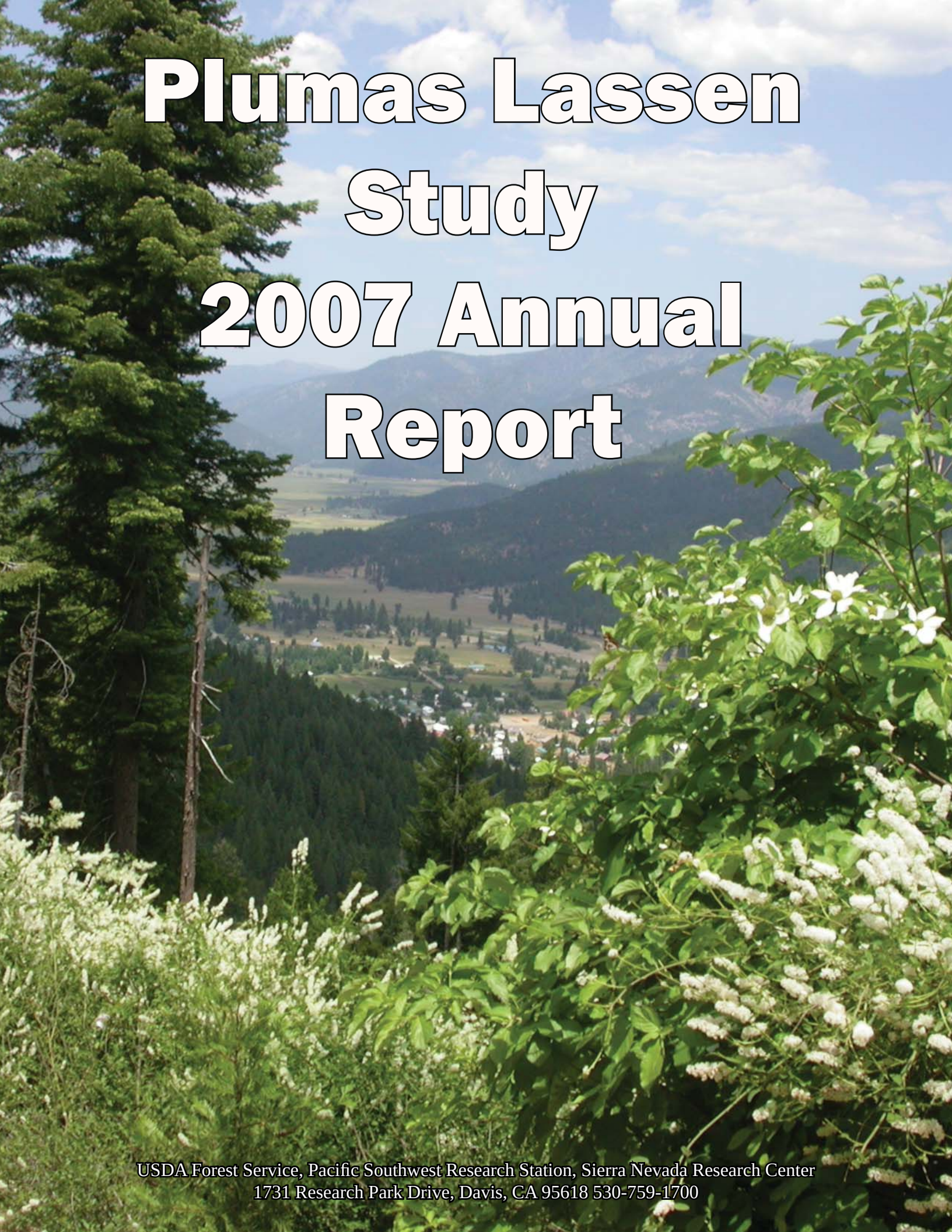

Plumas Lassen Study 2007 Annual Report

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Introduction

The Pacific Southwest Region and the Pacific Southwest Research Station agreed in 2002 to jointly develop and fund an administrative study to fill management information needs concerning the relationship between management-caused changes in vegetation and their effects on spotted owl habitat and population dynamics. The detailed discussions explaining how this program was started is provided in previous Annual Reports. Copies of previous Annual Reports for this program are available on the Sierra Nevada Research Center web site (www.fs.fed.us/psw/programs/snrc) or upon request.

