



# Clowhom Project Water Use Plan

**Monitor of Wildlife Use in Wetlands Affected by  
Dam Operations**

**Implementation Year 10**

**Reference: COMMON-1**  
*Clowhom Lake Reservoir Wildlife Census*

**Study Period: April 2015 to March 2016**

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## **Executive Summary**

A wildlife and habitat census of a small wetland complex at the north end of Clowhom Lake Reservoir was developed and initiated in 2006 by the shíshálh Nation under the direction of BC Hydro and its Watershed Use Planning process. The wetland complex was selected for its proximity to the reservoir and to examine how changing water levels from reservoir operation influence the wetland's flora and fauna over a 20-year period.

Data collected in 2015 and early 2016 are provided in this summary report and will be submitted to BC Hydro for inclusion in a master database for future analysis of the influence of reservoir operations on the established wetland habitat and subsequent use by area wildlife. .

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## **1.0 Introduction**

In 2015/2016 the shíshálh First Nation and BC Hydro completed the 10<sup>th</sup> Year of a 20 year monitoring program documenting wildlife utilization of a wetland complex at the head of the Clowhom Lake Reservoir. This data report presents the survey data collected during the second year of the third “Rotation” in the survey cycle. Each “Rotation” consists of a 4-year period.

As in previous years, the wetland complex continues to be influenced by changes in reservoir levels due to hydroelectric operations and reservoir management at Clowhom Falls Dam. This monitoring program, as originally implemented through recommendations made in BC Hydro’s Water Use Planning (WUP) process, documents wildlife use at various times in the year following a travelling count on predetermined and permanent transect(s). The intent is to relate area use, and any subsequent change in use to the operations of the reservoir.

This report presents the results of the 2015/2016 field-sampling season.

## **2.0 Study Area**

The study area for the census remains the same as delineated in 2006 and is comprised of a wetland complex. The wetland is located at the northeastern end of Clowhom Lake Reservoir, approximately 500 meters upstream from the lake, adjacent to the Clowhom River mainstem (**Figure 1**). The area is located in low elevation Coastal Western Hemlock Dry Maritime biogeoclimatic subzone, which has a climate consisting of cool summers and mild winters. As is past years, the study area is back-flooded cyclically by Clowhom Lake Reservoir as storage and lake stage height changes. The wetland is also inundated during spring and fall freshet events that occur in the Clowhom River drainage.

The study area is approximately 40 hectares in size and is characterized by a mix of deciduous and conifer forest of various ages, a diverse shrub and herbaceous understory, and a large area of wetland grasses and sedges along the reservoir’s shoreline. The vegetation cover has been undisturbed since the census began in 2006 and details of the polygons are reported in *Bates (2008)*.

## **3.0 Methods**

### **3.1 Wildlife Census**

A biologist and technician with the shíshálh Nation conduct the wildlife census following a predetermined schedule (**Table I**). The census area has remained unchanged and is referenced in *Bates (2007)*. Census surveys were conducted mid to late month, and completed within a 3–4 hour period post-sunrise. The date, time and reservoirs stage height at the start of each survey is provided in **Table II**.

As previously reported, the crew follows geo-referenced transects (*Bates*, 2007) starting at transect-T1. The crew walks a predetermined route, noting the following information:

- Species present;
- Habitat type detected in; and
- Type of detection.

Data collection relies on wildlife sounds and observed presence and/or use.

Three to four censuses are conducted each year during different months. Sample months were pre-determined using a seasonal rotating schedule (**Table I**). Staggered monthly survey times ensure data collected is seasonally representative of the wetland over the project's life and that each calendar year is completed. The 20-year study duration ensures that a total of five censuses are completed for each calendar month.

Data is recorded in the field, translated into an Excel spreadsheet, and attached to the annual data report.

