

Joint Fire Science Program
Project 04-2-1-52
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Annual Progress Report
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1. Title:

Productivity and Habitat Use of Spotted owls in Relation to Fire Severity in southwestern Oregon: Can prescribed burns be used to reduce fire hazards in spotted owl habitat?

2. Principal Investigators and Organizations:

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3. Study Objectives:

- Compare occupancy and productivity of spotted owl territories before and after wildfire.
- Compare home range size and habitat use of spotted owls within burned areas to owls in unburned habitat.
- Determine the effects of fire severity on survival rates of adult spotted owls.
- Relate changes in occupancy, productivity, movements and habitat use to the severity and scale of wildfire.

4. Study Area Description:

Research is being conducted in the Biscuit, Timbered Rock and Quartz Fires and their surrounding areas. The fires occurred within three geographic areas of southwestern Oregon: the Siskiyou Mountains, the mid-coastal Siskiyou Mountains, and the Cascade Mountains. This area of Oregon is part of the Mixed-Conifer and Mixed-Evergreen vegetation zones. In this classification system a variety of tree species are found including: ponderosa pine (*Pinus ponderosa*), Douglas-fir (*Pseudotsuga menziessii*), incense cedar (*Calocedrus decurrens*), black oak (*Quercus kelloggii*), Oregon white oak (*Quercus garryana*), Pacific madrone (*Arbutus menziessi*), and tanoak (*Lithocarpus densiflorus*).

The Quartz Fire ignited during a lightning storm in August, 2001. The boundaries of the fire were within the Glade Creek, Little Applegate, and Yale Creek watersheds within the Siskiyou Mountains. An estimated 2,484 ha of public (Rogue River and Siskiyou National Forest, Medford District – Bureau of Land Management, and Oregon Department of Forestry – Southwest Oregon District) and private land were burned within the Siskiyou Mountains.

The Biscuit Fire originated from several smaller fires initiated by lightning strikes in July, 2002, and eventually became a large complex fire, consuming 201,436 ha of public (Rogue River and Siskiyou National Forest, Medford District – Bureau of Land Management, Oregon Department of Forestry – Southwest Oregon District, and Josephine County, Oregon) and private land within the mid-Coastal Siskiyou Mountains.

The Timbered Rock fire started in July of 2002 during a lightning storm. The fire was confined within the boundaries of the Elk Creek watershed. Approximately 11,028 ha of public (Rogue River and Siskiyou National Forest, Medford District – Bureau of Land Management, and Oregon Department of Forestry – Southwest Oregon District) and private land were burned within the western edge of the southern Oregon Cascade Range.

5. Research Accomplishments:

Owl Capture and Radio-transmitter Attachment

Efforts to capture owls began in September, 2004 within the boundaries of the Timbered Rock Fire. Ten owls were captured during the fall from six different owl territories. All, owls were fitted with 7.5 gram backpack mounted radio transmitters. During the spring of 2005 an additional 10 owls were captured within the Timbered Rock Fire and just outside the fire perimeter. To date, 21 owls (10 pairs, 1 single) have been captured from 11 historic owl activity centers (Table 1). 11 owls are located primarily outside the boundaries of the fire and the other ten have their activity centers within the boundaries of the fire.

During the spring of 2004 efforts were made to capture owls at the Quartz Fire. To date three owls have been captured from two historic owl sites. One pair is located outside the fire boundary (Table 1). The third owl is located inside the fire perimeter and is paired with a female that we have yet to capture. Two additional owl pairs are located on the edge of the Quartz Fire but we are not attempting to capture these owls due to potential complications with access to conduct telemetry.

At this time we are attempting to capture additional owls to increase sample sizes at both fires. At the Quartz Fire we are attempting to capture a female that is paired with a male, captured in the spring of 2005. At the Timbered Rock Fire there is only one known pair that we have yet to capture and a consistent effort is being applied to locate and radio-tag this pair. The male at this site was captured in September of

2005 and we are still attempting to capture the female. Vacant historic owl sites are being surveyed periodically to locate immigrating owls that may be included in the study.

Table 1. Radio-tagged owls at the Timbered Rock and Quartz Fires

| Timbered Rock Fire | | | |
|---------------------------|----------------------|--------------------------------|----------------------------|
| Site Name | Owls Captured | Date Captured | Inside/Outside Fire |
| Alco Rock | Pair | Male - 09/04 Female 02/05 | Inside |
| Flat Creek | Pair | Male - 03/05 Female 09/04 | Inside |
| Miller Mountain | Pair | Male - 09/04 Female 09/04 | Inside |
| Upper Timber Creek | Pair | Male - 09/04 Female 09/04 | Inside |
| Gobblers Knob | Pair | Male - 09/04 Female 09/04 | Inside |
| Hungry Elk | Pair | Male - 03/05 Female 03/05 | Outside |
| Lower Morine | Pair | Male - 02/05 Female 02/05 | Outside |
| South Boundary | Pair | Male - 03/05 Female 03/05 | Outside |
| Oliver Springs | Pair | Male - 03/05 Female 03/05 | Outside |
| Louis Creek | Pair | Male - 09/04 Female 09/04 | Outside |
| Hawk Creek | Male | Male - 09/05 Female Attempting | Inside |
| Quartz Fire | | | |
| Yale Creek | Pair | Male - 04/05 Female 06/05 | Outside |
| Glade Creek | Male | Male - 04/05 Female Attempting | Inside |

