Kwets'ootł'àà

Ecological Assessment of the

Kwets'ootł'àà Candidate Protected Area: Phase II

December 2011

Wek'èezhìi Renewable Resources Board

North Slave Metis Alliance

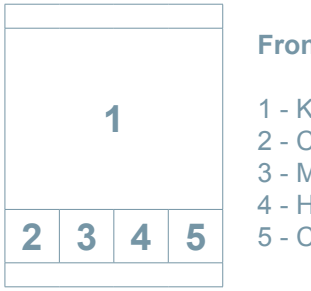
Northwest Territory Metis Nation

Aboriginal Affairs and Northern Development Canada / Affaires autochtones et Développement du Nord Canada

Northwest Territories Environment and Natural Resources

Northwest Territories Protected Areas Strategy

Environment Canada / Environnement Canada



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Ecological Assessment of the Kwets'ootł'àà Candidate Protected Area: Phase II

Prepared by:

Canadian Wildlife Service

Yellowknife, NT

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Executive Summary

Numerous partner organizations, including the Tłı̨chǫ Government, Wek'èezhìi Renewable Resources Board, Yellowknives Dene First Nation, North Slave Métis Alliance (NSMA) and multiple other stakeholders are working through the NWT Protected Areas Strategy (PAS) process for the Kwets'ootł'àà (*kwet-sowt-laa*) candidate protected area (CPA). The Canadian Wildlife Service (CWS; Environment Canada), in cooperation with the Kwets'ootł'àà Working Group, is overseeing the ecological assessment of the CPA as described in Step 5 of the PAS. This ecological assessment necessitates a detailed inventory of key ecological components of the Kwets'ootł'àà CPA to determine species richness and distribution. The assessment allows an evaluation of the area's contribution to the conservation of these components and processes at a regional and national level. The knowledge and understanding gained will also form the baseline for future management planning and monitoring for the area.

The Kwets'ootł'àà CPA covers 593 km^2 and is located at the northern tip of the North Arm of Great Slave Lake (GSL) in the Northwest Territories (NWT), Canada. It contains hundreds of rocky islands (<0.01 to 350 ha in size), and numerous bays with extensive, shallow wetlands. The area is bound to the north by Frank Channel and Mosquito Creek and by Boundary Creek and Whitebeach Point to the south. The Stagg River, Miller Creek, Boundary Creek and numerous other waterways flow into Kwets'ootł'àà. The land on the south-side of the North Arm represent the unique ecological characteristics of the Taiga Plains' Great Slave Plains High Boreal Ecoregion (281 km^2 within the CPA, 1.8% of ecoregion), while land to the north represents the Great Slave Lowland High Boreal Ecoregion portion of the Taiga Shield (312 km^2 within CPA, 2.8% of ecoregion) (Ecosystem Classification Group 2007; 2008, Wiken 1986). The more southern Taiga Plains has soft sedimentary rock, carved and smoothed by continental glaciers and eroded by glacial Lake McConnell, now covered with distinctive denser boreal forest. The Taiga Shield is dominated by open, stunted taiga forest and hundreds of lakes underlain by Precambrian granite sporadically covered by glacial tills and sediments (Mackenzie River Basin Board 2004). The elevation of the area ranges between 125 and 300 m above sea level. Most of the waters in the North Arm of GSL are shallow, <70 m deep (AECOM 2009), and water depth measurements within Kwets'ootł'àà range between 2 - 14 m (Rawson 1949; 1950; 1951). Kwets'ootł'àà CPA maintains a high water quality and associated aquatic resources of GSL. The study area covers three watersheds including the Westshore (290 km^2 within CPA, 2.5% of watershed), Snare (170 km^2 within CPA, 0.7% of watershed) and Yellowknife (133 km^2 within CPA, 0.6% of watershed) watersheds.

GSL is a relatively pristine ecosystem with low contaminant levels due to minimal anthropogenic impacts directly on the lake and on the lake's watershed (Evans et al. 1996). The waters are dominated by *Asterionella*, *Melosira* and *Tabellaria* diatoms (phytoplankton), *Keratella* rotifer and *Limnocalanus*, *Diaptomus*, and *Cyclops* copepods forms (zooplankton; Rawson 1956). These organisms, along with amphipod, nematodes, larvae and others are the main food source for many species of fish and birds that use the area.

Kwets'ootł'àà and the surrounding 200 km area contain 539 different plant species from 72 families, 29 fish species from 11 families, 33 species from 12 mammalian families and 223 species of bird from 46 families.

Kwets'ootl'a forests are composed of Jack Pine (*Pinus banksiana*), White Spruce (*Picea glauca*) and White Birch (*Betula papyrifera*) stands dominate moist areas, and Trembling Aspen (*Populus tremuloides*) are more abundant near the shores of GSL. Bog and fen vegetation covers wet areas in the region, and includes plants such as Black Spruce (*Picea mariana*), Labrador tea, ericaceous shrubs, and mosses. Sparse communities of Common bearberry (*Arctostaphylos uva-ursi*) and Shrubby cinquefoil (*Dasiphora fruticosa*) are found along low north-south ridges of till deposits and dense Variegated Pond Lily (*Nuphar variegata*) colonies can be found on shallow wetlands (Ecosystem Classification Group 2007).

Generally, the fish community is similar to that in the main lake, with Northern Pike (*Esox lucius*), White Sucker (*Catostomus commersonnii*) and Walleye (*Sander vitreus*) favoring the warmer shallow waters within Kwets'ootł'àà CPA.

Many mammals use the area for at least part of their annual cycle and include species such as Red Squirrel (*Tamiasciurus hudsonicus*), Common Muskrat (*Ondatra zibethicus*), Red Fox (*Vulpes vulpes*), Moose (*Alces americanus*), Boreal Woodland Caribou (*Rangifer tarandus caribou*), Wood Bison (*Bison bison athabascae*), and Wolverine (*Gulo gulo*).

Waterfowl, waterbirds, raptors and songbirds use the area as a migratory stopover, and for breeding and brood rearing. Migratory bird surveys were done specifically to aid in the ecological assessment of the CPA. In July 2010, 1,050 nests from six species of the *Laridae* family (gulls and terns) were found during ground surveys. Common and Arctic Terns (*Sterna hirundo* and *S. paradisaea*, respectively) were the most numerous nesting larids. Aerial waterfowl surveys were conducted in Kwets'ootł'àà during spring and autumn 2010. In the spring, a total of 13,000 individual waterfowl from 21 species were recorded including geese (primarily Canada and Cackling geese, *Branta Canadensis*, *B. hutchinsii*), swans (primarily Tundra Swans, *Cygnus columbianus*), and numerous duck species. Peak times for migration varied by bird group. Other avifauna were also observed during these surveys and included Bald Eagles (*Haliaeetus leucocephalus*), Horned Grebes (*Podiceps auritus*; COSEWIC – Special Concern), and Black Terns (*Chlidonias niger*; GNWT Status Ranking – Sensitive).

The ecological significance of the Kwets'ootł'àà candidate protected area includes a number of factors:

1. It supports Species At Risk listed under the federal Species At Risk Act (SARA) or assessed as being at risk by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). Boreal Woodland Caribou, Wood Bison (both SARA listed), Wolverine and Shortjaw Cisco (*Coregonus zenithicus*; both COSEWIC assessed) occur year-round. Common Nighthawk (*Chordeiles minor*), Yellow Rail (*Coturnicops noveboracensis*), Rusty Blackbird (*Euphagus carolinus*), Olive-sided Flycatcher (*Contopus cooperi*), Peregrine Falcon (*Falco peregrinus*; *anatum subspecies*; all SARA listed), Short-eared Owl (*Asio flammeus*), Horned Grebe, and Barn Swallow (*Hirundo rustica*; all COSEWIC assessed) are migratory, using the area seasonally (COSEWIC 2011). Kwets'ootå'àà is bound within an Important Bird Areas (IBA) Program site. The North Arm site (NT086, 3,100 km^2) has been internationally recognized as an area important to migrating and breeding birds.

2. Kwets'ootł'àà is partially situated within a BirdLife International Important Bird Areas (IBA) Program site. The North Arm site (NT086, 3,100 km^2) has been internationally recognized as an area important to migrating and breeding birds (IBA Canada 2010).

3. The North Arm has been identified by the Canadian Wildlife Service as a "Key Migratory Bird Terrestrial Habitat Site". The North Arm supports over 1% of the national populations of a number of migratory bird populations including Canada and Cackling geese, Tundra Swans and breeding Caspian Terns (*Hydroprogne caspia*). This area is also noted for its importance to numerous other migratory birds including many species of ducks, gulls and terns, marsh birds and birds of prey (Latour et al. 2008).

Kwets'ootł'àà contains an abundance of ecologically significant features including wetland, marsh and lake habitats, rare species, species at risk, pristine waters and landscapes, and high wildlife richness. With its high density of migratory birds, wealth of flora and fauna species, and its noteworthy species with special conservation status, Kwets'ootł'àà meets the requirements to become a National Wildlife Area.

Acknowledgements

Many people contributed to the success of this project:

- P. Woodard, T. Marsh, M. Wasiuta, C. Wood and M. Robertson (Canadian Wildlife Service – Yellowknife, NT) planned and collected data for the waterfowl and larid surveys.
- M. Rabesca of Behchokǫ̀ provided guiding services and participated in the larid surveys.
- Marshbird and species at risk playback surveys were performed by contractors (EBA Engineering) in 2011.
- Helicopter pilots, I. Hayne, M. Murray and K. Richards of Great Slave Helicopters provided flying expertise.
- E. Gah (GNWT ENR) provided assistance with the ecological representation of the candidate area.
- This report was written and edited by CWS Yellowknife staff: J.-F. Dufour, M. Fast, K. Kardynal, M. Robertson and C. Wood.

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Introduction

The Kwets'ootł'àà candidate protected area (CPA) encompasses 593 km^2 within the Wek'èezhìi region of the Northwest Territories (NWT) on the North Arm of Great Slave Lake (GSL; Tłı̨chǫ Land Claims and Self Government Agreement 2003, Figure 1). It is located southeast of the community of Behchokǫ̀ between 62° 27' N and 62° 46' N and 115° 09' W and 116° 03' W, centered at 62° 36' N and 115° 35' W.

The Canadian Wildlife Service (CWS), in cooperation with the Kwets'ootł'àà Working Group, is overseeing the ecological assessment of the Kwets'ootł'àà CPA as described in Step 5 of the Northwest Territories Protected Areas Strategy (The Northwest Territories Protected Areas Strategy Advisory Committee 1999). An ecological assessment requires a detailed account of a candidate protected area's key ecological components. This information is required to determine species richness and distribution to ensure that the candidate area captures the full range of successional stages, wildlife habitat, self-sustaining land and water systems, and sensitive or rare species. In this way, the candidate area's contribution to the conservation of these components and processes at a regional and national scale can be assessed. This information will also form the basis of future management planning and monitoring for the area.

Figure 1: The location of the Kwets'ootł'àà candidate protected area in the Northwest Territories.

Objectives

The purpose of ecological assessment, as set out in the NWT Protected Areas Strategy, is to: (1) assess the ecological value of candidate protected areas and to evaluate their ability to meet criteria set out in the Strategy and (2) ensure there is sufficient value in protecting the area as a National Wildlife Area (NWA). The ecological assessment guidelines (NWT PAS 2002) outline the following objectives:

- Provide an effective, timely and cost-efficient evaluation of the species diversity and habitat potential of the candidate protected areas.
- Improve the state of knowledge of ecological processes for these areas.
- Provide a coordinated and consistent process for government agencies, communities and other stakeholders to plan and implement ecological assessment activities for candidate protected areas.
- Provide information for the consideration of social and economic implications of the ecological values, to be used along with the social and economic implications of the other evaluation study results for candidate protected areas.

Along with fulfilling the goals outlined in the assessment guidelines, the objective of this study was to provide an assessment of the flora and fauna of the Kwets'ootł'àà CPA based on as broad a sampling program as possible within the temporal and financial limits of the study. This was accomplished through direct observations, a scientific literature search, and interviewing stakeholders and researchers who have lived and worked in the area. Specific aspects of the assessment included:

- Aerial surveys of the waterfowl community
- A census of the larid nesting sites
- A marshbird and Species At Risk survey
- Habitat use by wildlife through direct observation of individuals as well as indirect evidence such as nests, dens, tracks and other natural history sign
- Species lists of plant, fish, amphibian, bird, and mammal species observed, augmented by a list of species likely occurring in the area based on relevant literature.

This report is also intended, in part, to supplement and refine the biotic information described in the Phase 1 ecological assessment report produced by AECOM Canada Ltd (AECOM 2009).

Study Area

Kwets'ootł'àà CPA features the northern tip of GSL's North Arm. The area contains hundreds of rocky islands (<0.01 to 350 ha in size) and numerous bays with extensive, shallow wetlands. The area provides a variety of open water and marsh habitats suitable for waterbirds (McCormick and Sirois 1988, Sirois et al. 1989, Sirois and Seddon 1990, Sirois and Westover 1990, Sirois 1993, Sirois et al. 1995, Fournier and Hines 2001, Fournier et al. Unpublished). Frank Channel and Mosquito Creek are near the northern boundary of the CPA, whereas Boundary Creek and Whitebeach Point lie near the southern boundary. The Stagg River, Miller Creek, Boundary Creek and numerous other waterways flow into Kwets'ootł'àà (Figure 2).

Kwets'ootł'àà CPA overlaps two ecozones – the Taiga Shield to the north and the more southern Taiga Plains (Wiken 1986). The Taiga Plains have been carved and smoothed by continental glaciers and contain distinctive dense boreal forest, while the Taiga Shield is distinguished by open, stunted taiga forest and hundreds of lakes (Mackenzie River Basin Board 2004). These ecozones have recently been further refined and subdivided in the Northwest Territories into Level IV ecoregions or physiographic units based on distinctive regional ecological factors, including climate, physiography, vegetation, soil, water and fauna (Ecosystem Classification Group 2007; 2008). The land on the south side of the North Arm represent the unique ecological factors of the Taiga Plains' Great Slave Plains High Boreal Ecoregion, and land to the north represent the Great Slave Lowland High Boreal Ecoregion portion of the Taiga Shield (Figure 3). The elevation of the area ranges between 125 and 300 m above sea level.

Typical rocky island of the Taiga Shield ecozone within the Kwets'ootł'àà CPA - **Paul Woodard**

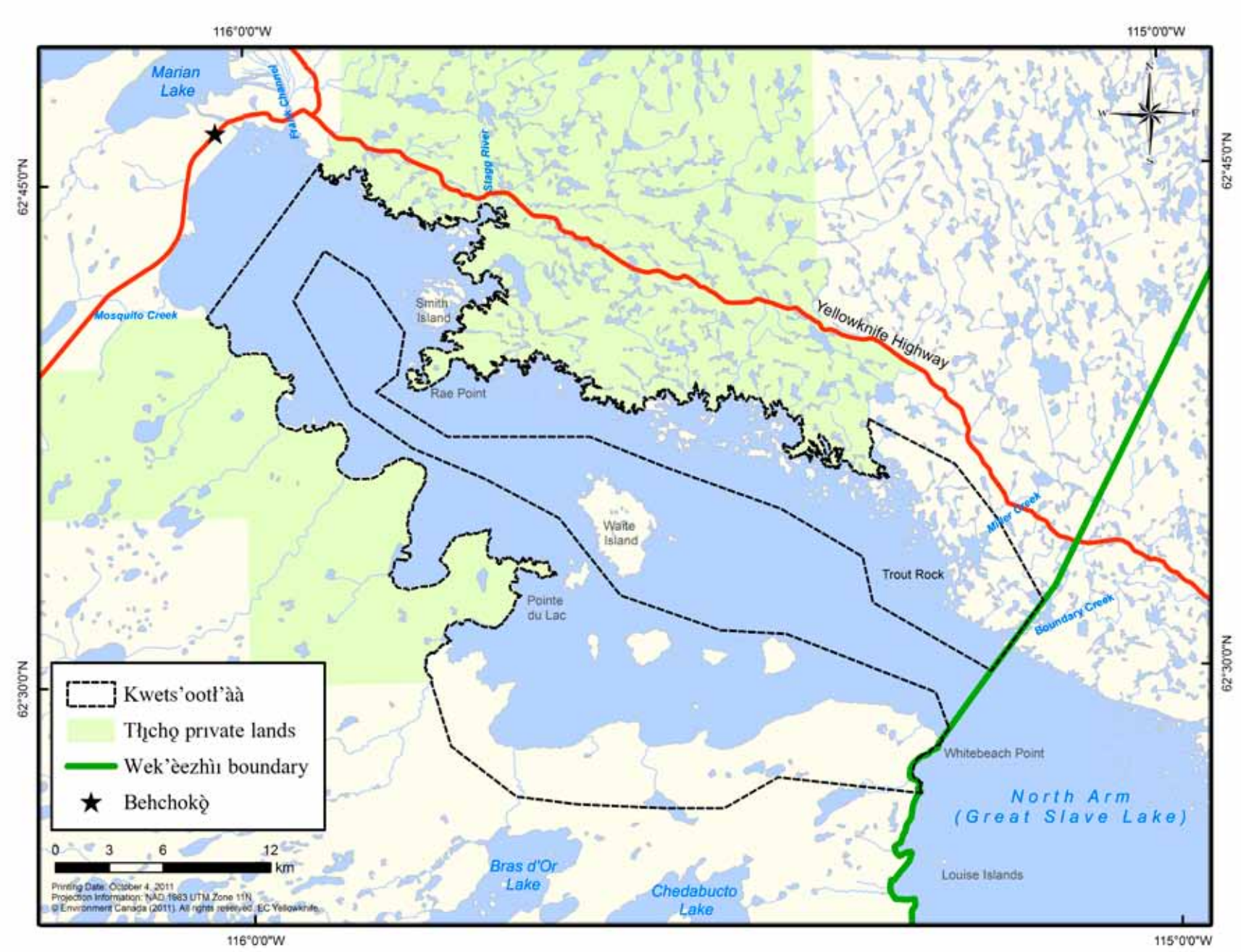

Figure 2: **The Kwets'ootł'àà candidate protected area.**

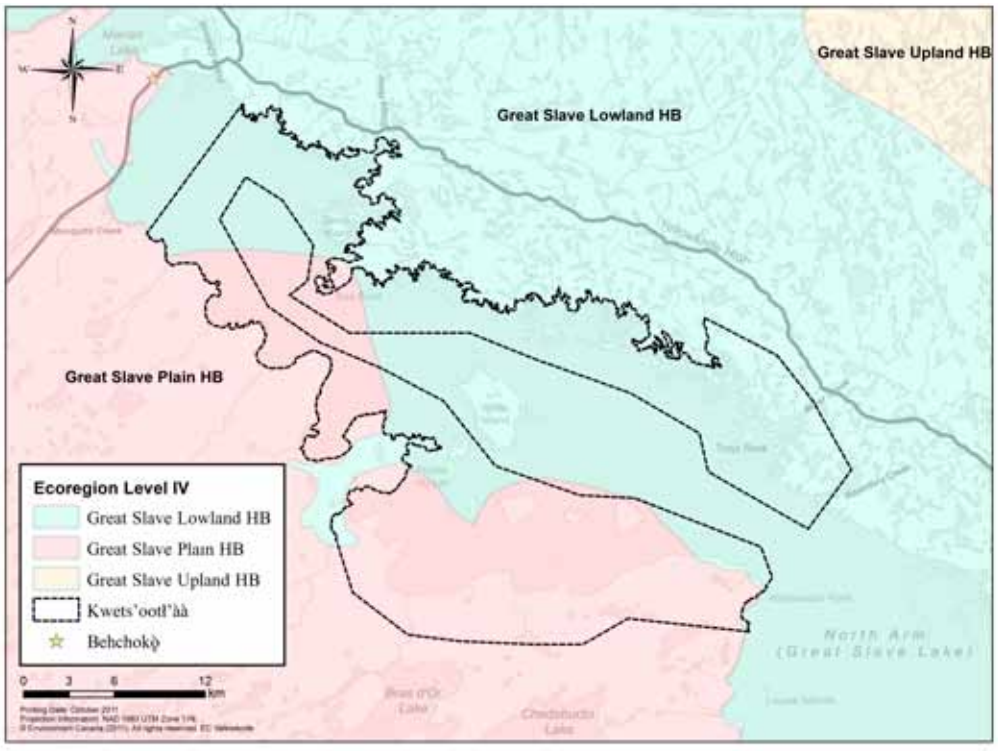

Figure 3: Physiographic units of the Kwets'ootł'àà candidate protected area.

Climate

The area is transitional between ecoclimates; a subhumid high boreal and a low subarctic ecoclimate (Ecological Stratification Working Group 1995). The region typically experiences cool summers and long cold winters. The nearest weather station reporting climate normals is located in Yellowknife, approximately 90 km east of the candidate area's northeast corner. Mean daily temperatures in Yellowknife are -26.8 °C in January and +16.8 °C in July (Environment Canada 2011). Summers are short, but this area experiences approximately 20 hours of daily sunlight in June and averages 143 frost-free days due to the moderating effect of GSL. Mean annual precipitation is 280 mm, half of which falls between July and October (Environment Canada 2011).

Ice phenology (freeze and thaw dates) of GSL has been described in several studies (Rawson 1949;1950, Walker and Davey 1993, Sirois et al. 1995, Walker et al. 1999, Ménard and Duguay 2002, Schertzer et al. 2003, Gibson et al. 2006a, Howell et al. 2009). However, the focus of many of these studies has been on the main west basin of the lake where freeze and thaw dates are later than the shallow waters of the North Arm. A generalized description of the ice cycle on the North Arm of GSL is based on Sirois et al. (1995). Melt onset generally begins in mid-April with meltwater beginning to appear on nearshore ice. Open water typically first appears nearshore and around islands in early May. By 20 May, small shallow bays and channels are usually ice-free, and shoreleads can be up to 50 m wide (Rawson 1950, Sirois et al. 1995). By the end of

May, most large bays are clear of ice, ice-free channels along the shores can be over 1 km wide, and large offshore leads have usually developed. Freeze onset occurs in wetlands and shallow bays by mid-October, and large bays are usually ice-bound by early November but open water may persist offshore into December (Rawson 1950, Sirois et al. 1995).

Limnology and hydrological processes of Kwets'ootł'àà

Previous research on the limnological features and hydrological processes for the area focused on the main body of GSL, its ability to support a commercial fishery, and on evaluating the health of the watershed from the impacts of the mining industry, sewage effluents and power generation (Rawson 1949; 1950; 1951; 1953; 1956, Evans 2000, Ménard and Duguay 2002, Schertzer et al. 2003, Mackenzie River Basin Board 2004, Oswald and Rouse 2004, Gibson et al. 2006a; b, Howell et al. 2009). Little information specific to the Kwets'ootł'àà portion of GSL is available. Many previous studies divided the lake into two regions: the relatively shallow West Basin and the deep East Arm. Evans (2000) summarized physical and limnological features of GSL (Table 1).

Table 1: Physical and limnological features of Great Slave Lake (from Evans 2000).

	West Basin	East Arm
Area (km^2)	19,400	9,168
Maximum depth (m)	60	614
Mean depth (m)	41	185
Age (years)	8,500	8,200
TDS (mg/l)	160	50
Secchi disc (m)	2.5	9
Epilimnion temperature (°C)	10	4
Total P (ug/l)	12.5	8.8
Nitrite-nitrate (ug/l)	144	190
Silicon (mg/l)	1.3	1
Chlorophyll (ug/l)	2.7	1.7

Most of the waters in the North Arm are shallower than other parts of GSL, with water depths typically <70 m (AECOM 2009). Few water depth measurements have been taken in Kwets'ootł'àà, but ranges between 2 - 14 m have been reported (Rawson 1949; 1950; 1951) and this area contributes to the 45% of the West Basin that is less than 25 meters deep (Rawson 1949; 1950; 1951). Due to shallow depths, the waters of the CPA are subject to increased light penetration and heating, as heat may be reflected from the bottom and is not lost by circulation into deeper water (Rawson 1950).

The Emile and Snare Rivers are the major tributaries of the North Arm and both flow into the northern tip of the North Arm and provide a relatively stable flow regime. Overall, the Slave River which flows into the southern part of GSL is the lake's major water source, contributing to about 77% of the lakes water budget (Gibson et al. 2006a). Recent studies suggest that both climatic

variability and flow regulation of the Bennett Dam in British Columbia (located on the Peace River which feeds into the Slave River) affect water levels within GSL. Flow regulation has a significant impact on the seasonal timing of GSL's water level variations. Current maximum lake water levels typically occur in mid June to early July, after which water levels drop steadily to an annual low near mid-November. Annual fluctuation of the lake's water level is approximately 40 cm, but may reach or exceed 70 cm (Rawson 1950, Mackenzie River Basin Board 2004, Gibson et al. 2006a). The outflow of water in GSL is through the Mackenzie River. Based on the total water inflow and lake volume, water in GSL has a residence time of between 14 to 16 years (Evans 2000). However, the West Basin, due to its shallow depth and the ability of water to bypass from the Slave to the Mackenzie River, likely a shorter mean residence time of about 7 years (Evans 2000, also see Gibson et al. 2006a).

The Slave River also contributes a significant sediment load to GSL which reduces water clarity in the West Basin during summer, though this effect has decreased since the Bennett Dam was constructed (Mackenzie River Basin Board 2004). Measures of water transparency depths (using a Secchi discs) typically range from 1-5 m versus 4-13 m in Christie Bay and 11-17 m in McLeod Bay (Rawson 1950). Transparency measurements for the North Arm have not been completed or are not published; however, the waters are often murky from sediment from the Snare River.

The pH of the surface water of the main lake varies from 7.45 to 8.3. No consistent seasonal trends were detected in the change of surface pH (Rawson 1950, Evans 1997). Mineral analysis from water within the GSL shows that total soluble solids average 150 p.p.m (Rawson 1950). Overall the lake water is fairly soft, with soluble calcium carbonate levels between 70 and 90 p.p.m. (Rawson 1950).

Aerial view of the pristine waters in the Kwets'ootł'àà CPA - **Paul Woodard**

Geology and Geomorphology

The history of glacial retreat in the late Wisconsin period indicates that GSL is approximately 10,000 years old (Rawson 1950). Due to deglaciation occurring in stages, areas of GSL are believed to have become ice free as recently as 8,500 to 8,200 years ago (West Basin and East Arm, respectively; Evans 2000, Evans et al. 2002).

The Great Slave Lowland High Boreal ecoregion is dominated by low-relief outcrops of weather-resistant Precambrian granite. Glacial Lake McConnell flooded much of the area after the most recent glacial period, resulting in wave-washed tills and glaciolacustrine and glaciofluvial sediments being thinly and sporadically deposited between rock outcrops forming oases of richer flora (Rawson 1950, Ecosystem Classification Group 2008).

Soft horizontally laid sedimentary rocks of Cambrian to Devonian age form the Great Slave Plain High Boreal ecoregion. Waves from glacial Lake McConnell eroded escarpments layers of dolomite, limestone and sandstone along GSL and spread a layer of till throughout the area. Karst formations, present in the northeastern section, formed as soft limestone, dissolved. Shorelines and the substrate of shallow ponds are lined with calcium carbonate deposits due to the high dissolved solid content of the water. A receding Lake McConnell also created concentric beach ridges atop a north-south ridge formed by gravelly and highly calcareous till deposits (Ecosystem Classification Group 2007).

Unlike the regular shoreline of the West Basin, thousands of bays, channels and islands form the north shore of the North Arm from Gros Cap to Behchokǫ̀. The islands are polished granitic or basaltic rock with reliefs of 3 – 7 m with varying amounts of organic soil (Fournier and Hines 2001).

Typical low-relief island habitat in the Kwets'ootł'àà CPA - **Steve Moore**

Existing Biological Information

General Vegetation Description

Kwets'ootł'àà comprises parts of two ecoregions; the Great Slave Plain High Boreal to the south and the Great Slave Lowland High Boreal ecoregion to the north (Figure 3; also see *Ecological Representation* in *Results & Discussion* section). The Great Slave Plain High Boreal ecoregion (15,838 km^2 of the NWT) characterizes the vegetation of the south shore of Kwets'ootł'àà and is distinguished by jack pine (*Pinus banksiana*) forests with an understory of dwarf birch (*Betula glandulosa*), Labrador tea (*Ledum groenlandicum*), lichen and moss. White spruce (*Picea glauca*) stands are found throughout the area, typically adjacent small streams and wetlands, while trembling aspen (*Populus tremuloides*) are more abundant near the shores of GSL. Bog and fen vegetation covers wet areas in the region, and includes black spruce (*Picea mariana*), Labrador tea, ericaceous shrubs, and mosses. Sparse communities of common bearberry (*Arctostaphylos uva-ursi*) and shrubby cinquefoil (*Dasiphora fruticosa*) grow along low north-south ridges of till deposits (Ecosystem Classification Group 2007).

The north shore of GSL's North Arm is covered by the Great Slave Lowland High Boreal ecoregion which covers >11,040 km^2 of the NWT (Figure 3). This region's vegetation composition is influenced by its numerous wetlands, lakes, shallow bays, fens and marshes. The discontinuous forest vegetation is characterized by jack pine and aspen, with white spruce and white birch (*Betula papyrifera*) dominating moist areas (Ecosystem Classification Group 2008). Extensive shrubby and graminoid fens are present along with bogs and peat plateaus with large collapse scars. Dense variegated pond lily (*Nuphar variegata*) colonies can be found on shallow wetlands.

A plant list was developed for Kwets'ootł'àà and a 200 km radius using Porsild and Cody (1980) containing 539 different plant species from 72 families (Figure 4; Appendix 1). The 10 most common families account for up to 58.1% (313/539) of all species within the Kwets'ootł'àà area (Table 2).

Typical sparse coniferous island vegetation in the Kwets'ootł'àà CPA - **Paul Woodard**

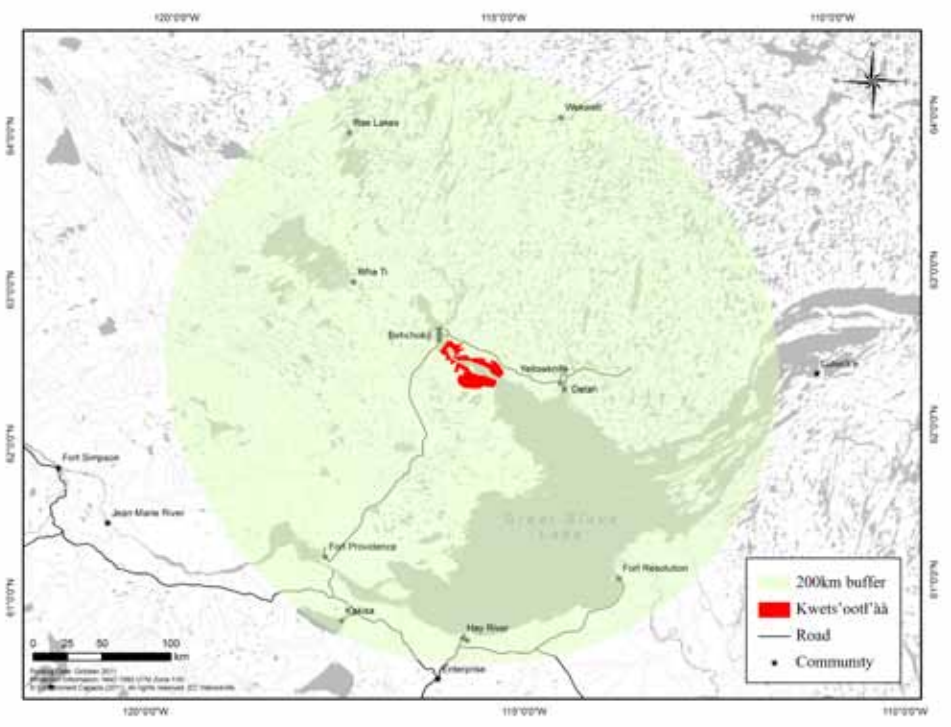

Figure 4: **The Kwets'ootł'àà candidate protected area and a 200 km buffer radius used for developing species lists.**

Coniferous forest along a shoreline in the Kwets'ootł'àà CPA - **Paul Woodard**

Table 2: Number and percentage of vascular plant species from families occurring within 200 km of the Kwets'ootł'àà candidate protected area based on Porsild and Cody (1980).

