



CATALINA ISLAND
CONSERVANCY™

Riding the Invasion Curve: Invasive plant management on Santa Catalina Island

Aaron Kreisberg

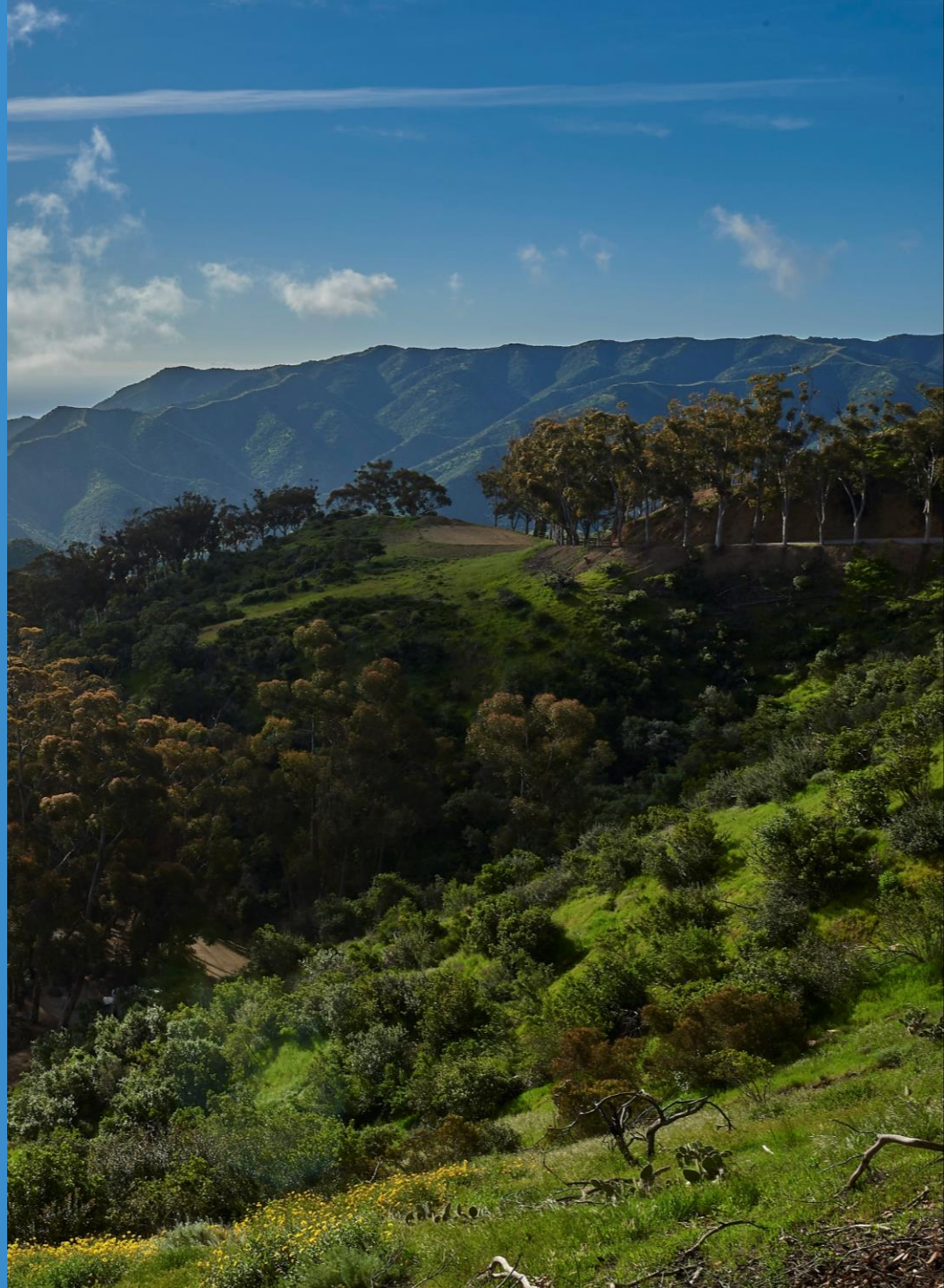
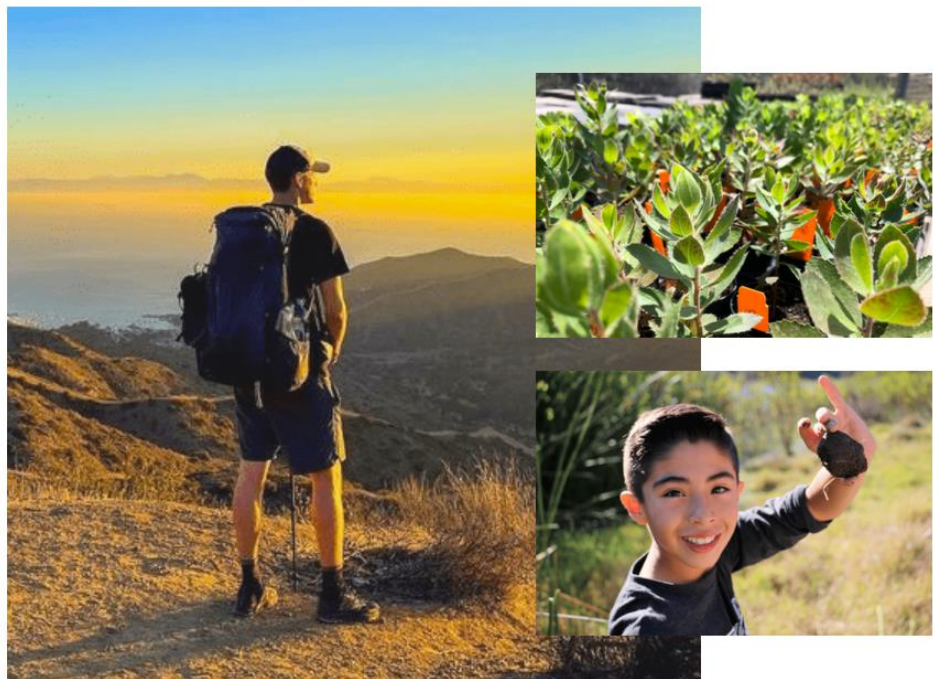
Invasive Plant Program Manager

Catalina Island Conservancy



Mission:

“To be an exemplary steward of Island resources through a balance of conservation, education, and recreation.”





