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Natural Resource Stewardship and Science

Bats of Klondike Gold Rush National Historical Park and the Taiya Inlet Watershed

2013-2014 Survey Results with notes on habitats and roosts

A Klondike Gold Rush National Historical Park - Natural Resources Management Report

ON THIS PAGE

Long-legged Myotis (*Myotis volans*), one of four species detected at KLGO.
Photograph by: Jonathan Fiely

ON THE COVER
Mist-netting setup at the Frisbee Golf Course, Skagway, AK
Photograph by: Jonathan Fiely

Bats of Klondike Gold Rush National Historical Park and the Taiya Inlet Watershed

2013-2014 Survey Results with notes on habitats and roosts

A Klondike Gold Rush National Historical Park - Natural Resources Management Report

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Skagway, Alaska

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Executive Summary

Bats were surveyed during the summers of 2013 and 2014 at Klondike Gold Rush National Historic Park (KLGO) and surrounding Taiya Inlet watershed in the vicinity of Skagway, Alaska. A combination of techniques was used, including mist-netting, passive acoustic monitoring, and a review of specimen records in museum collections worldwide.

We confirmed the presence of four species in the region: Little Brown Myotis (*Myotis lucifugus*), Keen's Myotis (*M. keenii*), Long-legged Myotis (*M. volans*), and Silver-haired Bat (*Lasionycteris noctivagans*). For the latter three species, these represent northern range extensions in Alaska. Keen's myotis and Silver-haired bats had been detected acoustically in KLGO, but not verified by capture. An active maternity colony of *M. lucifugus* was confirmed at a residence in Skagway, although residents could not confirm year-round habitation. Evidence of long-distance movements of *M. lucifugus* around White Pass suggests the area may be an important stopover site for bats migrating to and from interior Canada or that bats are using high-elevation habitats during the summer. *M. keenii* do not appear present north of White Pass despite intensive survey work done in Yukon, supporting the preference of these species for temperate coastal forests, but little work has been done in the areas of British Columbia adjacent to the park.

Finally, we present preliminary data on roost and habits of *M. keenii* in and around Skagway. Data from four radio-tagged *M. keenii* in 2014 supported use of forest edge habitat by foraging bats and nearly exclusive use of dead, standing snags—primarily hemlock—as day roosts. Bats appeared to use the space between the trunk and loose 'shingles' of bark 1-4 meters from the ground, with 1-3 individuals present at each site. No maternity colonies for this species were found.

This study highlights the importance of using a variety of survey techniques in the inventory of rare, cryptic, and/or difficult-to-study species such as bats, as no single technique detected all species present in and around the park. Detailed surveys of more remote areas with different forest structures and hydrologic features may yet confirm the presence of species presumed present but not detected, including *Myotis californicus* and possibly *M. yumanensis*, the latter of which has only recently been confirmed in Alaska. Additional research is needed to establish both the seasonal movement patterns and location of winter hibernacula used by bats in this region. These data would reveal the degree of isolation and potential susceptibility of the area's bat population to newly emergent diseases such as White-nose Syndrome, which is currently affecting bats in similar habitats to the east.

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List of Terms

Abbreviations used:

KLGO – Klondike Gold Rush National Historic Park

MYKE – Keen's Myotis – *Myotis keenii*

MYLU – Little Brown Bat – *Myotis lucifugus*

MYVO – Long-legged Myotis – *Myotis volans*

LANO – Silver-haired Bat – *Lasionycteris noctivagans*

WNS – White-nose Syndrome

Introduction

The emergence of White-Nose Syndrome (WNS) has had a deleterious impact on bats in eastern North America, an additive pressure to the challenges of habitat loss and climate change. Largely affecting cave-hibernating bats in northern climes, the fungal disease has seen rapid spread from its epicenter in New York in late 2006 and is now present in over 25 states and five Canadian provinces. Susceptible species typically suffer 95-100% mortality at hibernacula where WNS is present: in eight years since the disease was first detected, at least one species – the Long-eared Myotis (*Myotis septentrionalis*) – has been proposed for listing under the Endangered Species Act as a direct result of the disease. Canadian authorities have also listed three species - Little Brown Myotis (*M. lucifugus*), Northern Myotis (*M. septentrionalis*) and the Tri-colored Bat (*Perimyotis subflavus*) – for protection under Canada's Species at Risk Act.

Alaska's response to the disease remains largely focused on basic inventories of species across the state but particularly in SE Alaska, which harbors most of the state's bat diversity. This simple metric – what species are present and where – represents critical baseline data. Collecting presence/absence data on bats is nonetheless challenging. The simplest solution – passively recording the ultrasonic calls of bats as they forage through the night – can be used to confidently identify only a fraction of species that might be present. Further, careful consideration on the timing and locations of surveys must be made, as many species are potentially migratory and vary widely in habitat preference, feeding altitude, and roosting behavior.

Today, eight species of bat are known from Alaska. The most widely distributed species, the Little Brown Myotis (*Myotis lucifugus*), ranges as far north as Interior Alaska and west to Bristol Bay (Tessler et al. 2014). Other species are thought to be restricted to the temperate climes of coastal Southeast Alaska and include the Long-legged Myotis (*M. volans*), Keen's Myotis (*M. keenii*), California Myotis (*M. californicus*), Yuma Myotis (*M. yumanensis*), Silver-haired Bat (*Lasionycteris noctivagans*), and Hoary Bat (*Lasiurus cinereus*) (Parker et al. 1997; MacDonald & Cook 2009; Olson et al. 2014; Blejwas et al. 2014). The Big Brown Bat (*Eptesicus fuscus*) is known from a single specimen collected in Interior Alaska, but it is thought to be the result of accidental transport by humans as the species has not been detected since by either capture or acoustic records (see Parker et al. 1997), but acoustic calls can be difficult to distinguish from silver-haired bats. A recent resurgence in interest and research focused on Alaska's bats (see Olson and Jung [2014] and Jung et al. [2014]) is timely in light of potential emerging threats and persistent questions about their basic biology, ecology, and movement across the landscape.

Klondike Gold Rush National Historic Park (KLGO) at the Taiya Inlet is situated at the northern limit of southeast temperate rainforest and links to the boreal interior forests by several low-elevation mountain passes. This makes the region of particular interest for survey efforts, as species known only from Southeast Alaska would presumably be limited by a combination of geographic and hydrologic features including the St. Elias Mountains, Malaspina Glacier, and associated icefields, as well as the steep altitudinal gradient from coastal temperate rainforest to alpine habitat. Recent surveys conducted in and around Whitehorse, Yukon Territory indicate only *M. lucifugus*, and more

recently *M. volans* present (Slough et al. 2014) in contrast to the higher diversity found to the south in Juneau and the surrounding area.

In 2007, KLGO conducted a preliminary inventory of bats in the park (Feierabend & Schirokauer 2009). The 2007 study used passive acoustic recording to capture call sequences of foraging bats and confirmed the presence of *L. noctivagans* in the park from its unique acoustic signature. All other calls recorded (over 1000+) could be identified only to the genus level. In addition, two specimens of bat collected from buildings in downtown Skagway were identified as *M. lucifugus*, a species commonly known to roost in human structures.

The current study sought to provide more detailed data on bat species present in and around KLGO. In the summers of 2013 and 2014 bats were captured in mist-nets and harp traps to cover as wide a variety of habitat as possible throughout the season. The use of physical capture methods as well as full-spectrum acoustic recordings provide a more comprehensive assessment of species presence than any single method alone. We also recorded preliminary data on species movement and roost use gathered from a telemetry and tracking effort on key species captured during this survey. Non-lethal tissue sampling and the collection of a small number of voucher specimens will permit DNA-based identifications to test for the possible presence of the Yuma Myotis (*M. yumanensis*), which is exceedingly difficult to distinguish from the Little Brown Myotis (*M. lucifugus*) and has only recently been confirmed from SE Alaska (Olson et al. 2014), as well as future genetic studies of migration. Recommendations for future efforts are also presented.

Methods

Site Selection

Site selection for mist-netting, harp trapping, and acoustic monitoring was made on the basis of generalized habitat type, road and trail access, and geographic coverage to include the US/Canada border at White Pass and south to the Dyea/Skagway basins. This included both NPS-administered parcels and surrounding public and private land where permission to survey could be obtained. Proximity to low-turbidity bodies of water and the availability of natural, open corridors through habitat were also considered in final site selection, as these are leading factors to high success rates for both acoustic and mist-netting techniques.

Fifteen sites [Table 1, Appendix A] were selected for sampling during the 2013 and 2014 field seasons. Of these, 12 sites were sampled via a combination of both mist-netting and passive acoustic monitoring, and three exclusively by acoustics due to logistical constraints of trapping at the locations.

Table 1. Sampling locations in 2013 and 2014

Locality	Latitude	Longitude	Sampling type	Year
Black Lakes	59.50268	-135.26410	Netting, Acoustics	2013, 2014
Frisbee Golf	59.46554	-135.31023	Netting, Acoustics	2014
Matthew's Creek	59.47985	-135.33601	Netting, Acoustics	2014
Nelson Slough	59.50357	-135.35859	Netting, Acoustics	2013, 2014
Pullen Pond	59.45198	-135.31707	Netting, Acoustics	2013, 2014
West Creek	59.52982	-135.34743	Netting, Acoustics	2014
White Pass	59.59604	-135.18527	Netting, Acoustics	2014
Skagway residence	59.45625	-135.32077	Netting, Acoustics	2014
Yakutania Point	59.45799	-135.32916	Netting, Acoustics	2014
Nahku Road	59.46780	-135.34792	Netting, Acoustics	2014
Jim Frey Bridge	59.53046	-135.38478	Netting, Acoustics	2014
Gold Rush Cemetery	59.47360	-135.28895	Netting, Acoustics	2014
Lower Dewey	59.45026	-135.31007	Acoustics	2013, 2014
International Falls	59.61102	-135.17449	Acoustics	2013
Lost Lake	59.51691	-135.37895	Acoustics	2013, 2014

Capture

Mist-netting

The capture of bats via mist-netting follows the methods established in Kunz & Parsons (2009), using a combination of both collapsible triple- and single-high sets. BCM's Forest Filter collapsible mist-net system was used for triple-high sets, while Avinet poles or 1" steel conduit pipe provided support for single-high sets. Avinet 38mm mesh mist-nets were used for both setups. All nets were of 1m-high, 4-shelf designs and ranged in length from 2.6m to 18m wide. Number of sets, length of nets selected, and set type was dependent on site characteristics at the time.

