

# Channel Islands National Park

## The Challenge of Controlling the Invasive Offspring of Historic Olive Trees







The California Channel Islands



# Santa Cruz Island – largest and most diverse of the Channel Islands





Supporting many **endemic**  
**plants** and **animals**





# Santa Cruz Island fox




Photo: Gary Crabbe



# Island scrub-jay







**Three unique  
animals  
Nine unique  
plants**











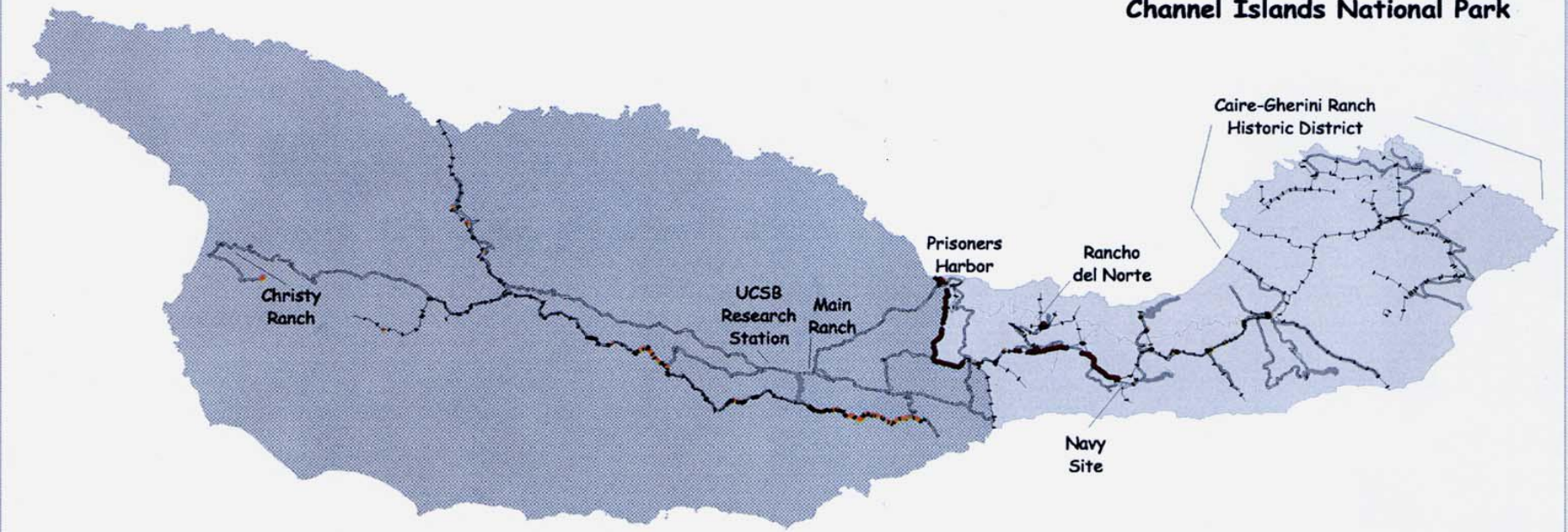








**Site Map #1**  
**Santa Cruz Island**  
**Santa Cruz Island Ranching District**  
**Channel Islands National Park**



**Legend**

**Roads and Trails**

-  4-Wheel Drive Access
-  ATV Access
-  Road Trace
-  Hiking Trail



Fenceline

Fence Post



Telephone Pole



The Nature Conservancy

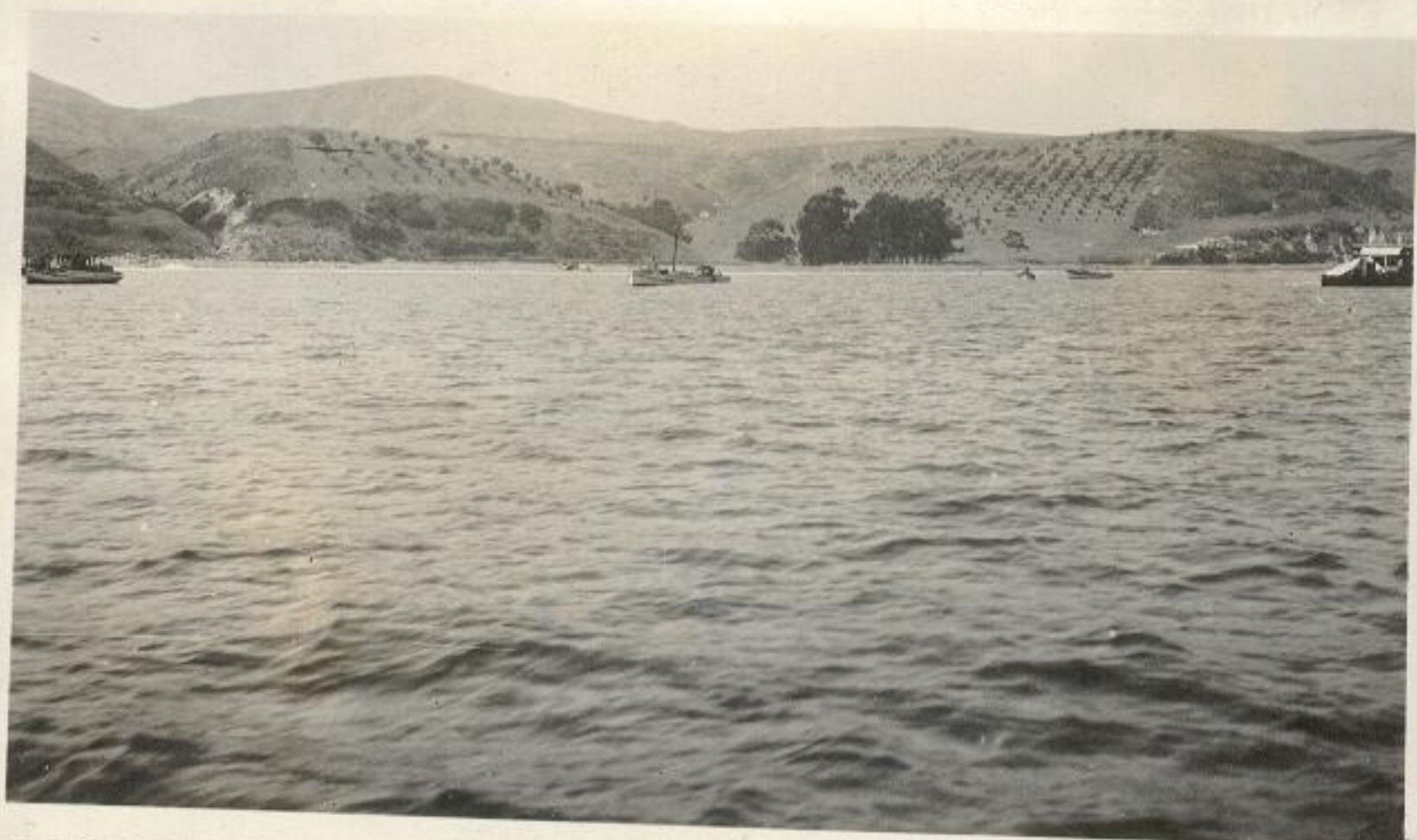


United States Department of the Interior  
 National Park Service  
 Pacific West Region  
 Cultural Landscape Program  
 Oakland, CA  
 2004



Source: Map derived from park data sources and GPS (2002 and 2003).











# Feral Olive Dispersal and Establishment

<b>Olives</b> <b>planted at</b> Smugglers	<b>Seeds</b> <b>dispersed</b> by birds and feral pigs	<b>Seedlings</b> <b>browsed</b> by feral sheep
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1887 —————> 1998-1999 2005-2007 —> present



# Feral Olive Dispersal and Establishment

**Olives  
planted at  
Smugglers**

**Seeds  
dispersed  
by birds and  
feral pigs**

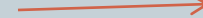
**Seedlings  
browsed  
by feral  
sheep**

