BRITISH COLUMBIA

FIA Activity Standards Document

Information Gathering and Management Component, Resource Inventories Activity Area, Wildlife and Wildlife Habitat Activities, specifically Williamson's Sapsucker Inventory, Stand-level Habitat Assessment and Nest Productivity Assessment Standards

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1. BACKGROUND

1.1 ELIGIBLE ACTIVITIES

The following Forest Investment Account (FIA) Activity Standards apply to activities eligible under the Land Base Information Program, Information Gathering and Management Component, Resource Inventories Activity Area, Wildlife and Wildlife Habitat Activities, specifically the Williamson's Sapsucker Inventory, Stand-level Habitat Assessment and Nest Productivity Assessment Standards Activities.

1.2 REVISIONS TO THE RISC INVENTORY METHODS FOR WOODPECKERS

The following FIA Activity Standards are based on Williamson's Sapsucker survey work conducted between 1996 and 2005 by Les Gyug under contract to the BC Ministry of Environment. The Resources Information Standards Committee (RISC) standards for woodpecker inventory (RISC 1999) are available from the RISC Website http://ilmbwww.gov.bc.ca/risc/pubs/tebiodiv/woodpeckers/index.htm. This paper will describe only methods that differ from the RISC standards, or provide more specific methods that are required for Williamson's Sapsuckers.

- Sections 1 and 2 of the RISC standards are introductory and detail species requirements; they will remain the same.
- Section 3.0 (Protocol) of the RISC standards will still apply.
- Section 3.1 (Methods) of the RISC standards will still apply except as refined in this paper in Section 2: Inventory Techniques for Williamson's Sapsucker.
- Section 3.2 of the RISC standards will be replaced by the two survey types (Presence/Not Detected using call playback surveys, and Absolute Density using call playback surveys and nest search methods) outlined in Section 2.2: Survey Types. The data forms listed in Section 3.2 will still be required.
- Section 3.3 (Present/Not Detected) of the RISC standards will be largely replaced by Section 2.2.1: Presence/Not Detected. General office procedures will remain similar. Equipment requirements are modified—hip chain and altimeter are not required, but GPS unit and hypsometer (or tape and clinometer) are required.
- Section 3.4 (Relative Abundance) of the RISC standards will not apply.
- Section 3.5 (Absolute Abundance) of the RISC standards will be replaced by the Section 2.2.2: Absolute Density.
- Section 3.6 (Data Analysis) of the RISC standards will still apply to Presence/Not Detected surveys and to Absolute Abundance surveys.

Information contained in sections 3 and 4 of this FIA Activity Standard that refer to Stand-level Habitat Assessment and Nest Productivity Assessment are additional standards not included in the RISC standards.

2. INVENTORY STANDARDS

2.1 INVENTORY TECHNIQUES FOR WILLIAMSON'S SAPSUCKER

2.1.1 Call Playbacks (CPB)

Call playbacks are to be used as the standard method for surveying for Williamson's Sapsuckers. Additional background information is available in Appendix 1. The following standards are to be followed when conducting CPBs:

Time-of-Year

- Spontaneous calling/drumming surveys (i.e., with no call playbacks) are to be used only in the first 2 weeks after the birds arrive on the breeding range (late March or early April). Any surveys attempted after early April must use CPBs to elicit responses from otherwise fairly quiet birds.

Distance between CPB Points

- The distance between CPB points will depend on the type of survey being conducted. Where CPBs are being used for Presence/Not Detected surveys (see Section 2.2.1) to achieve effective surveys that provide good coverage without leaving large gaps in sampled area, CPB points must be spaced so that no point in a search area is more than 250 m from a CPB point. On a square grid, this requires spacing of 400 m between points. For Absolute Density surveys CPB points may be placed closer together due to the smaller area being surveyed. See Section 2.2.2 for more details.

Other Factors

- Conditions must be calm: wind must be below Beaufort 4 (20–29 km/hr), and should be below Beaufort 3 (13–19 km/hr). There must be no hard rain, although light drizzle is acceptable.

- CPBs must be conducted only when ambient temperatures are below 28ºC.

- If relative density is required, then CPBs should not be conducted in the afternoon. If only reconnaissance-level presence/not detected is required, then afternoon surveys are acceptable as long as the wind is calm and the day is not too hot. Surveys should not start until after sunrise (local time).

- To check if conditions are still suitable for CPB, play Red-naped Sapsucker and/or Hairy Woodpecker drums and calls after the Williamson's Sapsucker CPB. Usually one or both of these species are so common that they will respond very quickly to the CPB, and the drum of the Hairy Woodpecker is generic enough that virtually all woodpeckers will respond to it. If no response is received after several points even for these species, then conditions have probably deteriorated to the point where CPBs are no longer effective and the surveys should be abandoned for the rest of that day. It is usually advisable to wait out passing showers, since conditions after the showers can be excellent for CPB responses as long as any winds have abated.

Methodology

- Williamson's Sapsucker calls played at each CPB point must consist of 10 seconds of audio played in each of three directions (120º, 240º, and 360º) with 20 seconds of silence between each 10-second playback. Playbacks must be broadcast using a megaphone that is capable of broadcasting 600 m in open habitats. A CD, cassette, or MP3 player may be used to play the recording through the megaphone.