Generally, sites were surveyed and netting locations flagged the day prior to trapping. Nets were typically deployed perpendicular to the road, waterway, or natural corridor being trapped – selected for areas where bats would naturally be funneled into the set and unable to easily evade nets due to physical boundaries (i.e. forest clutter).

To avoid stress to captured bats, trapping was not conducted if temperatures dropped below 5°C, winds exceeded 5-10mph gusts (or nets were noticeable billowing), or precipitation was heavy enough to accumulate on the nets. This follows generally established guidelines for similar species-based inventories across North America, including those used by USFWS as guidelines for surveys of the endangered Indiana Bat (*Myotis sodalis*) (USFWS 2014).

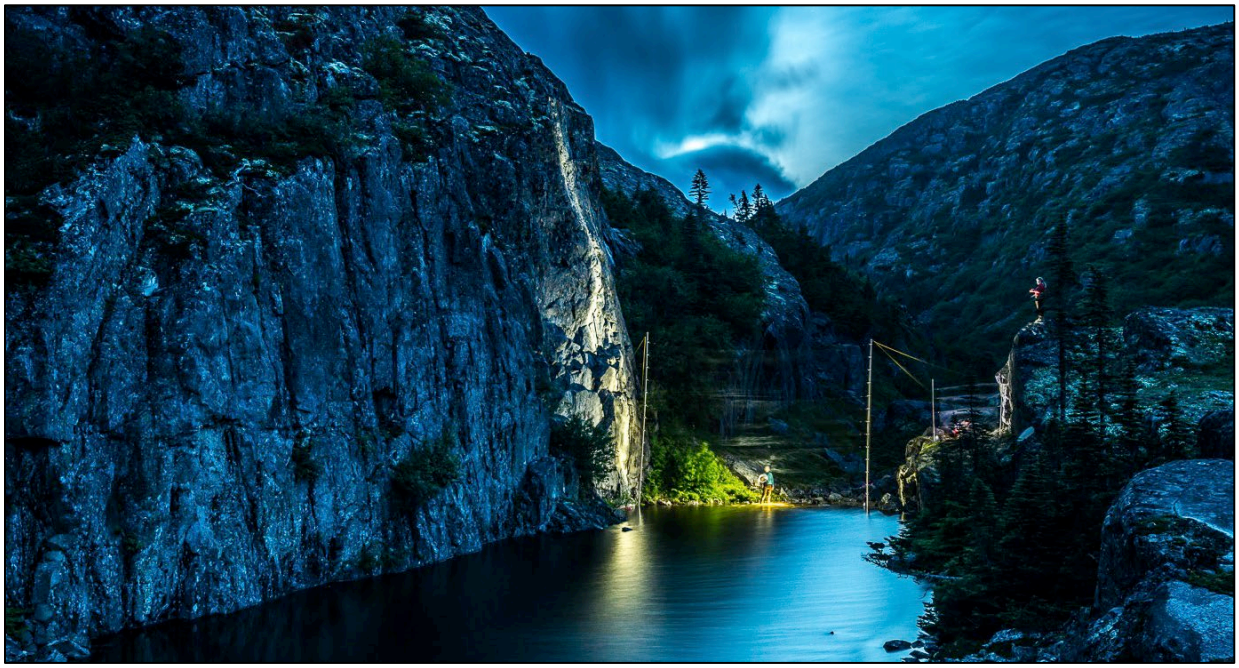

Figure 1. An example setup at White Pass, demonstrating the use of both triple-high 12m-length nets and single-high 6m net to effectively trap a potential corridor for flying bats foraging over a pool.

Harp-trapping

In certain situations, a harp trap was also used to capture bats exiting roost sites, and in select instances along tight forest corridors or in areas of heavy clutter. We followed the methodologies outlined in Kuntz & Parsons (2009) for trap deployment, with a typical setup illustrated in Figure 2. With this method, bats are captured as they fly into a series of monofilament line stretched between two aluminum poles and falling into the lower capture bag, where they are later collected by biologists. As bats are not entangled (as they are in mist-nets), a greater number of bats can be safely captured in a short period of time – such as bats exiting a known roost *en masse* at dusk.

Figure 1. Harp trap deployed behind a Skagway residence. Bats exited a known maternity roost via the bottom edge of the chimney and were captured as they flew over the deck.

Handling

Decontamination and voucher collection

Captured bats were handled, measured, sampled, and released following the latest guidelines for WNS-infected states (Foley et al. 2011, USFWS 2012). This included precautions for both bat and researchers, including regular decontamination of equipment between trapping and handling and between sites, and use of semi-sterile sampling protocols for collection of genetic vouchers. Representatives of each species were collected as voucher specimens consisting of prepared skulls and skeletons, study skins, tissues, and (when present) ectoparasites and deposited in the Mammal Collection at the University of Alaska Museum (UAM). Animal handling and specimen collection was conducted following the guidelines of the American Society of Mammalogists (Sikes et al. 2011) and under University of Alaska Fairbanks IACUC assurances 152295 and 613047, NPS IACUC AKR_KLGO_Olson_Bats_2014.A2, NPS permit KLGO-2013-SCI-0004, and permits 13-089 and 14-029 issued by the Alaska Department of Fish and Game.

Measurements, sampling, and banding

Data recorded for captured bats include field species identification, total weight, forearm length, sex, reproductive status, and detailed notes on parasite load and apparent health of the individual. A 2-mm punch was taken with a sterile biopsy from the uropatagium close to the right hindleg as a genetic voucher of each bat and deposited in the University of Alaska Museum's Genomic Resources

facility. Bats were then banded with a specially designed bat-specific aluminum band stamped with a number unique to that individual in coordination with statewide bat inventories being conducted by the Alaska Department of Fish and Game, U.S. Forest Service, and National Park Service (see appendix C for detailed banding information). The band encircles the radius and ulna while still allowing free movement between the elbow and wrist of the bat, and allows positive identification if the bat is re-captured during future trapping efforts.

Radiotelemetry

Eight individuals of two species were fitted with custom-made 0.25-g radio transmitters manufactured by Phillip Blackburn. Lactating females, juveniles, and individuals weighing less than 5g were not tagged in order to avoid undue stress. Established guidelines to avoid tag impact on a bat's maneuverability advise fitting tags that weigh less than 5% the total body weight of the animal (Aldridge & Brigham 1988, Kunz & Parsons 2009). Tags were attached with skin-safe surgical contact cement between the shoulder blades directly behind the cervical vertebrae after trimming the fur to ensure contact between transmitter and skin (Figure 3).

Figure 2. *M. lucifugus* fitted with an arm band and radio transmitter between shoulder blades. Transmitter antenna can be seen trailing bat at the rear.

Individuals were followed via radiotelemetry through the night to identify foraging corridors and the location of day roosts for the full 5-8 days of battery life. These data, including observations of distance traveled between foraging areas, roosts, and capture location, were analyzed in qGIS to determine the minimum convex polygon of foraging locations.

Acoustic surveys

Passive acoustic surveys were conducted parallel to mist-netting each night trapping occurred. In addition, a long-term passive acoustic monitoring site was established from June 26-July 16 at White Pass (Figure 4) and areas inaccessible to trapping throughout the 2013 and 2014 field season (Table 1).

Equipment

Passive acoustic monitoring was conducted using a Wildlife Acoustics SM2BAT+ unit fitted with a SMX-UT microphone. Running of internal power, the recorders managed five nights uninterrupted data collection before the batteries required charging.

SM2BAT+ units were configured to automatically record a 5-second clip after being triggered by a >20kHz signal. As a comprehensive library for bat calls in Alaska has not been established and no Alaska-specific autoclassifiers exist (and their utility beyond reference call libraries questionable [Clement et al. 2014]), the majority of high-frequency call sequences we recorded (typified by a >35kHz call sequence) could be confidently identified only to the genus (*Myotis* sp.) level. However, calls of *Lasionycteris noctivagans* can be positively identified by call alone given their uniquely low-frequency call consisting of a downward-inflected echolocation with a lower frequency range averaging ~25kHz (Appendix B). The only other low-frequency bat call that could be mistaken for *L. noctivagans* is the Big Brown Bat (Eptesicus fuscus) which is unlikely to occur in Skagway but cannot be completely discounted.

