



California Essential Habitat Connectivity Project

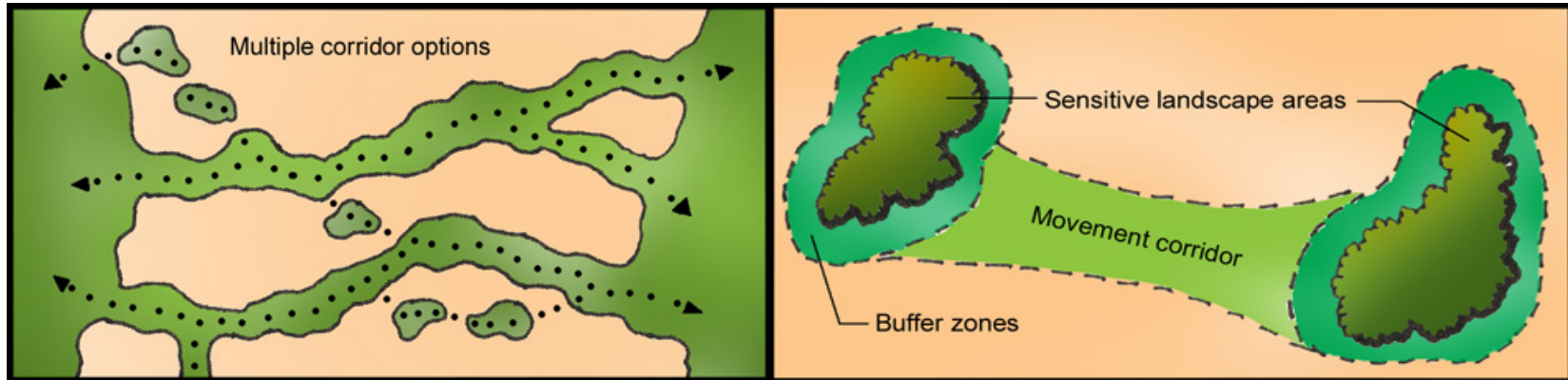
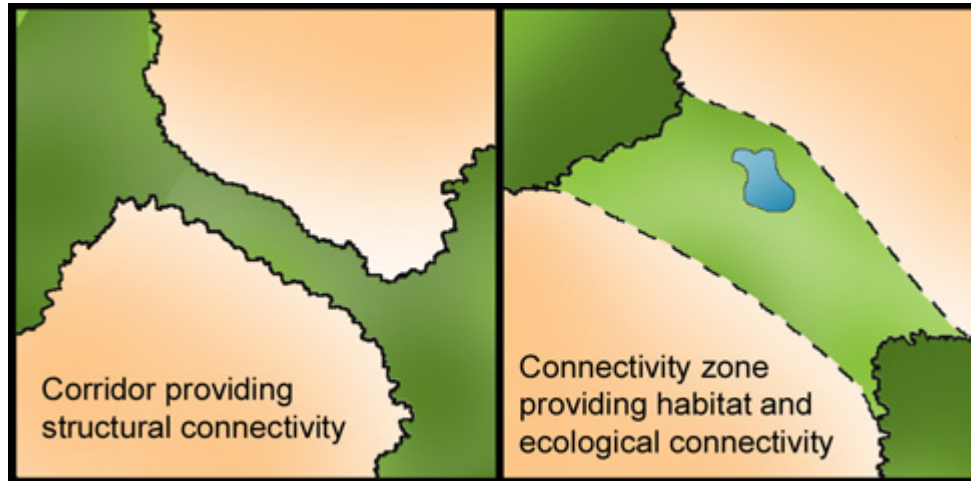


Planning for Habitat Connectivity

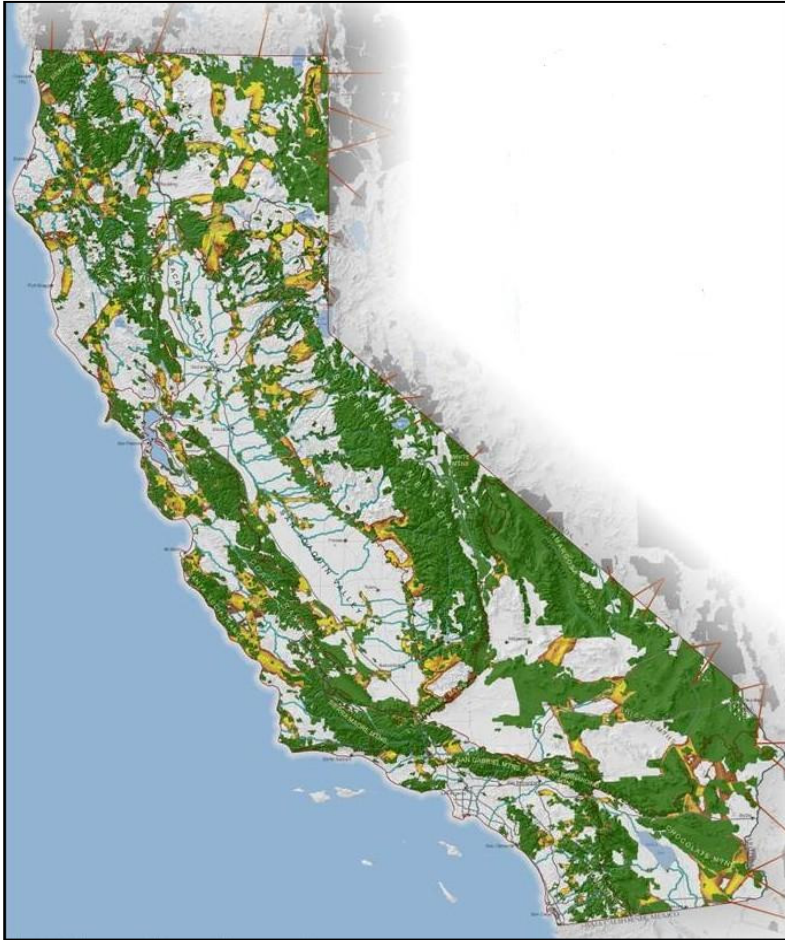
Why? Nature needs room to roam. Connected habitat reserves provide for:

- * Movement by individuals to access resources in home range
 - * Seasonal migration
 - * Immigration and emigration within metapopulations, allowing for demographic rescue
 - * Gene flow. Areas with genetic variability are more likely to facilitate evolution as the environment changes.
 - * Recolonization after local extinction
 - * Population movement in response to disasters or changing climate
 - * Ecological processes such as disturbance, predator-prey interactions, and seed dispersal
-

How? Habitat connectivity can take many forms.



California Essential Habitat Connectivity Project: Products



- * statewide wildlife habitat connectivity map and model
- * assessment of the biological value of identified connectivity areas
- * strategic plan to supplement the map and help end users interpret it

California Essential Habitat Connectivity Project: Goals

Produce a statewide assessment of essential habitat connectivity that:

- * complies or is consistent with recent legislation.

AB 2785 (2008) requires CDFG to map essential wildlife corridors and habitat linkages.

SB 85 (2007) requires CDFG to develop vegetation and wildlife habitat mapping standards.

