Appendix E

California Spotted Owl Module: 2004 Annual Report

Principal Investigator:

John J. Keane
Sierra Nevada Research Center
Pacific Southwest Research Station
U.S. Forest Service
2121 2nd Street, Suite A-101
Davis, CA 95616
530-759-1704; jkeane@fs.fed.us

Research Team:

Field Project Leaders:
Paula A. Shaklee
Dan L. Hansen
Claire V. Gallagher

GIS Analyst:
Sean A. Parks

Sierra Nevada Research Center
Pacific Southwest Research Station
U.S. Forest Service
2121 2nd Street, Suite A-101
Davis, CA 95616
530-759-1700

Introduction

Knowledge regarding the effects of fuels and vegetation management on California spotted owls (***Strix occidentalis occidentalis;*** CSOs) and their habitat is a primary information need for addressing conservation and management objectives in Sierra Nevada forests. The specific research objectives of the California spotted owl module as identified and described in the Plumas-Lassen Study (PLS) Plan are:

1) What are the associations among landscape fuels treatments and CSO density, distribution, population trends and habitat suitability at the landscape-scale?

2) What are the associations among landscape fuels treatments and CSO reproduction, survival, and habitat fitness potential at the core area/home range scales?

3) What are the associations among landscape fuels treatments and CSO habitat use and home range configuration at the core area/home range scale?

4) What is the population trend of CSO in the northern Sierra Nevada and which factors account for variation in population trend?

5) Are barred owls increasing in the northern Sierra Nevada, what factors are associated with their distribution and abundance, and are they associated with reduced CSO territory occupancy?

6) Does West Nile Virus affect the survival, distribution and abundance of California spotted owls in the study area?

Current information on the distribution and density of CSOs across the HFQLG study area is required to provide the data necessary to build predictive habitat models and provide baseline population information against which we will assess post-treatment changes in CSO populations and habitat. Our focus in 2004 was to complete collection of CSO surveys and continue banding to provide the required baseline information to meet the objectives of Research Questions 1-4 identified above. Complete landscape inventory surveys were conducted across 5 survey areas in 2004 (Figure 1). Details on survey methods are described in the study plan. Efforts were made to monitor the pair and reproductive status of each owl, and to capture, uniquely color-mark, and collect blood samples from each individual owl. Color-marking is necessary to estimate survival and population trend, and to assess exposure to West Nile Virus (WNV)(Research Question #5). We also recorded all barred and hybrid barred-spotted owls encountered in the study area and synthesized all existing barred owl records for the northern Sierra Nevada to address Research Question #6.

Results

CSO Numbers, Reproductive Success, and Density:

A total of 50 territorial CSO sites were documented in 2004 across the study area (Figure 2). This total consisted of 43 pairs and 7 territorial single CSOs (single owl detected multiple times with no pair-mate detected). Eighteen pairs successfully reproduced in 2004 (42% of documented pairs). A total of 29 young were fledged (1.61 young per successful nest).

We estimated the crude density of CSOs based on the number of territorial owls detected in each of the 5 survey areas during 2004 surveys at the Treatment Unit and Cal-Planning Watershed spatial scales (Table 1, Figure 3). The estimated crude density across the study area was 0.084 owls/km^2 (Table 1). Estimated mean crude density across 32 CAL-Planning Watersheds was 0.075 owls/km^2 (Figure 3).

Table 1. Crude density of territorial California spotted owls across treatment units on the Plumas National Forest in 2004.

Survey Area	Size (km^2)	Crude Density of Territorial CSOs
TU-2	182.4	0.013 /km^2
TU-3	214.4	0.093 /km^2
TU-4	238.2	0.067 /km^2
TU-5	260.2	0.077 /km^2
TU-7	210.3	0.071 /km^2
Total Study Area	1,105.5	0.084 /km^2

Seventy-nine CSOs were captured and uniquely banded in 2004. Blood samples were collected from 68 individuals and screened at the University of California, Davis for West Nile Virus exposure. None of the 68 individuals tested positive for WNV exposure in 2004.

