

#### 4.4.5 Merchantable Timber Resource

Tree clearing will be restricted to a historically gladed area associated with Lift 1. The coniferous trees within this area do not meet the utilization standard for the Spray Lakes Forest Management Agreement (FMA) to be classified as merchantable. This typically is associated with coniferous trees larger than 15 cm (6 inches) diameter at the stump and of a size, quality and/or volume to make them suitable for harvesting (Canadian Forest Service and Alberta Land and Forest Service 1993).

### 4.5 Wildlife

#### 4.5.1 Survey Methods

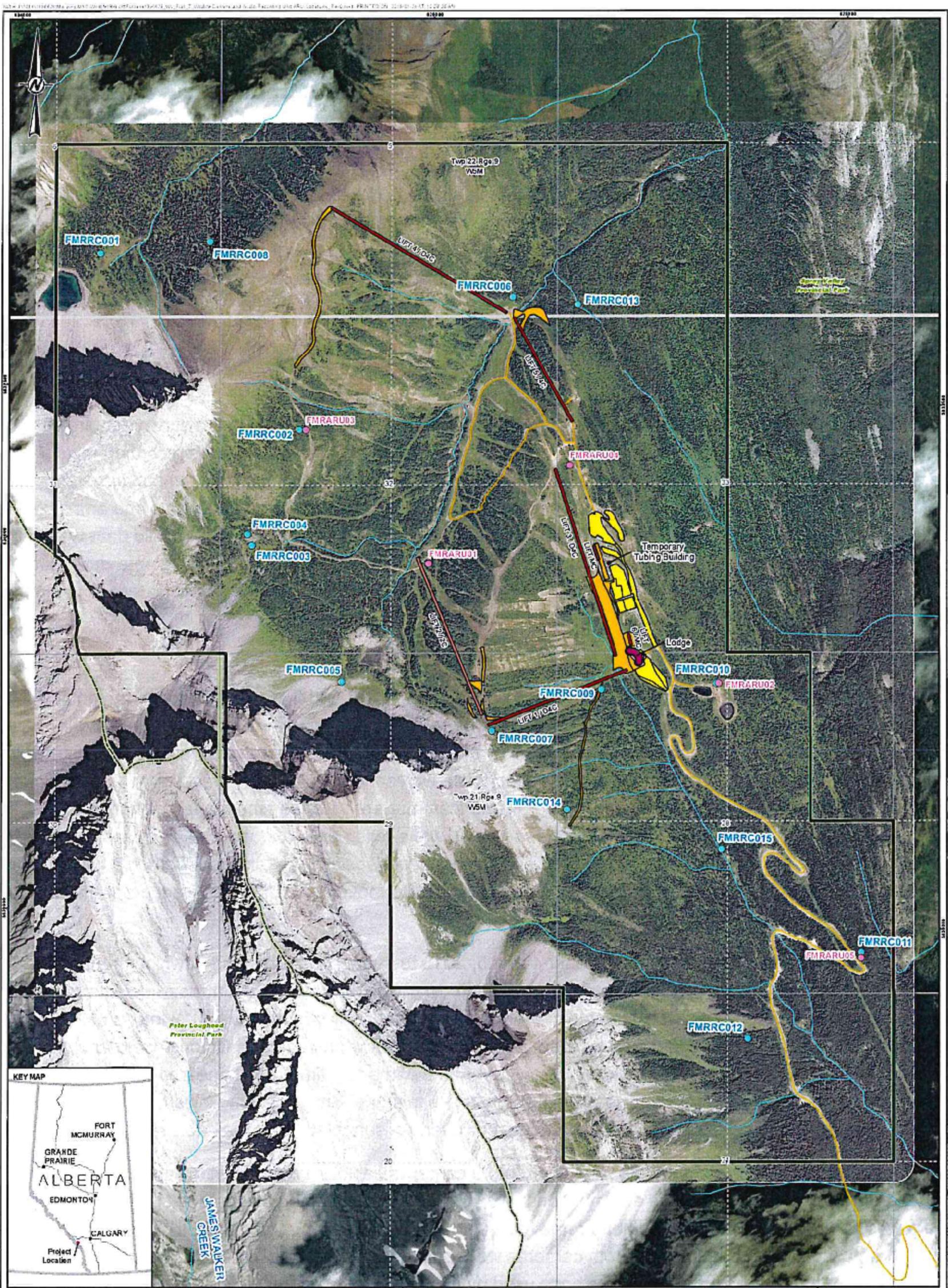
In 2018, FMH undertook field studies to collect current wildlife data in accordance with the survey requirements outlined in the terms of reference (TOR) (Golder 2018). Remote cameras and autonomous recording units (ARUs) were deployed throughout the lease area to detect wildlife presence and habitat use. The remote cameras targeted ungulates and medium to large mammalian carnivores. The ARUs targeted birds, bats and amphibians. Incidental wildlife or their sign (e.g., tracks, scat) were recorded during all surveys. The 2018 field data were supplemented with anecdotal wildlife observations provided by FMH staff, historical remote camera data provided by AEP, telemetry data provided by Brett Boukall on November 14, 2018, and historical data accessed using the Fish and Wildlife Internet Mapping Tool (FWMIT).