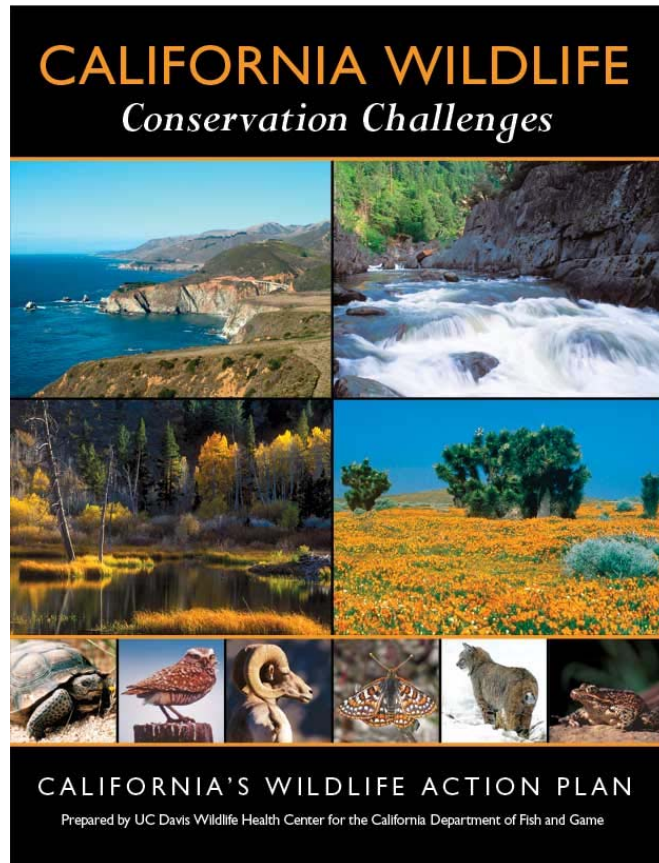
Produce a statewide assessment of essential habitat connectivity that:

- * complies or is consistent with recent legislation.

Section 6001 of the Safe Accountable Flexible Efficient Transportation Equity Act (SAFETEA-LU) of 2005 requires that environmental resource impacts be considered in the transportation planning process.

Avoidance, minimization and mitigation measures must be identified.

Produce a statewide assessment of essential habitat connectivity that:



for Fish and Game, will help expand the State Wildlife Action Plan.

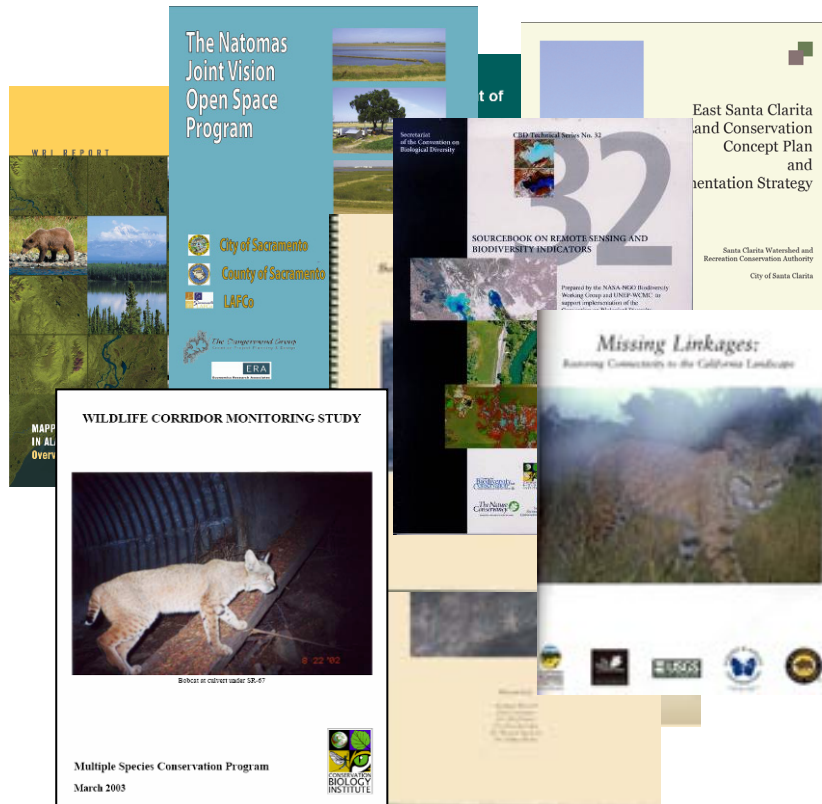
Connectivity is identified as a key action both statewide and in 4 of 8 terrestrial ecoregions, but there is no map of key linkages and no list of priorities.

Produce a statewide assessment of essential habitat connectivity that:



for Caltrans and regional transportation agencies, will inform policy and provide standardized data for integrating transportation planning with connectivity planning.

Produce a statewide assessment of essential habitat connectivity that:



promotes opportunities for integrated planning among all entities that acquire or regulate or influence wildlife habitat across the state.

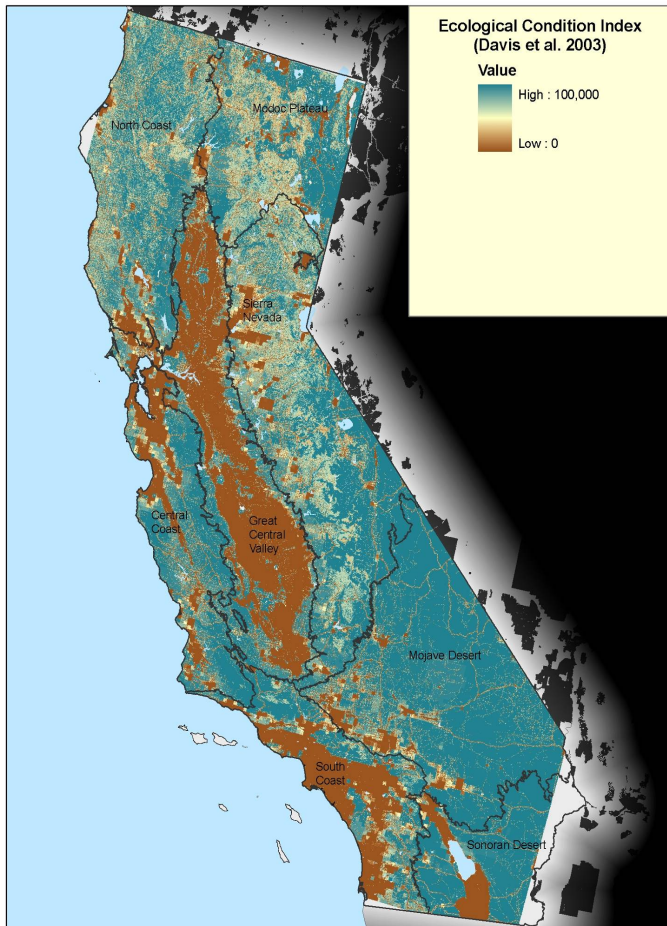
Produce a statewide assessment of essential habitat connectivity that:



builds upon earlier efforts.

