Northern Spotted Owl Resource Plan: A Spotted Owl Toolbox

California Department of Fish and Wildlife
Northern Spotted Owl Stakeholder Forum

January 30, 2018

Stuart Farber
stuf@wmbeaty.com
W.M. Beaty and Associates
845 Butte Street
Redding CA 96001

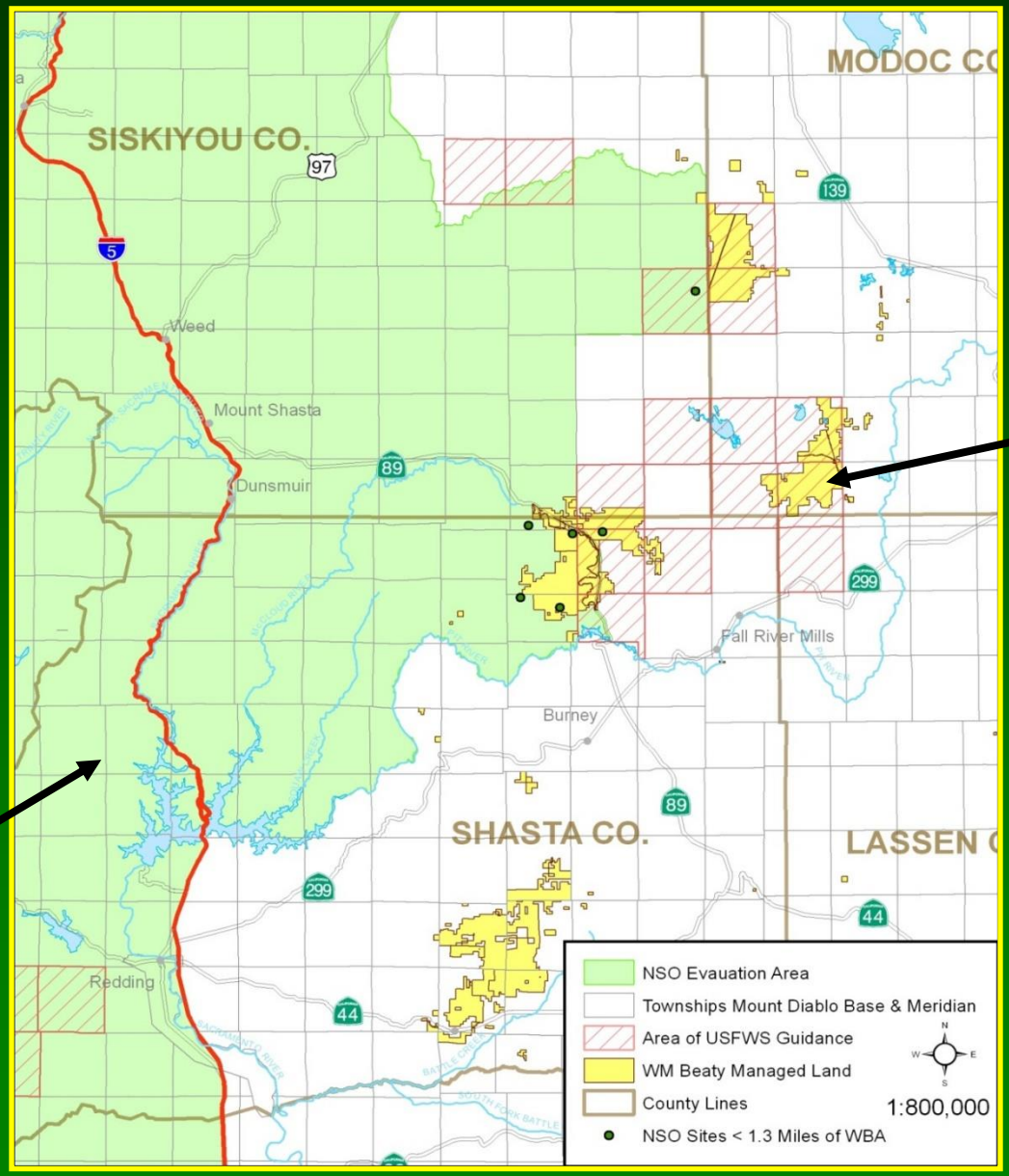
W.M. Beaty & Associates

Redding, California

290,000 acres of forest and range land

Forest Stewardship Council (FSC) certified

NSO Evaluation Area 14 CCR 895.1



USFWS Guidance regarding Southern and Eastern Boundaries

Technical Assistance 81333-2008-TA0058 May 28, 2008

NSORP: A Spotted Owl Toolbox

Examples of Toolboxes:

