

Northern Spotted Owl Habitat Relationships in the Central Washington Cascades

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Northern Spotted Owl Status Review 2nd Public Meeting

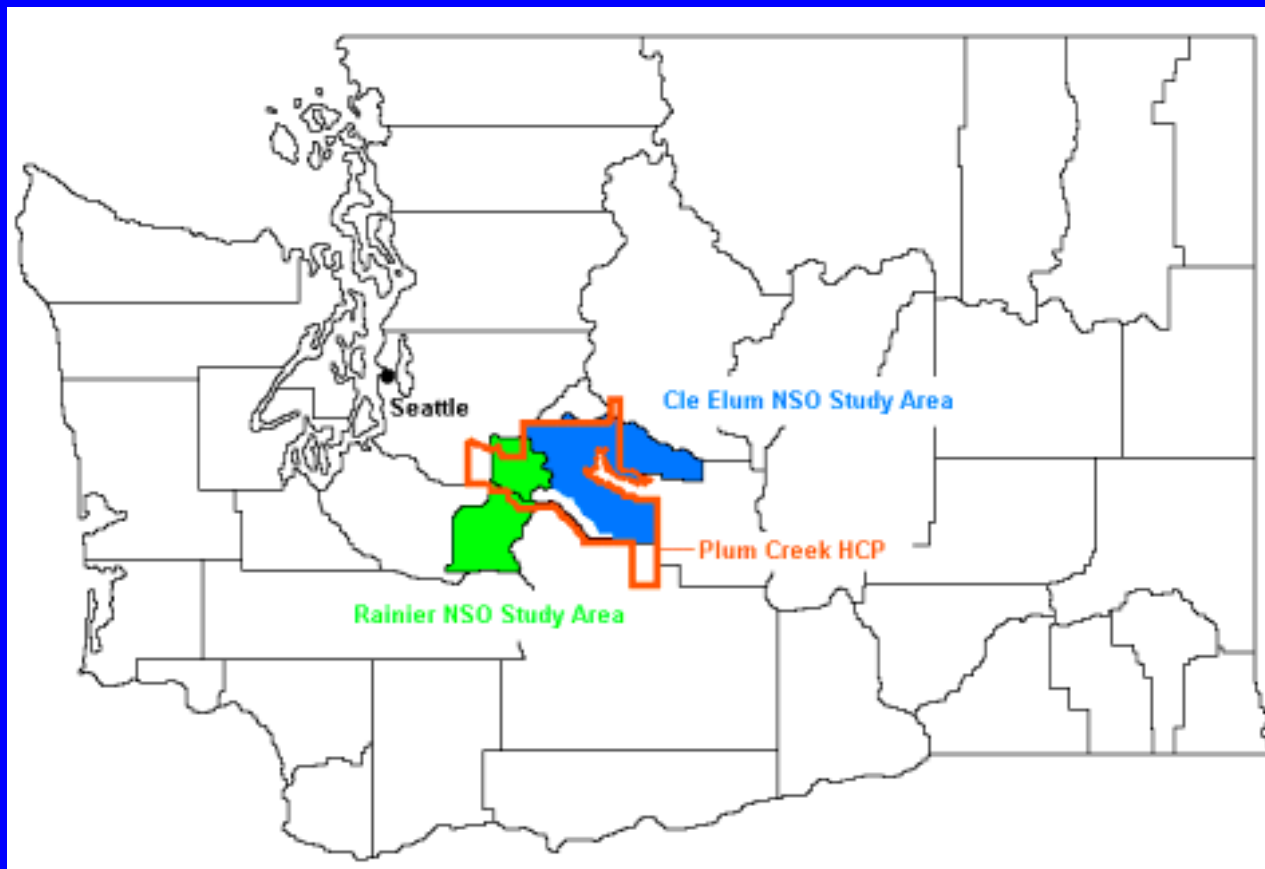
Vancouver WSU Campus

March 4, 2004

Presentation Outline

- Barred Owl / Spotted Owl habitat use
- Clines in NSO life history characteristics east to west across the Cascade Range
- NSO productivity related to landscape habitat characteristics
- Habitat selection based on telemetry studies
- Habitat management for NSO prey species

