SCAG Conservation Framework and Assessment

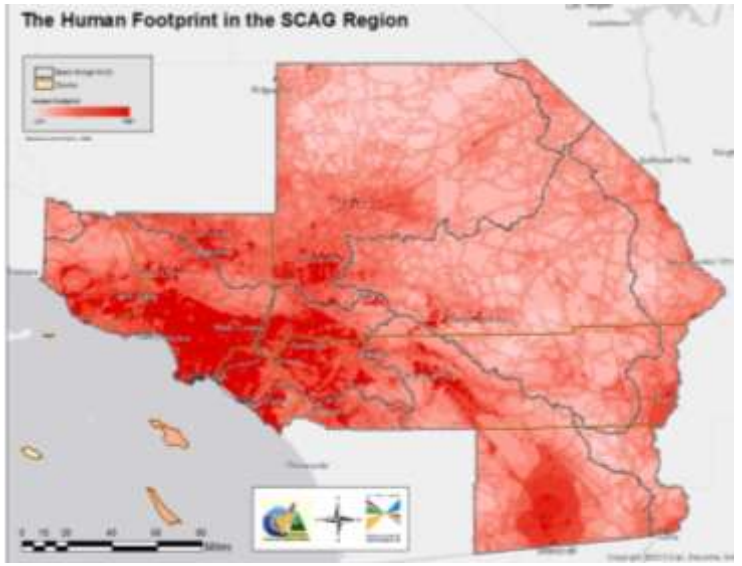
December 16th, 2014

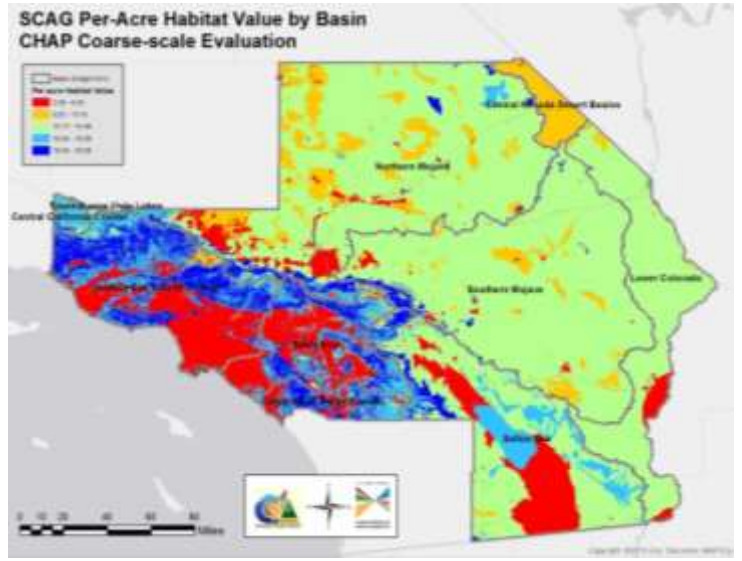
Northwest Habitat Institute

SOUTHERN CALIFORNIA ASSOCIATION of GOVERNMENTS

In today's presentation:

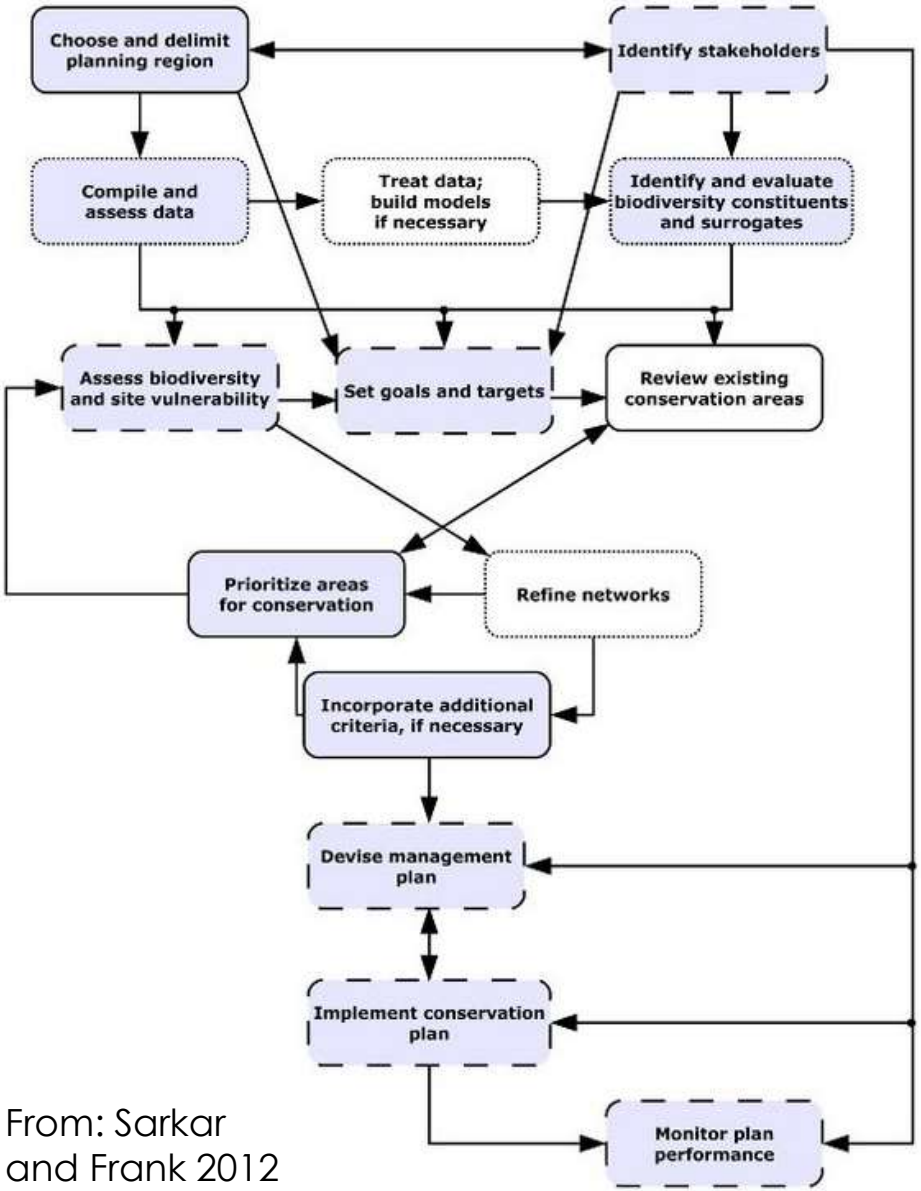
- Regional conservation planning
  - Approaches
  - Framework
- CHAP approach
  - Mitigation
  - Ecosystem services
- CHAP habitat assessment
  - Coarse scale
  - Fine scale (Prado)
- Conservation strategy next steps





Why do we need conservation planning?

Human population and biodiversity are not distributed evenly.



From: Sarkar and Frank 2012

Stages of Systematic Conservation Planning

Conservation Planning Approaches

- *Ad hoc* establishment of conservation areas
- Subjective, consensus-based workshops
- Quantitative, data-driven
- Combination of quantitative and stakeholder-driven techniques

Conservation Planning Approaches

Coarse Filter

- Assessment of biological diversity based on species and habitat
- Assumes vegetation/habitats serves as surrogates for ecosystems and elements of biodiversity

Fine Filter

- Applies local information, usually at local level
- Exemplified by action taken under ESA to recover individual at-risk species

Important Components of Quantitative Approaches

- Well-defined goals
- Appropriate spatial scale
- Conducting analysis at several scales
- Understanding of limitations of maps
- Appropriate units for the analyses
- Indices of viability and threat

Guiding Principles for a Conservation Framework

- Based on scientific principles
- Frame a common understanding of biological realities related to conservation
- Emphasize the interactions between species, habitat, and functions (including human actions)
- Recognize the dynamic nature of ecosystems and role of climate; importance of biological diversity
- Management is adaptive and citizens can play a key role in monitoring

[See Box 1 of report (page 6)]

CHAP Approach

- Ecosystem-based habitat evaluation framework
- Uses a habitat and biodiversity system to assess multiple **species**, **habitat** features, and **functions** by habitat type (O'Neil et al. 2012)

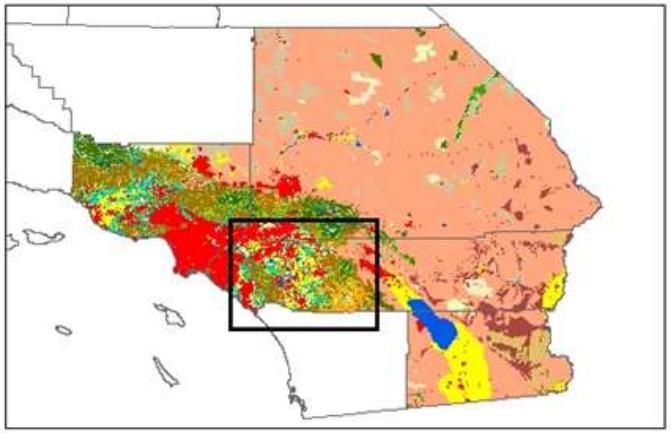
  - At the fine scale, includes an inventory of habitat components and their relationship to ecological functions performed by species.
- CHAP method is a biological accounting system capable of evaluating impacts (debits) and mitigation (credits) at a site.