Barred and Sparred (spotted/barred hybrid) Distributional Records:

We detected one barred owl and one sparred owl during 2004 surveys. Our synthesis of barred-sparred records from Forest Service and California Department of Fish and Game databases indicates that there are a minimum of 31 individual site records across the northern Sierra Nevada (Figure 4). The first barred owl in the region was reported in 1989. Nineteen of the 31 site-records were recorded and known occupied between 2002-2004. The pattern of records suggests that barred/sparred owls have been increasing in the northern Sierra Nevada between 1989-2004.

California Spotted Owl Diet:

A single survey plot was established at a CSO nest or roost location at each CSO territory in 2003 and 2004. Systematic searches for pellets and prey remains were conducted in each plot during each year. A total of 1424 pellets have been collected over the two years. To date 495 pellets have been sorted and all prey items identified to species or taxonomic group when species identification could not be ascertained. Mammals comprised the dominant taxonomic group identified in the diet. The three most frequently detected species were the dusky-footed woodrat, northern flying squirrel, and *Peromyscus* species (Table 2).

Table 2. Composition of prey items identified in California spotted owl pellets from the Plumas National Forest, 2003-2004.

	Percent Occurrence (n=495)		Number of Individuals	
Prey Species	n	%	n	%
Dusky-footed Woodrat (*Neotoma fuscipes*)	217	43.8%	225	20.0%
Northern Flying Squirrel (*Glaucomys*	175	35.4%	208	18.5%

sabrinus)				
Deer Mouse (*Peromyscus spp*.)	122	24.6%	222	19.7%
Botta's Pocket Gopher (*Thomomys bottae*)	28	5.7%	29	2.6%
California Mole (*Scapanus latimanus*)	22	4.4%	23	2.0%
Voles (*Microtus* spp.)	16	3.2%	18	1.6%
Shrews (*Sorex* spp.)	16	3.2%	16	1.4%
House Mouse (*Mus musculus*)	13	2.6%	23	2.0%
Bats (*Chiroptera*)	10	2.0%	9	0.8%
Western Harvest Mouse (*Reithrodontomys megalotis*)	2	0.4%	2	0.2%
Unidentified Rodent	57	11.5%	59	5.2%
Total Mammals	**452**	**91.5%**	**834**	**76.6%**
Birds (*Aves*)	**65**	**14.0%**	**65**	**6.0%**
Insects (*Insecta*)	**100**	**18.0%**	**190**	**17.4%**
Total Prey	**na**	**na**	**1089**	**100.0%**

[1]Percent Occurrence = Percentage of the total 495 pellets in which the species was identified (e.g., Dusky-footed woodrats were identified in 217/495 pellets (43.8%), mammals were detected in 452/495 (91.5%)).

Current Research - 2005

In addition to continuing field surveys in 2005 designed to address our six research questions, our emphasis will broaden to focus on the development of predictive habitat relationship models as described in the module study plan. Baseline information collected in 2002-2004 forms the foundation for this phase of the research. These models should be completed in Winter 2005. We also are expanding the scope of our study to fully collaborate and integrate our work with the ongoing Lassen Demographic study. This collaboration and integration will broaden the base of CSO distributional and demographic information that can be used to develop predictive habitat models for our use in an adaptive management framework and to directly monitor implementation of the HFQLG project.

