

Williamson's Sapsucker Merritt Occupancy Monitoring 2019

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ABSTRACT

Field data collection for effectiveness monitoring for the Endangered Williamson's Sapsucker (WISA) began in 2017. This report continues the occupancy monitoring for the Ministry of Environment Region 3 portion of the WISA West Area of Occupancy (AO) near Merritt (the "Merritt area") for 2019.

WISA breeding occupancy of 42 Wildlife Habitat Areas (WHAs) and 18 harvested cutblocks in the Merritt area were assessed in June 2019. The cutblocks were all approved after April 2014 when the WISA Best Management Practices (BMPs) were published, overlapped with low or better suitability WISA habitat and had been harvested by June 2019.

WISA breeding was confirmed or probable at 21% of the WHAs and possible at an additional 27% for total breeding occupancy of 48% of the 42 WHAs. WISA were found in only one of the 18 harvested cutblocks. The WISA BMPs had not been applied to any of the 18 study cutblocks, so to date have not been effective in maintaining WISA breeding habitat in this study area. Habitat plot results indicated that the reserved tree densities met or came close to the WISA BMP reserve tree target densities in the two small scale salvage blocks, and the four dead-only salvage blocks.

Trembling Aspen made up 74% of the 57 WISA nest trees assessed for current status in the Merritt area. Incorporating the data from other regions, Trembling Aspen had an average survival rate of 30% from 2004-2009 when they were discovered to 2019, while Western Larch nest trees had a very high average survival rate of 94% over the same period. Since Western Larch do not occur in the Merritt area, it is clear that long-term WISA nesting success in the Merritt area will require continual recruitment of new aspen nest trees. Survival of Ponderosa Pine nest trees from 2004-2015 to 2019 was 50%, while survival of the very large veteran Douglas-firs that WISA tend to use for nesting was 75%, although sample size was fairly small for both Ponderosa Pine (n = 12) and Douglas-fir (n = 8) nest trees.

Recommendations were made to continue WHA effectiveness monitoring by expanding to areas, i.e., particularly the remainder of the West AO and Okanagan AO, that have yet to be assessed. Harvested cutblocks should continue to be assessed both annually in all areas, and by expanding assessment to regions yet to be assessed, firstly to determine if the BMPs are being applied, and, if applied, whether or not the harvested blocks meet the BMP live tree retention targets, and if WISA use or continue to use the blocks after harvest.

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INTRODUCTION

Williamson's Sapsucker (WISA) has been designated as Endangered in Canada (COSEWIC 2005, 2017), and is listed under Schedule 1 of the Species at Risk Act. Effectiveness monitoring protocols (Gyug 2016) were prepared to estimate the conservation effectiveness of Wildlife Habitat Areas (WHAs) and the Best Management Practices (BMPs) (BC FLNRORD 2014) for timber harvesting in the Williamson's Sapsucker Area of Occupancy (AO). Application of the BMPs to cutblocks is voluntary for licensees, i.e., there is no Government Action Regulation (GAR) stipulating they must be applied. However, the provincial WISA Recovery Plan (BC MOE 2012) and the federal Recovery Plan (Environment Canada 2014, Environment and Climate Change Canada 2016) both rely on the application of the BMPs to provincial crown forest to attain its objective of maintaining current abundance through maintenance of current habitat suitability.

To assess effectiveness of WHAs and BMPs, surveys were started in 2017 by Ministry of Forests, Land, Natural Resource Operations and Rural Development (FLNRORD), Kamloops, including some habitat plots. Only Level 1 (early spring) surveys were conducted for WISA presence in 2017 (Gyug 2018). In 2019, funding came through too late to conduct Level 1 (April or early May) surveys, so only Level 2 (mid-May through June) surveys were conducted for WISA presence.

The purpose of this report for the was to:

1. Report Level 2 WISA occupancy monitoring for the Ministry of Environment Region 3 portion of the WISA West AO (the "Merritt area"), in all 42 WHAs and in any cutblocks approved and harvested after 2014 that overlapped with WISA Critical Habitat;
2. Summarize and interpret the occupancy results from 2017 and 2019 in the Merritt area;
3. Summarize current nest tree condition while doing occupancy checks of old nests, and
4. Conduct a preliminary assessment of the effectiveness of the BMPs in harvested cutblocks in the Merritt area based on observed application to cutblocks and on observed WISA breeding occupancy in the blocks.

METHODS

Study Sites

The initial round of study sites were chosen in 2017 by FLNRORD in the Merritt and Princeton areas of the West Williamson's Sapsucker AO (Gyug 2018). In 2017, 13 WHAs in the Merritt area were sampled for WISA presence in April or early May (Level 1). All WHAs in the Merritt area (n = 42) were included in this study so that in 2019 the same 13 WHAs that were checked in 2017 and the 29 remaining WHAs were sampled for WISA presence and nesting in June (Level 2). Two of these WHAs were in Ministry of Environment Region 3 but north of the

Merritt area: one was near Isobel Lake northwest of Kamloops, and one near Chartrand Creek FSR east of Logan Lake. These nests and WHAs were included in the “Merritt” study area for the purposes of this report.

Cutblocks were examined to determine if the WISA BMPs had been applied, how they had been applied, and if WISA were present and/or breeding within the cutblocks. Cutblocks were considered which had been submitted or approved after April 2014, i.e., when the BMPs were published, and to which the BMPs therefore may have been applied. Only 18 cutblocks that had been cut by June 2019, and which at least partially overlapped WISA Critical Habitat (Low or better suitability habitat as outlined in the BMPs) were selected for sampling. Site Plans were obtained to assess if the prescriptions included reference to WISA and the BMPs, and if so, how they had been applied.

Occupancy Field Methods

The WHAs and cutblocks were sampled for Level 2 occupancy from June 7-20, 2019 (Figure 1). Methods have been described in Gyug (2016) and were slightly modified by Gyug (2018) as summarized below. Level 1 Occupancy was not completed in 2019 because of late funding, but would have been completed if funding had come earlier. WISA are much more detectable in April as they establish breeding territories, so surveys are most efficient at that time.

Occupancy Level 1: WISA Presence during territory establishment phase (April-early May).

1. Visit the site any time from approximately April 1 to May 7.
2. Begin assessment at any previously known nests, should there be any.
3. If no WISA are detected at known nest sites, use at least 5 CPB over 30 minutes moving around entire site and listening for responses. If sites are larger than 16 ha, this may take longer than 30 minutes.
4. The assessment can be terminated as soon as any WISA are found.

Occupancy Level 2: Breeding Confirmation during nesting phase (mid-May to late-June).

1. If no WISA were present on a prior Level 1 visit, then WISA will almost certainly not be present later in the breeding season, and Level 2 surveys need not be conducted as WISA will be assumed absent.
2. Breeding confirmation requires visits to any old nests, and up to 30 minutes on sites of 16 ha or smaller including a series of CPB throughout the site, approaching most areas of the site to within at least 200 m, or until a response is detected.
3. Sites larger than 16 ha may take considerably longer to survey for breeding evidence.
4. Summarize the breeding activity observed using the Breeding Bird Atlas breeding evidence codes (see Appendix 5).
5. Whenever a nest tree from previous years is checked for current occupancy, the current status of the nest tree itself is recorded.