- The 10-second call segments must consist of two drums followed by several "Cheeur" calls and several scold/alarm calls.

- Surveyors must wait a minimum of 2 minutes of silent listening after the final CPB before moving on to the next point.

Data Recording

For each CPB, record the following information on the data form in Appendix 2:

- Date, time, and location (UTM, NAD 83) on consumer-grade GPS units to an accuracy of at least 10 m.

- Sky, wind, and temperature conditions.

- Distance and direction to each Williamson's Sapsucker heard or seen, so that the actual location of the bird(s) can be estimated and later plotted and entered into a GIS shapefile separate from the CPB point shapefile.

- Williamson's Sapsucker observations, including number of birds, sex of birds, whether a pair or not, the type of observation (drums, calls, visual), whether birds were interacting with each other (e.g., two males in a territorial dispute), whether the observation was clearly in response to the CPB, or was prior to any CPB, and whether it was believed that a bird was the same one detected from a previous CPB point.

- All cavity nesting birds and raptors heard or seen at CPB points. This is partly to check on the conditions of the surveys (i.e., if no Williamson's Sapsuckers are heard, it is helpful to know whether it is because no woodpeckers or sapsuckers are active that day at all, or whether there may be no Williamson's Sapsuckers present).

Where CPB techniques are being used for Absolute Density surveys, it is at the discretion of the individual surveyor whether to record all the locations and results of these multiple CPBs within a small area. In general these data should be recorded only if they provide new information about the birds and the precise locations/habitats used.

2.1.2 Nest Searches

Undertake nest searches only after presence has already been detected by CPBs, or if presence is known from previous years' surveys. Nests can be found by following adults to the nest sites, or by listening for the begging calls of young woodpeckers in the nest. If no adults are detected when a site is revisited after previous initial detections, use CPB to try to elicit responses and locate the adults. Investigate all young heard from a nest to determine the species of nesting woodpecker or sapsucker. Record the locations of any other woodpecker or raptor nests found. Additional background information is contained in Appendix 3.

Time-of-Year

- Conduct nest searches during the final 2 weeks that young are in the nest and most vocal. In most years this represents mid to late June, but this can vary from the end of May to early July.

- If a nest search is unsuccessful but one or more adults are detected in an area, they may still be incubating eggs, or the young may be very small and not in constant need of food. Return in a few weeks for an additional nest search when the nest may be more detectable.

- If fledged young are found, then they have already left the nest, and it is not likely that the nest will be found.

Data Recorded at the Nest

For each nest, record the following information on the data form in Appendix 4:

- Determine the locations (UTM, NAD 83, <10-m accuracy) of Williamson's Sapsucker nests using a handheld consumer-grade GPS unit.

- Record tree species, DBH, tree height, nest height (measured using hypsometer, or with tape and clinometer), nest hole aspect, Wildlife Tree Decay Class, type of decay, elevation, slope, aspect, topographic situation, soil moisture regime, physical and vegetative characteristics of nesting stand, and enough understorey information to later determine Site Series once the BEC variant has been determined.

- Other notes to include are observations on the birds, including presence of one or both adults, whether the young in the nest could be heard or seen, and which stands the adults were flying to and from in their foraging bouts.

- When Williamson's Sapsuckers are detected but no nest is found, note the sex, type of observation, activity, and at least one point marked on the GPS unit at the exact location of the bird(s) observation.

2.2 SURVEY TYPES

RISC standards for woodpeckers (1999) identify three levels of inventory:

- Presence/Not Detected using call playback surveys
- Relative Density using call playback surveys
- Absolute Density using spot-mapping methods.

Relative Density methods from CPB surveys are not the most effective or efficient method for surveying Williamson's Sapsuckers. Too many variables affect CPB response rates that are not understood and have yet to be quantified. These variables include weather conditions, time of day, time of year, and the observed differences in strength and type of responses of individual birds to call playbacks. As a result, relative density methods cannot yet provide a reliable and trustworthy statistic for comparison of one survey to another, except in orders of magnitude. CPB surveys for Williamson's Sapsucker will therefore provide only an indication of presence or not, and will therefore be more appropriately considered as surveys at the Present/Not Detected level.

Therefore, two levels of survey are to be used as standard for Williamson's Sapsucker:

- Presence/Not Detected using CPB surveys.
- Absolute Density using CPB surveys and nest search census methods.

2.2.1 Presence/Not Detected

When conducting Presence/Not Detected surveys, follow the standards for Call Playback Surveys as described above.

Once the general survey area and objectives have been established, pre-establish CPB points in GIS at 400-m intervals. The pre-established points should be downloaded to field GPS units for field navigation, and for field use, a paper printout of the pre-established GPS points on an aerial photo background is useful. The actual CPB points must be recorded in the field, and the field-marked points will eventually supplant the pre-established points in the final GIS and data files.

For initial reconnaissance surveys, roadside CPB surveys provide the most efficient method to cover the largest area in the shortest time, but as survey areas and objectives become more refined in a given area, they should be replaced by walking surveys along old roads, skid trails, or on the simplest topographic walking routes (generally contouring). If roads or topographic constraints are absent, use a 400-m grid spacing.

