

Digital Imaging of Plant Photographic Resources San Diego Natural History Museum



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Curator of Botany
San Diego
Natural History Museum

www.sdnhm.org/research/botany



Biodiversity Research Center of the Californias (BRCC)

Departments

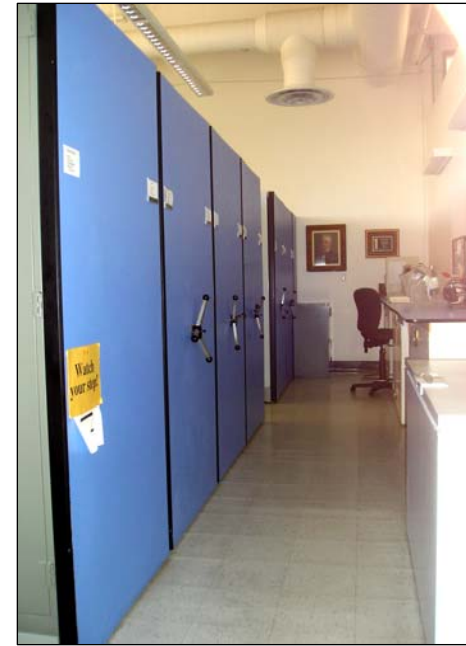
- Botany
- Birds & Mammals
- Collections Care
- Entomology
- Herpetology
- Marine Invertebrates
- Mineralogy
- Paleontology



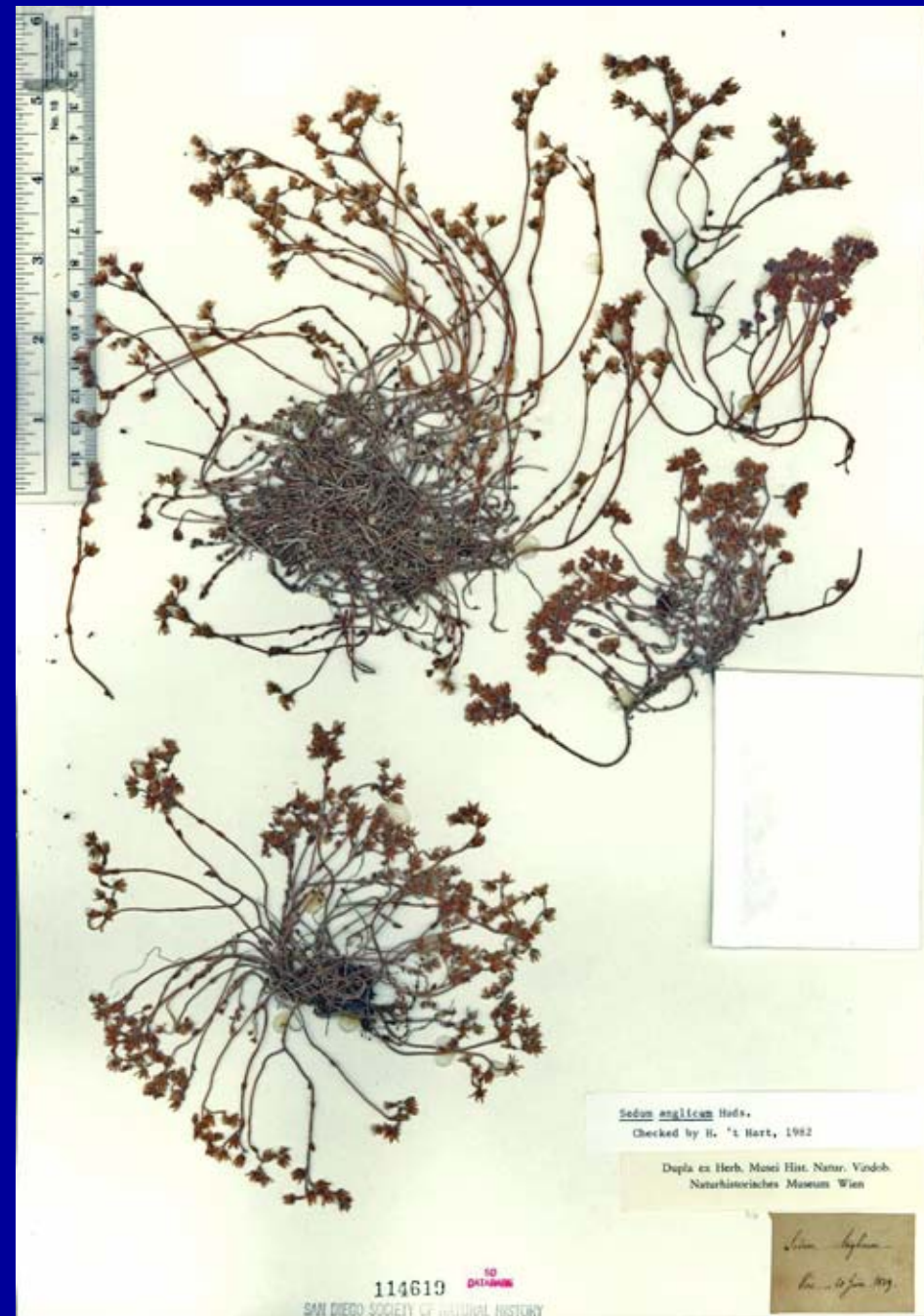
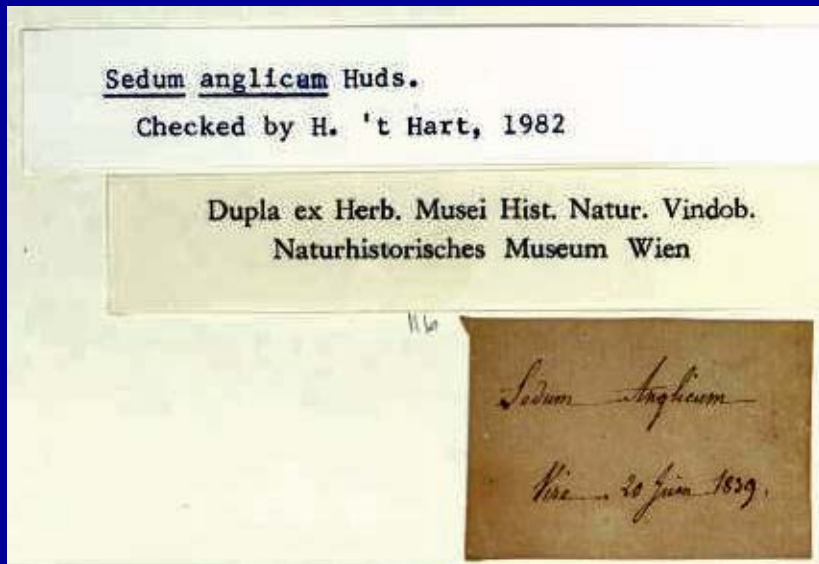
Approx. 8.5 million scientific collections

SD Herbarium

- **Approx. 181,000 accessioned specimens**
- **Estimated holdings include over 70,000 vascular plants from CA (35,000 in San Diego Co.) and 50,000 from Mexico (mostly Lower CA)**
- **Many specimens date to 1870's**
- **~5,000 algae, 1,000 lichens, 100 fungi, 100 bryophytes**
- **385 types & searchable online**
- **72% of collection is databased**



**Oldest SD Herbarium
specimen is
Sedum anglicum
(Crassulaceae)
20 June 1839**





Checklist of the Vascular Plants of San Diego County



- 🌱 By Jon Rebman & Michael Simpson
- 🌱 New Edition published in Spring 2006
- 🌱 Includes recent name changes
- 🌱 Documents 126 new county records
- 🌱 Now searchable online at sdplantatlas.org
- 🌱 Available in our Museum Store

	<i>Total</i>	<i>Native</i>	<i>Non-Native</i>
Species	2,143	1,573 (73%)	570 (27%)
Genera	2,314	1,735 (75%)	579 (25%)

Up 8% from the 2001 Checklist

New pdf additions (94) & changes available online

Floristic Checklist of San Diego County is based only upon vouchers and all are available online as a virtual collection



Biodiversity Research Center of the Californias

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Checklist of the Vascular Plants of San Diego County Documented with Herbarium Vouchers

ANGIOSPERMS: EUDICOTS

AMARANTHACEAE - Amaranth Family [INCL. CHENOPODIACEAE]

Allenrolfea occidentalis (S. Watson) Kuntze {SD 138900}

IODINE BUSH

Aphanisma blitoides Moq. {SD 112588}
1B 2-2-2 FSC

APHANISMA

**Amaranthus albus* L. {SD 124472}

WHITE TUMBLEWEED

Amaranthus blitoides S. Watson {SD 54847}

PROSTRATE AMARANTH

*!*Amaranthus blitum* L. {SD 153130}

PURPLE AMARANTH

Amaranthus californicus (Moq.) S. Watson {SD 106652}

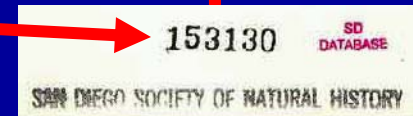
CALIFORNIA AMARANTH

**Amaranthus deflexus* L. {SD 112937}

LOW AMARANTH

Amaranthus fimbriatus (Torrey) Benth. {SD 118896}

FRINGE AMARANTH



SD Herbarium

- Major taxonomic collections of succulent taxa in the Crassulaceae and Cactaceae
- Crassulaceae: 2643 specimens, 74 types, 760 photos
- Cactaceae: 2400 specimens, 40 types, 2830 photos



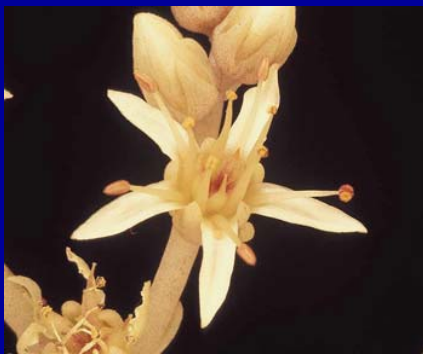
Dudleya pachyphytum



Cochemia maritima



Crassulaceae



*Dudleya
edulis*





Cactaceae

Echinocereus lindsayi



San Diego Natural History Museum
 Note: flower was preserved in alcohol,
 and was from a different individual
 -Determined by in the same population.

