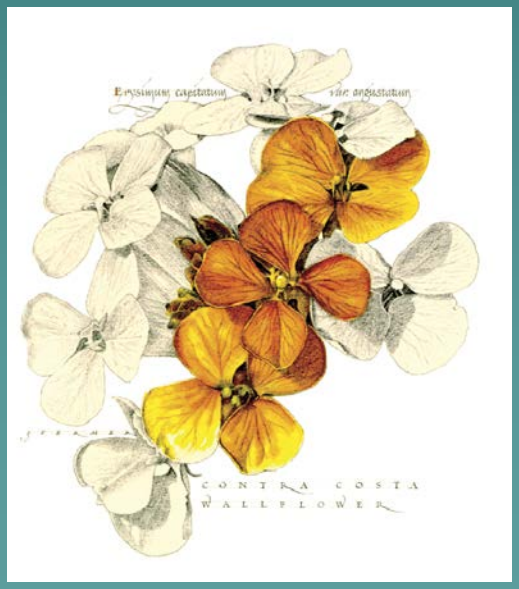
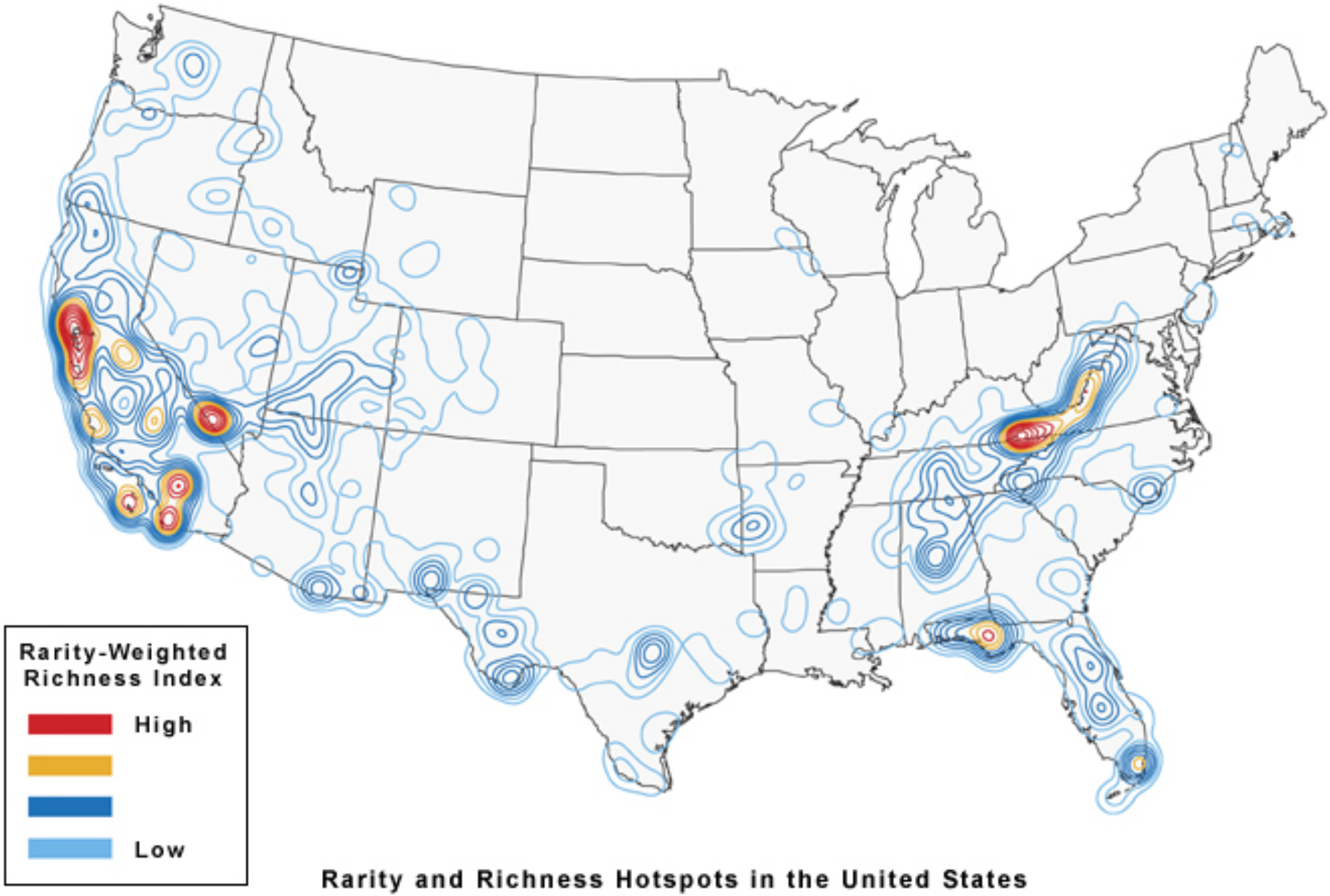
RESOURCES AGENCY
CALIFORNIA
DEPARTMENT
FISH&GAME