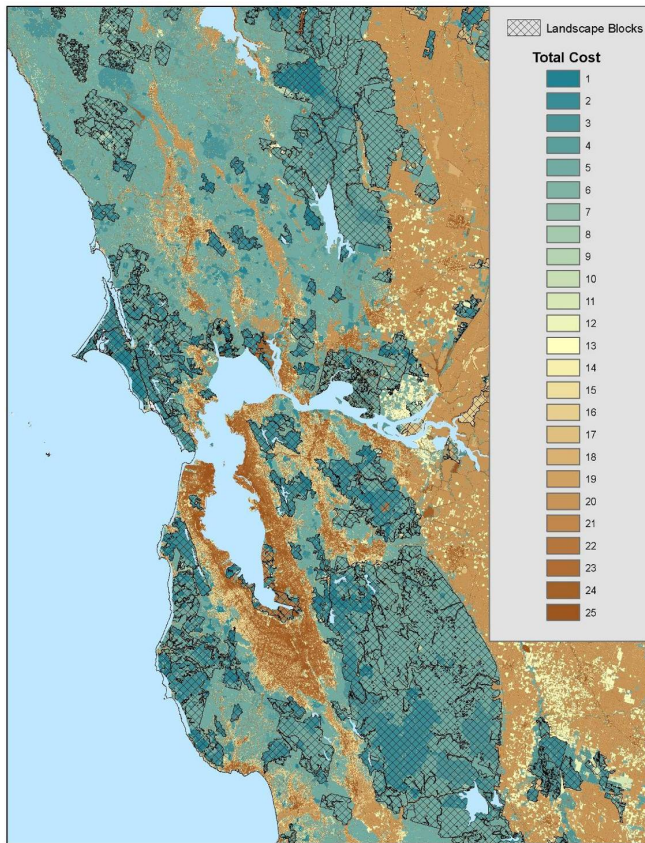
Missing Linkages (2001) invited experts to identify linkages at risk in a workshop setting. However, linkages were not prioritized and some were found to be missing.

Produce a statewide assessment of essential habitat connectivity that:



is transparent scientifically-
defensible and repeatable.

Produce a statewide assessment of essential habitat connectivity that:



provides a methodology for connectivity analysis at finer scales than statewide.

California Essential Habitat Connectivity Project: Approach

Approach



18 Month Project completion anticipated February 2010

Engage Multidisciplinary Team
• evaluate habitat connectivity and prioritization methods
• reach consensus

Team Meeting #1
Introduce Project & Approach

Develop Work Plan with Multidisciplinary Team

Statewide Connectivity Map
• Compare with existing Conservation Plans

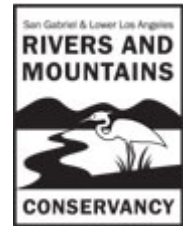
Team Meeting #2
Criteria Development, Prioritization, and Consensus Building

Develop Strategic Plan
• guide future regional connectivity analysis, planning, and implementation

Team Meeting #3
Review Draft Maps/Strategic Plan

Prioritization Analysis
Biological Values Matrix

Team Meeting #4
Review Final Maps/Strategic Plan



ERN CALIFORNIA



ASSOCIATION OF GOVERNMENTS



CONTRA COSTA transportation authority



California Essential Habitat Connectivity Project: Key Decisions

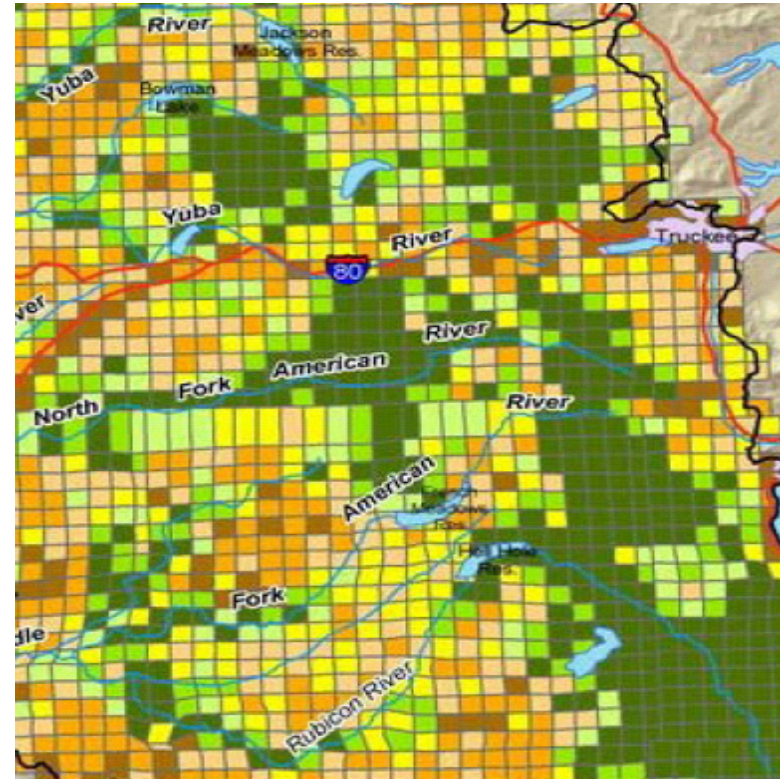
1) Define the analysis area.

Analysis area will be
the State of California plus a
flexible buffer into adjacent
states.



2) Define the areas to be connected - a.k.a. Natural Landscape Blocks (NLBs) or “blobs”.

- * Use areas of high ecological integrity.
- * Use 6,000 acre minimum to start.
- * Use a relatively fine resolution (100m pixel).



Note: Graphic is for display purposes only.

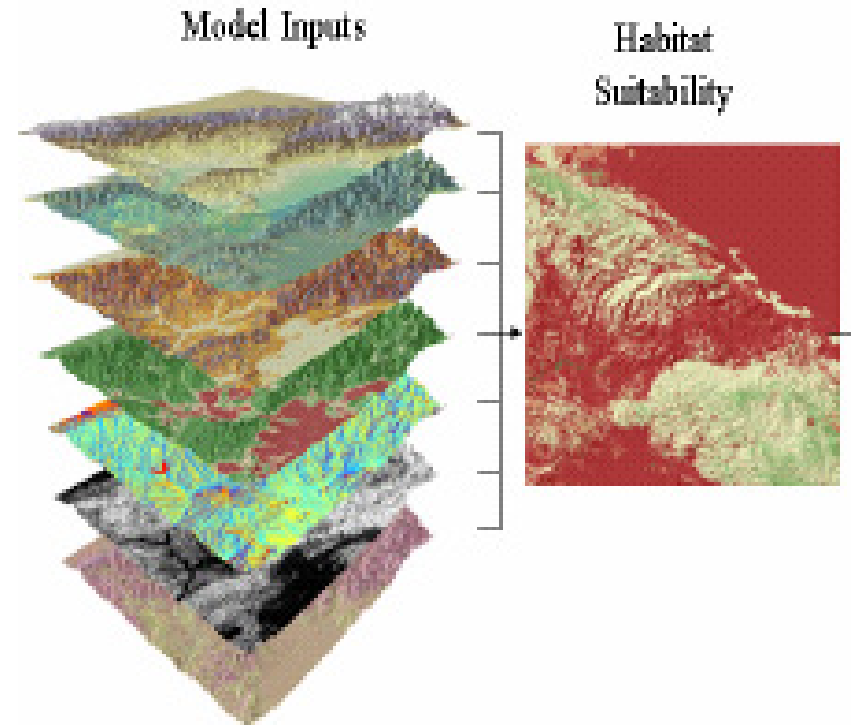
- * Use statewide and readily available spatial data sets as model inputs.

Land conversion

Residential housing impacts

Road effects

Forest structure (where applicable)



- * Modify slightly based on conservation status and biological value.