Habitat Conservation Plans

Spotted Owl Management Plans

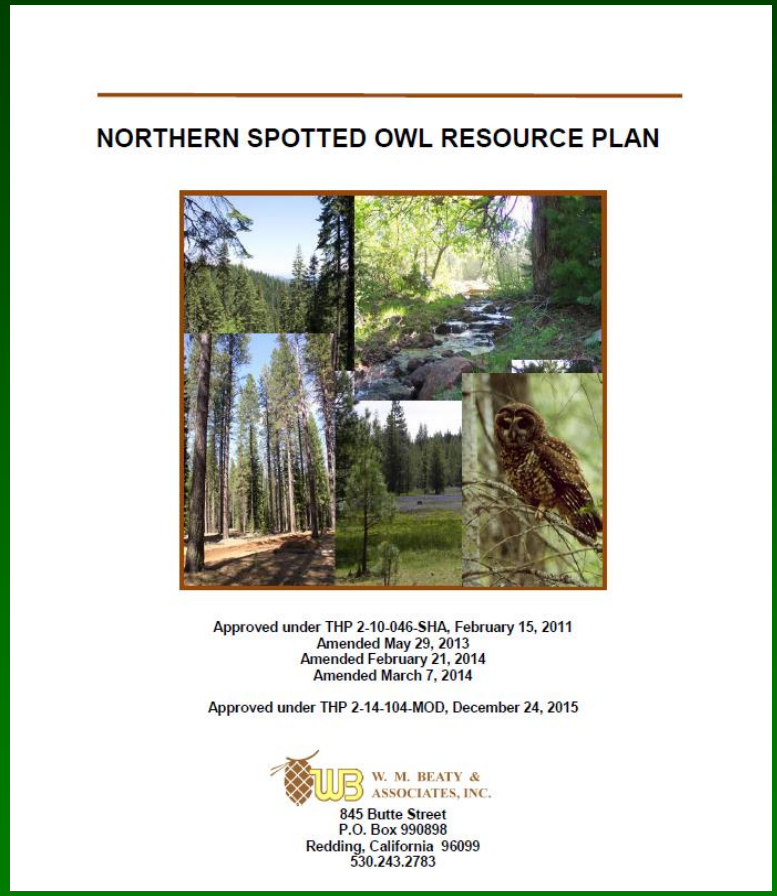
Technical Assistance *(single tool)*

Spotted Owl Resource Plans *(14 CCR § 939.9(a))*

- Scientific-based approach
- Programmatic
- Adaptable and Flexible *(Adaptive Management)*

NSORP

- Consulted with CALFIRE and USFWS in 2010 and approved by CALFIRE in 2011
- Amended three times between 2011 and 2015
- CDFW reviewed during candidacy, 2015
- CDFW reviewed following listing, 2017



NORTHERN SPOTTED OWL RESOURCE PLAN

Approved under THP 2-10-046-SHA, February 15, 2011
Amended May 29, 2013
Amended February 21, 2014
Amended March 7, 2014

Approved under THP 2-14-104-MOD, December 24, 2015

W. M. BEATY & ASSOCIATES, INC.
845 Butte Street
P.O. Box 990898
Redding, California 96099
530.243.2783

Surveys

- Barred owls can influence spotted owl detection probabilities *Olson et al. 2005*
- Barred owls may influence spotted owl occupancy *Anthony et al. 2006*

- Assumed per-visit detection probability for protocol surveys (USFWS 1992) may be less than 0.65 in landscapes with high barred owl densities.