SAN MIGUEL

SANTA CRUZ

ANACAPA

Los Angeles

SANTA ROSA

SANTA BARBARA

SANTA CATALINA

San Diego

SAN NICOLAS

SAN CLEMENTE

The California Channel Islands

Pimu / Pimugna San Salvador Santa Catalina

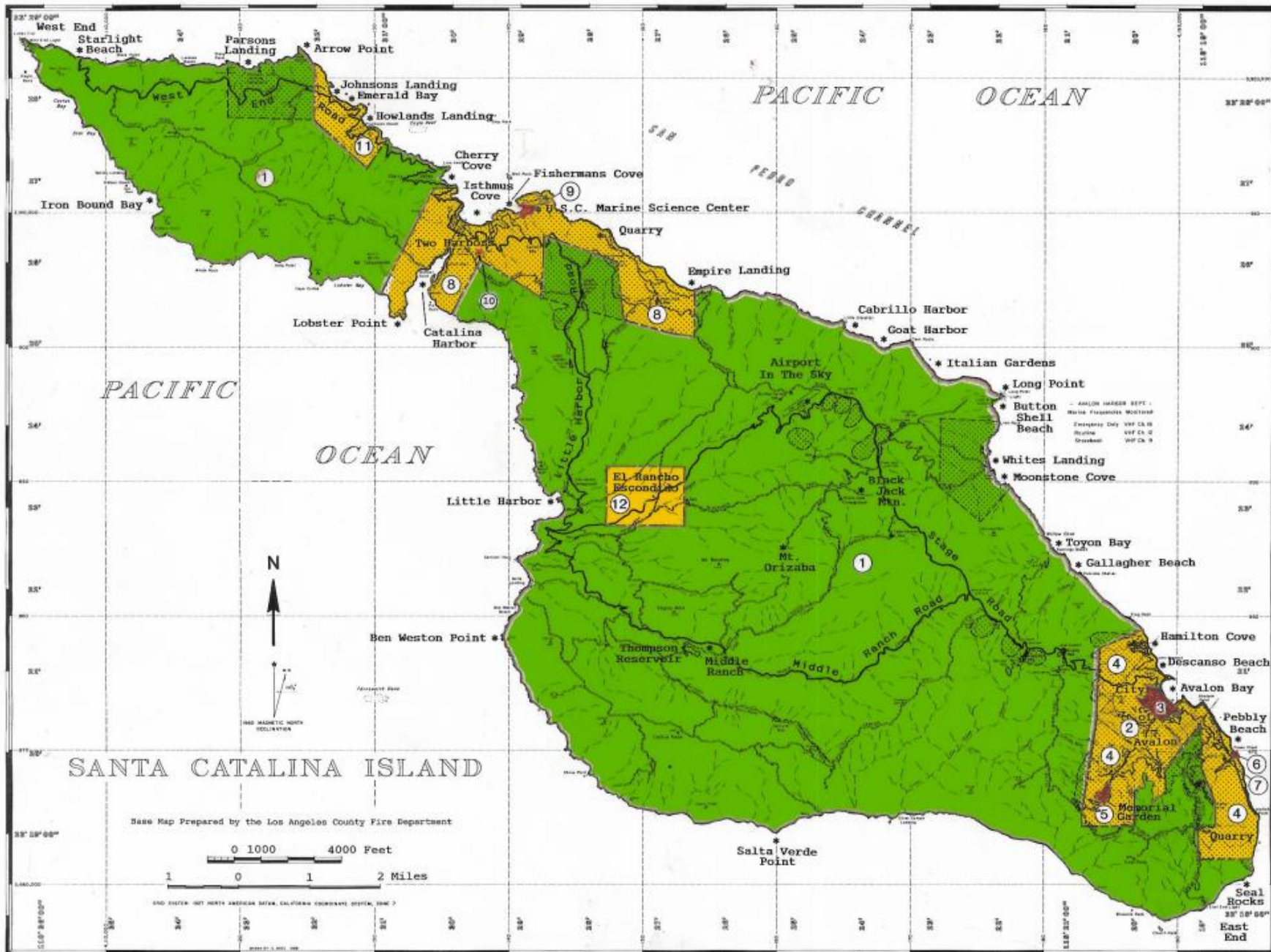


0 0.95 1.9 2.85 3.8 Miles

SOURCE:
Catalina Island Conservancy
NOAA/NGDC
LAR-IAC

SANTA CATALINA ISLAND

Land Ownership Map



Ownership of Santa Catalina Island 1990

	Acres
① Santa Catalina Island Conservancy	42,134.22
Avalon & Vicinity:	
Incorporated Area (City of Avalon):	
② Santa Catalina Island Company	695.79
③ Private Individuals & Municipal	104.81
Unincorporated Area:	
④ Santa Catalina Island Company	1,562.72
⑤ Wrigley Memorial Garden Found'n	37.85
⑥ So. Calif. Edison Co. (Pebble Bch)	2.88
⑦ City of Avalon (sewage plant)	1.54
Two Harbors & Vicinity (uninc.):	
⑧ Santa Catalina Island Company	2,272.22
⑨ University of Southern Calif.	14.26
⑩ So. Calif. Edison Co.	1.46
Emerald Bay & Vicinity (uninc.):	
⑪ Santa Catalina Island Company	418.40
El Rancho Escondido (uninc.):	
⑫ Santa Catalina Island Company	537.73
Total Island Area	47,883.88

- Santa Catalina Island Conservancy
42,134+ acres (88%)
- Santa Catalina Island Company
5,587+ acres (11%)
- All Other Ownership
163+ acres (1%)
- Areas excluded from Los Angeles County Open Space Easement.

NRCS Soils Map Catalina Island

This survey was completed
in 2007 by the
Natural Resources
Conservation Service

This survey can be found
at the following website:
<http://websoilsurvey.nrcs.usda.gov/app/>

— Road
- - - - - Hiking trail



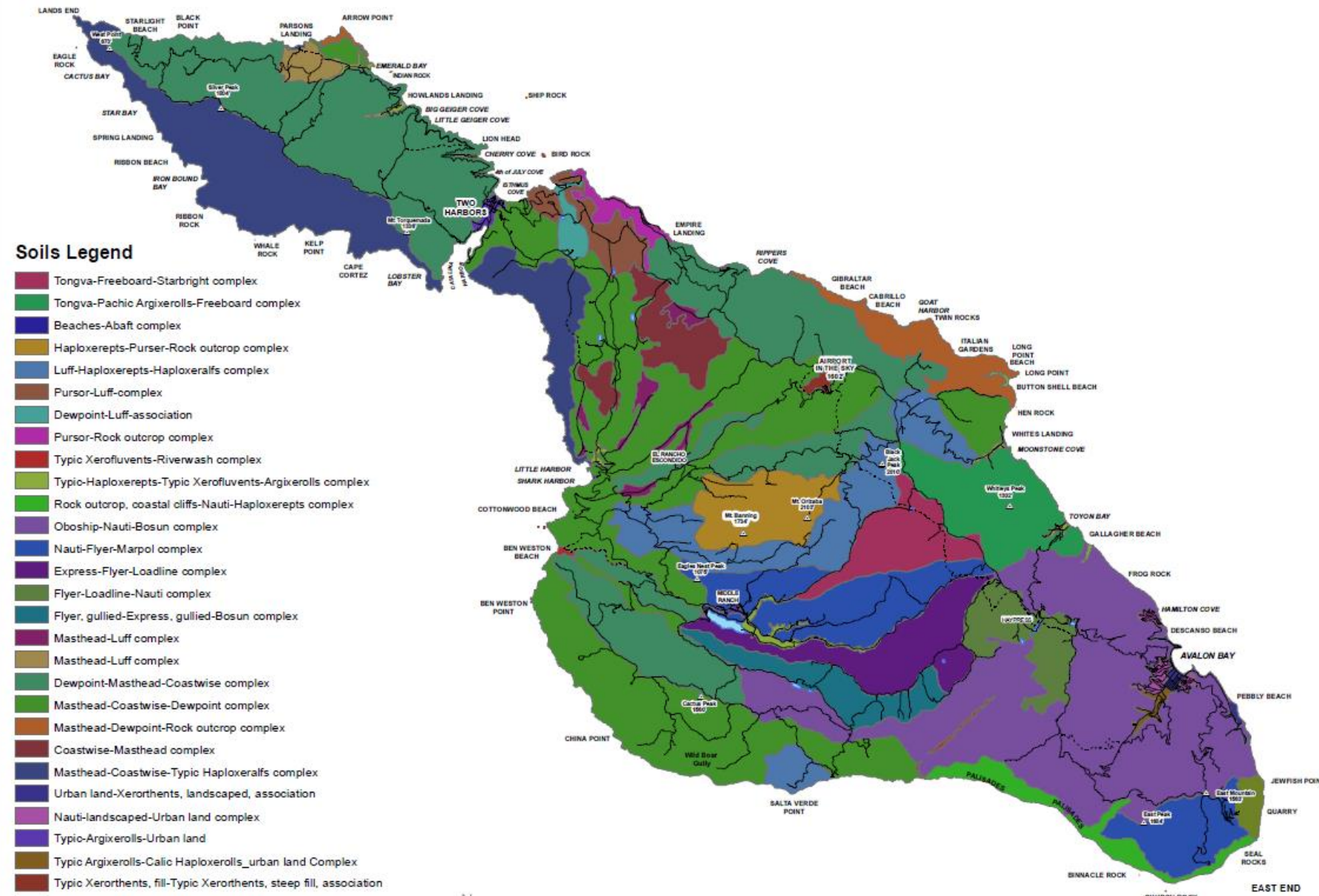
CATALINA ISLAND CONSERVANCY

The mission of the
Catalina Island Conservancy
is to be a responsible steward of its
land through a balance of conservation,
education and recreation.