This is the sixth such Annual Report that we have compiled. The primary purpose of this is to provide a periodic synopsis of what we have been learning so all interested parties can remain abreast of the progress. Research products resulting from this effort will be disseminated as they are ready and this will vary from module to module, project to project, and from year to year. We expect that there will be a continuous flow of findings documented primarily with publications in both refereed journals and other publication outlets. The cadre of scientists, support staff, students, and others contributing to this effort will also be making oral presentations and providing other kinds of outreach materials to help inform interested parties and our peers on the results of this work.

We provide some review information here to reinforce the intent of our work. This background information provides a general overview on the purpose of this research program and helps set the context for the report. We have had to remind many interested parties and in particular our own program administrators that we embarked on the project virtually from square one. A project of this magnitude and ambition is difficult to initiate under the best of circumstances. When a research program begins work in a new area, addressing large geographic areas with complex questions on a busy landscape that is already subject to many other demands, it is not easy to establish all the field activities and produce results quickly.

However, we now believe we have emerged from the initiation phase and we have collected an impressive amount of information. Many publications are in development and we expect to provide useful information in the immediate future. Of course much of our research purpose depends on forest management treatments to be put in place and then observe short and even long term response to those treatments. Such treatments are now being executed in some locations and thus some of our potentially most significant work has only recently begun. Observations of response after treatments will logically take place in the ensuing years. If funding can be sustained we intend to continue to follow up with further data collection, field observations and insights addressing the questions we have posed.

We recognize that response of different elements of the forest can occur immediately after treatments however it is also possible that response can occur slowly and not be recognized for some period of time depending on the response variable of interest. Alternatively it is also possible that some response variables exhibit a notable initial response and then return to a state similar to that of before the treatments. Thus we

believe it is prudent to look at a fairly long period of post treatment response if possible, even if funding limitations require scheduling follow-up work in stages over time with periods of inactivity.

Purpose of the Study

This study is interdisciplinary by design, examining at least five groups of response variables (spotted owls, small mammals, terrestrial birds, vegetation, and fuels conditions) through collaboration between researchers of the USDA Forest Service Pacific Southwest Research Station (PSW) and cooperators from the Universities of California, Berkeley and Davis, and the PRBO Conservation Science. The study addresses some of the most significant uncertainties that confound management decisions in the Sierra Nevada today, including in the HFQLG Pilot Project Area. How do old-forest-dependent species respond to vegetation management over space and time? Do fuels management approaches effectively address fuels loadings without negatively affecting species viability? How effective are landscape level fuels management strategies in modifying fire behavior and reducing the extent and severity of wildland fire? These and related questions are the focus of the work being done in this study.

Objectives of Study

The original overarching objective of this proposed research was to address an array of related ecological questions in a coordinated, integrated effort, thereby providing empirical data to inform future management decisions. The landscape scale of this design was both the driving force addressing the key questions as well as the largest impediment to successful construction of a scientifically credible experimental design and implementation in the field. Our research team believes that assessing many of the key elements of forest ecosystems should be done over larger spatial and temporal scales than has typically been investigated in past research. The important difference we are investigating is the response to changes in forest structure and composition over space and time rather than simply site specific and immediate response. We believe this difference is especially relevant to forest management practices that are designed for large landscapes, executed over relatively long time frames, such as landscape level fuels treatment strategies.

This research program is designed to address the three principal issues described below. These issues are specifically addressed through research questions and attending investigational approaches tailored for five different research components of this research program. These specific questions are detailed in the individual study plans for each module. Here we simply highlight the main objectives of the integrated research program and summarize the primary research questions that we plan to pursue.

- ***Wildland Fire Behavior and Protection.*** How do landscape level fuels and silvicultural treatments affect potential fire behavior and effects? Are specific combinations of defensible fuel profile zones (DFPZs) and subsequent individual tree selection or area treatments to thin the matrix effective in reducing the extent

and severity of wildland fires? Are realized fire management benefits consistent with hypothesized results in reducing fire risk and altering fire behavior?

• ***Landscape Dynamics.*** How do combinations of DFPZs, subsequent individual tree selection or area treatments to thin the matrix, group selection, riparian protection standards, and species-specific protection measures affect landscape dynamics such as forest structure, composition, and succession at multiple scales of space and time?

• ***Species Viability.*** Induced by a forest management regime, how will old-forest dependent species, particularly the California spotted owl and its prey base comprised of various species of small mammals, respond to changes in vegetation composition, structure, and distribution over space and time? How is response to treatments manifested at the individual and population levels of biological organization?

