

# Genetic Structure of Coastal Cactus Wren Populations in San Diego and Orange Counties

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Nature Reserve of Orange County

# Outline of Presentation

Background

Project Description

- objectives
- methods
- study sites

Progress Update

Future plans



## Connectivity Monitoring Strategic Plan For the San Diego Preserve System



Prepared for the San Diego Environmental Mitigation Program Working Group

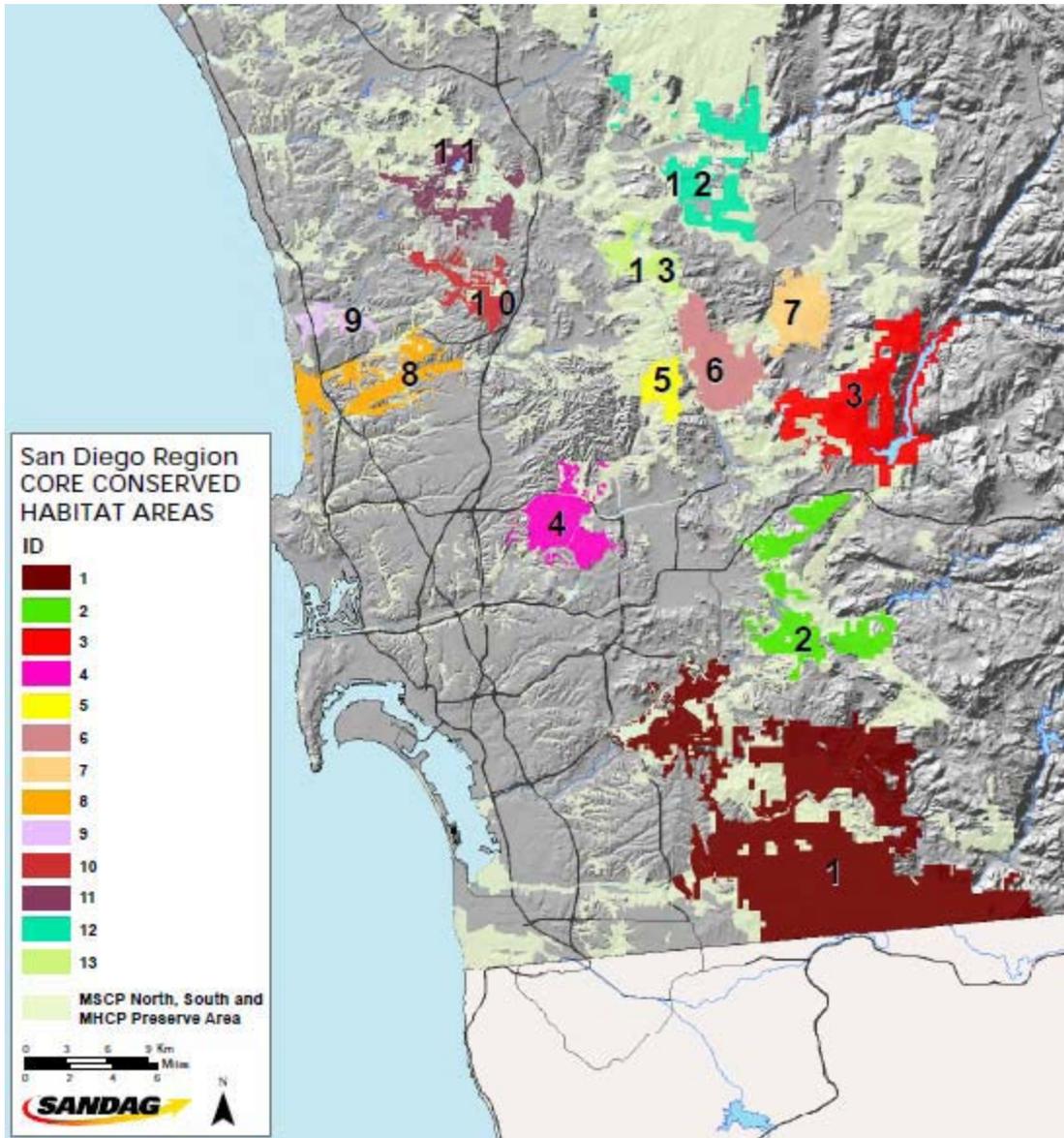
January 11, 2011

- Developed by SDMMP
- Technical workshop

### Goal:

To identify and inform adaptive management actions to *maintain, restore or improve connectivity* between conserved core areas, and thereby:

- ensure persistence of species across preserve system
- preserve ecosystem function across the landscape



What is the functional connectivity among core areas for

- large animals
- small animals
- birds

Priority bird species:

- coastal cactus wren
- Ca. gnatcatcher
- least Bell's vireo
- sw. willow flycatcher

# Why Cactus Wrens?

- dependent upon habitat type (cactus) that is naturally limited in distribution
- cactus habitat is highly fragmented by urbanization
- many cactus patches are small and isolated

➤ suggest connectivity important for dispersal, (re)colonization, maintenance of genetic diversity

- wildfires in 2003 and 2007 have further reduced and fragmented cactus habitat
- extensive and costly cactus patch restoration occurring that would benefit from knowledge of connectivity needs

*Proposal:*

“Genetic Connectivity among Coastal Cactus  
Wren Populations in San Diego County”

Barbara Kus and Amy Vandergast, USGS

Kristine Preston, NROC

*Funding:*

Sandag Environmental Management Program

Nature Reserve of Orange County



# Project Description

## *Goal:*

To evaluate the degree of genetic connectivity among coastal Cactus Wren populations in San Diego and Orange Counties

## *Objectives:*

- Develop a minimum of 10 polymorphic loci that amplify from coastal Cactus Wrens
- Collect blood samples from Cactus Wren populations throughout San Diego and Orange Counties
- Individually color band Cactus Wren nestlings/fledglings to investigate juvenile dispersal
- Use microsatellite markers to evaluate within- and among-population genetic variability of coastal Cactus Wrens
- Conduct follow-up surveys to resight color banded wrens and evaluate dispersal patterns and behavior