Washington Study Areas



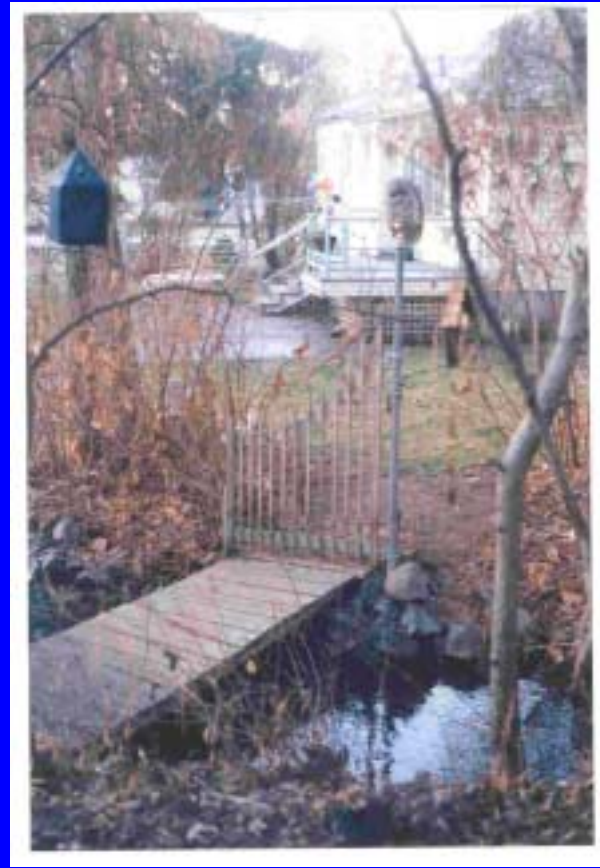
Barred Owl / Spotted Owl Trends

- Approximately equal numbers of barred owl and spotted owl territories in the central Cascades as of 1993
- Barred owls first occupied wetter habitats, now appear to occupy all NSO habitats
- 70% decline in spotted owl territorial adults since 1992, however, no indication barred owls are declining

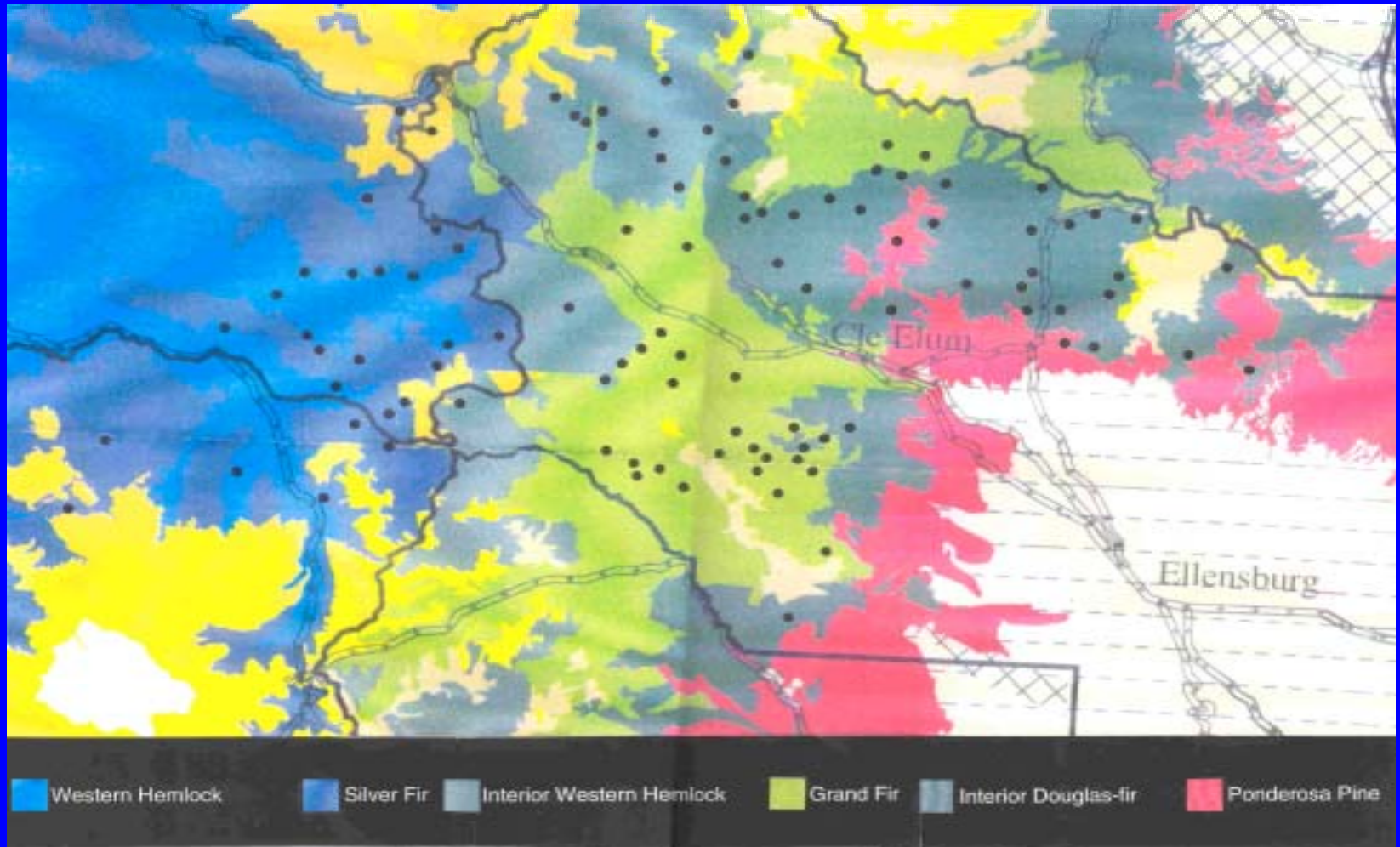
Spotted Owl / Barred Owl Habitat Relationships

