Clowhom Project Water Use Plan

Monitor of Aquatic Wildlife in Wetlands Affected by Dam Operations

Implementation Year 7

Reference: COMMON-1

Clowhom Lake Wildlife Census

Study Period: April 2012 to March 2013

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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 during this study period is presented in this report and will be submitted to BC Hydro for inclusion in a master database and future analysis.

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1.0 Introduction

In 2012/2013, the shíshálh First Nation and BC Hydro completed the 7th 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 3rd year of the second "rotation" of the survey cycle. Each "rotation" consists of a 4-year period.

As in previous years, the wetland complex continues to be affected by changes in reservoir levels due to hydroelectric operations and reservoir management at the 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. The intent is to relate use, and any subsequent change in use to the operations of the reservoir.

This report presents the results of the 2012/2013 sampling season, discusses challenges and success encountered, and where appropriate provides recommendations for the next sampling year.

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, 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. Average annual temperature is 8˚C. As is past years, the study area is back-flooded cyclically by Clowhom Lake 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. This vegetation cover has been unaltered since the census began in 2006. Details of the vegetation polygons were originally summarized and 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. The census area was predetermined and is referenced in *Bates* (2007). The census is conducted mid to late month, and is completed within 1 to 3 hours after sunrise over a one day period.

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

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

Data collection relies on wildlife sounds and observed use.

Two to three censuses are conducted each year during different months. The sample months are pre-determined using a seasonal rotating schedule. 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 in a cost effective manner. Over the 20-year study duration, a total of five wildlife censuses are expected for each month of the year, allowing for the comparison of monthly data over multiple years.

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

Table 1. Schedule of the second rotation for the wildlife census to be completed for the Clowhom Lake wetland complex (schedule altered following 2011/2012 season).

Census Number	**Year (Rotation 2)**			
	1 (2010/2011)	2 (2011/2012)	3 (2012/2013)	4 (2013/2014)
1	June	July	August	April
2	October	November	December	September
3	January	March		March

3.2 Data Entry

Wildlife data is entered into an Excel spreadsheet for future analysis. The format remains the same each year and is based on the 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 is collected on the general vegetation community type and associated structure for the location of detection (*Bates*, 2008).