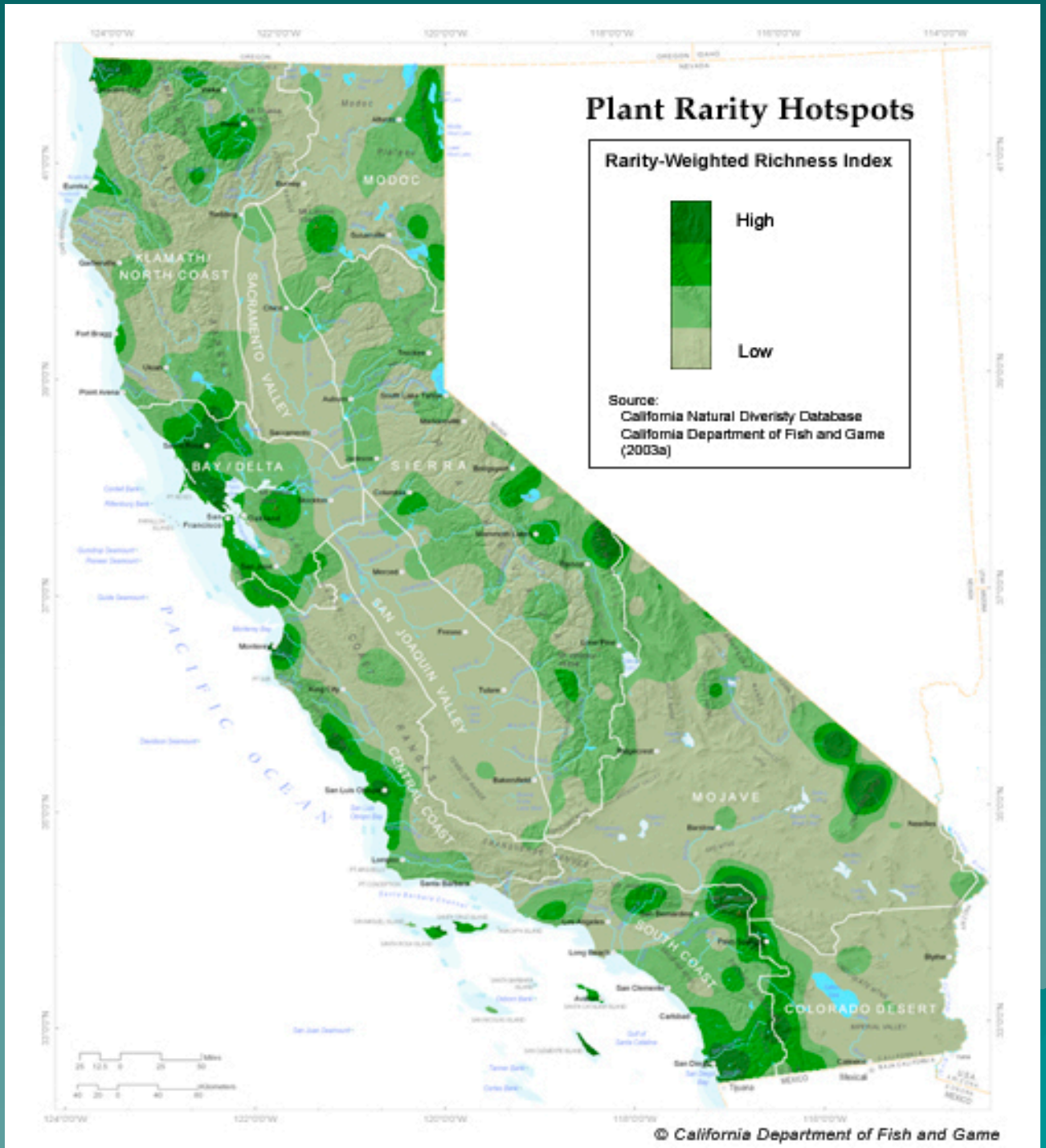


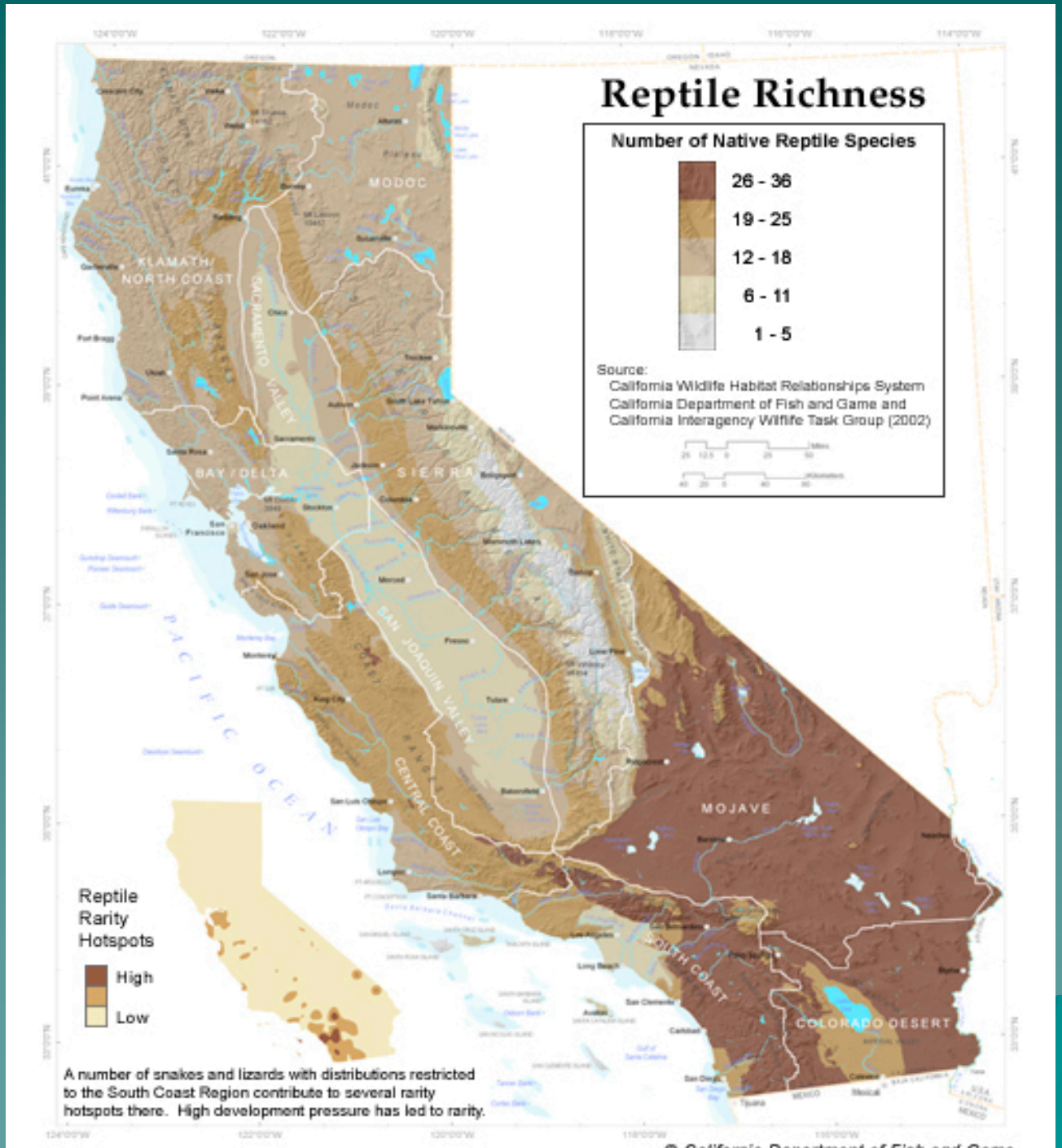
Biogeographic Data Branch
Dept of Fish and Game
Tom Lupo, Branch Chief
tlupo@dfg.ca.gov

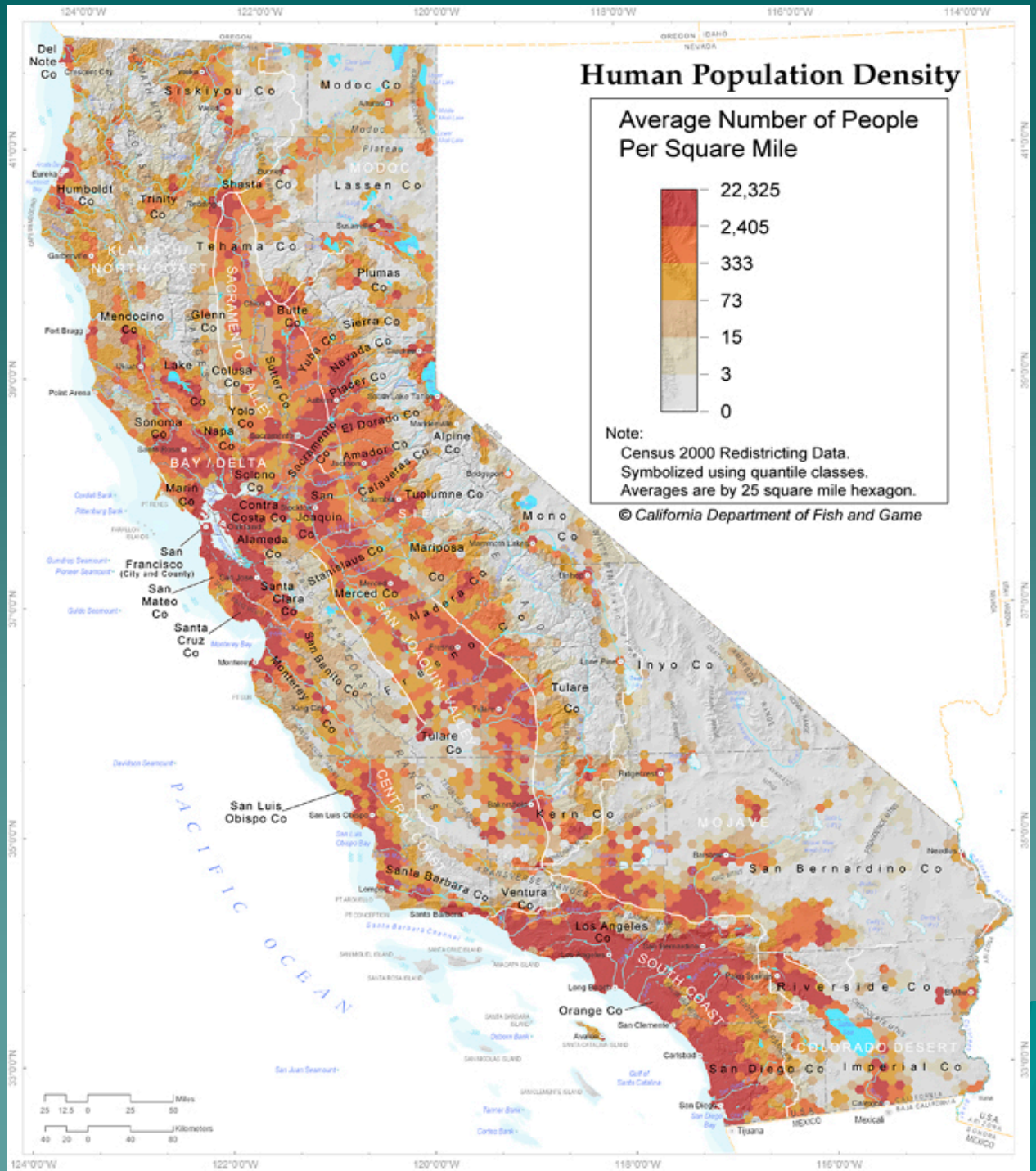


Rarity and Richness Hotspots in the United States

Source: Precious Heritage, Stein et al. 2000. Used by permission.


Plant Rarity Hotspots
Rarity-Weighted Richness Index
High
Low
Source:
California Natural Diversity Database
California Department of Fish and Game
(2003a)
MODOC
KLAMATH/
NORTH COAST
SACRAMENTO VALLEY
BAY / DELTA
SIERRA
SAN JOAQUIN VALLEY
CENTRAL COAST
MOJAVE
SOUTH COAST
COLORADO DESERT
PACIFIC OCEAN
© California Department of Fish and Game

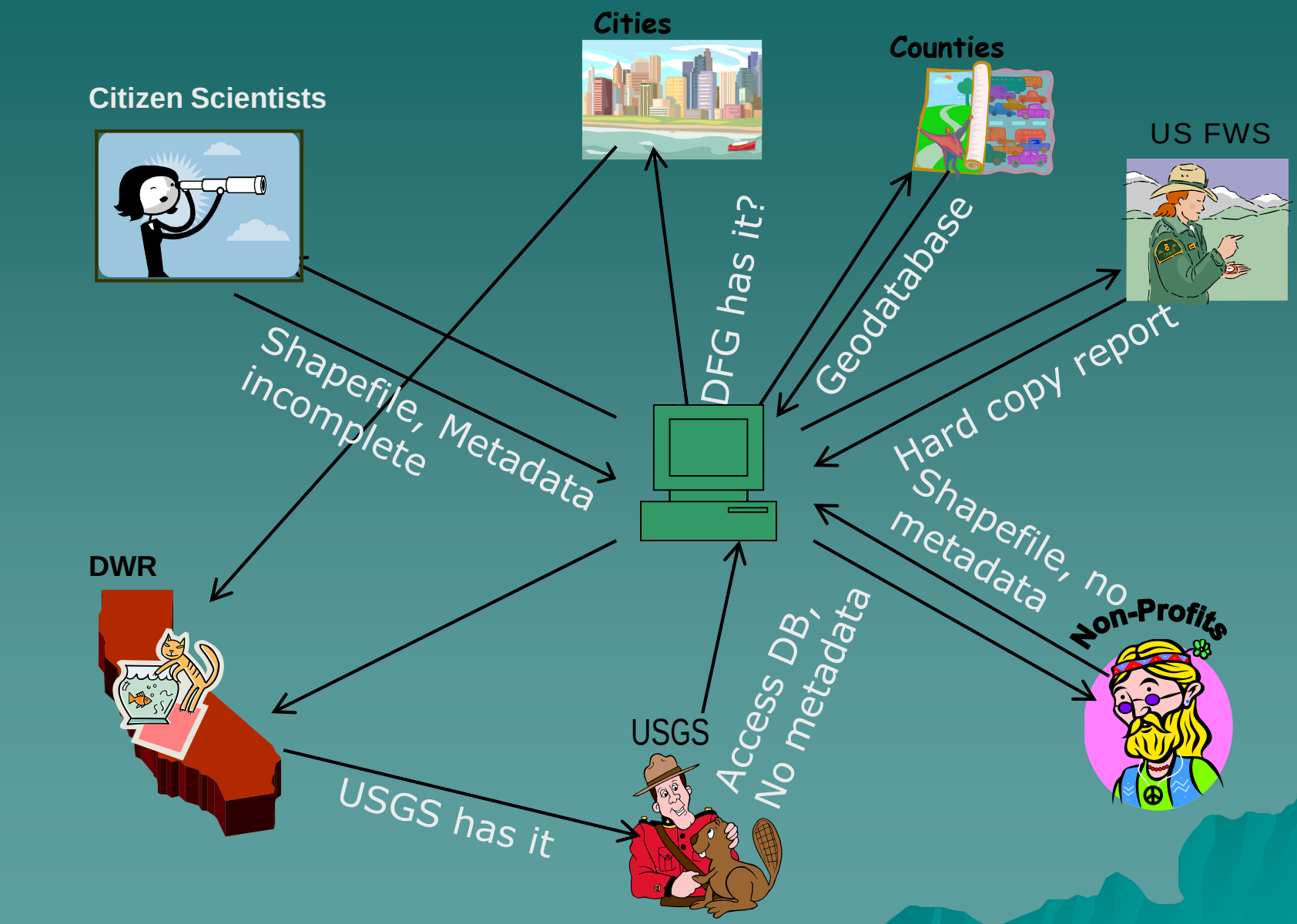



Human Population Density
Average Number of People Per Square Mile
22,325
2,405
333
73
15
3
0
Note:
Census 2000 Redistricting Data.
Symbolized using quantile classes.
Averages are by 25 square mile hexagon.
© California Department of Fish and Game
Del Norte Co
Siskiyou Co
Modoc Co
Humboldt Co
Trinity Co
Shasta Co
Lassen Co
Tehama Co
Plumas Co
Mendocino Co
Glenn Co
Butte Co
Sierra Co
Lake Co
Colusa Co
Sutter Co
Yuba Co
Nevada Co
Placer Co
Yolo Co
Sonoma Co
Napa Co
El Dorado Co
Alpine Co
Solano Co
Amador Co
Calaveras Co
Tuolumne Co
Marin Co
Contra Costa Co
San Joaquin Co
Alameda Co
Mono Co
Mariposa Co
San Francisco (City and County)
San Mateo Co
Stanislaus Co
Merced Co
Santa Clara Co
Madera Co
Santa Cruz Co
Fresno Co
Inyo Co
San Benito Co
Monterey Co
Tulare Co
Kern Co
San Luis Obispo Co
Santa Barbara Co
Ventura Co
San Bernardino Co
Los Angeles Co
Riverside Co
Orange Co
San Diego Co
Imperial Co
Tijuana
PACIFIC OCEAN
SACRAMENTO VALLEY
SAN JOAQUIN VALLEY
BAY / DELTA
KLAMATH / NORTH COAST
SIERRA
CENTRAL COAST
SOUTH COAST
MOJAVE
COLORADO DESERT
Miles
Kilometers