##### 4.5.1.1 Remote Camera Survey

Two Golder technicians deployed ten remote cameras on June 22, 2018 and five additional cameras on July 24, 2018 throughout the lease area (Figure 4-7). Remote cameras were deployed at various elevations and in different habitat types (i.e., stratified sampling design) to provide coverage of the lease area. Habitats suitable for grizzly bears (*Ursus arctos*), black bears (*Ursus americanus*), wolverines (*Gulo gulo*), grey wolves (*Canis lupus*), red foxes (*Vulpes vulpes*), cougars (*Puma concolor*), American martens (*Martes americana*), bighorn sheep (*Ovis canadensis*), mountain goats (*Oreamnos americanus*), white-tailed deer (*Odocoileus virginianus*), mule deer (*Odocoileus hemionus*), moose (*Alces alces*), and elk (*Cervus canadensis*) were targeted. Cameras were located on visible game trails to increase the probability of detecting wildlife movement. Cameras were programmed to take two photos per second when triggered.

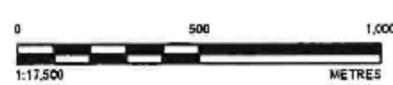
A maintenance check was completed on October 4 and 5, 2018 to replace batteries and download data. Only 12 of the 15 cameras were accessible due to early, deep, snow conditions. Two of the three remaining cameras were serviced on November 23, 2018. Remote cameras will remain deployed until May 2019 to capture seasonal wildlife presence and habitat use in the lease area. Data recorded between June and October were analyzed using the Timelapse2 program. Individuals were considered "new" the first time they appeared within a photo-series or when photos were separated by more than five minutes. Small mammals were omitted from counts to allow for efficiency in processing the photos; however, presence/absence was noted.

In addition to the 2018 data, historic data from two remote cameras deployed by AEP within the lease area were obtained from AEP. One camera was deployed on July 5, 2012 and retrieved on December 21, 2012. The second camera was deployed on April 24, 2013 and retrieved on April 7, 2014. The cameras were located along the lower portion of the access road (Figure 4-7). Both cameras were baited with scented lures and programmed to take five photos when triggered. The different methods used by AEP and Golder limits the ability to make comparisons among years; however, the data help inform the seasonal presence of medium and large mammals utilizing the lease area.