# Site Selection

- reviewed results of cactus mapping and Cactus Wren presence/absence surveys (USFWS 2009)
- consulted other resources to identify additional Cactus Wren locations (SD Bird Atlas, CACW Working Group)
- contacted property owners to request access

*Coordinated with a network of partners and cooperators*

USFWS

USFWS/SDNWR

CDFG

ICR Safari Park

CBI

TNC

AECOM

Fallbrook NWC

MCB Camp Pendleton

SD Audubon Society

Sweetwater Authority

SDMMP

San Dieguito River Valley Conservancy

# Methods: Sample Collection



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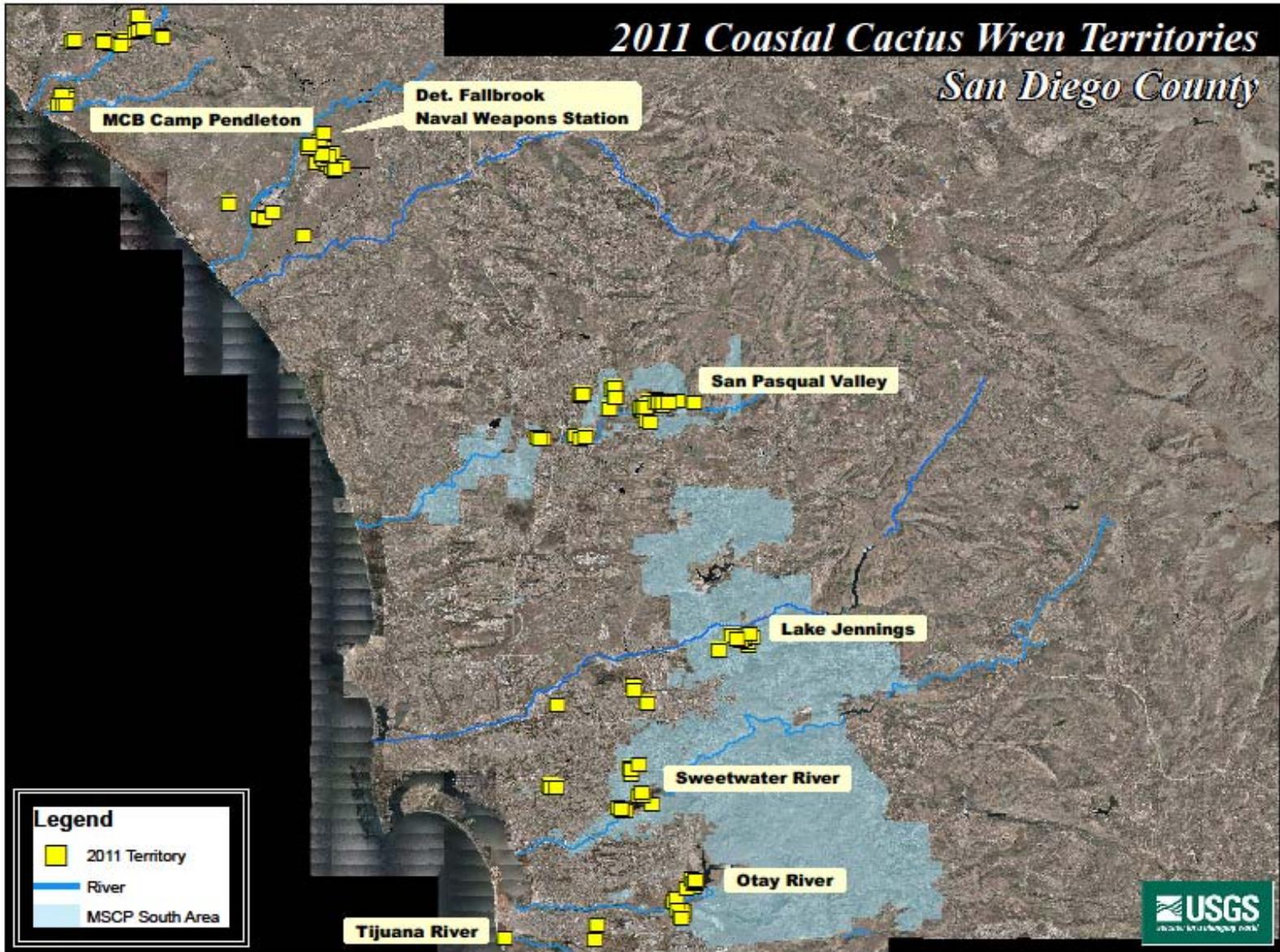
# Methods: Sample Collection