CHAP Approach

CHAP Approach

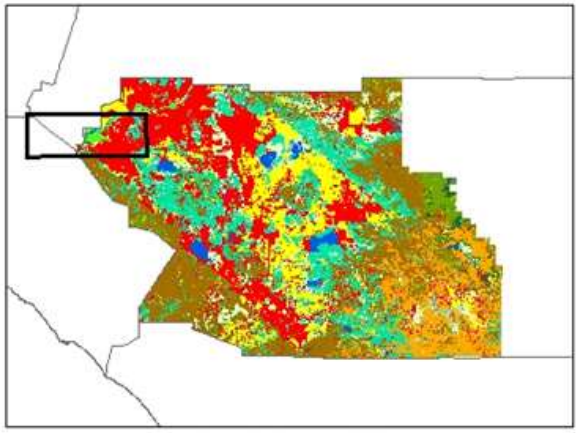
Hierarchical Habitat Mapping

Region: Coarse Level



1) Consistent region-wide habitat map across county boundaries.
2) Change detection capabilities with previous and future versions.
3) Support for decision making at a landscape level.

Intermediate Level



1) Refined habitat and structure mapping.
2) Improved delineation of unique habitat/structural habitat combinations.

Site: Fine Level

1) Site-specific habitat structure and KEC mapping.
2) Support for debiting and crediting protocols for mitigation and impact assessment.

Steps for Mitigation

- Determine project's boundaries
- Field Data Collection
- Develop a species list
- Data Compilation

Step 1: Determine a Project's Boundaries

Step 2: Field Data Collection

ID	TITLE_NAME	SCI_NAME
A001	California Tiger Salamander	Ambystoma californiense
A004	California Giant Salamander	Dicamptodon ensatus
A006	Rough-skinned Newt	Taricha granulosa
A007	California Newt	Taricha torosa
A012	Ensatina	Ensatina eschscholtzii
A014	California Slender Salamander	Batrachoseps attenuatus
A020	Black Salamander	Aneides flavipunctatus
A022	Arboreal Salamander	Aneides lugubris
A028	Western Spadefoot	Spea hammondii

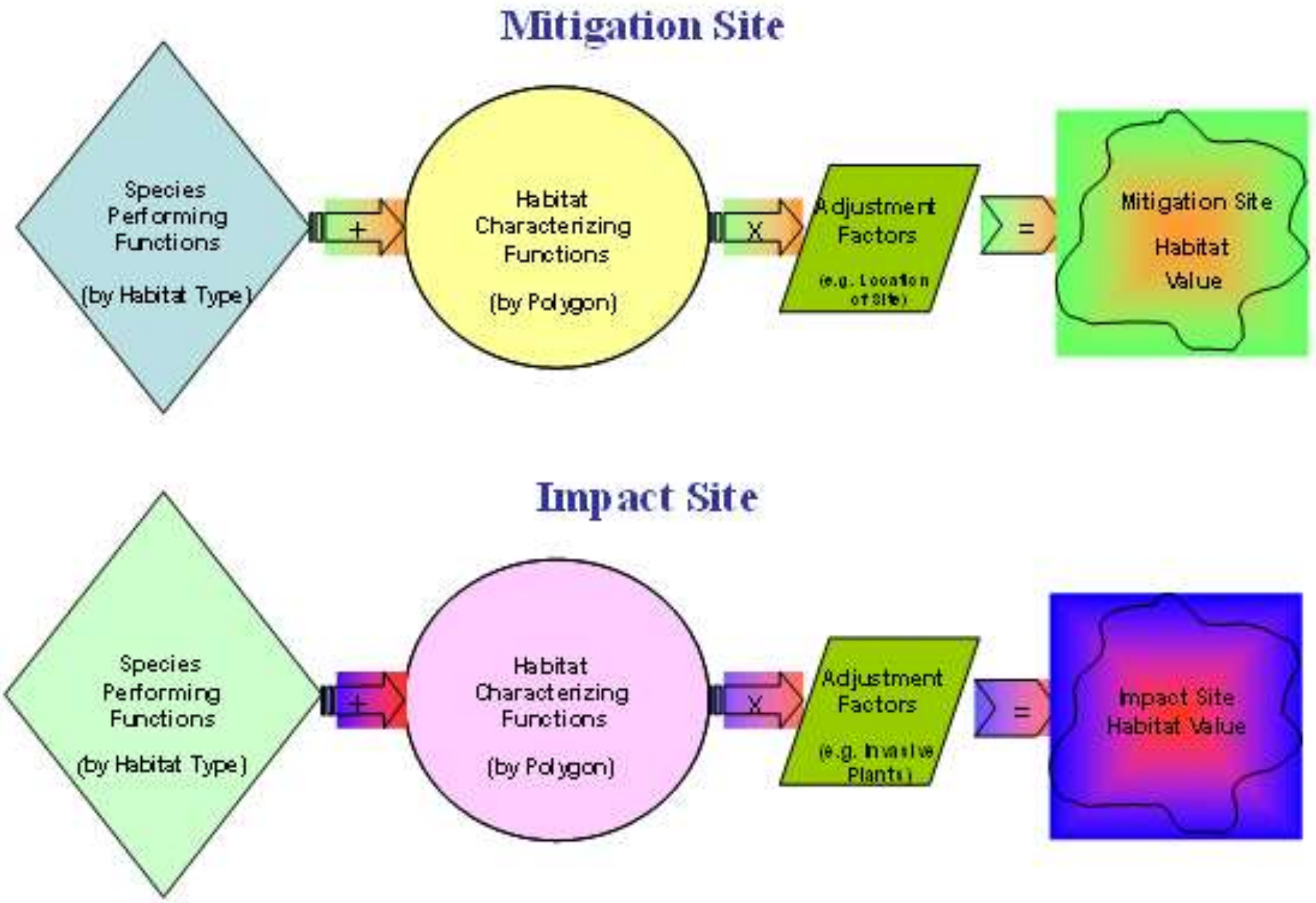
Step 3: Species List

Step 4: Data Compilation

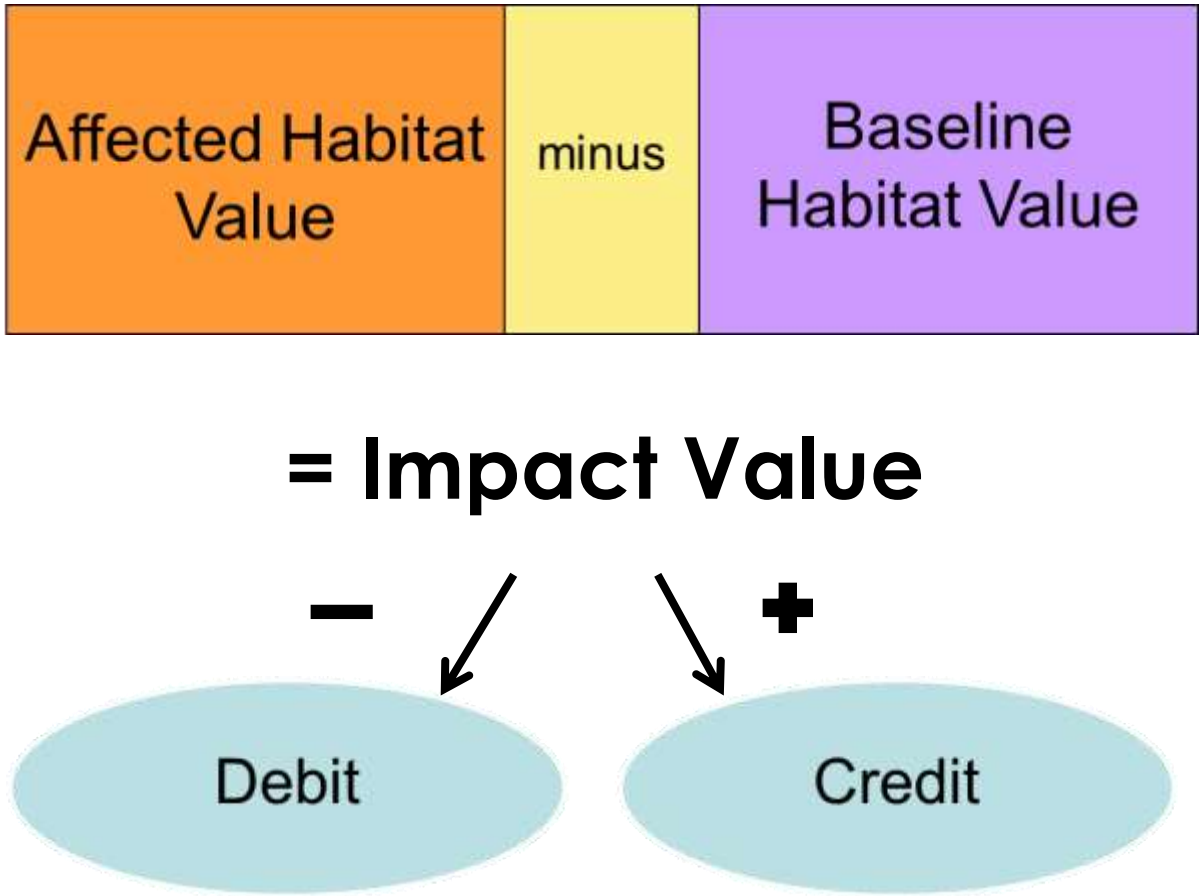
- Baseline data from the mapping and field inventory is used to generate two relationship matrices including
  1) a potential species by function (KEFs) matrix
  2) a habitat (KECs) by function (KEFs) matrix

- To create these matrices, each species is linked to the associated habitat elements (KECs) and functions (KEFs).

CHAP Approach



CHAP Approach



Advance Mitigation

- Advance mitigation is a form of mitigation constructed in advance of a permitted impact.
- The coarse-scale CHAP per-acre values developed for each basin can give planners a relative idea of the value of each habitat type for the purposes of advance mitigation.
- The coarse-scale value is an estimate, and if sites are purchased then a fine-scale CHAP analysis of the impact and mitigation areas would be needed for a more precise value and tracking.

Definition of Terms

- **Mitigation**
  - "Environmental mitigation is typically a part of an environmental crediting system established by governing bodies which involves allocating debits and credits."
  - "Steps taken to avoid or minimize negative environmental impacts."
  - "Steps taken to achieve a goal of no overall net loss of values and functions."

