Williamson's Sapsucker Relative Abundance Monitoring, East Kootenay 2019

Les Gyug, R.P.Bio.

Okanagan Wildlife Consulting
3130 Ensign Way,
West Kelowna, BC V4T 1T9

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Environment and Climate Change Canada
– Canadian Wildlife Service
5421 Robertson Road, Delta, B.C.

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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 fourth year (2014, 2017-2019) of annual monitoring using Call Playback (CPB). Six focus areas totaling 50.75 km^2 in area were sampled by 73 CPB points from April 23-26, 2019. We detected 26 WISA from 73 CPB points in five of the focus areas, while none were detected in Kimberley Nature Park. Relative abundance averaged 0.356 WISA detected per CPB point. These six focus areas accounted for half of the known WISA nesting territories in the East Kootenay.

We found WISA in April in the vicinity of 24% of 25 previously known nesting territories outside the focus areas, which was similar to the 22% found in both 2011 and 2012 in the East Kootenay. Occupancy in April within the focus areas was slightly higher at 32%, but still at the low end of the 30-50% rate found in other regions occupied by WISA in BC. Returning to the sites in June found 20% occupancy outside the focus areas, and the same 32% inside the focus areas.

The results from the CPB points sampled in 2019 were compared to the same points sampled in 2014 and 2017-18. Looking at the four focus areas where WISA have been detected each year, Coefficient of Variation (CV = SD/Mean) from 2014 to 2019 for each area varied between 34% and 72%. Grouping all CPB points, the regional mean CV for relative abundance was 24% from 2014-2019. Power analysis to detect trends in relative abundance in the East Kootenay given CV of 24% would allow this monitoring to detect a statistically significant net population decline of 53% over a 10 year-period. We recommend continuing this annual monitoring as an efficient and effective method to monitor WISA population trends in the East Kootenay. However, we recommend modifying the search methods in Kimberley Nature Park where no WISA have been detected since 2009, and extending the Strauss focus area with 15 CPB points to the northwest, northeast and east where WISA have been found before or nests are now known.

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Acknowledgments

This monitoring was funded by the Canadian Wildlife Service (CWS) of Environment and Climate Change Canada, Delta, B.C., through contract 3000688183 to Okanagan Wildlife Consulting. Eric Gross of CWS was the contract monitors. This July 8 report replaces the previous drafts with additional surveys for nesting territory occupancy beyond the contract specifications done in June while in the area on other work, and a few other corrections. Many thanks to Ted Antifeau for assistance in collecting field data in April, and providing some data corrections based on his field notes from the area prior to 2017.

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. 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 two seasons of effort.

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 because of 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, 2018) 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 2019 that were sampled in 2017 and 2018 (Figure 1). The intent was to sample as early in the breeding season as possible, preferably in 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. Snowmelt was earlier in 2019, with all access roads snowfree by late April. The six focus areas containing 73 CPB points in total were sampled from April 23-26, 2019, by two people working independently but in radio, cell phone or satellite transmitter contact.

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.

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 dense forests. Softer drumming or calling can generally be heard from 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.