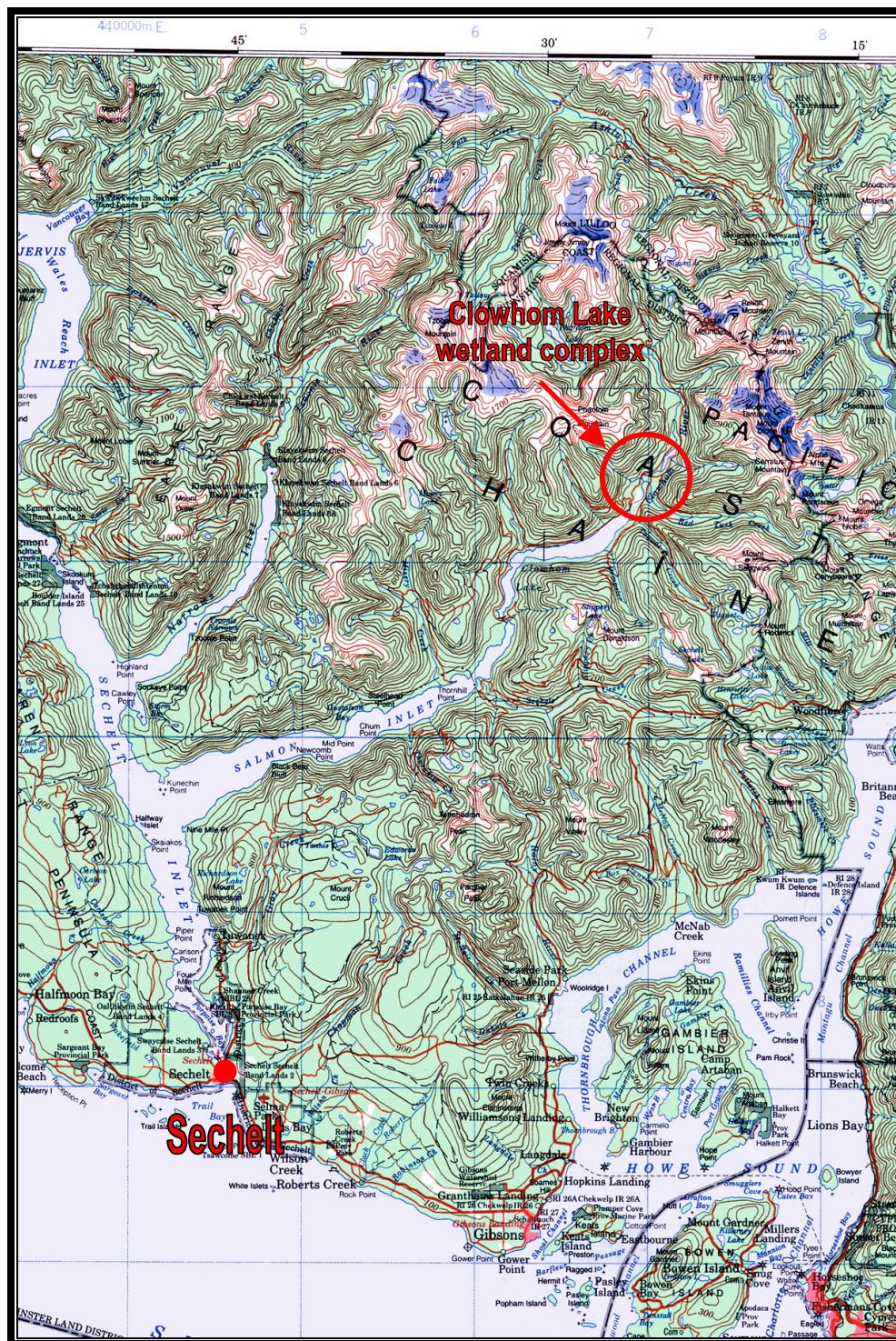
**Table I.** The schedule for the third rotation (2014-2018) of the Clowhom Lake Reservoir wildlife census surveys\*.

| Field<br>Census | Sample Rotation (3rd)<br>(Year) |                  |                  |                  |
|-----------------|---------------------------------|------------------|------------------|------------------|
|                 | 1<br>(2014/2015)                | 2<br>(2015/2016) | 3<br>(2016/2017) | 4<br>(2017/2018) |
|                 | 1                               | June             | May              | April            |
| 2               | September                       | October          | May              | August           |
| 3               | November                        | January          | July             | February         |
| 4               | -                               | -                | December         | March            |

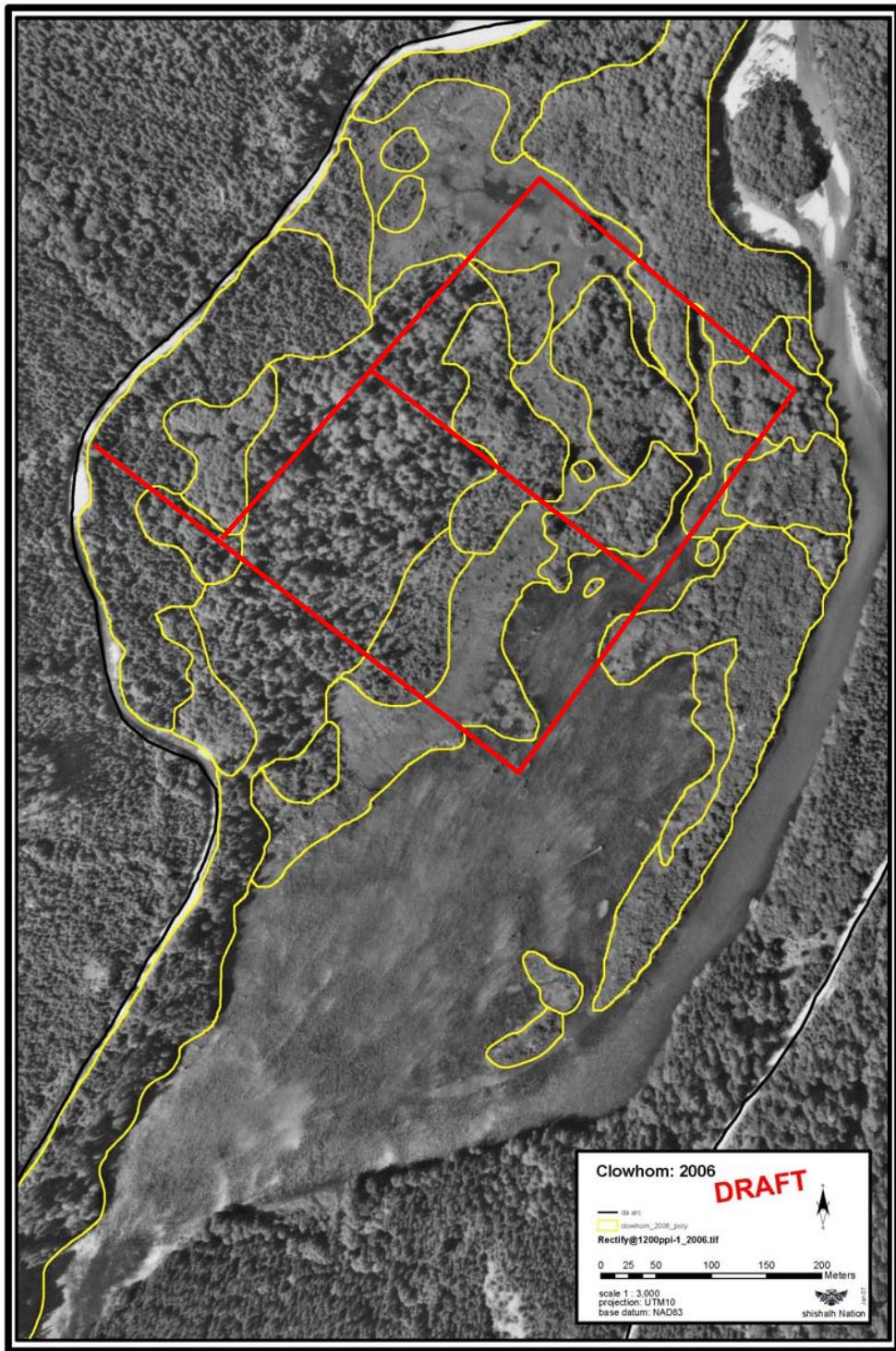
\*Within the rotation block 4 seasons are surveyed three to four times to ensure each month is covered. All census/surveys use the same transects established in *Bates* (2007) (**Figure 2**).

