

Williamson's Sapsucker Relative Abundance Monitoring, East Kootenay 2018

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ABSTRACT

Long-term monitoring of the Endangered Williamson's Sapsucker (WISA) relative abundance in focus areas began in 2014 in the East Kootenay region in B.C. This was the third round of annual monitoring (2014, 2017, 2018) using Call Playback (CPB). Six focus areas totaling 50.75 km² in area were sampled by 73 CPB points from April 24- May 7, 2018. We detected 33 WISA from 73 CPB points in five of the focus areas, while none were detected in Kimberley Nature Park. Relative abundance averaged 0.452 WISA detected per CPB point. Sampling of the six focus areas using an 800-m CPB point grid during April proved to be a simple and logistically efficient method that appears useful for long-term monitoring.

The results from the CPB points sampled in 2018 were compared to the same points sampled in 2014 and 2017. Looking at the four individual focus areas where WISA have been detected each year, Coefficient of Variation (CV = SD/Mean) from 2014 to 2017 was 25-62%. Grouping all CPB points, the regional mean CV for relative abundance was 30% from 2014-2018. Power analysis to detect trends in relative abundance in the East Kootenay given CV of 30% would allow monitoring to detect a statistically significant net population decline of 56% over a 10 year-period.

These monitoring results cannot be extrapolated to the population of the entire East Kootenay AO because the areas were not selected randomly, and so will only apply to the focus areas. These six focus areas accounted for half of the known WISA nesting territories in the East Kootenay. Only wider area sampling, which was tried in 2010-2012 and proved to be very inefficient, can still address the population as a whole.

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INTRODUCTION

Williamson's Sapsucker (WISA) has been designated as Endangered in Canada (COSEWIC 2005, and re-confirmed in 2017), and is listed under Schedule 1 of the Species at Risk Act. Population monitoring in the East Kootenay region of BC was undertaken in 2010-2012 first by random sampling (2010) and then by Dual-Frame sampling (2011-2012) (Ohanjanian et al. 2012). In the Dual-Frame sampling, the List Frame consisted of the previously known nests, all of which were checked for occupancy each year, and an Area Frame that was sampled randomly, stratified either by habitat and/or by road access. The sampling proved expensive and did not collect enough data to provide a reliable population estimate with only one nest found in the Area Frame sampling in the two years.

In March 2014, a WISA-monitoring workshop was sponsored by CWS. At that workshop, it was decided to limit the areas regularly monitored in the East Kootenay to only those areas where WISA was known to have nested or occurred in groups of at least two, i.e., not at single isolated nests. In 2014, sampling consisted of Call and Drum Playbacks (CPB) at 400-m grid spacing in four areas each known to have several previously occupied WISA nests (Ohanjanian 2014). The sampling was only partially completed (129 out of about 180 planned points) because of weather problems, and logistical and funding limits.

To attempt to simplify the monitoring, roadside CPB monitoring was attempted in the East Kootenay in 2016 by Les Gyug and Ted Antifeau. This was similar in scope and design to the annual monitoring underway in the Okanagan and West Regions (e.g., Gyug 2014). However, the 108 CPB points within 300 m of Low or better suitability habitat only sampled four WISA on the first round and one WISA on the second round in the East Kootenay in 2016. These counts were too low for a reliable long-term monitoring program.

In 2017, the 2014 long-term monitoring scheme was revived but using an 800-m point grid spacing as used in the Okanagan in 2014 (Gyug 2014). The 400-m grid spacing is too close for WISA as a given WISA will frequently respond from more than one point, and the points will not be independent. Two other sampling areas were added to the four East Kootenay areas monitored in 2014. Gyug (2017) found that this CPB sampling was simple, efficient, and appeared acceptable for trend monitoring of WISA relative abundance in the East Kootenay.

METHODS

The same focus areas and points were sampled in 2018 that were sampled in 2017 (Gyug 2017). All focus areas were on Crown land. The intent was to sample as early in the breeding season as possible, preferably in early to mid-April, while WISA were establishing territories and tend to be very responsive. However, most areas are still snowbound in early or mid-April, so the sampling was moved to late April in 2017 and 2018.

CPB points that were re-used from 2014 were renamed to be consistent with the Okanagan and West naming scheme. These were labelled FM (for focused CPB monitoring), EK (for East Kootenay), followed by two letters for the focus area (see Table 1), a dash, and then a three-digit number. The final three-digit numbers were retained from 2014 if the point had been planned to be sampled in 2014.

