

# Wildlife Survey Report

## Moosehead Lake Ski Resort

### Big Moose Township, Piscataquis County, Maine



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March 2022

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## 1.0 INTRODUCTION

Big Lake Development, LLC is developing the Moosehead Lake Ski Resort (Project) located in Big Moose Township at the former Big Squaw Mountain Ski Area (Project Area, Figure 1). James W. Sewall Company (Sewall) is providing design, engineering, and permitting services for the Project. Sewall contracted Tetra Tech, Inc. (Tetra Tech) to conduct natural resource studies. This report describes the wildlife studies performed by Tetra Tech to determine the presence or probable absence of northern bog lemming (*Synaptomys borealis*), Bicknell's Thrush (*Catharus bicknelli*), and northern spring salamander (*Gyrinophilus porphyriticus porphyriticus*).

## 2.0 CONSULTATION HISTORY AND BACKGROUND

The bulleted timeline below summarizes relevant consultation history and background for the wildlife studies conducted by Tetra Tech.

- **January 27, 2020:** Maine Department of Inland Fisheries and Wildlife (MDIFW) sent a consultation letter to Sewall highlighting bats, northern bog lemming, roaring brook mayfly (*Epeorus frisonii*), northern spring salamander, Bicknell's thrush, significant vernal pools, and fisheries habitat as potential resources of concern within the Project Area.
- **February 26, 2020:** Big Lake Development Company met with Tetra Tech staff to discuss wildlife studies and other natural resource surveys in the Project Area.
- **January 28, 2021:** Tetra Tech performed a winter site reconnaissance and deployed game cameras for a Canada lynx (*Lynx canadensis*) study.
- **February 11, 2021:** Tetra Tech checked lynx game cameras.
- **February 12, 2021:** At a virtual pre-application meeting MDIFW reiterated their previous natural resource concerns.
- **March 8, 2021:** Tetra Tech checked lynx game cameras.
- **March 22, 2021:** Sewall submitted the Land Use Planning Commission (LUPC) Development Permit Application for the Project (DP 3639-F).
- **April 21, 2021:** Maine Natural Areas Program (MNAP) provided comments about rare and exemplary botanical features for the Project and identified a mapped Subalpine Fir Forest (State Rank S3, rare in Maine) that overlaps with a portion of the Project Area. Bicknell's thrush is associated with this type of high-elevation forest community type.
- **April 28, 2021:** Tetra Tech performed a spring site reconnaissance with a focus on riparian and wetland habitat and checked the lynx game cameras.
- **May 26, 2021:** Representatives from MDIFW, LUPC, Maine Department of Environmental Protection (MDEP), Big Lake Development Company, and Sewall conducted a site visit to the Project Area.
- **June 2, 2021:** Tetra Tech participated in a virtual meeting with MDIFW to discuss wildlife studies and other natural resource surveys.
- **June 3–4, 2021:** Tetra Tech performed the first of two Bicknell's thrush surveys (June 3) and a northern bog lemming reconnaissance survey (June 3–4).

- **June 5, 2021:** MDIFW provided comments and recommendations on the Project's LUPC application and reiterates their previous natural resource concerns.
- **June 16, 2021:** Tetra Tech performed the second Bicknell's thrush survey.
- **September 22, 2021:** Sewall provided Tetra Tech with GIS data from a winter wetland and waterbody delineation and vernal pool surveys (Boyle Associates 2021).
- **September 27–30:** Tetra Tech conducted surveys for northern spring salamander and northern bog lemming (September 27-29). Tetra Tech's subcontractor conducted surveys for Roaring Brook mayfly (September 27–30).
- **December 13, 2021:** Sewall responded to MDIFW's comments and recommendations in a letter submitted to LUPC. In the letter, Sewall addressed concerns about bats by indicating that there are no rocky or talus areas in excess of 1,000 square feet and that all tree clearing will be conducted outside of the restricted periods, reported that surveys for other species have been conducted, and stated that all fisheries recommendations from MDIFW will be implemented.
- **January 11, 2022:** LUPC forwards comments from MDIFW, which indicate no further concerns for bats, minimal concerns for fisheries, and a request for additional information and reports for northern bog lemming, Bicknell's thrush, vernal pools, Roaring Brook mayfly, and northern spring salamander.

## 3.0 NORTHERN BOG LEMMING

### 3.1 Introduction

Northern bog lemming habitat consists of alpine sedge meadows, krummholz, spruce-fir forest with dense herbaceous and mossy ground cover, acidic wet meadows, and mossy stream-sides that are at or above 1,000 feet elevation in the western mountain and northern areas of Maine (MDIFW 2003, 2016, 2018, 2020).

### 3.2 Methods

Prior to conducting field work, Beginning with Habitat online maps (MDIFW 2021), Google Earth aerial imagery, MDIFW's wind (2018) and solar (2020) guidance documents, a natural resources report provided by Sewall (Boyle Associates 2021), publicly available northern bog lemming survey reports (Stantec 2013, 2016; Olson and Mosby 2017; Olson 2018) from unrelated projects, and protocol guidance from Dr. Zach Olson from University of New England (Olson 2020) were reviewed.

Northern bog lemming field surveys were performed September 27–29, 2021 in conjunction with northern spring salamander surveys. A team of two biologists used meandering transects within delineated streams and wetlands provided by Sewall (Figure 1, Figure 2; Boyle Associates 2021). Each natural resource exhibiting northern bog lemming habitat characteristics was investigated for the presence of green scat, latrines, and evenly cut graminoid vegetation along well-defined runways. Habitat was documented using an iPad equipped with the ESRI Field Maps application.

Field reconnaissance for northern bog lemming habitat is typically performed concurrently with vernal pool surveys and wetland delineations. For this Project, Tetra Tech was not involved with those efforts; thus, reconnaissance was performed during other surveys and site visits. On April 28, field reconnaissance focused on evaluating riparian areas within the Project Area for suitable lemming habitat. The June 3–4 reconnaissance examined the areas around the zip-line stations (outside of Project Area provided to Tetra Tech by Sewall). Incidental observations were also made during Bicknell's thrush surveys (June 3).