San Diego Natural History Museum
 Plants of Baja California, Mexico

Echinocereus lindsayi Meyran
 Chromosome voucher; (n=11) by J. Rebman. Note: this individual
 had root rot and was almost dead.

South of Cataviña, Mesa el Gato, 29°35'N, 114°35'W. Elev. ca.
 900 m. Volcanic substrate with *Viguiera purissima*, *Ambrosia*,
camphorata, and *Yucca whipplei*.

Ezequiel Ezcurra
 1 May 1999

143383
 SD DATA BASE
 SAN DIEGO SOCIETY OF NATURAL HISTORY

[Introduction](#)

[Baja Flora](#)

This web site is under development. Items will be added as funds allow.



Fouquieria columnaris

The Flora of Baja California

Sponsored by:
San Diego
Natural History Museum

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Botany Department
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Baeriopsis guadalupensis

The Botany Dept. of the San Diego Natural History Museum has a collection of over 40,000 35mm slides of the plants of Baja California, some in their native habitat, and others cultivated. A project to digitize these slides is underway, funded by the Longino family of Tucson Arizona. This web site includes the first draft version of the public presentation of these photographs. At this date, seven thousand photographs are available at this

Online Access to Baja California Plant Photos



Cylindropuntia cholla
Photo #: P04255
Photo by: Jon Rebman
Date: 17 May 1992
Where: Todos Santos
[View Photo](#)



Cylindropuntia cholla
Photo #: P04256
Photo by: Jon Rebman
Date: 17 May 1992
Where: La Matanza, West of
[View Photo](#)



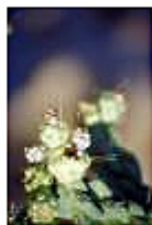
Cylindropuntia cholla
Photo #: P04258
Photo by: Jon Rebman
Date: 15 Apr 1992
Where: San Quintin, near
[View Photo](#)



Cylindropuntia cholla
Photo #: P04259
Photo by: Norman Roberts
Date: 15 Nov 1988
Where: Borrego
[View Photo](#)



Cylindropuntia cholla
Photo #: P04260
Photo by: Jon Rebman
Date: 15 Jun 1996
Where:
[View Photo](#)



Cylindropuntia cholla
Photo #: P04261
Photo by: Jon Rebman
Date: 15 Oct 1995
Where:
[View Photo](#)



Cylindropuntia cholla
Photo #: P04262
Photo by: Jon Rebman
Date:
Where:
[View Photo](#)



Cylindropuntia cholla
Photo #: P04263
Photo by: Jon Rebman
Date: 15 Jun 1997
Where: La Purissima
[View Photo](#)



Cylindropuntia cholla
Photo #: P04264
Photo by: George Lindsay
Date: 23 May 1961
Where: Bahia Concepcion,
Coyote Bay
[View Photo](#)



Cylindropuntia cholla
Photo #: P04265
Photo by: George Lindsay
Date: 23 May 1961
Where: Bahia Concepcion,
Coyote Bay
[View Photo](#)

*Photos include thumbnails and full size images

*Database includes locality, photographer, content, date of photo, and cross-references to collected herbarium specimens



Ipomopsis tenuifolia

**12,076 slides have been scanned
& are available online**

22,000 left to scan

3,700 2x2 positives left

Moran's 1,300 large negatives left



Gilia capitata

Digital Scans of Baja California Synoptic Collection

*Includes all specimen data for voucher in Checklist

*Scans can be enlarged to see small details and ruler for scale

SDNHM Number: 141541

Pteridaceae *Cheilanthes bonariensis*

Collector: Jon Rebman

Number: 4699 **Date:** Oct 29, 1997

Phenology: Flower

Latitude: 26.8978° **Longitude:** -112.436°

Elevation (meters): 1300

Location: Sierra Guadalupe: West of Mulege: Cumbra de San Pedro: Between the Ex-Misión de Guadalupe and San Juan de las Pilas

Habitat: Fouquieria splendens, Nolina beltingii, Prosopis sp., volcanic substrates



Click the picture to enlarge it.
The picture will open in a new window.
Further enlargement can be done in that window.
Close the window to return to this page.
Image © San Diego Natural History Museum.

SDNHM Number: 94584

Pteridaceae *Cheilanthes brandegeei*

Collector: Ira L. Wiggins

Number: 176 **Date:** Feb 09, 1962

Phenology: Vegetative

Latitude: 29.3667° **Longitude:** -114.817°



Click the picture to enlarge it.
The picture will open in a new window.
Further enlargement can be done in that window.
Close the window to return to this page.
Image © San Diego Natural History Museum.

Digital Scans of Baja California Cacti

SDNHM Number: 143330

Cactaceae *Opuntia lagunae*

Collector: Jon Rebman

Number: 5874 **Date:** Oct 29, 1998

Phenology: Fruit

Latitude: 23.5506° **Longitude:** -109.983°

Elevation (meters): 1200

Location: Sierra de la Laguna: NE of Todos Santos: vicinity of Valle La Laguna at top of the Sierra; NE of Cañon La Burrera and Rancho Corral Grande

Habitat:



Click the picture to enlarge it. The picture will open in a new window. Further enlargement can be done in that window. Close the window to return to this page. Image © San Diego Natural History Museum

SDNHM Number: 143357

Cactaceae *Opuntia littoralis*

Collector: Jon Rebman

Number: 5340 **Date:** Jun 09, 1998

Phenology: Flower

Latitude: 31.5364° **Longitude:** -116.662°

Elevation (meters): 50

Location: Puerto Santo Tomás: south of Ensenada and west of Hwy. 1, at the ocean



Click the picture to enlarge it. The picture will open in a new window. Further enlargement can be done in that window. Close the window to return to this page. Image © San Diego Natural History Museum

Plant Distribution Mapping for Lower California

- *Based only on databased & georeferenced specimens at SD (more than 20,000 specimens, but many more not yet available)
- *Multiple species maps on current vegetation types

Genus: Genus:
Specific Epithet: + Specific Epithet:
Infraname: Infraname:

[Quick Map \(below\)](#)

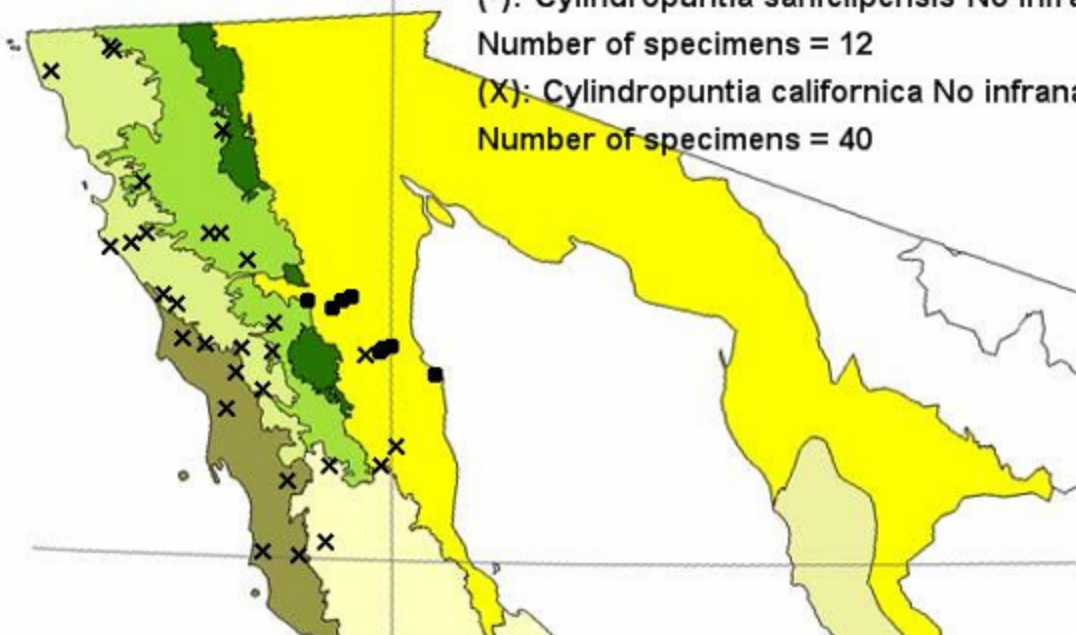
[Berkeley Mapper](#)

(•): *Cylindropuntia sanfelipensis* No infraname.

Number of specimens = 12

(X): *Cylindropuntia californica* No infraname.