Current Situation

- Environmental resource data are being collected at an increasing rate.
- There is a lack of statewide standardization in how data are recorded, stored, and shared.
- Previously collected data are disappearing as employees change jobs or retire.
- Action is required to correct this situation.

Data Collection/Analysis Scenario



DFG - Biogeographic Data Branch

- Our mandate to provide quality information, tools, and expertise to DFG and community, for making informed conservation decisions.
- Programs include:
  - Biogeographic Information and Observation System (BIOS)
  - California Natural Diversity Database (CNDDB)
  - Vegetation Classification and Mapping Program (VegCAMP)
  - Atlas of the Biodiversity of California
  - California Wildlife Habitat Relationships System (CWHR)

Part of the Solution

- Establish a “data warehouse” to store new and existing databases.
- Create a data management strategy that provides standards without confining ability to gather or analyze data.
- Provide an organized, unified system but with maximum flexibility for individual needs.
- Provide an information distribution system to facilitate use of the data by all conservation planning partners.

B I O S

Biogeographic Information and Observation System

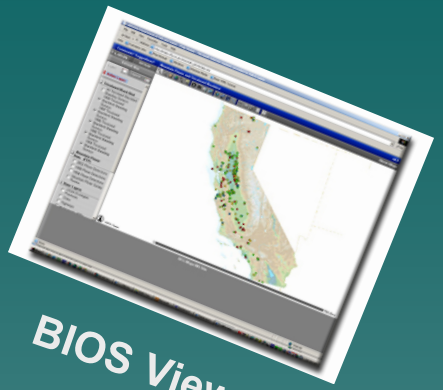
BIOS is a **strategy** for managing biological and spatial information and to facilitate the sharing of that information within DFG and with our conservation partners.

It is an **evolving** system and will change in response to user needs and technology improvements.

What is BIOS?

BIOS Web site

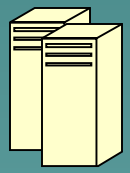
BIOS Data



BIOS Viewer

BIOS Support
and Development Team

Database Processes



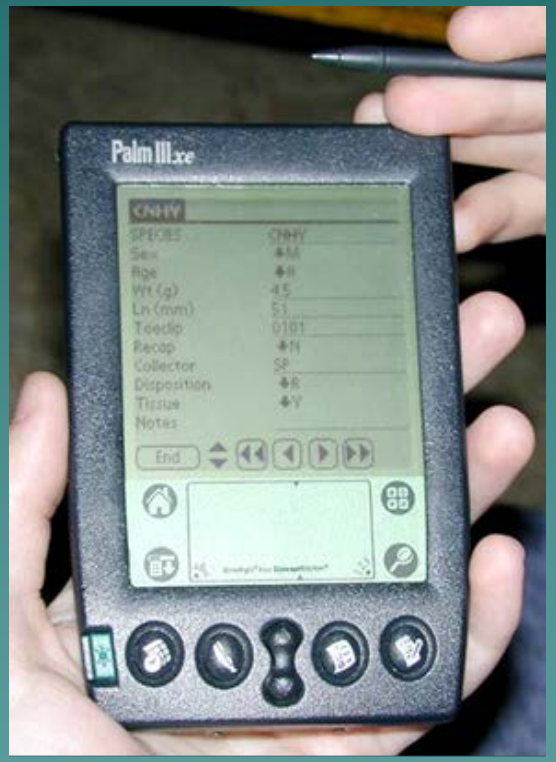
Servers and
Data Storage

B I O S

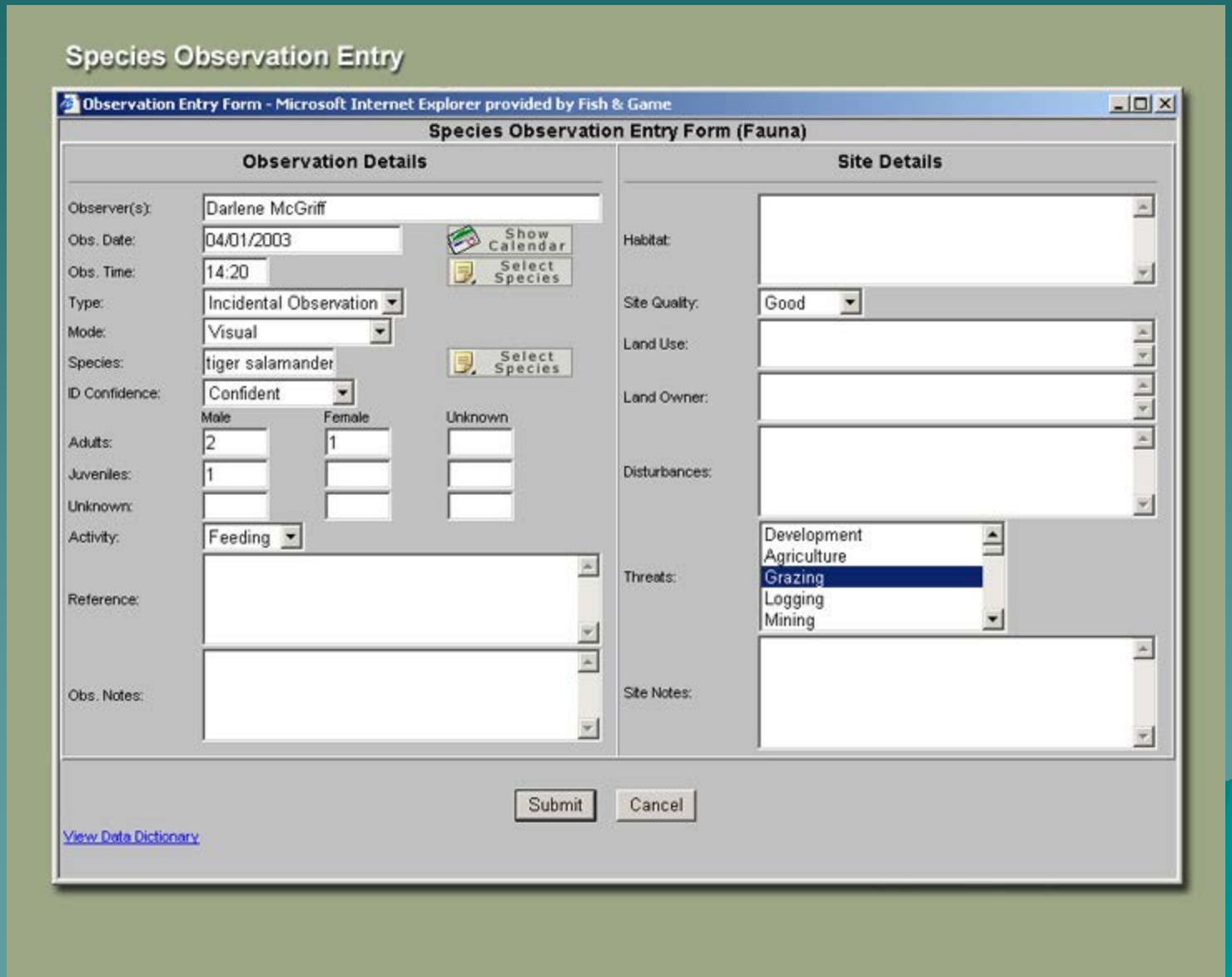
Biogeographic Information and Observation System

- Utilizes GIS, relational database management, and Internet map server technology to manage biological observations.
- Provides **secure** password protected, layer specific read and download protection.
- Is being designed and built by a team of GIS specialists and biologists from DFG and our partners.