# Progress: Field Data Collection

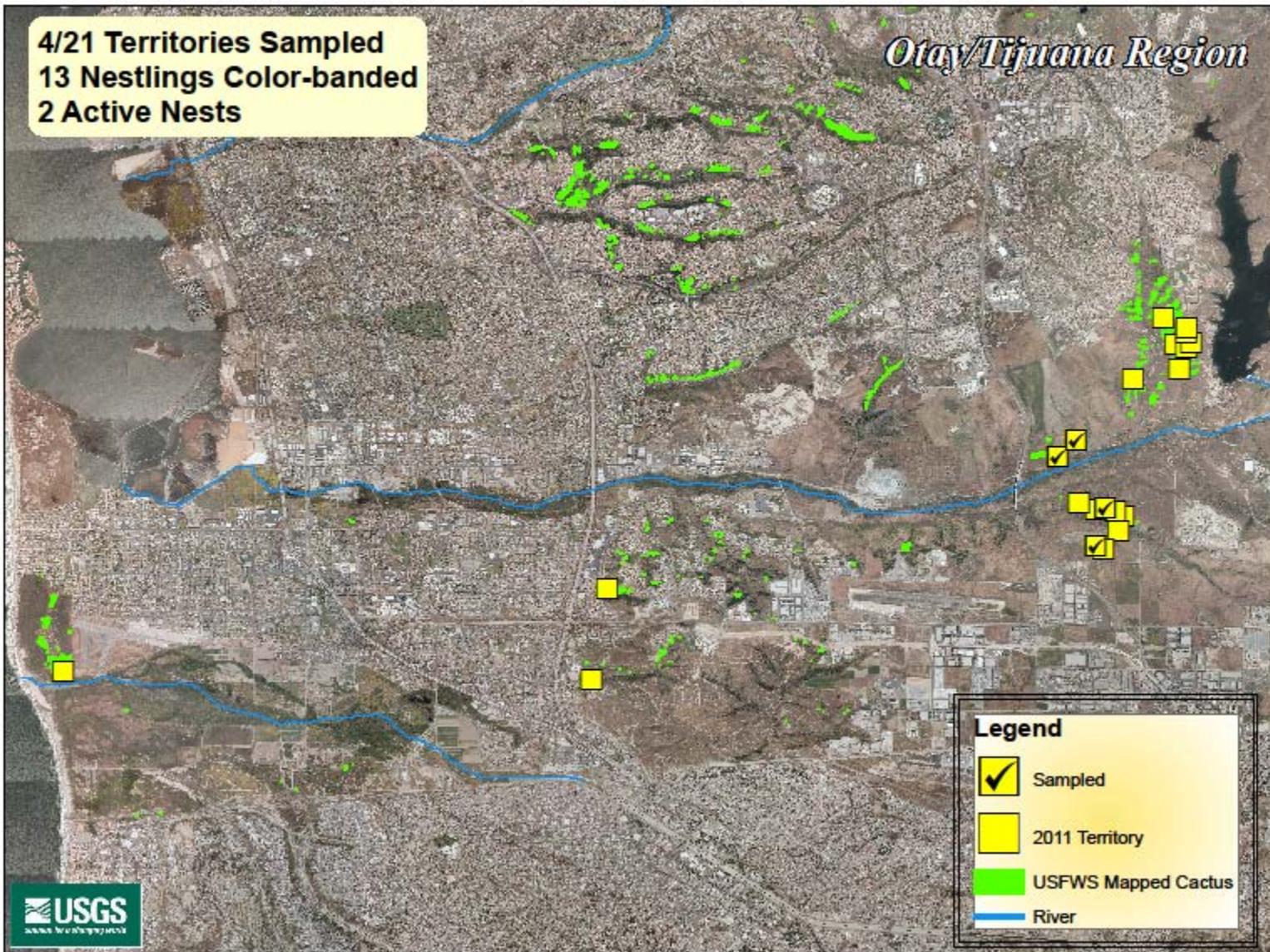
# 2011 Coastal Cactus Wren Territories

## San Diego County



4/21 Territories Sampled  
13 Nestlings Color-banded  
2 Active Nests

*Otay/Tijuana Region*



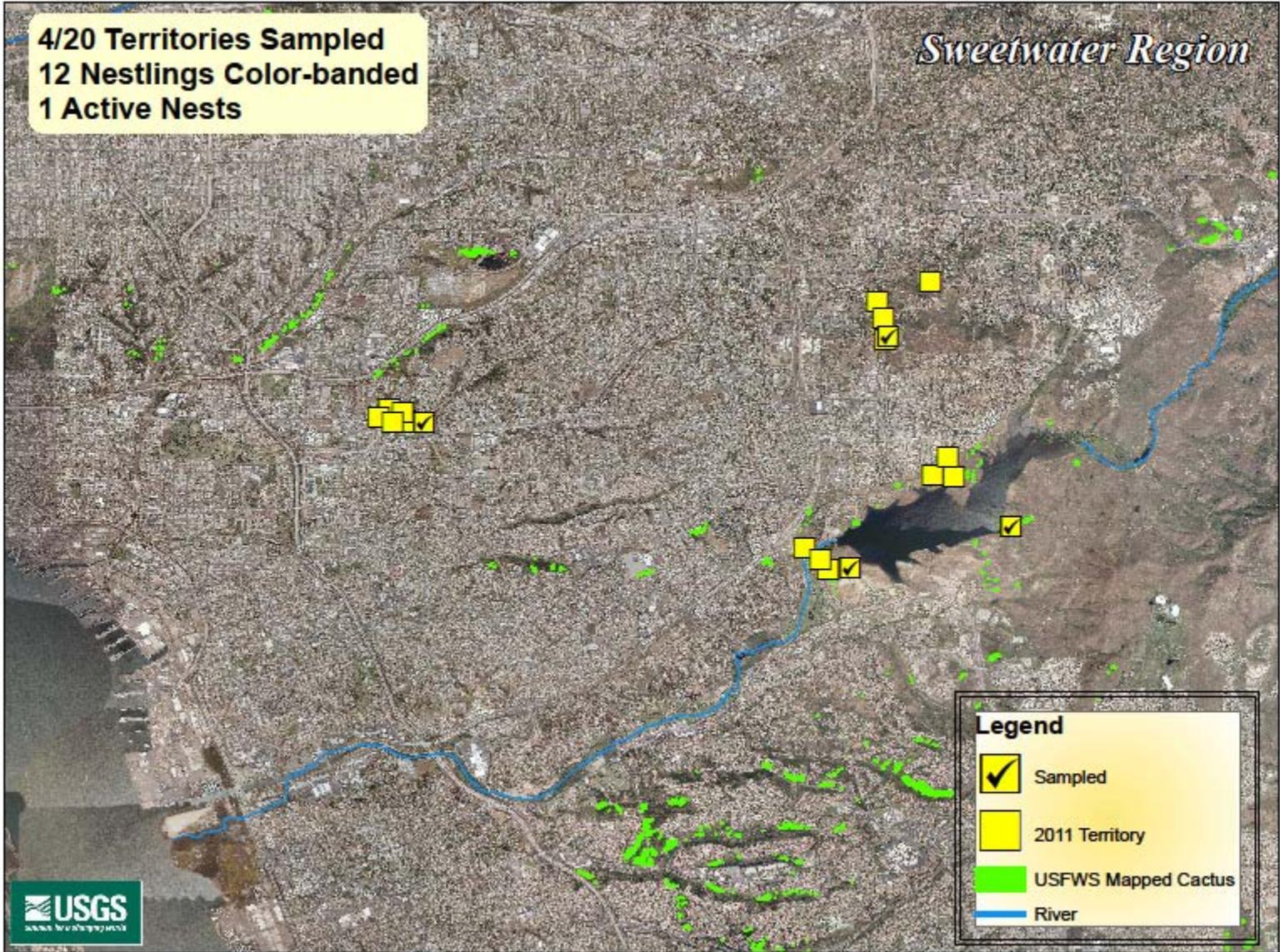
**Legend**

-  Sampled
