Connectivity Monitoring Strategic Plan

San Diego Management & Monitoring Program

Connected?

One reserve or many-

Does it make a difference?

The ongoing biodiversity crisis is primarily driven by the loss and fragmentation of natural habitats" (Burdett et al. 2010)

Connectivity

- What is connectivity
- Overview of connectivity issues
- Examples
- Connectivity Monitoring Strategic Plan

Connectivity

Two interrelated connectivity goals*

- ensuring the persistence of species across the preserve system
- preserving ecosystem functions across the landscape.

*MSCP, MHCP, and supporting documents

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No Connectivity

- Demographic Isolation
- Local Extirpations
- Extirpation from the plan area !
- Reintroductions- $$$$$$$

Two Examples

- Bobcat

- Deer

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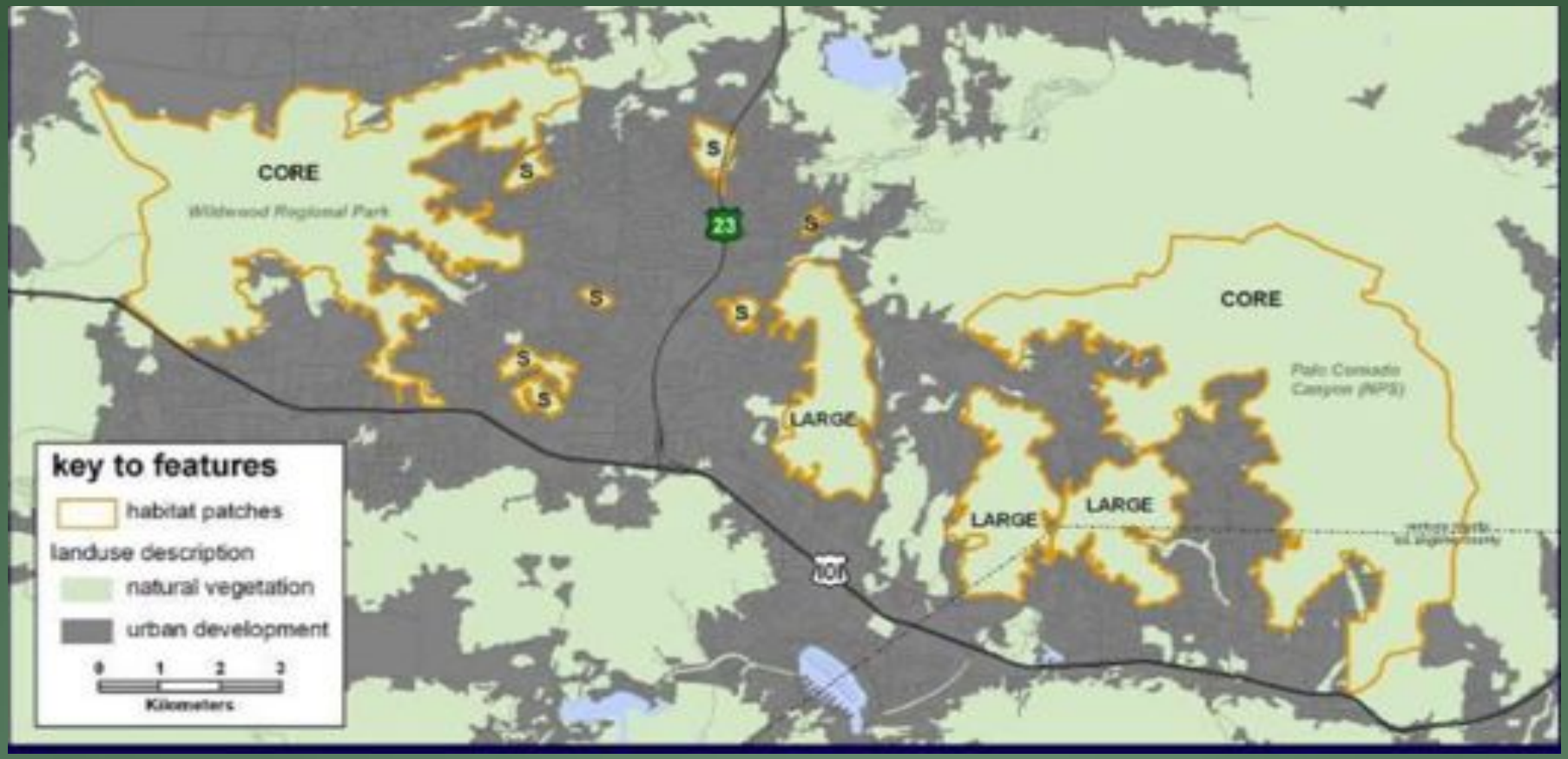
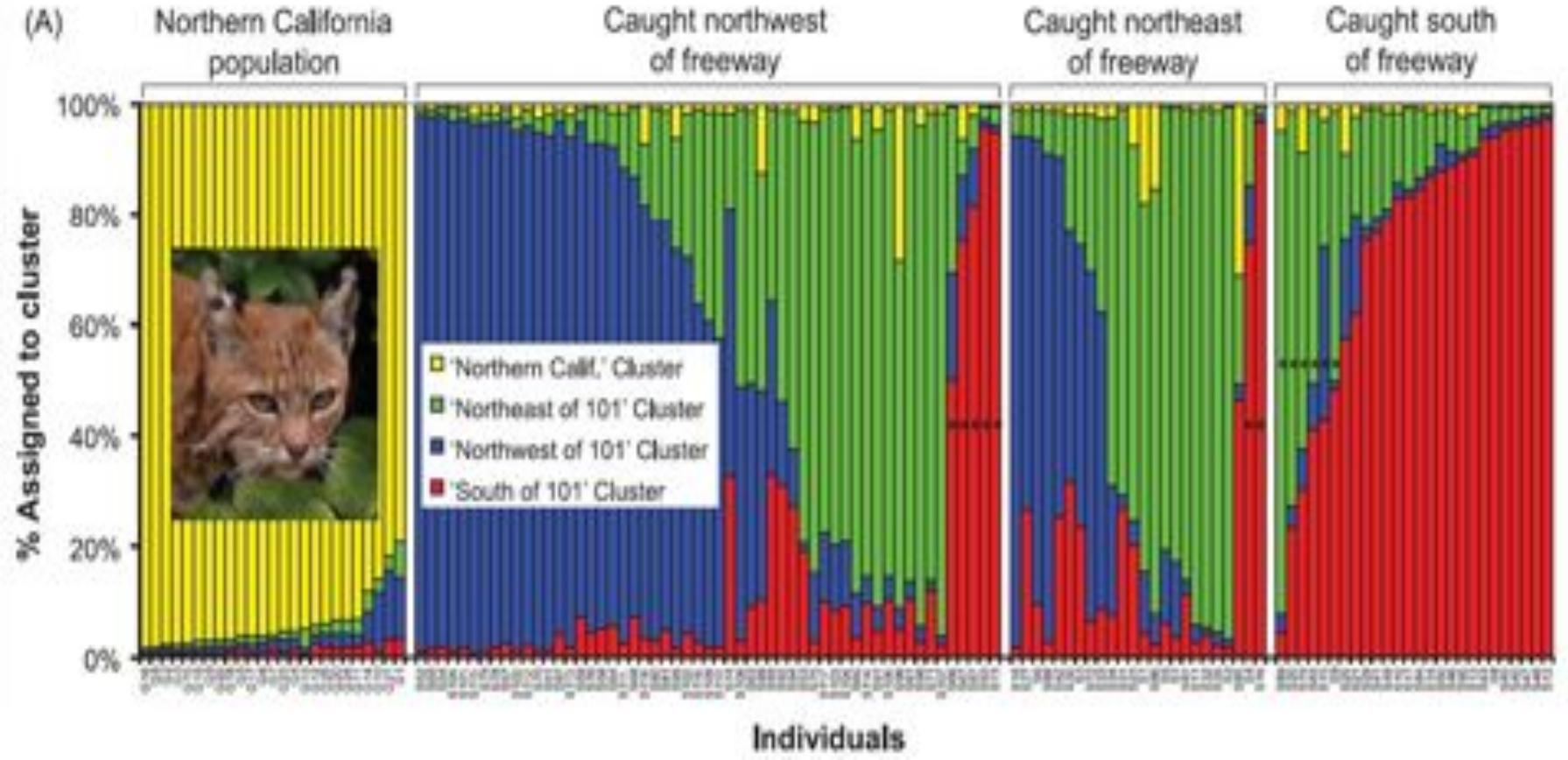
Example 1- Bobcat (Los Angeles and Ventura Counties)