- During 1990's, NSO sites contained significantly more mature/old forest within 0.8 km radius than barred owl sites
- No significant difference in mean amount of all habitat types within 1.6 km radius of either spotted or barred owl site centers
- Currently, no significant difference in amount of mature/old forest within 0.8 km of NSO sites that: (1) still have NSO pairs, (2) are now barred owl sites, or (3) contain both species

How Adaptable?



100 NSO Territories Monitored for 10 years



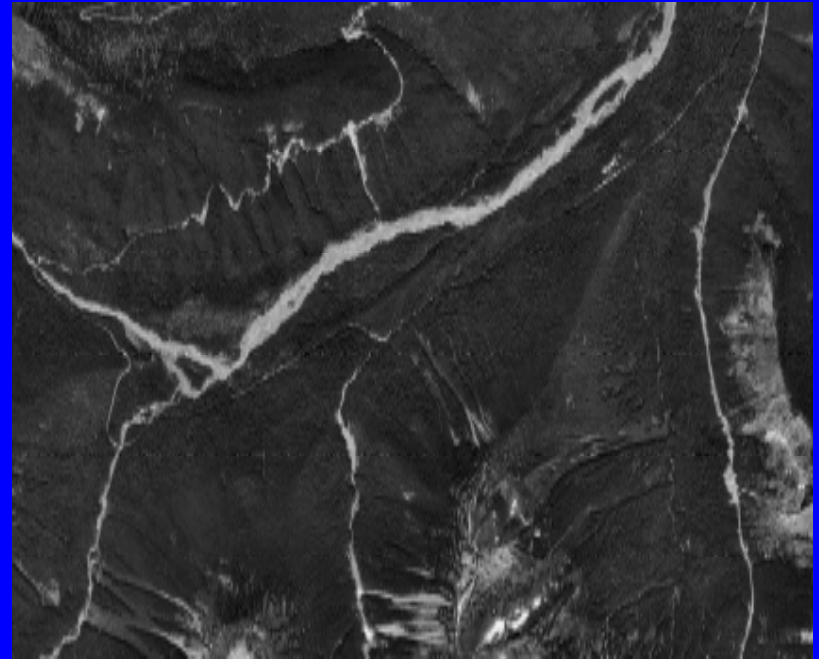
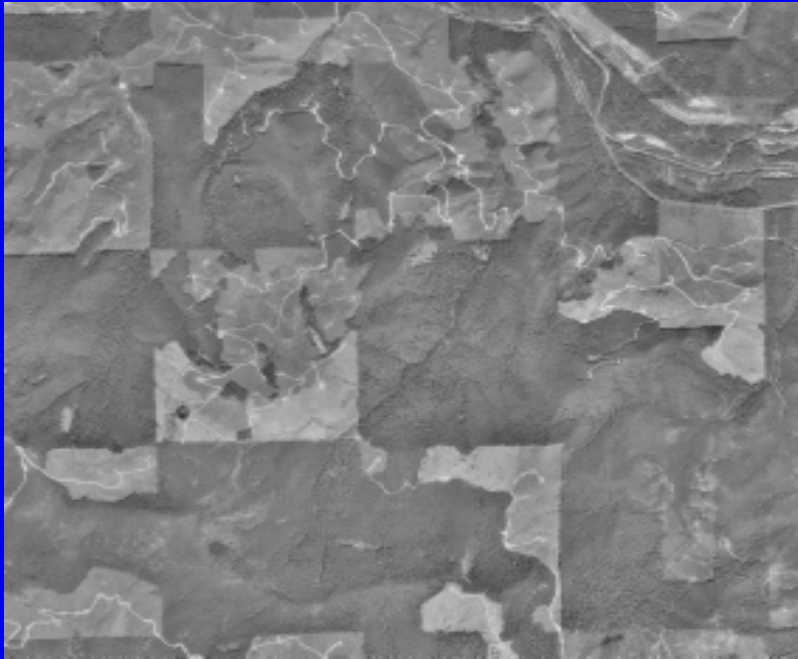
Productivity of Spotted Owls by Vegetation Zone, 1990-1999

