Yukon

SR-26-03

Results of the 2009 to 2025 Field Surveys for Collared Pika (*Ochotona collaris*) in the Yukon

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Executive summary

- Collared Pikas (*Ochotona collaris*) are cold-adapted alpine mammals that persisted through the Last Glacial Maximum in eastern Beringia and are highly sensitive to the effects of climate change. As such, they are listed as Special Concern under Canada's *Species at Risk Act*, with climate change identified as the primary threat.
- Approximately 50% of the global population occurs in Canada, primarily in the Yukon, making the territory a global steward of the species.
- From 2009 to 2025, we implemented a non-invasive monitoring program across the Yukon, with the aims of (a) tracking trends in annual site occupancy (a proxy for abundance) and (b) determining correlates of the spatiotemporal patterns in occupancy.
- The design of our monitoring program included three sites that span the south-to-north distribution of the species: Kusawa Territorial Park (southern edge), Tombstone Territorial Park (range centre) and Dàadzàii Vàn (northern edge).
- Overall, we conducted 2,091 surveys at 506 unique sites distributed among six survey areas, with repeated surveys at long-term monitoring locations in Tombstone Territorial Park, Kusawa Territorial Park and Dàadzàii Vàn, and single year reconnaissance surveys at three other areas in central Yukon.
- Site occupancy by Collared Pikas exhibited substantial annual variability, both within and among study areas, highlighting the importance of long-term monitoring to distinguish directional trends from short-term fluctuations.
- At Tombstone Territorial Park, site occupancy declined significantly over time, with a consistent decrease of approximately 1.6 to 1.7% per year, although the decline appears to have stabilized at a low level (~30 to 33% site occupancy) in recent years.
- At Kusawa Territorial Park, site occupancy showed high annual variability and a non-significant declining trend over a shorter monitoring period (2020 to 2025). A small number of survey years limits inferences, so reported trends are exploratory.
- Overall, our results provide an assessment of trends in site occupancy by Collared Pikas and offer early evidence of declines in Tombstone and Kusawa territorial parks.
- As per the 2023 *Management Plan for Collared Pika in Canada*, continued, systematic monitoring is recommended to improve trend detection, assess leading-edge dynamics, inform Committee on the Status of Endangered Wildlife in Canada (COSEWIC) status assessments, and guide conservation planning for Collared Pikas under climate change.

Table of contents

Introduction

Collared Pikas (*Ochotona collaris*; Figure 1) are a small, alpine-dwelling lagomorph that survived the Last Glacial Maximum (LGM) amidst the ice sheets in eastern Beringia (MacDonald and Jones 1987; Lanier et al. 2015). In contrast, their sibling species, the American pika (*O. princeps*), survived the LGM south of the extensive ice cover that dominated much of northwestern North America. Their evolutionary history has shaped Collared Pikas into being strongly cold-adapted and sensitive to climate warming (Morrison and Hik 2007). They are subject to classic metapopulation dynamics, including periodic extinction and colonization of suitable habitat patches (Franken and Hik 2004), and they have limited dispersal ability across unsuitable terrain. Consequently, Collared Pikas are regarded as an indicator species for tracking climate-driven changes in alpine mammal communities (Harrison et al. 2025; Jung et al. 2026). A recent survey of 47 researchers with expertise in either species of North American pika confirmed climate change as the most important perceived threat to Collared Pikas and documented concerns regarding the species' capacity to adapt to rapidly changing environmental conditions (Jung et al. 2026).

In November 2011, Collared Pikas were assessed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) as a species of Special Concern, with climate change identified as the primary threat (COSEWIC 2011). As such, the federal Minister added Collared Pika as a species of Special Concern in Schedule 1 of Canada's *Species at Risk Act* in February 2017, and a national management plan was finalized in November 2023 (ECCC 2023). The 2023 national management plan provides recommendations to ensure the long-term viability of Collared Pikas across their range, including spatiotemporal monitoring of population trends (ECCC 2023).

Approximately 60% of the global population of Collared Pikas are estimated to occur in Canada, with most of those animals residing in the Yukon (COSEWIC 2011; ECCC 2023). In conjunction with Alaska, the Yukon is therefore the global steward of this species. Despite this responsibility, research and monitoring of Collared Pikas in the Yukon has historically been limited, with most research concentrated at a single intensively studied site in southwestern Yukon ("Pika Camp;" e.g., Franken and Hik 2004; Morrison and Hik 2007). Research at Pika Camp concluded in the mid-2000s. Until recently, there has been no coordinated monitoring of Collared Pikas across their geographic range. That said, research and monitoring efforts have recently been conducted in Alaska (e.g., Harrison et al. 2025), and are underway in Nahanni National Park Reserve, Northwest Territories, and at several locations within the Yukon (e.g., Cannings et al. 2019; Kukka et al. 2014, 2020, Jung et al. 2020).

Long-term monitoring of population trends is particularly important for species such as Collared Pikas that exhibit high annual variability in site occupancy and are expected to respond to climate change (Morrison and Hik 2008; ECCC 2023; Jung et al. 2026). Theory and empirical evidence suggest that climate-driven range shifts should follow a predictable spatial pattern, whereby populations at the southern (trailing) edge of a species' distribution experience increasingly unfavourable environmental conditions (e.g., surficial geology, temperature, precipitation, shrubification, etc. (Gilbert et al. 2019; Jung et al. 2026), that correspond with local extinction events. Meanwhile, populations at the northern (leading) edge may experience improved environmental conditions and increases in persistence (Gilbert et al. 2019; Kukka et al. 2020). Detecting such patterns requires consistent monitoring across a latitudinal gradient over sufficiently long-time frames to distinguish directional trends from short-term variability.

The purpose of our monitoring efforts was to establish a robust, repeatable and non-invasive occupancy-based monitoring program for Collared Pikas in the Yukon that could be sustained over the long term and implemented, in part, by territorial parks staff and community scientists. Specifically, our objectives were to (1) document site occupancy across their range in the Yukon, and (2) assess temporal trends in site occupancy at key long-term monitoring sites representing the trailing edge, centre and leading edge of the species' distributional range in the territory. Given projected and observed climate warming in the Yukon, our hypothesis was that site occupancy will decline at the southern (trailing) edge of the range, be more stable or variable near the centre, and show evidence of increase at the northern (leading) edge, over time.

Here, we report on our preliminary results, with a focus on (1) estimating site occupancy rates from six survey areas, (2) assessing how our survey design and protocols impacted site occupancy rates, and (3) analyzing trends in naïve site occupancy rates at Tombstone Territorial Park and Kusawa Territorial Park. These aims were recommended through an expert solicitation survey (Jung et al. 2026) and entrenched in the 2023 national management plan for Collared Pikas (ECCC 2023).

Figure 1. Photographs of a vigilant Collared Pika (*Ochotona collaris*; top panel); biologists searching and listening for pika or their sign (e.g., haypiles) in ideal talus habitat (bottom right panel); and a fresh haypile (bottom left panel).

Methods

Study areas

We surveyed pika occupancy in six study areas of southern and central Yukon, including in two territorial parks (Kusawa and Tombstone) and one territorial park currently under planning (Dàadzàii Vàn; Figure 2). The three sites were chosen as longer term monitoring sites that spanned the south-to-north distributional range of pika. Our design of monitoring Collared Pikas at these three sites was explicitly aimed at capturing the variability in site occupancy trends that we would expect to see at the trailing edge (Kusawa Territorial Park), centre (Tombstone Territorial Park) and leading edge (Dàadzàii Vàn) of their distributional range in the territory.

Monitoring at Tombstone Territorial Park (hereafter, Tombstone) began in 2009 as a reconnaissance and pilot project. Our initial aims were to trial a home-grown, non-invasive, occupancy-based survey protocol, as well as evaluate characteristics of sites used by Collared Pika. In that first year, we surveyed 58 sites and recorded habitat characteristics such as rock size and aspect, for example (Andresen et al. 2010). No surveys were conducted in the years afterwards (2010 to 2012); however, in 2012 further site selection and protocol development was completed in advance of beginning a simple monitoring program that could be largely conducted by seasonal parks staff and community scientists. Surveys resumed in 2013 in Tombstone and have been ongoing until 2025. On average, 84.5 ± 17.6 (SD; range = 59–107; n = 13 years) sites were surveyed each year during the continuous monitoring phase (2013 to 2025).

At Kusawa Territorial Park (hereafter, Kusawa), a reconnaissance survey occurred in 2012 at 28 sites in a small part of the park. From 2020 to 2025, annual monitoring took place in up to three areas of the park, and included an expanded number of sites, with an average of 104 ± 21.6 (SD) sites surveyed per year (range = 72–125; n = 6 years). These three survey areas (blocks) were geographically separated from one another to assess spatial variability that may occur within the park (Figure 2). Coordinates of each unique site surveyed are provided in Appendix 1.

Of note, criteria for site selection at each survey area varied and consequently it would be incorrect to compare naïve occupancy rates between survey areas.