Do not randomly locate CPB points since spacing at other than 400 m will not be efficient. Closer spacing of points may be desired if the surveyor wants to increase the likelihood of detection, or in areas of very dense forest and severe topography, but the survey will not necessarily be more efficient. Completely random placement or stratified-random placement of areas to be surveyed, each of which will be sampled in a fairly complete manner by CPB points within those areas, is a valid type of study design with this type of survey.

Generally, survey objectives will be to determine the extent and location of the area of occupancy (AO), but may also be simply to find Williamson's Sapsuckers for later nest searches that will confirm the breeding status in the area. Since Williamson's Sapsuckers may have territories larger than 50 ha around nests, CPB Presence/Not Detected observations alone will generally not be useful for detailed habitat analyses. However, they may be useful at the BEC variant scale in a coarse Relative Abundance analysis.

The only way to turn a Present/Not Detected survey into a Present/Absent survey is by very intensive local area censuses, which are absolute density inventories. Therefore, even if birds are not detected, the surveyor will always be dealing with the possibility of presence with 400-m spaced CPB surveys. At the moment, it is not possible to put a firm number on what that probability is for a given level of intensity or effort in CPB surveys.

2.2.2 Absolute Density

Absolute Density is to be measured by the density of nests (usually expressed per square kilometre), although the density of pairs may be used if the activity of a pair indicates a nest might be present but the timing of the survey is not during the short period when the young in the nest are easily detected. In general, because density is based on nest densities, and territory use is not necessarily known for each nesting pair, partial territories should not be used for densities unless there is firm telemetry data indicating the amount of each census area used. However, partial territories may be qualitatively noted since the birds may be using a critical habitat component within the census area.

Two levels of census intensity will be used, depending on whether Williamson's Sapsucker are previously known in an area:

- If the presence of Williamson's Sapsucker is not known, then conduct a "quick" census that will be sufficient to determine if the birds are present or absent. This will usually require a complete follow-up census to find all nests and/or territories in the census area if presence is found.
- If presence of Williamson's Sapsucker is already known, either from previous years, from CPB surveys, or from a first census visit, then the level of effort is higher and the timing of the survey must be more precise to determine the number of nests and/or territories in the census area.

Presence is Not Known—First Census

The first census visit is to establish if Williamson's Sapsuckers are present, and to find any nests, if possible. This may be considered a special case of the Present/Not Detected survey, except that the survey is very intensive and area-specific, and also serves as a census method since if no birds are detected, they are considered to be absent for the year surveyed.

1. Follow the standards as described above for CPB surveys except where these are varied as per *Census Methodology* below.

2. If no Williamson's Sapsuckers are detected, then they are absent for the year surveyed, and no second visit is required.

3. Where Williamson's Sapsuckers are detected, follow the standards as described above for Nest Searches.

4. If Williamson's Sapsuckers are detected, and nests not discovered for all detections, then a second visit is required.

Presence is Known—Full Census

The full census is conducted to find every Williamson's Sapsucker nest and/or territory centre in the census area.

1. The survey should be during early to mid-June (but may be in late June in some years) to attempt to find young while still in the nest. Follow the standards as described above for Nest Searches.

2. Use a mixed method of CPB and silent listening. No point in the site should be more than 100 m from an approach, or 200 m from a CPB point. CPB are not as useful when the density of Williamson's Sapsuckers is high because too many birds will be attracted to the CPB point, territorial squabbles often result, and this does not help to determine the location of the nests.

3. The survey path will be dictated by locations of easy walking trails (old or existing roads or skid trails), topography, and sight lines. Deviate from planned lines or points to inspect possible nest trees, including veteran western larches, aspen copses, birches in draws, and other large veteran trees or snags. Grid lines may be used in the absence of any other constraints.

4. If no Williamson's Sapsuckers are detected, then they are absent for the year surveyed.

5. If Williamson's Sapsucker pairs are detected, but nests are not discovered for those pairs, then another visit is required 1 to 2 weeks later to complete the census.

Census Methods

Predetermine and download into GPS units the boundaries of the census areas and possible CPB points to provide 300-m or 200-m spacing within the census area and print a paper copy for field use. The predetermined boundaries will usually require slight changes based on 100-m buffer of actual locations of CPB points, and a 100-m buffer on a continuous GPS track of the observer's path recorded during the field surveys. Do not extend boundaries to include observations just outside the boundary, although these should be recorded for possible followup.

During the census surveys, multiple CPBs at 10- to 15-minute intervals may be used to elicit responses from birds or pairs that have been detected but have become silent and cannot be precisely located. It may take up to 1–2 hours to find a nest after initial detection of a Williamson's Sapsucker during the census. It is at the discretion of the individual surveyor whether to record all the locations and results of these multiple CPBs

within a small area. In general these data should only be recorded if they provide new information about the birds and the precise locations/habitats used.

Census areas must be a minimum of 200 ha in size, and preferably larger. Census areas smaller than 200 ha risk sampling portions of many territories, rather than whole territories, and the results may be difficult to interpret if there are too many Williamson's Sapsucker detections for which nests cannot be found because they are outside the census area.