- LEGEND**
- AUTOMATED RECORDING UNIT (ARU)
  - REMOTE CAMERA LOCATION
  - PARK / PROTECTED AREA BOUNDARY
  - ROAD
  - WATERCOURSE
  - FORTRESS MOUNTAIN RESORT LEASE AREA BOUNDARY

- PROPOSED PHASE 1 DEVELOPMENT**
- LODGE
  - LODGE SIDEWALK
  - SURFACE PARKING
  - TRAIL (PHASE 1)
  - TEMPORARY TUBING BUILDING
  - REFURB SHED LIFT
  - PROPOSED LIFT



**REFERENCE(S)**  
 ATIS, ROAD, AND HYDROGRAPHY DATA OBTAINED FROM ALTALIS © GOVERNMENT OF ALBERTA 2018. ALL RIGHTS RESERVED. PARK AND PROTECTED AREA BOUNDARY DATA OBTAINED FROM ALBERTA ENVIRONMENT AND PARKS (AEP) © 2018. ALL RIGHTS RESERVED. IMAGERY 2012 OBTAINED FROM VANTUS. ADDITIONAL IMAGERY COPYRIGHT © 2012/2006 ESRI AND ITS LICENSORS. SOURCE: DIGITAL GLOBE. USED UNDER LICENSE. ALL RIGHTS RESERVED. PROJECTION: UTM ZONE 11 DATUM: NAD 83

**CLIENT**  
 FORTRESS MOUNTAIN RESORT

**PROJECT**  
 FORTRESS MOUNTAIN RESORT WILDLIFE MONITORING PROGRAM

**TITLE**  
 WILDLIFE CAMERA AND AUDIO RECORDING UNIT (ARU) LOCATIONS

**CONSULTANT**

DESIGNED	BS
PREPARED	PWT
REVIEWED	BS
APPROVED	DK

**GOLDER**

PROJECT NO.	DATE	REV.	FIGURE
1896628		0	4.7

#### 4.5.1.2 Autonomous Recording Unit Survey

Five ARUs were deployed from June 22, 2018 to July 24, 2018 in various habitat types (i.e., stratified sampling design) throughout the lease area to detect birds, bats, and amphibians (Figure 4-7). Habitats suitable for these taxa and particularly species at risk (e.g., olive-sided flycatcher, *Contopus cooperi*) were targeted. The ARUs were programmed to record for one 10-minute interval every hour from one hour before sunset to 1 AM (evening sample period) and for one 10-minute interval every hour from one hour before sunrise to four hours after sunrise (morning sampling period) each day throughout the deployment period.

Acoustic data were analyzed with Audacity version 2.2.0. Ten-minute recording intervals were selected for analysis according to the sampling requirements outlined in the Sensitive Species Inventory Guidelines (ESRD 2013). One ARU unit located in Disturbed-E3 habitat malfunctioned after three days of deployment (ARU02). Two 10-minute intervals were analyzed from the available recordings. During data analysis, species are recorded as present the first time they are heard during each 10-minute interval. In addition, automated classifiers from the Alberta Biodiversity Monitoring Institute were applied to all ARU data to increase the detection probability for select listed species including: bay-breasted warbler, great-horned owl, common nighthawk, olive-sided flycatcher, yellow rail, boreal owl, barred owl and western toad.

Bat recordings were analysed using Sonobat version 4.2.1 and the Montana mountains classifier suite. Results from the program's analysis of call files were vetted by an experienced biologist to confirm Sonobat's accuracy in assigning identifications. Sonobat identifies bat calls in call recordings and assigns a score of acceptable calls within a file. These accepted calls can usually be assigned a confident species identification. The number of accepted calls in a file is an indication of the recording's quality. During the vetting process, any recordings that contained less than three accepted calls were grouped into either high or low frequency categories due to low confidence in species identification.

#### 4.5.2 Wildlife Species Occurrence

Spring and early-fall results from the remote cameras deployed in the lease area are summarized in Table 4-9. A total of four ungulate species including white-tailed deer, mule deer, elk, and moose, and seven mammalian carnivores including grizzly bear, black bear, wolf, coyote, cougar, lynx and marten were photographed between June and November 2018. The presence of red squirrel (*Sciurus vulgaris*), snowshoe hare (*Lepus americanus*), hoary marmot (*Marmota caligata*), Columbian ground squirrel (*Urocitellus collumbianus*), and golden-mantled ground squirrel (*Callospermophilus lateralis*) were also confirmed in the lease area.