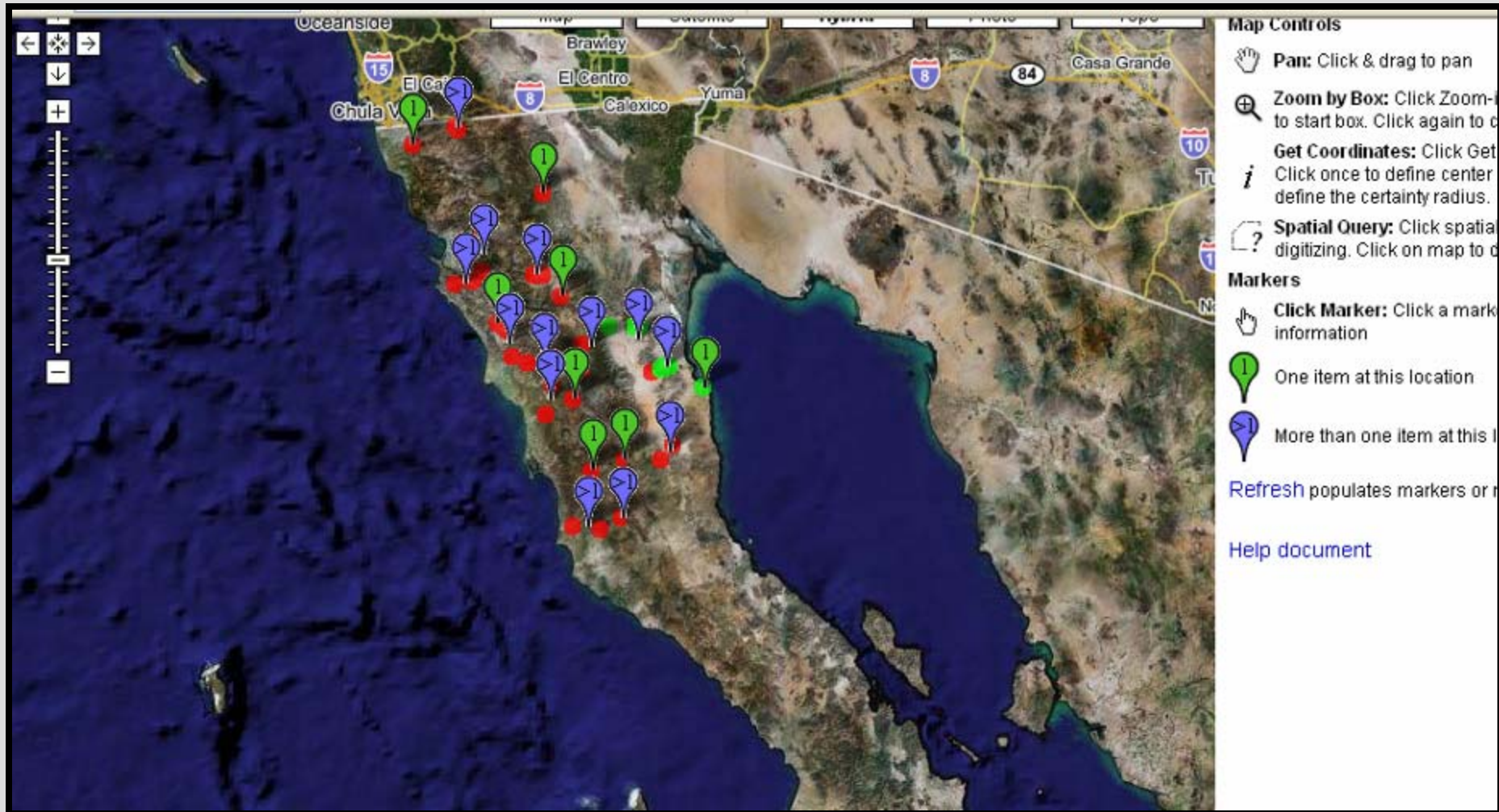
Number of specimens = 40

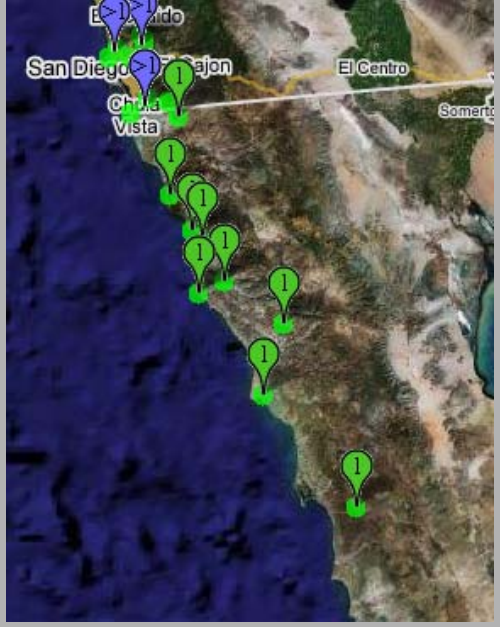
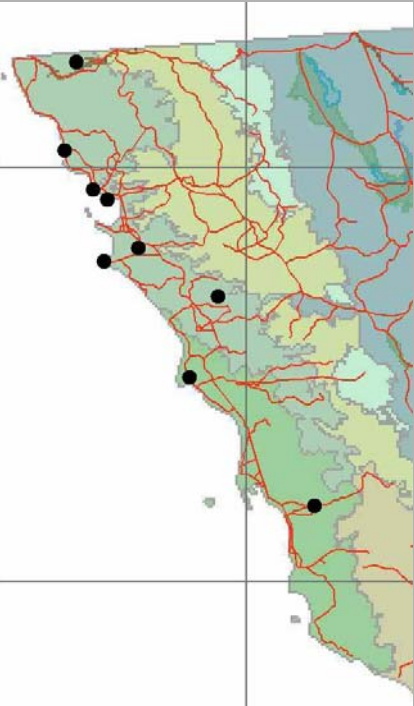


- Otros
- Californian Pacific Islands/ Islas Californianas del Pacifico
- Cape Lowlands/ Matorrales Tropicales y Selvas Bajas del Cabo
- Central Desert/ Desierto Central de Baja California
- Chaparral
- Coastal Sage Matorral/ Matorral Costero
- Gulf Coast/ Costa Central del Golfo
- La Giganta Ranges/Sierra de la Giganta
- Lower Colorado Valley/ Cuenca Inferior del Rio Colorado
- Magdalena Plains/Planicies de Magdalena
- Sierra de la Laguna
- Sierras de Juarez and San Pedro Martir/ Sierras de Juarez y San Pedro
- Succulent Coastal Matorral/ Matorral Costero Rosetofilo
- Vizcaino Desert/ Desierto de El Vizcaino

Plant Distributions with Interactive Mapping

- *Berkeley Mapper system and our herbarium specimen data
- *Multiple base maps and scales





Ferocactus viridescens

A satellite map showing a collection site. A popup window displays the following data:

Feature	
Location	
Date	Jan 21, 1994
Collector	Jon P. Rebman
Genus	Ferocactus
Species	viridescens
SD_Num	SD138307
Phen	fl
Plant	1
Coll_Num	2098





Click on map for

Latitude:

Longitude:

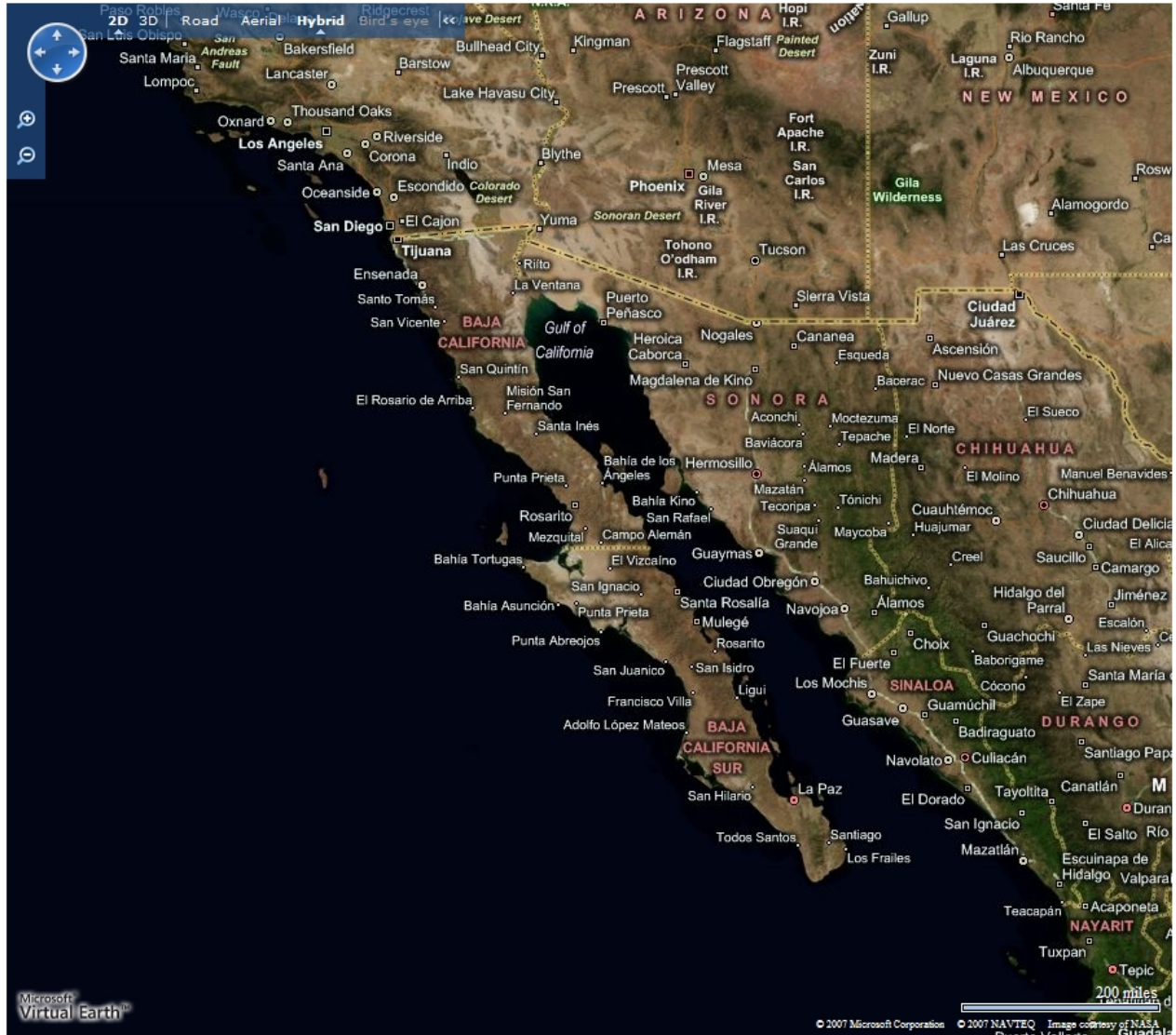
Cape Region

Mark the Selected Region

Clear the Map

Select a region from the drop-down list. Click the Mark the Selected Region button. Mouse over the icons to see regional photos.

This web page is under development, and presented for review. It will continue to grow. Cape Region, Sierra Juárez, and Cedros Island photo locations and captions are fictional. Guadalupe Island photo locations are correct but the location of the island on the Virtual Earth map is in error. Other selected regions will produce a primary icon that will link to the photo collection but will not place individual photo icons on the map. Some listed photos are not yet scanned.