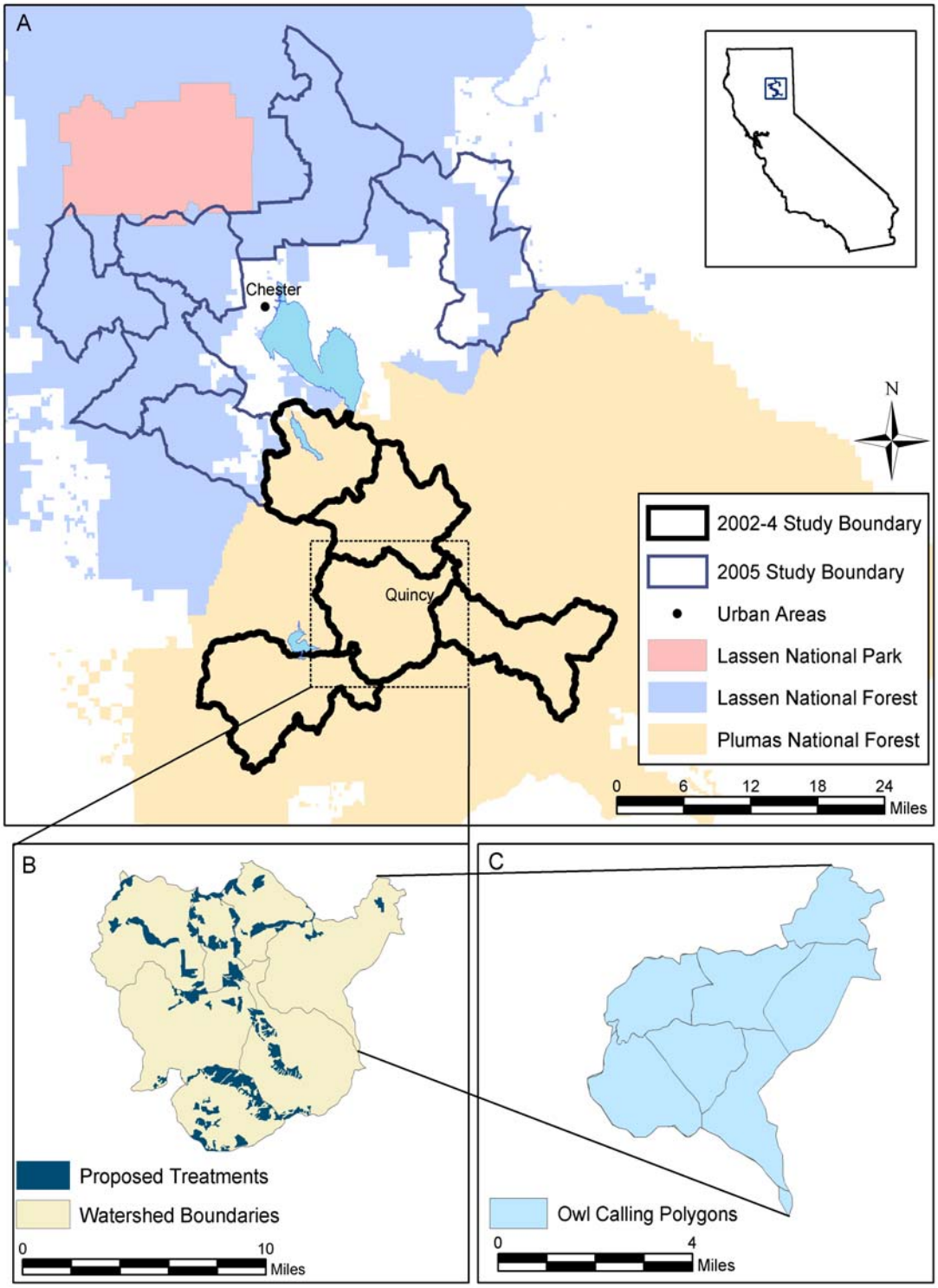
A
Chester
Quincy
N
2002-4 Study Boundary
2005 Study Boundary
Urban Areas
Lassen National Park
Lassen National Forest
Plumas National Forest
0 6 12 18 24
Miles
B
Proposed Treatments
Watershed Boundaries
0 10
Miles
C
Owl Calling Polygons
0 4
Miles

Figure 1. (A) Location of CSO Survey Plots surveyed in 2004. (B) Example of original survey plot consisting of multiple Cal-Planning watersheds. (C) Example of Primary Sampling Units for surveying for CSOs. See text and study plan for further details .

