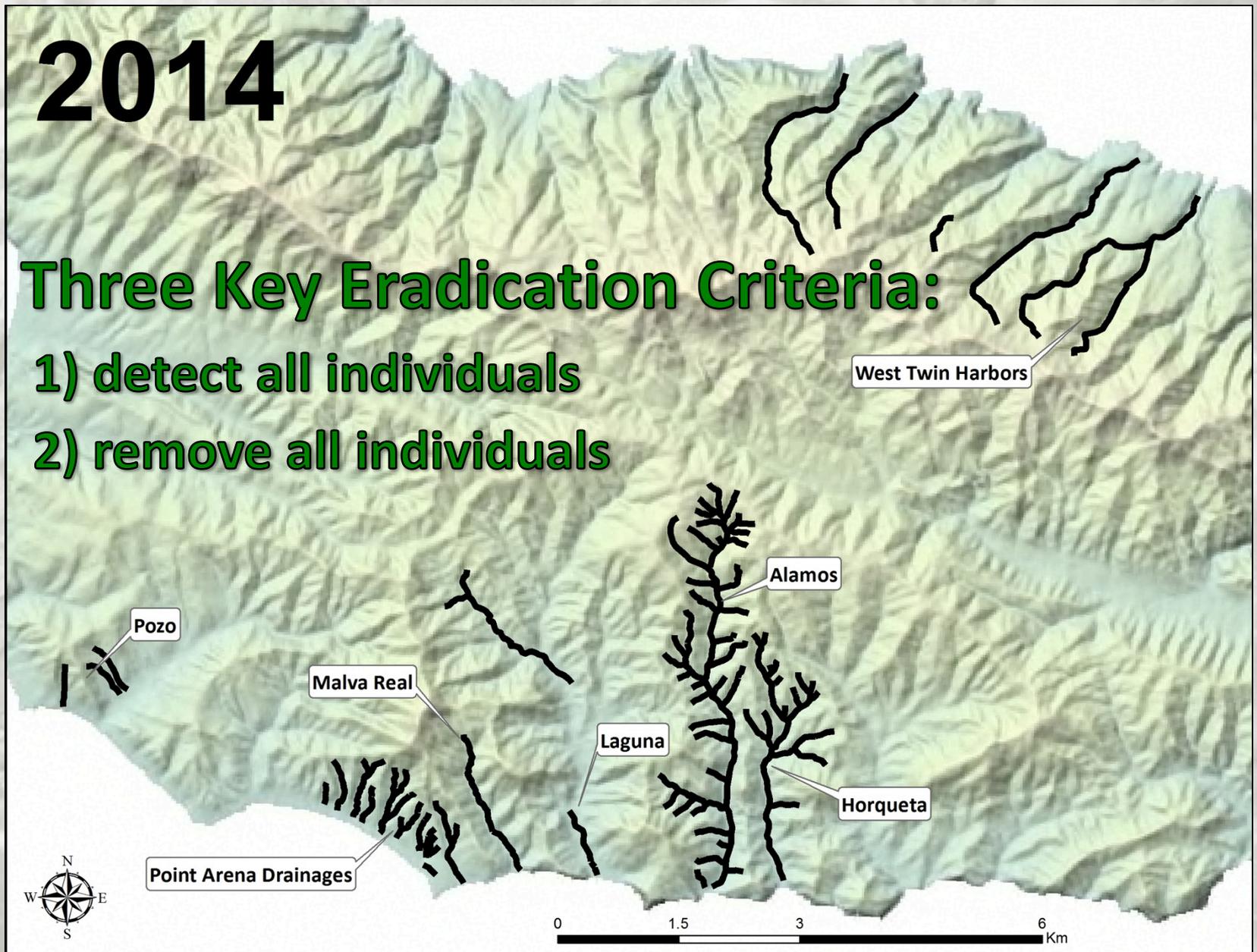
1) detect all individuals



2014

Three Key Eradication Criteria:

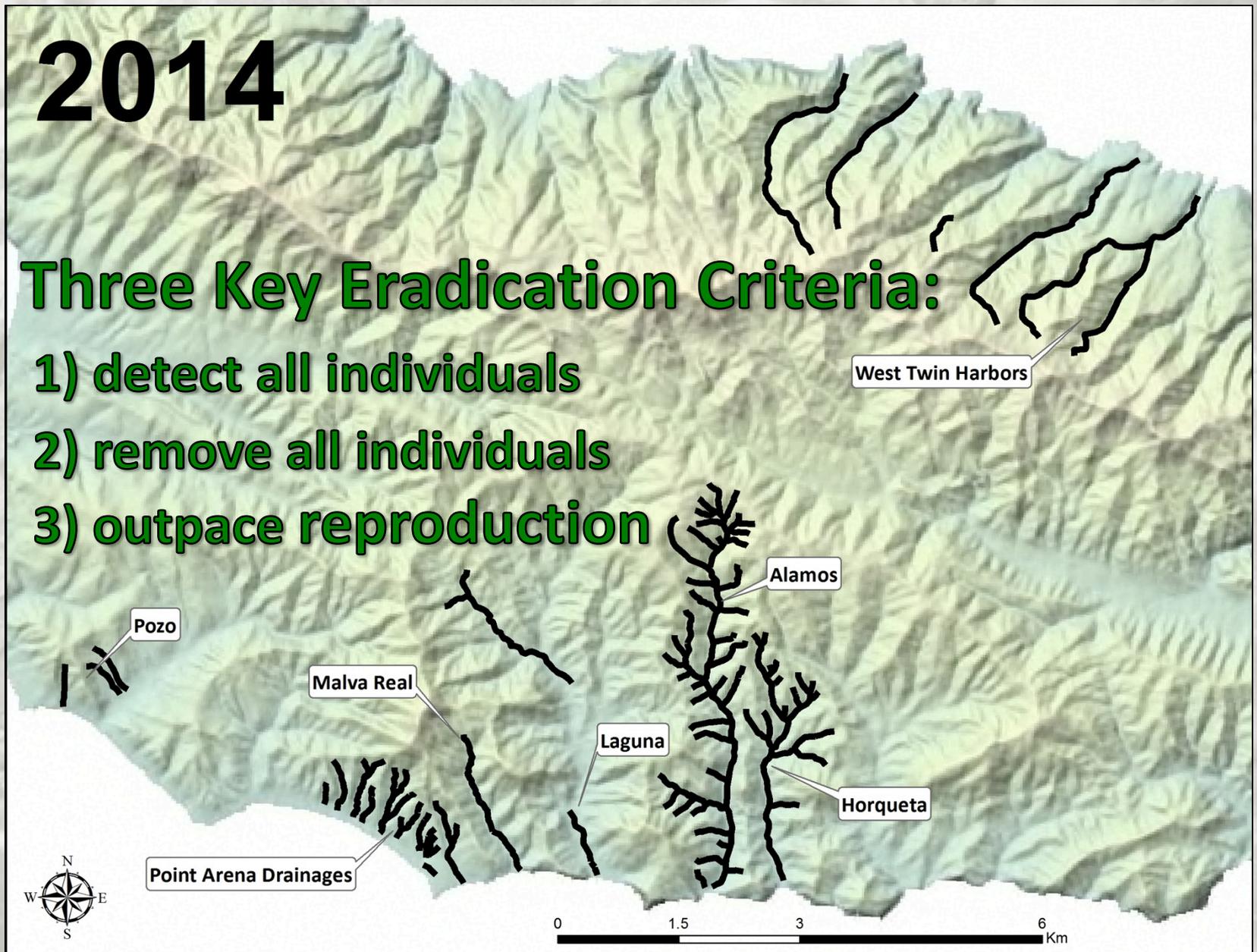
- 1) detect all individuals
- 2) remove all individuals



2014

Three Key Eradication Criteria:

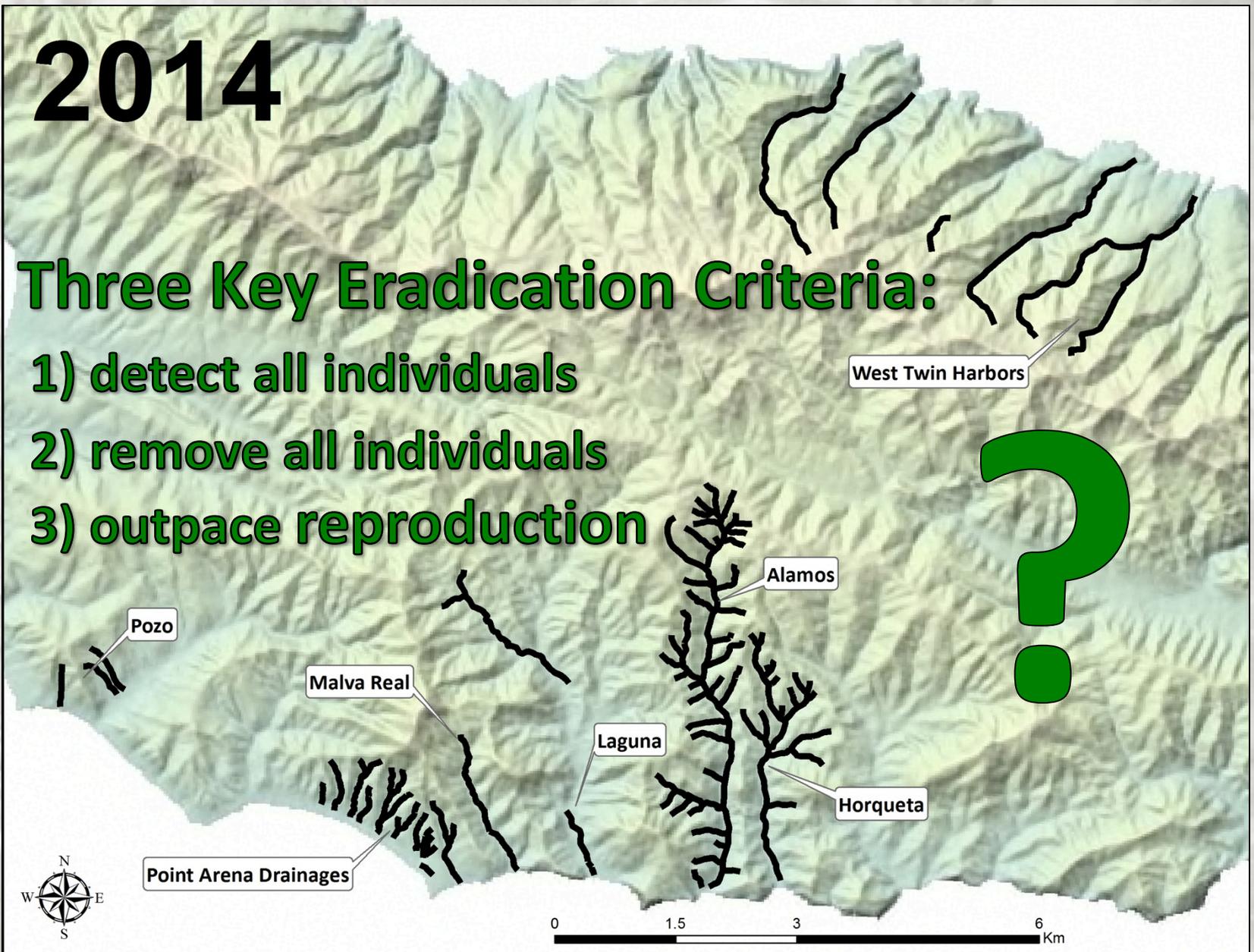
- 1) detect all individuals
- 2) remove all individuals
- 3) outpace reproduction



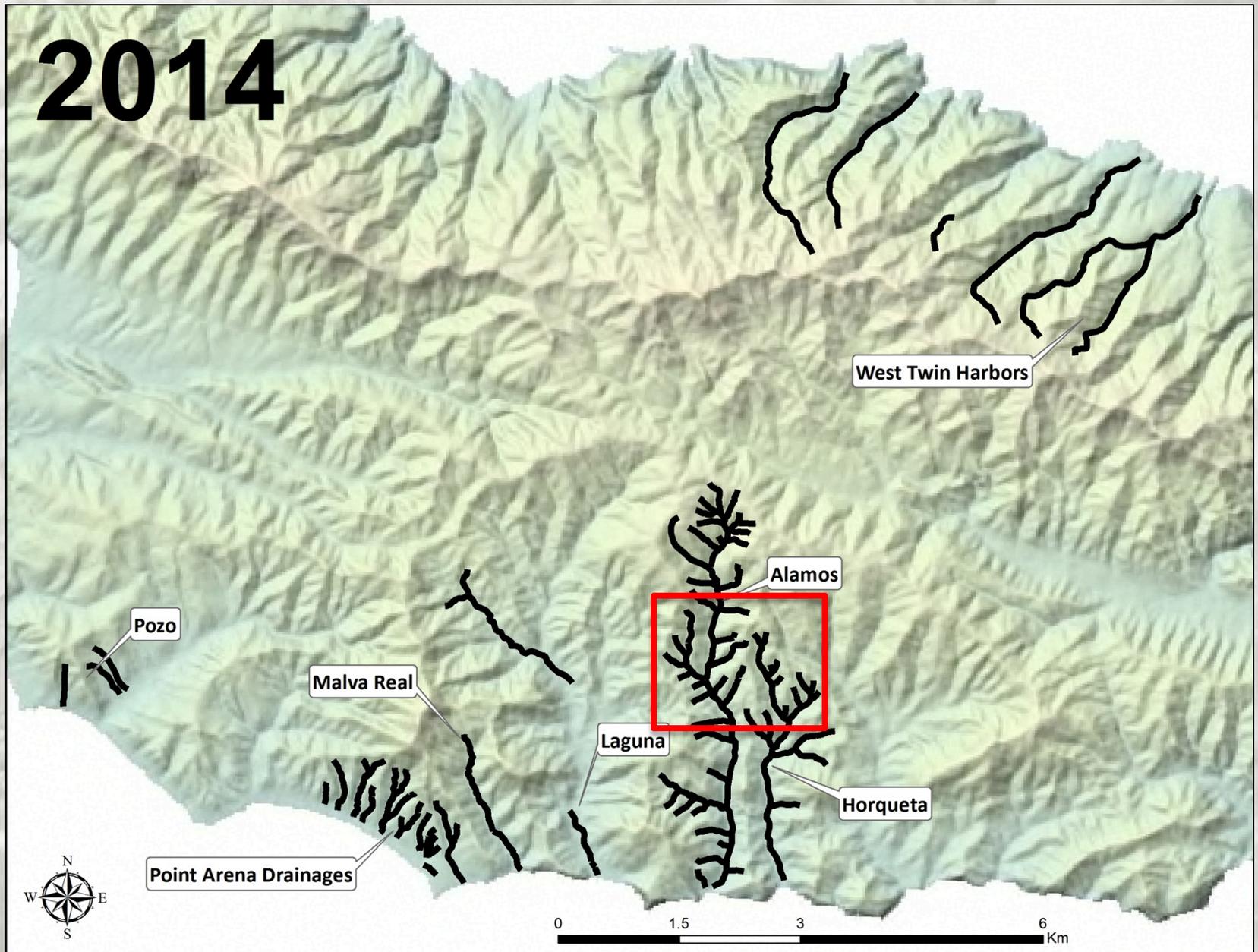
2014

Three Key Eradication Criteria:

