

Executive Summary

FIA-FSP project number: Y081156

FIA-FSP project title: An experimental study of variable-retention harvest methods on forest birds

Project purpose and management implications:

Variable-retention (VR) harvesting is increasingly being practiced by forest companies but many questions remain regarding its effectiveness in maintaining biodiversity, and in how it should best be implemented. The overall, long-term objective of this study is to determine how variable-retention harvesting should be implemented in order to maximize its effectiveness in sustaining biodiversity. Our specific objectives are to 1) Identify the effects of different VR harvest factors (i.e. dispersion pattern, retention level, patch size, and size of opening) on the relative abundance of individual avian species; 2) identify the effects of different VR harvest factors on avian communities as measured by avian guilds and species richness; 3) examine whether and how treatment effects change over time; 4) contribute to a cross-taxa database (e.g., birds in this study; gastropods, amphibians, small mammals, epiphytes, bryophytes, vascular plants, beetles, and fungi that are being collected in the same VRAM experimental sites in linked studies) for eventually assessing the cross-taxa response of biodiversity to VR harvesting; and 5) provide recommendations on how to improve the effectiveness of variable-retention harvesting methods for sustaining biodiversity.

Project start date and length of project: Start May 2007, for 3 years

Methodology overview:

The study treatments and study sites for this research are part of a series of 5 experimental harvesting blocks replicated three times that test different types, amounts and spatial patterns of retention. These Variable Retention Adaptive Management (VRAM) experiments are the foundation of Western Forest Products' Adaptive Management Program. Each block has 4 or 5 treatments consisting of clearcut, uncut control (old growth or 2nd growth), and either two or three variable retention alternatives. Each treatment unit is approximately 20 ha in size. The VRAM sites were chosen to be as uniform as possible in timber type, site series and topographic features. Each VRAM site was installed with random allocation of treatments.

The 5 variable-retention experiments consisted of the following: A) The Group Size Experiment is a group-size comparison with 3 harvest treatments retaining 15% of the trees in either a dispersed fashion (as single tree to very small groups < 0.1 ha) or in grouped fashion as medium-sized patches (0.2 to 0.5 ha) or as large patches (0.8 – 1.2 ha). B) The Group Retention Experiment compares 3 retention levels (10%, 20%, and 30%) for VR harvesting that retains trees as medium sized (0.2 to 0.5 ha) patches. C) The Dispersed Retention Experiment compares 3 retention levels (5%, 10%, and 30%) for VR harvesting that retains trees in a dispersed fashion (as single stems or as small groups up to 0.1 ha). D) The Group Removal Experiment compares 2 triple-pass harvest treatments having either a short (5-7 years) or a long return (20 years) period between passes. At each pass, 4 size classes of tree patches (1 ha, 0.5 ha, 0.25 ha, and 0.1 ha) are

removed from each treatment, following the spatial guidelines for maintaining set distances between residual trees required by variable-retention harvesting. The retention level after the first pass is 69%, and will be the effective treatment assessed in this project as subsequent passes will occur after the timeframe for this project. E) The Riparian Experiment compares the effects of buffered and unbuffered streams in residual tree patches, in the harvested matrix, and in undisturbed controls.

During 2007-08, we conducted bird surveys at 5 experimental sites, namely: i) the group size experiment at Klanawa; ii) the group retention experiment at Hoodoo; iii) the group retention experiment at Goat Island; iii) the group removal experiment at Memekay; and v) the riparian experiment at Lewis Lake. Treatment units at each experimental site were sampled for bird occurrence and abundance following the standards established by Resource Information Standards Committee (RISC) for surveying forest songbirds (MOELP 1999 Standards for Components of British Columbia's Biodiversity No 15). We established 60-m radius, circular point count stations at the intersection of 170-m grid lines using a randomized, systematic layout (1st plot randomly located). This allowed for the requisite 50 m between the outer circumferences of adjacent stations (RISC Standards), while maximizing the number of stations that can be accommodated within the 20 ha treatment units. We conducted bird surveys four times annually at each site, at approximately 2-week intervals in May and June; this conforms to the survey period and sampling effort for breeding bird surveys in BC recommended by RISC Standards. We controlled for observer bias by having each station surveyed the same number of times by trained observers, and who were randomly rotated after each round. We randomized the sequence in which sites will be surveyed in the first round; subsequent rounds followed the rotation of the first round. To standardize diurnal variation, each point count station within a site was censused in reverse order of the previous round. Censuses began at dawn and ended within 4 hours after sunrise. Observers waited for one minute following arrival at each count station before beginning the 8-minute survey. In accordance with RISC standards, we did not conduct surveys during unacceptable weather conditions, when there was moderate rain or snow, when temperatures < 7°C, or when wind speeds exceeded Beaufort 2 (6-12 km/hr).