Map datum: UTM NAD83 Zone 11
Map date: May 14, 2010
Contact: Conservation Dept. (310) 510-1288 ext.227



WEST END



Soils Legend

- Tongva-Freeboard-Starbright complex
- Tongva-Pachio Argixerolls-Freeboard complex
- Beaches-Abaft complex
- Haploxerepts-Purser-Rock outcrop complex
- Luff-Haploxerepts-Haploxerafls complex
- Pursor-Luff-complex
- Dewpoint-Luff-association
- Pursor-Rock outcrop complex
- Typic Xerofluvents-Riverwash complex
- Typic-Haploxerepts-Typic Xerofluvents-Argixerolls complex
- Rock outcrop, coastal cliffs-Nauti-Haploxerepts complex
- Oboship-Nauti-Bosun complex
- Nauti-Flyer-Marpol complex
- Express-Flyer-Loadline complex
- Flyer-Loadline-Nauti complex
- Flyer, gullied-Express, gullied-Bosun complex
- Masthead-Luff complex
- Masthead-Luff complex
- Dewpoint-Masthead-Coastwise complex
- Masthead-Coastwise-Dewpoint complex
- Masthead-Dewpoint-Rock outcrop complex
- Coastwise-Masthead complex
- Masthead-Coastwise-Typic Haploxerafls complex
- Urban land-Xerorthents, landscaped, association
- Nauti-landscaped-Urban land complex
- Typic-Argixerolls-Urban land
- Typic Argixerolls-Calic Haploxerepts_urban land Complex
- Typic Xerorthents, fill-Typic Xerorthents, steep fill, association
- Dam
- Gravel Pits
- Water



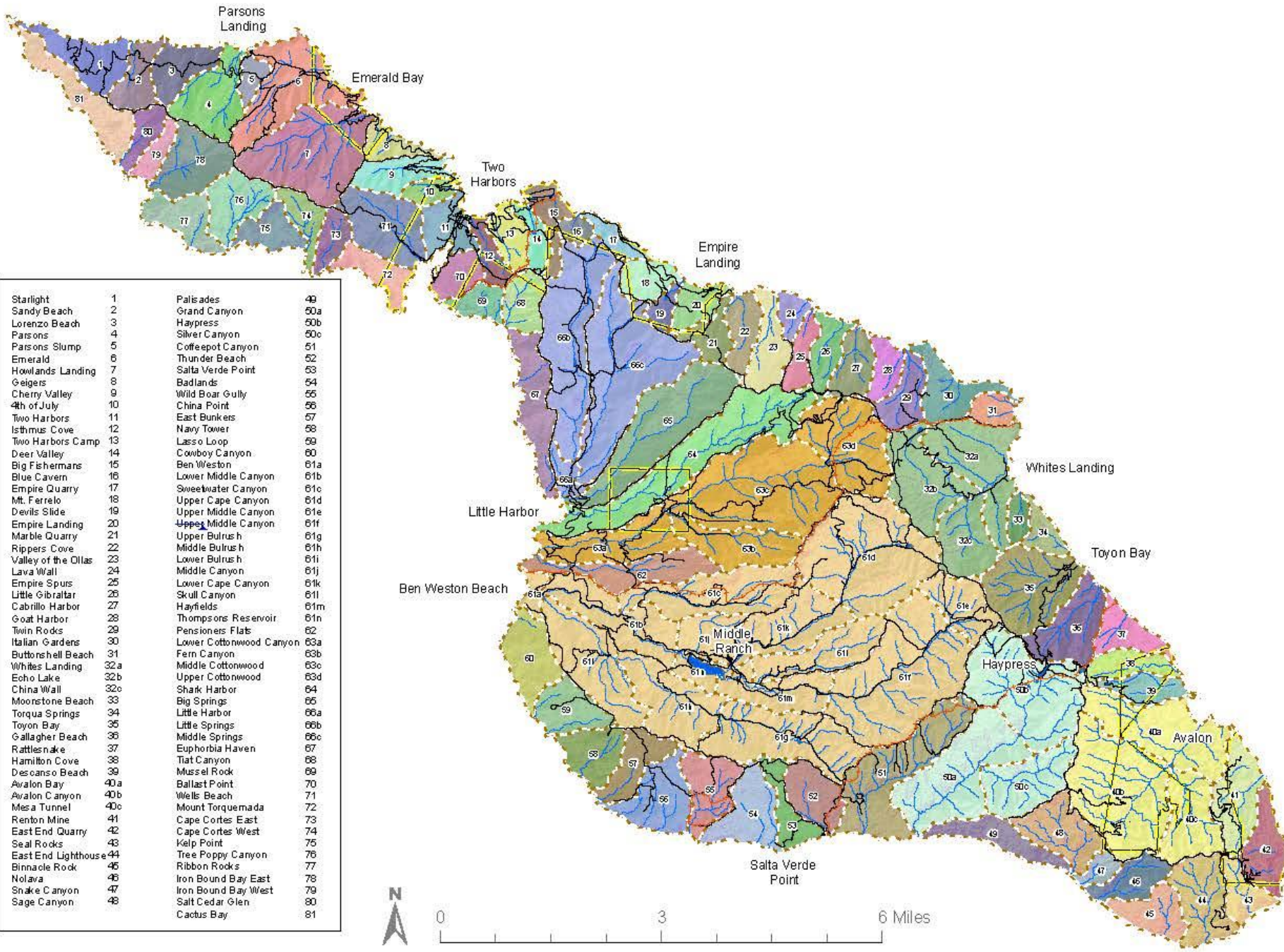
EAST END

Catalina Island Watershed Management Units

-  Management Unit
-  SCICo Property
-  Roads
-  Cross-island Fences
-  Intermittent Streams
-  Ponds & Reservoirs


CATALINA ISLAND CONSERVANCY
 P.O. Box 2739
 Avalon, Ca 90704
www.catalinaconservancy.org

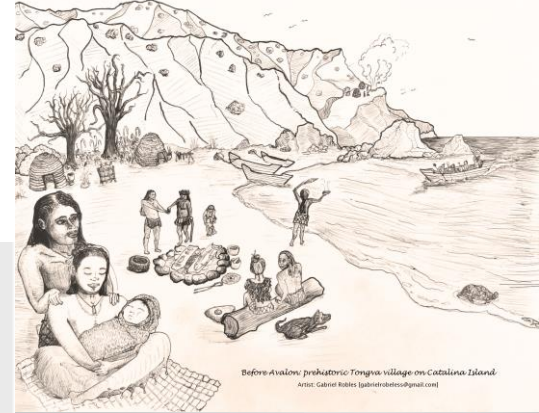
Map datum: UTM NAD83 Zone 11
 Map date: June 20, 2008
 Contact: Frank Starkey (310) 510-1299 ext.227



Starlight	1	Palisades	49
Sandy Beach	2	Grand Canyon	50a
Lorenzo Beach	3	Haypress	50b
Parsons	4	Silver Canyon	50c
Parsons Slump	5	Coffeepot Canyon	51
Emerald	6	Thunder Beach	52
Howlands Landing	7	Salta Verde Point	53
Geigers	8	Badlands	54
Cherry Valley	9	Wild Boar Gully	55
4th of July	10	China Point	56
Two Harbors	11	East Bunkers	57
Isthmus Cove	12	Navy Tower	58
Two Harbors Camp	13	Lasso Loop	59
Deer Valley	14	Cowboy Canyon	60
Big Fishermans	15	Ben Weston	61a
Blue Cavern	16	Lower Middle Canyon	61b
Empire Quarry	17	Sweetwater Canyon	61c
Mt. Farrello	18	Upper Cape Canyon	61d
Devils Slide	19	Upper Middle Canyon	61e
Empire Landing	20	Upper Middle Canyon	61f
Marble Quarry	21	Upper Bulrus h	61g
Rippers Cove	22	Middle Bulrus h	61h
Valley of the Ollas	23	Lower Bulrus h	61i
Lava Wall	24	Middle Canyon	61j
Empire Spurs	25	Lower Cape Canyon	61k
Little Gibraltar	26	Skull Canyon	61l
Cabrillo Harbor	27	Hayfields	61m
Goat Harbor	28	Thompsons Reservoir	61n
Twin Rocks	29	Pensioners Flats	62
Italian Gardens	30	Lower Cottonwood Canyon	63a
Buttshell Beach	31	Fern Canyon	63b
Whites Landing	32a	Middle Cottonwood	63c
Echo Lake	32b	Upper Cottonwood	63d
China Wall	32c	Shark Harbor	64
Moorestone Beach	33	Big Springs	65
Torqua Springs	34	Little Harbor	66a
Toyon Bay	35	Little Springs	66b
Gallagher Beach	36	Middle Springs	66c
Rattlesnake	37	Euphorbia Haven	67
Hamilton Cove	38	Tiat Canyon	68
Descanso Beach	39	Mussel Rock	69
Avalon Bay	40a	Ballast Point	70
Avalon Canyon	40b	Wells Beach	71
Mesa Tunnel	40c	Mount Torquemada	72
Renton Mine	41	Cape Cortes East	73
East End Quarry	42	Cape Cortes West	74
Seal Rocks	43	Kelp Point	75
East End Lighthouse	44	Tree Poppy Canyon	76
Binnaole Rock	45	Ribbon Rocks	77
Nolava	46	Iron Bound Bay East	78
Snake Canyon	47	Iron Bound Bay West	79
Sage Canyon	48	Salt Cedar Glen	80
		Cactus Bay	81



