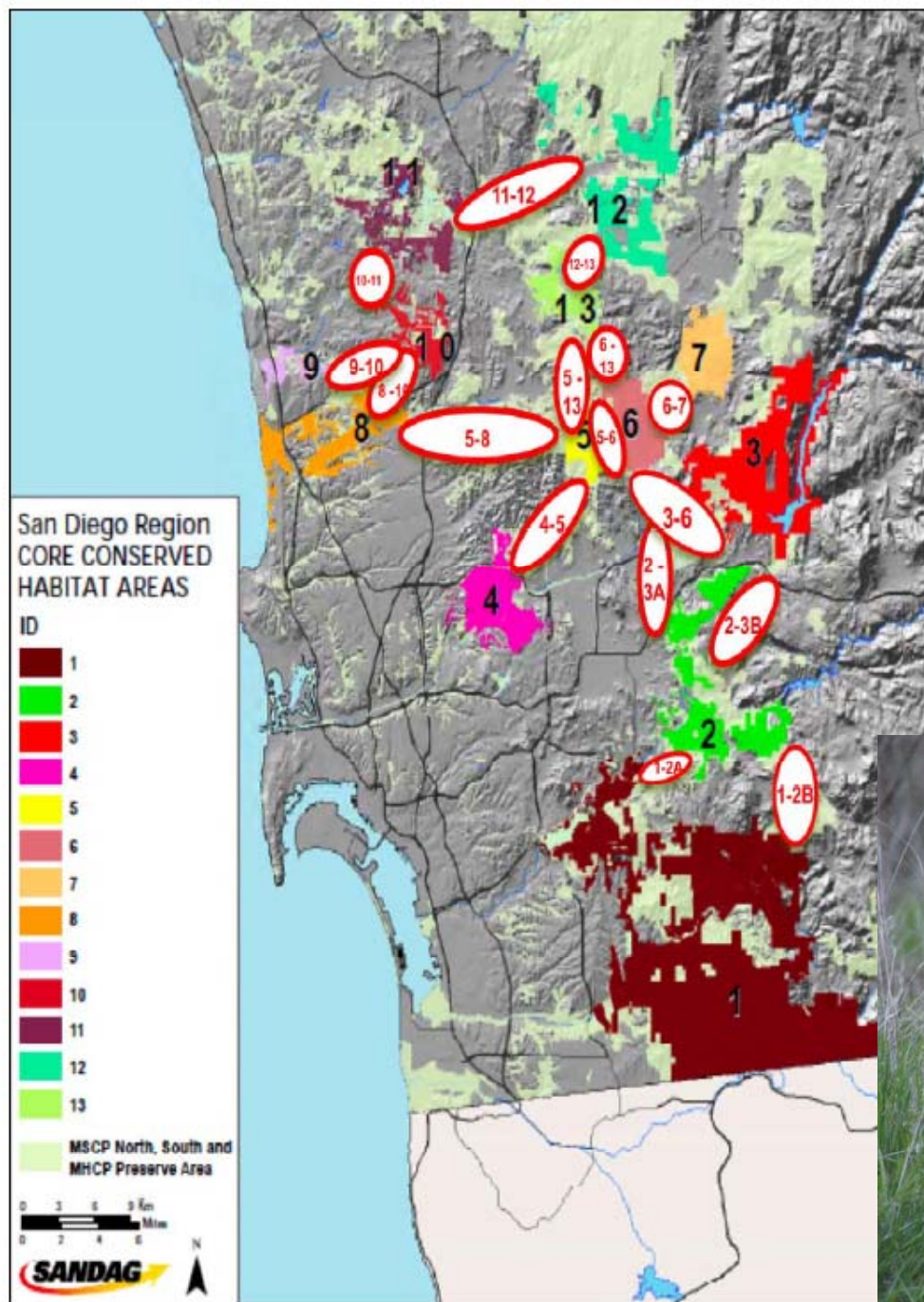


**PLANNING FOR
CONNECTIVITY UNDER
CLIMATE CHANGE : USING
BOBCAT MOVEMENT TO
ASSESS WILDLIFE
LANDSCAPE LINKAGES**

Megan
Jennings



SAN DIEGO STATE
UNIVERSITY



Linkage map by
Jeff Tracey

MSCP AREA
Priority
Linkages
identified



PROJECT GOALS

- **Assess current connectivity across MSCP preserves**
 - Physical or structural connectivity
 - Functional connectivity
- **Interpret results through the lens of climate change and land use changes in the future**
 - Changes predicted over the next 20-30 years
- **Interpret results through lens of recreation and trails use**