Data inputs are from existing and new sources

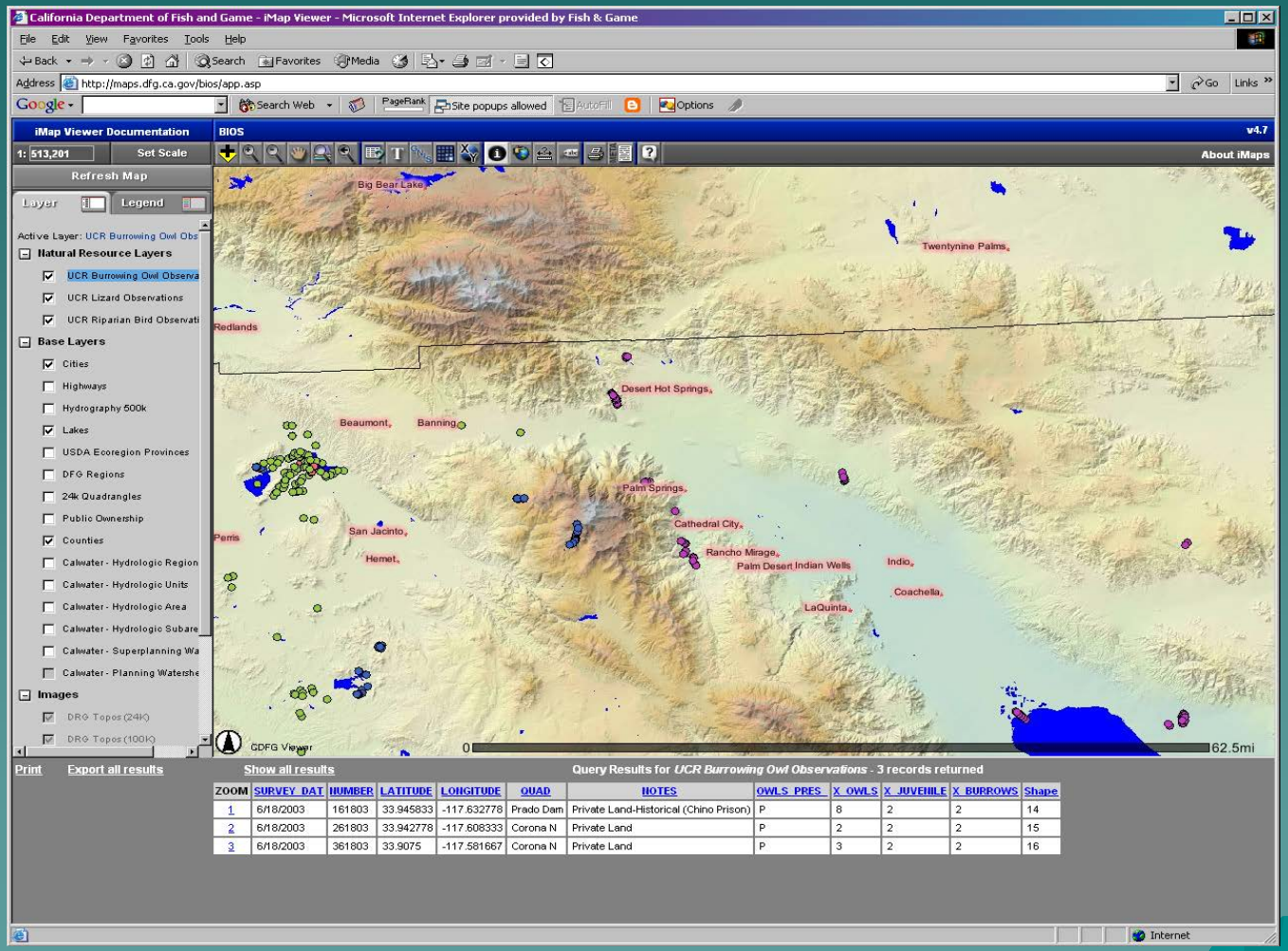


Input will also be via a web-based forms



Data are stored in secure professionally managed conditions

Data are distributed via web-based GIS



ZOOM	SURVEY_DAT	NUMBER	LATITUDE	LONGITUDE	QUAD	NOTES	OWLS_PRES	X_OWLS	X_JUVENILE	X_BURROWS	Shape
1	6/18/2003	161803	33.945833	-117.632778	Prado Dam	Private Land-Historical (Chino Prison)	P	8	2	2	14
2	6/18/2003	261803	33.942778	-117.608333	Corona N	Private Land	P	2	2	2	15
3	6/18/2003	361803	33.9075	-117.581667	Corona N	Private Land	P	3	2	2	16

The BIOS Viewers

Secure BIOS Data Viewer:

- ❑ Available to DFG employees and BIOS collaborators
- ❑ Available to CNDDB subscribers
- ❑ Available to others as designated by data contributors, collaborators and BIOS staff

Public BIOS Data Viewer:

- ❑ Available to the general public
- ❑ Includes a subset of the data layers available in the Secure BIOS Data Viewer
- ❑ All tools and functions are the same in both Viewers

B I O S

Biogeographic Information and Observation System

- We are not trying to take over or control information, only to ***liberate*** it.
- We are not offering to maintain anyone's data, only to provide efficient ways to collect, store and share it.
- We are working with various internal programs and external partners to identify data that people wish to include in BIOS.

Some current collaborative uses of BIOS

- **CalFish**: compilation of biological, environmental and restoration project information focused on North Coast anadromous fisheries. www.calfish.org
- **USGS Biological Resources Discipline:** centralization of biological data collected by WERC in California.
- **Southern California Data Integration Project**: State/Federal partnership to manage biological inventory and monitoring data needed for NCCP work.
- **CalFed**: management of habitat restoration projects data funded by CalFed ERP program
- **Salton Sea Restoration Project**: management of data for DFG/DWR project to restore habitat and water quality in the area.

www.CalFish.org

The California Natural Diversity Database

What is the CNDDB?

It is a continually refined and updated, computerized inventory of location and status information on the rarest plants, animals, and natural communities in California

What is the CNDDB? (con't)

- We create a value-added product by combining different data sources into a quality-controlled feature while maintaining access to each original source document.

- We create data-rich records with information on habitats, threats, species status, condition of the site, ownership, museum collection numbers, etc.

We currently have 2,110 plants on the “Special Plants” list and 817 animals on the “Special Animals” list.

What do we track in the CNDDB?

- State and/or Federally listed species

- State and/or Federal candidates for listing.

- California Specie
  of Special Conce
  - (Animals only)

- Species with very limited distributions

Pansy monkeyflower

- Species recommended for inclusion on the list by recognized experts.

Delta smelt

- Special biological "situations"

Wintering sites

Rookeries

Very tiny fieldwork component

Where do we get our information?

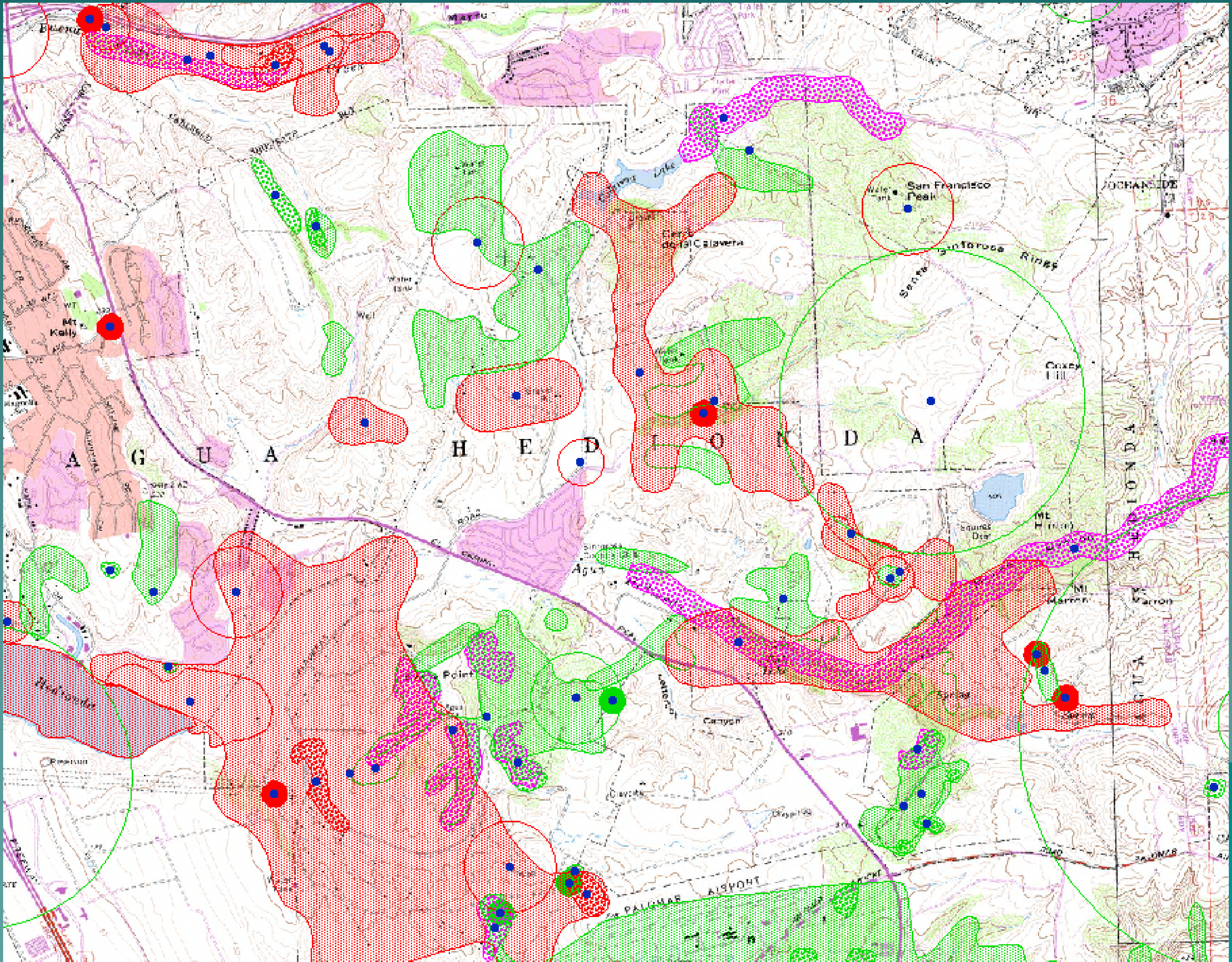
- Biological Consultants
- DFG biologists
- Other agency biologists
- Conservation groups

- Information is **prioritized** for data entry based on requests received from DFG biologists, anticipated listings, proposed or on-going NCCP / HCPs, and other identified DFG priorities.

Maple-leaved checkerbloom

California tiger salamander

Occurrences are mapped as precisely as possible



Vireo bellii pusillus

least Bell's vireo

Element Code: ABPBW01114

Status		NDDB Element Ranks		Other Lists	
Federal:	Endangered	**Global:**	G5T2	**CDFG Status:**	
State:	Endangered	**State:**	S2		

Habitat Associations

General: (NESTING) SUMMER RESIDENT OF SOUTHERN CALIF IN LOW RIPARIAN IN VICINITY OF WATER OR IN DRY RIVER BOTTOMS; BELOW 2000 FT.

Micro: NESTS PLACED ALONG MARGINS OF BUSHES OR ON TWIGS PROJECTING INTO PATHWAYS, USUALLY WILLOW, BACCHARIS, MESQUITE.

Occurrence No. 89 **Map Index:** 03282 **EO Index:** 13753

Dates Last Seen

Occ Rank: Excellent
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Stable
Main Source: GRIFFITH, J. 1990 (OBS)

Element: 1999-XX-XX
Site: 1999-XX-XX

Record Last Updated: 2004-07-23

Quad Summary: LAS PULGAS CANYON (3311734/051C)
County Summary: SAN DIEGO

Lat/Long: 33.31782° / -117.43880°
UTM: Zone-11 N3686607 E459156
Mapping Precision: SPECIFIC
Symbol Type: POLYGON
Area: 1,101.0 ac

Township: 10S
Range: 05W
Section: 07 **Qtr:** XX
Meridian: S
Elevation: 120 ft

Location: LAS FLORES CREEK (LAS PULGAS CYN), FROM JUST NORTH OF BASILONE ROAD EXTENDING SW TO JUST WEST OF I-5, CAMP PENDLETON MCB

Location Detail: 1981-82: 0.4 MI S OF BASILONE ROAD. 1988-90: 1 MI S OF BASILONE ROAD AND 0.4 - 0.7 MI N TO NE OF STUART MESA RD. 1995 & 1999: PAIRS OBSERVED THROUGHOUT SITE.

