

## MONITORING AVIAN RESPONSE TO DENSITY MANAGEMENT

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Understanding the development of structure in young forest stands in response to management is critical for federal land managers implementing the Northwest Forest Plan and for managers attempting to accommodate both consumptive and nonconsumptive uses of their lands. Primary management activities in young forests include thinning and fuels management. Thinning is increasingly used in young forests to meet multiple objectives and has been identified as a potential approach to enhance wildlife habitat and accelerate the development of characteristics that are typical of older forest stands. The purpose of this study is to monitor abundance of birds in stands that have been thinned to different densities to demonstrate the range of responses that might occur as a result of different thinning practices.

### METHODS

This research is being conducted at the Green Peak, O.M. Hubbard, Bottom Line, and Ten High density management sites established by the BLM in the Oregon Coast Range. A series of density-management demonstration sites were established throughout western Oregon to represent a broad range of opportunities for creating structure in young forest stands. Each site received four treatments that resulted in different stocking levels: high retention (light thinning, 120 trees/acre), moderate retention (thinned to 80–110 trees/acre), variable retention (thinned to 40, 80, and 120 trees/acre—scattered throughout the 50-acre treatment block), and control (no thinning). Three 1/4-acre and three 1-acre areas were left untreated in each of the moderate and variable density units. Three 1/2-acre and three 1-acre openings (all trees removed) also were created in the moderate and variable treatments. Two sites (Bottom Line

and O.M. Hubbard) were thinned after the 1998 season; Ten High was thinned during the 1999 season, and Green Peak was thinned after the 1999 season.

The four replicate sites were sampled in random order approximately weekly from 10 May to 30 June 1998 and 1999. Because of the delayed treatment in Green Peak and Ten High, these sites were resampled in 2000 to obtain first-year post-treatment data. Four visits to each site were conducted in 1998 and 2000; six visits were conducted in 1999. Within each replicate, all four stands were sampled in a single morning. Surveys were conducted within 4 hours of sunrise and were not conducted in heavy wind or rain.

Relative abundance of nesting songbirds was sampled using fixed-radius point counts. Observers recorded all birds seen or heard within 50 m of the point count station during an 8-minute observational period. Birds detected before or after the survey were not recorded; birds flying over were recorded as such and were not included in data summaries or analyses.



### RESEARCH RESULTS AND MANAGEMENT IMPLICATIONS

A total of 3,440 birds of 47 species were detected. Relative abundance for each species is listed in Table 6. Species' responses were variable among treatments. For many species, changes in abundance between pre- and post-treatment years were similar between unthinned and thinned stands (see Figure 12, hermit warbler [*Dendroica occidentalis*] and Wilson's warbler [*Wilsonia pusilla*]), indicating that abundance of these species was relatively unchanged by thinning treatments. The relative abundance of golden-crowned kinglets (*Regulus satrapa*) and Pacific-slope flycatchers (*Empidonax difficilis*) decreased in response to thinning whereas dark-

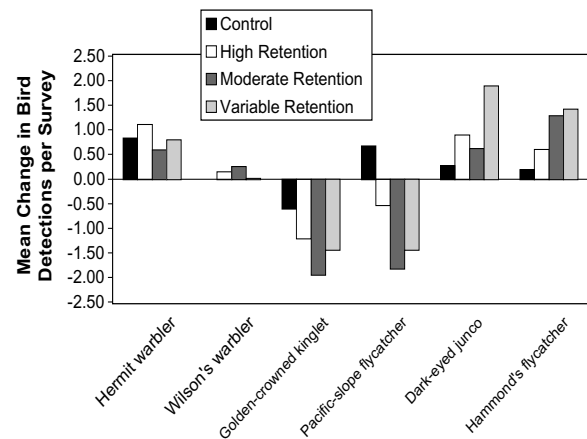
**Table 6. Abundance of breeding birds (mean number detected per visit during an 8-minute survey within 50 m from the observer) at density-management sites in the Oregon Coast Range, 1998-2000.**