**Feral pigs  
and sheep  
removed**

1887



1980's-1999  
2005-2007



present



# Feral Olive Dispersal and Establishment

**Olives  
planted at  
Smugglers**

**Seeds  
dispersed  
by birds and  
feral pigs**

**Seedlings  
browsed  
by feral  
sheep**

**Feral pigs  
and sheep  
removed**

**Established feral  
olives released  
from browsing  
pressure**

1887



1980's-1999  
2005-2007



present



Effects of grazing

by domestic sheep

*No sheep*

*Sheep*







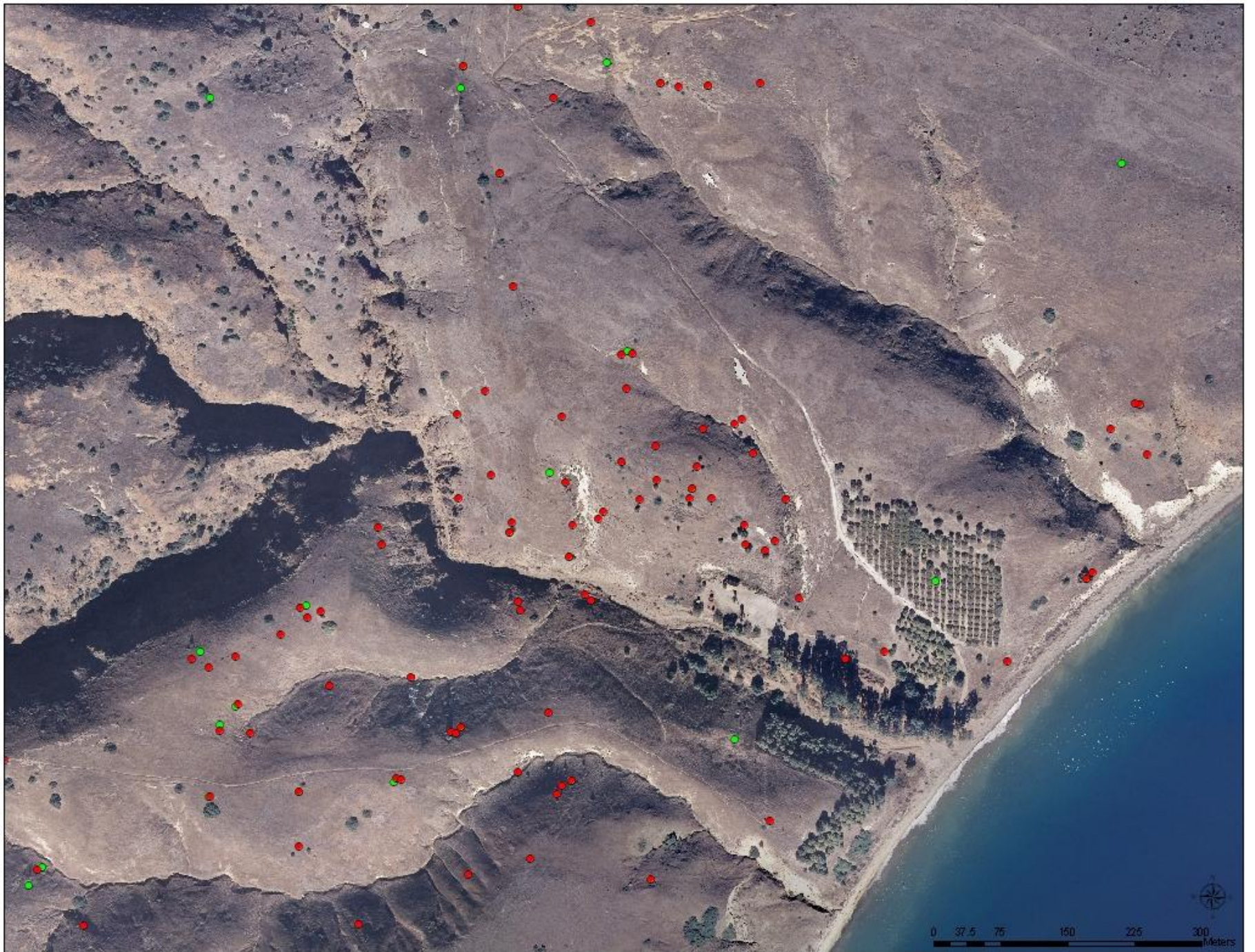




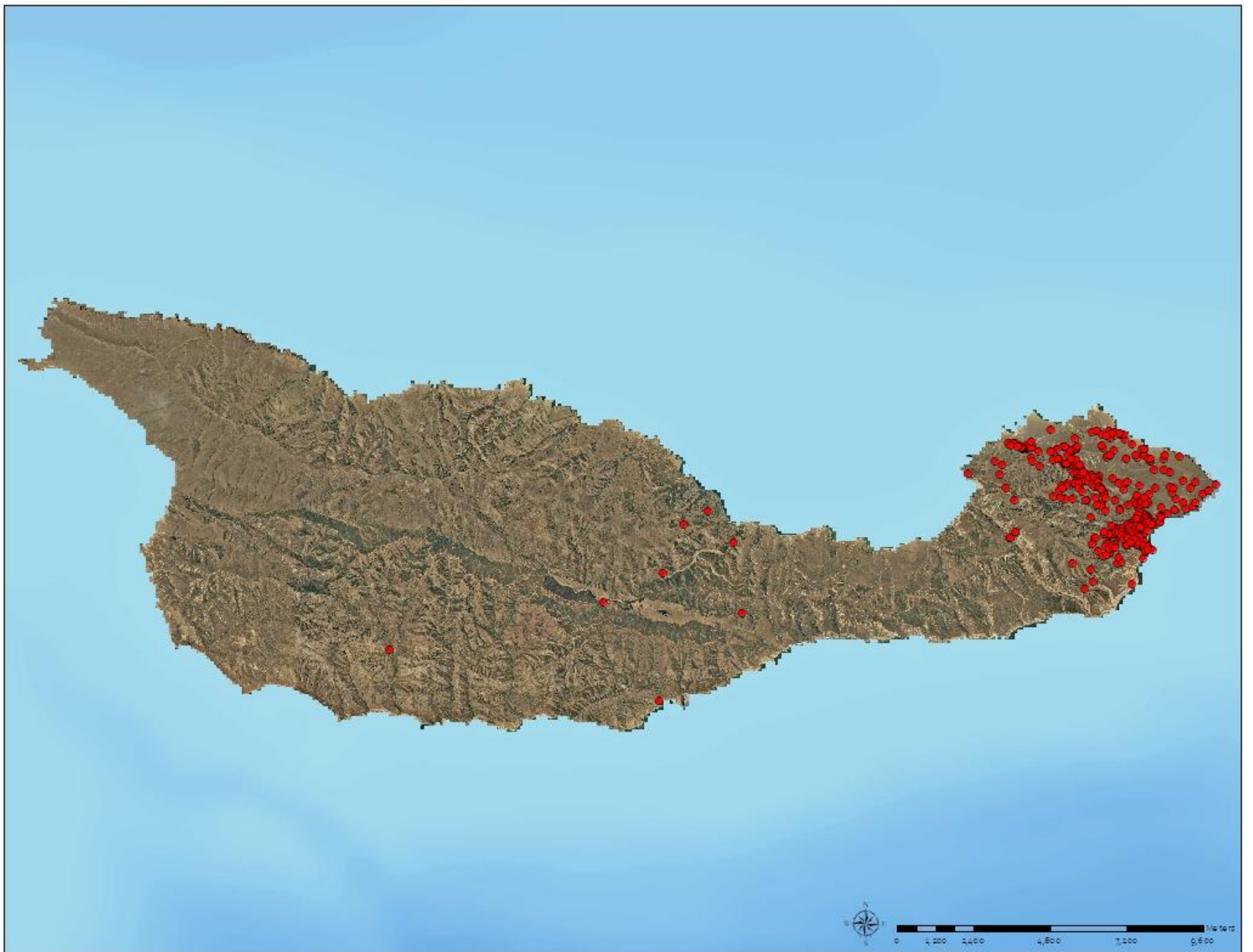






















# Manual removal of saplings









## GPS Data collection







	<b>Olives Planted 1887</b>	<b>Olives Removed pre-FY08</b>	<b>Olives Removed FY08</b>	<b>Olives Removed FY09</b>	<b>Olives Removed FY10</b>	<b>Olives To Be Removed</b>
<b># trees</b>	400					
<b># acres</b>	6.2					





	<b>Olives Planted 1887</b>	<b>Olives Removed pre-FYo8</b>	<b>Olives Removed FYo8</b>	<b>Olives Removed FYo9</b>	<b>Olives Removed FY10</b>	<b>Olives To Be Removed</b>
# trees	400	>6,000				
# acres	6.2	East end				





	<b>Olives Planted 1887</b>	<b>Olives Removed pre-FYo8</b>	<b>Olives Removed FYo8</b>	<b>Olives Removed FYo9</b>	<b>Olives Removed FY10</b>	<b>Olives To Be Removed</b>
# trees	400	>6,000	3,633			
# acres	6.2	East end	77			





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# trees	400	>6,000	3,633	4,704		
# acres	6.2	East end	77	296		





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# acres	6.2	East end	77	296	23	





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# trees	400	>6,000	3,633	4,704	255	>5,000
# acres	6.2	East end	77	296	23	Island-wide



# Natural Resource Management Goal:

## Ecosystem Recovery

- Ensure vegetation is dominated by native vegetation
- Remove all feral olives
- Eliminate or substantially reduce seed production



# Cultural Resources Management Goal:

## Preservation of Historic Landscapes

- Maintain historic ranching resources
- Maintain historic olive grove





# Interim Management Strategy



- **Become Informed about the Resource**
- Annual Survey of Health of Trees
- Annual Survey of Number of Fruiting Trees – are all trees producing fruit? Are the same trees producing fruit?
- Sweep for feral olives every five years – how extensive is the seed bank?