Regional & Landscape Photos from Lower California



Click on map for

Latitude:

Longitude:

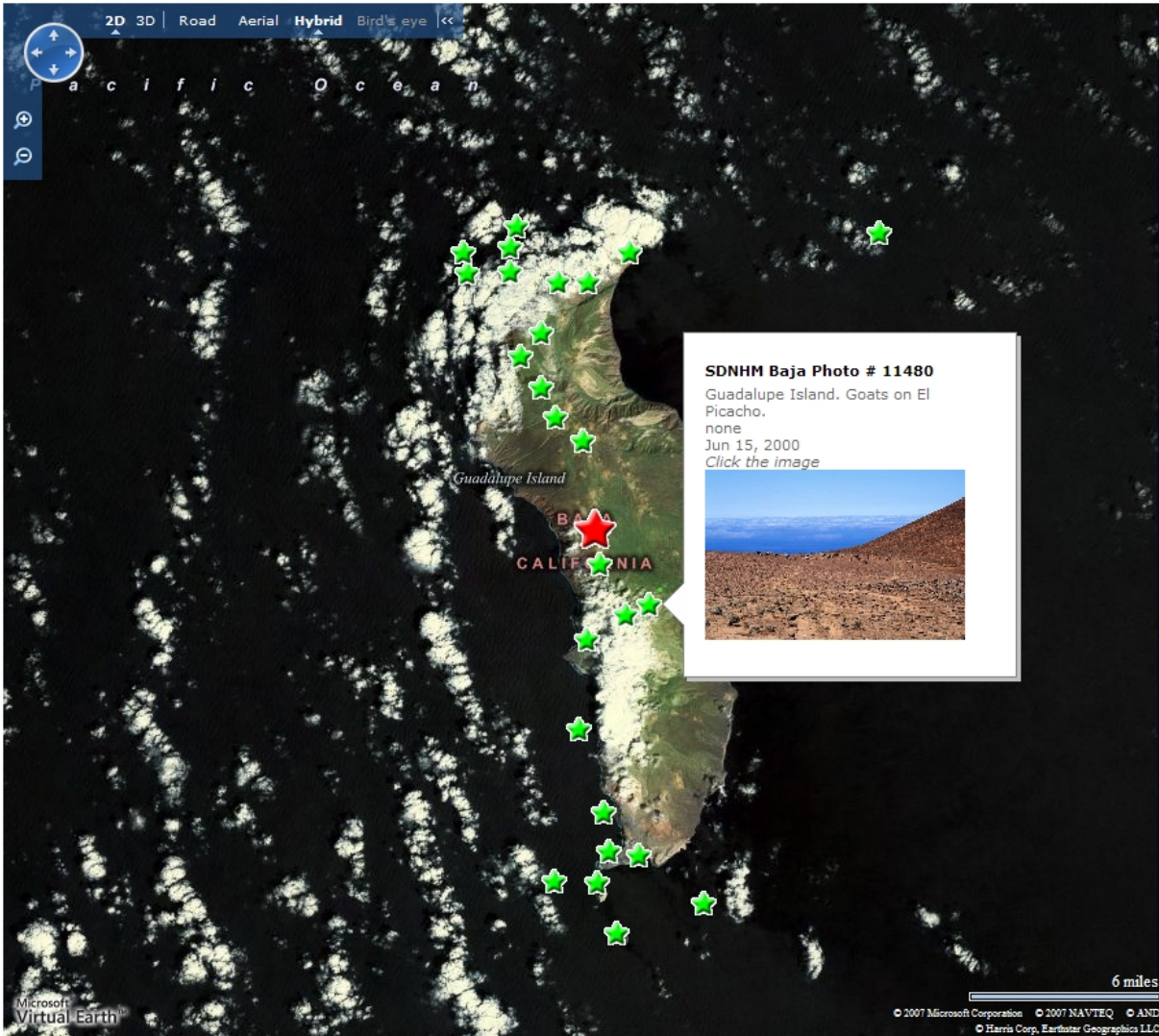
Guadalupe Island

Mark the Selected Region

Clear the Map

Select a region from the drop-down list. Click the Mark the Selected Region button. Mouse over the icons to see regional photos.

This web page is under development, and presented for review. It will continue to grow. Cape Region, Sierra Juárez, and Cedros Island photo locations and captions are fictional. Guadalupe Island photo locations are correct but the location of the island on the Virtual Earth map is in error. Other selected regions will produce a primary icon that will link to the photo collection but will not place individual photo icons on the map. Some listed photos are not yet scanned.



Region selection

Georeferenced pics

Icon placement

Mouseover thumbnails

Enlarged pics

Red icon for all images



Click on map for

Latitude: 32.10701°

Longitude: -115.811°

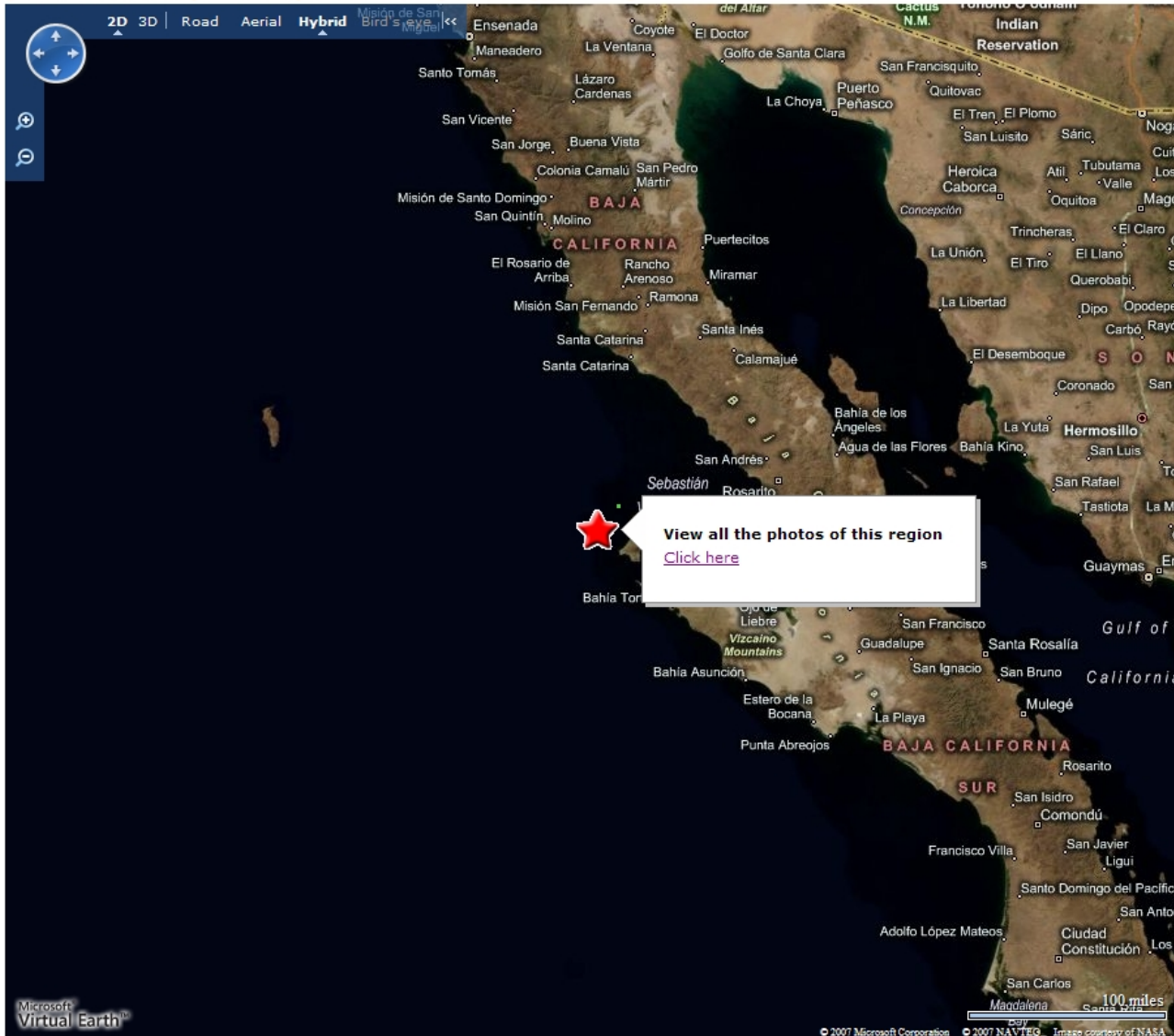
San Benito Islands

Mark the Selected Region

Clear the Map

Select a region from the drop-down list. Click the Mark the Selected Region button. Mouse over the icons to see regional photos.

This web page is under development, and presented for review. It will continue to grow. Cape Region, Sierra Juárez, and Cedros Island photo locations and captions are fictional. Guadalupe Island photo locations are correct but the location of the island on the Virtual Earth map is in error. Other selected regions will produce a primary icon that will link to the photo collection but will not place individual photo icons on the map. Some listed photos are not yet scanned.



Red Icon Image Lists

[Baja Flora Home](#)

SDNHM Photographic Collection — Regions of Baja California Photos from the region of San Benito Islands

All photographs Copyright 2008 San Diego Natural History Museum



Photo #: 11376 (P10925)
Photo by: Reid Moran
Date: NoDate
Where: n/a
Latitude: ?, Longitude: ?
Caption: none



Photo #: 11377 (P10926)
Photo by: Reid Moran
Date: NoDate
Where: n/a
Latitude: ?, Longitude: ?
Caption: none



Photo #: 11454 (P11003)
Photo by: George Lindsay
Date: Feb 15, 1978
Where: West San Benito Island
Latitude: ?, Longitude: ?
Caption: none



Photo #: 11455 (P11004)
Photo by: George Lindsay
Date: Feb 15, 1978
Where: West San Benito Island
Latitude: ?, Longitude: ?
Caption: none



Photo #: 11456 (P11005)
Photo by: George Lindsay
Date: Feb 15, 1978
Where: West San Benito Island.
Elephant seal.
Latitude: ?, Longitude: ?
Caption: none



Photo #: 11457 (P11006)
Photo by: George Lindsay
Date: Feb 15, 1978
Where: West San Benito Island.
Elephant seal.
Latitude: ?, Longitude: ?
Caption: none



Photo #: 11458 (P11007)
Photo by: George Lindsay
Date: Feb 15, 1978
Where: West San Benito Island
Latitude: ?, Longitude: ?
Caption: none



Photo #: 11459 (P11008)
Photo by: George Lindsay
Date: Feb 15, 1978
Where: San Benito Island
Latitude: ?, Longitude: ?
Caption: none