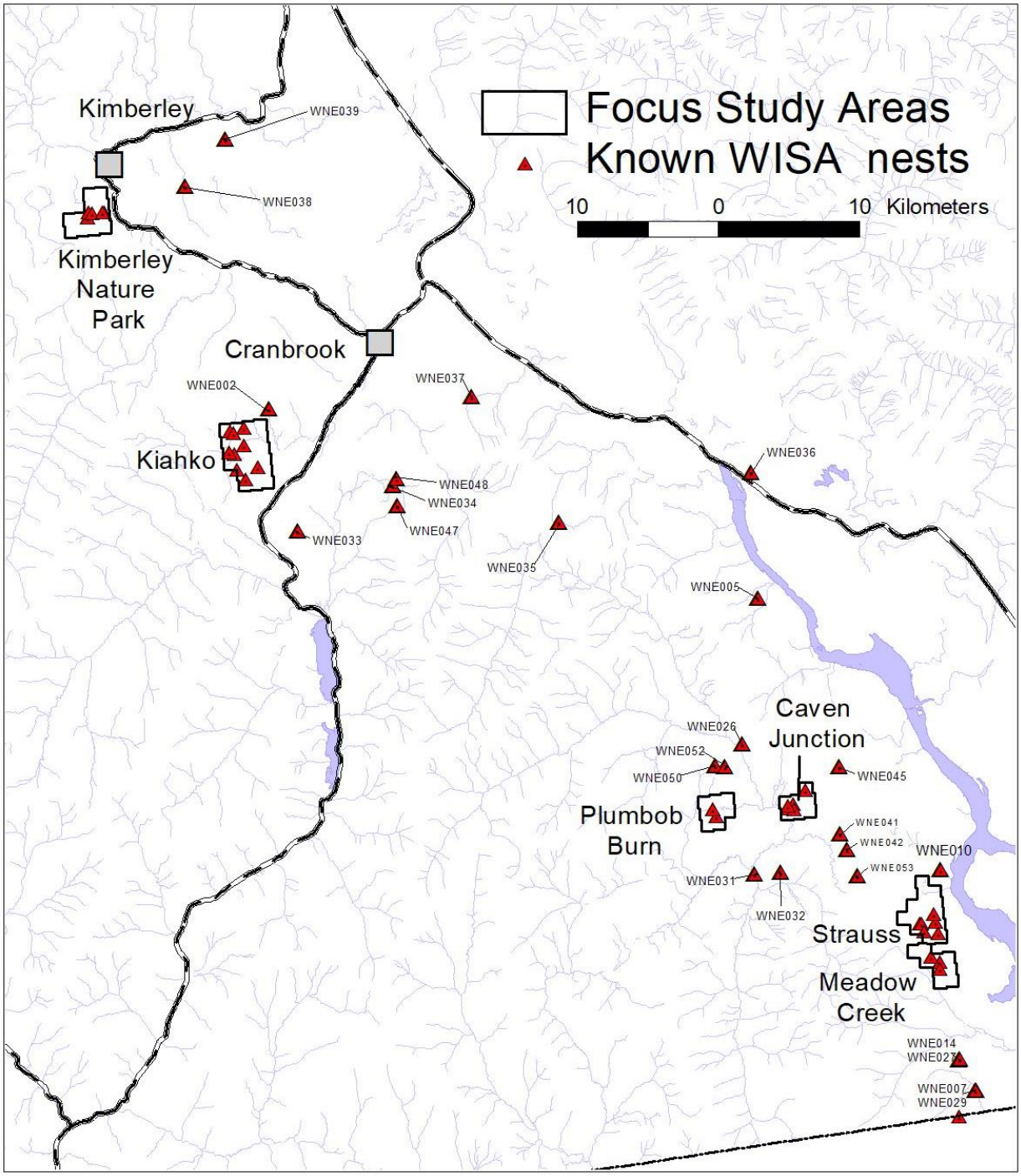

Figure 1. The six focus areas for long-term monitoring of Williamson's Sapsucker relative abundance in the East Kootenay, 2017-19, and the 25 nests rechecked for occupancy in April, 2019.

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		2019	
			N WISA Detected	WISA/ CPB	N WISA Detected	WISA/ CPB	N WISA Detected	WISA/ CPB
Caven Junction (CP)	4.97	7	3	0.429	6	0.857	1	0.143
Kiahko Creek (KI)	14.94	22	10	0.455	11	0.500	8	0.364
Kimberley Nature Park (KN)	8.36	12	0	0.000	0	0.000	0	0.000
Meadow Creek (MC)	6.42	9	0	0.000	2	0.222	2	0.222
Plumbob Burn (PB)	5.63	8	5	0.625	10	1.250	7	0.875
Strauss Road (ST)	10.43	15	4	0.267	4	0.267	8	0.533
Total	**50.75**	**73**	**22**	**0.301**	**33**	**0.452**	**26**	**0.356**

Relative abundance was the number of WISA detected divided by the number of CPB points, either per focus area, or for all focus areas grouped.

In 2019, 25 previously known nests outside the focus areas were also checked for WISA presence in late April. If no WISA were detected as we walked towards the old nest, several quiet and incomplete CPB were done to determine if any WISA were present in the immediate area of the old nest. If no WISA were detected after the quiet CPB, then the full CPB protocol outlined above was undertaken near the old nest. Additional surveys of any nest territories occupied in April, and all other known nests not surveyed in April, were done in June while in the area on other work for the Ministry of Forests, Lands, Natural Resource Operations and Rural Development.

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 was quality checked for formatting and for data entry errors.

RESULTS

WISA were detected in five of the focus areas with a total of 26 WISA detected from CPB points (Table 1, see maps in Appendix 1). In these areas, relative abundance ranged from 0.143 to 0.875 WISA detected per CPB point. The overall mean for 2018 of all CPB points (not separated by focus area) was 0.356 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 both 2018 and 2019 (Appendix 1, Map 5). In Kiahko, WISA were only detected at the northwestern portion of the focus area (Appendix 1, Map 2) despite additional nest checks in the southern half of the focus area.

Additional WISA were detected incidentally separate from any of the CPB points in Strauss focus area (Appendix 1, Map 6).

We found WISA in the vicinity of only 6 of 25 previously known nests outside the focus areas, or a 24% re-occupancy rate of nesting territories early in the breeding season (Table 2). Previously known nests with WISA present in April 2019 were: WNE010, WNE033, WNE045, WNE050, WNE052, and WNE053 (Figure 1).

Rechecking those territories in June that were occupied in April showed successful nesting in three (12%) of the 25 breeding territories, with another two still occupied but no active nests found, for a total 20% occupied. This occupancy rate was only slightly lower than the 24% found in April (Table 2). The only nest site where we found a WISA in April but did not find one in June was WNE050. When re-sampled in June, the only old nest still active outside the focus areas was WNE053. Nest WNE033 was replaced by a new nest 95 m northwest, and there was the single nest found about halfway between WNE050 and WNE052. As in April, a female was found in June within 125 m of WNE045 but no nest could be found, and a WISA (not seen) was found within 100 m of WNE010 but no nest could be found.

No WISA and no occupied nesting territories were found north of Cranbrook in 2019 when checked in April, and the area was not re-checked in June.

One active Lewis's Woodpecker nest was discovered in the Strauss focus area in June 2019, about 200 m due North of Pt 027.

Table 2. East Kootenay WISA occupancy rates within and outside focus areas based on nest checks in April and June, and locations of WISA detected during 800-m grid sampling in April 2019.