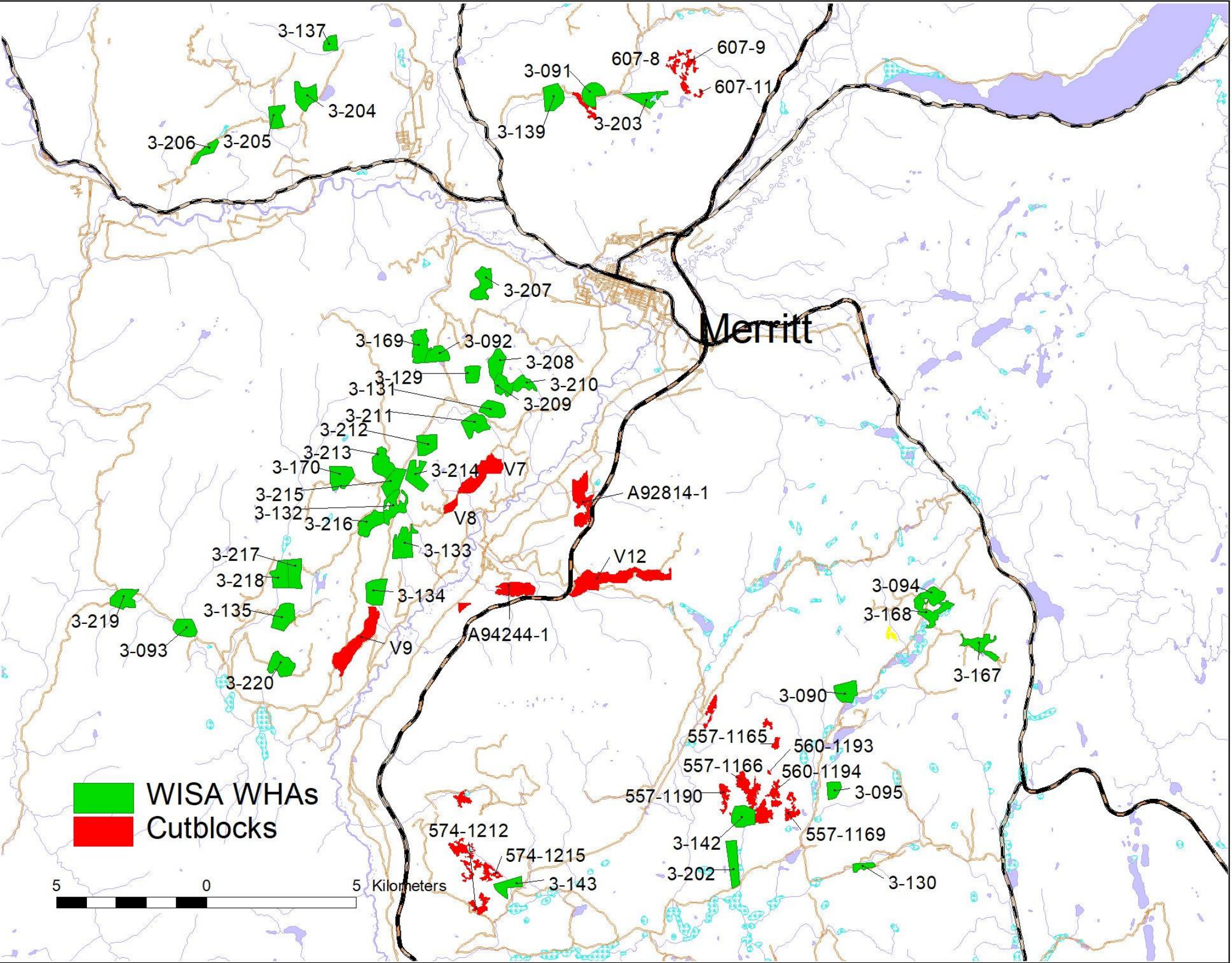


Figure 1. Overview map of 2019 WHA and cutblock WISA occupancy sampling sites in the Merritt area.

Call playback equipment used included FoxPro electronic game caller units through large external FoxPro speakers with front bell dimensions of 25-cm x 17-cm or 21-cm diameter. When walking through the site with the intention of covering every area of the site to within at least 200 m, sometimes only a pocket call playback unit (FoxPro NX4 or equivalent) with a 14-cm diameter speaker was used.

Each formal CPB point sample consisted of three broadcasts of a 10-15 second Williamson's Sapsucker drum and call combination repeated three times in three directions, and then a silent listening period of 3 minutes, for a total listening time of 4 minutes and 20 seconds. At least one formal CPB point was done during the initial survey at a site. We recorded location of each such point. For each WISA detection we recorded the time (seconds) of the initial response from the beginning of the CPB. We recorded the sex (male, female, unknown or pair), the number of birds, and the type of responses (visual, drum and/or call), the estimated distance (m) and direction (degrees from a compass reading) to each WISA. Both male and female WISA drum, so the type of response cannot be used to identify sex. While walking within a site where we were doing CPBs, we did not necessarily do the full CPB protocol because WISA would be heard while walking away from a site, or even at the next CPB point. In those cases, we recorded the GPS track showing the route taken, and for each WISA detection we recorded WISA location by estimating distance and bearing from observer location, or by extrapolating WISA location directly on GPS unit using the cursor.

In this project, only Level 2 occupancy checks were done so the methods were slightly different than when both Level 1 and 2 were done. We used CPB at every site, but these were not necessarily recorded as individual CPB points. The WHA or the cutblock was searched until WISA presence was confirmed, and a nest search undertaken. If no WISA were detected, then we searched the site until we had confidence WISA were absent during the survey period. Location, type of observation and sex (if observed) were recorded for any WISA detections. The breeding evidence observed was recorded using the Breeding Bird Atlas breeding activity code (Appendix 4) along with any other observations, such as the location and nesting tree data for any newly-discovered nests. When an active nest was confirmed, other nearby WISA detections of the same pair were not usually entered into the final observation file.

Field data was entered into a single WISA Excel file template designed in 2007 in consultation with the Wildlife Species Inventory (WSI) for submission to the WSI Species Inventory (SPI) system of the BC Ministry of Environment. Formal CPBs were entered into the "CPB-DataEntry" sheet. Follow-up visits to WISA detections and old nests to check for continued occupancy or re-occupancy were usually entered into the "NestSearch_Visits-DigiDataEntry" sheet. There was a separate sheet for incidental detections of WISA or other

species. This file was quality checked for formatting and for data entry errors, and submitted to SPI at the end of the field season along with WISA data from other projects.

Habitat Plots

Habitat plot data collection methods were described in Gyug (2018). Habitat plots were only set out in recently harvested cutblocks in this project. Site Plans were obtained from licensees, but in this case only after the June field season as WISA field surveys began immediately once the contract was in place. No habitat plots were conducted in the Tolko harvested sites because the Site Plans indicated the BMPs had not been applied to any of them, and based on our June WISA field surveys, it was clear none of them met the tree density targets of the BMPs. Habitat plots were randomly placed using GIS in the remainder of the cutblocks. Circular tree, snag and stump tally plots were placed in the field at each of the pre-planned random points.

Habitat plot field methods and field data forms are given in Appendix 6. Plots were nested so that smaller trees were counted in smaller radii plots around the same plot centre. Trees, snags and stumps were tallied by the following dbh classes: 17.5-22.4 cm, 22.5-37.4 cm, 37.5-52.4 cm, 52.5-57.4 cm, >57.4 cm. The actual radii used at any given plot depended on tree density and sight lines. In harvested blocks, plots were often quite large because there were often very few trees. Distance from plot centre to trees were measured using a laser distance measurer for trees near plot boundaries. Stumps were always tallied within an 11.28 m radius plot and were classified as from old logging, or from the most recent harvest. Snags were tallied within 17.84-m radius (or larger radius) from the same plot centres, but only for snags with dbh >22.4 cm. Tree tallies in plots were used to estimate the merchantable tree density and snag density remaining after timber harvest; stump tallies were used to estimate trees taken during the most recent harvest.

CWD volume was estimated on 25-m transects in north and east directions from the plot centre using the transect-intercept method. CWD was classed based on the size of the Large End Diameter (LED) as 7.5-22.4 cm or >22.4 cm. LED was measured on downed logs where the dbh would have been measured, if that could be determined, i.e., the base of the tree could be found, or the end of the log if it was not possible to determine where dbh may have been measured, or if the log was broken. WISA Suitable Nest Trees (see Gyug 2018 and Appendix 6) were tallied in a large circular radius (at least 17.84 m but usually 30 m or more) from the same plot centre. Large thatch ant nests (usually *Formica rufa* spp.) were tallied within the same 11.28 m radius plots as stumps.