- 1) detect all individuals
- 2) remove all individuals
- 3) outpace reproduction



2014



Pozo

Malva Real

Laguna

Alamos

Horqueta

West Twin Harbors

Point Arena Drainages

0 1.5 3 6 Km







E

D

C

A

B

Treatment Crew Leaving Home Base





E

D

C

A

B

Example Of The Terrain





E

D

C

A

B





E

D

C

A

B





E

D

C

A

B





E

D

C

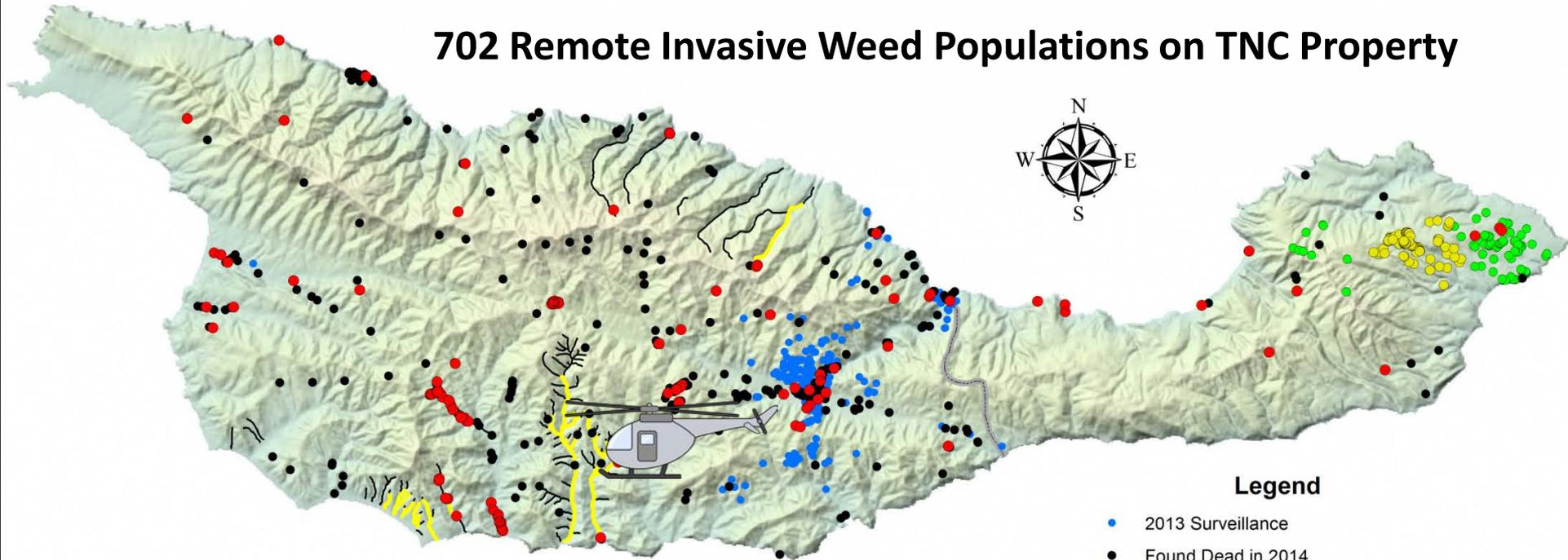
A

B



Santa Cruz Island Weed Treatment Map

702 Remote Invasive Weed Populations on TNC Property



Legend

- 2013 Surveillance
- Found Dead in 2014
- Active in 2014
- Feral Olive Treated in 2014
- Feral Olive Surveyed in 2014
- Canyon Treated for Helichrysum in 2014
- Canyon Clean of Helichrysum in 2014
- TNC-NPS Boundary