Sites	Known WISA Nesting Territories	Occupied in April 2019	*Occupancy Rate (%)*	Occupied in June 2019		*Occupancy Rate (%)*
				Active Nest	Other	
Outside Focus Areas	25	6	***24***	3	2	***20***
Focus Area						
Caven Junction (CP)	4	0		0	0	
Kiahko Creek (KI)	7	3		3	0	
Kimberley Nature Park (KN)	4	0		-	-	
Meadow Creek (MC)	3	1		1	0	
Plumbob Burn (PB)	2	1		1	0	
Strauss Road (ST)	5	3		0	3	
Total Focus Areas	**25**	**8**	***32***	**5**	**3**	***32***

Within the focus areas, the April occupancy rate was slightly higher at 32% than outside the focus areas. We did not actually check most of the nests within the focus areas, but based the April results on assumed occupancy from the 800-m grid sampling (Table 2). Re-checking nests and territories in the focus areas in June gave the same 32% occupancy rate as in April (Table 2).

DISCUSSION

As in 2017 and 2018, 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.

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 2017-2019 included 24 of the 48 nest territories known prior to 2017. Therefore, this focus area sampling may only address about half of the estimated population. However, this is relatively efficient considering it only samples 6% of the Area of Occupancy (51 km^2 of 851 km^2).

Ohanjanian (2011) and Ohanjanian et al. (2012) found nesting in 18% of 39 previously known nesting territories in 2011 and in 25% of 40 in 2012. Recalculating the 2011 and 2012 rates from the original data, 8 of 37 breeding territories were occupied in 2011 and 2012, for an occupancy rate of 22% in each year. These rates are very similar to the 21% rate we found in April, 2019. Within the

focus areas, the occupancy rate was closer to the 30-50% re-occupancy rates found in the Okanagan-Boundary and West regions (Gyug 2016), but was still at the low end of this range.

Recommended Monitoring Modifications

I recommend two changes to the focus area sampling make the monitoring more efficient in 2020 and beyond. Firstly, no WISA have been found in Kimberley Nature Park (KNP) since 2009. Therefore, I suggest sampling only the central four of the 800-m grid CPB points around the five previously known nests, and substituting eight irregularly-spaced CPB points near the old nests for the eight outlying 800-m grid points (Map 3). This would provide confirmation that the known nesting territories are either occupied or not, rather than relying on the 800-m grid points alone, which do not directly sample all the known nests closely. If WISA are to return to the KNP, then this area of previous nesting is the area they are most likely to return to. If no WISA are detected in KNP in 2020, then it should only be sampled every second year in the future.

Secondly, I recommend adding 15 CPB points to the Strauss focus area. On the northwest side, the three points would bring the new nest found in 2019 into the area (Appendix 1, Map 6). On the northeast side, the five points would bring known nesting territory of WNE010 into the area. On the east side, the seven points would bring areas where WISA were found near three of the proposed points in 2007, 2008, 2012, and in our sampling in 2019. Each of the points is within at least 300 m of roads, so access is fairly good. The time required to sample these additional points should not be excessive, and should be achievable within the current level of funding.

In an initial draft of this report, I had recommended putting a new focus area on the north side of the Plumbob Burn where there appeared to be two active nest territories in 2019 (WNE050 and WNE052). However, the surveys in June showed there was only one WISA breeding territory there, with the 2019 nest about halfway between the two previously known nests. Ted Antifeau provided his field notes from 2012, 2013, and 2015 with additional information on the site, which had not previously been recorded in the WISA master database. While only one nest was found in that area in 2012 and 2013, there were at least two pairs in the area in each year. In 2015, both WNE050 and WNE055 were active nests within that area. There would be insufficient time in the budget to add this as a new focus area in 2020 given the proposed expansion of the Strauss sampling area, although this area should be considered for sampling in the future.

Table 3. East Kootenay WISA Relative Abundance Coefficient of Variation (Std. Deviation/Mean) for area monitoring by CPB. 2017-19 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. 2014-2019 Mean, SD and CV calculated using the same points as closely as possible.

Area	Year	N CPB	N WISA	WISA /CPB	SD	CV% (SD/Mean)
Caven Junction	2014	7	2	0.286		
	2017	7	3	0.429		
	2018	7	6	0.857		
	2019	7	1	0.143		
Mean				**0.429**	**0.308**	**72%**
Kiahko	2014	10	1	0.100		
	2017	22	10	0.455		
	2018	22	10	0.500		
	2019	22	8	0.364		
Mean				**0.355**	**0.179**	**50%**
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		
	2019	12	0	0		
Meadow Creek	2014	27	0	0		
	2017	9	0	0		
	2018	9	2	0.222		
	2019	9	2	0.222		
2014-2019 Mean				**0.111**	**0.128**	**115%**
Plumbob Burn	2017	8	5	0.625		
	2018	8	10	1.250		
	2019	8	7	0.875		
2017-2019 Mean				**0.917**	**0.315**	**34%**
Strauss	2014	12	2	0.167		
	2017	15	4	0.267		
	2018	15	4	0.267		
	2019	15	8	0.533		
2014-2019 Mean				**0.309**	**0.157**	**51%**

Power Analysis

To estimate the power of this annual monitoring to detect long-term trends, I compared the 2019 relative abundance to prior years (Table 3). CV for annual monitoring in the 2014-2019 period, assuming no actual change in relative abundance was in the range of 34 -72% based on the four focus areas where WISA occurred in each year. At a regional level, grouping all CPB, mean relative abundance was 0.343 WISA/CPB point, with a CV of 24% (Table 4).