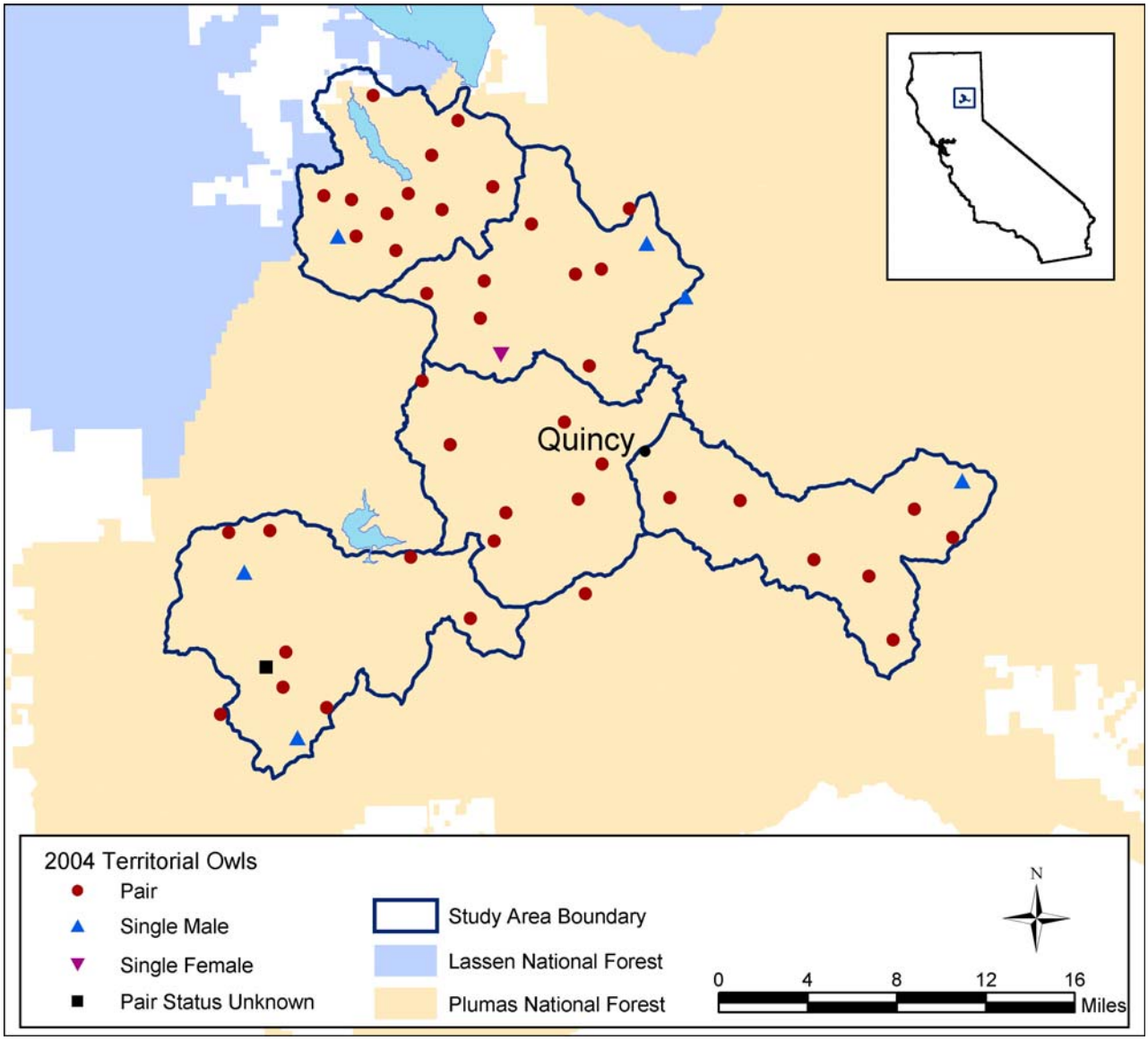

Figure 2. Distribution of California spotted owl territories within CSO survey plots across the Plumas National Forest, 2004.