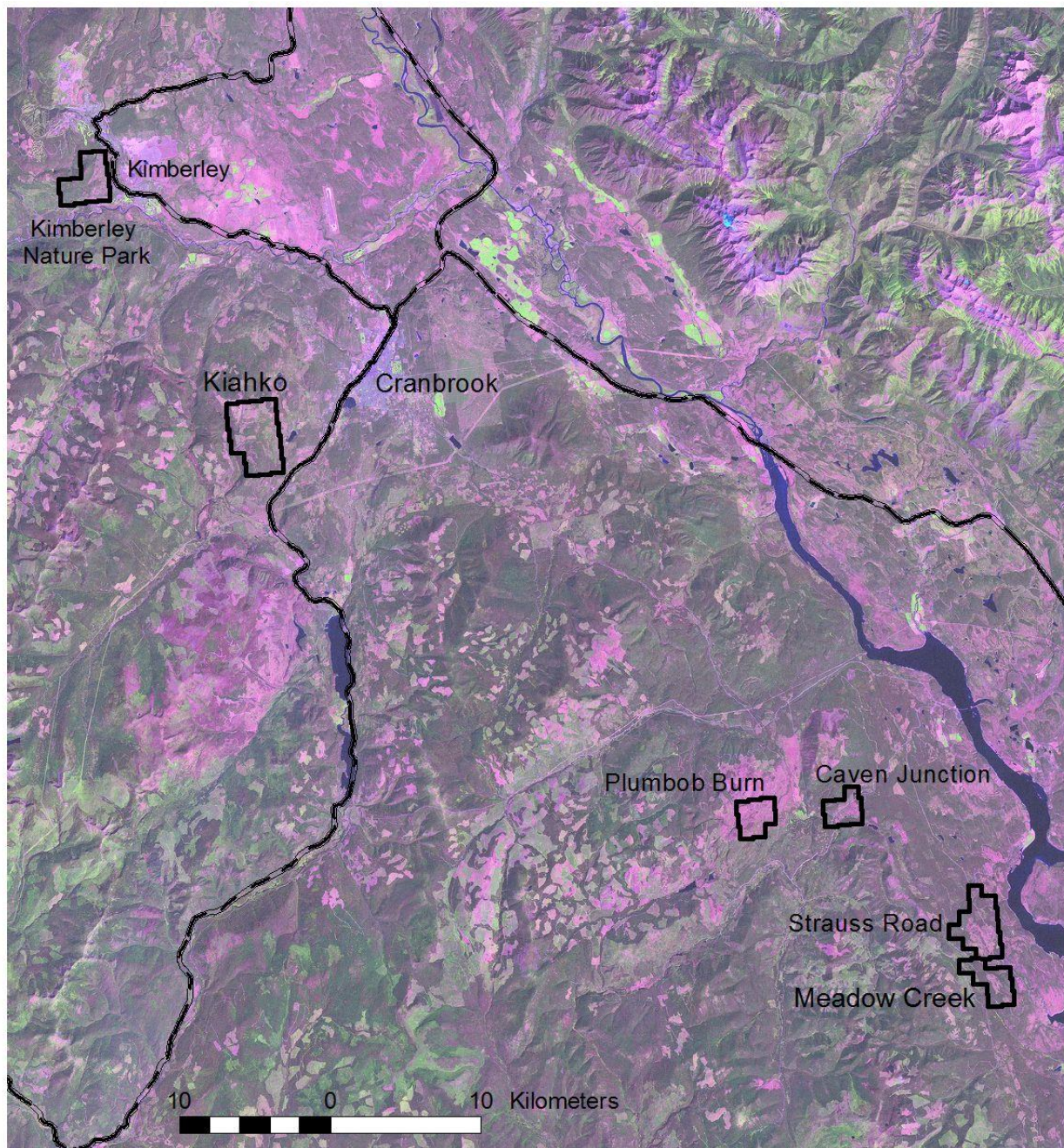


Figure 1. The six focus areas for long-term monitoring of Williamson's Sapsucker relative abundance in the East Kootenay, 2017-18. Background image is 2006 Landsat.

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. WISA can generally be heard if they respond by loud calling or drumming within 400 m if there are no competing sounds, e.g., wind, water, or traffic, even in densely forested stands. The distances at which softer drumming or calling can be heard is highly variable, but can generally be heard within 200 m.

Points were sampled by CPB in the planned grid locations with four exceptions. Four points were moved up to 50 m out of gullies, marshes or away from rushing creeks because of difficult access or to better allow any WISA responses to be heard. No WISA were detected at any of these points. Recorded at each CPB point were: date, time of day, ambient temperature, consistent wind speed (Beaufort) and speed of the highest wind gust during the listening period, cloud cover (1-4 scale where 1 = clear, 2 = <50% clouds, 3 = >50% clouds, 4 = overcast) and precipitation (None, Drizzle). Sampling was conducted from as early as one-half hour before sunrise until late afternoon, only if consistent winds were <Beaufort 3, and not in rain. Each 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.

For each WISA detection we recorded the time (seconds) of the initial response from the beginning of the CPB. If we detected a WISA from a point before CPB started, it was given a time of 0 seconds. CPB were still done at a point even if a WISA was detected before a CPB started because frequently the CPB prompted additional WISA to begin calling or drumming. We recorded the sex (male, female, unknown or pair), the number 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. WISA detected while walking between CPB points were recorded as incidental detections if they had not already been detected from a CPB point.

Relative abundance per focus area and for the sampled areas in the region as a whole was the number of WISA detected divided by the number of CPB points. Field data was entered into a single WISA Excel file template designed for submission to the Wildlife Species Inventory (WSI) Species Inventory (SPI) system of the BC Ministry of Environment. This file has been quality checked for formatting and for data entry errors.

RESULTS

The six focus areas containing 73 CPB points in total were sampled from April 24-May 7, 2018, by two people working independently but in radio, cell phone or satellite transmitter contact. The Plumbob Burn was not sampled until May 7 because road access was still snowbound in April; all other areas were sampled April 24-26. Snowshoes were required for access in the highest areas ~1200 m and above, which was about 200 m lower than at the same time in 2017. For example, snowshoes were not required in Kimberley Nature Park in 2017 but were required for about 3 km of the 16 km walked in 2018.