  Olson et al. 2005, Kroll et al. 2010, Dugger et al. 2009

Surveys

p_{ij} USFWS (1992) 0.65

USFWS (2012) 0.40

No. visits	0.30 p_i^*	0.35 p_i^*	0.40 p_i^*	0.45 p_i^*	0.50 p_i^*	0.60 p_i^*	0.70 p_i^*	0.80 p_i^*	0.90 p_i^*
1	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90
2	0.51	0.58	0.64	0.70	0.75	0.84	0.91	0.96	0.99
3	0.66	0.73	0.78	0.83	0.88	0.94	0.97	0.99	1.00
4	0.76	0.82	0.87	0.91	0.94	0.97	0.99	1.00	1.00
5	0.83	0.88	0.92	0.95	0.97	0.99	1.00	1.00	1.00
6	0.88	0.92	0.95	0.97	0.98	1.00	1.00	1.00	1.00
7	0.92	0.95	0.97	0.98	0.99	1.00	1.00	1.00	1.00
8	0.94	0.97	0.98	0.99	1.00	1.00	1.00	1.00	1.00
9	0.96	0.98	0.99	1.00	1.00	1.00	1.00	1.00	1.00
10	0.97	0.99	0.99	1.00	1.00	1.00	1.00	1.00	1.00

Surveys

- 14 years of surveys from 1995 to 2009

p_{ij}

0.67

No. visits	0.30 p_i^*	0.35 p_i^*	0.40 p_i^*	0.45 p_i^*	0.50 p_i^*	0.60 p_i^*	0.70 p_i^*	0.80 p_i^*	0.90 p_i^*
1	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90
2	0.51	0.58	0.64	0.70	0.75	0.84	0.91	0.96	0.99
3	0.66	0.73	0.78	0.83	0.88	0.94	0.97	0.99	1.00
4	0.76	0.82	0.87	0.91	0.94	0.97	0.99	1.00	1.00
5	0.83	0.88	0.92	0.95	0.97	0.99	1.00	1.00	1.00
6	0.88	0.92	0.95	0.97	0.98	1.00	1.00	1.00	1.00
7	0.92	0.95	0.97	0.98	0.99	1.00	1.00	1.00	1.00
8	0.94	0.97	0.98	0.99	1.00	1.00	1.00	1.00	1.00
9	0.96	0.98	0.99	1.00	1.00	1.00	1.00	1.00	1.00
10	0.97	0.99	0.99	1.00	1.00	1.00	1.00	1.00	1.00

Surveys

The Journal of Wildlife Management 76(6):1145–1152; 2012; DOI: 10.1002/jwmg.368

Population Ecology

Site Occupancy Dynamics of Northern Spotted Owls in Managed Interior Douglas Fir Forests, California, USA, 1995–2009

STUART L. FARBER, *W.M. Beaty & Associates, P.O. Box 990898, Redding, CA 96099, USA*
ANDREW J. KROLL,[1] *Weyerhaeuser Company, WTC 1A5, P.O. Box 9777, Federal Way, WA 98063, USA*

ABSTRACT Northern spotted owls (*Strix occidentalis caurina*) have received intense research and management interest since their listing as a threatened species by the United States Fish and Wildlife Service in 1990. For example, public and private forest managers in the Pacific Northwest, USA, conduct surveys to determine presence or absence of spotted owls prior to timber harvest operations. However, although recently developed statistical methods have been applied to presence–absence data collected during research surveys, the effectiveness of operational surveys for detecting spotted owls and evaluating site occupancy dynamics is not known. We used spotted owl survey data collected from 1995 to 2009 on a study area in interior northern California, USA, to evaluate competing occupancy models from Program PRESENCE using Akaike's Information Criterion (AIC). During 1,282 individual surveys, we recorded 480 spotted owl detections (37.4%) and 13 barred owl (1.0%) detections. Average per visit detection probability (85% CL) for single and paired spotted owls was 0.93 (0.90–0.96) for informed daytime, stand-based searches and 0.47 (0.43–0.51) for nighttime, station-based surveys (estimated from the best model); the average per visit detection probability from the null model was 0.67 (0.64–0.70). Average pair-only detection probabilities were 0.86 (0.81–0.90) for informed daytime, stand-based searches and 0.23 (0.18–0.29) for nighttime, station-based surveys; the average per visit detection probability from the null model was 0.63 (0.58–0.68). Site occupancy for any owl declined from 0.81 (0.59–0.93) in 1995 to 0.50 (0.39–0.60) in 2009; pair occupancy declined from 0.75 (0.56–0.87) to 0.46 (0.31–0.61). Our results suggest that a combination of 1 informed stand and 2 station-based operational surveys can support determinations of spotted owl site status (either a single or a pair) at desired levels of confidence. However, our information was collected in an area where barred owls were rarely detected. Surveys conducted in areas that support well-established barred owl populations are likely to be less effective for determining presence or absence of spotted owls and may require more surveys and/or different survey methods to determine site status with confidence. © 2012 The Wildlife Society.