E

D



C



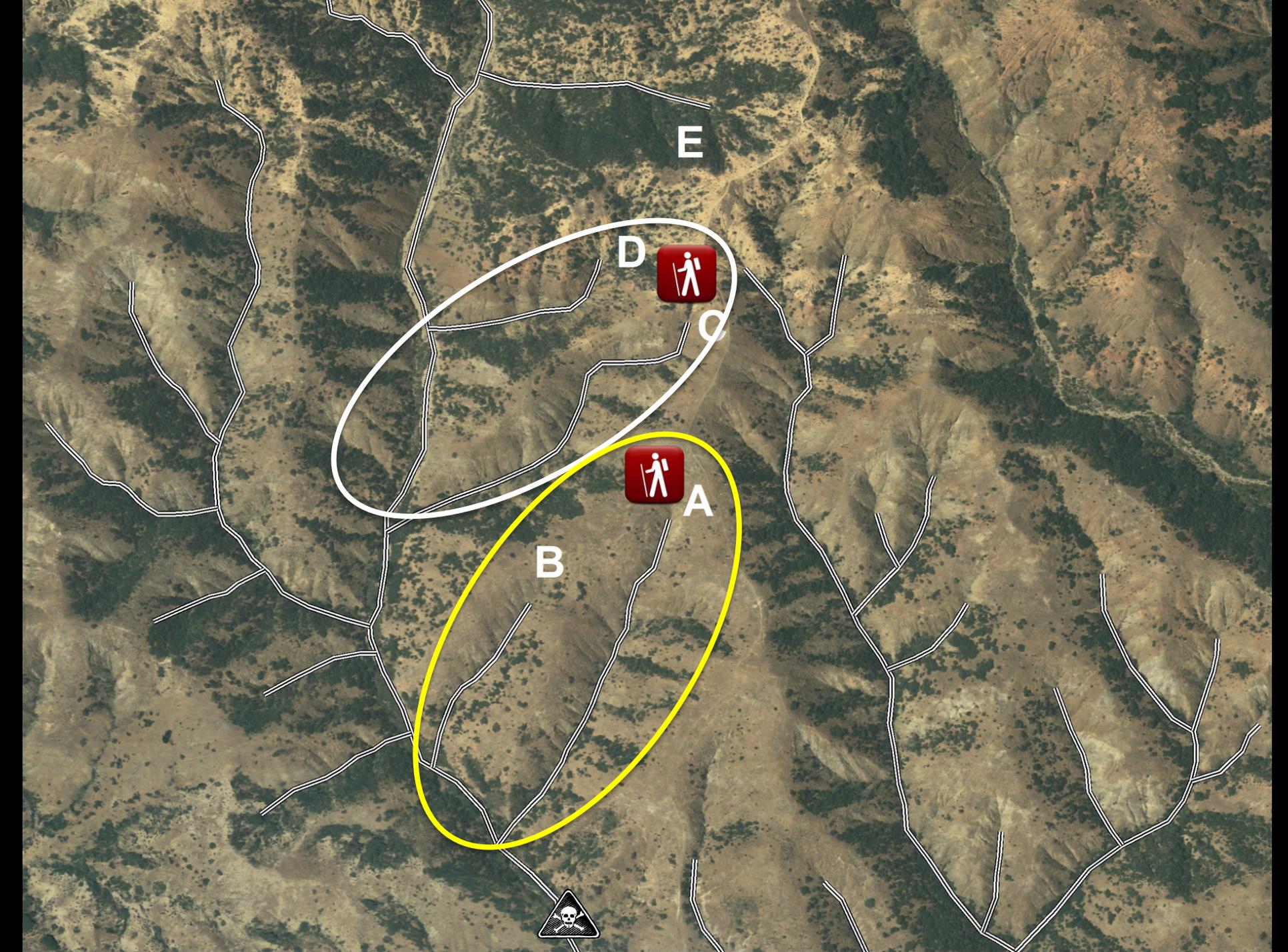
A

B



Tunnel Runner Tools





E

D

C

A

B





E

D

C

A

B





E

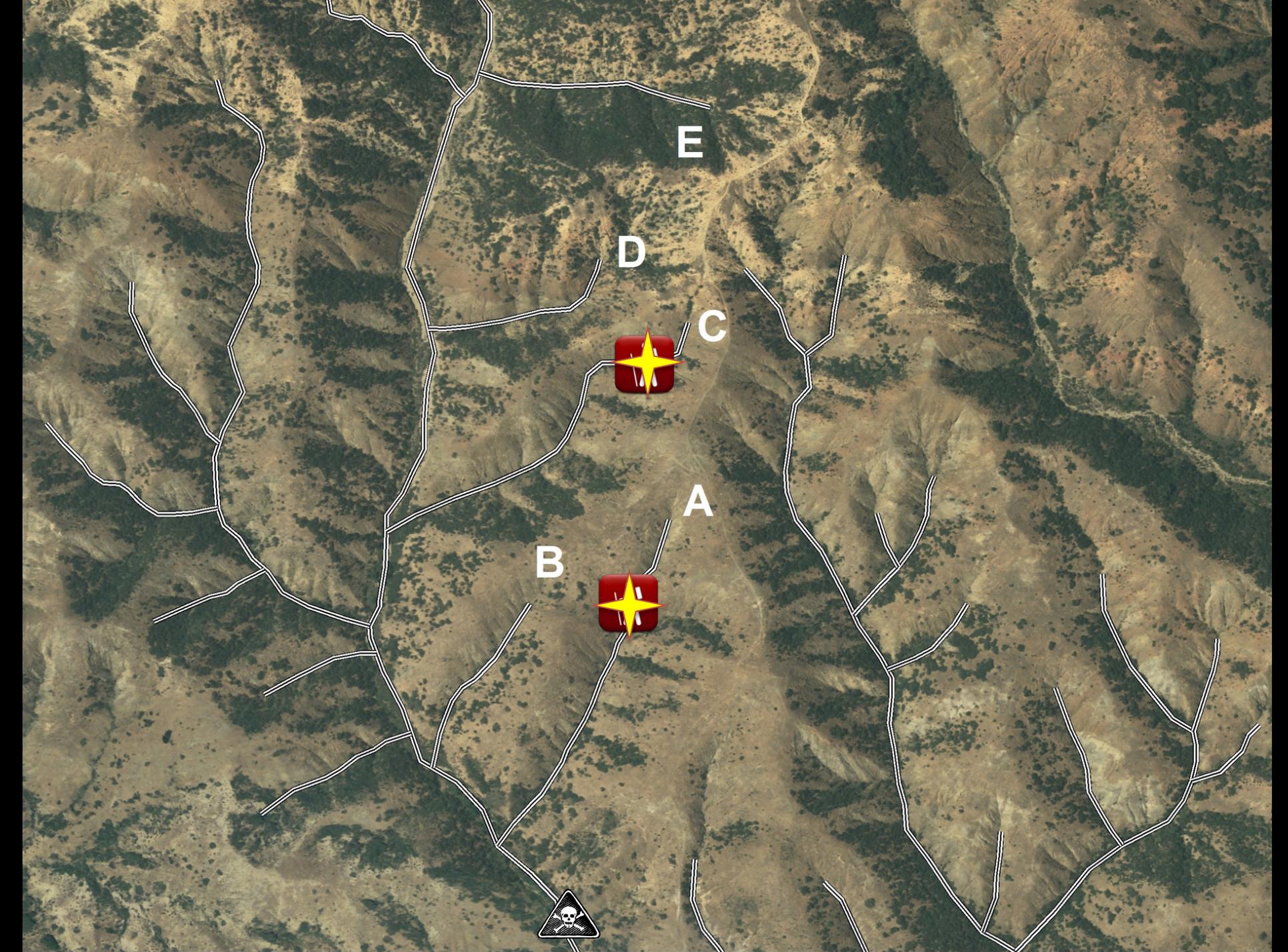
D

C

A

B





E

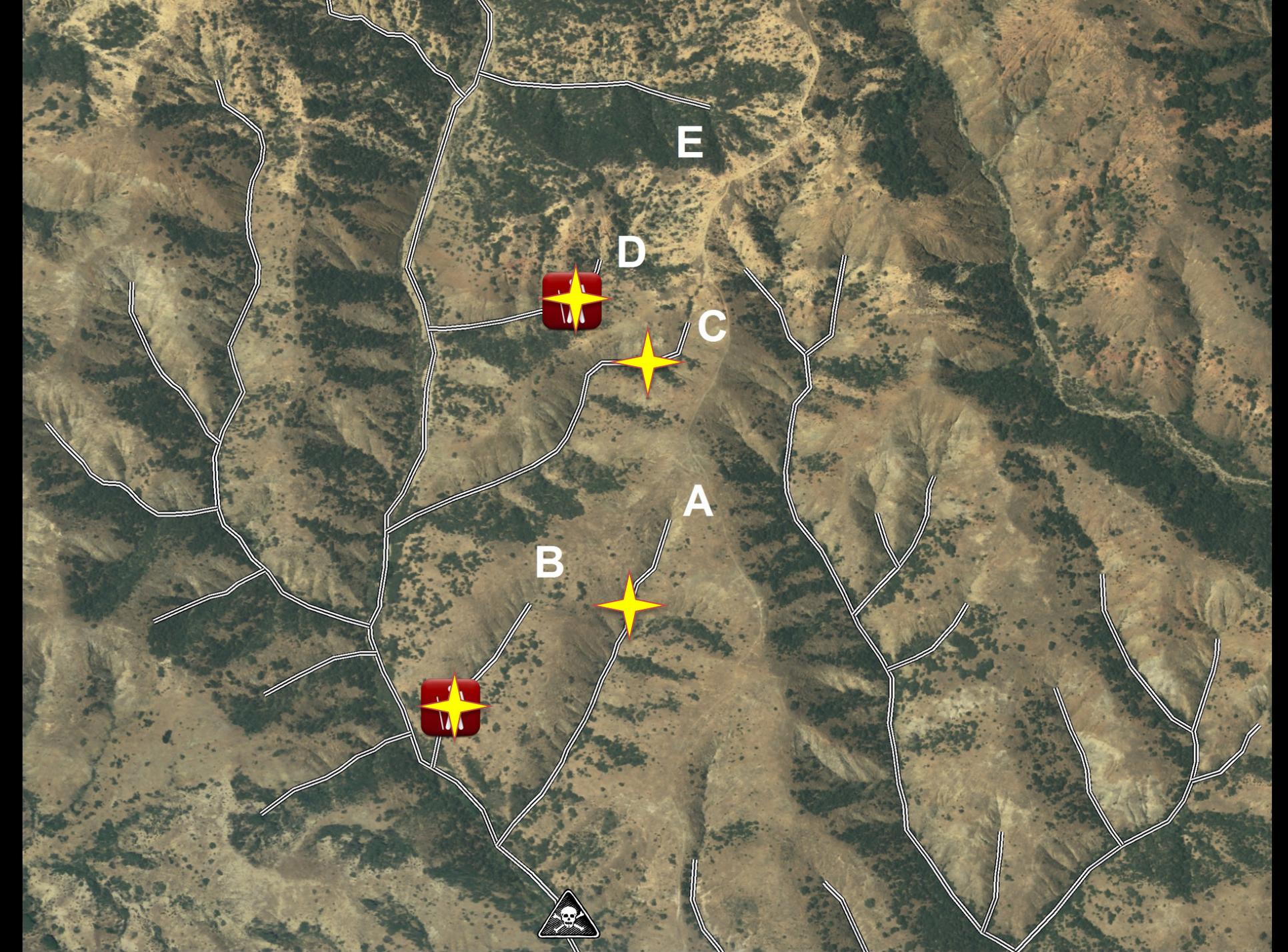
D

C

A

B





E

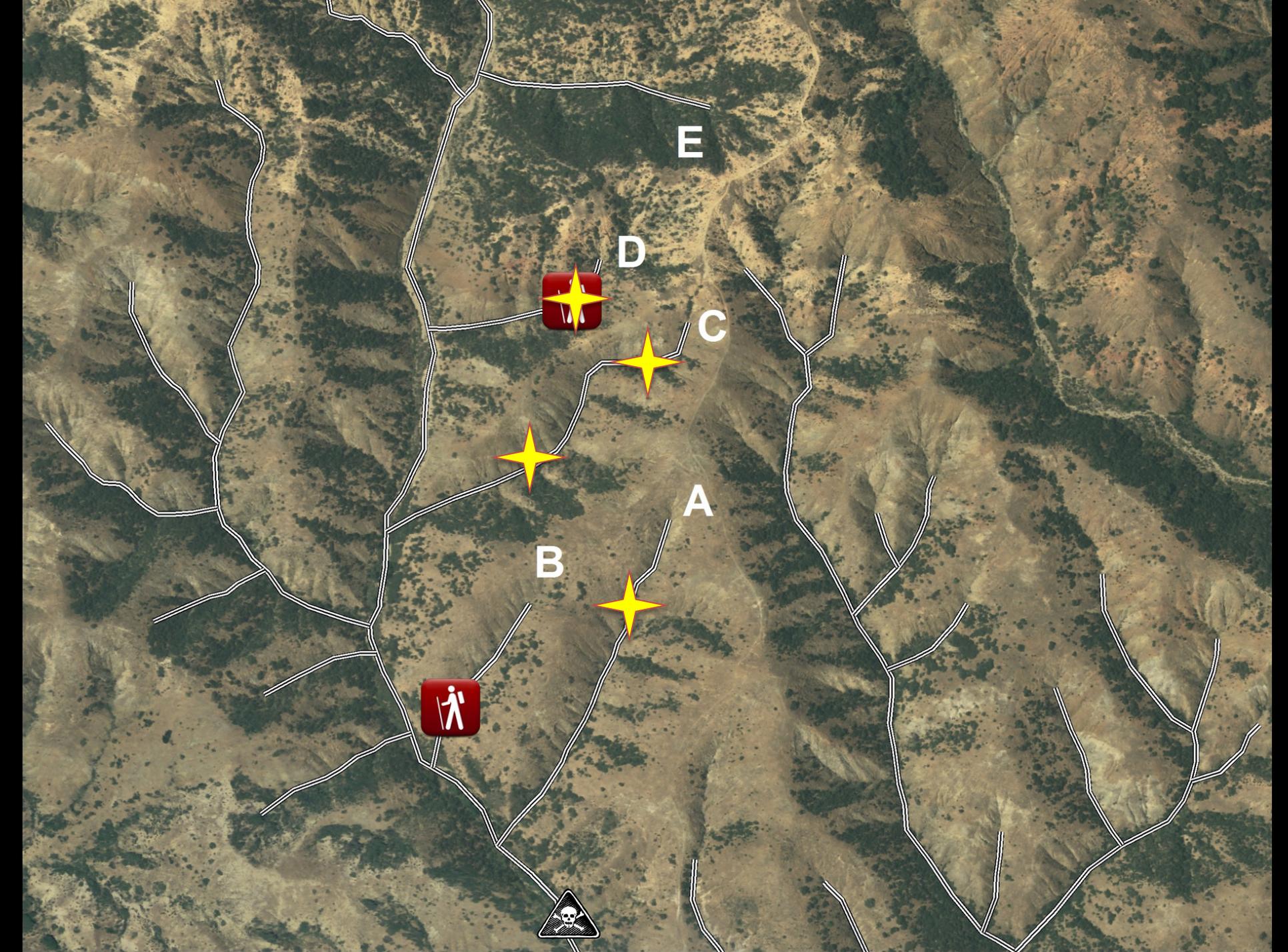
D

C

A

B





E

D

C

A

B





Treatment Crew Shuttle Transfer



Treatment Crew Shuttle Transfer



Treatment Crew Shuttle Transfer

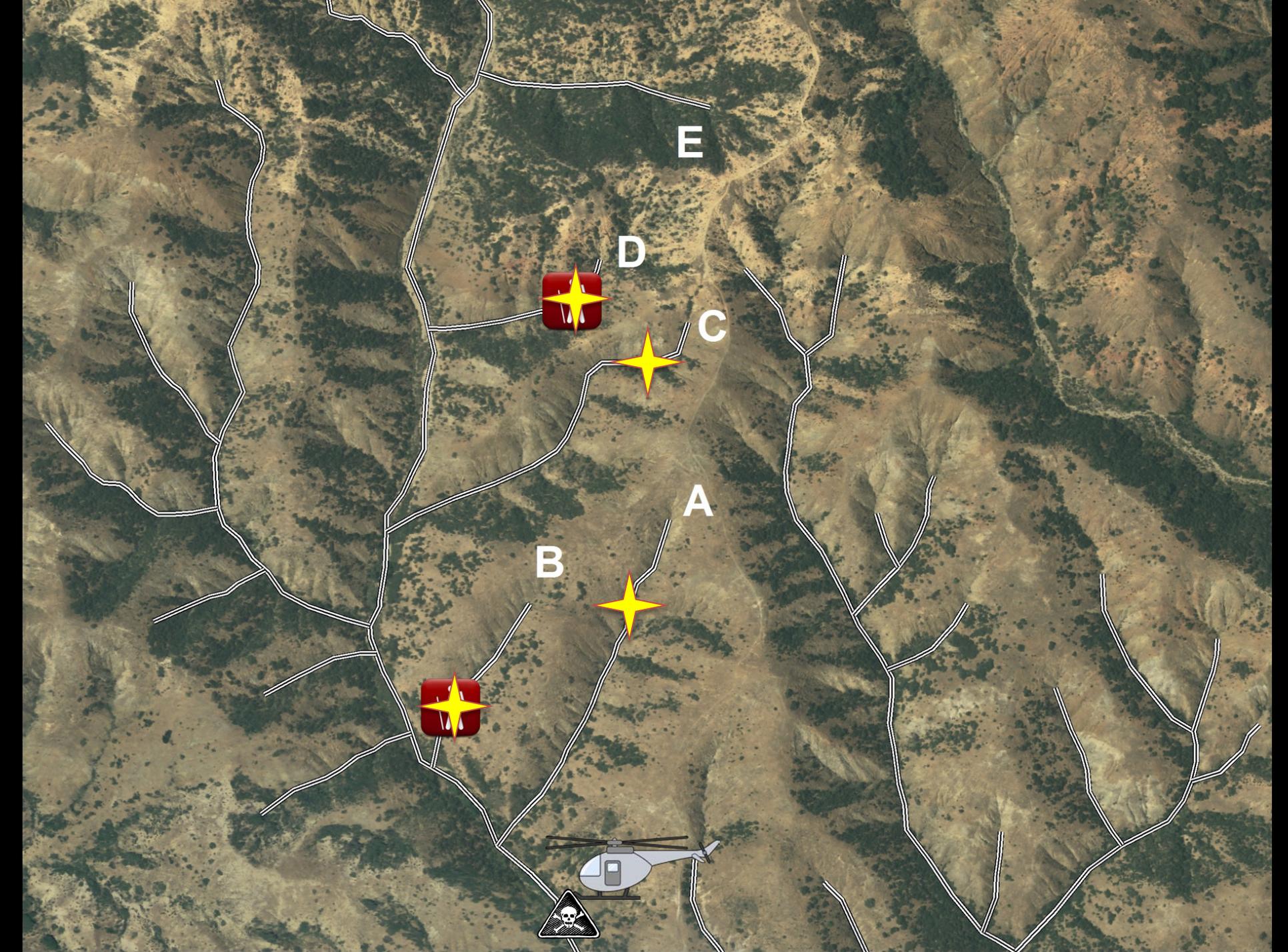