### 3.3 Results and Conclusion

The entire Project Area is above 1,000 feet; therefore, all natural resources within the Project Area meet the elevation requirement for northern bog lemming habitat. A total of 11 wetlands were searched for signs of northern bog lemming (Table 1, Figure 2). Two wetlands, Unnamed Wetland 01 (UNWL-01) and Unnamed Wetland 02 (UNWL-02), both located in the marina property of the Project Area, were noted as having good habitat for northern bog lemming. These wetlands were characterized by mossy ground cover, mossy stream-sides, and spruce-fir forests (Appendix A). Both wetlands were extensively searched but no bog lemming signs were observed. One brown fecal pellet was observed (Appendix A) but it was determined to be from a non-target species and therefore was not collected for DNA analysis. Streams within the Project Area also were searched for northern bog lemming, but no streams with suitable habitat for the species were observed. Based on the results of the 2021 northern bog lemming survey conducted at the Moosehead Lake Ski Resort Project Area, the species is not likely to be present.

**Table 1. Wetlands Searched for Northern Bog Lemming at the Moosehead Lake Ski Resort Project; Piscataquis County, Maine, 2021.**

Wetland Name <sup>1</sup>	Wetland Type <sup>2</sup>	Total Area (sq ft)	Date Searched	Search Start (24hr)	Search End (24hr)	Search Time (H:MM)	Survey Notes
W-MR-01	PFO	12,173	9/29	11:50	12:00	0:10	Habitat not suitable for NBL.
W-MR-03-East	PFO	1,100	9/28	15:45	16:45	1:00	Duplicate names split apart by location. Habitat not suitable for NBL. No NBL sign detected.
W-MR-03-West	PFO	1,100	9/28	13:40	13:50	0:10	Duplicate names split apart by location. Habitat not suitable for NBL. No NBL sign detected.
W-MR-04	PFO	5,809	9/29	13:50	14:00	0:10	Habitat not suitable for NBL. No NBL sign detected.
W-MR-05	PFO	661	9/29	14:00	14:10	0:10	Habitat not suitable for NBL. No NBL sign detected.
W-MR-06	PFO	20,832	9/28	16:45	17:00	0:15	Marginal habitat for NBL. No NBL sign detected.
W-SK-01	PFO/PEM	24,678	9/28	14:45	15:00	0:15	Marginal habitat for NBL. No NBL sign detected.
W-SK-04	PFO	920	9/28	13:00	13:30	0:30	Marginal habitat for NBL. No NBL sign detected.
UNWL-01 <sup>3</sup>	PFO	15,383	9/28	8:30	9:30	1:00	Marina. Not in wetland report. Good habitat present for NBL, but no sign.
UNWL-02 <sup>3</sup>	PFO	2,043	9/28	9:30	9:40	0:10	Marina. Not in wetland report. Good habitat present for NBL, but no sign.
UNWL-03 <sup>3</sup>	PEM	12,198	9/28	11:00	11:30	0:30	Pond. Not good habitat for NBL. Lots of trash in the vicinity.

1 – Boyle Associates 2021.

2 – PFO-Palustrine Forested Wetland, PEM-Palustrine Emergent Wetland (Cowardin et al. 1979)

3 – Wetland name not available from Boyle Associates 2021 or provided by Sewall. See Figure 2.



## 4.0 BICKNELL'S THRUSH

### 4.1 Introduction

The Bicknell's thrush is a rare, Nearctic-Neotropical migrant that breeds in the Northeast United States within a patchy network of high-elevation islands across New York and New England reaching highest densities in naturally disturbed thickets of red spruce (*Picea rubens*) and balsam fir (*Abies balsamea*) (Wallace 1939, Atwood et al. 1996, Connolly et al. 2002). Its breeding range extends north into Canada through portions of New Brunswick, Nova Scotia, the Gaspé Peninsula, to the Laurentians at the southeastern edge of the Canadian Shield, where the species remains restricted to high altitudes on mountain tops and plateaus (Ouellet 1993, Nixon et al. 2001, Chisholm and Leonard 2008). The Bicknell's thrush is listed as threatened in Canada and internationally vulnerable (Townsend et al. 2015, Lloyd and McFarland 2017, BirdLife International 2018). It is also a Species of Special Concern in Maine (MDIFW 2011) and is known to occur in the vicinity of the Project Area (MDIFW, personal communication).

### 4.2 Methods

#### 4.2.1 Survey Methods

A desktop habitat assessment was conducted to identify potential Bicknell's thrush habitat and plot point count locations within the Project Area. Mid-successional spruce-fir habitats and areas within or adjacent to proposed construction (i.e., present location of top of lift line and proposed top of zip line) were given preference when selecting survey points. In addition, point count locations were spaced a minimum of 200 meters apart to avoid double-counting individual birds and throughout the Project Area, which also provided representation of bird species on an elevational gradient (2,400 to 3,200 feet). Six point count locations were ultimately selected for the survey (Table 2, Figure 3).

Survey methodology followed the Mountain Birdwatch Protocol from the Vermont Center for Ecostudies (2021). Surveys were conducted in fair weather conditions (i.e., no precipitation and a gentle breeze or less) and began prior to sunrise. Point count locations were surveyed two times, two weeks apart in June. Surveys consisted of four consecutive 5-minute independent counts (i.e., each 5-minute count was treated as a new count). All species observed visually or aurally were counted, not just the 11 focal species in the Mountain Birdwatch protocol, which made this survey a "complete count" (Vermont Center for Ecostudies 2021). Incidental observations of focal species were recorded when observed outside of official survey time. A photo log of all point count locations is available in Appendix B.