Example 2- Bobcat



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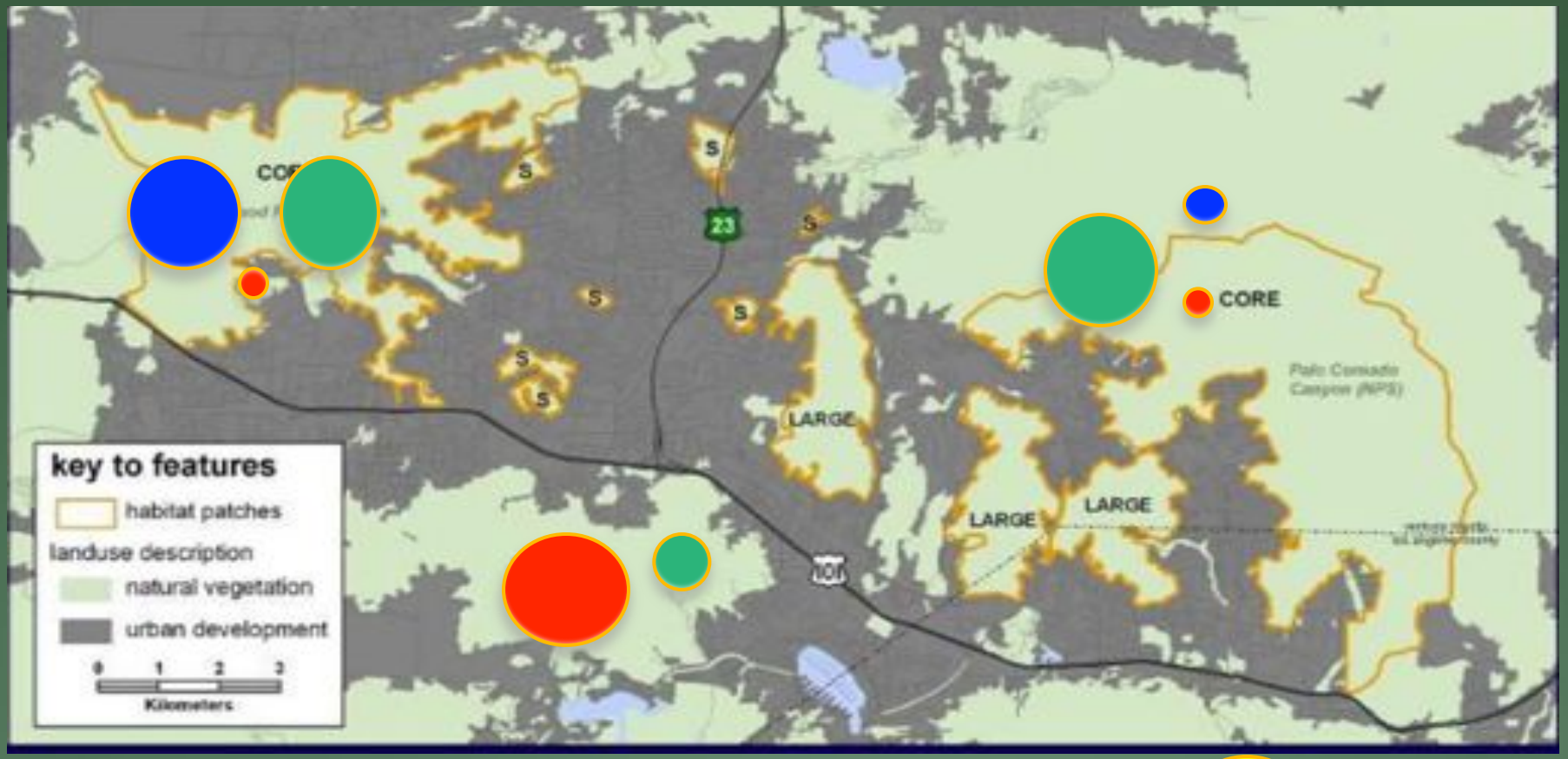