Treatment Crew Shuttle Transfer



Treatment Crew Shuttle Transfer





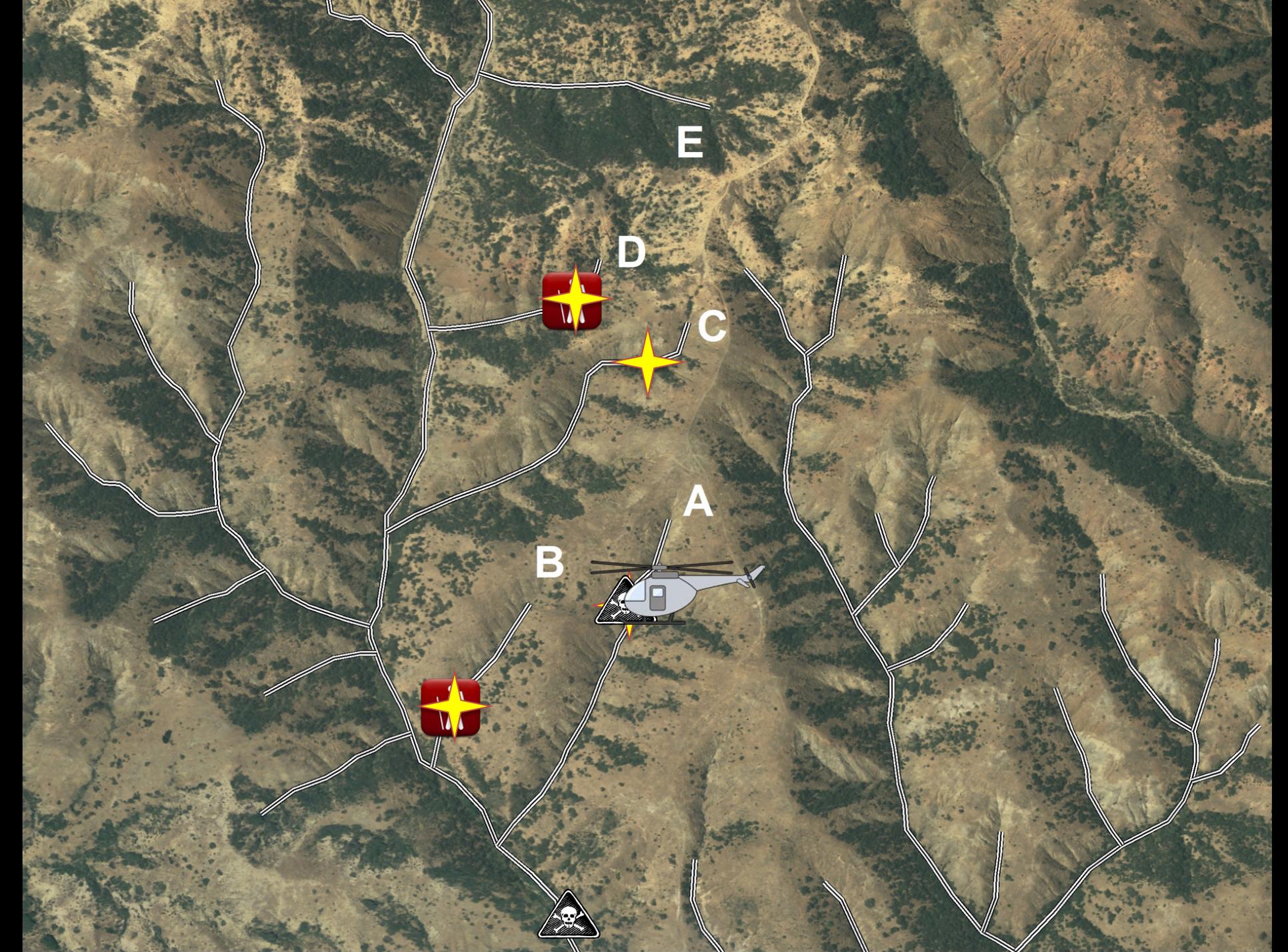
E

D

C

A

B



E

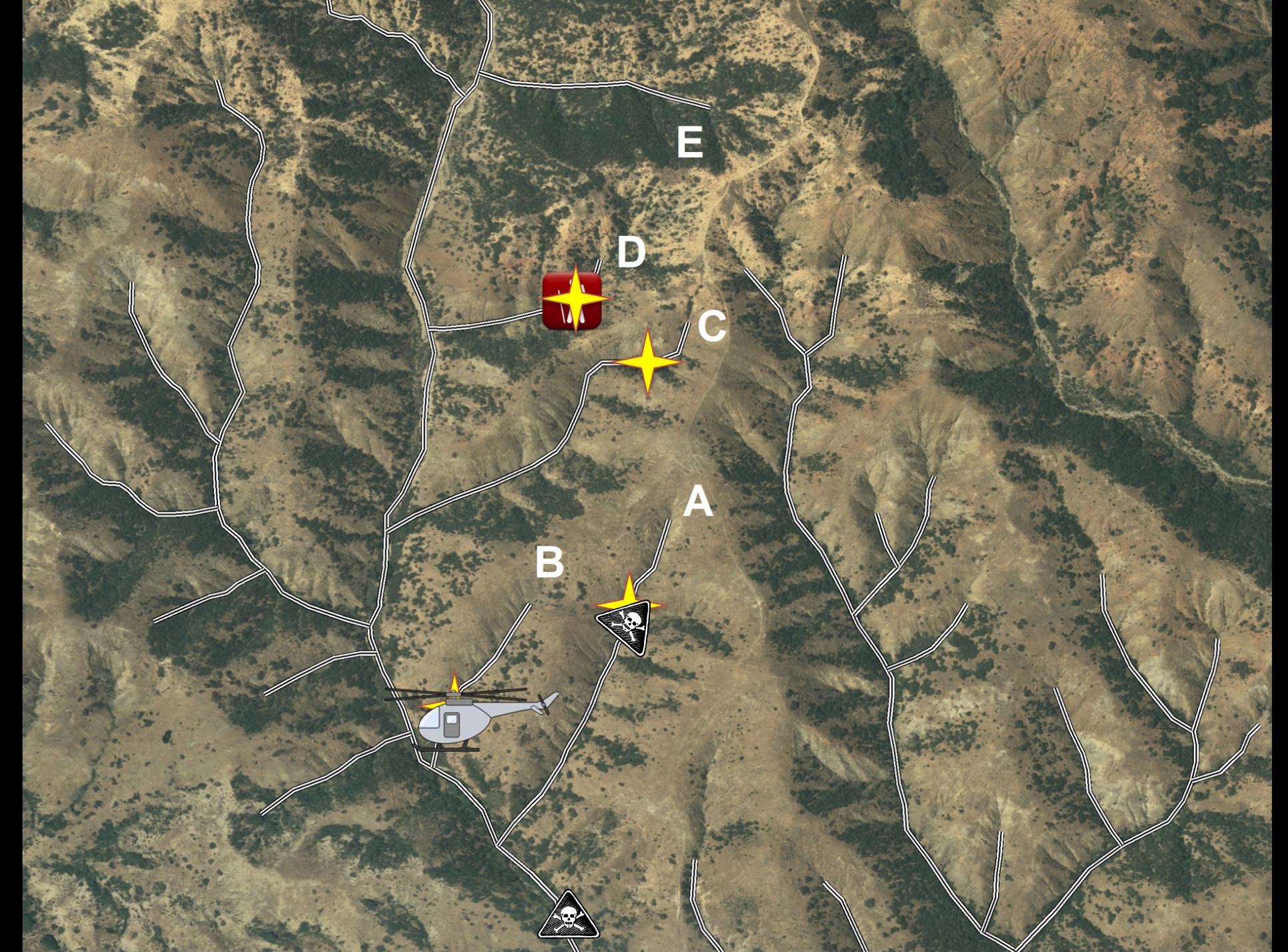
D

C

A

B





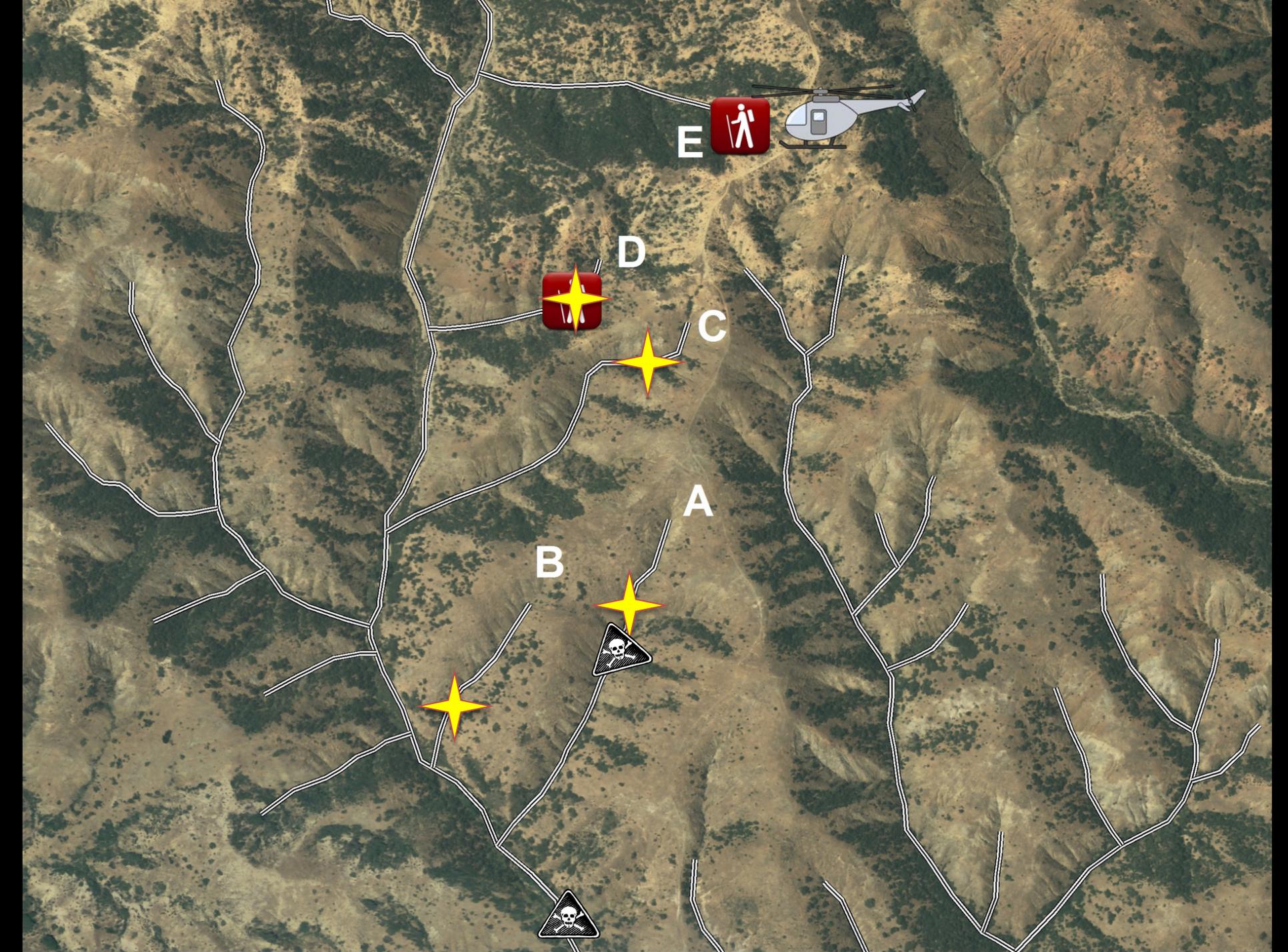
E

D

C

A

B



E



D



C



A

B





E

D



C



A

B

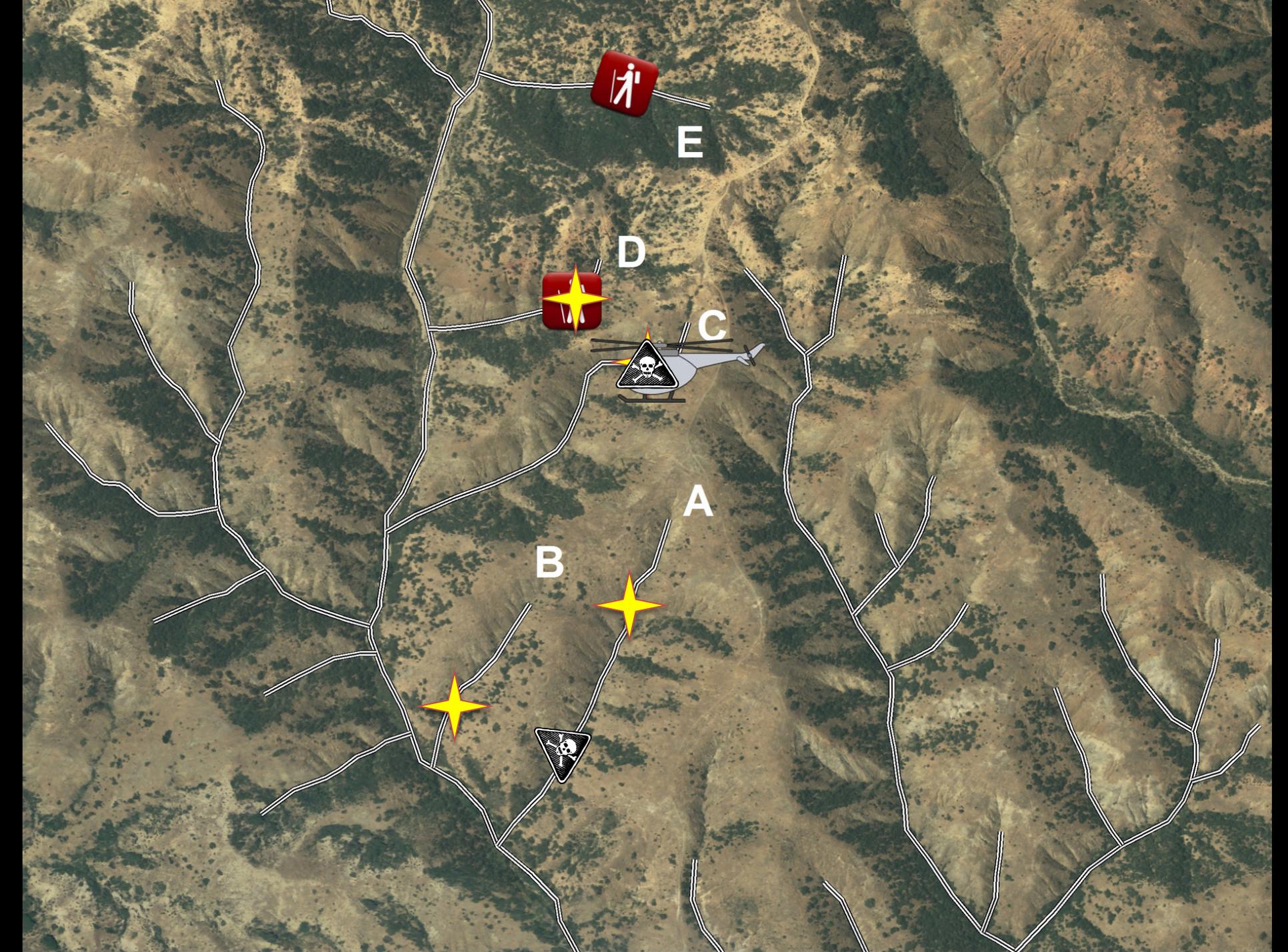


***Helichrysum* Survey/Treatments in Alamos Canyon**



Herbicide Delivery





E



D



C

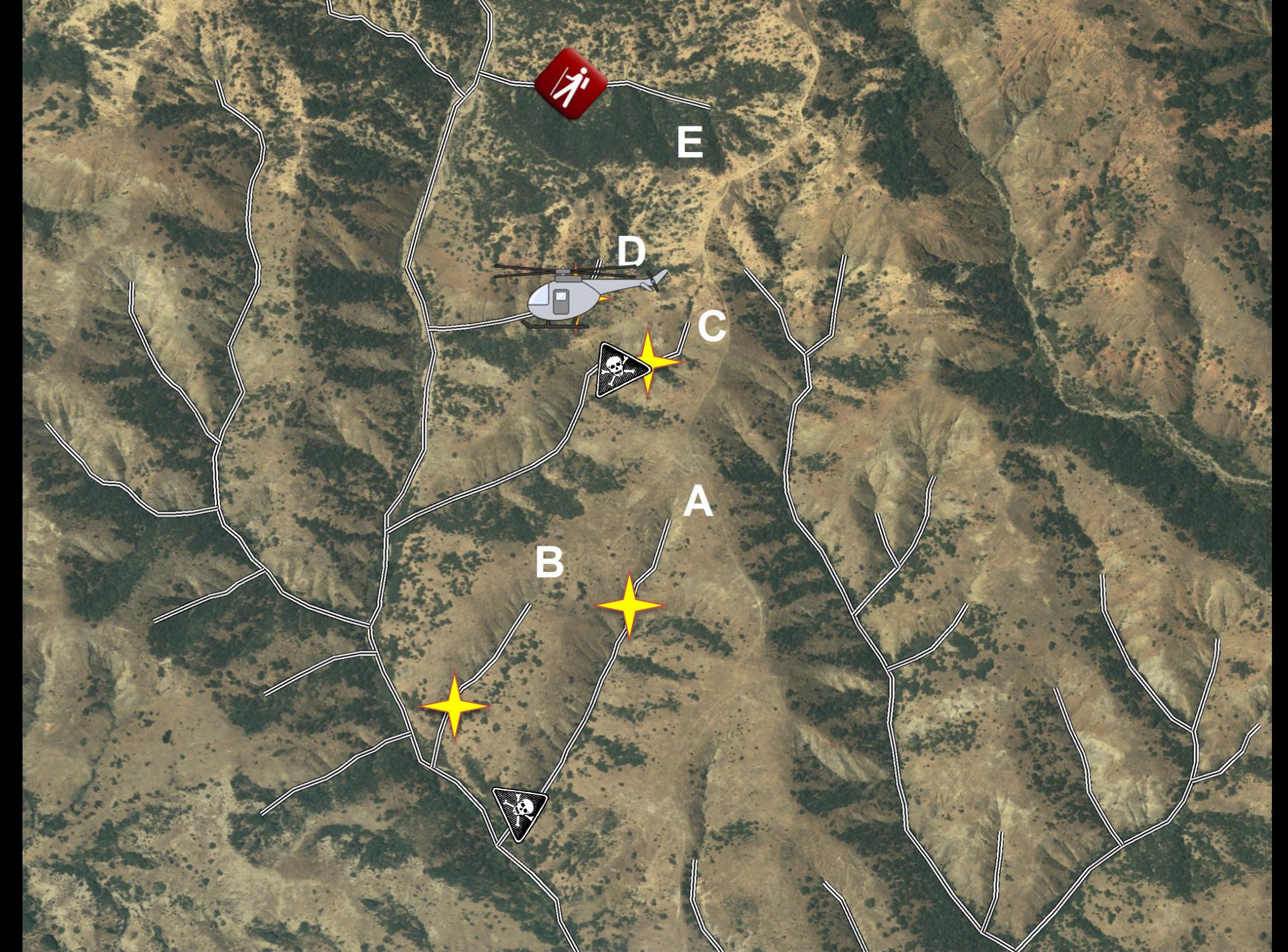


A



B