**Table 2. Descriptions of Bicknell's Thrush Point Count Locations at the Moosehead Lake Ski Resort Project; Piscataquis County, Maine, 2021.**

Point Count Location	Latitude	Longitude	Elevation (feet)	Habitat Description
1	45° 29.20230944' N	69° 42.69579529' W	3,211	High point above top of lift line. Great mid-successional spruce fir habitat for Bicknell's Thrush.
2	45° 29.26194752' N	69° 42.82210221' W	2,994	Beyond the top of the lift line in an area with a recent spruce fir die off. Regeneration is underway and this will be good future habitat. Regenerating patch bordered by great mid-successional spruce-fir Bicknell's habitat.
3	45° 29.31991590' N	69° 42.74702213' W	3,018	Top of lift line at old lift shack. Ski trails bordered by spruce-fir.
4	45° 29.42420272' N	69° 42.70017570' W	2,858	On the edge of old ski trail. Transition of spruce-fir to mixed forest.
5	45° 29.56716608' N	69° 42.66907044' W	2,519	On the edge of old ski trail beneath lift line. Hardwood dominated.
6	45° 29.54059712' N	69° 42.50440128' W	2,494	Within a mature stand dominated by fir with a hardwood component.

#### 4.2.2 Data Summary Methods

The purpose of the four, 5-minute independent counts in the Mountain Birdwatch Protocol was to collect data that can be modeled (Vermont Center for Ecostudies 2021). Survey data was recorded along with conditional variables such as wind speed, time of day, year, weather, and background noise levels. Recording background noise levels accounted for detection probability, which is an important consideration for accurately assessing bird populations. This methodology was followed for consistency and so data could be incorporated into the Mountain Birdwatch database in the future if desired. The intent of this survey, however, was to determine presence or probable absence of Bicknell's thrush, and further analysis was beyond the scope of this effort.

To most accurately present counts recorded during the surveys, the maximum number of individuals observed by species across all survey intervals for each point count location was used to represent the count for that point count location. In effect, this count represents all individuals and species encountered over the 20-minute survey without double counting. For example, if one (1) Bicknell's thrush was counted in the first 5-minute interval, one (1) was counted in the second 5-minute interval, none (0) were counted in the third 5-minute interval, and two (2) were counted in the fourth 5-minute interval; then this point count location would be presented as two (2) Bicknell's thrush.

#### 4.3 Results

Surveys were conducted on the mornings of June 3 and 16, 2021. Overall, 27 species of birds were observed during surveys (Table 3). Bicknell's thrush was observed on both dates. At least five (5) individual Bicknell's thrush were observed at point count locations 1–3 on June 3 and at least three (3) individuals were observed at point count locations 2 and 3 on June 16 (Table 4, Table 5).

Eight (8) of the 11 target Mountain Bird Watch species were observed during the surveys as well as three (3) Maine species of special concern (Bicknell's thrush, black and white warbler [*Mniotilta varia*], white-throated sparrow [*Zonotrichia albicollis*]; Table 3). The number of species detected at each point count



location ranged from 4 to 19 (Table 4, Table 5). Table 4 and Table 5 present the maximum count for each species across the four 5-minute survey intervals recorded at each point count location. With this method, data is presented as a “simple count” over the 20-minute period without double counting between intervals. Results from all intervals are included in Appendix C.

#### 4.3.1 Incidental observations

On the evening of June 2, multiple Bicknell’s thrushes were observed across the top of Moose Mountain near the top of the lift line and east of point count location 4. A period of high frequency of singing and calling lasted from 8 to 9 p.m. Many thrushes, and especially the Bicknell’s thrush, exhibit crepuscular vocal periods and in addition to early mornings prior to sunrise are quite vocal on warm, calm, evenings early in the breeding season.

On the morning of June 3, a Canada warbler (*Cardellina canadensis*; Maine species of special concern) was observed downslope of point count location 5 in an area of dense mid-successional, mixed forest near the lift line. At approximately 2,500 feet, bird species diversity increased where habitat transitioned into a deciduous dominated forest.

**Table 3. Bird Species Observed Visually or Aurally within Survey Periods on June 3 and 16 at the Moosehead Lake Ski Resort Project; Piscataquis County, Maine, 2021.**

Common Name <sup>1</sup>	Scientific Name	Common Name <sup>1</sup>	Scientific Name
American Goldfinch	<i>Spinus tristis</i>	<b>Hermit Thrush</b>	<i>Catharus guttatus</i>
Black-and-white Warbler*	<i>Mniotilta varia</i>	Magnolia Warbler	<i>Setophaga magnolia</i>
Black-backed Woodpecker	<i>Picoides arcticus</i>	Ovenbird	<i>Seiurus aurocapilla</i>
Blue-headed Vireo	<i>Vireo solitarius</i>	Pine Siskin	<i>Spinus pinus</i>
<b>Bicknell's Thrush*</b>	<i>Catharus bicknelli</i>	Red-breasted Nuthatch	<i>Sitta canadensis</i>
Blue Jay	<i>Cyanocitta cristata</i>	Ruby-crowned Kinglet	<i>Regulus calendula</i>
<b>Blackpoll Warbler</b>	<i>Setophaga striata</i>	Red-tailed Hawk	<i>Buteo jamaicensis</i>
<b>Boreal Chickadee</b>	<i>Poecile hudsonicus</i>	<b>Swainson's Thrush</b>	<i>Catharus ustulatus</i>
Brown Creeper	<i>Certhia americana</i>	<b>Winter Wren</b>	<i>Troglodytes hiemalis</i>
Black-throated Green Warbler	<i>Setophaga virens</i>	<b>White-throated Sparrow*</b>	<i>Zonotrichia albicollis</i>
Common Yellowthroat	<i>Geothlypis trichas</i>	White-winged Crossbill	<i>Loxia leucoptera</i>
Dark-eyed Junco	<i>Junco hyemalis</i>	<b>Yellow-bellied Flycatcher</b>	<i>Empidonax flaviventris</i>
Golden-crowned Kinglet	<i>Regulus satrapa</i>	Yellow-rumped Warbler	<i>Setophaga coronata</i>
Hairy Woodpecker	<i>Picoides villosus</i>		

1 - Focal species for VCE's Mountain Birdwatch Protocol are presented in **bold**.

\* - Maine species of special concern.