Northern California

Constrained Connectivity

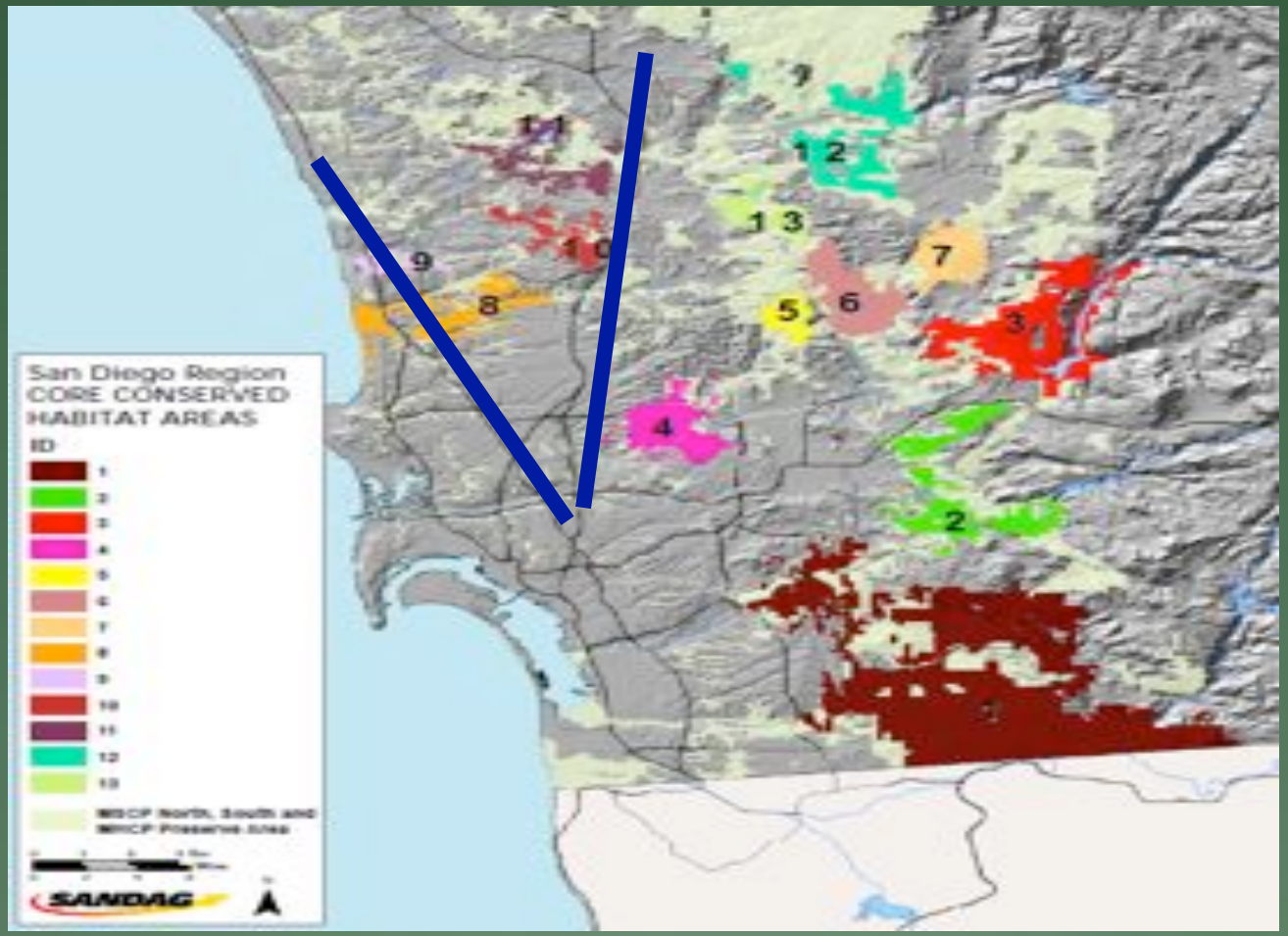
- Freeways constraining connectivity
  - territory pileup
  - opportunities to breed decreased
  - Dispersing individuals not contributing to the gene pool
- Reduced or no rescue effect- local extinctions
- Loss of genetic diversity- reduced potential to track environmental change

Example 2

Connectivity - Southern Mule Deer SD

- Less connectivity
- Restricted movement between fragments
- N-S freeways - barrier
- Genetic signature- recent reduction in Torrey Pines population

Freeways Creating Barriers to Deer



CMSP- WHY?