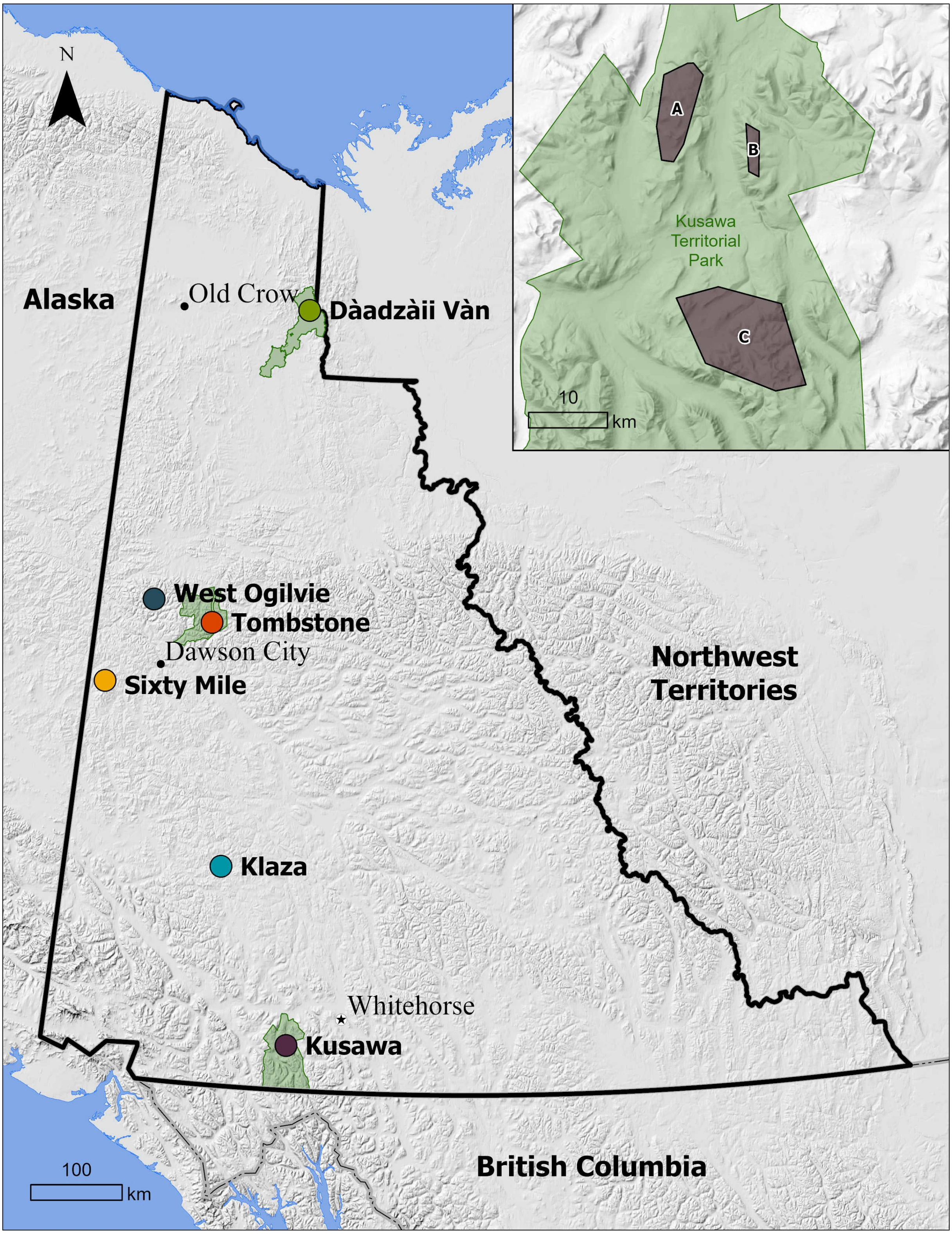

Figure 2. Location of six areas surveyed for Collared Pika (*Ochotona collaris*) in the Yukon, from 2009 to 2025. Inset shows the three blocks (sub-areas) surveyed in Kusawa Territorial Park.

Survey protocols

In 2009, we developed a non-invasive survey methodology that could be used to assess site occupancy of Collared Pikas over time and space. We used site occupancy as a proxy for abundance, meaning that we assumed that site occupancy of a study area is related to the abundance of Collared Pikas in that area. To do so, we needed to sample at scale at each study area by sampling a fairly large number of individual sites. As such, a key feature of our survey protocol is that it is simple and a site can be rapidly surveyed (Andresen et al. 2010; Kukka et al. 2020; Jung et al. 2020). Additionally, our survey protocols needed to be cost effective so that they could be sustained over time, which is important for collecting longitudinal data that can be used to track trends over longer time scales. Importantly, we aimed to design a survey protocol that was easily implemented by field crews, including community scientists (also called citizen scientists), with minimal prior experience.

Collared Pikas are highly amenable to occupancy-based surveys because they are distributed in talus patches that are easily located on the landscape and individuals in those patches are easily detected. This is because Collared Pikas are highly territorial and vocalize when other pikas or other species (including people) enter their territory (Trefry and Hik 2009). Collared Pikas also build and rely on easily recognizable hay piles within the talus (MacDonald and Jones 1987). As such, the presence of Collared Pikas or their hay piles is easily detected by field personal, including community scientists (Morrison and Hik 2008; Moyer-Horner et al. 2012; Kukka et al. 2020).

Our surveys occurred during mid-July to early September, with survey timing at each study area depending primarily on the local climate and the possibility of disturbing sheep (*Ovis dalli*) hunters. Areas to the north were surveyed sooner than areas to the south, given differences in seasonal timing. Our survey timing was likely ideal for detecting pika because they tend to be more detectable in late summer and fall, when they are most territorial (active alarm calling) and actively caching food into conspicuous hay piles (MacDonald and Jones 1987; David Hik, pers. comm.). They are less active in warmer-hot temperatures (Harrison 2023), so we avoided surveys earlier in the summer, especially at our most southern study areas. While survey timing varied between study areas, we consistently re-surveyed study areas at the same time of year.

Prior to surveying a study area, field crews were provided written instructions on the sampling protocol in advance, followed by a group discussion prior to the survey to answer remaining questions and ensure the protocol was clear. At the same time, field crews were provided a datasheet with verbal instruction and discussion on how to record data. Each crew of two surveyors included a seasoned person with more than a year of experience implementing our protocols. This person trained the newer person at the first site and was responsible for navigating to the sites and recording data.

Analysis of occupancy-based data requires repeated surveys to estimate a detection probability. As such, we conducted two simultaneous, but independent, surveys of each site by two surveyors, each surveying the site independently. Observers did not communicate during the survey, because observer-independent data was needed for our planned analyses. The surveyors walked slowly around or through the site, stopping periodically to look and listen for pika or their sign. Detection included seeing or hearing pika or finding a fresh hay pile (Kukka et al. 2020; Jung et al. 2020). Hay piles may persist for several years, so we only included fresh hay piles as evidence of presence. Fresh hay piles were easily distinguished from old hay piles by colour, with fresh hay piles having green vegetation, rather than brown (Figure 1). Each observer independently recorded pika either as "present" or "absent" at each site. If pikas were present, the type of detection was also recorded (i.e., visual, vocal or fresh hay pile). Surveys were conducted only during suitable weather conditions for detecting Collared Pikas (i.e., no precipitation, high winds or fog).

The amount of time spent surveying a site evolved over the course of our monitoring and went through three phases (Table 1). Essentially, we moved from an area-based design to one that was time-based, as we learned and adapted. This change made our surveys more efficient, allowing more sites to be surveyed with the available time. In order, protocols 3, 2 and 1 were followed the most, representing 45%, 30% and 25% of the 2,091 surveys completed, respectively (Table 1).

At each survey site we recorded a range of site, weather and habitat characteristics, as well as other mammal species observed in each talus patch; however, those data were not germane relevant to this report and not considered further.

Table 1. Evolution of protocols with respect to the time allotted to site surveys for Collared Pikas (*Ochotona collaris*) in the Yukon, 2009 to 2025.

Protocol	Application to study areas
Protocol 1: Area-based search with no limits on the amount of time to survey the perimeter and through the site.	• Tombstone in 2009 to 2018 • Kusawa in 2012
Protocol 2: Timed search based on area. Search time varied by site size as follows: 30 min at sites >100 m wide, 20 min at sites 50–100 m wide, and 10 min at sites <50 m wide.	• Tombstone in 2019 to 2023 • Sixty Mile in 2020 • Dàadzàii Vàn in 2019
Protocol 3: Time-based search with a 10 min limit for all sites regardless of size. Sites delineated based on ability to search effectively in 10 min. Time-to-detection recorded for some.	• Tombstone in 2024 to 2025 • Kusawa in 2020 to 2025 • Dàadzàii Vàn in 2023 • Klaza in 2020 • West Ogilvie in 2022

Analysis

We calculated a naïve occupancy rate for each study year in each region, and calculated 95% confidence intervals using Wilson's adjustment, which is based on a binomial distribution and appropriate for normally distributed data and small sample sizes. Given that most sampling effort (87% of surveys) occurred in Tombstone and Kusawa, our analyses focus on these two areas.

Our protocols evolved slightly over time since 2009, specifically with regards to the amount of time allocated to searching for pikas during each survey (Table 1). As such, starting in 2020 we recorded the time-to-detection of pikas or their sign during a sample of surveys to the nearest second in most cases. We produced a histogram to visualize these data and then used a Pearson chi-square test to test for differences in the frequency of detections within 1 to 3, 4 to 7 and 8 to 10 minutes since the start of a survey.

In addition, the number of sites we surveyed varied considerably (Table 2) across study areas and survey years. As such, we assessed whether there was a monotonic relationship between the number of sites surveyed in an area and naïve site occupancy rates in any given year. To do so, we used a non-parametric Spearman correlation, using our full dataset from all study areas to improve sample size and inference.

We were also interested in understanding how including some sub-regions within our main study areas influenced overall occupancy rates, given not all sites or sub-regions were surveyed in each year. Specifically, we surveyed three distinct "blocks" at Kusawa (Blocks A to C; Figure 2), but we did not always survey all blocks in each year. As such, we calculated naïve occupancy rates and 95% confidence intervals as per above for each block in each year they were surveyed. We then plotted these occupancy rates and visually inspected how they corresponded across the blocks in each year.

We assessed temporal trends in annual occupancy rates at Tombstone using nonparametric and parametric approaches. A monotonic trend over time was tested using Kendall's correlation (τ_β), which is robust to non-normal data, ties, and missing years. Trend magnitude was estimated using the Theil–Sen median slope estimator. For comparison, we also fit a simple linear regression of percentage values against year to assess consistency of inference across methods. Because data from Tombstone included surveys in 2009, followed by a gap from 2010 to 2012 with no surveys conducted, we did a trend analysis using data from 2009 to 2025 including the missing years, and we repeated this analysis but excluded data from 2009, using data from only 2013 to 2025 where data were continuous. We conducted a similar trend analysis for Kusawa, using the 2020 to 2025 data—we excluded the data from 2012 due to the gap from 2013 to 2019 with no data.

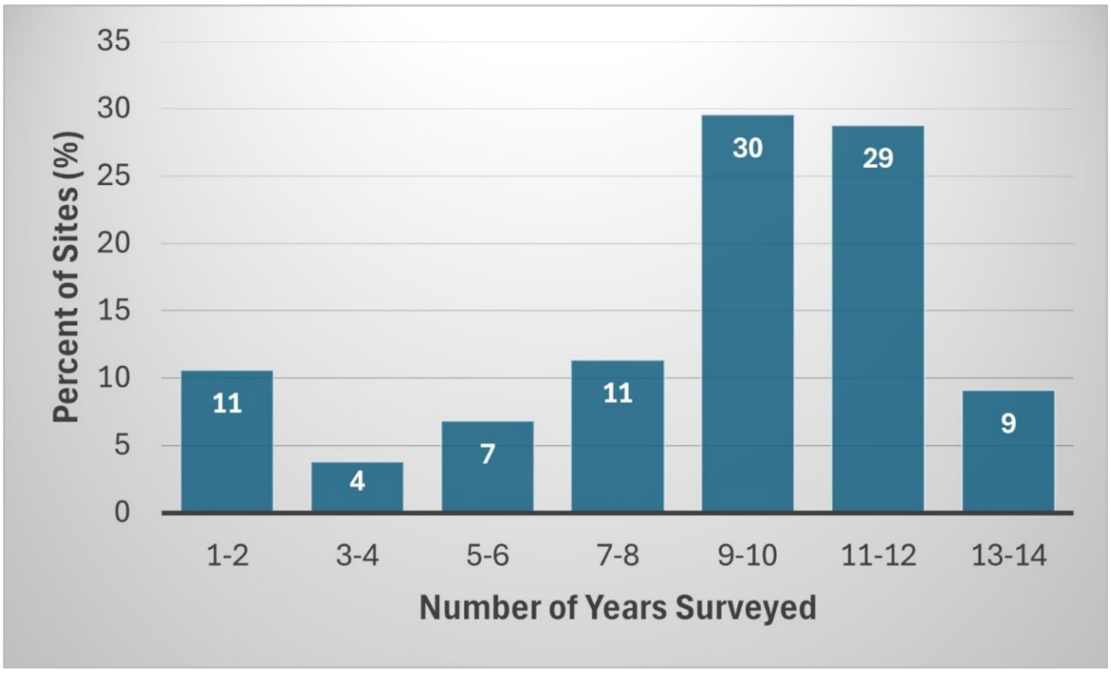

Figure 3. Distribution of the number of years that 129 unique sites were surveyed for Collared Pika (*Ochotona collaris*) at Tombstone Territorial Park during 2009 to2025. Bars represent the percent of sites in each category of years, and the percentage is embedded within each bar.