- **Advance Mitigation**
  - "A process in which the impacts from one or many transportation (or infrastructure) projects are estimated and addressed before or during the planning phase."

Definition of Terms

- **Universal site-selection criteria**

  Those site-selection criteria that apply to site selection for all mitigation projects, including on-site and off-site, in-kind and out-of-kind. The following universal criteria are categorized as those relating to watershed position, connectivity of aquatic resources, function to be mitigated, and the durability or sustainability of mitigation actions at a site

- ***Watershed position criteria***

  Site is identified in a watershed or other landscape scale plan as important or critical to aquatic ecosystem functions or other environmental priorities, where watershed plans exist, *and* has potential to address established objectives.

  Site is on same stream type as impacts being mitigated.

Definition of Terms

- ***Connectivity of aquatic resources criteria***

  Where primarily in-channel mitigation is proposed, associated floodplain and associated riparian corridor is unconstrained and fully functioning, *or* mitigation includes restoration of floodplain and riparian corridor.

  Access to site by aquatic organisms (not limited to fish) is not limited by downstream man-made passage barriers *or* includes passage remedy, if appropriate to the functions being replaced/restored.

- ***Function specificity criteria***

  Site provides opportunity to improve functions identified as priorities for restoration in the sub-basin, or functions that are most likely to influence and enhance other functions, as indicated by their influence rank.

  Site provides opportunity to improve multiple functions identified as limiting or constrained in a watershed context.

- ***Durability criteria***

  Site provides for enduring and sustainable benefits through existing or new protections such as easements or public ownership.

  Site lacks conflicting adjacent land uses that would compromise function and is generally self-sustaining

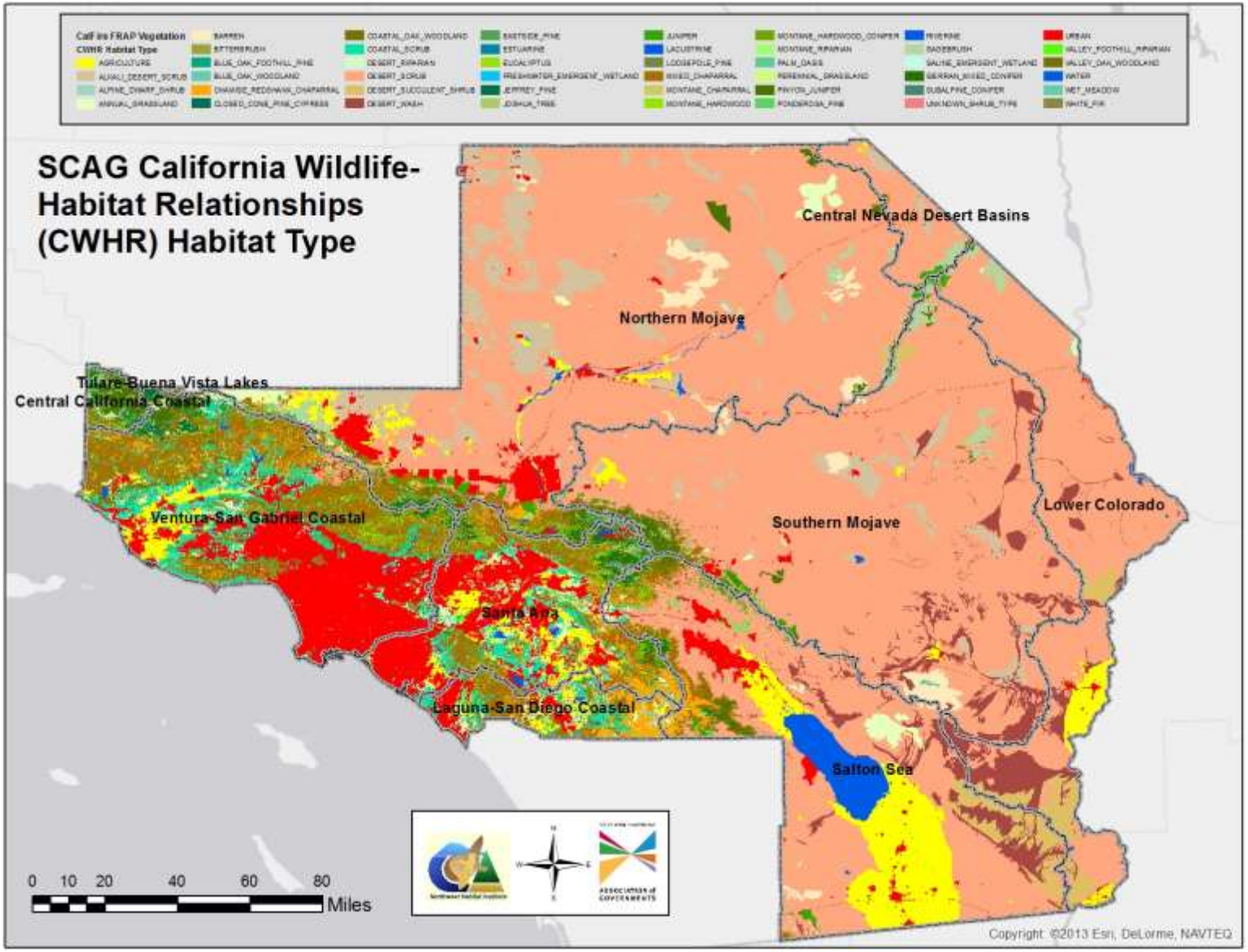
USEPA/*Nadeau Excerpted from "Draft Functional Assessment Framework"* January 2012

SCAG Regional CHAP Assessment

Coarse-scale Assessment

CHAP Assessment

CHAP Assessment



CHAP Assessment

Range Maps

Habitat Types

Habitat Associations

BITTERBRUSH
BLUE OAK WOODLAND
BLUE OAK-FOOTHILL PINE
CHAMISE-REDSHANK CHAPARRAL
COASTAL OAK WOODLAND
COASTAL SCRUB
DESERT RIPARIAN
DESERT WASH
EUCALYPTUS
JUNIPER
MIXED CHAPARRAL
MONTANE CHAPARRAL
MONTANE HARDWOOD
PINYON-JUNIPER
PONDEROSA PINE
SAGEBRUSH
VALLEY FOOTHILL RIPARIAN
VALLEY OAK WOODLAND

Key Ecological Functions:

BLUE-GRAY GNATCATCHER

Trophic relationships:
- heterotrophic consumer
  - secondary consumer (primary predator or primary carnivore)
    - invertebrate eater
      - terrestrial invertebrates

Prey relationships:
- prey for secondary or tertiary consumer (primary or secondary predator)

Organismal relationships:
- nest parasite
  - common interspecific host

Species List

- Generated by intersecting CWHR species range maps with basins within the SCAG regional boundary
- CWHR range maps do not include fish species

Animal Type	# of Species	# Listed	% Listed
Amphibian	23	4	17
Bird	333	20	6
Mammal	111	11	10
Reptile	72	5	7
Total	539	40	7

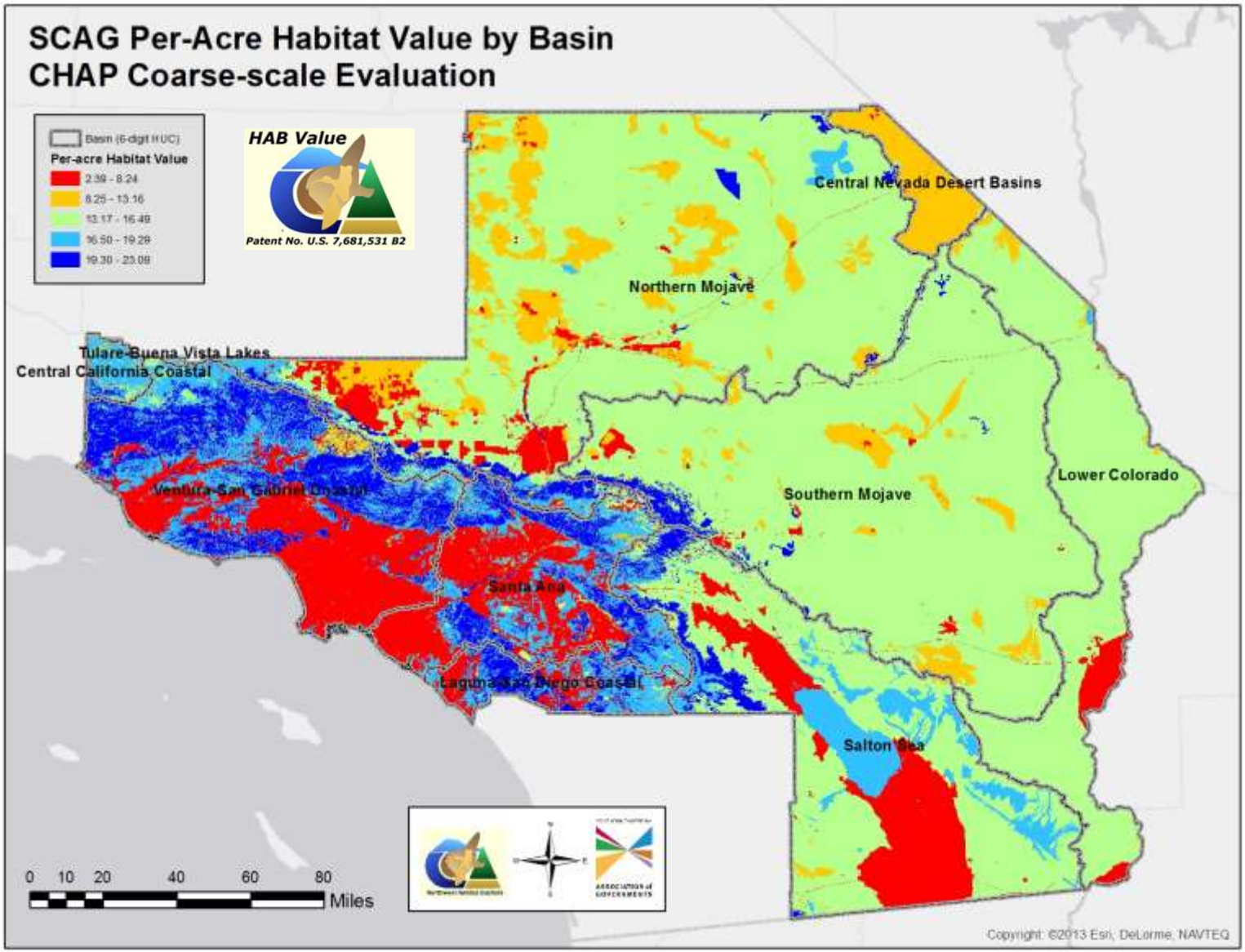
Mean Functional Redundancy Index (MFRI)