Species	Bottom Line	Green Peak	O. M. Hubbard	Ten High
American goldfinch	0.00	0.00	0.03	0.00
American robin	0.64	0.13	0.32	0.03
Black-headed grosbeak	0.15	0.09	0.04	0.11
Brown creeper	0.54	0.43	0.06	0.25
Band-tailed pigeon	0.07	0.09	0.02	0.05
Black-throated gray warbler	0.17	0.03	0.21	0.02
Chestnut-backed chickadee	2.99	1.61	1.50	1.17
Common raven	0.00	0.01	0.04	0.03
Dark-eyed junco	2.53	1.21	2.11	0.94
Downy woodpecker	0.06	0.03	0.04	0.01
Evening grosbeak	0.99	0.32	0.06	0.22
Golden-crowned kinglet	2.17	2.31	1.55	2.97
Gray jay	0.31	0.19	0.13	0.12
Hammond's flycatcher	0.15	0.17	0.29	0.86
Hairy woodpecker	0.43	0.04	0.18	0.02
Hermit thrush	0.29	0.23	0.24	0.06
Hermit warbler	3.28	2.64	2.42	2.37
House finch	0.00	0.00	0.02	0.00
House wren	0.00	0.00	0.00	0.06
Hutton's vireo	0.03	0.14	0.47	0.22
MacGillivray's warbler	0.06	0.02	0.00	0.01
Northern flicker	0.02	0.04	0.07	0.00
Northern pygmy-owl	0.02	0.00	0.02	0.00
Orange-crowned warbler	0.04	0.26	0.07	0.00
Olive-sided flycatcher	0.06	0.00	0.04	0.11
Pine siskin	0.14	0.06	0.06	0.03
Pileated woodpecker	0.11	0.01	0.04	0.00
Pacific-slope flycatcher	0.58	1.40	1.90	1.76
Purple finch	0.04	0.03	0.06	0.08
Red-breasted nuthatch	1.27	0.11	0.11	0.01
Red-tailed hawk	0.00	0.00	0.02	0.00
Rufous hummingbird	0.06	0.02	0.14	0.08
Song sparrow	0.02	0.00	0.00	0.03
Spotted towhee	0.95	0.13	0.33	0.08
Steller's jay	0.06	0.22	0.44	0.15
Swainson's thrush	0.64	0.60	0.31	0.28
Townsend's solitaire	0.05	0.00	0.11	0.00
Varied thrush	0.04	0.15	0.06	0.11
Warbling vireo	0.00	0.14	0.05	0.22
White-crowned sparrow	0.08	0.01	0.13	0.00
Western tanager	0.73	0.15	0.08	0.62
Western wood-pewee	0.00	0.02	0.02	0.02
Wilson's warbler	0.06	0.45	0.00	0.06
Winter wren	4.04	1.85	1.57	1.85
Yellow-rumped warbler	0.00	0.00	0.02	0.00

eyed juncos (*Junco hyemalis*) and Hammond's flycatchers (*Empidonax hammondi*) increased in response to thinning (Figure 12). The responses of other species to thinning are less obvious. For some species there appears to be some response to thinning, but statistical analyses are needed to confirm the observed patterns. For other species, there may be differential responses to the different thinning treatments. For example, abundance of winter wrens (*Troglodytes troglodytes*) increased more in high and variable retention stands than in control stands, but decreased in moderate retention stands. This pattern suggests a positive response to high and variable retention thinning, but a negative response to moderate retention thinning. Future statistical analyses may help elucidate these patterns.

### STUDY TIMELINE

This study was initiated in spring 1998. Pre-treatment point counts were conducted at all sites in 1998, and again at Green Peak and Ten High in 1999. Post-treatment point counts were conducted at O.M. Hubbard and Bottom Line in 1999 and at Green Peak and Ten High in 2000. All sites will have post-thinning counts conducted again in spring 2005, at which time final analyses will be conducted and the study will conclude.



*Figure 12. Examples of changes in avian abundance between pre- and post-treatment in density-management stands, 1998-2000. Data from Ten High, 1999, were omitted. Treatment was implemented during the sampling session thus the data did not represent pre- or post-treatment results.*