Typically one person can sample 200–250 ha in a first-visit census in one day, and 100–125 ha in a full census. Multiple visits may be required to one site to complete a census. Therefore approximately 2.5 person-days should be allotted to each census area. On average, therefore, censuses should take about one person-day per square kilometre.

Study Design and Effort

Use a stratified random block (SRB) census for estimating population size for a given AO. Stratification will usually provide more precise confidence intervals of the final population estimate than simple random sampling of blocks. Census areas (blocks) will be set out for the entire AO and stratified by habitat quality and/or by predicted density. The number of blocks to be censused per strata will depend on the total number of blocks per strata, the variation in density from block-to-block within each strata estimated from previous survey data, and the desired precision of the final estimate.

Habitat models and habitat stratification have been completed for Williamson's Sapsucker in the Okanagan-Boundary (Gyug 2000) and in the Merritt TSA (Gyug 2005). The habitat model developed in 2000 for the Okanagan-Boundary area, which was based on only 33 nests, had not changed for 2005, although there were 124 nests in the 2005 sample. A separate WISA habitat model has been developed for the TFL 15 TEM mapping (Bruhjell and Robertson 1999) that is similar to the Okanagan-Boundary model (i.e., highest-rated habitats are mature and old forests in the IDFdm1). However, this area could be assessed separately as an alternative for habitat and/or population prediction power, using either existing data or data collected specifically to test that model.

2.3 RECOMMENDED WORKFLOW AND DATA MANAGEMENT

2.3.1 Workflow

This workflow method has been used for Northern Goshawk CPB surveys and nest searches, and for Williamson's Sapsucker CPB surveys, nest searches, and census areas. This is not the only possible workflow, but it has been found to be efficient for managing thousands of CPB points where field sampling is by more than one person.

1. The project biologist sets out all preliminary CPB points at 400-m centres in the office using GIS, or at 300-m or 200-m centres for more detailed census surveys, and delineates the boundaries of any census areas using GIS. These points/areas will be used by all field workers in that particular project

area (e.g., one biologist for East Kootenays, one for Okanagan, one for Princeton, one for Merritt, and one for Hat Creek).

2. The project biologist must be very familiar with the road network and the actual forest stands. There is a limit to what can be deduced from aerial photos and VRI/TEM/PEM alone, and roadside points set out along an impassable road or waypoints to be sampled on foot that require travel over impassable barriers can create unnecessary frustration for fieldworkers.
3. Use a P (for preliminary) prefix for the consecutively numbered preliminary waypoints (e.g., P001) to distinguish them from field waypoints (e.g., 001). Previous WISA detection points given a W prefix (e.g., W001), or WN prefix (e.g., WN001) for previous nests may also be uploaded into GPS units so that surveyors can check for occupancy at previous nest sites or other occupied locations.
4. The best way to ensure complete coverage is to make a 400-m dot grid (or 300, or 200 as the case may require) over the entire project area, GIS mark 400-m CPB waypoints on whatever roads are passable to cover the priority polygons or the census area of interest, and then fill in offroad areas with CPB waypoints for walking surveys to complete the coverage of the area.
5. Print out 8.5" × 11" paper map(s) for each geographic location from the GIS on paper that includes an orthophoto or Landsat background, priority polygon outlines, census area outlines (if required), and the labeled preliminary GPS points. Map scales of 1:20,000 to 1:50,000 usually work for roadside sampling, but 1:20,000 is better for walking surveys. These maps are for field use and are considered disposable (i.e., can be folded or marked as required). CPB points may be mapped as white circles so they can be filled in with pencil as they are completed.
6. Download preliminary CPB points to consumer-grade GPS units daily or weekly for field work. Any cheap GPS unit will work that will interface with the computer and supports at least 1000 waypoints. Units that support only 500 waypoints may not have enough memory and require frequent downloads and uploads. If Garmin units that support maps are used, then maps of the priority polygons or census areas can be put into the units as a mapscreen background.
7. GPS mark the actual CPB waypoints in the field at the time they are surveyed because they usually do not perfectly match the preplanned points. The field waypoints are set using the default GPS unit numbering, which is usually three consecutive numbers.
8. Upload the completed CPB waypoints to computer at end of the day (or week).
9. Discard the preliminary waypoints (e.g., P001), and use the final CPB points to generate coverages/shapefiles to which field data is added to file templates by manual entry.

2.3.2 Data Management

Use the Species Inventory (SPI) data management system as the data repository for this project, and all other projects for Williamson’s Sapsucker. RISC protocols already exist for documenting projects for SPI.

However, the protocols for data entry, editing, and retrieval from this system for the Williamson's Sapsucker data need to be established.

Keep the data in ESRI shapefile sets or coverages. Attach projection information, a metadata file, and a data dictionary to each coverage or shapefile. Although the files listed below are not the only possible data to be collected, this is the format used for the 1996–2005 Williamson's Sapsucker inventories. Projection files, metadata files, and data dictionaries are available for each shapefile set.

