

HABITAT ASSOCIATIONS



INTRODUCTION

More studies of habitat relationships have been conducted on the Spotted Owl than any other raptor in the world.

(Ltmus 2003)

1990 Definition of NSO Habitat:

- **multilayered, multispecies canopy**
- **dominated by large (>30 inches in d.b.h.) conifer overstory trees**
- **an understory of shade-tolerant conifers or hardwoods**
- **moderate to high (60 to 80%) canopy closure**
- **substantial decadence**

(Thomas et al. 1990)

Orders of Habitat Selection

- **physical or geographical range**
- **home range**
- **use of habitat components within the home range**
- **choice of items within an individual habitat component (e.g. prey)**

(Johnson 1980)

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Home Ranges and Core Areas

- **Size**
- **Composition**
- **Fragmentation and Landscape Configuration**
- **Survival, Reproduction and Population trend in relation to Landscape composition and configuration**

Home Ranges and Core Areas

- **Size**
- **Similar to those tabulated by Thomas et al. (1990)**
- **Related to degree of fragmentation within forest type / geographical area**
 - **larger where more fragmented**
- **Related to primary prey**
 - **smaller where diet dominated by woodrats**
 - **larger where dominated by flying squirrels**
- **Related to proportion of mature/old growth forest**
 - **Smaller where proportion was greater**

Home Ranges and Core Areas

2. Composition

- More mature/old growth within circles around owl sites than random sites for nearly all areas (10 of 11)
 - Exception in E. Cascades, WA
- Differences between owl and random sites diminished as circle radius increased

Home Ranges and Core Areas

3. Forest fragmentation and landscape composition

- **Meta-analysis of 3 subspecies of Spotted Owl**
- **7 studies of NSO**
- **3 Metrics associated with Owl site occupancy:**
 - **mean patch area of mature and old-growth forest (positive)**
 - **amount of patch interior of mature and old-growth forest (positive)**
 - **a fragmentation index (GISfrag of Ripple et al. 1991) (negative)**

Home Ranges and Core Areas

3. Forest fragmentation and landscape composition, continued

- Redwood zone: owl sites contained more edge than random sites
 - Edge defined as juxtaposition of different cover types or age class of the same cover type

Home Ranges and Core Areas

4. **Survival, Reproduction and Population trend in relation to Landscape composition and configuration**
 - **Deferred to presentation on Demography**

Stand Condition

Classification based on species composition, tree age or size, canopy closure, fire regime, soil, Climate, and/or topographic characteristics.

- **Juvenile Dispersal**
- **Foraging and Roosting**
- **Nesting**

Stand Condition

- **Juvenile dispersal**
 - Mature and old-growth forest was used slightly more than expected based on availability during the transience phase
 - Mature and old-growth forest was used nearly twice its availability during the colonization phase
 - Closed pole-sapling-sawtimber habitat type was used roughly in proportion to availability in both phases

Stand Condition

2. Foraging and Roosting

- At the stand-level scale, mature and old-growth forest was generally used more than expected based on availability
- At a finer scale, portions of young forests were used for foraging in greater proportion than their availability, especially where woodrats were present

Stand Condition

3. Nesting

- **Generally used mature/old forest disproportionately for compared to other cover types available**
- **In E. Cascades of Washington, > 57 % of nests were in understory reinitiation phase of stand development**
- **In redwood forest, 54% of nests were in stands 31-60 yrs old, usually with residual, older trees present**

Stand Structure

Based on detailed measurements of: canopy cover, tree diameter distribution, snag density, coarse woody debris, etc.

- **Foraging and Roosting**
- **Nesting**

Stand Structure

Forest stand structural attributes positively associated with foraging, roosting and nesting included:

- **vertical canopy layering**
- **tree height or diameter diversity**
- **canopy volume**
- **canopy closure**
- **snag diameter**
- **snag basal area or volume**
- **tree diameter**
- **log volume**

Stand Structure

- **Positive relationships were found with the aforementioned structural attributes:**
 - **within old growth forest, non-old growth forest**
 - **National Parks, public land, private land, Indian Reservation**
 - **in the Eastern Cascades and Redwood zone, where owl core areas contained lower or equivalent proportion of old forest compared to random locations**

Nest Types			% of Total		
Province	Primary nest tree species	n	Cavity	Platform	Source
WA Olympic Peninsula	hemlock, Douglas fir, red cedar	116	90	10	Forsman and Giese 1997
WA Olympic Peninsula	hemlock, Douglas fir, red cedar	15	93	7	Hershey et al. 1998
WA Eastern Cascades	Douglas fir	85	17	84	Buchanan et al. 1993
OR Coast Range	Douglas fir	30	93	7	Hershey et al. 1998
OR Klamath	Douglas fir	29	58	41	Hershey et al. 1998
OR Western Cascades	Douglas fir	27	93	7	Hershey et al. 1998
OR Western Cascades	Douglas fir	39	44	56	Irwin et al. 2000
CA Coastal	redwood, Douglas fir	97	30	65	Pious 1994
CA Coastal	redwood, Douglas fir	60	53	47	Folliard et al. 2000
CA Coastal	redwood	11	27	73	Tanner 1999
CA Coastal	Douglas fir, redwood, bishop pine	28	29	71	Chow 2001
CA Coastal & Klamath	Douglas fir, redwood	69	80	20	LaHaye and Gutierrez 1999
CA Klamath & Cascades	Douglas fir	29	41	59	White 1993
CA Klamath & Cascades	Douglas fir, sugar pine	14	0	100	Farber and Crans 2000

SUMMARY

What's New since 1990?

- **Many studies on private land**
- **Broader geographical scope of knowledge**
- **Use of demographic data as response variables in evaluating habitat associations [more on this in demography presentation]**
- **Effects of forest fragmentation/heterogeneity better understood**