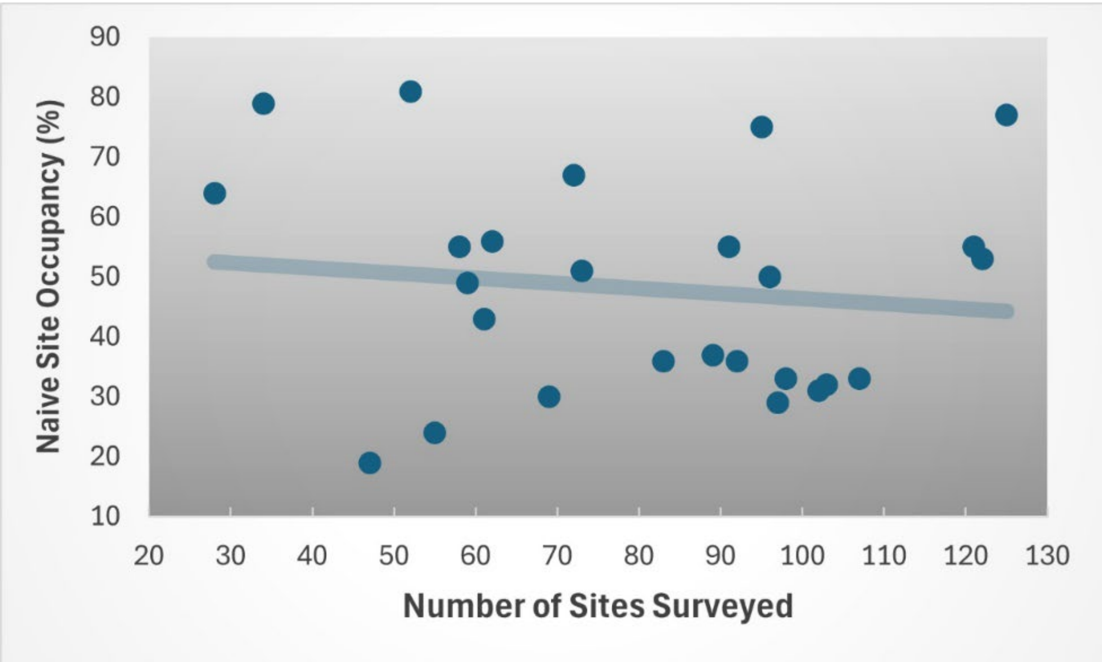

Figure 4. Scatterplot and trend line of the relationship between the number of sites surveyed and naïve site occupancy rates for Collared Pika (*Ochotona collaris*) in the Yukon, 2009 to 2025.

Results and discussion

Survey effort

Our ability to survey all sites at our three main study areas in all years was constrained for various reasons (e.g., funding, people, other priorities, etc.). Thus, the number of sites varied each year at each study area. We completed 1,157 surveys at 129 unique sites at Tombstone over 15 years of survey effort (Table 2). At Kusawa we completed 654 surveys at 140 unique sites over 7 years of effort (Table 2). Survey effort was reduced at Dàadzàii Vàn due to cost, but we conducted 102 surveys at 55 unique sites during two non-consecutive years of survey effort (Table 2). In addition to our core work in the three sites, and as part of a larger effort to survey species at risk and rare species in three regions, we surveyed the following once: 94 sites in the Sixty Mile area, 34 sites in the Klaza area in 2020, and 52 in the West Ogilvie area in 2022 (Table 2). Overall, we conducted 2,091 surveys of 506 unique talus patches (sites) for site occupancy by Collared Pikas, with each survey completed by two independent observers.

The distribution of survey effort among sites at Tombstone was variable; however, most sites (68%) were surveyed at least 9 to 10 of the 14 years (Figure 3). All the sites in Tombstone that were sampled only once or twice were surveyed in the first year (2009) and not revisited. In contrast, all but two of the sites at Kusawa in the A and B blocks (91 of 93 sites) were surveyed every year once they were established; the exceptions being one site that was surveyed in 2020 and never again, and another site in 2025 that we missed for logistical reasons. Resurvey of sites in the C block at Kusawa were more variable.

Site occupancy rates

The number of sites surveyed in each area by year varied from 28 in Kusawa in 2012 to 125 in 2023 also at Kusawa. The relationship between the number of sites surveyed and naïve site occupancy rate trended downward (Figure 4), meaning that site occupancy rates were lower as the number of sites surveyed increased. However, the trend was weak and not statistically significant (r = -0.128, P = 0.532; n = 26).

Overall, site occupancy rates varied widely within and between study areas (Figure 6). For instance, annual variability in our naïve site occupancy rates fluctuated greatly at our longer-term monitoring sites, ranging from 29 to 56% at Tombstone and 53 to 75% at Kusawa (Figure 6). Spatially, our highest site occupancy rate at the West Ogilvie study area in 2022 (81%) was four times greater than our lowest at Dàadzàii Vàn in 2023 (19%), and site occupancy by Collared Pikas was consistently higher at Kusawa than Tombstone in all comparable years. Reasons for the observed variability remain unexplored.

Importantly, we urge caution in comparing site occupancy rates between study areas because that was not an explicit aim of our study design. Spatial variability is likely a function of our site selection, which differed between study areas. For instance, at Tombstone we selected talus patches with a wider range of site and habitat characteristics (e.g., elevation, rock size and depth, patches of forage within the talus, etc.) to survey than at Kusawa, given our interest in gaining a first approximation of site selection by pikas (Andresen et al. 2010). At Kusawa, we used the knowledge gained earlier at Tombstone to select sites more likely to harbour pikas so that we could maximize monitoring trends over time. Thus, differences in naïve site occupancy rates between Tombstone and Kusawa, for example, may be a function of the quality of the suite of sites selected for monitoring, more favourable environmental conditions at the southern (trailing) edge of their range, other unmeasured factors, or a combination thereof. Moreover, in 2022, naïve site occupancy rates varied substantially between Tombstone (33%) and West Ogilvie (81%), despite the proximity of these survey areas (Figure 1). Site selection must have been, in part, a factor in the discrepancy, with significantly more suitable sites surveyed in West Ogilvie.

Time-to-detection

Time-to-detection data was recorded for 565 of 2,091 surveys (27%). These data revealed that 64% (95% CI = 59–69%) of the first detection of a Collared Pika occurred within the first three minutes of a survey and only 8% (95% CI = 6–12%) of the first detections were in the last three minutes of each 10-minute survey (Figure 5). There was strong evidence that the frequency distribution of time-to-detection was significantly different (Pearson X^2_2 = 271.76, $P < 0.001$). Our data indicated that almost all (97%) pikas are detected within the first nine minutes of our 10-minute surveys (Figure 5). Thus, longer surveys likely do not result in a substantial increase in detecting site occupancy by Collared Pikas, and data across the years are comparable regardless of changes in how long we surveyed each site. Greater effort to survey more sites is likely more effective than long surveys at each site.

Intra-annual variability

At Kusawa, all three blocks surveyed for Collared Pika site occupancy rates oscillated in synchrony over the monitoring period; however, Block B oscillated with a greater magnitude than Blocks A and C (Appendix 2; Figure 7). For the most part, Collared Pika site occupancy rates were remarkably similar between the three blocks in each survey year (Figure 7), with values being particularly tightly aligned (1 to 3%) between Blocks A and C. This result strongly indicates that Collared Pika site occupancy rates at Kusawa were not biased by which blocks were surveyed in which years. Moreover, it suggests that Block A (the most consistently surveyed block) was a good indicator of annual variation and overall trends of site occupancy by Collared Pikas elsewhere in the park.

Table 2. Summary of results from 2,091 Collared Pika (*Ochotona collaris*) surveys completed at six survey areas in the Yukon during 2009 and 2013 to 2025.

Year	Number of sites surveyed	Number of sites occupied	Number of sites unoccupied	Naïve occupancy (%)	95% Confidence intervals (%)
Tombstone Territorial Park					
2009	58	32	26	55%	42–68%
2013	73	37	36	51%	39–63%
2014	62	35	27	56%	43–69%
2015	59	29	30	49%	36–63%
2016	83	30	53	36%	26–47%
2017	102	32	70	31%	23–41%
2018	61	26	35	43%	30–56%
2019	96	48	48	50%	40–60%
2020	97	28	69	29%	20–39%
2021	107	35	72	33%	24–42%
2022	98	32	66	33%	24–43%
2023	89	33	56	37%	27–48%
2024	69	21	48	30%	20–43%
2025	103	33	70	32%	23–42%
Kusawa Territorial Park					
2013	28	18	10	64%	44–81%
2020	95	71	24	75%	65–83%
2021	72	48	24	67%	55–77%
2022	91	50	41	55%	44–65%
2023	125	96	29	77%	68–84%
2024	122	65	57	53%	44–62%
2025	121	66	55	55%	45–64%

Table 2. (continued)

Year	Number of sites surveyed	Number of sites occupied	Number of sites unoccupied	Naïve occupancy (%)	95% Confidence intervals (%)
Dàadzàii Vàn Survey Area					
2019	55	13	42	24%	13–37%
2023	47	9	38	19%	9–33%
Klaza Survey Area					
2020	34	27	7	79%	62–91%
Sixty Mile Survey Area					
2020	92	33	59	36%	26–47%
West Ogilvie Survey Area					
2022	52	42	10	81%	67–90%