Photo #: 11460 (P11009)
Photo by: Reid Moran
Date: Mar 25, 1974
Where: West San Benito Island
Latitude: ?, Longitude: ?
Caption: none

[No Photo](#)

Photo #: 11764 (P11304)
Photo by: Reid Moran
Date: Apr 18, 1948
Where: West San Benito Island
Latitude: ?, Longitude: ?
Caption: none



San Diego County Plant Atlas Project

[Introduction](#)

[Project News](#)

[Public Resources](#)

[Website Tools](#)

[Parabotanist's Resources](#)

[Forms](#)

[Parabotanist's FAQ](#)

[Plant Name Finder](#)

[TopoZone to Atlas Square](#)

[SD Wildflower Identification](#)



*This project is sponsored by the
San Diego Natural History Museum,
Department of Botany
Jon Rebman, Ph.D., Curator of Botany
Mary Ann Hawke, Ph.D., Project Director
Jeannie Gregory, Parabotanist Manager*



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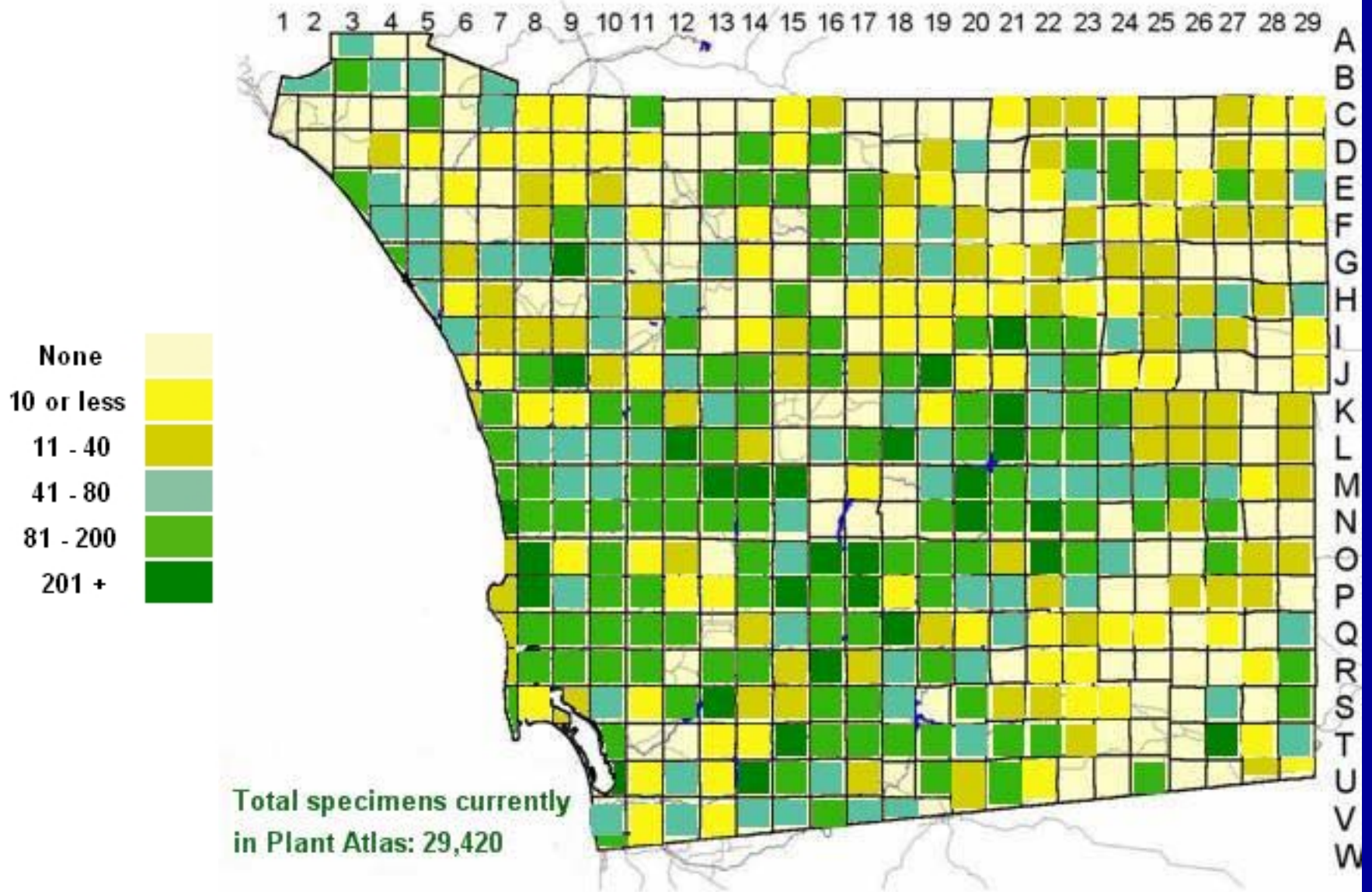
Wildflower photographs courtesy of [Ken Bowles](#)

[Parabotanist Log In](#)

San Diego County Plant Atlas

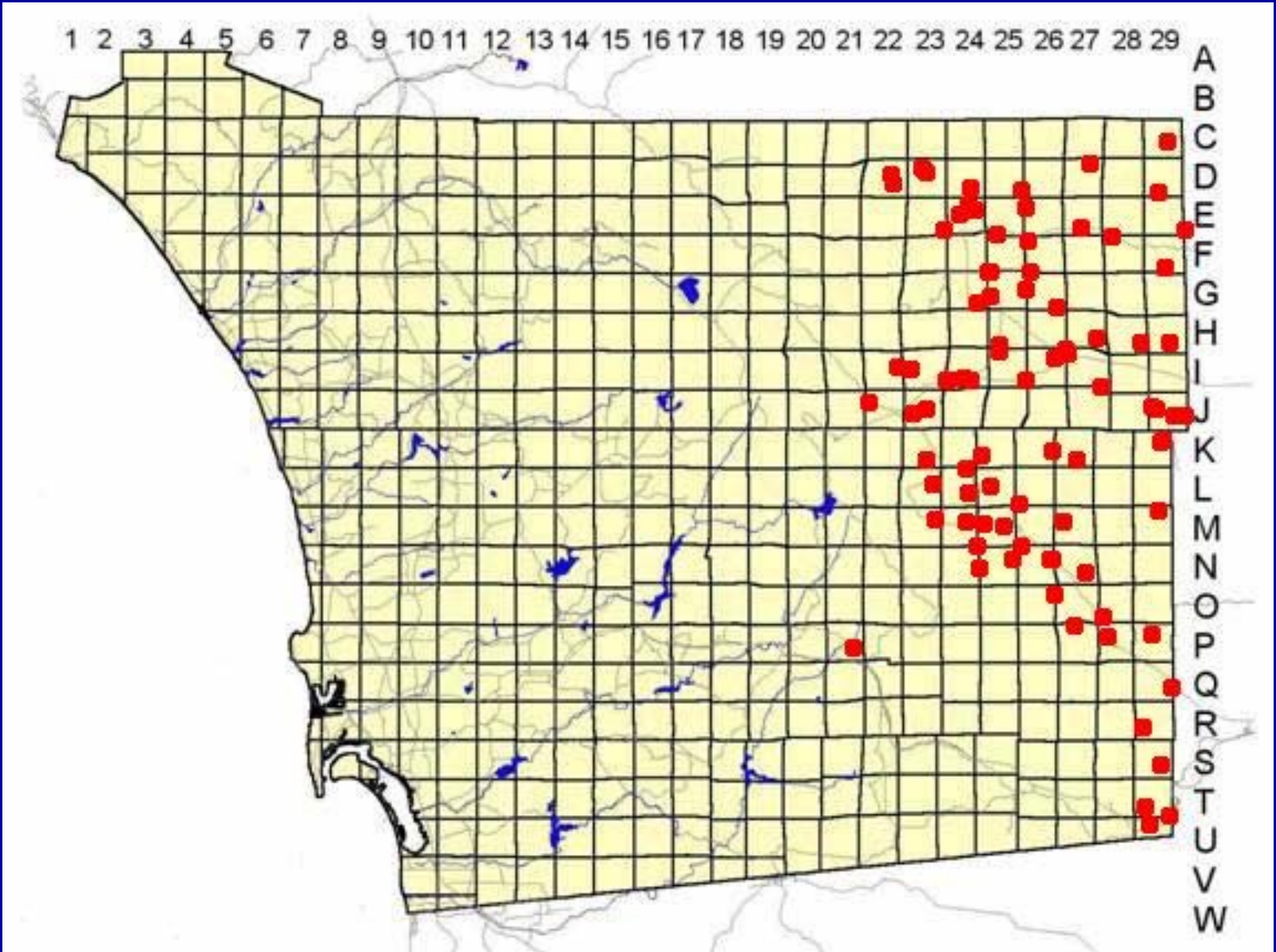
Success to Date:

- 🌱 New website, internet resources, and online database searches; plus mapping
- 🌱 Database has over 30,187 entries based on voucher specimens only
- 🌱 Verified ~ 27,780 specimens
- 🌱 Discovered over 200 new County records (8% increase in the flora) & 1 new taxon
- 🌱 Taught 35 training classes
- 🌱 Trained over 600 parobotanists
- 🌱 Secured various financial grants & contracts