Below we provide brief summary statements that capture the essence of the questions we are pursuing under this research agenda. Once again we direct you to the detailed study plans for further information on each module of this research program.

The specific management questions that are being addressed within the five different research components are:

Fuels and Fire Module

1. Current conditions: measurement of vegetation and fuels at the landscape scale
2 Fire modeling: how might current conditions (above) affect fire *behavior* and *effects?*
3. Effects of treatments: how might landscape-scale treatments change fire behavior and effects (as measured by using simulation programs such as FlamMap)?
4. Fire and habitat model integration (how can we address fuels management objectives in ways compatible with sensitive species conservation?).

Vegetation Module

1. What are the effects of canopy reduction due to thinning treatments on understory microclimate and shrub cover? How do we accurately measure changes in canopy cover to meet management prescriptions?
2. What are the appropriate ecological conditions to induce regeneration of shade-intolerant conifer species?
3. How does ecosystem resilience to forest harvesting, particularly group selection silviculture, vary across landscape gradients of precipitation and soil type?

Small Mammal Module

1. What are the habitat associations of the different taxa of small mammals found in coniferous forests in the northern Sierra Nevada (objective of developing refined yet functional models of habitat associations)? What is the relative abundance and distribution of these taxa with respect to forest structure and composition?
2. Estimate values of the demographic parameters (for example, population size, reproductive output, survivorship, and mortality rates) of these taxa.
3. Estimate values for spatial patterns (for example, home range area and configuration) for these taxa.

Bird Community Module

1. Do current forest management practices promote an ecologically balanced forest ecosystem that supports sustainable populations of the breeding bird community over time?
2. What are the critical local-scale habitat components and landscape-scale composition elements that should be managed for in order to sustain the avian community over time (20 to 50 years)? Can we predict species composition, abundance, and distribution in response to future landscape treatments?
3. How do, or will, a suite of avian species that are associated with a wide range of forest conditions respond to fuels treatments, at the local and landscape scales in the short (one to five years) and long term (five to 20 years)?
4. Do Spotted Owl protected activity centers provide high quality habitat for the broader avian community? What are the differences in the avian community composition within owl territories compared to the surrounding landscape?

California Spotted Owl Module

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 for CSOs in the northern Sierra Nevada and what 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?

Progress to Date

Given that we have completed a sixth year of work we are beyond the initiation phase and many findings are beginning to take shape. Some results, based on primarily pretreatment data, are crystallizing and findings are being reported. Some of the work described here includes activities from other locations but are potentially relevant to the Plumas and Lassen National Forest landscape, thus they are included in this summary. A preliminary list of completed and anticipated publications is summarized below:

FIRE AND FUELS MODULE

Menning, K.M., and S.L. Stephens. (2008: draft complete, being submitted to Landscape Ecology). "Potential forest fire behavior as a function of three weather scenarios and two landscape fuels treatments based on a fuels and vegetation landscape derived from fine-grain IKONOS satellite imagery, Sierra Nevada (USA)." Draft being submitted to Landscape Ecology.

Menning, K.M., and S.L. Stephens. 2007. Fire Climbing in the Forest: a semi-qualitative, semi-quantitative approach to assessing ladder fuel hazards, Western Journal of Applied Forestry 22(2): 88-93.

Menning, K. M. and S. L. Stephens (2006). Modeling Landscape Fire Behavior and Effects in the Northern Sierra Nevada. 3rd International Fire Ecology and Management Congress, San Diego, CA.

Menning, K. M. and S. L. Stephens (2006). Landscape-scale Fire Risk Wildlife Habitat Considered Jointly. 21st Annual Symposium of the United States Regional Chapter of the International Association for Ecology (US IALE), San Diego, CA.

Menning, K. M. and S. L. Stephens (2006). Assessing Ladder Fuels in Forests. 3rd International Fire Ecology and Management Congress, San Diego, CA.

Menning, K.M., and S. L. Stephens (2005) Fire rising in the forest: Ladder fuel hazard assessment using a mixed qualitative and quantitative approach, Ecological Society of America, August 7-12, 2005, Montreal Canada. (Abstract attached to end of report).

Menning, K. M. and S. L. Stephens (2005). (Invited speaker:) Linking fire and wildlife habitat in California: Spectral entropy canopy diversity analysis. UK Centre for Ecology and Hydrology, Monks Wood, Cambridgeshire, England, UK. November 21, 2005.