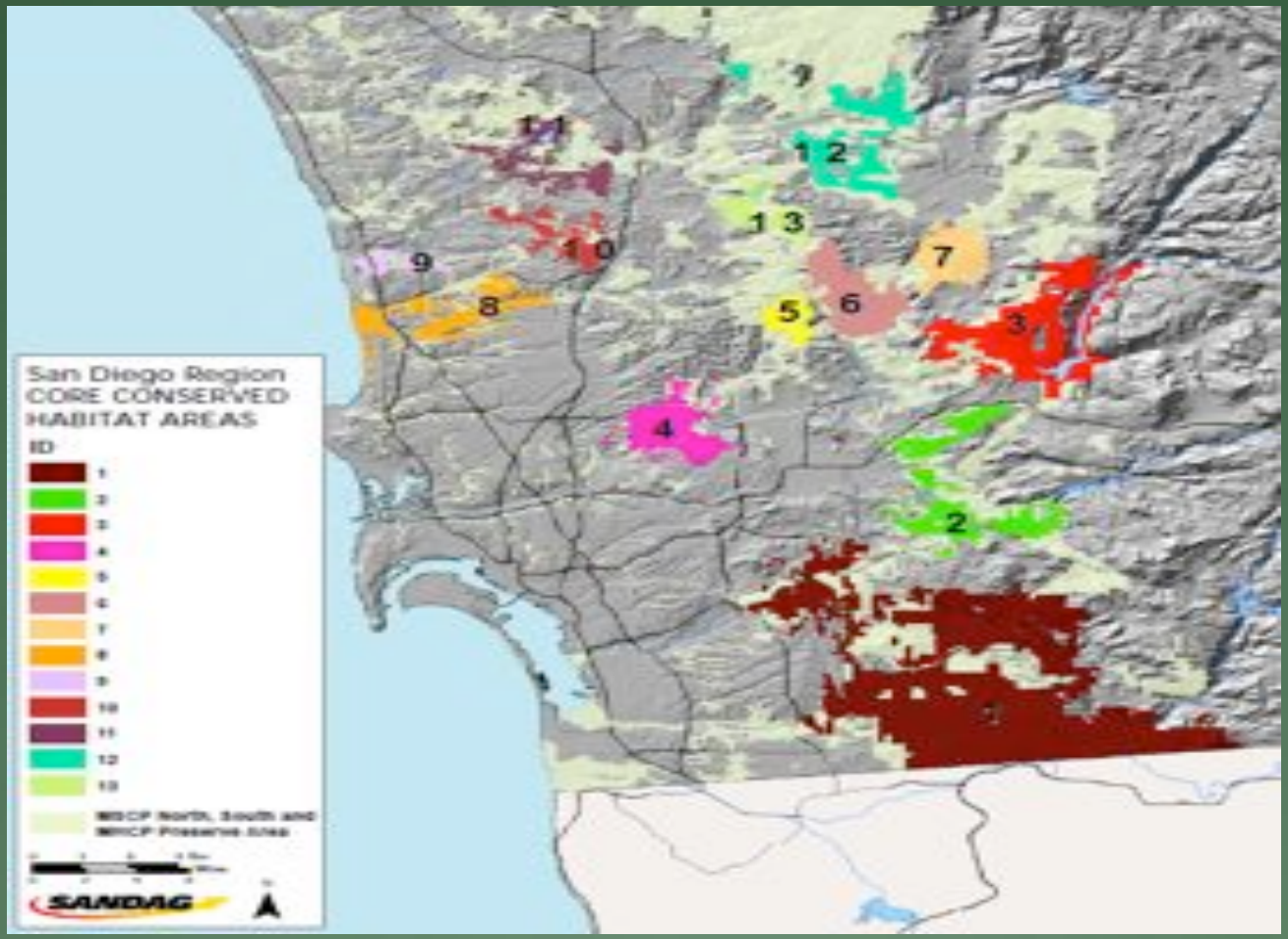
Identify:

- Monitoring objectives
- Focal groups and rationale
- Focal species and rationale
- Priority actions to meet objectives
- Timelines for actions
- Costs for actions

Developing the CMSP

- Review CBI reports
- Identified conserved lands- core areas and linkages
- Convened small working group
- Science Workshop
- Draft CMSP review
  - Science Workshop Group
  - Monitoring Coordination Group