-  2011 Territory
-  USFWS Mapped Cactus
-  River



4/20 Territories Sampled  
12 Nestlings Color-banded  
1 Active Nests

*Sweetwater Region*



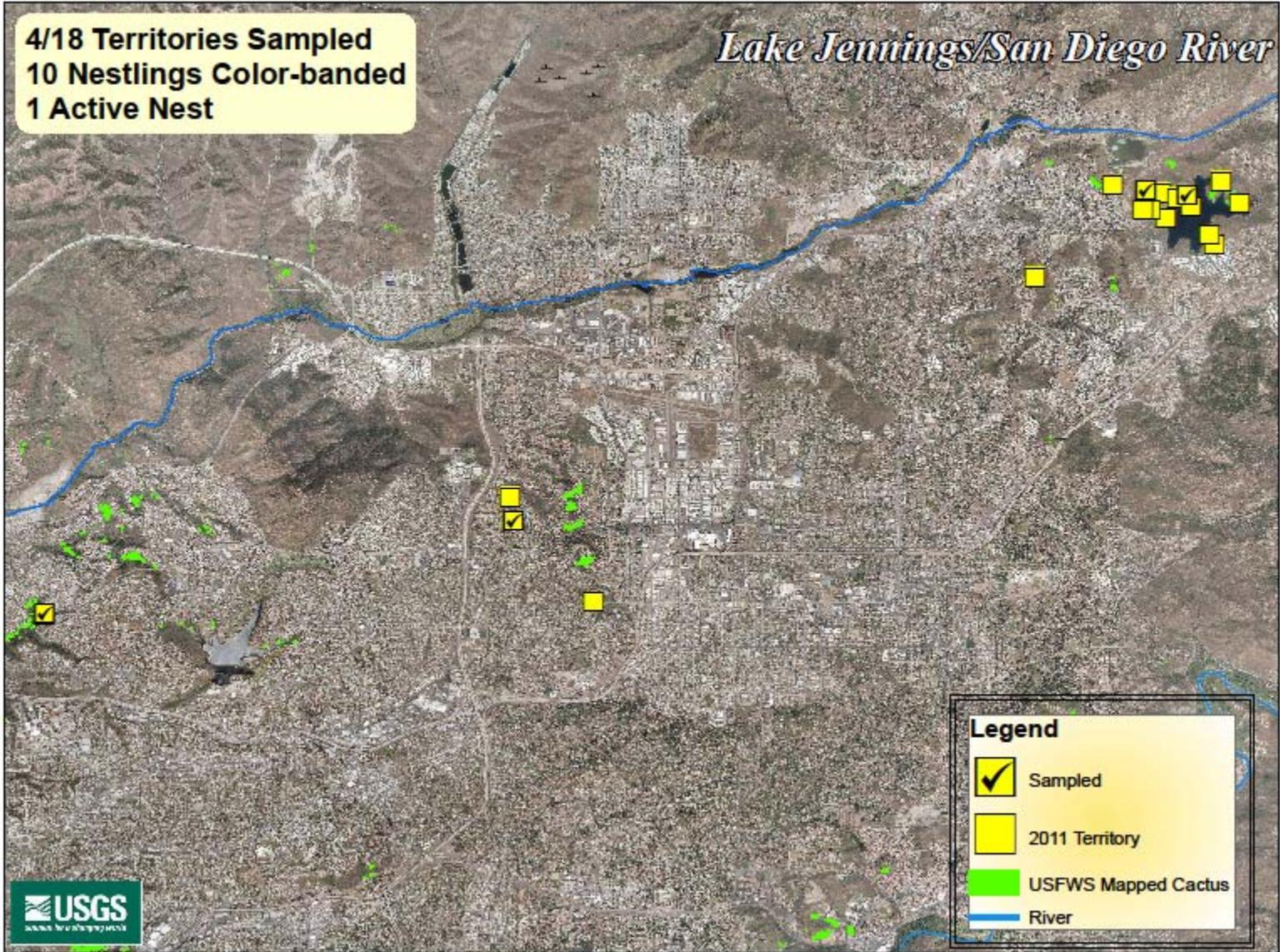
**Legend**

-  Sampled
-  2011 Territory
-  USFWS Mapped Cactus
-  River



4/18 Territories Sampled  
10 Nestlings Color-banded  