Menning, K. M. and S. L. Stephens (2005). (Invited speaker:) Spatial Ecological Links Between Fire, Forests and Habitat in the Plumas-Lassen Administrative Project. Geographic Information Centre Seminar: City University, London, London, England UK. November 22, 2005.

Menning, K. M. and S. L. Stephens (2005). (Invited speaker:) Forest Structural Diversity: Spectral Entropy Canopy Diversity Analysis. Swiss Federal Institute for Forest, Snow and Landscape Research, Birmensdorf, Switzerland. December 5, 2005.

Publications Planned for 2008

Menning, K. M. and S. L. Stephens. "Spectral Entropy Canopy Diversity Analysis (SpECDA) used to Assess Variability in Forest Structure and Composition" to be submitted to Photogrammetric Engineering and Remote Sensing.

Menning, K. M., S. L. Stephens, J. Keane, D. Kelt, and others. "Integrated modeling of fire and California Spotted Owl habitat conditions given different weather and landscape treatment scenarios" To be submitted to a journal mutually agreed upon.

Menning, K. M. and S. L. Stephens. "Fire Behavior and Effects as a Result of Defensible Fuel Profile Zones" To be submitted to International Journal of Wildland Fire.

Menning, K. M. and S. L. Stephens. "Landscape Forest Variability across the Northern Sierra Nevada" To be submitted to Landscape Ecology.

VEGETATION MODULE

Papers planned

Models of Resource-Dependent Growth for Sierran Mixed-Conifer Saplings.
Seth Bigelow, Malcolm North, and Will Horwath.
Summary: We document the relationship between light and growth rate for saplings of the six dominant species of mixed conifer stands, and quantitatively determine the minimum light requirement for rapid growth of shade-intolerant pines.
Status: In revision. Resubmit to Forest Ecology and Management by end April, 2008.

Resistance to alteration in landscape connectivity from small clearfell harvesting in a patchy, ecotonal conifer forest. Seth Bigelow and Sean Parks.
Summary: Group selections as currently implemented in patchy east-side forest did not disrupt connectivity (as assessed by percolation) for the most part. We demonstrate a new method for predicting probably of habitat fragmentation due to forest operations in patchy landscapes. Aerial-photography-based canopy cover estimates were far higher than ground-based estimates.
Status: Being written. Submit to Ecology and Society or The Open Forest Science Journal by July 2008.

Understory light in mixed-conifer forest: effects of fuels treatments and group selection silviculture.
Seth Bigelow, Carl Salk, Malcolm North.

Summary: We show the effects of thinning to various cover levels on the understory light environment, and infer probable effects on tree species composition (particularly comparing shade-tolerant and intolerant species) with data on seedling height growth in response to light.
Status: In data analysis. Submit by October, 2008.

Fuels Treatment and Group Selection Effects on Fire Climate.
Malcolm North, Seth Bigelow.
Summary: Air temperature and humidity, wind speed, and fuel moisture, duff and mineral soil moisture were measured for 3 yrs prior thinning to 1 yr after (end of 2008 season). Did treatments affect fire climate and soil moisture dynamics?
Status: Requires one more year of data collection. Submit mid-2009, 2 years after thinning.

Group selection harvest impacts in an ecotonal environment.
Seth Bigelow, Malcolm North.
Summary: We measured soil water dynamics in natural gaps, group selection openings, and closed canopy stands in patchy east-side forest. Natural gaps had rocky soil which prevented tree establishment. Despite large differences in canopy cover inside and outside group openings there were no measurable differences in soil water dynamics.
Status: Data collection complete. Submit 2009.

SMALL MAMMAL MODULE

Theses

Coppeto, S. A. 2005. Habitat associations of small mammals at two spatial scales in the northern Sierra Nevada, California. M.S. Thesis, University of California, Davis, 39 pp.

Innes, R.J. 2006. Habitat selection by dusky-footed woodrats in managed, mixed-conifer forest of the northern Sierra Nevada. M.S. Thesis, University of California, Davis, 31 pp.

Smith, J.R. *In Prep*. Home range and habitat selection of the northern flying squirrel (*Glaucomys sabrinus*) in northeastern California. M.S. Thesis, University of California, Davis. Winter 2009.

Peer-reviewed

Coppeto, S. A., D. A. Kelt, D. H. Van Vuren, J. A. Wilson, S. Bigelow, and M. L. Johnson. 2006. Habitat associations of small mammals at two spatial scales in the northern Sierra Nevada. Journal of Mammalogy 87:402-416.