Habitat plot data from 2019 was entered into an Excel template file developed specifically for this WISA data. The summarized results of those plots were added to the WISA habitat plot master file. Additional habitat plot data collected at some sites in 2017 had

already been entered into an Excel file in a different format, but the final summarized results were entered into the WISA habitat plot master file. Brief summarized results of the 2017 habitat plots are presented in Appendix 3, but have not been used for any of the analyses in this report.

RESULTS and DISCUSSION

WISA Surveys

Level 1 (April-early May) occupancy in 2017 selected Merritt area WHAs (n = 12) was 42%. Level 2 (late-May – June) occupancy in the same WHAs in 2019 was the same (42%, Table 1). Overall Level 2 occupancy in WHAs was 48% in the Merritt area in 2019, but probable or confirmed nesting was only found in 21% of the WHAs. In the other WHAs, WISA were present, but we could not confirm nesting. This 48% Level 2 WHA occupancy was very similar to the Level 2 WHA occupancy rate of 44% in Boundary, and was higher than the 27% rate observed in the East Kootenay (Gyug 2019).

Thirteen of the 18 harvested blocks in the Merritt area had previously had at least some surveys for WISA (Tables 1 and 2, Appendix 2). WISA were found in and near only one block (V9) of the 18 in 2019. At this block, a pair of WISA had been previously found in 2006 before it was harvested, but no nest could be located. This block had been partially cut in the past (around 1970), and was being partially cut again around 2015. Despite three WISA found within and adjacent to the block in June 2019, we could not find any nest within the block. That block had a remnant tree density of 70/ha in the harvested portion of the site (Table 2).

With WISA found in only one of the 18 cutblocks in June 2019, there were too few WISA found to conduct meaningful analyses for preference of any type of harvest or retained density of reserved trees. In the single block (V7) where nesting was known prior to 2019, the known WISA nest tree, a dead Py, had been cut down during harvesting, and no WISA were present in June 2019. Residual tree density in this block was 85/ha.

Table 1. Williamson's Sapsucker occupancy summary, Merritt area of West AO, 2017 and 2019. See Appendices for detailed information on each site and Appendix 5 for the definitions of Possible, Probable and Confirmed nesting.

Type of Site	Occupancy Level 1 (April to early May 2017)			Occupancy Level 2 (late-May to June 2019)				
	Sites (N)	Occu- pied Sites (n)	Occu- pancy Rate (%)	Sites (N)	Prob. and Conf. Nesting		Poss., Prob. and Conf. Nesting	
					Sites (n)	Rate (%)	Sites (n)	Rate (%)
WHAs (Total N = 42)								
12 WHAs checked in 2017 (Level 1) and 2019 (Level 2)	12	5	42	12	3	25	5	42
30 other WHAs				30	6	20	15	50
Total 2019				42	9	21	20	48
Harvested Sites								
<i>Previously Surveyed for WISA*</i>								
<i>Prior Nests Known</i>				1	0	0	0	0
<i>WISA presence Known</i>				3	0	0	1	33
<i>Previously surveyed but no WISA detected</i>				9	0	0	0	0
<i>Not previously Surveyed</i>				<u>5</u>	<u>0</u>	0	<u>0</u>	0
Total				18	0	0	1	6

* Previous surveys were between 2006 and 2014 for other purposes, and may have included as few as one Call-playback point within or within 100 m of the cutblock. See Appendix 2.

Table 2. Harvested cutblock WISA occupancy survey results, Merritt area of WISA West AO. The 18 harvested sites were surveyed only at Level 2 (June) in 2019. See Appendix 2 for details of each cutblock.

Block	Description	Area (ha)	Tree Density (>17.4 cm dbh/ha)	Previous		2019	
				CPB* (n)	WISA detected	CPB (n)	N WISA found
A18967 Tolko							
557-1165	Clearcut with Reserves (CCRES)	7	est <20	1	0	2	0
557-1166	CCRES	77	est <20	7	Yes	17	0
557-1169	CCRES	22	est <20	12	0	5	0
557-1190	CCRES	19	est <20	0	-	7	0
560-1193	CCRES	1	est <20	1	0	1	0
560-1194	CCRES	22	est <20	6	0	5	0
574-1212	CCRES	21	est 20-50	6	0	7	0
574-1215	CCRES	26	est <20	1	0	7	0
A18695 Aspen Planers							
607-5	CCRES	18	42	5	Yes	NR	0
607-8	CCRES	12	48	0	-	3	0
607-9	CCRES	19	23	0	-	4	0
607-11	CCRES	4	44	0	-	2	0
Other							
A92814-1	Even-aged, thinning	76	74	0	-	14	0
A94244-1	Even-aged, thinning	53	177	3	0	8	0
A93019 V7	Salvage block, no SP	79	85	9	1 nest, 2012	12	0, nest tree felled during harvest
A93019 V8	Salvage block, no SP	15	99	8	0	6	0
A93019 V9	Salvage block, no SP	102	70	17	Yes (Pair in 2006, Male in 2009)	19	3 – no nests
A96144 V12	Salvage block, no SP	132	208	10	0	21	0

*Previous WISA CPB were conducted for other purposes between 2004 and 2014.

NR = CPB points not recorded, i.e. thorough search with informal CPB only. Not all CPB locations were recorded in any given site.

Table 3. Current suitability of previously known nest trees checked in 2018 and/or 2019. Table includes Boundary and East Kootenay results for comparisons among regions.

Region	Nest Tree Species ¹	Number Checked 2018/19	Number Remaining Suitable	% Remaining Suitable
Boundary	<i>Lw found 1996-1997</i>	4	1	25
	<i>Lw found 1998 or later</i>	<u>16</u>	<u>15</u>	94
	Lw Total	20	16	80
	At	5	2	40
	Py	1	0	0
East Kootenay	Lw	36	33	92
	At	7	6	86
	Fd	4	2	50
Merritt Area	<i>At found live 2004-2009</i>	13	5	38
	<i>At found dead 2004-2009</i>	7	1	14
	<i>At found live 2010-2015</i>	10	9	90
	<i>At found dead 2010-2015</i>	<u>7</u>	<u>3</u>	43
	At Total ²	42	18	43
	Py	11	6	55
	Fd	4	4	100
Totals	Lw	56	49	88
	At	52	26	50
	Py	12	6	50
	Fd	8	6	75

¹ Lw = Western Larch, At = Trembling Aspen, Fd = Douglas-fir; Py = Ponderosa Pine

² At Total is higher than sum of above because includes trees for which initial status was not recorded.

Nest tree survival

We examined 57 WISA nest trees in the Merritt area in 2019 for current status (Table 3), the majority of which were Trembling Aspen. Survival here indicates whether the known nest tree remained suitable for nesting, i.e., usually standing, and with the portion of the tree where nesting occurred, or could occur, still intact. Survival clearly varied by time since discovery, and with live/dead status when first found. Aspen nest trees that were dead 10-15 years ago, had very low current survival rate of only 14%, compared to aspen nest trees found dead 5-10 years ago where the current survival rate was 43%. Aspen nest trees that

were live 10-15 years ago, had a lower than average survival rate of 38%, compared to aspen nest trees that were live 5-10 years ago where the current survival rate was high at 90%. Based on these results, we expect that after 20 years, very few aspen nest trees will remain standing, and continuous recruitment of new aspen nest trees will be required for the same stands to retain value for WISA nesting.

Compared to Trembling Aspen with an average survival rate of 30% from 2004-2009 to 2019, Western Larch nest trees had a very high average survival rate of 94% over the same period (Table 3). Since Western Larch do not occur in the Merritt area, it is clear that long-term WISA nesting success in the Merritt area will require continual recruitment of new aspen nest trees. This is in contrast to the Okanagan, Boundary and East Kootenay, where the majority of nest trees are Western Larch (Gyug et al. 2009), and the turnover of suitable nest trees appears to be much slower (Table 3). Managing for suitable WISA nest trees in the Merritt area will require constant recruitment of Trembling Aspen into the suitable age classes for WISA nesting (generally aspen that are 60-120 years old), while managing for suitable WISA Western Larch nest trees elsewhere will require retention and protection of existing nest trees, and recruitment on a longer time scale because Western Larch generally become suitable WISA nest trees when they get older than 300 years.