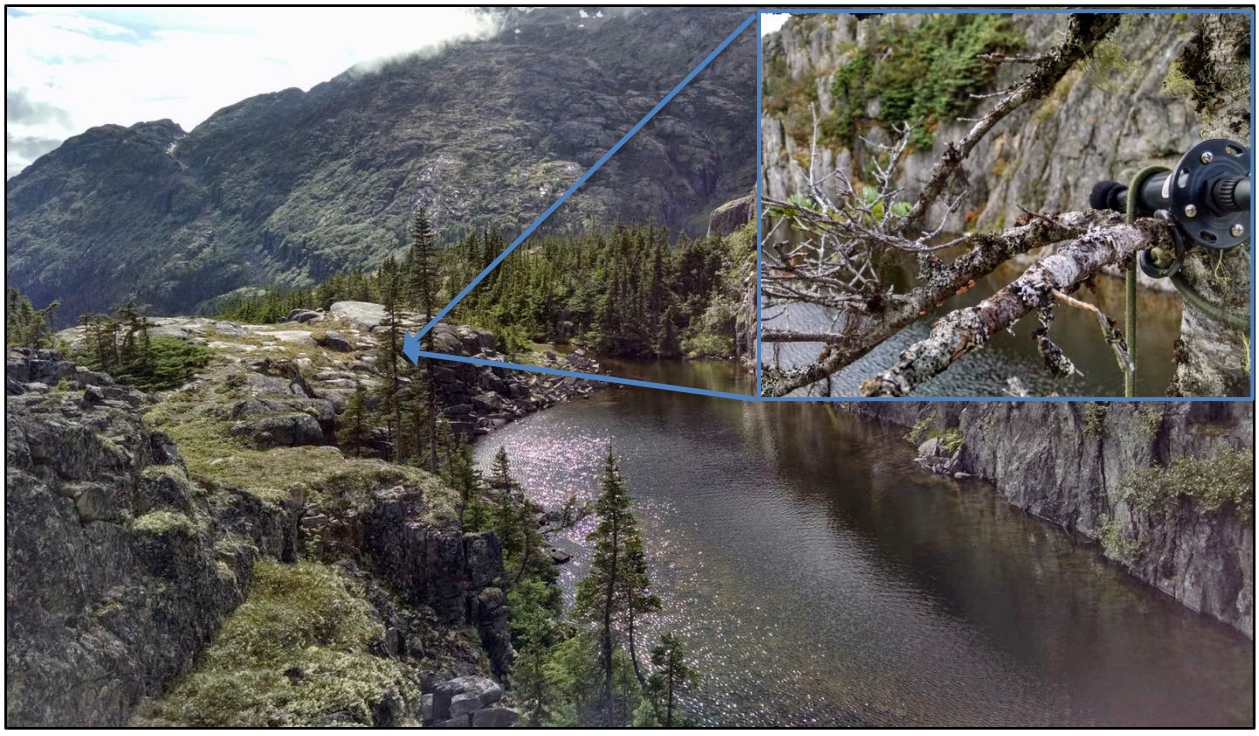

Figure 3 - White Pass acoustic monitoring site. Microphone was placed 1.5m above pond to capture recordings of bats drinking or foraging over the water.

We also began collection of an acoustic call library of bats captured in the course of this study that could either be confidently identified in the field or later using DNA barcodes. Recordings were made on hand-released bats with a Pettersson D240x recorder, processed as full-spectrum files via Sonobat 3.14, and archived at KLGO and as digital media files associated with genetic vouchers on UAM's online database Arctos.

Results and Discussion

Mist-netting

Effort

We trapped 9 nights in 2013 and 41 nights in 2014. A detailed summary of netting effort for 2014 is presented in Table 2, including a metric of effort calculated as the average square meters of net deployed per night at each site.

Sites where no bats were caught and no activity was recorded via the acoustic detector were visited only once. In 2014 these sites were Gold Rush Cemetery, Jim Frey Bridge, and Nahku Road. Pullen Pond was visited approximately once/week to observe recapture rates of *M. lucifugus* at the site.

Table 2. Sites, effort, and length of nets deployed through the 2014 field season

Locality	Nights/Site	2.6m	6m	9m	12m	18m	m / night
Black Lakes	7	-	-	5	19	3	46m
Frisbee Golf	2	-	2	1	1	6	70m
Gold Rush Cemetery	1	-	2	2	-	-	30m
Jim Frey Bridge	1	-	3	3		-	45m
Matthew's Creek	1	-	6	-	-	-	36m
Nahku Rd	1	-	-	1	-	3	63m
Nelson Slough	2	1	4	1	7	1	68m
Pullen Pond	11	2	17	32	21	1	60m
West Creek	2	-	4	2	6	-	57m
White Pass	3	1	2	6	5	-	43m
Skagway House	4	3	1	1	1	1	13m
Yakutania Pt	6	2	7	17	5	3	52m
Grand Total	**41**	**9**	**48**	**71**	**65**	**18**	**49m**

Totals

Table 3. Capture totals for species captured in the 2013/2014 field season.

Year/Site	MYKE	MYLU	MYVO	LANO*	Total
2013					
Black Lakes	1	8	-		9
2014					
Black Lakes	6	13	-	1	19
Frisbee Golf	2	1	-		3
Matthew's Creek	1	-	-		1
Nelson Slough	-	1	-		1
Pullen Pond	-	153	-		153
West Creek	1	-	-		1
White Pass	-	3	-		3
Skagway House	-	23	-		23
Yakutania Pt	2	4	1	2	7
Grand Total	**13**	**206**	**1**		**220**

**L. noctivagans* (LANO) documented only via passive acoustics

We made 220 captures of four species during 2013 and 2014 (Table 3). Of these, 24 were recaptures, including one bat initially captured in 2013 and caught in 2014 at the same site. A total of 196 individual bats were therefore captured over the course of this study.

One site in particular, Pullen Pond, accounted for nearly 70% of captures, 100% of which were *M. lucifugus*. In contrast, Black Lakes and Yakutania Point – each on the outskirts of major development with more diverse, mixed-coniferous habitats –were both sites with low capture rates but high diversity. Yakutania Point was also the site of our sole *M. volans* capture during the course of the study. A detailed description of each species captured follows.

Table 4. Average bat captures per night effort at a given site

Year/Site		Average bats/night		
	Nights/site	MYKE	MYLU	MYVO
Black Lakes	7	1.0	3.0	0.0
Frisbee Golf	2	1.0	0.5	0.0
Matthew's Creek	1	1.0	0.0	0.0
Nelson Slough	2	0.0	0.5	0.0
Pullen Pond	11	0.0	13.9	0.0
West Creek	2	0.5	0.0	0.0
White Pass	3	0.0	1.0	0.0
Skagway House	4	0.0	5.8	0.0
Yakutania Pt	6	0.3	0.7	0.2

Myotis lucifugus

This species was well represented in the study, comprising nearly 93% of captures. The majority (74%) of these were collected at Pullen Pond, a small body of water fed by Pullen Creek at Skagway.

One hypothesis describing this high rate of capture – nearly 14bats/nights effort (Table 4) – is that bats of this species roosting within the city and surrounding buildings concentrate at the site to feed and drink. Including Pullen Creek, this represents the only low-turbidity source of water available to bats in Skagway without having to ascend 200 meters elevation to the Lower Dewey Reservoir, or nearly 300 meters to Icy Lake.

This hypothesis is supported by preliminary data gathered via telemetry tracking of three *M. lucifugus* males captured at Pullen Pond. These bats were tracked to roosts within the city limits and consistently visited Pullen Pond via Pullen Creek immediately upon leaving the roost at dusk. No individuals were relocated outside the developed area of Skagway when tracking. In addition, one *M. lucifugus* first captured and tagged at Yakutania Point – 400m west of downtown Skagway across the Skagway River – was also observed consistently foraging at Pullen Pond and Pullen Creek during four nights of tracking.

The roosting habits of *M. lucifugus* at Skagway largely follow the norms for the species. Bats captured at Pullen Pond and Yakutania Point were observed to roost exclusively within human structures in and around Skagway itself. These included four private residences and one KLGO-

owned property where three individuals (presumably *M. lucifugus*) inhabited the insulating walls at the Frye-Bruhn warehouse (Figure 5). No maternity colonies were found via telemetry, and each roost contained approximately 1-3 individuals.

Figure 4. KLGO's historical Frye-Bruhn warehouse, an ideal roost for bats with hollow boarded walls and plenty of cracks for access. Three individuals, presumably *M. lucifugus*, were counted exiting this site.

One maternity colony of *M. lucifugus* was found in 2013 through word of mouth at the house of a Skagway resident. Exit counts in 2014 at the site indicated an average of 36 bats leaving the roost, which was later trapped to verify age, reproductive status, and species (Figure 2). At least one tagged bat - initially captured at Pullen Pond – was recaptured at the site.

Capture rates of *M. lucifugus* outside of Skagway were considerably lower but the species was found to be widely distributed and present from Dyea to White Pass. Of note, two *M. lucifugus* captured and tagged at White Pass and Black Lakes were each observed utilizing natural roosts in the form of cliff-facing cracks. This is only the second time this behavior has been observed in Alaska (Figure 6).

Figure 5. Crack-based roost of *M. lucifigus* adult male. An endoscope was used to confirm use of the crack by at least two bats. Black Lakes are visible in the background.

Finally, of note is the capture of three *M. lucifugus* at White Pass during the 2014 field season. The capture site (Figure 1) is situated at ~900m elevation just above treeline largely surrounded by alpine shrub habitat. Although capture rates were low as a unit of effort (only one bat/night, Table 4), passive acoustic detection rates of *Myotis* sp. were fairly consistent through the season indicating regular use of the site.

To test whether bats were using the pass in transit or regularly inhabiting the area we radio-tagged one *M. lucifugus* male and tracked it for four days. Immediately upon release, it travelled nearly 5.4km south where it foraged over Black Lakes, then presumably farther up White Pass Valley. The first night after release the bat roosted within White Pass Valley although we were unable to determine the location past triangulation via the railroad. On subsequent nights the bat switched roost locations and was observed roosting in cracks within cliffs the NE of Black Lakes (Figure 7). It returned to this roost and foraged in the area for the duration of the transmitter's life. This suggests that White Pass is not only surmountable by bats migrating between coastal SE Alaska and interior British Columbia and Yukon Territory but contains suitable, if perhaps marginal, foraging habitat throughout the summer.

Figure 8. Standing snags and horizontal granite fissure at Matthews Creek, two roosts of *M. keenii*

In contrast, the 2nd radiotagged *M. keenii* travelled a much greater distance (4.6km) from its initial capture site to a roost tree and between its roost tree and foraging areas (covering 16.5km^2 as calculated via minimum convex polygon of relocations; see Figure 10). This bat used three different roost trees – all standing snags - over seven days on the western aspect of the slope, approximately 65m in elevation. Interestingly, this is adjacent to the slope on the same peninsula as the other tagged *M. keenii* male and suggests spatial partitioning among males.

Finally, we had the opportunity to observe the Matthews Creek male foraging via high-powered flashlight and videography where the transmitter antennae could be clearly seen. During the brief period of observation (45 mins) the bat was observed feeding 5-20m high within branches of standing hemlock and spruce, appearing to glean insects from inner branches and along branch edges.