Each local or regional project will have at least two data sets, and at least three if census areas are used. These will consist of:

- **Call Playback Results:** A point file consisting of CPB station locations and results from call playbacks including present/not detected roadside surveys and walking surveys, and including the CPB points used during nest censuses and searches. The following data format (**wisa_callplaybacks.xls**) and data dictionary (**wisa_callplaybacks_dictionary.doc)** were used for the 1997–2005 Williamson's Sapsucker surveys.
- **All Williamson's Sapsucker Observations:** A point file that includes the actual or estimated locations of birds located during the call playbacks, the birds located during nest surveys, the nest tree locations and data, and sap-tree locations and data. Where birds are being followed and a nest is discovered on the same day, the surveyor can choose whether to include all observations from that particular nest search, or to include just the nest tree location with the bird observations at the nest tree in the same line. This can also be used to enter negative data when checking for reoccupancy of nest sites or territories in succeeding years. The following data format (**wisa_obs.xls**) and data dictionary (**wisa_obs_dictionary.doc**) were used for the 1997–2005 Williamson's Sapsucker surveys.
- **Williamson's Sapsucker Census Areas (if used):** A polygon file that includes the boundaries of the census areas and the summary results for each census block or area. The actual bird and nest locations will be in the Observations file. The following data format (**wisa_census_areas.xls**) and data dictionary (**wisa_census_areas_dictionary.doc**) were used for the 1997–2005 Williamson's Sapsucker surveys.

3. STAND-LEVEL HABITAT ASSESSMENT STANDARDS

The following standards apply to collection of stand-level attributes pertaining to sap trees used for foraging and stands used for foraging by Williamson's Sapsuckers. The current standards apply to data collected during the breeding season. Although collection of these attributes currently are not included in the standard, it is intended that they will be amended later to include them.

3.1 COLLECTION OF FORAGING TREE AND FORAGING STAND DATA

For each survey area, known nest areas should be stratified by habitat type (open versus old continuous forest). For each study area, a total of 10 nest sites within each strata should be surveyed to collect foraging

tree and foraging stand data. These should be the same nests sites where it will be possible to collect data on nest site productivity.

1. Data on foraging trees and stands must be conducted at the same nest sites where productivity data can be collected. For example, a nest site that was too high to obtain productivity data would not be a good candidate to collect foraging tree use data.
2. At each nest site, find locations and describe sap trees used for foraging by Williamson's Sapsucker. This will likely result in 4 to 5 trees per nest site. This should be done at 10 nests within each strata (open forest and continuous old forest). The following steps should be followed to accomplish this:
    a) Follow adults during foraging bouts to identify sap trees. Trees should be flagged so that they can be revisited and described. This will usually require a minimum of 1 hour per nest when adults are actively flying to and from the nest to feed nestlings, but may take longer, and will best be achieved with two or more observers in radio contact with each other.
    b) For each sap tree, record tree species, DBH, tree height, Wildlife Tree Decay Class, type of decay, approximate distance and direction from the nest tree. Take a GPS location of each sap tree. Use the data form provided in Appendix 4.
3. At the same nest sites, identify stands used for foraging by Williamson's Sapsucker. Where possible also identify individual trees used for foraging. The following steps should be followed to accomplish this:
    a) Where possible follow adults on foraging bouts to foraging stands and take a GPS location within the foraging stand. This will be most successful only in open habitats, but may be used for any nest, and may be combined with sap tree observations.
    b) Where it is not possible to follow adults on foraging bouts, describe the direction and approximate distance traveled to the foraging stand. If possible project a GPS point location. Return to the stands after the breeding season to characterize stand-level attributes. Use the data form provided in Appendix 5.

4. NEST PRODUCTIVITY ASSESSMENT STANDARDS

The following standards apply to the collection of nest productivity standards for Williamson's Sapsucker.

1. For as many active nests as possible, include a measure of nest productivity (number of nestlings) and success (i.e., raised to at least 80% of fledging time, which is the Birds and Burns Network standard for woodpeckers) for nests that are accessible with a pole-mounted video camera. Nests at >80% of fledging (23 to 24 days old) on first discovery will be considered "successful" and the nest need not be revisited, but young will have to be counted using a nest pole camera. See Section 2.1.2 to determine the appropriate time to visit nest sites. Use the data form provided in Appendix 4.
2. If it is not possible to sample all nests, ensure that nests are stratified. Nest height will more often determine which ones can be selected, and it will probably be necessary to sample all nests below pole height.

3. For each nest visited, include an assessment of nest hole, nest tree and territory re-occupancy rates. Use the data table provided in Appendix 4.

5. ACKNOWLEDGEMENTS

This document is based primarily on data collected by Les Gyug, Okanagan Wildlife Consulting, from 1996 to 2005 under contract to the Ministry of Environment; part of the data resides in interim and unpublished reports that are not cited here. The data from these interim and project reports have been reanalyzed and interpreted for this report.

6. REFERENCES

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7. APPENDICES

Appendix 1. Background Information: Call Playback Surveys

Time-of-Year

Williamson's Sapsucker will respond to call playbacks (CPBs) any time in the breeding season from the earliest date of arrival on the breeding range (usually late March to early April, depending on the year) to shortly after the young have fledged (usually late June or early July). Spontaneous calling/drumming surveys (i.e., with no call playbacks) are useful only in the first 2 weeks after the birds arrive on the breeding range (late March or early April). At this time, the males are very vocal and drum frequently as they establish breeding territories and attempt to attract females (Crockett 1975)[1]. Any surveys attempted after early April will require CPBs to elicit responses from otherwise fairly quiet birds.