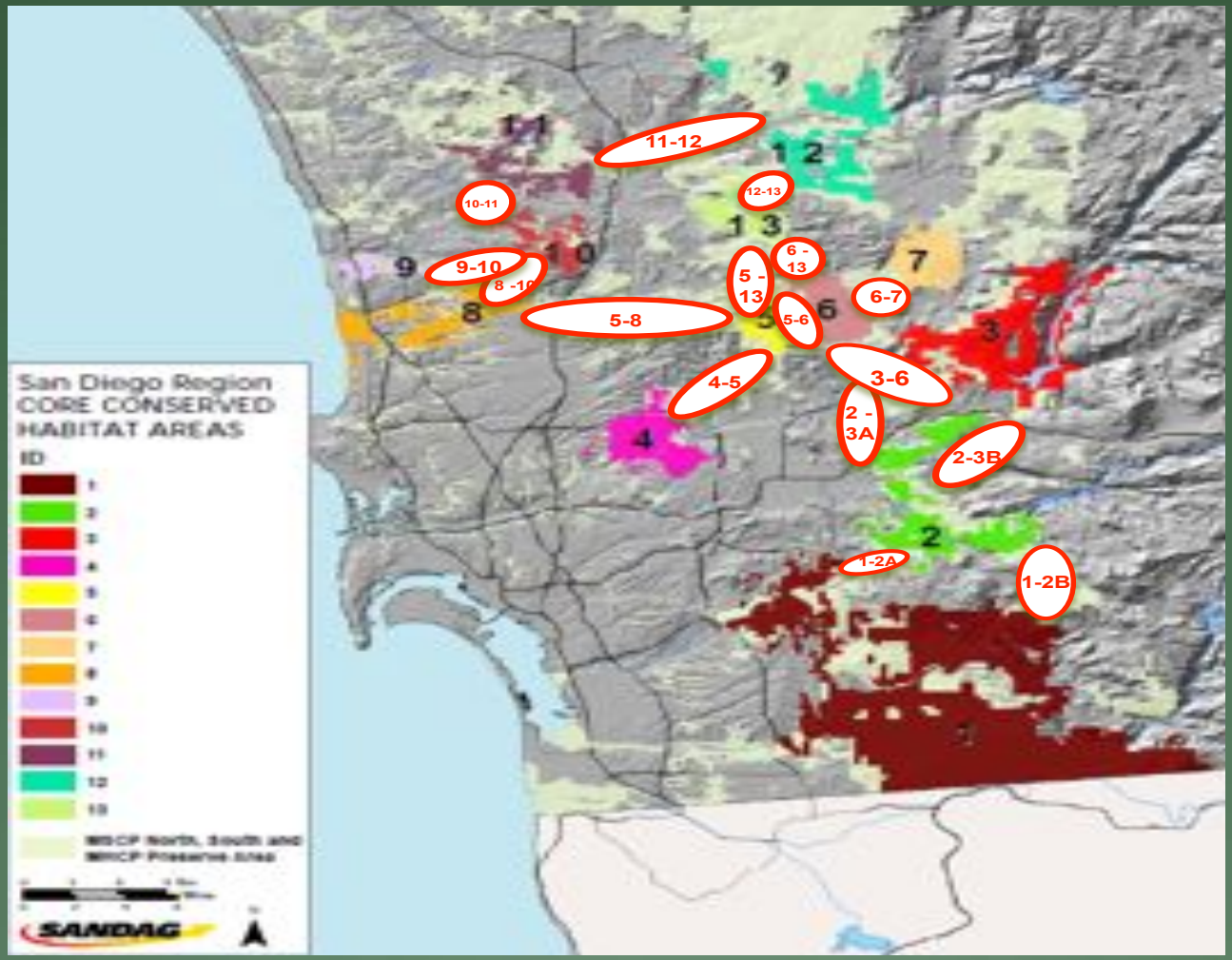
Conserved Lands within MSCP Core Areas



Size of MSCP Core Areas

Core Area	Acreage	Core Area	Acreage
1	57,060	8	6,730
2	9,606	9	1,422
3	15,483	10	3,530
4	6,264	11	5,182
5	2,295	12	8,244
6	7,203	13	3,228
7	5,199	Total	131,452

Linkages Connecting Core Areas



Connectivity Monitoring Strategic Plan

- CMSP- SDMMP.COM
- Appendix 1- Actions/Priorities/Funding
- Appendix 2- MSCP/MHCP references
- Appendix 3- CMSP development

Connectivity Monitoring Strategic Plan

Appendix 1- Priorities and Funding

- LA 1-1
- LA 2-1
- SA 2-1
- B1-1

Connectivity Monitoring Strategic Plan

Appendix 2

- MSCP Resource Document- Vols. I and II
- MSCP Monitoring Plan
- City Poway Plan
- MSCP
- MSCP Subarea Plans and Co. BMO
- MHCP- Vols. I-III
- MHCP Subarea Plan

CMSP

- Objectives:
  - Evaluate core area functional connectivity
  - Inform adaptive management
  - Test multiple connectivity monitoring approaches

CMSP

Functional Groups

- Animals that primarily move on the ground through the landscape
  - Large Animals – inter-core connectivity
  - Small Animals – inter- and intra-core connectivity
- Birds- stepping stones etc.
- Animals that move along water columns*
- Invertebrates*
- Plants*