<u>Vegetation Zone</u>	Percent of nest attempts resulting in:			
	<u>3 young</u>	<u>2 young</u>	<u>1 young</u>	<u>Nest failure</u>
Interior Douglas-fir	15	50	20	15
Grand Fir	3	53	26	18
Interior W. Hemlock	0	53	24	24
Silver Fir	0	47	39	14
Western Hemlock	0	26	38	35

NSO Productivity, Recruitment, and Mortality Rates (per decade) by Vegetation Zone, 1990-1999

<u>Vegetation Zone</u>	<u>Young/territory</u>	<u>Recruitment/territory</u>	<u>Deaths/territory</u>	<u>No. of territories</u>
Interior				
Douglas-fir	7.2	1.1	2.1	34
Grand Fir	5.3	0.7	2.1	26
Interior				
W. Hemlock	4.7	0.7	1.8	14
Silver Fir	3.2	0.5	1.4	16
Western				
Hemlock	3.0	0.3	1.3	10

NSO Productivity vs. Landscape Pattern



Productivity vs. Landscape

Checkerboard

N=28 sites checked annually

Average nest elev.= 930m

Range: 700 –1250 m

Year	Active Sites	Successful Nests	No. Young
1998	19	14	20
1999	20	0	0
2000	15	5	10
2001	18	4	7
2002	15	5	9
2003	13	3	5
		31	51