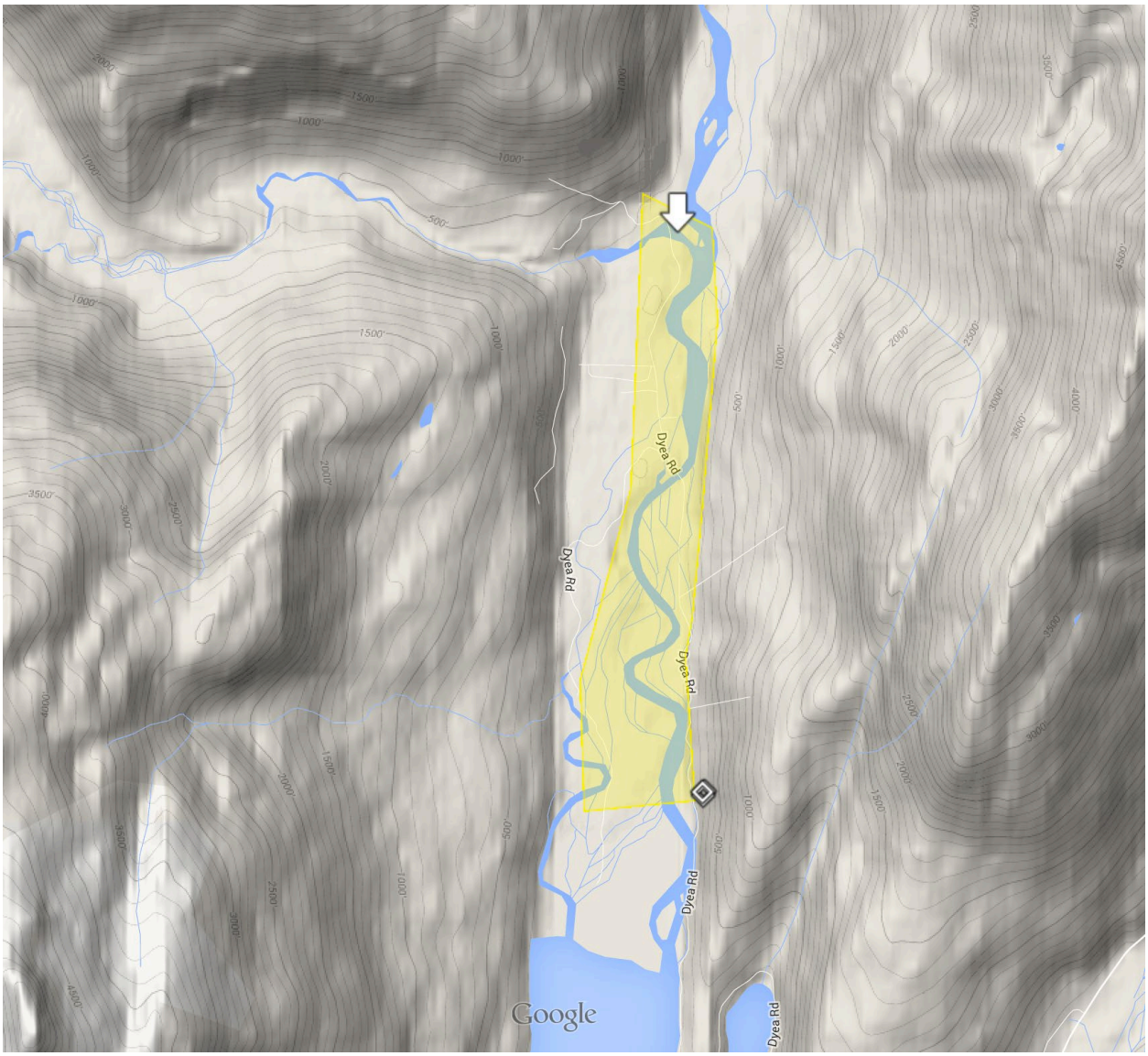

Figure 9. Capture site (↓) and location of roosts (◇) for *M. keenii* tagged at West Creek.

Myotis volans

The capture of one adult male Long-legged Myotis (*M. volans*) at Yakutania Point in 2014 also represents a northern range extension in Alaska (although the species has been documented from similar latitudes in adjacent British Columbia; Nagorsen & Brigham 1993). The species is generally associated with stands of old-growth timber or less developed forests given available roost trees, and is also known to inhabit caves as winter hibernacula (Schowalter 1980), features present north Yakutania Point along the Skagway River and highway. During the same year colleagues with the ADF&G also capturing a single *M. volans* approximately 30km southwest in Haines, AK, indicating the species is established in the region but in low abundance. One voucher specimen collected (UAM 120853).

Lasionycteris noctivagans

Three discrete call sequences of Silver-haired Bat (*L. noctivagans*) were recorded at Yakunania Point and Black Lakes during 2014 (Table 3). Feierabend & Schirokauer (2009) also recorded several low-frequency detections of this species. A review of full-spectrum recordings to existing reference call libraries (and the absence of any other species present in Alaska with a frequency in this 25kHz range) leaves us confident in our identification of these calls to species. See Appendix B for example sonogram collected at Yakutania Point on 19 Jul 2014, call fragment, and comparison review of a verified *L. noctivagans* reference call.

Acoustics

Nightly acoustic recordings made at site were immediately analyzed for identifiable call sequences – specifically, *Lasionycteris noctivagans* (see above). Long term monitoring at White Pass returned a consistent but low total number of calls attributable as *Myotis* sp. - 287 over 45 deployed nights - and we observed no peaks of activity through the summer. We did not detect *M. californicus* at any site. Finally, we collected a total of 141 species-verified echolocation recordings of released bats over the course of the summer, contributing to a reference call library for KLGO and Alaska.

Conclusions and Recommendations

This study builds on a preliminary survey conducted at KLGO (Feierabend &Schirokauer 2009) and contributes to a regional effort to document the distribution, ecology, and population status of bats across Alaska, British Columbia, Northwest Territories, and the Yukon (Olson & Jung 2014). Confirmation of Silver-haired Bat (*Lasionycteris noctivagans*), Keen's Myotis (*Myotis keenii*), and Long-legged Myotis (*M. volans*) at KLGO extends the known range of all three species in Alaska (and, in the case of Keen's Myotis, its entire range). Increased knowledge of bat species distributions and habitat affiliations will help inform management decisions and future studies as researchers expand their efforts across the region.

In light of our findings, the absence of the California Myotis (*Myotis californicus*) during the course of this study is notable, as the species is often found in close association to *M. keenii* and *M. lucifugus* in other parts of Southeast Alaska. There are no obvious geological or hydrological barriers between the northermost Alaskan records of this species in the southern Alexander Archipelago (MacDonald & Cook 2009). Likewise, the Yuma Myotis (*M. yumanensis*), which has only recently been confirmed from extreme SE Alaska (Olson et al. 2014), was neither captured nor detected during this study. However, *M. yumanensis* is notoriously difficult to distinguish from *M. lucifigus*, particularly in the field, and genetic verification of species identification using biopsies collected for this study may yield evidence of *M. yumanensis* in the study area. Further surveys at more remote regions around Skagway, as well as the coastal forests of the Chilkoot Inlet, might confirm the presence of *M. californicus* or *M. yumanensis* in the region as well.

For *M. lucifugus*, this study highlights the importance of key resources supporting a (proportionally) large population of the species at Skagway: widespread availability of roosts and use of Pullen Pond and Pullen Creek as a resource for water and foraging. Furthermore, the use of White Pass by bats contributes to our understanding of population movement between Yukon, B.C. and Alaska, an important finding with implications for the management of key migration corridors and the possible transmission routes of diseases such as WNS. Additional research along these lines would undoubtedly yield important new information.

Evidence of breeding by *M. keenii* at KLGO suggests the species is established in the region, although the location of maternity roosts and winter hibernacula remain key elements that require further study. The importance of dead, standing snags as preferred roosting sites is nonetheless important for land managers seeking to limit the potential impact of forestry practices on the species. Future research on the ecology and seasonal movement of Keen's Myotis would yield important new information on this poorly studied species at the northern terminus of its known range. Although currently ranked as a species of Least Concern by the IUCN (Arroyo-Cabrales & Álvarez-Castañeda 2008), Keen's Myotis was identified as a species of conservation concern in the Alaska Department of Fish and Game's 2006 Comprehensive Wildlife Conservation Strategy. However, at that time, it was known from only two records in Alaska, both from the Alexander Archipelago. Since then, additional records from the Juneau area and, as of this report, Skagway, have extended its known

range significantly. The relatively accessible population in the Juneau-Dyea area represents an outstanding opportunity to learn more about this species.