CONNECTIVITY

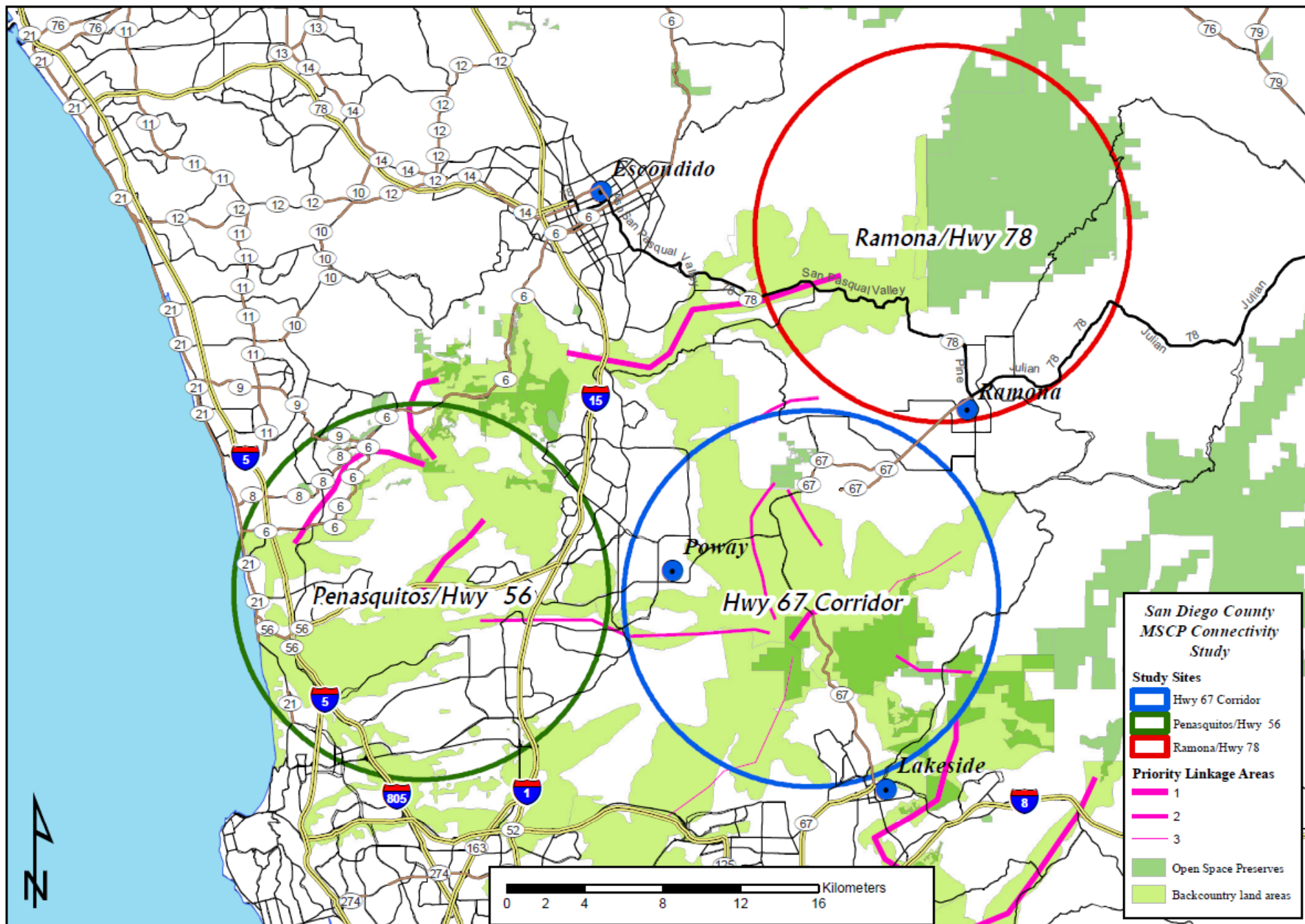
- **Physical - How do we measure?**
 - Trap, collar, and track 15 bobcats
 - Use remote camera stations
 - Collect roadkill in and around important areas of the open space network
- **Functional - How do we measure?**
 - Look at genetic variation between fragmented coastal and more contiguous inland core areas
 - Genotype samples from captures, roadkills, and contributed samples