Innes, R. J., D. H. Van Vuren, D. A. Kelt, M. L. Johnson, J. A. Wilson, P. A. Stine. 2007. Habitat selection by dusky-footed woodrats in managed, mixed-conifer forest of the northern Sierra Nevada. Journal of Mammalogy 88(6): 1523-1531.

Innes, R. J., D. H. Van Vuren, D. A. Kelt. 2008. Characteristics and use of tree houses by dusky-footed woodrats in the northern Sierra Nevada. Northwestern Naturalist 89(2).

Wilson, J. A., D. A. Kelt, and D. H. Van Vuren. 2008. Home range and activity of northern flying squirrels (*Glaucomys sabrinus*) in the Sierra Nevada. Southwestern Naturalist.

Submitted

Wilson, J. A., D. A. Kelt, D, H, Van Vuren, and M. Johnson. *Submitted*. Population dynamics of small mammals in relation to cone production in four forest types in the northern Sierra Nevada. Western North American Naturalist.

Mabry, K.E., and Wilson, J. A. *Submitted*. Trapping rodents in a cautious world: the effects of disinfectants on trap success. American Midland Naturalist.

In Preparation

Coppeto, S. A., D. A. Kelt, D. H. Van Vuren, J. Sullivan, J. A. Wilson, and N. Reid. *In Prep*. Different scales tell different tales: niche conservatism vs. niche differentiation in chipmunks in the northern Sierra Nevada. To be determined. Spring 2008.

Innes, R. J., D. H. Van Vuren, D. A. Kelt, M. L. Johnson, and J. A. Wilson. *In Prep*. Spatial organization of the dusky-footed woodrat (*Neotoma fuscipes*) in mixed-conifer forests of the northern Sierra Nevada. To be determined. Winter 2008.

Wilson, J. A., D. A. Kelt, and D. H. Van Vuren. *In Prep*. Effects of maternal body condition on offspring dispersal in golden-mantled ground squirrels (*Spermophilus lateralis*). To be determined. Spring 2008.

Presentations

Coppeto, S. A., D. A. Kelt, J. A. Wilson, D. H. Van Vuren, and M. L. Johnson. 2004. Habitat selection by small mammals in the northern Sierra Nevada, California. Poster to the American Society of Mammalogists, Annual Meeting, Arcata, CA.

Coppeto, S. A., D. A. Kelt, D. H. Van Vuren, J. A. Wilson, S. Bigelow, and M. L. Johnson. 2005. Spatial scale and habitat use of small mammals in the northern Sierra Nevada, California. Poster to the American Society of Mammalogists, Annual Meeting, Springfield, MO.

Innes, R. J., D. H. Van Vuren, J. A. Wilson, D. A. Kelt, and M. B. Johnson. 2004. Factors affecting the distribution and use of dusky-footed woodrat (*Neotoma fuscipes*) houses. Poster to the American Society of Mammalogists, Annual Meeting, Arcata, CA.

Innes, R. J., D. H. Van Vuren, J. A. Wilson, D. A. Kelt, and M. B. Johnson. 2005. Space use and social organization of dusky-footed woodrats (*Neotoma fuscipes*) in mixed-conifer forests of the northern Sierra Nevada. Poster to the American Society of Mammalogists, Annual Meeting, Springfield, MO.

Innes, R. J., D. H. Van Vuren, D. A. Kelt, M. B. Johnson, J.A. Wilson. 2006. Habitat relations of dusky-footed woodrats (*Neotoma fuscipes*) in mixed-conifer forests of the northern Sierra Nevada. Poster to the American Society of Mammalogists, Annual Meeting, Amherst, MA.

Smith, W. 2006. Ecology of *Glaucomys sabrinus*: habitat, demography, and community relations. Presentation to the American Society of Mammalogists, Annual Meeting, Springfield, MO.

Wilson, J.A., and K.E. Mabry. 2005. Trap disinfection to reduce Hantavirus risk: does it also reduce small mammal trapability? Presentation to the American Society of Mammalogists, Annual Meeting, Springfield, MO.

Wilson, J. A., D. A. Kelt, and D. H. Van Vuren. 2005. Effects of maternal body condition on offspring dispersal in golden-mantled ground squirrels (*Spermophilus lateralis*). Presentation to the American Society of Mammalogists, Annual Meeting, Springfield, MO.