CMSP

- Focal Species For Functional Groups
  - Covered species and species identified for connectivity monitoring
  - How the species uses the landscape (surrogate for other species)
  - Sensitivity to habitat fragmentation
  - Population status in the plan areas
  - Helps maintain ecosystem integrity

CMSP

- Large animal focal species
  - Deer
  - Mountain Lions
  - Badgers
  - Bobcats
  - Roadrunners
  - Gray Fox*

CMSP

- Small Animal Focal Species
  - **Orange-throated whiptail**
  - **San Diego horned lizard**
  - **Dulzura kangaroo rat**
  - **California ground squirrel**
  - **San Diego black-tailed jackrabbit**
  - **Western spadefoot toad**
  - **+ others**

CMSP

- Bird Focal Species
  - **Coastal cactus wren**
  - **California gnatcatcher**
  - **Least Bell's vireo**
  - **Southwestern willow flycatcher**
  - **Burrowing Owl***

What are the questions?

- Today
- Tomorrow
- Next year
- Next 5 Decades

What methodologies are best to answer the question(s)?

- **Genetics**
- **Camera stations**
- **Tracking**
- **Telemetry**
- **Banding**
- **Others/Combinations**

CMSP

- Questions and Methodologies
  - Functional Connectivity- genetics
  - Use of the landscape- telemetry and banding
  - Where species are crossing roads- tracking, camera traps, telemetry

CMSP

- Prioritizing Monitoring
  - Urgency
  - Cost
  - Synergy
  - Feasibility
  - Tested approach