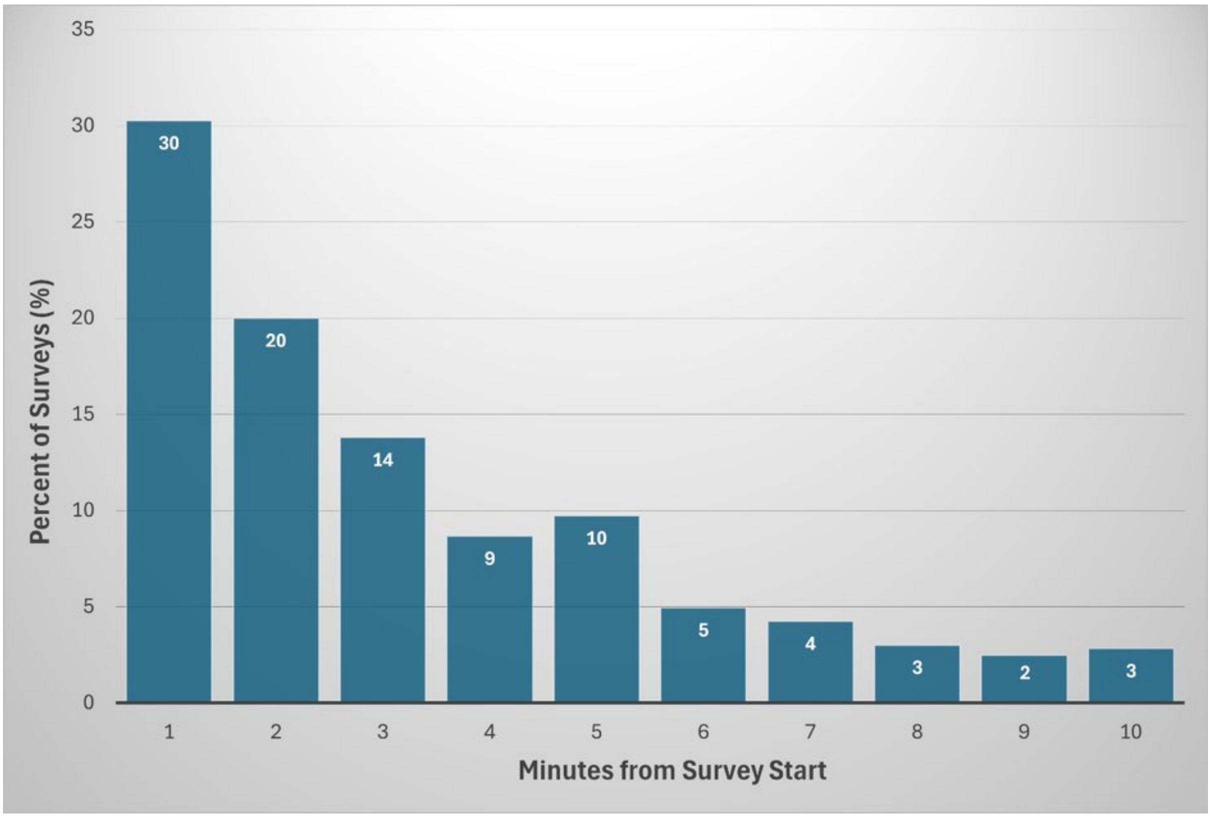

Figure 5. Distribution of the first time-to-detection events from 565 occupancy-based surveys for Collared Pika (*Ochotona collaris*) in the Yukon. Bars represent the percent of surveys where a pika was first detected within each minute since the start of the survey.

Site occupancy trends

Site occupancy rates by Collared Pikas declined significantly over time at Tombstone. Trend analysis indicated a strong negative monotonic decline (Kendall's τ_β = –0.53, P = 0.008, n = 14 years), with the Theil–Sen estimator indicating a median decline in site occupancy of 1.6% per year (95% CI = 0.8–2.5). Results from a linear regression were concordant, with pika site occupancy decreasing by 1.7% per year (t = –4.20, R^2 = 0.60, P = 0.001). Results were similar when we re-ran our tests without data from 2009, due to missing data for 2010 to 2012 (Table 2; Figure 6). For the 2013 to 2025 data, trend analysis also indicated a strong negative monotonic decline (Kendall's τ_β = –0.48, P = 0.024, n = 13 years), and the Theil–Sen estimator indicated a median decline in pika site occupancy of 1.7% per year (95% CI = 0.6–2.9). The magnitude of decline was consistent with a linear regression, which also indicated a decrease in site occupancy of 1.7% per year (t = –3.36, R^2 = 0.51, P = 0.006). Taken together, our results for Tombstone suggest that site occupancy by Collared Pikas at Tombstone declined at a rate of 1.6 to 1.7% per year during 2009 to2025, and inference was robust to our analytical approach. However, site occupancy was relatively stable at ~30 to 33% during the last six years of surveys (2020 to 2025; Table 2; Figure 6), so occupancy rates have apparently stabilized at a low level in recent years.

At Kusawa, an exploratory analysis hinted at a decline in site occupancy by Collared Pikas between 2020 and2025 (Table 2; Figure 6); however, no analysis was statistically significant. Specifically, a trend analysis indicated a moderate but non-significant decline (Kendall's τ_β = −0.43, P = 0.22; n = 6 years). Consistent with this result, the Theil–Sen estimator indicated a median decline of 4.0% per year (95% CI = −19.8 to 16.1) in site occupancy but the confidence intervals overlapped 0, indicating non-significance. Simple linear regression similarly suggested a decrease of approximately 3.4% per year, but the slope was not statistically significant (t = −1.5, R^2 = 0.36; P = 0.21). Similar to Tombstone, we observed a sharp decline in site occupancy rates in recent years followed by relative stability at a lower occupancy rate of ~53 to 55% (Figure 6). Of note, was a bump in site occupancy in 2023 that was seen in all three survey blocks and remains unexplained. High annual variability and the limited number of years of surveys resulted in low statistical power. As such, trend estimates for Kusawa must be interpreted as exploratory.

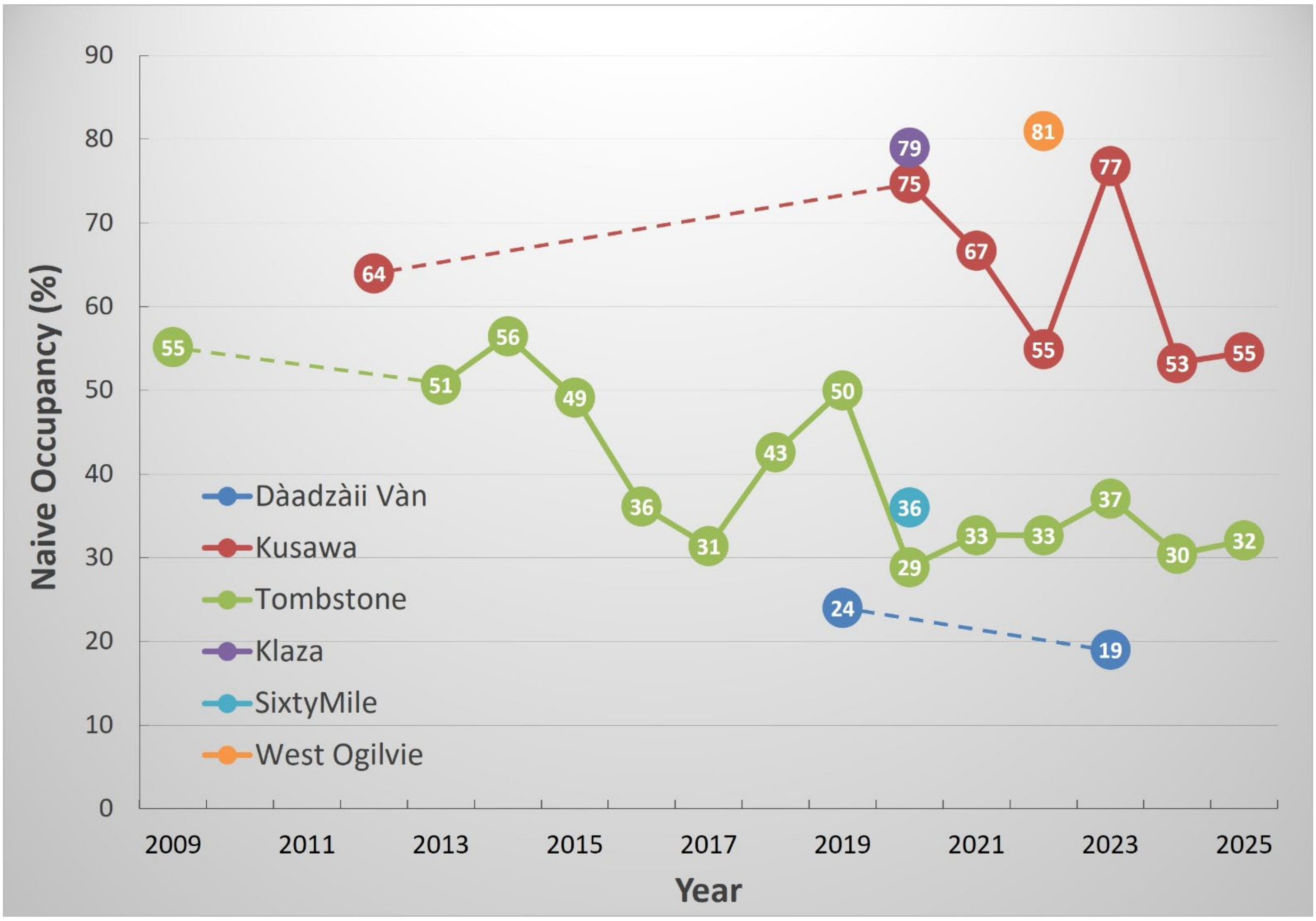

Figure 6. Naïve occupancy rates for sites repeatedly surveyed for Collared Pikas (*Ochotona collaris*) between 2009 and 2025. Values inside the bubbles are the naïve occupancy rate (% of sites surveyed with pikas detected) for each year. Dashed lines represent estimated trend between years when surveys between consecutive years did not occur. Sample sizes and 95% confidence intervals are available in Table 1.