E

D



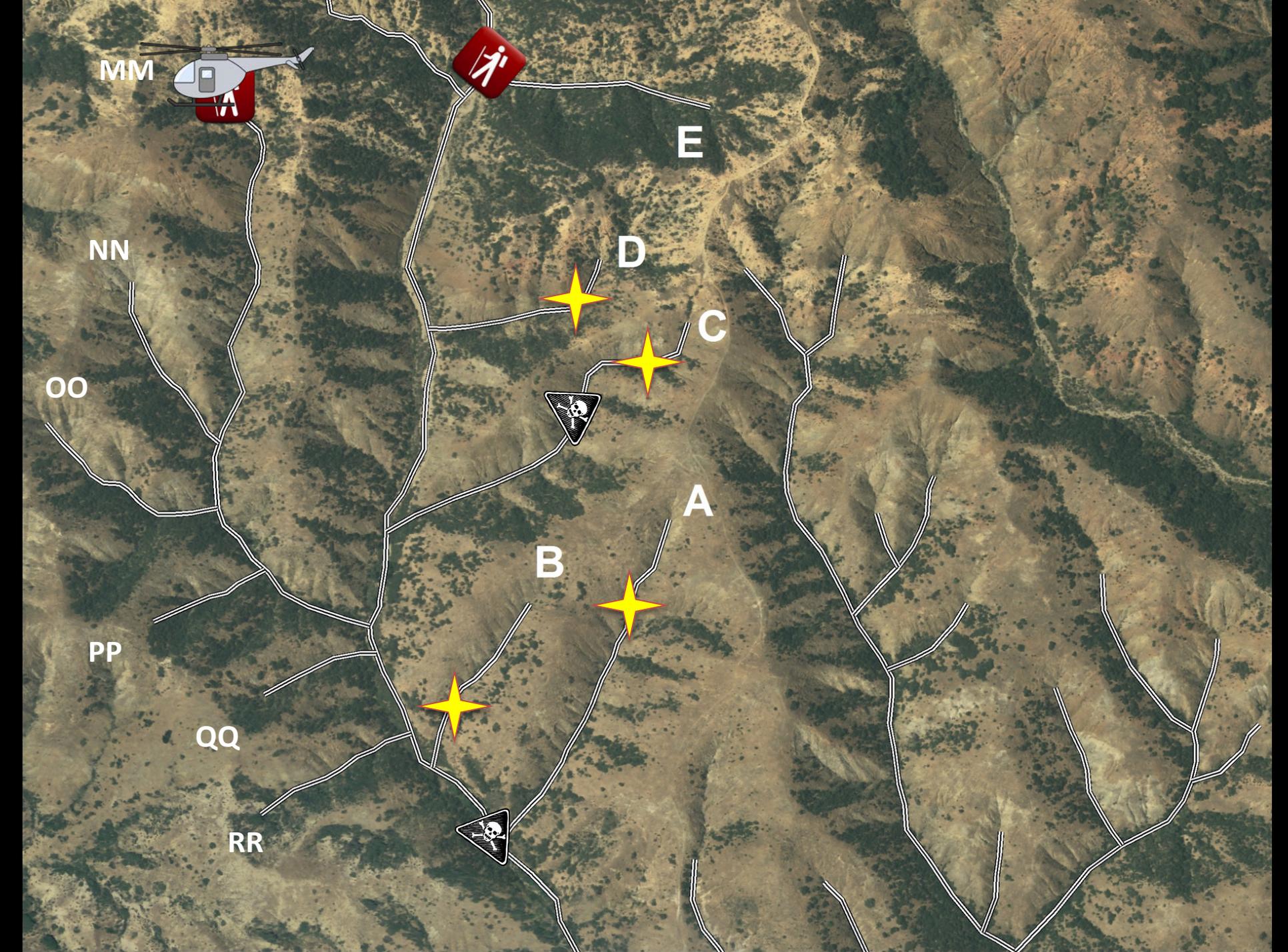
C



A

B





MM



E

NN

D



C

OO



A

B



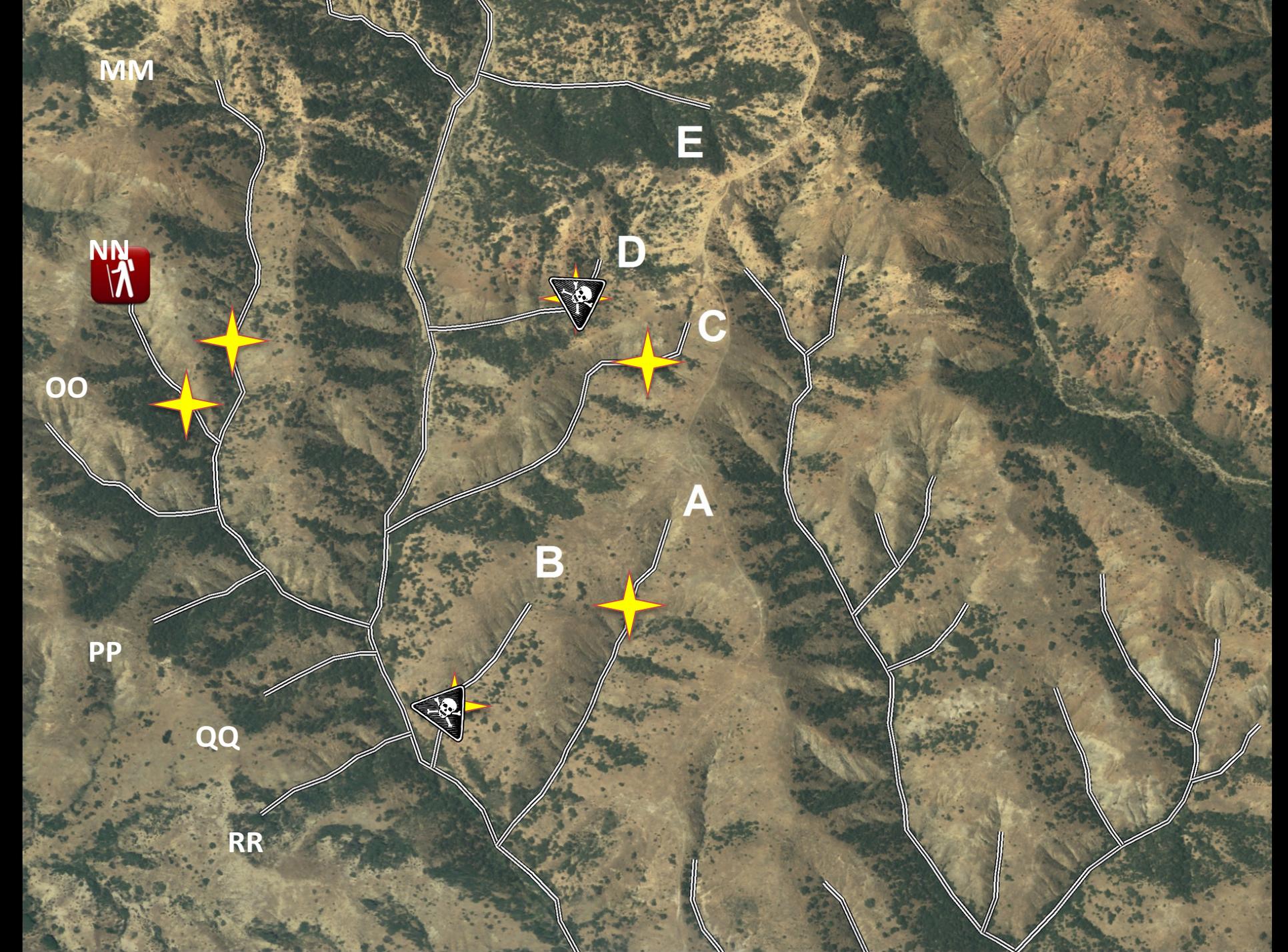
PP



QQ



RR



MM

E



D

C

OO

A

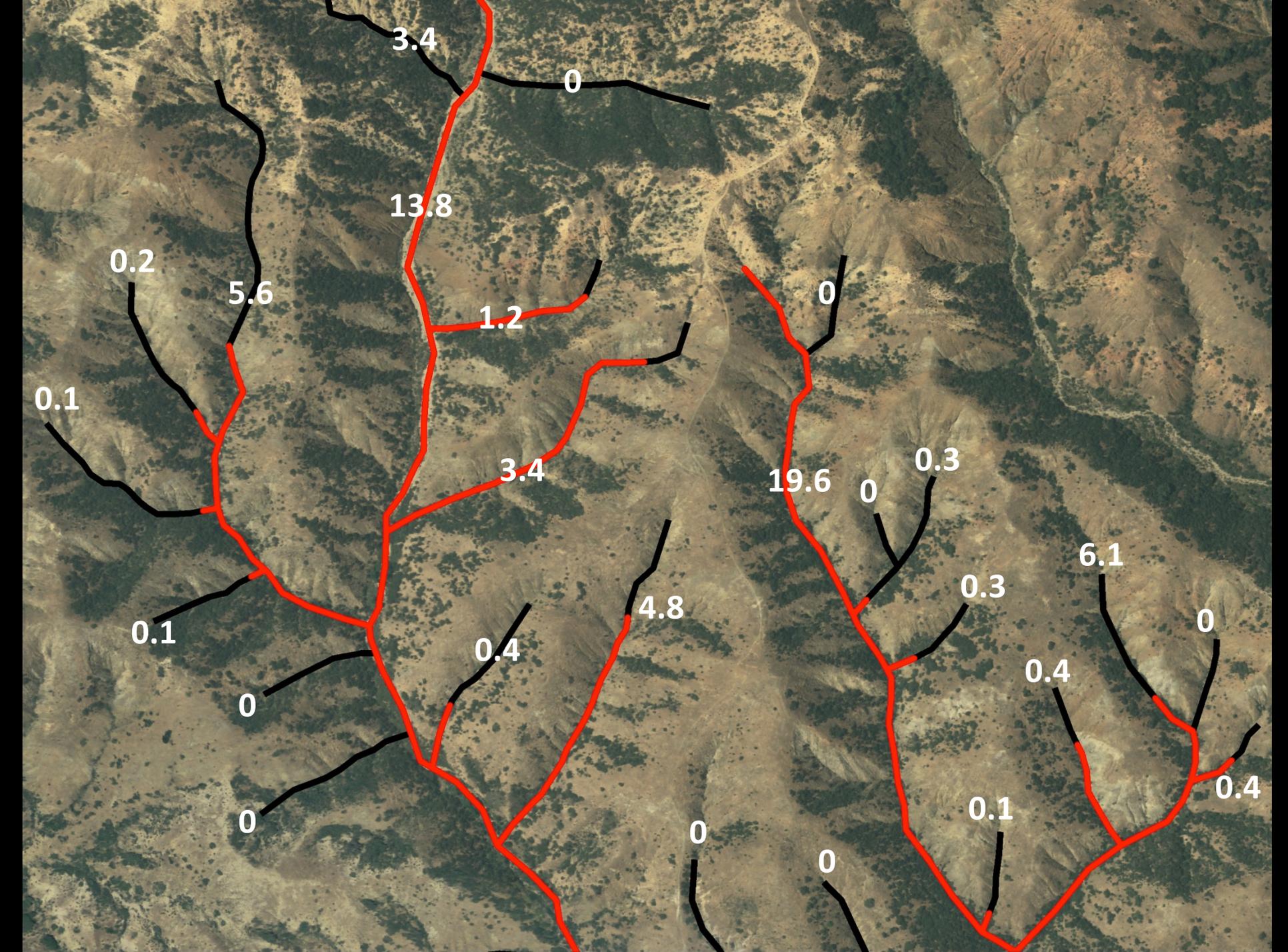
B

PP

QQ

RR





3.4

0

13.8

0.2

5.6

1.2

0

0.1

3.4

19.6

0

0.3

0.1

4.8

0.3

6.1

0

0.4

0

0.4

0

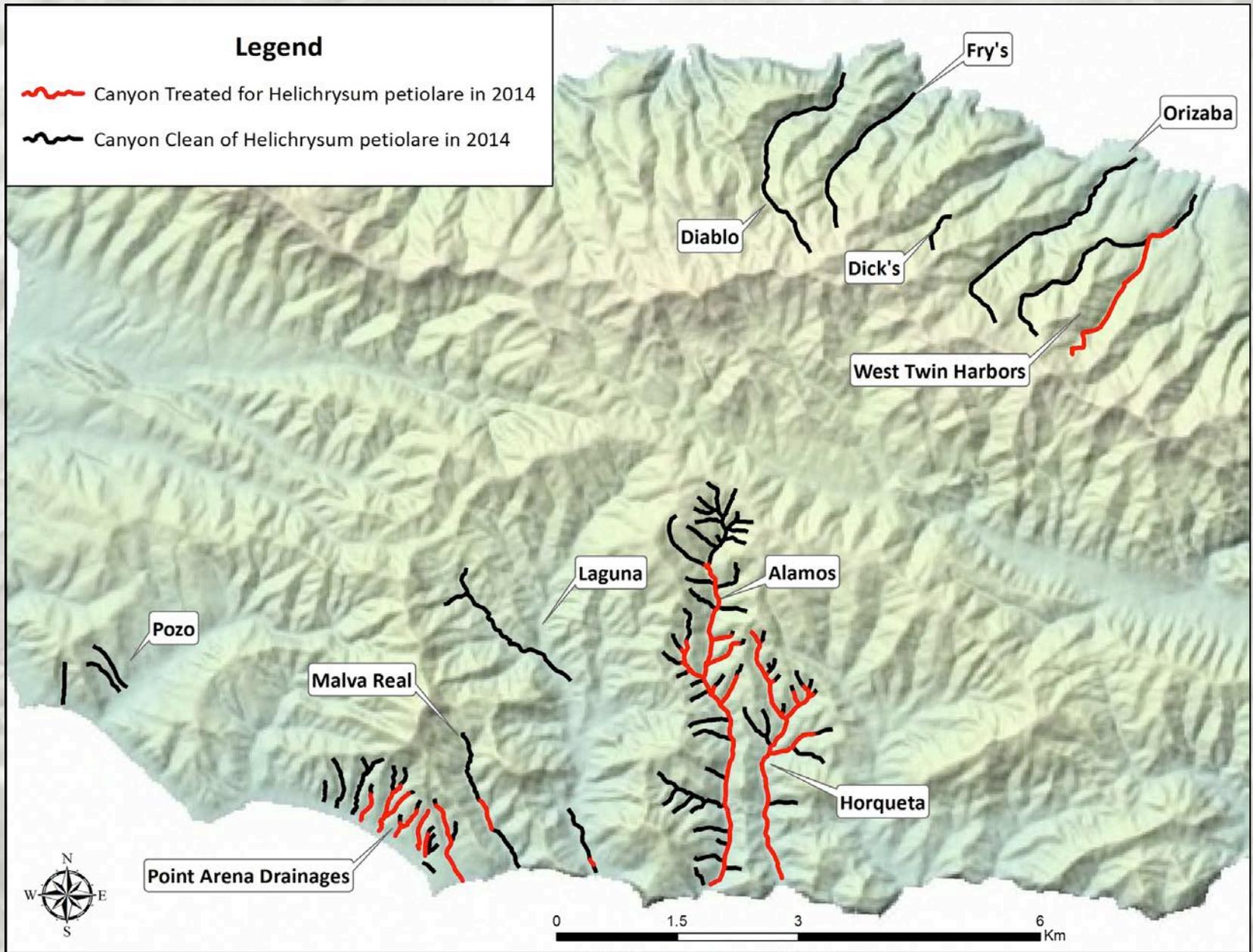
0

0

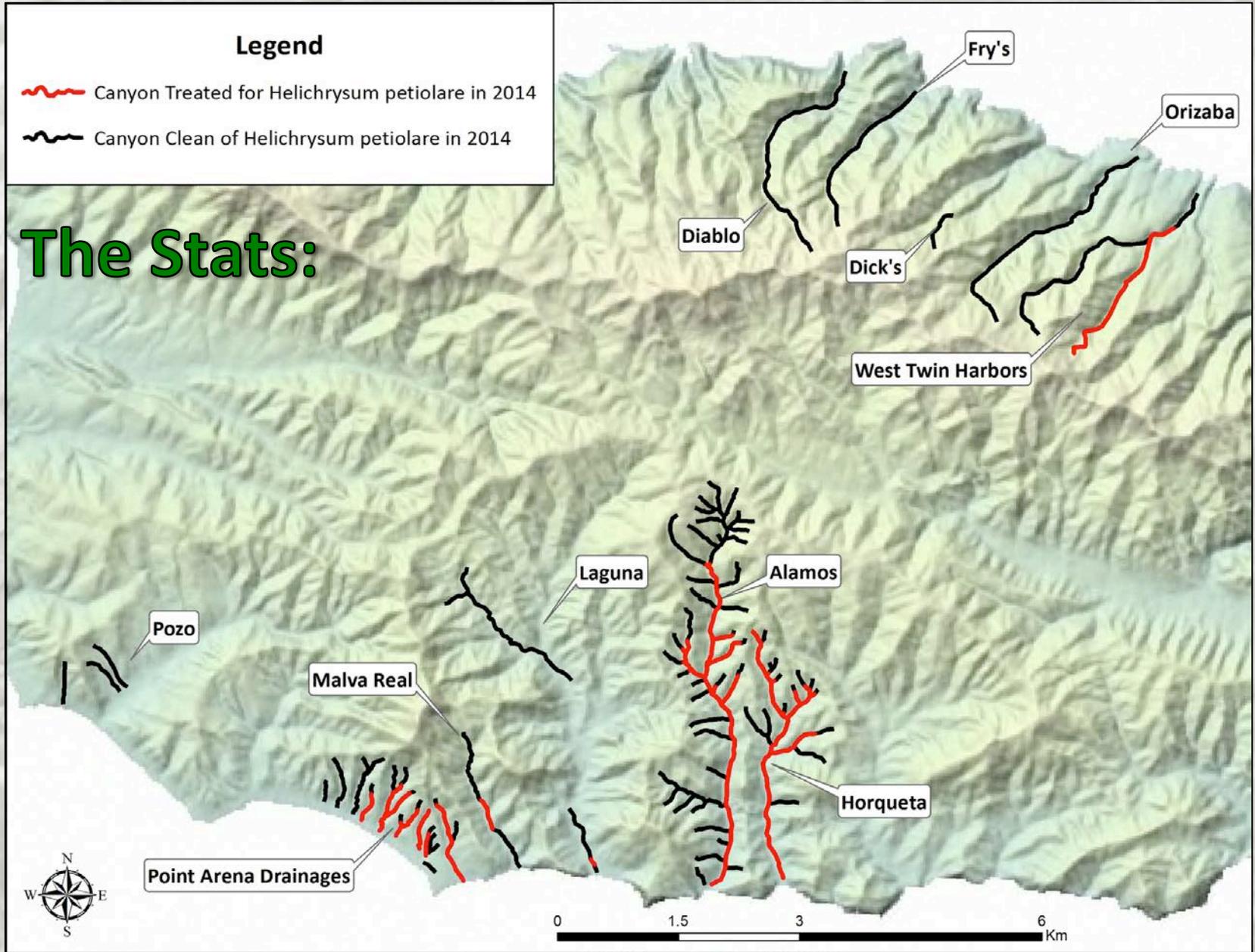
0.1

0.4

Remote Helichrysum Survey & Treatment