Ancestral Tongva/Gabrielino Land



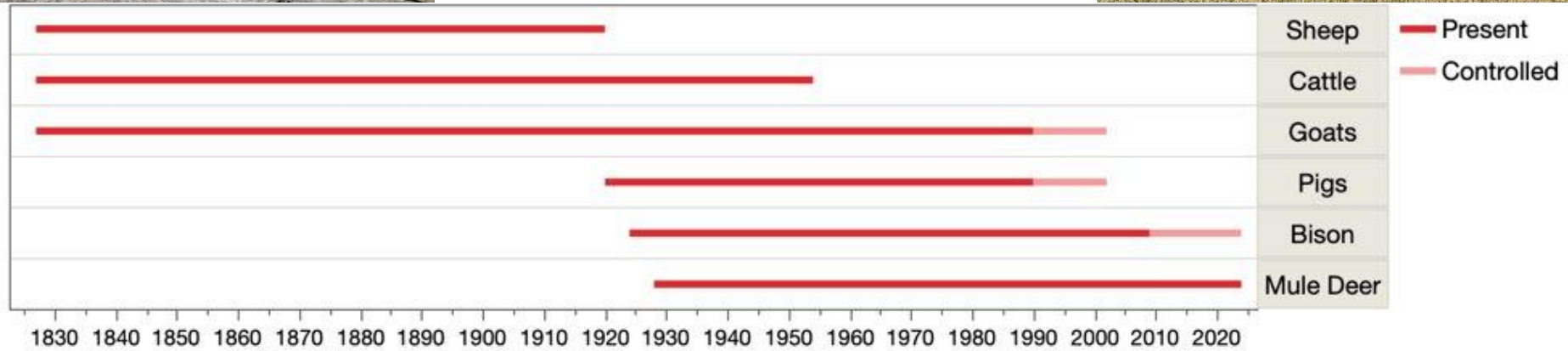
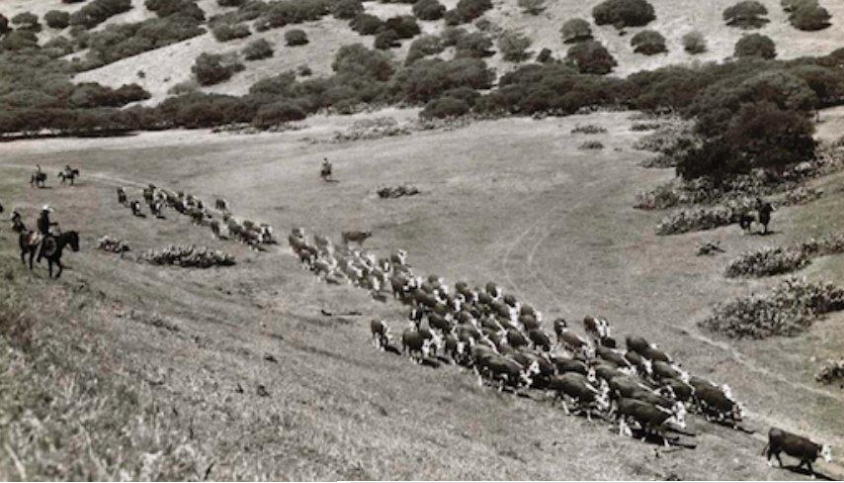


Catalina as “an island utopia in a modern, busy, everyday world. A land where there are neither rich nor poor. A heaven on earth—without a fence around it.”

“Eventually, I’ll make up the cost by taking the smallest possible profit from an increased number of visitors.”

-William Wrigley Jr.

History of Introduced Herbivores 1820 to 2024



Flora of Catalina

Author(s)	Year	# Total Plant Records	# Exotic Plant Records	Percent of Introduced vs. Native Species
Millspaugh & Nuttall	c.1923	455	75	16%
Thorne	c.1967	573	171	30%
Muns	c.1983	618	198	32%
Junak, Guilliams, and Hoefs	c. 2024*	707**	238**	34%

* in publication

** Records are not final, so this numbers may shift by publication

Invasive Plant Project Management Strategies

Catalina Habitat Improvement and Restoration Program (CHIRP) Invasive Plant Project (IPP)

- 1) Prevention
- 2) Early Detection Rapid Response (EDRR)
- 3) Eradication
- 4) Control
- 5) No Management (Intentional and Unintentional)
(Prioritized species and site led methods)



Quantity of CHIRP Target Species 2003 - 2024

2005	43		2012	50		2017	47		2021	55
2006	60		2015	50		2018	51		2023	53
2009	39		2016	53		2019	52		2024	57

CHIRP IPP Prioritization

- Control
- Eradication – Natural Areas
- Eradication – Island Wide
- Corridors
- Volunteers
- Priority Watershed/Watershed Management Units

	A	B	C	D	E
1	Management Goal	2024 Overall Rank	2024 Goal Rank	Species Name	Common Name
2	Control	1	1	<i>Genista linifolia</i>	Flax leaf broom
3	Control	2	2	<i>Foeniculum vulgare</i>	Fennel
4	Eradication- Island Wide	3	1	<i>Pennisetum setaceum</i>	Fountain grass
5	Eradication- Island Wide	4	2	<i>Cortaderia selloana</i>	Pampas grass
6	Eradication- Natural Areas	5	1	<i>Cynara cardunculus</i>	Artichoke thistle
7	Control	6	3	<i>Silybum marianum</i>	Milk thistle
8	Eradication- Natural Areas	7	2	<i>Arundo donax</i>	Giant cane
9	Eradication- Natural Areas	8	3	<i>Spartium junceum</i>	Spanish broom
10	Control	9	4	<i>Phalaris aquatica</i>	Harding grass
11	Control	10	5	<i>Carduus pycnocephalus</i>	Italian thistle
12	Eradication- Island Wide	11	3	<i>Tamarix ramosissima</i>	Tamarisk
13	Eradication- Island Wide	12	4	<i>Stipa tenuissima</i>	Mexican feathergrass
14					

Early Detection	Rapid response, eradication target species
Eradication- Island wide	Eradication of all known populations on the island
Eradication- Natural Areas	Eradication on Conservancy land
Control	Mgmt in high priority watersheds, restoration &/or high use areas & transportation corridors
Corridors	Roadside - 60 meter treatment buffer; Trails - 10 meter buffer <i>*buffer distance relates to one side of corridor</i>