KEY WORDS California, colonization, detection probability, local-extinction, managed forests, northern spotted owls, occupancy, operational surveys, *Strix occidentalis caurina*.

Presented at TWS Western Section Annual Meeting, 2011 and at TWS National Conference, 2012
Manuscript accepted for publication in 2012

NSORP Surveys *(Section 5.0)*

- Results indicate a 3-visit, 2-year survey would produce confidence intervals greater than 0.95
- Barred owls occurred infrequently
- Scientific inference limited to repeated detections (more than once) of barred owls within 0.5 mile core use area
- 6-visit, 2-year survey required in landscapes outside scientific inference

Surveys

- Hunter et al. 1995, Franklin et al. 2000, Zabel et al. 2003 predicted low occupancy when no nesting and roosting habitat occurred within 0.5 mile

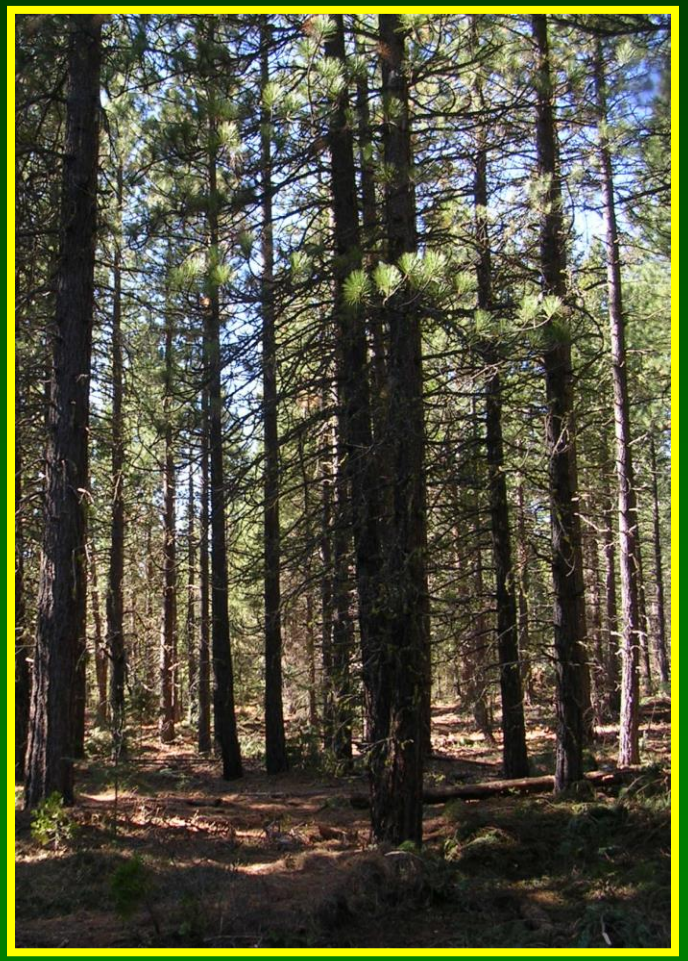
NSORP Surveys *(Section 5.1 and 5.2)*

- Uneven-aged silviculture may retain suitable habitat type post-harvest

  Surveys conducted within 0.5 miles of THP area

- Some uneven-aged and even-aged silviculture result in a change suitable habitat type post-harvest