Remote Helichrysum Survey & Treatment

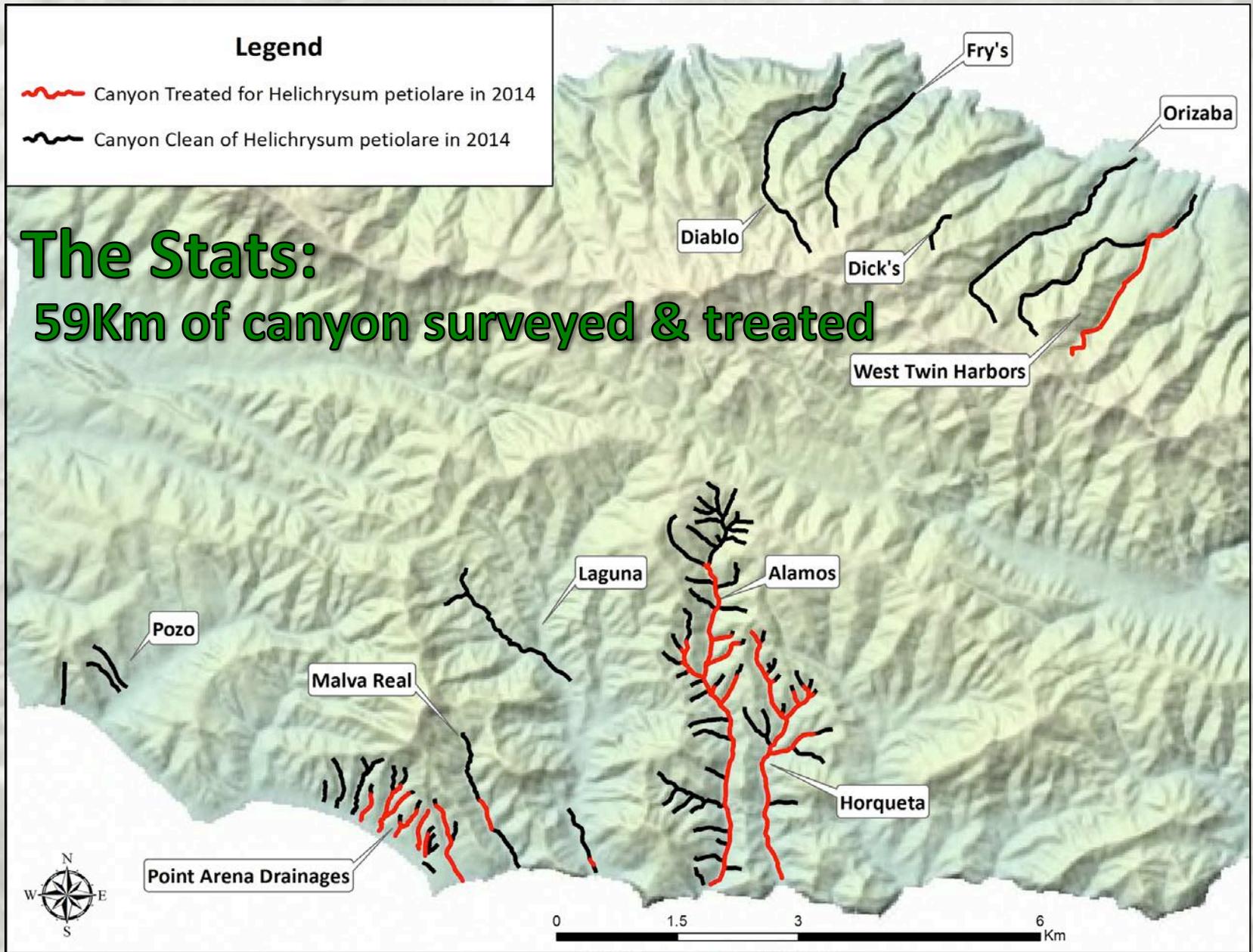


Remote Helichrysum Survey & Treatment

Legend

-  Canyon Treated for *Helichrysum petiolare* in 2014
-  Canyon Clean of *Helichrysum petiolare* in 2014

The Stats:
59Km of canyon surveyed & treated



Remote Helichrysum Survey & Treatment

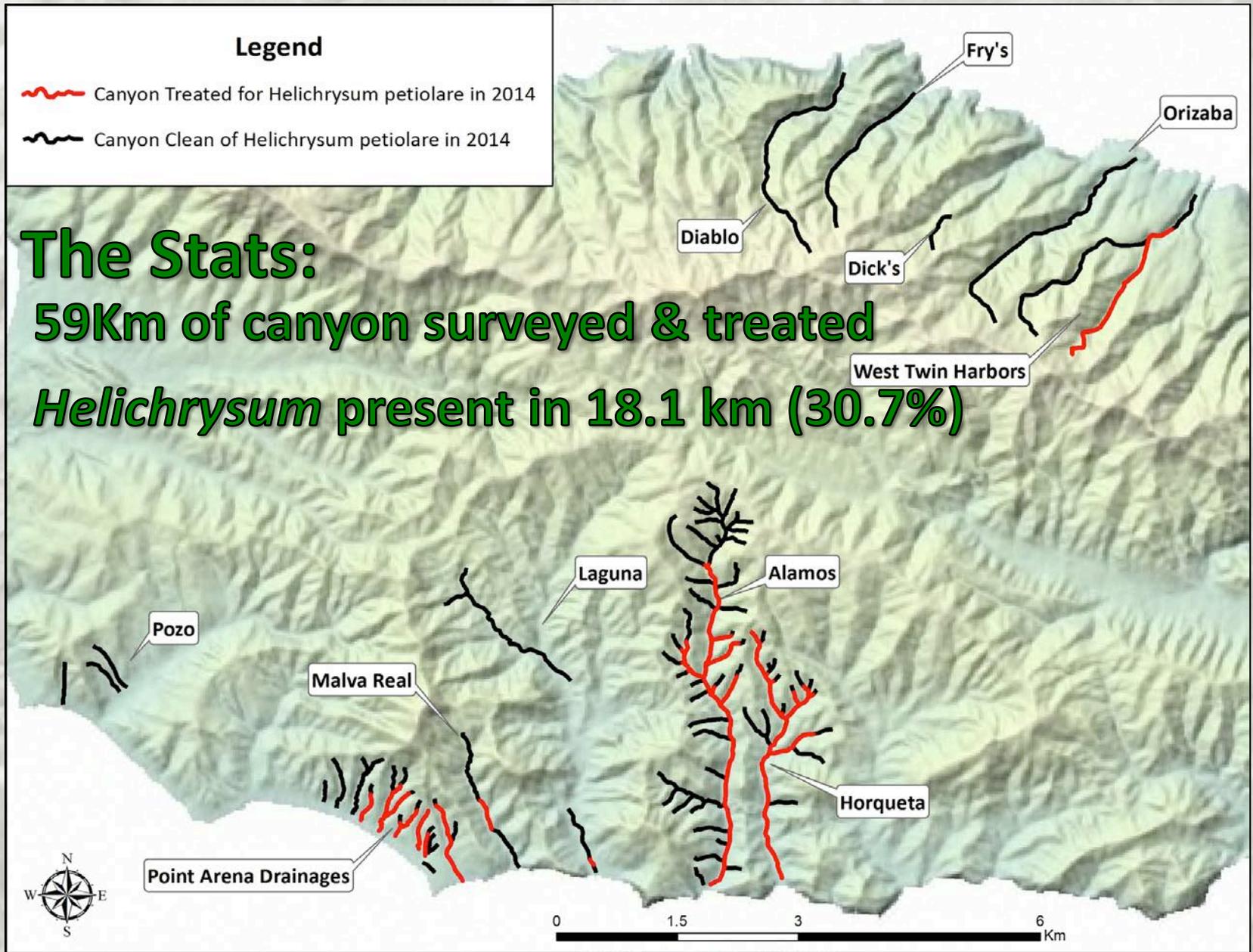
Legend

-  Canyon Treated for *Helichrysum petiolare* in 2014
-  Canyon Clean of *Helichrysum petiolare* in 2014