Examples of wildlife photographs taken by the remote cameras are shown in Photo 5 and Appendix F.

Mountain goat, bighorn sheep, wolverine and red fox have the potential to occur in the lease area but were not detected during the summer/early fall deployment period. Incidental sightings of mountain goat and bighorn sheep by Golder and FMH staff confirms the presence of these species in the lease area. For example, on July 13, 2018, Golder observed fifteen mountain goats at the top of the Canadian chair lift during a rare plant survey. Mountain goat have also been observed by FMH staff above the area of Fortress Lake beyond the Farside chair. Bighorn sheep have been observed by FMH staff high on Fortress shoulder in the Summer and Fall, as well as high above the access road.



**RC04 - American Black Bear; 11U 0625161 E 5631808 N  
(Taken September 9, 2018)**



**RC011 - American Marten; 11U 0628173 E 5629880 N  
(Taken October 4, 2018)**



**RC08 - Canada Lynx; 11U 0624944 E 5633199  
(Taken September 19, 2018)**



**RC011 - Cougar; 11U 0628173 E 5629880 N  
(Taken September 15, 2018)**



**RC04 - Coyote; 11U 0625161 E 5631808 N  
(Taken August 10, 2018)**



**RC010 - Elk; 11U 0627442 E 5631148 N  
(Taken August 6, 2018)**

**Photo 5: Remote Camera Wildlife Photos**

**Table 4-9: Remote Camera Results - Detection Rate (Individuals/Camera Day) of Medium and Large Mammals per Habitat Type in the FMH Lease Area during the Summer and Early Fall**

Species(b)	Total	Habitat Type <sup>(a)</sup>					
		(C1)	(E1)	(E3)	(E4)	(F2)	(G3)
Black bear	0.087	0.009	-	0.004	0.010	0.064	-
Cougar	0.011	-	0.009	0.002	-	-	-
Coyote	0.028	0.018	-	-	0.010	-	-
Grey wolf	0.070	0.002	0.047	0.002	0.019	-	-
<b><i>Grizzly bear</i></b>	0.053	-	0.009	0.010	0.029	0.005	-
Elk	0.027	-	-	0.002	-	0.025	-
Lynx	0.005	-	-	-	-	0.005	-
Marten	0.026	0.007	0.009	-	-	0.010	-
Moose	0.335	-	0.236	0.030	-	0.069	-
Mule deer	0.180	0.0574	-	0.018	0.029	0.030	0.048
Unknown canid	0.015	0.009	-	0.006	-	-	-
Unknown species	0.071	0.005	0.028	0.004	0.010	0.015	0.010
Unknown ungulate	0.026	-	0.009	0.002	-	0.005	0.010
White-tailed deer	1.045	0.045	0.500	0.087	0.086	0.241	0.086

(a) Full descriptions can be found in Section 4.4.2.

(b) Species that are bold and italicized are listed provincially or federally.

- = Species not detected by remote camera(s) in that habitat.

White-tailed deer were the most abundant species photographed in the lease area and were detected at a rate five times higher than mule deer. White-tailed deer and mule deer appear to utilize all six habitat types where cameras were deployed except for one habitat, E1 – False Azalea/Grouseberry/Lodgepole Pine, where mule deer were not detected. The habitats occupied by deer range from high to low elevation forests dominated by subalpine larch, subalpine fir, lodgepole pine, and/or Engelmann spruce, as well as a low elevation meadow.

Moose was the second most abundant species photographed in the lease area. Moose and elk were photographed in forested habitat at mid to low elevations; they were not detected in the high elevation forest or low elevation meadow.