**Table II.** The date, time and reservoir stage height for each census survey conducted in the 2015/2016-field season.

| Census | Date         | Start time | Finish Time | Reservoir<br>Stage (m) |
|--------|--------------|------------|-------------|------------------------|
| 1      | May 15, 2015 | 5:59       | 9:19        | 50.02                  |
| 2      | Oct 18, 2015 | 8:05       | 10:40       | 51.39                  |
| 3      | Jan 15, 2016 | 8:30       | 10:40       | 52.06                  |



**Figure 1:** Location of Clowhom Lake Reservoir wetland complex census area.



**Figure 2:** Approximate location of the wildlife census transects. There are 5 transects in total and the start and finish is marked with a 1.25-metre metal pole (*Bates, 2007*).

### **3.2 Data Entry**

Data is entered into a spreadsheet for future analysis. The spreadsheet format remains the same as previous years and is based on a format reported by *Bates* (2007, 2008). Data will eventually be collated as a time series in order to analyze for temporal trends in species diversity.

For each species identified during a wildlife survey, supplementary data was also collected, documenting general vegetation community type and associated structure in and around the detection (*Bates*, 2008).

## **4.0 Results**

### **4.1 Wildlife Census**

Three census surveys were conducted in 2015/2016. These were; May 15 and October 18, 2015 and January 15, 2016. Data spreadsheets detailing the results are included in the attached Appendix (**Appendix 1**).

## **5.0 Discussion**

### **5.1 Wildlife Census**

The 2015/2016 wildlife surveys were completed without any problems. The protocol and continuity remains unchanged in 2015/2016.

The original ToR called for the completion of the census mid month (*BC Hydro*, 2005) but over the course of the sample years the schedule has changed. In 2015/2016 the field crew moved the timing back to align with the original target period. The necessity for moving the dates, in the past, was difficulty in accessing site during winter months. Weather constraints are not predictable and there may be a necessity to alter the sample period again in the future. Efforts will always be made to maintain the approximate sample date.

The important component for the study's success is the continued involvement of field staff familiar with the methodology. The pairing of a skilled biologist (Biologist has not changed from the start of the project in 2006) and technician continues to allow capacity building among the technical staff and consistency in the data collection. It is anticipated that the crew will remain the same for the completion of the third "rotation" and that techniques and methodology will remain unchanged.

### **5.2 Vegetation Typing**

Vegetation typing is required once during each census "rotation". In 2015 the wetland area was scheduled to be flown and new air photos produced. In consultation with BC

Hydro the planned 2015 photos were deferred to 2016. This was a result of changes internally at BC Hydro and new staff becoming familiar with the project. The wetland area is scheduled to be flown in July 2016 followed by the vegetation typing and ground truthing of the vegetation polygons. Vegetation surveys completed in 2016, are still within the third survey rotation timeframe.

## **6.0 Conclusion**

In conclusion, the 2015/2016-sample season was considered a success. Components of the repeated wildlife use-monitoring program have yielded data within the wetland complex and identified polygons.

## **7.0 Recommendations**

- The Year-2 census in the “Third Rotation” of the wildlife use monitoring has been successfully completed. Continued use of study transects and vegetation typing should remain unchanged and the third year of this rotation should be completed in 2016/2017.
- In 2015, the wetland area was not flown, producing recent air photos for vegetation typing. In 2016 the area should be flown targeting the same area photographed in 2010.

## **8.0 References**

- Bates, D.J. 2007. Clowhom Lake Water Use Plan - Clowhom Lake wildlife census - Year 1. Resource Management Department, shíshálh Nation, Sechelt, BC.
- Bates, D.J. 2008. Clowhom Lake Water Use Plan - Clowhom Lake wildlife census - Year 2. Resource Management Department, shíshálh Nation, Sechelt, BC.
- BC Hydro, 2005. Clowhom Lake Water Use Plan - Monitoring Program Terms of Reference. BC Hydro, Burnaby, BC.