Family	Number of Species	%
Cyperaceae	70	13.0%
Asteraceae (Compositea)	50	9.3%
Poaceae (Gramineae)	45	8.3%
Brassicaceae (Cruciferae)	28	5.2%
Salicaceae	25	4.6%
Rosaceae	24	4.5%
Ranunculaceae	22	4.1%
Fabaceae (Leguminosea)	18	3.3%
Caryophyllaceae	17	3.2%
Potamogetonaceae	14	2.6%
Saxiflagaceae	14	2.6%
Ericaceae	13	2.4%
Juncaceae	12	2.2%
Orchidaceae	12	2.2%
Polygonaceae	10	1.9%
Equistaceae	8	1.5%
Primulaceae	8	1.5%
Betulaceae	7	1.3%
Chenopodiaceae	7	1.3%
Liliaceae	7	1.3%
Lamiacese (Labiatae)	6	1.1%
Lentibulariaceae	6	1.1%
Pyrolaceae	6	1.1%
Violaceae	6	1.1%
Lycopodiaceae	5	0.9%
Onagraceae	5	0.9%
Pinaceae	5	0.9%
Scrophulariaceae	5	0.9%
Umbelliferae	5	0.9%
Caprifoliaceae	4	0.7%
Gentianaceae	4	0.7%
Dryopterdaceae	4	0.7%
Rubiaceae	4	0.7%
Boraginaceae	3	0.6%
Cornaceae	3	0.6%
Droseraceae	3	0.6%
Haloragaceae	3	0.6%
Plantaginaceae	3	0.6%
Scheuchzeriaceae	3	0.6%
Sparganiaceae	3	0.6%
Apocynaceae	2	0.4%
Araceae	2	0.4%
Callitrichaceae	2	0.4%
Elaeagnaceae	2	0.4%
Fabaceae	2	0.4%
Fumariaceae	2	0.4%
Nymphaeaceae	2	0.4%
Orobachacae	2	0.4%
Pteridaceae	2	0.4%
Woodsiaceae	2	0.4%
Alismaceae	1	0.2%
Amaranthaceae	1	0.2%
Araliaceae	1	0.2%
Ceratophyllaceae	1	0.2%
Cistaceae	1	0.2%
Crassulaceae	1	0.2%
Elatinaceae	1	0.2%
Empetraceae	1	0.2%
Geraniaceae	1	0.2%
Lemnaceae	1	0.2%
Lobeliaceae	1	0.2%
Menyanthaceae	1	0.2%
Myricaceae	1	0.2%
Ophioglossaceae	1	0.2%
Papaveraceae	1	0.2%
Polemoniaceae	1	0.2%
Polypodiaceae	1	0.2%
Santalaceae	1	0.2%
Sarraceniaceae	1	0.2%
Selaginellaceae	1	0.2%
Typhaceae	1	0.2%
Urticaceae	1	0.2%
Total	**539**	**100%**

Vascular Plant Species At Risk

Of the 539 plant species potentially present within Kwets'ootł'àà, the NWT General Status Rank 2011-2015 identifies 372 (69.0%) as secure, 63 (11.8%) as sensitive, and 23 (4.3%) that may be at risk (Table 3; Working Group on General Status of NWT Species 2011). Of the 23 plant species ranked as May be at Risk, six species have been confirmed within the area or near the boundary (Table 4, Figure 5). These species have the highest rank given by the General Status Ranking system pending a more detailed assessment (Working Group on General Status of NWT Species 2011). There are no federally listed plant species within Kwets'ootł'àà or the surrounding area.

Table 3: Number and percent of vascular plant families located within 200 km of the Kwets'ootł'àà candidate protected area based on the NWT conservation status categories (Working Group on General Status of NWT Species 2011).

NWT General Status Rank	Number of Species	%
Secure	372	69.0%
Undetermined	66	12.2%
Sensitive	63	11.8%
May Be At Risk	23	4.3%
Alien	15	2.8%
Total	**539**	**100.0%**

Potentilla sp. - **Donna Mulders**

Table 4: Vascular Plant species designated as May Be At Risk (GNWT General Status Rank) and confirmed within or near the Kwets'ootł'àà candidate protected area (see Figure 5 for locations).

Scientific Name	Common Name	Typical Habitat
Acorus americanus	Several Vein Sweetflag (Rat Root)	Wetlands
Cardamine parviflora	Small-flowered Bittercress	Sandy, open places or rocky ledges
Chenopodiun rubrum	Red Prigweed (Coast-blite goosefoot)	Gravel pits
Crassula aquatica	Water Pigmy weed	Shallow ponds
Lodelia dortmanna	Water Lobelia	Shallow, sandy shores of lakes and ponds
Malaxis monophylla var brachypoda	White Adder's Mouth	Damp calcareous fens

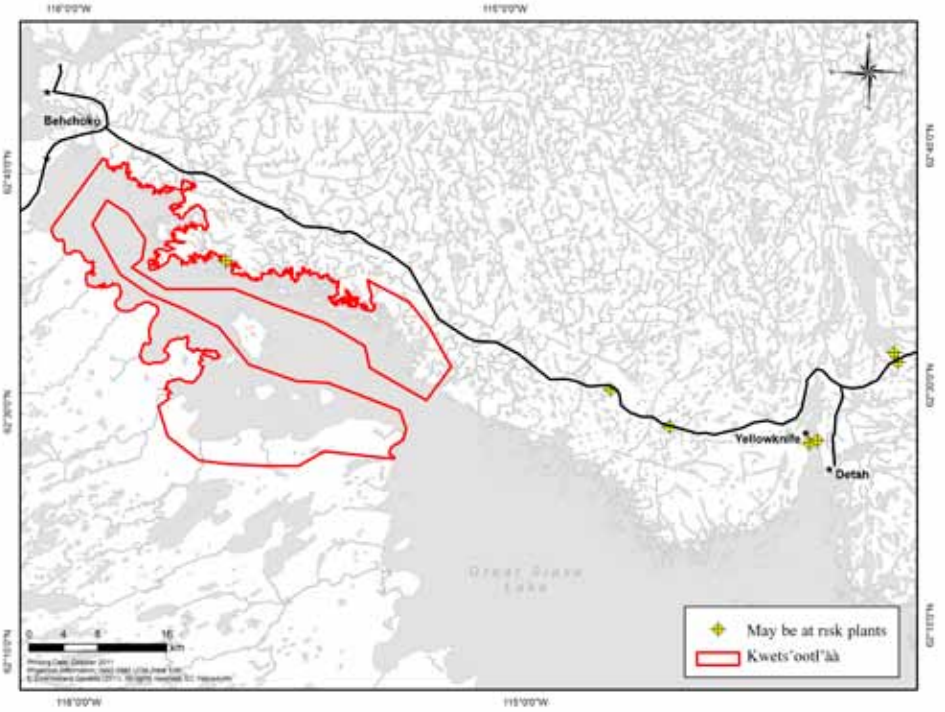

Figure 5: Location of vascular plant species that May be at Risk, North Arm, Great Slave Lake, NWT (from AECOM 2009).

Rare Vascular Plants

The Canadian Museum of Nature has compiled a list of rare vascular plants for the Northwest Territories (McJannet et al 1995). They define rare plant species as those that exist in low numbers or in a restricted area within a region. Their occurrence may reflect unique biological characteristics due to their constrained habitat requirements or evolutionary factors such as isolation in glacial refugia or centres of evolution (Argus and McNiell 1975 *in* McJannet et al. 1995). There are potentially 22 rare plant species within Kwets'ootł'àà and the 200 km buffer (based on McJannet et al. 1995, Table 5) and seven of these are also listed as May Be At Risk (Table 5, Working Group on General Status of NWT Species 2011). Protection of the Kwets'ootł'àà CPA would contribute to the conservation of these rare species.

Non-native/Alien Vascular Plants

Non-native or alien species are those species (or subspecies or lower taxon) that are introduced to an area, typically by humans, outside their natural distribution. Fifteen species have been identified as non-native or alien within Kwets'ootł'àà and a 200 km buffer (Table 6; based on Porsild and Cody 1980, AECOM 2009, Working Group on General Status of NWT Species 2011). It is probable that other non-native plants found in other parts of Canada are also present in the CPA, including scentless chamomile (*Tripleurospermum inodorum*) and perennial ryegrass (*Lolium perenne*); however, no evidence or documentation of these species was found. These two species are likely moderate invasive to non-invasive in the NWT (i.e., the species introduction is not likely to cause economic, environmental or human health harm).

Table 5: Rare vascular plants within 200 km of the Kwets'ootł'àà candidate protected area. Asterisk denotes those species that are also listed as May Be At Risk (Working Group on General Status of NWT Species 2011; see *Table 4* for complete list).

Family	*Scientific Name*	Common Name	Phyto-geopraphy	Habitat
Araceae	*Acornus americanus* *	Several Vein Sweetflag (Rat Root)	Boreal	Wetlands
Cruciferae	*Arabis holboellii*	Holboell Rock-cress	Boreal	Dry open areas and on shallow soil
Ranunculaceae	*Caltha palustris var. palustris*	Yellow Marsh Marigold	Boreal	Shallow water and wet marshy places
Cyperaceae	*Carex sychnocephala*	Many-headed Sedge	Boreal	Wet places and open woodland meadows
Chenopodiaceae	*Chenopodium rubrum**	Red Prigweed (Coast-blite goosefoot)	Prairie	Salt plains and disturbed soil
Asteraceae	*Cirsium foliosum**	Leafy Thistle	Montane	Sedge and grass meadow
Crassulaceae	*Crassula aquatica* *	Water Pigmy-weed	Aquatic	Shallow ponds
Dryopteridaceae	*Dryopteris carthusiana**	Spinulose Wood Fern	Boreal	Rich woods
Elatinaceae	*Elatine americana*	Threestamen Waterwort	Aquatic	Muddy shores and shallow pond margins
Cyperaceae	*Eleocharis comperssa*	Flat-Stemmed Spike Rush	Prairie	Calcareous muddy and sandy shores
Poaceae	*Elymus canadensis*	Canada Nodding Wild Rye	Boreal	Sandy and gravelly places
Onagraceae	*Epilobium leptophyllum*	Linear-leaved or Bog Willowherb	Boreal	Marshes, sloughs, bogs, and sedge meadows
Gentianaceae	*Gentiana affinis*	Prairie Gentian	Prairie	Gravelly and silty river bars
Gentianaceae	*Gentianopsis macounii**	Macoun's Gentian	Prairie	Gravelly beaches, marshy shores and marshy areas
Sacifragaceae	*Heuchera richardsonii**	Richardson's Alumroot	Boreal	Woodland meadows
Cistaceae	*Hudsonia tomentosa*	Woolly Beach-heather	Boreal	Jack pine woods and sand blow-outs
Juncaceae	*Juncus vaseyi*	Vasey's Rush	Boreal	Moit margins of lakes, rivers and sloughs
Nymphaeaceae	*Nymphaea tetragona*	Pygmy White Waterlily	Aquatic	Shallow lakes and slow moving streams
Potamogetonaceae	*Potamogeton foliosus*	Leafy Pondweed	Aquatic	shallow still waters
Potamogetonaceae	*Potamogeton obtusifolius*	Bluntleaf Pondweed	Aquatic	Shallow lakes and ponds
Brassicaceae	*Rorippa crsytallina*	MacKenzie River Yellowcress	Boreal	Carex meadows and marshes
Cyperaceae	*Scirpus rollandii*	Rolland's Bullrush	Boreal	Marly lake shores and hot springs

Table 6: Non-native vegetation species found within 200 km of the Kwets'ootł'àà candidate protected area.

Family	*Scientific Name*	Common Name	Habitat Occurrence	Historical Distribution	Predicted Invasiveness	Located within Kwets'ootł'àà
Lamiaceae	*Galeopsis tetrahit*	Commom hemp nettle	A small colony in shallow peat over sand	Introduced from Europe	None	Unknown
Asteraceae (Compositea)	*Taraxacum officinale*	Common dandelion	Disturbed and degraded ground	Introduced from Europe	Moderate/low	Unknown
Asteraceae	*Senecio vulgaris*	Common ragwort	A week in market garden; scattered	Introduced from Europe	None	Unknown
Brassicaceae	*Thlaspi arvense*	Field penny cress	Shallow layer of humus over sand or sandy gravel	Introduced from Eurasia	None	Unknown
Brassicaceae	*Descurainia sophia*	Flixweed	Fairly common around buildings	Introduced from Europe	None	Unknown
Amaranthaceae	*Chenopodium album*	Lamb's quarters	Moist peat in gardens	Introduced from Europe	None	Unknown
Chenopodiaceae	*Chenopodium simplex*	Maple Goosefoot	Shaded ledges of bluffs, base of slopes, waste places, disturbed sites	Native to Canada but introduced to NWT	Unknown	Unknown
Plantaginaceae	*Plantago major*	Nipple-seed plantain	Disturbed ground around buildings	Possibly introduced	None	Unknown
Asteraceae	*Achillea ptarmica*	Pearl yarrow	Open bulldozed trail beside Niven Lake, N side of Yellowknife	Introduced from elsewhere in NA	None	No
Asteraceae	*Matricaria discoidea*	Pineapple weed	Common in moist fill along bay, scattered in sandy gravel	Generally introduced	None	Unknown
Caryophyllaceae	*Sagina procumbens*	Procumbent pealwort	Garden in front of Nothern Frontier Visitor Centre	Native to Canada but introduced to NWT	None	No
Brassicaceae	*Capsella bursa-pastoris*	Shepherd's purse	Scattered in sandy gravel, airstrip	Introduced from Eurasia	None	Unknown
Polygonaceae	*Polygonum achoreum*	Striated knotweed	In sandy gravel	Introduced fron elsewhere in NA	None	Unknown
Fabaceae	*Melilotus albus*	White sweet clover	In sandy gravel	Introduced from Eurasia	None	Unknown
Fabaceae	*Melilotus officinalis*	Yellow sweet clover	Sandy gravel along roadsides	Introduced from Eurasia	Moderate/low	Unknown

Wetlands

Wetlands are areas where the water table level is at that of the mineral soil resulting in annually or seasonally saturated soil. General information regarding dominant wetland types in each ecoregion was compiled by the Ecosystem Classification Group (2007; 2008). Wetlands were classified by dominant plant community (tree, shrub, or herb) based on Landsat satellite imagery classification of the NWT (Figure 6, Earth Observation for Sustainable Development of Forests (EOSD) 2006 modified with a minimum mapping unit of 0.5 ha by NWT PAS). Wetlands cover approximately 15.3 km^2 (9.1%) of Kwets'ootł'àà (Table 7), with similar amounts of herb, tree and shrub covered wetlands each accounting for approximately 3% (5 km^2) of the land base. Within Kwets'ootł'àà there is a large number of small wetlands which are unrepresented in the EOSD classification which has a 25 m resolution and is based on limited ground truthing data.

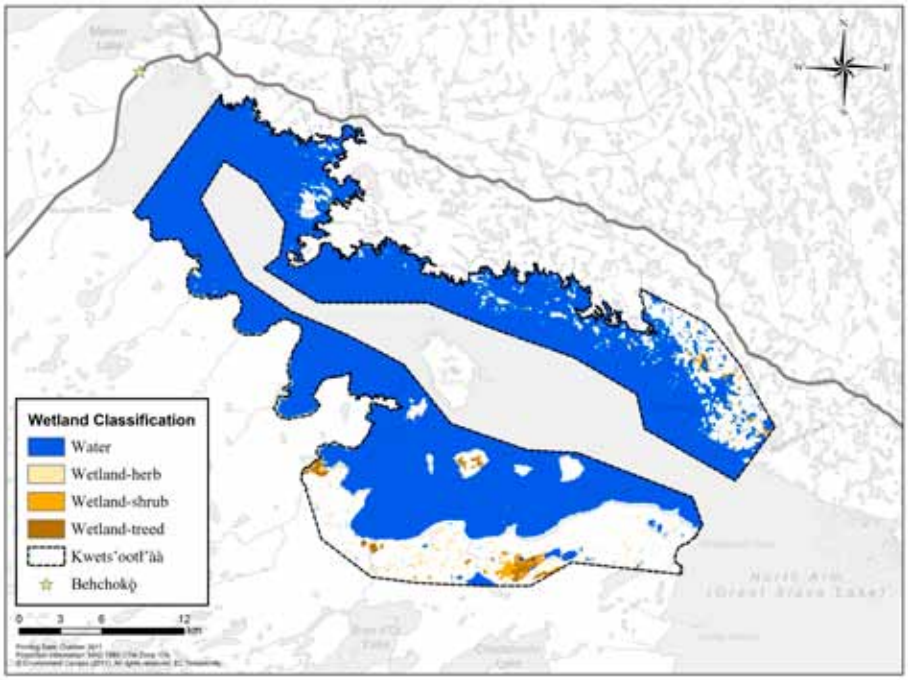

Figure 6: Location and classification of wetlands within the Kwets'ootł'àà candidate protected area (EOSD 2006, modified by NWT PAS).

Vegetation Classification

There are 15 land cover classifications within the Kwets'ootł'àà CPA (Table 7, Figure 7; EOSD 2006 modified with a minimum mapping unit of 0.5 ha by NWT PAS). Coniferous forest covers 50.6% (85.4 km^2) of the land within Kwets'ootł'àà, represented by both open and dense canopies (26-60% and >60% crown closure, respectivley; Wulder and Nelson 2003). Upland broadleaf trees cover 10.8% (18.3 km^2) of the land base. Exposed land dominated by rock/rubble and <5% vegetation cover accounts for 16% (27 km^2) of the land area within the CPA (Table 7).

Table 7: Area and percent coverage of Earth cover classification within the Kwets'ootł'àà candidate protected area (EOSD 2006, modified by NWT PAS).

Earth Cover classification	Area (km^2)	% cover within Kwets'ootł'àà	% cover within Kwets'ootł'àà - land only
Water	425.7	71.6%	-
Coniferous open	44.1	7.4%	26.1%
Coniferous dense	41.3	6.9%	24.5%
Broadleaf dense	18.3	3.1%	10.8%
Exposed land	17.4	2.9%	10.3%
Rock / Rubble	9.6	1.6%	5.7%
Shrub low	9.4	1.6%	5.6%
Mixedwood open	6.9	1.2%	4.1%
Wetland-treed	5.9	1.0%	3.5%
Wetland-herb	5.0	0.8%	3.0%
Wetland-shrub	4.4	0.7%	2.6%
Coniferous sparse	4.2	0.7%	2.5%
Bryoids	1.2	0.2%	0.7%
Herb	0.6	0.1%	0.3%
Shadow	0.3	0.1%	0.2%
Broadleaf open	0.1	0.0%	0.1%
Mixedwood sparse	0.0	0.0%	0.0%
	594.3	**100.0%**	**100.0%**

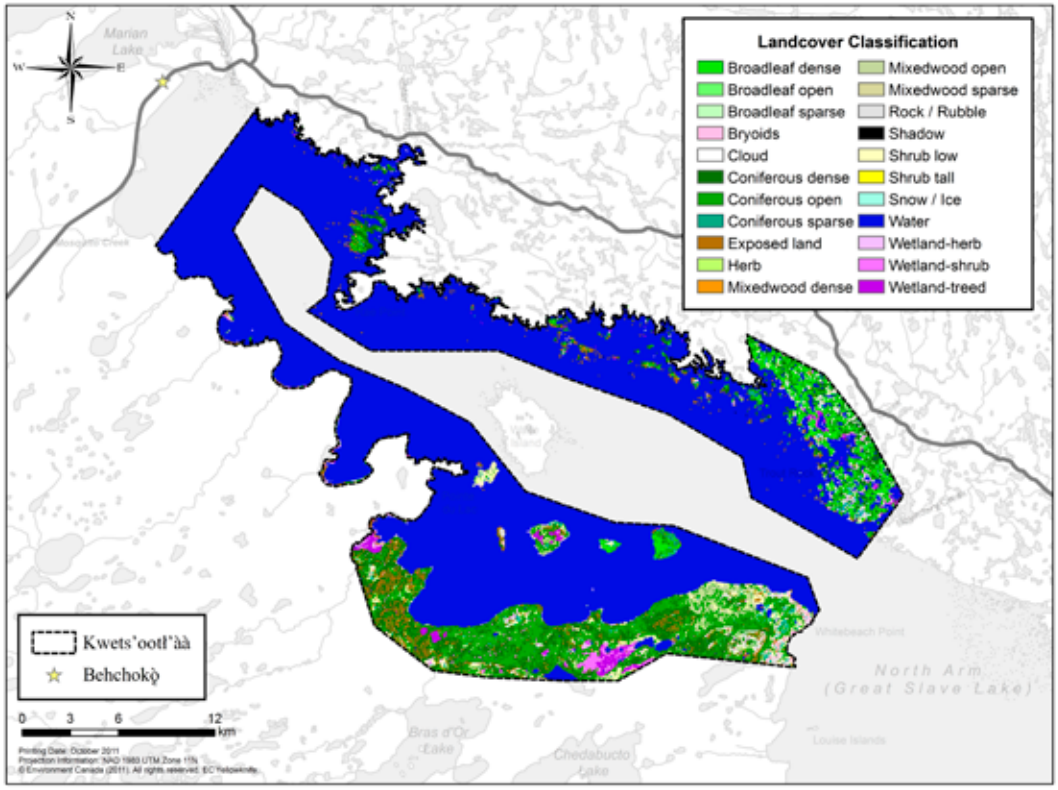

Figure 7: Land cover classifications within the Kwets'ootł'àà candidate protected area (EOSD 2006, modified by NWT PAS).

Fire History

Given the extensive shoreline, area of lake and limited landmass, there has been little fire activity within the CPA, with only 68.2 km^2 (11.5%) being affected by fire in the last 40 years. The most recent fire within the area occurred on the south shore in 2008 (Figure 8). This fire covered regions to the south and west of Kwets'ootł'àà, but only a small area within the boundary was burned. In 1981, a fire burned parts of south eastern region of Kwets'ootł'àà. Fires have also occurred on two of the larger islands within Kwets'ootł'àà; one in 1999 and the other fire occurred >40 years ago. The northern portion of the CPA remains unburned in the last 40 years.

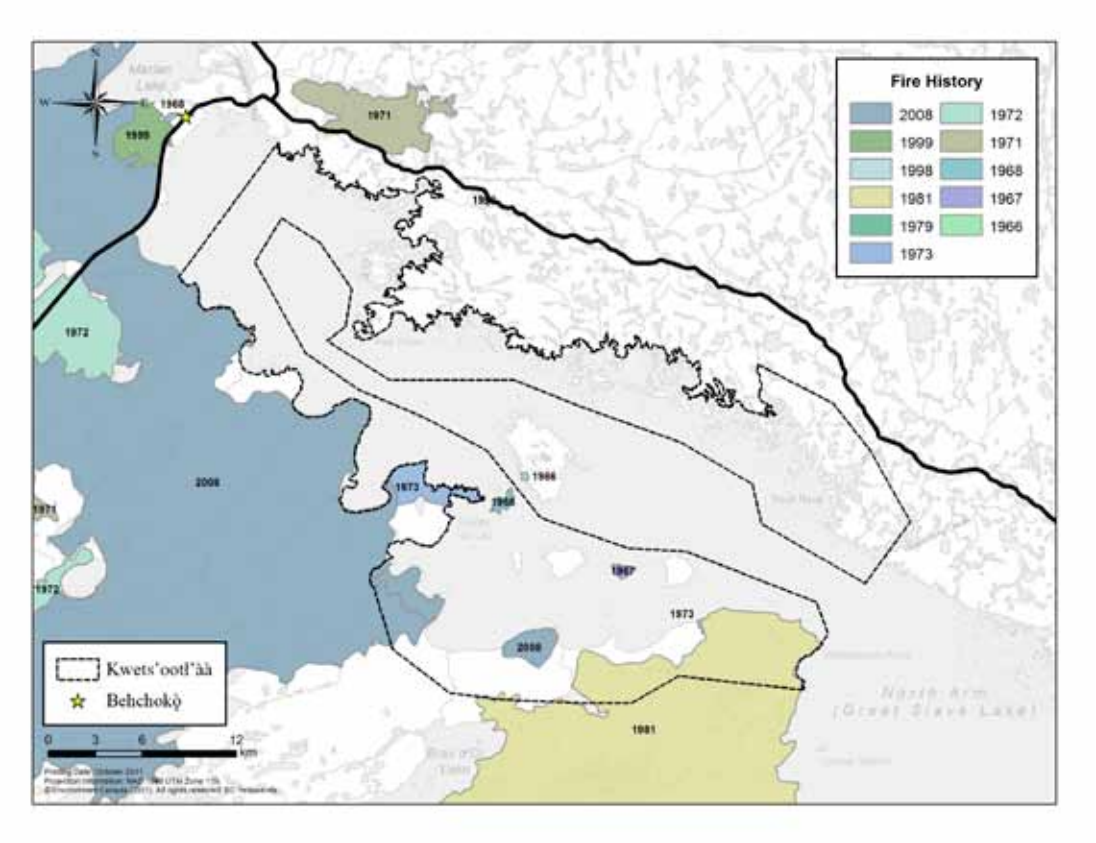

Figure 8: Fire history of the Kwets'ootł'àà candidate protected area and the surrounding area from, 1966 to present- 2010.

Wildlife

Northern Land Use Information Series

The Northern Land Use Information Series (NLUIS) iss the only broad wildlife (fish, birds, and mammals) habitat classification in the NWT (Department of Environment 1975). It documents the area and surrounding creeks as important migration routes during spring (S) and autumn (A) for Lake Whitefish (*Coregonus clupeaformis*), Northern Pike (*Esox lucius*), Walleye (*Sander vitreus*) and Arctic Grayling (*Thymallus arcticus*). Creeks on both shorelines also serve as spawning areas for sucker (*Catostomidae* spp.; S), Walleye (S), Arctic Grayling (S), Northern Pike (S), Lake Trout (*Salvelinus namaycush*; A) and Lake Whitefish (A). Mosquito Creek and Stagg River are most frequently used for migration and spawning. The CPA (including Marian, James and Chedabucto Lakes) is used by various fish species, making it an important fishing resource for the communities of Behchokǫ̀ and Yellowknife-Dettah. Fishing is often associated with hunting and trapping activities and provides food for human and domestic canine consumption.

According to the NLUIS, the north shore of the North Arm of GSL is used in spring for trapping American Beaver (*Castor canadensis*) and Muskrat (*Ondatra zibethicus*). Moose (*Alces americanus*) are abundant throughout the area. The Bras d'Or and Chedabucto Lakes area extending to the shoreline of GSL is also important for hunting moose. During the winter, Boreal Woodland Caribou (*Rangifer tarandus caribou*) and furbearers have been harvested traditionally around these lakes. Wood Bison (*Bison bison athabascae*) also inhabit the CPA.

Plankton and Benthic Fauna

Plankton and benthic organisms play an important role in Kwets'ootł'àà's food chain and are the main food source for many species of fish and birds that use the area. The dominant phytoplankton in GSL are diatoms, especially *Asterionella*, *Melosira* and *Tabellaria*. The most abundant zooplankton forms are the copepods *Limnocalanus*, *Diaptomus*, and *Cyclops*, and the rotifer *Keratella* (Rawson 1956). The benthic invertebrate population of GSL is dominated by the amphipod *Pontoporeia affinis* which makes up 62% (mean = 1,018 individuals/m^2) of the organisms present (Table 8; Rawson 1953). Other common organisms include sphaeriids, oligochaetes and chironomid larvae (11, 10 and 8% of the population, respectively; mean count/m^2 = 1,018, 175 and 164 individuals, respectively). The inshore region (0-10 m depth) has the highest benthic invertebrate population (Table 9; Rawson 1953).

A list of the 210 net plankton and 95 macroscopic benthic organisms identified by Rawson (1953, 1956) from within GSL is presented in Appendices 2, 3, 4; Rawson assumed his findings of net plankton was reasonably complete for open water species, but likely incomplete for the rich and varied shallow water species.

Table 8: Composition of Great Slave Lake's benthic organisms (from Rawson 1953).

Organism	Mean number/m^2	% of population
Amphipoda	1,018	62.5%
Sphaeriidae	175	10.8%
Oligochaeta	164	10.1%
Chironomid larvae	125	7.7%
Ostracoda	57	3.5%
Gastropoda	48	2.9%
Nematoda	24	1.5%
Miscellaneous	16	1.0%
	1,627	**100%**

Table 9: Density and weight of benthic organisms in relation to depth in Great Slave Lake (from Rawson 1953).

Depth range (m)	Number of dredges	Number of organisms	Weight (g/m^2)
0-5	69	3,291	9.68
5-10	60	2,121	2.86
10-15	64	2,042	2.90
15-20	38	1,558	2.88
20-25	44	1,581	2.56
25-30	27	1,817	2.80
30-40	37	1,471	2.10
40-50	18	1,790	2.38
50-60	38	1,869	2.80
60-70	23	1,483	1.81
70-80	25	903	0.93
80-90	15	1,229	1.89
90-100	16	695	0.71
100-125	23	718	0.62
125-150	11	720	0.56
150-175	11	507	0.31
175-200	6	496	0.27
200-300	25	386	0.39
300-400	12	300	0.23
400-500	12	254	0.15
500-600	16	402	0.34

Fish

Fish were studied within GSL prior to the opening of the lake for commercial fishing in 1945. Rawson (1949, 1951) documented 22 fish species within the lake, with the community dominated by Lake Trout, Lake Whitefish and Ciscoes (*Coregonus spp*.; Table 10). Seven other species have also been confirmed recently (Richardson et al. 2001, Evans et al. 2002, P. Vecsei pers. comm.).

Generally, the fish community of the Kwets'ootł'àà CPA is similar to that of the main lake, with Northern Pike, White Sucker (*Catostomus commersonnii*) and Walleye favoring the warmer shallow waters. Lake Trout and Ciscoes generally avoid shallow waters and are comparably scarce near the CPA (Rawson 1951). Fish movements within GSL are likely generally limited, with a median recapture distance of 8 km after a mean period of 268 days (Keleher 1963), suggesting that species have high local fidelity.

The Department of Fisheries and Oceans Canada is responsible for the assessment of fish stocks and the management of fisheries in GSL. (Cosens et al. 1993, Mackenzie River Basin Board 2004). Commercial fish harvest rates are controlled by quotas assigned to each of seven management areas of the lake (see Figure 6-8 in Mackenzie River Basin Board 2004). The waters within Kwets'ootł'àà currently support a Lake Trout sports fishery and a commercial fishery operation ended between 1964 and 1972 (Keleher 1972, Moshenko and Low 1978). The sports fishery on GSL includes fishing lodges, outfitters and unguided recreational anglers.

Table 10: The number and percent of fish species from families occurring within 200 km of the Kwets'ootł'àà candidate protected area.

Family	Number of species	%
Salmonidae	10	34.5%
Cyprinidae	5	17.2%
Cottidae	3	10.3%
Catostomidae	2	6.9%
Gasterosteidae	2	6.9%
Percidae	2	6.9%
Esocidae	1	3.4%
Gadidae	1	3.4%
Hiodontidae	1	3.4%
Percopsidae	1	3.4%
Petromyzontidae	1	3.4%
Total	**29**	**100%**

Table 11: Number and percent of fish species located within 200 km of the Kwets'ootł'àà candidate protected area in each NWT conservation status category (Working Group on General Status of NWT Species 2011).