2009

Fruiting trees: 83

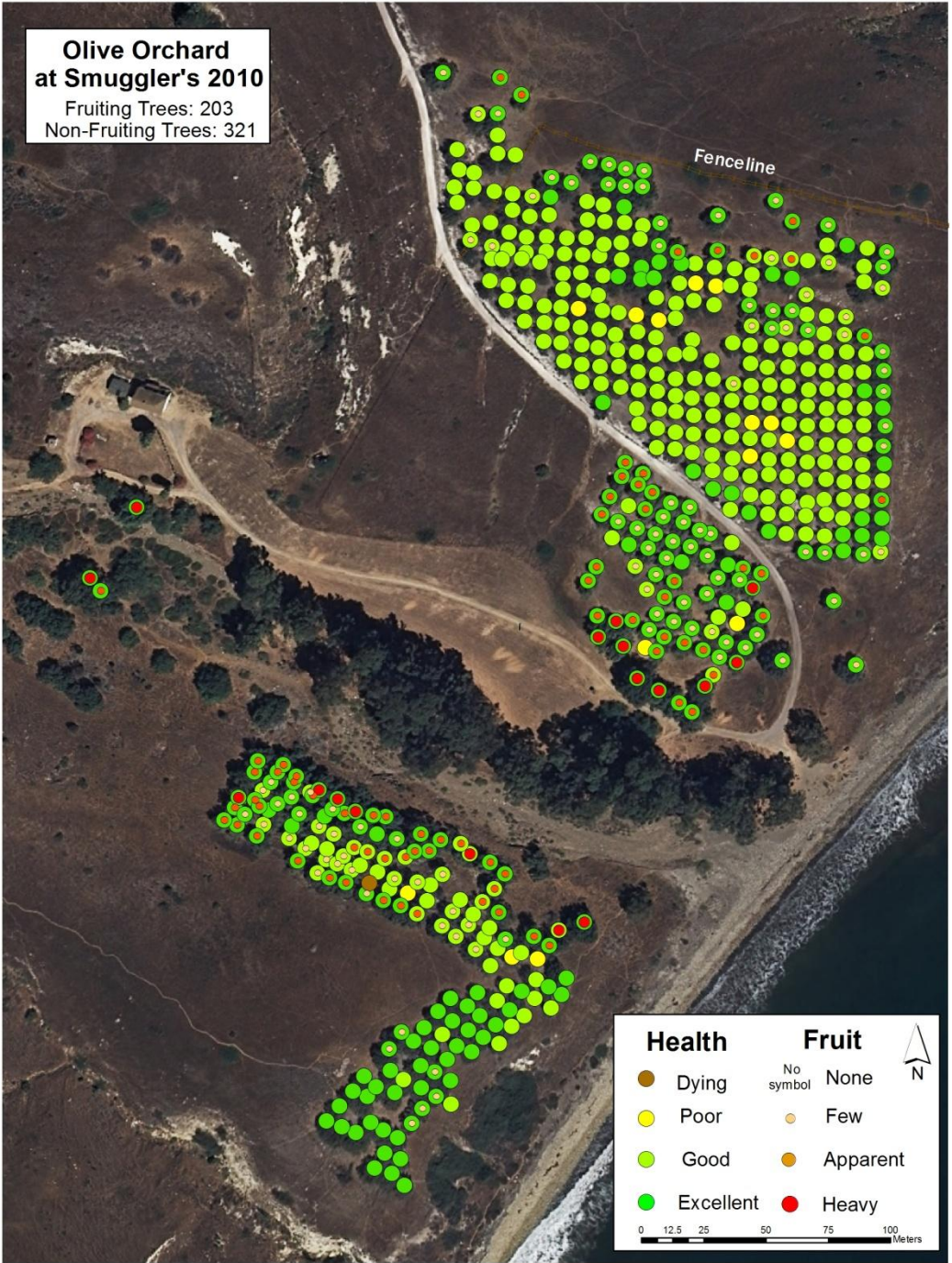
Non fruiting trees: 441

Annual Precip.: 9.28"