Table 1. East Kootenay WISA Relative Abundance in areas monitored by CPB sampling points on 800-m grid. Nominal area sampled was based on 450-m square buffer around all CPB points in each focus area.

Focus Area	Area Sampled (km ²)	N CPB Points	2017		2018	
			N WISA Detected	WISA/CPB	N WISA Detected	WISA/CPB
Caven Junction (CP)	4.97	7	3	0.429	6	0.857
Kiahko Creek (KI)	14.94	22	10	0.455	11	0.500
Kimberley Nature Park (KN)	8.36	12	0	0.000	0	0.000
Meadow Creek (MC)	6.42	9	0	0.000	2	0.222
Plumbob Burn (PB)	5.63	8	5	0.625	10	1.250
Strauss Road (ST)	10.43	15	4	0.267	4	0.267
Total	50.75	73	22	0.301	33	0.452

WISA were detected in five of the focus areas with a total of 33 WISA detected from CPB points (Table 1). In these areas, relative abundance ranged from 0.222 to 1.250 WISA detected per CPB point. The overall mean for 2018 of all CPB points (not separated by area) was 0.452 WISA detected per CPB point.

No WISA were found in Kimberley Nature Park. WISA have not been found in the Kimberley Nature Park since they were found nesting there in 2009. Nests were known in the park from 2004-2009 but the area no longer appears to be occupied. At least one pair of WISA nested in Meadow Creek in 2012. While the 2014 and 2017 found no WISA at Meadow Creek, a pair was detected at one sampling point near a previously known nest in 2018.

An additional WISA was detected incidentally in Kiahko separate from any of the CPB points. WISA were detected between CPB points in Plumbob Burn as well but most of these were probably the same birds detected from the CPB points (see Discussion).

DISCUSSION

As in 2017, sampling the six areas with CPB in April or early May on an 800-m grid proved to be a logistically simple and manageable approach to long-term WISA monitoring in the East Kootenay. However, the Plumbob site was not accessible because of snow bound roads in the last week of April and had to be completed in the first week of May. In future, allowance needs to be made in the sampling plan for such contingencies. Alternatives are to sample the higher elevation sites (Kiahko and Plumbob) while most roads are still snowbound, e.g. second week of April using a snowmachine for access, and then sampling when all lower elevation roads are snow-free, usually by third or fourth week of April. However, responsiveness of WISA to CPB even on May 7 was still very high, so I do not feel we lost anything in 2018 by waiting an extra week for access to the Plumbob focus area.

Ten WISA were detected on CPB points in Plumbob Burn in 2018 compared to only five in 2017. This almost certainly does not represent a doubling of the local population. Instead, it appears in 2018 to have included some overlap with pairs detected on more than one CPB point, and more times that both members of a pair were detected. Based on the 2018 CPB results, and incidental detections between CPB points, we estimated that in 2018 there were probably four pairs present that had established territories, and one other WISA separate from those that was present at both the beginning and end of the day's surveys. Two of those pairs were seen, while two other pairs were only detected with the two birds calling or drumming in very close proximity to each other, which we assumed to be pairs. In 2017, we detected WISA in four separate locations, probably indicative of four separate territories, with a pair detected at only one of those. In the end, there may have been only one more WISA breeding territory present in 2018 ($n = 5$) compared to 2017 ($n = 4$). Only with further surveys designed to census the numbers of breeding pairs or active nests could that be definitively determined.

To estimate the power of this annual monitoring to detect long-term trends, I compared the 2018 relative abundance to prior years (Table 2). CV for the annual monitoring of 2014-2018 was in the range of 25 – 62% based on the four focus areas where WISA occurred in each year. At a regional level, grouping all CPB, mean relative abundance was 0.338 WISA/CPB point, with a CV of 30% (Table 3).

The power analysis results were the same as estimated in 2017 because the assumption of 30% CV in 2017 was found to be suitable using the 2014-2018 data. Power analysis was conducted using Monitor v11.0.0 software (Gibbs and Ene 2010). I assumed one sampling round per year, grouping all CPB at a regional level, CV of 30%, alpha of 0.10, desirable power ($1 - \beta$) of 0.80, and a constant CV, i.e., SD varies with the mean. We could expect to detect a net change in relative abundance over a 10-year period of 8.8% per year, or net decline of 56% in 10 years, or a net increase of 113% in 10 years. Conducting two sampling sessions per year would allow us to detect a change of 6.0% per year, or net decline of 43% in 10 years, or net increase of 70% in 10 years. Doubling the sampling effort by sampling two rounds per year would not appear to be an efficient use of resources because it would not result in a halving of the net change that could be detected.

These long-term monitoring area results cannot be extrapolated to the population of the entire East Kootenay AO because the areas were not selected randomly. Only wider area sampling, which was tried in 2010-2012 and proved to be very inefficient, can still address the population as a whole. The focus areas sampled in 2017 included 41 of the 72 known WISA nests in the East Kootenay (counting a nest more than once if known to be used in more than one year), and 24 of the 48 known nest territories. Therefore, this focus area sampling may only address about half of the estimated population, but which is relatively efficient considering it only sampled 6 % of the Area of Occupancy (51 km^2 of 851 km^2). Only wider area sampling would be able to determine if any trend detected is region wide, or specific to these particular focus areas. At some point in the future, wider area sampling may still be required, which is likely to be very expensive to sample with an acceptable level of confidence.