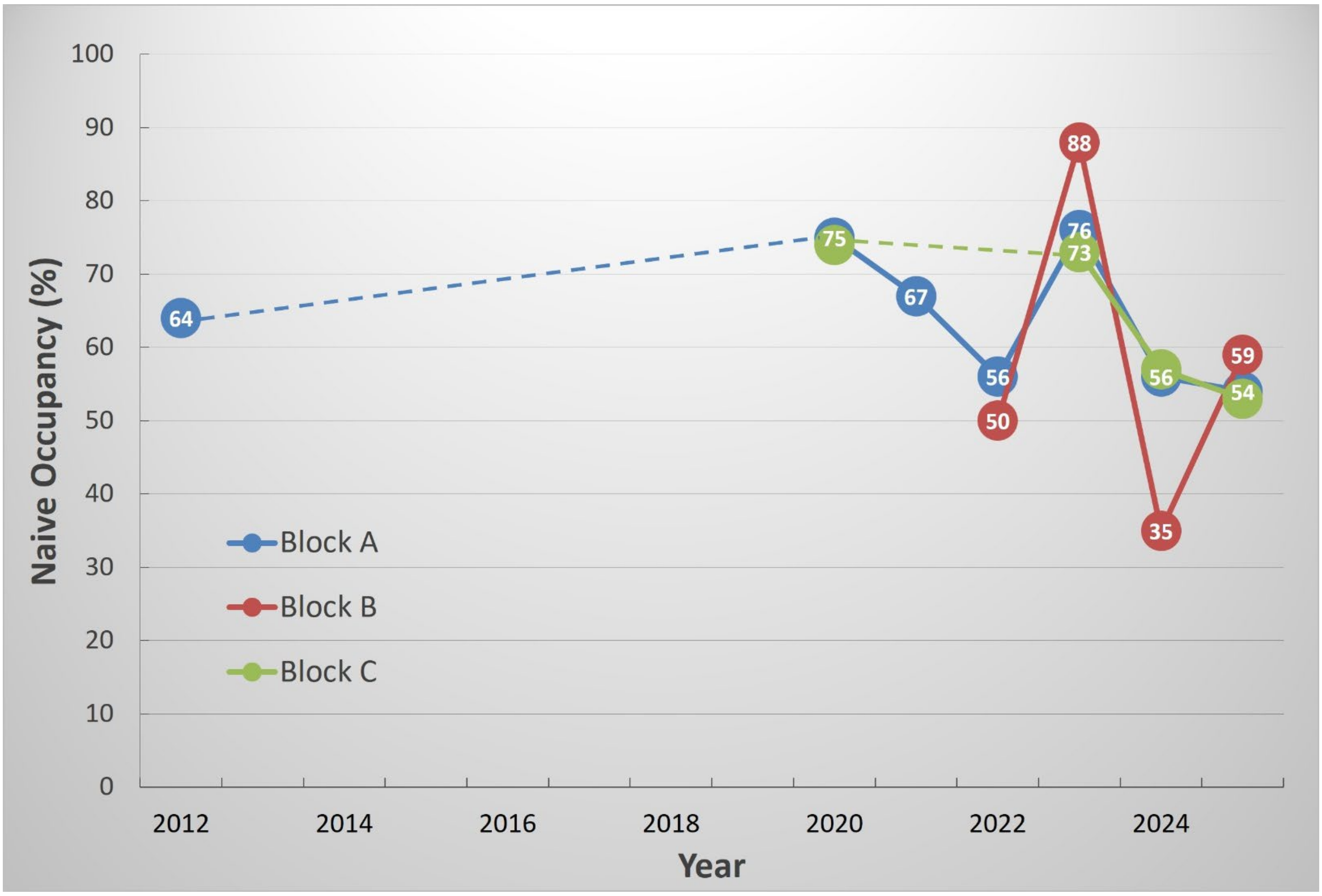

Figure 7. Naïve occupancy rates for sites repeatedly surveyed for Collared Pikas (*Ochotona collaris*) at survey blocks (A to C; see Figure 2) in Kusawa Territorial Park between 2012 and 2025. Values inside the bubbles are the naïve occupancy rate (% of sites surveyed with pikas detected) for each year. Dashed lines represent estimated trend between years when surveys between consecutive years did not occur. Sample sizes and 95% confidence intervals are available in Appendix 2.

Conclusions and next steps

Our monitoring program revealed spatial and annual variability in naïve site occupancy rates for Collared Pika across the species' range in the Yukon. At Tombstone Territorial Park, we detected a statistically significant decline in site occupancy from 2009 to 2025, averaging approximately 1.6 to 1.7% per year. Although site occupancy appeared to stabilize at relatively low levels during recent years, the persistence of this apparent stabilization remains uncertain, particularly in the context of ongoing climate warming. In contrast, site occupancy at Kusawa Territorial Park, near the southern (trailing) edge of the species' range, exhibited high annual variability with weak evidence of decline over the shorter monitoring period. While exploratory analyses suggested a potential downward trend at Kusawa, this trend was not statistically significant, largely due to limited number of years of sampling and annual variability. This variability reinforces the importance of longitudinal studies for distinguishing directional change from short-term fluctuations driven by environmental variability. Continued monitoring at Tombstone and Kusawa is necessary to increase statistical power and determine whether reported declines are sustained, as predicted under climate change.

Additionally, our analyses demonstrated that naïve site occupancy estimates within study areas were robust to variation in survey effort, minor protocol changes over time, and spatial sampling. Time-to-detection analyses showed that 97% of pika detections occurred within the first nine minutes of surveys, supporting the comparability of data collected across years despite changes in survey protocols. Similarly, synchronized occupancy patterns across survey blocks at Kusawa indicated that uneven spatial coverage was unlikely to bias park-level trend estimates.

Key next steps include: (1) evaluating the role of weather, habitat characteristics, and other factors in driving observed spatial and temporal variation in Collared Pika site occupancy; (2) using the analyses presented here to further refine monitoring protocols, particularly with respect to survey effort and spatial sampling design; and (3) sustaining long-term monitoring at the three territorial parks to strengthen trend detection.

Taken together, our results provide an initial assessment of the variability and trends in Collared Pika site occupancy. Our monitoring and analyses advance several key recommendations in the national management plan for Collared Pikas (ECCC 2023). Given that a substantial proportion of the global population occurs within the territory, continued systematic monitoring will be important for detecting emerging trends, improving understanding of underlying mechanisms, informing COSEWIC status assessments and developing conservation strategies under ongoing climate change.

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Appendices

Appendix 1. Location and the number of times surveyed for each of 506 unique sites surveyed for Collared Pikas (*Ochotona collaris*) in the Yukon during 2009 to 2025.

Site	Area	Site ID	Latitude	Longitude	Elevation (m ASL)	Number of years surveyed
1	Dàadzàii Vàn	N01	67.76890	-136.70069	882	2
2	Dàadzàii Vàn	N02	67.76982	-136.70057	881	2
3	Dàadzàii Vàn	N03	67.77231	-136.69657	819	2
4	Dàadzàii Vàn	N04	67.77426	-136.69880	866	2
5	Dàadzàii Vàn	N05	67.77551	-136.70794	1052	2
6	Dàadzàii Vàn	N06	67.77499	-136.71140	1109	2
7	Dàadzàii Vàn	N07	67.77672	-136.71137	1097	2
8	Dàadzàii Vàn	N08	67.77800	-136.71418	1087	2
9	Dàadzàii Vàn	N09	67.76849	-136.67658	840	1
10	Dàadzàii Vàn	N10	67.76891	-136.66457	939	1
11	Dàadzàii Vàn	N11	67.77326	-136.67251	998	1
12	Dàadzàii Vàn	N12	67.77607	-136.67260	1008	2
13	Dàadzàii Vàn	N13	67.77702	-136.67476	958	2
14	Dàadzàii Vàn	N14	67.77981	-136.67629	1038	2
15	Dàadzàii Vàn	N15	67.78994	-136.71455	976	1
16	Dàadzàii Vàn	N16	67.78971	-136.72340	1057	1
17	Dàadzàii Vàn	N17	67.78844	-136.72258	1098	1
18	Dàadzàii Vàn	N18	67.78735	-136.71586	1057	1
19	Dàadzàii Vàn	N19	67.78593	-136.71083	1076	2
20	Dàadzàii Vàn	N20	67.78396	-136.70678	1022	2
21	Dàadzàii Vàn	N21	67.78562	-136.70054	903	2
22	Dàadzàii Vàn	N22	67.79651	-136.71600	951	1
23	Dàadzàii Vàn	N23	67.79820	-136.69648	1050	2
24	Dàadzàii Vàn	N24	67.79437	-136.69066	1143	2
25	Dàadzàii Vàn	N25	67.79348	-136.69240	1081	2
26	Dàadzàii Vàn	S01	67.52149	-136.50014	767	2
27	Dàadzàii Vàn	S02	67.52080	-136.49668	827	2
28	Dàadzàii Vàn	S03	67.52178	-136.49302	832	2
29	Dàadzàii Vàn	S04	67.52083	-136.49059	855	2
30	Dàadzàii Vàn	S05	67.51863	-136.48491	963	2
31	Dàadzàii Vàn	S06	67.51647	-136.48437	1093	2
32	Dàadzàii Vàn	S07	67.51436	-136.48424	1191	2
33	Dàadzàii Vàn	S08	67.51667	-136.48852	1079	2
34	Dàadzàii Vàn	S10	67.52057	-136.50665	794	2
35	Dàadzàii Vàn	S11	67.52022	-136.51085	816	2
36	Dàadzàii Vàn	S12	67.51615	-136.51884	825	2

37	Dàadzàii Vàn	S13	67.51455	-136.51990	818	2
38	Dàadzàii Vàn	S14	67.51363	-136.51767	875	2
39	Dàadzàii Vàn	S15	67.51226	-136.51730	921	2
40	Dàadzàii Vàn	S16	67.51151	-136.52522	875	2
41	Dàadzàii Vàn	S17	67.51201	-136.52921	820	2
42	Dàadzàii Vàn	S18	67.51522	-136.52374	790	2
43	Dàadzàii Vàn	S19	67.51604	-136.52267	783	2
44	Dàadzàii Vàn	S20	67.52235	-136.49802	814	2
45	Dàadzàii Vàn	S21	67.52538	-136.49294	993	2
46	Dàadzàii Vàn	S22	67.52666	-136.49194	948	2
47	Dàadzàii Vàn	S23	67.52557	-136.48628	1070	2
48	Dàadzàii Vàn	S24	67.52534	-136.48027	1117	2
49	Dàadzàii Vàn	S25	67.52469	-136.48355	1069	2
50	Dàadzàii Vàn	S26	67.52361	-136.48335	1006	2
51	Dàadzàii Vàn	S27	67.52210	-136.48581	899	2
52	Dàadzàii Vàn	S28	67.52357	-136.48807	972	2
53	Dàadzàii Vàn	S29	67.51701	-136.49895	872	2
54	Dàadzàii Vàn	S30	67.51519	-136.49773	950	2
55	Dàadzàii Vàn	S31	67.51367	-136.49174	1099	2
56	Klaza	CAR01	62.10037	-137.37128	1685	1
57	Klaza	CAR02	62.10042	-137.37868	1691	1
58	Klaza	CAR03	62.09922	-137.37897	1716	1
59	Klaza	CAR04	62.10087	-137.38373	1632	1
60	Klaza	CAR05	62.07776	-137.40819	1482	1
61	Klaza	CAR06	62.08126	-137.40926	1455	1
62	Klaza	CAR07	62.08219	-137.40524	1440	1
63	Klaza	CAR08	62.08121	-137.40123	1540	1
64	Klaza	CAR09	62.11011	-137.38298	1592	1
65	Klaza	CAR10	62.10756	-137.37355	1579	1
66	Klaza	CAR11	62.10726	-137.37112	1593	1
67	Klaza	CAR12	62.10788	-137.36717	1643	1
68	Klaza	CAR13	62.46334	-137.95201	1533	1
69	Klaza	CAR14	62.46365	-137.94992	1507	1
70	Klaza	CAR15	62.46478	-137.94702	1518	1
71	Klaza	CAR16	62.46404	-137.94604	1485	1
72	Klaza	CAR17	62.46331	-137.94405	1460	1
73	Klaza	CAR18	62.46307	-137.94124	1459	1
74	Klaza	CAR19	62.46509	-137.90233	1128	1
75	Klaza	CAR20	62.46502	-137.90488	1158	1
76	Klaza	CAR21	62.43739	-137.85144	1495	1
77	Klaza	CAR22	62.43905	-137.84853	1487	1
78	Klaza	CAR23	62.43943	-137.85725	1448	1
79	Klaza	CAR24	62.44115	-137.85915	1432	1
80	Klaza	CAR25	62.44110	-137.86201	1410	1
81	Klaza	CAR26	61.79058	-137.77240	1508	1
82	Klaza	CAR27	61.79093	-137.77013	1510	1
83	Klaza	CAR28	61.78897	-137.75919	1524	1