Figure 3a.

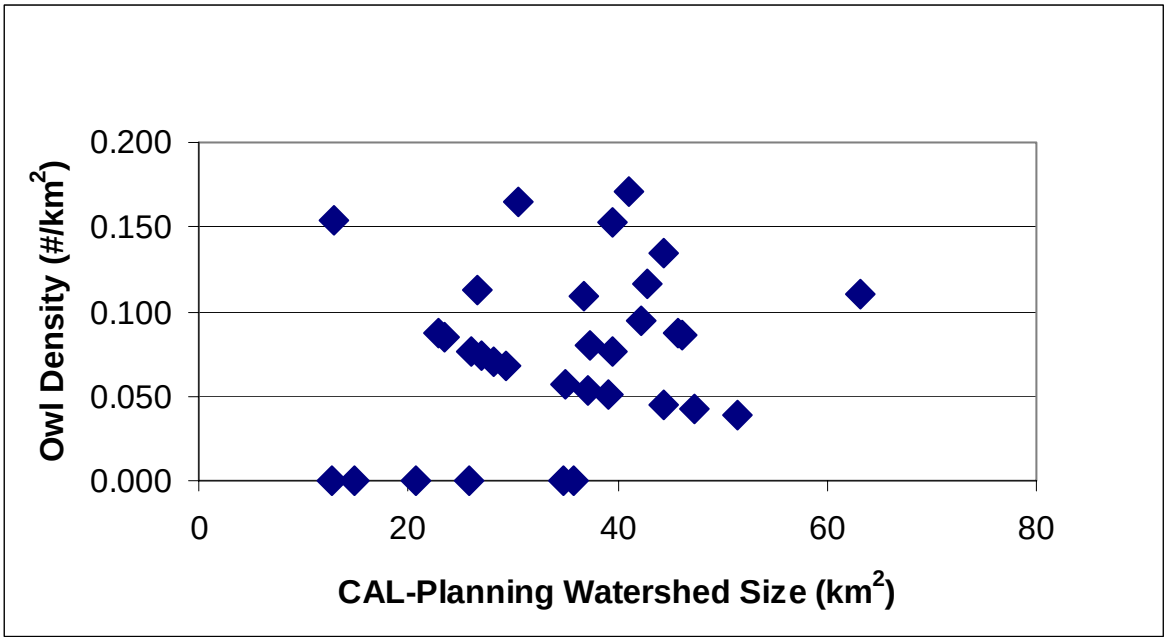

Figure 3b.