Ecological: RIPARIAN HABITAT; DOMINANTS: SALIX SP, BACCHARIS GLUTINOSA, ALNUS RHOMBIFOLIA, PLATANUS RACEMOSA, SAMBUCUS MEXICANA

Threat: MARINE CORPS ACTIVITY; TANK ROADS BISECT CREEK; SHEEP GRAZING

General: 1 MALE OBSERVED IN 1981; 2 MALES OBS IN 1982; 1 TERRITORIAL MALE OBS IN 1983, 1988, AND 1989; 2 PAIRS IN 1988; 3 PAIRS IN 1989; 8 PAIRS DETECTED IN 1990. 111 PAIRS OBS SOMETIME BETWEEN 1 APR&31 JUL 1995. 102 PAIRS DETECTED IN 1999.

Owner/Manager: DOD-CAMP PENDLETON MCB

Sources

FWS85U02 U.S. FISH & WILDLIFE SERVICE. TABLES FOR LEAST BELL'S VIREO DATA UP TO 1984. 1985-XX-XX.

GRI89F03 GRIFFITH WILDLIFE BIOLOGY. FIELD SURVEY FORM FOR VIREO BELLII PUSILLUS. 1989-08-31.

GRI90F02 GRIFFITH, J. FIELD SURVEY FORM FOR VIREO BELLII PUSILLUS. 1990-07-31.

GRI90R01 GRIFFITH, J.T., AND J.C. REPORT ON LEAST BELL'S VIREO ON MARINE CORP BASE CAMP PENDLETON, 1989.

The CNDDB is a positive sighting database

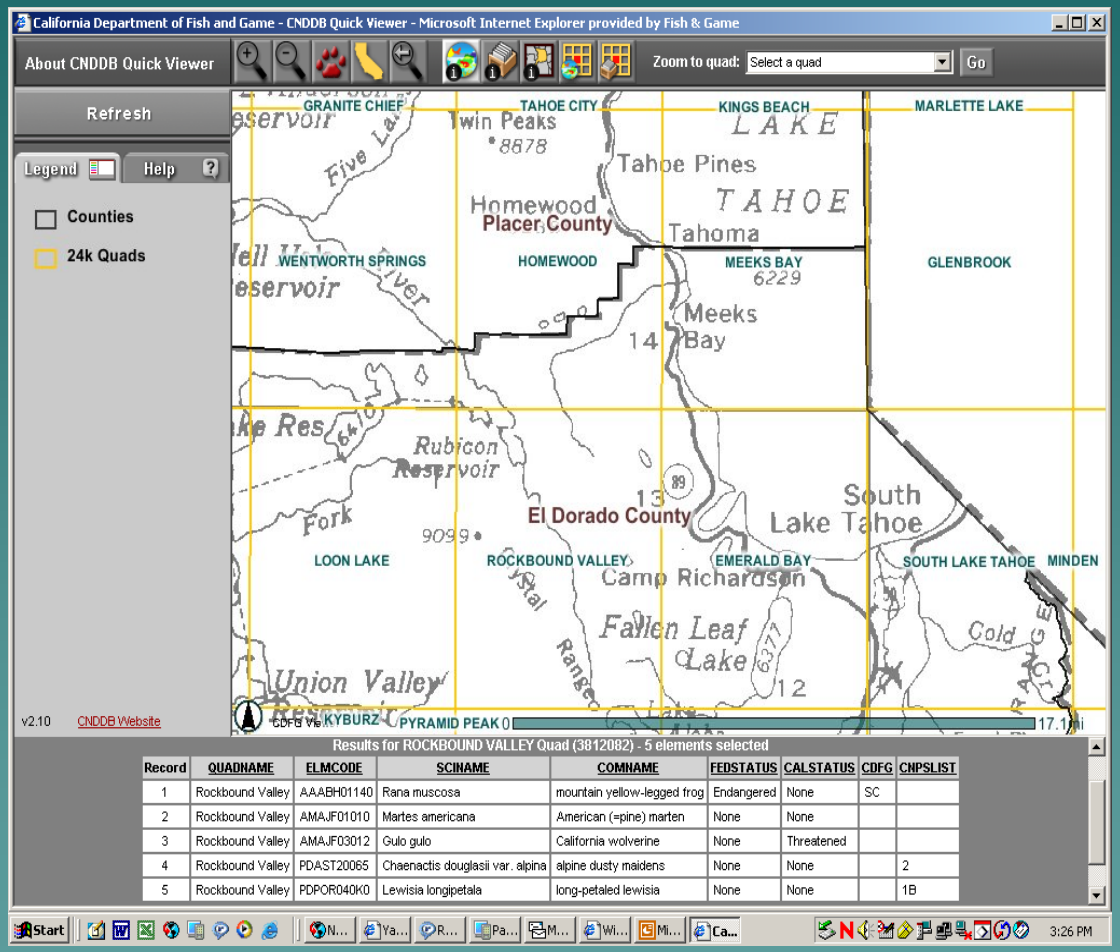
- We do not predict where an element might occur; we report only where an element has been documented to occur.

- No provision for recording negative data – except at sites where the element has been previously found.

There may be sites with significant resources that have never been surveyed and no one has data. Absence of data in the CNDDB does not mean that no sensitive species occur on a site.

Absence of data in the CNDDB about an element or a site does not constitute the basis for a negative declaration.

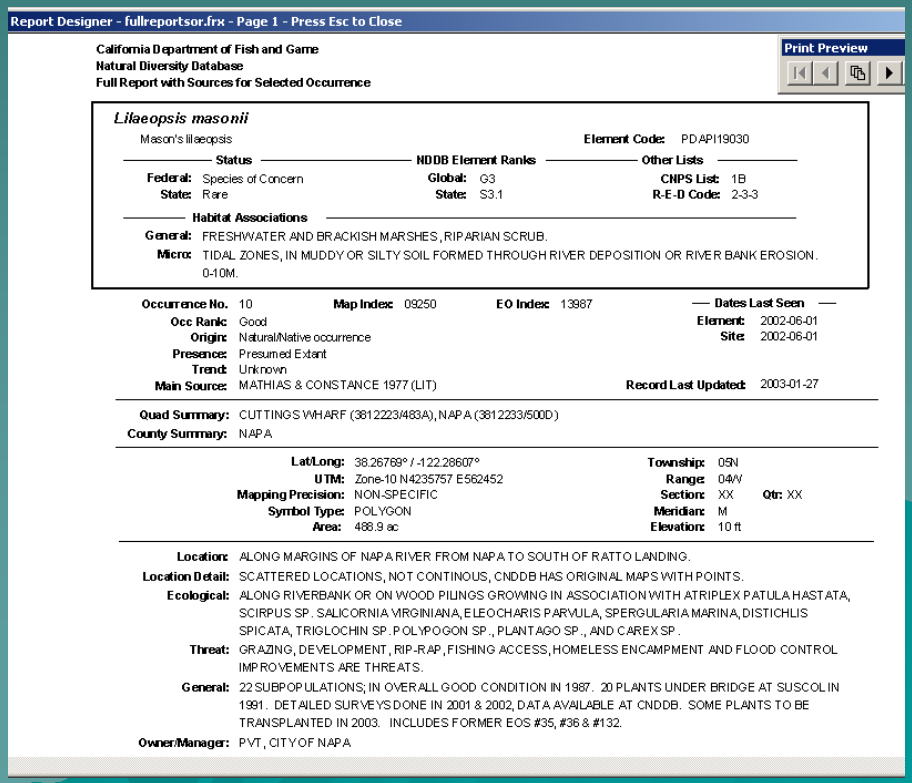
California Natural Diversity Database free on the Web



Taxa-by-quadrangle level information is now available free of charge on the Internet thru the CNDDB "Quick Viewer" web GIS application. Development is also well underway on a separate web GIS application to provided fully detailed attribute and spatial information to CNDDB subscribers.

RareFind

- PC application of *tabular* CNDDB data
- Allows for a variety of text queries
  - **Simple queries**
    - Everything on species “X”
    - Everything on quad “Y”
  - **Complex queries**
    - Combinations of taxonomy, status, counties, quads, etc.
- Produce and print reports


Report Designer - fullreportsor.frx - Page 1 - Press Esc to Close

Print Preview

California Department of Fish and Game
Natural Diversity Database
Full Report with Sources for Selected Occurrence

Lilaeopsis masonii
Mason's lilaeopsis

Element Code: PDAPI19030

Status		NDDB Element Ranks		Other Lists	
Federal:	Species of Concern	Global:	G3	CNPS List:	1B
State:	Rare	State:	S3.1	R-E-D Code:	2-3-3

Habitat Associations
General: FRESHWATER AND BRACKISH MARSHES, RIPARIAN SCRUB.
Micro: TIDAL ZONES, IN MUDDY OR SILTY SOIL FORMED THROUGH RIVER DEPOSITION OR RIVER BANK EROSION. 0-10M.