WISA tend to use Ponderosa Pine and Douglas-fir for nesting when the trees are already dead (Gyug et al. 2009). Survival of Ponderosa Pine nest trees was fairly low, i.e., only 50%, and similar to Trembling Aspen (Table 3). Most of the Ponderosa Pine trees used for nesting had been killed by pine beetles during the epidemic of 2005-2010. Their survival as nest trees appears to be relatively limited in time to a few decades at best. Survival of the very large veteran Douglas-firs that WISA tend to use for nesting appear to survive longer (75% remaining) than the Ponderosa Pines (50% remaining), although sample size was fairly small for both species.

BMP Assessment

The following table excerpted from the West BMPs (BC FLNRORD 2014) summarizes the BMP live tree density expectations on timber harvest blocks in the West AO.

Table 1. Live tree retention targets (> 17.5 cm dbh) and the percent area of new blocks (blocks established after April 1, 2014) to be retained in the target classes for each licensee within moderate and low suitability habitat.	
Average live tree retention target (trees/ha)	% area of new blocks for each licensee
85–125	5–15
126–175	25–35
176–225	40–50
> 225	10–20
Neither OGMAs nor WHAs for any species are to be included in the live tree retention target averaging.	

The WISA BMPs had not been applied to any of the 18 cutblocks examined for this project. Four of the 18 cutblocks had no Site Plans because they were exempt from Site Plan preparation because they were supposed to be dead-only salvage blocks. The WISA BMPs had not been applied to any of the 14 cutblocks for which there were Site Plans. Residual tree densities in the harvested areas for the 12 licensee Clearcut with Reserves blocks were all <50 trees/ha, and no WISA were found in any of them in June 2019 (Tables 1 and 2). Tree densities in the other cutblocks that were Even-aged Thinning were 74 and 177 trees/ha, and in the four salvage blocks were 70 to 208 trees/ha. These last six salvage blocks either met or at least approached the desired live tree retention targets, but none of the cutblocks by major licensees did to.

The three cutblocks that were adjacent to WISA WHAs acknowledged the presence of those WHAs (see Appendix 2). However, none of the Site Plans acknowledged that WISA may occur within the blocks in the sections that discussed wildlife or species at risk. In the Tolko Site Plans, up to 11 other species at risk were mentioned based on review of “Cascadia’s Species at Risk database”, but WISA did not seem to be in that database. It is not clear why any database of species at risk would not list WISA as occurring in these areas. It is clear that this database used by licensees to assess species at risk occurrence will need to be checked and corrected. The licensees also appeared to make no use of the existing FLNRORD database of WISA observations or surveys, or the WISA habitat suitability models, which have been completed for each WISA AO since 2010.

During the assessment, two blocks (Aspen Planers FL A18695 CP 604-4 and 604-5) with planned harvest dates of 2018 were found that overlapped WHA 3-219, which was established in October 2015. These do not appear to have been harvested yet, so were not included in the assessment sample. However, it is not clear how or why they were approved within a WHA, or if they had been approved prior to the establishment of the WHA. This should be answered before these are harvested.

This assessment indicates that the WISA BMPs have yet to be applied in this study area so their effectiveness cannot yet be evaluated. In the sense that the BMPs are not yet been included or addressed in Site Plans, the BMPs can be said to be completely ineffective so far. One major licensee indicated they have applied the BMPs to some cutblocks, but these were in not within this particular study area, so were not part of this assessment. Those cutblocks will need to be assessed in the future as the scope of this assessment expands to other areas. However, as it stands, WISA breeding habitat continues to be lost, and there is no indication in the current assessment that the recovery goals for maintaining suitable are being met, or even adequately addressed on crown forest lands in this study area.

RECOMMENDATIONS

1. Continue WHA effectiveness monitoring over the next 2-3 years (2020-2022) by:
 - a. In the WISA West AO by sampling the MOE Region 8 portion of WHAs (n = 16) in 2020,
 - b. Start monitoring Okanagan WHAs (n = 57),
 - c. Continue monitoring the remaining WHAs in the Boundary that were not already checked in 2018/2019 (n = 20 of 38 yet to check).
 - d. Include assessment of current status of nest trees while checking for WISA occupancy at Levels 1 and 2 in the above WHAs, and incorporate into a survival model of nest trees by species.
2. Continue to select potential sample cutblocks from those approved after the publication of the WISA BMPs in the remainder of the West AO, i.e., the MOE Region 8 portion, as well as the MOE Region 8 Okanagan AO to assess for application of the BMPs.
3. Examine the Site Plans of these blocks to determine if the WISA BMPs were considered, and, if so, whether the harvesting and/or leave tree prescriptions met the BMPs for tree densities, and whether these targets were met on site through a rigorous and reliable sampling plan and tree tally plots.
4. Determine how or why FL A18695 CP 604-4 and 604-5 appear to overlap with WHA 3-219 before these are harvested.
5. Since the BMPs were not being incorporated into Site Plans yet, and existing WISA information was not being incorporated, clearly some communication to licensees and others responsible for preparing Site Plans in the Merritt area is required. Ecosystems Section FLNRORD needs to make bring to the attention of licensees and other preparing Site Plans:
 - a. the conservation status of Williamson's Sapsucker,
 - b. the status, goals and objectives of the Recovery Plans – both federal (Environment and Climate Change Canada 2016) and provincial (BC MOE 2012), and
 - c. the existing WISA observation and survey databases and the WISA habitat suitability mapping.

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APPENDICES

Appendix 1. WHA WISA occupancy survey results, Merritt area of WISA West AO. 13 WHAs were surveyed at Level 1 in 2017 and re-surveyed at Level 2 in 2019. .

Sort No.	WHA Name	WHA Area (ha)	N WISA nests known in WHA prior to 2017	N CPB done Level 1 2017	N WISA found during Level 1 2017	N WISA found during Level 2-2019
1	3-090	43	1	14	0	0
2	3-092	34	2	12	0	0
3	3-131	38	3	4	3	2 pairs + Male at nest hole
4	3-132	49	3	2	2	0
5	3-133	59	3	5	2	0
6	3-134	49	1	1	1	Female
7	3-135	50	1	2	1	0
8	3-168	50	1	14	0	0
9	3-204	49	1	4	0	Male
10	3-205	33	1	3	0	Pair
11	3-213	49	1	12	0	0
12	3-219	46	1	2	0	NY
13	3-220	49	1	13	0	0
14	3-091	41	1			NY
15	3-093	39	2			0
16	3-094	32	1			0
17	3-095	22	1			0
18	3-096	23	3			0
19	3-127	23	1			0
20	3-129	26	2			Male
21	3-130	15	3			0
22	3-137	20	1			Male
23	3-139	49	1			Female
24	3-142	48	1			Nest - Female CF
25	3-143	32	1			0
26	3-167	42	1			0
27	3-169	52	1			0
28	3-170	52	1			0
29	3-202	49	1			Male
30	3-203	35	1			NY outside WHA
31	3-206	25	1			Pair + Male
32	3-207	50	1			0
33	3-208	40	3			NY
34	3-209	32	2			NY
35	3-210	26	3			2 Males
36	3-211	47	1			1 Unk Sex
37	3-212	41	1			0
38	3-214	46	2			Male
39	3-215	43	1			0
40	3-216	46	1			0
41	3-217	41	1			Male-same as 3-218
42	3-218	44	1			Male-same as 3-217

Appendix 2. Cutblock specifics and results of WISA habitat plots, Merritt area of WISA West AO.