Table 2. East Kootenay WISA Relative Abundance Coefficient of Variation (Std. Deviation/Mean) for area monitoring by CPB. 2017 and 2018 used 800-m point grid spacing, 2014 on 400-m grid (but not all CPB were completed-the total number planned is in parentheses), and surveyor-choice sampling in prior years. 2014-2018 Mean, SD and CV calculated using the same point sets as closely as possible.

Area	Year	N CPB	N WISA	WISA /CPB	SD	CV% (SD/Mean)
Caven Junction	2008	8	6	0.750		
	2012	6	0	0		
	2014	22	6	0.273		
	(same points as 2017)	2014	7	2	0.286	
		2017	7	3	0.429	
		2018	7	6	0.857	
	2014-2018 Mean			0.524	0.297	57%
Kiahko	2006	56	17	0.304		
	2007	19	3	0.158		
	2008	44	21	0.477		
	2012	6	1	0.167		
	2014	38(83)	4	0.105		
	(same points as 2017)	2014	10	1	0.100	
		2017	22	10	0.455	
		2018	22	10	0.500	
	2014-2018 Mean			0.352	0.219	62%
Kimberley Nature Park	2006	24	4	0.167		
	2007	16	1	0.063		
	2008	10	0	0		
	2017	12	0	0		
	2018	12	0	0		
Meadow Creek	2006	14	0	0		
	2008	9	1	0.111		
	2014	27(36)	0	0		
	2017	9	0	0		
	2018	9	2	0.222		
	2014-2018 Mean			0.074	0.128	173%
Plumbob Burn	2017	8	5	0.625		
	2018	8	10	1.250		
	2017-2018 Mean			0.938	0.442	47%
Strauss	2007	27	5	0.185		
	2008	17	15	0.882		
	2012	18	2	0.111		
	2014	42(56)	9	0.214		
	(same points as 2017)	2014	12	2	0.167	
		2017	15	4	0.267	
		2018	15	4	0.267	
	2014-2018 Mean			0.234	0.058	25%

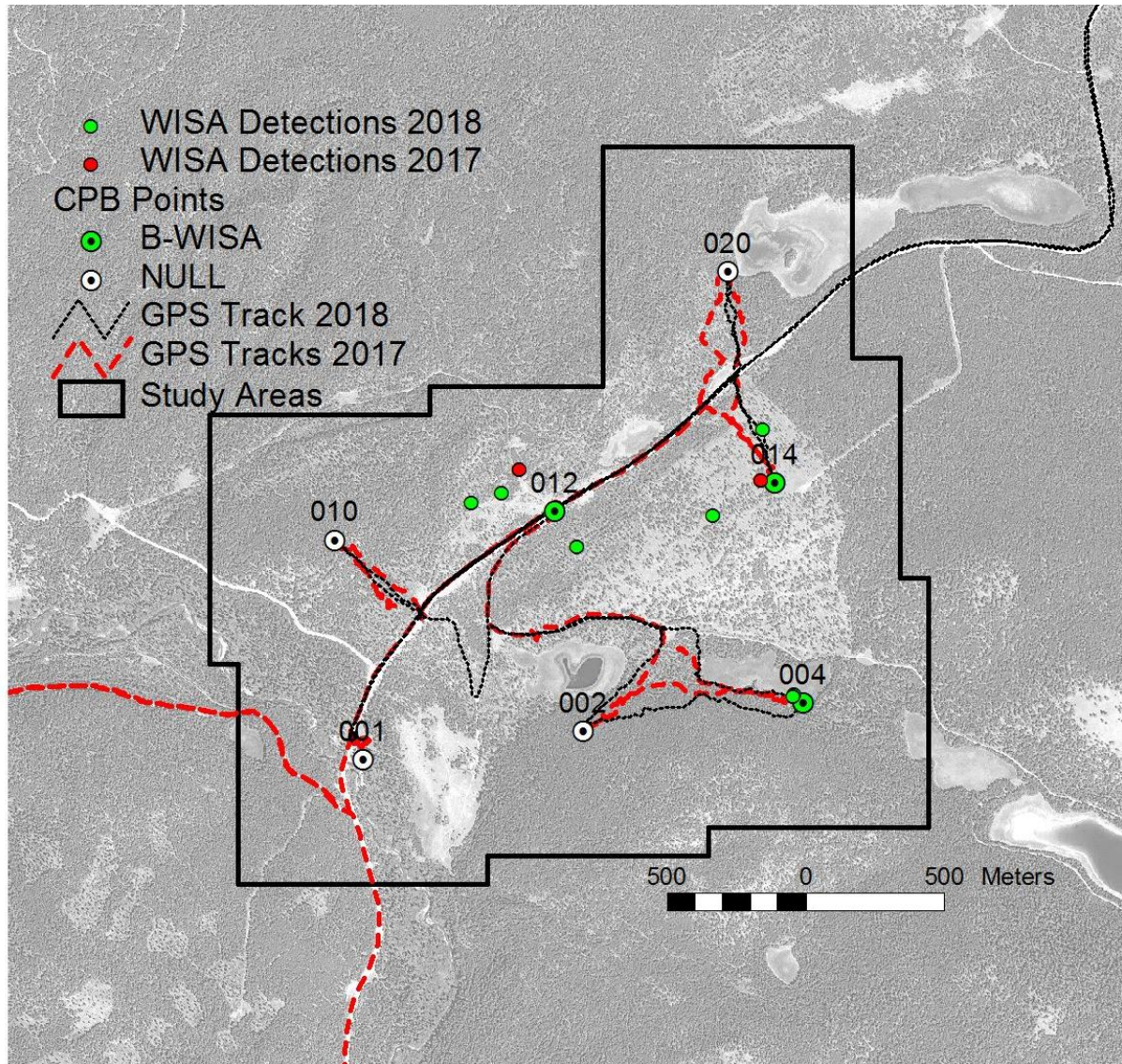
Table 3. East Kootenay WISA Relative Abundance Coefficient of Variation (Std. Deviation/Mean) at a regional level, grouping the areas. Only 800-m spacing CPB points were used for the 2014 comparison.