Occurrence No. 10 Map Index: 09250 EO Index: 13987
Occ Rank: Good
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown
Main Source: MATHIAS & CONSTANCE 1977 (LIT)

Dates Last Seen
Element: 2002-06-01
Site: 2002-06-01
Record Last Updated: 2003-01-27

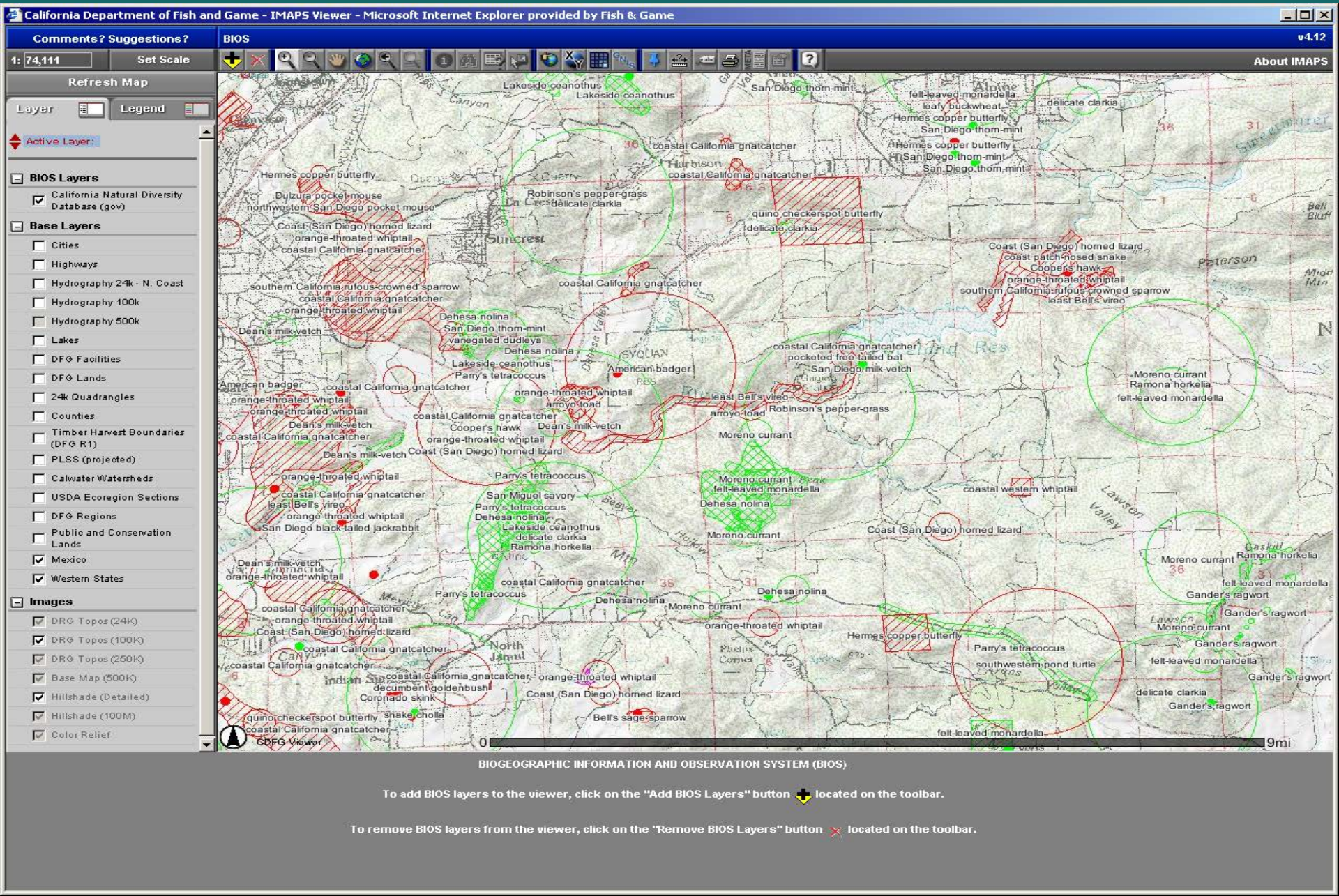
Quad Summary: CUTTINGS WHARF (3812223/483A), NAPA (3812233/500D)
County Summary: NAPA

Lat/Long: 38.26769° / -122.28607°
UTM: Zone-10 N4235757 E562452
Mapping Precision: NON-SPECIFIC
Symbol Type: POLYGON
Area: 488.9 ac

Township: 05N
Range: 04W
Section: XX Qtr: XX
Meridian: M
Elevation: 10 ft

Location: ALONG MARGINS OF NAPA RIVER FROM NAPA TO SOUTH OF RATTO LANDING.
Location Detail: SCATTERED LOCATIONS, NOT CONTINOUS, CNDDB HAS ORIGINAL MAPS WITH POINTS.
Ecological: ALONG RIVERBANK OR ON WOOD PILINGS GROWING IN ASSOCIATION WITH ATRIPLEX PATULA HASTATA, SCIRPUS SP. SALICORNIA VIRGINIANA, ELEOCHARIS PARVULA, SPERGULARIA MARINA, DISTICHLIS SPICATA, TRIGLOCHIN SP. POLYPOGON SP., PLANTAGO SP., AND CAREX SP.
Threat: GRAZING, DEVELOPMENT, RIP-RAP, FISHING ACCESS, HOMELESS ENCAMPMENT AND FLOOD CONTROL IMPROVEMENTS ARE THREATS.
General: 22 SUBPOPULATIONS; IN OVERALL GOOD CONDITION IN 1987. 20 PLANTS UNDER BRIDGE AT SUSCOL IN 1991. DETAILED SURVEYS DONE IN 2001 & 2002, DATA AVAILABLE AT CNDDB. SOME PLANTS TO BE TRANSPLANTED IN 2003. INCLUDES FORMER EOS #35, #36 & #132.
Owner/Manager: PVT, CITY OF NAPA

RareFind 4: CNDDB in BIOS

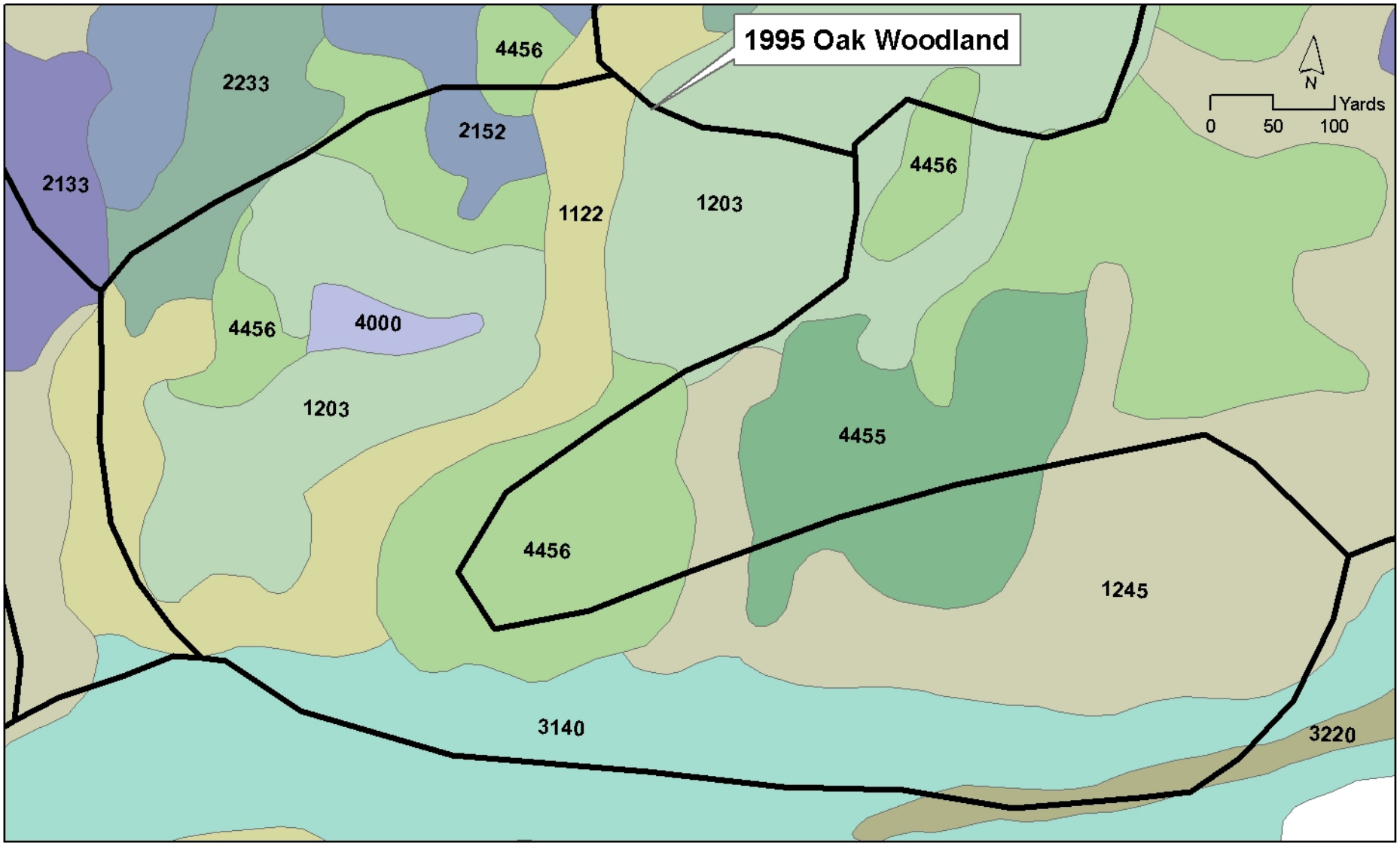


How is BIOS different from CNDDB?

	California Natural Diversity Database	BIOS
Data	Rare species and communities only	Any environmental/biological information with a spatial component
Source Materials	All raw source materials are preserved, tracked, and available at DFG	All raw source materials remain with the contributor
Data Layer	Single layer; records within the layer are aggregations of information from numerous data sources including field survey forms, specimens, environmental documents, published literature	Multiple layers; records within each layer are from a single data contributor
Data Format	All records are in a standardized format, facilitating comparisons of data from varying data sources	Data layers are non-standardized (using different scales, methods, details, etc.) making comparisons among layers potentially difficult.
Metadata	Extensive metadata developed and maintained by CNDDB staff	Layer-specific metadata provided by contributor using a standard format
Quality Control	All data are extensively quality-controlled	Minimal quality control
Data Processing	Data are prioritized and available after processing and quality control	Data are available quickly after minimal processing
Data Availability	Products are licensed from DFG and exempt from FOIA and PRA requests	Products are subject to FOIA and PRA requests
Update Frequency	Continuously	Variably
Crossover	CNDDB spatial data appear in BIOS as a layer	Appropriate rare species data from BIOS are incorporated into CNDDB
Support	Contact CNDDB staff	Contact data contributor indicated in metadata