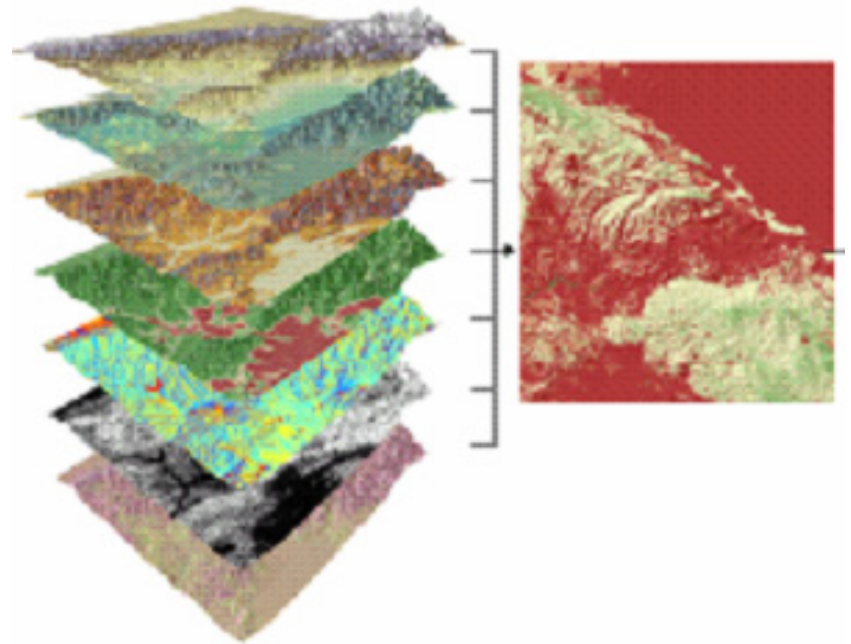
GAP 1 & 2

Essential and designated critical habitat

Wetlands/vernal pools

“Hotspots” for amphibians, reptiles, mammals and plants

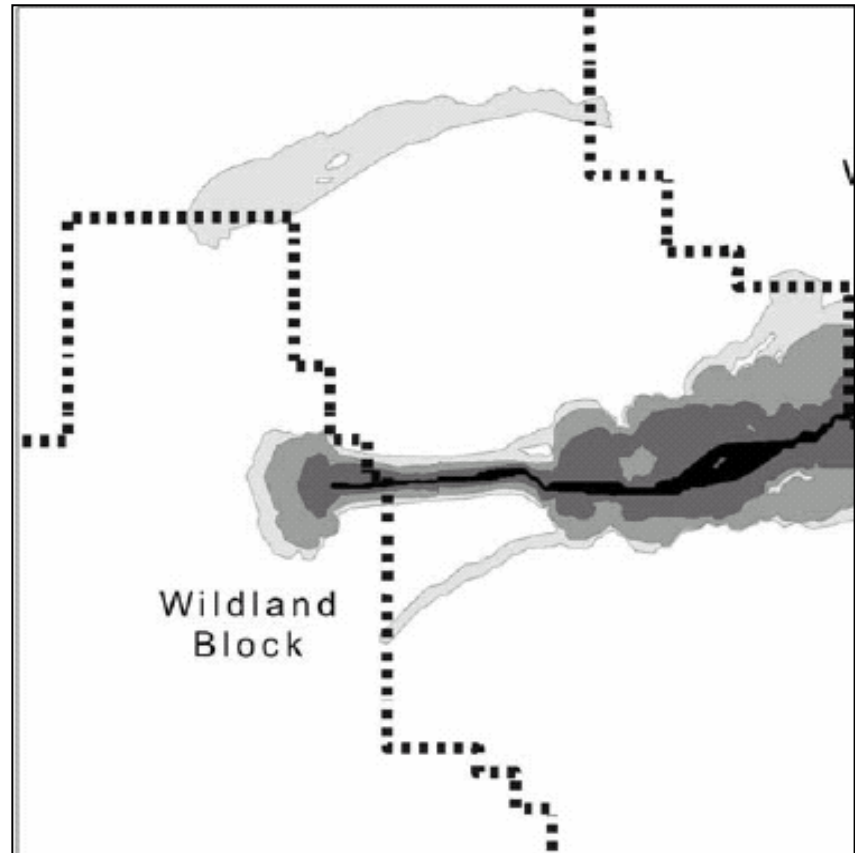
Areas of Critical Biological Concern



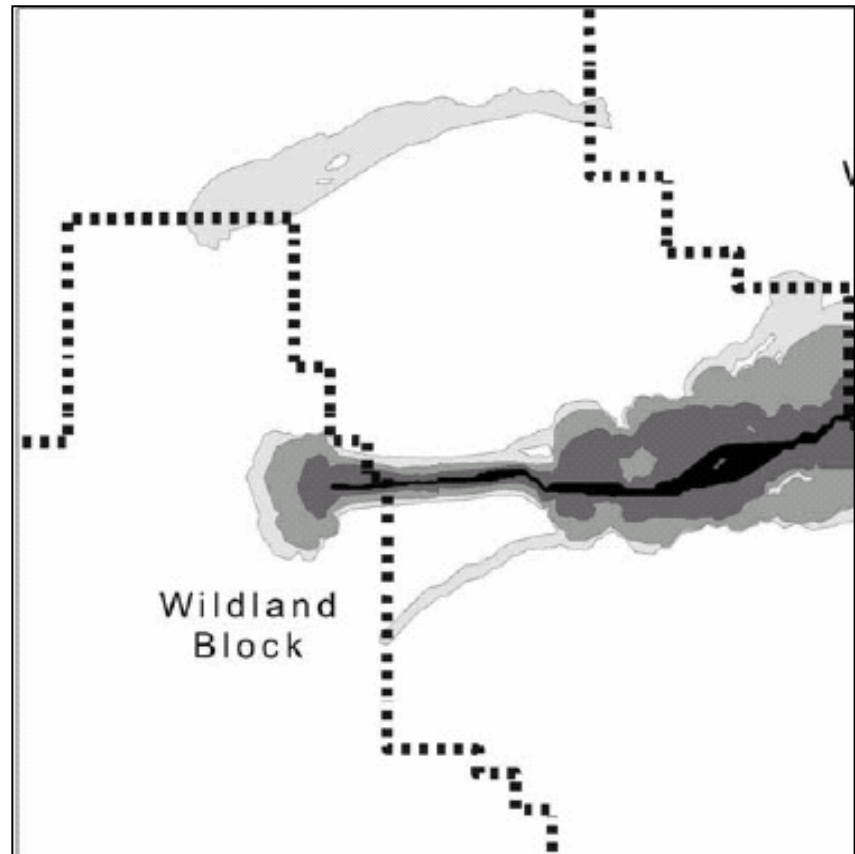
A total of 850
Natural Landscape
Blocks of 2,000 to
3.7 million acres
were identified.



3) Define the Essential Connectivity Areas (ECAs) or “sticks” to connect the “blobs”.