Area	Year	N CPB	N WISA	WISA /CPB	SD	CV% (SD/Mean)
All focus areas	2014	46	12	0.261		
	2017	73	22	0.301		
	2018	73	33	<u>0.452</u>		
2014-2018 Mean				0.338	0.101	30%

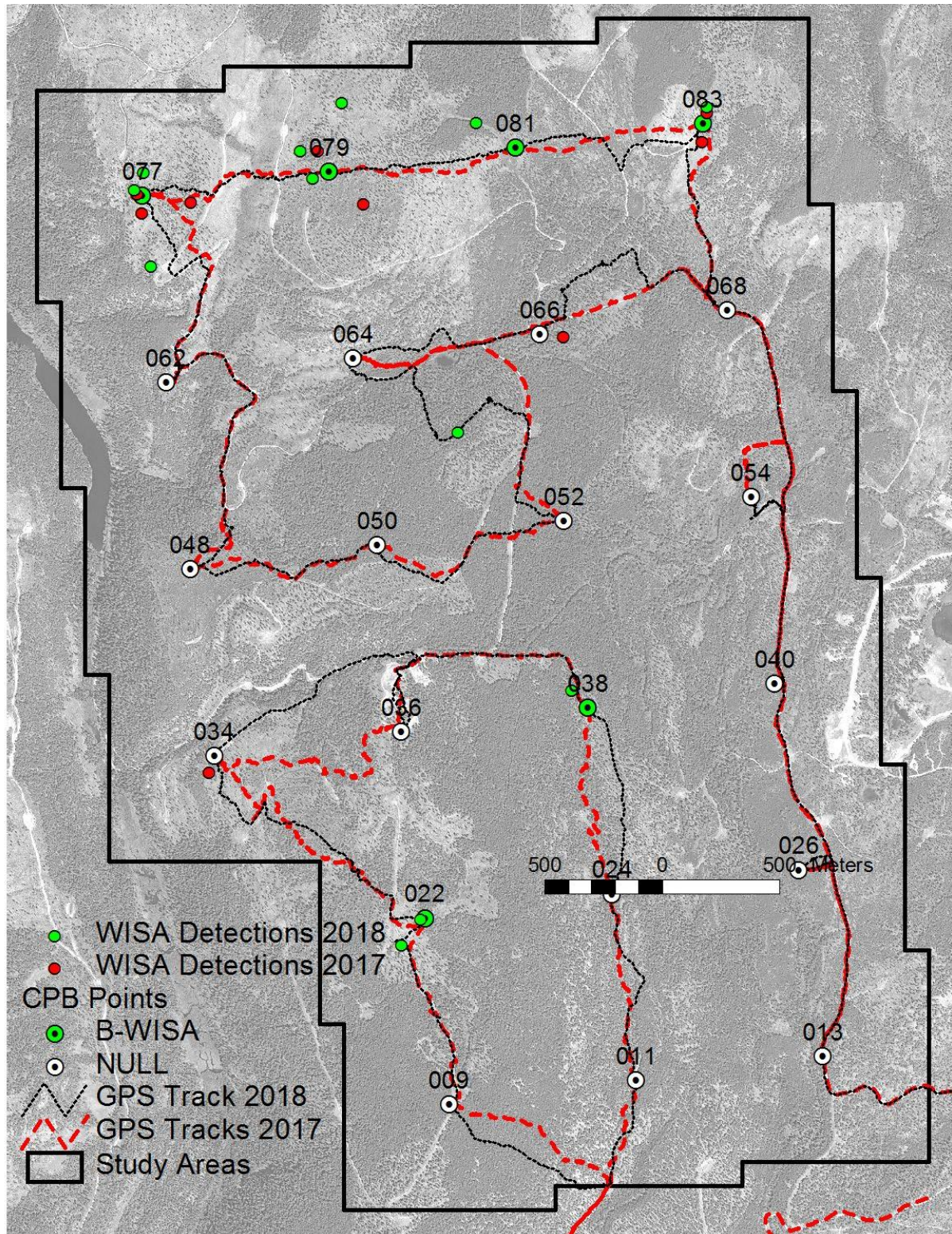
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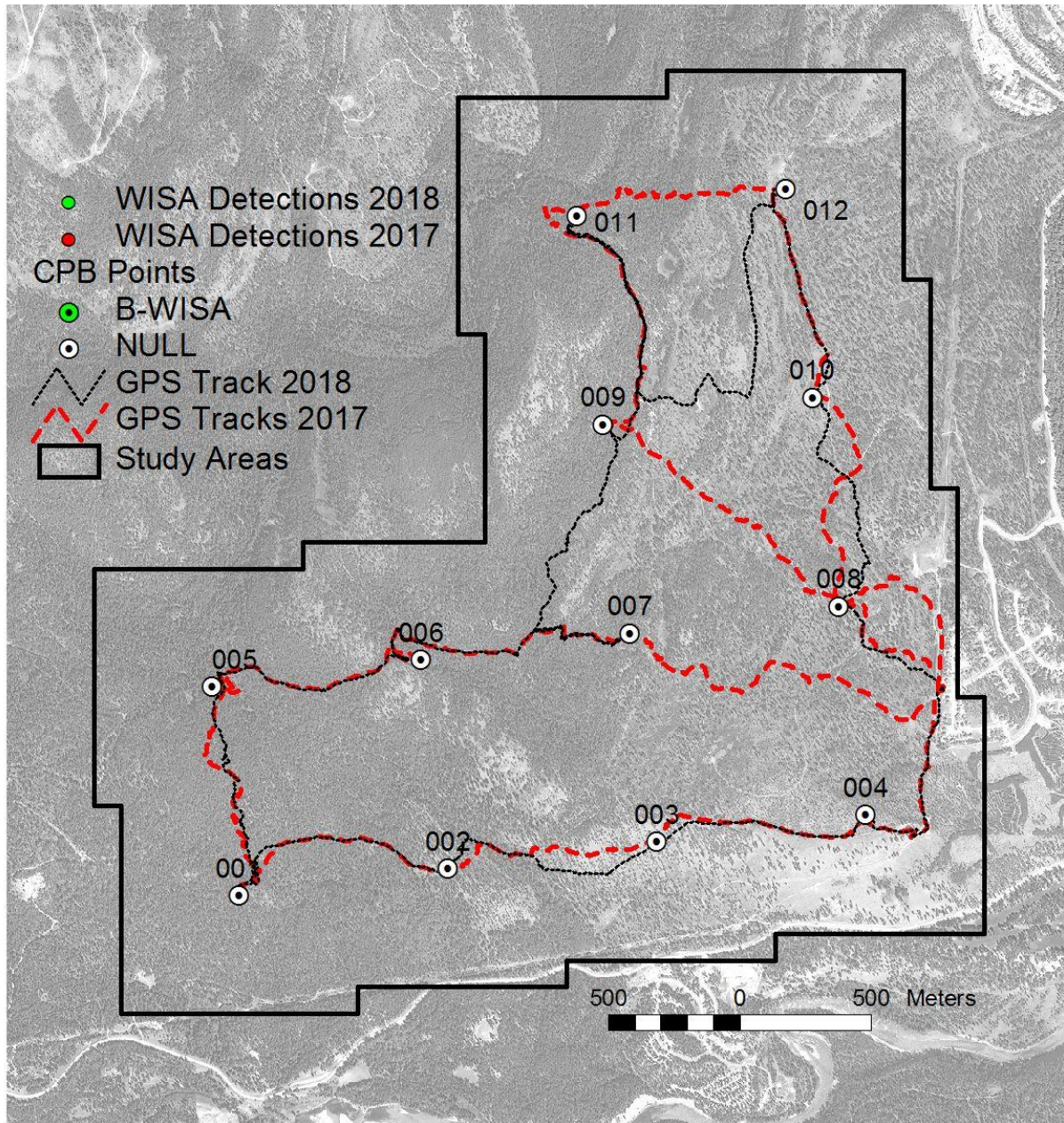
APPENDIX 1. Focus Area Maps