Block	Type of Cut	Area (ha)	Site Plan Submitted Date* ("YYYY-MM)	WISA Mentioned	Leave Tree Specs
A18967 Tolko					
557-1165	Clearcut with Reserves (CCRES)	7	2015-12	No. This SP references 11 Red/Blue-listed species from "Cascadia's Species at Risk Database" for this BEC zone but does not include WISA. This same erroneous database was consulted for every one of these Tolko blocks.	Reserve: 95% Fd ≥85 cm dbh (goal 7-70 total); 95% At, Ac, Ep (goal 0-40 total)
557-1166	CCRES	77	2015-12	Yes-Adjacent to WISA WHA	Reserve: 95% Fd ≥80 cm dbh (goal 0-46 total); 95% At, Ac, Ep (goal 0-230 total); 95% Py >64 cm dbh (goal 0-230 total)
557-1169	CCRES	22	2016-02	No	Reserve: 95% Fd ≥80 cm dbh (1-9/ha or goal 22-198 total); 95% At, Ac, Ep (goal 0-110); 95% Py ≥65 cm dbh (0-5/ha or goal 0-110 total); Reserve healthy Sx/Bl/Fd clumps of 5 or more where feasible along NCDs or moist areas or elsewhere (goal 10-150 total).
557-1190	CCRES	19	2016-02	Yes-adjacent to WISA "habitat" [actually a WHA] southeast of the block	Reserve: 95% Fd ≥80 cm dbh (0-1/ha or goal 0-19 total); 95% At, Ac, Ep (goal 0-5); 95% Py ≥65 cm dbh (0-5/ha or goal 0-95 total); Reserve healthy Sx/Bl/Fd clumps of 5 or more where feasible (goal 10-150 total).
560-1193	CCRES	1	2016-02	No	Reserve: 95% Fd ≥70 cm dbh (0-1/ha, goal 0-1 total); 95% At, Ac, Ep (goal 0-5 total); 95% Py ≥65 cm dbh (goal 0-1 total)
560-1194	CCRES	22	2016-02	No	Reserve: 95% Fd ≥70 cm dbh (0-1/ha, goal 0-19 total); 95% At, Ac, Ep (goal 0-95 total); 95% Py (goal 0-19 total)
574-1212	CCRES	21	2017-06	No	Reserve: 95% Fd ≥75 cm dbh (goal 0-93 total); 95% At, Ac (goal 0-186 total); 95% Py (goal 0-56 total)
574-1215	CCRES	26	2017-06	No	Reserve: 95% Fd ≥75 cm dbh (goal 0-110 total); 95% At, Ac (goal 0-220 total); 95% Py (goal 0-66 total)
A18695 Aspen Planers					
607-5	CCRES	18	2018-02	Yes-Adjacent to WISA WHA	Reserve: 95% Fd >72.5 cm dbh (goal 0-2/ha); 95% At, Ac, Py; 95% of Fd 17.5-22.4cm dbh (goal 10-40/ha); 95% of Fd and Sx <17.5 cm (goal 50-500/ha)
607-8	CCRES	8	2018-02	No; However, most of WISA Critical Habitat in the block ended up in WTP placed around a Cooper's Hawk nest.	Reserve: 95% Fd >67.5 cm dbh (goal 0-2/ha); 95% At, Ac, Py; 95% Fd 17.5-22.4cm dbh (goal 10-50/ha); 95% Fd and Sx <17.5 cm (goal 50-250/ha)

Block	Type of Cut	Area (ha)	Site Plan Submitted Date* ("YYYY-MM)	WISA Mentioned	Leave Tree Specs
607-9	CCRES	19	2018-02	No	Reserve: 95% Fd >67.5 cm dbh (goal 0-2/ha); 95% At, Ac, Py; 95% Fd 17.5-22.4cm dbh (goal 10-50/ha); 30% Fd and Sx <17.5 cm (goal 50-400/ha)
607-11	CCRES	4	2018-02	No	Reserve: 95% Fd >67.5 cm dbh (goal 0-2/ha); 95% At, Ac, Py; 95% Fd 17.5-22.4cm dbh (no goal stated as none picked up on cruise); Fd and Sx <17.5 cm (goal 50-400/ha); 50% Fd 22.5-27.4 cm dbh (goal 10-30/ha)
Other					
A92814-1	Even-aged, thinning Small-scale salvage program.	76	Original 2014-09, Amended 2015-02	No	Block purpose was community wildfire protection, i.e., reduce wildfire hazard. Goal was to leave ±7 m intertree spacing, intended to be ~300/ha (trees >12.5 cm dbh), and crown closure of 40-50%. Overall goal was 250/ha Layer 1 stems >17.5 cm dbh. Reserve: random patches of trees <17.5 cm dbh, vets >50 cm dbh, 80% Py (goal 40/ha), all deciduous, all wildlife trees; 40% Fd 17.5-50 cm dbh (goal 250/ha).
A94244-1	Even-aged, thinning Small-scale salvage program.	53	2016-05	No	Block purpose was community wildfire protection, i.e., reduce wildfire hazard, and maintain water quality and quantity in community watershed. Goal was to leave ±9 m intertree spacing, intended to be ~285/ha (trees >12.5 cm dbh), and crown closure of 45-50%, 40% removal of Layer 1 stems, Basal Area reduced from 20 to 10 m ² /ha. Overall goal was 110/ha Layer 1 stems >17.5 cm dbh. Reserve: random patches of trees <17.5 cm dbh, vets >50 cm dbh, 80% Py (goal 15/ha), all deciduous, all wildlife trees; 25% Fd 17.5-50 cm dbh (goal 95/ha).
A93019 V7*	Dead Salvage block	79	2014-12	NA; WISA Nest tree known from 2012 was cut down during harvest	No Site Plan
A93019 V8*	Dead Salvage block	15	2014-12	NA	No Site Plan
A93019 V9*	Dead Salvage block	102	2014-12	NA	No Site Plan
A96144 V12*	Dead Salvage block	132	2018-03	NA	No Site Plan

*For cutblocks with no Site Plans, approval date is given.

Block	Type of Cut	Area (ha)	N Plots	Densities (/ha)						Volume (m³/ha)			
				Tree >17.4 cm dbh	Tree >22.4 cm dbh	Tree >52.4 cm dbh	Snag >22.4 cm dbh	Recent Stump >17.4 cm dsh*	Suitable WISA nest trees	Large Thatch Ant Nests	SWD*	LWD*	CWD*
A18967 Tolko													
557-1165	CCRES	7	0	est <20									
557-1166	CCRES	77	0	est <20									
557-1169	CCRES	22	0	est <20									
557-1190	CCRES	19	0	est <20									
560-1193	CCRES	1	0	est <20									
560-1194	CCRES	22	0	est <20									
574-1212	CCRES	21	0	est 20-50									
574-1215	CCRES	26	0	est <20									
A18695 Aspen Planers													
607-5	CCRES N of Jesse Cr	3.7	5	20	4	2.0	9.9	302	0	0	20	28	48
	CCRES S of Jesse Cr	11.4	3	80	26	8.8	0.0	92	0	0	35	183	218
	WTP	2.7	3	393	217	13.3	3.3	0	0	0	24	68	92
607-8	CCRES	8.0	6	48	23	0.0	2.5	133	0	0	14	31	45
	WTP (Critical Habitat)	4.4	4	224	208	20.0	0.0	0	0	0	9	33	42
607-9	CCRES	16.8	4	10	7	1.1	2.5	272	0	0			
	CCRES Critical Habitat	2.0	2	50	38	12.5	0.0	75	0	0			
	WTP (moist area)	0.4	1	80	55	0.0	20.0	0	0	0	14	96	110
607-11	CCRES	4.4	6	44	27	4.2	0.0	175	0	0	23	22	44
Other													
A92814-1	Even-aged, thinning	72.1	11	74	48	5.2	0.9	186	0	4.6	8	2	9
	WTP (gully)	3.5	1	525	350	0.0	20.0	0	0	0	11	0	11
A94244-1	Even-aged, thinning	45.0	13	177	77	5.1	1.0	42	0	3.8	14	21	35
	WTP	7.7	3	309	176	3.3	8.3	0	0	0	18	35	52
A93019 V7	Dead Salvage block	78.8	15	85	56	3.0	2.0	47	0.67	13.3	15	25	40
A93019 V8	Dead Salvage block	14.8	5	99	68	1.0	1.0	100	0	5.0	17	14	32
A93019 V9	Dead Salvage block	102.1	12	70	54	9.6	5.0	63	0.42	0	13	17	30
A96144 V12	Dead Salvage block	131.9	19	208	111	12.4	5.3	64	0.26	0	18	42	60

*dsh = diameter at stump height; CWD = Coarse Woody Debris and is equal to LWD + SWD. LWD = Large Woody Debris with Large End Diameter (LED) >22.4 cm; SWD = Small Woody Debris with LED 7.5-22.4 cm;

Appendix 3. 2017 WISA Habitat Plot results, including WISA presence where available.