Wilson, J. A., D. A. Kelt, and D. H. Van Vuren. 2005. Effects of maternal body condition on offspring dispersal in golden-mantled ground squirrels (*Spermophilus lateralis*). Presentation to the IX International Mammalogical Conference, Sapporo, Japan.

Wilson, J. A., D. A. Kelt, and D. H. Van Vuren. 2006. Home range and activity of the northern flying squirrel (Glaucomys sabrinus) in the northern Sierra Nevada. Poster to the American Society of Mammalogists, Annual Meeting, Amherst, MA.

TERRESTRIAL BIRD MODULE

Publications in Prep

Landscape effects on songbird abundance in the Northern Sierra – submitted March 2008 – Journal of Wildlife Management.

Avian community composition in the context of Spotted Owl management in the Sierra Nevada – submitted April 2008 – Forest Ecology and Management.

Habitat use and productivity of two shrub dependent bird species in clear cut plantations in the Sierra Nevada – submitted spring 2008 – The Condor.

Short-term response of the avian community to Aspen enhancement timber harvest treatments – submitted summer 2008 – Restoration Ecology.

Presentations

Using Birds to Guide National Forest Management in the Sierra Nevada – oral presentation – International Partner's in Flight Conference – 2/16/08 – McAllen, TX.

Managing Disturbance Associated Habitats for Birds in the Sierra Nevada – invited oral presentation – Region 5 Forest Management Conference – 2/6/08 – Reno, NV.

Managing Aspen Habitat for Birds in the Sierra Nevada– invited oral presentation at: Aspen Delineation Project – Aspen Workshop – 9/12/2007 – Lassen National Forest.

Ecological Significance of Lake Almanor Meadows to Birds – oral presentation at Almanor Basin Watershed Advisory Committee Workshop on meadow management – 8/7/07 - Chester, CA.

Using Birds to Guide Forest Management in the HFQLG Area: Results from 2002 – 2006 – invited oral presentation – USFS Region 5 biologist conference – 5/23/07 - Sacramento, CA & PLAS symposium 3/2007.

Other Outreach

"Birds in the Park" – presentation on managing coniferous forest for birds and bird banding demonstration in collaboration with Lassen Volcanic National Park – over 200 park visitors participated 7/22/07.

Sierra Nevada Conservancy Field Trip – 5/1/2007 – Westwood, CA.

Aspen Workshop – invited to participate in the event co-sponsored by the Lassen National Forest, Aspen Delineation Project, and Sierra Forest Legacy – 9/13/2007.

Led Plumas Audubon Society Field Trip – 10/3/2007 – Chester, CA.

Bird Banding Field Trip – coordinated outreach field trips with the Lassen National Forest to view bird banding and discuss the use of birds as indicators in forest management, PLAS study, and PRBO – 7/25/2007, 8/8/2007.

Integration with Management

We provided input to several important Forest Service projects in 2007 in an effort to integrate our results to help guide forest management in the Sierra Nevada. In addition we:

1. Updated the "Interactive GIS Project" with 2007 avian monitoring data. This product can be used by forest planners in the region to determine the presence/absence or abundance of all species detected in the study area.

2. Updated the Lassen National Forest interactive GIS CD with presence/absence data of each woodpecker species at every point count station ever surveyed by PRBO in the district. We also conducted a tutorial of its application and use with ARD biologist Mark Williams.

3. Continued distribution with positive feedback for our white papers integrating avian monitoring data into science based recommendations for managing four important Sierra habitat types for birds.

OWL MODULE

Keane, J.J., J.A. Blakesley, C.V. Gallagher, D.L. Hanson, P.A. Shaklee, and D.W.H. Shaw. Status and Distribution of the Barred Owl in the Sierra Nevada. To be submitted to the Condor.

Keane, J.J., J.A. Blakesley, C.V. Gallagher, D.L. Hanson, P.A. Shaklee, and D.W.H. Shaw. Nest-site habitat characteristics of California spotted owls in the northern Sierra Nevada. To be submitted to Journal of Wildlife Management.

Keane, J.J., J.A. Blakesley, C.V. Gallagher, D.L. Hanson, P.A. Shaklee, and D.W.H. Shaw. Landscape nesting habitat characteristics of California spotted owls in the northern Sierra Nevada. To be submitted to the Journal of Wildlife Management.