NWT General Status Rank	Number of species	%
Secure	19	65.5%
Sensitive	4	13.8%
Undetermined	4	13.8%
Vagrant	1	3.4%
At Risk	1	3.4%
Total	**29**	**100%**

The list of fish species for Kwets'ootł'àà, based on a search of existing literature, contains 29 fish species from 11 families (Table 10, Appendix 5). Only one fish species within the CPA, the Shortjaw Cisco (*Coregonus zenithicus*), has been assessed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) as being at risk and is eligible for addition to Schedule 1 of the federal Species At Risk Act (COSEWIC 2011). Additionally, the NWT General Status Rank 2011-2015 classifies 19 (65.6%) of these species as secure, four (13.8%) as sensitive, and one (3.4%) as at risk (Table 11, Working Group on General Status of NWT Species 2011).

Amphibians

The wood frog (*Rana sylvatica*) is the only amphibian known to occur in the Kwets'ootł'àà CPA. They are widely distributed throughout the forested regions and are one of six amphibian species know to occur in the NWT (Environment and Natural Resources 2006, Ecology North Unknown). Wood frogs are ranked as secure in the NWT (Working Group on General Status of NWT Species 2011).

Birds

Due to this area's importance to waterbirds, the Canadian Wildlife Service has designated the North Arm of GSL, including Kwets'ootł'àà, as a "Key Migratory Bird Terrestrial Habitat Site" (NT Site 20; Alexander et al. 1991, Latour et al. 2008).

Previous studies on migratory birds in the CPA include spring and fall aerial surveys of the North Arm in order to monitor waterfowl use (1989-1992; Sirois and Westover 1990, Sirois 1993, Fournier et al. Unpublished) and censuses of larid and waterfowl nests on islands of the North Arm (1986, 1988, 1990-1995, 2000-2002; McCormick and Sirois 1988, Sirois et al. 1989, Sirois and Seddon 1990, Fournier and Hines 2001). Since 1955, the U.S. Fish and Wildlife Service (USFWS) has conducted aerial surveys each spring over the most important waterfowl nesting habitat in North America; one of the survey transects is directly over the North Arm of GSL (Smith 1995, Fournier and Hines 2005). The USFWS has also banded thousands of waterfowl at the mouth of the Stagg River in Kwets'ootł'àà since the mid 1990's.

Numerous other studies have been conducted on migratory birds near the CPA but outside the boundary. Since 1985, CWS has monitored basic population dynamics of waterfowl populations between Yellowknife and Behchokǫ̀ along Highway 3 (Hines et al. Unpublished). More intensive studies on Lesser Scaup (*Aythya affinis*), Canvasback (*Aythya valisineria*) and Grebes (*Podiceps spp.*) have been completed within the study area (Fournier et al. 1992, Fournier and Hines 1998a; b; 1999, Fournier and Hines 2001, Brook 2002, Brook and Clark 2002, Fast et al. 2004, Brook and Clark 2005, Brook et al. 2005). Boreal shorebirds were surveyed there from 2000–2008 through intensive searches, point counts and aerial surveys (Elliott et al. 2010, Elliott and Johnston Unpublished). A Breeding Bird Survey (BBS) route is located along Highway 3 near the Stagg River with surveys conducted from 1988-1993, in 1999 and 2011 (USGS Patuxent Wildlife Research Center 2011).

A list of 225 bird species from 46 families was compiled for Kwets'ootł'àà from existing datasets (Table 12; Appendix 6). These birds occur either as breeders or during migration in the area. Ten families account for >63% of the bird richness in the area (Table 12). Eleven of these species have been listed under the federal SARA or have been assessed by COSEWIC, including two have been assessed as endangered, four as threatened, and five assessed as Special Concern (COSEWIC 2011). Similarly, the NWT General Status Rank 2011-2015 identifies 138 as secure, 38 as sensitive, and 4 at risk (Table 13; Working Group on General Status of NWT Species 2011).

Table 13: The number and percent of bird species from families occurring within 200 km of the Kwets'ootł'àà candidate protected area.

Family	Number of Species	%
Anatidae	35	15.6%
Scolopacidae	23	10.2%
Emberizidae	18	8.0%
Parulidae	14	6.2%
Laridae	13	5.8%
Accipitridae	10	4.4%
Strigidae	8	3.6%
Fringillidae	7	3.1%
Picidae	7	3.1%
Tyrannidae	7	3.1%
Icteridae	6	2.7%
Turdidae	6	2.7%
Charadriidae	5	2.2%
Corvidae	4	1.8%
Falconidae	4	1.8%
Hirundinidae	4	1.8%
Phasianidae	4	1.8%
Podicipedidae	4	1.8%
Ardeidae	3	1.3%
Gaviidae	3	1.3%
Rallidae	3	1.3%
Vireonidae	3	1.3%
Bombycillidae	2	0.9%
Columbidae	2	0.9%
Gruidae	2	0.9%
Mimidae	2	0.9%
Motacillidae	2	0.9%
Paridae	2	0.9%
Regulidae	2	0.9%
Stercoraiidae	2	0.9%
Trochilidae	2	0.9%
Troglodytidae	2	0.9%
Alaudidae	1	0.4%
Alcedinidae	1	0.4%
Alcidae	1	0.4%
Calcariidae	1	0.4%
Caprimulgidae	1	0.4%
Cardinalidae	1	0.4%
Laniidae	1	0.4%
Pandionidae	1	0.4%
Passeridae	1	0.4%
Pelecanidae	1	0.4%
Phalacrocoracidae	1	0.4%
Sittidae	1	0.4%
Sturnidae	1	0.4%
Thraupidae	1	0.4%
	225	100%

Table 12: Number and percent of bird species located within 200 km of the Kwets'ootł'àà candidate protected area in each of the NWT conservation status categories (Working Group on General Status of NWT Species 2011).

NWT General Status Rank	Number of species	%
Secure	138	61.3%
Sensitive	38	16.9%
Undetermined	22	9.8%
Vagrant	12	5.3%
At Risk	4	1.8%
No Status	4	1.8%
May be at Risk	3	1.3%
Alien	3	1.3%
Presence Expected	1	0.4%
Total	**225**	**100.0%**

Northern Shoveler drake - **Lisa Pirie**

Mammals

The Boreal Woodland Caribou population in the North Slave region was assessed during three aerial surveys by Environment and Natural Resources (ENR) of the GNWT between 2004-2005 (Hillis and Cluff 2005). Density estimates within this region range between 0.25-3.44 caribou/100 km^2. In November 2004, a boreal caribou survey was conducted in the Taiga Plain ecozone of the North Slave Region including areas on the south side of Kwets'ootł'àà. This survey produced an estimate of 2.62 caribou/100 km^2. These density estimates have high variability and should be interpreted cautiously as this was this area's first caribou-specific survey and the survey area was relatively small. Local aboriginals state that Barren-ground Caribou (*Rangifer tarandus groenlandicus*), likely from the Bluenose East or Bathurst herds, have occupied the Kwets'ootł'àà CPA during winter sporadically over the last 60 years.

Wood Bison were introduced in 1963 into an area now known as the Mackenzie Wood Bison Sanctuary south and west of Kwets'ootł'àà to aid in the recovery of its population (Larter et al. 2000). The bison population now ranges from the north side of the Mackenzie River near Mills Lake to the Boundary Creek area between Behchokǫ̀ and Yellowknife. ENR has monitored this population since 1964 and was estimated at 1,555 bison in 2008. Low densities occur in the sampling units intersecting Kwets'ootł'àà (1 - 6 bison/100 km^2 in units 20 and 21). Range expansion of the Mackenzie bison herd beyond the sanctuary began in the mid-1990's (T. Armstrong, pers. comm.). Since 2002, regular Wood bison sightings have been reported along Highway 3 around the North Arm of GSL (data supplied by ENR WMIS database; WIMIS 2011) and are found within the CPA boundary.

ENR has established baseline information on Moose density in the Taiga Plain and Taiga Shield ecozones within the North Slave Region (Cluff 2005). Moose densities are estimated to be 2.75 and 3.99 moose / 100 km^2 for the Taiga Plain and Taiga Shield, respectively. Based on hunter surveys, estimates of Moose harvested by recreational residents ranges between 80-100 animals (Cluff 2005).

Abundance of small mammals and Snowshoe Hare (*Lepus americanus*) has been monitored in the Mackenzie Bison Sanctuary and Yellowknife area by ENR since 1988 and 1991, respectively. Small mammal numbers for 2010, including a Yellowknife trapping site, were estimated at 5 individuals/100 trap-nights (Carriere 2010). Hare populations across the NWT remained low between 2002 and 2006, but increased rapidly in 2009 and may have peaked in 2010. In 2010, the North Slave hare density was estimated at between 1 - 1.5 hares/ha. This latest peak is numbers is lower than those in previous decades (Carriere 2010).

Canada Lynx (*Lynx canadensis*) are an important predator in boreal ecosystems and are closely associated with Showshoe Hare population cycles. There has been little research on Lynx near the CPA. Poole (1994; 1997) examined lynx density, survival rates and adult dispersal of an unharvested population in response to a decline in Snowshoe Hares within the Mackenzie Bison Sanctuary. Densities ranged between 3-30 lynx/100 km^2, and noted that the lowest densities and highest dispersal rates were during and after the period of hare density decline.

Musiani et al. (2007) reported that tundra/taiga and boreal coniferous forest Grey Wolves (*Canis lupus*) are genetically, phenotypically and behaviorally distinct ecotypes. The boundary separating the tundra/taiga and boreal coniferous forest Grey Wolves lies south of the North Arm of GSL (see *Figure 4* in Musiani et al. 2007). Wolves in the Kwets'ootł'àà area are part of the tundra/taiga ecotype (Musiani et al. 2007). Using GPS marked individuals, Musiani et al. (2007) determined that these wolves followed the migration patterns of their primary food source, the Barren-ground Caribou.

A list of 33 mammal species was compiled for Kwets'ootł'àà from existing literature and in consultation with local wildlife biologists (S. Carrière, pers. comm., Appendix 7). These mammals represent 12 families and are present during at least one part of year in the area (Table 14, Appendix 6). Both the Boreal Woodland Caribou and Wood Bison are listed under the federal Species At Risk Act (COSEWIC 2011). Of these mammal species, the NWT General Status Rank 2011-2015 (Working Group on General Status of NWT Species 2011) identifies 28 as secure, 3 as sensitive, and 1 at risk (Table 15).

Table 15: Number and percent of mammal species located within 200 km of the Kwets'ootł'àà candidate protected area in each of the NWT conservation status categories (Working Group on General Status of NWT Species 2011).

NWT General Status Rank	Number of species	%
Secure	28	84.8%
Sensitive	3	9.1%
At Risk	1	3.0%
Undetermined	1	3.0%
Total	**33**	**100%**

Table 14: The number and percent of mammal species from families occurring within 200 km of the Kwets'ootł'àà candidate protected area.

Family	Number of species	%
Cricetidae	7	21.2%
Mustelidae	6	18.2%
Soricidae	6	18.2%
Canidae	3	9.1%
Cervidae	3	9.1%
Sciuridae	2	6.1%
Ursidae	1	3.0%
Bovidae	1	3.0%
Felidae	1	3.0%
Castoridae	1	3.0%
Erithizontidate	1	3.0%
Leporidae	1	3.0%
Total	**33**	**100%**

Wood Bison - **CWS**

Contaminants

Contaminant levels in GSL are generally low due to minimal anthropogenic impacts directly on the lake and on the lake's watershed (Table 16, Evans et al. 1996). Concentrations of inorganic and organic contaminates are low in all but the most industrialized areas of the lake (i.e., Yellowknife and Hay River; Stien and Miller 1972, Moore et al 1978, 1979, Mudroch et al 1989a *in* Evans et al. 1996). Contaminants in northern Canada are mostly transported into the environment through long-range atmospheric transportation from distant southern sources which allows northern areas to maintain a low contaminant load (Evans et al. 2005). However, due to the continued input of contaminants, subtle increases have been shown over time in the sediments of the West Basin (including the North Arm and the Slave River Delta; Mudroch et al. 1992, Evans et al. 1996). Sediment levels of organochlorine (OC) compounds, such as polychlorinated biphenyls (PCB), chlorobenzene, dichlorodiphenyltrichloroethane (DDT), hexachlorocyclohexane (HCH), chlordane and dieldrin, are similar to other subarctic and arctic lakes (Table 16, Evans et al. 1996). Increased development within the Peace and Athabasca drainage basins during recent decades, including forestry and oil developments, has lead to increased concern that contaminants associated with these activities, such as polychlorinated dibenso-p-PCDDx (PCDDs), polychlorinated dibenzofurans (PCCFs) and polycyclic aromatic hydrocarbons (PAHs), will travel downstream via the Peace, Athabasca and Slave rivers to GSL. Polycyclic aromatic hydrocarbons (PAHs) associated with the oil and gas industry was found at a mean concentration within the West Basin of 639.3 ± 77.7 nanogram of PAH/g of dry weight surface sediment (Evans et al. 1996). Additionally, recent uranium exploration and mine development north of Kwets'ootł'àà on the Snare River have caused concern that these activities could increase contaminant loads in the North Arm.

Due to GSL's large dependence on the Slave River for water inflow and the short water residency time in the West Basin (about 7 years; Evans 2000, Gibson et al. 2006a), the lake has the potential to be rapidly affected by events and activities occurring in its watershed. Contaminant concentrations in inflowing water are likely to be low due to dilution and degradation, but large amounts may enter GSL over time (Evans et al. 1996). Biomagnification of toxins in aquatic organisms and carcinogenic and mutagenic properties of contaminants increases concern for the local communities and wildlife population health. Compared to similar biota inhabiting southern locations with similar contaminate levels, those living in northern areas may have an increased possibility of increased lifetime accumulation due to slower growth rates (Evans et al. 1996). Contaminant studies of nesting larids and migrating Scaup spp. (*Aythya affinis* and *marila spp*.) indicate relatively low levels of chlorinated hydrocarbons present in the area (Table 16; Wayland et al. 2000, DeVink et al. 2008). Similarly, mercury levels in Lake Trout from GSL are relatively low (< 0.2 µ) compared with other northern lakes (Fisk et al. 2003).

Table 16: Concentration of organohalogen contaminates (∑CBZ = chlorobenzene, ∑HCH = Hexachlorocyclohexane, ∑CHL = Chlorodane, ∑DDT = total dichlorodiphenyltrichloroethane, ∑PCB = polychlorinated biphenyls), selenium (Se) and Mercury (Hg) in sediment, freshwater invertebrates, fish and birds from Great Slave Lake.

Species (common name)	Location	Tissue	Year	% lipid	n	Statistic	units	∑CBZ	∑HCH	∑CHL	∑DDT	∑PCB	Toxaphene	Dieldrin	Se	Hg	Source
Surface sediment	Slave River delta		1993			mean ± SD	ng/g dw	0.7 ± 0.3	0.4 ± 0.1	0.3 ± 0.2	0.5 ± 0.3	9.8 ± 4.3		0.08 ± 0.03			1
Invertebrates																	
Plankton	West basin		1993–95	1.4 ± 0.6	-	mean ± SD	ng/g ww	-	-	0.2 ± 0.1	0.3 ± 0.3	3.4 ± 2.4	1.2 ± 0.2	0.1 ± 0.1	-	-	1
Mysids	West basin		1993–95	33.6 ± 4.6	-	mean ± SD	ng/g ww	-	-	0.89 ± 0.6	0.3 ± 0.1	2.2 ± 0.7	6.5 ± 2.2	0.2 ± 0.2	-	-	1
Amphipods	West basin		1993–95	2.2 ± 0.6	-	mean ± SD	ng/g ww	-	-	0.7 ± 0.4	0.4 ± 0.2	2.4 ± 0.8	6.1 ± 1.1	0.2 ± 0.1	-	-	1
Freshwater fish																	
Lota lota (Burbot)	West basin	liver	1993	22.9 ± 8.9	-	mean ± SD	ng/g ww	-	-	63.1 ± 16.0	26.9 ± 5.1	76.7 ± 16.9	263 ± 100	-	-	-	1
	West basin	liver	1995	21.2 ± 13.7	-	mean ± SD	ng/g ww	-	-	92.3 ± 29.0	50.0 ± 16.9	158 ± 21.6	424 ± 199	-	-	-	1
	West basin	liver	1996	43.3 ± 9.2	-	mean ± SD	ng/g ww	-	-	74.7 ± 16.7	27.7 ± 2.2	96.4 ± 9.5	348 ± 114	-	-	-	1
	West basin	liver	1999		-	mean ± SD	ng/g ww	-	-	71.7 ± 19.3	32.0 ± 9.1	114 ± 47.3	277 ± 48.4	-	-	-	1
Esox locius (Northern pike)	West basin	muscle	1996	2.2 ± 0.6	-	mean ± SD	ng/g ww	-	-	93.5 ± 34.7	51.2 ± 25.7	138 ± 52.2	762 ± 298	-	-	-	1
	West basin	muscle	1999	0.9 ± 0.3	-	mean ± SD	ng/g ww	-	-	1.9 ± 1.1	2.3 ± 1.1	4.8 ± 2.5	21.5 ± 7.3	-	-	-	1
Coregonus spp (Whitefish)	West basin	muscle	1993–95	9.9 ± 7.0	-	mean ± SD	ng/g ww	-	-	0.8 ± 0.2	1.3 ± 0.4	2.5 ± 0.9	12.1 ± 2.5	-	-	-	1
Salvelinus namaycush (Lake Trout)	West basin	muscle	1993–95	12.8 ± 3.1	-	mean ± SD	ng/g ww	-	-	2.9 ± 2.3	2.8 ± 1.1	6.6 ± 2.8	25.5 ± 14.3	0.5 ± 0.2	-	-	1
	West basin	muscle	1993	12.8 ± 3.1	-	mean ± SD	ng/g ww	-	-	14.6 ± 8.5	8.9 ± 5.8	23.2 ± 5.3	122 ± 88.1	1.1 ± 0.5	-	-	1
	West basin	muscle	1999	12.6 ± 6.8	-	mean ± SD	ng/g ww	-	-	12.6 ± 6.8	6.7 ± 3.4	30.2 ± 16.7	80.3 ± 28.9	-	-	-	1
Stizostedion vitreum (Walleye)	West basin		1996	3.4 ± 1.3	-	mean ± SD	ng/g ww	-	-	16.8 ± 9.9	9.6 ± 7.2	24.9 ± 18.5	151 ± 102	-	-	-	1
Stenodus leucichthys nelma (Inconnu)	West basin		1996	20.5 ± 6.2	-	mean ± SD	ng/g ww	0.22 ± 0.04	0.09 ± 0.02	1.19 ± 0.24	1.28 ± 0.17	3.44 ± 0.41	1.46 ± 0.33	-	-	-	2
Coregonus autumnalis (Arctic Cisco)	West basin		1995	8.1 ± 6.3	-	mean ± SD	ng/g ww	-	-	0.6 ± 0.4	1.5 ± 0.4	3.4 ± 3.3	1.7 ± 0.8	0.1 ± 0.1	-	-	1
Birds																	
Larus argentatus (Herring Gull)	Yellowknife Bay	eggs	1995	-	5	mean ± SD	µg/g ww dw*	-	-	0.03 ± 0.01	0.40 ± 0.24	0.24 ± 0.09	-	-	1.83 ± 0.40	0.31 ± 0.81	3
Chlidonias niger (Black Tern)	North Arm	eggs	1995	-	3	mean ± SD	µg/g ww dw*	-	-	0.01 ± 0.002	0.11 ± 0.04	0.09 ± 0.06	-	-	1.72 ± 0.44	0.42 ± 0.07	3
Sterna caspia (Caspian Tern)	North Arm	eggs	1995	-	3	mean ± SD	µg/g ww dw*	-	-	0.04 ± 0.02	1.78 ± 0.24	0.79 ± 0.43	-	-	2.18 ± 0.09	1.15 ± 0.11	3
Larus canus (Mew Gull)	North Arm	eggs	1995	-	3	mean ± SD	µg/g ww dw*	-	-	0.05 ± 0.01	1.42 ± 0.32	0.63 ± 0.26	-	-	1.62 ± 0.22	0.33 ± 0.07	3
Aythya affinis & *A. marila* (Scaup)	Yellowknife	liver	2003-04	-	25	mean (95% CI)	mg/kg dw	-	-	-	-	-	-	-	6.0 (5.0-7.3)	1.3 (0.9-1.7)	4
Aythya collaris (Ring-necked Duck)	Yellowknife	liver	2003-05	-	15	mean (95% CI)	mg/kg dw	-	-	-	-	-	-	-	3.9 (3.2-4.9)	0.8 (0.6-1.1)	4

Sources: [1]Evans et al. 1996, 2001, [2]Muir et al. 2001, [3]Wayland et al. 2000, [4]DeVink et al. 2008
* dry weight used for Se and Hg

Methods

Ecological Representivity

Each ecoregion with the NWT has a unique combination of flora, fauna and landscapes. One goal of the NWT PAS is to maintain ecological representation (The Northwest Territories Protected Areas Strategy Advisory Committee 1999), which is accomplished by protecting representative samples of all ecoregions within the NWT (represented by the 1995 National Ecological Framework classification; Ecological Stratification Working Group 1995). Core representative areas within an ecoregion contain the maximum richness of flora, fauna and landscapes that is possible within that ecoregion.

The NWT PAS completed an analysis using MARXAN software (Ball and Possingham 2000, Game and Grantham 2008, Ardon et al. 2008, Watts et al. 2010) to identify core representative areas within NWT ecoregions, including the two ecoregions that lie partially within Kwets'ootł'àà (NWT Protected Areas Strategy Science Team 2009). This analysis incorporated a range of biological and physical diversity within NWT's ecoregions by using three broad features: vegetation types, landscape units and physiographic units. The assumption of the analysis was that these broad features account for almost the entire biotic and abiotic factors that determine an ecoregion's biodiversity. Vegetation types consist of distinct associations of plant species such as spruce forest, deciduous forest, mixed forest, tall shrub community and wetlands. Landscape units consist of areas with similar types of surficial geology, soil and terrain. Physiographic units consist of areas with similar elevation, climate, slope, aspect, and landforms.

The goal of the analysis was to ensure that approximately 30% of each of the broad features within each ecoregion are represented. The types and units within each feature were represented on the basis of their total area (size) within each ecoregion. Proportional representation targets range from 10-25% for most components and 100% for rare ones (Gah et al. 2008).

An "open" scenario was used to describe the ecological representation of Kwets'ootł'àà. In this scenario, core representative areas based on the three broad features and their components are determined and mapped for each ecoregion. The MARXAN software was run 100 times to display the different spatial configurations of ecoregion representation that result from the analysis. Results are then compiled into a single map displaying the selection frequency of each area. The boundary of Kwets'ootł'àà is then overlaid to assess its importance to ecoregion representivity.

Larid Censuses

To assess the importance of the CPA area to nesting larids (gull and tern species from the *Laridae* family), surveys were conducted in 2010 to update the information available for the Kwets'ootł'àà ecological assessment.

Within this report, a colony site refers to the location (i.e., an island, or in some cases clusters of small islands, where nesting occurs) and a colony refers to a group of larids using the nesting site.

Islands in Kwets'ootł'àà were systematically surveyed to locate active nests. The number of nests of each larid species was determined through ground searches at each suspected nesting site. The number of eggs and young in each nest and the number of adults present at each site was recorded and the location was geo-referenced (using GPS). Nests or scrapes containing eggs or young were defined as active nests and were included in the nest total. Similarly, nests apparently occupied, including those that were empty but freshly built or appeared to have contained eggs or young during that breeding season (i.e., depredated or previously fledged), were also included in the total nest tally as they indicated a current breeding season attempt. Evidence of recently fledged nestlings included egg shells and membranes, fecal matter and evidence of depredation included egg shell fragments without membranes, possibly with blood within the nest. The apparently occupied nests designation was used only for gull species, as the scrapes and nests used by terns are more inconspicuous and identification of a nest without eggs or young is difficult and provides unreliable data. Visit times were kept as short as possible in order to limit disturbance to nests and colonies. Further details on the data collection protocol can be found in Morris et al. (2003, 2009).

Surveys began 22 June 2010 following ice break-up so that access to the islands was unhindered and completed 29 June 2010 in order to minimize disturbance to larid chicks. Surveys were focused along the northern shoreline of Kwets'ootł'àà between Frank Channel and Trout Rock (Figure 2) to replicate previous CWS surveys (Sirois and Seddon 1990, Sirois and Fournier 1993, Sirois et al. 1995). This area contains approximately one quarter of North Arm Key Migratory Bird Terrestrial Habitat Site (NT Site 20), as described by Latour et al. (2008). The southern shoreline, including Waite Island and surrounding islands, was surveyed by helicopter on July 2, 2010. Low water levels and the prevalence of emergent vegetation restricted access to some inner bays and near shore islands sites and were not surveyed. However, previous surveys have shown limited use of these locations as nesting sites by larids.

For all species, when comparisons were made between previous years (1986, 1991-1995, 2001) and 2010, only nests containing eggs or young at the time of observation were included.

Common and Arctic Terns (*Sterna hirundo* and *paradisaea*) nests can be difficult to differentiate and are often found occupying the same colony sites within Kwets'ootł'àà. In order to estimate the number of nest for each species, a weighted average based on a count of adults at 10 mixed breeding sites was applied to the total nest counted at mixed sites (60.2% Common Tern and 39.8% Arctic Tern).

Aerial Waterfowl Surveys

Given the importance of the North Arm of GSL to migrating waterfowl, aerial surveys were conducted in 2010 to update information on bird use of the area for the ecological assessment of the CPA.

Surveys were conducted along 85 km of transects on the northern shoreline of Kwets'ootł'àà between Boundary Bay and Frank Channel (Figure 9, Figure 10). Sirois (1993) determined that >90% of the waterfowl population of the North Arm use the islands of the north shore during

spring, likely because the south shore experiences more severe weather conditions (e.g., higher winds). In order to compare 2010 data with previously surveys conducted in the area (1989-1992), aerial surveys followed the same protocols and transects were a subsample of previous CWS surveys of the key migratory bird terrestrial habitat site (Fournier et al. Unpublished).

Twenty-two aerial surveys were conducted: eight during the spring (May 8, 12, 18, 22, 27 and 31, and June 5 and 12) and fourteen during the fall (August 16, 21, 26 and 31, September 7, 12, 17, 22 and 29, October 2, 7, 12, 17 and 22). All surveys were conducted in a Bell 206B Jet Ranger helicopter, flying at a ground speed of 80 km/hr, at a height of approximately 45 m in the spring and 60 m in the autumn. As in previous surveys of this area, two observers, one in the front left and one in the rear right of the aircraft, recorded all birds within 200 m of the transects in spring and within 400 m of the transects in autumn. Waypoints and transect lines were programmed into OziExplorer GPS mapping software© (version 3.95.5k, D & L Software Pty Ltd, Brisbane, Australia) to ensure that survey routes were replicated during subsequent surveys.

Waterfowl species (if determined), time of observation, breeding status, and number of individuals was recorded using a digital voice recorder. Observations were later transcribed. Each observation was geo-referenced by linking the time of the observation to the most similar time on the GPS track log from the flight path.

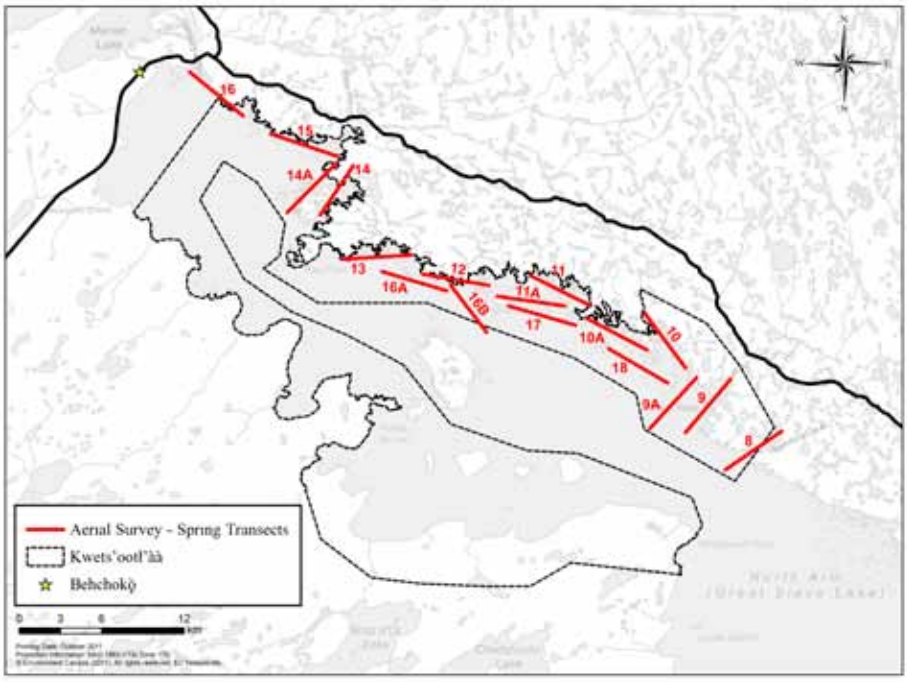

Figure 9: Locations of spring aerial waterfowl survey transects in the Kwets'ootł'àà candidate protected area.

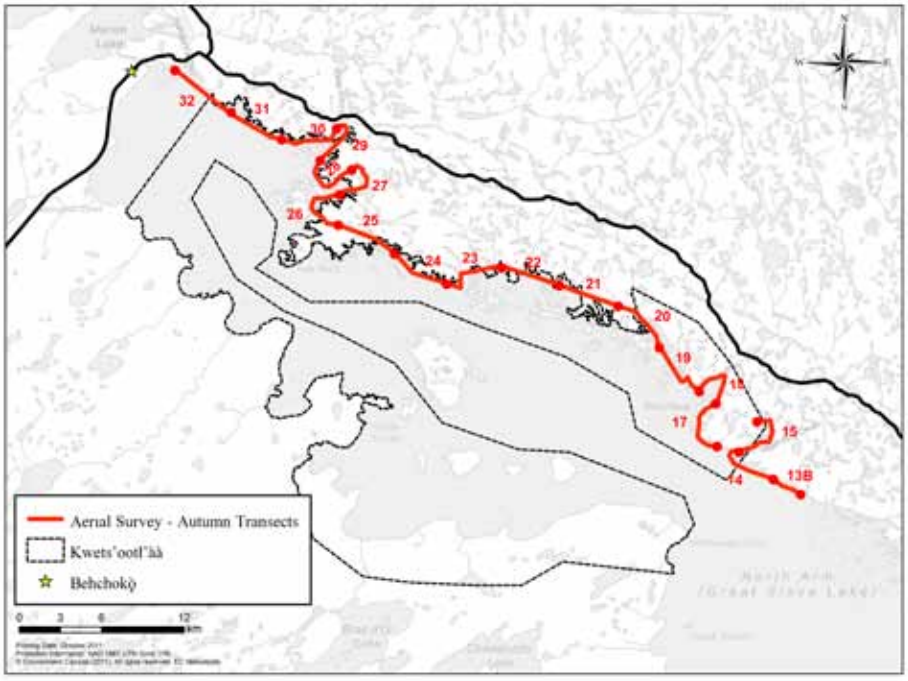

Figure 10: Locations of fall aerial waterfowl survey transects in the Kwets'ootł'àà candidate protected area.