CLIMATE CHANGE

- Predicted changes in rainfall, fire frequency, temperatures
- How will wildlife respond?
 - Range contractions or shifts predicted
- How do we plan for that?
 - Assess current habitat use and connectivity
 - Model changes in vegetation and land use
 - Predict availability of habitat under new conditions
 - Provide adequate connectivity to allow for range shifts

RECREATION

- Permitted in some MSCP preserves, not others
- How does that affect wildlife use? Resultant impacts on connectivity?
 - Shifts in activity patterns (George & Crooks 2006, Reed & Merenlender 2008)
 - Potential avoidance of some areas
- Knowledge base to manage in the future as need for connectivity changes



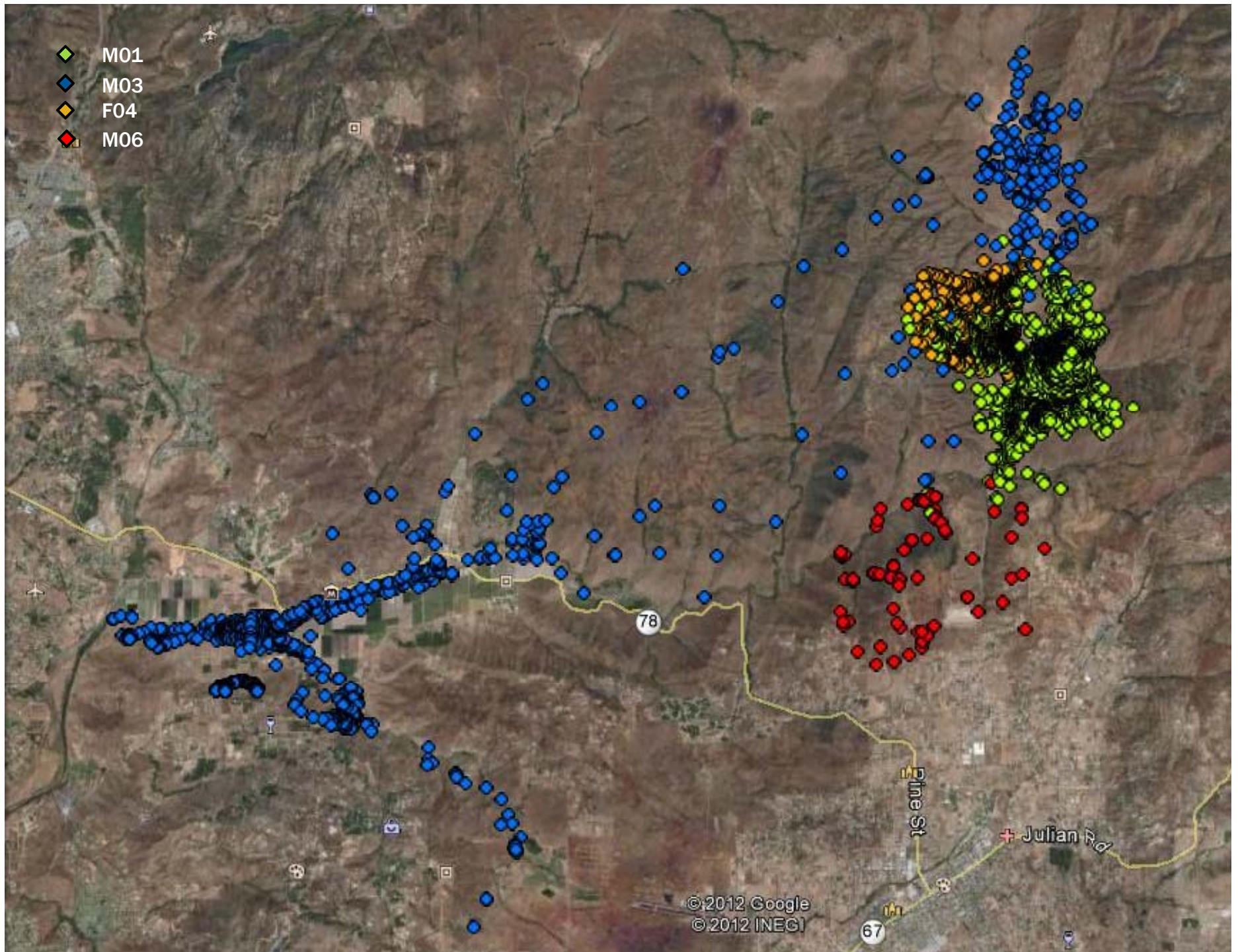
CURRENT STATUS OF DATA COLLECTION

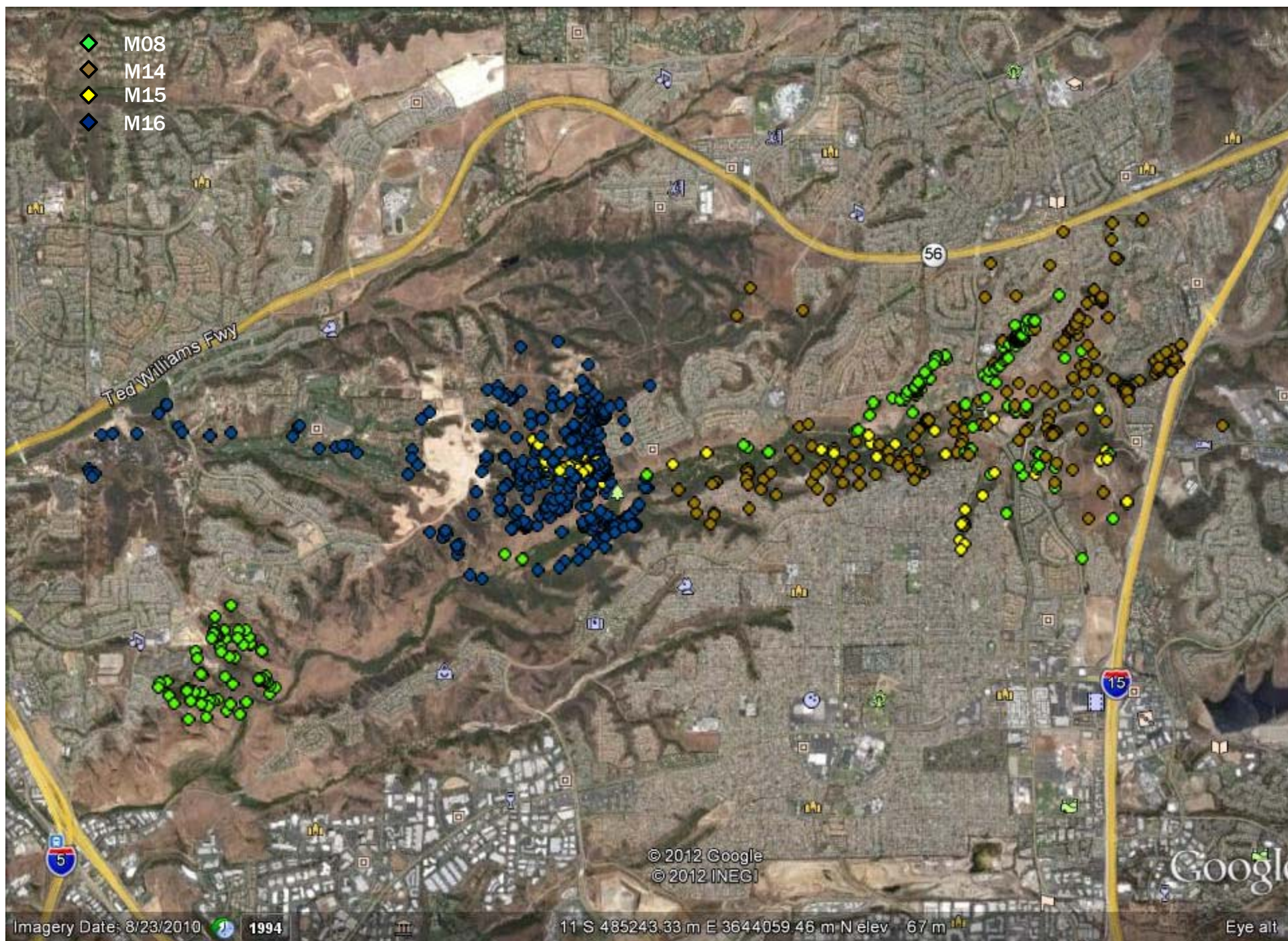
- 19 bobcats captured and collared – data from collars received back on 8 so far
 - Remaining data to be retrieved by Fall 2012