1 Active Nest

*Lake Jennings/San Diego River*



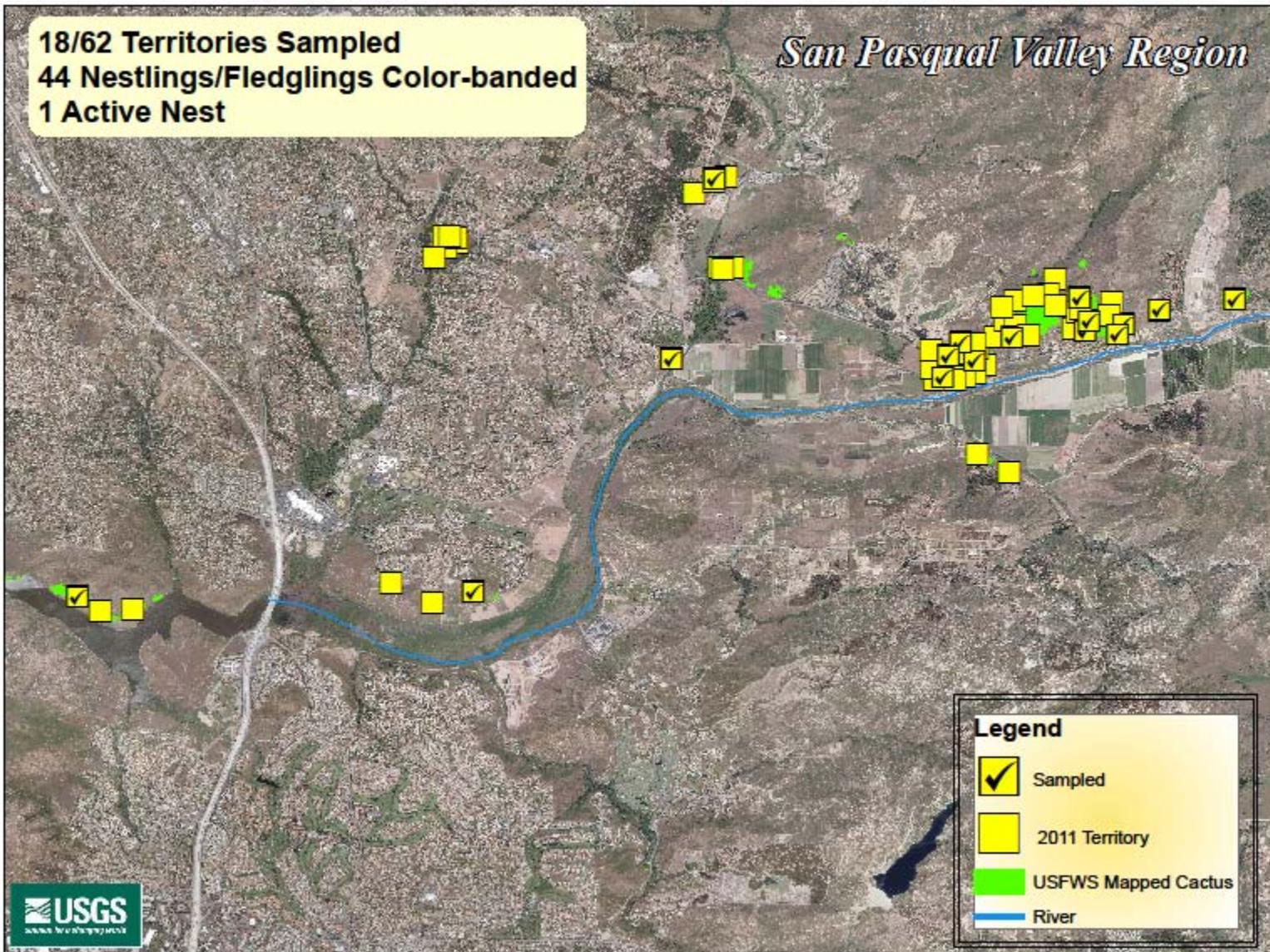
**Legend**

-  Sampled
-  2011 Territory
-  USFWS Mapped Cactus
-  River



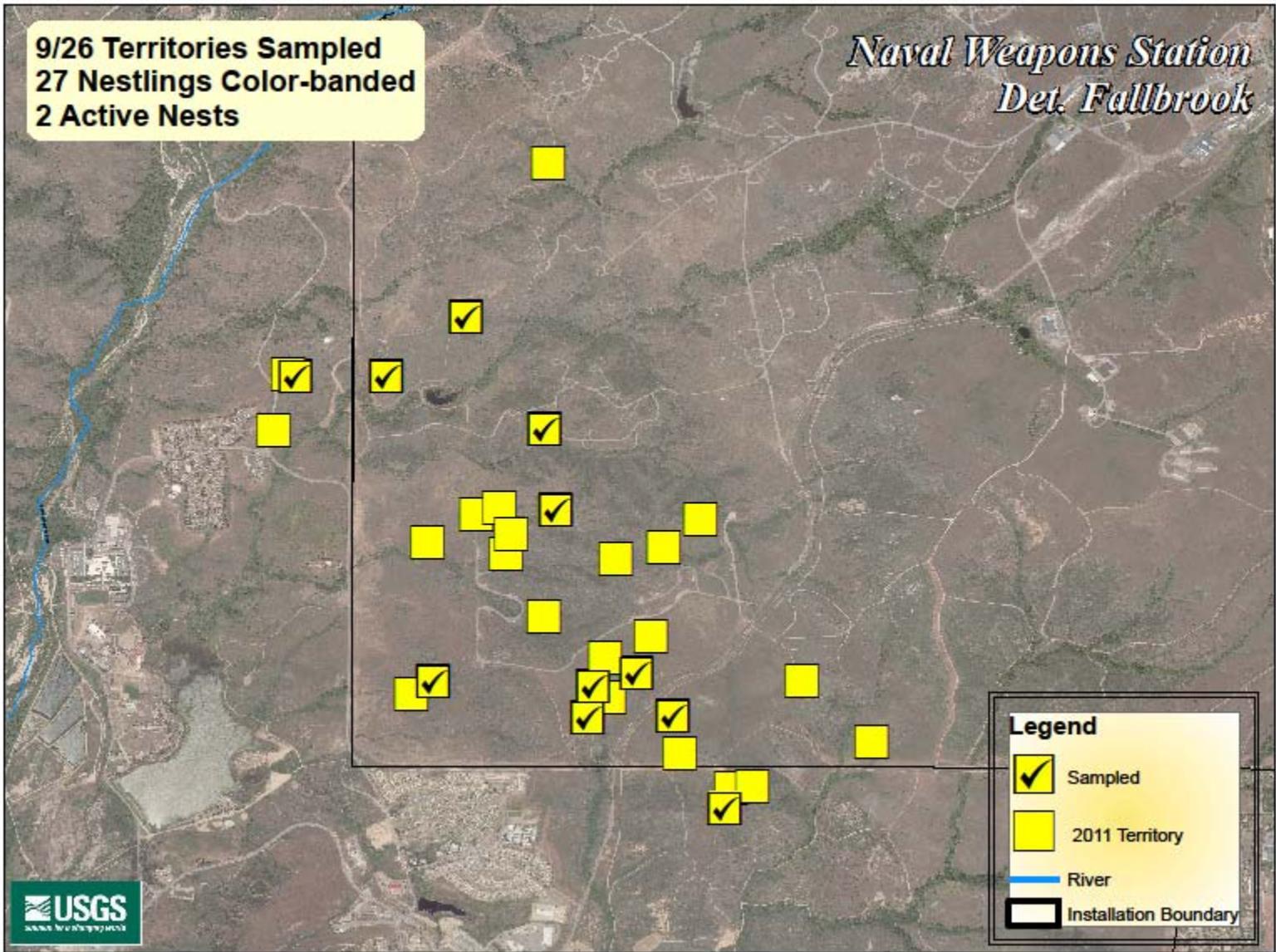
18/62 Territories Sampled  
44 Nestlings/Fledglings Color-banded  
1 Active Nest

*San Pasqual Valley Region*



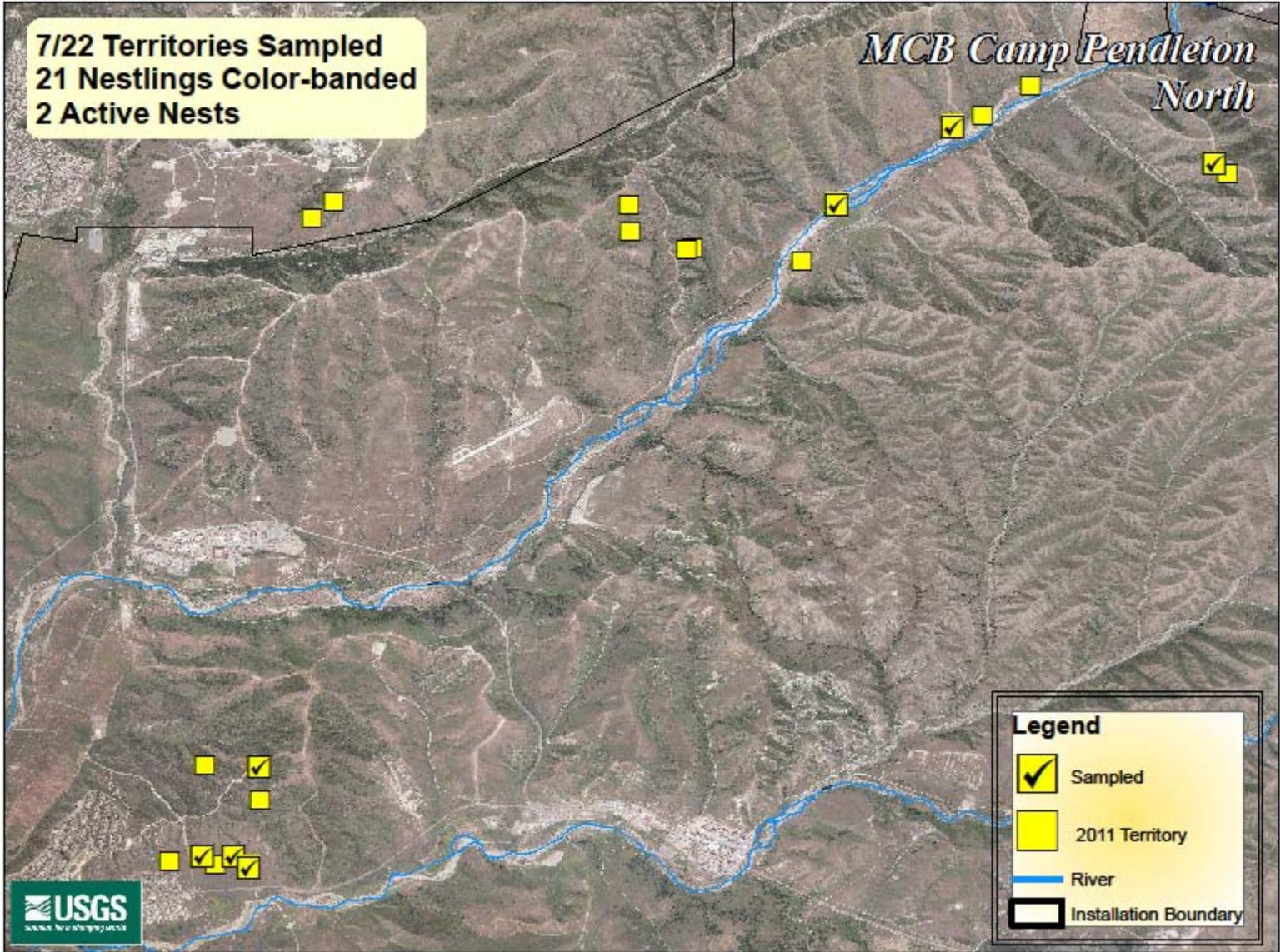
9/26 Territories Sampled  
27 Nestlings Color-banded  
2 Active Nests