Species Density and Distribution Analysis

A series of maps were created to illustrate the spatial distribution and abundance of larid colonies and waterfowl in Kwets'ootł'àà. Densities were calculated using the number of nests located during larid censuses (nests/km^2) and individual waterfowl located during aerial surveys (birds/km^2). Maps were created using the kernel density function of the Spatial Analyst extension for ArcGIS 9.3 (Environmental Research Systems Institute 2009) with cell size set to 50 m, and bandwidth (the size of the neighbourhood in which features have influence on each other when calculating cell densities) set to 1000 m for all maps. A bandwidth of 1000 m fit within the ArcGIS suggested value based on the minimum dimension of the extent of our data.

As there was little variation in nesting densities among larid species, our results were mapped using the same five classes to allow easy visual comparisons across species. Waterfowl density results were mapped in five classes using the Geometrical Interval classification method available in ArcGIS 9.3 software (Environmental Research Systems Institute 2009).

In previous surveys, the survey area was divided into three similarly sized geographic zones for reporting and interpretation of results. Data in 2010 was also summarized to these zones to facilitate data comparisons. These zones are (from north to south): Stagg River (51.1 km^2), Old Fort Rae (64.9 km^2), Trout Rock (59.7 km^2) (Figure 11).

An index of seasonal abundance was calculated as waterfowl use-days to allow for comparisons between important migratory bird stopover sites in the NWT. This index provides a measure of attractiveness of a site or region to waterfowl (Boyd 1974). Seasonal waterfowl use was calculated by averaging the number of waterfowl counted during two consecutive surveys and then multiplying the mean by the number of days between the two survey days. This was repeated for each set of consecutive surveys (i.e., surveys 1 and 2; surveys 2 and 3; surveys 3 and 4). These values were summed to estimate the total number waterfowl use-days over the spring (8 May – 12 June) and fall (16 August – 22 October) survey periods.

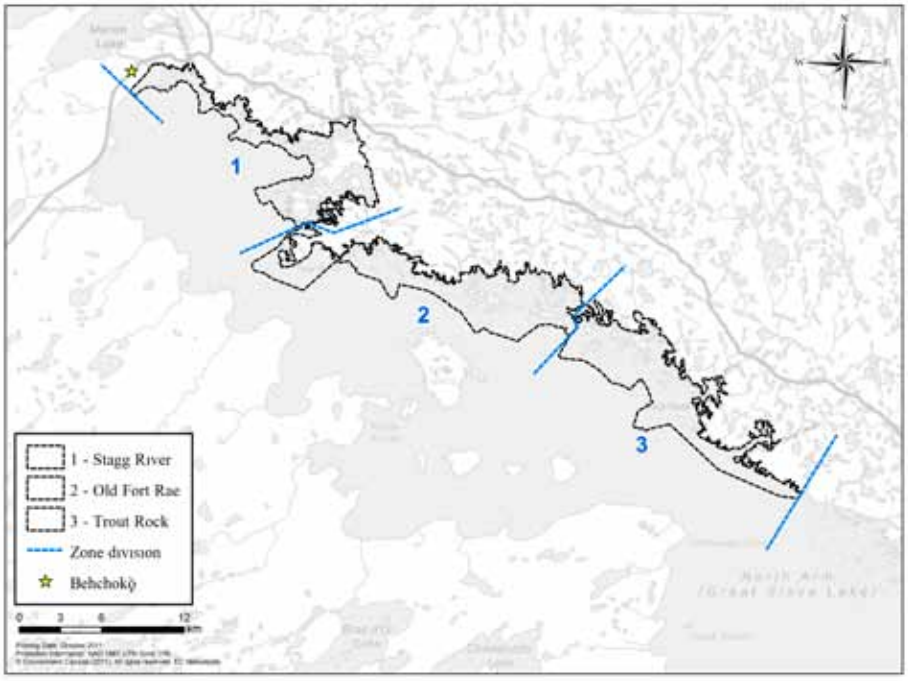

Figure 11: Zones used for reporting larid and waterfowl data in the Kwets'ootł'àà candidate protected area.

Marsh Bird and Species at Risk Surveys

Abundance and distribution of marsh birds and Species At Risk inhabiting Kwets'ootł'àà are generally poorly known. Therefore, as part of the CPA's ecological assessment, surveys were conducted to identify these species in June, 2011. The surveys were designed locate and identify marsh birds and Species At Risk present within the in Kwets'ootł'àà CPA, including Yellow Rail (*Coturnicops noveboracensis*), Olive-sided Flycatcher (*Contopus cooperi*), Rusty Blackbird (*Euphagus carolinus*), and Common Nighthawk (*Chordeiles minor*).

Point count surveys were conducted within the CPA, with survey points located on both the north and south shorelines and on islands with suitable habitat. Survey points were spaced at least 400 m apart to reduce the likelihood of double counting birds at adjacent playback stations and

were placed in locations with suitable habitat for the target species based on satellite imagery of the area (i.e., marsh). Surveys were conducted between 2300 and 0900. To increase detections of target species, bird call playbacks were used and included Sora (*Porzana Carolina*), American Bittern (*Botaurus lentiginosus*), Horned Grebe (*Podiceps auritus*), American Coot (*Fulica Americana*), and Olive-sided Flycatcher calls. Bird observations, both visual and audio, were recorded. Species, sex, location of the observation (survey point location; GPS) and breeding status (lone or paired) was recorded for each individual when possible.

Incidental Wildlife Observations

Incidental observations of wildlife were collected during surveys of the area and contributed to the ecological assessment. These include geo-referenced observations of mammal, raptor, corvid, and waterbird species.

Sandhill Crane - **Lisa Pirie**

Results and Discussion

Ecological Representation

One of the main goals of the NWT PAS is to protect core representative areas within each ecoregion to contribute to the conservation of the complete diversity of all life forms and their habitat (The Northwest Territories Protected Areas Strategy Advisory Committee 1999). Using improved spatial information and a more detailed understanding of climate and landscape patterns and processes through intensive aerial surveys, a revised delineation of ecoregions in the NWT has been created (Ecosystem Classification Group 2007;2008). The re-classified ecoregions included in Kwets'ootł'àà are Great Slave Plain High Boreal and Great Slave Lowland High Boreal (Table 17, Figure 3).

Table 17: Ecoregions within the Kwets'ootł'àà candidate protected area.

Ecoregion	Ecoregion Area (km^2)	Ecoregion area within Kwets'ootł'àà (km^2)	% of Kwets'ootł'àà	% within Kwets'ootł'àà
Taiga Plain				
Great Slave Plain High Boreal	15,837	281	47%	1.8%
Taiga Shield				
Great Slave Lowland High Boreal	11,040	312	53%	2.8%
Total	**26,877**	**593**	**100%**	**2.2%**

An "open scenario" analysis of the ecological representivity of the area shows Kwets'ootł'àà CPA does not contribute greatly to achieving ecological representation (NWT Protected Areas Strategy Science Team 2009). This is likely because it contains only small areas of land along the southeastern and northeastern shores. Kwets'ootł'àà consists mostly of freshwater habitat, for which no ecological representation targets currently exist within the PAS goals. In addition, many representation objectives are already met by other conservation initiatives within these ecoregions (i.e., Thaidene Nene Land Withdrawal for the proposed National Park, Dehcho Land Use Plan Conservation zones and Edéhzhíe candidate protected area).

However, Kwets'ootł'àà contains one small area north of Chedabucto Lake that is important for meeting ecological representation. Waite Island, located outside Kwets'ootł'àà, also appears important in achieving representation goals and should be considered for inclusion in the CPA during boundary discussions (NWT Protected Areas Strategy Science Team 2009).

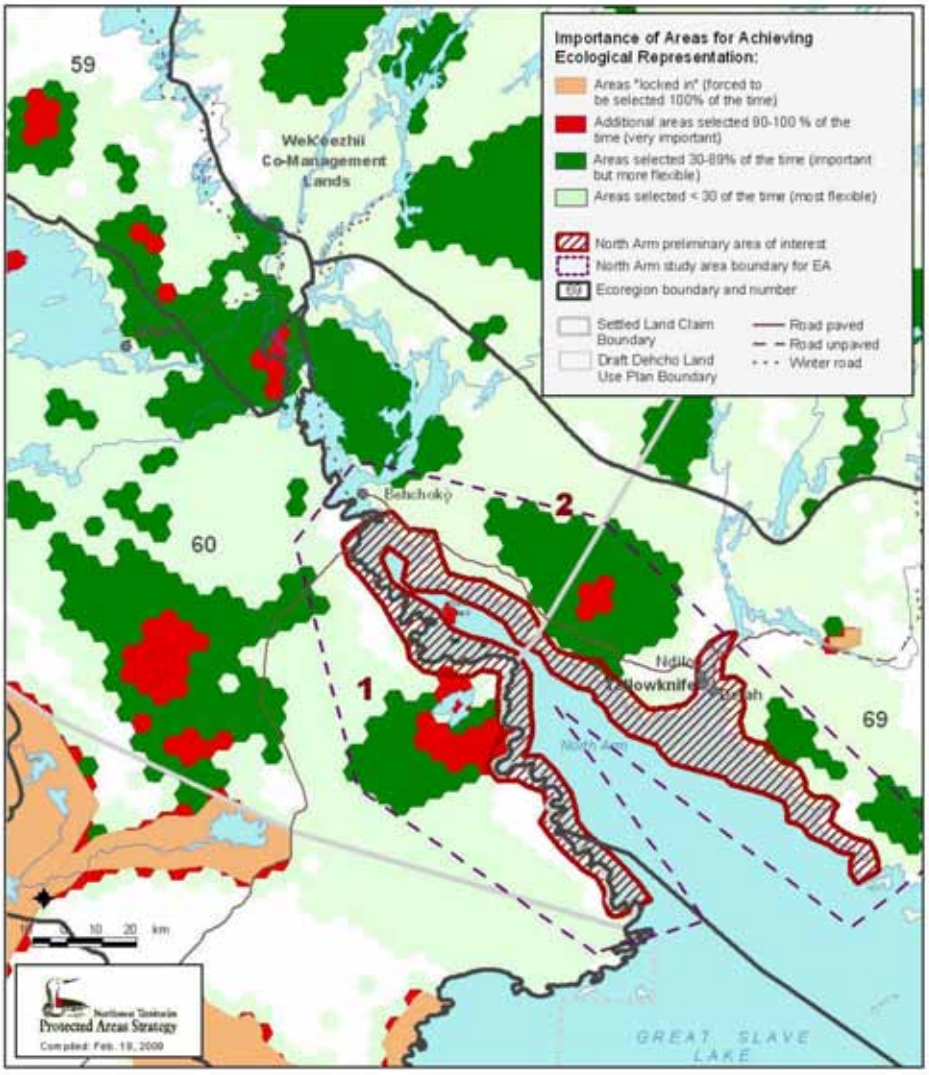

Figure 12: Ecological representation of the Kwets'ootł'àà candidate protected area (NWT Protected Areas Strategy Science Team 2009).

Watersheds

Protection of major water bodies and their associated waterways, shorelines, marshes and wetlands is important in maintaining water quality and for providing wildlife habitat. Kwets'ootł'àà is located within the Great Slave sub-basin of the Mackenzie River Basin (Mackenzie River Basin Board 2004) and includes portions of three watersheds; Westshore (2.5%), Snare (0.7%) and Yellowknife (0.6%; Table 18, Figure 13). The Westshore, Snare and Yellowknife watersheds drain 49%, 29% and 22% of Kwets'ootł'àà, respectively.

Table 18: Watersheds within the Kwets'ootł'àà candidate protected area.

Watershed	Watershed Area (km^2)	Watershed area within Kwets'ootł'àà (km^2)	% of Kwets'ootł'àà	% within Kwets'ootł'àà
Snare	25,854	170	29%	0.7%
Yellowknife	20,482	133	22%	0.6%
Westshore	11,638	290	49%	2.5%
Total	**57,974**	**593**	**100%**	**1.0%**

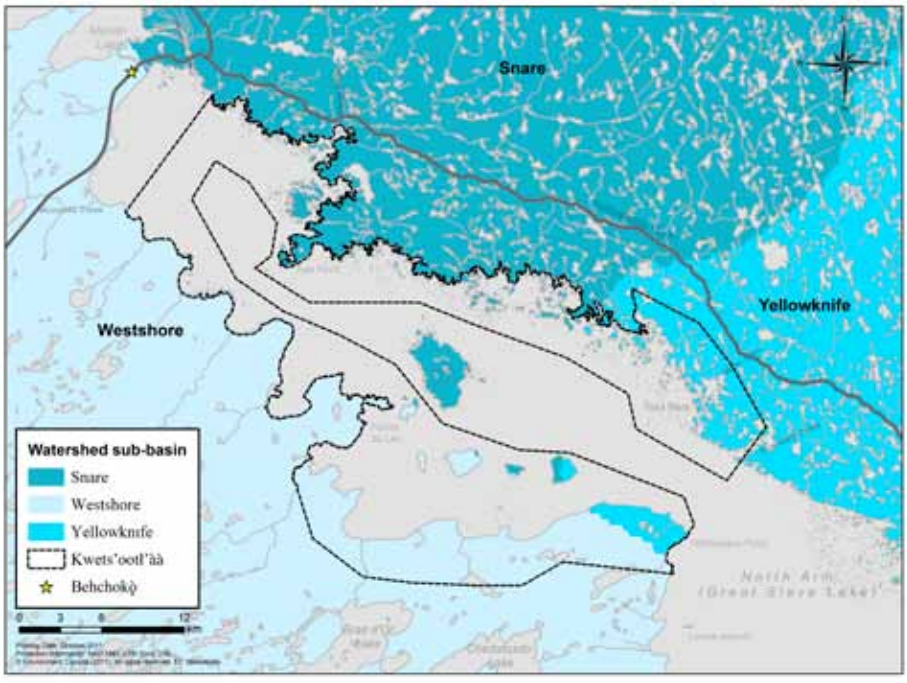

Figure 13: Watersheds within the Kwets'ootł'àà candidate protected area.

Larid Censuses

Larid nests were found along the northern shoreline between Frank Channel and Trout Rock within the Kwets'ootł'àà CPA. The western shores of the CPA were not surveyed and no nests were found along the western shoreline or around Waite Island during aerial reconnaissance on 2 July, 2010. A total of 1,910 adults and 1,050 nests, including apparently occupied nests, were found at larid colonies, with the highest densities occurring within the Trout Rock zone (Table 19; Figure 14). A total of 2,214 eggs and young were counted at a subset of 972 occupied nests in Kwets'ootł'àà with a mean clutch size of 2.28 ± 0.02 (Table 20). Common and Arctic terns were the most numerous larid species nesting in the CPA and were often found nesting together at colony sites (Table 19).

Table 19: Number of nests and adults of Larid species per zone during censuses in the Kwets'ootł'àà candidate protected area, 2010.

Species	Stagg River		Old Fort Rae		Trout Rock		Total	
	Nests #	Adults #	Nests #	Adults #	Nests #	Adults #	Nests #	Adults #
Herring Gull	58	140	18	37	31	67	107	244
Mew Gull	20	40	37	91	25	55	82	186
Ring-billed Gull	0	0	2	2	29	52	31	54
Common Tern	133	228	114	212	246	412	493	852
Arctic Tern	45	55	75	150	153	292	273	497
Caspian Tern	0	0	0	0	65	77	65	77
Total	**256**	**463**	**246**	**492**	**549**	**955**	**1,051**	**1,910**

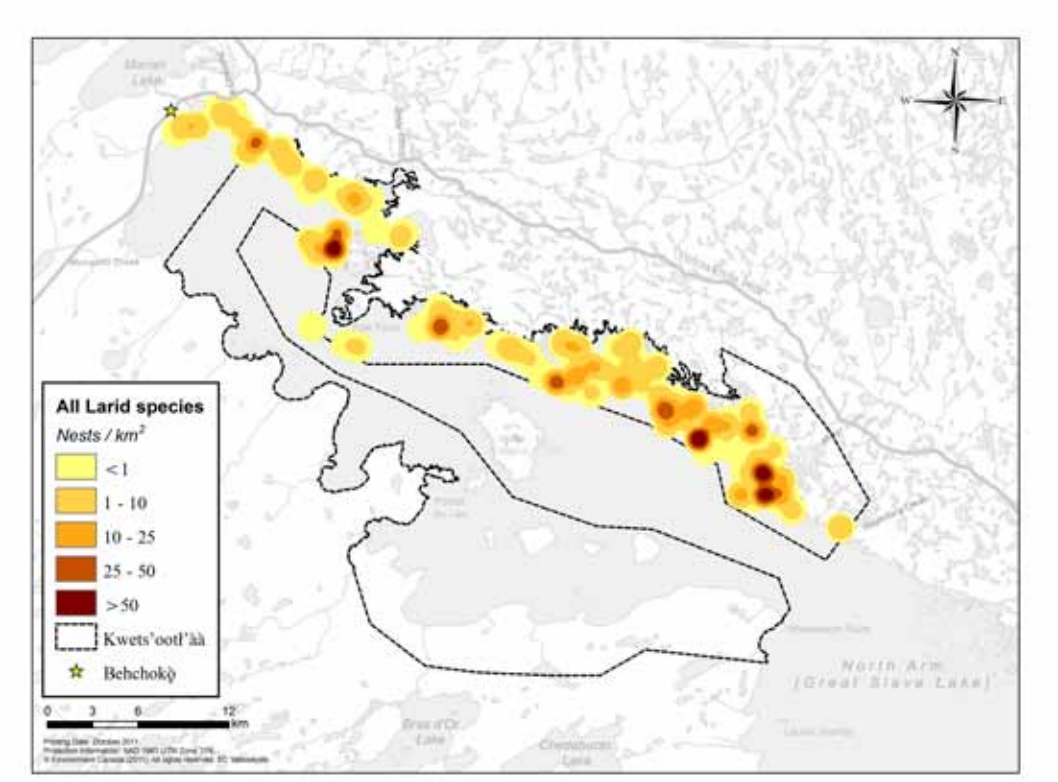

Figure 14: Density and distribution of larid nests in the Kwets'ootł'àà candidate protected area, 2010.

The mean colony size in 2010 was 6.4 nests (or 12-14 adult larids) and 60% of colonies consisted of 1 or 2 nests. The largest colony in 2010 had 97 nests located in the Trout Rock area. The mean number of nests per colony, for all years combined was 15.7 nests (or 30-32 adult larids) and 38% comprised 1 or 2 nests. The largest colony in all years surveyed contained 135 nests (1986) located in the Old Fort Rae zone.

Table 20: Nest data of Larid species during censuses in the Kwets'ootł'àà candidate protected area, 2010.

Species	Clutch Size			# of eggs and/or young	n	Mean	SE
	1	2	3				
Herring Gull	17	16	6	153	70	2.19	0.09
Mew Gull	12	17	14	130	60	2.17	0.10
Ring-billed Gull	5	4	3	46	26	1.77	0.15
Common Tern	42	60	92	538	217	2.48	0.05
Arctic Tern	30	36	6	164	87	1.89	0.07
Caspian Tern	14	31	11	126	60	2.10	0.08
Common/Arctic Tern	88	179	167	1,057	452	2.34	0.03
Total	**208**	**343**	**299**	**2,214**	**972**	**2.28**	**0.02**

Over 90% (149/164) of all colonies sites supported only one or two breeding species in 2010. Thirteen colonies sites supported three nesting species, and two colonies sites had four species (see individual species results for details).

Based on CWS surveys (1986, 1990-1995, 2000-2002, 2010) with complete and partial coverage of the CPA, Kwets'ootł'àà supports at least 252 unique larid colonies, which represents 63% of known larid colony sites between Yellowknife Bay and Behchokǫ̀ on GSL. Of these 252 sites, 41 were occupied >50% of the years surveyed, with the majority being used only once in all survey years (Stagg River 60%; Old Fort Rae 67.4%; Trout Rock 55.9%). Variation in annual nest site location is common in larids. Common Tern colonies have moved en mass, with a mean distances between colony sites of 37 km (Great Lakes; see Haymes and Blokpoel 1978 in Nisbet 2002).

Low colony site return rates (i.e., low site fidelity) has been associated with unstable (e.g., sand bars, marshes) or unpredictable habitats (e.g., water level fluctuations, predation rates; McNicholl 1975, Burger 1982, Kilpi 1995). In Kwets'ootł'àà, low site fidelity may be linked with spring break-up chronology on GSL which could affect access to sites and alter prey and predator dynamics. Human activity has been linked directly and indirectly (by increased egg and chick loss due to predation) to the abandonment of entire colonies of Caspian Terns (Hydroprogne caspia; for a review see Cuthbert and Wires 1999) and early ice break-up may permit human access at critical nesting times. Similarly, Arctic Terns generally have high site fidelity with dispersal occurring in response to changes in food abundance and distribution or predators (Hatch 2002). Further investigation would be required to determine the ultimate causes of the shifts in nest-site use that have been documented within Kwets'ootł'àà. Carreker (1985) suggests that because larids, particularly terns, frequently shift nesting sites between years, a larger amount of habitat than is being used at any year should be protected in order to accommodate future needs. Similarly, in areas with shifting breeding colony sites, protecting previously occupied larid nesting sites is important to effectively conserve these species (Kilpi 1995).

Caspian Tern

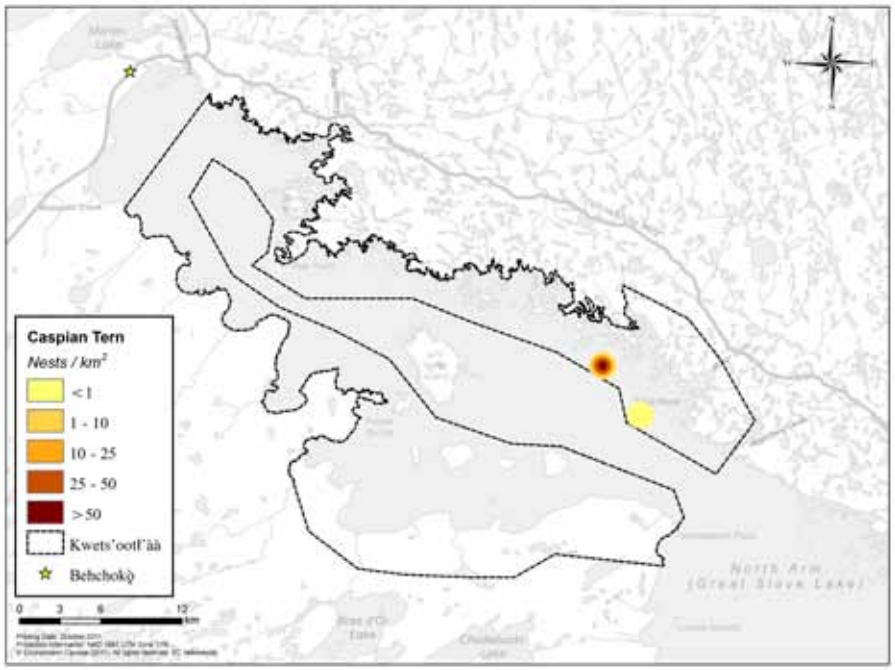

Figure 15: Density and distribution of Caspian Tern nests in the Kwets'ootł'àà candidate protected area, 2010.

In 2010, 65 Caspian Tern nests were found at two colonies in the Trout Rock zone (Table 19; Figure 15). One colony site contained 98% (64/65) of nests in 2010 and was also used in 2000. Caspian Terns nest in a variety of habitats, but select sites with open, flat islands or similar environments that provide protection to vulnerable eggs and young from ground predators; this includes small open rock, pebble, gravel, or sandy beach islands (Cuthbert and Wires 1999). The number of colony sites used by Caspian terns in all years of surveys in Kwets'ootł'àà varied from 2-11 sites per year, with a total of 23 different sites used. Adults show a strong fidelity to colony sites (Cuthbert and Wires 1999) and between 1986 and 2010, 8 colony sites in Kwets'ootł'àà contained 100% of nests during five survey years (1991: 15/15, 1992: 44/44, 1993: 62/62, 2001: 76/76, 2010: 65/65), and >49% in the remaining years (1986: 98%, 49/50 nests; 1994: 62%, 54/87; 1995: 49%, 40/81; n = 8 surveys, years with complete coverage). These eight colony sites were located in the Trout Rock zone and in all years except 1995, this zone contained the highest density of Caspian Tern nests.

A total of 126 Caspian Tern eggs and young were found in 60 nests in 2010 (Table 20). The mean clutch size was 2.1 ± 0.08, excluding 12 depredated eggs. On 27 June, 10 nests had 17 chicks and eight nests had 10 eggs showing evidence of hatching (e.g., pipping). The estimated first egg laying date for 2010 was 1 June, based on a 26 day incubation period beginning immediately after the first egg is laid (Cuthbert and Wires 1999). This clutch initiation date is similar to that observed by Sirois and Seddon (1990) from this area.

Caspian Tern nests were located near other larid species' nests at both colony sites in 2010. At the main colony, there were 28 Ring-billed Gull (Larus delawarensis) and five Herring Gull (L. argentatus) pairs and at the satellite colony there were 14 Herring Gull and one Arctic Tern pair. Similarly, during all survey years with complete coverage (n = 8 surveys, 1986-2010) in Kwets'ootł'àà, Caspian Terns were observed nesting with up to 4 other larid species including with Common Tern (78% of sites, 40/51),Ring-billed Gull (33%, 17/51), Herring Gull (24%, 12/51), Arctic Tern (29%, 15/51) and Mew Gull (Larus canus; 22%, 11/51). Two Caspian Tern breeding sites (<5%, 2/51) did not have other larid species present.

Common Tern

In 2010, 492 Common Tern nests were counted at 50 colony sites in Kwets'ootł'àà (Table 19). Common Terns prefer to nest on sand, gravel, cobble or rocky islands that have scattered low vegetation or other protected sites where chicks can shelter (Nisbet 2002). Over half of Common Tern colony sites were located in the Trout Rock zone (27/50), with the remaining sites distributed along Stagg River (Smith Island, 24%, 12/50) and Old Fort Rae (southeast of Rae Point, 22%, 11/50) (Figure 16). During all survey years with complete coverage (n = 8 years, 1986-2010), the number of colony sites used by this species in Kwets'ootł'àà ranged from 22-50. Natal site fidelity is often high for Common Tern, with many chicks returning to breed when they are three years old; similarly colony site fidelity is also high (Nisbet 2002). The Trout Rock zone was the most heavily used area by nesting Common Terns in all years with complete survey coverage of the CPA.

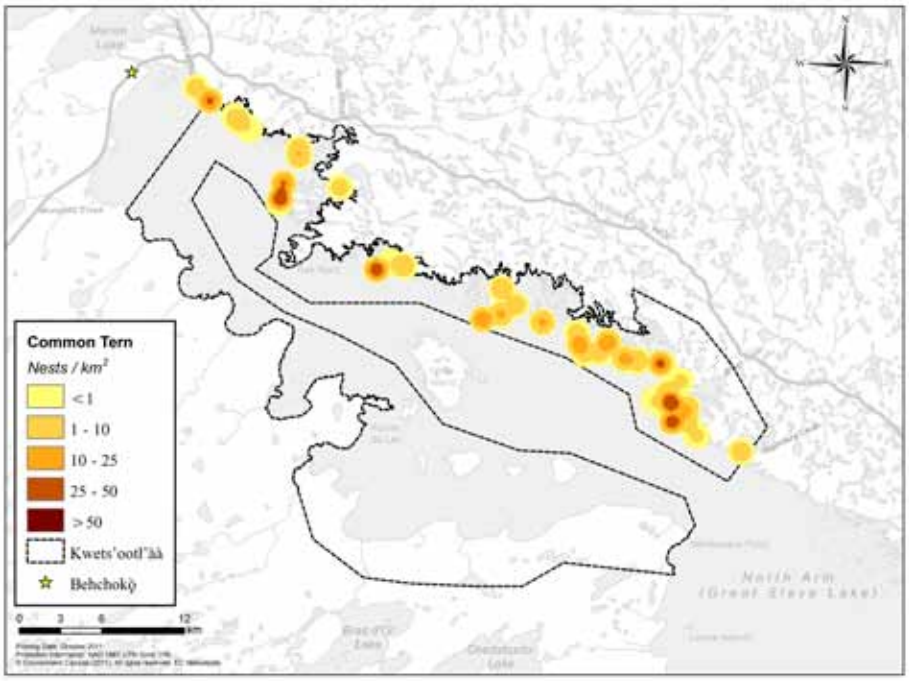

Figure 16: Density and distribution of Common Tern nests in the Kwets'ootł'àà candidate protected area, 2010.

A total of 538 eggs and young were found in 217 nests in 2010 (mean clutch size = 2.48 ± 0.05; Table 20). On 23 June, nine hatched young (from eight nests) and 15 eggs (from 13 nests) at different stages of hatching were found at one colony. Using this data and based on a 23 day mean incubation period from the first egg laid (Nisbet 2002), the estimated the first egg laying date for Common Tern in 2010 is 31 May. This clutch initiation daea is similar to that reported by McCormick and Sirois (1988) for the area. Four eggs were depredated at colonies and 17 nests were abandoned.

In 2010, Common Terns nested in association with four other larid species and up to three species at any one location. Common Terns generally select islands for nesting that are closer inshore and use sites with more vegetative cover than those sites used by Arctic Terns (Palmer 1949, Chapdelaine et al. 1985, Kirkham 1986, C. S. Hall *in* Nisbet 2002). However, Arctic Terns were found at 52% (26/50) of the colonies and Mew Gulls were found at one third (30%, 15/50). At 18% (9/50) of colonies, single pairs nested alone and at 36% (18/50) Common Tern were the only larid species present. Throughout previous surveys with complete coverage of the CPA (n = 8 years 1986 – 2010), Common Terns were observed nesting with up to four other larid species at one colony site, nesting in association with Arctic Tern (49% of sites, 143/294), Mew Gull (31%, 91/294), Herring Gull (15%, 44/294), Caspian Tern (14%, 40/294) and Ring-billed Gull (13%, 39/294). Common Terns nested without other larids at 24% (70/294) of sites within Kwets'ootł'àà (1986 – 2010).

Arctic Tern

In 2010, 273 Arctic Tern nests were counted at 63 colony sites in Kwets'ootł'àà (Table 19). Frequently they are found nesting on islands with loose substrate, low vegetation or rock (Hatch 2002). Over half of Arctic Tern nests were located in the Trout Rock zone (56%, 153/273), with fewer in the Old Fort Rae and Stagg River zones (27%, 75/273 and 16%, 45/273, respectively; Table 19; Figure 17). The number of colony sites used by Arctic terns in Kwets'ootł'àà varied from 10-63 sites (n = 8 survey years with complete coverage 1986-2010) with the Trout Rock zone being the area most used for nesting. Natal dispersal for this species range from <20 km to approximately 1,000 km (for details see Hatch 2002), suggesting that many of the birds nesting in the CPA may have also hatched in this area.

A total of 164 eggs and young in 87 nests were found in 2010 (mean clutch size 1.89 ± 0.07; Table 20). One nestling and five eggs at different stages of hatching (from six nests) were found on 25 June 2010 at one colony. Based on a mean 22 day incubation period (Hatch 2002), the first egg laying date for this colony was estimated to be 3 June. McCormick and Sirois (1988) also reported that Arctic Tern initiated laying after Common Tern in this area. During the 2010 survey, four depredated eggs and six abandoned nests were found.

In 2010, Arctic terns nested in association with five other larid species and up to three species at one site. Arctic Terns were found nesting with Common Terns (41%, 26/63 sites), or with conspecifics only (24%, 15/63). Single pairs were found at 37% (23/63) of sites. During previous years with complete coverage of Kwets'ootł'àà CPA, Arctic Terns were observed nesting with up to 4 other larid species at one site including Common Tern (71%, 143/202), Mew Gull (41%,82/202) and Herring Gull (17%, 34/202; n = 8 survey years, 1986-2010). At 12% (24/202) of colony sites, Arctic Tern were the only larid species nesting. When nesting with Common Terns, Arctic Terns are often found in the centre of the islands, with the Commons nesting at the edges (Hatch 2002).