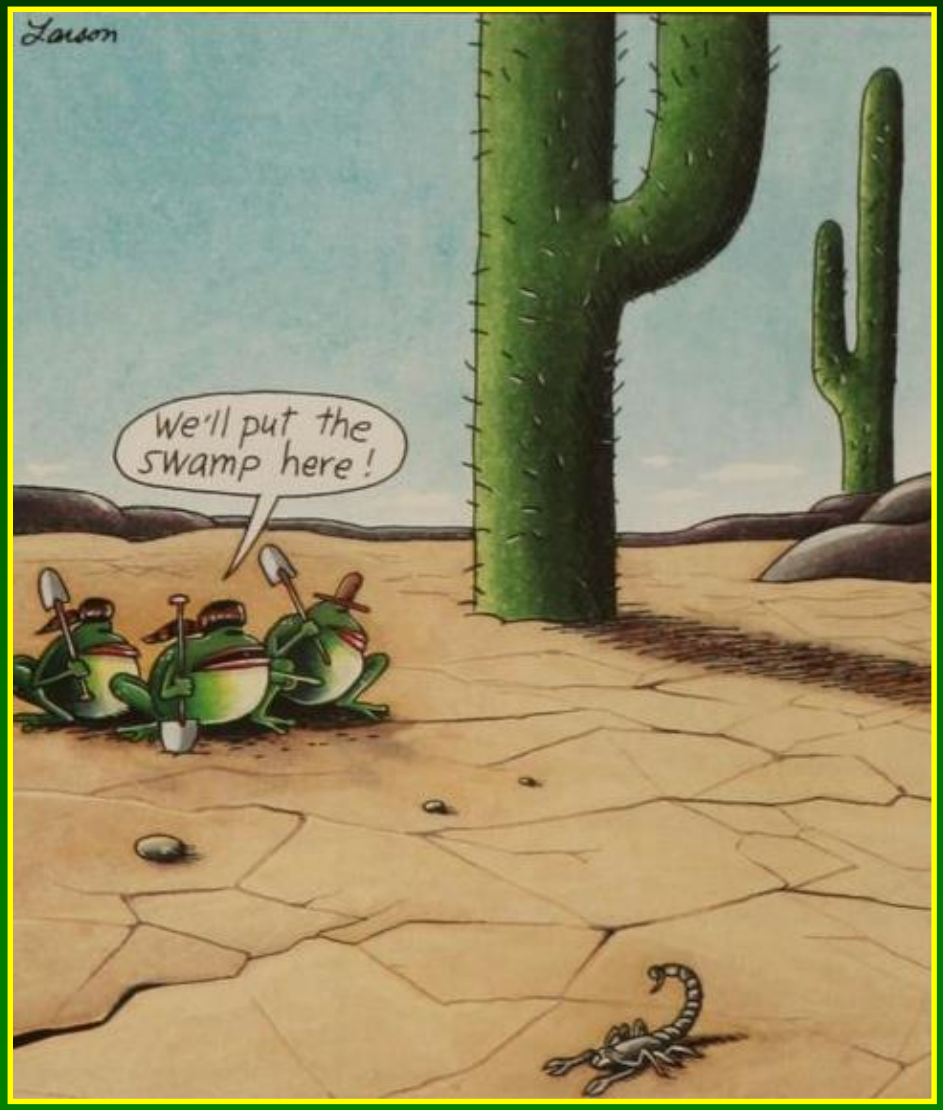
  Surveys conducted within 1.3 miles of THP area



Abiotic favored habitats

- Franklin et al. 2000
- Zabel et al. 2003
- Clark, L. 2002
  Irwin et al. 2007
- USFWS 2008
- Underwood et al. 2010
- Irwin et al. 2012

Increasing Understanding



Abiotic favored habitats

Irwin et al. 2012 (NCASI and landowners)

- 5 years (1998 to 2003)
- 71 individuals owls
- 10,242 telemetry locations
- 8,305 forest inventory plots