**Table 4. Summary of Maximum Interval Count by Species and Station over the Full 20-minute Survey on June 3 at the Moosehead Lake Ski Resort Project, Piscataquis County, Maine, 2021.**

Point Count Station	1	2	3	4	5	6	Species Total
Start Time (24HR))	525	610	448	700	834	750	
American Goldfinch	0	0	0	0	1	0	1
Bachman's Warbler	0	0	0	0	1	0	1
Black-backed Woodpecker	0	0	0	1	0	0	1
Blue-headed Vireo	0	0	0	0	1	0	1
<b>Bicknell's Thrush</b>	<b>2</b>	<b>1</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>5</b>
Blue Jay	0	0	0	1	1	0	2
Blackpoll Warbler	1	3	2	1	2	1	10
Boreal Chickadee	1	0	0	0	0	0	1
Common Yellowthroat	0	0	0	1	1	0	2
Dark-eyed Junco	0	2	0	0	1	1	4
Golden-crowned Kinglet	0	1	1	0	1	0	3
Hairy Woodpecker	0	0	0	1	0	0	1
Magnolia Warbler	0	1	0	0	1	0	2
Ovenbird	0	0	0	0	1	0	1
Red-breasted Nuthatch	0	1	0	0	0	0	1
Ruby-crowned Kinglet	0	0	2	1	0	0	3
Red-tailed Hawk	0	1	0	0	0	0	1
Swainson's Thrush	1	0	3	0	1	1	6
Winter Wren	1	1	1	3	1	1	8
White-throated Sparrow	1	1	2	2	3	0	9
Yellow-bellied Flycatcher	1	1	0	1	2	0	5
Yellow-rumped Warbler	0	1	2	1	1	0	5
<b>Station Total</b>	<b>8</b>	<b>14</b>	<b>15</b>	<b>13</b>	<b>19</b>	<b>4</b>	<b>73</b>

**Table 5. Summary of Maximum Interval Count by Species and Station over the Full 20-minute Survey on June 16 at the Moosehead Lake Ski Resort Project, Piscataquis County, Maine, 2021.**

Point Count Station	1	2	3	4	5	6	Species Total
Start Time (24HR)	653	727	610	540	903	823	
Blue-headed Vireo	0	0	0	0	1	0	1
<b>Bicknell's Thrush</b>	<b>0</b>	<b>2</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>3</b>
Blue Jay	1	0	0	0	1	1	3
Blackpoll Warbler	1	0	2	2	0	1	6
Brown Creeper	0	1	1	0	0	0	2
Black-throated Green Warbler	0	0	0	0	0	1	1
Common Yellowthroat	0	0	0	1	0	0	1
Dark-eyed Junco	0	1	0	0	1	1	3
Golden-crowned Kinglet	0	0	0	0	1	1	2
Hermit Thrush	0	0	0	1	0	0	1
Magnolia Warbler	1	1	0	1	1	0	4
Pine Siskin	0	0	0	0	1	1	2
Red-breasted Nuthatch	0	0	0	0	1	0	1
Ruby-crowned Kinglet	1	1	1	0	0	0	3
Swainson's Thrush	0	1	2	2	3	2	10
Winter Wren	1	3	2	2	1	1	10
White-throated Sparrow	1	3	1	0	3	1	9
White-winged Crossbill	0	0	0	1	0	0	1
Yellow-bellied Flycatcher	0	1	1	1	1	1	5
Yellow-rumped Warbler	0	2	2	2	0	1	7
<b>Station Total</b>	<b>6</b>	<b>16</b>	<b>13</b>	<b>13</b>	<b>15</b>	<b>12</b>	<b>75</b>

## 5.0 NORTHERN SPRING SALAMANDER

### 5.1 Introduction

Northern spring salamanders use clear, cold, mountain streams underlain by coarse substrates at or above 500 feet and bordered by hardwood or mixed wood forests. The species typically occurs in moderate to fast gradient first or second order streams. They can also occur in larger third-order streams and rivers with similar habitat characteristics (Hunter et al. 1999, MDIFW 2019).

Data on waterbodies within the Project Area were provided by Sewall (Boyle Associates 2021).

### 5.2 Methods

Prior to conducting field work, MDIFW's Northern Spring Salamander Survey Protocols (2019), Beginning with Habitat online maps (MDIFW 2021), Google Earth aerial imagery, MDIFW's wind (2018) and solar (2020) guidance documents, a natural resources report provided by Sewall (Boyle Associates 2021), and publicly available northern spring salamander survey reports (Stantec 2013, 2016) from unrelated projects were reviewed.

Northern spring salamander field surveys were performed September 27–29, 2021 in conjunction with northern bog lemming surveys. A team of two biologists walked each stream, moving upstream whenever possible, and searched under stones and rocks alongside and within each delineated stream. Stream data was provided by Sewall (Figure 1, Figure 4; Boyle Associated 2021). Multiple sections of each stream were searched. Rocks of various shapes and sizes were searched with preference for larger, flatter rocks. Biologists wore polarized sunglasses when practicable to reduce glare and improve visibility of aquatic organisms. Representatives of all species of salamanders were caught, photographed, and locations were documented using an iPad equipped with the ESRI Field Maps application.

Field reconnaissance for northern spring salamander habitat is typically performed concurrently with vernal pool surveys and wetland delineations. For this Project, Tetra Tech was not involved with those efforts; thus, reconnaissance was performed during other surveys and site visits. On April 28, field reconnaissance focused on evaluating riparian areas within the Project Area for suitable northern spring salamander habitat. The June 3–4 reconnaissance examined the areas around the zip-line stations (outside of Project Area provided to Tetra Tech by Sewall), which included several small unmapped streams.