## **9.0 Appendices**

Appendix 1. Data collected from wildlife census in 2015 and 2016.

**CLOWHOM WILDLIFE SURVEY****Date**

15/05/2015 (i.e., 15 May 2015)

**Weather**

Cloud Cover: 100; Precipitation: None; Wind: 0 (absent).

**Site Conditions**

Lake/reservoir level low to very low (photos). Streams running through upper part of forest were dry and lower streams had minimal water. Patches of standing water present in flat wetland/lake transition area. Portion of plants in wetland area in flower. Lots of no-see-ums flying.

**Surveyors**

Greg Ferguson, Jerry Johnson

**Time Started**

5:59 AM

**Time Finished**

9:19 AM

**Sunrise**

5:27 AM

**Temperature**

14 °C

**TRANSECT 1 (T1A TO T1B) RUNS EAST/WEST****Species and Number/Habitat ()****Habitat**

|                                               |                                                                                                                                                  |  | <b>Time Start: 5:59 Time Finish: 6:55</b> |
|-----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|--|-------------------------------------------|
|                                               |                                                                                                                                                  |  | <b>Observation of behaviour</b>           |
| Surveyors                                     | Greg Ferguson, Jerry Johnson                                                                                                                     |  |                                           |
| Time Started                                  | 5:59 AM                                                                                                                                          |  | Calling                                   |
| Time Finished                                 | 9:19 AM                                                                                                                                          |  |                                           |
| Sunrise                                       | 5:27 AM                                                                                                                                          |  |                                           |
| Temperature                                   | 14 °C                                                                                                                                            |  |                                           |
| <b>TRANSECT 1 (T1A to T1B) Runs East/West</b> |                                                                                                                                                  |  |                                           |
| <b>Species and Number/Habitat ()</b>          |                                                                                                                                                  |  |                                           |
| Pacific Wren (1, 2)                           | Second growth forest ~20m tall, brushed, sloped, dry (spruce, hemlock, cedar), Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage |  | Calling                                   |
| Chestnut-backed Chickadee (1, 1)              | Second growth forest ~20m tall, brushed, sloped, dry (spruce, hemlock, cedar), Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage |  | Calling                                   |
| Stellars Jay (1, 2)                           | Second growth forest ~20m tall, brushed, sloped, dry (spruce, hemlock, cedar), Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage |  | Singing, calling                          |
| Cyanide Millipede (1)                         | Second growth forest ~20m tall, brushed, sloped, dry (spruce, hemlock, cedar)                                                                    |  | Visual                                    |
| American Robin (1)                            | Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage                                                                                |  | Calling                                   |
| Ruffed Grouse (1)                             | Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage                                                                                |  | Scat on log (photo)                       |
| Golden-crowned Kinglet (1)                    | Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage                                                                                |  | Calling                                   |
| Hairy Woodpecker (1)                          | Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage                                                                                |  | Drumming, calling, visual (male)          |
| Sparrow (3) Common                            | Flat wetland/lake transition zone (bog orchid, sphagnum, bog cranberry)                                                                          |  | Singing, calling                          |
| Yellowthroat (2)                              | Flat wetland/lake transition zone (bog orchid, sphagnum, bog cranberry)                                                                          |  | Calling                                   |
| Sparrow (1)                                   | Flat wetland/lake transition zone (bog orchid, sphagnum, bog cranberry)                                                                          |  | Calling                                   |
| Tree Swallow (6)                              | Flat wetland/lake transition zone (bog orchid, sphagnum, bog cranberry)                                                                          |  | Calling, visual. Flying and perched.      |
| Northern Flicker (1)                          | Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage                                                                                |  | Calling                                   |
| Yellow-rumped Warbler (1)                     | Flat wetland/lake transition zone (bog orchid, sphagnum, bog cranberry)                                                                          |  | Flying, calling                           |
| Vaux's Swift (6)                              | Flat wetland/lake transition zone (bog orchid, sphagnum, bog cranberry) and Lake                                                                 |  | Flying, calling, visual                   |
| Mallard (4)                                   | Lake                                                                                                                                             |  | Visual                                    |
| White-crowned Sparrow (1)                     | Flat wetland/lake transition zone (bog orchid, sphagnum, bog cranberry)                                                                          |  | Calling, visual                           |

**TRANSECT 2 (T2A to T2B) RUNS NORTH/SOUTH****Species and Number/Habitat ()****Habitat**

|                    |                                                                   | <b>Time Start: 6:56 Time Finish: 7:31</b>            |
|--------------------|-------------------------------------------------------------------|------------------------------------------------------|
|                    |                                                                   | <b>Observation of behaviour</b>                      |
| American Robin (3) | Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage | Visual                                               |
| Mallard (1)        | Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage | Visual, calling. Female nesting with 9 eggs (photos) |
| Song Sparrow (2)   | Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage | Calling, visual                                      |