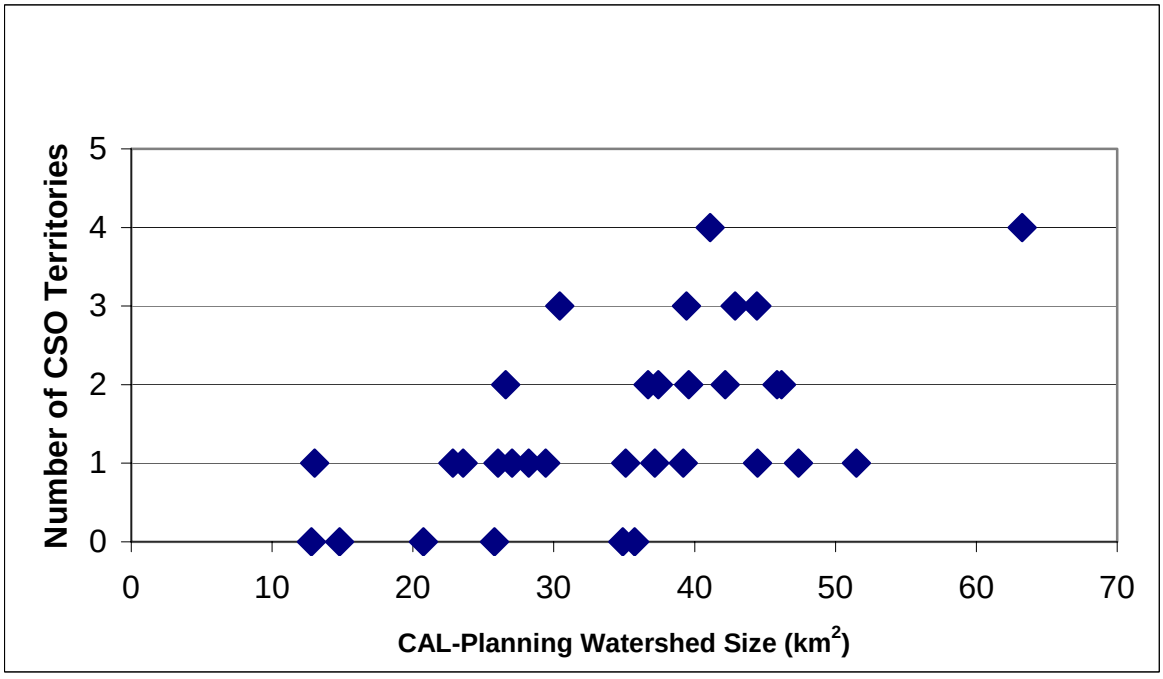

Figure 3. (a) Estimated crude density of territorial California spotted owls across CAL-Planning Watersheds, and (b) number of California spotted territories across CAL-Planning Watersheds on the Plumas National Forest during 2004.