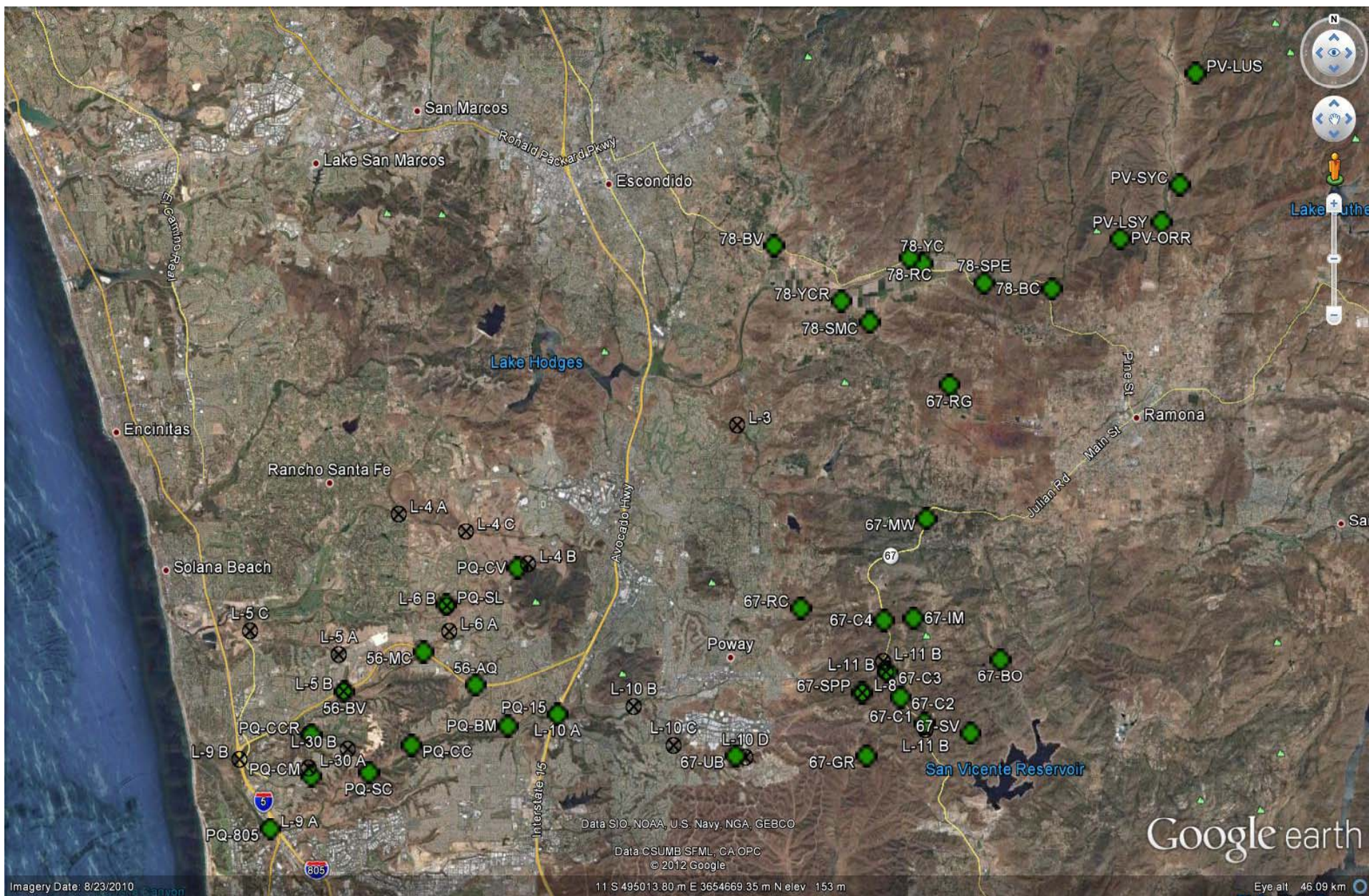
- ◆ M01
- ◆ M03
- ◆ F04
- ◆ M06





CURRENT STATUS OF DATA COLLECTION

- 19 bobcats captured and collared – data from collars received back on 8 so far
 - Remaining data to be retrieved by Fall 2012
- 36 remote camera stations established
 - Repeat sampling from 2002-2003 (CBI 2003)
 - Will run 9-12 months





Ltl Acorn



078°F 026°C

12.30.2011 12:00:23



Ltl Acorn



071°F 022°C

04.05.2012 16:19:11



1/24/12 6:47 PM





2/09/12 6:53 PM





Ltl Acorn



078°F 026°C

02.03.2012 15:57:26



Ltl Acorn

(037°F 003°C

04.14.2012 23:49:11

CURRENT STATUS OF DATA COLLECTION

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 - Remaining data to be retrieved by Fall 2012
- 36 remote camera stations established
 - Will run 9-12 months
- Roadkill collection
 - Wildcat Canyon Rd., SR-67, Poway Rd.
 - Expanding collection network

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- 19 bobcats captured and collared – data from collars received back on 8 so far
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- 36 remote camera stations established
 - Will run 9-12 months
- Roadkill collection
 - Wildcat Canyon Rd., SR-67, Poway Rd.
 - Expanding collection network
- Genetic analysis
 - Approximately 60 samples
 - Camp Pendleton to Anza Borrego SP
 - Potential for regional comparison with our data