|                               |                                                                                                                                               |                                         |
|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|
| Harry Woodpecker (1)          | Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage                                                                             | Drumming. Same bird as one seen before. |
| Common Raven (2)              | Flat wetland/lake transition zone (bog orchid, sphagnum, bog cranberry) and Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage | Calling, flying                         |
| European Slug (1)             | Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage                                                                             | Visual                                  |
| Roosevelt Elk (1)             | Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage                                                                             | Tracks, scat, bed                       |
| Red-breasted Sapsucker (1)    | Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage                                                                             | Feeding. Fresh sap wells in conifer.    |
| Rufous Hummingbird (1)        | Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage                                                                             | Visual, feeding                         |
| Yellow-rumped Warbler (1)     | Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage                                                                             | Singing                                 |
| Black Bear (1)                | Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage                                                                             | Scat                                    |
| Western Tanager (1)           | Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage                                                                             | Singing                                 |
| Varied Thrush (1)             | Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage                                                                             | Singing                                 |
| Stellar's Jay (1)             | Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage                                                                             | Calling, flying                         |
| Pacific-sloped Flycatcher (1) | Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage                                                                             | Singing                                 |
| Golden-crowned Kinglet (1)    | Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage                                                                             | Singing                                 |

#### Transect 4 (T4B to T4A) Runs East/West

| Species and Number/Habitat ()                                                                                       | Habitat                                                                                                                                                                                                                                                                                                                                                           | Observation of behaviour                                                        |
|---------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|
| Black Bear (1)                                                                                                      | Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage                                                                                                                                                                                                                                                                                                 | Scat                                                                            |
| American Robin (4) Pacific-slope Flycatcher (2) Douglas Squirrel (1) Yellow-rumped Warbler (1) Roosevelt Elk (1, 1) | Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage<br>Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage<br>Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage<br>Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage<br>Second growth forest ~20m tall, brushed, sloped, dry (spruce, hemlock, cedar) | Calling<br>Calling<br>Singing<br>Calling<br>Calling<br>Tracks, feeding (spring) |

| Species and Number/Habitat () | Habitat                                                                                                                                          | Observation of behaviour |
|-------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| Variety Thrush (1)            | Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage                                                                                | Calling                  |
| Western Wood-pewee (1)        | Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage                                                                                | Calling                  |
| Pacific Wren (3)              | Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage                                                                                | Calling                  |
| Ruffed Grouse (1)             | Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage                                                                                | Scat                     |
| Banana Slug (1, 1)            | Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage, Second growth forest ~20m tall, brushed, sloped, dry (spruce, hemlock, cedar) | Visual                   |
| Chestnut-backed Chickadee (1) | Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage                                                                                | Calling                  |
| Warbling Vireo (1)            | Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage                                                                                | Singing                  |

#### Transect 5 (T5A to T5B) Runs North/South

| Species and Number/Habitat () | Habitat                                                                       | Observation of behaviour |
|-------------------------------|-------------------------------------------------------------------------------|--------------------------|
| Banana Slug (1)               | Second growth forest ~20m tall, brushed, sloped, dry (spruce, hemlock, cedar) | Visual                   |
| Ruffed Grouse (1)             | Second growth forest ~20m tall, brushed, sloped, dry (spruce, hemlock, cedar) | Dead (photos)            |
| Warbling Vireo (1)            | Second growth forest ~20m tall, brushed, sloped, dry (spruce, hemlock, cedar) | Calling                  |
| Chestnut-backed Chickadee (1) | Second growth forest ~20m tall, brushed, sloped, dry (spruce, hemlock, cedar) | Calling                  |

#### Transect 3 (T3A to T3B) Runs West/East

Time Start: 8:42 Time Finish: 9:19

| Species and Number/Habitat ()  | Habitat                                                                                                                                             | Observation of behaviour                                                                                               |
|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| Cassin's Vireo (1)             | Second growth forest ~20m tall, brushed, sloped, dry (spruce, hemlock, cedar)                                                                       | Singing                                                                                                                |
| Red Crossbill (2)              | Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage                                                                                   | Calling, flying                                                                                                        |
| Banana Slug (2)                | Second growth forest ~20m tall, brushed, sloped, dry (spruce, hemlock, cedar)                                                                       | Visual                                                                                                                 |
| Black Bear (1)                 | Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage and Second growth forest ~20m tall, brushed, sloped, dry (spruce, hemlock, cedar) | Scat                                                                                                                   |
| Golden-crowned Kinglet (1)     | Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage                                                                                   | Calling                                                                                                                |
| American Robin (2)             | Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage                                                                                   | Calling                                                                                                                |
| Douglas Squirrel (1)           | Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage                                                                                   | Visual                                                                                                                 |
| Roosevelt Elk (1)              | Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage                                                                                   | Tracks                                                                                                                 |
| Snowshoe Hare (1)              | Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage                                                                                   | Scat (photos)                                                                                                          |
| European Slug (1)              | Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage                                                                                   | Visual                                                                                                                 |
| Yellow-rumped Warbler (1)      | Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage                                                                                   | Singing                                                                                                                |
| Rufous Hummingbird (1)         | Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage                                                                                   | Calling                                                                                                                |
| Black-tailed Deer (1)          | Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage                                                                                   | Scat                                                                                                                   |
| Barn Swallow (1)               | Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage and Lake                                                                          | Visual, flying                                                                                                         |
| Violet-green Swallow (1)       | Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage and Lake                                                                          | Visual, flying                                                                                                         |
| Red-winged Blackbird (1)       | Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage                                                                                   | Visual, calling. Female.                                                                                               |
| <b>Total Number of Species</b> | <b>37</b>                                                                                                                                           | <b>Note:</b> Includes all sign: feeding, scat, tracks, hair, calling, etc.                                             |
| <b>Species List</b>            |                                                                                                                                                     | <b>Additional Note:</b> Some individual species observed on transects were likely repeat sightings on other transects. |
| Pacific Wren                   |                                                                                                                                                     |                                                                                                                        |
| Chestnut-backed Chickadee      |                                                                                                                                                     |                                                                                                                        |
| Stellar's Jay                  |                                                                                                                                                     |                                                                                                                        |
| Cyanide Millipede              |                                                                                                                                                     |                                                                                                                        |
| American Robin                 |                                                                                                                                                     |                                                                                                                        |
| Ruffed Grouse                  |                                                                                                                                                     |                                                                                                                        |
| Golden-crowned Kinglet         |                                                                                                                                                     |                                                                                                                        |
| Hairy Woodpecker               |                                                                                                                                                     |                                                                                                                        |
| Song Sparrow                   |                                                                                                                                                     |                                                                                                                        |
| Common Yellowthroat            |                                                                                                                                                     |                                                                                                                        |
| Savanna Sparrow                |                                                                                                                                                     |                                                                                                                        |
| Tree Swallow                   |                                                                                                                                                     |                                                                                                                        |
| Northern Flicker               |                                                                                                                                                     |                                                                                                                        |
| Yellow-rumped Warbler          |                                                                                                                                                     |                                                                                                                        |
| Vaux's Swift                   |                                                                                                                                                     |                                                                                                                        |
| Mallard                        |                                                                                                                                                     |                                                                                                                        |
| White-crowned Sparrow          |                                                                                                                                                     |                                                                                                                        |
| Common Raven                   |                                                                                                                                                     |                                                                                                                        |
| European Slug                  |                                                                                                                                                     |                                                                                                                        |
| Roosevelt Elk                  |                                                                                                                                                     |                                                                                                                        |