Black bears were the most abundant mammalian carnivore photographed in the lease area followed by wolves, grizzly bears, coyotes, then martens. Cougars and lynx were detected at relatively low rates (0.011 and 0.005 individuals/camera-day; Table 4-9). Mammalian carnivores were only detected in forested habitats and were not detected in the meadow. Wolves, coyotes, black bears, and martens were detected at all elevations whereas grizzly bears, cougars and lynx were only documented at mid to low elevations.

An AEP species summary report generated through the Fish and Wildlife Internet Mapping Tool reported the presence of grizzly bear within the lease area. The Fisheries and Wildlife Management Information System (FWMIS) data has one grizzly bear telemetry location in June 2014 within 1 km of the FMR lease area. Telemetry data provided by AEP shows seven grizzly bears within the lease area in 2014-2017 between April and November (Figure 4-8). One female had telemetry locations in November, January, and April all in the same location indicating that she denned overwinter within the lease area, but outside of the development footprint (Figure 4-8).

June through October had the highest number of collared bears present within the lease area (4-7 bears/month). Two adult males were recorded within the lease area in July. One adult female and one juvenile female were recorded within the lease area in June and July respectively. The last three female bears (1 adult; 2 juvenile) were within the lease area between April-November, with two of these bears using the lease area over multiple years. During this time, they travelled across the entire lease area.

Twenty-one distinct bird species were recorded during the summer breeding bird season (Table 4-10). The most abundant species were white-crowned sparrow, hermit thrush, chipping sparrow, and American robin. Ten species were recorded only once during the study. Disturbed E3 (DIS-E3) habitat had the highest species richness with 12 species detected. The E3 (False Azalea-Grouseberry-Engelmann Spruce) had the lowest species richness with a total of five species detected. One species, olive-sided flycatcher, is provincially listed as "May Be at Risk" and federally listed as "Threatened". Olive-sided flycatcher was recorded once at FMRARU03 in E4 (False Azalea-Grouseberry-Subalpine Fire) habitat (Figure 4-7). Results from the automated classifiers confirmed the presence of one additional listed species; western toad was identified at FMRARU02 located in DIS-E3. FMH has also reported observations of swallows nesting in the historic day lodge.

**Table 4-10: Bird ARU Results – Total Number of Individuals Detected by Species per Habitat Type in the FMH Lease Area from June 23, 2018 to July 24, 2018**

Species <sup>(b)</sup>	Total	Habitat Type <sup>(a)</sup>				
		(E1)	(E3)	(E4)	DIS (E3)	DIS (E4)
American robin	5	-	1	-	2	2
Black-capped chickadee	1	-	-	-	1	-
Cedar waxwing	1	-	-	-	1	-
Chipping sparrow	5	1	-	1	3	-
Dark-eyed junco	1	1	-	-	-	-
Fox sparrow	3	-	-	2	-	1
Hermit thrush	7	-	-	3	1	3
MacGillivray's warbler	1	-	-	-	1	-
<b><i>Olive-sided flycatcher</i></b>	1	-	-	1	-	-
Orange-crowned warbler	1	-	-	-	1	-
Passerine sp.	1	-	1	-	-	-
Pine siskin	4	-	-	2	1	1
Red-winged blackbird	1	-	1	-	-	-
Ruby-crowned kinglet	3	-	-	1	1	1
Swainson's thrush	4	1	-	-	3	-
Tennessee warbler	1	1	-	-	-	-
Tree swallow	2	-	2	-	-	-
Varied thrush	3	1	-	-	1	1
Warbling vireo	3	3	-	-	-	-
White-crowned sparrow	8	1	-	1	2	4
Yellow warbler	1	-	1	-	-	-
Yellow-rumped warbler	3	2	-	1	-	-
<b>Total</b>	<b>60</b>	<b>11</b>	<b>6</b>	<b>12</b>	<b>18</b>	<b>13</b>

(a) Full descriptions can be found in Section 4.4.2.

(b) Species that are bold and italicized are listed provincially or federally.