Table 4. 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	0.452		
	2019	73	28	0.356		
2014-2019 Mean				**0.343**	**0.083**	**24%**

The power analysis results were similar to those estimated in 2017, where the CV estimate of 30% was used, but slightly more powerful with a found regional CV of 24% in 2014-2019. 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 24%, alpha of 0.10, desirable power (1-beta) of 0.80, and a constant CV, i.e., SD varies with the mean. With these assumptions, and using the same relative abundance sampling methods we used, we could expect to detect a net change in relative abundance over a 10-year period of 7.1% per year. This is equivalent to a net decline of 53% or a net increase of 85% in 10 years (Table 5).

Specific population targets have not been set in the Recovery Strategy for the East Kootenay, other than to maintain at or above current abundance allowing for natural fluctuations (Environment and Climate Change Canada 2016). For the moment, we will assume that natural fluctuations in the East Kootenay are on the order of 24-30% using the observed CV of this sampling. Given this natural variance, the power analysis of Table 5 could be used to set monitoring goals and the effort/funding required to meet those goals. For instance, sampling only once per year will only allow a decline of 53% to be reliably detected in 10 years (Table 5). Longer-term sampling will be required to determine if trends are actually observable using the current level of effort. However, using our estimates to predict what will be observable, if we want to detect trends between the observed natural fluctuation rate, i.e., 30%, and the minimum that we predict is detectable using our current methods, i.e., 53%, then an increase in sampling effort should be considered.

Table 5. Power analysis of annual and 10-year net changes detectable in East Kootenay regional relative abundance using CPB monitoring of the six focus areas accounting for half of the known nesting territories. Assumptions are listed in the text.

Sampling Sessions per Year	Annual change detectable in Relative Abundance over 10 years	Net Change over 10-year period	
1	7.1%	-53%	+85%
2	4.8%	-36%	+52%
3	4.2%	-32%	+45%
0.5 (every second year)	12.2%	-65%	+154%