WHA or Site Name*	N Plots	Tree >17.4 cm dbh	Tree >22.4 cm dbh	Tree >52.4 cm dbh	Snag >22.4 cm dbh	Stump >22.4 cm dsh	WISA Presence 2017	WISA Presence 2019
3-092	9	122	94	5.6	13.3	34	0	0
3-093	16	106	88	15.6	13.1	42	na	0
3-094	16	55	33	3.1	3.8	15	na	0
3-131	22	174	133	5.0	20.5	114	1	1
3-135	9	100	72	16.7	11.1	43	1	0
3-142	9	142	109	25.6	13.3	17	na	1
3-203	4	121	59	2.5	12.5	160	na	1
3-216	9	112	78	14.4	7.8	13	na	0
3-217	9	224	141	15.6	11.1	15	na	1
3-218	9	132	99	15.6	15.6	55	na	1
3-219	9	123	90	6.7	16.7	60	0	1
3-220	9	171	104	6.7	6.7	47	0	0
8-097	17	196	128	5.9	7.6	89	1	na
8-098	10	143	103	18.0	11.0	44	1	na
8-394	8	118	81	8.8	15.0	30	na	na
8-396	5	90	80	0.0	6.0	27	na	na
8-397	8	294	219	10.0	3.8	56	na	na
8-399	6	121	104	8.3	8.3	123	na	na
8-400	8	73	42	1.3	13.8	4	na	na
8-404	9	134	106	8.9	12.2	106	0	na
A93019 V7	9	103	64	0.0	4.4	63	na	0
557-1169-before cut	10	258	183	40.0	6.0	30	na	-
560-1194-before cut	6	283	191	11.7	18.3	52	na	-
574-1215-before cut	5	416	276	16.0	18.0	30	na	-
Jesse1 (mix forest-grassland)	9	156	112	25.6	10.0	8	na	
Jesse2-Forest near 3-091	9	209	126	3.3	11.1	62	na	na
Forest near 557-1169	9	230	191	18.9	10.0	13	na	na
Allenby-old cut	6	168	118	10.0	30.0	102	na	na
Forest near Tolko 146-2	6	148	98	1.7	13.3	84	na	0

*Only sites with >3 plots included in this table.

Appendix 4. WISA Nest Tree status for trees checked in 2019 and/or 2018. 9 for Wildlife Tree Code means tree has fallen.

Nest Tree GPS Mark	WHA	Year nesting first observed	Tree Sp.	Wildlife Tree Code (1-9) Status in Year first observed	Current Wildlife Tree Code Status	Tree Still suitable for Nesting?	Comments
Boundary (26 of 121 known nests were checked)							
WN011	8-382	1996	Lw	2	7	0	
WN016	8-387	1997	Lw	2	9	0	
WN019	8-389	1997	Lw	2	9	0	Cut down long ago for firewood
WN047	8-389	2003	Lw	2	4	1	Counted 78 cavity nest holes in tree
WN212	8-383	2004	Lw	6	6	1	
WN213	8-383	2004	At	6	7	1	
WN223	8-208	2004	Lw	2	2	1	
WN311	8-213	2005	Lw	2	2	1	
WN317	8-210	2005	Lw	2	2	1	
WNB010	8-312	2006	At	2	9	0	
WNB014		2006	Lw	2	2	1	
WNB015		2006	Lw	2	2	1	
WNB016		2007	Lw	2	2	1	
WNB017		2007	Lw	2	2	1	
WNB021	8-383	2007	At	3	7	0	
WNB023	8-312	2007	At	6	9	0	
WNB033		2008	Lw	2	2	1	
WNB035	8-366	2008	Lw	2	2	1	
WNB038	8-379	2008	Lw	2	2	1	
WNB041		2012	Lw	2	2	1	
WNB042		2012	Lw	2	2	1	
WNB048		2012	Py	3	9	0	
WNB058	8-202	2012	At	2	2	1	
WNB059	8-389	2012	Lw	2	9	0	
WNB061		2012	Lw	2	2	1	
WNB065		2012	Lw	2	2	1	
East Kootenay (all known nests listed here, n = 61)							
WNE501	4-108	2004	Lw	5	6	1	
WNE502	4-108	2005	Lw	2	2	1	
WNE001	4-141	2006	Lw	2	2	1	
WNE002	4-144	2006	Lw	2	2	1	
WNE003	4-142	2006	Lw	2	2	1	
WNE004	4-143	2006	Lw	2	2	1	
WNE005		2006	Lw	2	2	1	
WNE006	(4-110)	2006	Lw	3			Nest in U.S. – not checked
WNE007	4-127	2006	Lw	2	2	1	
WNE008		2006	Py	3			Not checked in 2018/19
WNE009		2007	Lw	2			Not checked in 2018/19
WNE010	4-138	2007	Fd	3	4	1	
WNE011	4-129	2007	Fd	2	7	0	
WNE012	4-136	2007	Fd	2	2	1	
WNE013	4-137	2007	Lw	2	2	1	
WNE014	4-128	2007	Lw	2	2	1	

Nest Tree GPS Mark	WHA	Year nesting first observed	Tree Sp.	Wildlife Tree Code (1-9) Status in Year first observed	Current Wildlife Tree Code Status	Tree Still suitable for Nesting?	Comments
WNE015	4-143	2007	Lw	2			Not checked in 2018/19
WNE016	4-139	2008	Lw	2	4	1	
WNE017	4-188	2008	Lw	3	3	1	
WNE018	4-187	2008	Lw	2	2	1	
WNE019	4-190	2008	Lw	3	3	0	Cut stub- nest hole filled with grass
WNE020	4-183	2008	Lw	2			Not checked in 2018/19
WNE021	4-183	2008	Lw	2			Not checked in 2018/19
WNE022	4-202	2008	Lw	2	2	1	
WNE023	4-193	2008	Fd	5	7	0	
WNE024	4-191	2008	At	2	2?	1?	Could not determine which At the tree was; -presumed Okay
WNE025	4-190	2008	Lw	2	2	1	
WNE026		2008	Lw	2	2	1	
WNE027	4-128	2008	Lw	2	2	1	
WNE028	4-137	2008	Lw	2	8	0	
WNE029	4-127	2008	Lw	2	2	1	
WNE030	4-196	2008	Lw	2	2	1	
WNE031	4-201	2009	Lw	2	2	1	
WNE032	4-186	2009	Lw	2	2	1	
WNE033	4-200	2009	At	2	2	1	
WNE034	4-198	2009	At	3	2	1	
WNE035	4-189	2009	At	2	2	1	
WNE036	4-195	2009	At	2	6	0	
WNE037	4-194	2009	At	2	2	1	
WNE038		2009	At	2			On private land, not checked
WNE039	4-192	2009	At	2	5	1	NOFL in tree
WNE040	4-182	2009	Lw	2	2	1	
WNE041	4-184	2009	Lw	3	3	1	
WNE042	4-185	2009	Lw	2	2	1	
WNE043		2009	Lw	2		?	Not checked in 2018/19
WNE044	4-193	2011	Lw	2	7	0	
WNE045	4-181	2011	Lw	2	2	1	
WNE046	4-197	2011	Lw	2	2	1	
WNE047	4-199	2011	At	2	?	?	No notes made on tree status
WNE048		2012	At	2	2	1	
WNE049	4-139	2012	Lw	2	2	1	
WNE050		2012	Lw	2	2	1	
WNE051		2012	Lw	2	2	1	
WNE052		2013	Lw	2	2	1	
WNE053		2013	Lw	2	2	1	
WNE054		2018	Lw	2	2	1	
WNE055		2015	Lw	2	2	1	Location corrected in 2019.
WNE056	4-200	2019	At	2		1	New nest 2019
WNE057		2019	Lw	2		1	New nest 2019
WNE058	4-202	2019	Py	2		1	New nest 2019
WNE059	4-196	2019	Lw	2		1	New nest 2019
WNE060		2019	Py	5		1	New nest 2019