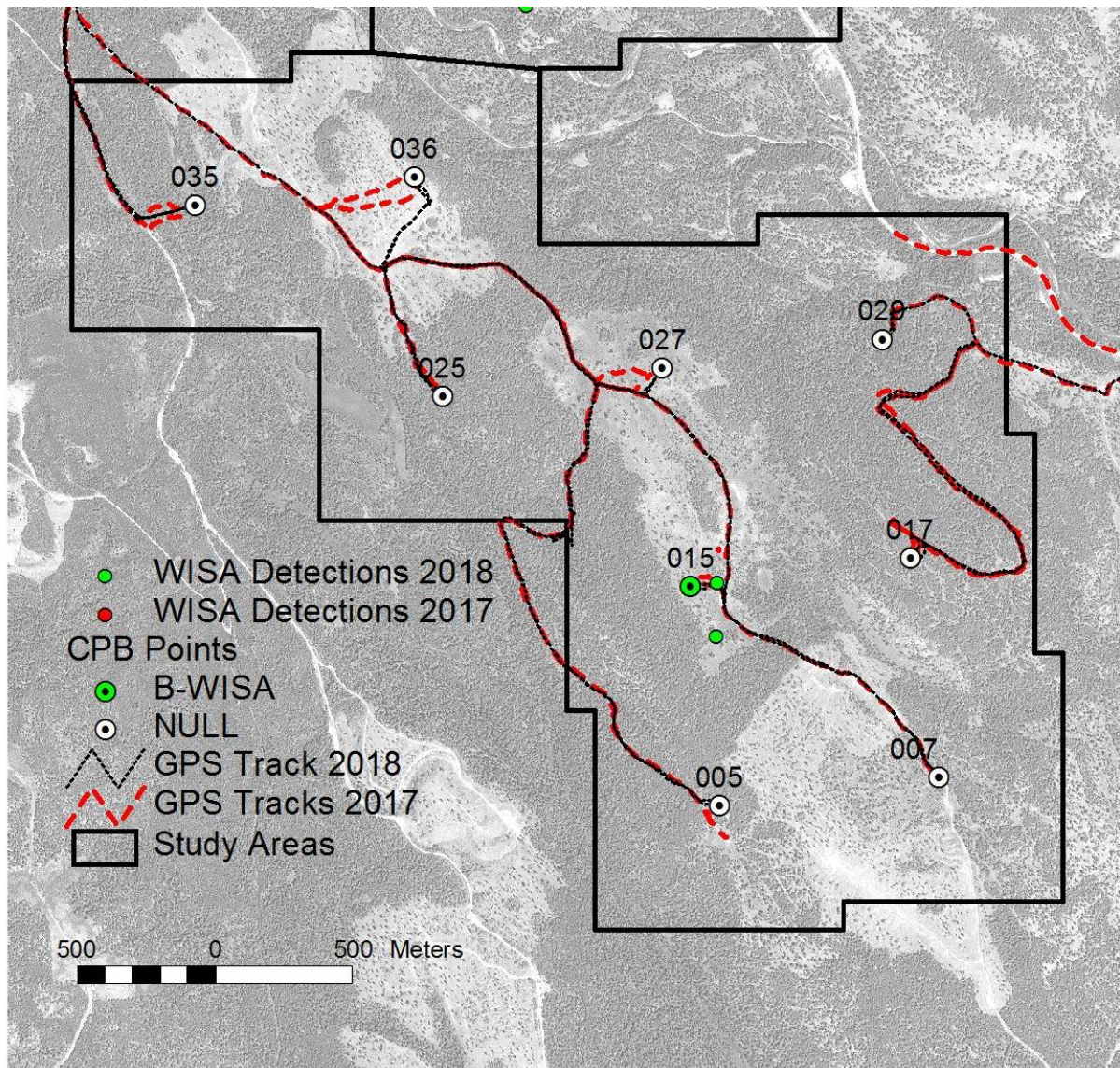
Map 1. Caven Junction WISA CPB sampling, April 26, 2018. The main forestry roads were snow-free and drivable on the sampling date.