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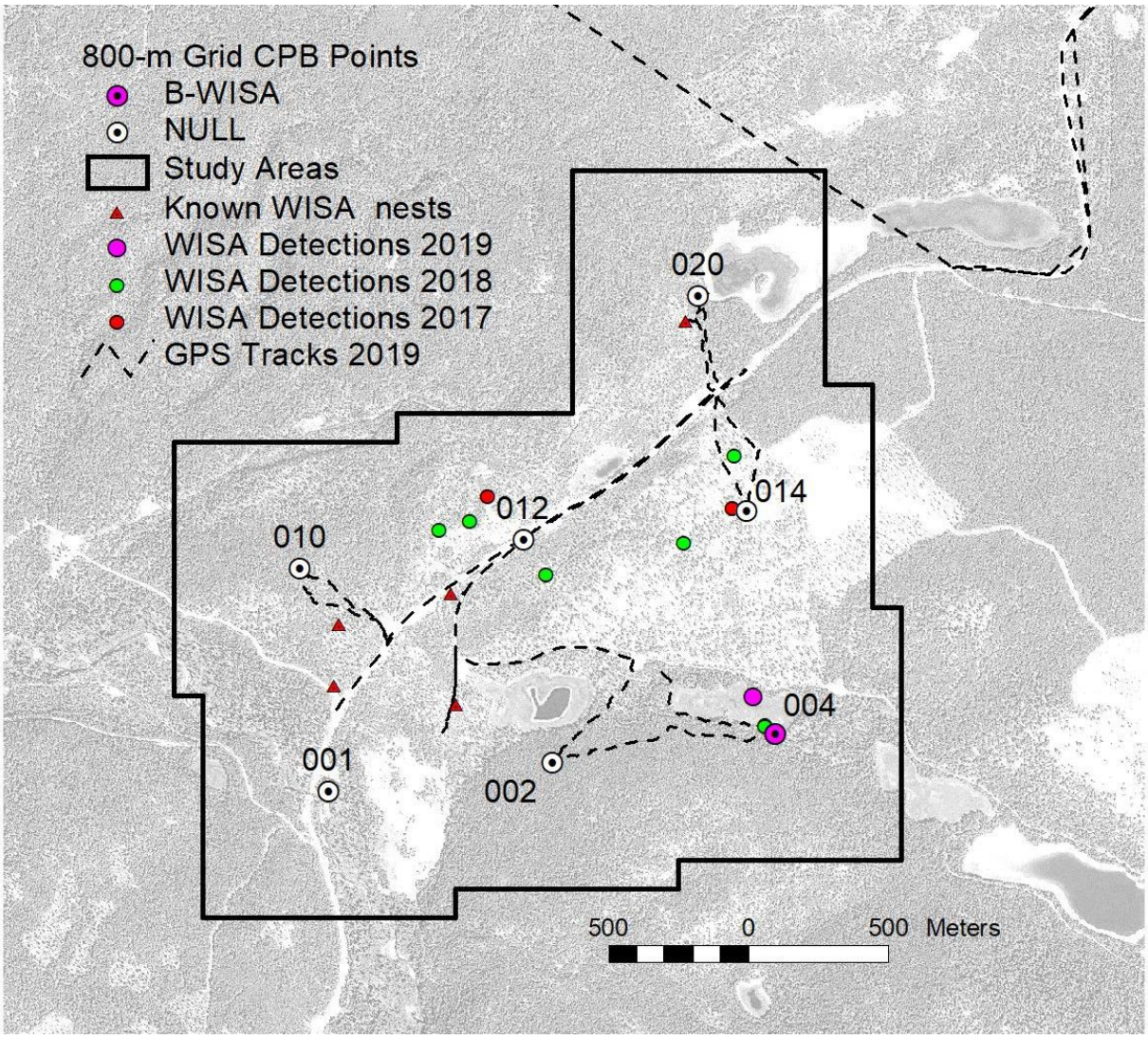
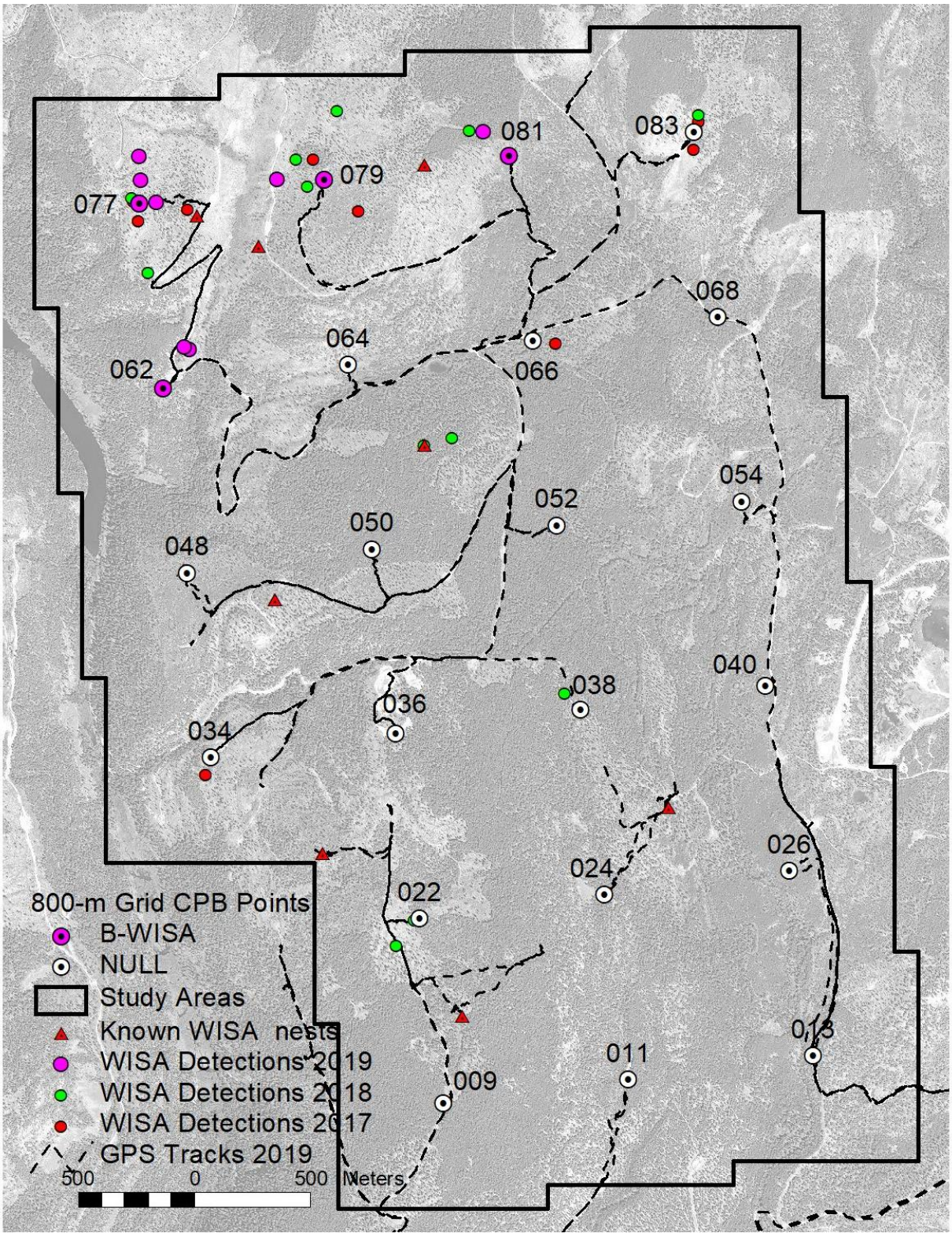
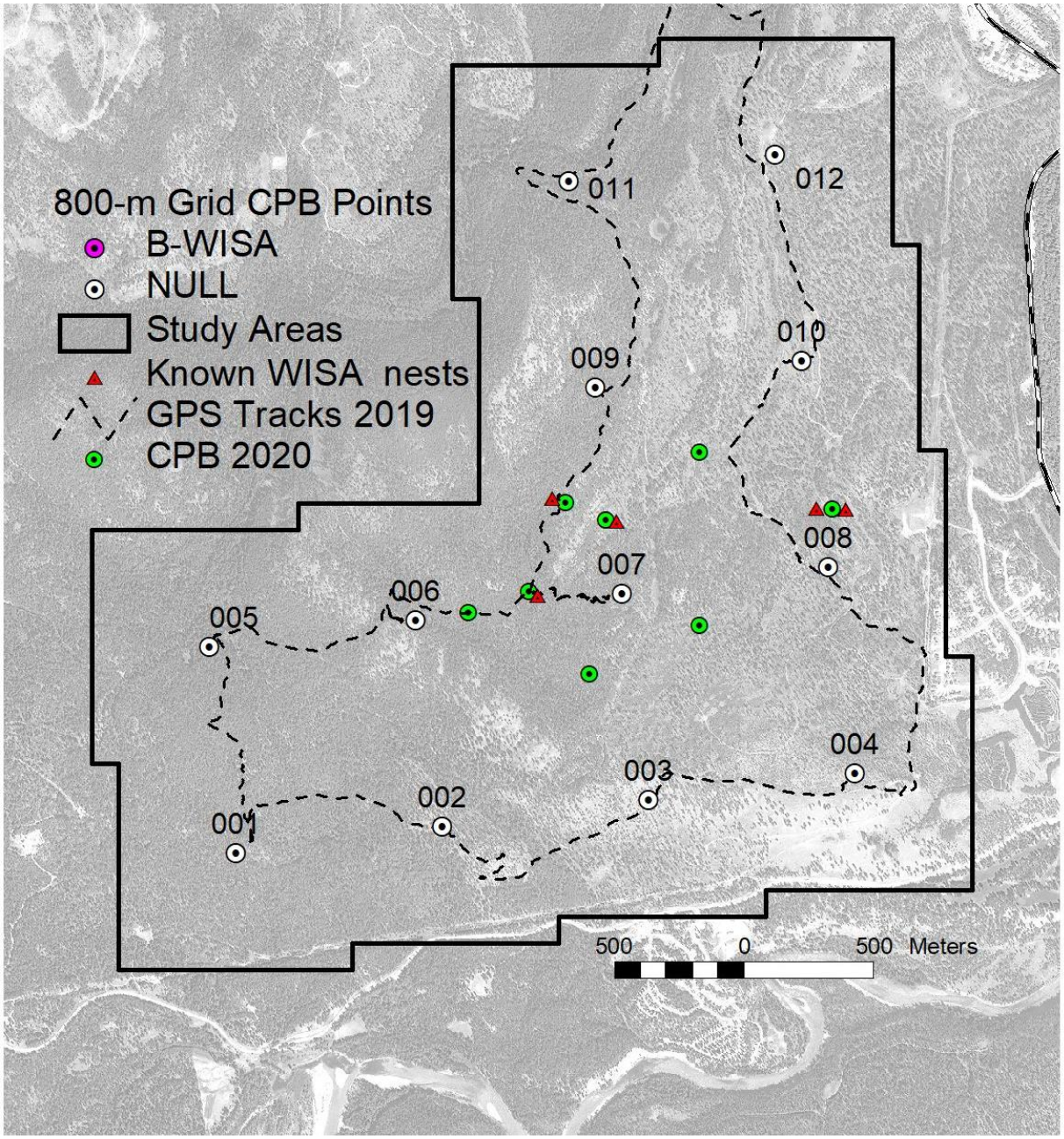
APPENDIX 1. Focus Area Maps