Nest Tree GPS Mark	WHA	Year nesting first observed	Tree Sp.	Wildlife Tree Code (1-9) Status in Year first observed	Current Wildlife Tree Code Status	Tree Still suitable for Nesting?	Comments
Merritt area WHA Nests (n = 59 nest trees in 42 WHAs)							
WN204	3-094	2004	At	3	3	1	
WN304	3-095	2005	At	3	7	0	
WNA002	3-096	1994	Ac[?]		?	?	Nest tree location not exact
WNA004	3-096	1996	At		?	?	"
WNA005	3-096	2003	At		?	?	"
WNL001	3-127	2007	At		9	0	
WNM003	3-090	2006	At	4	9	0	
WNM004	3-092	2006	At	2	9	0	
WNM005	3-093	2006	At	3	9	0	
WNM007	3-091	2006	At	2	7		
WNM014	3-130	2006	At	2	9	0	
WNM016	3-168	2007	At	2	9	0	
WNM020	3-093	2007	At	2	2	1	
WNM023	3-129	2007	At	6	9	0	
WNM028	3-143	2007	At	2	2	1	
WNM029	3-133	2008	At	3	9	0	
WNM030	3-131	2008	Py	3	9	0	
WNM031	3-135	2008	At	2	8	0	
WNM032	3-137	2008	At	2	8	0	
WNM035	3-130	2008	At	2	9	0	
WNM040	3-129	2008	At	2	2	1	
WNM043	3-142	2008	At	2	2	1	
WNM044	3-134	2008	At	2	2	1	
WNM045	3-139	2008	Fd	2	2	1	
WNM046	3-133	2008	Py	2	9	0	
WNM047	3-132	2008	At	2	9	0	
WNM049	3-130	2009	At	4	9	0	
WNM050	3-167	2009	At	2	9	0	
WNM054	3-169	2010	At	6	6	1	
WNM057	3-170	2011	At	2	2	1	
WNM058	3-209	2012	Py	5	9	0	
WNM059	3-210	2012	Fd	2	2	1	
WNM060	3-208	2012	At	4	4	1	
WNM062	3-211	2012	Py	4	9	0	
WNM063	3-213	2012	At	2	2	1	
WNM064	3-214	2012	At	4	6	1	
WNM065	3-215	2012	At	2	2	1	
WNM066	3-216	2012	At	2	2	1	
WNM075	3-202	2012	At	2	2	1	
WNM078	3-203	2012	At	3	9	0	
WNM079	3-206	2012	At	2	2	1	
WNM080	3-205	2012	Py	3	8	0	
WNM081	3-204	2012	Py	3	3	1	
WNM082	3-207	2012	Fd	3	3	1	
WNM083	3-220	2012	At	2	3	1	
WNM084	3-219	2012	At	3	7	0	
WNM085a	3-217	2012	At	4	9	0	

Nest Tree GPS Mark	WHA	Year nesting first observed	Tree Sp.	Wildlife Tree Code (1-9) Status in Year first observed	Current Wildlife Tree Code Status	Tree Still suitable for Nesting?	Comments
WNM086	3-210	2012	Py	3	3	1	
WNM087	3-209	2012	Py	2	2	1	
WNM088	3-208	2012	Fd	3	3	1	
WNM089	3-132	2012	At	2	2	1	
WNM090	3-212	2012	At	3	9?	0	
WNM092	3-218	2012	At	2	7	0	
WNM096	3-132	2015	At	?	9?	0	
WNM097	3-092	2015	At	?	9	0	
WNM098	3-131	2015	Py	?	4	1	
WNM099	3-131	2015	Py	?	5	1	
WNM100	3-210	2015	Py	?	5	1	
WNM101	3-214	2015	At	?	2	1	

Appendix 5. Breeding Bird Atlas codes used for WISA breeding evidence. .

OBSERVED	
X	Species observed in its breeding season (no breeding evidence)

POSSIBLE	
H	Species observed in its breeding season in suitable nesting habitat
S	Singing male(s) present, or breeding calls heard, in suitable nesting habitat in breeding season

PROBABLE	
M	Multiple singing males (7 or more) found during one visit within the same square, during the breeding period in suitable nesting habitat. Most species listed as (M) can be upgraded during other visits. Use with caution to avoid counting migrants.
P	Pair observed in suitable nesting habitat in nesting season
T	Permanent territory presumed through registration of territorial song, or the occurrence of an adult bird, at the same place, in breeding habitat, on at least two days a week or more apart, during its breeding season. Use discretion when using this code. "T" is not to be used for colonial birds, or species that might forage or loaf a long distance from their nesting site e.g. Kingfisher, Turkey Vulture, and male waterfowl
D	Courtship or display, including interaction between a male and a female or two males, including courtship feeding or copulation
V	Visiting probable nest site
A	Agitated behaviour or anxiety calls of an adult
B	Brood Patch on adult female or cloacal protuberance on adult male
N	Nest-building or excavation of nest hole by wrens and woodpeckers

CONFIRMED	
NB	Nest building or carrying nest materials, for all species except wrens and woodpeckers
DD	Distraction display or injury feigning
NU	Used nest or egg shells found (occupied or laid within the period of the survey)
FY	Recently fledged young (nidicolous species) or downy young (nidifugous species), including incapable of sustained flight
AE	Adult leaving, occupying or entering nest sites in circumstances indicating occupied nest (eg. sitting on nest)
FS	Adult carrying fecal sac
CF	Adult carrying food for young
NE	Nest containing eggs
NY	Nest with young seen or heard

WISA Habitat Data 2019

Reference Pg. 1

Desktop: Find the CP-Block number. Make the harvested area and reserves different strata. WHAs can be >1 stratum if required. Confirm from satellite/orthophotos/site visit/etc. that block has been harvested. Place plots by stratum in GIS - either randomly without overlap or at intersection of 100-m grid. 100-m grid is only for fairly small areas. If >16 ha use random plots to reduce total number of plots. Check plot placement does not overlap strata boundaries, i.e., each plot at least 25 m from boundary.

Field: NEVER move a plot from the planned point unless it straddles a stratum boundary by mistake. If unsafe to do a plot, e.g. on a cliff or in a river, then drop plot. Roads, landings or tree-less sites are okay if that is how the stratum has been laid out. Record any notes about plot site history (e.g. recently harvested, old high-grading, mature forest, road in plot).

Plot sheets are designed to be printed on 8.5x11" paper, fold on centerline to use on a half-size clipboard (which fits in a vest pocket), or in a 6-ring notebook binder.

Minimum plot radii in typical IDF forest:

9.77 m for 17.5-22.4 cm DBH trees;

11.28 m for 22.5 – 52.4 DBH trees/stumps,

17.84 m for ≥52.5 DBH trees/stumps and for all snags ≥22.5 DBH.

Use larger radii where trees are scarce, e.g. Seed tree cuts, or smaller radii in dense young PI stands or SxBI stands.