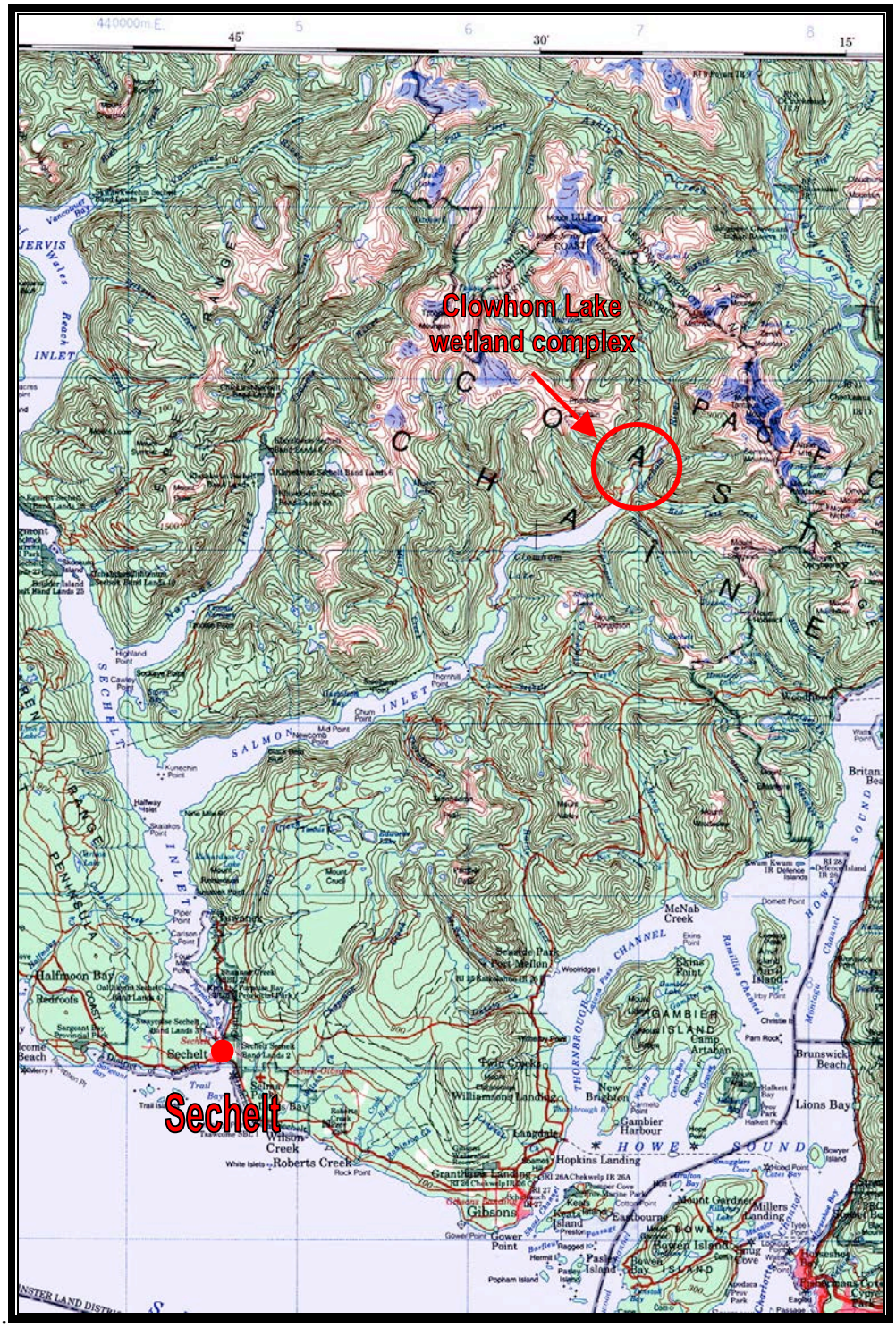

Figure 1: Location of Clowhom Lake wetland complex census area. The study area was established in 2006 and remains unchanged.

4.0 Results

4.1 Wildlife Census

Two wildlife censuses were conducted in 2012/2013: August 12 and December 16, 2012. The data is included in the attached Appendices (**Appendix 1**).

5.0 Discussion

5.1 Wildlife Census

The 2012/2013 wildlife censuses proved successful and the protocols followed will remain the same for the 2012/2013 census.

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. The change in timing resulted from difficulty in accessing the site during winter months. It is not anticipated that the shift to dates later in each month will have any effect ion the final outcome. Efforts are made, wherever possible to maintain the approximate sample date.

In addition to a slight change in timing of survey each month a change in the sequence of months sampled occurred in 2012/2013. This change was also required following poor weather and difficulty in accessing the sample wetland. The result was a realignment of the month sampled and adjustment to the present and future schedule.

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 and remains the same individual that started the project in 2006) and technician continues to allow capacity building among the technical staff. It is anticipated that the crew will remain the same for the completion of the second "rotation" and that techniques and methodology will remain unchanged.

6.0 Conclusion

In conclusion, the 2012/2013-sample season was considered a success. Components of the wildlife use-monitoring program have yielded data within the wetland complex and identified polygons.

7.0 Recommendations

The Year-3 census in the second "Rotation" of the wildlife use monitoring has been successfully completed. Continued use of study transects and vegetation typing has remained unchanged in 2012/2013.

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 2012 and 2013.

Clowhom Wildlife Survey	
Date	12/08/2012 (i.e., 12 August 2012)
Weather	Cloud Cover: 0%; Precipitation: none; Wind: 0 (absent).
Site Conditions	Lake/reservior level low (little water in channel east of survey area). Streams running through forest and wetland were low. Wetland still moist.
Surveyors	Greg Ferguson, Peter Jackson
Time Started	7:00 AM
Time Finished	9:30 AM
Sunrise	6:00 AM
Temperature (Sechelt)	18 ˚C

Transect 1 (T1A to T1B) Runs East/West		**Time Start: 7:00 Time Finish: 7:30**
Species and Number/Habitat ()	**Habitat**	**Observation of behaviour**
Stellar's Jay (3)	Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage	Calling, visual
Douglas Squirrel (1)	Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage	Calling, bark stripping
Paperwasp (1)	Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage	Nest, visual
Cedar Waxwing (1)	Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage	Calling
Red Crossbill (1)	Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage	Calling
Northern Flicker (2)	Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage	Calling, drumming
Roosevelt Elk (1)	Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage	Tracks