Valley Foothill Riparian	Function 1 Disperses Seeds/Fruits (through ingestion or caching)	Function 2 Breaks up Down Wood	Function 3 Primary Burrow Excavator (underground)	Function 4 Eats Terrestrial Invertebrates
Acorn Woodpecker	1	1	0	1
Black Bear	1	1	1	1
California Newt	0	0	0	1
Yellow Warbler	0	0	0	1

Coarse-scale Habitat Values

HUC 6 NAME	WHR NAME	Acres	MFRI
Santa Ana	PERENNIAL GRASSLAND	313.59	17.62
Santa Ana	PINYON JUNIPER	8098.78	19.49
Santa Ana	PONDEROSA PINE	552.75	18.71
Santa Ana	SAGEBRUSH	6420.16	14.98
Santa Ana	SALINE EMERGENT WETLAND	627.13	13.43
Santa Ana	SIERRAN MIXED CONIFER	68513.23	17.08
Santa Ana	SUBALPINE CONIFER	8956.67	8.46
Santa Ana	URBAN	584331.57	4.41
Santa Ana	VALLEY FOOTHILL RIPARIAN	11062.28	22.92

CHAP Assessment



CHAP Assessment

Riparian

Grassland

In general, riparian and woodland habitats will have a higher functional redundancy than grassland and desert habitats. But that does not mean than one is more important in terms of conservation.

Pilot Fine-scale Assessment

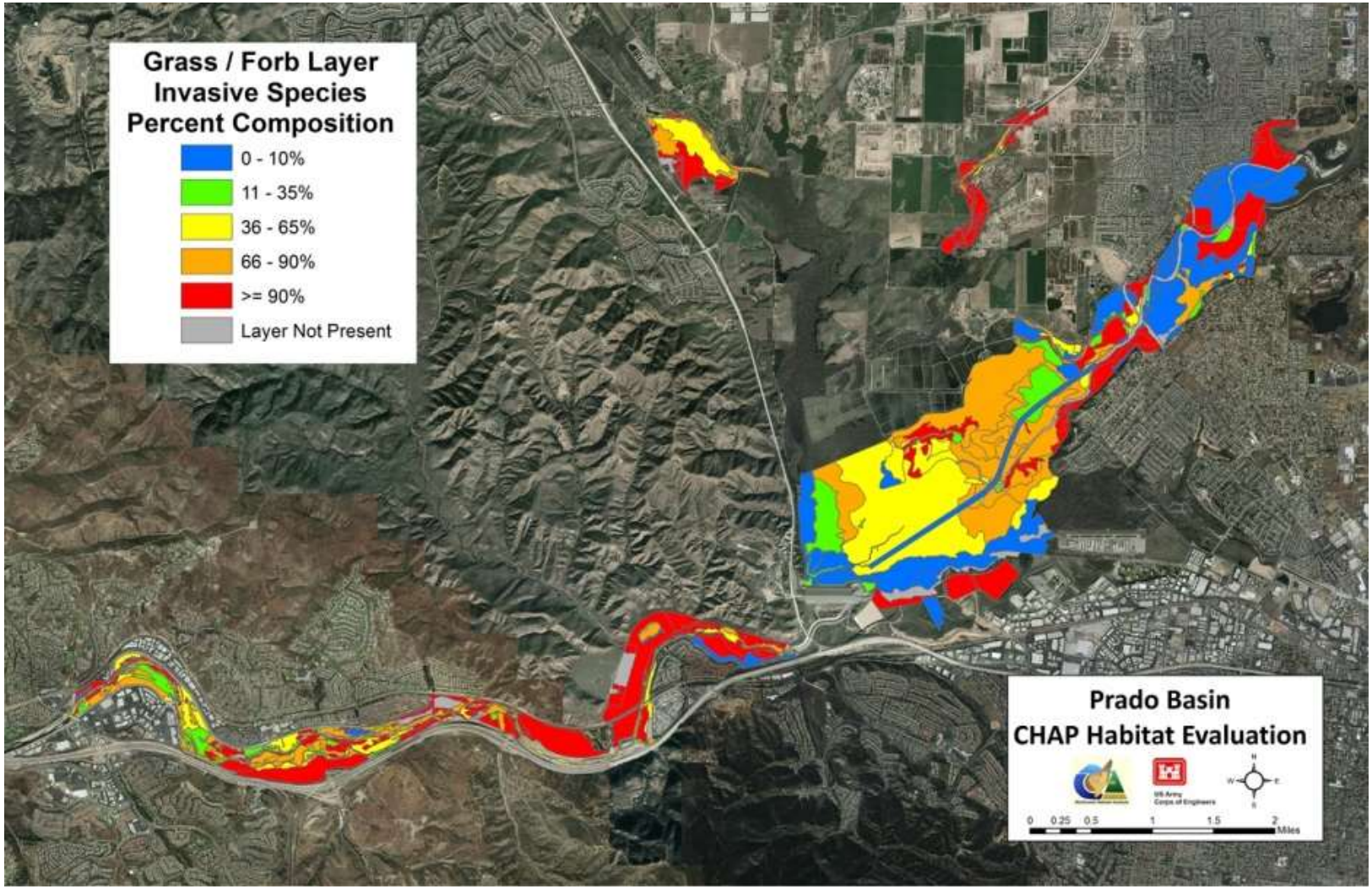
Prado Basin

CHAP Assessment

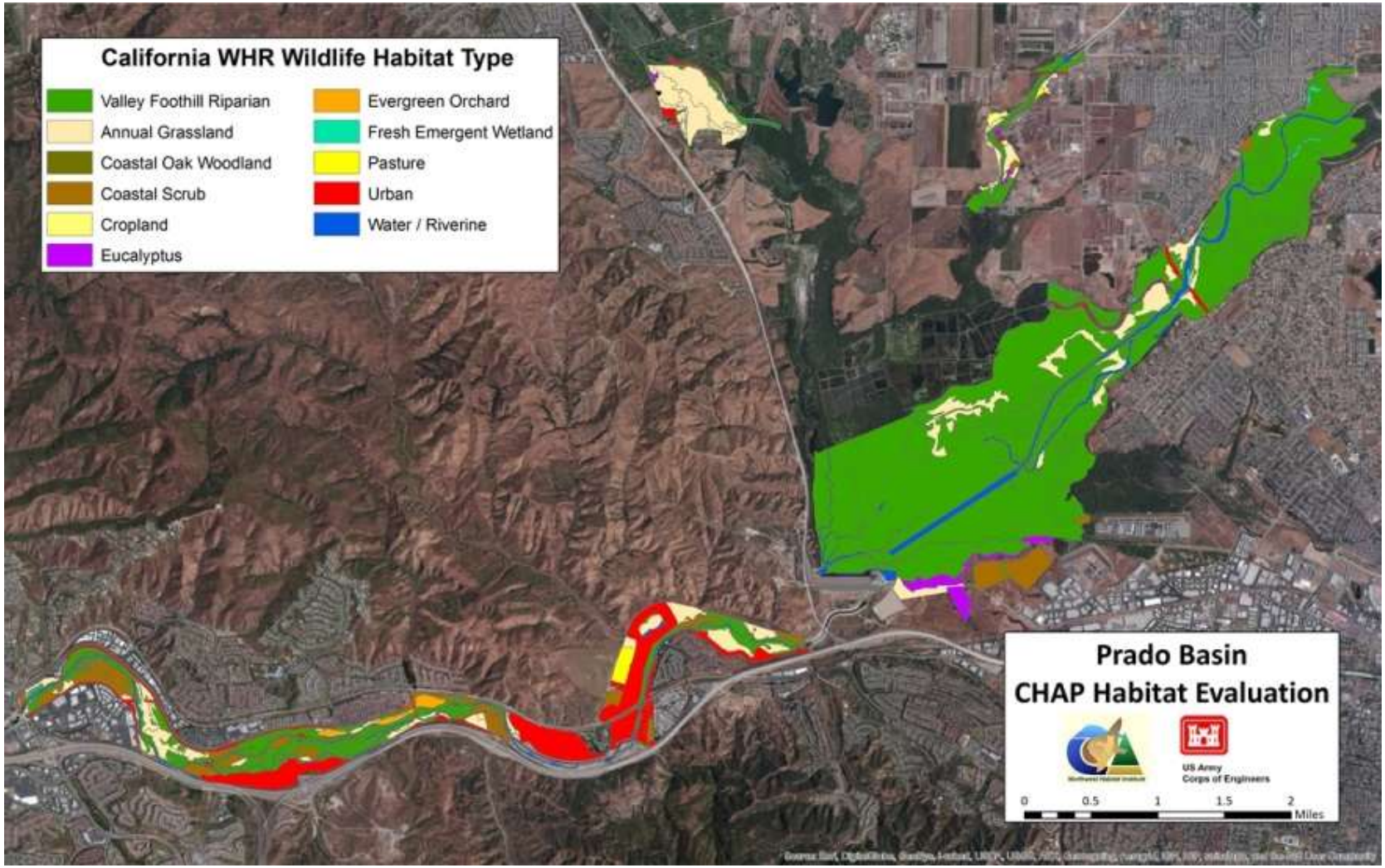
Fine-scale CHAP Methods

- Form a Habitat Evaluation Team
- Create a species list
- Preliminarily map study site
- Conduct field inventory
- Finalize mapping and data entry
- Run calculations
- Produce report