84	Klaza	CAR29	61.78725	-137.76193	1494	1
85	Klaza	CAR30	61.81545	-137.80101	1579	1
86	Klaza	CAR31	61.81414	-137.80388	1531	1
87	Klaza	CAR32	61.81330	-137.81330	1554	1
88	Klaza	CAR33	61.81495	-137.80717	1568	1
89	Klaza	CAR34	61.81636	-137.79639	1600	1
90	Kusawa	KUS001	60.52473	-136.26199	1486	6
91	Kusawa	KUS002	60.52219	-136.26451	1526	6
92	Kusawa	KUS003	60.52328	-136.26304	1568	5
93	Kusawa	KUS004	60.52513	-136.26151	1481	6
94	Kusawa	KUS005	60.52641	-136.25421	1479	6
95	Kusawa	KUS006	60.52523	-136.24675	1542	6
96	Kusawa	KUS007	60.52282	-136.24358	1634	6
97	Kusawa	KUS008	60.52549	-136.24002	1571	6
98	Kusawa	KUS009	60.54220	-136.24283	1654	1
99	Kusawa	KUS010	60.57602	-136.23904	1688	7
100	Kusawa	KUS011	60.57075	-136.23737	1676	6
101	Kusawa	KUS012	60.56994	-136.23061	1647	6
102	Kusawa	KUS013	60.56741	-136.22691	1600	6
103	Kusawa	KUS014	60.56297	-136.22874	1578	6
104	Kusawa	KUS015	60.56128	-136.23019	1570	6
105	Kusawa	KUS016	60.59210	-136.22667	1704	6
106	Kusawa	KUS017	60.59474	-136.22797	1687	7
107	Kusawa	KUS018	60.59821	-136.23753	1706	7
108	Kusawa	KUS019	60.59805	-136.24403	1763	7
109	Kusawa	KUS020	60.59747	-136.25189	1832	7
110	Kusawa	KUS021	60.59856	-136.24988	1803	7
111	Kusawa	KUS022	60.60532	-136.25098	1691	7
112	Kusawa	KUS023	60.60598	-136.25618	1698	7
113	Kusawa	KUS024	60.60986	-136.25906	1675	7
114	Kusawa	KUS025	60.61509	-136.26671	1651	7
115	Kusawa	KUS026	60.62783	-136.21247	1723	7
116	Kusawa	KUS027	60.62824	-136.21890	1771	7
117	Kusawa	KUS028	60.62213	-136.21144	1748	7
118	Kusawa	KUS029	60.61903	-136.19607	1600	7
119	Kusawa	KUS030	60.61368	-136.19957	1676	7
120	Kusawa	KUS031	60.61273	-136.20049	1671	6
121	Kusawa	KUS032	60.61121	-136.20143	1668	6
122	Kusawa	KUS033	60.61014	-136.20078	1643	7
123	Kusawa	KUS034	60.60971	-136.19710	1576	7
124	Kusawa	KUS035	60.61139	-136.19606	1574	6
125	Kusawa	KUS036	60.59034	-136.22774	1733	7
126	Kusawa	KUS037	60.58793	-136.23092	1782	7
127	Kusawa	KUS038	60.58682	-136.23380	1790	6
128	Kusawa	KUS039	60.58484	-136.23716	1723	7
129	Kusawa	KUS040	60.58374	-136.24405	1701	7
130	Kusawa	KUS041	60.58090	-136.23946	1666	7

131	Kusawa	KUS042	60.57830	-136.24492	1700	6
132	Kusawa	KUS043	60.58039	-136.25062	1706	7
133	Kusawa	KUS044	60.58728	-136.27690	1685	6
134	Kusawa	KUS045	60.58170	-136.26101	1664	7
135	Kusawa	KUS046	60.58114	-136.26599	1644	6
136	Kusawa	KUS047	60.58874	-136.26894	1729	7
137	Kusawa	KUS048	60.58810	-136.27450	1713	7
185	Kusawa	KUS096	60.60423	-136.24968	1706	5
186	Kusawa	KUS097	60.57133	-136.24429	1735	5
187	Kusawa	KUS098	60.58869	-136.26085	1777	5
188	Kusawa	KUS099	60.57968	-136.26224	1689	5
189	Kusawa	KUS100	60.54710	-136.22330	1489	5
190	Kusawa	KUS101	60.54647	-136.22870	1633	5
191	Kusawa	KUS102	60.54544	-136.22810	1585	5
192	Kusawa	KUS103	60.54501	-136.22540	1482	5
193	Kusawa	KUS104	60.55349	-136.23228	1510	5
194	Kusawa	KUS105	60.55175	-136.23582	1524	5
195	Kusawa	KUS106	60.55141	-136.23962	1530	5
196	Kusawa	KUS107	60.55072	-136.24313	1563	5
197	Kusawa	KUS108	60.55218	-136.24655	1561	5
198	Kusawa	KUS109	60.55417	-136.24405	1525	5
199	Kusawa	KUS110	60.55377	-136.24162	1523	5
200	Kusawa	KUS111	60.56817	-136.25772	1775	5
201	Kusawa	KUS112	60.56664	-136.26044	1745	5
202	Kusawa	KUS113	60.56546	-136.26385	1709	5
203	Kusawa	KUS114	60.56423	-136.26697	1673	5
204	Kusawa	KUS115	60.56332	-136.27087	1633	5
205	Kusawa	KUS116	60.55474	-136.27766	1569	5
206	Kusawa	KUS117	60.55231	-136.27525	1601	5
207	Kusawa	KUS118	60.55014	-136.26891	1644	5
208	Kusawa	KUS119	60.55183	-136.26401	1632	5
209	Kusawa	KUS120	60.55282	-136.26332	1596	5
214	Kusawa	KUS125	60.58365	-136.26074	1658	4
225	Kusawa	KUS136	60.61250	-136.26405	1702	4
226	Kusawa	KUS137	60.61002	-136.26331	1723	4
230	Kusawa	NUM10	60.60546	-136.23311	1644	7
231	Kusawa	NUM21	60.57209	-136.24275	1705	7
210	Kusawa	KUS121	60.54512	-136.06488	1805	4
211	Kusawa	KUS122	60.54348	-136.05968	1732	4
212	Kusawa	KUS123	60.54162	-136.05888	1732	4

213	Kusawa	KUS124	60.53977	-136.05469	1744	4
215	Kusawa	KUS126	60.51541	-136.05768	1803	4
216	Kusawa	KUS127	60.51469	-136.05403	1798	4
217	Kusawa	KUS128	60.51164	-136.05196	1746	4
218	Kusawa	KUS129	60.53924	-136.06247	1750	4
219	Kusawa	KUS130	60.53739	-136.06055	1768	4
220	Kusawa	KUS131	60.53554	-136.06050	1777	4
221	Kusawa	KUS132	60.53416	-136.05750	1811	4
222	Kusawa	KUS133	60.52657	-136.06006	1828	4
223	Kusawa	KUS134	60.52825	-136.06233	1838	4
224	Kusawa	KUS135	60.52411	-136.05103	1768	4
227	Kusawa	KUS138	60.56306	-136.07427	1729	4
228	Kusawa	KUS139	60.55885	-136.06151	1609	4
229	Kusawa	KUS140	60.55808	-136.05683	1565	3
138	Kusawa	KUS049	60.28600	-135.94656	1623	4
139	Kusawa	KUS050	60.28699	-135.94887	1664	4
140	Kusawa	KUS051	60.29159	-135.94400	1678	4
141	Kusawa	KUS052	60.35707	-135.99048	1920	2
142	Kusawa	KUS053	60.35820	-135.99117	1885	2
143	Kusawa	KUS054	60.35917	-135.99004	1865	2
144	Kusawa	KUS055	60.36042	-135.98875	1809	2
145	Kusawa	KUS056	60.36020	-135.99289	1770	2
146	Kusawa	KUS057	60.35734	-136.19922	1676	1
147	Kusawa	KUS058	60.36047	-136.20000	1632	1
148	Kusawa	KUS059	60.36139	-136.19910	1603	1
149	Kusawa	KUS060	60.36274	-136.19975	1548	1
150	Kusawa	KUS061	60.27734	-135.98166	1848	4
151	Kusawa	KUS062	60.27938	-135.97548	1828	4
152	Kusawa	KUS063	60.27805	-135.97269	1802	4
153	Kusawa	KUS064	60.27402	-135.96773	1767	4
154	Kusawa	KUS065	60.27289	-135.97124	1793	4
155	Kusawa	KUS066	60.29539	-136.12386	1648	3
156	Kusawa	KUS067	60.29615	-136.12102	1633	3
157	Kusawa	KUS068	60.29824	-136.12714	1602	3
158	Kusawa	KUS069	60.29975	-136.12813	1590	3
159	Kusawa	KUS070	60.35102	-136.10750	1698	2
160	Kusawa	KUS071	60.35121	-136.10327	1724	2
161	Kusawa	KUS072	60.35119	-136.09912	1748	2