CMSP

Large animal priorities-

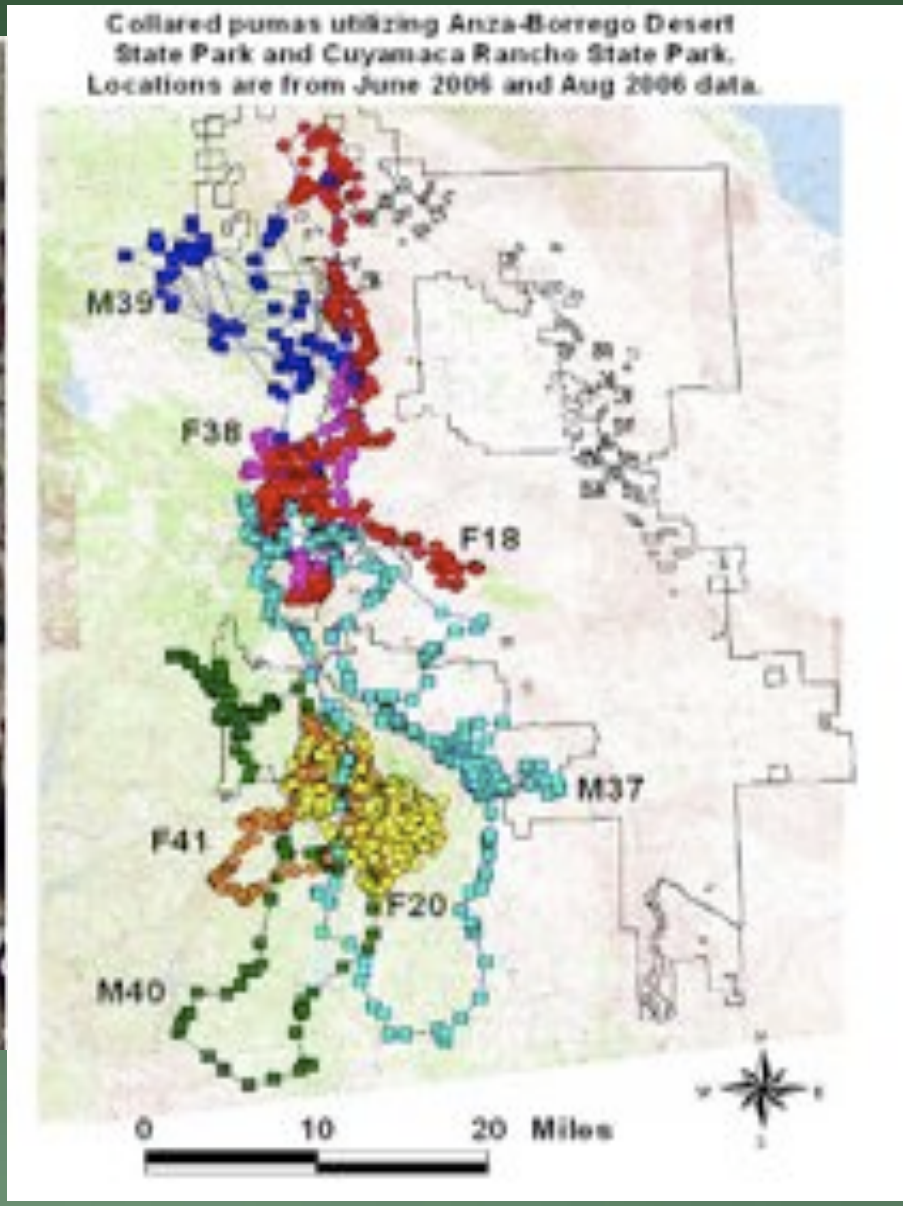
1st

- Mtn. lions – road crossings, landscape use, population size, functional connectivity
- Badgers- where, road crossings, functional connectivity, population size

2nd

- Deer- road crossings
- Bobcats – functional connectivity, road crossings
- Roadrunners – landscape use, functional connectivity


Lake Forest
Mission Viejo
Temecula
Carlsbad
Escondido
San Diego


Collared pumas utilizing Anza-Borrego Desert State Park and Cuyamaca Rancho State Park. Locations are from June 2006 and Aug 2006 data.
M39
F38
F18
M37
F41
F20
M40
0
10
20 Miles

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CMSP

Small animal priorities

- Further review of data from on-going genetic analysis and post-fire monitoring data
- Development of a research approach- intra- and inter preserve connectivity

CMSP

Bird Priorities

1st.

- Coastal cactus wren
- California gnatcatcher

2nd.

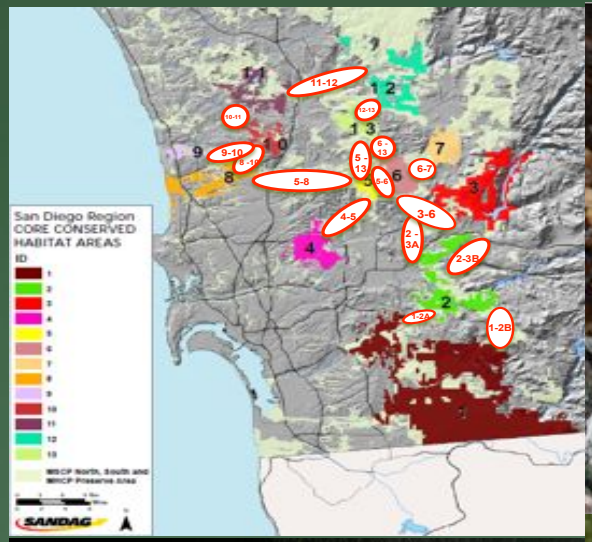
- Burrowing Owl*
- Least Bell's vireo
- Southwester willow flycatcher

Current Funding

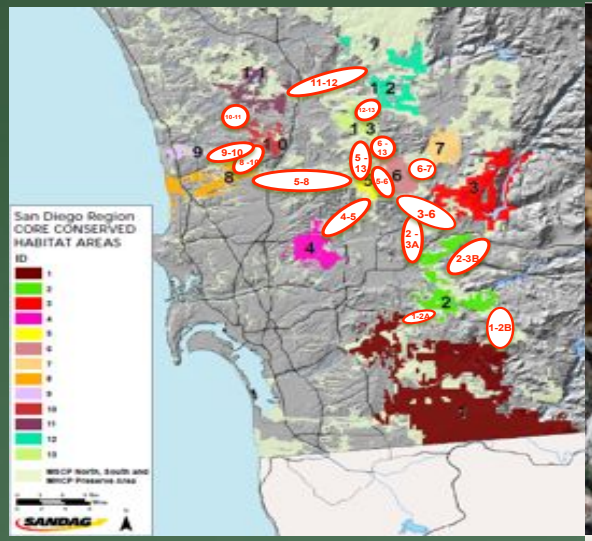
Available Funds- $300,000

- Initiate specific management actions (fencing, culvert cleaning etc.) $100,000
- Mtn. lion- telemetry and genetics- $93,000 (Yr. 1)
- Cactus wren genetics and banding- $107,000 (Yr. 1)
- Gnatcatcher genetics- if outside funding is available
- Badger- model habitat and field verification- SDMMP

Functionally Connected



CMSP



Living Document

- Analyze Data Yearly
- Re-evaluate
  - Objectives
  - Priorities
  - Actions

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