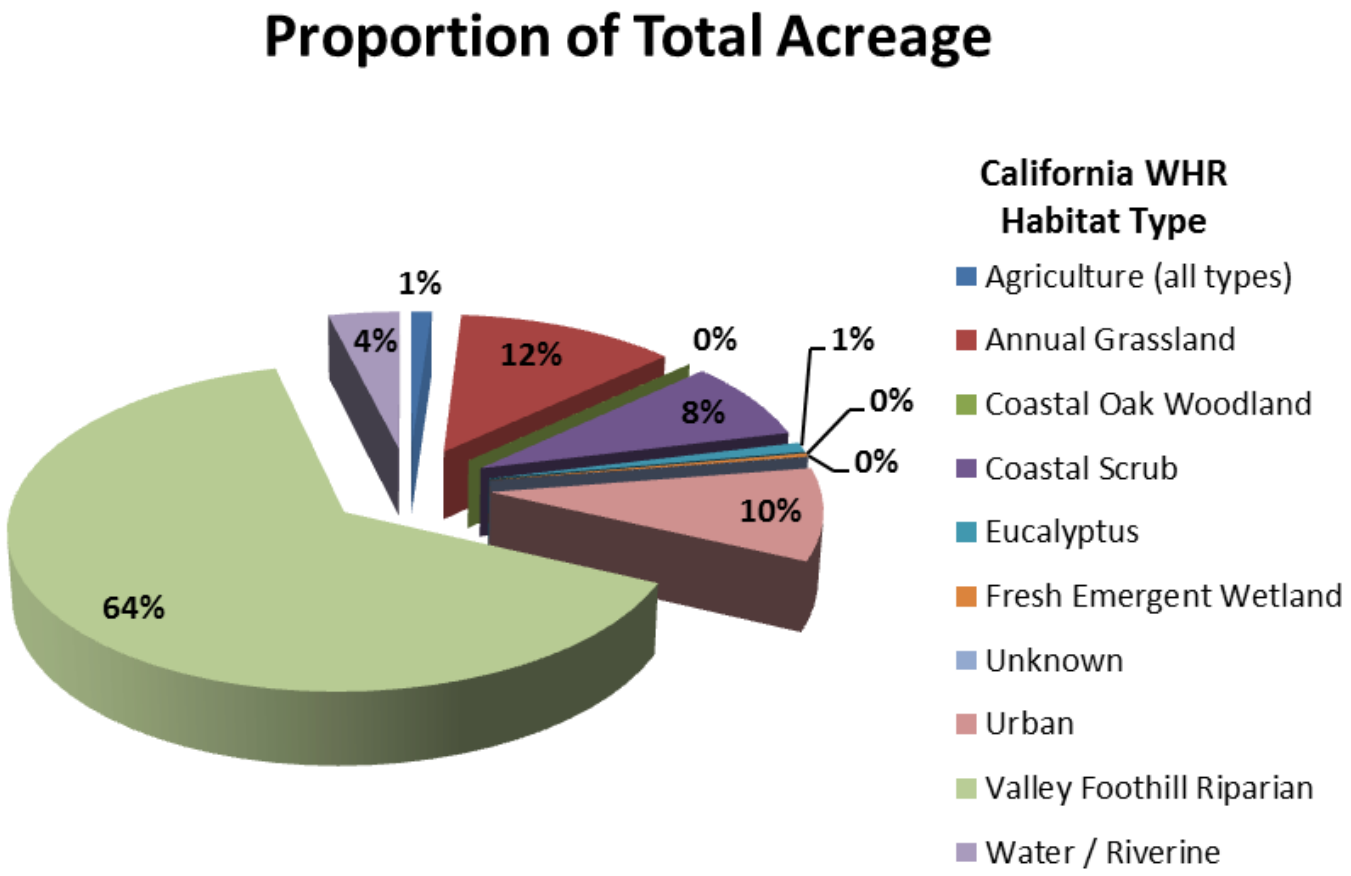
CHAP Assessment



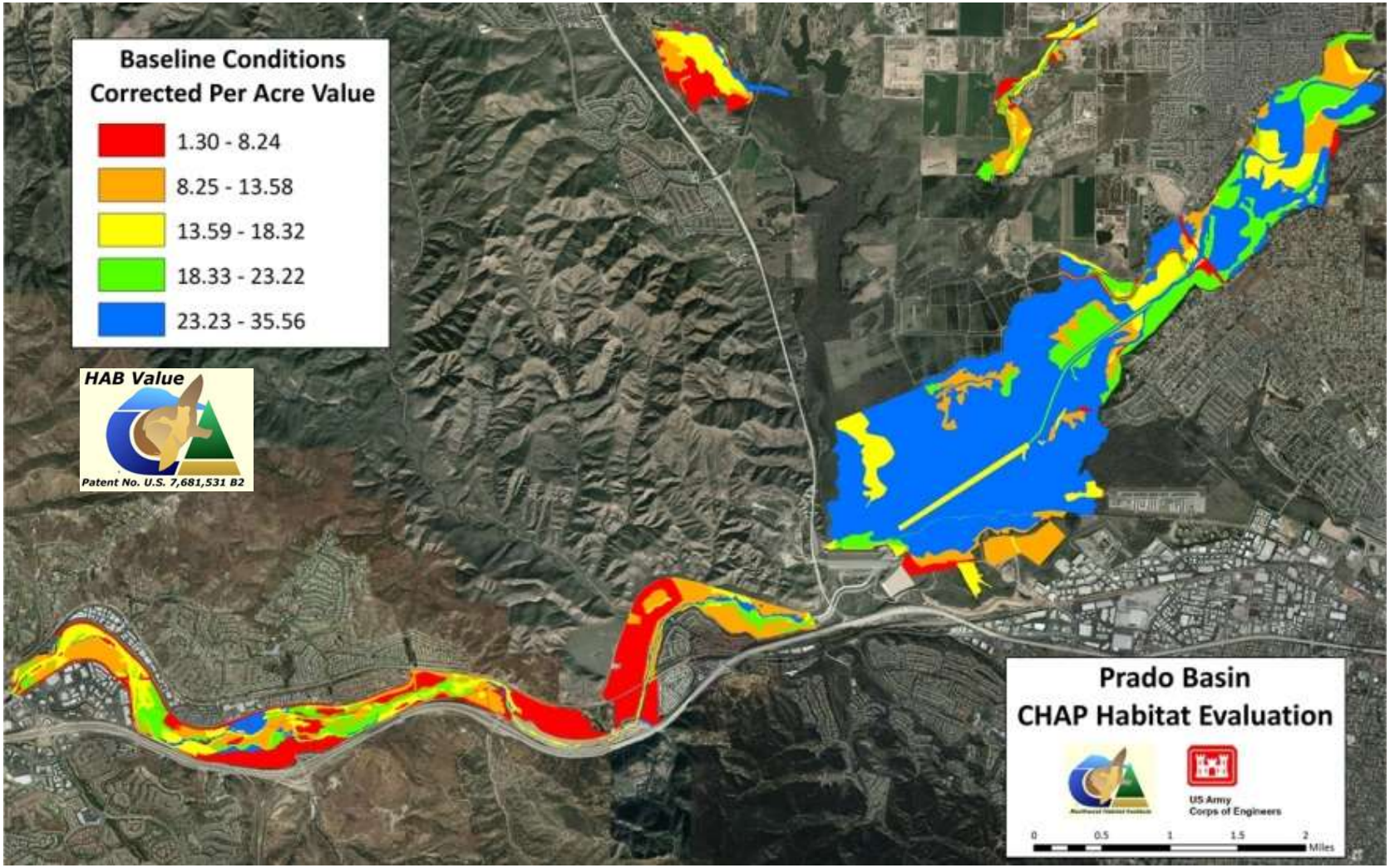
CHAP Assessment



CHAP Assessment



CHAP Assessment



Comparison of Coarse- to Fine-scale Analyses

- Species lists

  - Fine-scale species list is reviewed and refined by habitat evaluation team.

- Habitat Value

  - Fine-scale includes aerial and field mapping of habitats, structural conditions, KECs, and invasive plant species.