Owl Mortalities

Six out of 24 radio-tagged owls have died during the course of research activities. Whenever possible the carcass was retrieved in a timely fashion and was submitted for necropsy. All necropsies were performed by the Oregon State University, College of Veterinary Medicine, Veterinary Diagnostic Lab (VDL) in Corvallis, Oregon. The VDL was able to determine the cause of death for all carcasses that were submitted (Table 2). Four out of the five owls were emaciated at the time of death and died of starvation. The Yale Creek Male was submitted for necropsy but the remains were in poor condition and limited results were obtained to help determine the cause of death, although it was confirmed the owl had a broken leg which likely led to its emaciated condition. The Miller Mountain male was not submitted for necropsy because it appeared to be a predation event and very few remains were found in the field. The South Boundary Female carcass could not be found in the field after an extensive search. The transmitter from this owl had switched to mortality mode but could never be found. We feel that this owl likely died to some unknown mortality source and that the transmitter did not come free from the owl. None of the owls submitted for necropsy have tested positive for West Nile Virus.

| Owl | Mortality Date | Cause of Death |
|-----------------------|-----------------------|-----------------------|
| Upper Timber Female | 1/18/2005 | Emaciation |
| Upper Timber Male | 5/7/2005 | Emaciation/Parasitism |
| Oliver Springs Female | 5/16/2005 | Emaciation/Parasitism |
| Miller Mountain Male | 7/12/2005 | Likely Predation |
| Yale Creek Male | 7/13/2005 | Emaciation/Broken Leg |
| South Boundary Female | 11/13/2005 | Unknown Mortality |

Radio-telemetry Effort

Owls have been monitored on a consistent basis since the initial date of capture. Locations have been obtained on alternate days of the week with up to five night time and two day time locations every two weeks per owl. Roughly 2047 telemetry locations have been gathered on 23 different owls from September 2004 through August 2005 (Appendix A). Total numbers of locations on individual owls range from 27 to 145. Radio-telemetry efforts will continue through the summer of 2006 or until transmitters fail to ensure that at least one year of data is gathered on each owl.

Occupancy and Reproduction Surveys

Through cooperative efforts of the Bureau of Land Management (BLM), Boise Building Solutions, private contractors, and the Oregon Cooperative Fish and Wildlife Research Unit (OCFWRU) post-fire occupancy and productivity data has been gathered at 39 historic owl cores at three fires in southwestern Oregon. Three years of data have been collected at the Timbered Rock and Biscuit fires and four years of data has been collected at the Quartz Fire.

Timbered Rock Fire

Boise Building Solutions and the BLM began surveying all historic owl cores located on BLM or private land following the Timbered Rock Fire in 2003 and 2004 and the OCFWRU conducted owl surveys on lands managed by the U.S. Forest Service during this time. Starting with the 2005 breeding season the OCFWRU has assumed all survey responsibilities throughout the Timbered Rock Fire. Twenty-two historic owl sites have been monitored for three years post-fire within the boundaries of the Timbered Rock Fire (Appendix B). Surveys will again be conducted during the 2006 breeding season.

From 2003 to 2005 an average of 10 out of 22 sites have been occupied by at least one owl. The highest number of sites occupied came in the year 2003, with 12 sites occupied and a low of eight sites occupied in 2005. Reproductive success has been relatively low inside of the fire boundaries with an average of 0.14 (range 0.08 – 0.25) young produced per occupied site each year.

Biscuit Fire

There were roughly 50 known spotted owl territories within the fire perimeter. We have selected eight historic owl cores on the eastern edge of the Biscuit Fire which have been surveyed all three years post-fire (Appendix C). The OCFWRU has conducted all surveys from 2003-2005, and will continue surveys during the 2006 breeding season.

During the three years post-fire the eight sites that have been monitored at the Biscuit fire averaged 4.3 sites occupied per year. The 2003 and 2004 breeding seasons had at least one owl at four historic owl sites and in 2005 at least one owl was detected at five sites. The Biscuit Fire has enjoyed the highest reproductive success out of the three fires with an average of 0.71 young fledged per occupied site per year (range 0.00 – 1.75).