- = Species not detected by autonomous recording unit(s). DIS = Disturbed.

Four bat species were recorded during the summer within the lease area: hoary bat (*Lasiurus cinereus*), silver-haired bat (*Lasionycteris noctivagans*), big brown bat (*Eptesicus fuscus*), and little brown myotis (*Myotis lucifugus*); (Table 4-11). The ARU unit in DIS-E3 habitat (FMRARU02; Figure 4-7) malfunctioned after three days which may explain the lower number of recorded species. Little brown myotis and silver-haired bats were the most frequently detected species across all habitats. These species were recorded at least twice as often as hoary bats and big brown bats. All four species had the highest detection rate in the subalpine fir dominated E4 (False Azalea-Grouseberry-Subalpine Fir) habitat and had the lowest detection rate in both disturbed habitats. Silver-haired and hoary bats are provincially listed as "Sensitive" because as migratory tree roosting bats they are sensitive to mortality at wind energy projects (AEP 2017). Little brown bats are provincially listed as "May Be at Risk" and federally listed as "Endangered" due to large population declines in the eastern portion of their range as a result of white-nose syndrome (Environment Canada 2015).

**Table 4-11: Bat ARU Results – Total Number of Bat Passes per Detector Night<sup>(a)</sup> by Species or Species Group per Habitat Type in the FMH Lease Area from June 22, 2018 to July 24, 2018**

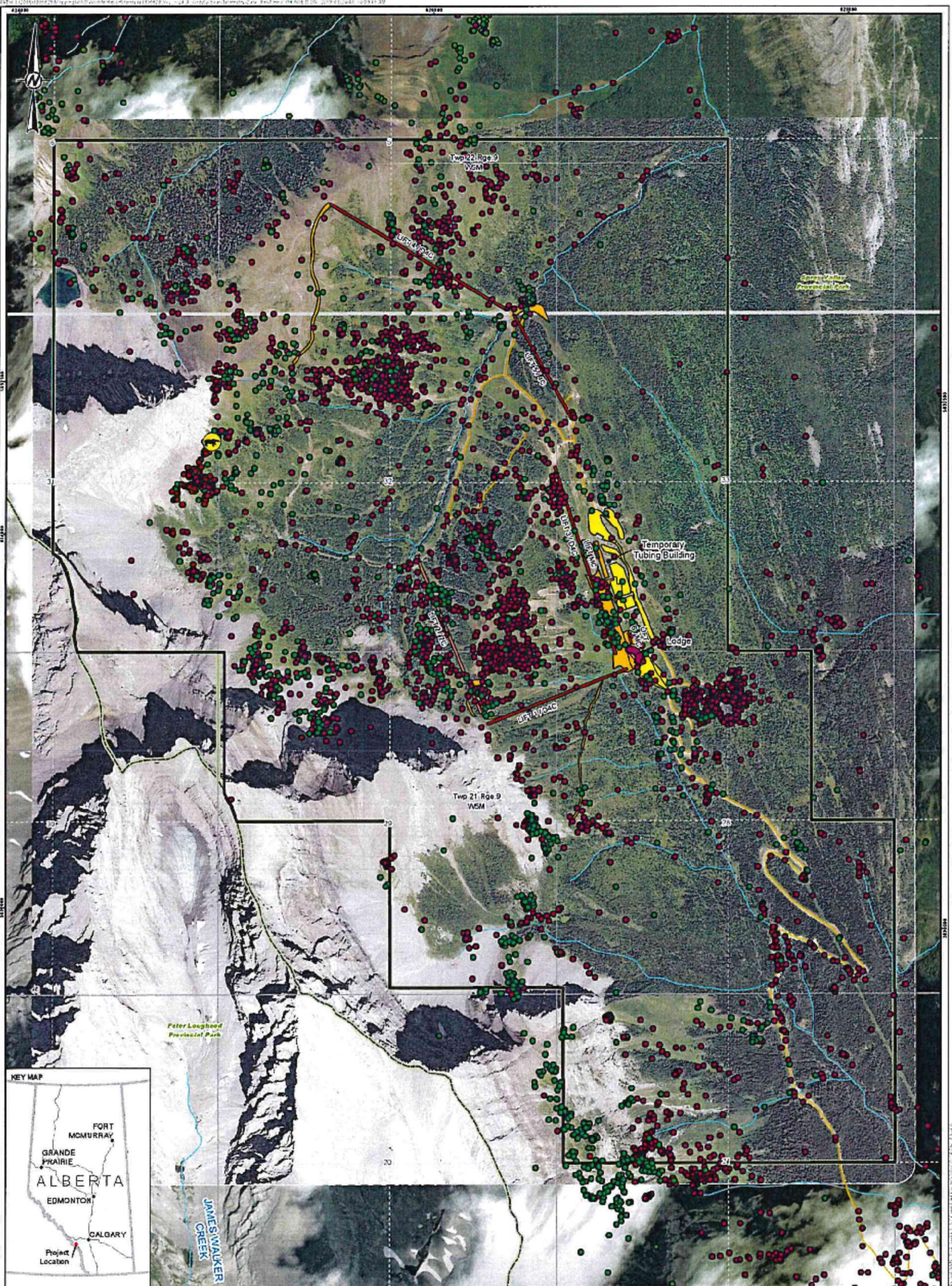
Species/Species Group <sup>(b)</sup>	Total	Habitat Type <sup>(c)</sup>			
		(E3)	(DIS-E3)	(E4)	(DIS-E4)
Big brown bat	0.22	0.25	-	0.34	0.09
<b><i>Hoary bat</i></b>	0.26	0.13	-	0.47	0.19
<b><i>Little brown myotis</i></b>	0.67	0.19	-	1.72	0.16
<b><i>Silver-haired bat</i></b>	0.58	0.78	-	0.94	0.06
Big brown/silver-haired bat	0.22	0.13	-	0.53	0.03
Myotis species	0.69	0.59	0.50	1.25	0.25
High frequency	6.76	0.66	0.50	17.56	2.44
Low frequency	1.58	1.16	-	3.06	0.63
<b>Total</b>	<b>10.99</b>	<b>3.88</b>	<b>1.00</b>	<b>25.88</b>	<b>3.84</b>