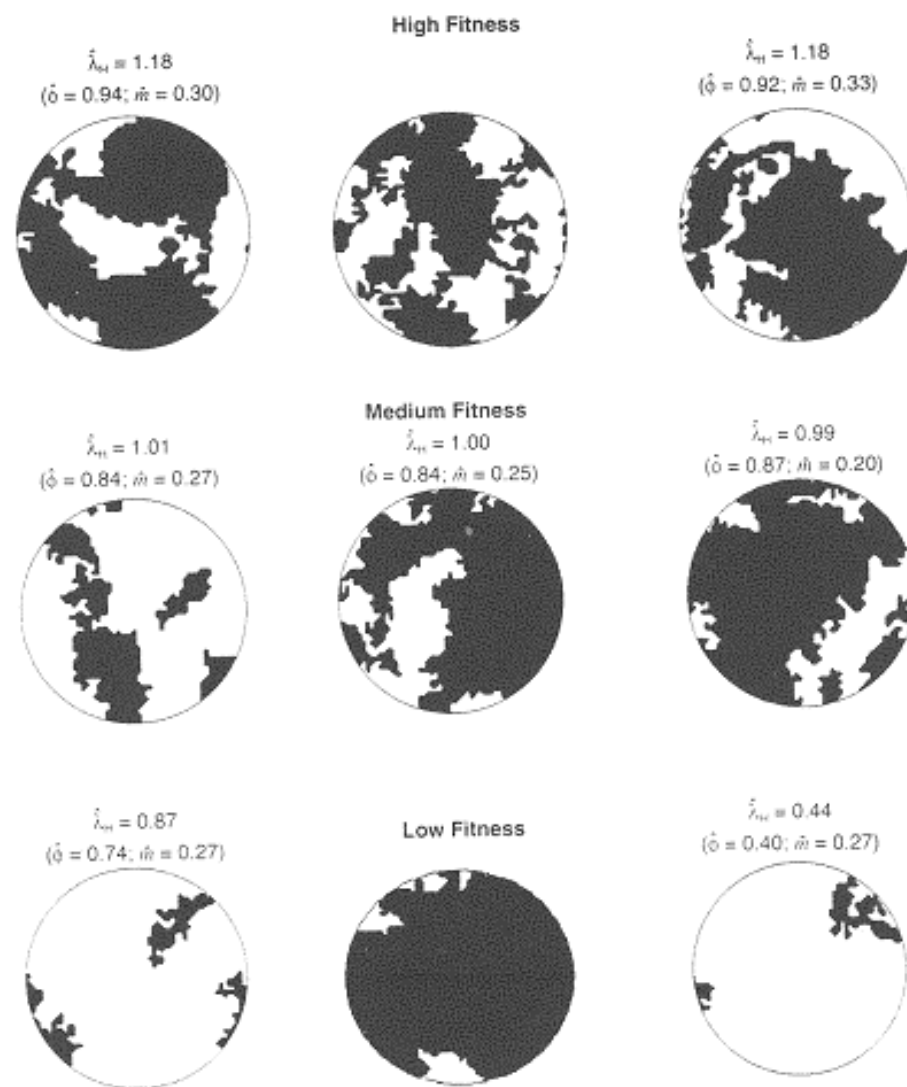
National Park

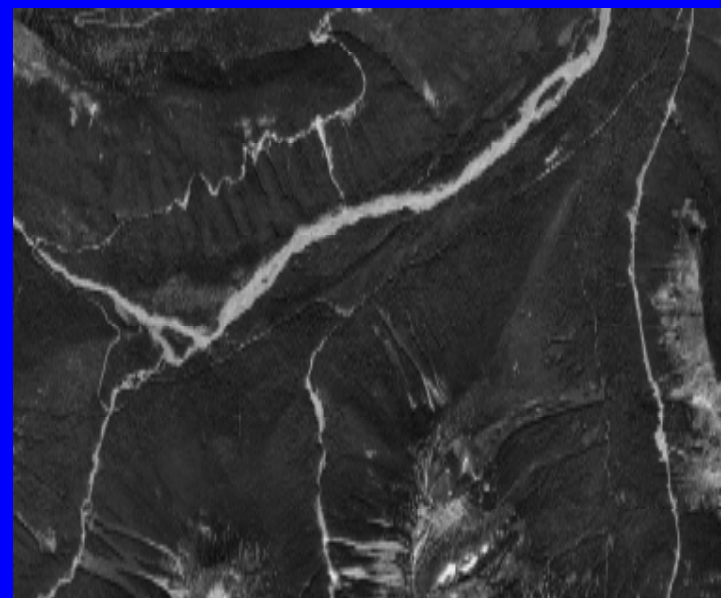
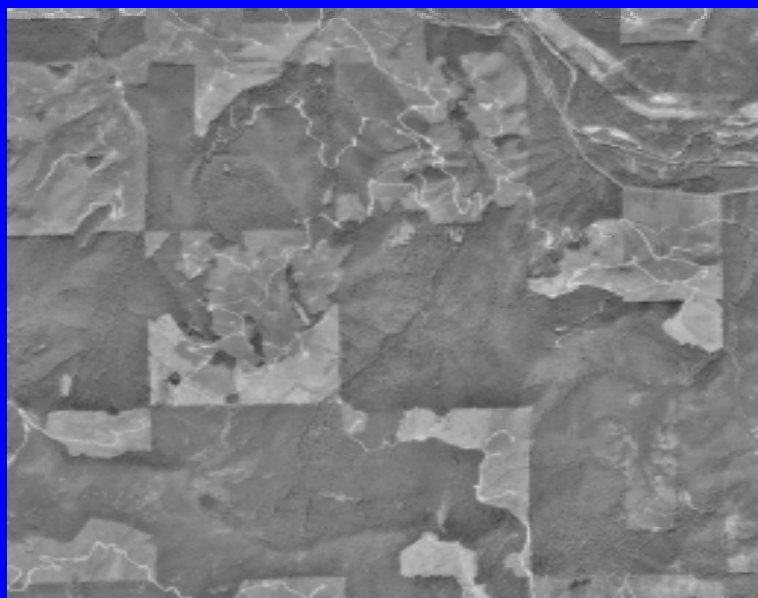
N=26 sites checked annually