Quartz Fire

Post-fire surveys in the Quartz Fire and the surrounding area began in 2002. Efforts have been made by employees of Boise Building Solutions, private contractors and the OCFWRU to conduct surveys at up to 16 historic owl cores within and around the Quartz Fire (Appendix D). To date, owl surveys have been conducted four years post-fire from 2002-2005 at nine of the sites. Seven of the sites were not monitored all years post-fire because they were located outside the fire perimeter.

Nine sites within the boundaries of the Quartz fire have been consistently monitored since the 2002 breeding season. Of these nine sites there has been an average of 4.75 sites occupied per year. At least one owl was detected at six sites in 2002, five sites in 2003 and 2004, and three sites in 2005. Reproductive success at these nine sites has averaged 0.33 young per occupied site per year (range 0.00 – 0.60). Additional sites were monitored some years but a consistent effort was not made every year and these sites are not included in this discussion.

6. Data Analysis:

Owl survey statistics have been summarized for the three fires (Appendix E). A rigorous assessment of demographic trends will not be conducted until all data collection is complete. Currently the project is still in the process of field research and data collection. None of the telemetry data has been analyzed at this point in time and will not occur until field research has concluded. All collected data is still in raw form and is not presentable at this time.

7. Future Research Plans:

- Conduct demographic surveys in the Timbered Rock and Biscuit Fires during the 2006 breeding season.
- Continue collection of owl pellets and analyze pellet contents to help determine owl diets post-wildfire.
- Continue radio-telemetry monitoring of radio-tagged owls through the summer of 2006.
- Conduct habitat surveys to help describe forest features that are important to spotted owls in burned landscapes.

8. Acknowledgements:

Many agencies and personnel have helped contribute to data collection, including: Doug Barret (Wildlife Biologist, Westside Ecological), Tim Burnett (Wildlife Biologist, Private Contractor, Boise Building Solutions/Forest Capitol Resources), Jim Harper (Wildlife Biologist, Butte Falls Resource Area, Medford District BLM), Dave Clayton (Forest Wildlife Biologist, Rogue River and Siskiyou National Forest, USFS) and Amy Price (Volunteer). We would like to thank Frank Wagner (Faculty Research Assistant, Oregon State University, Department of Fisheries and Wildlife) for assistance with field logistics and data collection. We would also like to thank the Klamath Falls Fish and Wildlife Office for additional support through the purchase of additional radio-transmitters, donation of computers for field work, and loaning additional radio receivers.

Appendix A: Total number of telemetry locations for each owl from September, 2004 - August, 2005

| Timbered Rock Fire | | | |
|---------------------------|----------------------|------------------------|------------------------|
| Owl | Day Locations | Night Locations | Total Locations |
| Alco Rock Male | 42 | 94 | 136 |
| Alco Rock Female | 30 | 57 | 87 |
| Flat Creek Male | 19 | 50 | 69 |
| Flat Creek Female | 44 | 101 | 145 |
| Gobblers Knob Male | 48 | 94 | 142 |
| Gobblers Knob Female | 40 | 81 | 121 |
| Hungry Elk Male | 23 | 53 | 76 |
| Hungry Elk Female | 25 | 56 | 81 |
| Louis Creek Male | 42 | 93 | 135 |
| Louis Creek Female | 37 | 77 | 114 |
| Lower Morine Male | 27 | 58 | 85 |
| Lower Morine Female | 27 | 60 | 87 |
| Miller Mountain Male | 35 | 86 | 121 |
| Miller Mountain Female | 45 | 99 | 144 |
| Oliver Springs Male | 26 | 59 | 85 |
| Oliver Springs Female | 10 | 23 | 33 |
| South Boundary Male | 23 | 59 | 82 |
| South Boundary Female | 24 | 54 | 78 |
| Upper Timber Male | 24 | 54 | 78 |
| Upper Timber Female | 14 | 22 | 36 |
| Quartz Fire | | | |
| Glade Creek Male | 21 | 34 | 55 |
| Yale Creek Male | 12 | 15 | 27 |
| Yale Creek Female | 10 | 20 | 30 |
| All Locations | 648 | 1399 | 2047 |