The Journal of Wildlife Management 76(1):200–213; 2012; DOI: 10.1002/jwmg.218

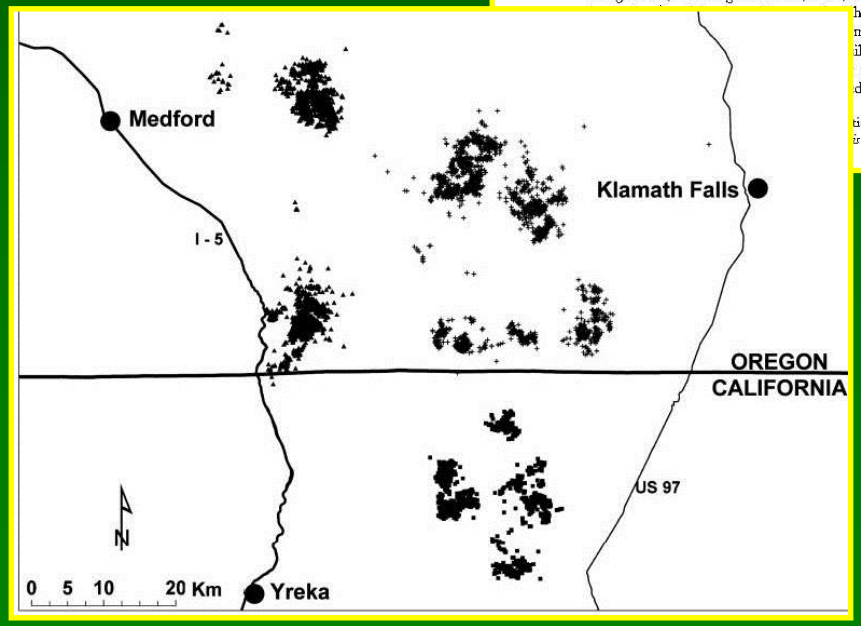
Habitat Relations

Habitat Selection by Northern Spotted Owls in Mixed-Coniferous Forests

LARRY L. IRWIN,[1,2] *National Council for Air and Stream Improvement, Inc., 3816 Salish Trail, P.O. Box 68, Stevensville, MT 59870, USA*
DENNIS F. ROCK, *National Council for Air and Stream Improvement, Inc., 43613 NE 309th Ave., Amboy, WA 98601, USA*
SUZANNE C. ROCK, *National Council for Air and Stream Improvement, Inc., 43613 NE 309th Ave., Amboy, WA 98601, USA*

ABSTRACT Conservation planning for the federally threatened northern spotted owl (*Strix occidentalis caurina*) requires an ability to predict their responses to existing and future habitat conditions. To inform such planning we modeled habitat selection by northern spotted owls based upon fine-scale (approx. 1.0 ha) characteristics within stands comprised primarily of mixed-aged, mixed coniferous forests of southwestern Oregon and north-central California. We sampled nocturnal (i.e., primarily foraging) habitat use by 71 radio-tagged spotted owls over 5 yr in 3 study areas and sampled vegetative and physical environmental conditions at inventory plots within 95% utilization distributions of each bird. We compared conditions at available forest patches, represented by the inventory plots, with those at patches used by owls using discrete-choice regressions, the coefficients from which were used to construct exponential resource selection functions (RSFs) for each study area and for all 3 areas combined. Cross-validation testing indicated that the combined RSF was reasonably robust to local variation in habitat availability. The relative probability that a fine-scale patch was selected decreased nonlinearly with distances from nests and streams; varied unimodally with increasing average diameter of coniferous trees and also with increasing basal area of Douglas-fir (*Pseudotsuga menziesii*) trees; increased linearly with increasing basal areas of sugar pine (*Pinus* h increasing density of understory shrubs. Large-diameter trees n nest sites. The RSF can support comparative risk assessments of ilvicultural alternatives designed to integrate forest ecosystem northern spotted owls. Results suggest fine-scale factors may d owls. © 2011 The Wildlife Society.