(a) Bat passes per detector night is calculated based on 32 detector nights for each detector except the unit deployed in DIS-E3, which only recorded for two nights.

(b) Species that are bold and italicized are listed provincially or federally.

(c) Full descriptions can be found in Section 4.4.2.

- = Species not detected by autonomous recording unit(s).



- LEGEND**
- BEAR DEN
  - TELEMETRY BEAR DATA**
  - AUTUMN
  - SPRING
  - SUMMER
  - PARK / PROTECTED AREA BOUNDARY
  - ROAD
  - WATERCOURSE
  - FORTRESS MOUNTAIN RESORT LEASE AREA BOUNDARY

- PROPOSED PHASE 1 DEVELOPMENT**
- LODGE
  - LODGE SIDEWALK
  - SURFACE PARKING
  - TRAIL (PHASE 1)
  - TEMPORARY TUBING BUILDING
  - REFURBISHED LIFT
  - PROPOSED LIFT
- 0 500 1,000  
1:17,500 METRES

REFERENCE(S)  
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CLIENT  
**FORTRESS MOUNTAIN RESORT**

PROJECT  
**FORTRESS MOUNTAIN RESORT WILDLIFE MONITORING PROGRAM**

TITLE  
**GRIZZLY BEAR TELEMETRY DATA (JUNE 20, 2015 TO JULY 17, 2017)**

CONSULTANT	VVVVMM/00	2018-01-24
DESIGNED	KK	
PREPARED	PMT	
REVIEWED	BS	
APPROVED	DK	

PROJECT NO: 1896628 CONTROL: 0 REV: 0 FIGURE: 4.8