Record stumps in 11.28 m radius, and record as recent or old.

DBH 5-cm classes are mid points. E.g., 25 = 22.5-27.4 cm DBH.

Use either straight line route between points as **SNT** transects (e.g., 40-m x 100 m), or very large radius at the plot centre. These are optional as low densities are expected. But if you are going to do them, do them at ALL plots.

Potential Plot Sizes

Circular Plot Radius (m)	50-m Trans. Total Width (m)	Width Each Side (m)	Plot Area (ha)	Plot Factor Tally x Factor = Density (/ha)
5.64	2	1	0.01	100
7.98	4	2	0.02	50
9.77	6	3	0.03	33.33
11.28	8	4	0.04	25
12.62	10	5	0.05	20
17.84	20	10	0.1	10
25.23	40	20	0.2	5
28.21	50	25	0.25	4
32.57	66.67	33.33	0.33	3
35.68	80	40	0.4	2.5
39.89	100	50	0.5	2
56.42	200	100	1.0	1

WISA Habitat Data 2019

Reference Pg. 2

Suitable WISA Nest Tree (SNT) plots usually overlap the Other Tree plots, therefore a SNT would be recorded in both plot types if it falls in both plots.

Radius used will depend on visibility. At a minimum use 17.84 m radius, but often much larger.

Suitable WISA nest trees (SNTs) will almost always have both old and new nest cavities of the size made and used by sapsuckers (3-5 cm diameter), as trees are used for many years.

Do NOT count trees with:

- only old nest cavities, (e.g. punky old Fd WTC 8)
- only small (<3-cm diameter) typical of chickadees and nuthatches,
- only with old large cavities (>5-cm diameter) typical of Northern Flickers,
- only with large and oblong cavity entrances typical of Pileated Woodpeckers,
- only with one recent hole in a relatively hard tree (e.g. relatively small sized lodgepole pine) as these will normally be from Black-backed or American Three-toed Woodpeckers.

Nest cavities will sometimes be high up on the tree, and not visible from the ground on very tall large trees or snags, so check carefully

For Lw, **SNT** will most often be large to very large live Lw with obvious defects (broken top, dead top) or large dead Lw with that had obvious heart rot (from when it was still alive). **Do not** count fire-killed Lw that have remained solid.

Large aspen and birch are the next most used **SNTs**. Only count if there are multiple cavities of the correct size, with some new and some old.

Other large conifers are rarely used, so be cautious before including these. Make sure the cavities are of the right size, and there are some new cavities and some old. Be sure to distinguish nest cavities (round entrances) from large woodpecker feeding holes. Tree decay class 8 snags of any species (very decayed and soft, usually <6-m tall), are not suitable nest trees.

CWD transects only measure the diameter (to the nearest cm) of the piece/log at the intercept with the transect line. Tree calipers work best for CWD intercept-diameters. No need to measure anything else.

Split CWD into LWD (LED ≥22.5 cm) and SWD (LED 7.5-22.4 cm) to allow comparisons with past data. The LED is what distinguishes LWD from SWD.

LED need not be recorded, just visually estimate the LED to decide which class (LWD, SWD) it is in, or measure it if in doubt. LED is measured on a whole log where the dbh would have been measured, or at the largest end.

Where the CWD is a branch or root piece, this is considered SWD, do not use the LED of the tree bole.

Do 25-m CWD transects on the North bearing and the East bearing from plot centre (for a total of 50 m per plot).

CWD Calculations:

When L = 25 m; $m^3/ha = 0.049348 \times \text{Sum } (d_1^2, d_2^2, d_3^2, \dots)$

When L = 50 m $m^3/ha = 0.024674 \times \text{Sum } (d_1^2, d_2^2, d_3^2, \dots)$

1

WISA Habitat Plot Data SINGLE PLOT PER SHEET Obs: _____

Date: _____ WHA or CP _____ Plot No. _____

Time: _____ Comments: _____

Sp	WTC	17.5-22.4	22.5-37.4	37.5-52.4	52.5-57.4	>57.4
Live Plot Radius (m):						
Dead Plot Rad.(m):						
Stump Plot Rad.(m):						
	9COld					
	9CRec					

CWD Intercept Transects (only Decay 1-4)

Tran/ Length	Record Intercept Diameters (d) (to closest cm) e.g. 20,35,8,15,11. . .
N-SWD/25	
N-LWD/25	
E-SWD/25	
E-LWD/25	

WISA Suitable Nest Trees Can use large radius plot, or transect.

Plot Area (LxW) or Radius	Sp	WTC	DBH 5-cm Class	Number/Type/Size of Cavities and Comments

WTC = Live (1/2) or Dead (WTC 3-8) or Cut Stumps (9C; R for Recent, O for Old) or Natural Stumps still in ground (9N). For stumps use DSH (Diam at Stump Ht).
Species = Py, Pl, Sx, Bl, Fd, At, Ac, Lw See LMH25 for other codes

2

WISA Habitat Plot Data SINGLE PLOT PER SHEET Obs: _____

Date: _____ WHA or CP _____ Plot No. _____

Time: _____ Comments: _____

Sp	WTC	17.5-22.4	22.5-37.4	37.5-52.4	52.5-57.4	>57.4
Live Plot Radius (m):						
Dead Plot Rad.(m):						
Stump Plot Rad.(m):						
	9COld					
	9CRec					

CWD Intercept Transects (only Decay 1-4 – not if in duff layer at intercept)

Tran/ Length	Record Intercept Diameters (d) (to closest cm) e.g. 20,35,8,15,11. . .
N-SWD/25	
N-LWD/25	
E-SWD/25	
E-LWD/25	

WISA Suitable Nest Trees Can use large radius plot, or transect.

Plot Area (LxW) or Radius	Sp	WTC	DBH 5-cm Class	Number/Type/Size of Cavities and Comments

CWD Trans = **N**(orth) or **E**(ast), Length should be 25 m for each transect
CWD = **SWD** (Small CWD LED <22.5 cm) OR **LWD** (Large CWD LED ≥22.5 cm)
LED (Large End Diameter) measured where DBH would be measured, or large end

3

WISA Habitat Plot Data SINGLE PLOT PER SHEET Obs: _____

Date: _____ WHA or CP _____ Plot No. _____

Time: _____ Comments: _____

Sp	WTC	17.5-22.4	22.5-37.4	37.5-52.4	52.5-57.4	>57.4
Live Plot Radius (m):						
Dead Plot Rad.(m):						
Stump Plot Rad.(m):						
	9COld					
	9CRec					

CWD Intercept Transects (only Decay 1-4)

Tran/ Length	Record Intercept Diameters (d) (to closest cm) e.g. 20,35,8,15,11. . .
N-SWD/25	
N-LWD/25	
E-SWD/25	
E-LWD/25	

WISA Suitable Nest Trees (SNT) -must have WISA-sized nest holes.

Plot Area (LxW) or Radius	Sp	WTC	DBH 5-cm Class	Number/Type/Size of Cavities and Comments

Addt'l Comments:

4

WISA Habitat Plot Data SINGLE PLOT PER SHEET Obs: _____

Date: _____ WHA or CP _____ Plot No. _____

Time: _____ Comments: _____

Sp	WTC	17.5-22.4	22.5-37.4	37.5-52.4	52.5-57.4	>57.4
Live Plot Radius (m):						
Dead Plot Rad.(m):						
Stump Plot Rad.(m):						
	9COld					
	9CRec					

CWD Intercept Transects (only Decay 1-4)

Tran/ Length	Record Intercept Diameters (d) (to closest cm) e.g. 20,35,8,15,11. . .
N-SWD/25	
N-LWD/25	
E-SWD/25	
E-LWD/25	

WISA Suitable Nest Trees Can use large radius plot, or transect.

Plot Area (LxW) or Radius	Sp	WTC	DBH 5-cm Class	Number/Type/Size of Cavities and Comments

Addt'l Comments: