



California Gnatcatcher Monitoring and the MSCP: Synthesis of Findings and Future Research Needs

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Sources of Information

Recent Investigations

Winchell, C.S. 2008. Monitoring protocol: California Gnatcatcher (*Polioptila californica californica*) (DRAFT). Prepared for San Diego Management and Monitoring Program. San Diego, CA.

Winchell, C.S. and P.F. Doherty, Jr. 2005. Estimation of California Gnatcatcher pair abundance and occupancy rates. Prepared for California Department of Fish and Game, San Diego, CA.

Winchell, C.S. and P.F. Doherty, Jr. 2008. Using California Gnatcatcher to test underlying models in habitat conservation plans. Journal of Wildlife Management 72:1322-1327.

Winchell, C.S. and P.F. Doherty, Jr. 2012. Effects of fire, elevation, and habitat quality on the occupancy, extinction, and colonization of Coastal California Gnatcatcher. Unpubl. ms.

USFWS 2009. Estimation of San Diego County California Gnatcatcher population size and recovery following the 2003 October wildfires. Summary Report November 2009.

Available on SDMMP website



Sources of Information

Technical Workshop

Research and Monitoring Priorities for the California Gnatcatcher in the San Diego MSCP

> July 18, 2013 San Diego, CA

Participants

Barbara Kus Kristine Preston Ron Rempel Jon Atwood Clark Winchell Paul Doherty USGS SDMMP SDMMP Antioch University USFWS Colorado State University



Previous CAGN Monitoring





Framework for Study Design

TAIC habitat model

Classified CAGN-occupied sites according to:

- Sagebrush + or -
- Slope
- Precipitation
- Temperature
- Patch size

Categorized suitability as:

Μ

- Very High VH
- High H
- Moderate
- Low





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Goal: Test accuracy of the model Covariates in analyses



Strata in sampling design

Field Data Collection: CAGN

Surveys in 2004, 2007, 2009

Total of 639 points

 not all surveyed each year

Stratified by habitat quality

- VH, H, M, L
- Only VH and H surveyed in 2007, 2009

Points visited 1-6 times

detectability calculated

Surveys completed w/i ~ 8 wks

March - June





USFWS Survey Locations for California Gnatcatchers in 2004, 2007, and 2009

Field Data Collection: Vegetation

2007: (prior to Oct. fire)

43 transects - unburned

2009:

• 82 transects - unburned

2009:

- 40 transects burned
- Before/after fire data





Questions

- 1. What proportion of the habitat is occupied by CAGN?
- 2. How does CAGN distribution vary with habitat type?
- 3. What are the colonization and extinction rates for patches within the MSCP preserve?
- 4. What is the abundance of CAGN in the MSCP preserve?
- 5. What is the population trend of CAGN in the MSCP preserve?
- 6. What is the re-colonization rate of CAGN in habitat burned by wildfire?



1. What proportion of the habitat is occupied by CAGN?

Occupancy estimate





2. How does CAGN distribution vary with habitat type?

Occupancy:

- highest in VH, H habitats
- lower in M and L habitats





2. How does CAGN distribution vary with habitat type?

Hypotheses I

	Ave. Jan. Minimum Temp.	Annual Precip.	Slope	Patch Size
Occupancy	+	-	-	+



2. How does CAGN distribution vary with habitat type?

Hypotheses I

	Ave. Jan. Minimum Temp.	Annual Precip.	Slope	Patch Size
Occupancy	+	-	-	+
Observed	*	*	*	NS



2. How does CAGN distribution vary with habitat type?

Hypotheses II

	Elevation	Year	Heat Load	Dist. to Pacific Coast
Occupancy	-	variable	+	-



2. How does CAGN distribution vary with habitat type?

Hypotheses II

	Elevation	Year	Heat Load	Dist. to Pacific Coast
Occupancy	-	variable	+	-
Observed	*	NS	NS	NS



2. How does CAGN distribution vary with habitat type?





USFWS Survey Locations for California Gnatcatchers in 2004, 2007, and 2009

3. What are the colonization and extinction rates for patches within the MSCP?

Hypotheses

	Habitat Quality	Dist. to Pacific Coast	Elevation	Year
Extinction	-			variable
Colonization	+	-	-	variable



3. What are the colonization and extinction rates for patches within the MSCP?

Hypotheses

	Habitat Quality	Dist. to Pacific Coast	Elevation	Year
Extinction	-			variable
Observed	constant	constant	constant	constant
Colonization	+	-	-	variable



3. What are the colonization and extinction rates for patches within the MSCP?

Hypotheses

	Habitat Quality	Dist. to Pacific Coast	Elevation	Year
Extinction	-			variable
Observed	constant	constant	constant	constant
Colonization	+	-	-	variable
Observed	*	NS	*	*



3. What are the colonization and extinction rates for patches within the MSCP?

Extinction:

- constant over habitat types
- overall average = 0.13

Colonization:

- overall average = 0.06
- highest in VH, H
- higher in 2007- 2009 than 2004-2007
- higher at low elevations

Colonization





- 4. What is the abundance of CAGN in the MSCP preserve?
- 5. What is the population trend of CAGN in the MSCP preserve?