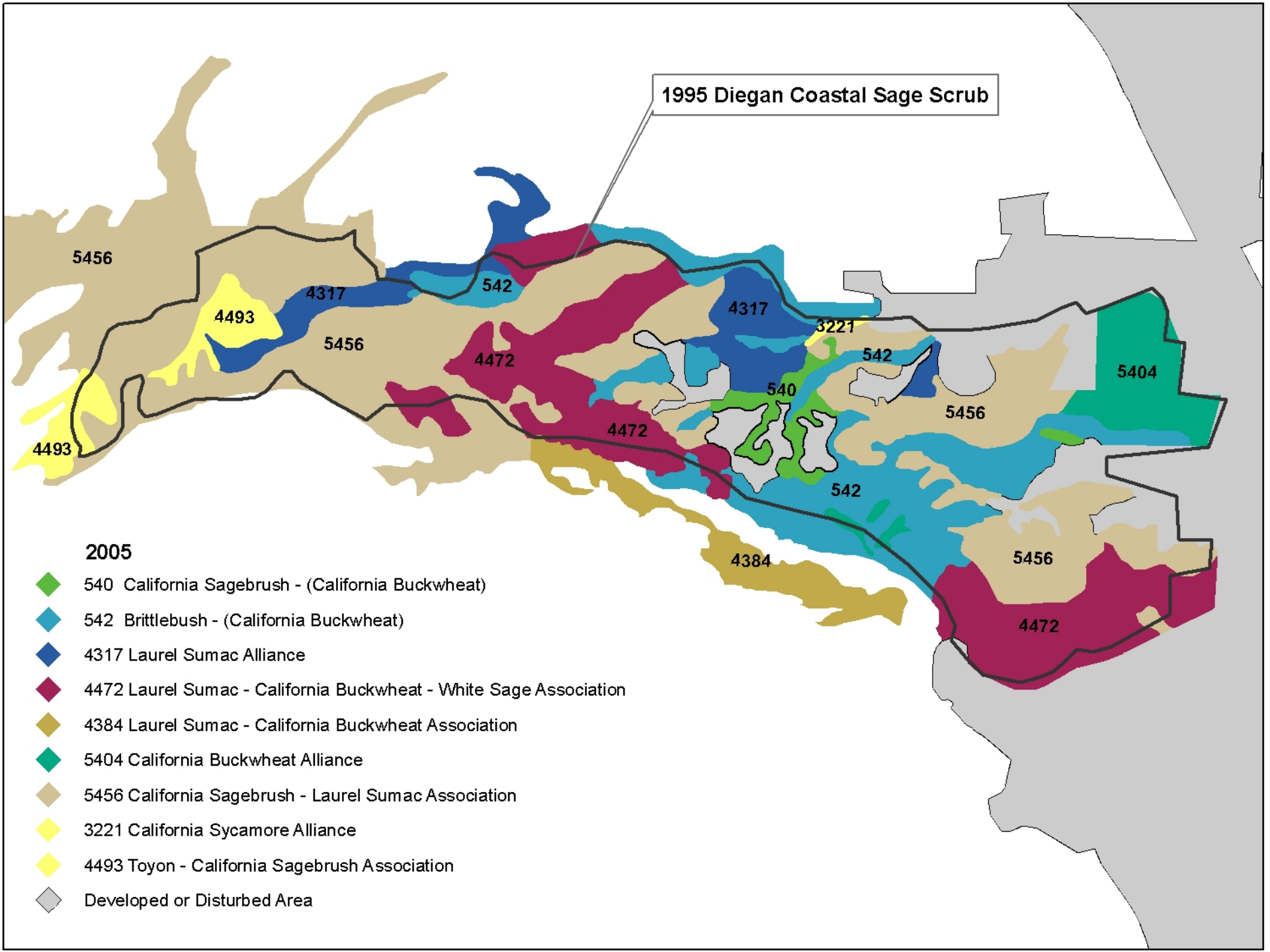
Problems with current vegetation mapping and information

- Current vegetation mapping is limited to agencies' geographic jurisdictions and done to address agency-specific business needs
- "Frankenmap" (California multi-source land cover map, 2002) uses all the best available data and stitches it together -- a patchwork quilt of many products, many scales, many dates



2005 Mapping Codes and Types

- 1122 Canyon Live Oak Allianceÿ
- 1203 Interior Live Oak - Canyon Live Oak Alliance
- 1245 Interior Live Oak - Canyon Live Oak - Coulter Pine Association
- 2133 Coulter Pine / Eastwood Manzanita Alliance
- 2152 Coulter pine - Canyon live oak / Pink-bracted Manzanita Association
- 2233 White Fir - Sugar Pine - Incense Cedar - Canyon Live Oak Association
- 3140 Black Oak - Incense Cedar Association
- 3220 White Alder Alliance
- 4000 Evergreen Shrubland Formation
- 4455 Eastwood Manzanita - Interior Live Oak Association
- 4456 Eastwood Manzanita - Pink-bracted Manzanita Association


1995 Diegan Coastal Sage Scrub
5456
4317
542
4493
5456
4472
4317
3221
542
5404
540
5456
4493
4472
542
4384
5456
4472
2005
540 California Sagebrush - (California Buckwheat)
542 Brittlebush - (California Buckwheat)
4317 Laurel Sumac Alliance
4472 Laurel Sumac - California Buckwheat - White Sage Association
4384 Laurel Sumac - California Buckwheat Association
5404 California Buckwheat Alliance
5456 California Sagebrush - Laurel Sumac Association
3221 California Sycamore Alliance
4493 Toyon - California Sagebrush Association
Developed or Disturbed Area

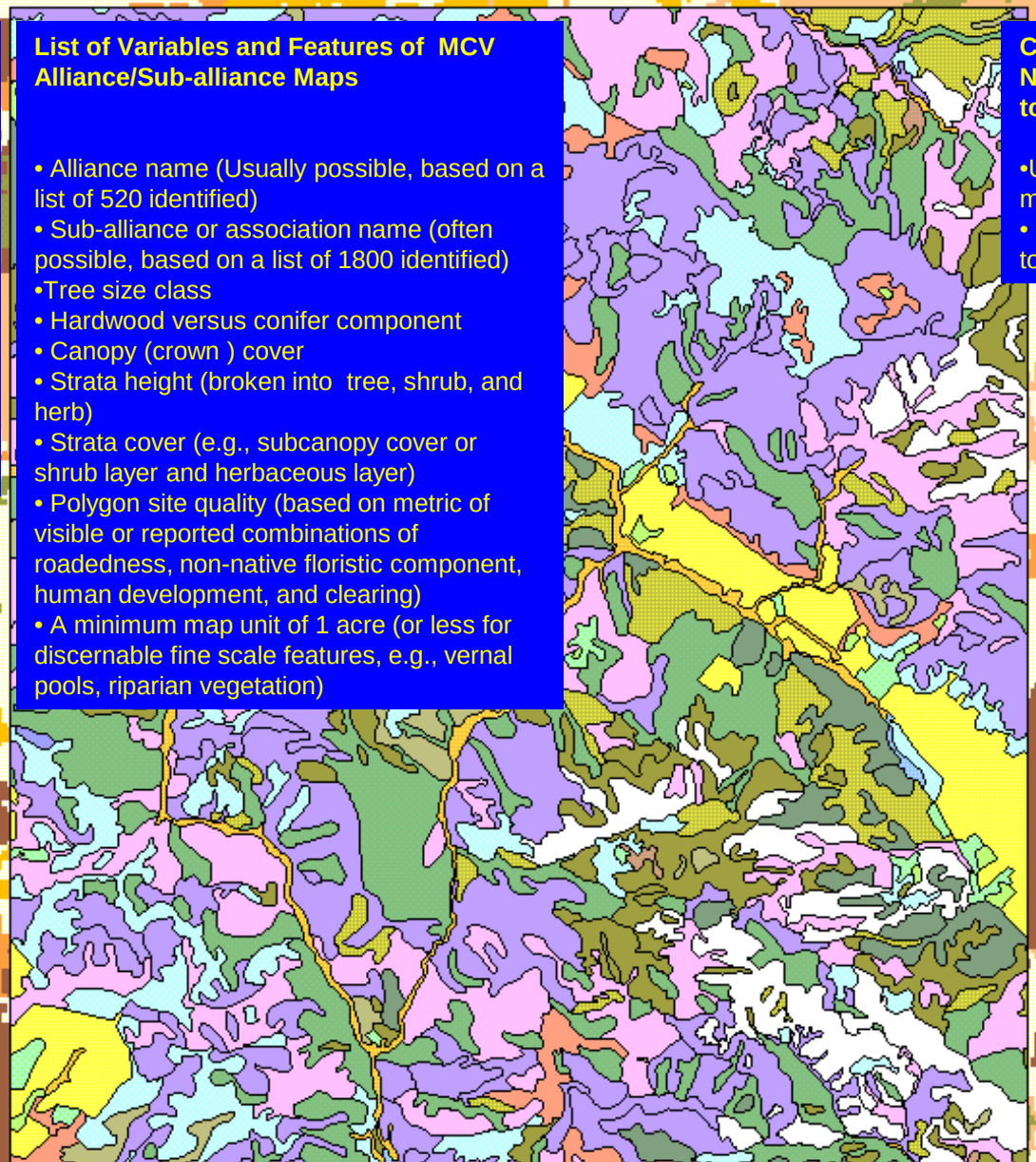
Comparison of Map Attributes and Resolution in Existing Mid-Scale and Fine Scale Approaches

List of Variables and Features of CDF and Forest Service CALVEG Map

- Species groupings, based on CalVeg (220 units identified)
- Tree size class
- Canopy (crown) cover
- No strata height info
- Stand condition (if tree type)
- Productivity (if tree type)
- No site quality information
- A minimum map unit of 2.5 acres.