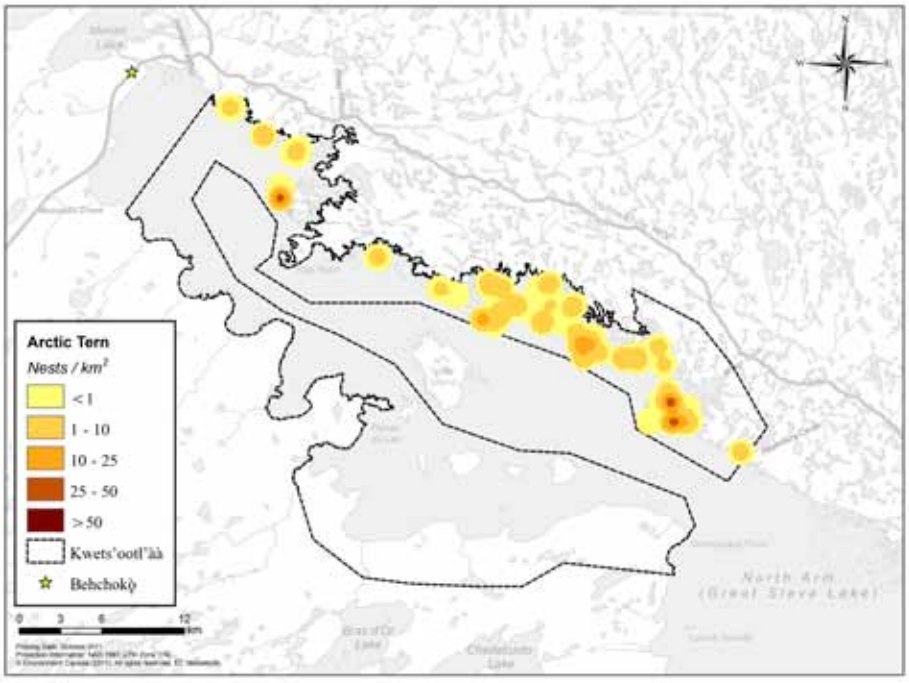

Figure 17: Density and distribution of Arctic Tern nests in the Kwets'ootł'àà candidate protected area, 2010.

Herring Gull

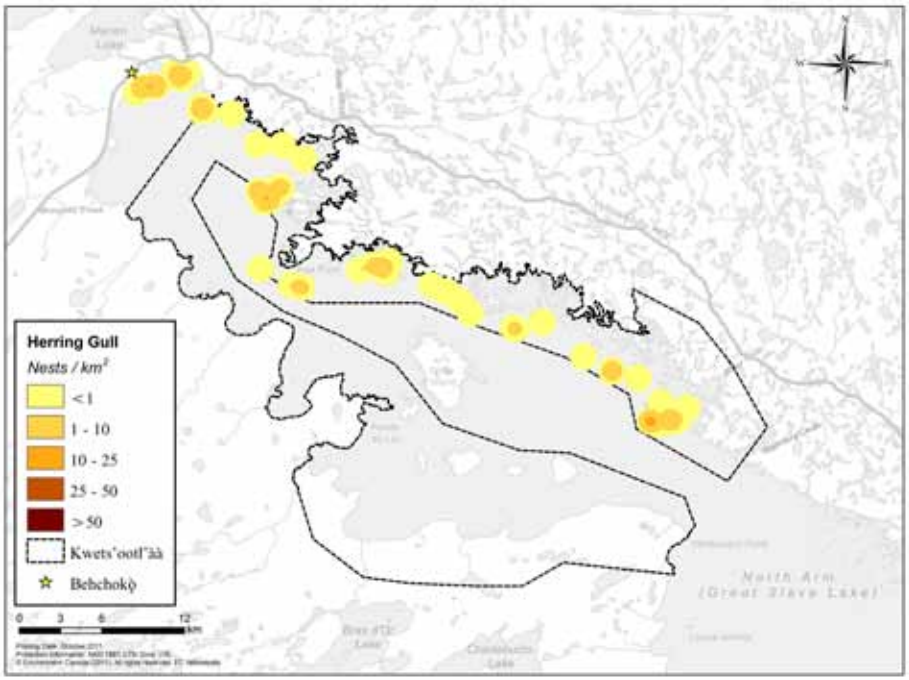

Figure 18: Density and distribution of Herring Gull nests in the Kwets'ootł'àà candidate protected area, 2010.

In 2010, 107 Herring Gull nests were located at 56 colonies in Kwets'ootł'àà (Table 19). Half of the Herring Gull nests were located in the Stagg River zone (54%, 58/107), with the remaining 29% (31/107) and 17% (18/107) within the Old Fort Rae and Trout Rock zones, respectively (Table 19; Figure 18). Variation in site use is typically low, with males being more philopatric than females resulting in pairs using the same breeding territory until death or abandonment of the site (Pierotti and Good 1994). The number of colony sites used in Kwets'ootł'àà varied from 9-56 sites and the number of nests varied from 1-14 nests per site (n = eight survey years with complete coverage, 1986-2010). Natal site fidelity is density-dependent with dispersal generally occurring when densities are high (Pierotti and Good 1994). Herring Gull site requirements may inhibit terrestrial predators' access and shelter nests from prevailing winds as they typically nest on rocky, well drained islands with vegetative cover or other physical barriers (rock, crevice) to provide protection and to act as a visual barrier to other nests (Pierotti and Good 1994).

In 2010, 153 Herring Gull eggs and young from 70 nests were found (mean clutch size = 2.19 ± 0.09; Table 20). Seven nestlings and one pipping egg (from five nests) were found on 22 June, 2010 at one colony. The estimated first egg laying date for this site was 24 May, given a 30 day mean incubation period (Pierotti and Good 1994). As in previous surveys, Herring Gulls were the earliest to nest in this area (Sirois et al. 1995). Three eggs were depredated and no nests were abandoned during the study period.

In 2010, Herring gulls nested in association with five other larid species, with up to four species at once. At 84% (47/56) of colonies Herring Gull nested with only conspecifics, and frequently single pairs nested alone (66%, 37/56). Arctic terns nested at 13% (7/56) of the Herring Gull colony sites. In eight years of surveys between 1986–2010 with complete CPA coverage, Herring gulls nested with other larids at 41% (61/150) of sites within Kwets'ootł'àà CPA, and 77% (115/150) contained a single nesting pair. There were three times more colonies and nests in Kwets'ootł'àà in 2010 than any other survey year (previous maximum 1994; 18 colonies and 28 nests).

Mew Gull

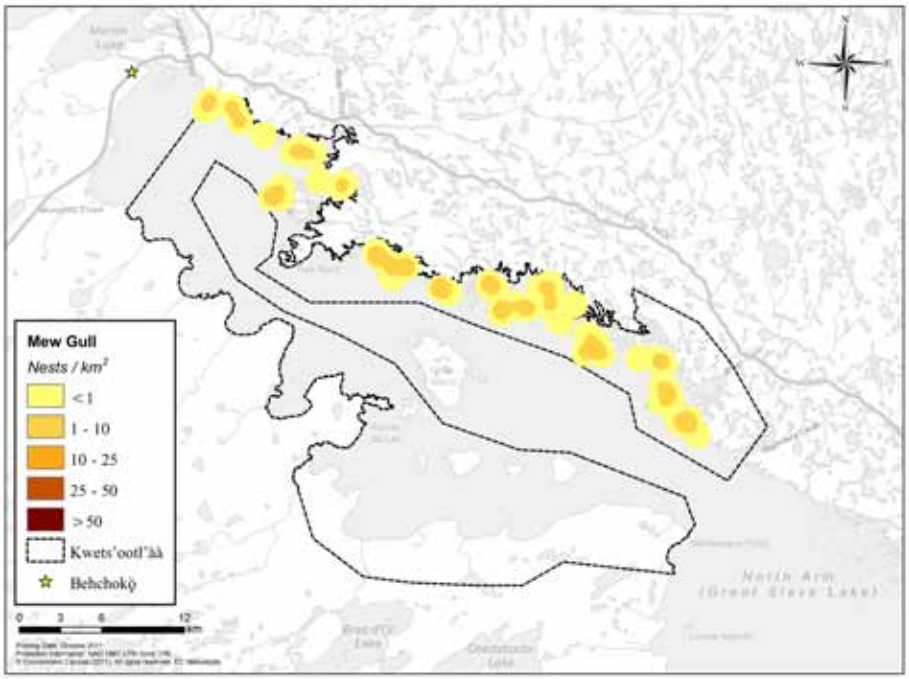

Figure 19: Density and distribution of Mew Gull nests in the Kwets'ootł'àà candidate protected area, 2010.

Eighty-two Mew Gull nests were found at 63 colonies during surveys conducted in Kwets'ootł'àà in 2010 (Table 19). The Old Fort Rae zone contained 45% (37/82) of Mew Gull nesting colony sites, while 31% (25/82) were within Trout Rock and 24% (20/82) were within the Stagg River zone (Table 19; Figure 19). The number of Mew Gull colony sites varied from 9 to 63 and the number of nests at a site varied from 1-10/site for all years with complete coverage in Kwets'ootł'àà (n = 8 survey years, 1986-2010). Smaller Mew Gull nesting colonies in Europe were found to have higher site turnover rates than those with >5 pairs, with 50% of colony sites used from one year to the next (Wesolowski et al 1995 in Moskoff and Bevier 2002). However, only 5% of Mew Gull pairs changed nesting islands during a 25 year study in Estonia (Moskoff and Bevier 2002). During all comparable survey years in Kwets'ootł'àà, Trout Rock was the most frequently used zone by nesting Mew gulls (69/169 colony sites and 127/272 nests, n = 8 survey years). In the 2010 surveys, Mew Gulls generally nested on islands closer to the shoreline than the other larids. Mew Gulls nesting in a variety of habitats, nesting in trees and on the ground; generally, when they nest near water they select rocky treed islets or rocky islands, with large boulders or low vegetation cover (Moskoff and Bevier 2002).

A total of 130 eggs and young from 60 Mew Gull nests were recorded in 2010 (mean clutch size = 2.17 ± 0.10; Table 20). Three nestlings were found in one nest on 23 June, 2010. With a mean 25 day incubation period commencing after laying is complete (mean laying period of 3.7 days for a three egg clutch; Moskoff and Bevier 2002), the estimated first egg laying date for this Mew Gull nest was 27 May, 2010.

In 2010, Mew gulls nested in association with three other larid species, Arctic Tern (46%, 29/63), Common Tern (24%, 15/63) and Herring Gull (6%, 4/63). These four species were found nesting together at one colony site. Colonies with only Mew gulls occurred at 43% (27/63) of sites, while lone pairs were found at 83% (52/63) colony sites. Generally in Kwets'ootł'àà, Mew gulls nested in association with conspecifics (27%, 44/163 of sites) or as lone pairs (73%, 119/163; n = 8 surveys, years with complete coverage 1896 - 2010). The breeding population within Kwets'ootł'àà in 2010 was twice as large and there were three times the number of colony sites than previous years (prior maximums = 46 nests in 1995; 21 colony sites in 2001).

Ring-billed Gull

Thirty-one Ring-billed Gull nests were found in 2010 in three colonies in Kwets'ootł'àà CPA, with the majority (94%, 29/31) found within the Trout Rock zone (Table 19; Figure 20). Older, successful males breeding in stable habitats typically have high site fidelity (Ryder 1993). The number of colony sites used in Kwets'ootł'àà varied from 3-11 sites for this species from 1986–2010 (n = 8 surveys, years with complete coverage). Number of nests at a site varied from one to 132 nests during all survey years with the Old Fort Rae zone most frequently used. Ring-billed Gulls generally nest on the ground in close proximity to water selecting low elevation (2-30 m) islands with sparse or woody vegetation.

A total of 46 eggs and young from 26 Ring-billed Gull nests were located in 2010 (mean clutch size = 1.77 ± 0.15; Table 20). On 27 June, there were 24 nestlings from 15 nests at one colony. Accounting for laying and incubation periods of Ring-billed Gulls (mean = 1.92 days and 26.1 days, respectively; Ryder 1993), the estimated first egg laying date for this colony was 30 May, 2010 .

Ring-billed Gulls nested in association with four other larid species during the 2010 breeding season. Ring-billed Gulls usually nested with Common Terns (68%, 39/57 of sites) and with other conspecifics (89%, 51/57) in the Kwets'ootł'àà CPA (n = 8 surveys, years with complete coverage 1986 – 2010). The number of Ring-billed Gull nests in Kwets'ootł'àà's was six times lower in 2010 than the previous minimum number of nests (n = 214 nests; 1995), and 10 times lower than the previous maximum (n = 333 nests; 2001).

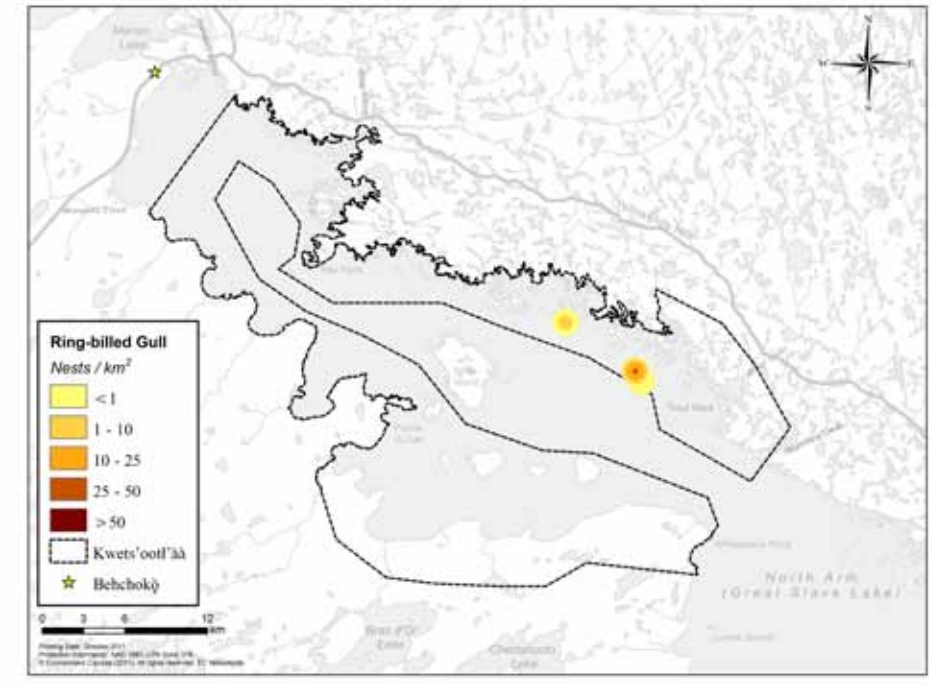

Figure 20: Density and distribution of Ring-billed Gull nests in the Kwets'ootł'àà candidate protected area, 2010.

California Gull

Non-breeding California Gulls (*Larus californicus*) have been observed in Kwets'ootł'àà but no colony sites have been found. Colony sites have been located near Enodah, West Mirage Islands and Yellowknife Bay (Sirois et al. 1989, Sirois and Seddon 1990, Sirois et al. 1995). It is possible that this species nests within the Kwets'ootł'àà boundary even though nests have not been located. California Gulls nest on islands, with some pairs nesting next to shrubs, while other prefer open sites (see Winkler 1996).

Larid colony site within the Kwets'ootł'àà CPA - **Paul Woodard**

Aerial Waterfowl Surveys

During the 2010 spring and fall aerial survey periods, a total of 72,287 individual waterfowl, from at least 21 species were observed in Kwets'ootł'àà CPA. Overall, waterfowl use of Kwets'ootł'àà was higher during the autumn surveys in 2010.

The survey data reported here are conservative estimates as they have not been corrected for visibility bias. Visibility bias corrections for the nearby Yellowknife Study Area resulted in increases of 1.7-2.3 times the number of individuals recorded (Dufour et al. Unpublished). Many factors hinder identification from the air, including lighting, observation duration, observer experience, evasive responses of waterfowl (e.g., diving) and the ability to view distinguishing characteristics of birds from the air. The latter factor can present a problem even for ground surveys (e.g., Lesser vs. Greater Scaup, single females or even molting individuals in eclipse plumage). To account for this limitation, we used waterfowl groupings based on physical or behavior similarities.

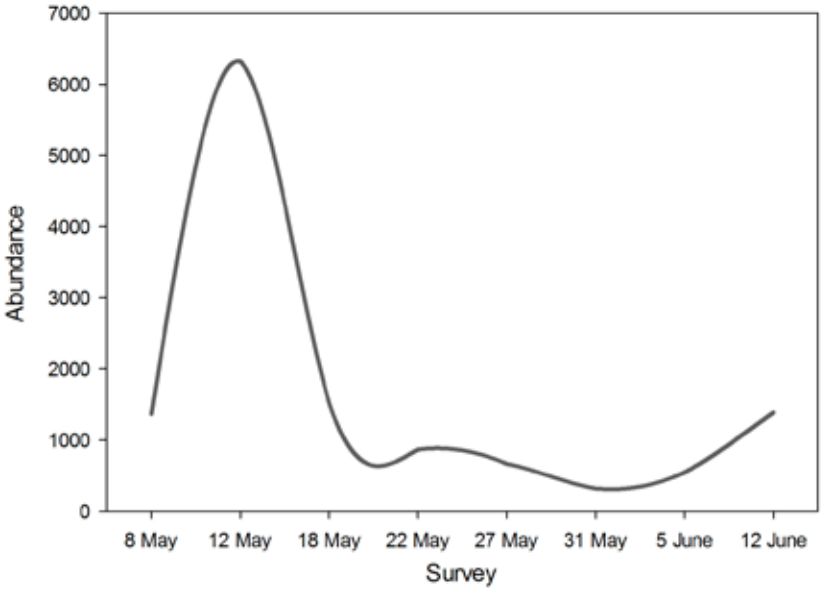

Figure 21: Spring waterfowl abundance in the Kwets'ootł'àà candidate protected area (8 May – 12 June 2010).

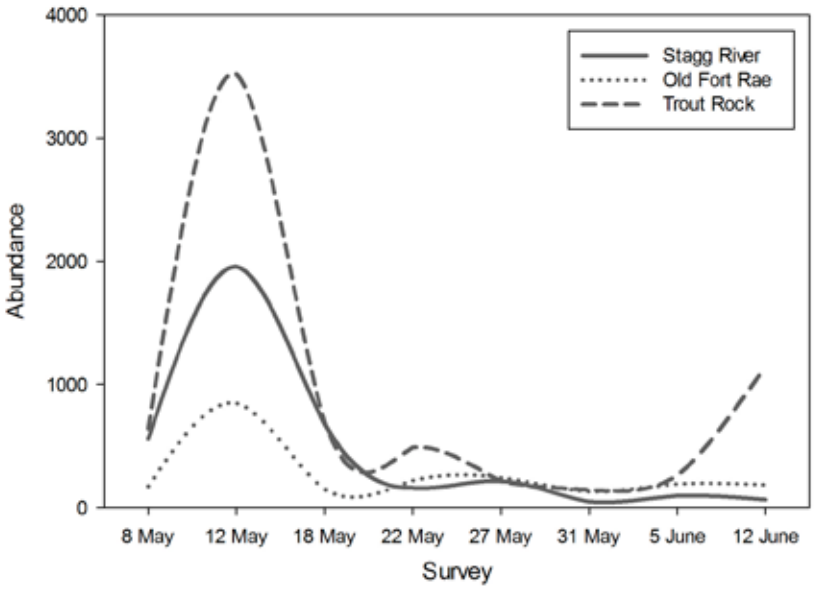

Figure 22: Waterfowl abundance in three zones in the Kwets'ootł'àà candidate protected area, 2010.

Spring Surveys

During the spring period (8 May – 12 June, 2010) waterfowl use was estimated at 58,323 waterfowl use-days (Table 21). Peak waterfowl abundance occurred on 12 May, when 6,323 waterfowl were observed in Kwets'ootł'àà (Figure 21). This peak coincides with the waters of the North Arm becoming ice-free. Waterfowl abundance dropped significantly after this date likely due to water opening in other breeding areas in the Northwest Territories. The Trout Rock zone consistently supported the most waterfowl during the spring period, with more than half of all spring waterfowl observations reported (55%, 7,095/13,000; Figure 22).

Table 21: Spring waterfowl use-days in the Kwets'ootł'àà candidate protected area (8 May – 12 June 2010).

	Stagg River	Old Fort Rae	Trout Rock	TOTAL	%
Ducks					
American Green-winged Teal	57	24	36	116	0.2%
American Wigeon	430	524	432	1,385	2.4%
Mallard	1,484	511	1,400	3,394	5.8%
Northern Pintail	407	151	488	1,045	1.8%
Northern Shoveler	112	14	21	147	0.3%
Unidentified dabbling duck	1,579	406	1,756	3,741	6.4%
Dabbling ducks	***4,067***	***1,629***	***4,131***	***9,827***	***16.8%***
Bufflehead	92	251	108	450	0.8%
Canvasback	378	203	1,361	1,942	3.3%
Common Goldeneye	7	139	11	156	0.3%
Common Merganser	5	290	901	1,196	2.0%
Red-breasted Merganser	5	118	32	154	0.3%
Merganser spp.	2,620	346	3,326	6,292	10.8%
Ring-necked Duck	76	86	125	286	0.5%
Scaup spp.	785	822	2,922	4,529	7.8%
Surf Scoter	22	315	34	370	0.6%
White-winged Scoter	0	11	0	11	0.0%
Scoter spp.	45	168	193	406	0.7%
Unidentified diving duck	421	819	566	1,806	3.1%
Diving ducks	***4,454***	***3,565***	***9,576***	***17,595***	***30.2%***
Unidentified duck	287	997	505	1,789	3.1%
TOTAL	**8,808**	**6,191**	**14,212**	**29,210**	**50.1%**
Geese					
Canada/Cackling Goose	6,879	2,521	8,860	18,260	31.3%
Great White-fronted Goose	0	0	1,000	1,000	1.7%
Unidentified dark goose	9	150	5,340	5,499	9.4%
TOTAL	**6,888**	**2,671**	**15,200**	**24,758**	**42.4%**
Swan spp.	**1,282**	**854**	**2,220**	**4,355**	**7.5%**
TOTAL	**16,977**	**9,716**	**31,631**	**58,323**	**100.0%**

In all cases, unidentified classes include large mixed groups, identified species observed in low numbers or unidentified species. Similar species were sometimes hard to identify and in those cases grouped to a species (spp.) category. Refer to species list in Appendix 5 for detailed species presence/absence during aerial surveys.

Geese

Goose abundance (primarily Canada and Cackling goose) peaked on 12 May with >4,440 individuals observed (Figure 23). This was the highest single day count for any species group in 2010. Sirois (1993) reported a two-day peak of 32,200 Canada geese on 21 - 22 May, 1990 between Frank Channel and the Beaulieu River when little ice-free habitat was available elsewhere.

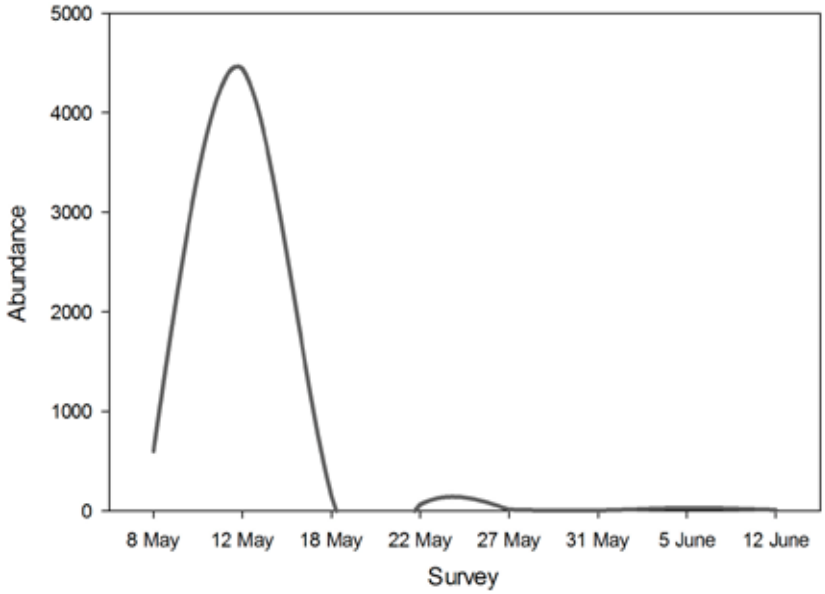

Figure 23: Geese spring abundance in the Kwets'ootł'àà candidate protected area, 2010.

Geese were present on the first survey on May 8, and low numbers of geese persisted until the last spring survey, which may represent local breeding pairs. Early counts of paired and single birds in the spring showed at least 15 breeding pairs using the area (Table 22). This is approximately two to three times more breeding pairs than reported from the 1990-1992 surveys (Fournier et al. Unpublished). The Trout Rock zone accounted for 60% of all spring observation of geese. Bays near Boundary and Miller creeks were important sites, as were the sheltered bays between Smith Island and Stagg River (Figure 24).

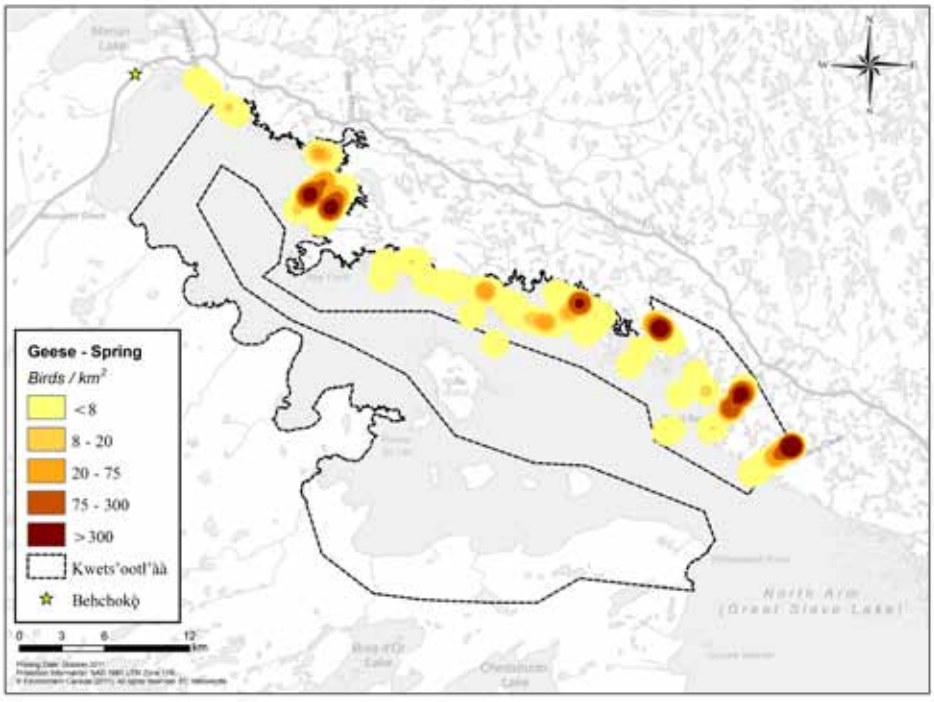

Figure 24: Density and distribution of geese during spring waterfowl surveys in the Kwets'ootł'àà candidate protected area, 2010.

Swans

Swans were present during the first survey on 8 May, 2010 but had mostly moved from the area by 31 May (Figure 25). Swan (primarily Tundra, *Cygnus columbianus*) abundance peaked on 18 May, 2010 with 406 individuals observed. Sirois (1993) reported a two-day peak of 2,000 Tundra swans between Frank Channel and the Beaulieu River during 21-22 May, 1990 when available ice-free habitat was limited elsewhere. The mean number of swans observed in Kwets'ootł'àà during 1990-1992 surveys was 380.

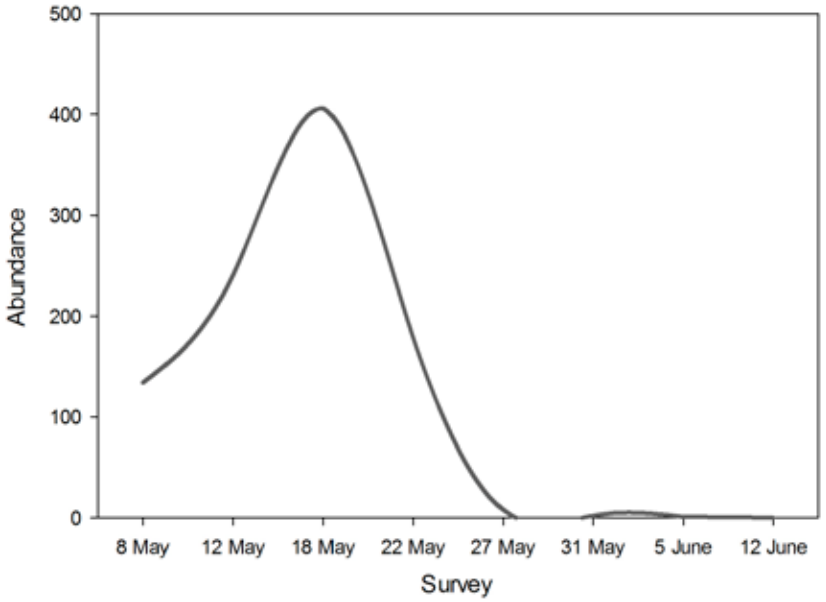

Figure 25: Swan spring abundance in the Kwets'ootł'àà candidate protected area, 2010.

There are no records of swans nesting in the Kwets'ootł'àà CPA. During the spring period, almost half of all swan observations were within the Trout Rock zone (48%, 467/970). The mouth of Boundary Creek was frequently used by swans, along with 2 neighboring bays northwest of Miller Creek and those sheltered between Smith Island and Stagg River (Figure 26).

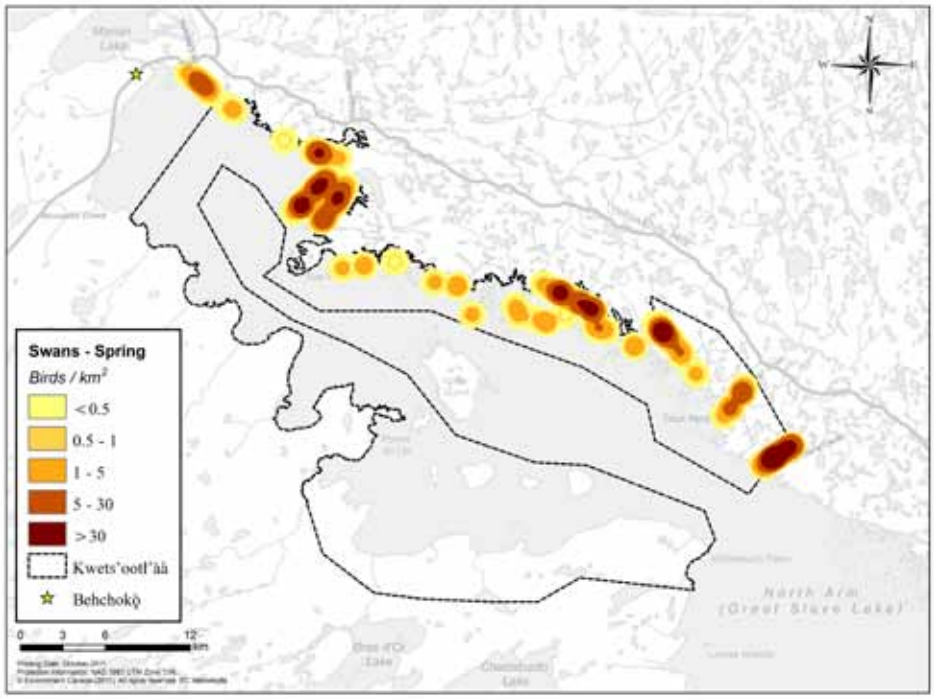

Figure 26: Density and distribution of swans during spring waterfowl surveys of the Kwets'ootł'àà candidate protected area, 2010.