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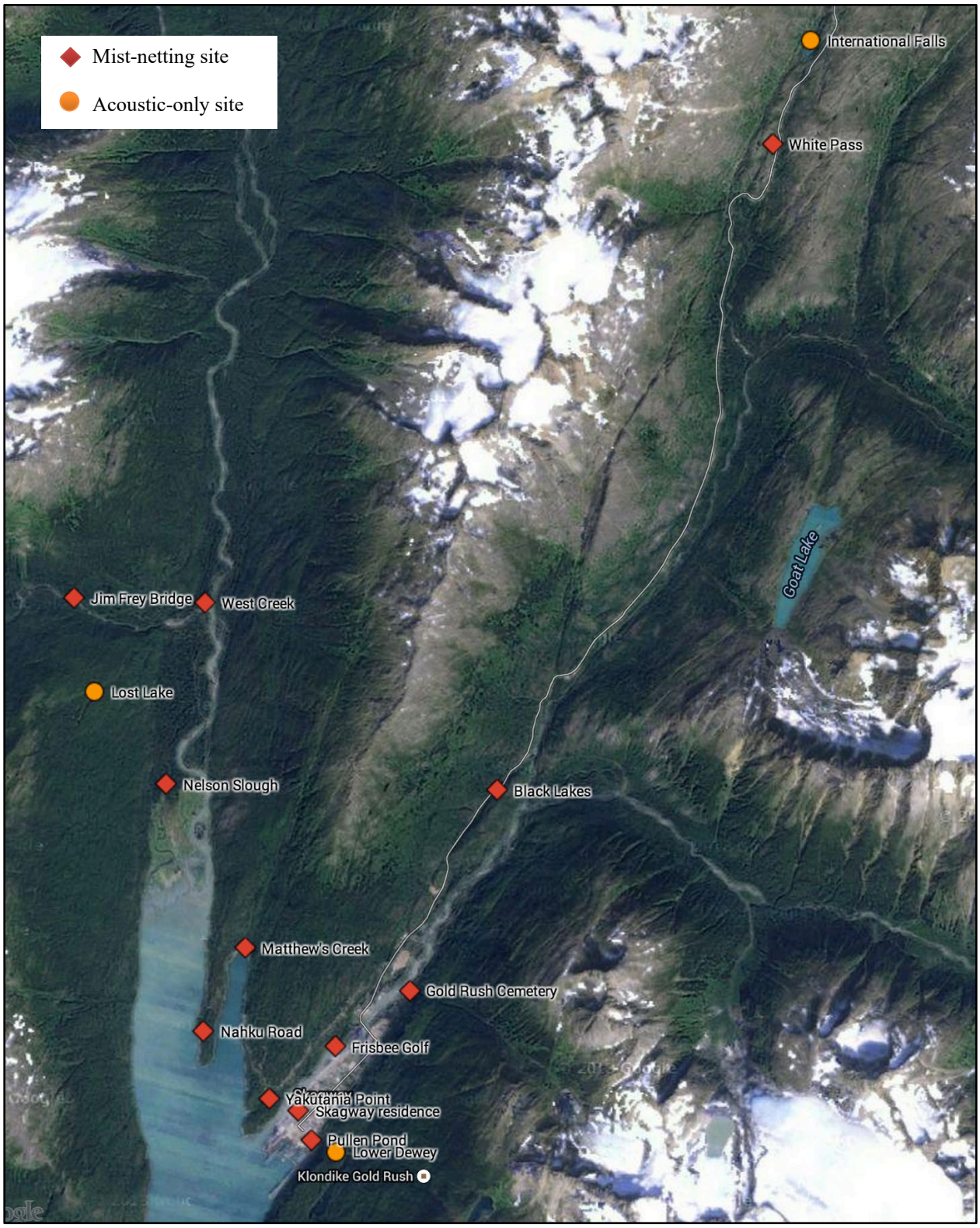
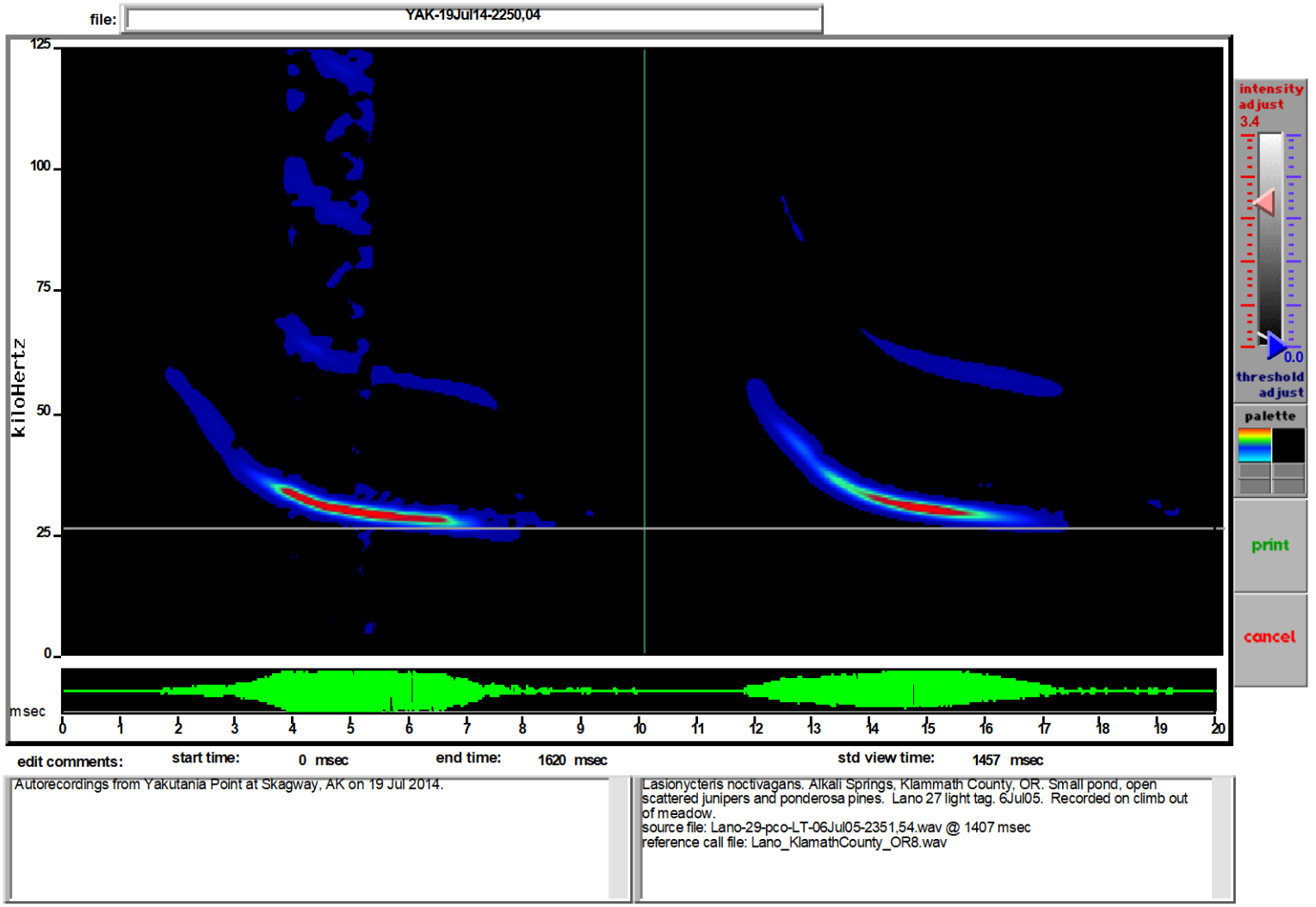
Appendix A – Capture Locations



Appendix B – *L. noctivagans* voucher call for Skagway, AK.

Sonobat 3.14 standard view comparison of call recorded at Yakutania Point (left) and reference call (right).



Apendix C: Bat Capture Information

Site	Species	Date	Time	Re cap	Net	Band	AF	Sex	Age	Repro	FA	WT	Keel	Ecto	Release	Comment
Worley House	MYLU	7/11/2014	22:34	N	1	AP0001	-	F	A	NR	37.3	5.96	N	N	22:54	
Worley House	MYLU	7/11/2014	23:10	N	1	AP0002	-	F	A	L	35	6.24	N	N	23:27	
Pullen Pond	MYLU	7/21/2014	23:10	N	-	-	-	M	A	-	-	-	-	-	-	released at net
Pullen Pond	MYLU	7/21/2014	23:10	N	-	-	-	M	A	-	-	-	-	-	-	released at net
Pullen Pond	MYLU	7/21/2014	23:10	N	-	-	-	M	A	-	-	-	-	-	-	released at net
Pullen Pond	MYLU	7/21/2014	23:10	N	-	-	-	F	A	-	-	-	-	-	-	released at net
Pullen Pond	MYLU	7/21/2014	23:10	N	-	-	-	F	A	-	-	-	-	-	-	released at net
Pullen Pond	MYLU	7/21/2014	23:20	N	-	-	-	F	A	-	-	-	-	-	-	released at net
Pullen Pond	MYLU	7/21/2014	23:20	N	-	-	-	F	A	-	-	-	-	-	-	released at net
Pullen Pond	MYLU	7/21/2014	23:20	N	-	-	-	F	A	-	-	-	-	-	-	released at net
Pullen Pond	MYLU	7/21/2014	23:20	N	-	-	-	F	A	-	-	-	-	-	-	released at net
Pullen Pond	MYLU	7/21/2014	23:20	N	-	-	-	F	A	-	-	-	-	-	-	released at net
Pullen Pond	MYLU	7/21/2014	23:20	N	-	-	-	M	A	-	-	-	-	-	-	released at net
Pullen Pond	MYLU	7/21/2014	23:20	N	-	-	-	M	A	-	-	-	-	-	-	released at net
Pullen Pond	MYLU	7/21/2014	23:20	N	-	-	-	M	A	-	-	-	-	-	-	released at net
Pullen Pond	MYLU	7/21/2014		Y	-	AP0002	-	-	A	-	-	-	-	-	-	
Pullen Pond	MYLU	7/21/2014		Y	-	AP0004	-	-	A	-	-	-	-	-	-	
Pullen Pond	MYLU	7/21/2014		Y	-	AP0006	-	-	A	-	-	-	-	-	-	
Pullen Pond	MYLU	7/21/2014	23:10	N	1	-	-	M	A	-	-	-	-	-	-	

Site	Species	Date	Time	Re cap	Net	Band	AF	Sex	Age	Repro	FA	WT	Keel	Ecto	Release	Comment
Pullen Pond	MYLU	7/21/2014	23:10	N	1	-	-	F	A	NR	-	-	-	-	-	
Pullen Pond	MYLU	7/21/2014	23:10	N	1	-	-	M	A	NR	-	-	-	-	-	
Pullen Pond	MYLU	7/21/2014	23:10	N	1	-	-	M	A	NR	-	-	-	-	-	
Pullen Pond	MYLU	7/21/2014	23:10	N	1	-	-	M	A	-	-	-	-	-	-	
Pullen Pond	MYLU	7/21/2014	23:10	N	1	-	-	M	A	SCR	-	-	-	-	-	
Pullen Pond	MYLU	7/21/2014	23:10	N	3	-	-	M	A		-	-	-	-	-	
Pullen Pond	MYLU	7/21/2014	23:10	N	3	-	-	F	A	NR	-	-	-	-	-	
Pullen Pond	MYLU	7/21/2014	23:10	N	3	-	-	M	A	SCR	-	-	-	-	-	
Worley House	MYLU	7/26/2014	22:50	Y	1	AP0018	-	-	-	-	-	-	-	-	22:51	Recapture
Worley House	MYLU	7/26/2014	00:20	Y	1	AP0039	-	-	-	-	-	-	-	-	0:20	Recapture
Pullen Pond	MYLU	7/27/2014	22:50	Y	1	AP0002	-	-	-	-	-	-	-	-	-	Recapture
Pullen Pond	MYLU	7/27/2014	23:50	Y	3	AP0010	-	-	-	-	-	-	-	-	-	Recapture
Worley House	MYLU	8/5/2014	23:05	Y	1	AP0038	-	M	J	-	-	-	-	-	-	Recapture
Pullen Pond	MYLU	8/12/2014	22:10	Y	-	AP0073	-	-	-	-	-	-	-	-	-	Recapture
Pullen Pond	MYLU	8/12/2014	22:40	Y	2	AP0019	-	-	-	-	-	-	-	-	-	Recapture; band slightly pulled through wing
Pullen Pond	MYLU	8/12/2014	22:40	Y	3	AP0064	-	-	-	-	-	-	-	-	-	Recapture; transmittered 840
Pullen Pond	MYLU	8/12/2014	-	Y	3	AP0013	-	-	-	-	-	-	-	-	-	Recapture
Pullen Pond	MYLU	8/12/2014	23:45	N	2	-	-	-	J	-	-	-	-	-	-	Accidental release by JLF
Pullen Pond	MYLU	8/12/2014	00:15	Y	2	AP0015	-	-	-	-	-	-	-	-	-	Recapture