List of Variables and Features of MCV Alliance/Sub-alliance Maps

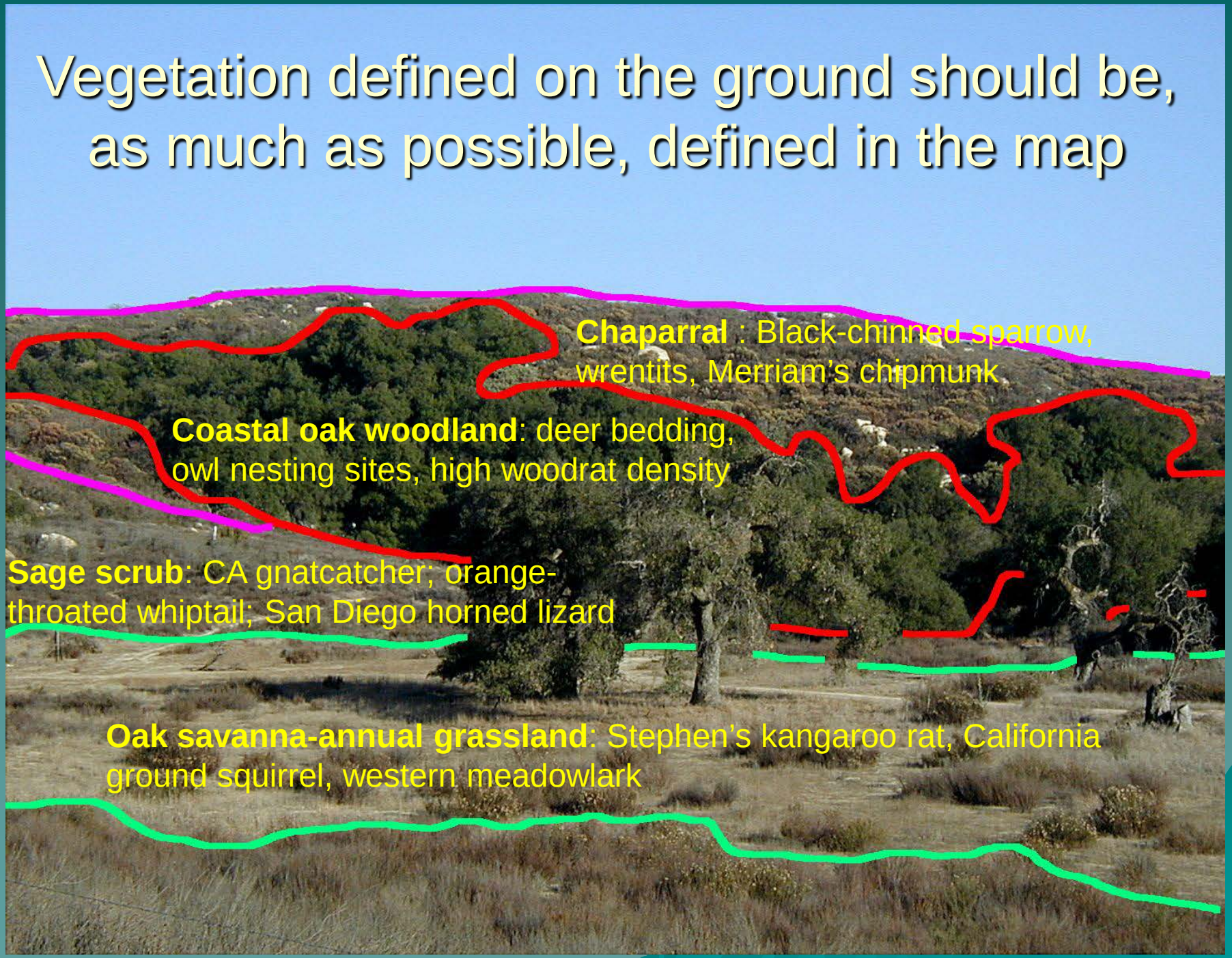
- Alliance name (Usually possible, based on a list of 520 identified)
- Sub-alliance or association name (often possible, based on a list of 1800 identified)
- Tree size class
- Hardwood versus conifer component
- Canopy (crown) cover
- Strata height (broken into tree, shrub, and herb)
- Strata cover (e.g., subcanopy cover or shrub layer and herbaceous layer)
- Polygon site quality (based on metric of visible or reported combinations of roadedness, non-native floristic component, human development, and clearing)
- A minimum map unit of 1 acre (or less for discernable fine scale features, e.g., vernal pools, riparian vegetation)



Comparison of Size and Number of Polygons (CalVeg to MCV)

- Usually about ½ to 1/6 total mapped types
- Usually about ½ the number of total polygons

Vegetation defined on the ground should be, as much as possible, defined in the map



Why vegetation was identified as one of the top needs:

- Allows informed conservation planning and resource management through:
  - improved regional conservation planning,
  - wildland fire/fuels modeling for improved preparedness,
  - identifying potential rare and endangered species locations,
  - predicting the spread of invasive species,
  - early scoping for transportation projects to avoid rather than mitigate impacts,
  - prioritizing land acquisitions for parks and ecological reserves,
  - identifying important wildlife corridors,
  - setting a baseline for monitoring impacts of global climate change.

Key Points of DFG's Vegetation Mapping Initiative

- Statewide coverage across all ownerships
- Large scale, high spatial resolution
- Attribute rich, beyond just a few veg types
- High accuracy assessment scores
- Insanely expensive, but cost effective
- Multiple use product that serves and improves numerous government processes.

Manual of California Vegetation, 2nd Edition – in press

Washingtonia *filifera* intermittently flooded Woodland

***Washingtonia filifera* sole or dominant tree in canopy;** *Salix lasiolepis, Salix gooddingii, S. exigua, Platanus racemosa, Populus fremontii, Alnus rhombifolia, Prosopis glandulosa,* and/or *Fraxinus velutina* may be present. Trees < 30 m; canopy continuous open or intermittent. Shrubs occasional or absent. *Atriplex canescens, A. hymenelytra, A. polycarpa, Baccharis emoryi, Encelia farinosa,* and/or *Suaeda moquinii* may be present. Ground layer sparse. *Distichlis spicata* may form sparse turf. (Plate xx)

Wetlands: soils intermittently flooded. Saturated. Water chemistry: fresh mixosaline. Canyon waterways; along fault lines. Cowardin class: temporarily flooded palustrine forested wetland. The national inventory of wetland plants (Reed 1988) lists *W. filifera* as a FACW. **Elevation:** 0-900 m.

Rarity Ranking: G3 S3.2. **NVCS**: Alliance II.A.2.N.b.1. *Washingtonia filifera* seasonally flooded woodland alliance; Formation: II.A.2.N.b Seasonally flooded temperate broad-leaved evergreen woodland

Synonyms

Holland type: Desert fan palm oasis woodland (62300); **Cheatham & Haller type**: Palm oasis woodland ; **PSW-45 type**: Palm series; **Thorne type**: Desert oasis woodland; **WHR type**: Palm oasis; **Munz type**: Creosote bush scrub; **CalVeg type**: Fan Palm

Membership Rules

Keeler-Wolf *et al.* (1998) *W. filifera* > 3% cover, may share dominance with other riparian trees and large shrubs.

Remarks

Vogl & McHargue (1966) report great floristic variation among oases, however, canyon waterway oases differ consistently from those along fault lines in importance of other species besides *W. filifera*. Between 70 and 100 stands exist in CA. All major *W. filifera* sites have been mapped (CNDDB has data on Rarefind). The Anza-Borrego stands have been re-mapped in 1998 (Keeler-Wolf *et al.* 1998). Variation in Anza-Borrego is defined by at least two associations, see below.

Figure x. *Washingtonia filifera* alliance in California

The fan palm oases of the Colorado and adjacent Sonoran deserts are well known and have been focal points since humans arrived in the desert over 10,000 years ago. Natural disturbance patterns involved both flood and fire, although the latter was frequently used by CA Indians, and now, in a less directed way, by European immigrants for the entire known history of virtually all stands.

W. filifera does not reproduce vegetatively and it typically does not live for more than 150 years (Howard 1992). Seedlings require sunny moist openings for germination. Occasional lightning fires and active burning by Indians opened up the understory for germination sites by killing other competing shrubs and trees. It did not typically kill individuals of *W. filifera* as their bark is extremely fire resistant. The death of the competing species also temporarily increased the flow of the springs or streams affording better germination and growth of the *W.f.* seeds and seedlings (Howard 1992). Flash floods also create openings allowing for germination sites. Lightning fires are a infrequent, but major cause of natural fires in these stands (Howard 1992).

Regional Status

Colorado Desert: (322C) 29 stands are mapped in Anza Borrego (322Cb and adjacent M262Bp). Most stands are tucked away in canyons and have other tall riparian trees such as *Platanus racemosa, Populus fremontii, Salix lasiolepis,* and *Alnus rhombifolia*. A small number of stands exist in the desert lowlands. Most of these stands are similar ecologically to *Prosopis glandulosa* alliance stands and have *Atriplex* and other salt tolerent species. The largest stands known occur in this section (e.g., Thousand Palms oasis). Many of these are on the San Andreas Fault zone in subsection Ca.

Sonoran Desert (322B): Relatively few stands exist in this section, probably the result of the paucity of permanent springs. Gene Wash (Ba) and Corn Springs (Be) are two of the largest stands although both are invaded by *Tamarix* and Data *Palms (Pheonix dactylifera)*.

Mojave Desert (322A): Although groves have been widely planted over the past 100 years only a few long-standing sites for this alliance are known. Several occur in Joshua Tree National Park (Ap).

Management Considerations

Many California palm oases have been destroyed by agricultural and urban development. Others have been eliminated due to loss of oases water sources. California palm is sensitive to any change in water level; either a lowering of water tables or the inundation of root systems may kill plants. Other phreatophytes competing for limited water resources can also greatly effect how much water will be available to palms. Increases of mesquite in the understory of some spring stands are probably an additional cause of the water table drop. Tamarix spp., with its extremely high evapotranspiration rate, can dry up or reduce the yield of oases seeps and springs. Tamarix sp. Is displacing California palm in some areas. (See the FEIS write-up on *Tamarix ramosissima* for information regarding the control of saltcedar.) Near the San Andreas Fault, palms receiving percolating water through rock fractures sometimes perish when the fault shifts, eliminating or relocating seeps. Outlying California palm oases are popular destinations for hikers, and oliv enthusiasts. Vegetational disturbance, vandalism, and theft of Indian relics by recreationists are of continuing management concern.

Reported Occurrences

Vogl & McGargue (1966) report on 24 oases in Colorado Desert and Sonoran Desert (322 B & C). CNDDB (2003) has mapped locations of 74 stands.

Associations

Spolsky (1979) and Keeler-Wolf *et al.* 1998) *W. filifera-Platanus racemosa* (a canyon type), Keeler-Wolf *et al.* (1998) *W. filifera/Prosopis glandulosa* (as fan palm-spring type)[n=4].

General References

Howard, Janet L. 1992. *Washingtonia filifera*. In: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (2003, January). Fire Effects Information System, [Online]. Available: http://www.fs.fed.us/database/feis/

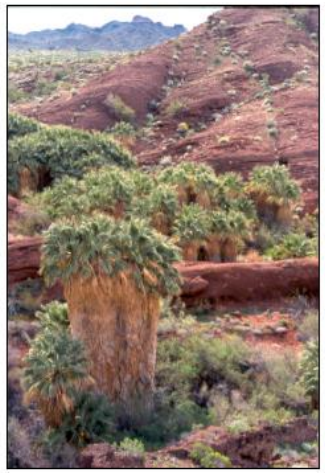


Figure x. *Washingtonia filifera* stand, Whipple Mountains, Eastern Riverside Co.

Figure x. *Washingtonia filifera* stand, Cottonwood Spring, Joshua Tree N.P.

Why do this now?

- Methodology has been refined and proven
- Advances in GIS, GPS and computer technologies make a project of this scope practical
- Statewide GIS plan is being prepared
- The second edition of the Manual of California Vegetation is in press
- Demand is at an all-time high
  - Universal usage of GIS and analytical methods
  - Infrastructure bonds and land acquisition bonds
- Constituent support is very strong