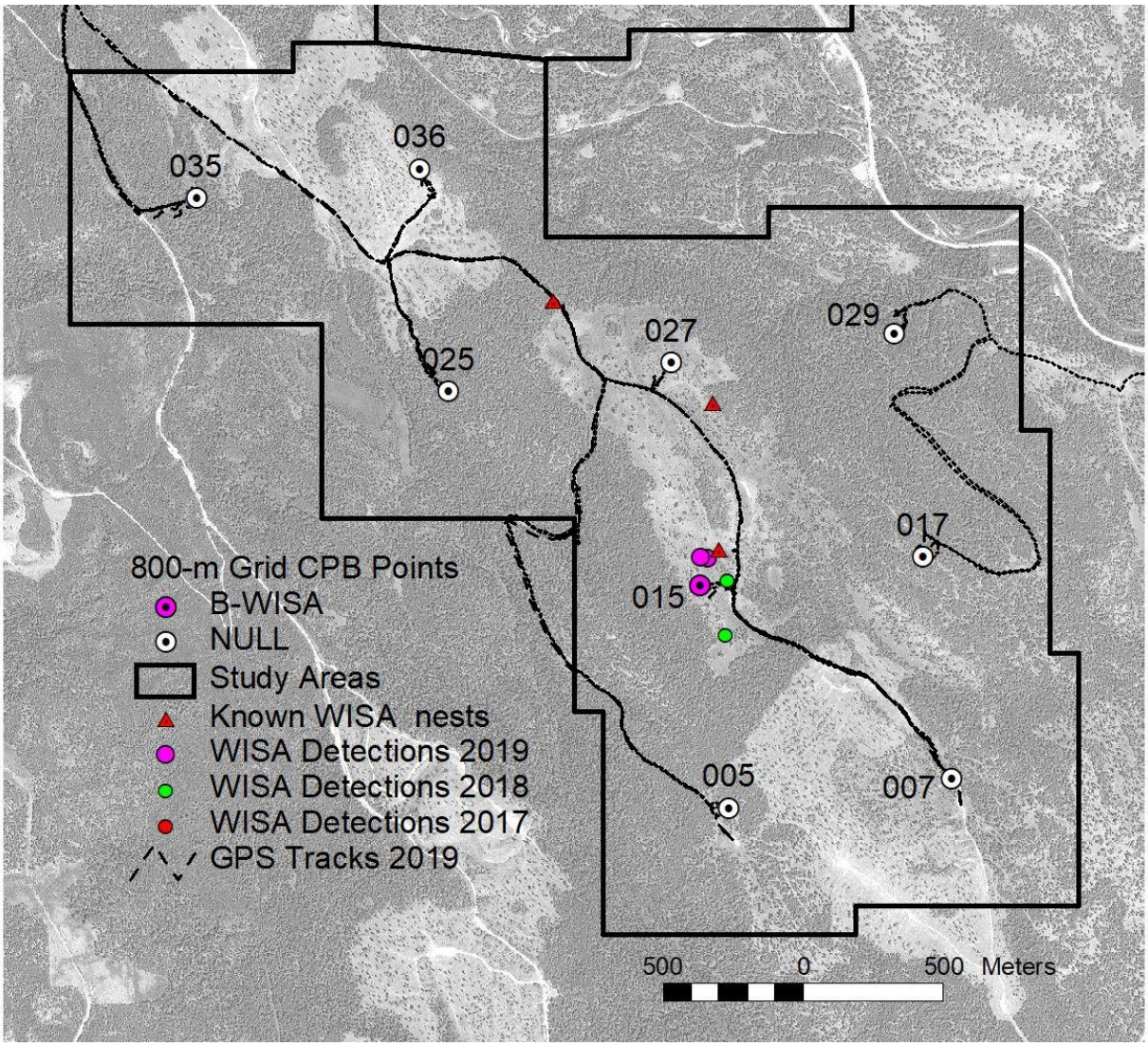
Map 1. Caven Junction WISA CPB sampling, April 25, 2019.



