

*Focused sampling to inform population monitoring
of Williamson's Sapsucker (*Sphyrapicus thyroides*)
in the East Kootenay Area of Occupancy, 2014*

for
Environment Canada

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ACKNOWLEDGEMENTS

Thanks to Lisa Rockwell for her help in establishing call playback stations and Cathy Conroy, Doug Schneider and Shirley Hansen for field work

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INTRODUCTION

In 2010, 2011 and 2012 an Adaptive Monitoring Framework involving random call playbacks (cpb) was developed and applied in three areas of British Columbia to track the status of Williamson's Sapsucker (*Sphyrapicus thyroides*) populations (Marmorek and Pickard 2010). In one of those areas, the East Kootenay, the application of random call playbacks throughout the very large Area of Occupation (AO) proved unsuitable - detection rates were extremely low, thus hampering efforts to reliably monitor the status of the population (Ohanjanian et al. 2012, Ohanjanian 2011, Ainsworth et al. 2013).

To test the prediction that focused sampling over smaller areas (rather than the entire AO) would increase the probability of detection to a level that would allow meaningful statistical analysis to be undertaken, an alternate method was used in 2014. This revised plan involved systematic rather than random sampling by call-playback within pre-determined sites that were delineated around clusters of known nests/detections. This paper reports on the field work carried out in spring of 2014, the results of which will be analyzed by statisticians in the near future. The expectation in light of a positive result would then be the development of a statistically valid and efficient monitoring program for Williamson's Sapsucker in the East Kootenay.

METHODS

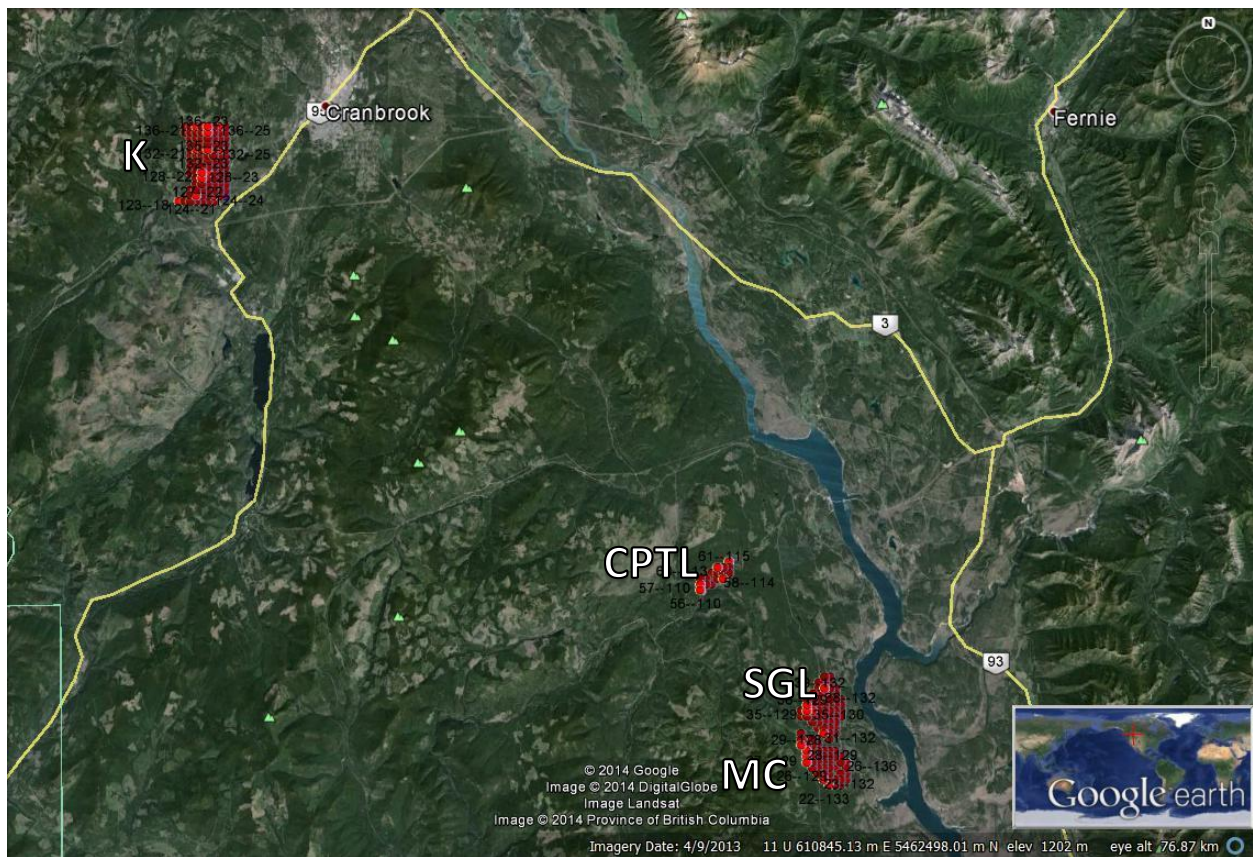
A systematic sampling regime using call playbacks was used at four locations. These were the Kiahko (K), Caven/Plumbob Junction to Twin Lakes (CPTL), Strauss/Gorrie/Linklater (SGL) and Meadow Creek (MC) sampling areas (Figure 1). Call playback stations were laid out at 400 m intervals in a grid pattern to effectively sample the area of interest. These were uploaded into handheld GPS Map 60CSX or 70CSX units prior to field work. Field methodology followed that developed for the Forest Investment Account (FIA 2006) and the provincial Inventory Methods for Woodpeckers; Standards for Components of British Columbia's Biodiversity No. 19 (RISC 1999).