Distance between CPB Points

The effective distance sampled from a CPB cannot be precisely known. The distance to the initial response from a CPB is not always possible to precisely determine because the birds often approach silently before announcing their presence close to the CPB point. In other cases, the responding bird is out of sight and the distance is difficult to estimate. Triangulation methods can be used to estimate the location of a distant bird as long as it continues to call for several minutes. However, the number of unresponsive birds is difficult to determine, so an absolute response rate cannot be estimated. The farthest that a Williamson's Sapsucker was observed responding to a CPB in the 2003–2005 surveys was 600 m: a male began drumming on a power pole in response to the CPB.

The mean distance of the nest from the initial CPB point was 244 m (median, 230 m; $N = 61$), based on the 2003–2005 discovery of nests that were initially detected from CPB points. A plot of the cumulative number of nests discovered against the distance from the initial CPB does not show any sharp inflection point in the curve (Figure 1), although the discovery rate appears to be fairly constant to 300 m, and then declines gradually to 597 m—the nest discovered farthest from a CPB point after initial discovery of the birds' presence by CPB.

[1] Crockett, A.B. 1975. Ecology and behavior of the Williamson's Sapsucker in Colorado. PhD dissertation, Univ. of Colorado, Boulder, CO.

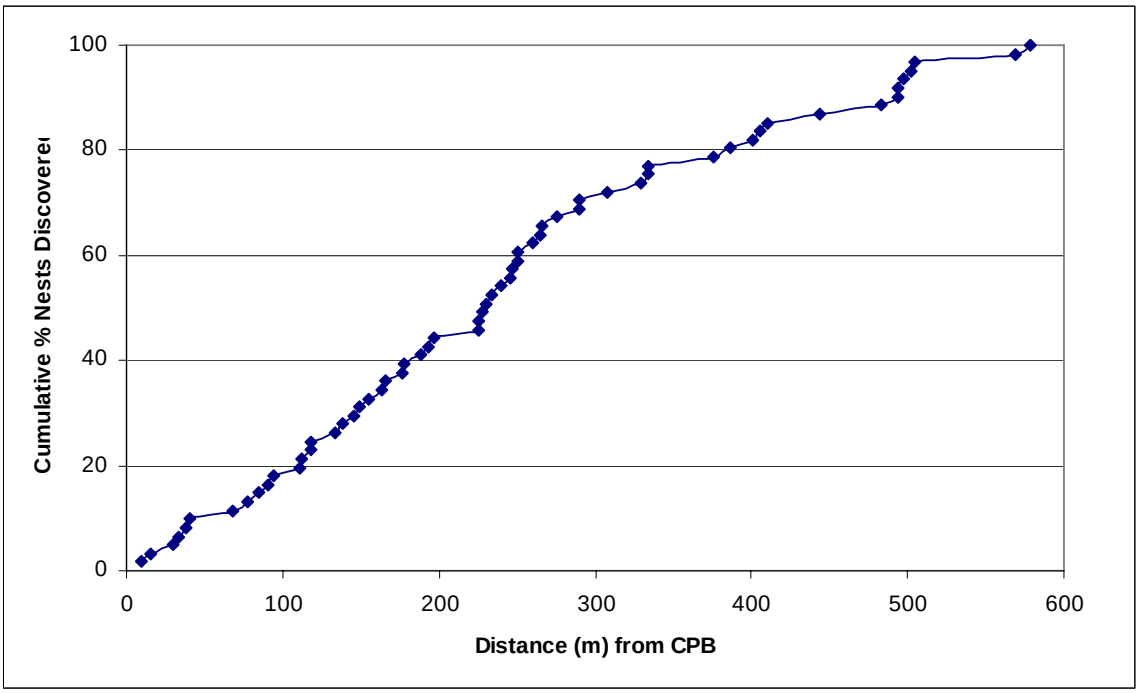

Figure 1. Cumulative percentage of Williamson's Sapsucker (*N* = 61) nests discovered versus distance from the call playback (CPB) point at which the presence of a Williamson's Sapsucker was first detected in the 2003–2005 surveys.

Ideally, Figure 1 should include the success in discovering nests at different distances from the initial CPB point. However, it is not known how many nests remained undiscovered after initial detection, or how many nests remained undiscovered because there was no initial detection. This could be known only if all nest locations were known before the survey was undertaken—data that could be obtained but has not been attempted because time and funds have been limited in the inventory field seasons to date. Of the 99 nest searches attempted after initial detection from a CPB point, 61 successfully discovered a nest, but 38 were unsuccessful. In 14 of the unsuccessful cases, the pair could be found but no nest could be located; in 9 cases, only the male could be located and no nest was found; and in 15 cases, no Williamson's Sapsucker could be located even by returning to the site up to 1 month after initial discovery of presence.

Other Factors

Weather conditions are important to efficient CPB surveys for Williamson's Sapsuckers.