Ducks

Dabbling duck abundance peaked on 12 May 2010 at 804 individuals (Figure 27). During the spring survey period, Mallards (*Anas platyrhynchos*, n = 789) were the most abundant dabbling duck followed by American Wigeon (*A. Americana*, n = 302) and Northern Pintail (*A. acuta,* n = 221). Numbers of dabbling ducks were fairly evenly distributed between Trout Rock (n = 4131) and Stagg River zones (n = 4067). Boundary Creek, the Stagg River – Smith Island area and the bays northwest of Miller Creek had the highest abundance of dabbling ducks (Figure 28).

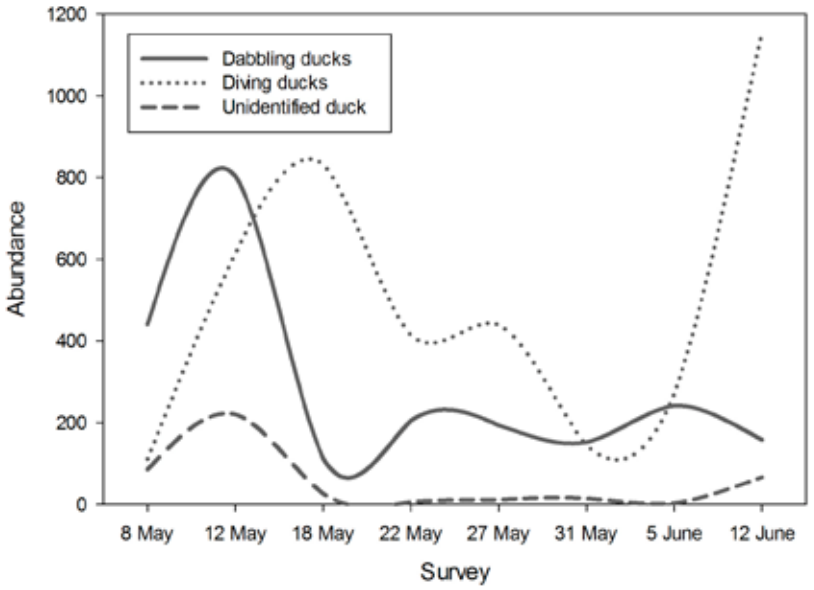

Figure 27: Spring abundance of ducks in the Kwets'ootł'àà candidate protected area during aerial waterfowl surveys, 2010.

Less than 30 pairs of dabbling duck pairs were observed for any species in Kwets'ootł'àà (Table 22). Similar results were reported during surveys conducted in 1990-1992, except Northern Pintails breeding pairs were 6 times more numerous in 1990 (n = 69; Fournier et al. Unpublished).There were fewer unidentified ducks during the spring surveys compared to the autumn (Table 21, 23). This is likely due to higher survey flight levels in the autumn (60 m compared to 45 m in the spring), and the presence of young of the year and adults experiencing molt who lack distinguishing features in autumn.

During spring surveys, diving ducks were observed almost twice as often as dabbling ducks (3,977 vs. 2,306; Table 21). The highest numbers of diving ducks were observed during the last spring survey on 12 June (n = 1,153; Figure 27). Merganser species (mostly *Mergus spp.*) were the most abundant diving duck followed by scaup species and Canvasback (Table 21). Diving duck were concentrated in the Trout Rock zone, especially at the mouth of Miller Creek, the bay to northwest of Miller Creek and the mouth of Stagg River (Figure 29).

Scaup breeding pairs were approximately half of those reported previously for this area (2010, 80 pairs; 1991-1995, mean = 195 nests; 1990-1992, mean = 160 pairs) (Fournier and Hines 2001, Fournier et al. Unpublished). Canvasback and Surf Scoter (*Melanitta perspicillata*) breeding pairs were lower, while Bufflehead (*Bucephala albeola*) pairs were similar to earlier surveys (Fournier et al. Unpublished).

Unidentified classes include large mixed groups, identified species observed in low numbers or unidentified species.

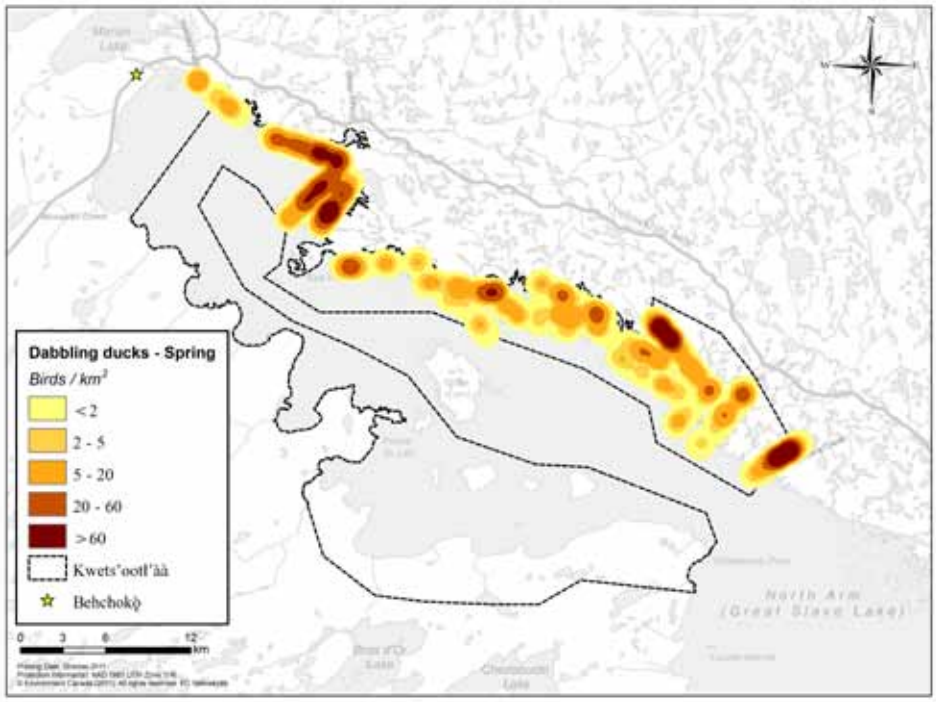

Figure 28: Density and distribution of dabbling ducks during spring waterfowl surveys of the Kwets'ootł'àà candidate protected area, 2010.

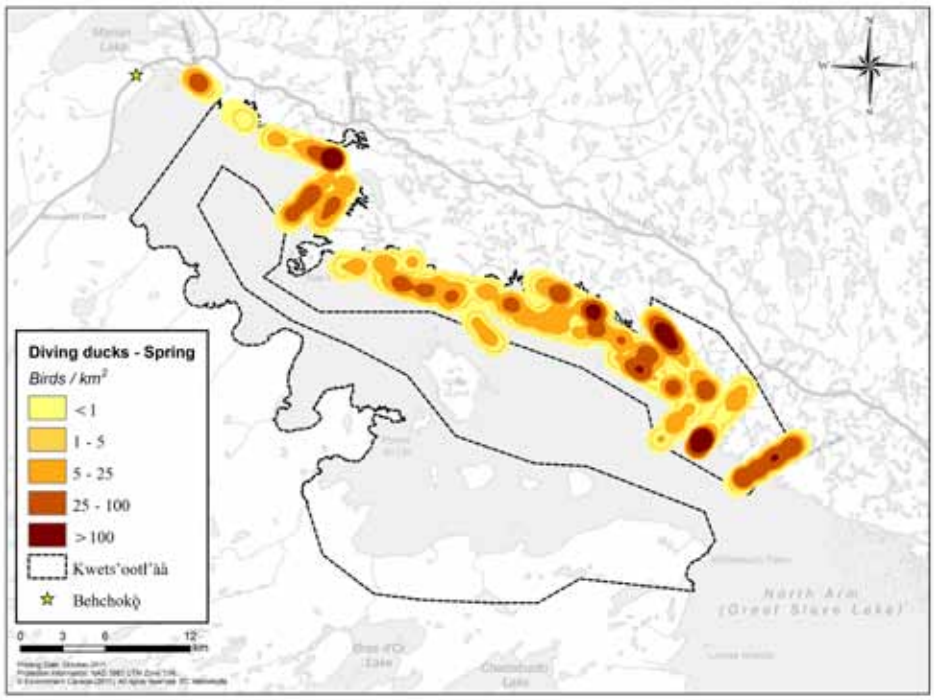

Figure 29: Density and distribution of diving ducks during spring waterfowl surveys of the Kwets'ootł'àà candidate protected area, 2010.

Table 22: Estimated number of breeding waterfowl pairs in the Kwets'ootł'àà candidate protected area from select spring waterbird surveys, 2010.

Species	Indicated breeding pairs	Survey[1]
American Green-winged teal	3	31-May
American wigeon	27	27-May
Canada goose	14	18-May
Canvasback	2	18-May
Bufflehead	4	12-Jun
Mallard	29	18-May
Northern pintail	11	22-May
Northern shoveler	5	27-May
Scaup sp.	88	05-Jun
Surf scoter	6	12-Jun

[1] selected to represent nest initiation dates reported by Murdy (1964)

Scaup pair - **Anthony Levesque**

Autumn Migration Surveys

Waterfowl use during autumn surveys (16 August – 22 October 2010) was estimated at 279,197 waterfowl use-days (Table 23). Peak waterfowl abundance occurred on 31 August, with >7,441 individuals observed in Kwets'ootł'àà (Figure 30). Trout Rock and Stagg River zones supported similar numbers of waterfowl, with >80% of observations occurring at these two sites during the autumn survey period (Figure 31).

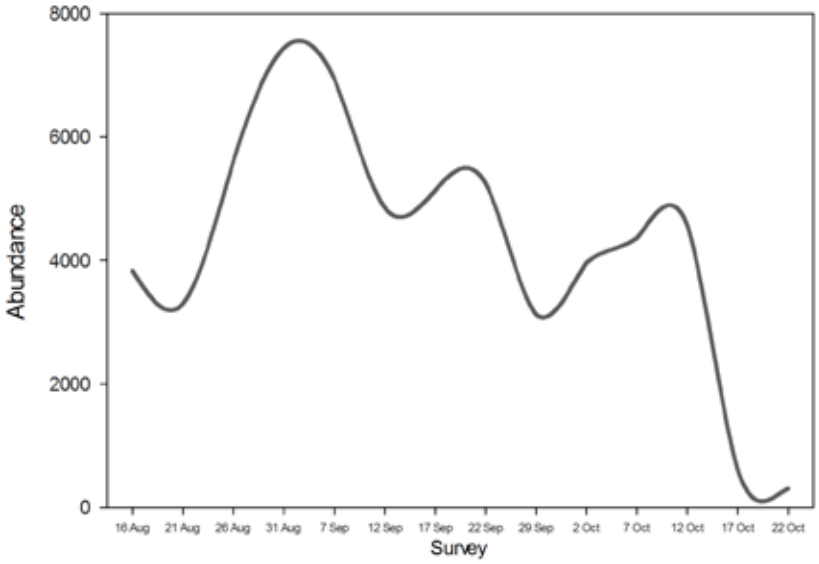

Figure 30: Autumn waterfowl abundance in the Kwets'ootł'àà candidate protected area (16 August – 22 October 2010).

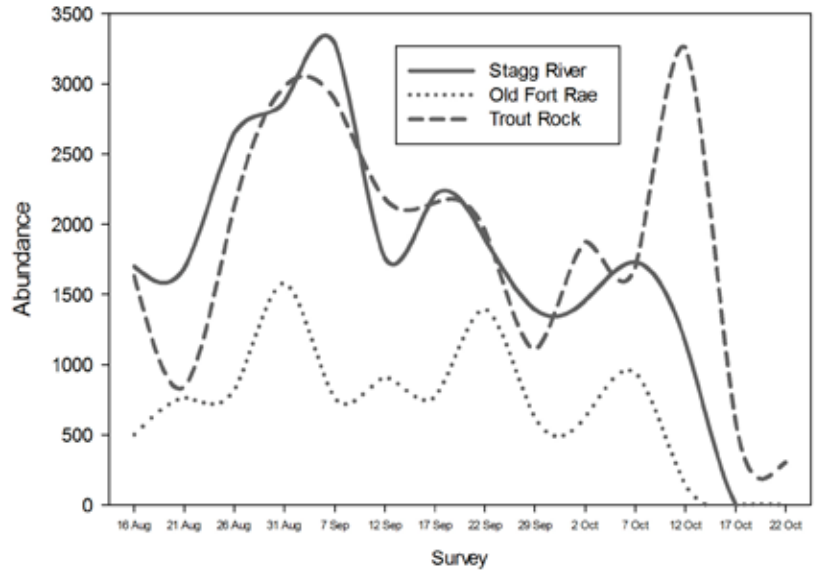

Figure 31: Abundance of waterfowl in three zones in the Kwets'ootł'àà candidate protected area from autumn aerial surveys, 2010.

Table 23: Autumn waterfowl use-days in the Kwets'ootł'àà candidate protected area from aerial surveys (16 August – 22 October 2010).

	Stagg River	Old Fort Rae	Trout Rock	TOTAL	%
Ducks					
American Green-winged Teal	4,075	393	742	5,210	1.9%
Teal spp.	475	35	5	515	0.2%
American Wigeon	3,024	2,569	1,357	6,949	2.5%
Mallard	37,793	10,438	41,202	89,433	32.0%
Northern Pintail	1,488	47	52	1,587	0.6%
Unidentified dabbling duck	16,378	6,850	21,354	44,581	16.0%
Dabbling ducks	***63,231***	***20,332***	***64,711***	***148,274***	***53.1%***
Bufflehead	3,375	1,320	1,178	5,873	2.1%
Canvasback	13	110	30	153	0.1%
Common Goldeneye	1,988	717	1,536	4,241	1.5%
Common Merganser	0	0	425	425	0.2%
Merganser spp.	579	906	4,960	6,445	2.3%
Scaup spp.	5,248	656	7,791	13,695	4.9%
Ring-necked Duck	52	285	36	373	0.1%
Scaup spp. or Ring-necked Duck	357	1,962	1,404	3,722	1.3%
Surf Scoter	0	42	0	42	0.0%
White-winged Scoter	10	24	360	394	0.1%
Scoter spp.	0	12	304	316	0.1%
Unidentified diving duck	3,489	4,893	6,260	14,642	5.2%
Diving ducks	***15,110***	***10,925***	***24,283***	***50,318***	***18.0%***
Unidentified duck	28,871	12,719	29,994	71,584	25.6%
TOTAL	**107,212**	**43,976**	**118,988**	**270,176**	**96.8%**
Canada/Cackling Goose	**1,698**	**710**	**948**	**3,356**	**1.2%**
Swan spp.	**1,688**	**2,137**	**1,841**	**5,666**	**2.0%**
TOTAL	**110,598**	**46,823**	**121,777**	**279,197**	**100.0%**

In all cases, unidentified classes include large mixed groups, identified species observed in low numbers or unidentified species. Similar species were sometimes hard to identify and in those cases grouped to a species (spp.) category. Refer to species list in Appendix 5 for detailed species presence/absence during aerial surveys.

Geese

In Kwets'ootł'àà, goose abundance was highest during the first autumn survey on 16 August 2010 (n = 330; Figure 32). However, geese abundance declined after the first autumn survey indicating the peak abundance may have already passed through the area prior to our surveys. Surveys during both seasons indicated a higher use of Kwets'ootł'àà by geese in the spring (Table 21 & Table 23).

Geese were the earliest group of migrants to move through the area, with the last individuals recorded during the 29 September survey. The Stagg River zone accounted for 50% of all autumn goose use (Table 23). The sheltered bays between Smith Island and Stagg River along with the Miller Creek bay were important sites for geese during autumn (Figure 33).

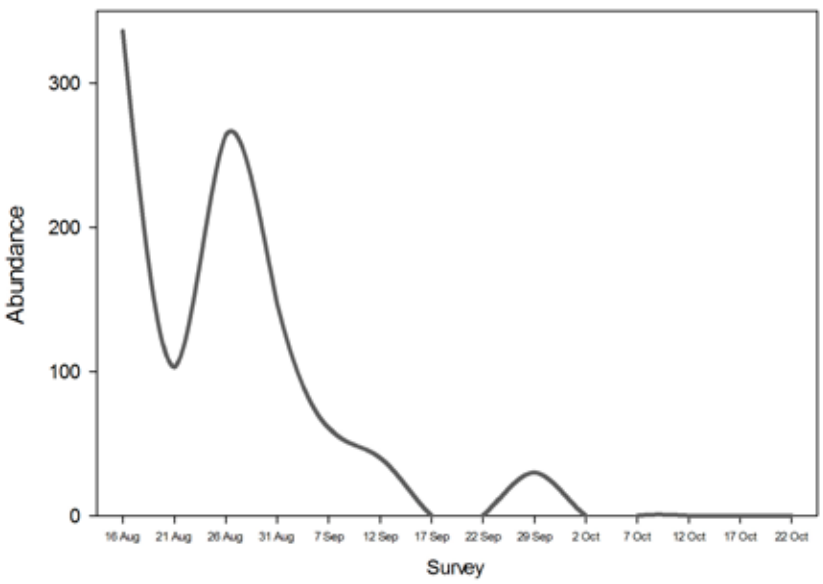

Figure 32: Geese autumn abundance from aerial waterfowl surveys in the Kwets'ootł'àà candidate protected area, 2010.

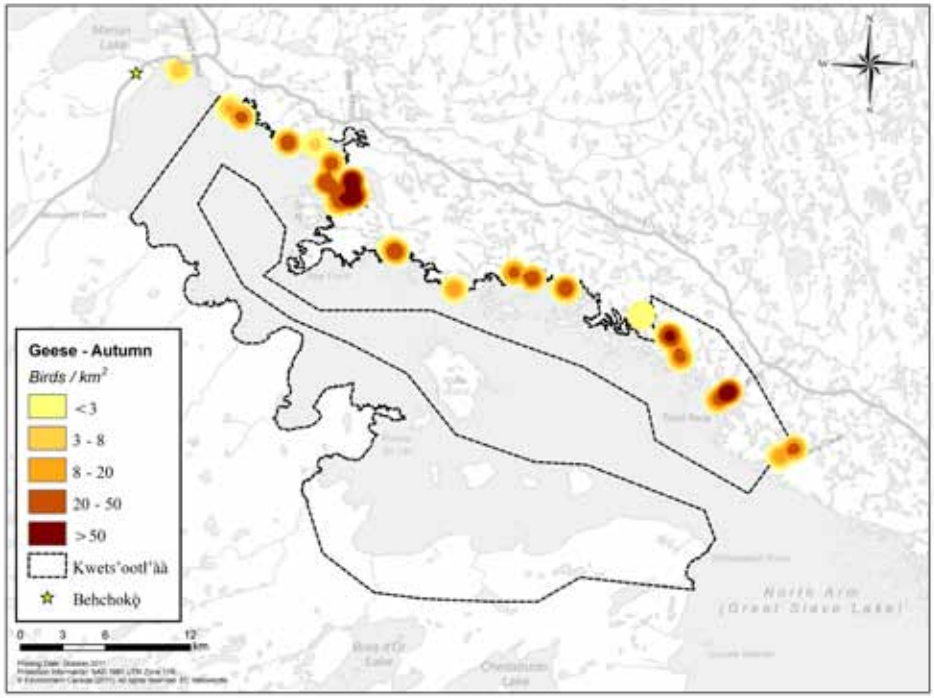

Figure 33: Density and distribution of geese during autumn waterfowl surveys of the Kwets'ootł'àà candidate protected area, 2010.

Swans

In the fall of 2010, the first observations of Swans were on 26 August and were present through to the 17 October survey (Figure 34). Autumn Swan abundance peaked on 2 October, when 174 adults and 65 young were observed (Figure 34). Adult swans with cygnets were present three weeks after the first swan observation on 17 September. Fournier et al. (Unpublished data) also observed a 2-3 week lag before young were first observed on the North Arm during a similar time period (September 17-20).

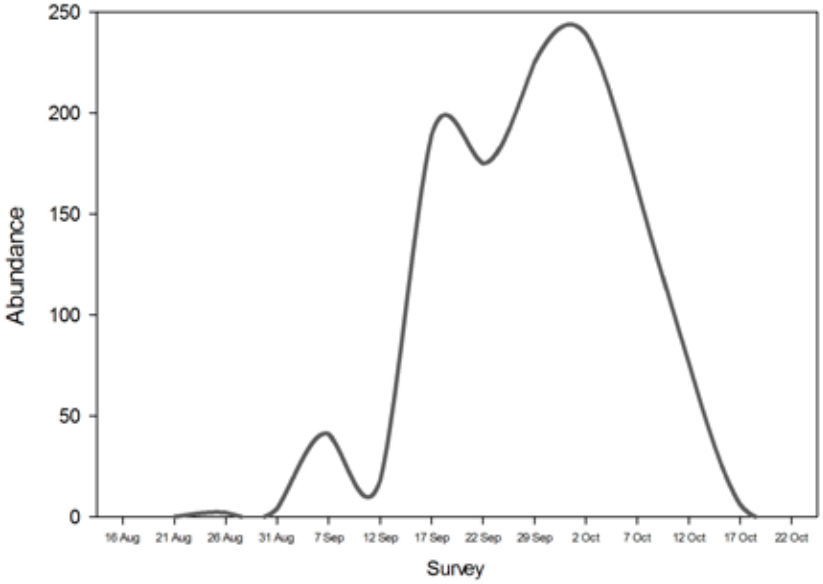

Figure 34: Swan autumn abundance from aerial waterfowl surveys in the Kwets'ootł'àà candidate protected area, 2010.

Swan use of the CPA was evenly distributed during autumn surveys, with Old Fort Rae, Trout Rock and Stagg River zones accounting for 37%, 33% and 30% of observations, respectively (Table 21). The surveys showed high swan densities in most bays along the northern shoreline, and particularly in the eastern half of the Old Fort Rae zone (Figure 35).

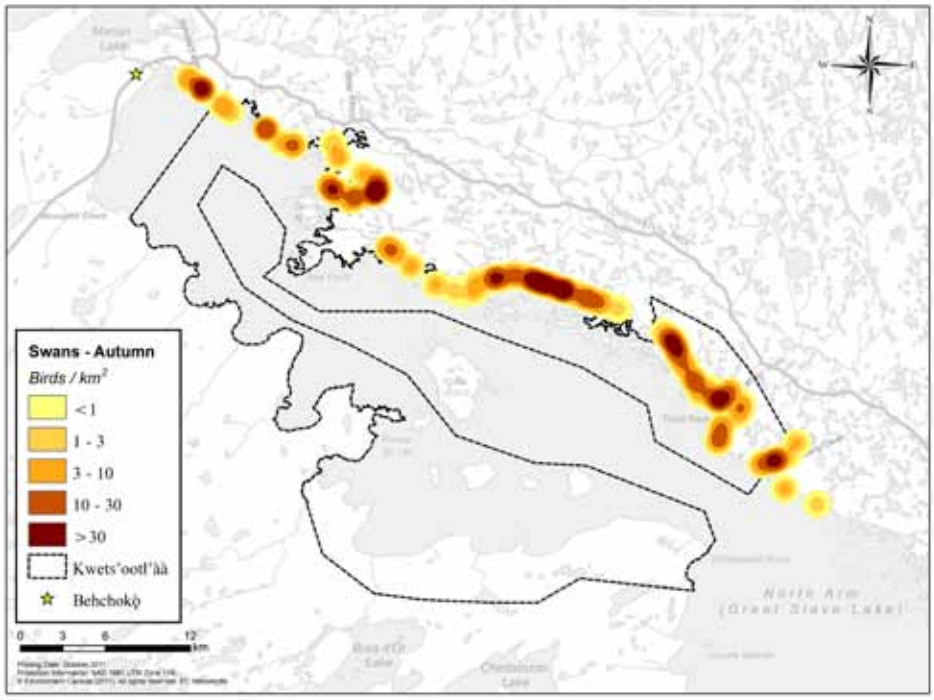

Figure 35: Density and distribution of swans observed during autumn waterfowl surveys of the Kwets'ootł'àà candidate protected area, 2010.

Ducks

Dabbling duck abundance peaked on 31 August with 4,400 individuals with numbers remaining high until 17 October (Figure 36). Mallard were the most abundant identified dabbling duck during autumn with a maximum count of 4,000 recorded on October 12 (Appendices 17-30). Dabbling ducks were evenly distributed between Trout Rock and Stagg River zones. These zones accounted for 85% of autumn observations (Table 23). As in the spring, Boundary Creek, the Stagg River – Smith Island area and the bays northwest of Miller Creek had high densities of dabbling ducks (Figure 37) and correspond to distributions of autumn dabbling duck concentrations reported by Fournier et al. (Unpublished).

Autumn population densities of dabbling ducks were approximately three times higher than diving ducks in Kwets'ootł'àà in 2010 (148,274 vs. 50,318, respectively; Table 23). Highest abundance of diving ducks were observed 17 September (n = 1,380; Figure 37). Scaup species were the most abundant identified diving duck followed by Merganser species, Bufflehead and Goldeneye (Bucephala spp.; Table 23). Approximately half of the diving ducks were in the Trout Rock zone. Diving duck densities were highest in the bay to the northwest of Miller Creek, as well as the bay between Smith Island and Stagg River (Figure 38). In addition to these sites, Fournier et al. (Unpublished) reported that the bay at Boundary Creek was an important site for diving ducks during the autumn. About half the total ducks observed during the autumn period were not identified to a species, but in most case they were associated to a behavioral grouping (i.e., dabbling or diving duck).

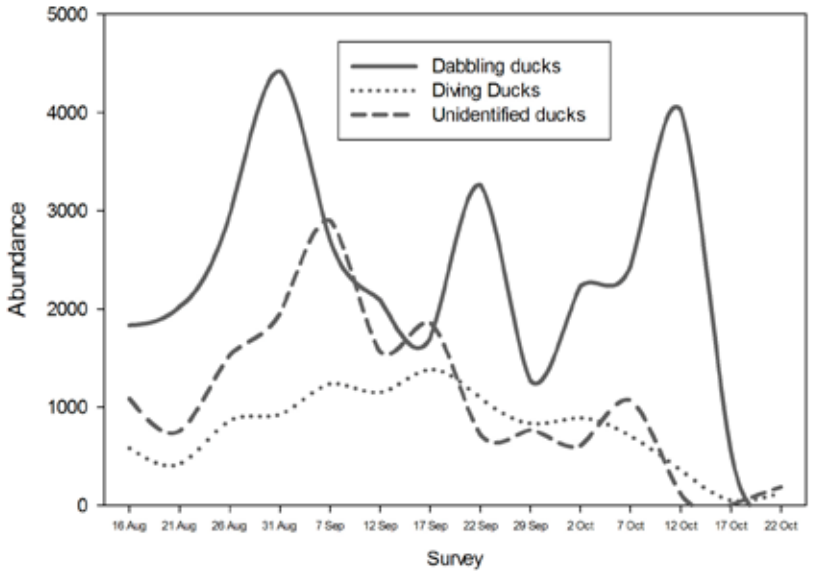

Figure 36: Autumn abundance of ducks observed during aerial surveys in the Kwets'ootł'àà candidate protected area, 2010.

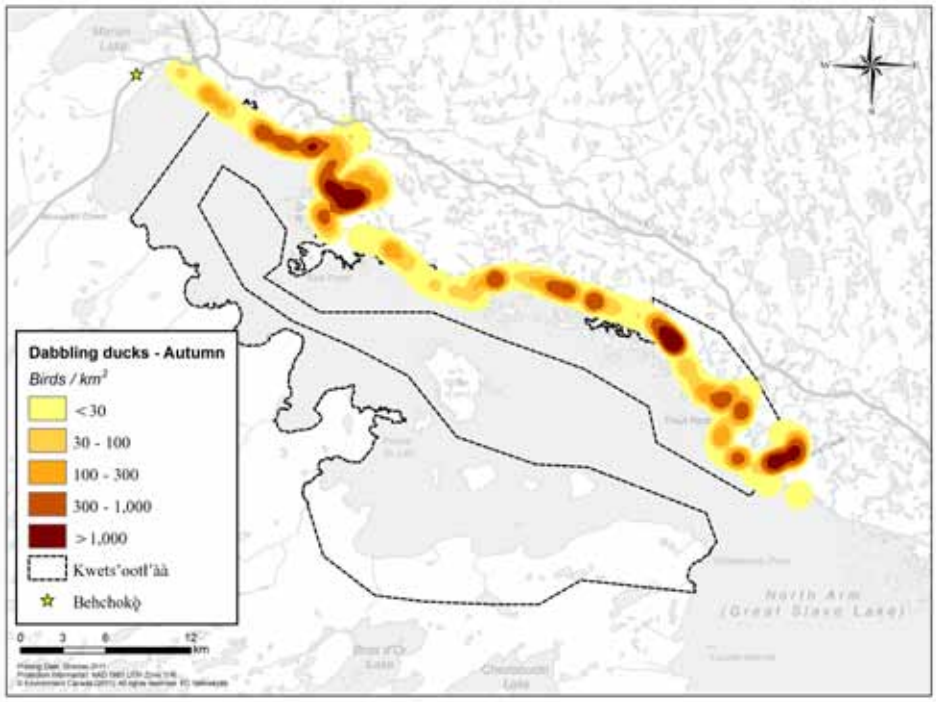

Figure 37: Density and distribution of dabbling ducks during autumn aerial waterfowl surveys in the Kwets'ootł'àà candidate protected area, 2010.

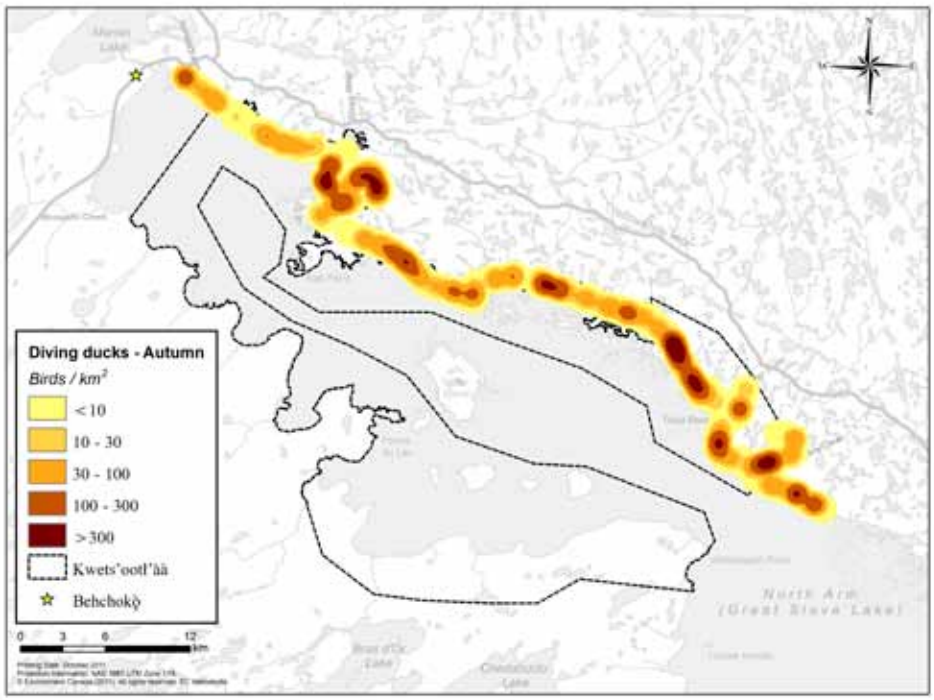

Figure 38: Density and distribution of diving ducks during autumn aerial waterfowl surveys of the Kwets'ootł'àà candidate protected area, 2010.