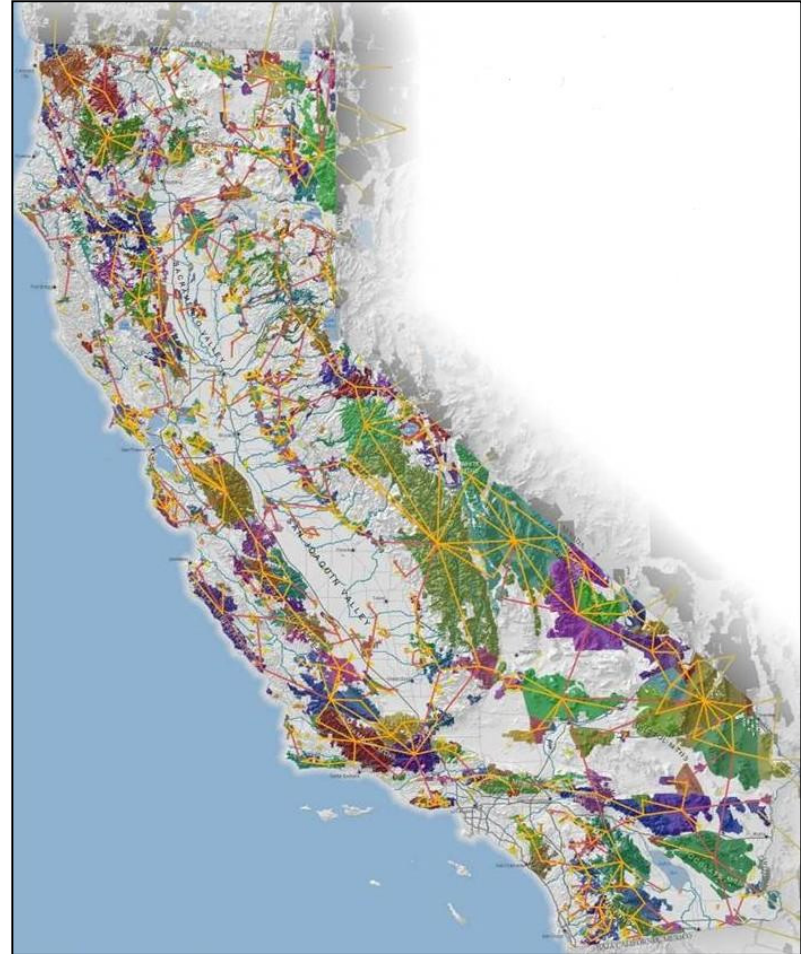


- * Use a least-cost corridor method of connecting wildland blocks.
- * Use the centroid of each wildland block as a corridor terminus.
- * Use an inverse of ecological integrity as the resistance surface (alternative would be to define by focal species).
- * Add buffered river corridors where they are not already included.

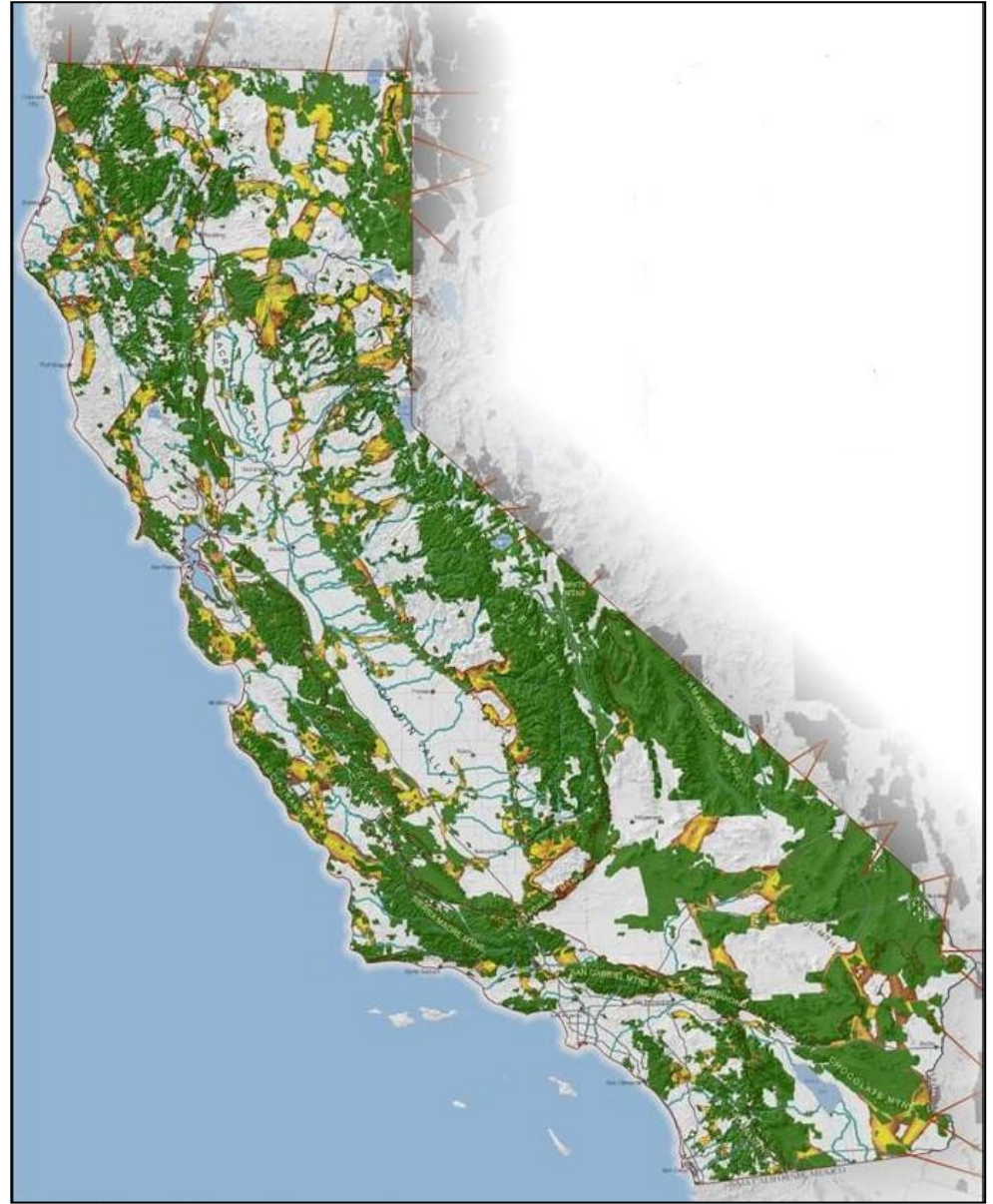


A total of 192 linkage polygons were modeled using this method. Rule sets were established for which blocks to connect using nearest neighbor and network analyses.

An additional 552 “road mitigation sticks” and 31 “inter-state sticks” were identified but not modeled.