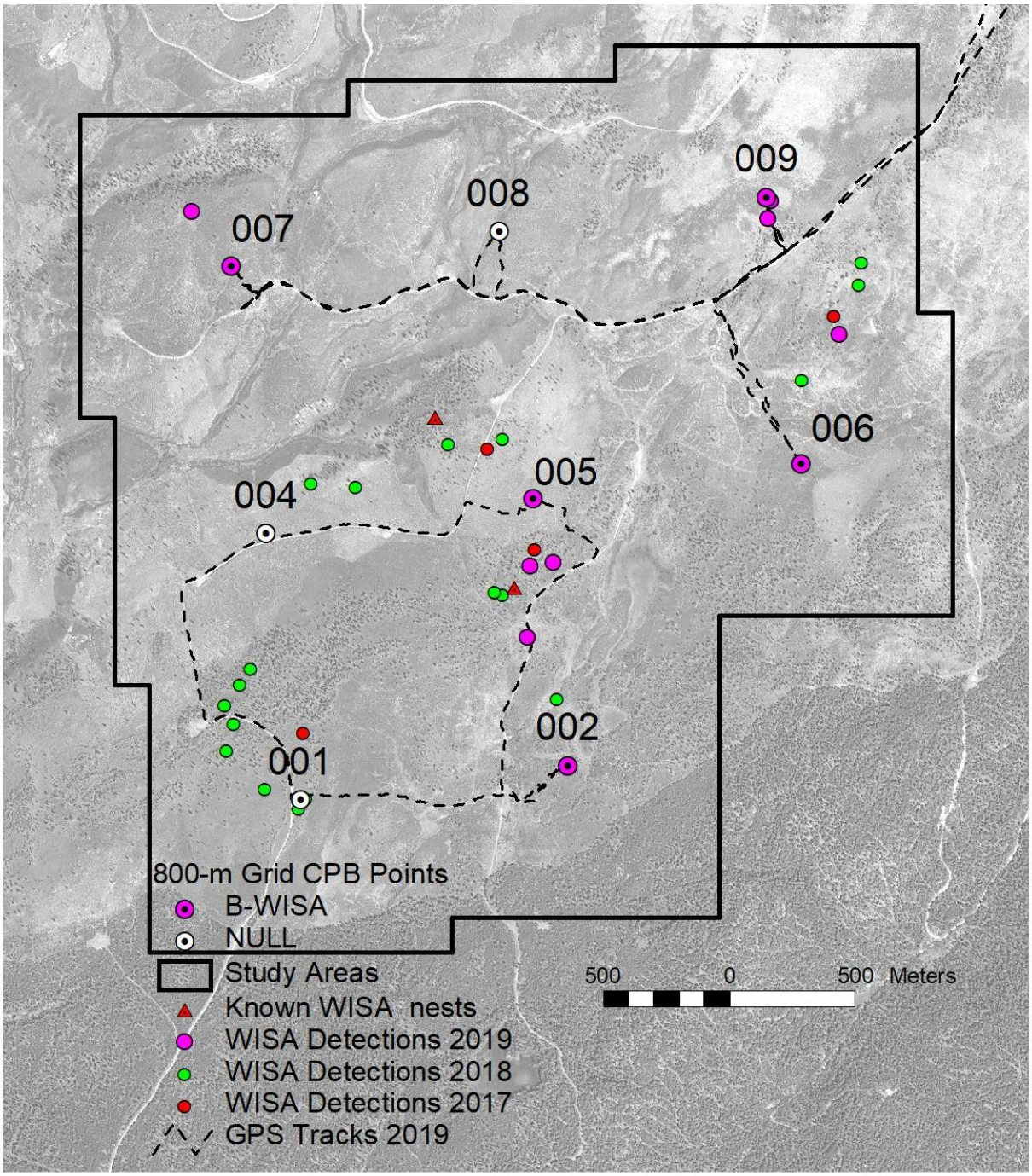
Map 2. Kiahko WISA CPB sampling, April 23, 2019.