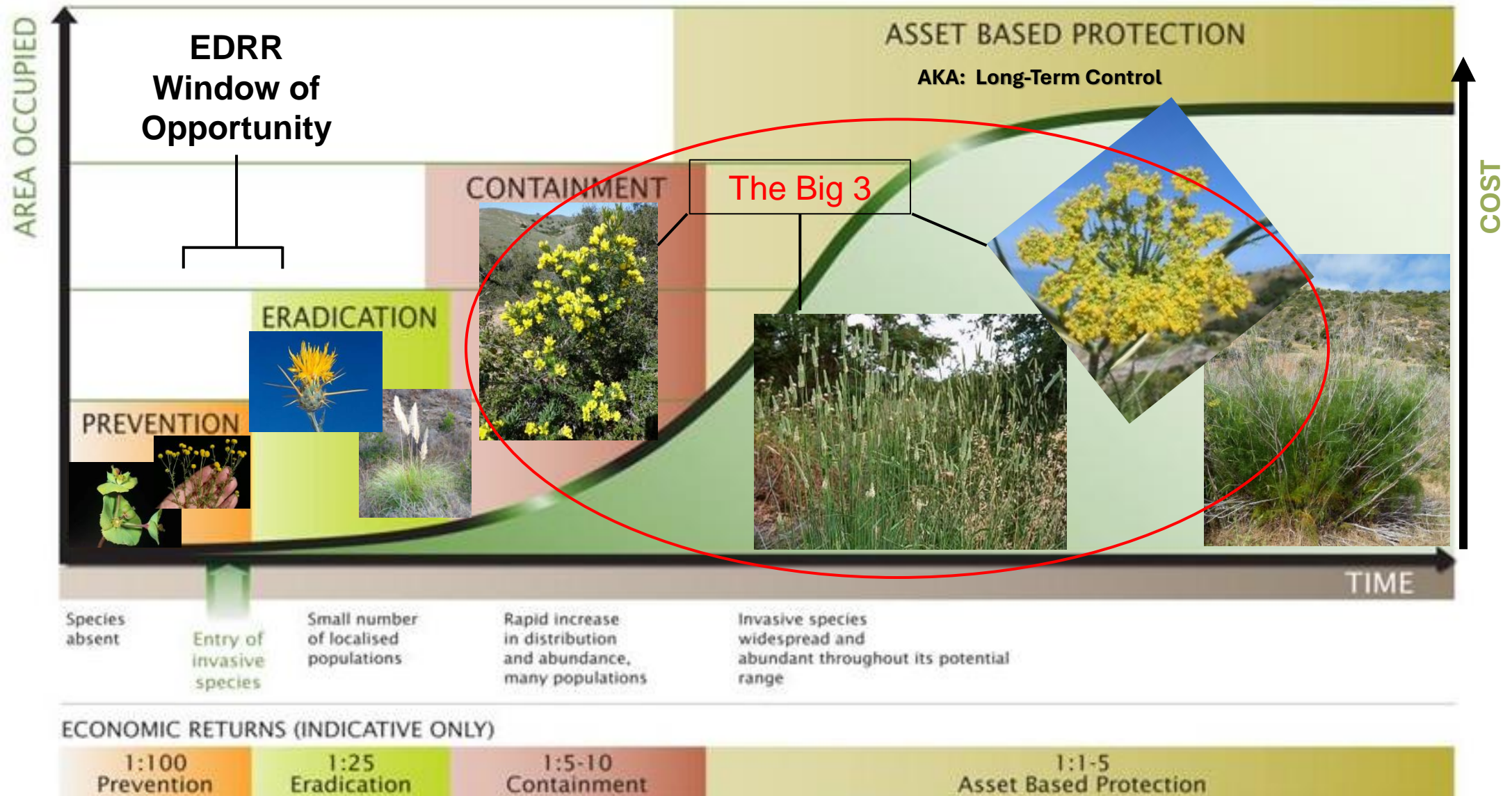
High Priority Watersheds

1. Middle Canyon	5. Little Harbor	9. Parson's Landing
2. Haypress	6. White's Landing	10. Goat Harbor
3. Cottonwood Canyon	7. Coffeepot	11. Big Springs Canyon
4. Shark Harbor	8. Emerald	12. Empire's Landing

Catalina Habitat Improvement and Restoration Program - Invasive Plant Project

GENERALISED INVASION CURVE SHOWING ACTIONS APPROPRIATE TO EACH STAGE

Version 1.0: 30 APR 2009



Case for Early Detection Rapid Response (EDRR)– Mediterranean Broom (*Genista linifolia*)




FIELD MUSEUM OF NATURAL HISTORY
PUBLICATION 212
BOTANICAL SERIES Vol. V

FLORA
OF
SANTA CATALINA ISLAND
(California)

BY
CHARLES FREDERICK MILLSPAUGH
AND
LAWRENCE WILLIAM NUTTALL
(Field Collaborator)

14 Plates 1 Map

CHARLES FREDERICK MILLSPAUGH
Curator, Department of Botany



CHICAGO, U. S. A.
January, 1923

154 FIELD MUSEUM OF NATURAL HISTORY—BOTANY, VOL. V.

cells longer than the calyx-tube, calyx dilated, pubescent, particularly on the margin; upper calyx-teeth broadly triangular, acute, lateral pair oblong-lanceolate, and the lowest coriaceous, subulate, the three lower teeth equalling the tube, the upper shorter; legume flat, sparingly pubescent, about 8-seeded.

Moist shady banks or among grasses. January to May. The many flowered, ovate-leaved race: Lyon, Trask; Brandegee (as *L. vestitus*); trail to Summit and in Cherry Canyon, Smith 5930, 5994; shady, rich banks along Avalon Run, Millsp. 4736; Golf Links Canyon and Big Wash Canyon, Nuttall 77, 1085.

The (sometimes) fewer-flowered, narrow-leaved race: dry stream-bed in open pasture, Middle Ranch, Millsp. 40070; ridge between Rack Spring and Rock Falls Canyons, Hoxley 609; Schoolhouse Ridge and Pebble Beach Canyon, Nuttall 45, 205, 676; ridge between Descanso and Hamilton Canyons, Knopf 30, WILD SWIFT PEA.

There are many races of this plant some with more and larger flowers, some with broadly oval to ovate leaves, others with ovate-lanceolate to linear, but all may appear on one stem. These races do not even remain constant as to shady or exposed situations though the broader leaves are more common to shade and the narrower to exposure. The synonymy would be difficult to settle upon except through extended field work, copious notes, ripe fruit, and a goodly series of well prepared specimens. Apparently (at this writing) the following species are included in this: *L. stricta* Nutt. (this would supplant Alefeldt) and *L. violacea* (?) *Barbarea* White; but possibly not *L. vestitus* Nutt., *L. violacea* Greene, and *L. puberula* White. All attempts to properly classify vines or climbing plants through leaf-forms and sizes; inadequate herbarium material; or worse still by cultivation from seed, in which case characters can not remain constant, appears to us worse than futile.

[*Genista linifolia* Linn. The European DYERS' GREEN-WOLD grows as a silvery, yellow-flowered bush, four feet high, at the summit of the cable railway on the south hill above Avalon, where it blooms profusely from March to April (Millsp. 4836). It has not, so far, shown a tendency to become naturalized.]

[*Acacia* sp. There have been transplanted to the hill just above Lover's Cove, several species of *Acacia* of evident Australian origin (Nuttall 101, 119, 672). They are growing and fruiting luxuriantly but have, so far, shown no tendency to reproduce on the island.]

[*Mucuna* sp. One of the old fishermen claims to have collected in 1915, "about a dozen sea beans" (Knopf 200) from "a bush growing at the base of a seaside hill in one of the bays of the island shore." He claims to have no positive remembrance of the exact spot, and that they might possibly have been from a vine climbing over the bush. Though he has attempted to guide Mr. Knopf to the locality, no specimen has, as yet, resulted.]

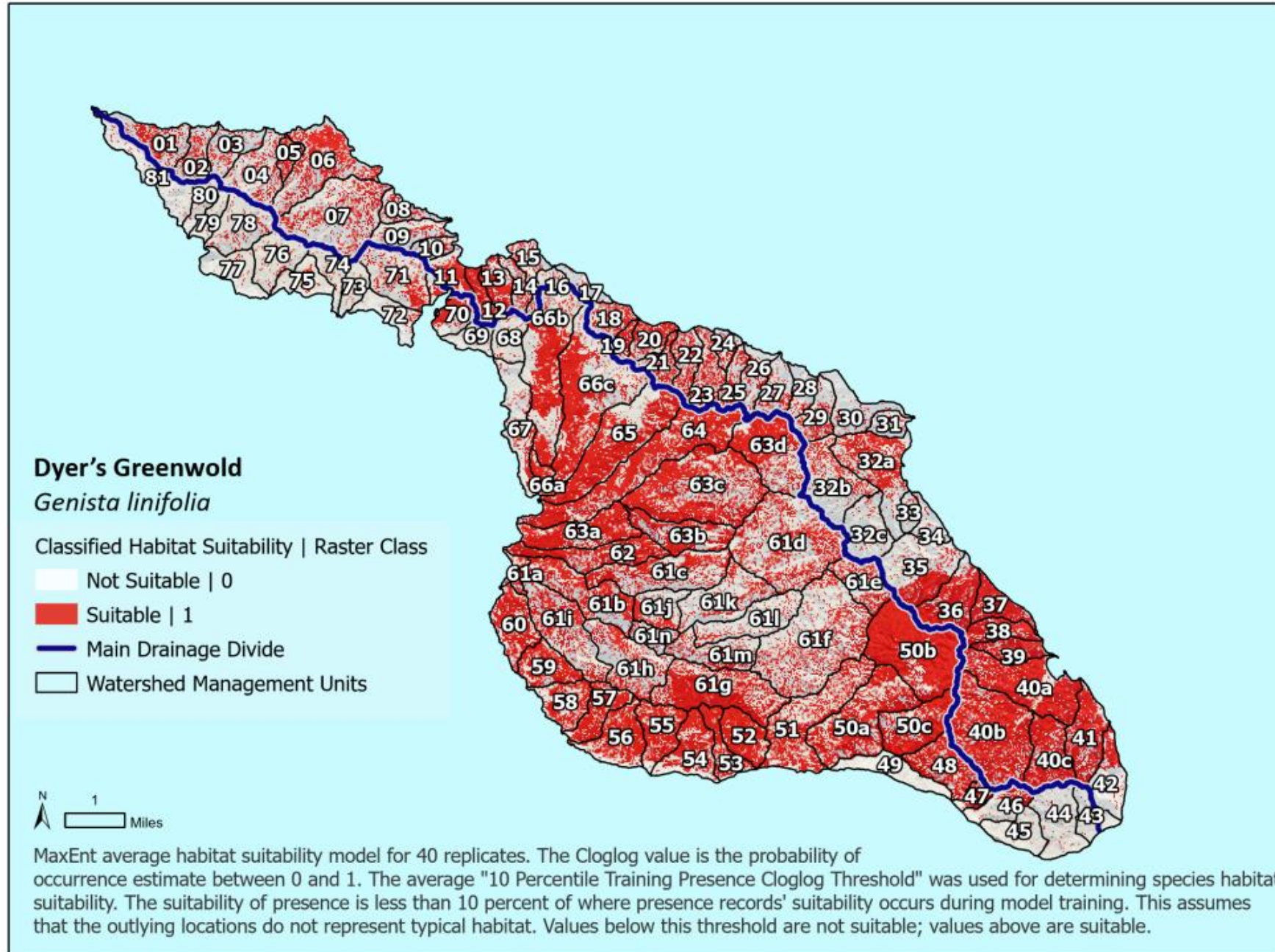
Order 10. GERANIALES.