Average nest elev.= 975m

Range: 730-1220 m

Year	Active Sites	Successful Nests	No. Young
1998	19	6	9
1999	9	0	0
2000	16	0	0
2001	18	1	1
2002	14	1	2
2003	14	1	1
		9	13





High Fitness



Low Fitness



Comparison of Individual Northern Spotted Owl Home Ranges

Location	Mean 100% MCP (ha)	Range (ha)	No. Birds	Source
WA				
Washington	2311	278-7060	14	(Hays et al.)
NW Washington Cascades	2670	998-7261	10	(Hamer et al.)
E Washington Cascades	1170	249-2980	20	(Hicks et al.)
OR				
NW Oregon Coast Range	2372	1600-3200*	9	(Glenn et al.)
Oregon Coast Range	1458	900-2000*	5	(Thraillkill and Meslow)
Oregon Coast Range	2411	2000-2800*	5	(Thraillkill and Meslow)
Oregon Coast Range (Elliott S.F.)	1107	900-1300*	15	(Glenn et al.)
SW Oregon (Roseburg BLM)	1913	549-3380	6	(Forsman et al.)
S Oregon Cascades (HJ Andrews S.F.)	1177	920-3254	8	(Forsman et al.)
CA				
NW California	(none given)	340-1030	48	(Gutierrez et al.)
* Range interpolated from graphic				

Analysis of Eastside Cascades NSO Home Range Data: 8 Pairs

- Compositional Analysis
 - Strong evidence of selection among 3 habitat types: NRF, FD, Non (Hotelling's $T = 41.87$, $p < 0.001$)
 - No evidence that owls in checkerboard landscape vs. USFS landscape selected differently (Wilke's $\lambda = 0.832$, $p = 0.48$)
 - But, strong evidence that individual owls selected differently among habitat types (Wilke's $\lambda = 0.00016$, $p = 0.004$)

Resource Selection with Analysis of Deviance

OWL(S)	NRF	FD	NON	Distance
LCF	Very Strong	None	None	0-1200 m
LCM&FMF	Weak	None	None	0-1200 m
FMM	Moderate	None	Weak	300-2400 m
WCF	Strong	Weak	None	0-1200 m
WCM	Very Strong	None	Weak	0-1200 m
FCF	Very Strong	None	None	0-300 m
FCM	Very Strong	None	None	0-2400 m
FRF	Moderate	None	None	0-1200 m
KEF&BRF	Moderate	Strong	None	0-1200 m
5 OWLS	Weak	Strong	None	0-1200 m

Managing Habitat for NSO and their Prey



Mole Mtn Small Mammal Study Design

- Located eastside Cascades near Ellensburg
- 180-acre harvest treatment 1994-95
- Unharvested control adjacent USFS land in LSR
- Timber type includes mature DF, PP, WL, GF @ 3,600 ft. elevation.
- 1994 pre-treatment trapping (2,240 trap nights) and 1995 post-harvest trapping (2,254 trap nights)
- Pre/post-harvest variable plot cruise data

Mole Mountain Small Mammal Study Results

Variable	Pre-harvest	Post-Harvest	Control
Glsa 94 d/ac	0.2		1.6
Glsa 95 d/ac		2.0	2.0
TPA	91.3	73.8	114.6
BA	123.6	93	152.3
QMD	15.8	15.2	15.6
RD	31	24	39
% Defect		31	36
Snag / Ac		20.8	22.6
CWD T/A		34.4	47.5

Mole Mtn. Flying Squirrel Results: Comparison with other studies

Location	Density / ha	Reference
Southern Coast Range	1.9	Carey et al. 1992
Central western Cascades, OR	2.3	Rosenburg & Anthony 1992
Western Olympics WA	0.5	Carey 1995
Eastside Cascades WA	4.9	This study 1995

Summary and Conclusions

- Little difference in habitat selection between barred owls and spotted owls
- Eastside forests more productive for NSO than westside forests
- NSO productivity appears to be higher in multi-aged managed landscapes
- Habitat use is influenced by distance from nest and varies among individual owls
- Active management in eastside owl habitat is possible and perhaps necessary