Upon arrival at a station, environmental conditions (wind speed, cloud cover and precipitation) and the time were recorded on datasheets. The observer listened passively for one minute to detect spontaneous drumming or calling. Then a CD recording, consisting of 2 drums followed by several cheeur calls and scold/alarm calls, was broadcast using a TOA ER-604W¹ megaphone in 3 directions, with 20 seconds of silence between each 10 seconds of playback. After each broadcast, we listened for 2 minutes before moving on to the next CPB station. Williamson's Sapsucker detections were recorded on datasheets along with their compass bearing, estimated distance, sex and activity, and the way they were discovered (visual or aural – drum or call). No effort was made to locate nests.

To prevent sampling bias, researchers who carried out 95% of the survey were not told the locations of previous nests.

¹ Audible range of megaphone was determined to be 600+ m prior to its use in the field.

Figure 1. Location of 2014 sampling areas in the East Kootenay



The approximate locations of detected birds were subsequently plotted on satellite images (see Appendix A, Figures 2 to 4) using the compass bearings and distance estimates obtained in the field. Known nest locations were added to these images to provide context in this report.

To aid in development of a future survey methodology, the systematic sampling system was qualitatively evaluated and total time spent traveling between stations was quantified.

RESULTS

Call playbacks were carried out between April 19 and May 21, 2014 at 130 cpb stations. Williamson's Sapsuckers were detected at 15 of these (11.5%). The breakdown of these results is presented in more detail below.

Kiahko sampling area

Five individual Williamson's Sapsuckers were detected in the Kiahko area at 4 (10.3%) of 39 call playback stations (Appendix A, Figure 2). Two individuals were within 200 m of previously confirmed Williamson's Sapsucker nests, and two were approximately 500 m from a formerly occupied nest tree. One

Williamson's Sapsucker was observed incidentally, 100 m away from a call playback station and several minutes after the survey time ended. This individual was non-responsive to the recording when observed, however it is assumed here that the call playback at the station had elicited the subsequent visual observation.

Caven/Plumbob Junction to Twin Lakes sampling area

In the CPTL area six Williamson's Sapsucker responded to call playbacks at 5 (22.7%) of 22 call playback stations (Appendix A, Figure 3). Only three of these, however, could be positively confirmed as individuals, although it is likely that there were at least four or five distinct birds. Four birds were within 250 m of three previously occupied nest trees, and a fifth was observed in a known foraging area (Ohanjanian et al. 2008).