Red-breasted Sapsucker  
 Rufous Hummingbird  
 Black Bear  
 Western Tanager  
 Varied Thrush  
 Pacific-slope Flycatcher  
 Douglas Squirrel  
 Western Wood-peewee  
 Banana Slug

Warbling Vireo  
 Cassin's Vireo  
 Red Crossbill  
 Snowshoe Hare  
 Black-tailed Deer  
 Barn Swallow  
 Violet-green Swallow  
 Red-winged Blackbird

| Total Number of Species by Habitat Type                                                                        |                                                                                                                                          |
|----------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| Number of Species                                                                                              | Habitat Type                                                                                                                             |
| 10                                                                                                             | Second growth forest ~20m tall, brushed, sloped, dry (spruce, hemlock, Upland mixed deciduous/coniferous forest (hemlock, cedar, maple)) |
| 0                                                                                                              | Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage                                                                        |
| 30                                                                                                             | Flat wetland/lake transition zone (bog orchid, sphagnum, bog cranberry)                                                                  |
| 8                                                                                                              | Lake                                                                                                                                     |
| 4                                                                                                              |                                                                                                                                          |
| <b>Other Species Observed or Reported in Area (i.e., greater than 100m from plot area or not on transects)</b> |                                                                                                                                          |
| Sooty Grouse (1)                                                                                               | Second growth forest ~20m tall, brushed, sloped, dry (spruce, hemlock, cedar)                                                            |
| Townsend's Warbler (1)                                                                                         | Second growth forest ~20m tall, brushed, sloped, dry (spruce, hemlock, cedar)                                                            |
| Black-headed Grosbeak (1)                                                                                      | Second growth forest ~20m tall, brushed, sloped, dry (spruce, hemlock, cedar)                                                            |
| Spotted Sandpiper (1)                                                                                          | Lake                                                                                                                                     |
| Common Yellowthroat (1)                                                                                        | Lake                                                                                                                                     |
| Canada Goose (7)                                                                                               | Lake                                                                                                                                     |
| MacGillivray's Warbler (2)                                                                                     | Second growth forest ~20m tall, brushed, sloped, dry (spruce, hemlock, cedar)                                                            |
| Orange-crowned Warbler (1)                                                                                     | Second growth forest ~20m tall, brushed, sloped, dry (spruce, hemlock, cedar)                                                            |
|                                                                                                                | Singing along road west of transect 1                                                                                                    |
|                                                                                                                | Singing south of transect 1                                                                                                              |
|                                                                                                                | Calling southeast of transect 2                                                                                                          |
|                                                                                                                | Visual, calling southeast of transect 2                                                                                                  |
|                                                                                                                | Singing along road, west of transect 5                                                                                                   |
|                                                                                                                | Calling/Singing west of transect 5                                                                                                       |
|                                                                                                                | Singing south of transect of 1                                                                                                           |
|                                                                                                                | Singing on east side of reservoir                                                                                                        |

**Clowhom Wildlife Survey**

|                 |                                                                                                                                                                                                        |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Date            | 18/10/2015 (i.e., 18 October 2015)                                                                                                                                                                     |
| Weather         | Cloud Cover: 100; Precipitation: None; Wind: 0 (absent). Low cloud present throughout survey with visibility at lake approximately 300-400m.                                                           |
| Site Conditions | Lake/reservoir level high (photos). Streams running through upper part of forest were dry and lower streams had moderate water. Patches of standing water present in flat wetland/lake transition area |
| Surveyors       | Greg Ferguson, Jerry Johnson                                                                                                                                                                           |
| Time Started    | 8:05 AM                                                                                                                                                                                                |
| Time Finished   | 10:40 AM                                                                                                                                                                                               |
| Sunrise         | 7:41 AM                                                                                                                                                                                                |
| Temperature     | 14 °C                                                                                                                                                                                                  |