### 5.3 Results

One northern spring salamander was detected below a dam on Unnamed Stream 04 (UNST-04), which is located on the western boundary of the Project Area (Figure 4, Appendix D). Based on the results of the 2021 northern spring salamander survey conducted at the Moosehead Lake Ski Resort Project area, the species is present in stream UNST-04 and not likely to be present in other streams within the Project Area. The entire Project Area is above 1,000 feet; therefore, all natural resources within the Project Area meet the elevation requirement for northern spring salamander habitat. A total of 23 streams were searched over 3 field days for a total search time of 20 hours and 30 minutes and a total search length of 18,486 feet (Figure 4, Table 6). Most of the streams were noted as having good habitat for northern spring salamander i.e., clear, cold streams with fast gradients, underlain by coarse substrate, and bordered by hardwood or mixed wood forests. Some of the streams, however, were mostly dry at the time of the survey (Table 6). Eastern red-backed salamander (*Plethodon cinereus*), northern dusky salamander (*Desmognathus fuscus*), and northern two-lined salamander (*Eurycea bislineata*) were three incidental salamander species observed in nearly every stream that was searched in the Project Area (Appendix D).

**Table 6. Streams Searched for Northern Spring Salamander at the Moosehead Lake Ski Resort Project; Piscataquis County, Maine, 2021.**

Stream Name	Date Searched	Total Length Searched (ft)	Search Start (24hr)	Search End (24hr)	Search Time (H:MM)	Survey Notes
21-CD-S-1	9/27–28	1,863	N/A	N/A	2:45	No NSS. Searched in two segments.
S-MR-03	9/29	1,092	10:00	11:45	1:45	No NSS.
S-MR-04	9/29	535	12:00	12:15	0:15	No NSS. Mostly dry channel.
S-MR-05	9/29	1,784	12:20	13:45	1:25	No NSS.
S-MR-06	9/28	738	15:45	16:45	1:00	No NSS.
S-MR-07	9/28	190	15:45	16:45	1:00	No NSS.
S-MR-08	9/28	139	15:45	16:45	1:00	No NSS.
S-MR-09	9/28	795	15:15	15:45	0:30	No NSS. Mostly dry channel.
S-MR-10	9/28	697	15:15	15:45	0:30	No NSS. Mostly dry channel.
S-MR-11	9/28	233	13:50	14:00	0:10	No NSS.
S-SK-03	9/28	408	14:30	15:00	0:30	No NSS. Mostly dry channel.
S-SK-04	9/28	950	13:00	13:30	0:30	No NSS. Mostly dry channel.
S-SK-06	9/27	874	11:45	13:15	1:30	No NSS.
S-SK-07	9/28	229	13:00	13:30	0:30	No NSS. Mostly dry channel.
S-SK-08	9/28	1,442	9:00	10:00	1:00	No NSS. Low flow, some dry areas.
S-SK-10	9/27	1,821	15:15	16:30	1:15	No NSS.
S-SK-14	9/28	865	9:45	11:00	1:15	No NSS.
S-SK-15	9/28	496	15:00	15:30	0:30	No NSS. Mostly dry channel.
S-SK-16	9/28	589	17:30	17:45	0:15	No NSS.
UNST-01	9/29	104	15:30	16:00	0:30	No NSS.
UNST-02	9/29	223	15:15	15:25	0:10	No NSS.
UNST-03	9/29	584	14:00	14:45	0:45	No NSS.
UNST-04	9/28–29	1,835	N/A	N/A	1:30	<b>NSS present.</b> Searched in two segments.

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## FIGURES





Not for Construction

Figure 1. Project Area and Delineated Natural Resources at Moosehead Lake Ski Resort, Piscataquis County, ME, 2021.