**Olive Orchard  
at Smuggler's 2010**

Fruiting Trees: 203  
Non-Fruiting Trees: 321



2010

Fruiting trees: 203

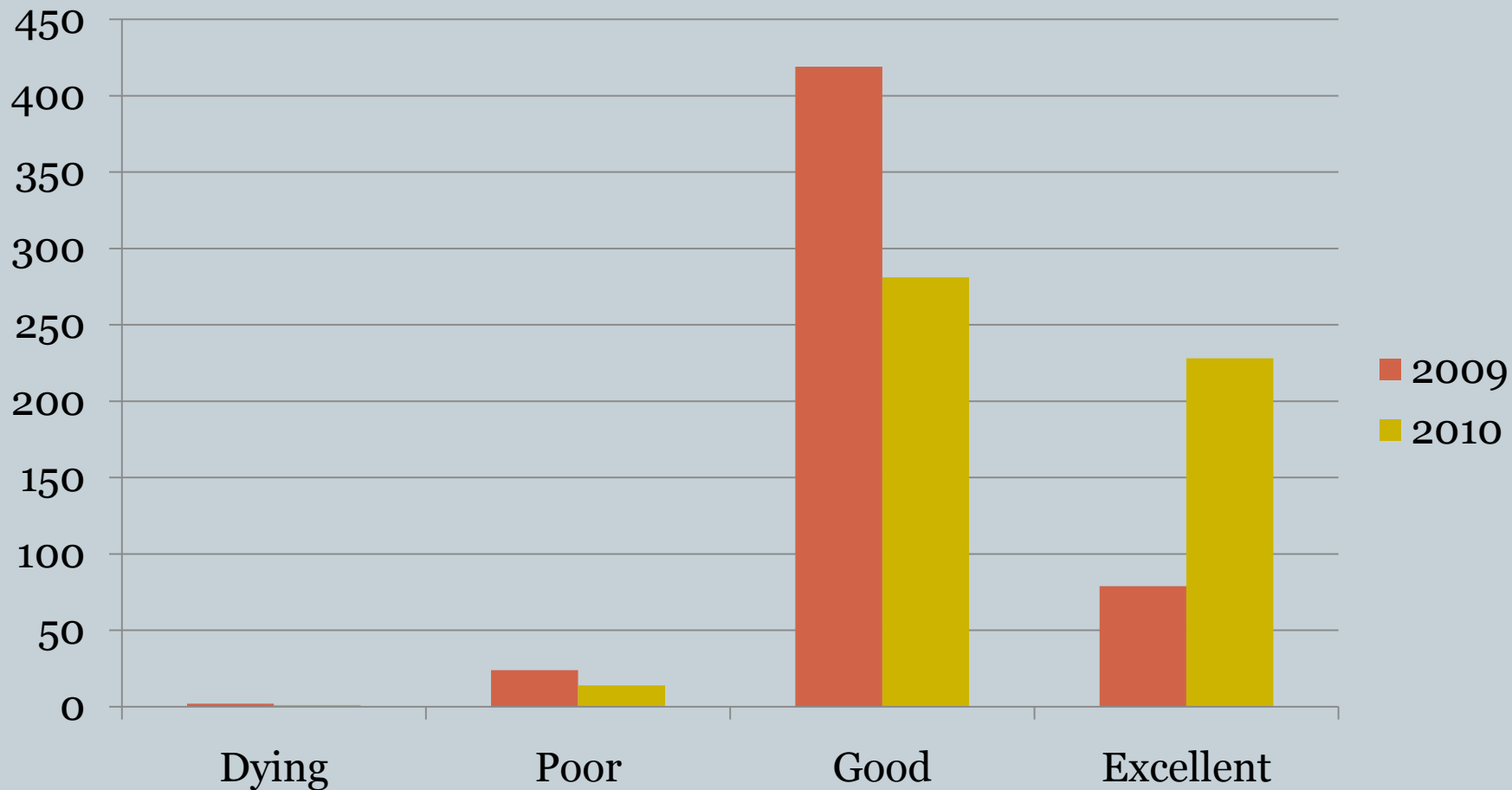
Non fruiting trees: 321

Annual Precip.: 18.81"