The Stats:

59Km of canyon surveyed & treated

***Helichrysum* present in 18.1 km (30.7%)**



Remote Helichrysum Survey & Treatment

Legend

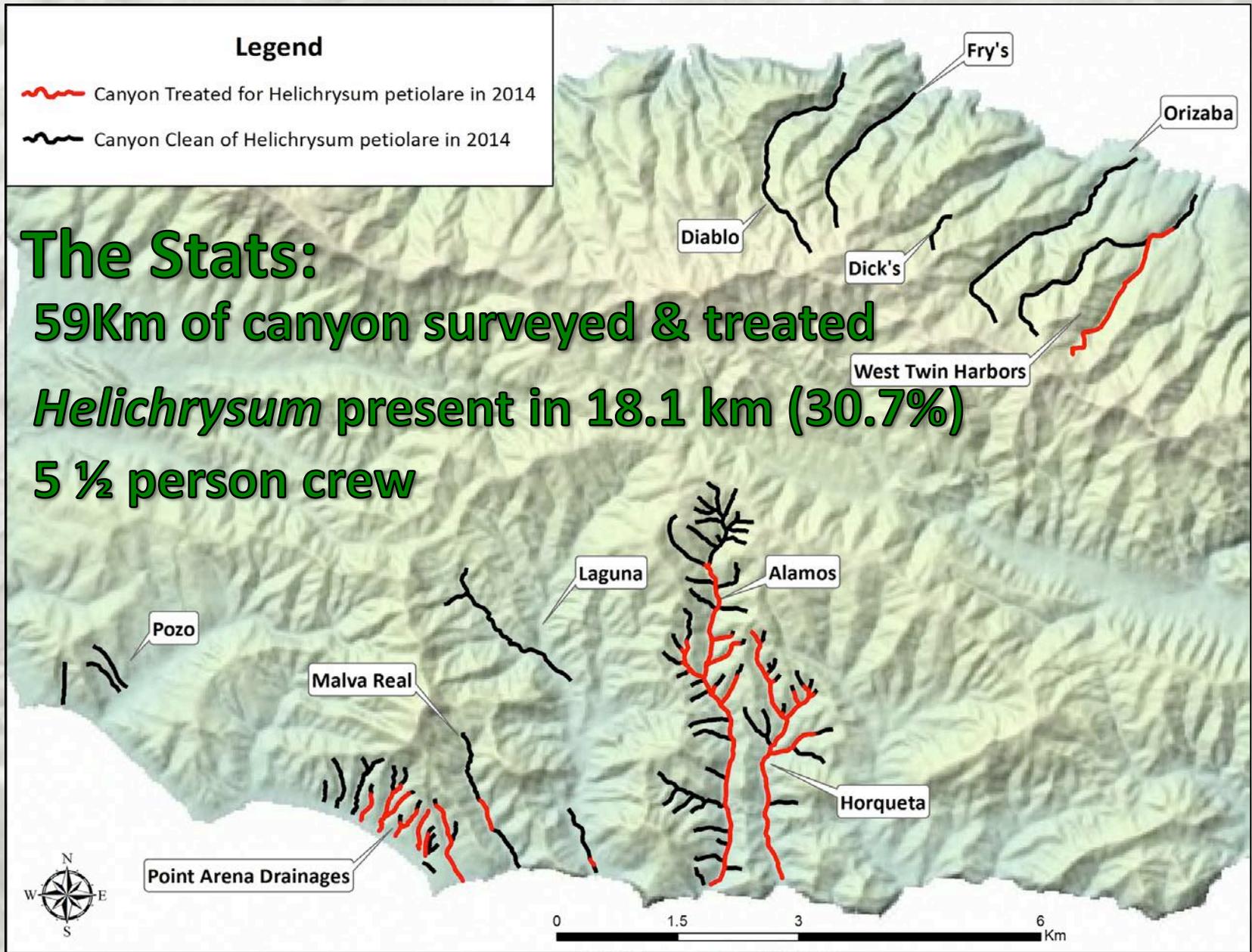
-  Canyon Treated for *Helichrysum petiolare* in 2014
-  Canyon Clean of *Helichrysum petiolare* in 2014

The Stats:

59Km of canyon surveyed & treated

Helichrysum present in 18.1 km (30.7%)

5 ½ person crew



Remote Helichrysum Survey & Treatment

Legend

-  Canyon Treated for *Helichrysum petiolare* in 2014
-  Canyon Clean of *Helichrysum petiolare* in 2014

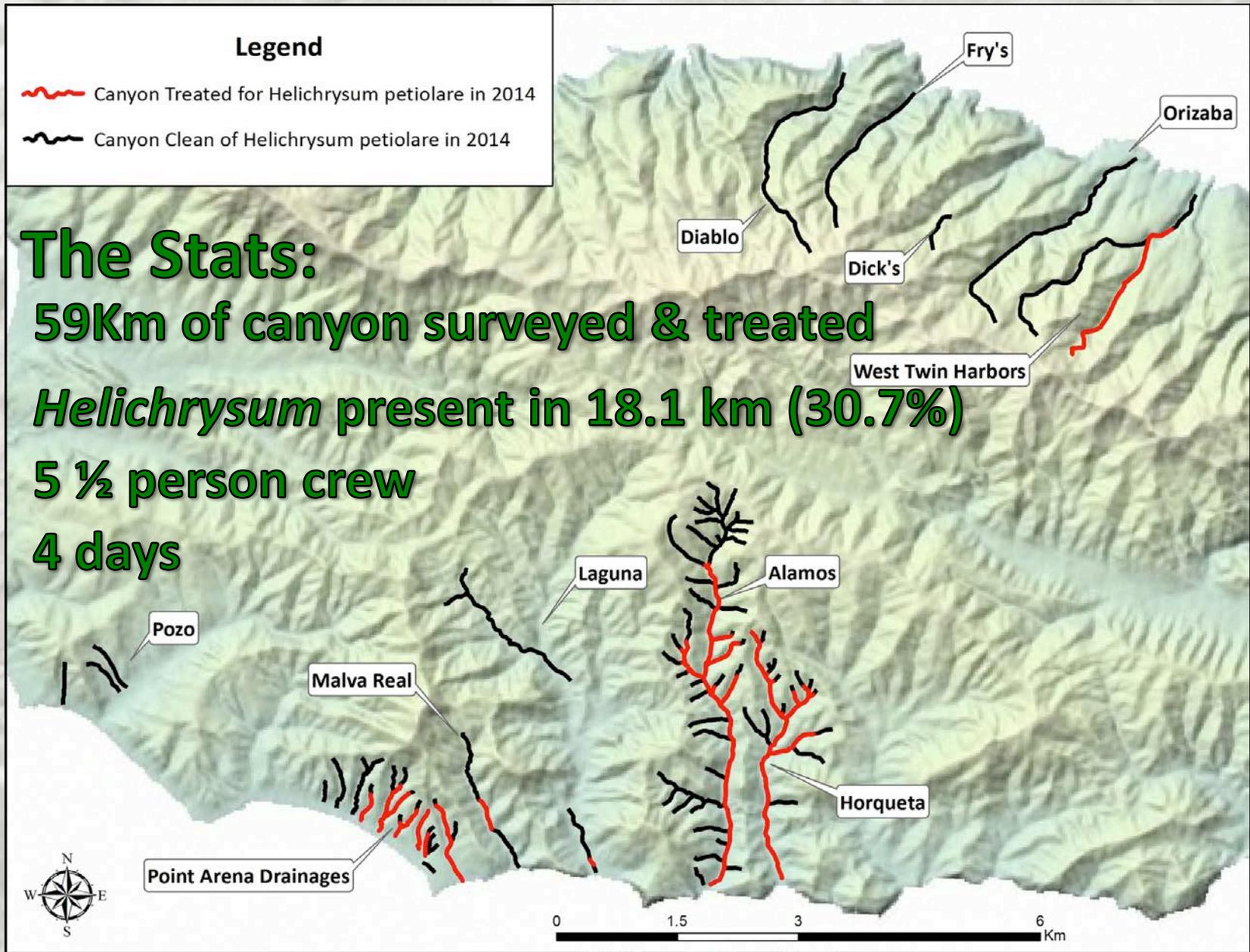
The Stats:

59Km of canyon surveyed & treated

Helichrysum present in 18.1 km (30.7%)

5 ½ person crew

4 days



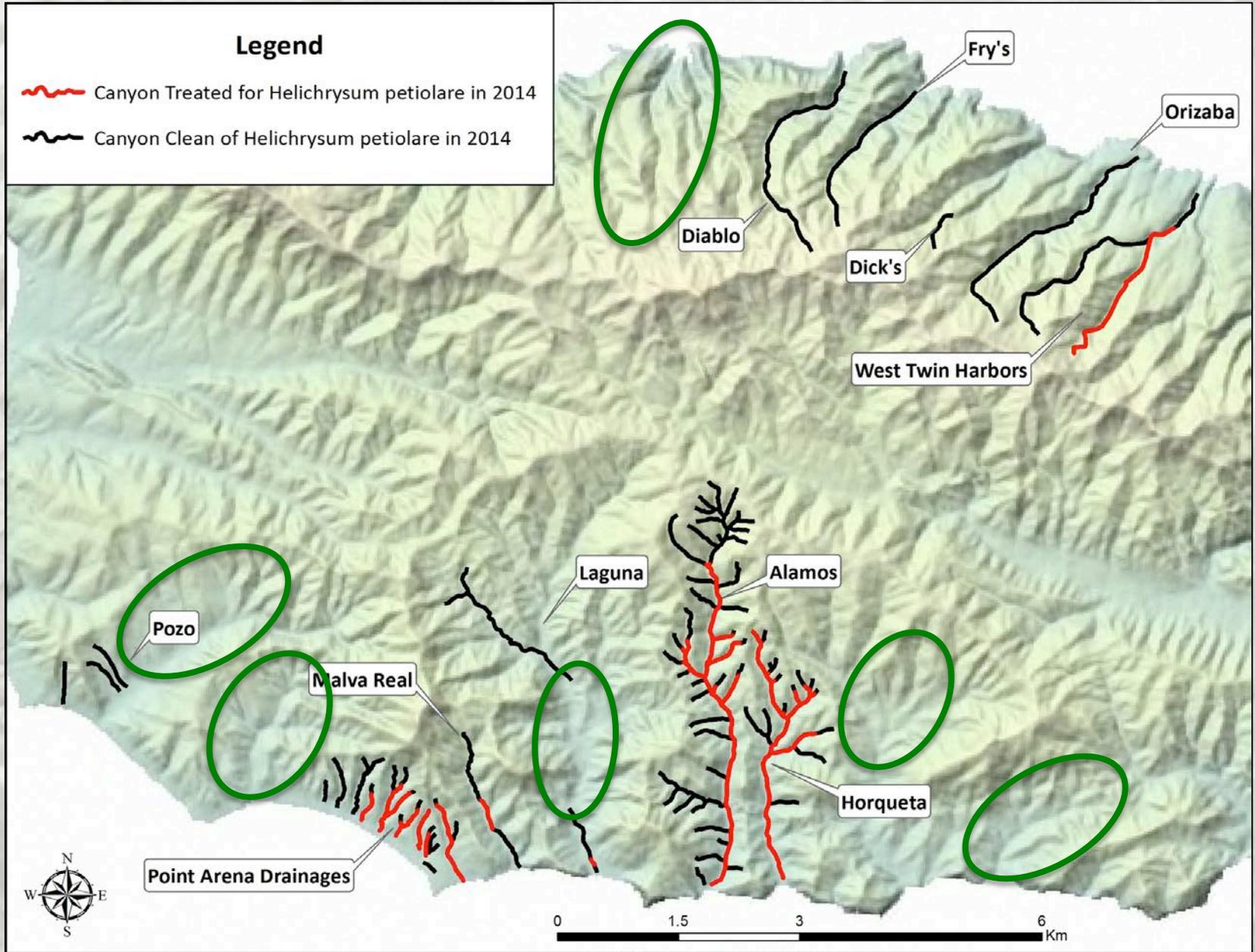
The Benefits



Recovery



Efficiencies Allow More To Get Done In Future Years For The Same \$\$



Great Bonus!!!