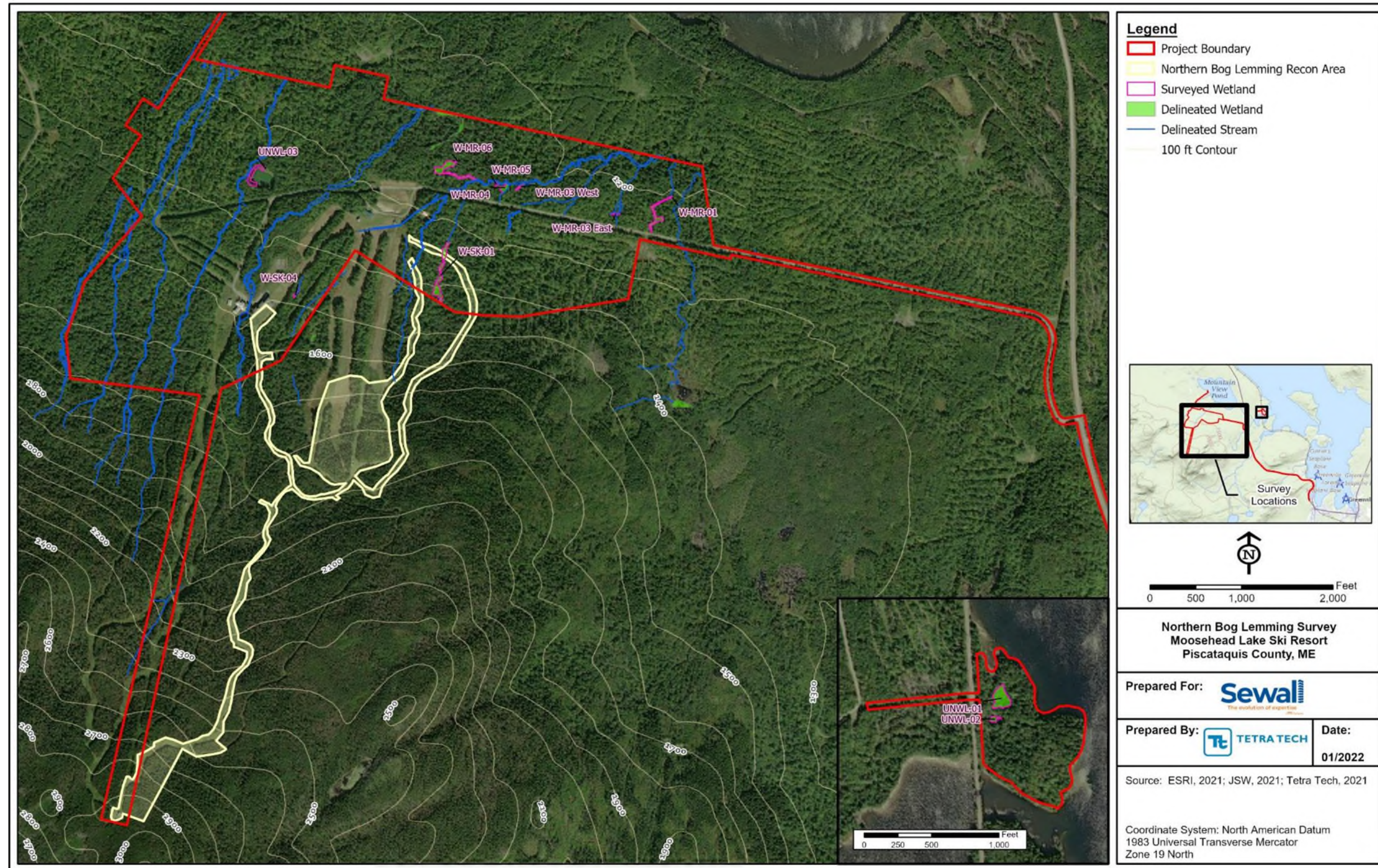


Figure 2. Northern Bog Lemming Survey at Moosehead Lake Ski Resort, Piscataquis County, ME, 2021.



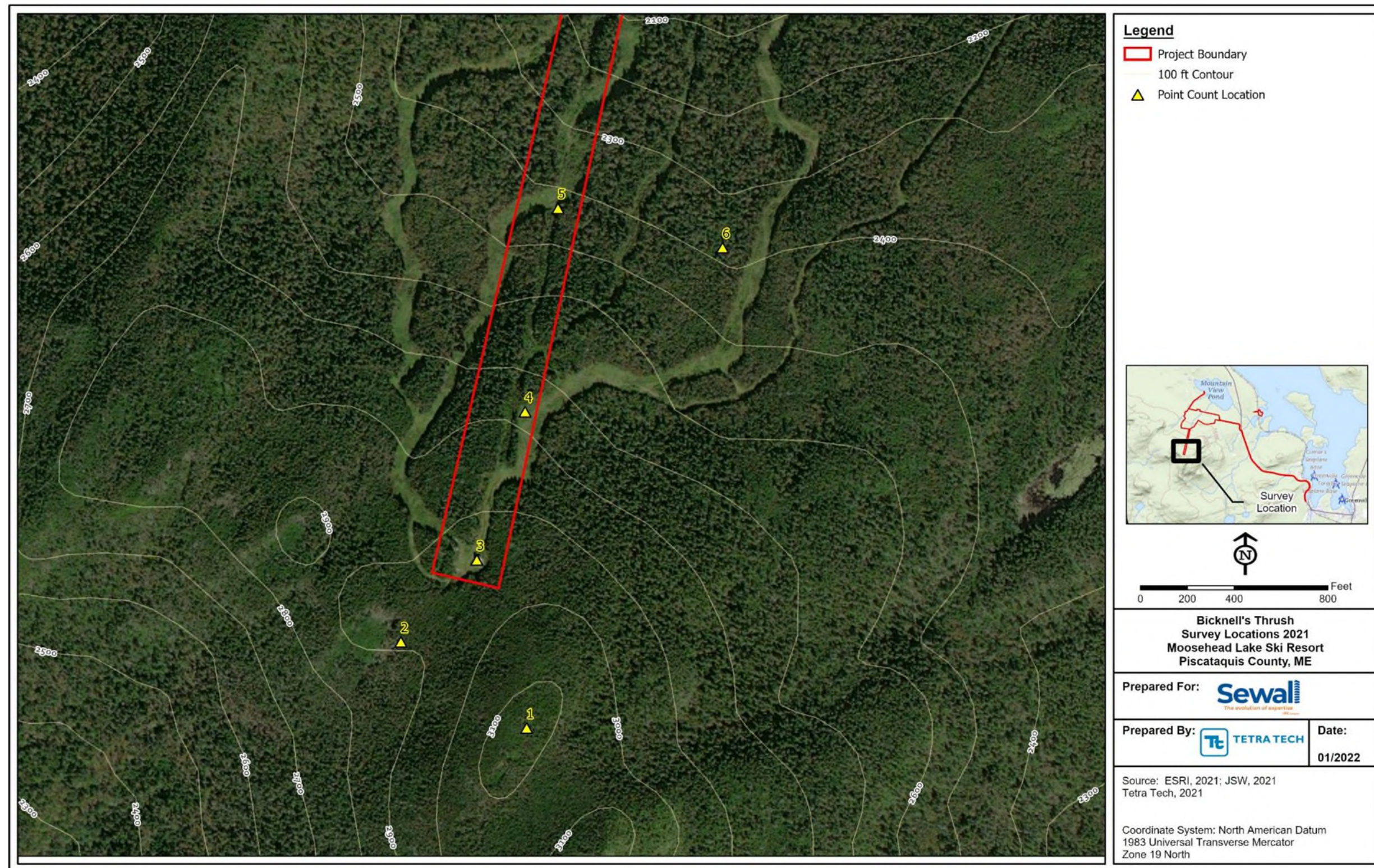


Figure 3. Bicknell's Thrush Survey Locations at Moosehead Lake Ski Resort, Piscataquis County, ME, 2021.