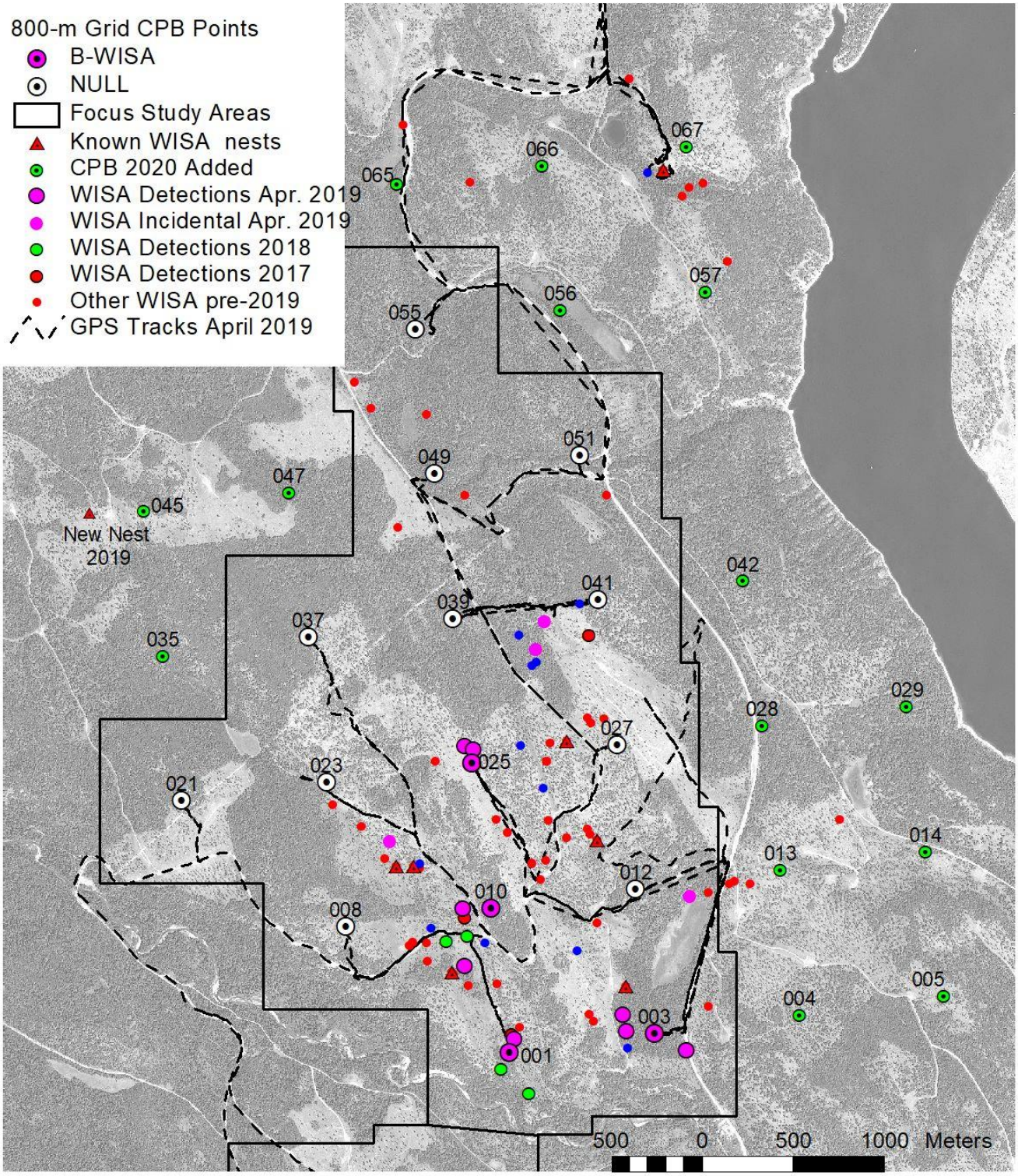
Map 3. Kimberley Nature Park WISA CPB sampling, April 24, 2019. No WISA have been detected from 2017 to 2019, and the last WISA record from the park was in 2009. Only CPB Pts 007 to 010 are recommended to be sampled in 2020, along with additional in-filling points (green-filled circles).



Map 4. Meadow Creek WISA CPB sampling, April 25-26, 2019.



Map 5. Plumbob Burn WISA CPB sampling, April 25, 2019. WISA detections in 2018 include incidental detections between CPB pts.



Map 6. Strauss Road WISA CPB sampling, April 26, 2019. Recommended for 2020 is to enlarge the study area to the east, northeast and northwest with 15 additional 800-m grid points. WISA detections in June 2019 shown as blue points (no active nests were located).