162	Kusawa	KUS073	60.35250	-136.09753	1650	1
163	Kusawa	KUS074	60.35426	-136.10223	1562	2
164	Kusawa	KUS075	60.27639	-135.92555	1834	4
165	Kusawa	KUS076	60.27774	-135.92421	1842	4
166	Kusawa	KUS077	60.27985	-135.92308	1806	4
167	Kusawa	KUS078	60.28097	-135.92676	1739	4
168	Kusawa	KUS079	60.28172	-135.92940	1656	4
169	Kusawa	KUS080	60.30710	-136.03021	1542	4
170	Kusawa	KUS081	60.30723	-136.02756	1599	4
171	Kusawa	KUS082	60.30548	-136.02817	1541	4
172	Kusawa	KUS083	60.30406	-136.02745	1528	4
173	Kusawa	KUS084	60.36064	-136.15596	1291	3
174	Kusawa	KUS085	60.36334	-136.14677	1336	3
175	Kusawa	KUS086	60.37008	-136.13937	1372	1
176	Kusawa	KUS087	60.37013	-136.12466	1465	1
177	Kusawa	KUS088	60.37106	-136.11833	1404	1
178	Kusawa	KUS089	60.30674	-135.95500	1694	4
179	Kusawa	KUS090	60.30566	-135.94989	1710	4
180	Kusawa	KUS091	60.30392	-135.94760	1712	4
181	Kusawa	KUS092	60.30194	-135.94891	1685	4
182	Kusawa	KUS093	60.29976	-135.95167	1726	4
183	Kusawa	KUS094	60.30140	-135.95647	1692	4
184	Kusawa	KUS095	60.30321	-135.96179	1659	4
285	Sixty Mile	SM54	63.73889	-140.50278	1528	1
234	Sixty Mile	SM03	63.91738	-140.64796	1421	1
235	Sixty Mile	SM04	63.91745	-140.64869	1426	1
236	Sixty Mile	SM05	63.91781	-140.64841	1435	1
237	Sixty Mile	SM06	63.92165	-140.65124	1466	1
238	Sixty Mile	SM07	63.92233	-140.65221	1458	1
239	Sixty Mile	SM08	63.92380	-140.65294	1464	1
240	Sixty Mile	SM09	63.92305	-140.65044	1469	1
287	Sixty Mile	SM56	63.68853	-140.60589	1653	1
289	Sixty Mile	SM58	63.68944	-140.60539	1663	1
291	Sixty Mile	SM60	63.69048	-140.60354	1687	1
293	Sixty Mile	SM62	63.69127	-140.59578	1675	1
295	Sixty Mile	SM64	63.69214	-140.59246	1678	1
296	Sixty Mile	SM65	63.69262	-140.59139	1680	1
297	Sixty Mile	SM66	63.69453	-140.58842	1693	1

298	Sixty Mile	SM67	63.87774	-140.83041	1438	1
299	Sixty Mile	SM68	63.87825	-140.83621	1463	1
300	Sixty Mile	SM69	63.87916	-140.83193	1456	1
301	Sixty Mile	SM70	63.87960	-140.83160	1452	1
302	Sixty Mile	SM71	63.84001	-140.90499	1378	1
303	Sixty Mile	SM72	63.84085	-140.90565	1387	1
304	Sixty Mile	SM73	63.84187	-140.90337	1414	1
305	Sixty Mile	SM74	63.84530	-140.90688	1408	1
306	Sixty Mile	SM75	63.84630	-140.90855	1418	1
307	Sixty Mile	SM76	63.84783	-140.91011	1424	1
308	Sixty Mile	SM77	63.84925	-140.91209	1428	1
309	Sixty Mile	SM78	63.84710	-140.91643	1373	1
310	Sixty Mile	SM79	63.84686	-140.91988	1433	1
311	Sixty Mile	SM80	63.88161	-140.84325	1450	1
312	Sixty Mile	SM81	63.88240	-140.83794	1375	1
313	Sixty Mile	SM82	63.88308	-140.83475	1342	1
314	Sixty Mile	SM83	63.88456	-140.83444	1266	1
315	Sixty Mile	SM84	63.88456	-140.84286	1439	1
316	Sixty Mile	SM85	63.84149	-140.92805	1466	1
317	Sixty Mile	SM86	63.83923	-140.93140	1418	1
318	Sixty Mile	SM87	63.83697	-140.93127	1422	1
319	Sixty Mile	SM88	63.83487	-140.92738	1453	1
320	Sixty Mile	SM89	63.83463	-140.92513	1455	1
321	Sixty Mile	SM90	63.83448	-140.91986	1394	1
322	Sixty Mile	SM91	63.83871	-140.91844	1350	1
323	Sixty Mile	SM92	63.84149	-140.91780	1361	1
324	Sixty Mile	SM93	63.84328	-140.91826	1392	1
325	Sixty Mile	SM94	63.84464	-140.91861	1418	1
280	Sixty Mile	SM49	63.68568	-140.60457	1636	1
281	Sixty Mile	SM50	63.68647	-140.60209	1584	1
282	Sixty Mile	SM51	63.68533	-140.60193	1583	1
283	Sixty Mile	SM52	63.68447	-140.60061	1554	1
284	Sixty Mile	SM53	63.68222	-140.59789	1551	1
273	Sixty Mile	SM42	63.75771	-140.64356	1558	1
274	Sixty Mile	SM43				1
275	Sixty Mile	SM44	63.75490	-140.64958	1551	1
276	Sixty Mile	SM45	63.75441	-140.65237	1517	1
277	Sixty Mile	SM46	63.75551	-140.65545	1464	1

278	Sixty Mile	SM47				1
279	Sixty Mile	SM48	63.75351	-140.65628	1413	1
286	Sixty Mile	SM55	63.76513	-140.66858	1470	1
288	Sixty Mile	SM57	63.76423	-140.66838	1469	1
290	Sixty Mile	SM59	63.76324	-140.66821	1446	1
292	Sixty Mile	SM61	63.76245	-140.66634	1402	1
294	Sixty Mile	SM63	63.75924	-140.66841	1434	1
241	Sixty Mile	SM10	63.91143	-140.47530	1520	1
242	Sixty Mile	SM11	63.91129	-140.47384	1514	1
243	Sixty Mile	SM12	63.91095	-140.47393	1509	1
244	Sixty Mile	SM13	63.91053	-140.47093	1478	1
245	Sixty Mile	SM14	63.91149	-140.46919	1482	1
246	Sixty Mile	SM15	63.89244	-140.42305	1388	1
247	Sixty Mile	SM16	63.89205	-140.42379	1399	1
248	Sixty Mile	SM17	63.89112	-140.42393	1405	1
249	Sixty Mile	SM18	63.89113	-140.42491	1398	1
250	Sixty Mile	SM19	63.89047	-140.42518	1396	1
251	Sixty Mile	SM20	63.88919	-140.42515	1391	1
252	Sixty Mile	SM21	63.91571	-140.41684	1429	1
253	Sixty Mile	SM22	63.91660	-140.41576	1412	1
254	Sixty Mile	SM23	63.91642	-140.41393	1399	1
255	Sixty Mile	SM24	63.91695	-140.41386	1405	1
256	Sixty Mile	SM25	63.91721	-140.41333	1398	1
257	Sixty Mile	SM26	63.91760	-140.41241	1382	1
258	Sixty Mile	SM27	63.91919	-140.40912	1337	1
259	Sixty Mile	SM28	63.77277	-140.49979	1661	1
260	Sixty Mile	SM29	63.77269	-140.49749	1659	1
261	Sixty Mile	SM30	63.77155	-140.49484	1641	1
262	Sixty Mile	SM31	63.76909	-140.48990	1585	1
263	Sixty Mile	SM32	63.76795	-140.48853	1545	1
264	Sixty Mile	SM33	63.76729	-140.48636	1503	1
265	Sixty Mile	SM34	63.76741	-140.48270	1445	1
266	Sixty Mile	SM35	63.73978	-140.47296	1491	1
267	Sixty Mile	SM36	63.74078	-140.47104	1453	1
268	Sixty Mile	SM37	63.74120	-140.47398	1485	1
269	Sixty Mile	SM38	63.74064	-140.48087	1476	1
270	Sixty Mile	SM39	63.74046	-140.48434	1492	1
271	Sixty Mile	SM40	63.74125	-140.48787	1486	1

272	Sixty Mile	SM41	63.74030	-140.49814	1524	1
232	Sixty Mile	SM01	63.98618	-140.61771	1265	1
233	Sixty Mile	SM02	63.98671	-140.60855	1362	1
416	Tombstone	TS066	64.60635	-138.31561	1259	11
417	Tombstone	TS067	64.61119	-138.29728	1312	9
450	Tombstone	TS146	64.60926	-138.30301	1395	10
451	Tombstone	TS147	64.60929	-138.30433	1394	9
452	Tombstone	TS148	64.60943	-138.30491	1373	10
453	Tombstone	TS149	64.60857	-138.30981	1340	9
454	Tombstone	TS150	64.60797	-138.31068	1326	10
326	Tombstone	JT001	64.58831	-138.21509	1625	10
327	Tombstone	JT002	64.58884	-138.21187	1698	9
328	Tombstone	JT003	64.58875	-138.20981	1735	10
329	Tombstone	JT004	64.58711	-138.21170	1690	9
330	Tombstone	JT005	64.58666	-138.21313	1661	10
331	Tombstone	JT006	64.58696	-138.22180	1553	10
346	Tombstone	PK001	64.58105	-138.21553	1568	10
347	Tombstone	PK002	64.58012	-138.21684	1555	9
348	Tombstone	PK003	64.57937	-138.21880	1534	9
349	Tombstone	PK004	64.57683	-138.21832	1553	9
350	Tombstone	PK005	64.57706	-138.22272	1473	9
351	Tombstone	PK006	64.57737	-138.22368	1465	8
352	Tombstone	PK007	64.57839	-138.22525	1455	9
413	Tombstone	TS061	64.44946	-138.42409	1542	7
414	Tombstone	TS062	64.44882	-138.42224	1544	6
415	Tombstone	TS064	64.45176	-138.41993	1582	7
362	Tombstone	TS010	64.55037	-138.19204	1360	11
363	Tombstone	TS011	64.54983	-138.19183	1382	11
364	Tombstone	TS012	64.55049	-138.18954	1375	12
365	Tombstone	TS013	64.54957	-138.19319	1356	12
366	Tombstone	TS014	64.54974	-138.18759	1434	4
367	Tombstone	TS015	64.54665	-138.18328	1528	9
368	Tombstone	TS016	64.54779	-138.18239	1470	9
369	Tombstone	TS017	64.54766	-138.17870	1512	10
370	Tombstone	TS018	64.54523	-138.17695	1681	4
371	Tombstone	TS019	64.54778	-138.17768	1521	9
372	Tombstone	TS020	64.55106	-138.18558	1381	10
392	Tombstone	TS040	64.52860	-138.19408	1693	3