California
Essential
Habitat
Connectivity
Project:
Resulting
Statewide Map

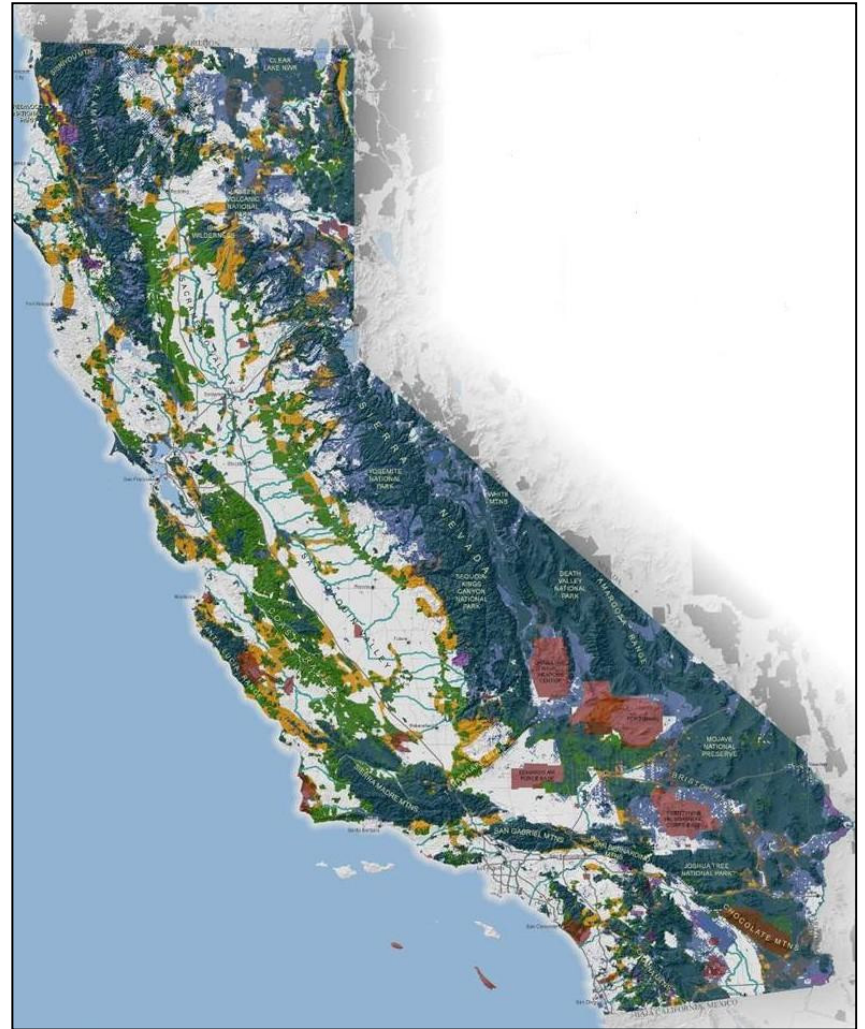


California Essential Habitat Connectivity Project:

Comparison of Results to Existing Connectivity Analyses and Conservation Networks

Examples of Statewide Comparisons

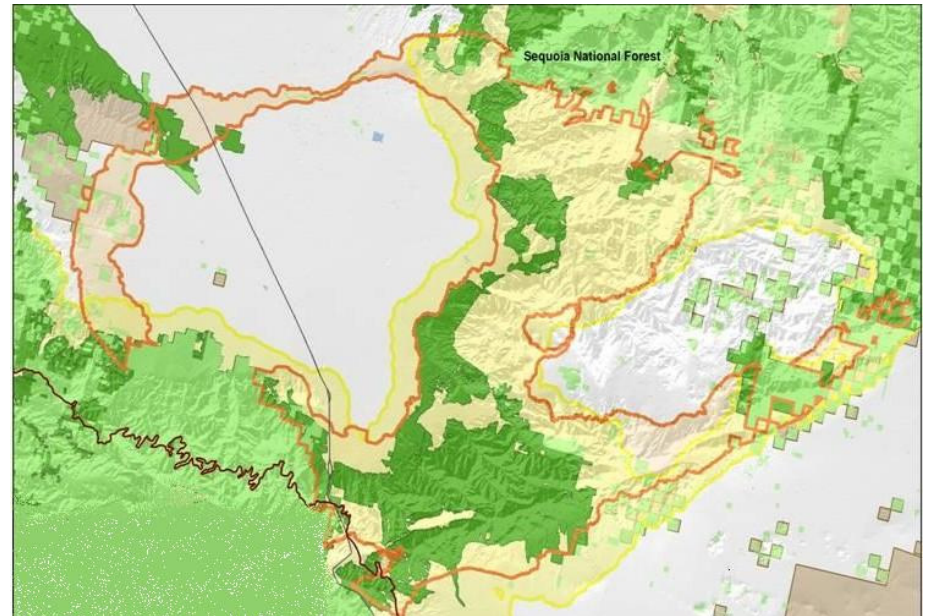
- * Existing Conservation Network and Other Major Landholders
- * Missing Linkages (2001)
- * Network of Natural Community Conservation Plans (NCCPs) and Habitat Conservation Plans (HCPs)
- * The Nature Conservancy Ecological Priorities



The California Essential Habitat Connectivity Project captured 76% of protected lands.

Example of Local Comparison

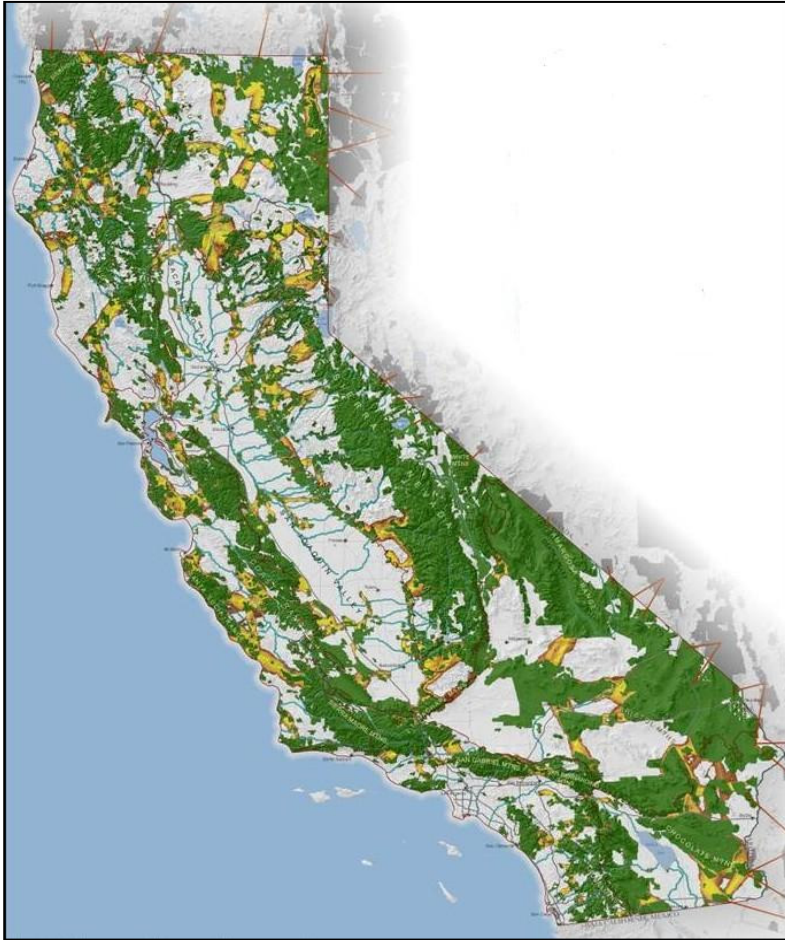
South Coast Missing Linkages
(Penrod et al., 2003)



The California Essential Habitat Connectivity Project captured 81% of the designed linkages.