Keane, J.J., J.A. Blakesley, J.R. Dunk, and S.A. Parks. Predictive habitat suitability models of California spotted owls for assessing effects of forest management and fuels treatments. To be submitted to Ecological Applications or Forest Ecology and Management.

Keane, J.J., J.A. Blakesley, C.V. Gallagher, D.L. Hanson, P.A. Shaklee, and D.W.H. Shaw. Diets of California spotted owls in the northern Sierra Nevada. To be submitted to Forest Ecology and Management.

Dunk, J.R., J.J. Keane, and S.A. Parks. Predictive habitat suitability models of northern goshawks for assessing effects of forest management and fuels treatments in the northern Sierra Nevada. To be submitted to Ecological Applications or Forest Ecology.

J.J. Keane , J.R. Dunk, and S.A. Parks. Landscape habitat patterns and predictive habitat suitability models for northern goshawks in the Lake Tahoe Basin, Sierra Nevada. To be submitted to Journal of Wildlife Management or Forest Ecology and Management.

J.J Keane, J.R. Dunk, and T. Gaman. Nest-site characteristics of northern goshawks in the southern Sierra Nevada. To be submitted to Condor.

J.J. Keane, B.Woodbridge, and S.A. Parks. Conservations status and distribution of the northern goshawk in California. To be submitted to the Journal of Biogeography or Biological Conservation.

J.J Keane and J.R. Dunk. Predictive habitat modeling of California spotted owl and northern goshawk habitat in the Sierra Nevada. To be submitted to Ecological Applications.

B. Woodbridge, J.J. Keane, J.R. Dunk, and J. Hawley. Habitat conservation assessment for northern goshawks in California. To be published as a GTR.

J.J. Keane. Effectiveness of artificial great horned owls for capturing northern goshawks. To be submitted to the Journal of Raptor Research or Journal of Field Ornithology.

J.J. Keane and B. Woodbridge. Effectiveness of broadcast surveys for detecting northern goshawks. To be submitted to the Wildlife Society Bulletin.

J.J. Keane, E.B. Jepsen, L.A. Tierney and C.V. Gallagher. Effectiveness of survey techniques for detecting great gray owls. To be submitted to the Journal of Wildlife Management.

Summary

This work represents some significant scientific study that has occurred over the last six years. Our original expectation was to continue for up to another three years within the HFQLG Pilot Project area to capture adequate post-treatment data. However, when we began this study the pilot project was scheduled to end in 2005 and since then it has been extended twice, now to 2012 to enable the complete pilot project to be implemented. If funding support persists we will continue to pursue filed work for perhaps two to three more field seasons. Upon completion of the field work the remainder of the effort will be devoted to data analysis and reporting.

At the conclusion of the pilot project the HFQLG Act requires the Forest Service to commission a team of scientists to evaluate the pilot project and provide the Forest

Service with guidance on the efficacy of the work and what were the environmental consequences on the natural resources of the geographic region. The results of these studies will contribute valuable, objective scientific insights that managers can use to develop subsequent management direction for the Plumas and Lassen National Forests, as well as other National Forest lands in the northern Sierra Nevada such as the portions of the Tahoe National Forest that contain similar ecological conditions. A team, lead by the Gifford Pinchot Institute, has been assembled for this purpose and they have begun their work as of the fall of 2007. Our research team will assist and cooperate with the Pinchot Team in every way we can.

We cannot ignore or deny the fact that designing a credible and useful research program in this area has been challenging. We want to be clear to all interested parties that the Pacific Southwest Research Station was asked to become involved in this project and for the purposes stated in the introduction above and we responded with the intent to provide as much new scientific learning as would be possible. PSW knew that we would be entering into efforts that would have many more challenges than research projects typically encounter. Our goal was to contribute as much as we could to the better understanding of forest ecosystem response to fuels and other forest management practices as they are manifested at a landscape scale.

We understand there is some uncertainty and sometimes controversy over how various forest elements will respond to planned forest management practices. This is likely to be the case under any chosen management regime. The objective of PSW was to tackle the difficult scientific challenges derived from the salient management questions. PSW, as a research organization, remains wholly objective in executing this charge. We have assembled an excellent team of scientists with the appropriate areas of expertise and we have done the best we can to design our work to address the important questions. Many of these questions present significant challenges to experimental design of field ecology experiments and management constraints further constrain our ability to test questions with traditional hypothesis testing approaches. We expect to make the most of these opportunities in advancing our scientific understanding of forest ecosystem response to management practices.