Appendix B: Timbered Rock Fire spotted owl survey effort post fire

| Site Name | MSNO | Landowner | Years Surveyed |
|-----------------------|-------------|------------------|-----------------------|
| Alco Creek | 2001 | BLM | 2003-2005 |
| Alco Ridge | 4029 | BLM | 2003-2005 |
| Alco Rock | 2012 | BLM | 2003-2005 |
| Alco Rock West | 2275 | BLM | 2003-2005 |
| Elkhorn Creek | 1833 | BLM | 2003-2005 |
| Flat Creek | 2011 | BLM | 2003-2005 |
| Flat Creek Divide | 2252 | BLM | 2003-2005 |
| Gobblers East | 1829 | BLM | 2003-2005 |
| Gobblers Knob | 0885 | BLM | 2003-2005 |
| Hawk Creek | 1828 | BLM | 2003-2005 |
| Lower Pelt Creek | 3606 | USFS | 2003-2005 |
| Lower Timber Creek | 1950 | BLM | 2003-2005 |
| Middle Creek | 0056 | BLM | 2003-2005 |
| Miller Mountain | 0898 | BLM | 2003-2005 |
| Pelt Creek | 1056 | USFS | 2003-2005 |
| Ragsdale | 1825 | BLM | 2003-2005 |
| Shell Rock | 0884 | BLM | 2003-2005 |
| Timbered Rock | 0954 | BLM | 2003-2005 |
| Upper Elkhorn Creek | 3113 | USFS | 2003-2005 |
| Upper Pelt Creek | 2677 | USFS | 2003-2005 |
| Upper Timber Creek | 2057 | BLM | 2003-2005 |
| West Branch Elk Creek | 2002 | BLM | 2003-2005 |

Appendix C: Biscuit Fire spotted owl survey effort post fire

| Site Name | MSNO | Landowner | Years Surveyed |
|---------------------|-------------|------------------|-----------------------|
| East Chief Creek | 4318 | USFS | 2003-2005 |
| Mikes/Days Gulch | 411 | USFS | 2003-2005 |
| North Sixmile Creek | 248 | USFS | 2003-2005 |
| Pine Creek Camp | 315 | USFS | 2003-2005 |
| Red Dog Creek | 66 | USFS | 2003-2005 |
| Silver Falls | 117 | USFS | 2003-2005 |
| Squaw Creek | 152 | USFS | 2003-2005 |
| Sourgrass | 3390 | BLM | 2003-2005 |

Appendix D: Quartz Fire spotted owl survey effort post fire

| Site Name | MSNO | Landowner | Years Surveyed |
|----------------------|-------------|------------------|-----------------------|
| Duncan Gap | ---- | USFS | 2002 |
| Dutchman South | 7005 | USFS | 2002-2005 |
| Garvin Gulch | 1877 | USFS | 2002-2005 |
| Glade Creek | 3845 | USFS | 2002-2005 |
| Happy Dutch | ---- | USFS | 2002-2005 |
| Hendricks Creek | 7000 | Private Timber | 2002-2005 |
| Lick Gulch | 1876 | BLM | 2002-2005 |
| Little Red Mountain | ---- | USFS | 2002 |
| New Site | ---- | USFS | 2002-2005 |
| Owl Gulch | ---- | BLM | 2002 |
| Quartz Gulch | 0957 | BLM | 2002-2005 |
| Sevenmile Ridge East | 1314 | USFS | 2002 |
| Shump Gulch | ---- | USFS | 2002 |
| Skunk Gulch | 0993 | USFS | 2002-2003 |
| Woodpecker Springs | 0627 | USFS | 2002-2005 |
| Yale Creek | 2713 | USFS | 2002-2003, 2005 |

Appendix E: Summary of post-fire demographic surveys for 2002-2005 breeding seasons in the Quartz, Timbered Rock and Biscuit Fires

| Quartz Fire | | | | | |
|--------------------|---------------------------------|---------------------------------|---------------------------------|-----------------------------------|--|
| Year | Number of Sites Surveyed | Number of Sites Occupied | Number of Breeding Pairs | Number of Successful Pairs | Number of Young Per Occupied Site |
| 2002 | 16 | 10 | 2 | 1 | 0.10 |
| 2003 | 11 | 7 | 4 | 2 | 0.29 |
| 2004 | 9 | 5 | 3 | 3 | 0.60 |
| 2005 | 10 | 4 | 3 | 2 | 0.75 |

| Biscuit Fire | | | | | |
|---------------------|---------------------------------|---------------------------------|---------------------------------|-----------------------------------|--|
| Year | Number of Sites Surveyed | Number of Sites Occupied | Number of Breeding Pairs | Number of Successful Pairs | Number of Young Per Occupied Site |
| 2003 | 8 | 4 | 0 | 0 | 0.00 |
| 2004 | 8 | 4 | 4 | 4 | 1.75 |
| 2005 | 8 | 5 | 2 | 2 | 0.38 |

| Timbered Rock Fire | | | | | |
|---------------------------|---------------------------------|---------------------------------|---------------------------------|-----------------------------------|--|
| Year | Number of Sites Surveyed | Number of Sites Occupied | Number of Breeding Pairs | Number of Successful Pairs | Number of Young Per Occupied Site |
| 2003 | 22 | 12 | 2 | 1 | 0.08 |
| 2004 | 22 | 10 | 2 | 1 | 0.10 |
| 2005 | 22 | 8 | 1 | 1 | 0.25 |