393	Tombstone	TS041	64.52902	-138.19241	1737	7
394	Tombstone	TS042	64.53001	-138.19001	1827	1
445	Tombstone	TS140	64.54392	-138.19123	1399	8
332	Tombstone	KB001	64.47638	-138.16635	1325	5
373	Tombstone	TS021	64.47466	-138.17799	1196	10
374	Tombstone	TS022	64.47716	-138.17418	1373	9
375	Tombstone	TS023	64.47765	-138.16990	1388	8
376	Tombstone	TS024	64.47721	-138.16797	1365	10
377	Tombstone	TS025	64.47585	-138.16676	1300	10
378	Tombstone	TS026	64.47675	-138.16545	1330	8
379	Tombstone	TS027	64.47617	-138.16841	1312	8
380	Tombstone	TS028	64.47599	-138.16798	1300	1
381	Tombstone	TS029	64.47691	-138.17236	1344	10
438	Tombstone	TS132	64.47138	-138.21982	1200	11
439	Tombstone	TS133	64.47276	-138.22569	1362	10
440	Tombstone	TS134	64.47218	-138.22699	1374	12
441	Tombstone	TS135	64.47490	-138.23522	1516	12
442	Tombstone	TS136	64.47407	-138.22945	1403	11
446	Tombstone	TS141	64.47063	-138.21958	1181	11
447	Tombstone	TS142	64.47601	-138.24115	1607	11
448	Tombstone	TS143	64.47913	-138.24702	1728	11
449	Tombstone	TS144	64.48061	-138.26119	1715	12
353	Tombstone	TS001	64.54487	-138.21146	1407	13
354	Tombstone	TS002	64.54556	-138.21123	1432	14
355	Tombstone	TS003	64.54616	-138.21190	1429	13
395	Tombstone	TS043	64.54723	-138.21101	1448	14
396	Tombstone	TS044	64.55033	-138.21217	1404	14
397	Tombstone	TS045	64.54961	-138.21235	1403	11
398	Tombstone	TS046	64.54934	-138.21263	1406	13
399	Tombstone	TS047	64.54861	-138.21468	1343	14
400	Tombstone	TS048	64.54390	-138.21199	1382	14
401	Tombstone	TS049	64.54299	-138.19816	1460	11
402	Tombstone	TS050	64.54365	-138.19654	1431	11
403	Tombstone	TS051	64.54328	-138.19582	1436	12
436	Tombstone	TS129	64.53919	-138.19899	1625	9
437	Tombstone	TS130	64.54124	-138.19769	1531	9
386	Tombstone	TS034	64.43658	-138.35202	1641	10
387	Tombstone	TS035	64.43621	-138.35453	1616	11

418	Tombstone	TS094	64.44295	-138.37395	1668	11
419	Tombstone	TS095	64.44386	-138.39066	1699	11
420	Tombstone	TS097	64.44410	-138.39547	1713	11
421	Tombstone	TS098	64.44336	-138.39798	1691	10
422	Tombstone	TS099	64.44313	-138.40304	1717	11
423	Tombstone	TS100	64.43993	-138.40388	1592	9
424	Tombstone	TS100b	64.43972	-138.40426	1584	8
425	Tombstone	TS101	64.43891	-138.40586	1571	11
426	Tombstone	TS102	64.43473	-138.41320	1541	11
427	Tombstone	TS103	64.43427	-138.42766	1517	10
428	Tombstone	TS104	64.43203	-138.43977	1391	10
429	Tombstone	TS105	64.43170	-138.44262	1390	11
430	Tombstone	TS106	64.43135	-138.45211	1415	11
431	Tombstone	TS107	64.42943	-138.45705	1400	11
432	Tombstone	TS108	64.42837	-138.46132	1371	11
356	Tombstone	TS004	64.62637	-138.44643	1258	12
357	Tombstone	TS005	64.62566	-138.44792	1279	12
358	Tombstone	TS006	64.62599	-138.45100	1267	12
359	Tombstone	TS007	64.62609	-138.45332	1296	13
360	Tombstone	TS008	64.62627	-138.45456	1297	12
361	Tombstone	TS009	64.62619	-138.45685	1302	13
404	Tombstone	TS052	64.62466	-138.45196	1326	11
405	Tombstone	TS053	64.62441	-138.45256	1349	12
406	Tombstone	TS054	64.62454	-138.45308	1343	12
407	Tombstone	TS055	64.62454	-138.45488	1364	12
408	Tombstone	TS056	64.62344	-138.45341	1421	13
409	Tombstone	TS057	64.62508	-138.43765	1283	12
410	Tombstone	TS058	64.62507	-138.43629	1282	11
411	Tombstone	TS059	64.62519	-138.43454	1282	13
333	Tombstone	MK001	64.58644	-138.37123	1387	7
334	Tombstone	MK002	64.58608	-138.37155	1391	9
335	Tombstone	MK003	64.58612	-138.36868	1415	8
336	Tombstone	MK004	64.58603	-138.36720	1439	9
337	Tombstone	MK005	64.58322	-138.36674	1523	9
338	Tombstone	MK006	64.58093	-138.36918	1565	8
339	Tombstone	MK007	64.57710	-138.37194	1676	8
340	Tombstone	MK008	64.57688	-138.37904	1657	8
341	Tombstone	MK009	64.58068	-138.37293	1508	8

382	Tombstone	TS030	64.42971	-138.33821	1384	1
383	Tombstone	TS031	64.42995	-138.33521	1364	1
384	Tombstone	TS032	64.42996	-138.33810	1390	1
385	Tombstone	TS033	64.43747	-138.35468	1677	1
388	Tombstone	TS036	64.43510	-138.35820	1495	1
389	Tombstone	TS037	64.43683	-138.35820	1612	1
390	Tombstone	TS038				1
391	Tombstone	TS039	64.43312	-138.34050	1453	1
443	Tombstone	TS137	64.47109	-138.73946	1578	3
444	Tombstone	TS138	64.46801	-138.71632	1457	3
342	Tombstone	P2016NEW	64.41940	-138.47146	1553	6
343	Tombstone	P2016NEW2	64.41713	-138.50207	1556	5
344	Tombstone	P2016NEW3	64.41613	-138.49815	1570	5
345	Tombstone	P2016NEW4	64.41386	-138.49650	1537	5
412	Tombstone	TS060	64.41505	-138.50126	1522	5
433	Tombstone	TS112	64.41438	-138.49940	1530	6
434	Tombstone	TS113	64.41372	-138.50698	1516	3
435	Tombstone	TS114	64.40970	-138.49605	1491	6
455	West Ogilvie	SOG01	64.50066	-139.21556	1529	1
456	West Ogilvie	SOG02	64.50289	-139.21811	1496	1
457	West Ogilvie	SOG03	64.51312	-139.15244	1219	1
458	West Ogilvie	SOG04	64.51005	-139.15743	1272	1
459	West Ogilvie	SOG05	64.51176	-139.15877	1250	1
460	West Ogilvie	SOG06	64.66329	-139.74408	1294	1
461	West Ogilvie	SOG07	64.66474	-139.74724	1275	1
462	West Ogilvie	SOG08	64.66733	-139.74954	1306	1
463	West Ogilvie	SOG09	64.74294	-139.72050	1202	1
464	West Ogilvie	SOG10	64.74348	-139.71519	1256	1
465	West Ogilvie	SOG11	64.75761	-139.70454	1638	1
466	West Ogilvie	SOG12	64.75954	-139.69997	1735	1
467	West Ogilvie	SOG13	64.75716	-139.69276	1617	1
468	West Ogilvie	SOG14	64.75532	-139.69673	1472	1
469	West Ogilvie	SOG15	64.75397	-139.69312	1451	1
470	West Ogilvie	SOG16	64.75970	-139.67575	1331	1
471	West Ogilvie	SOG17	64.75963	-139.67995	1361	1
472	West Ogilvie	SOG18	64.74350	-140.13962	1461	1
473	West Ogilvie	SOG19	64.74167	-140.14011	1432	1
474	West Ogilvie	SOG20	64.73890	-140.14026	1384	1

475	West Ogilvie	SOG21	64.73653	-140.14178	1372	1
476	West Ogilvie	SOG22	64.77184	-140.35664	1107	1
477	West Ogilvie	SOG23	64.77364	-140.36557	1161	1
478	West Ogilvie	SOG24	64.77413	-140.36095	1083	1
479	West Ogilvie	SOG25	64.78345	-140.28526	1280	1
480	West Ogilvie	SOG26	64.78424	-140.28868	1250	1
481	West Ogilvie	SOG27	64.49982	-139.21906	1474	1
482	West Ogilvie	SOG28	64.50175	-139.22526	1419	1
483	West Ogilvie	SOG29	64.52431	-139.18823	1472	1
484	West Ogilvie	SOG30	64.52368	-139.19310	1488	1
485	West Ogilvie	SOG31	64.52317	-139.19908	1461	1
486	West Ogilvie	SOG32	64.66987	-139.71550	1421	1
487	West Ogilvie	SOG33	64.66876	-139.71069	1437	1
488	West Ogilvie	SOG34	64.67182	-139.71257	1365	1
489	West Ogilvie	SOG35	64.74706	-139.69939	1448	1
490	West Ogilvie	SOG36	64.74505	-139.70253	1400	1
491	West Ogilvie	SOG37	64.74554	-139.67837	1296	1
492	West Ogilvie	SOG38	64.74776	-139.67999	1370	1
493	West Ogilvie	SOG39	64.76533	-139.70550	1433	1
494	West Ogilvie	SOG40	64.76733	-139.71019	1377	1
495	West Ogilvie	SOG41	64.76719	-139.71967	1332	1
496	West Ogilvie	SOG42	64.76776	-139.72580	1311	1
497	West Ogilvie	SOG43	64.75983	-139.67238	1310	1
498	West Ogilvie	SOG44	64.75951	-139.66827	1278	1
499	West Ogilvie	SOG45	64.73068	-140.14223	1369	1
500	West Ogilvie	SOG46	64.73295	-140.13776	1328	1
501	West Ogilvie	SOG47	64.73489	-140.14220	1366	1
502	West Ogilvie	SOG48	64.76681	-140.32123	1368	1
503	West Ogilvie	SOG49	64.76428	-140.32703	1279	1
504	West Ogilvie	SOG50	64.76366	-140.33400	1255	1
505	West Ogilvie	SOG51	64.78278	-140.28828	1258	1
506	West Ogilvie	SOG52	64.78474	-140.29363	1196	1

Appendix 2. Summary of results from 654 Collared Pika (*Ochotona collaris*) surveys completed in Kusawa Territorial Park during 2012 and 2025, in three different survey blocks. See Figure 2 for the location of each survey block.

Year	Number of sites surveyed	Number of sites occupied	Number of sites unoccupied	Naïve occupancy (%)	95% Confidence intervals (%)
Block A					
2012	28	18	10	64%	44–81%
2020	48	36	12	75%	60–86%
2021	72	48	24	67%	55–77%
2022	75	42	28	56%	44–67%
2023	75	57	18	76%	65–85%
2024	75	42	28	56%	44–67%
2025	74	40	34	54%	42–66%
Block B					
2022	16	8	8	50%	25–75%
2023	17	15	2	88%	64–99%
2024	17	6	11	35%	14–62%
2025	17	10	7	59%	33–82%
Block C					
2020	47	35	9	74%	60–86%
2023	33	24	9	73%	54–87%
2024	30	17	13	57%	37–75%
2025	30	16	14	53%	34–72%