Project scope and regional applicability: This project is being conducted in coastal BC, on Vancouver Island, the Sunshine Coast, and Haida Gwaii, near the communities of Sayward, Tlell/Juskatta, Powell River, and Port Alberni. The study area may be of interest to ongoing treaty processes by the Council of the Haida Nations (representing Skidegate Band Council) and the Sliammon First Nation.

Interim results:

Our preliminary results indicated that variable-retention harvesting was generally effective in retaining bird species that commonly inhabit mature forests. In contrast, clearcuts lacked many of the forest bird species that occurred in the undisturbed controls and in the variable retention treatments. This pattern was consistent across all the experimental sites surveyed in 2007-08. Mature-forest dwelling species that occurred in the VR cutblocks and in the controls, but that were missing from the clearcuts, included the brown creeper (Memekay), chestnut-backed chickadee (Memekay, Lewis Lake), golden-crowned kinglet (Memekay, Hoodoo), Pacific-slope flycatcher (Memekay, Klanawa), black-throated grey warbler (Lewis Lake), winter wren (Lewis Lake, Goat Island), Hammond's flycatcher (Lewis Lake), and Townsend's warbler (Hoodoo). Moreover, variable retention cutblocks sustained higher densities of forest bird species

that were detected in the clearcuts. In particular, relative densities of the mature forest dwelling guild were significantly higher in the controls and in many of the variable-retention treatments than in the clearcuts.

Abundances of species requiring shrubs or open and edge habitats were, however, significantly lower in controls than in clearcuts and VR treatments. Relative densities of dark-eyed juncos (Memekay, Goat Island, Hoodoo, Lewis Lake), the shrub guild (Memekay, Goat Island, Hoodoo, Klanawa, Lewis Lake), and the edge and open habitat guild (Memekay, Goat Island, Hoodoo, Lewis Lake) were significantly lower in the control than in the variable retention cutblocks or the clearcuts.

Although variable-retention harvesting successfully retained bird species that commonly inhabit mature forests bird species, densities of these species were frequently lower in the variable retention cutblocks than in the undisturbed controls. Controls had higher abundances of mature forest dwelling species than all VR and clearcut treatments at 3 of the 5 VRAM sites. In the group size experiment at Klanawa, densities of Pacific-slope flycatcher and the mature forest guild were significantly higher in the controls than in the small group, medium group, and large group VR treatments. Similarly, in the group retention treatment at Hoodoo, densities of Townsend's warbler, the cavity-nester guild, and the mature forest guild were significantly higher in the controls than in the 10%, 20%, or 30% group retention treatments. Densities of the mature forest guild were higher in the control than in all other treatments at the riparian experiment at Lewis Lake. In contrast, variable-retention harvesting successfully retained mature forest dwelling bird species at densities comparable to those in the control for 2 VRAM sites. In the group removal experiment at Memekay and in the group retention experiment at Goat Island, the mature forest guild and mature forest dwelling species did not differ between the controls and the VR treatments.

Differences between variable retention treatments were not as pronounced as differences between clearcut harvesting and the variable retention harvesting methods. Differences in avian response were not apparent between VR treatments at either the group removal experiment at Memekay or the group size experiment at Klanawa. Differences between variable retention treatments were observed at the group retention experiment on both Goat Island and at Hoodoo. In general, mature forest dwelling species (e.g., Townsend's warbler, golden-crowned kinglet, winter wren) were more abundant at the higher retention levels than at the 10% retention treatment or in clearcuts.

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