Marsh bird and Species at Risk Surveys

Marsh bird and species at risk surveys occurred in the Kwets'ootł'àà CPA between 7 to 14 June 2011, at numerous wetlands and bays located within the CPA (Figure 39). Over the course of the survey period 147 birds at 48 survey locations were observed within Kwets'ootł'àà CPA, including numerous waterfowl (ducks, geese, and swans), gulls, terns, raptors, shorebirds, songbirds and waterbirds. Overall, approximately 35 different bird species were observed.

Species At Risk and marsh birds were targeted during surveys. However, due to low water levels, fewer species than expected were detected. Two Species At Risk were identified during these surveys: Olive-sided Flycatcher (n = 1) and Common Nighthawk (n = 6). Marsh dwelling Sandhill Cranes (*Grus Canadensis*, n = 6), Swamp Sparrow (*Melospiza Georgiana*, n = 7) and Common Snipe (*Gallinago gallinago*, n = 23) were also detected. Given the limited sighting of target species during this survey, additional data from the NWT/NU Bird Checklist Survey were used to determine presence of these species within the CPA. Using this additional data, the presence of two additional species assessed by COSEWIC as special concern were located within the study area, including Rusty Blackbirds and Yellow Rail (Appendix 5). Additional marsh species were also identified within the CPA, including American Bittern, Red-winged Blackbird, Red-necked Grebe (*Podiceps grisegena*), Northern Harrier (*Circus cyaneus*), and Belted Kingfisher (*Megaceryle alcyon*, Appendix 5).

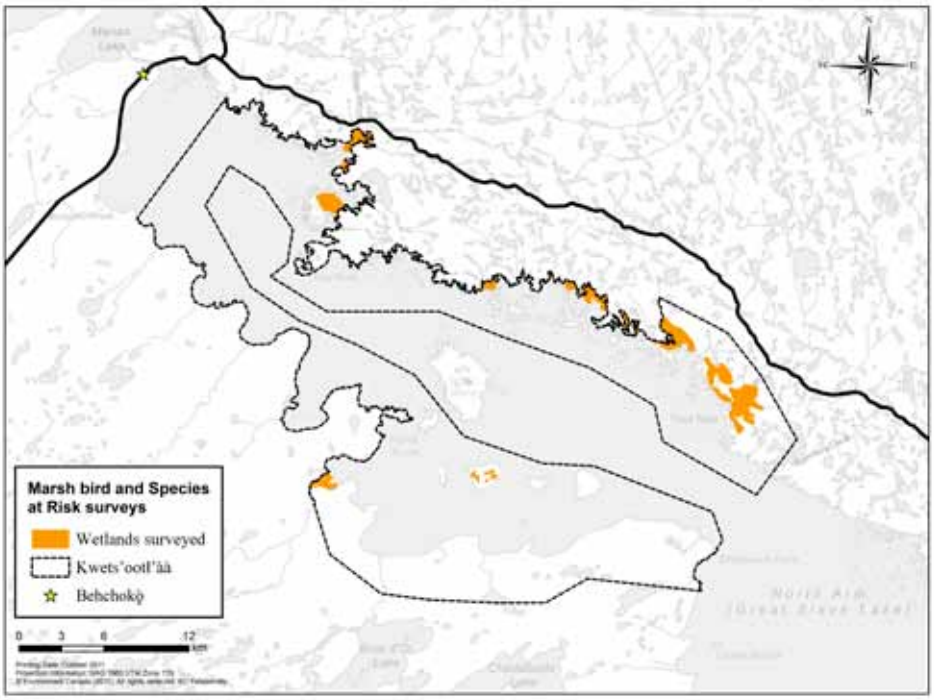

Figure 39: Locations of wetlands surveyed for marsh bird and Species at Risk in the Kwets'ootł'àà candidate protected area, June, 2011.

Incidental Observations of Wildlife

A total of 314 incidental wildlife observations were collected during spring and autumn aerial waterfowl surveys in Kwets'ootł'àà (Table 24). Nearly half of the wildlife observations were of Bald Eagles (*Haliaeetus leucocephalus*, spring & autumn 146/314), with a high count of 15 on 8 May (Table 24). Observations of Bald Eagles in Kwets'ootł'àà were widely distributed with concentrations near Stagg River and Smith Island (Figure 40). Less than 15% of observations were of birds typically found in wetland habitats (Table 24). Species observed that are of particular interest include Horned Grebe (COSEWIC – Special Concern) and Black Tern (*Chlidonias niger*; GNWT Status Ranking – Sensitive) in wetlands near Rae Point and Boundary Creek respectively (Figure 41).

Table 24: Counts of incidental wildlife during aerial waterfowl surveys in the Kwets'ootł'àà candidate protected area, 8 May - 22 October 2010.

Species	Spring	Autum	Maximum Count (Date)
Bald Eagle	62	84	**15** (8-May)
Common Raven	21	42	**31** (21-Aug)
Moose	10	1	**5** (5-Jun)
Sandhill Crane	9	6	**5** (31-Aug)
Black-billed Magpie	4	22	**7** (26-Aug)
Red-throated Loon	4	0	**2** (5-Jun & 12-Jun)
Northern Harrier	2	19	**4** (31-Oct)
Golden Eagle	2	1	**1** (12-May, 5-Jun & 7-Oct)
Black Tern	2	0	**2** (12-Jun)
Red-tailed Hawk	1	3	**1** (5-Jun, 21-Aug, 26-Aug & 17-Sep)
Merlin	1	2	**2** (21-Aug)
Common Loon	1	0	**1** (31-May)
American Kestrel	1	0	**1** (18-May)
American Crow	0	8	**8** (16-Aug)
Rough-legged Hawk	0	2	**1** (16-Aug & 12-Sep)
Horned Grebe	0	2	**1** (16-Aug & 7-Sep)
Wolf	0	1	**1** (16-Aug)
Red-necked Grebe	0	1	**1** (7-Sep)
	120	**194**	

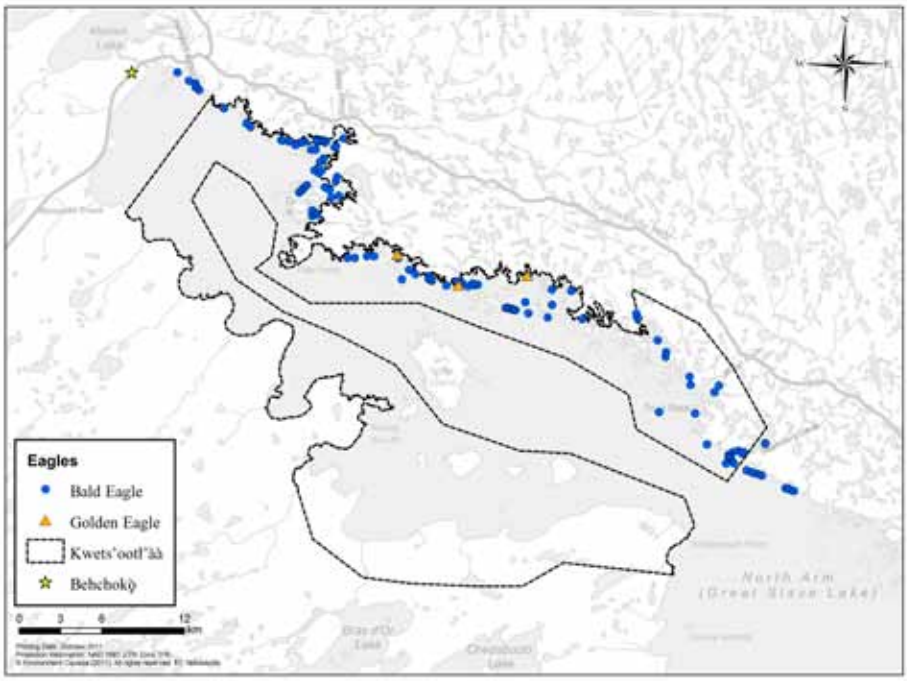

Figure 40: Incidental observations of eagles during aerial surveys of the Kwets'ootł'àà candidate protected area, 8 May - 22 October 2010.

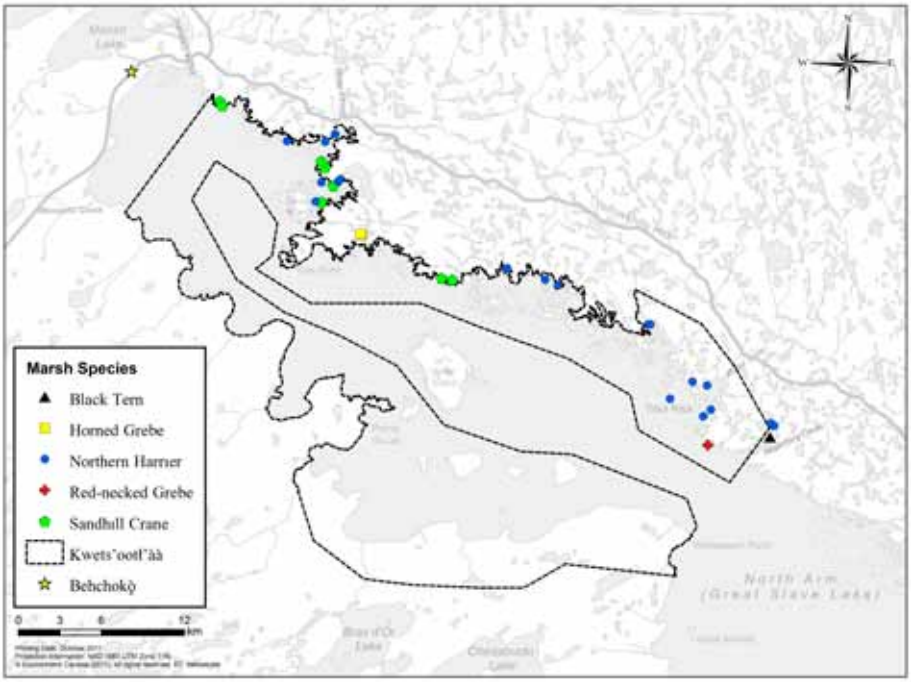

Figure 41: Incidental observations marsh birds during aerial surveys of the Kwets'ootł'àà candidate protected area, 8 May - 22 October 2010.

Three bird species from the Corvidae family accounted for 31% (97/314) of incidental observations made in Kwets'ootł'àà during the spring and autumn (Common Raven *Corvus corax*: 20%, 63/314, Black-billed Magpie *Pica hudsonia*: 8.3%, 26/314, American Crow *Corvus brachyrhynchos*: 2.5%, 8/314; Table 24). Corvids are predators of eggs and young of most bird species present in Kwets'ootł'àà and were widely distributed with higher concentrations near and north of Stagg River (Figure 42).

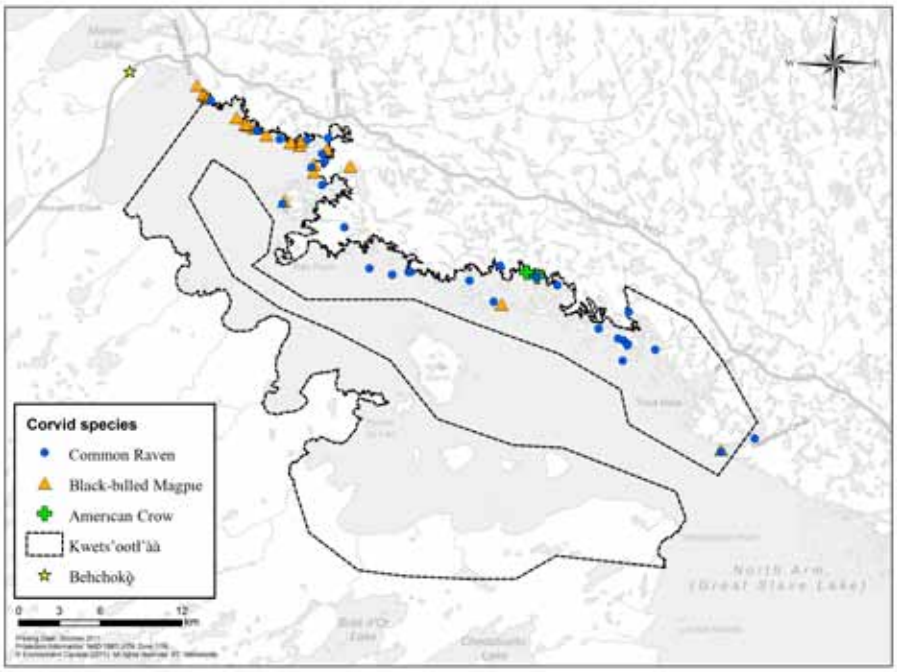

Figure 42: Incidental observations of corvids during aerial surveys of the Kwets'ootł'àà candidate protected area, 8 May - 22 October 2010.

Common Raven - **Anthony Levesque**

Eleven incidental Moose observations were made during aerial waterfowl surveys (Table 24). Moose observations were limited to the eastern portion of the Old Fort Rae zone and the mouth of Stagg River (Figure 43). One wolf was observed 16 August at the northern end of Kwets'ootł'àà (Figure 43 & Table 24).

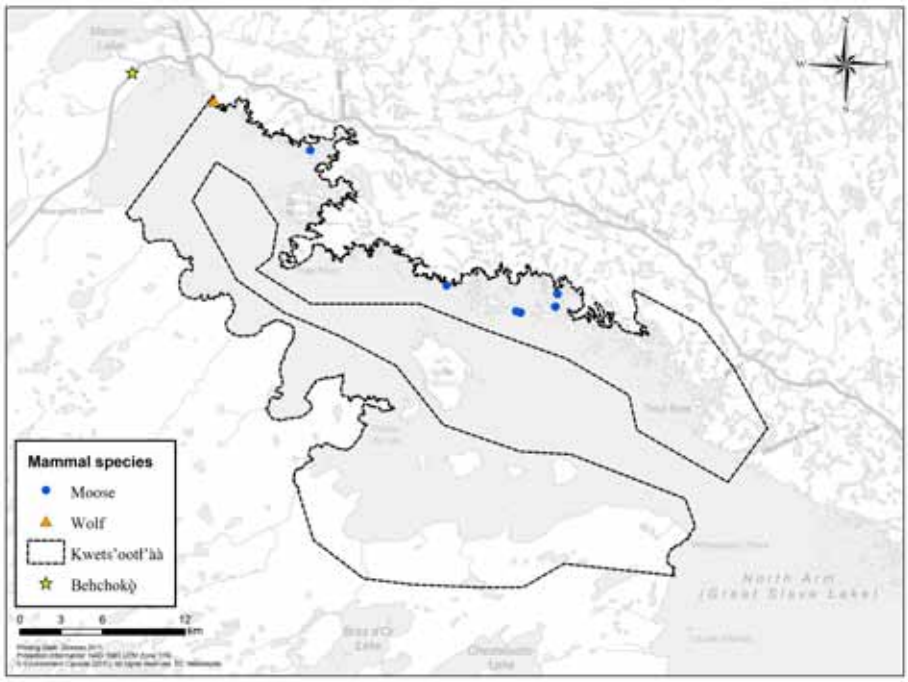

Figure 43: Incidental observations of mammals during aerial surveys of the Kwets'ootł'àà candidate protected area, 8 May - 22 October 2010.

Bald Eagle at nest - **Troy Marsh**

Ecological Significance of Kwets'ootå'àà

Species at Risk

Conservation Status of Plants

There are seven plant species designated as "May Be at Risk" by the Government of the Northwest Territories that potentially occur within Kwets'ootł'àà (see the *General Vegetation Description* section). Species that may be at risk of extirpation or extinction, and therefore are the highest priority candidates for a detailed risk assessment are given this designation. Given this heightened risk, permanent protection of Kwets'ootł'àà would help protect these plant species.

Conservation Status of Wildlife

There are numerous species located within Kwets'ootł'àà that are listed on Schedule 1 or the List of Wildlife Species at Risk under the Federal *Species at Risk Act* (SARA). Listed Endangered and Threatened species benefit from protection of SARA's prohibitions against killing, harming, harassing, or capture and from recovery planning and identification and protection of critical habitat from destruction. Special Concern species benefit from SARA's management planning.

Eleven species that occur in or have ranges extending over Kwets'ootł'àà have been listed under the federal SARA or have been assessed by Committee on the Status of Endangered Wildlife in Canada (COSEWIC; COSEWIC 2011). The Federal SARA schedule list includes those listed as 'Special Concern,' 'Threatened' and 'Endangered' and contains: Wood Bison, Woodland Caribou (boreal population), Common Nighthawk, Yellow Rail, Rusty Blackbird, Olive-sided Flycatcher, and Peregrine Falcon *anatum* subspecies. Further, COSEWIC assessed the following as being at risk and are eligible for addition to Schedule 1 of the federal SARA: Short-eared Owl (*Asio flammeus*), Horned Grebe, Barn Swallow (*Hirundo rustica*), Wolverine (*Gulo gulo;* western population) and Shortjaw Cisco (COSEWIC 2011).

The GNWT Species at Risk (NWT) Act recently became law in February 2010 and is complementary to the federal SARA. Currently, no species have been listed under the territorial Species at Risk (NWT) Act. However, many of the species listed by the federal SARA or assessed by COSEWIC are also ranked by NWT General Status Ranking Program as 'Sensitive.' Seventeen species have distributions directly overlapping the candidate protected area that are ranked as 'Sensitive' under the NWT General Status Ranking Program. These include Northern Pintail, Lesser Scaup, White-winged Scoter (*Melanitta fusca*), Surf Scoter, Black Tern, Caspian Tern, Least Sandpiper (*Calidris minutilla*), Red-necked Phalarope (*Phalaropus lobatus*), Lesser Yellowlegs (*Tringa flavipes*), American Bittern, American Tree Sparrow (*Spizella arborea*), White-throated Sparrow (*Zonotrichia albicollis*), Boreal Chickadee (*Poecile hudsonicus*), Blackpoll Warbler (*Setophaga striata*), Walleye, Arctic Grayling, and Inconnu. Additional mammals, and birds with populations of concern are located within 200 km buffer surrounding the study area (Barren-ground Caribou, Whooping Cranes (*Grus Americana*), Hudsonian Godwit (*Limosa haemastica*), Long-tailed Duck (*Clangula hyemalis*), Harris's Sparrow (*Zonotrichia querula*), and Pied-billed Grebe (*Podilymbus podiceps*).

Protecting Kwets'ootł'àà as a National Wildlife Area under the *Canada Wildlife Act* will help conserve habitat for these species and aid in meeting national and regional conservation goals.

International Recognition

The Important Bird Areas (IBA) Program is a global collaboration of internationally significance places for bird conservation and biodiversity, coordinated by BirdLife International. This program is recognized worldwide as a practical tool, based on standardized quantitative and scientifically defensible data, to identify distinct area for conservation and monitoring (IBA Canada 2010). Though there are no special regulatory controls in place for protecting IBAs, this designation serves to highlight an area's ecological importance, and encourages their consideration in planning and regulatory processes.

In Canada, under the co-partnership of Bird Studies Canada and Nature Canada, nearly 600 IBAs are designated based on the presence of globally threatened species, restricted-range species, biome-restricted species or congregations of species. The North Arm site (NT086, 3,100 km^2), which overlaps Kwets'ootł'àà CPA (Figure 44), has been recognized as an area important to migrating and breeding birds. This region is particularly important in late springs when open water is limited, as in 1990 when >20,000 Canada Geese, 12,000 Scaup, 5,700 Northern Pintail, 2,050 Tundra Swans and 1,280 Surf Scoters were present (IBA Canada 2010).

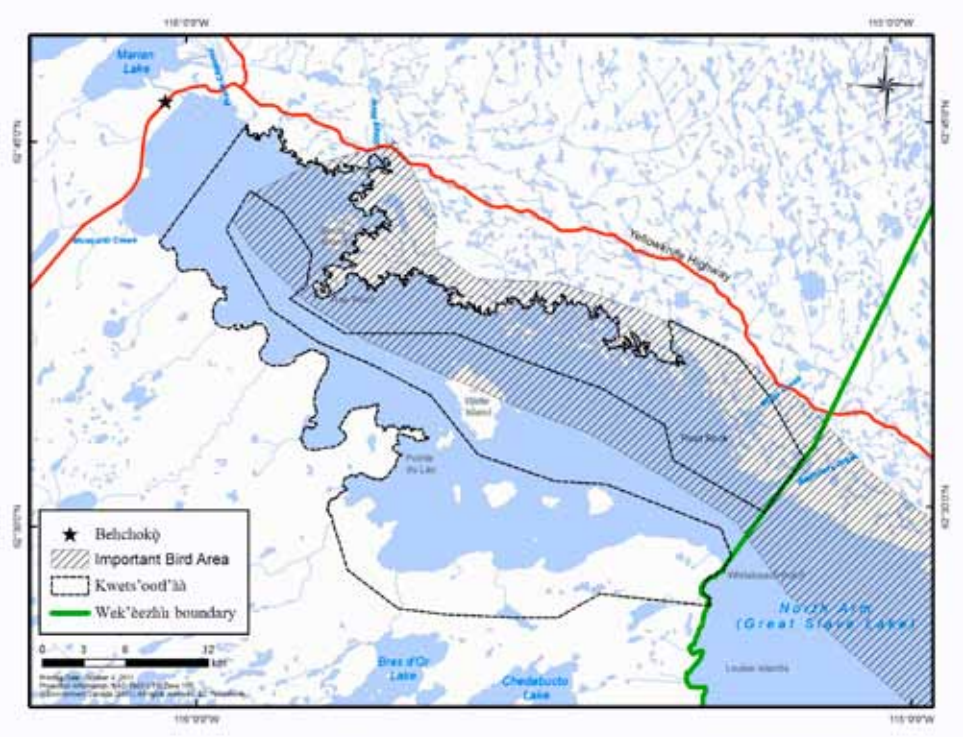

Figure 44: Location of the North Arm Important Bird Area in relation to Kwets'ootł'àà candidate protected area's boundary.

Key Migratory Bird Terrestrial Habitat Site

The Key Migratory Bird Terrestrial Habitat Site designation is given to an area that supports at least 1% of Canada's population of any migratory bird species, at any time (Latour et al. 2008). The North Arm of GSL was designated in 1984 as a Key Migratory Bird Terrestrial Habitat site due to its importance to migrating Tundra Swans, Canada and Cackling geese, and breeding Caspian Terns. This area also supports a high abundance and richness of other waterbirds that use the area during migration and large local breeding populations (Latour et al. 2008). Surveys conducted in 2010 confirm the area's importance to waterbird populations at a national level.

The eastern North American population of Tundra Swans was estimated at 97,300 in 2010 from the US Fish and Wildlife Service's mid-winter survey (Canadian Wildlife Service Waterfowl Committee 2010). These birds migrate between the Atlantic coast, west through the Great Lakes to North Dakota, then north over the Prairies to either western Hudson Bay or to the Mackenzie River Delta to breed (Petrie and Wilcox 2003). The Mackenzie Delta and surrounding Western Arctic mainland supports about two-thirds of the Eastern Population (approximately 64,800 individuals; Canadian Wildlife Service Waterfowl Committee 2010). The aerial survey conducted on 18 May 2010 detected 406 individuals, representing the highest count for that spring's surveys. Surveys of Kwets'ootł'àà in 1990 observed >1,450 swans representing more >1% of the Eastern Population (Fournier et al. Unpublished). Given the large annual fluctuation in surveyed individuals, with three-fold changes occurring from one year to the next in the North Arm of GSL, 2010 may represent a low use year for Tundra Swans within Kwets'ootł'àà.

The Short-grass Prairie population of Canada/Cackling geese breeds in western Arctic islands, and on the Nunavut and NWT mainland between Queen Maud Gulf, the Mackenzie River and northern Alberta (Canadian Wildlife Service Waterfowl Committee 2010). Geese migrating through and breeding within Kwets'ootł'àà likely form a part of this population, which is estimated to contain 247,300 individuals (Canadian Wildlife Service Waterfowl Committee 2010). Surveys on 12 May 2010 documented 3,162 geese in Kwets'ootł'àà, representing >1% of the population.

Kwets'ootł'àà is the most northern breeding location for Caspian Terns in Canada. The North American breeding population was last estimated at around 33,000 in 2002 (Shuford and Craig 2002). Approximately 37% (12,200) of the population likely resides in Canada during the breeding season (Shuford and Craig 2002). In 2010, 65 Caspian Tern nests (or 130 breeding individuals) were found in Kwets'ootł'àà representing just over 1% of the Canadian population. The highest number of Caspian Terns recorded within Kwets'ootł'àà to date was in 2001, when 93 nests (or 186 individuals) were documented.

Kwets'ootł'àà also represents an important area to other bird species, that use the area for staging and breeding, including thousands of waterbirds such as Ducks, Loons, Grebes, Gulls and Terns. Similarly, birds of prey (Eagles, Hawks and Falcons), Corvids (Ravens, Crows, Magpies), and marsh birds (Cranes, Black Terns, Coots, Rails and Sora) also use the area for nesting, brood rearing, migratory stopover and as a feeding site. The relatively pristine condition of GSL makes Kwets'ootł'àà an ideal location to protect habitat and to encourage wildlife use.

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Appendix 1: Plant species with overlapping ranges with the Kwets'ootł'àà candidate protected area (CPA) and those likely occurring in the CPA (200 km search radius). All species listed are likely to be found in the Kwets'ootł'àà CPA. Data compiled from literature.

Common Name	Scientific Name	NWT conservation status
Arrowhead	*Sagittaria cuneata*	Secure
Amaranthaceae		
Lamb's quarters	*Chenopodium album*	Alien
Apocynaceae		
Spreading Dogbane	*Apocynum androsaemifolium*	Secure
Indian Hemp	*Apocynum sibiricum*	May Be At Risk
Araceae		
Several Vein Sweetflag (Rat Root)	*Acorus americanus*	May Be At Risk
Wild Calla or Water Dragon	*Calla palustris*	Secure
Araliaceae		
Wild or False Saraparilla	*Aralia nudicaulis*	Secure
Asteraceae (Compositea)		
Commom Yarrow	*Achillea millefolium*	Secure
Pearl yarrow	*Achillea ptarmica*	Alien
Siberian Yarrow	*Achillea sibirica*	Secure
Marhs Alkali Aster	*Almutaster pauciflorus*	May Be At Risk
Alpine Pussytoes	*Antennaria alpina*	Secure
Small-leaf Pussytoes	*Antennaria microphylla*	Secure
Field Pussytoes	*Antennaria neglecta*	Sensitive
Showy Pussytoes	*Antennaria pulcherrima*	Secure
Rosy Pussytoes	*Antennaria rosea*	Secure
Narrowleaf Arnica spp.	*Arnica alpina subsp. angustifolia*	Undertermined
Narrowleaf Arnica spp.	*Arnica angustifolia subsp. tomentosa*	Undertermined
Leafy Arnica	*Arnica chamissonis ssp. foliosa*	Secure
Leafy Arnica	*Arnica chamissonis ssp. Incana*	Secure
Long Leafed Arnica	*Arnica lonchophylla*	Secure
Boreal Sage	*Artemisia boreale*	Secure
Tall Wormwood	*Artemisia campestris subsp. canadensis*	Undertermined
Tilesius Sagebrush	*Artemisia tilesii*	Secure
Vierhapper's Aster	*Aster alpinus ssp. Vierhapperi*	Secure
Nodding Beggartick	*Bidens cernua*	Secure
Leafy Thistle	*Cirsium foliosum*	May Be At Risk
Bitter Fleabane	*Erigeron acris var. asteroides*	Secure
Dwarf Mountain Fleabane	*Erigeron compositus s. lat.*	Secure
Angular Fleabane	*Erigeron elatus*	Secure
Smooth Fleabane	*Erigeron glabellus ssp. pubescens*	Secure
Hyssopleaf Fleabane	*Erigeron hyssopifolius*	Secure
Shortray Fleabane	*Erigeron lonchophyllus*	Undertermined
Philadelphia Fleabane	*Erigeron philadelphicus*	Secure
Arctic Aster	*Eurybia siberica*	Secure
Common Sneezeweed	*Helenium autumnale var. grandiflorum*	Sensitive
Narrowleaf hawkweed	*Hieracium umbellatum*	Secure
Pineapple weed	*Matricaria discoidea*	Alien
Blue Lettuce	*Mulgedium pulchellum*	Secure
Mountain Groundsel	*Packera indecora*	Secure

Common Name	Scientific Name	NWT conservation status
Balsam Graoundsel	*Packera paupercula*	Secure
Rocky Mountain Groundsel	*Packera streptanthifolius*	Secure
Arctic Sweet Coltsfoot	*Petasites frigidus*	Secure
Arrow-leaved Sweet Coltsfoot	*Petasites frigidus var. sagittatus*	Undertermined
Grape-leaved Coltsfoot	*Petasites frigidus var. Xvitifolius*	Undertermined
narrowleaf saw-wort	*Saussurea angustifolia var. angustifolia*	Secure
Marsh Ragwort	*Senecio congestus*	Secure
Desert Ragwort	*Senecio eremophilus*	Sensitive
Common ragwort	*Senecio vulgaris*	Alien
Canada Goldenrod	*Solidago canadensis s. lat.*	Secure
Alpine Multiray Goldenrod	*Solidago multiradiata*	Secure
Dwarf Goldenrod	*Solidago simplex subsp. simplex var. simplex*	Undertermined
Boreal Aster	*Symphyotrichum boreale*	Secure
Alkali Aster	*Symphyotrichum ciliatum*	Sensitive
Lindley's Aster	*Symphyotrichum ciliolatum*	Secure
Manyflowered Aster	*Symphyotrichum ericoides*	Secure
Common Dandelion	*Taraxacum officinale*	Alien
Betulaceae		
Grey or Hoary Alder	*Alnus incana ssp. Tenuifolia*	Secure
Green Alder	*Alnus viridis*	Secure
Ground or Dwarf Birch	*Betula glandulosa*	Secure
Water Birch	*Betula occidentalis*	Secure
Paper Birch	*Betula papyrifera var. commutala*	Secure
Paper Birch	*Betula papyrifera var. neoalaskana*	Secure
Bog Birch	*Betula pumila var. glandulifera*	Sensitive
Boraginaceae		
Northern Stickseed	*Hackelia deflexa*	Undertermined
Western Stickseed	*Lappula occidentalis*	Sensitive
Northern Bluebell	*Mertensai paniculata var. paniculata*	Secure
Brassicaceae (Cruciferae)		
Western Hairy Rockcress	*Arabis hirsuta*	Secure
Holboell Rockcress	*Arabis holboellii*	Secure
American Wintercress	*Barbarea orthoceras*	Secure
Limestone Rockcress	*Boechera divaricarpa*	Secure
Alpine Northern Rockcress	*Braya humilis s. lat.*	Secure
Shepherd's purse	*Capsella bursa-pastoris*	Alien
Small-Flowered Bittercress	*Cardamine parviflora var. arenicola*	May Be At Risk
Pensylvania Bitter Cress	*Cardamine pensylvanica*	Sensitive
Cuckoo Flower	*Cardamine pratensis var. angustifolia*	Secure
Green Tansy Mustard	*Descurainia incana*	Secure
Pinnate Tansy Mustard	*Descurainia pinnata*	May Be At Risk
Flixweed	*Descurainia sophia*	Alien
Northern Tansy Mustard	*Descurainia sophioides*	Secure
Golden Draba	*Draba aurea*	Secure
Hoary Draba	*Draba cana*	Undertermined
Grayleaf Whitlow grass	*Draba cinerea*	Secure
Rock Whitlow grass	*Draba glabella*	Secure
Wood Whitlow grass	*Draba nemorosa var. leiocarpa*	Sensitive