*Naval Weapons Station  
Det. Fallbrook*



7/22 Territories Sampled  
21 Nestlings Color-banded  
2 Active Nests

*MCB Camp Pendleton  
North*



**Legend**

-  Sampled
-  2011 Territory
-  River
-  Installation Boundary



4/13 Territories Sampled  
10 Nestlings Color-banded  
1 Active Nest

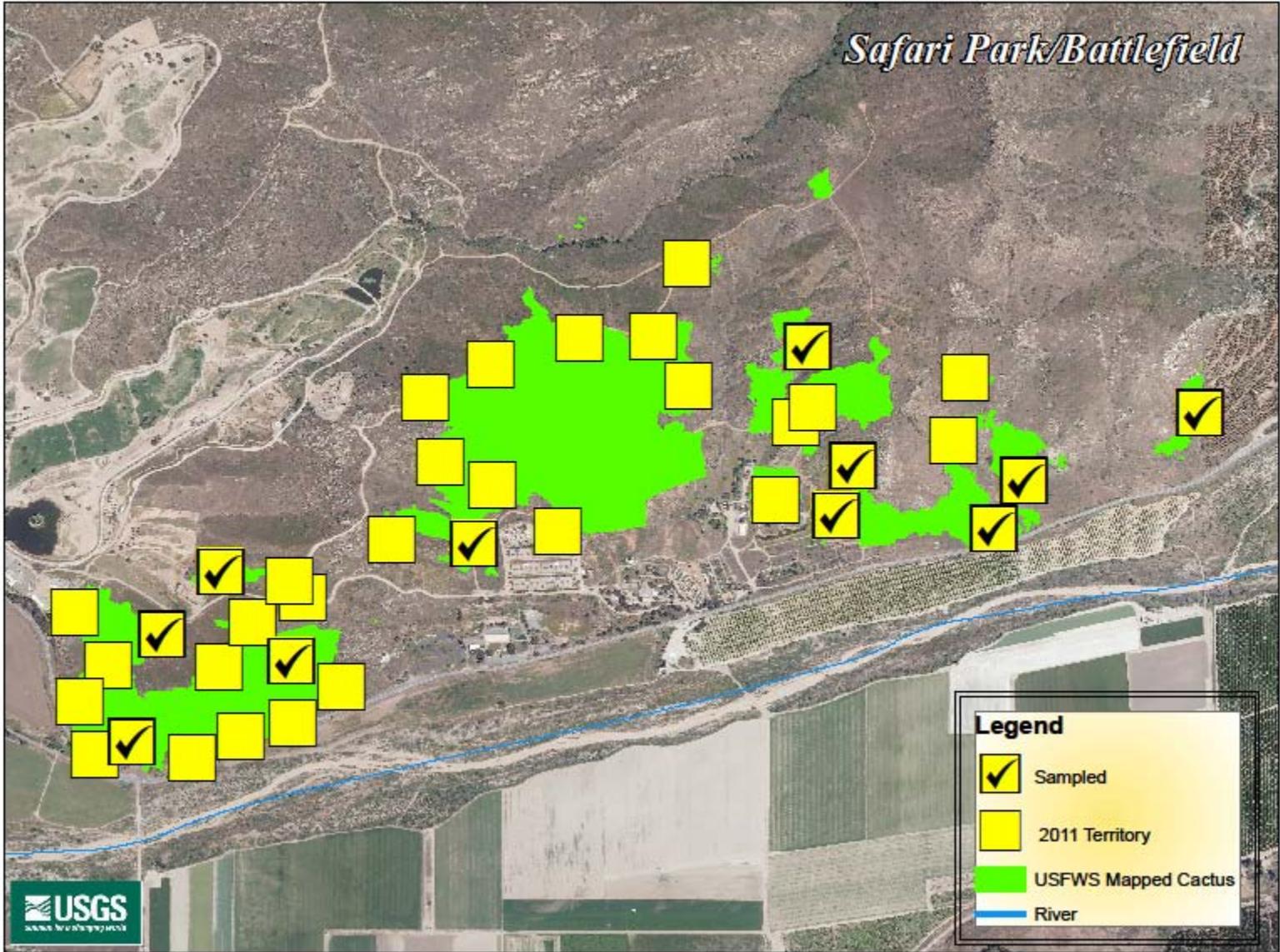
*MCB Camp Pendleton  
South*



**Legend**

-  Sampled
-  2011 Territory
-  River
-  Installation Boundary

*Safari Park/Battlefield*

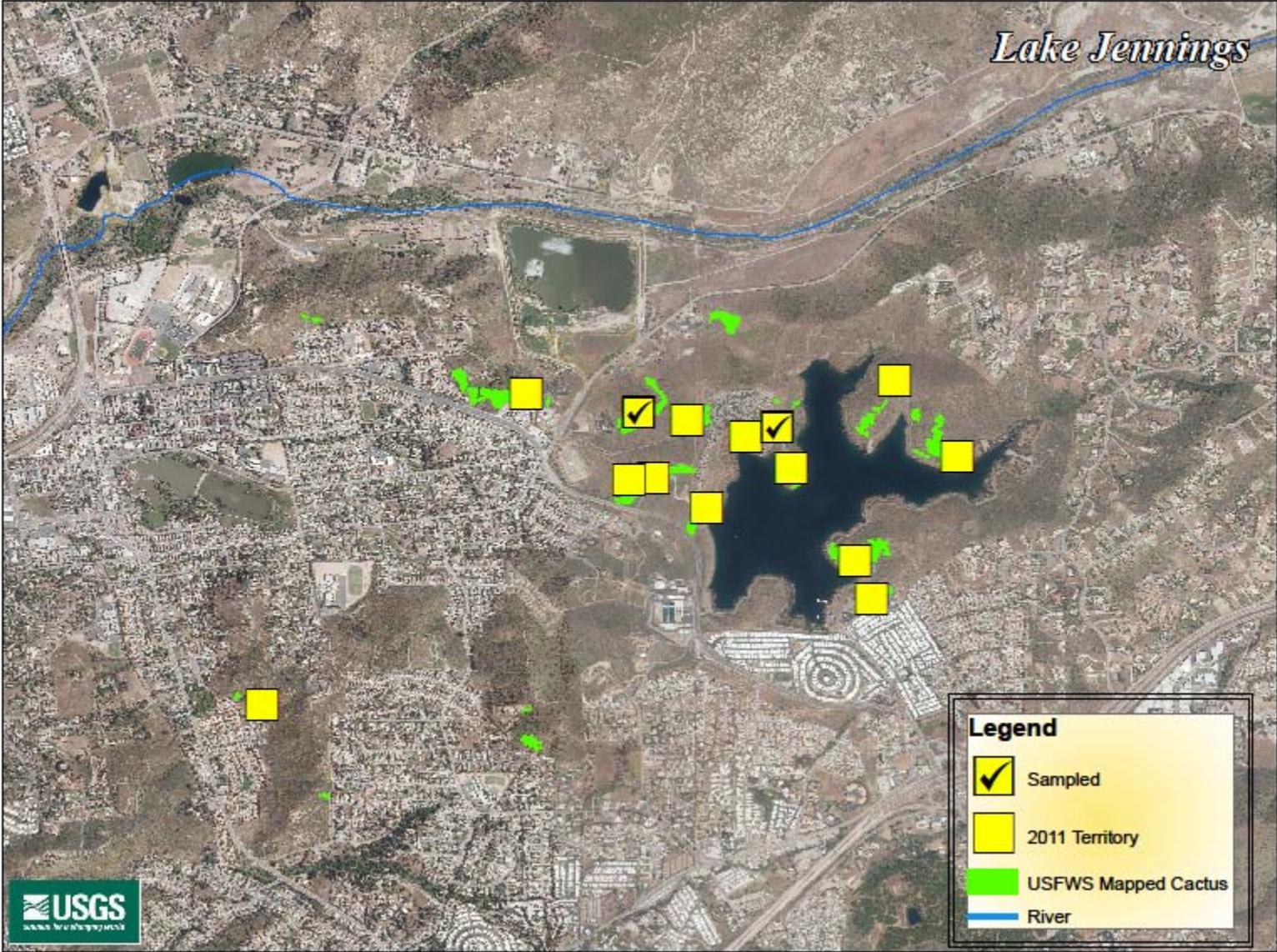


**Legend**

- ✓ Sampled
- 2011 Territory
- USFWS Mapped Cactus
- River



Lake Jennings



# Summary of Sample Collection

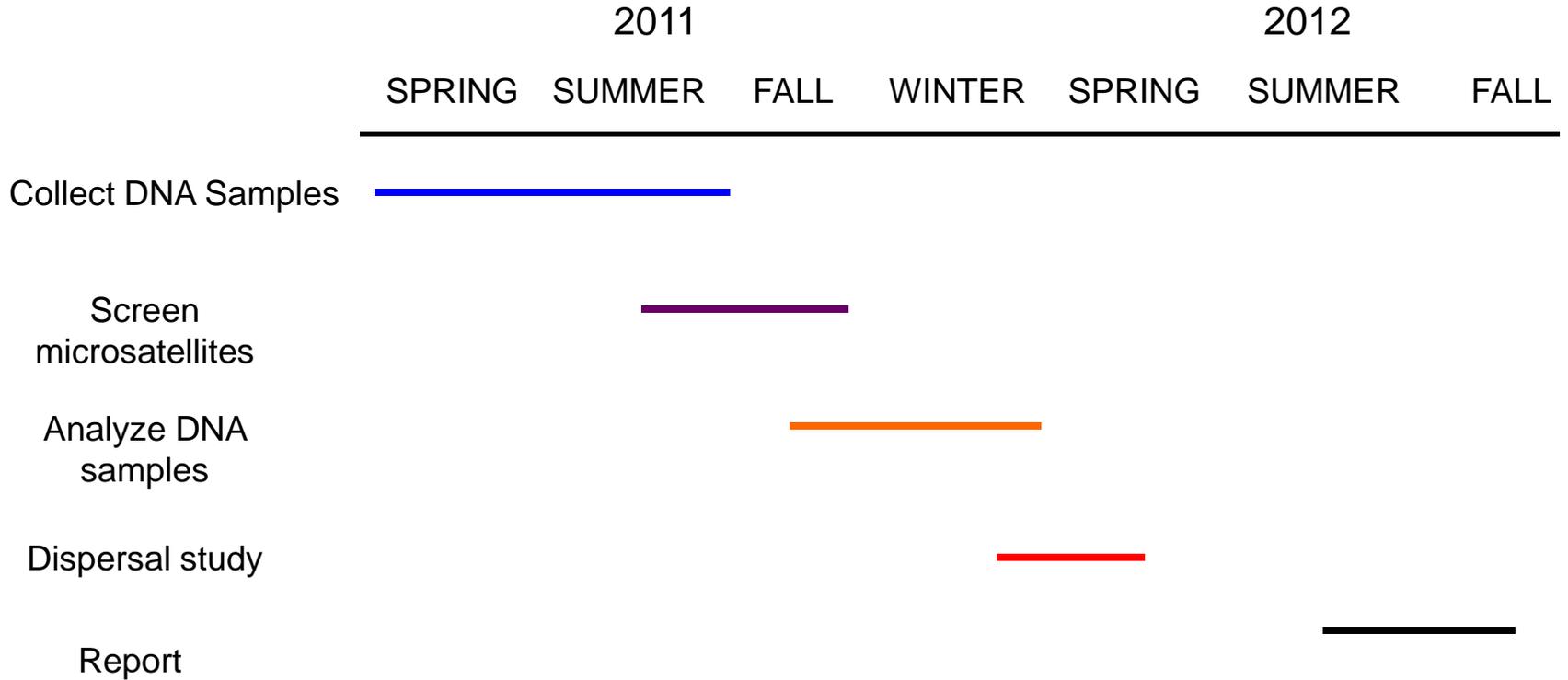
Region	# Territories	# Sampled	# Active Nests	Color-Banded		
				# Nestlings	# Fledglings	# Adults
Tijuana/Otay	21	4	2	13	0	0
Sweetwater	20	4	1	12	0	0
Lake Jennings/San Diego	18	4	1	10	0	0
San Pasqual Valley	62	18	1	36	8	5
Fallbrook NWC	26	9	2	27	0	0
MCB Camp Pendleton	35	11	3	31	0	0
<b>Total</b>	<b>182</b>	<b>50</b>	<b>10</b>	<b>129</b>	<b>8</b>	<b>5</b>

# Progress Update: Lab Analyses

- developed library of Cactus Wren microsatellites
- choosing loci (at least 10) for analyses
- extracting DNA from samples to verify quality



# Timeline



# Future Plans

- Expand sampling within range of Coastal Cactus Wren
- Expand sampling inland:
  - compare genetic structuring in less fragmented landscape
  - inform subspecies question
- Expand temporal framework:
  - analyze material from museum specimens
  - compare historic with current genetic structure
  - *Paquita Hoeck (ICR Safari Park)*

# Acknowledgements

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Cactus Wren Coordination Group

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Aaron Gallagher

Kelly Barr

Dana Kamada

Karly Moore



*Photo credits: Scarlett Howell, Barbara Kus, Pete Famolaro, Jim Merzbacher*