Site	Species	Date	Time	Re cap	Net	Band	AF	Sex	Age	Repro	FA	WT	Keel	Ecto	Release	Comment
Pullen Pond	MYLU	8/19/2014	21:57	N	3	AP0090	-	F	A	NR	37.4	6.5	N	N	22:03	no punches taken, bat released
Pullen Pond	MYLU	8/19/2014	23:45	Y	3	AP0006	-	F	A	PL	-	-	-	-	-	Recapture
Pullen Pond	MYLU	9/1/2014	22:00	Y	2	AP0034	-	-	-	-	-	-	-	-	-	Recapture
Pullen Pond	MYLU	9/1/2014	00:30	Y	3	AP0007	-	-	-	-	-	-	-	-	-	Recapture
Yakutania Pt	MYLU	9/2/2014	21:10	Y	1	AP0010	-	F	A	PL	-	-	-	-	21:20	Recapture; damage from band on right arm; moved band from right to left FA
Pullen Pond	MYLU	9/8/2014	20:34	Y	-	AP0088	-	-	-	-	-	-	-	-	-	Recapture
Pullen Pond	MYLU	9/8/2014	20:50	Y	2	AK0929	-	-	-	-	-	-	-	-	20:51	Recapture
Pullen Pond	MYLU	9/8/2014	20:51	Y	2	AP0035	-	-	-	-	-	-	-	-	20:52	Recapture
Pullen Pond	MYLU	9/8/2014	22:05	N	1	AK0937	-	F	A	PL	36	8	N	N	22:10	no punch taken
Black Lakes	MYLU	9/14/2014	20:05	Y	1	AP0102	-	-	-	-	-	-	-	-	-	Recapture
Black Lakes	MYLU	9/14/2014	23:40	Y	1	AK0996	-	-	-	-	-	-	-	-	-	Recapture from 2013
Pullen Pond	MYLU	9/16/2014	21:00	Y	2	AK0925	-	-	-	-	-	-	-	-	21:05	Recapture
Pullen Pond	MYLU	7/13/2014	23:05	N	2	AP0003	AF76257	F	A	NR	36.2	5.58	N	N	0:22	
Pullen Pond	MYLU	7/13/2014	23:05	N	3	AP0004	AF76258	F	A	L	36.5	6.57	N	N	23:39	
Pullen Pond	MYLU	7/13/2014	23:05	N	3	AP0005	AF76259	M	A	NR	35.7	6.27	N	Y	23:41	Red ear mites
Pullen Pond	MYLU	7/13/2014	23:05	N	3	AP0006	AF76260	F	A	L	36	6.71	N	N	0:18	
Pullen Pond	MYLU	7/13/2014	01:10	N	3	AP0007	AF76261	M	A	SCR	34.9	6.69	N	N	1:36	
Frisbee Golf	MYKE	7/14/2014	0:23	N	2	AP0008	AF76262	M	A	SCR	36.2	6.79	N	N	-	EFN=17mm
Frisbee Golf	MYKE	7/14/2014	00:23	N	2	-	AF76263	M	A	SCR	36.4	6.02	N	N	-	Collected!

Site	Species	Date	Time	Re cap	Net	Band	AF	Sex	Age	Repro	FA	WT	Keel	Ecto	Release	Comment
Frisbee Golf	MYLU	7/14/2014	01:10	N	2	AP0009	AF76264	F	A	NR	37.8	6.97	N	Y	1:30	Bat is full; red mites
Yakutania Pt	MYLU	7/19/2014	23:10	N	2	AP0011	AF76265	M	A	SCR	35.5	6.43	N	N	-	2 biopsy-looking holes in left wing
Yakutania Pt	MYLU	7/19/2014	23:10	N	1	AP0010	AF76266	F	A	L	38.1	7.1	N	N	-	
Yakutania Pt	MYVO	7/19/2014	1:30	N	2	-	AF76267	M	A	SCR	37.2	7.76	Y	N	-	Collected!
Pullen Pond	MYLU	7/21/2014	23:10	N	3	AP0012	AF76268	F	A	NR	36.3	5.35	N	N	23:45	
Pullen Pond	MYLU	7/21/2014	23:10	N	3	AP0013	AF76269	M	A	SCR	35.5	6.82	N	N	-	
Pullen Pond	MYLU	7/21/2014	23:10	N	3	AP0014	AF76270	F	A	R	35.9	6.55	N	N	-	
Pullen Pond	MYLU	7/21/2014	23:30	N	4	AP0015	AF76271	M	A	NR	35.9	5.52	N	N	-	
Pullen Pond	MYLU	7/21/2014	23:40	N	3	AP0016	AF76272	M	A	SCR	38	7.75	N	N	1:15	
Pullen Pond	MYLU	7/21/2014	23:40	N	3	AP0017	AF76273	F	A	NR	35.5	6.32	N	N	1:15	
Pullen Pond	MYLU	7/21/2014	23:20	N	3	AP0018	AF76274	F	A	NR	37.4	6.83	N	Y	1:15	red mites
Pullen Pond	MYLU	7/21/2014	23:10	N	1	AP0019	AF76275	F	A	NR	36.1	6.56	N	N	1:15	3rd phalange broken
Pullen Pond	MYLU	7/21/2014	00:49	N	1	AP0020	AF76276	M	A	SCR	37	8.78	N	N	1:15	
Pullen Pond	MYLU	7/21/2014	23:40	N	1	AP0021	AF76277	M	A	NR	36.7	6.39	N	N	1:15	large amount of scarring; healed wing membrane between 1st and 4th phalange
Pullen Pond	MYLU	7/21/2014	01:25	N	1	AP0022	AF76278	M	A	NR	36.8	7.67	N	Y	2:00	bat bugs; a lot of ectos!
Pullen Pond	MYLU	7/21/2014	01:50	N	3	AP0024	AF76279	F	A	NR	36.5	7.09	N	N	2:00	scarring on both wings
Pullen Pond	MYLU	7/21/2014	01:50	N	1	AP0023	AF76280	M	A	NR	37.2	7.06	N	N	2:00	wing scarred extensively
Pullen Pond	MYLU	7/21/2014	01:50	N	3	AP0026	AF76281	M	A	NR	36.6	6.65	N	Y	2:15	tear on right 3rd and 4th phalange; 4x3mm mite colony; no reference call

Site	Species	Date	Time	Re cap	Net	Band	AF	Sex	Age	Repro	FA	WT	Keel	Ecto	Release	Comment
Pullen Pond	MYLU	7/21/2014	01:50	N	4	AP0025	AF76282	M	A	NR	35.3	6.68	N	Y	2:13	red mites; extensive wing scarring
Pullen Pond	MYLU	7/21/2014	01:50	N	3	AP0027	AF76283	F	A	NR	35.5	5.68	N	N	-	
Pullen Pond	MYLU	7/21/2014	02:35	N	4	AP0028	AF76284	M	A	NR	37	6.75	N	Y	-	red mites
Black Lakes	MYLU	7/22/2014	23:04	N	1	AP0029	AF76285	F	A	NR	36.2	6.92	N	Y	-	red mites
Black Lakes	MYKE	7/22/2014	23:24	N	1	AP0030	AF76286	F	A	NR	33.5	6.16	N	N	0:14	clean wings
Black Lakes	MYKE	7/22/2014	23:24	N	1	AP0031	AF76287	M	A	NR	34.9	4.93	N	N	23:52	
Black Lakes	MYKE	7/22/2014	23:24	N	1	AP0032	AF76288	M	A	NR	34	5.72	N	N	-	
Black Lakes	MYLU	7/22/2014	00:05	N	1	AP0033	AF76289	F	A	NR	35	7.92	N	Y	-	red mites
Black Lakes	MYKE	7/22/2014	00:30	N	1	AP0034	AF76290	F	A	PL	36.9	7.1	N	N	0:45	
Black Lakes	MYKE	7/22/2014	00:30	N	-	AP0035	AF76291	F	A	PL	35.6	6.12	N	N	0:50	no reference call
Worley House	MYLU	7/23/2014	22:35	N	1	AP0036	AF76292	F	A	PL	38	7.1	N	N	-	
Worley House	MYLU	7/23/2014	22:35	N	1	AP0037	AF76293	F	A	PL	35	5.75	N	N	-	
Worley House	MYLU	7/23/2014	22:48	N	1	AP0038	AF76294	M	A	NR	37.5	7.1	N	N	-	
Worley House	MYLU	7/26/2014	22:00	N	1	AP0039	AF76295	F	J	NR	34.6	4.5	N	N	22:15	
Worley House	MYLU	7/26/2014	22:10	N	1	AP0040	AF76296	F	A	PL	34.5	6.75	N	Y	22:32	small spider-looking bugs on both wings collected
Worley House	MYLU	7/26/2014	22:33	N	1	AP0041	AF76297	M	J	NR	35.4	5.5	N	Y	22:40	
Worley House	MYLU	7/26/2014	22:33	N	1	AP0042	AF76298	F	A	PL	36.5	8	N	N	22:50	no reference call
Worley House	MYLU	7/26/2014	23:45	N	1	AP0043	AF76299	M	J	NR	34.2	4.75	N	N	23:55	
Black Lakes	MYLU	9/10/2014	20:18	N	1	AP0103	AF79560	M	A	SCR	36.8	9.1	N	N	21:03	no AF page