Herbs, shrubs, trees or sometimes succulent or tender plants or woody vines with tissues with or without secreting glands or cells. Leaves various in position and form. Calyx and corolla regular or

Lesson Learned- Consequence of No EDRR



Modeled Suitable Habitat for Mediterranean Broom



Calflora, iNaturalist, & CCH2

 Calflora, a 501c3 non-profit Taxon Report

Genista linifolia L.
Mediterranean broom

Genista linifolia is a **shrub** that is **not native** to California.
There is a high risk of this plant becoming invasive in California according to Cal-IPC.



Plant Range

Observation Search
~1573 records in California

Plant Characteristics

one or more occurrences within a 7.5-minute quadrangle

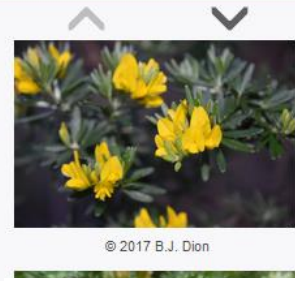
© 2024 Calflora



Bloom Period

Photos on Calflora

Genus: Genista
Family: Fabaceae
Category: angiosperm
PLANTS group: Dicot
Jepson eFlora section: eudicot



Search Criteria and Options

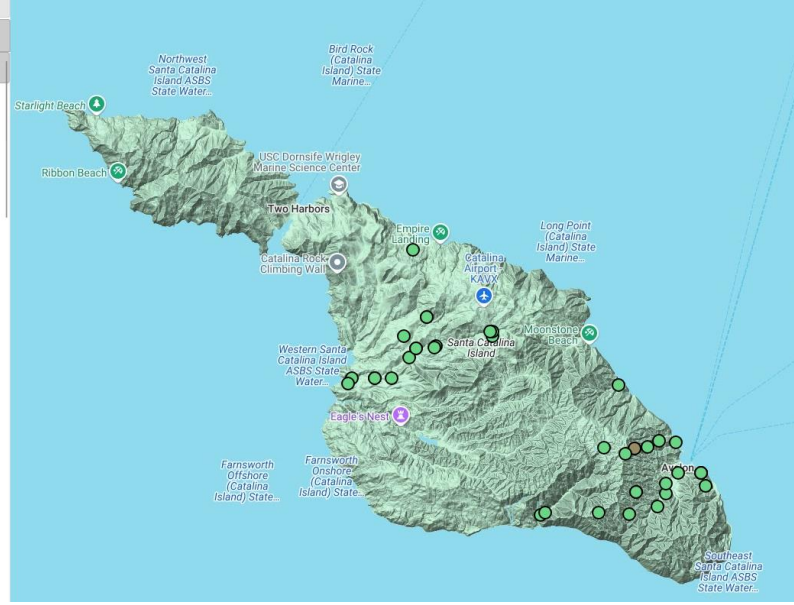
Records and Taxa

Records Collections Taxa List

Download KML

1
Page 1, records 1-45 of 45

Catalog Number	Collector	Date	Scientific Name	Map Link
	R. C. Templeton 7671	1955-08-20	Cytisus linifolius	See map point
	R. F. Thorne 33277	1964-02-06	Cytisus linifolius	See map point
	R. F. Thorne 36240	1966-04-28	Cytisus linifolius	See map point
CSLA001243	James Henrickson 8127	1973-01-00	Cytisus linifolius	See map point
CSLA001244	James Henrickson 8127	1973-01-00	Cytisus linifolius	See map point
86096	Henry M. Pollard	1952-04-05	Genista linifolia	See map point
	Ruth F. Eaton s.n.	1956-08-02	Genista linifolia	See map point
38928	M. A. Piehl 62514	1962-10-03	Genista linifolia	See map point



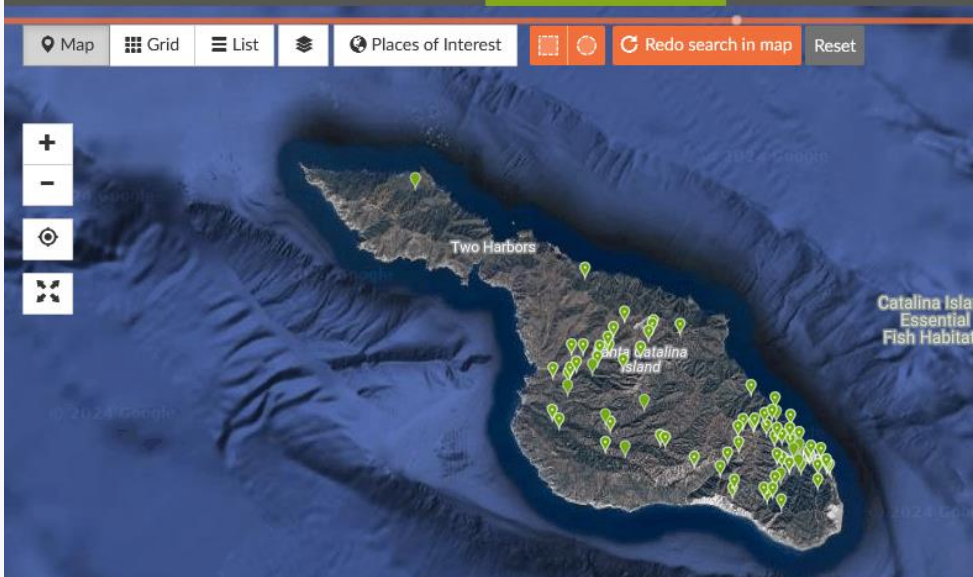
Observations

Needle-leaved Broom Location Go Filters

Custom Boundary

246 OBSERVATIONS 1 SPECIES 30 IDENTIFIERS 105 OBSERVERS

Map Grid List Places of Interest Redo search in map Reset



Two Harbors Catalina Island Essential Fish Habitat

- Needle-leaved Broom (Genista linifolia) Avalon, CA 90704, ... • Oct 6, 2024 Research Grade 2 3d
- Needle-leaved Broom (Genista linifolia) Santa Catalina Isl... • Sep 28, 2024 1 10d
- Needle-leaved Broom (Genista linifolia) Santa Catalina Isl... • Sep 28, 2024 Research Grade 2 11d
- Needle-leaved Broom (Genista linifolia) Avalon, CA 90704, ... • Sep 28, 2024 1 11d
- Needle-leaved Broom (Genista linifolia)

Map Legend

Name Status: Accepted by JEF + PLANTS

Alternate Names: JEF + PLANTS Cytisus linifolius PLANTS Teline linifolia

Natural Resource Conservation Service(NRCS) Environmental Quality Incentives Program (EQIP) Grant



0 1 2 4 6 8 Miles

Earthstar Geographics

- Covers 2023-2025
- 8 treatment “fields” containing 19 polygons across 621 acres
- Primary treatments conducted by the California Institute of Environmental Studies (CIES) from March through June
- Primary target species:
 - Mediterranean Broom (*Genista linifolia*)-GELI
 - Fennel (*Foeniculum vulgare*)-FOVU
 - Harding Grass (*Phalaris aquatica*)-PHAQ
 - Artichoke thistle (*Cynara cardunculus*)-CYCA
 - Milk Thistle (*Silybum marianum*)-SIMA