Strauss/Gorrie/Linklater sampling area

In the SGL area, eight² individual Williamson's Sapsucker responded at 6 (14.0%) of 43 stations (Appendix A, Figure 4). Although not positively confirmed, these responses were from birds that were likely on six different territories. Two detections were within 200 m of previous nests.

Meadow Creek sampling area

No Williamson's Sapsuckers responded to call playbacks (0 of 26 stations) in the Meadow Creek sampling area nor were any observed there incidentally.

Logistics

The average time between stations was 31 minutes (range 11 to 90).³ Sixty stations were reached in less than 30 minutes.

DISCUSSION

Detection rates

The prediction that focused sampling over smaller areas (rather than the entire AO) would increase the probability of detection of Williamson's Sapsucker in the East Kootenay was confirmed in 2014. In previous work (Ohanjanian et al. 2010, 2011 and 2012) detections at cpb stations that were randomly distributed throughout the entire Area of Occupation resulted in extremely low detection rates of 1.5%,

² Possibly one more Williamson's Sapsucker answered here, but the conservative estimate is 8 individuals

³ Note that this value includes driving and/or walking between stations. Values > 90 min were removed as these values reflected survey halts due to wind gusts, tracking down birds, etc. However, it should be noted that such delays would still occur in future monitoring.

2.3% and 3.2% of stations in 2010, 2011 and 2012, respectively (Table 2). Methodology was identical in all years⁴.

Table 1. Comparison of detection rates at cpb stations between years

Year	stations	w. detections (%)
2010	135	2 (1.5%)
2011	220	5 (2.3%)
2012	248	8 (3.2%)
2014	130	15 (11.5%)

In contrast, when surveys were focused on known clusters of Williamson's Sapsuckers in 2014, the detection rate was 3.6 to 7.6 times greater. This greater probability of detection under the alternate methodology should inform future monitoring protocols.

Project logistics

The window for optimal Williamson's Sapsucker call playback surveys is during the spring period when birds drum during territory establishment. In 2014, the weather during this period was exceedingly disruptive to the project - winds reached Beaufort 4 or 5 and remained so for the duration of the day on 9 of 14 days when surveys were initiated. This effectively "shut down" surveys on the majority of days (64%), and reduced the amount of data collected. As a result of this, as well as budget and logistical constraints, 44 stations of 174 were not sampled. This deficit occurred almost exclusively in the Kiahko area (Table 2). For example, the area near WNE 025 in Kiahko (call playback stations 136-20 and 136-21) was not surveyed (Appendix A, Figure 2). However, birds were observed there in both 2012 and 2013 (T. Antifeau, pers. comm.).

Table 2. Sampling completion and deficits in four Williamson's Sapsucker areas in 2014

Survey area	No. cpb stations	No. surveyed	Deficit
Kiahko	76	39	37
Caven/Twin Lakes	22	22	0
Gorrie/Linklater/Strauss	43	43	0
<u>Meadow Cr</u>	<u>33</u>	<u>26</u>	<u>7</u>
Total:	174	130	44

⁴ Timing was begun later in 2010 than in the other years, with cpbs lasting well into the incubation period (up to June 15).

The decision to use a grid pattern to locate all birds in the surveyed area has several implications.

- a) It requires high levels of fitness (which the 2014 team had).
- b) Rough terrain, creek crossings, etc may reduce the opportunity to obtain adequate sample size in the given time.
- c) The mean interstation time of 31 minutes could be greatly decreased if a vehicle were used, thus allowing a larger sample size for the same budget, while taking care that possible bias due to roads is eliminated.
- d) In 2014, only four areas could be surveyed – a vehicle would have allowed more of the Williamson’s Sapsucker clusters to be sampled over a wider area of the AO.

Conclusions

When a statistically meaningful monitoring protocol for Williamson’s Sapsuckers in the East Kootenay is developed, focused sampling within pre-determined sites around clusters of known nests/detections should be used, while allowing for periodic exploratory sampling to “catch” new areas that might be utilized by the birds in future. While the former must adhere to a methodology that allows for defensible statistical analysis, the latter need not - its goal would be to discover new areas that could subsequently be incorporated into the monitoring program.