# Olive Reproductive Survey

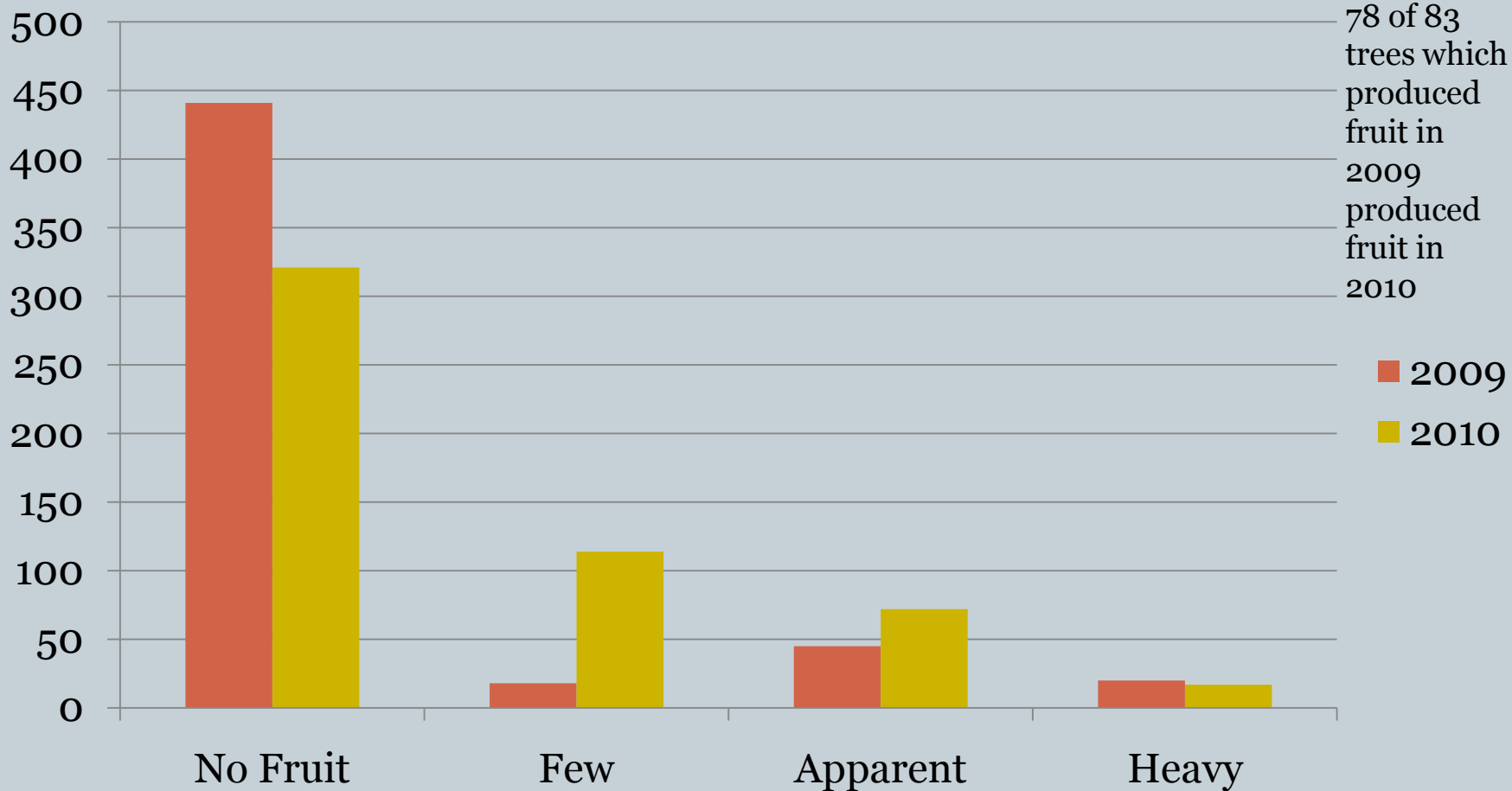
## Tree Health





# Olive Reproductive Survey

## Fruiting





# Olive Management Strategy



**CONTINUE HEALTH AND REPRODUCTIVE  
SURVEY**

**CONDUCT A SWEEP FOR SAPLINGS IN 3  
YEARS**

**DEVELOP ALTERNATIVE MANAGEMENT  
ACTIONS ON WHICH TO BASE FINAL  
DECISION**



# Some Management Options

	<b>Status Quo</b>	<b>Fruit Reduction</b>	<b>Tree Replacement</b>	<b>Tree Removal</b>
<b>Action</b>	<ul style="list-style-type: none"> <li>·Maintain olive orchard</li> <li>·Remove feral olives</li> </ul>	<ul style="list-style-type: none"> <li>·Growth regulator applied to trees – flower drop</li> </ul>	<ul style="list-style-type: none"> <li>·Replace olives with non-fruiting variety</li> </ul>	<ul style="list-style-type: none"> <li>·Remove orchard</li> <li>·Replace with native vegetation</li> </ul>
<b>Cost</b>	<ul style="list-style-type: none"> <li>·Five year cycle</li> <li>·On-going maintenance of orchard</li> <li>·Feral olive control required</li> </ul>	<ul style="list-style-type: none"> <li>·Annual maintenance issue – low efficacy</li> <li>·Feral olive control required</li> </ul>	<ul style="list-style-type: none"> <li>·10 year project</li> <li>·Remove and replant orchard</li> <li>·Irrigation required</li> <li>·Feral olive control required</li> </ul>	<ul style="list-style-type: none"> <li>·5 year project</li> <li>·Remove orchard</li> <li>·Replace native vegetation</li> <li>·Feral olive control required</li> </ul>
<b>Natural Resources goal</b>	<ul style="list-style-type: none"> <li>·Remove feral olives</li> <li>·Seed production</li> </ul>	<ul style="list-style-type: none"> <li>·Seed production reduced</li> </ul>	<ul style="list-style-type: none"> <li>·Seed production eliminated</li> <li>·Threat to native plant community reduced</li> </ul>	<ul style="list-style-type: none"> <li>·Seed production eliminated</li> <li>·Threat to native plant community reduced</li> </ul>
<b>Cultural Resources goal</b>	<ul style="list-style-type: none"> <li>·Historic olive grove maintained</li> </ul>	<ul style="list-style-type: none"> <li>·Historic olive grove maintained</li> </ul>	<ul style="list-style-type: none"> <li>·Virtual historic landscape preserved</li> </ul>	<ul style="list-style-type: none"> <li>·Historic landscape not preserved</li> </ul>



# Acknowledgements

CaEPMT and Sarah Chaney for getting the park started in feral olive removal

Clark Cowan and Jim Roberts for dedication and commitment to data collection and field work

Ann Huston, Chief Cultural Resources for commitment to cooperative effort

NRPP for providing funds for the initial weed action

NPS Regional Block Program funds for the Health and Fruiting survey







<b>Age class</b>	<b>Treatment Method</b>	<b>Number trees FY08</b>	
Mature	Cut-stump Drill + fill	157	
Sapling	Hand pull Mattock	3,476	Released from browsing pressure

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Cost	<ul style="list-style-type: none"> <li>·Five year cycle On-going maintenance of orchard</li> <li>·Feral olive control required</li> </ul>			
Natural Resources goal	Remove feral olives Seed production			
Cultural Resources goal	·Historic olive grove maintained			



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Initial Costs:

Park staff time – field observation discovered problem

Ca EPMT – three tours + 1 month special assignment

The Nature Conservancy – Santa Cruz Island Weed Map

Removal Costs:

	<b>FY 08</b>	<b>To Be Removed</b>	<b>Seed Bank</b>
# Trees	3,633	10,000	???
PERSONNEL	\$31,844	\$88,526	
SUPPLIES	\$1,250	\$3,475	
HOUSING	\$350	\$973	
MISC.	\$500	\$1,390	
<b>TOTAL</b>	<b>\$33,944</b>	<b>\$94,364</b>	<b>???</b>
<b>Funding Source</b>			

## Panel Discussion

When a Line on the Map isn't Enough:  
Thinking through Resource Stewardship  
Dilemmas