**Transect 1 (T1A to T1B) Runs East/West****Species and Number/Habitat 0****Habitat**

Pacific Wren (1, 2)

Second growth forest ~20m tall, brushed, sloped, dry (spruce, hemlock, cedar), Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage

Golden-crowned Kinglet (2, 2)

Second growth forest ~20m tall, brushed, sloped, dry (spruce, hemlock, cedar), Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage

Chestnut-backed Chickadee (1)

Second growth forest ~20m tall, brushed, sloped, dry (spruce, hemlock, cedar)

Roosevelt Elk (1, 1)

Second growth forest ~20m tall, brushed, sloped, dry (spruce, hemlock, cedar), Flat wetland/lake transition zone (bog orchid, sphagnum, bog cranberry)

Banana Slug (1)

Upland mixed deciduous/coniferous forest (hemlock, cedar, maple)

Robust Lancetooth Snail (1)

Upland mixed deciduous/coniferous forest (hemlock, cedar, maple)

Douglas Squirrel (1)

Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage

Mallard (50)

Lake

Belted Kingfisher (1)

Lake

Bald Eagle (1)

Lake

Stellar's Jay (1)

Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage

Song Sparrow (2)

Flat wetland/lake transition zone (bog orchid, sphagnum, bog cranberry)

Downy Woodpecker (1)

Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage

Great Blue Heron (1)

Lake

Common Merganser (1)

Lake

**Time Start: 8:05 Time Finish: 8:55****Observation of behaviour**

Calling, visual

Calling

Calling

Rub, wallow (looks to be from summer)

Calling

Sharp-shinned Hawk (1) Visual. Juvenile perched on dead topped tree hunting.

Roosevelt Elk (2) Rub, tracks, scat, beds (8)

Stellars Jay (2) Visual, calling

Flat mixed deciduous/coniferous wetland forest with Skunk

Cabbage

Flat wetland/lake tranistion zone (bog orchid, sphagnum, bog

cranberry)

Flat mixed deciduous/coniferous wetland forest with Skunk

Cabbage

Flat mixed deciduous/coniferous wetland forest with Skunk

Cabbage

Flat mixed deciduous/coniferous wetland forest with Skunk

Cabbage

Flat mixed deciduous/coniferous wetland forest with Skunk

Lake

Calling. On east side of lake.

#### Transect 4 (T4B to T4A) Runs East/West

| <u>Species and Number/Habitat ()</u> | <u>Habitat</u>                                            | <u>Time Start: 9:21 Time Finish: 9:50</u> |
|--------------------------------------|-----------------------------------------------------------|-------------------------------------------|
|                                      |                                                           | <u>Observation of behaviour</u>           |
| Pacific Wren (3)                     | Flat mixed deciduous/coniferous wetland forest with Skunk | Calling                                   |
|                                      | Cabbage                                                   |                                           |
| Song Sparrow (2)                     | Flat mixed deciduous/coniferous wetland forest with Skunk | Calling, visual                           |
|                                      | Cabbage                                                   |                                           |
| Banana Slug (2)                      | Flat mixed deciduous/coniferous wetland forest with Skunk | Visual. One was all white                 |
|                                      | Cabbage                                                   |                                           |
| Douglas Squirrel (1)                 | Flat mixed deciduous/coniferous wetland forest with Skunk | Calling                                   |
|                                      | Cabbage                                                   |                                           |
| Roosevelt Elk (1)                    | Flat mixed deciduous/coniferous wetland forest with Skunk | Rubs (4), tracks                          |
|                                      | Cabbage                                                   |                                           |

#### Transect 5 (T5A to T5B) Runs North/South

| <u>Species and Number/Habitat ()</u> | <u>Habitat</u>                                                               | <u>Time Start: 9:51 Time Finish: 10:10</u> |
|--------------------------------------|------------------------------------------------------------------------------|--------------------------------------------|
|                                      |                                                                              | <u>Observation of behaviour</u>            |
| Varied Thrush (1)                    | Second growth forest ~20m tall, brushed, sloped, dry (spruce, hemlo) Calling |                                            |

#### Transect 3 (T3A to T3B) Runs West/East

| <u>Species and Number/Habitat ()</u> | <u>Habitat</u>                                            | <u>Time Start: 10:11 Time Finish: 10:40</u> |
|--------------------------------------|-----------------------------------------------------------|---------------------------------------------|
|                                      |                                                           | <u>Observation of behaviour</u>             |
| Pacific Wren (1)                     | Flat mixed deciduous/coniferous wetland forest with Skunk | Calling                                     |
| Black-tailed Deer (2)                | Flat mixed deciduous/coniferous wetland forest with Skunk | Tracks, scat                                |
| American Robin (1)                   | Flat mixed deciduous/coniferous wetland forest with Skunk | Calling                                     |
| Roosevelt Elk (1)                    | Flat mixed deciduous/coniferous wetland forest with Skunk | Calling                                     |
| Northern Flicker (1)                 | Flat mixed deciduous/coniferous wetland forest with Skunk | Visual                                      |
| Golden-crowned Kinglet (4)           | Flat mixed deciduous/coniferous wetland forest with Skunk | Calling, visual                             |
| Varied Thrush (1)                    | Flat mixed deciduous/coniferous wetland forest with Skunk | Visual                                      |