Analysis of data from 2002:

- compared 4 methods
- abundance estimated between 1,324 – 3,009
- sample sizes insufficient to distinguish between methods
- conclude more testing needed to determine best method







6. What is the re-colonization rate of CAGN in habitat burned by wildfire?

Wildfires:

- 2003 (October)
- 2007 (October)

Approximately 1/3 of preserve area burned

Burn Analysis

≥USGS

- 122 points within 2003 fire perimeter sampled
- VH and H only
- No points burned in 2007 were sampled in 2009



USFWS Survey Locations for California Gnatcatchers in 2004, 2007, and 2009

6. What is the re-colonization rate of CAGN in habitat burned by wildfire?

Treated Burned as 5th Stratum

Occupancy



Colonization







6. What is the re-colonization rate of CAGN in habitat burned by wildfire?

Re-colonization after 2003 fire :

- 0 CAGN in 2004
- 3 CAGN in 2007 (5% of burned points)
- 10 CAGN in 2009 (8% of burned points)
- Suggested that colonization occurred from perimeter inward, and was related to proximity to VH habitat outside perimeter



Vegetation Analysis



Not analyzed yet



Summary and Management Implications

- Validated TAIC CAGN habitat model
- Created a framework for future occupancy monitoring
- Recommend that acquisition/protection focus on VH or H quality habitat
- Documented slow re-colonization of burned areas by CAGN
- Suggest that post-fire restoration focus on areas adjacent to VH quality habitat



Future Research Needs





Research Priorities

Primary Stressors:

- Fire: temporary loss of habitat
- Habitat degradation/conversion

Focus research on:

- Effect of fire on habitat and birds, with the goal of informing management before, during, and after fire
- How and where to rehabilitate CSS
- How to predict and detect response of CAGN to climate change

Integrate vegetation into habitat model



Recommendations

- Design a post-fire study with adequate sample sizes for addressing habitat and CAGN recovery
- Add sampling points to monitor CAGN/bird response to climate change
- Continue occupancy
 monitoring





USFWS Survey Locations for California Gnatcatchers in 2004, 2007, and 2009

Examine existing data to evaluate the following:

Increase detectability

- Survey earlier in spring when detectability higher
- Use song playbacks to enhance detection

Shorten survey length (i.e. time spent at point)

Reduce number of visits to each point

Reduce frequency of surveys (e.g., every 3 yrs? 5 yrs?)

Streamline vegetation sampling to focus on important predictor variables



Selection of points:

Occupancy Monitoring:

Focus on VH and H quality points only

Sample same core points for occupancy monitoring (i.e. avoid rotating samples)

Determine desired sampling framework (e.g., MSCP? MHPA? San Diego Co.? Southern CA?); seek cooperators and standardize methodologies



Selection of points:

Post-fire Study:

Increase number of points within existing fire perimeters

Pre-select points in other areas so can begin post-fire sampling within 2 weeks of future fires





USFWS Survey Locations for California Gnatcatchers in 2004, 2007, and 2009

Selection of points:

Climate Change Monitoring:

Establish points based on projections of future conditions influencing CAGN occurrence

Survey for multiple species?





USFWS Survey Locations for California Gnatcatchers in 2004, 2007, and 2009

Other Considerations

How important is it to determine CAGN *abundance (# pairs)* vs occupancy? Abundance adds methodological and analytical complexity that will limit future work.

Are we asking the right questions so that managers can:

- Prioritize areas for restoration
- Prioritize areas for fuel reduction
- Prioritize areas to protect during a fire
- Know what to do to recover L, M, H, VH quality sites after a fire
- Determine whether land is on a trajectory towards where we want it to go



Next Steps

- Generate feedback and input from managers, agencies
- Do "homework" regarding increasing methodological efficiency
- Analyze vegetation data
- Refine analyses regarding:
 - Effects of 2003 and 2007 fires on occupancy
 - "Trends" in occupancy over time
- Develop study design, proposal
- Resume monitoring





Thank-you!