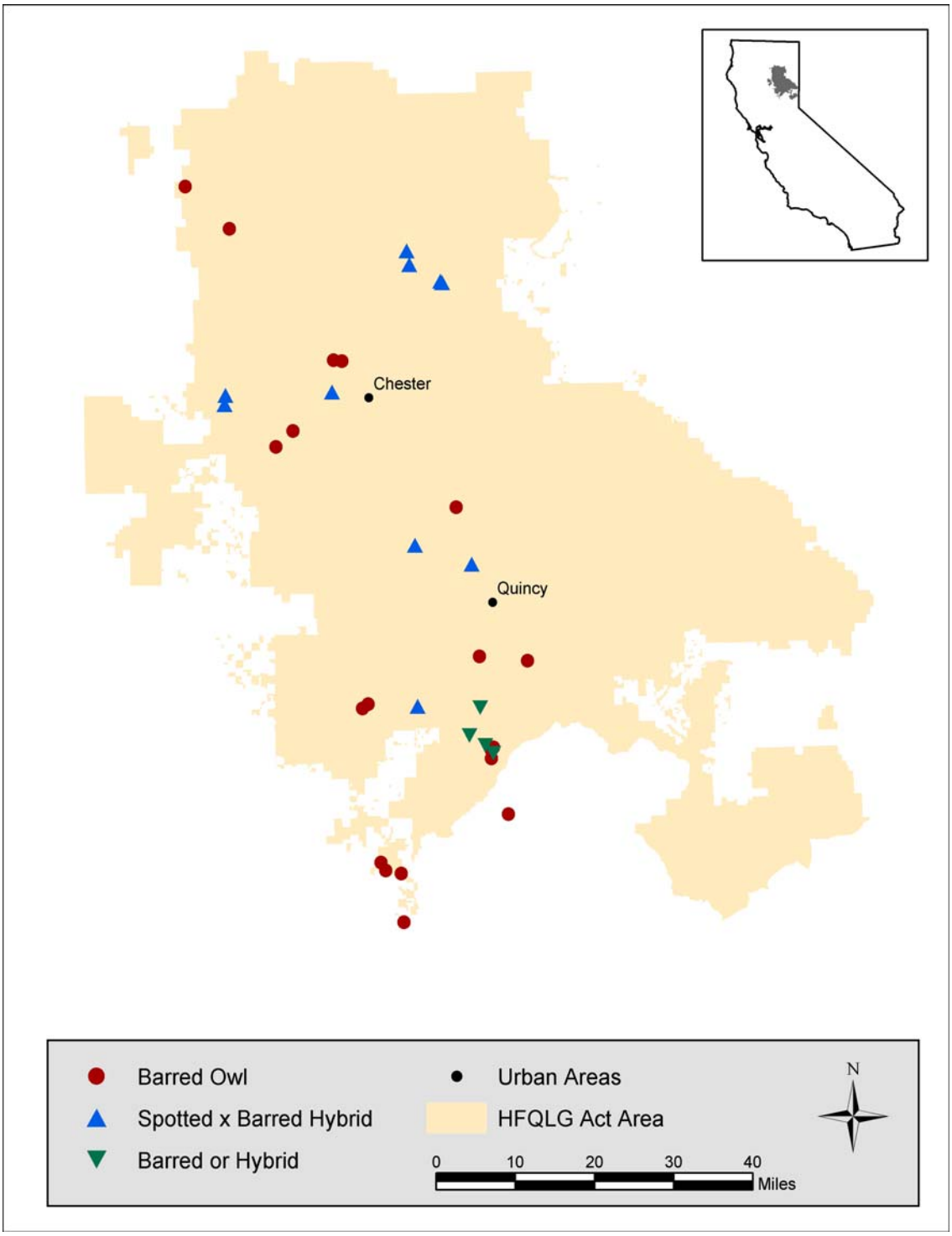

Figure 4. Distribution of Barred and Sparred (Spotted-Barred hybrids) Owls between 1989-2004 within the HFQLG Project area.

Appendix F

Coordination with National Forest System Staff

This project requires constant and careful collaboration with National Forest System (NFS) staff. There are many reasons this is required, including:

- Research is oriented towards management questions
- NFS staff are important "consumers" of the research results
- Treatments are executed by NFS
- Research work is done on Ranger Districts
- Safety of employees in the field is a shared concern

This project represents a program of significant geographic magnitude and thus coordination is especially important. Success is dependent on effective cooperation, communication, and understanding of the respective roles of the parties. Thus many people involved in this project have worked hard to accomplish this coordination.

Intra-Agency Agreement

The Pacific Southwest Region (REGION) and the Pacific Southwest Research Station (PSW) have developed an Intra-Agency Agreement to jointly develop and fund the study. This agreement was signed by the Regional Forester and the Station Director in April of 2002. This agreement lays the foundation for the close cooperation and collaboration between Region 5 (including the Lassen and Plumas National Forest staffs) and PSW (in particular the scientists and support staff of the Sierra Nevada Research Unit). The agreement establishes a commitment for up to twenty years to complete the objectives of this study.

QLG Steering Committee

Although the Plumas Lassen Study is not directly related to the HFQLG Pilot Project, the QLG Steering Committee has been an effective forum in which to coordinate with key individuals from the Plumas and Lassen National Forests. In particular the Forest Supervisors meet with PSW Research personnel regularly to stay in touch with study design and implementation issues. Other key personnel, including the HFQLG Pilot Project coordinator and his staff are consulted regularly regarding study issues. We use this venue as one of several for communicating on issues and findings.

Plumas Lassen Study Team

The Plumas Lassen Study Team is comprised of Principal Investigators for all five research modules, research support staff, and project coordinators from the Plumas and/or Lassen National Forests. The Study Coordinator provides liaison to National Forest managers and staff, coordinates National Forest activities related to Regional