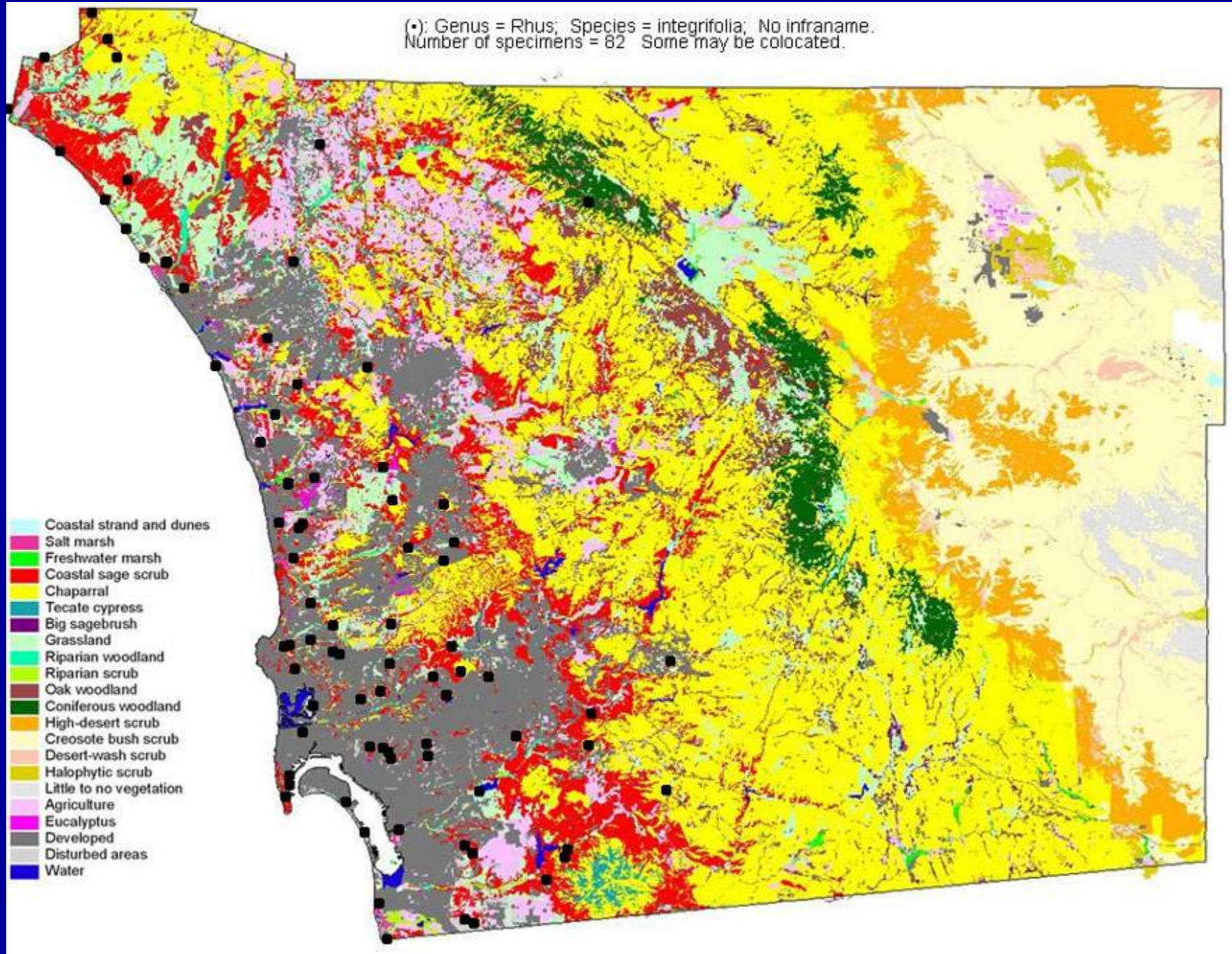
Progress and coverage of Plant Atlas collections

Distribution Data

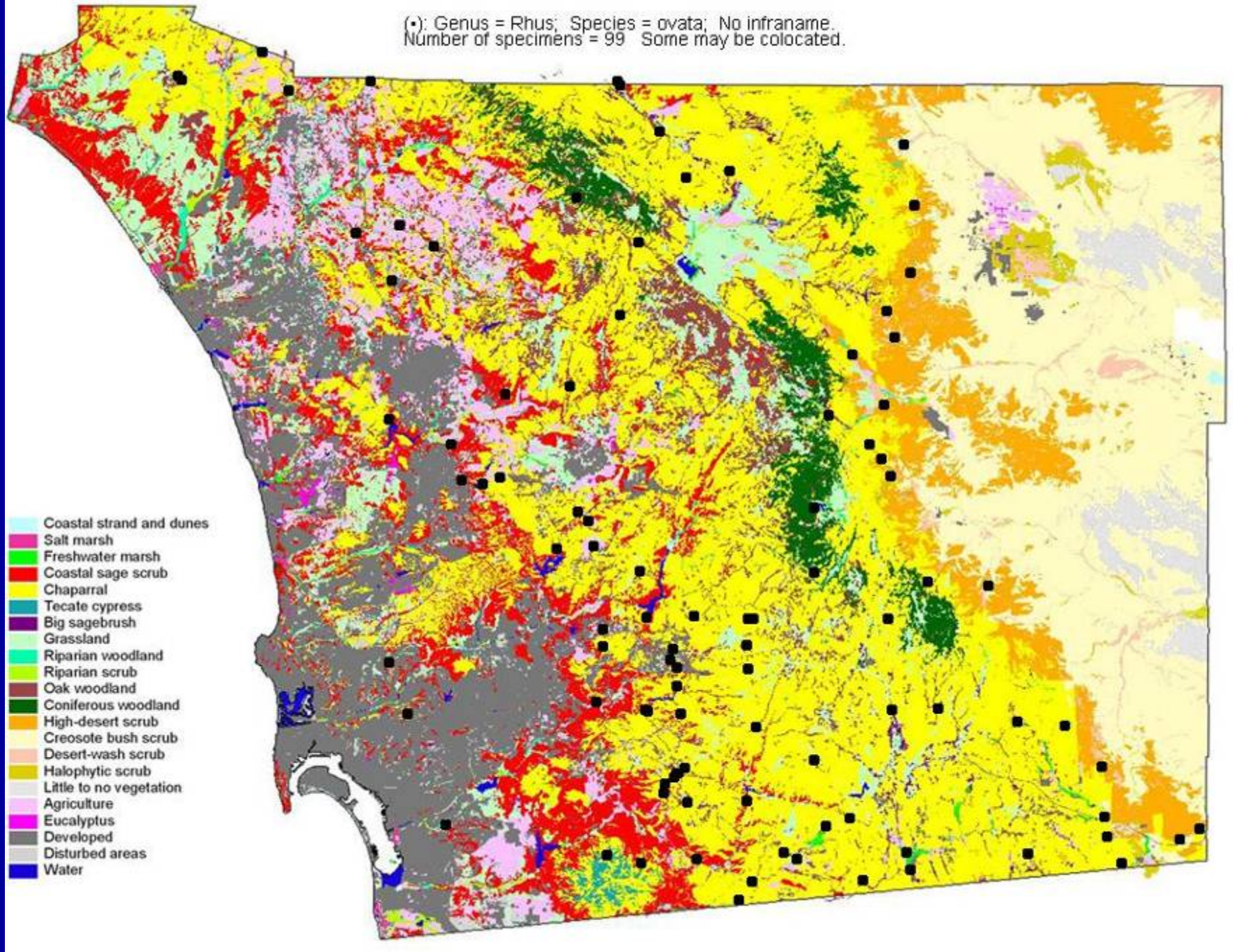


Larrea tridentata (Creosote Bush)

(•): Genus = *Rhus*; Species = *integrifolia*; No infraname.
Number of specimens = 82 Some may be colocated.



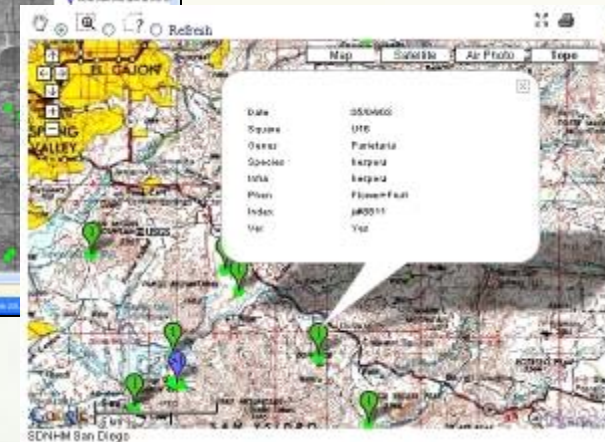
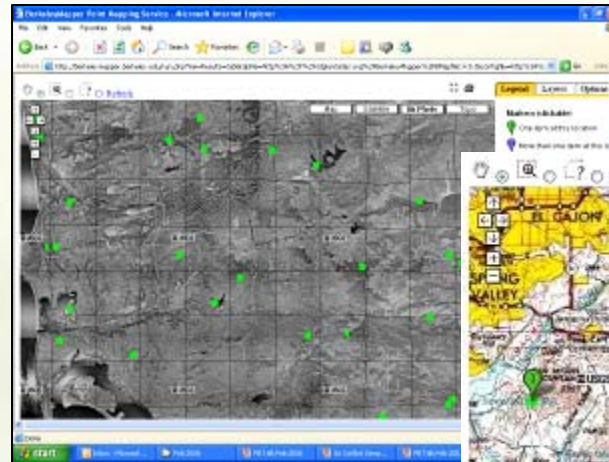
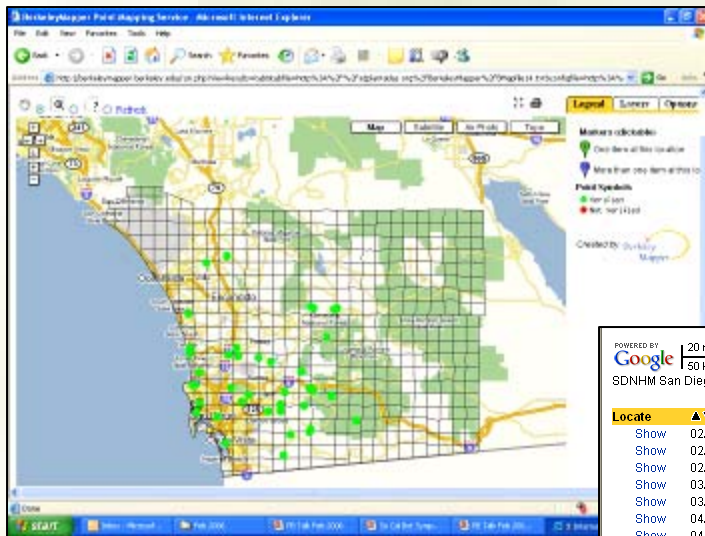
(•): Genus = *Rhus*; Species = *ovata*; No infraname.
Number of specimens = 99 Some may be collocated.