Site	Species	Date	Time	Re cap	Net	Band	AF	Sex	Age	Repro	FA	WT	Keel	Ecto	Release	Comment
Black Lakes	MYLU	9/10/2014	20:18	N	1	AP0104	AF79561	M	A	NR	35.4	6.5	N	N	21:28	clean; no AF page
Black Lakes	MYLU	9/10/2014	20:43	N	1	AP0105	AF79562	F	A	PL	36.4	7.8	N	Y	21:50	fleas; no AF page; transmittered 151.690
Black Lakes	MYLU	9/14/2014	20:05	N	1	AP0106	AF79563	M	A	NR	37	8.2	N	N	20:35	
Pullen Pond	MYLU	9/16/2014	21:00	N	1	AP0107	AF79564	F	A	PL	36.8	8.8	N	N	21:30	transmittered 151.3870
Pullen Pond	MYLU	9/16/2014	21:30	N	4	AP0108	AF79565	M	A	NR	36	7.2	N	N	22:00	
Pullen Pond	MYLU	9/16/2014	21:50	N	4	AP0109	AF79566	M	A	NR	37.7	9.7	N	N	22:10	
Pullen Pond	MYLU	9/16/2014	23:00	N	1	AP0110	AF79567	M	A	SCR	37	7.6	N	Y	23:23	white mites
Pullen Pond	MYLU	9/16/2014	23:00	N	2	AP0111	AF79568	F	A	PL	34.2	7.6	N	Y	-	fleas; transmittered 151.020
Worley House	MYLU	7/26/2014	23:55	N	2	-	AF79701	F	J	NR	35.2	4.75	N	N	0:07	not banded-too small
Pullen Pond	MYLU	7/27/2014	22:30	N	3	AP0044	AF79702	F	A	PL	35.4	6.25	N	N	22:40	
Pullen Pond	MYLU	7/27/2014	23:20	N	1	AP0045	AF79703	M	A	NR	37.7	8	N	N	23:30	Question mark next to species on datasheet
Pullen Pond	MYLU	7/27/2014	23:50	N	3	AP0046	AF79704	F	A	NR	-	7.25	N	N	-	No FA taken
Pullen Pond	MYLU	7/27/2014	23:50	N	3	AP0047	AF79705	M	A	NR	38.6	7.75	N	Y	-	red mites; scarring on right wing; EA=13mm; question mark next to species on datasheet
Pullen Pond	MYLU	7/27/2014	00:00	N	4	AP0048	AF79706	F	A	NR	34.7	6.5	N	Y	-	orange ear mites
Pullen Pond	MYLU	7/27/2014	00:00	N	4	AP0049	AF79707	F	J	NR	38	7.25	N	Y	-	bat bugs; collected ectos; wing scars on left wing between 2nd and 3rd phalanges

Site	Species	Date	Time	Re cap	Net	Band	AF	Sex	Age	Repro	FA	WT	Keel	Ecto	Release	Comment
Pullen Pond	MYLU	7/27/2014	00:00	N	4	AP0050	AF79708	F	A	NR	36.2	6.5	N	N	-	
Pullen Pond	MYLU	7/27/2014	00:43	N	1	AP0051	AF79709	F	A	PL	34.8	7	N	N	-	
Pullen Pond	MYLU	7/27/2014	00:40	N	3	AP0052	AF79710	F	A	PL	36.2	7.75	N	N	-	
Black Lakes	MYLU	8/3/2014	22:30	N	1	AP0053	AF79711	M	A	SCR	36.9	7.8	N	N	22:45	hairy toes
Black Lakes	MYLU	8/3/2014	23:35	N	1	AP0054	AF79712	F	A	PL	36.5	7.7	N	Y	23:47	hairy toes, small bat bugs
Black Lakes	MYKE	8/3/2014	2:00	N	1	AP0055	AF79713	F	A	PL	37.5	6.4	Y	Y	2:09	Red Mites
Pullen Pond	MYLU	8/4/2014	22:35	N	3	AP0058	AF79714	M	A	NR	35.4	6.8	N	Y	-	Red mites on left ear; long toe hairs
Pullen Pond	MYLU	8/4/2014	22:35	N	3	AP0057	AF79715	F	A	PL	37	6.9	N	N	-	
Pullen Pond	MYLU	8/4/2014	22:35	N	3	AP0059	AF79716	F	A	PL	36.7	7.2	N	N	-	
Pullen Pond	MYLU	8/4/2014	23:10	N	3	AP0061	AF79717	M	A	SCR	37	7.7	N	N	-	
Pullen Pond	MYLU	8/4/2014	22:35	N	4	AP0060	AF79718	M	A	NR	36.6	6.2	N	N	-	
Pullen Pond	MYLU	8/4/2014	23:10	N	3	AP0062	AF79719	M	A	SCR	33.7	6.3	N	N	-	
Pullen Pond	MYLU	8/4/2014	23:10	N	3	AP0063	AF79720	M	A	SCR	36.9	7.5	N	N	-	
Pullen Pond	MYLU	8/4/2014	23:30	N	4	AP0064	AF79721	F	A	NR	38.9	8.6	N	N	-	Red ear mite on R ear; fur collected; TAGGED 150.840
Pullen Pond	MYLU	8/4/2014	00:00	N	3	AP0065	AF79722	M	A	NR	36.1	7.2	N	N	-	
Pullen Pond	MYLU	8/4/2014	00:00	N	3	AP0066	AF79723	M	A	NR	35.7	6.5	N	N	-	
Pullen Pond	MYLU	8/4/2014	00:25	N	4	AP0067	AF79724	M	A	NR	36.3	7.3	N	N	-	
Pullen Pond	MYLU	8/4/2014	00:50	N	1	AP0068	AF79725	F	J	NR	36.9	4.7	N	N	-	
Worley House	MYLU	8/5/2014	23:05	N	1	AP0069	AF79726	M	J	NR	36	5.6	N	N	-	

Site	Species	Date	Time	Re cap	Net	Band	AF	Sex	Age	Repro	FA	WT	Keel	Ecto	Release	Comment
Worley House	MYLU	8/5/2014	23:05	N	1	AP0070	AF79727	M	J	NR	34.5	5.4	N	N	-	
Worley House	MYLU	8/5/2014	23:05	N	1	AP0071	AF79728	F	A	NR	36.9	7.2	N	N	-	
Worley House	MYLU	8/5/2014	23:05	N	1	AP0072	AF79729	M	J	NR	35.4	5.3	N	N	-	
Worley House	MYLU	8/5/2014	23:05	N	1	AP0073	AF79730	M	J	NR	36.2	5.5	N	N	-	
Worley House	MYLU	8/5/2014	23:05	N	1	AP0074	AF79731	M	A	NR	36.5	5.8	N	N	-	Tear in upper left wing
Worley House	MYLU	8/5/2014	23:05	N	1	AP0075	AF79732	F	J	NR	36	6.1	N	N	-	
Worley House	MYLU	8/5/2014	23.05	N	1	AP0076	AF79733	M	J	NR	36.1	5.6	N	N	-	
Yakutania Pt	MYKE	8/6/2014	22:15	N	3	AP0078	AF79734	M	A	SCR	35	6.1	N	N	-	
Worley House	MYLU	8/5/2014	00:23	N	1	AP0077	AF79735	F	A	PL	37.7	7.6	N	Y	-	Fleas
Pullen Pond	MYLU	8/12/2014	22:10	N	2	AP0079	AF79736	F	A	NR	38	7.8	N	N	-	
Pullen Pond	MYLU	8/12/2014	22:10	N	3	AP0080	AF79737	F	J	NR	36.2	5.7	N	N	-	
Pullen Pond	MYLU	8/12/2014	22:40	N	1	AP0081	AF79738	F	A	PL	36.5	8.6	N	Y	-	full stomach; white mites and white nose worm (not collected)
Pullen Pond	MYLU	8/12/2014	23:05	N	2	AP0082	AF79739	F	J	NR	38	6.7	N	-	-	
Pullen Pond	MYLU	8/12/2014	23:45	N	4	AP0084	AF79740	F	A	NR	37.5	7.8	N	Y	-	bat bugs; low frequency call
Black Lakes	MYLU	8/3/2014	2:00	N	1	AP0056	AF79741	F	A	NR	36.4	7.2	N	N	2:16	No reference call
Pullen Pond	MYLU	8/12/2014	01:35	N	3	AP0085	AF79742	M	A	SCR	36.4	8.5	N	N	-	
Pullen Pond	MYLU	8/12/2014	02:30	N	2	AP0086	AF79743	M	J	NR	34.3	5.2	N	N	-	
Matthew's Creek	MYKE	8/13/2014	22:50	N	1	AP0087	AF79744	M	A	SCR	36.6	7.5	N	N	23:30	wing scarring; collected fur; transmittered 150.7425
Pullen Pond	MYLU	8/19/2014	21:57	N	1	AP0088	AF79745	F	J	NR	36.6	5.5	N	N	-	