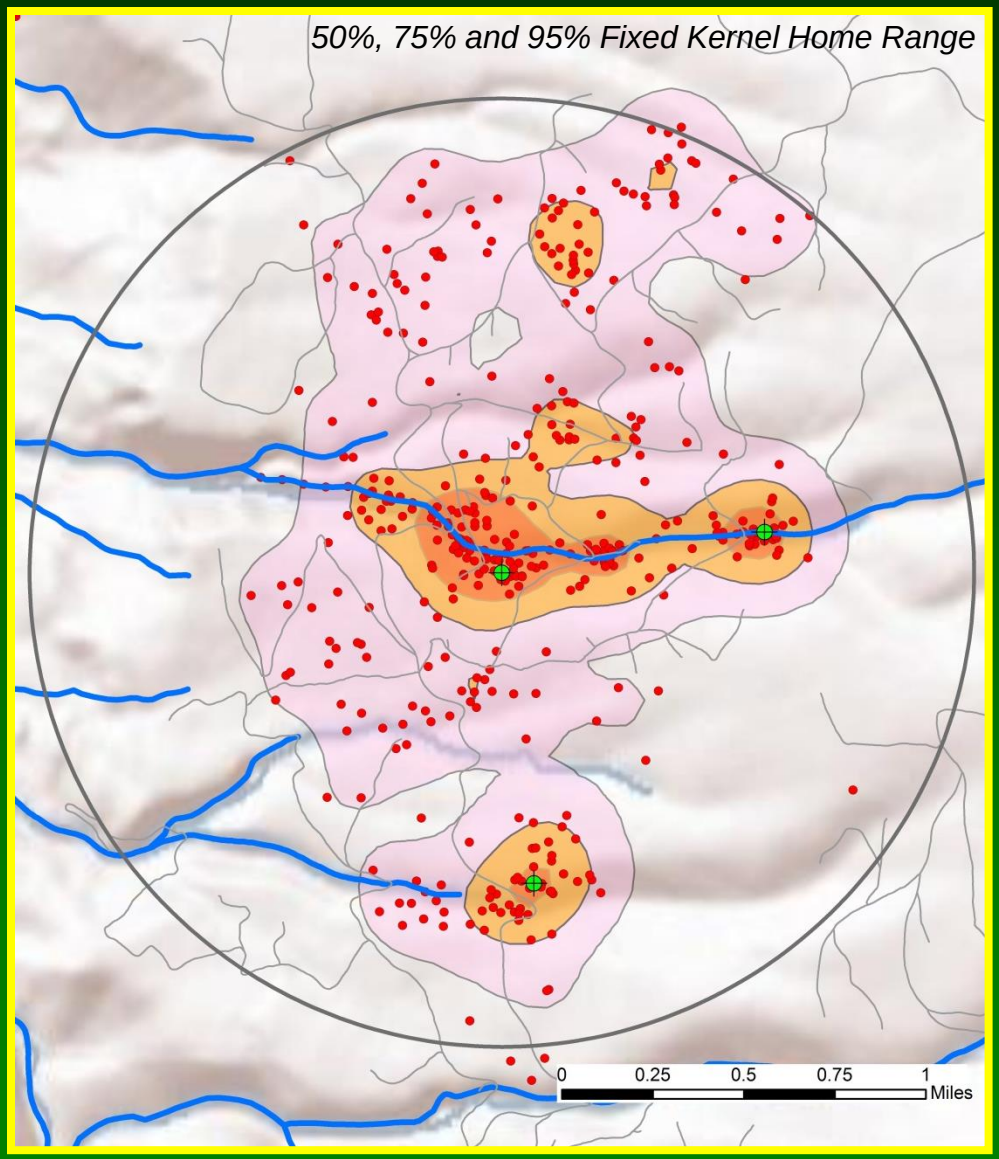
tion, mixed coniferous forests, northern spotted owl, resource selection
is caurina.