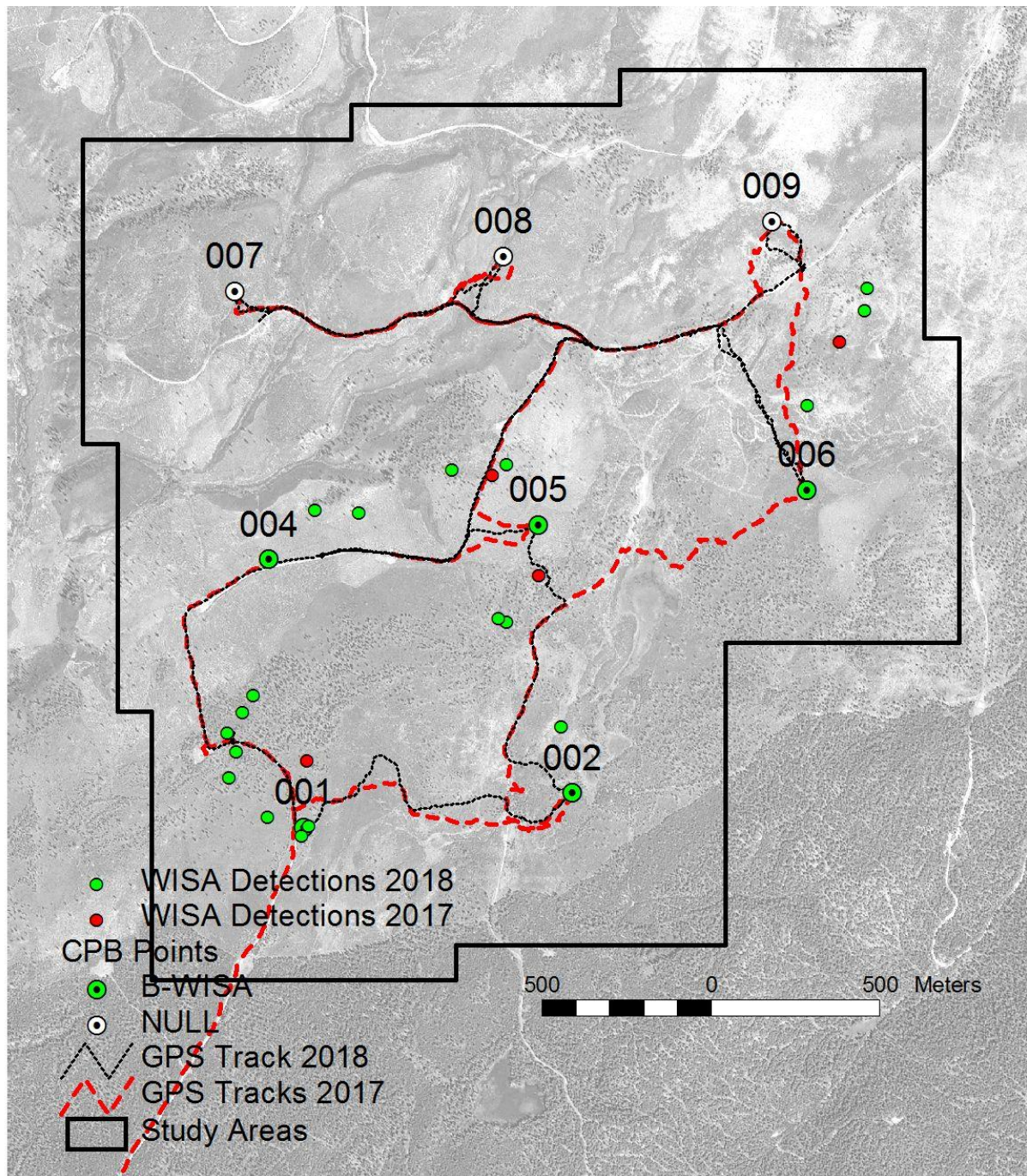
Map 2. Kiahko WISA CPB sampling, April 24, 2018. The only drivable roads on the sample date were to a point about 400 m south of Pt 011, and the road between pts 013 and 068.