#### Total Number of Species

**22**

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

**Additional Note:** Some individual species observed on transects were likely repeat sightings on other transects.

Pacific Wren  
Golden-crowned Kinglet  
Chestnut-backed Chickadee  
Roosevelt Elk  
Banana Slug  
Robust Lancetooth Snail

Douglas Squirrel  
 Mallard  
 Belted Kingfisher  
 Bald Eagle  
 Stellar's Jay  
 Song Sparrow  
 Downy Woodpecker  
 Great Blue Heron  
 Common Merganser  
 Sharp-shinned Hawk  
 Northern Flicker  
 Tree Frog  
 Song Sparrow  
 Varied Thrush  
 Black-tailed Deer  
 American Robin

| Total Number of Species by Habitat Type |  |                                                                                                                                 |
|-----------------------------------------|--|---------------------------------------------------------------------------------------------------------------------------------|
| Number of Species                       |  | Habitat Type                                                                                                                    |
| 5                                       |  | Second growth forest ~20m tall, brushed, sloped, dry (spruce, Upland mixed deciduous/coniferous forest (hemlock, cedar, maple)) |
| 2                                       |  | Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage                                                               |
| 13                                      |  | Flat wetland/lake transition zone (bog orchid, sphagnum, bog cranberry)                                                         |
| 2                                       |  | Lake                                                                                                                            |
| 6                                       |  | <b>Other Species Observed or Reported in Area (i.e., greater than 100m from plot area or not on transects)</b>                  |

**Clowhom Wildlife Survey**

|                 |                                                                 |
|-----------------|-----------------------------------------------------------------|
| Date            | 15/01/2016 (i.e., 15 January 2016)                              |
| Weather         | Cloud Cover: 0; Precipitation: None; Wind: 0 (absent).          |
| Site Conditions | Lake/reservoir level high (photos) and upper layer of water was |
| Surveyors       | Greg Ferguson, Jerry Johnson                                    |
| Time Started    | 8:30 AM                                                         |
| Time Finished   | 10:40 AM                                                        |
| Sunrise         | 8:05 AM                                                         |
| Temperature     | Minus 1 °C                                                      |

**Transect 1 (T1A to T1B) Runs East/West**

| Species and Number/Habitat () | Habitat                                                           |
|-------------------------------|-------------------------------------------------------------------|
| Roosevelt Elk (1, 1)          | Second growth forest ~20m tall, brushed, sloped, dry (spruce,     |
| Golden-crowned Kinglet (3)    | Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage |

**Transect 2 (T2A to T2B) Runs North/South**

| Species and Number/Habitat () | Habitat                                                      |
|-------------------------------|--------------------------------------------------------------|
| Roosevelt Elk (1-2)           | Flat wetland/lake tranistion zone (bog orchid, sphagnum, bog |

**Transect 4 (T4B to T4A) Runs East/West**

| Species and Number/Habitat () | Habitat                                                           |
|-------------------------------|-------------------------------------------------------------------|
| Hairy Woodpecker (1)          | Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage |
| Varied Thrush (2)             | Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage |
| Roosevelt Elk (1)             | Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage |
| Golden-crowned Kinglet (2)    | Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage |
| Douglas Squirrel (1)          | Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage |

**Transect 5 (T5A to T5B) Runs North/South**

| Species and Number/Habitat () | Habitat                                                       |
|-------------------------------|---------------------------------------------------------------|
| Song Sparrow (1)              | Second growth forest ~20m tall, brushed, sloped, dry (spruce, |

**Transect 3 (T3A to T3B) Runs West/East**

| Species and Number/Habitat () | Habitat                                                           |
|-------------------------------|-------------------------------------------------------------------|
| Douglas Squirrel (1)          | Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage |
| Roosevelt Elk (1)             | Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage |
| Pacific Wren (1)              | Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage |
| Ruffed Grouse (1)             | Upland mixed deciduous/coniferous forest (hemlock, cedar, maple)  |

**Total Number of Species**

**8**  
Note: Includes all sign, feeding, scat, tracks, hair, calling, etc.

**Additional Note:** Some individual species observed on transects were likely repeat sightings on other transects.

|                        |  |
|------------------------|--|
| Roosevelt Elk          |  |
| Golden-crowned Kinglet |  |
| Hairy Woodpecker       |  |
| Varied Thrush          |  |
| Song Sparrow           |  |

| Douglas Squirrel                               |                                                                                                                                |
|------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| Pacific Wren                                   |                                                                                                                                |
| Ruffed Grouse                                  |                                                                                                                                |
| <b>Total Number of Species by Habitat Type</b> |                                                                                                                                |
| Number of Species                              | Habitat Type                                                                                                                   |
| 2                                              | Second growth forest ~20m tall, brushed, sloped, dry (spruce, Upland mixed deciduous/coniferous forest (hemlock, cedar, maple) |
| 1                                              | Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage                                                              |
| 6                                              | Flat wetland/lake transition zone (bog orchid, sphagnum, bog cranberry)                                                        |
| 1                                              | Lake                                                                                                                           |
| 0                                              |                                                                                                                                |

**Other Species Observed or Reported in Area (i.e., greater than 100m from plot area or not on transects)**