California Essential Habitat Connectivity Project: Products

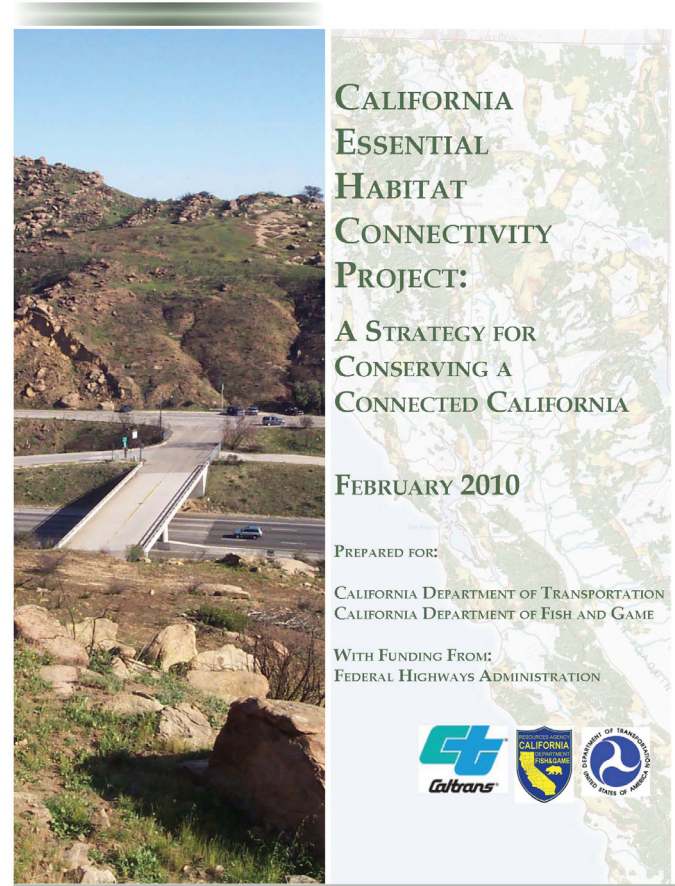
California Essential Habitat Connectivity Project: Products



In addition to the
statewide map ...

Strategic Plan

- * Methodology for statewide analysis
- * Frameworks for how to conduct regional and local scale analyses
- * Framework for road mitigation
- * Strategy for integration with conservation and infrastructure planning
- * Plan for data distribution

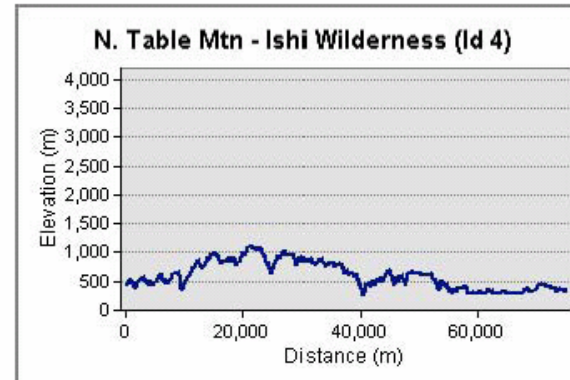
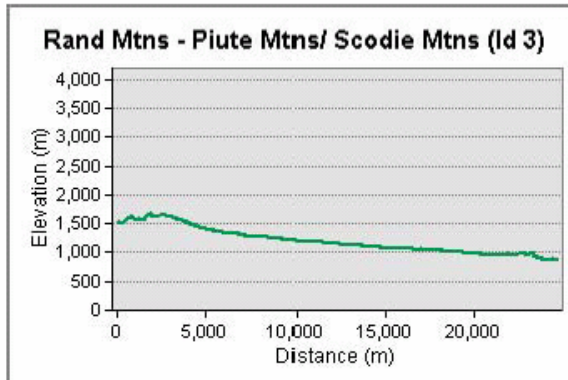
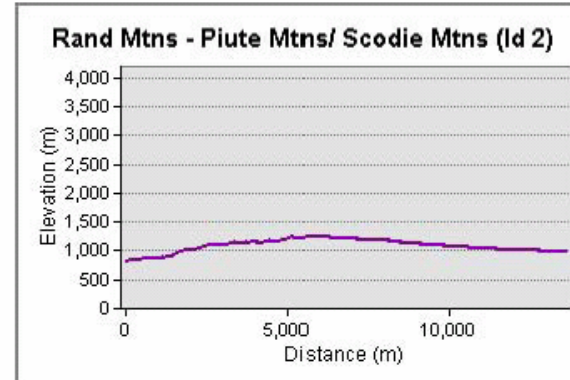
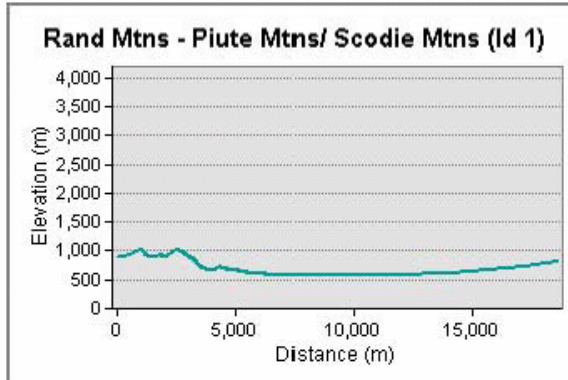


Assessment of Connectivity Areas

Identifier		Landform					ECI		Area	
ID	ECA_Name	elev_mean	elev_min	elev_max	elev_std	elev_range	mn_integ	std_integ	AREA_ac	AREA_km
1	Rand Mountains - Piute Mountains/ Scodie Mountains	750	576	1,329	192	753	74	37	12,733	52
2	Rand Mountains - Piute Mountains/ Scodie Mountains	932	692	1,101	71	409	74	31	16,485	67
3	Rand Mountains - Piute Mountains/ Scodie Mountains	946	681	1,061	48	380	65	39	7,438	30
4	North Table Mountain - Ishi Wilderness	399	58	1,016	192	958	51	37	244,242	988

Non-biological measures were taken of each Essential Connectivity Area (ECA).

Assessment of Connectivity Areas



Elevation profiles were completed for each Essential Connectivity Area (ECA).

Assessment of Connectivity Areas

Identifier		Species Diversity					Listed Species			
ID	ECA_Name	mn_sprich	std_sprich	CNDDB_plant_count	CNDDB_animal_count	pc_hotispt	pc_crithab	crithab_sp_count	pc_esshab	esshab_sp_count
1	Rand Mountains - Piute Mountains/ Scodie Mountains	166	2	3	6	0	14	1	0	0
2	Rand Mountains - Piute Mountains/ Scodie Mountains	160	2	0	2	0	13	1	0	0
3	Rand Mountains - Piute Mountains/ Scodie Mountains	172	5	6	10	15	0	0	0	0
4	North Table Mountain - Ishi Wilderness	269	11	22	15	0	3	2	5	1

Biological measures were taken of each Essential Connectivity Area (ECA).

California Essential Habitat Connectivity Project: Intended Uses

First ...

What It Is

- * A planning tool for conservation and transportation.
- * Broad scale and encompassing the entire state of California. The minimum size of a habitat (natural landscape) block identified and analyzed for connectivity with any other habitat block is 10,000 acres.

What It Is Not

- * A regulation that dictates land use for any public or private entity.
 - * Fine scale, with every important piece of habitat identified. Small reserves may not show up on the statewide map, because of the scale of analysis. The map and strategy do not suggest these reserves are unimportant, only that they are more appropriate pieces for a regional or local level strategy to conserve connectivity.
-

First ...




What It Is

- * “Essential”, meaning important, connectivity areas.
- * A modeled analysis using the ecological condition or integrity of the landscape to identify areas of essential connectivity.

What It Is Not

- * “Essential”, meaning the only places of importance. **Do not** assume lands not identified are unimportant.
 - * A solution by itself for how to provide necessary linkages for any given species of plant or animal. Linkage designs will vary depending on focal species chosen and the goal of providing connected habitat for a chosen species might be met several different ways.
-

Statewide Strategy: Conservation (Chapter 7)

- State Wildlife Action Plan  * Provide a data set to complement the plan, which identifies connectivity as a key action for wildlife.
- Land Acquisition Planning  * Use with Areas of Conservation Emphasis (ACE) II for prioritization, for example.
- California Climate Change Adaptation Strategy  * Use as a base layer and enhance with further analysis. Connectivity is a primary strategy for accommodating shifts in species ranges

Statewide Strategy: Infrastructure (Chapter 7)

California Transportation

Plan 2035 (California
Interregional Blueprint)



Use as a data layer for
integrated infrastructure and
conservation planning.