Transect 2 (T2A to T2B) Runs North/South		**Time Start: 7:30 Time Finish: 8:15**
Species and Number/Habitat ()	**Habitat**	**Observation of behaviour**
Stellar's Jay (2) Same as T1	Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage	Visual, flying
Grouse Sp. (1)	Flat wetland/lake tranistion zone (bog orchid, sphagnum, bog cranberry)	Scat (Sooty Grouse seen on road when leaving site)
Common Raven (2)	Flat wetland/lake tranistion zone (bog orchid, sphagnum, bog cranberry)	Visual, calling
Bobcat (1)	Flat wetland/lake tranistion zone (bog orchid, sphagnum, bog cranberry)	Scat - too small for cougar, bird killed in immediate area likely by bobcat
Rufuos Hummingbird (1)	Flat wetland/lake tranistion zone (bog orchid, sphagnum, bog cranberry)	Visual
Columbian Black-tailed Deer (2)	Flat wetland/lake tranistion zone (bog orchid, sphagnum, bog cranberry)	Tracks
Bald Eagle (1)	Flat wetland/lake tranistion zone (bog orchid, sphagnum, bog cranberry)	Feathers
Mallard (1)	Lake	Calling from water
Chocolate Arion (1)	Flat wetland/lake tranistion zone (bog orchid, sphagnum, bog cranberry)	Visual
Northern Flicker (2) Same as T1	Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage	Calling
Douglas Squirrel (2)	Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage	Calling, feeding
Cedar Waxwing (1)	Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage	Calling
Unknown Small Mammal (1)	Flat wetland/lake tranistion zone (bog orchid, sphagnum, bog cranberry)	Tracks
Belted Kingfisher (1)	Lake	Calling, flying over water
Merlin (1)	Lake	Flying over water
Cedar Waxwing (4)	Flat wetland/lake tranistion zone (bog orchid, sphagnum, bog cranberry)	Calling, flying, feeding
Yellow Warbler (1)	Flat wetland/lake tranistion zone (bog orchid, sphagnum, bog cranberry)	Calling
Savanna Sparrow (1)	Flat wetland/lake tranistion zone (bog orchid, sphagnum, bog cranberry)	Calling
Violet-green Swallow (2)	Lake	Visual, flying over water
American Robin (2)	Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage	Visual, calling, flying
Pacific-sloped Flycatcher (1)	Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage	Calling

Transect 4 (T4B to T4A) Runs East/West		**Time Start: 8:15 Time Finish: 8:45**
Species and Number/Habitat ()	**Habitat**	**Observation of behaviour**
Stellar's Jay (2) Same as T1	Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage	Visual
Douglas Squirrel (1) Same as T1	Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage	Calling
Western Tanager (2)	Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage	Visual, calling
Golden-crowned Kinglet (1)	Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage	Calling
Banana Slug (2)	Second growth forest ~20m tall, brushed, sloped, dry (spruce, hemlock, cedar)	Visual
Roosevelt Elk (1) Likely same as T1	Second growth forest ~20m tall, brushed, sloped, dry (spruce, hemlock, cedar)	Tracks

Transect 5 (T5A to T5B) Runs North/South		**Time Start: 8:45 Time Finish: 9:00**
Species and Number/Habitat ()	**Habitat**	**Observation of behaviour**

Hammon's Flycatcher (1)	Second growth forest ~20m tall, brushed, sloped, dry (spruce, hemlock, cedar)	Calling
Columbian Black-tailed Deer (1) Likely same as T1	Second growth forest ~20m tall, brushed, sloped, dry (spruce, hemlock, cedar)	Tracks
Roosevelt Elk (1) Likely same as T1	Second growth forest ~20m tall, brushed, sloped, dry (spruce, hemlock, cedar)	Tracks
Common Loon (1)	Lake	Calling
Pacific Wren (1)	Second growth forest ~20m tall, brushed, sloped, dry (spruce, hemlock, cedar)	Calling

Transect 3 (T3A to T3B) Runs West/East		**Time Start: 9:00 Time Finish: 9:30**
Species and Number/Habitat ()	**Habitat**	**Observation of behaviour**
Blackbear (1)	Second growth forest ~20m tall, brushed, sloped, dry (spruce, hemlock, cedar)	Scat
Banana Slug (1)	Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage	Visual
Douglas Squirrel (1)	Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage	Calling
Chestnut-backed Chickadee (1)	Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage	Calling
Chestnut-backed Chickadee (1)	Flat wetland/lake tranistion zone (bog orchid, sphagnum, bog cranberry)	Calling, Visual

Total Number of Species	**31**	
Species List	Note: Includes all sign: feeding, scat, tracks, hair, calling, etc.	**Additional Note:** Some individual species observered on transects were likely repeat sightings on other transects.