San Diego County Plant Atlas

Mapping:

Interactive mapping capabilities for searching and viewing species' distributions online



All points represent actual specimens

Powered by Google Maps | 20 mi | 50 km | SDNHM San Diego | [Terms of Use](#)

Displaying 1 to 10 of 40 records visible on map

Locate	▲▼Date	▲▼Square	▲▼Genus	▲▼Species	▲▼Intra	▲▼Index	▲▼Phen	▲▼Ver
Show	02/03/05	P14	Artemisia	californica	n/a	jr#10908	Fruiting	Yes
Show	02/18/04	R9	Artemisia	californica	n/a	jq#624	Flowering	Yes
Show	02/29/04	Q14	Artemisia	californica	n/a	cbc#14	Unknown	Yes
Show	03/01/04	P8	Artemisia	californica	n/a	m#4	Fruiting	Yes
Show	03/04/05	Q11	Artemisia	californica	n/a	jr#11145	Fruiting	Yes
Show	04/08/05	U14	Artemisia	californica	n/a	jr#11498	Fruiting	Yes
Show	04/09/05	S20	Artemisia	californica	n/a	jr#11630	Fruiting	Yes
Show	04/12/05	M7	Artemisia	californica	n/a	de#23	Fruiting	Yes
Show	04/29/05	J18	Artemisia	californica	n/a	jh#1034	Vegetative	Yes
Show	05/04/05	T15	Artemisia	californica	n/a	jr#11653	Vegetative	Yes

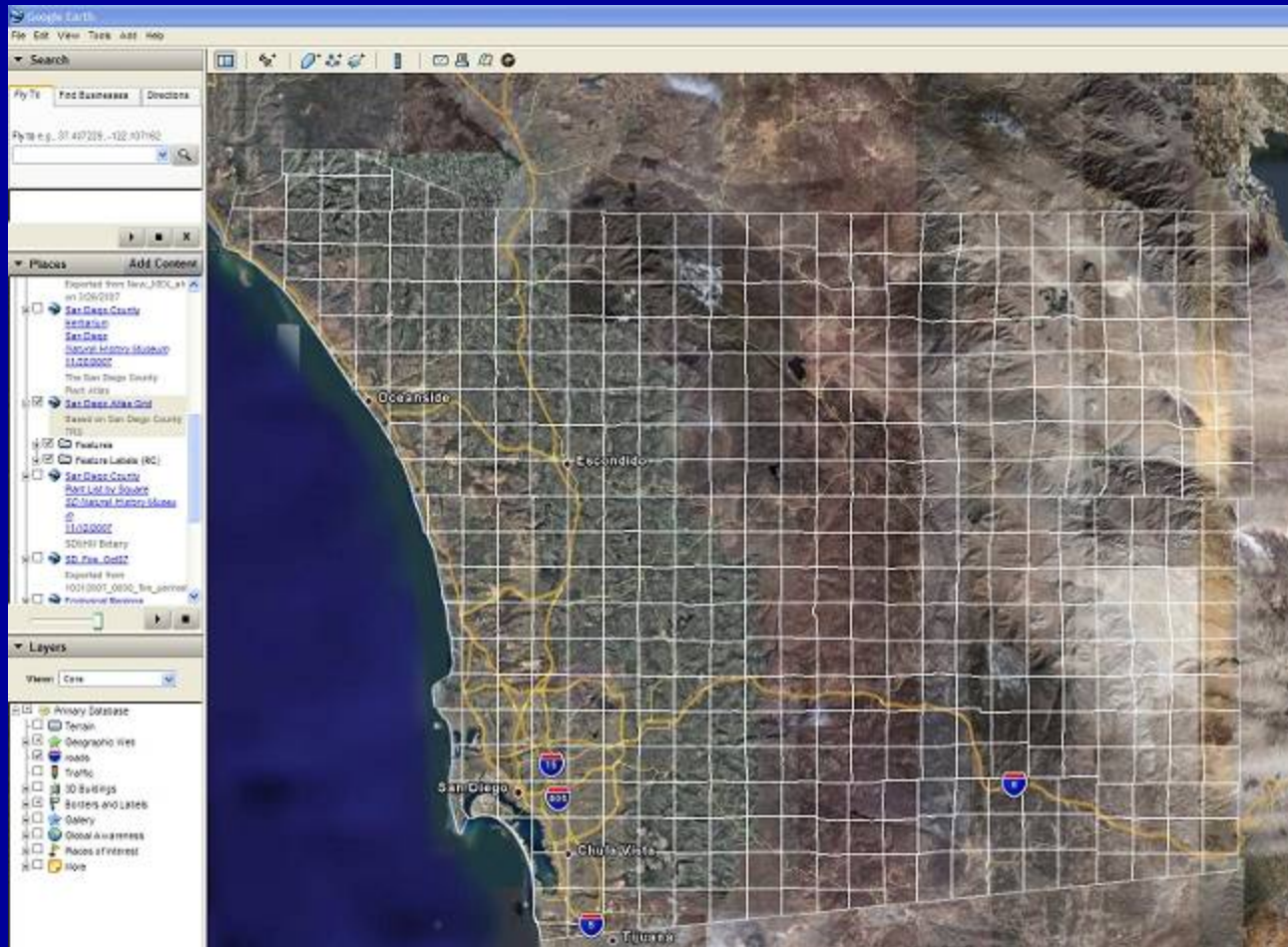


Old & New Specimen Data Combined

- Online mapping resources integrate new Plant Atlas collections with historic specimens
- IMLS grant to database and georeference old San Diego County collections
 - Currently 33,300 in SD Herbarium db.
 - 26,730 specimens georeferenced
 - 10% or 3,300 will be too vague to make a point or ex hort.
 - 3300 left to do

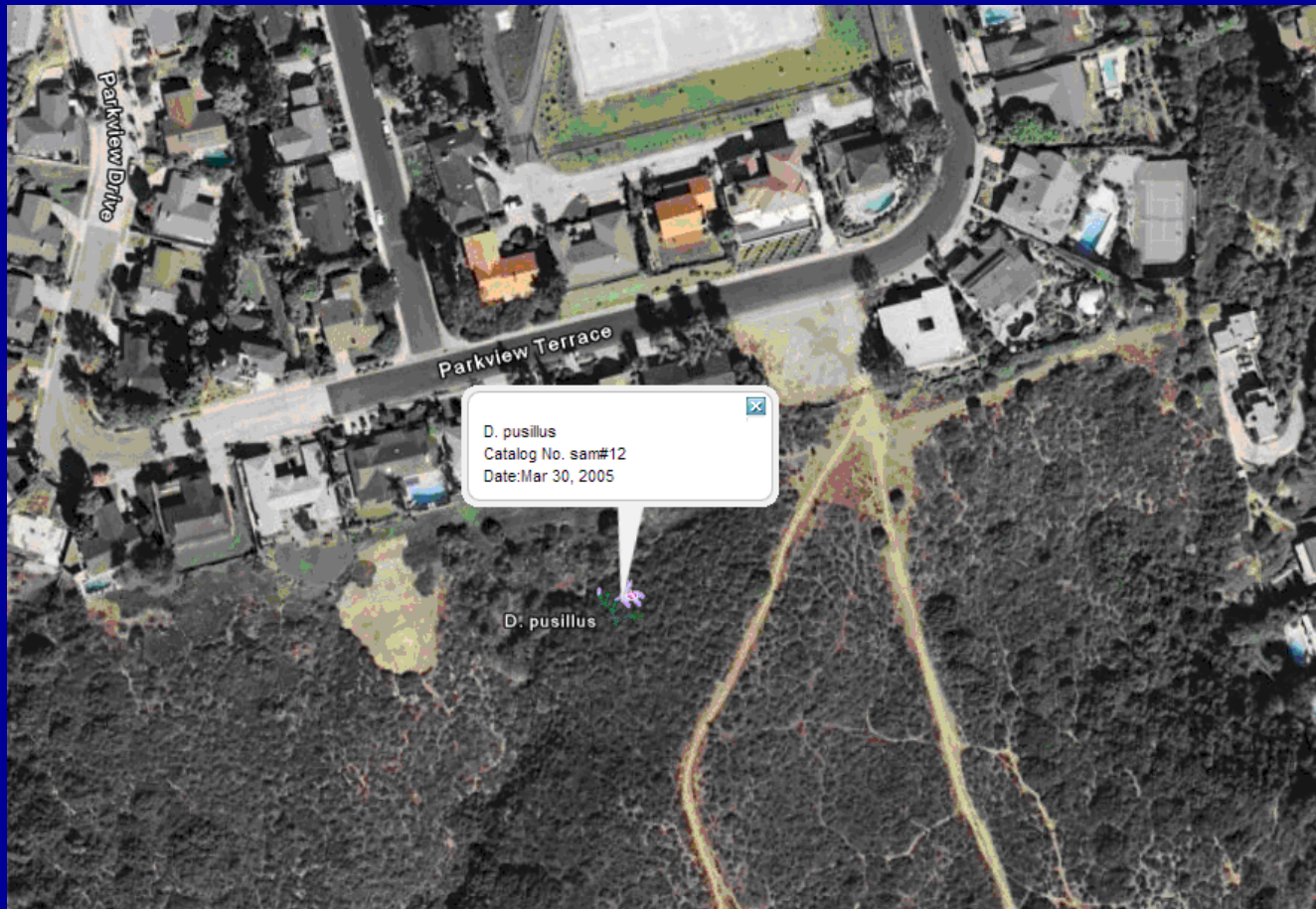


Google Earth provides a basemap



The Atlas Grid is downloaded from our web site to your Google Earth. The grid can be turned on or off, and labels on or off.

Google Earth gets right on down there



- Zooming in on the map takes the view down to a very fine area.