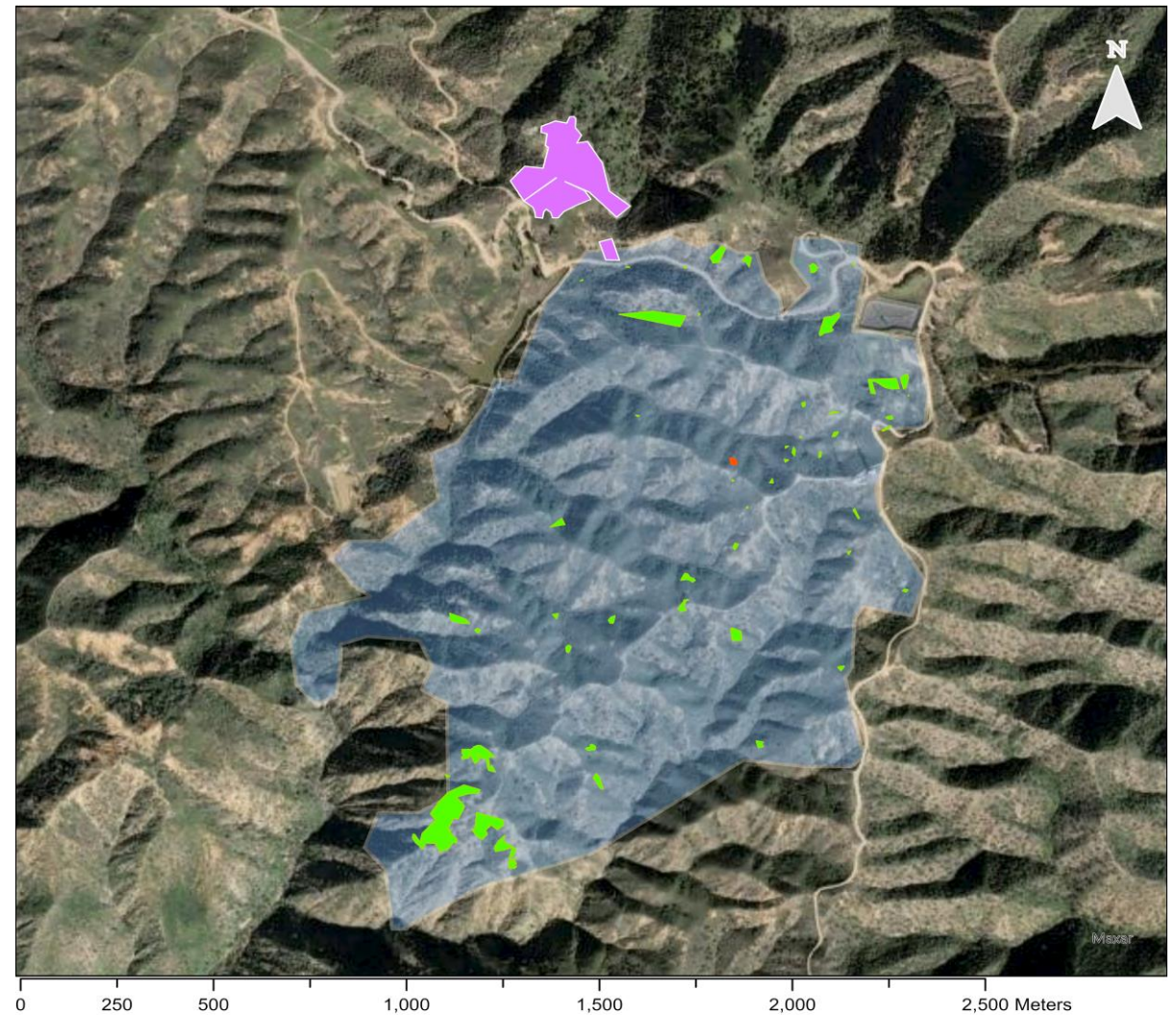


CALIFORNIA INSTITUTE
OF ENVIRONMENTAL STUDIES

Haypress

Field 28 and 32

<u>Species</u>	<u>Species Count</u>	<u>Treatment Area (Acres)</u>
<i>Genista linifolia</i>	9718	5.9
<i>Genista monspessulana</i>	56	0.02
<i>Phalaris aquatica</i>	7194	8.0



Haypress Treatment Totals

Species

- *Genista linifolia* (flax-leaved broom)
- *Genista monspessulana* (French broom)
- *Phalaris aquatica* (hardinggrass)
- Haypress NRCS Area

Haypress *Genista* Treatment

Cut-stump-50% triclopyr

Before



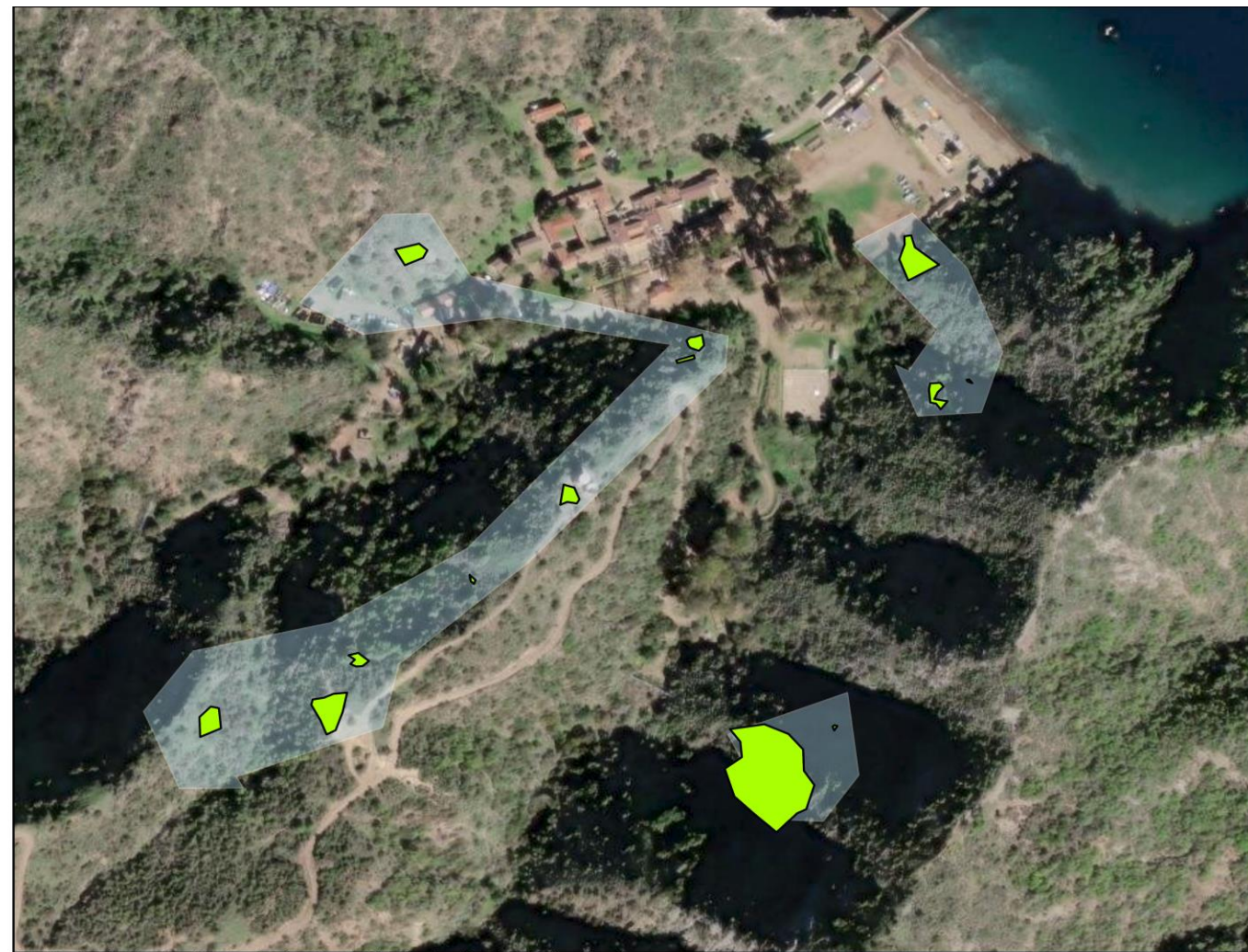
After



Toyon Bay

Field 31

<u>Species</u>	<u>Species Count</u>	<u>Treatment Area (Acres)</u>
<i>Genista linifolia</i>	4393	1.3



0 50 100 200 300 400 500 Meters

Genista linifolia
(flax-leaved
broom)