California Water Plan

Regional and Local Strategy: Conservation (Chapter 7)

Natural Community
Conservation Plans
(NCCPs) and Habitat
Conservation Plans (HCPs)



Facilitate connectivity of
reserves within and across
planning boundaries

Regional Land Management
Planning



Focus management actions in
locations where connectivity
could be maintained,
enhanced, or restored.

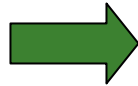
Regional and Local Strategy: Infrastructure (Chapter 7)

California Regional
Blueprint Planning



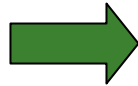
Use as a framework for regional
and local level analyses.

Mitigation Planning



Strategically site mitigation in
places where it can enhance
connectivity.

Infrastructure
Improvements



Inform programming, alternatives,
and mitigation estimates

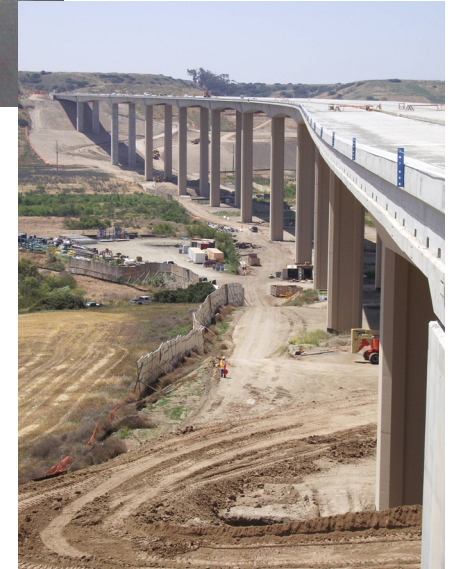
Project Specific
Connectivity



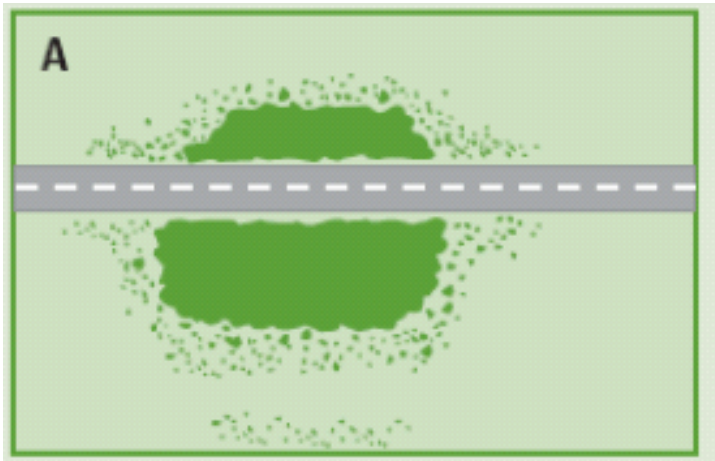
Reduce roadkill/operational effects.

Framework for Considering Roads (Chapter 6)

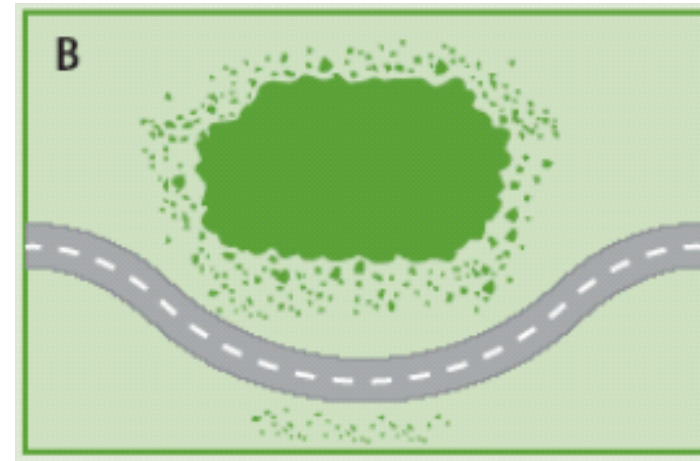
- * 850 Natural Landscape Blocks
- * 744 pairs within California
- * 552 of them separated only by a road



Framework for Considering Roads (Chapter 6): Avoidance

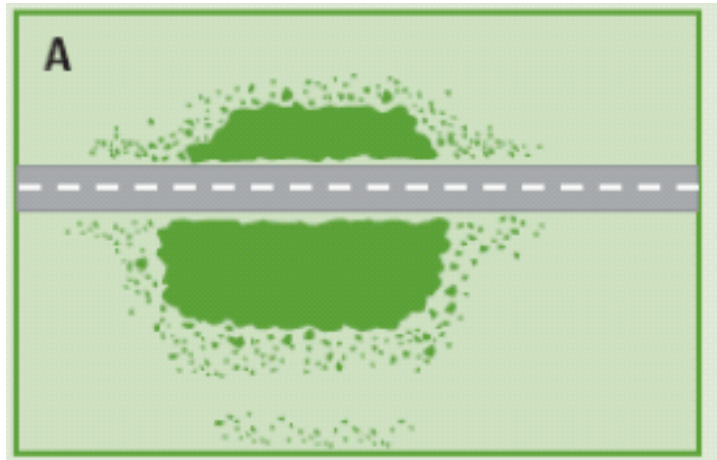


Initial concept

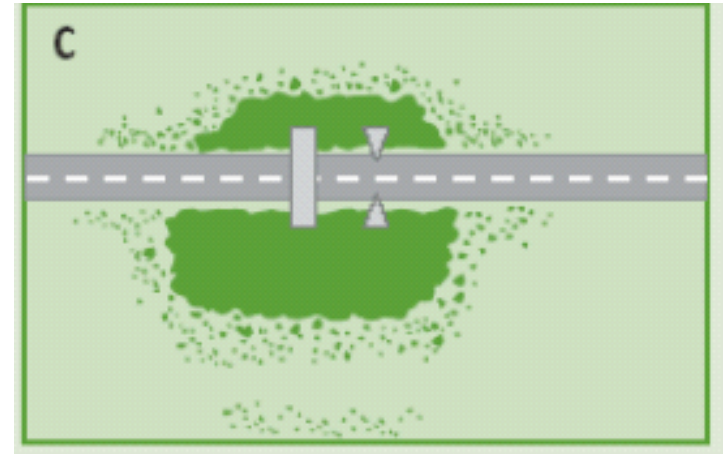


Avoidance

Framework for Considering Roads (Chapter 6): Minimization



Initial concept



Crossing structures

Types of Crossing Structures



Good for elk and mule deer



Good for pronghorn



Good for small mammals and amphibians

Spacing of Crossing Structures



One per mile



One per quarter mile

Why are there many different solutions?

Species Considerations

- resource/access needs
- predator/prey relationships
- size



Site Constraints

- topography
- water
- existing road
- substrate



Design Considerations

- fencing
- lighting



More Information:

California Essential Habitat Connectivity Project Websites

<http://www.dfg.ca.gov/habcon/connectivity>

http://www.dot.ca.gov/hq/env/bio/program_efforts.htm

Wildlife Crossing Guidance Manual

http://www.dot.ca.gov/hq/env/bio/wildlife_crossings.htm