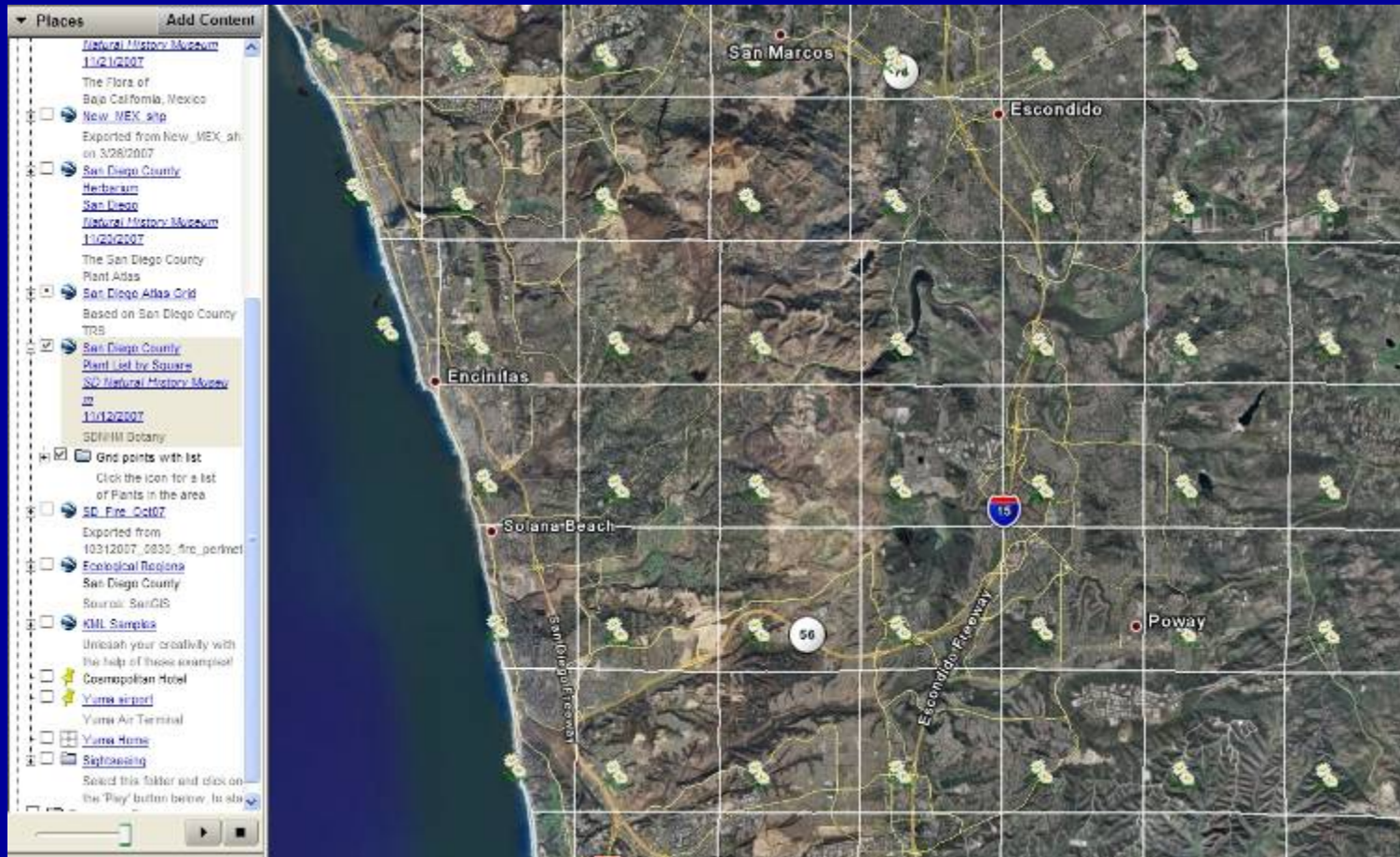
Medusahead Rye

Taeniatherum caput-medusae



Nipped in the bud?

Plant List



- There are two views of the Plant Atlas — the plant distribution shown of the previous slides, and the plant list shown here. Click one of the icons in a square to get a list of the plants collected in that square.

Plant List



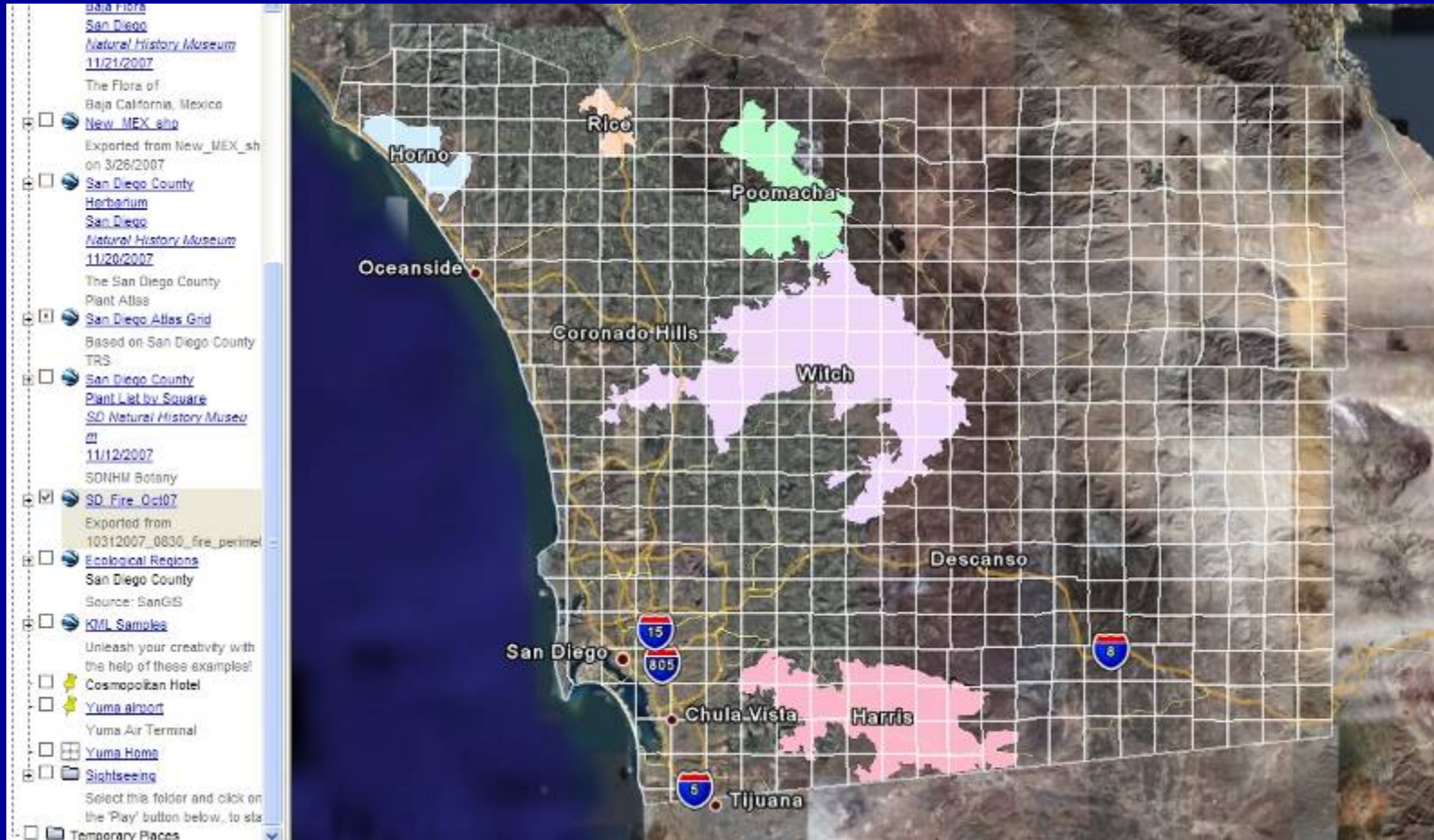

Would you like to participate in the Plant Atlas project to collect and catalog the plants of San Diego County? You can become a volunteer parobotanist after completing a short training at the San Diego Natural History Museum.
[Make a donation](#)

List of plants collected in Square K11, Mt. Carson Park
 The list includes all specimens currently in the San Diego Natural History Museum herbarium.
 Collecting is an ongoing effort. Volunteers are needed, particularly for those remote areas of the county for which we have few specimens.

Family	Genus	Sp. Epithet	ssp./var.	Common Name	Google®
Alismaceae	Echinodorus	bicolor		Burhead	Click
Anacardiaceae	Melicope	laurea		Laurel Sumac	Click
Anacardiaceae	Rhus	ovata		Sugar Bush	Click
Apiaceae	Bowlesia	incana		American Bowlesia	Click
Apiaceae	Sanicula	arguta		Sharp-Tooth Sanicle	Click
Araceae	Wolffia	borealis		Northem Water-Meal	Click
Araceae	Wolffia	columbiana		Columbian Water-Meal	Click
Araceae	Wolffia	globosa		Asian Water-Meal	Click
Asteraceae	Ambrosia	polystachya		Western Ragweed	Click
Asteraceae	Baccharis	salicifolia		Mule Fat, Seep Willow	Click
Asteraceae	Eriogonum	californica		California Eriogonum	Click
Asteraceae	Centromadia	parryi	ssp. australis	Southern Tarplant	Click
Asteraceae	Gnaphalium	californicum		California Everlasting	Click
Asteraceae	Gutierrezia	californica		California Maltweed	Click
Asteraceae	Hedysarum	pratense		Orete Hedysarum	Click
Asteraceae	Senecio	oleraceus		Common Sow-Thistle	Click
Asteraceae	Stylocine	gnaphaloides		Everlasting Nest Straw	Click
Azollaceae	Azolla	filiculoides		Pacific Mosquito Fern	Click
Dorogiaceae	Amaranthus	menziesii	var. intermedius	Rancher's Fiddleneck	Click
Boraginaceae	Holothropium	curassavicum		Salt Holitrope	Click
Brassicaceae	Brassica	nigra		Black Mustard	Click
Brassicaceae	Hirschfeldia	incana		Short-Pod Mustard	Click
Brassicaceae	Lepidium	latifolium		Broad-leaf Peppergrass	Click
Brassicaceae	Horispa	pelustria	var. occidentalis	Pacific Yellow Cress	Click

- The list opens in your browser, and is current as of the moment you click the link. All herbarium species are included. A Google link in the table will take you to a Google image search for the species you click.

Other Available Layers



We provide other downloadable layers for your Google Earth, such as the San Diego County Ecological Regions. Here, we have the fires of 2007.

Future Projects

Type specimen scans

Digital photos of field collected specimens

Integration of checklists with digital pics and scans