★ Location of 6 Santa Cruz Island bush mallow (*Malacothamnus fasciculatus* var. *nesioticus*) discovered by John Knapp on 13 May 2014 during *Helichrysum petiolare* surveys of the Alamos Canyon watershed.



New Weed Map Needed...

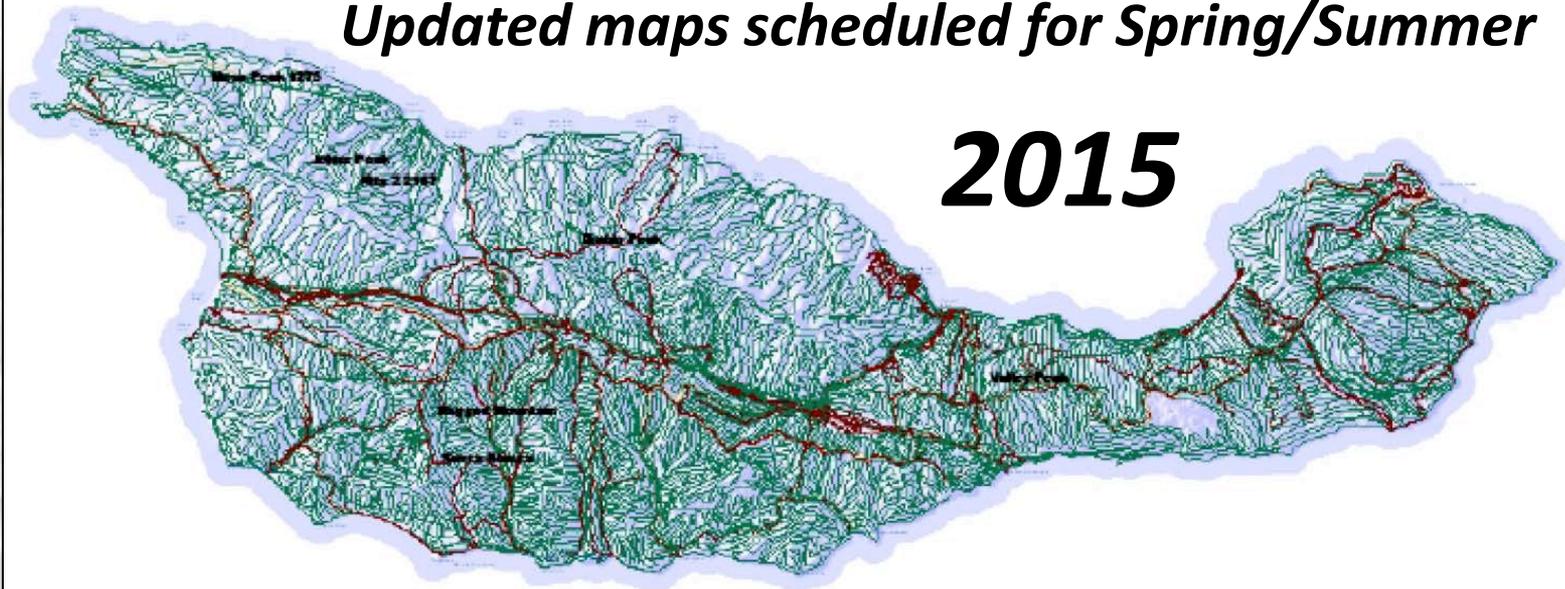
SANTA CRUZ ISLAND

GROUND AND AERIAL MAPPING TRACKS

APRIL - MAY 2007

Updated maps scheduled for Spring/Summer

2015



Mapper_tracks

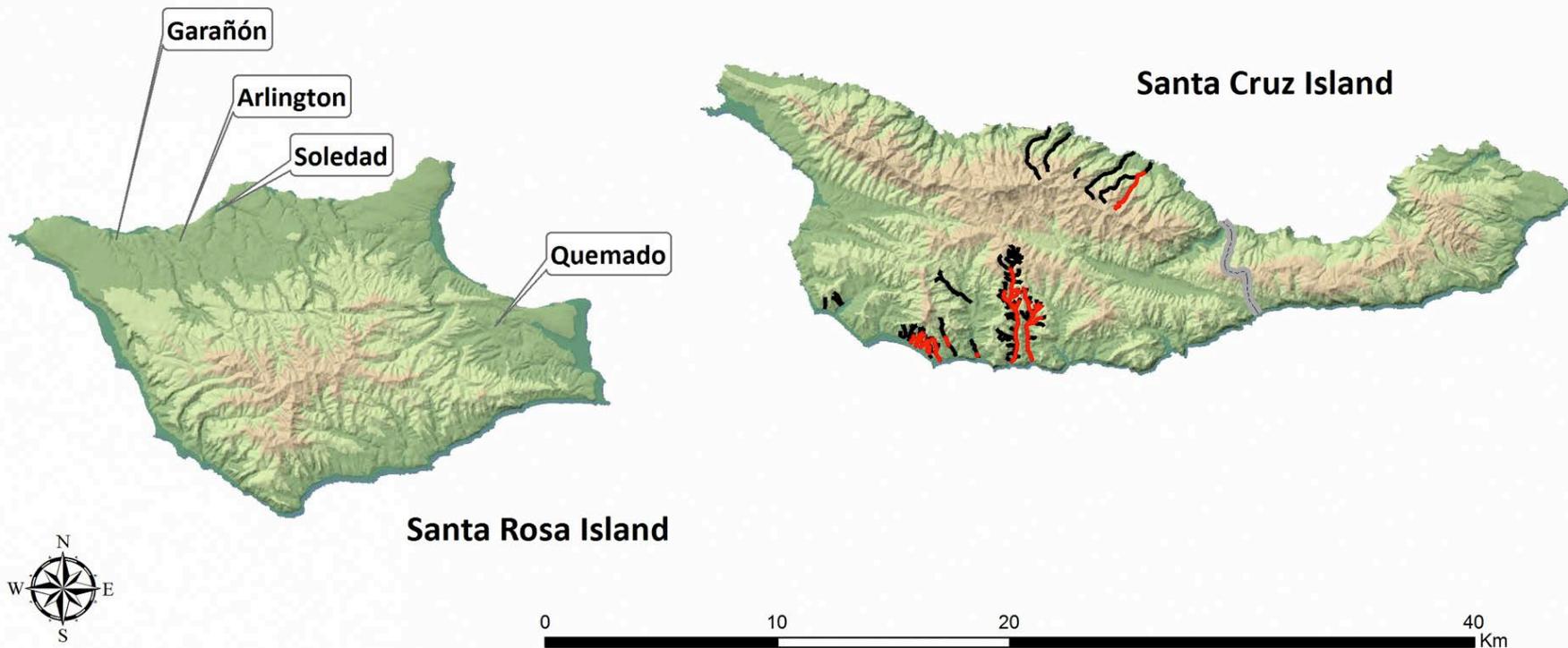
Type

- Ground
- Helicopter



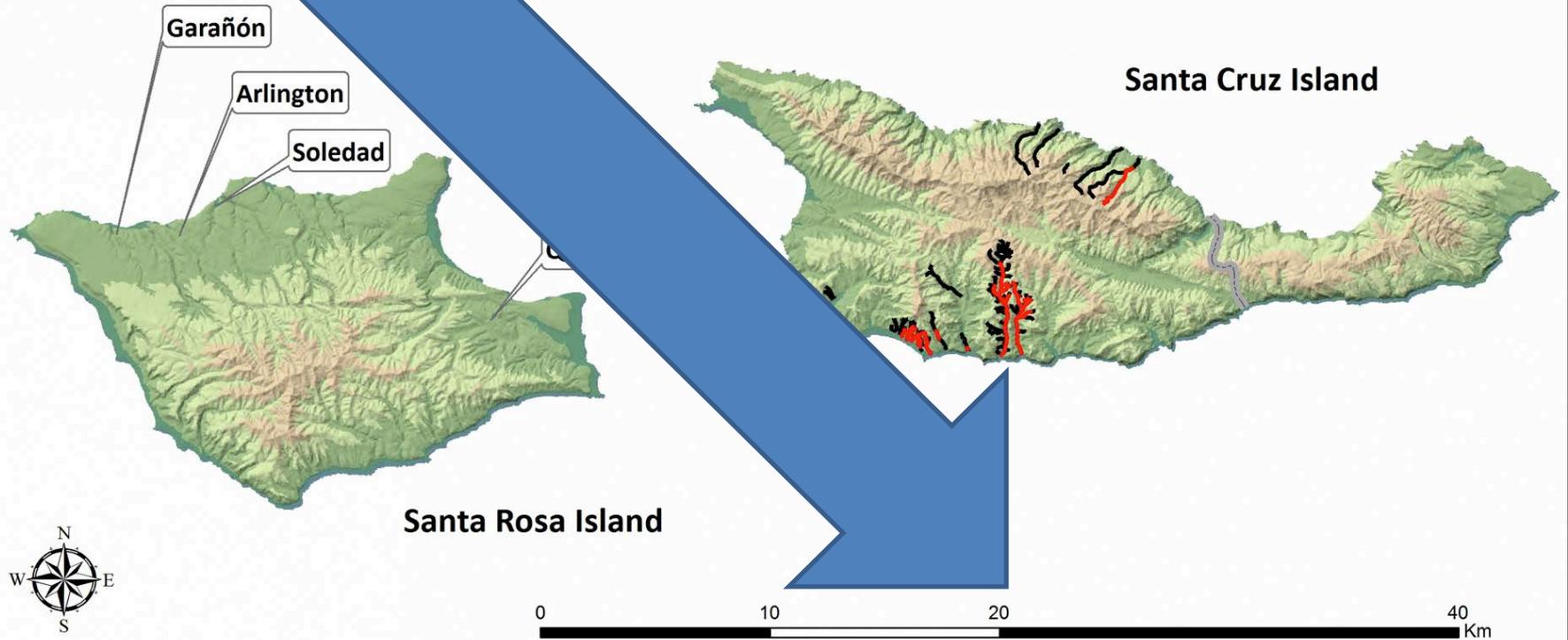
The Bad News

2014



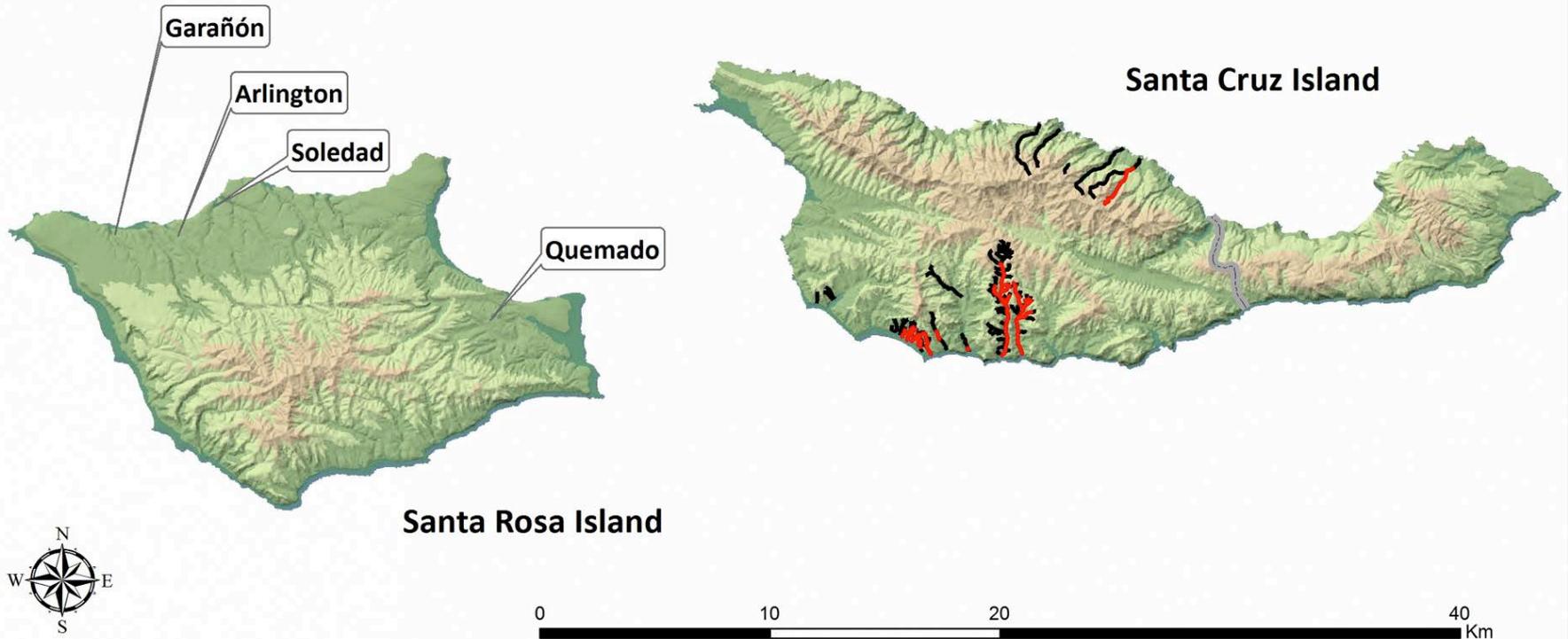
Prevailing Wind Is Northwesternerly

2014



Brings Up An Important Consideration

2014



Us?????

Potential Vector



ACKNOWLEDGEMENTS

A Special Thank You To:

The Nature Conservancy:

John Knapp, Christie Boser, David Dewey and the rest of the Ventura Office and Ranch Staff

The Los Angeles Conservation Corps:

Dan Knapp, Veronica Romero, Robert Skillman, & the habitat restoration crew/s

Wildlands and Native Range Staff:

Heather Fox, Robyn Shea, Mac Wing, John LaBonte, Tom McIntyre, Grant Powell, Aaron Garcia, Forrest Galante, William Ordonez, Samantha Cady, Claudia Makeyev, Yozora Tadehara