Building a Conservation Strategy

Prioritizing conservation actions

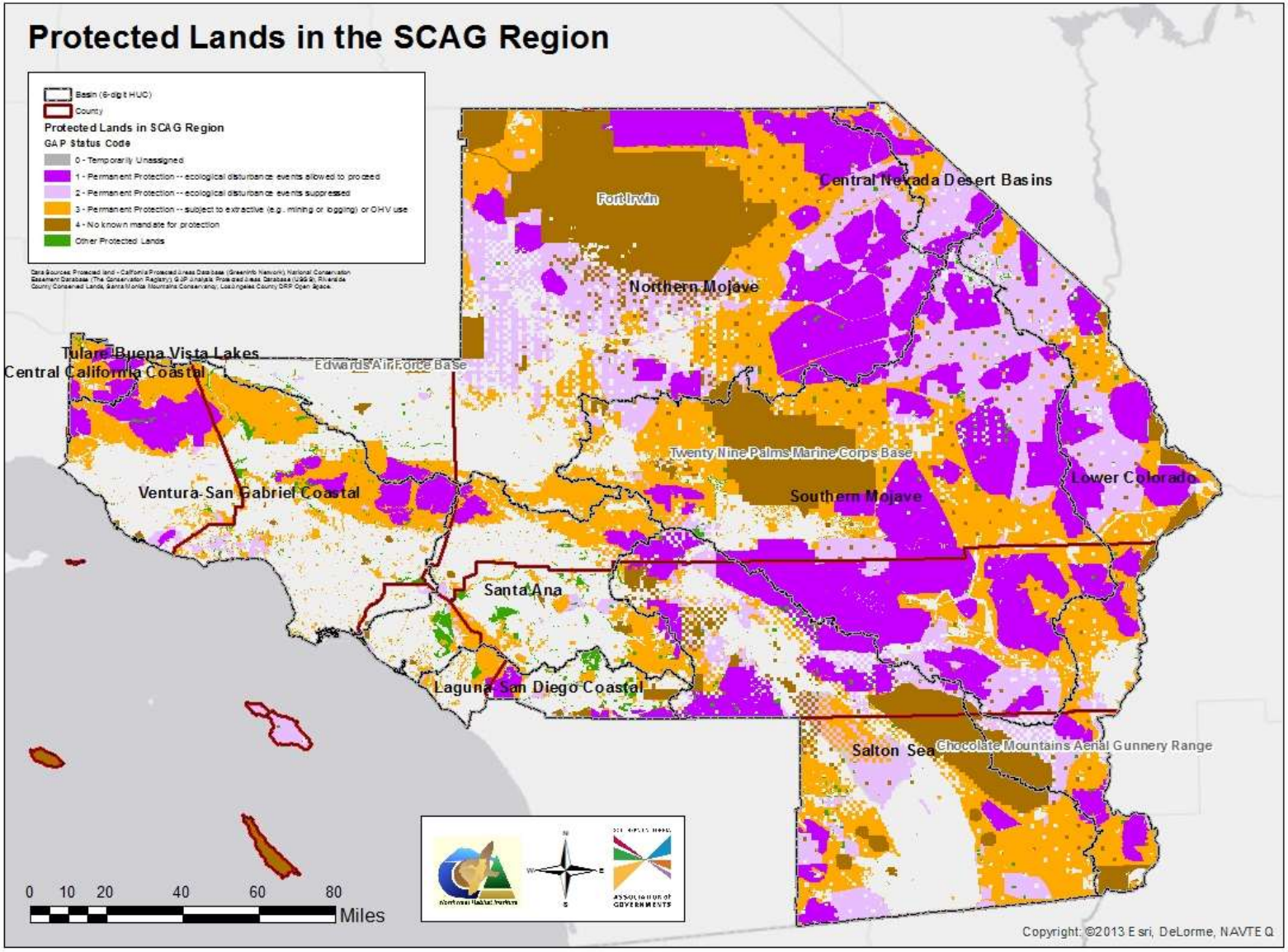
Protected Areas Should:

- Represent the biodiversity of a region
- Promote the long-term survival of species and other elements of biodiversity by maintaining natural processes and by excluding threats (in other words, promote ecological integrity)

Representation

- Ensure the full spectrum of habitat types are represented within a protected areas network.
- Fine-scale community and species needs should also be taken into account as these may be left out of a coarse-scale analysis of representation.

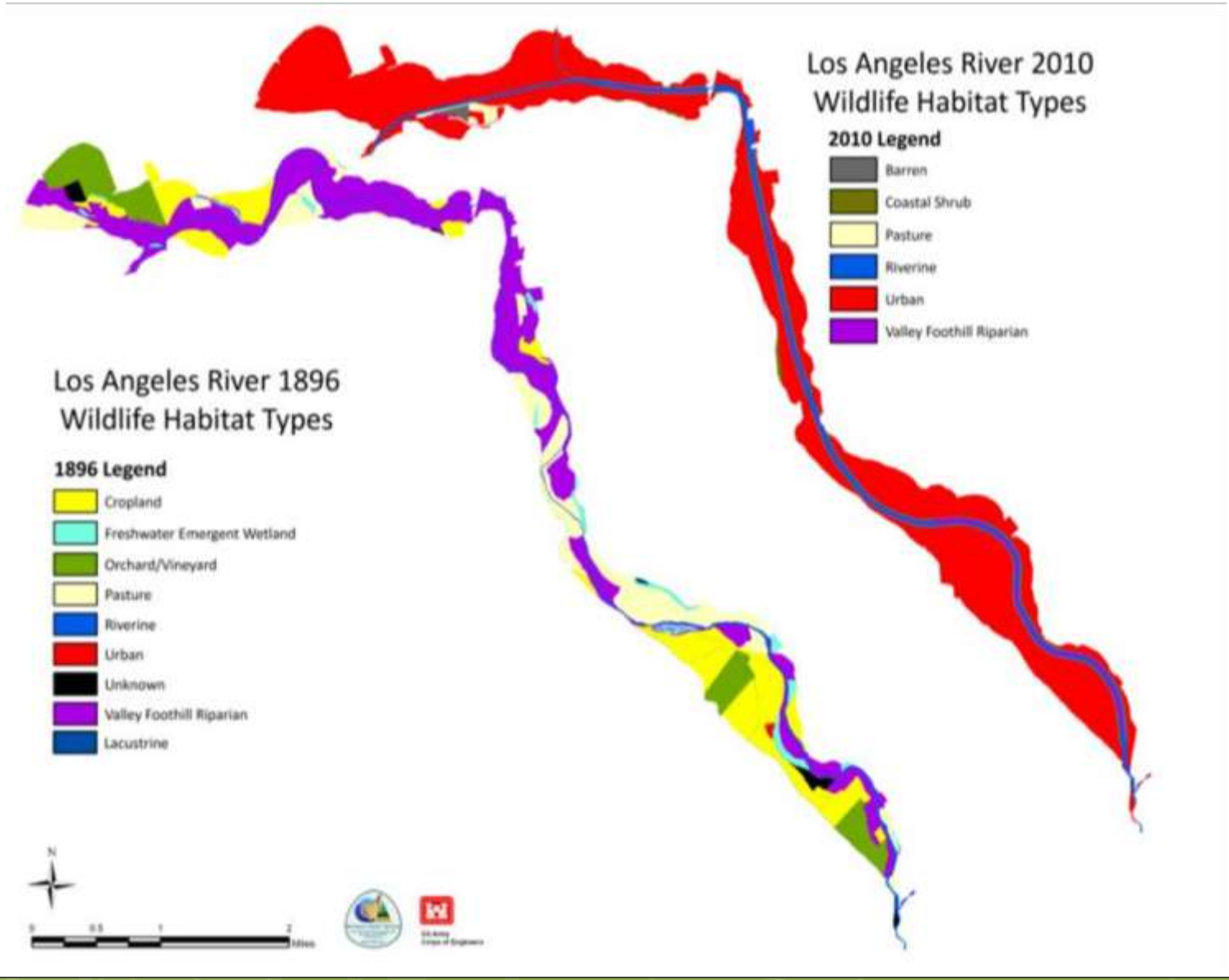
Next Steps


Protected Lands in the SCAG Region
Basin (6-digit HUC)
County
Protected Lands in SCAG Region
GAP Status Code
0 - Temporarily Unassigned
1 - Permanent Protection -- ecological disturbance events allowed to proceed
2 - Permanent Protection -- ecological disturbance events suppressed
3 - Permanent Protection -- subject to extractive (e.g., mining or logging) or OHV use
4 - No known mandate for protection
Other Protected Lands
Fort Irwin
Central Nevada Desert Basins
Northern Mojave
Tulare Buena Vista Lakes
Central California Coastal
Edwards Air Force Base
Twenty Nine Palms Marine Corps Base
Lower Colorado
Ventura-San Gabriel Coastal
Southern Mojave
Santa Ana
Laguna San Diego Coastal
Salton Sea
Chocolate Mountains Aerial Gunnery Range
0 10 20 40 60 80
Miles
Copyright: ©2013 Esri, DeLorme, NAVTEQ

Santa Ana Basin

- Protected areas cover 7% of the basin.
- Less than 3% of Valley Foothill Riparian habitat is protected.
- 4% of Coastal Scrub is protected.
- 89% of Subalpine Conifer has protected status.