Restrictions on weather conditions are based on qualitative observations made during CPB surveys where no response was gathered from known pairs or nests, or where pairs or nests were later discovered after the first surveys in an area found no response.

Ambient temperatures above 28ºC appeared to reduce call response (based on only one instance). On a hot day, CPB elicited no response and a nest could not be found on a followup nest search, but the next day when temperatures were cooler, the pair was responsive and the nest was easily found. Temperatures above 28ºC

do not often occur in June at the elevations where Williamson's Sapsucker are common, and almost never occur if surveys are made early in the morning, so that we do not have a large sample size of surveys conducted in hot weather. Sapsuckers (Red-naped) were very active and responded to Williamson's Sapsucker CPB in morning temperatures as low as 4ºC. CPB surveys were not run in temperatures lower than 4ºC in the 2003–2005 surveys because lower temperatures did not occur. However, since the birds may be actively calling when territories are established in late March or early April when snow is still on the ground in most of their territories, low temperatures may not be a factor in CPB response rates.

Time-of-day did not appear to be a critical factor in CPB surveys, although the response rate to CPB points was significantly lower in the afternoon than in the morning. Within the Okanagan-Boundary area of occupancy (AO), overall 15.9% of points from 0500 to 1059 hours (N = 709 points) and 11.5% of points from 1100 to 1559 hours (N = 383 points) had Williamson's Sapsucker responses or observations. Using mean hourly comparisons, response rates were significantly different (t = 2.79, p = 0.01) from morning (N = 6 hours) to afternoon (N = 5 hours). If relative density is required, then CPB surveys should not be conducted in the afternoon. If only reconnaissance-level presence/not detected is required, then afternoon surveys are acceptable as long as the wind is calm and the day is not too hot. Surveys should not start until after sunrise (local time).

Methodology

The Williamson's Sapsucker calls played at each CPB point in the 2003–2005 surveys consisted of 10 seconds of audio played in each of three directions (120º, 240º, and 360º) with 20 seconds of silence between each 10-second playback. Playbacks must be broadcast using a megaphone that is capable of broadcasting 600 m in open habitats. A CD, cassette, or MP3 player may be used to play the recording through the megaphone.

The 10-second call segments used in the 2003–2005 surveys consisted of two drums followed by several "Cheeur" calls and several scold/alarm calls. The Cheeur call sounds like a cross between the squawk of a Black-billed Magpie and the scream of a Red-tailed Hawk. The scold calls are given only near the nest or sap trees and sound like a "hoarse, guttural roll" with the best transliteration being "churrr" with a rolled "r". This is not the "Churr" call referred to in the Birds of North America account, for which Cheeur is a better transliteration. Which of the calls or drums would be most effective at eliciting responses has not been tested, but Hadow (1977)[2] tested the Cheeur call against the drum, and found the Cheeur call much more effective at eliciting prolonged responses than the drum. However, he did not report relative response rate.

Williamson's Sapsuckers are relatively silent in May-June and more than a few seconds of silent listening rarely produced any results. In the 2003–2005 surveys, silent listening after the CPB was usually less than 1

[2] Hadow, H.H. 1977. Audible communication and its role in species recognition by Red-naped and Williamson's Sapsucker (Piciformes). PhD dissertation, Univ. of Colorado, Boulder, CO.

minute. Responses, if any were forthcoming, were usually very quick, often within the first 10 seconds of CPB, although this was not true on every occasion and sometimes first responses took 2 to 3 minutes. Surveyors should wait a minimum of 2 minutes of silent listening after the final CPB before moving on to the next point. Sometimes birds that responded very late to a previous CPB point could be heard still calling from the next point 400 m away, so that even if birds responded very late to the CPB, they were not necessarily missed.

In the 2003–2005 surveys, we averaged 48 CPB points per day in surveys from the roadside, and 42 CPB points per day in walking surveys. The walking surveys were usually part of a census: they covered much smaller total areas than the roadside surveys in a given day, and the points were usually spaced much closer than 400 m. When we conducted Northern Goshawk CPB surveys on foot, using 300-m point spacing and longer silent waiting periods (2 minutes before and 3 minutes after) than for Williamson's Sapsucker, an average of 25 CPB points were done per day in 2001 (Gyug, unpubl. data).

Appendix 2. Call Playback Data Form

Okanagan Wildlife Playback Survey Data Form

Tenure/CP#	Area	YYYY MM DD	Temp Range C

ID NUM		Pre-Mark	Final GPS Mark	Time	Wind	Sky	Tape Used	Other Cav Nesters/Raptors/Comments (Distance/Bearing)
	1							
	2							
	3							
	4							
	5							
	6							
	7							
	8							
	9							
	0							

Beaufort scale	Wind speed	Scale	Sky condition
0	Smoke rises vertically	0	Clear or a few clouds
1	Wind direction shown by smoke drift	1	Partly cloudy or variable sky
2	Wind felt on face; leaves rustle	2	Cloudy or overcast
3	Leaves and small twigs in constant motion	4	Fog or smoke
4	Raises dust and small branches are moved	5	Drizzle
5	Small trees in leaf begin to sway	7	Snow
6	Large branches in motion	8	Showers
7	Whole trees in motion		

Record Type of Observation: d=drum, c=call, v=visual, h=hoot (owl), R=definite response to playback.