4 pm today



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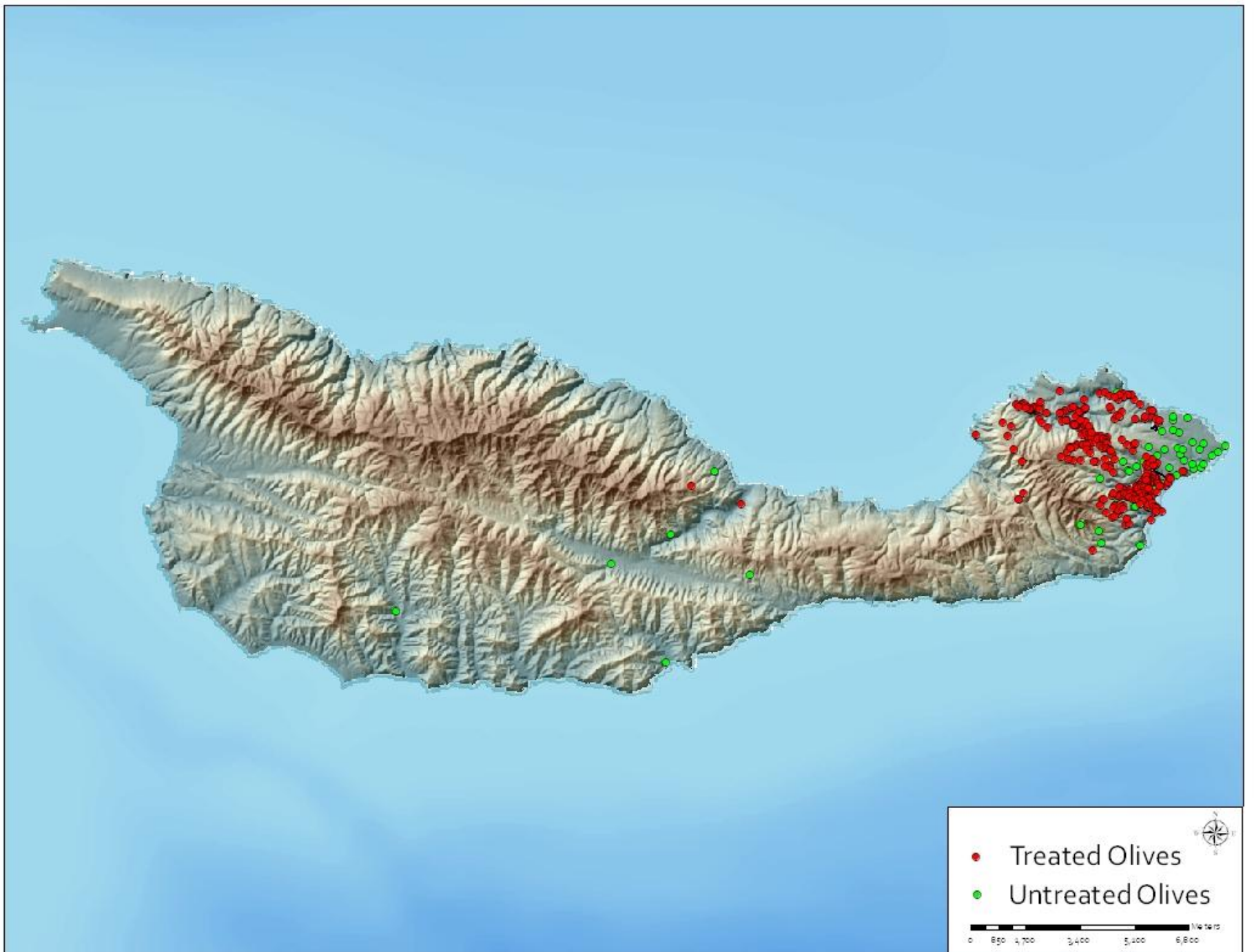
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<b>Funding Source</b>	<b>NRPP - larger invasive species project</b>	<b>Cyclic Maintenance? Cultural Resources? Natural Resources?</b>	