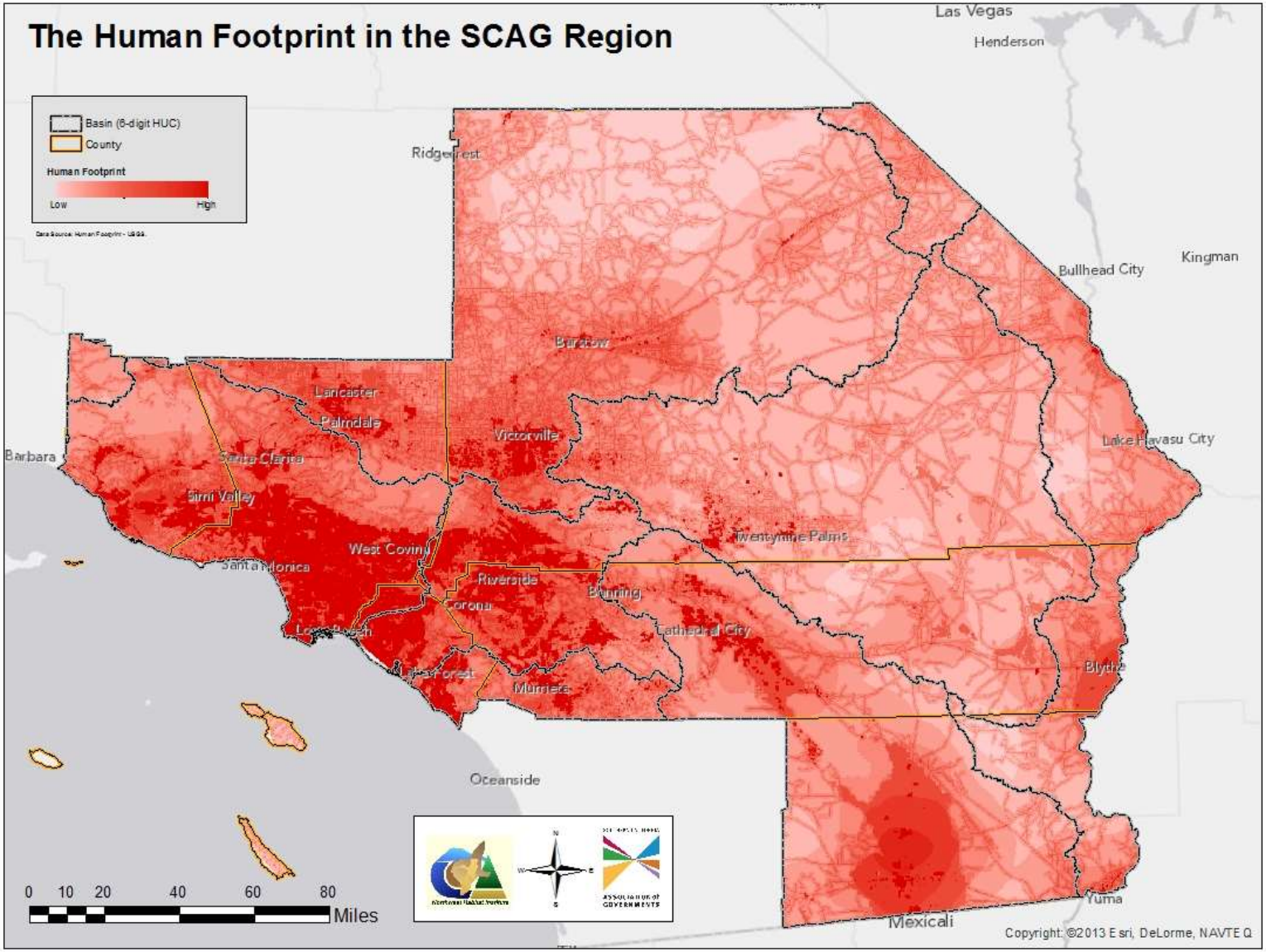
Next Steps


Los Angeles River 2010
Wildlife Habitat Types
2010 Legend
Barren
Coastal Shrub
Pasture
Riverine
Urban
Valley Foothill Riparian
Los Angeles River 1896
Wildlife Habitat Types
1896 Legend
Cropland
Freshwater Emergent Wetland
Orchard/Vineyard
Pasture
Riverine
Urban
Unknown
Valley Foothill Riparian
Lacustrine
N
0
0.5
1
2
Miles

Ecological Integrity

- An intact and well-functioning ecosystem.
- Stresses from human activity threaten ecological integrity.

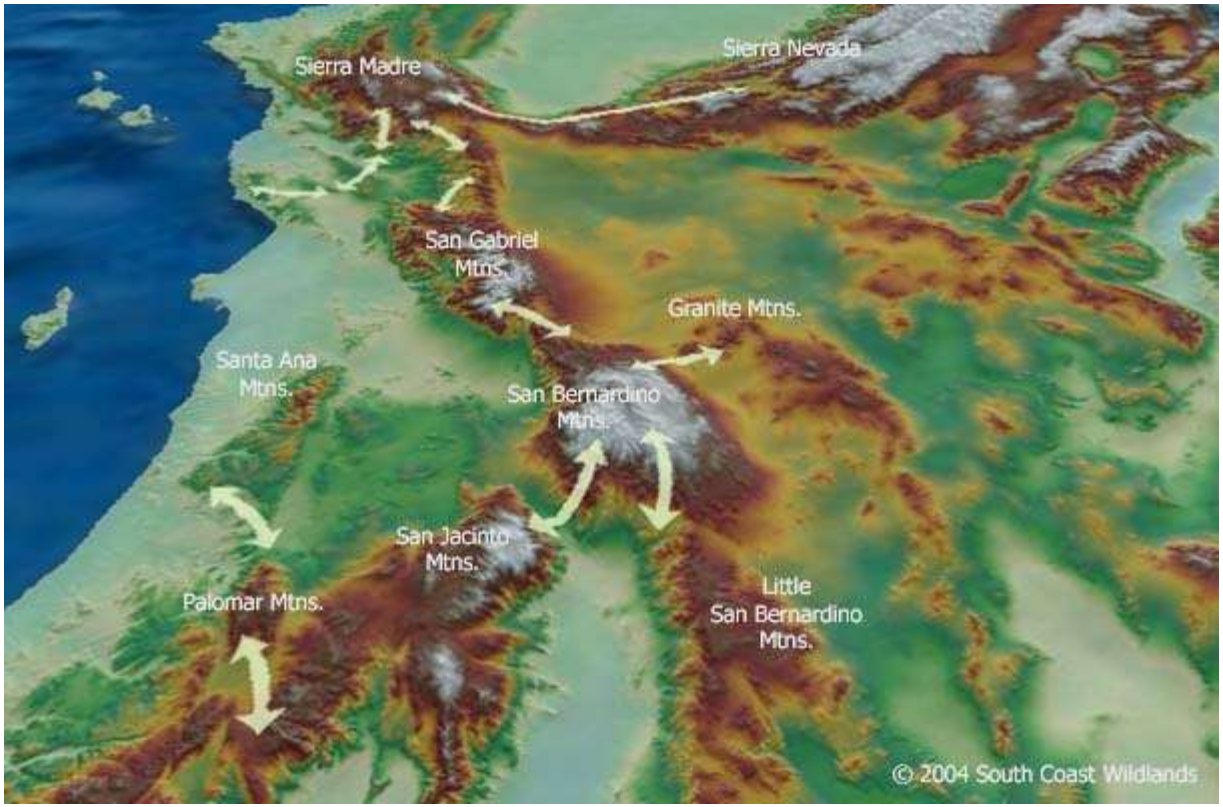
Next Steps


The Human Footprint in the SCAG Region
Basin (6-digit HUC)
County
Human Footprint
Low
High
Las Vegas
Henderson
Ridgecrest
Kingman
Bullhead City
Barstow
Lancaster
Palmdale
Victorville
Lake Havasu City
Barbara
Santa Clarita
Simi Valley
West Covina
Santa Monica
Riverside
Corona
Twentynine Palms
Banning
Cathedral City
Blythe
Murrieta
Oceanside
Yuma
Mexicali
0 10 20 40 60 80
Miles
Copyright: ©2013 Esri, DeLorme, NAVTEQ

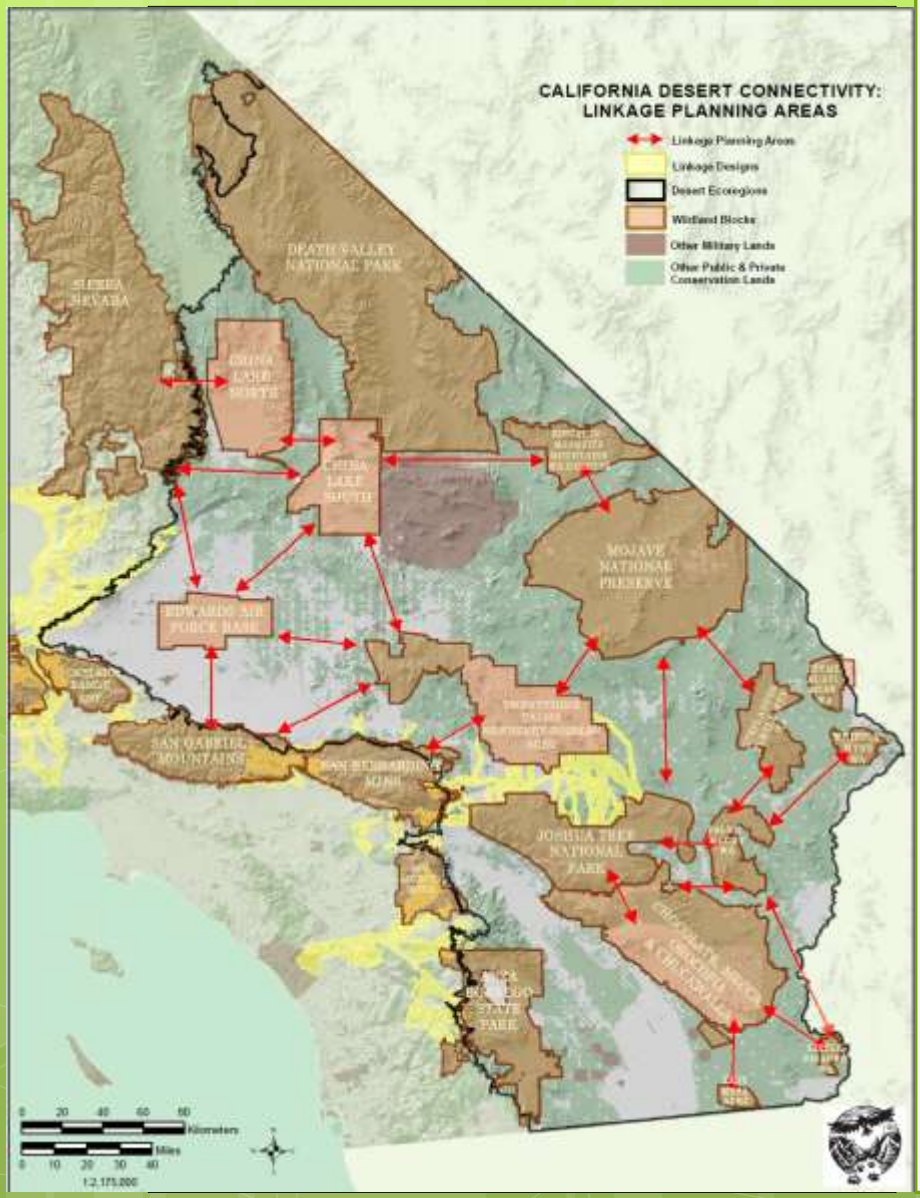
Connectivity

- Important for gene flow and animal movement.
- In fragmented habitat, conservation corridors (linkages) can connect patches of habitat and increase connectivity.
- The California Essential Habitat Connectivity Project is a coarse-scale attempt to identify important habitat corridors.