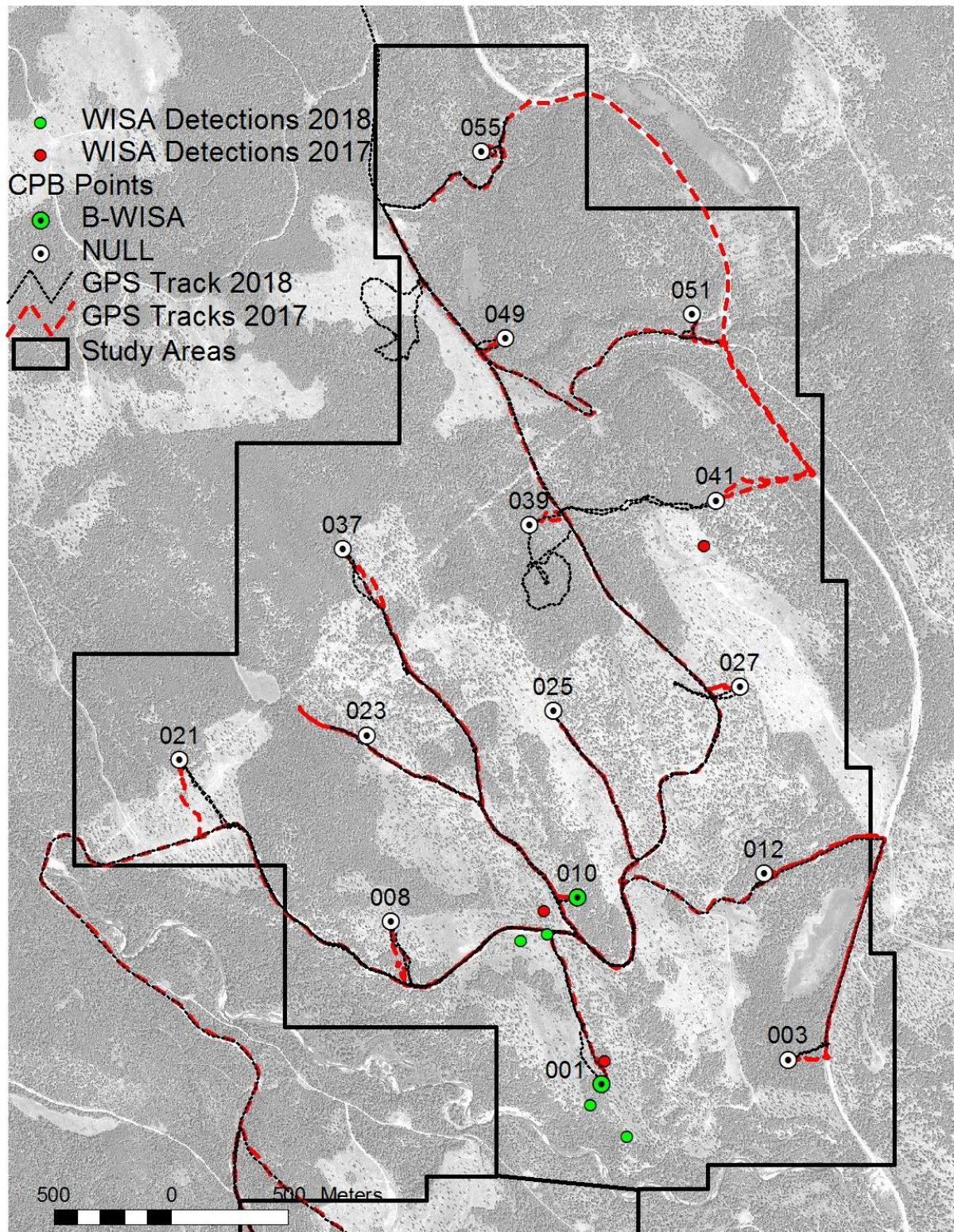
Map 3. Kimberley Nature Park WISA CPB sampling, April 25, 2018. There are no roads in Kimberley Nature Park but there is a trail network which was mostly snow free below 1200 m on the sample date. Snowshoes were used in the vicinity of pts 005, 006, 009 and 011.



Map 4. Meadow Creek WISA CPB sampling, April 26, 2018. All roads were drivable except for the roads to within 1.3 km of Pt 005 and to within 600 m of Pt 007.



Map 5. Plumbob Burn WISA CPB sampling, May 7, 2018. The area was not accessible by road in April 2018, but the road close to Pts 007, 008, 009 was accessible on May 7. Access was by foot off this main road. The area was accessed from the south in 2017 to Pt 001. WISA detections in 2018 include incidental detections between CPB pts.



Map 6. Strauss Road WISA CPB sampling, April 25, 2018. All main roads were snow free in the sampling area on April 25.