Abiotic favored habitats

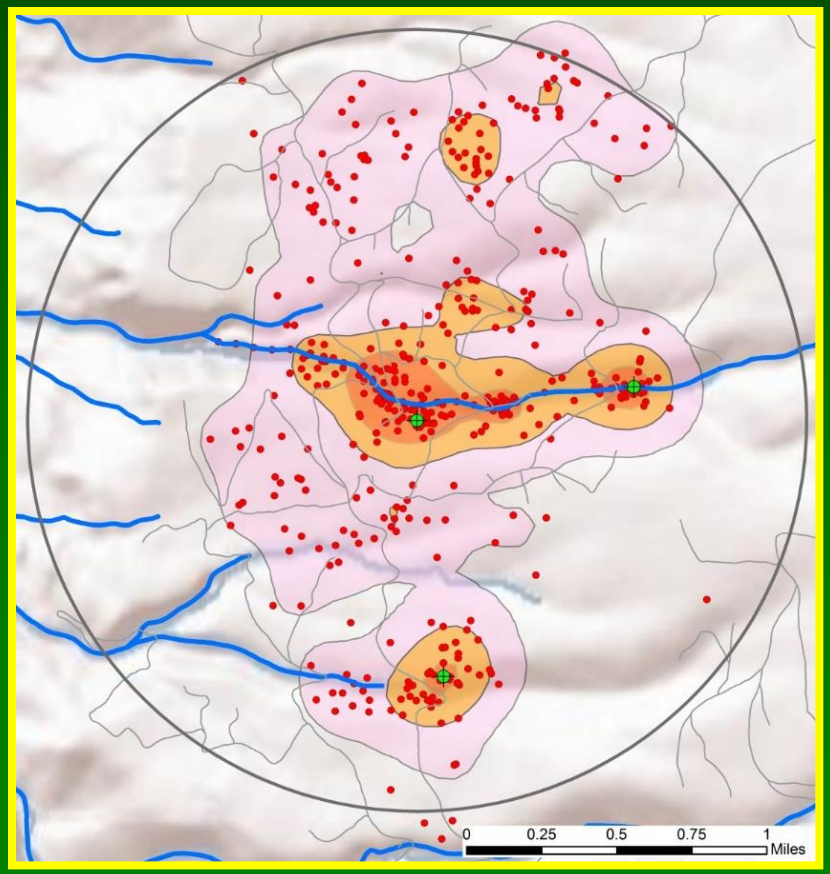
(In order of importance)

1. Distance to nest
2. Distance of stream
3. Lower third of slope
4. Basal area of both conifer and hardwood species
5. Basal of conifer over 26”dbh



NSORP Site-Specific Assessment *(Section 4.4.3 and 4.4)*

- USFWS (2008) guidance states thresholds simplify complex habitat conditions.
- Site-specific assessment is completed in lieu of a one-size-fits-all approach.
- Site-specific information taken into account in order:
  - Distance to nest
  - Distance to water
  - Lower third of slope
  - Informed Use
  - Suitable Habitat
  - Aspect
  - Elevation



Disturbance Measures and Guidelines

U.S. Fish and Wildlife Service, Estimating the Effects of Auditory and Visual Disturbance to NSO and MM in Northwestern California, Arcata Field Office, 2006

Figure 2 (USFWS 2006)
Estimated Harassment Distance Due to Elevated Sound Levels

Existing (Ambient) Pre-Project Sound Level (dB)	Anticipate Action-Generation Sound Level (dB)			
	Moderate (71-80 dB)	High (81-90 dB)	Very High (91-100 dB)	Extreme (101-110 dB)
Natural Ambient (<= 50 dB)	165 feet	500 feet	1,320 feet	1,320 feet
Very Low (51-60 dB)	0 feet	330 feet	825 feet	1,320 feet
Low (61-70 dB)	0 feet	165 feet	825 feet	1,320 feet
Moderate (71-80 dB)	0 feet	50 feet	330 feet	1,320 feet

Disturbance Measures and Guidelines

Noise Disturbance Only Operations *(Section 6.1)*

- U.S. Fish and Wildlife Service (2006)
  (Estimating the Effects of Auditory and Visual Disturbance)
- U.S. Fish and Wildlife Service (2008)
  (Take Avoidance Scenarios)

Haul Disturbance *(Section 6.2)*

- Within 0.25 miles then conduct assessment
- Consider ambient and project sound, use patterns and topographic and vegetative screening.

Annual Reporting *(Section 9.0)*

Summary of previous years:

- THP's filed under the NSORP
- Site-specific habitat assessments filed under the NSORP
- Operations conducted under the NSORP
- Summary of surveys conducted and results amended into THP's
- One-stop summary for CALFIRE *(Compliance monitoring)*

NSORP: A Spotted Owl Toolbox

What has worked well?

- Adding new science to the toolbox takes collaboration and consultation
- Application of science in form of amendment approved by CALFIRE
- Programmatic plans improve consistency and efficiency

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Lessons learned?

- NSORP and adaptive management is not a free lunch
- NSORP (14 CCR § 939.9(a)) and the Spotted Owl Expert (SOE) are valuable options for forest managers and biologists

QUESTIONS ?