South Coast Missing Linkages



Next Steps



Desert Connectivity Project

Incorporating Climate Change

- Connectivity often used as a strategy.
  - Species-based modeling (fine filter) using climate change simulations.
  - Linkage designs that prioritize climatic diversity and access to cooler climates.
  - Protect river valleys as they provide gentle temperature and moisture gradients (coarse filter).

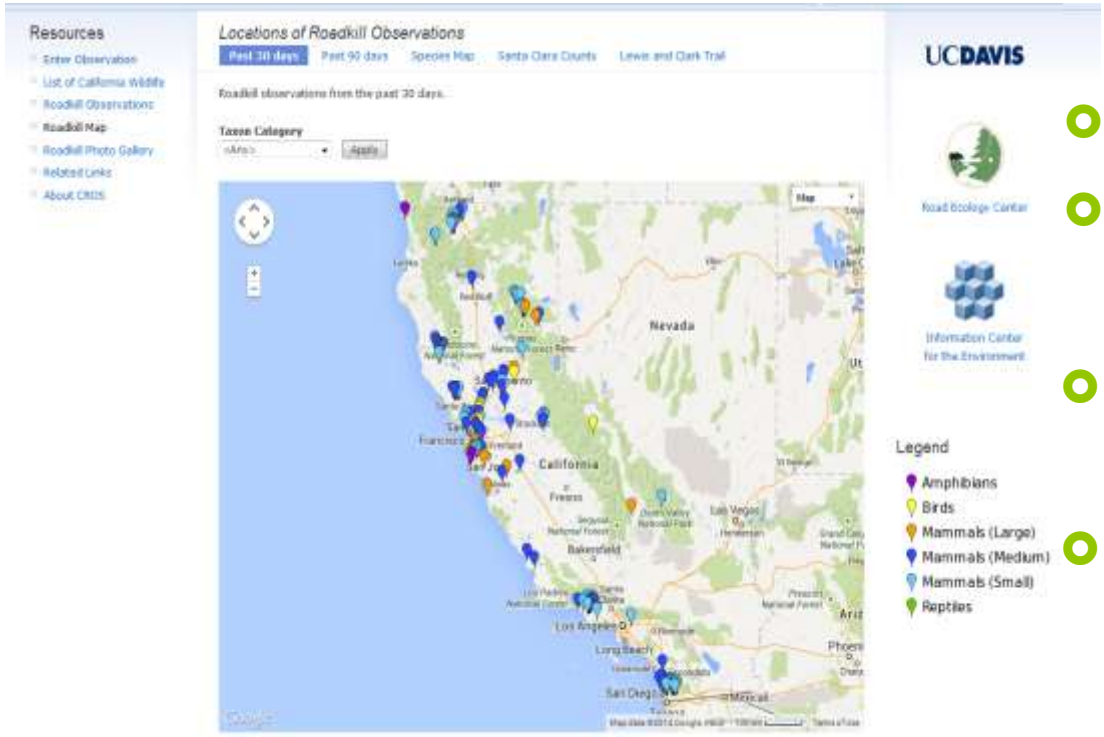
Incorporating Climate Change

- There is uncertainty in connectivity designs as well as climate models.
- Increasing size of existing protected areas and mitigating threats a well-established conservation strategy.

EDENs Environmentally Distributed Ecological Networks

- 10 Steps to Setting Up and Running an EDEN (p.30)
- Key Parts are to Develop a Structured Format to:
  - Identifying Questions
  - Assembling Network ~ Protected Areas
  - Training Participants to Apply Methods
  - Field Data QA/QC
- Establish Aquatic, Marine and Terrestrial Networks

Citizen Science



- Can't Do It All
- Engage Public with your Programs
- Involve Citizens with Science
- Make Better Decisions by having a more Informed Public

Definition of Terms

- **Open Space**
  - "Any open piece of land that is undeveloped (has no buildings or other built structures) and is accessible to the public."
  - "An area of land or water that remains in its natural state or is used for agriculture, free from intensive development for residential, commercial, industrial or institutional use. Open space can be publicly or privately owned."

- **DO Not use "Open space".**

  Survey demonstrates that "loss of open space" rates lower as a concern for voters (38% extremely or very serious problem) than many other environmental concerns, even those somewhat related such as "poorly planned growth and development" (45% extremely or very serious concern). Pluralities of both western U.S. and national voters indicate they think their community currently has "the right amount" of open space (51% and 46%, respectively).

- ***DO say "natural areas" instead.***

Definition of Terms

- **Protected Area**
  - "A clearly defined geographical space, recognized, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values."

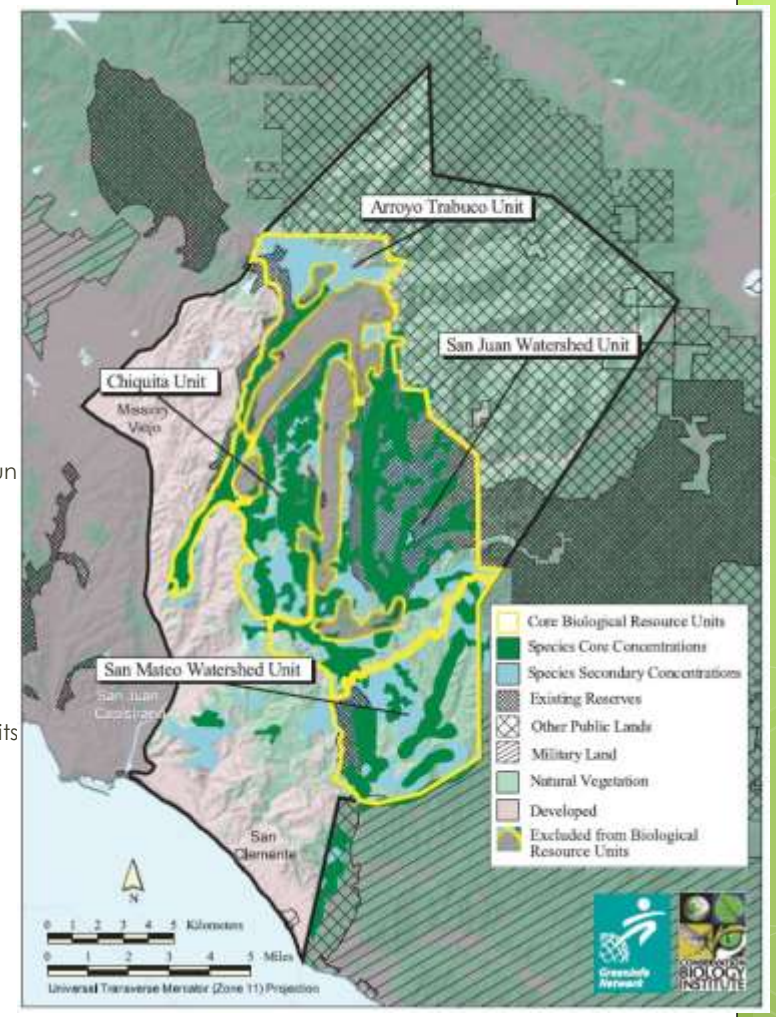
- **Connectivity**
  - "The state or extent of being connected or interconnected."
  - "The degree to which the landscape facilitates or impedes movement among resource patches."

Conservation Priorities in Southern California

- Conserve species throughout planning area
- Maintain potential for re-establishment or enhancement of sensitive species and habitats
- Keep reserves large to support larger populations of species and to maintain ecosystem processes that operate over large landscapes
- Maintain reserve diversity by capturing broad environmental gradients
- Maintain important grassland areas and grassland-scrubland mosaics
- Maintain integrity of riparian systems
- Keep reserves contiguous and connected, and avoid internal fragmentation of large habitat blocks
- Minimize physical or visual barriers to species movement
- Direct development to already disturbed areas and away from native communities wherever possible
- Maintain landscape linkages including riparian systems and ridge top connectivity

Conservation and Management Goals

- Arroyo Tobacco Unit
  - Manage edge effects, water runoff, and non-point source pollutants
  - Maintain natural hydrological cycles
  - Control trespass in sensitive areas
  - Maintain linkages to Cleveland National Forest and Chiquita Unit
- Chiquita Unit
  - Prevent internal fragmentation
  - Restore agricultural areas to coastal sage scrub and native grasslands
  - Maintain connections to other three units
  - Manage for natural fire regime
- San Juan Watershed Unit
  - Prevent internal fragmentation
  - Buffer and connect existing reserve areas
  - Maintain broad landscape connections to Chiquita and San Mateo Watershed un
  - Maintain watershed integrity and water quality
  - Manage for natural fire regime
- San Mateo Watershed Unit
  - Prevent internal fragmentation
  - Conserve all grassland areas
  - Buffer cliffs
  - Buffer and connect existing reserve areas
  - Maintain broad landscape connections to Chiquita and San Juan Watershed units
  - Maintain watershed integrity and water quality
  - Manage for natural fire regime
  - Manage trespass in or near sensitive areas



Moving Forward

- SCAG now has a GIS Data Inventory, Key Stakeholders and Scientific Expert Inventory, CHAP Assessment and Geodatabase.
- Data gaps include HCPs, NCCPs, regional connectivity plans, climate change data.
- Next step is to meet with stakeholders and experts and define conservation goals.

Conclusion


Arroyo Toad

Value All the Pieces
Big & Small