Stellar's Jay
Douglas Squirrel
Paperwasp
Cedar Waxwing
Red Crossbill
Northern Flicker
Roosevelt Elk
Grouse Sp.
Common Raven
Bobcat
Rufuos Hummingbird
Columbian Black-tailed Deer
Bald Eagle
Mallard
Chocolate Arion
Belted Kingfisher
Merlin
Yellow Warbler
Savanna Sparrow
Violet-green Swallow
American Robin
Pacific-sloped Flycatcher
Western Tanager
Golden-crowned Kinglet
Banana Slug
Hammon's Flycatcher
Common Loon
Pacific Wren
Blackbear
Chestnut-backed Chickadee
Unknown Small Mammal (1)
Hairy Woodpecker

Total Number of Species by Habitat Type	
Number of Species	**Habitat Type**
6	Second growth forest ~20m tall, brushed, sloped, dry (spruce, hemlock, cedar)
13	Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage
12	Flat wetland/lake tranistion zone (bog orchid, sphagnum, bog cranberry)
4	Lake

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

Clowhom Wildlife Survey	
Date	16/12/2012 (i.e., 16 December 2012)
Weather	Cloud Cover: 100%; Precipitation: none; Wind: 0 (absent).
Site Conditions	Lake/reservior level low (very little water in channel east of survey area). Streams running through forest and wetland were moderate. Flat wetland/forest area was very moist with frequent pools of standing water. Approximately 2cm of snow on ground and on surrounding vegetation. Believed to have snowed previous day and was partly clear and cold at night as snow was frozen.
Surveyors	Greg Ferguson, Peter Jackson
Time Started	9:00 AM
Time Finished	10:50 AM
Sunrise	8:00 AM
Temperature	5 ˚C

Transect 1 (T1A to T1B) Runs East/West		**Time Start: 9:00 Time Finish: 9:25**
Species and Number/Habitat ()	**Habitat**	**Observation of behaviour**
Cougar (1)	Second growth forest ~20m tall, brushed, sloped, dry (spruce, hemlock, cedar)	Tracks (medium sized, near transect start - T1A)
Pacific Wren (1)	Second growth forest ~20m tall, brushed, sloped, dry (spruce, hemlock, cedar)	Calling
Golden-crowned Kinglet (1)	Second growth forest ~20m tall, brushed, sloped, dry (spruce, hemlock, cedar)	Calling

Transect 2 (T2A to T2B) Runs North/South		**Time Start: 9:30 Time Finish: 9:40**
Species and Number/Habitat ()	**Habitat**	**Observation of behaviour**
No species detected		

Transect 4 (T4B to T4A) Runs East/West		**Time Start: 9:45 Time Finish: 10:05**
Species and Number/Habitat ()	**Habitat**	**Observation of behaviour**
Roosevelt Elk (1)	Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage	Tracks (likely 3 weeks or older from a group of 3-5)

Transect 5 (T5A to T5B) Runs North/South		**Time Start: 10:10 Time Finish: 10:20**
Species and Number/Habitat ()	**Habitat**	**Observation of behaviour**
Columbian Black-tailed Deer (1)	Second growth forest ~20m tall, brushed, sloped, dry (spruce, hemlock, cedar)	Tracks (only two observed along dry creek channel)
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: 10:25 Time Finish: 10:50**
Species and Number/Habitat ()	**Habitat**	**Observation of behaviour**
Roosevelt Elk (1)	Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage	Tracks (single individual)

Total Number of Species	**5**	
Species List	Note: Includes all sign: feeding, scat, tracks, hair, calling, etc.	**Additional Note:** Some individual species observered on transects were likely repeat sightings on other transects.

Cougar
Pacific Wren
Golden-crowned Kinglet
Roosevelt Elk
Columbian Black-tailed Deer

Total Number of Species by Habitat Type	
Number of Species	**Habitat Type**
4	Second growth forest ~20m tall, brushed, sloped, dry (spruce, hemlock, cedar)
1	Flat mixed deciduous/coniferous wetland forest with Skunk Cabbage
0	Flat wetland/lake tranistion zone (bog orchid, sphagnum, bog cranberry)
0	Lake

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

None