California EPMT  
Student Conservation  
Association



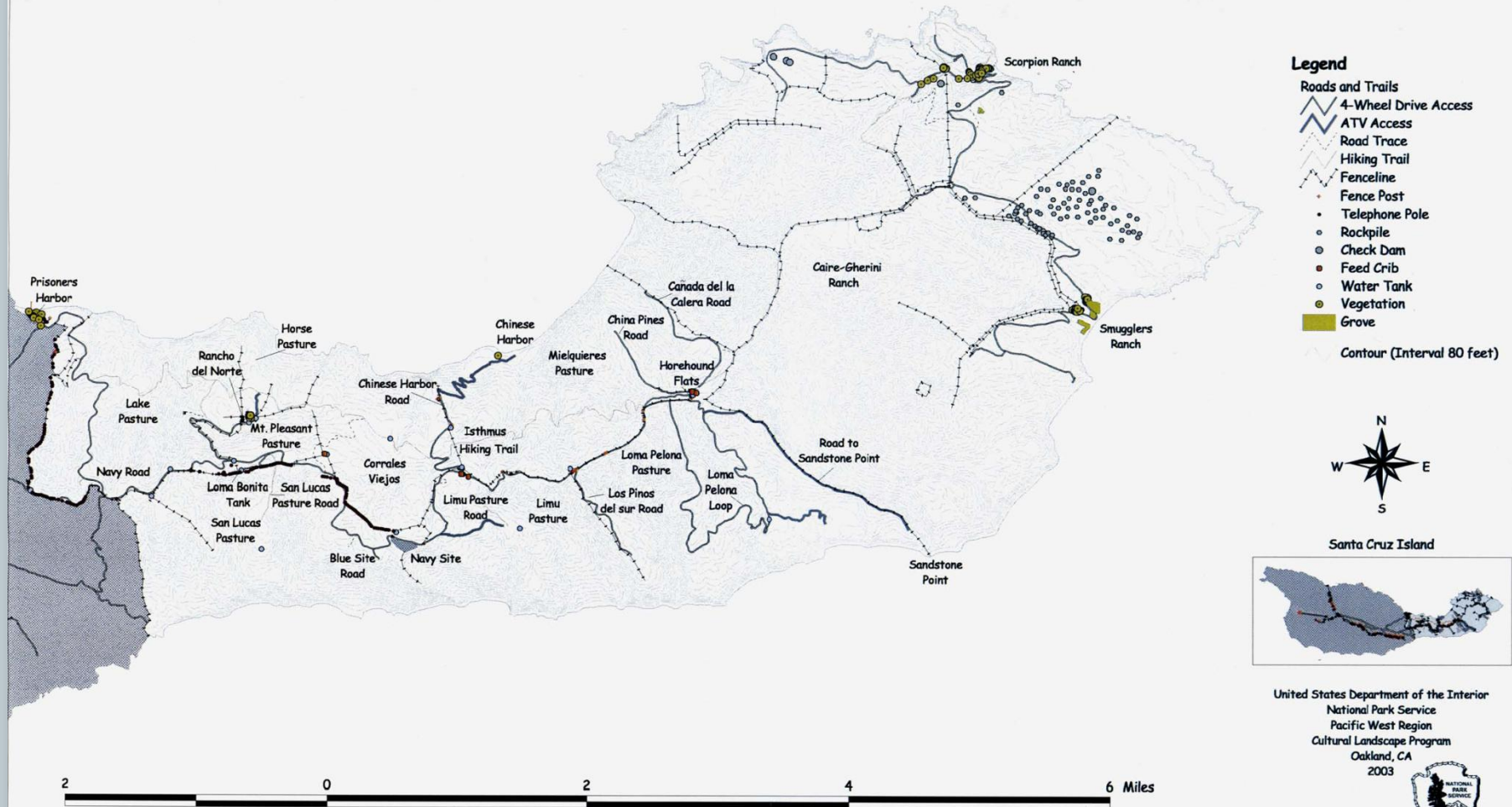








**Site Map #2**  
**Cultural Landscape Boundary**  
**Santa Cruz Island Ranching District**  
**Channel Islands National Park**



United States Department of the Interior  
 National Park Service  
 Pacific West Region  
 Cultural Landscape Program  
 Oakland, CA  
 2003

Source: Map derived from park data sources and GPS (2002 and 2003).



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## Ecosystem Recovery

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# Channel Islands National Park



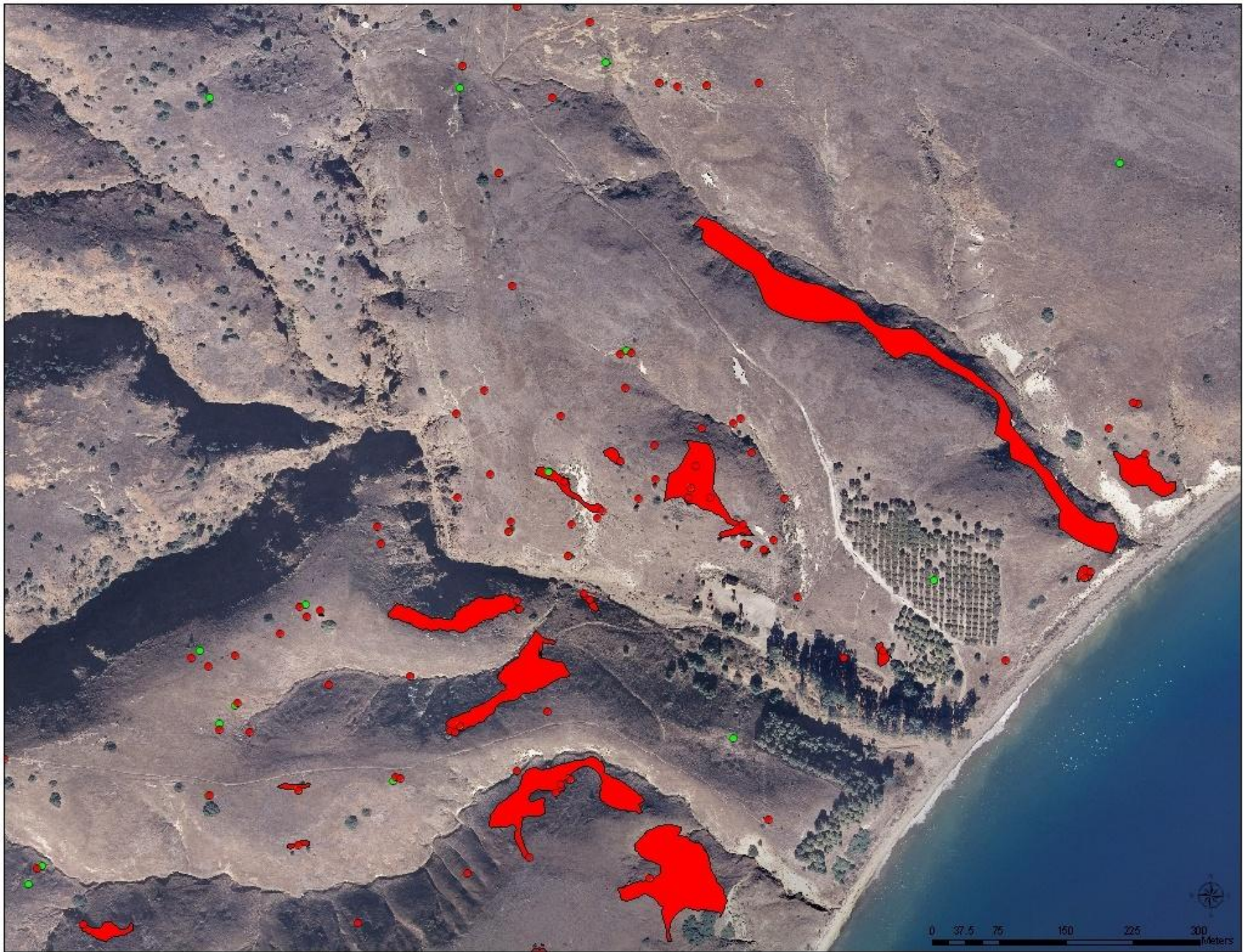
















<b>Community Types</b>	<b>Percent of All Locations</b>
Bare ground	1
Coastal Sage Scrub	3
Grassland	90
Gully	1
Island Chaparral	2
Landscape	1
Oak Woodland	2