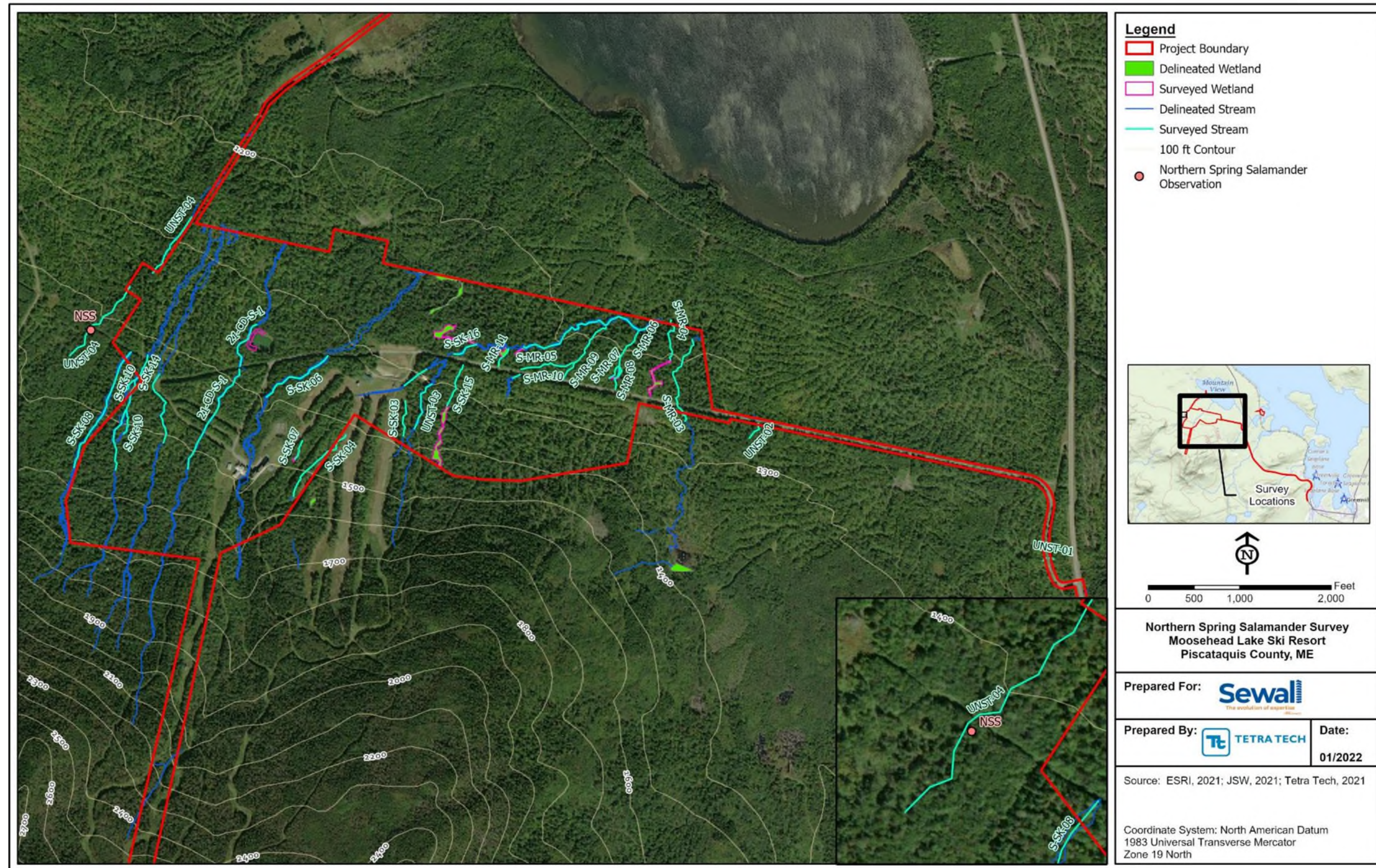


Figure 4. Northern Spring Salamander Survey at Moosehead Lake Ski Resort, Piscataquis County, ME, 2021.



## **APPENDIX A. BOG LEMMING SURVEY PHOTOS**



Mossy ground cover within spruce-fir/mixed hardwood forest.



Mossy ground cover and stream-sides within spruce-fir/mixed hardwood forest.



Mossy ground cover and stream-sides within spruce-fir/mixed hardwood forest.



Example of non-Northern bog-lemming pellet

**UNWL-01**

*approximately 1,045 feet elevation*





Mossy stream-sides within spruce-fir/mixed hardwood forest.



Mossy ground cover within spruce-fir/mixed hardwood forest.

**UNWL-02**

*approximately 1,042 feet elevation*



Mossy ground cover, spruce-fir forest at approximately 2,954 feet elevation.



Mossy ground cover, spruce-fir forest at approximately 2,851 feet elevation.

**Northern Bog Lemming Recon Area**

**APPENDIX B. BICKNELL'S THRUSH STUDY POINT COUNT  
LOCATION PHOTOS**





North. Dense mid-successional spruce-fir. Ideal Bicknell's Thrush Habitat.



East



South



West

Point Count Location 1





North. Recent dieback, now early succession.



East



South



West. Brodered by mid-successional spruce-fir. Great mosaic.

**Point Count Location 2**





North. Top of lift shack. Trails bordered by Bicknell's habitat.



East



South



West

Point Count Location 3





North. Dense mid-successional mixed forest.



East. Along ski trail.



South



West

**Point Count Location 4**





North. Within old lift line. Hardwood dominated.



East



South



West

**Point Count Location 5**





North. Late-successional fir-dominated with hardwood component.



East



South



West

Point Count Location 6

**APPENDIX C. COMPLETE BICKNELL'S THRUSH SURVEY  
RESULTS FOR ALL 5-MINUTE INTERVALS**

**Table B-1. Complete Bicknell's Thrush Survey Results for all 5-Minute Intervals at the Moosehead Lake Ski Resort Project, Piscataquis County, Maine, June 3, 2021.**

Station	Start Time	5-Min Interval	AMGO	BAWA	BBWO	BHVI	BITH	BLJA	BLPW	BOCH	COYE	DEJU	GCKI	HAWO	MAWA	OVEN	RBNU	RCKI	RESQ	RTHA	SWTH	WIWR	WTSP	YBFL	YRWA	Survey Totals	
1	525	<b>Station Total</b>					3		2	2											4	3	2	1		17	
		1																				1			1		2
		2									1											1	1	1			4
		3						2		1												1	1				5
		4						1		1	1											1	1	1			6
2	610	<b>Station Total</b>					2		10			4	2		2		1		1	1		2	1	1	1	1	28
		1					1		1			2	1										1	1		1	8
		2					1		3			1	1		1					1	1						9
		3							3						1		1						1				6
		4							3			1													1		5
3	448	<b>Station Total</b>					3		5				1					5			5	4	4		3	30	
		1					1		1									1			1	1	2		2	9	
		2					2												2		1	1				6	
		3							2				1						1			1	1		1	7	
		4							2										1			3	1	1			8
4	700	<b>Station Total</b>			1			1	1		4				1				3	1			9	5	2	3	31
		1									1				1								3	1	1	1	8
		2							1			1							1	1			2	1		1	8
		3								1		1							1				2	1		1	7
		4				1						1							1				2	2	1		8
5	834	<b>Station Total</b>	1	1		3		2	6		4	1	1		4	1					1	2	6	4	1	38	
		1							2		1				1	1									2	1	8
		2	1			1			1		1	1	1		1						1		1	1			10
		3		1		1		1	1		1				1								1	3			10
		4				1		1	2		1				1								1	2	1		10
6	750	<b>Station Total</b>							3			2									1	2				8	
		1							1			1											1				3
		2							1			1															2
		3							1													1					2
		4																					1				1
<b>Species Total</b>			1	1	1	3	8	3	27	2	8	7	4	1	6	1	1	8	2	1	11	22	18	8	8	152	

AMGO American Goldfinch | BAWW Black-and-white Warbler | BBWO Black-backed Woodpecker | BHVI Blue-headed Vireo | BITH Bicknell's Thrush | BLJA Blue Jay | BLPW Blackpoll Warbler | BOCH Boreal Chickadee | BRCR Brown Creeper | BTNW Black-throated Green Warbler | COYE Common Yellowthroat | DEJU Dark-eyed Junco | GCKI Golden-crowned Kinglet | HAWO Hairy Woodpecker | HETH Hermit Thrush | MAWA Magnolia Warbler | OVEN Ovenbird | PISI Pine Siskin | RBNU Red-breasted Nuthatch | RCKI Ruby-crowned Kinglet | RTHA Red-tailed Hawk | SWTH Swainson's Thrush | WIWR Winter Wren | WTSP White-throated Sparrow | WWCR White-winged Crossbill | YBFL Yellow-bellied Flycatcher | YRWA Yellow-rumped Warbler



**Table B-2. Complete Bicknell’s Thrush Survey Results for all 5-Minute Intervals at the Moosehead Lake Ski Resort Project, Piscataquis County, Maine, June 16, 2021.**

Station	Start Time	5-Min Interval	BHVI	BITH	BLJA	BLPW	BRCR	BTNW	COYE	DEJU	GCKI	HETH	MAWA	PISI	RBNU	RCKI	SWTH	WIWR	WTSP	WWCR	YBFL	YRWA	Survey Totals		
1	653	<b>Station Total</b>			1	3							1			2		2	1				10		
		1				1																		1	
		2			1	1													1						3
		3				1											1								2
		4												1			1		1	1					4
2	727	<b>Station Total</b>		5			2			1			1			3	3	7	4		2	6	34		
		1		2			1							1			1	2			1	1		9	
		2		1												1	1	1	1		1	2		8	
		3		2												1	1	1	3			1		9	
		4						1			1						1		3				2		8
3	610	<b>Station Total</b>		1		4	1									3	4	7	2		2	4	28		
		1		1															1	1			1		4
		2				1	1										1		2						5
		3					2										1	2	2			1	2		10
		4					1										1	2	2	1		1	1		9
4	540	<b>Station Total</b>				5			4			1	3				3	6		1	1	6	30		
		1				1			1				1					2			1		1		7
		2				1			1			1						1					2		7
		3					1		1				1					1	1			1	1		7
		4					2		1									2	2				2		9
5	903	<b>Station Total</b>	1		1					1	1		2	1	1		7	1	9		1		26		
		1	1							1	1						2		2						7
		2			1															3					4
		3											1				2	1	2						6
		4												1	1	1		3		2		1			9
6	823	<b>Station Total</b>			2	2		1		3	1			1			6	2	1		1	1	21		
		1				1					1						1								3
		2				1				1							2	1	1		1				7
		3				1				1							2	1							5
		4				1			1	1					1		1						1		6
<b>Species Total</b>			<b>1</b>	<b>6</b>	<b>4</b>	<b>14</b>	<b>3</b>	<b>1</b>	<b>4</b>	<b>5</b>	<b>2</b>	<b>1</b>	<b>7</b>	<b>2</b>	<b>1</b>	<b>8</b>	<b>23</b>	<b>25</b>	<b>17</b>	<b>1</b>	<b>7</b>	<b>17</b>	<b>149</b>		

AMGO American Goldfinch | BAWW Black-and-white Warbler | BBWO Black-backed Woodpecker | BHVI Blue-headed Vireo | BITH Bicknell’s Thrush | BLJA Blue Jay | BLPW Blackpoll Warbler | BOCH Boreal Chickadee | BRCR Brown Creeper | BTNW Black-throated Green Warbler | COYE Common Yellowthroat | DEJU Dark-eyed Junco | GCKI Golden-crowned Kinglet | HAWO Hairy Woodpecker | HETH Hermit Thrush | MAWA Magnolia Warbler | OVEN Ovenbird | PISI Pine Siskin | RBNU Red-breasted Nuthatch | RCKI Ruby-crowned Kinglet | RTHA Red-tailed Hawk | SWTH Swainson’s Thrush | WIWR Winter Wren | WTSP White-throated Sparrow | WWCR White-winged Crossbill | YBFL Yellow-bellied Flycatcher | YRWA Yellow-rumped Warbler

**APPENDIX D. REPRESENTATIVE PHOTOS OF SALAMANDER  
SPECIES DOCUMENTED IN THE PROJECT AREA**



Adult Northern Spring Salamander Observed in UNST-04.





**Adult Northern Spring Salamander Observed in UNST-04.**





**Representative Photo of an Eastern Red-backed Salamander Found in the Project Area.**





**Representative Photo of a Northern Dusky Salamander Found in the Project Area.**





**Representative Photo of a Northern Two-lined Salamander Found in the Project Area.**