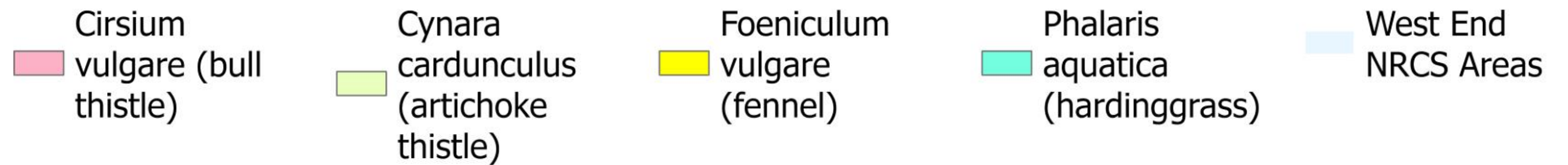
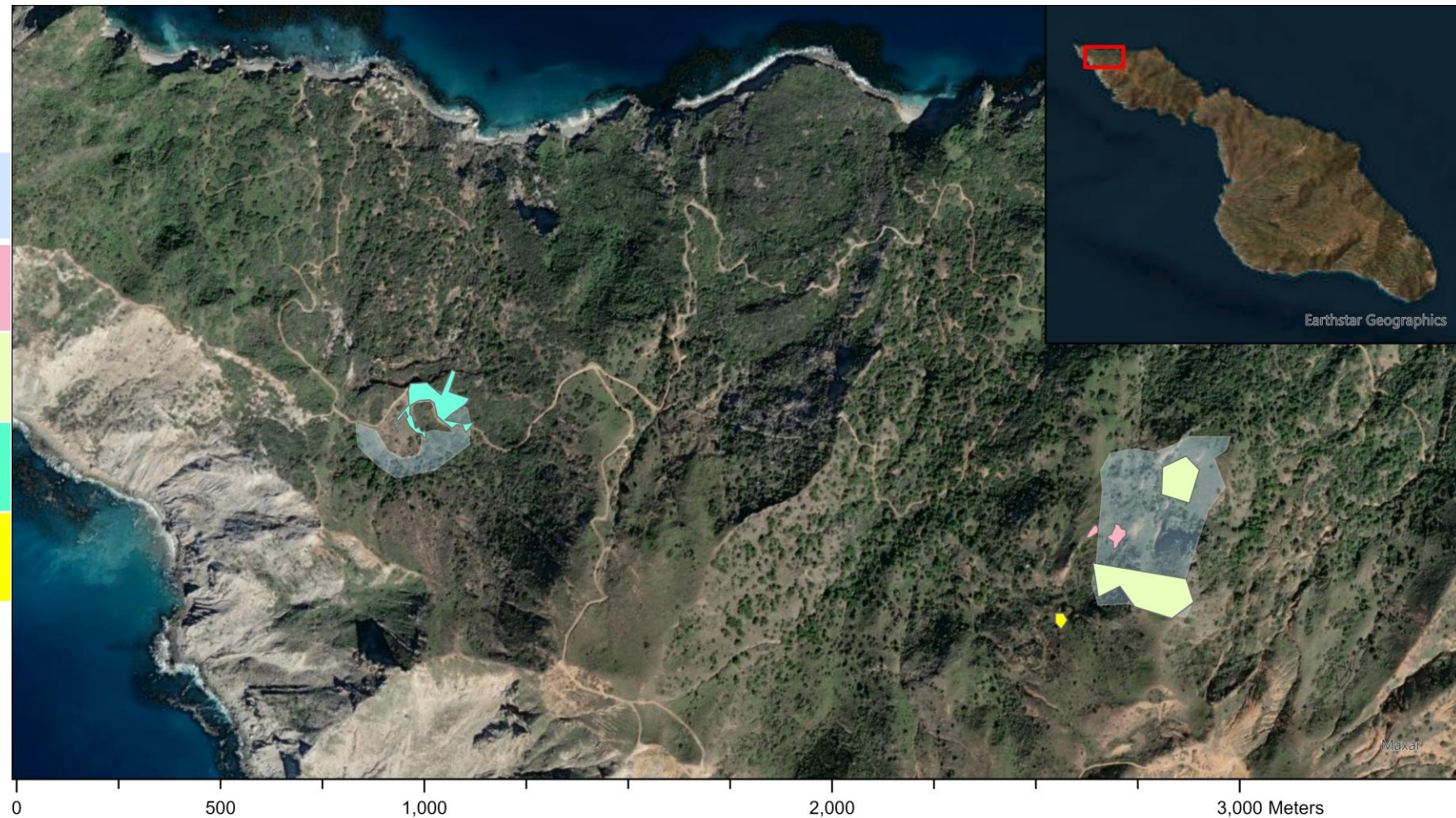
Toyon Bay NRCS
Area



West End

Field 2

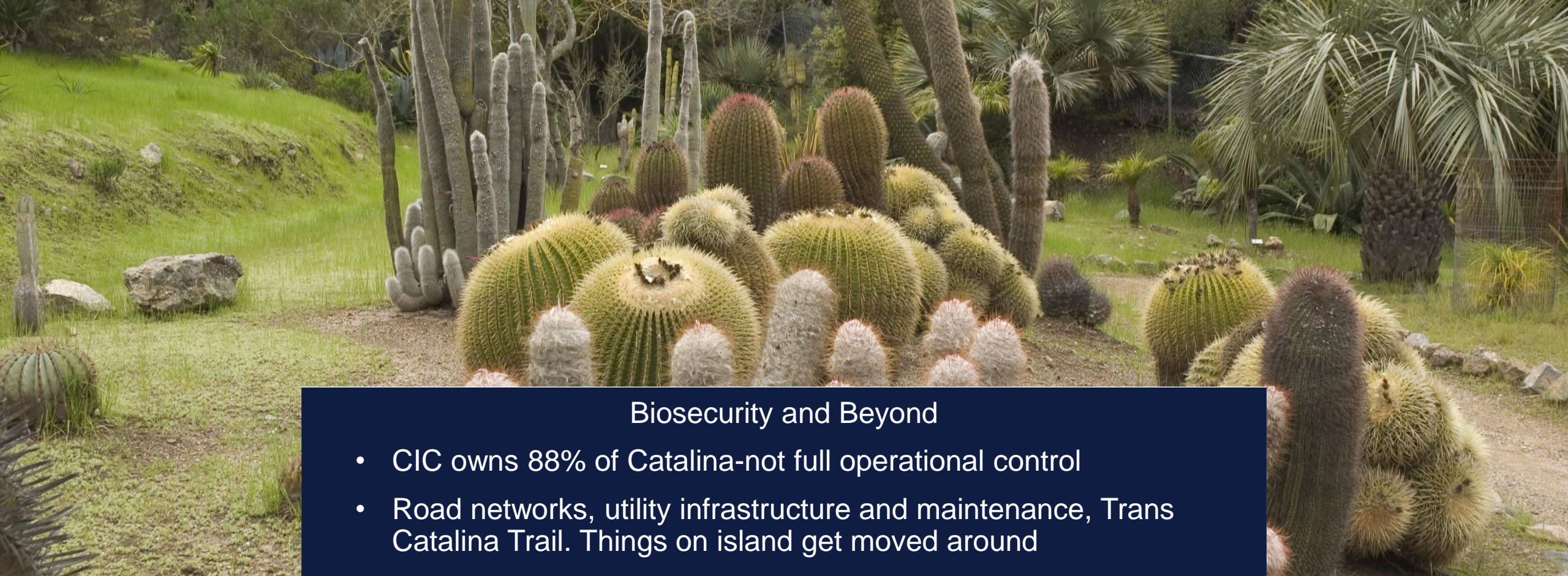
<u>Species</u>	<u>Species Count</u>	<u>Treatment Area (Acres)</u>
<i>Cirsium vulgare</i>	534	0.5
<i>Cyanara cardunculus</i>	227	6.6
<i>Phalaris aquatica</i>	305	2.4
<i>Foeniculum vulgare</i>	169	0.2



West End

- Artichoke thistle present in natural areas in one population on the far West End of Catalina
 - 0.3% Aminopyralid





Biosecurity and Beyond

- CIC owns 88% of Catalina-not full operational control
- Road networks, utility infrastructure and maintenance, Trans Catalina Trail. Things on island get moved around
- Avalon-landscaping, new introductions, weeds hiding in plain sight. Two Harbors in the same vein but to as extreme a magnitude
- Coves and camps along channel side of island

Lessons Learned

1. All of the above approach
 - Staff, contractors, partners, volunteers
 - No one size fits all approach
2. EDRR absolutely imperative
 - Effective program is easier said than done
 - Training and informational materials critical
3. Be realistic and strategic
 - Dedicate as much resource as possible to surveying and EDRR
 - Problematic weeds on mainland SoCal that have not made it to Catalina, and problematic weeds that have yet to make it beyond Avalon
4. Losing a season or more of treatment is very problematic
 - No treatment in 2020
5. Work with and utilize collective wisdom of the wider community of invasive plant management practitioners
 - Cal-IPC, Weed Management Areas, Islands of the California Botanical Collaborative, California Native Plant Society, Santa Barbara Botanic Garden, California Botanic Garden



Past, Present, & Future of Catalina Invasive Plant Management

- Solid foundation-CHIRP IPP and EDRR continues
- Landscape level habitat restoration following species management-Catalina Island Restoration Project





Catalina Island Restoration Project



**Habitat Restoration
and Enhancement Plan**



**Plant Restoration
and Seed Farm
Development**



**Species
Management**



Come Out and Visit!

- Volunteer Opportunities
- Nice, accessible place to visit and recreate
- **Please report sightings to Calflora and iNaturalist!**
- **Clean your boots and check your gear for seeds!**
- Avalon is great, but there is a whole island out there





CATALINA ISLAND
CONSERVANCY™

Thank You

Questions?

akreisberg@catalinaconservancy.org