The relative value of systematic vs random sampling needs to be evaluated by a statistician, as does minimum required sample size.

To increase efficiency, a combination of vehicular and walk-in access to cpb stations should be adopted.

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APPENDIX A. Williamson's Sapsucker detections and previous nests in three sampling areas.

Scale = 400 m interstation distance



Approximate location of bird



Previous Williamson's Sapsucker nest



Direction and approximate distance of detected bird

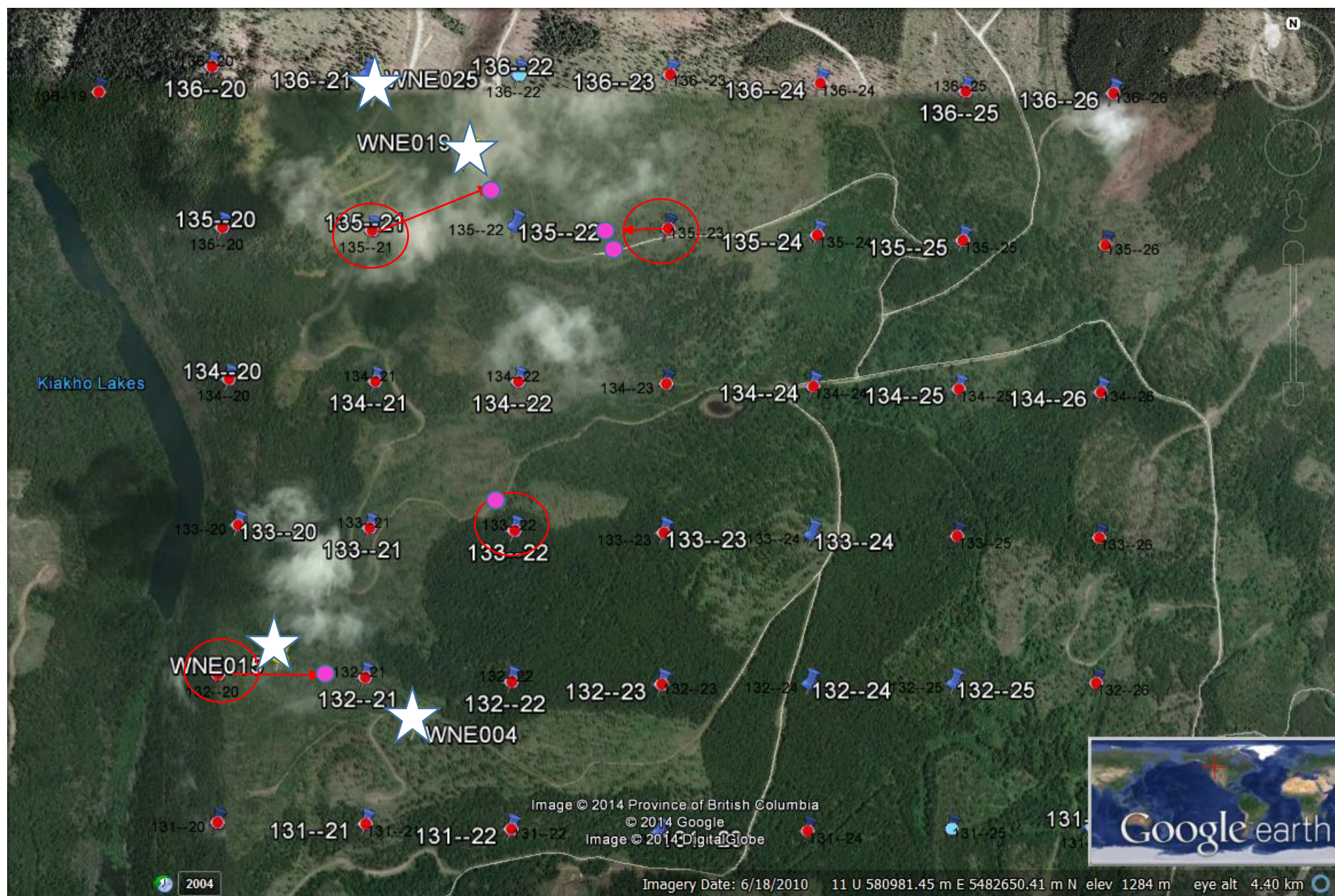


Figure 2. Kiahko sampling area

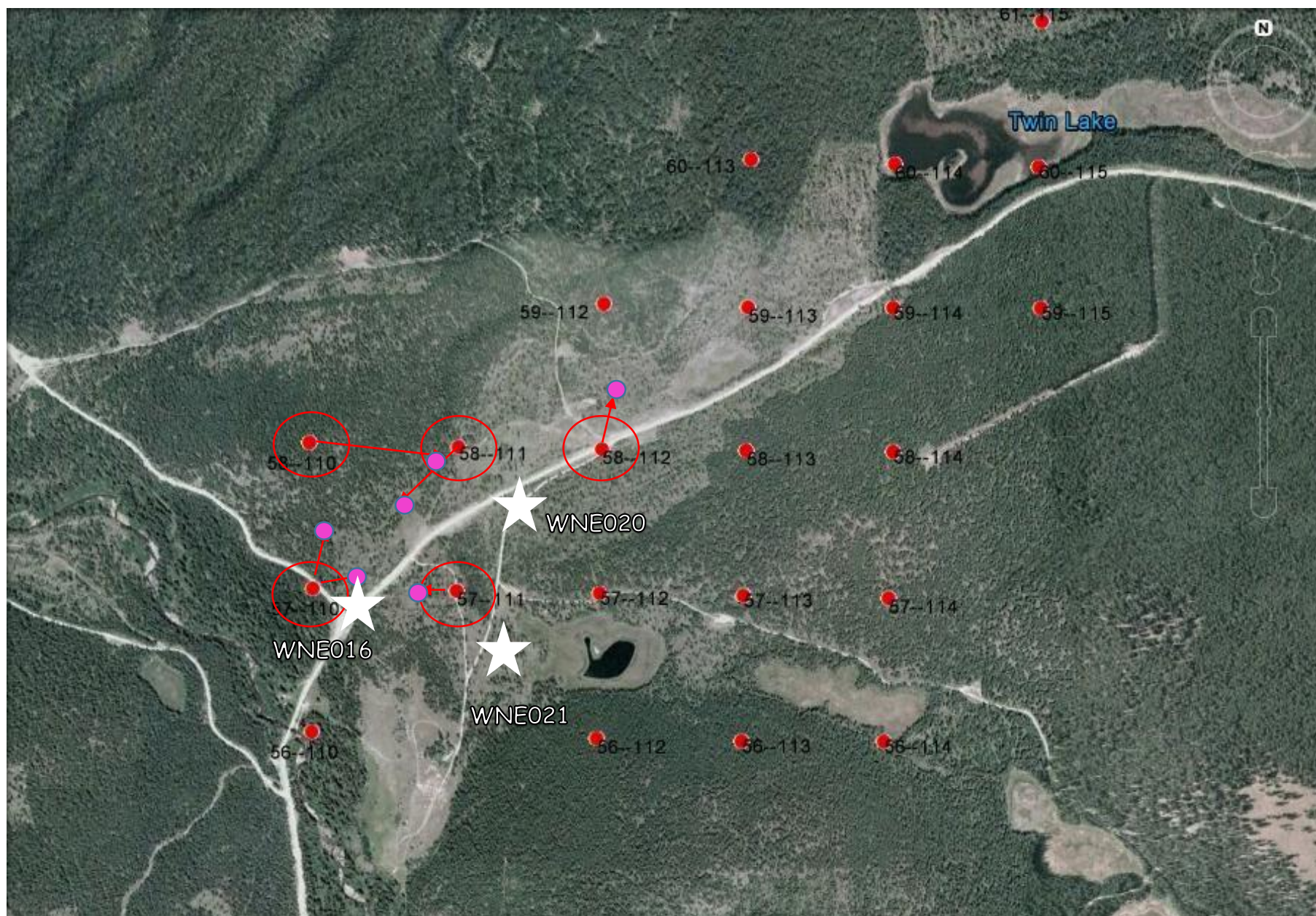


Figure 3. Caven/Plumbob Junction to Twin Lakes sampling area

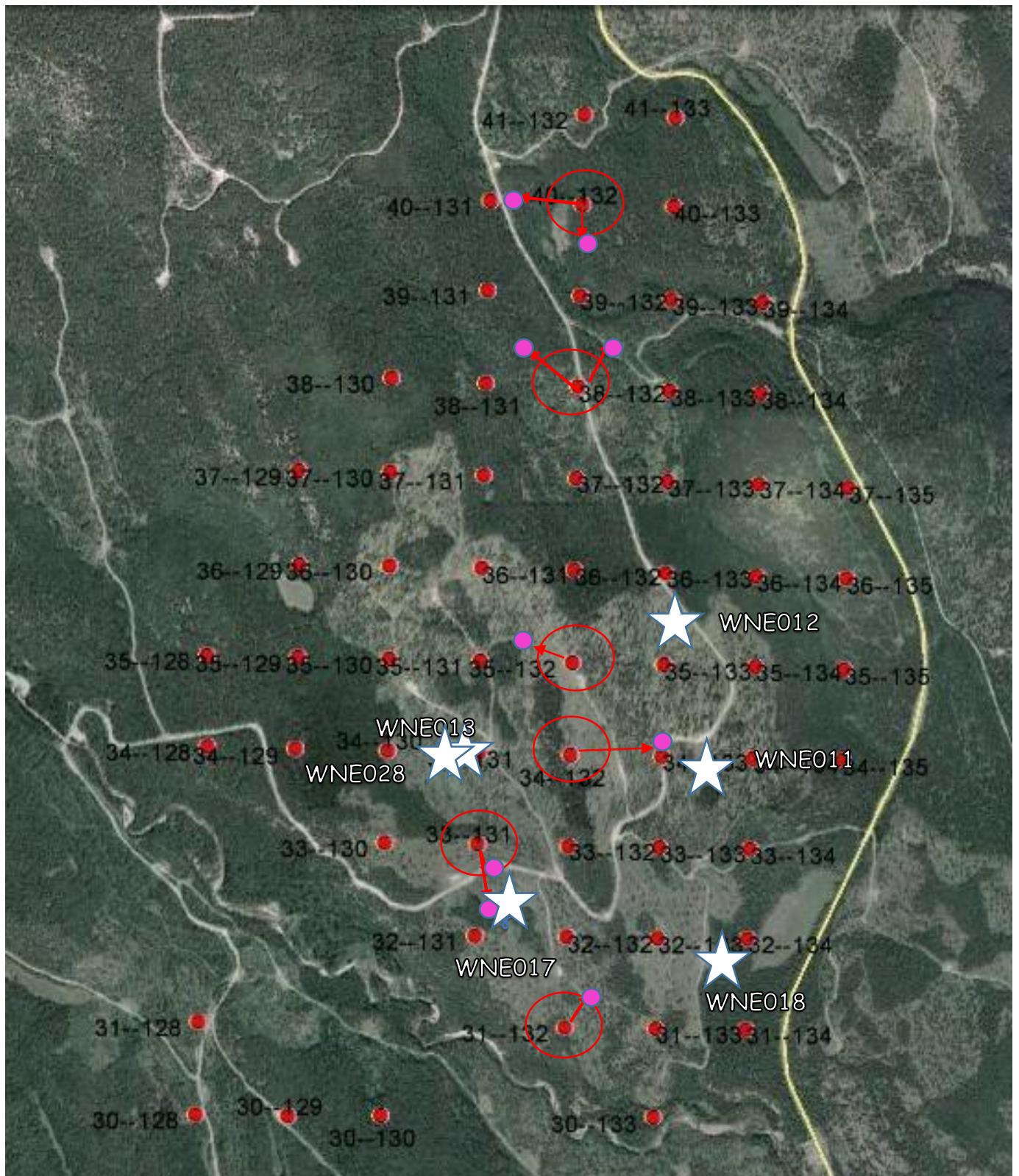


Figure 4. Strauss/Gorrie/Linklater sampling area