ANECDOTAL RESULTS

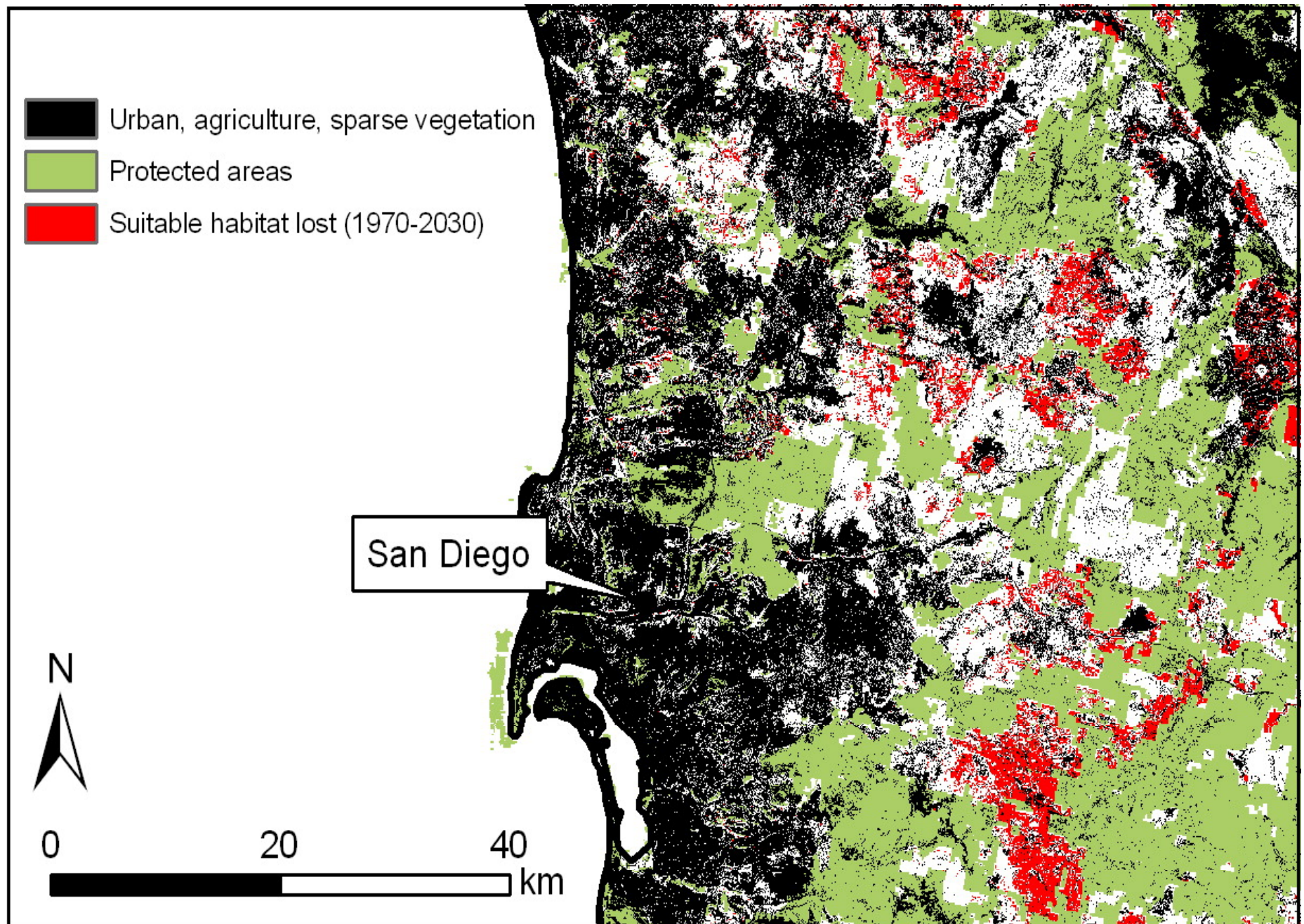
- Crossing under SR-56 and SR-78 is frequent
- SR-67 crossings need improvement
- Movements out of Penasquitos observed into Scripps Ranch and Black Mountain indicate good immediate connectivity
- High number of males in Penasquitos – good or bad indicator?

ANALYSES: CURRENT CONNECTIVITY

- Telemetry data
 - Quantify movement and crossings
 - Assess permeability across landscape
- Pelt pattern ID from camera data to add to telemetry data
 - Number of individuals in an area
 - Crossings made
 - Coupled with occupancy modeling from camera data
- Assessment of recreation impact
 - Rates and types of recreation (from cameras)
 - Compare species diversity, occupancy patterns, and activity patterns

ANALYSES: CONNECTIVITY UNDER CC

- Take baseline connectivity and habitat suitability information
 - Model changes in bobcat movement with changes in vegetation
 - With changes in land use
 - With both land use and vegetation shifts in next 20-30 years
- Land use data available SANDAG, SCAG
- Vegetation modeling at UCSB, SDSU
- Incorporate our other work on carnivore response to burned landscapes



Sample map of puma habitat with changes in land use from Burdett et al. 2010

ANALYSIS PLAN

- Based on predicted future conditions, re-asses current linkages
- Use San Diego data to test and further refine J. Tracey's models from Orange County data
- Apply what we learn to existing MSCP as well as MSHCP plans in progress

CONCLUSIONS

- Through telemetry and cameras, already seeing movement patterns in cores and along edges as well as bobcat use of linkages
- Integrating multiple data sources (telemetry, camera, genetic, roadkill), our project will provide a synoptic assessment of physical and functional landscape connectivity
- Building onto previous research to leverage large amount of work on minimal funding
- This work also supports disease phylogeography study at Colorado State University and mange study at UCLA and the Santa Monica Mtns. National Recreation Area

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- San Diego Tracking Team, Barry Martin, Jason Price, Karen Miner

QUESTIONS?