Site	Species	Date	Time	Re cap	Net	Band	AF	Sex	Age	Repro	FA	WT	Keel	Ecto	Release	Comment
Pullen Pond	MYLU	8/19/2014	21:57	N	2	AP0089	AF79746	F	A	NR	37.9	7.1	N	N	22:03	
Pullen Pond	MYLU	8/19/2014	22:30	N	1	AP0091	AF79747	M	A	NR	36.7	6.8	N	N	22:45	
Pullen Pond	MYLU	8/19/2014	22:30	N	1	AP0092	AF79748	F	A	NR	36.5	6.7	N	Y	23:00	white mites and bat bugs; lesion on right elbow; banded on left wing
Pullen Pond	MYLU	8/19/2014	23:45	N	2	AP0094	AF79749	F	A	PL	40.3	7.8	N	N	-	
Pullen Pond	MYLU	8/19/2014	23:45	N	3	AP0093	AF79750	F	A	PL	39.9	11.1	N	N	-	30k call
Pullen Pond	MYLU	8/19/2014	23:45	N	1	AP0095	AF79751	M	A	SCR	35	6.6	N	N	-	broken 2nd metatarsal of 2nd phalange
Pullen Pond	?	8/19/2014	22:30	N	1	-	AF79752	M	A	SCR	38.2	6.8	-	-	-	Collected; Tragus=7mm, Tot Length=84mm, tail=87mm
Pullen Pond	MYLU	8/19/2014	02:00	N	1	AP0096	AF79753	F	A	PL	35.5	6.9	N	Y	-	small white mites
White Pass	MYLU	8/20/2014	22:15	N	2	AP0097	AF79754	M	A	SCR	38.1	9.7	N	N	23:25	transmittered 150.350
White Pass	MYLU	8/21/2014	21:40	N	2	AP0098	AF79755	M	A	NR	35.3	6.4	N	Y	-	few orange ear mites
Pullen Pond	MYLU	8/25/2014	21:00	N	3	AP0099	AF79756	M	A	-	34.9	9.2	N	-	-	no release call
Pullen Pond	MYLU	8/25/2014	21:00	N	3	-	AF79757	M	J	NR	36.4	5.2	N	N	-	did not band; too small
Pullen Pond	MYLU	8/25/2014	21:00	N	-	AP0100	AF79758	M	J	NR	37.5	4.8	N	N	-	
Pullen Pond	MYLU	8/25/2014	21:00	N	-	AK0901	AF79759	M	J	NR	36.1	6.5	N	Y	-	orange mites on left ear
Pullen Pond	MYLU	8/25/2014	22:15	N	2	AK0902	AF79760	F	A	NR	36.4	7.4	N	Y	-	fleas
Pullen Pond	MYLU	8/25/2014	22:15	N	4	AK0903	AF79761	F	A	PL	38.3	8.6	N	Y	-	orange mites on both ears; bat bugs on wings
Pullen Pond	MYLU	8/25/2014	22:15	N	3	AK0904	AF79762	F	A	PL	38.1	7.7	N	Y	-	bat bugs

Site	Species	Date	Time	Re cap	Net	Band	AF	Sex	Age	Repro	FA	WT	Keel	Ecto	Release	Comment
Pullen Pond	MYLU	8/25/2014	22:15	N	4	AK0905	AF79763	M	A	SCR	36.6	7.3	N	N	-	
Pullen Pond	MYLU	8/25/2014	22:15	N	2	AK0906	AF79764	F	A	PL	36	6.5	N	N	-	
Pullen Pond	MYLU	8/25/2014	22:15	N	2	AK0907	AF79765	F	A	PL	39	7.8	N	N	-	heavy scarring on both wings
Pullen Pond	MYLU	8/25/2014	22:55	N	3	AK0908	AF79766	M	A	SCR	36.4	6.3	N	N	-	
Pullen Pond	MYLU	8/25/2014	22:55	N	4	AK0909	AF79767	M	A	SCR	35.5	6.7	N	N	-	
Pullen Pond	MYLU	8/25/2014	22:55	N	4	AK0910	AF79768	M	A	NR	38.5	6.7	N	Y	-	orange mites on right wing
Pullen Pond	MYLU	8/25/2014	23:50	N	2	AK0911	AF79769	M	A	SCR	37.4	8.5	N	N	-	
Pullen Pond	MYLU	8/25/2014	23:50	N	4	AK0912	AF79770	F	A	NR	36.4	6.8	N	Y	-	fleas
Pullen Pond	MYLU	8/12/2014	23:45	N	2	AP0083	AF79771	M	A	SCR	37.8	7.6	N	N	-	
Pullen Pond	MYLU	8/25/2014	23:50	N	2	AK0913	AF79772	M	A	NR	35.1	6.3	N	N	-	
Yakutania Pt	MYKE	8/28/2014	21:10	N	3	AK0914	AF79773	M	A	SCR	35	7.1	N	N	21:56	healed tear on left wing- 5th lateral phalange between left foot and wing bone; also scarred on uropatagium close to tail
West Creek	MYKE	8/29/2014	21:45	N	3	AK0915	AF79774	M	A	NR	34.7	6.3	N	N	-	transmittered 150.210; collected fur; short right tragus
Pullen Pond	MYLU	9/1/2014	20:55	N	3	AK0916	AF79775	F	A	PL	36.4	7	N	N	21:02	
Pullen Pond	MYLU	9/1/2014	20:55	N	1	AK0917	AF79776	F	A	PL	36.5	6.5	N	Y	21:13	orange mites; bat bugs; hole in left wing; healed break in 2nd digit
Pullen Pond	MYLU	9/1/2014	20:55	N	1	AK0918	AF79777	F	A	PL	38.2	7.4	N	N	23:15	transmittered 150.167
Pullen Pond	MYLU	9/1/2014	20:55	N	3	AK0919	AF79778	M	J	NR	37.2	6.7	N	N	21:30	visible healed scarring

Site	Species	Date	Time	Re cap	Net	Band	AF	Sex	Age	Repro	FA	WT	Keel	Ecto	Release	Comment
Pullen Pond	MYLU	9/1/2014	20:55	N	3	AK0920	AF79779	M	A	SCR	37	6.4	N	Y	21:40	healed breaks in 1st digit on left wing; orange mites
Pullen Pond	MYLU	9/1/2014	21:10	N	1	AK0921	AF79780	M	A	SCR	36.1	7.1	N	N	21:41	
Pullen Pond	MYLU	9/1/2014	21:10	N	1	AK0922	AF79781	M	J	NR	40.2	7.5	N	N	22:06	banded on left wing
Pullen Pond	MYLU	9/1/2014	21:10	N	1	AK0923	AF79782	M	A	SCR	35.6	6.2	N	N	21:51	
Pullen Pond	MYLU	9/1/2014	21:10	N	1	AK0924	AF79783	M	J	NR	37.8	7.4	N	N	21:59	
Pullen Pond	MYLU	9/1/2014	22:00	N	1	AK0925	AF79784	F	A	NR	37.3	6.3	N	Y	22:30	orange ear mites; white mites; hole in right wing
Pullen Pond	MYLU	9/1/2014	22:00	N	3	AK0926	AF79785	M	A	SCR	37.5	7.4	N	Y	22:35	bat bugs
Pullen Pond	MYLU	9/1/2014	22:25	N	2	AK0927	AF79786	F	A	PL	36.4	7.6	N	N	22:40	
Pullen Pond	MYLU	9/1/2014	22:25	N	2	AK0928	AF79787	M	J	NR	37.9	8	N	N	22:45	
Pullen Pond	MYLU	9/1/2014	22:50	N	2	AK0929	AF79788	M	J	NR	37.1	6.7	N	N	22:55	
Pullen Pond	MYLU	9/1/2014	23:55	N	2	AK0930	AF79789	F	A	PL	38.3	11.6	N	Y	-	bat bugs; orange mites on tragus; lack of pigment along distal edge of uropatagium
Nelson Slough	MYLU	9/3/2014	20:45	N	3	-	AF79790	M	J	NR	33	4.4	N	Y	-	did not band- too small; healed tear on left wing; bat bugs
Yakutania Pt	MYLU	9/7/2014	20:50	N	2	AK0931	AF79791	F	A	PL	37.6	7.5	N	N	21:10	transmittered 151.935
Pullen Pond	MYLU	9/8/2014	20:20	N	1	AK0932	AF79792	M	J	NR	35.9	5.1	N	N	20:24	
Pullen Pond	MYLU	9/8/2014	20:30	N	2	AK0933	AF79793	F	A	NR	35.7	6.5	N	Y	20:41	orange mites on left ear
Pullen Pond	MYLU	9/8/2014	20:28	N	2	-	AF79794	M	J	NR	34.3	4.4	N	N	20:48	too small to band
Pullen Pond	MYLU	9/8/2014	20:55	N	3	AK0934	AF79795	M	A	SCR	37.5	4.7	N	N	21:13	

Site	Species	Date	Time	Recap	Net	Band	AF	Sex	Age	Repro	FA	WT	Keel	Ecto	Release	Comment
Pullen Pond	MYLU	9/8/2014	21:34	N	2	AK0935	AF79796	M	A	SCR	35.5	7.2	N	N	21:50	
Pullen Pond	MYLU	9/8/2014	21:30	N	1	AK0936	AF79797	M	A	SCR	37.4	7.8	N	N	21:58	
Pullen Pond	MYLU	9/8/2014	23:00	N	2	AK0938	AF79798	F	A	PL	37.7	8.8	N	Y	23:10	fleas
Black Lakes	MYLU	9/10/2014	20:18	N	1	AP0101	AF79799	M	J	NR	37.5	7.8	N	Y	20:38	mites on left ear
Black Lakes	MYLU	9/10/2014	20:18	N	1	AP0102	AF79800	M	A	SCR	38.2	8.1	N	N	20:50	
Pullen Pond	MYLU	9/22/2014	19:40	N	1	AP0112	AF79569	M	A	NR	35.3	7.4	N	Y	20:05	
Pullen Pond	MYLU	9/22/2014	19:40	N	1	AP0113	AF79570	F	J	NR	37.1	5.8	N	N	20:20	
Pullen Pond	MYLU	9/22/2014	20:10	N	1	AP0114	AF79571	M	J	NR	34.9	5.2	N	Y	20:29	
Pullen Pond	MYLU	9/22/2014	21:00	N	1	AP0115	AF79572	F	J	NR	34.8	5.2	N	Y		
Pullen Pond	MYLU	9/22/2014	21:18	N	1	AP0116	AF79573	F	A	PL	38.5	8.6	N	Y	21:30	
Pullen Pond	MYLU	9/22/2014	23:15	N	1	AP0117	AF79574	F	A	PL	37	7.7	N	N	0:00	
Pullen Pond	MYLU	9/22/2014	23:30	N	4	AP0118	AF79575	M	A	NR	34.7	6.4	N	Y	0:00	
Site	Species	Date	Time	Recap?	Net	Band	AF	Sex	Age	Repro	FA	WT	Keel?	Ecto	Release	Comments

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