For positive locations of target species, fill in:

Simple description of habitat (e.g. mature Pl, OG Lw/Fd, seedtree cut) and any likely nesting trees under comments.

Fill in estimated distance and bearing, and triangulate from another location if possible and using the next line and another GPS, mark sex and age if seen.

ID NUM to be consecutive within project -- Fill in later.

Appendix 3. Background Information: Nest Searches

Time-of-Year

Nests are easy to locate only in the final 2 weeks that the young are in the nest (of the 4 weeks between hatching and fledging), when the young are very vocal, can be heard up to 100 m away, and the parents are flying almost continuously to and from the nest. The young are very vocal only for the final 2 weeks of the nestling stage, although if the nest is in an accessible location (i.e., low on the tree) that can be approached closely, the young can be heard at any time in the nestling period. The most successful time for nest searches is mid to late June, but this can vary from the end of May to early July.

If a nest search is unsuccessful but one or more adults are detected in an area, they may still be incubating eggs, or the young may be very small and not in constant need of food. Return in a few weeks for an additional nest search when the nest may be more detectable. In the 2003–2005 surveys, some territories in which no nests could be found sometimes appeared to be the territories of unmated males, and there may have been no nest.

If fledged young are found, then they have already left the nest, and it is not likely that the nest will be found. Sometimes, the likely nest tree and nest hole could be found based on piles of fecal sacs below a recently used nest hole. Usually finding a nest in this case will require returning earlier the next year to discover the nest used (although it may not be the same hole or tree used the previous year).

In a given year, there is a 2-week period when censusing is the easiest (usually June 14 to 28) because most of the young are in the last 2 weeks before fledging, and relatively few have actually fledged yet. In normal years, censuses undertaken in early June are usually not successful at finding all nests, and a return visit later in June is necessary to count all nests. In the 2003 and 2004 surveys, nesting appeared to be about 1 week earlier than in other years: the most successful nest-search period was about 1 week earlier, and by June 20 some nests had already fledged young.

Appendix 4. Nest/Sap Tree Data Form

Nest/SapTree Data Sheet W_____ WN_____ WTY_____

Date _____ _____ _____ **Time** _____**Observer(s)**_____
YYYY MM DD 0000 hrs Initials

Forest District_____ **Licensee and CP#**_____
Area/Location_____
NAD_____**UTM Zone** _____**GPS MARK** _____**Accuracy**_____
UTM East _____ **UTM North 5** _____

Nest Description **Bird Sp.** _____**Visit No. 1 2 3 4 5 6**___

Num & type Obsns M F Feeding Yg? Y N from Inside or Outside

Yg heard? Y N Yg heard from _____ m, Yg with heads out? Y N Num Yg____

Previously known tree? Y N New Nest Hole? Y N Nest Camera Used? Y N

Bill Items (if seen): Carpenter Ants Y N Winged Ants Y N Other_____

Nest **or** Sap Tree Sp._____DBH_____ Nest Aspect_____ deg

Decay Class_____Decay Type_____

Heights: d=tape dist, BH = Breast height (1.3m), Bole Shot only if Broken Top

d= _____m BH Shot_____% Nest Shot _____% Bole Shot _____%. Leader____%

d= _____m BH Shot_____% Nest Shot _____% Bole Shot _____%. Leader____%

d= _____m BH Shot_____% Nest Shot _____% Bole Shot _____%. Leader____%

Nest Ht = _____ m Tree Ht = _____ m (Bole Ht _____ m, If different)

No. of Other Nest Holes in Tree: Sap Well Ht Range_____m to _____m

SAPS size _____Smaller holes____Larger Holes_____Active Nests?_____

PHYSICAL DESCRIPTION

Macro Site Position _____ Micro Site Position _____

MacroAspect _____ MacroSlope _____ Elevation_____

BEC Zone _____SMoistureR _____ Site Series_____

Vegetation Description (within approx 50 m)

Vets present? Y N Vet Sp. _____Vet Density_____

Canopy Tree List_____dbh Range_____Crown Closure %_____

Subcanopy Tree List_____Structural Stage/History_____

Shrub/Understorey Sp._____

Circle Photos Taken None Stand View (W.A.) TreeBase TreeTop Others_____

Where is/are Foraging Stand(s)? (Dist and Dir) _____

Comments (continue on back) _____

Macrosite Position will typically be Ridge, Upper Slope, Mid-slope, Lower Slope, Valley Bottom
Microsite Position (if different) will be hummock, mound, gully, bench, floodplain etc. within macrosite

Appendix 5. Foraging Stand Data Form

WISA Foraging Data Sheet WN_____WTY_____Pg__/__

Date _____ _____ _____ Observer(s)_____

YYYY MM DD

- **Forest District/License/Area_____**

Time Begin Observations:_____Temp_____Sky_____Wind_____

Species_____Sex: Male Female

Time Leave Nest	Time Return Nest	Dir. Leaving From Nest	Distance/Habitat And/Or Specific Destination(s) that will be GPS marked later	Dir. Returning back to Nest

Time End Observations:_____ (leave blank if sheet continued)

Note main bill items if possible: