

Clowhom Project Water Use Plan

Clowhom Lake Wildlife Census

Reference: COMMON-1

Clowhom Lake Wildlife Census Year 3

Study Period: February 1, 2008 – January 31, 2009

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Executive Summary

The Clowhom Lake aquatic wildlife monitoring study was developed and initiated in 2006 in a small wetland complex at the north end of the Clowhom reservoir. The wetland complex was selected for its proximity to the reservoir and obvious influence from reservoir level and operation. The monitoring project includes the development of performance measures to track changes in both flora and fauna in the study area and is based on early studies of riparian vegetation development in response to reservoir operation conducted by BC Hydro.

In Year 3 (2008) a total of 3 field census (August, September and December) were completed. These census used the transect pattern established in 2006. The sampling crew walked the predetermined transects noting wildlife use through visual and auditory signs. Data was then recorded on an Excel spreadsheet for future inclusion in a database for analysis.

Table of Contents

Executive Summary	2
Table of Contents	3
List of Figures	3
List of Tables	3
List of Appendices	3
1.0 Introduction.....	4
2.0 Study Area	4
3.0 Methods.....	4
3.1 Wildlife Census.....	4
3.2 Data Analysis.....	6
4.0 Results/Discussion.....	6
4.2 Wildlife Census.....	6
References.....	7
Appendices.....	8

List of Figures

Figure 1: Location of the Clowhom Lake wetland complex in relation to Sechelt, B.C. The complex is at the head of the lake and is accessible by road.....	5
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List of Tables

Table I: Amended schedule for the wildlife census conducted on the Clowhom Lake headwater wetland. The column highlighted in yellow is the completed census period in 2008.	6
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List of Appendices

Appendix I: Data collected from the August, September and December 2008 wildlife census. The data is entered on an Excel spreadsheet.	9
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1.0 Introduction

In 2008, the shishalh First Nation and BC Hydro completed the third year of a 20 year monitoring program documenting change and wildlife utilization of a wetland complex at the head of Clowhom Lake in Salmon Inlet, BC. The monitoring program was implemented as a result of recommendations made during the water use planning (WUP) process and will quantify and qualify change in the utilization and development of a wetland ecosystem during varying lake management scenarios.

The monitoring program addresses specific management questions that are summarized from the BC Hydro Terms of Reference for this project and are reported in the Year 1 report (Bates, 2007).

The purpose of this report is to present the results of the Year 3 sampling season. Data analysis will be completed following Year 5.

2.0 Study Area

The study area for the wildlife census remains the same as 2006 and 2007 and includes a wetland complex located at the northeastern end of Clowhom Lake (**Figure 1**). The complex is located approximately 500-metres upstream from the lake along the Clowhom River and is influenced by back-flooding from the lake as storage in the lake increases. The wetland is also presumably inundated during spring and fall high water events in the Clowhom River.

The study area measures approximately 40 hectares and is characterized by both deciduous and conifer forest of various ages, patches of shrub layers and a large area consisting of wetland grasses and sedges. Details of the vegetation typing is summarized in Bates (2008).

3.0 Methods

3.1 Wildlife Census

Wildlife census was conducted through the study area three times a year. Each census period begins 1-2 hours after sunrise, is completed in 1 day following predetermined transects. Transects use a geo-referenced starting point and are traversed by compass bearings. Each transect corner is marked with a metal post that stands 1.25 metres in length painted orange. The approximate location of transects and the geo-referenced benchmark(s) is reported in Bates (2007).

The census is conducted mid to late month of the sample period. The schedule was amended in 2008 and is detailed in **Table I**. The sample periods shift ahead approximately one month over a 4-year census period. Review of the data will occur in the year 5 and amendments to the sampling design will be made if warranted

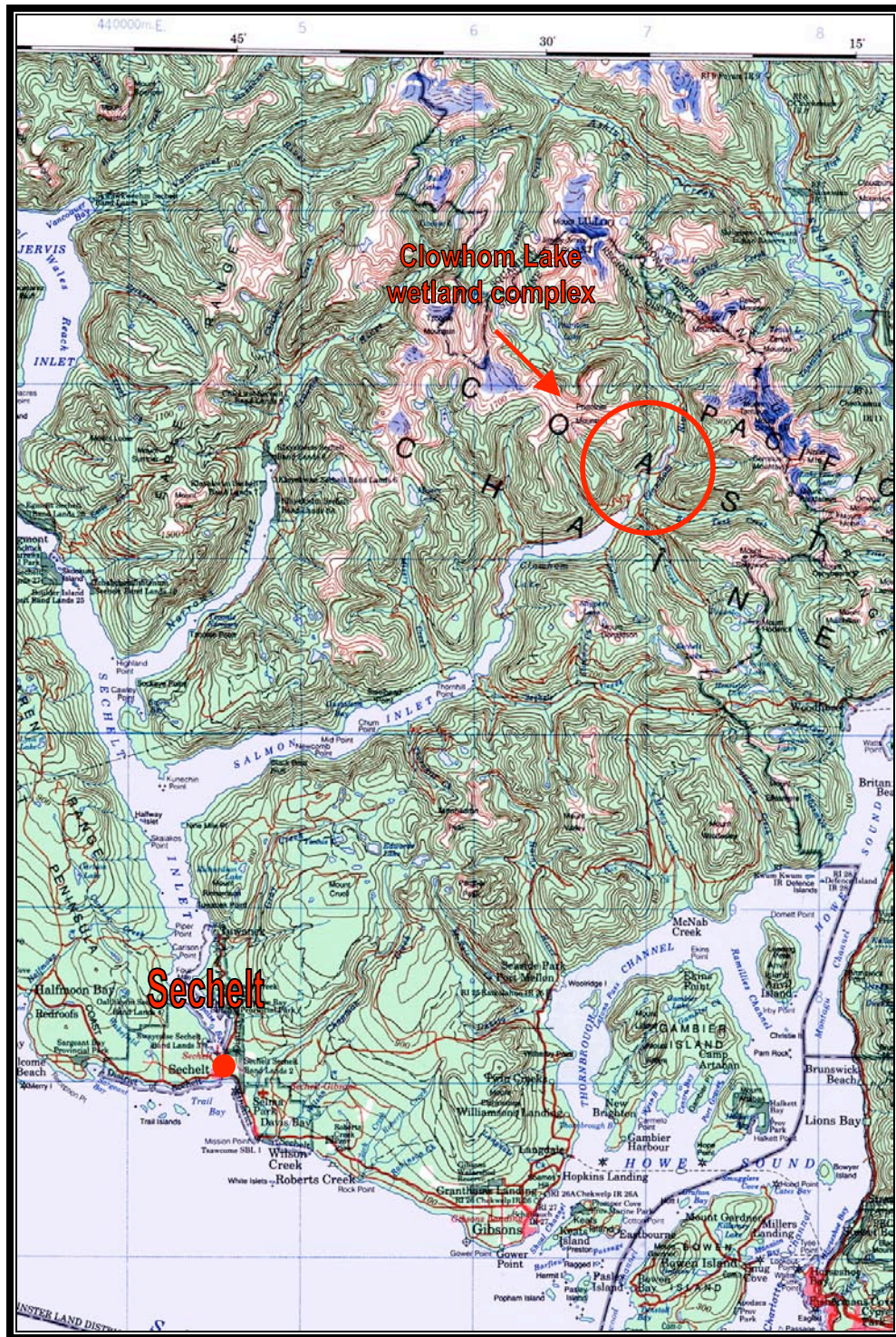


Figure 1: Location of the Clowhom Lake wetland complex in relation to Sechelt, B.C. The complex is at the head of the lake and is accessible by road.

Table I: Amended schedule for the wildlife census conducted on the Clowhom Lake headwater wetland. The column highlighted in yellow is the completed census period in 2008.

Census period	Year			
	1 (2006/07)	2 (2007/08)	3 (2008)	4 (2009/10)
1	June	July	August	April
2	October	November	September	May
3	February	March	December	January

Each census period continues to be conducted by a 2 person team consisting of a senior wildlife technician or biologist and a field technician. The crew begins the census at the designated start of the transect (T1) and walks the predetermined route noting time and wildlife sign(s). Data is recorded in the field then transcribed into an Excel spreadsheet.

3.2 Data Analysis

All data is entered into an Excel spreadsheet for future analysis. The data format will remain the same for each year using the format developed in 2006 (Bates, 2007). All data will be collected as a time series in order to analyze for temporal trends in species diversity.

Wildlife data is supplemented with the vegetation data defining vegetation community types and change (Bates, 2008). This will facilitate comparison of species diversity to vegetation community structure.

Finally, stage data and lake flooding of the wetland continues to be collected from BC Hydro records and will eventually be factored into the species diversity and vegetation community data. A comparison of wetland inundation through operation changes to the utilization and development of the wetland by species dependent on the habitats found throughout the study area.

The detailed analysis is not required until Year 5 with the intervening years only used for data collection.

4.0 Results/Discussion

4.2 Wildlife Census

The wildlife census has been conducted three times in 2007. The first census was on February 20, then July 20 and finally December 1, 2007. The census data is recorded on and Excel spreadsheet for each sample date and is included in **Appendix IV**.

References

Bates, D.J. 2007. Clowhom Lake Water Use Plan – Clowhom Lake wildlife census – Year 1. Resource Management Department, shishalh Nation, Sechelt, BC.

Bates, D.J. 2008. Clowhom Lake Water Use Plan – Clowhom Lake wildlife census – Year 2. Resource Management Department, shishalh Nation, Sechelt, BC.

Appendices

Appendix I: Data collected from the August, September and December 2008 wildlife census. The data is entered on an Excel spreadsheet.

Date 29/08/2008 (i.e., 29 Aug. 2008)
Weather Cloud Cover: 100% (low cloud); Precipitation: light to moderate rain intermittently; Wind: 0; Lake/reservoir level: low

Surveyors Greg Ferguson, Monty Staats
Time Started 8:40 AM
Time Finished 11:13 AM
Elevation ~72 m
Sunrise 6:24 AM
Temperature (Clowhom) 17 °C
UTM of Entrance to T1A from Clowhom Mainline: 10U 468853 5513815 +/- 5m

Transect 1 (T1A to T1B) Runs East/West Time Start: 8:40 Time Finish: 9:05

Species and Number ()	Habitat	Observation of behaviour
Roosevel Elk (1)	Upland mixed deciduous/coniferous forest (hemlock, cedar, maple) / Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage	Scat (old), scat & tracks (fresh near lake)
Banana Slug (1)	Upland mixed deciduous/coniferous forest (hemlock, cedar, maple)	Visual
American Robin (1)	Upland mixed deciduous/coniferous forest (hemlock, cedar, maple)	Calling
Stellars Jay (1)	Upland mixed deciduous/coniferous forest (hemlock, cedar, maple) / Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage	Calling
European Slug (1)	Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage	Visual
Belted Kingfisher (1)	Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage / Flat wetland/lake tranistion zone (bog orchid, sphagnum, bog cranberry)	Calling
Black Bear (1)	Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage	Scat (old)

Transect 2 (T2A to T2B) Runs North/South Time Start: 9:14 Time Finish: 9:33

Species and Number ()	Habitat	Observation of behaviour
Common Yellowthroat (1)	Flat wetland/lake tranistion zone (bog orchid, sphagnum, bog cranberry)	Calling, visual
Stellars Jay (2)	Flat wetland/lake tranistion zone (bog orchid, sphagnum, bog cranberry)	Calling, visual

Transect 4 (T4B to T4A) Runs East/West Time Start: 9:34 Time Finish: 10:06

Species and Number ()	Habitat	Observation of behaviour
Tree Frog (1)	Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage	Calling
Douglas Squirrel (1)	Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage	Calling
Golden Crowned Kinglet (1)	Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage	Calling, visual
Stellars Jay (1)	Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage	Visual

Transect 5 (T5A to T5B) Runs North/South Time Start: 10:06 Time Finish: 10:22

Species and Number ()	Habitat	Observation of behaviour
Golden Crowned Kinglet (2)	Second growth forest ~20m tall, brushed, sloped, dry (spruce, hemlock, cedar)	Calling
Stellars Jay (1)	Second growth forest ~20m tall, brushed, sloped, dry (spruce, hemlock, cedar)	Calling

Transect 3 (T3A to T3B) Runs West/East Time Start: 10:45 Time Finish: 11:15

Species and Number ()	Habitat	Observation of behaviour
Banana Slug (1)	Second growth forest ~20m tall, brushed, sloped, dry (spruce, hemlock, cedar)	Visual
Chickadee (2)	Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage	Calling

Red Breasted Nuthatch (1)	Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage	Calling
Golden Crowned Kinglet (1)	Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage	Calling
Mammal Bones	Flat wetland/lake tranistion zone (bog orchid, sphagnum, bog cranberry)	Visual (4 main bones, may be from previous elk carcass in area) UTM 10U N 0468862 E 5513814
Stellars Jay (2)	Flat wetland/lake tranistion zone (bog orchid, sphagnum, bog cranberry)	Visual
American Robin (2)	Flat wetland/lake tranistion zone (bog orchid, sphagnum, bog cranberry)	Flying

Total Number of Species **13**

Species List Note: Includes all sign: feeding scat, tracks, hair, etc.

Roosevel Elk
Banana Slug
American Robin
Stellars Jay
European Slug
Belted Kingfisher
Black Bear
Common Yellowthroat
Tree Frog
Douglas Squirrel
Golden Crowned Kinglet
Chickadee
Red Breasted Nuthatch

Clowhom Wildlife Survey

Date 20-Sep-08
Weather Cloud Cover: 100% (mid to high cloud); Precipitation: light rain intermittently (very minimal); Wind: 0; Lake/reservoir level: low

Surveyors Greg Ferguson, Monty Staats
Time Started 8:30 AM
Time Finished 10:50 AM
Elevation ~72 m
Sunrise 5:43 AM
Temperature (Clowhom) 14 °C
UTM of Entrance to T1A from Clowhom Mainline: 10U 468853 5513815 +/- 5m

Transect 1 (T1A to T1B) Runs East/West

Time Start: 8:30 Time Finish: 8:55

Species and Number ()	Habitat	Observation of behaviour
Winter Wren (2)	Second growth forest ~20m tall, brushed, sloped, dry (spruce, hemlock, cedar)	Calling
American Robin (1)	Second growth forest ~20m tall, brushed, sloped, dry (spruce, hemlock, cedar)	Calling
Black Bear (1)	Second growth forest ~20m tall, brushed, sloped, dry (spruce, hemlock, cedar)	Scat (new)
Grove Snail (1)	Second growth forest ~20m tall, brushed, sloped, dry (spruce, hemlock, cedar)	Broken shell
Roosevel Elk (1)	Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage, Flat wetland/lake tranistion zone (bog orchid, sphagnum, bog cranberry)	Tracks (fresh, looks like one adult, possible male), wallow
Banana Slug (2)	Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage	Visual

Transect 2 (T2A to T2B) Runs North/South

Time Start: 9:00 Time Finish: 9:23

Species and Number ()	Habitat	Observation of behaviour
Roosevel Elk (1)	Flat wetland/lake tranistion zone (bog orchid, sphagnum, bog cranberry)	Scat, tracks, fresh rub
Raven (1)	Flat wetland/lake tranistion zone (bog orchid, sphagnum, bog cranberry)	Calling
American Robin (1)	Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage	Calling
Stellars Jay (2)	Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage	Calling, visual
Song Sparrow (1)	Flat wetland/lake tranistion zone (bog orchid, sphagnum, bog cranberry)	Calling
Banana Slug (1)	Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage	Visual
Winter Wren (1)	Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage	Calling

Transect 4 (T4B to T4A) Runs East/West

Time Start: 9:25 Time Finish: 9:50

Species and Number ()	Habitat	Observation of behaviour
Banana Slug (6)	Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage	Visual (majority observed were white)
Winter Wren (1)	Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage	Calling
Golden Crowned Kinglet (1)	Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage	Calling
Black Bear (1)	Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage, Second growth forest ~20m tall, brushed, sloped, dry (spruce, hemlock, cedar)	Scat (old)
Roosevel Elk (1)	Second growth forest ~20m tall, brushed, sloped, dry (spruce, hemlock, cedar)	Tracks (fresh)

Douglas Squirrel (1) Second growth forest ~20m tall, brushed, sloped, dry (spruce, hemlock, cedar) Calling
 American Robin (1) Second growth forest ~20m tall, brushed, sloped, dry (spruce, hemlock, cedar) Calling

Transect 5 (T5A to T5B) Runs North/South Time Start: 9:55 Time Finish: 10:08

Species and Number ()	Habitat	Observation of behaviour
Banana Slug (1)	Second growth forest ~20m tall, brushed, sloped, dry (spruce, hemlock, cedar)	Visual
American Robin (1)	Second growth forest ~20m tall, brushed, sloped, dry (spruce, hemlock, cedar)	Calling
Winter Wren (1)	Second growth forest ~20m tall, brushed, sloped, dry (spruce, hemlock, cedar)	Calling
Chickadee (1)	Second growth forest ~20m tall, brushed, sloped, dry (spruce, hemlock, cedar)	Calling
Golden Crowned Kinglet (3)	Second growth forest ~20m tall, brushed, sloped, dry (spruce, hemlock, cedar)	Calling

Transect 3 (T3A to T3B) Runs West/East Time Start: 10:14 Time Finish: 10:50

Species and Number ()	Habitat	Observation of behaviour
Golden Crowned Kinglet (3)	Second growth forest ~20m tall, brushed, sloped, dry (spruce, hemlock, cedar)	Calling (same individuals observed on transect 3)
Chickadee (2)	Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage	Calling
American Robin (1)	Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage	Calling
Roosevel Elk (1)	Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage	Wallow (looks older), tracks, hair
Stellars Jay (1)	Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage	Calling
Douglas Squirrel (1)	Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage	Calling (likely same individual observed on transect 4)
Varied Thrush (1)	Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage	Calling
Song Sparrow (1)	Flat wetland/lake tranistion zone (bog orchid, sphagnum, bog cranberry)	Calling
Unknown Song Bird (2)	Flat wetland/lake tranistion zone (bog orchid, sphagnum, bog cranberry)	Calling

Total Number of Species **14**

Species List	Note: Includes all sign: feeding scat, tracks, hair, etc.	Additional Note: Three fresh elk wallows observed along the flat wetland/lake transition zone habitat and one older wallow observed in the deciduous/coniferous wetland forest with Skunk Cabbage.
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Roosevel Elk
 Banana Slug
 Grove Snail
 American Robin
 Stellars Jay
 Black Bear
 Winter Wren

Raven
Song Sparrow
Golden Crowned Kinglet
Douglas Squirrel
Chickadee
Varied Thrush
Unknown Song Bird

Clowhom Wildlife Survey

Date 20-Dec-08
Weather Cloud Cover: 0%; Precipitation: none; Wind: 0 (none); Lake/reservoir level: moderate to high. Lake frozen on northern end. ~10 cm of snow on ground.

Surveyors Greg Ferguson, Monty Staats
Time Started 11:00 AM
Time Finished 12:56 AM
Elevation ~72 m
Sunrise 8:08 AM
Temperature (Clowhom) -10 °C
UTM of Entrance to T1A from Clowhom Mainline: 10U 468853 5513815 +/- 5m

Transect 1 (T1A to T1B) Runs East/West Time Start: 11:00 Time Finish: 11:20

Species and Number ()	Habitat	Observation of behaviour
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No Species Observed

Transect 2 (T2A to T2B) Runs North/South Time Start: 11:25 Time Finish: 11:40

Species and Number ()	Habitat	Observation of behaviour
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Red-breasted Sapsucker (1)	Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage	Calling
Unknown Small Mammal (1)	Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage	Tracks
Downy Woodpecker (1) male	Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage	Visual
Bobcat (1)	Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage	Tracks
Squirrel (1)	Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage	Tracks

Transect 4 (T4B to T4A) Runs East/West Time Start: 11:45 Time Finish: 12:13

Species and Number ()	Habitat	Observation of behaviour
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Winter Wren (1)	Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage	Visual
Red-breasted Sapsucker (1)	Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage	Calling, visual
Golden Crowned Kinglet (2, 1)	Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage, Second growth forest ~20m tall, brushed, sloped, dry (spruce, hemlock, cedar)	Calling, visual

Harry Woodpecker (1) male	Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage	Drumming, visual, calling
Chestnut-backed Chickadee (5-7)	Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage	Calling, visual
Stellar Jay (4)	Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage	Visual, calling
Ruby Crowned Kinglet (1)	Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage	Visual
Squirrel (3)	Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage	Tracks

Transect 5 (T5A to T5B) Runs North/South Time Start: 12:20 Time Finish: 12:30

Species and Number ()	Habitat	Observation of behaviour
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Bobcat (1)	Second growth forest ~20m tall, brushed, sloped, dry (spruce, hemlock, cedar)	Tracks
Golden Crowned Kinglet (1)	Second growth forest ~20m tall, brushed, sloped, dry (spruce, hemlock, cedar)	Calling

Transect 3 (T3A to T3B) Runs West/East Time Start: 12:32 Time Finish: 12:56

Species and Number ()	Habitat	Observation of behaviour
Squirrel (2)	Upland mixed deciduous/coniferous forest (hemlock, cedar, maple)	Tracks
Bobcat (1)	Upland mixed deciduous/coniferous forest (hemlock, cedar, maple)	Tracks
Stellars Jay (2)	Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage	Visual, calling
Red-breasted Sapsucker (1)	Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage	Visual, drumming
Total Number of Species	11	
Species List	Note: Includes all sign: feeding scat, tracks, hair, etc.	Additional Note: Some individual species observed on transects were likely repeat sightings on other transects (e.g., woodpeckers, Stellars Jay, squirrel and bobcat tracks).

Unknown Small Mammal
Squirrel
Bobcat
Stellars Jay
Red-breasted Sapsucker
Golden Crowned Kinglet
Winter Wren
Harry Woodpecker male
Chestnut-backed Chickadee
Downy Woodpecker male
Ruby Crowned Kinglet