Common Name	Scientific Name	NWT conservation status
Few-seeded Whitlow grass	*Draba oligosperma*	Sensitive
Tall Whitlow Grass	*Draba praealta*	Secure
Wormseed Wallflower	*Erysimum cheiranthoides*	Secure
Shy Wallflower	*Erysimum inconspicuum*	Secure
Soft Rockcress	*Halimolobos mollis*	Secure
Branched Pepperwort	*Lepidium ramosissimum*	Secure
Arctic Bladderpod	*Lesquerella arctica*	Secure
MaKenzie River Yellowcress	*Rorippa crystallina*	Undertermined
Water Awlwort	*Subularia aquatica ssp. americana*	Sensitive
Field penny cress	*Thlaspi arvense*	Alien
Callitrichaceae		
Northern Water-Starwort	*Callitriche hermaphroditica*	Secure
March Water-Starwort	*Callitriche palustris*	Secure
Caprifoliaceae		
Twinflower	*Linnaea borealis var. americana*	Secure
Mountain Honeysuckle	*Lonicera dioica var. glaucescens*	Secure
Northern Snowberry	*Symphoricarpos occidentalis*	Secure
Squashberry (High-bush Cranberry)	*Viburnum edule*	Secure
Caryophyllaceae		
Creeping Sandwort	*Arenaria humifusa*	Secure
Field Mouse-ear Chichweed	*Cerastium arvense*	Secure
Bering Sea Chichweed	*Cerastium beeringianum*	Secure
Slender Mountain Sandwort	*Eremogone capillaris*	Secure
Rock Stitchwort	*Minuartia dawsonensis*	Secure
Boreal Sandwort	*Minuartia rubella*	Secure
Bluntleaf Sandwort	*Moehringia lateriflora*	Secure
Largeleaf Sandwort	*Moehringia macrophylla*	Sensitive
Knotted Pearlwort	*Sagina nodosa*	Sensitive
Procumbent pealwort	*Sagina procumbens*	Alien
Menzies' Pinl Campion	*Silene Mmenziesii*	Sensitive
Ostenfeld's Campion	*Silene ostenfeldii*	Secure
Northern Bog Starwort	*Stellaria calycantha*	Undertermined
Fleshy Stitchwort	*Stellaria carassifolia*	Secure
Longleaf Stitchwort	*Stellaria longifolia*	Secure
Long-stalked Stichwort	*Stellaria longipes*	Secure
Longstalk Stitchwort	*Stellaria longipes*	Secure
Ceratophyllaceae		
Common Hornwort	*Ceratophyllum demersum*	Sensitive
Chenopodiaceae		
Zschack's Goosefoot	*Chenopodium Bberlandieri var. Zschackei*	Undertermined
Strawberry Blite	*Chenopodium capitatum*	Secure
Red Prigweed (Coast-blite goosefoot)	*Chenopodium rubrum*	May Be At Risk
Rocky Mountain Goosefoot	*Chenopodium salinum*	Sensitive
Mapleleaf Goosefoot	*Chenopodium simplex*	Alien
Nuttall's Povertyweed	*Monolepis Nnuttalliana*	Sensitive
Red Glasswort	*Salicornia rubra*	May Be At Risk
Cistaceae		
Wooly Beach-heather	*Hudsonia tomentosa*	Sensitive

Common Name	Scientific Name	NWT conservation status
Cornaceae		
Dwarf Dogwood (Bunchberry)	*Cornus canadensis*	Secure
Red Osier Dogwood	*Cornus stolnifera*	Secure
Sweedish Dogwood	*Cornus suecica*	May Be At Risk
Crassulaceae		
Water Pigmy-weed	*Crassula aquatica*	May Be At Risk
Cyperaceae		
Black and White Sedge	*Carex albonigra*	Secure
Water Sedge	*Carex aquatilis var. aquatilis*	Secure
Water Sedge	*Carex aquatilis var. stans*	Secure
Wheat Sedge	*Carex atherodes*	Secure
Raymon's Sedge	*Carex atratiformis ssp. Raymondii*	Secure
Golden Sedge	*Carex aurea*	Secure
Bebb's Sedge	*Carex bebbii*	Sensitive
Bigelow's Sedge	*Carex bigelowii*	Secure
Yukon Sedge	*Carex bonanzensis*	Secure
Brownish Sedge	*Carex brunnescens*	Secure
Buxbaum's Sedge	*Carex Buxbaumii*	Secure
Sivery Sedge	*Carex canescens*	Secure
Hair-like Sedge	*Carex capillaris ssp. Capillaris*	Secure
Hair-like Sedge	*Carex capillaris ssp. Chlorostachys*	Secure
Capitate Sedge	*Carex capitata*	Secure
Creeping Sedge	*Carex chordorrhiza*	Secure
Low Northern Sedge	*Carex concinna*	Secure
Crawford's Sedge	*Carex crawfordii*	Sensitive
Northern Sedge	*Carex deflexa*	Secure
Lesser Panicled Sedge	*Carex diandra*	Secure
Softleaf Sedge	*Carex disperma*	Secure
Bristleleaf Sedge	*Carex eburnea*	Secure
Threadleaf Sedge	*Carex filifolia*	Secure
Bronze Sedge	*Carex foenea*	Undertermined
Dryspike Sedge	*Carex foenea*	Undertermined
Garber's Elk Sedge	*Carex garberi*	Secure
Glacial Sedge	*Carex glacialis*	Secure
Norther Bog Sedge	*Carex gynocrates*	Secure
Inland Sedge	*Carex interior*	Sensitive
Lapland Sedge	*Carex lapponica*	Secure
Slender Sedge	*Carex lasiocarpa var. americana*	Sensitive
Bristlystalked Sedge	*Carex leptalea*	Secure
Mud Sedge	*Carex limosa*	Secure
Livid Sedge	*Carex livida var. Vrayana*	Sensitive
Ryegrass Sedge	*Carex loliacea*	Sensitive
Boreal Bog Sedge	*Carex magellanica*	Secure
Norvegian Carex	*Carex media*	Secure
Looseflower Sedge	*Carex rariflora var. rariflora*	Secure
Richardson's Sedge	*Carex richardsonii*	Sensitive
Ross' Sedge	*Carex rossii*	Secure
Swollen Beaked Sedge	*Carex rostrata*	Undertermined

Common Name	Scientific Name	NWT conservation status
Pumpkin-fruited Sedge	*Carex rotundata*	Secure
Sartwell's Sedge	*Carex sartwellii*	Sensitive
Russet Sedge	*Carex saxatilis*	Secure
Rock Sedge	*Carex saxatilis var. rhomalea*	Secure
Bulrush Sedge	*Carex scirpoidea*	Secure
Many-headed Sedge	*Carex scyhnocephala*	Sensitive
Weak Arctic Sedge	*Carex supina*	Secure
Sparseflower Sedge	*Carex tenuiflora*	Secure
Sheathed Sedge	*Carex vaginate*	Secure
Llittle Green Sedge	*Carex viridula*	Secure
Williams's Sedge	*Carex williamsii*	Secure
Needle Spikerush	*Eleocharis acicularis*	Secure
Flatstem Spikerush	*Eleocharis compressa*	Undertermined
Common Spikerush	*Eleocharis palustris*	Secure
Fewflower Spikerush	*Eleocharis quinqueflora*	Secure
Narrow-leaved Cottongrass	*Eriophorum angustifolium*	Secure
Narrow-leaved Cottongrass	*Eriophorum angustifolium (triste)*	Secure
Short-antler Cottongrass	*Eriophorum brachyantherum*	Secure
Slender Cottongrass	*Eriophorum gracile*	Secure
Smooth-fruited Russet Cottongrass	*Eriophorum russeolum*	Undertermined
Tussock Cottongrass	*Eriophorum vaginatum spp. Vaginatum*	Secure
Tassel Cottongrass	*Eriophorum viridi-carinatum*	Secure
Simple Bog Sedge or Kobresai	*Kobresia simpliciuscula*	Secure
White Beakrush	*Rhynchospora alba*	May Be At Risk
Softstem Bulrush	*Schoenoplectus tabernaemontani*	Undertermined
Small-fruited Bulrush	*Scirpus microcarpus*	Secure
Rolland's Bulrush	*Scirpus rollandii or Trichophorum pumilum*	Sensitive
Alpine Bulrush	*Trichophorum alpinum*	Secure
Tufted Bulrush	*Trichophorum caespitosum*	Secure
Droseraceae		
English Sundew	*Drosera anglica*	Secure
Slenderlead Sundew	*Drosera linearis*	Sensitive
Round Sundew	*Drosera rotundifolia*	Secure
Dryopterdaceae		
Spinulose Wood Fern	*Dryopteris carthusiana*	May Be At Risk
Oak Fern	*Dryopteris disjuncta*	Undertermined
Fragrant Shield Fern	*Dryopteris fragrans*	Secure
Shield-Fern spp.	*Dryopteris robertiana*	Undertermined
Elaeagnaceae		
American Silverberry	*Elaeagnus commutata*	Secure
Buffaloberry	*Shepherdia canadensis*	Secure
Elatinaceae		
Long-stemmed Waterwort	*Elatine americana*	Undertermined
Empetraceae		
Black Crowberry	*Empetrum nigrum ssp. Hermaphroditum*	Secure
Equistaceae		
Field Horsetail	*Equisetum arvense*	Secure

Common Name	Scientific Name	NWT conservation status
Water Horsetail	*Equisetum fluviatile*	Secure
Scouring-Rush	*Equisetum hyemale var. affine*	Secure
Marsh-Horsetail	*Equisetum palustre*	Secure
Meadow-Horsetail	*Equisetum pratense*	Secure
Dwarf Scouring-Rush	*Equisetum scirpodies*	Secure
Woodland Horsetail	*Equisetum sylvaticum var. pauciramosum*	Secure
Variegated Horsetail	*Equisetum variegatum*	Secure
Ericaceae		
Bog Rosemary	*Andromeda polifolia*	Secure
Alpine Bear Berry	*Arctostaphylos alpina*	Secure
Red Bear Berry	*Arctostaphylos rubra*	Secure
Common Bearberry (Kinnikinnick)	*Arctostaphylos uva-ursi*	Secure
Leather-leaf	*Chamaedaphne calycylata*	Secure
Bog-laurel	*Kalmia polifolia*	Secure
Common Labrador-tea	*Ledum groenlandicum*	Secure
Alpine Azalea	*Loiseleuria procumbens*	Secure
Lapland Rosebay	*Rhododendron lapponicum*	Secure
Marsh Labrador-tea	*Rhododendron tomentosum*	Undertermined
Small Cranberry	*Vaccinium oxycoccos*	Secure
Alpine Bilberry	*Vaccinium uliginosum s. lat.*	Secure
Mountain Cranberry (Lingonbery)	*Vaccinium Vitis-idaea var. minus*	Secure
Fabaceae		
White sweet clover	*Melilotus albus*	Alien
Yellow sweet clover	*Melilotus officinalis*	Alien
Fabaceae (Leguminosea)		
Alpine Milk-Vetch	*Astragalus alpinus*	Secure
Prairie Milk-Vetch	*Astragalus adsurgens*	Undertermined
Meadow Milk-Vetch	*Astragalus agrestis*	Sensitive
American Milk-Vetch	*Astragalus americanus*	Secure
Indian Milk-Vetch	*Astragalus australis*	Secure
Bodin's Milk-Vetch	*Astragalus bodinii*	Secure
Elegant Milk-Vetch	*Astragalus eucosmus*	Secure
Looseflower Milk-Vetch	*Astragalus tenellus*	Secure
Tundra Milk-Vetch	*Astragalus umbellatus*	Secure
Alpine Sweetvetch	*Hedysarum alpinum var. americanum*	Secure
Boreal Sweetvetch	*Hedysarum boreale*	Secure
Cream Vetchling	*Lathyrus ochroleucus*	Secure
Boral Locoweed	*Oxytropis borealis*	Secure
Pendent-pod Locoweed	*Oxytropis deflexa*	Secure
Maydell's Locoweed	*Oxytropis maydelliana s. lat.*	Secure
Showy Locoweed	*Oxytropis splendens*	Secure
Field Locoweed	*Oxytropis varians*	Secure
American Purple Vetch	*Vicia americana*	Secure
Fumariaceae		
Golden Corydalis	*Corydalis aurea*	Secure
Pale Corydalis	*Corydalis sempervirens*	Secure

Common Name	Scientific Name	NWT conservation status
Gentianaceae		
Prairie Gentian	*Genetiana affinis*	Sensitive
Northern Fringed Gentian	*Gentianopsis barbata*	Undertermined
Macoun's Gentian	*Gentianopsis macounii*	May Be At Risk
Marsh Felwort	*Lomatogonium rotatum spp. tenuifolium*	Secure
Geraniaceae		
Biknell's Geranium	*Geranium bicknellii*	Secure
Haloragaceae		
Commom Mare's-Tail	*Hippuris vulgaris*	Secure
Spikes Water-Milfoil	*Myriophyllum sibiricum*	Secure
Whorled Watermilfoil	*Myriophyllum verticillatum*	Secure
Juncaceae		
Northern Green Rush	*Juncus alpinoarticulatus*	Secure
Arctic Rush	*Juncus arcticus*	Secure
Toad Rush	*Juncus bufonius*	Secure
Cheatnut Rush	*Juncus castaneus*	Secure
Thread Rush	*Juncus filiformis*	Secure
Knotted Rush	*Juncus nodosus*	Secure
Moor Rush	*Juncus stygius spp. americanus*	Sensitive
Northern White Rush	*Juncus triglumis*	Secure
Vasey's Rush	*Juncus vaseyi*	Undertermined
Northern Woodrush	*Luzula confusa*	Secure
Common Woodrush	*Luzula multiflora ssp. figida var. contracta*	Secure
Wahlenberg's Woodrush	*Luzula wahlenbergii*	Secure
Lamiacese (Labiatae)		
Blue Giant Hyssop	*Agastache foeniculum*	May Be At Risk
American Dragonhead Nettle	*Dracocephalum parviflorum*	Secure
Commom hemp nettle	*Galeopsis tetrahit*	Alien
Corn Mint	*Mentha arvensis var. villosa*	Secure
False Dragonhead	*Physostegia parviflora*	Undertermined
Hooded Skullcap	*Scutellaria galericulata var. pubescens*	Secure
Lemnaceae		
Star Duckweed	*Lemna trisulca*	Secure
Lentibulariaceae		
Hairy Butterwort	*Pinguicula villosa*	Secure
Common Butterwort	*Pinguicula vulgaris*	Secure
Flatleaf Bladderwort	*Utricularia intermedia*	Secure
Lesser Bladderwort	*Utricularia minor*	Sensitive
Yellowiswhite Bladderwort	*Utricularia ochroleuca*	Sensitive
Common Bladderwort	*Utricularia vulgaris*	Secure
Liliaceae		
Wild Chives	*Allium schoenoprasum var. sibiricum*	Secure
Lewis Blue Flax	*Linum lewisii*	Secure
Starry False Solomon's Seal	*Maianthemum stellatum*	Secure
Three-leaved False Solomon's Seal	*Maianthemum trifolia*	Secure
Sticky False Asphodel	*Tofieldia glutinosa*	Secure
Scotch False Asphodel	*Tofieldia pusilla*	Secure
Mountain Death Camas	*Zygadenus elegans*	Secure

Common Name	Scientific Name	NWT conservation status
Lobeliaceae		
Water Lobelia	*Lobelia dortmanna*	May Be At Risk
Lycopodiaceae		
Trailling Clubmoss	*Diphasiastrum complanatum*	Secure
Fir Club-Moss	*Huperzia selago*	Secure
Bristly Club-Moss	*Lycopodium annotinum*	Secure
Running Club-Moss	*Lycopodium clavatum var monostachyon*	Undertermined
Ground-Pine	*Lycopodium obscurum var. dendroideum*	Sensitive
Menyanthaceae		
Bog Buckbean	*Menyanthes trifoliata*	Secure
Myricaceae		
Sweet Gale	*Myrica gale*	Secure
Nymphaeaceae		
Variegated Pond Lily	*Nuphar variegata*	Secure
Pygmy White Waterlily	*Nymphaea tetragona*	Sensitive
Onagraceae		
Fireweed	*Chamerion angustifolium*	Secure
River Fireweed	*Chamerion latifolium*	Secure
Hairy Willow-herb	*Epilobium ciliatum*	Secure
Linear-leaved or Bog Willowherb	*Epilobium leptophyllum*	Sensitive
Marsh Willow-herb	*Epilobium palustre*	Secure
Ophioglossaceae		
Rattlesnake Fern	*Botrychium virginianum ssp. Europaeum*	Sensitive
Orchidaceae		
Calypso	*Calypso buibosa*	Secure
Early Coral-root	*Corallorhiza trifida*	Secure
Yellow Lady's-slipper	*Cypripedium calceolus var. parviflorum*	Secure
Spotted Lady's-slipper	*Cypripedium guttatum*	Secure
Richardson Sparrow's Egg Lady's-slipper	*Cypripedium passerinum*	Secure
Roundleaf Orchis	*Galearis rotundifolia*	Undertermined
Lesser Rattlesnake-plantain	*Goodyera repens*	Secure
Northern Green Orchid	*Habenaria hyperborea*	Secure
Small Northern Bog-Orchid	*Habenaria obtusata*	Secure
Northern Twayblade	*Listera borealis*	Secure
White Adder's-mouth	*Malaxis monophyllos*	May Be At Risk
Hooded Ladies'-tresses	*Spiramthes romanzoffiana*	Secure
Orobachacae		
Northern Groundcone	*Boschniakia rossica*	Secure
Little Yellow Rattle	*Rhinanthus borealis*	Secure
Papaveraceae		
Macoun's Poppy	*Papaver macounii*	Secure
Pinaceae		
Creeping Juniper	*Juniperus horizontalis*	Secure
Tamarack	*Larix laricina*	Secure
White Spruce	*Picea gluca*	Secure
Black Spruce	*Picea marina*	Secure
Jack Pine	*Pinus Banksiana*	Secure

Common Name	Scientific Name	NWT conservation status
Plantaginaceae		
Hairy Plantain	*Plantago canescens*	Secure
Saline Plantain	*Plantago eriopoda*	Secure
Nipple-seed Plantain	*Plantago major*	Alien
Poaceae (Gramineae)		
Northern Bentgrass	*Agrostis mertensii*	Secure
Rough Bentgrass or Tickle Grass	*Agrostis scabra*	Secure
Shortawn Foxtail	*Alopecurus aequalis*	Secure
Broad-Leaf Arctic-bent	*Arctagrostis latifolia*	Secure
Pendantgrass	*Arctophila fulva*	Secure
American Sloughgrass	*Beckmannia syzigachne*	Secure
Fringed Brome	*Bromus ciliatus*	Secure
Lapland Reedgrass	*Calamagrostis lapponica var. nearctica*	Secure
Puple Reedgrass	*Calamagrostis purpurascens*	Secure
Slim-Stem Reedgrass	*Calamagrostis stricta*	Secure
Slender Wood Reed Grass	*Cinna latifolia*	Sensitive
Tuftted Hairgrass	*Deschampsia caespitosa*	Secure
Canada Nodding Wild Rye	*Elymus canadensis*	Sensitive
Tufed Wheat Grass	*Elymus sericeus*	Undertermined
Slender Wild Rye	*Elymus trachycaulus*	Secure
Violet Wild Rye	*Elymus violaceus*	Secure
Short-Leaved Fescue	*Festuca brachyphylla*	Secure
Rocky Mountain Fescue	*Festuca saximontana*	Secure
Small Floating Mannagrass	*Glyceria borealis*	Sensitive
American Mannagrass	*Glyceria grandis*	Secure
Mackenzie Valley Mannagrass	*Glyceria pulchella*	Secure
Fowl Mannagrass	*Glyceria striata var. stricta*	Secure
Alpine Sweetgrass	*Hierochloë alpina*	Secure
Vanilla Sweetgrass	*Hierochloë odorata*	Secure
Foxtail Barley	*Hordeum jubatum*	Secure
Prairie Koeler's Grass	*Koeleria macrantha*	Sensitive
Downy Lyme Grass	*Leymus innovatus*	Secure
American Lyme Grass	*Leymus mollis*	Secure
Spiked Muhly	*Muhlenbergia glomerata var. cinnoides*	Sensitive
Matted Muhly	*Muhlenbergia richardsonis*	Sensitive
White-grained Mountain Ricegrass	*Oryzopsis asperifolia*	Sensitive
Reed Canary-grass	*Phalaris arundinacea*	Undertermined
Slender Short-Awn Mountain-Rice	*Piptatherum pungens*	Secure
Alpine Bluegrass	*Poa alpina*	Secure
White Bluegrass	*Poa glauca*	Secure
Fowl Bluegrass	*Poa palustris*	Secure
Kentucky Bluegrass	*Poa pratensis*	Secure
Kentucky Bluegrass	*Poa pratensis*	Secure
Curly Bluegrass	*Poa secunda*	Sensitive
Arctic Alkaligrass	*Puccinellia borealis*	Secure
Polar Nuttall's Alkali Grass	*Puccinellia nuttalliana*	Sensitive
Common Rivergrass	*Scolochloa festucacea*	Sensitive
Freshwater Cordgrass	*Spartina pectinata*	May Be At Risk

Common Name	Scientific Name	NWT conservation status
Slender Wedgescale Grass	*Sphenopholis intermedia*	Secure
Narrow False Oat	*Trisetum spicatum s. lat.*	Secure
Polemoniaceae		
Narrow Leaved Collomia	*Collomia linearis*	Sensitive
Polygonaceae		
Mountain Sorrel	*Oxyria digyna*	Secure
Water Smartweed	*Persicaria amphibia*	Secure
Striated knotweed	*Polygonum achoreum*	Alien
Water Smartweed	*Polygonum amphibium var. stipulaceum*	Secure
Alaska Knotweed	*Polygonum humifuscum*	Sensitive
Curlytop Knotweed	*Polygonum lapathifolium*	Undertermined
Alpine Bistort	*Polygonum viviparum*	Undertermined
Golden Dock	*Rumex maritimus var. fueginus*	Undertermined
Western Dock	*Rumex occidentalis*	Secure
Triangluar-valvrd Dock	*Rumex triangulivalvis*	Secure
Polypodiaceae		
Rock Polypody	*Polypodium virginianum*	Undertermined
Potamogetonaceae		
Alpine Pondweed	*Potamogeton alpinus ssp. Tenuifolius*	Secure
Thread-leaved Pondweed.	*Potamogeton filiformis*	Undertermined
Leafy Pondweed	*Potamogeton foliosus*	Sensitive
Fries' Pondweed	*Potamogeton friesii*	Secure
Grassy Pondweed	*Potamogeton gramineus*	Secure
Illinois Pondweed	*Potamogeton illinoensis*	May Be At Risk
Bluntleaf Pondweed	*Potamogeton obtusifolius*	Sensitive
Pondweed spp.	*Potamogeton porsildiorum*	Undertermined
White-stem Pondweed	*Potamogeton praelongus*	Secure
Slender Pondweed	*Potamogeton pusillus*	Secure
Richardson's Pondweed	*Potamogeton richardsonii*	Secure
Straightleaf Pondweed	*Potamogeton strictifolius var. ruiloides*	Secure
Sheathed Pondweed	*Potamogeton vaginatus*	Secure
Pondweed spp.	*Potamogeton zoseriformis*	Undertermined
Primulaceae		
Pygmyflower Rockjasmine	*Androsace septentrionalis*	Secure
Few-Flower Shootingstar	*Dodecatheon pulchellum spp. pauciflorum*	Sensitive
Milk Seawort	*Glaux maritima*	May Be At Risk
Tuffed Yellow Loosestrife	*Lysimachia thyrsiflora*	Secure
Mealy Primrose	*Primula incana*	Secure
Lake Mistassini Primrose	*Primula mistassinica*	Secure
Stiff Primrose	*Primula stricta*	Secure
Arctic Starflower	*Trientalis europaea ssp. arctica*	Sensitive
Pteridaceae		
Mountain-Parsely	*Crytopgramma crispa var. acrostichoides*	Undertermined
Mountain Bladder Fern	*Cystopteris montana*	Sensitive
Pyrolaceae		
One-Flowered Wintergreen	*Moneses uniflora*	Secure
Pink-flowered Wintergreen	*Pyrola asarifolia*	Secure
Greenflowered Wintergreen	*Pyrola chlorantha*	Secure
Arctic Pyrola	*Pyrola grandiflora*	Secure

Common Name	Scientific Name	NWT conservation status
Lesser Pyrola	*Pyrola minor*	Secure
One-sided Wintergreen	*Pyrola secunda s. lat.*	Undertermined
Ranunculaceae		
Red Baneberry	*Actaea rubra*	Secure
Canadian Anemone	*Anemone canadensis*	Secure
Cut-leaved Anemone	*Anemone multifida*	Secure
Smallflowered Anemone	*Anemone parviflora*	Secure
Yellow Thinbleweed	*Anemone Richardsonii*	Secure
Blue Columbine	*Aquilegia brevistyla*	Secure
Floating Marsh-marigold	*Caltha natans*	Sensitive
Yellow Marsh-marigold	*Caltha palustris var. palustris*	Secure
Pale Larkspur	*Delphinium glaucum*	Secure
Prairie Crocus or Pasque-flower	*Pulsatulla ludoviciana*	Undertermined
Tall or Common Buttercup	*Ranuculus aquatilis var. eradicatus*	Undertermined
Kidney-leaved Buttercup	*Ranunculus abortivus*	Sensitive
White Water-buttercup	*Ranunculus aquatilis var. subrigidus*	Secure
Seaside Buttercup	*Ranunculus cymbalaria*	Secure
Lesser Spearwort	*Ranunculus flammula*	Secure
Smal Yellow Water-Buttercup	*Ranunculus gmelinii*	Secure
Arctic Buttercup	*Ranunculus hyperboreus*	Secure
Lapland Buttercup	*Ranunculus lapponicus*	Secure
Macoun Buttercup	*Ranunculus macounii*	Secure
Bristly Crowfoot	*Ranunculus pensulvanicus*	Undertermined
Sulphur Buttercup	*Ranunculus sceleratus spp. multifidus*	Secure
Veined Meadow-Rue	*Thalictrum venulosum*	Secure
Rosaceae		
Saskatoon Berry	*Amelanchier alnifolia*	Secure
Purple Marshlocks	*Comarum palustre*	Undertermined
Shrubby Cinquefoil	*Dasiphora fruticosa*	Undertermined
Yellow Mountain Avens	*Dryas Drummondii*	Secure
Eightpetal Mountain Avens	*Dryas octopetala*	Secure
Entireleaf Mountain Avens	*Dryas sylvatica*	Undertermined
Virginia Strawberry	*Fragaria virginiana ssp. Glauca*	Secure
Largeleaf Avens	*Geum macrophyllum var. perincisum*	Secure
Prairie-smoke	*Geum triflorum*	May Be At Risk
Silverweed	*Potentilla anserian*	Undertermined
Tall Cinquefoil	*Potentilla arguta (Drymocallis arguta)*	Sensitive
Staghorn Cinquefoil	*Potentilla bimundorum*	Undertermined
Snow Cinquefoil	*Potentilla nivea*	Secure
Norwegian Cinquefoil	*Potentilla norvegica*	Secure
Pennsylvania Cinquefoil	*Potentilla pensylvanica*	Secure
Pin Cherry	*Prunus pensylvanica*	Secure
Choke Cherry	*Prunus virginiana*	May Be At Risk
Prickly Rose	*Rosa acicularis*	Secure
Wood's Rose	*Rosa woodsii*	Secure
Dwarf Raspberry	*Rubus acaulis*	Undertermined
Cloudberry	*Rubus chamaemorus*	Secure
Raspberry spp.	*Rubus paracaulis*	Undertermined

Common Name	Scientific Name	NWT conservation status
Dwarf Red Raspberry	*Rubus pubescens*	Secure
Wild Raspberry	*Rubus strigosus*	Undertermined
Rubiaceae		
Northern Bedstraw	*Galium boreale*	Secure
Bog Bedstraw	*Galium labradoricum*	Secure
Threepetal Bedstraw	*Galium tinctorium (var. subbiflorum)*	Undertermined
Fragreant Bedstraw	*Galium triflorum*	Secure
Salicaceae		
Balsam Poplar	*Populus balsamifera*	Secure
Trembling Aspen	*Populus tremuloides*	Secure
Alaska Willow	*Salix alaxensis*	Secure
Littletree Willow	*Salix arbusculoides*	Secure
Northern Willow	*Salix arctophila*	Secure
Athabasca Willow	*Salix athabascensis*	Secure
Bebb Willow	*Salix bebbiana*	Secure
Short-fruit Willow	*Salix brachycarpa*	Secure
Hoary willow	*Salix cadida*	Secure
Pussy Willow	*Salix discolor*	Sensitive
Alsaska Bog Willow	*Salix fuscescens*	Secure
Grayleaf Willow	*Salix glauca*	Secure
Dwarf Arctic Willow	*Salix gracilis*	Undertermined
Greenleaf or Pacific Willow	*Salix lasiandra*	Secure
Yellow willow	*Salix lutea*	Undertermined
MaCalla's Willow	*Salix maccalliana*	Secure
Blueberry Willow	*Salix myrtillifolia*	Secure
Park Willow	*Salix padophylla*	Undertermined
Bog Willow	*Salix pedicellaris var. hypoglauca*	Secure
Diamondleaf Willow	*Salix planifolia*	Secure
Balsam Willow	*Salix pyrifoloa*	Secure
Net-veined Willow	*Salix retuculata*	Secure
Scouler's Willow	*Salix scouleriana*	Secure
Autumn Willow	*Salix serissima*	Secure
Sandbar Willow	*Slaix interior var. pdicellata*	Undertermined
Santalaceae		
Northern Conandra	*Geocaulon lividum*	Secure
Sarraceniaceae		
Northern Pitcher-plant	*Sarracenia purpurea*	Sensitive
Saxiflagaceae		
Northern Golden Saxifrage	*Chrysosplenium tetrandrum*	Secure
Richardson Alumroot	*Heuchera richardsonii*	May Be At Risk
Bear-stem Bishop's Cap	*Mitella nuda*	Secure
Kotzebue's Grass-of-Parnassus	*Parnassia kotzebuei*	Secure
Mountain Grass-of-Parnassus	*Parnassia montanensis*	Undertermined
Marsh Grass-of-Parnassus	*Parnassia palustris var. neogaea*	Secure
Skunk Currant	*Ribes glandulosum*	Secure
Northern Black Currant	*Ribes hudsonianum*	Secure
Bristly Black Currant	*Ribes lacustre*	Secure

Common Name	Scientific Name	NWT conservation status
Canada Gooseberry	*Ribes oxyacanthiodes*	Secure
Swamp Red Currant	*Ribes triste*	Secure
Wild Mountain Saxifrage	*Samifrage aizoides*	Undertermined
Alpine Saxifrage	*Saxifrage nivalis*	Undertermined
Prickly Saxifrage	*Saxifrage tricuspidata*	Undertermined
Scheuchzeriaceae		
Scheuchzeria	*Scheuchzeeria palustris var. americana*	Undertermined
Seaside Arrow-grass	*Triglochin maritima*	Secure
Marsh Arrow-grass	*Triglochin palustris*	Secure
Scrophulariaceae		
Raup's Indian Pantbrush	*Castilleja raupii*	Secure
Labrador Lousewort	*Pedicularis labradorica*	Secure
Smallflower Lousewort	*Pedicularis parviflora*	Undertermined
Purslane Speedwell	*Veronica peregrina*	May Be At Risk
Marsh Speedwell	*Veronica scutellata*	Sensitive
Selaginellaceae		
Club Spikemoss	*Selaginella selaginoides*	Secure
Sparganiaceae		
Narrow leaved Bur-reed	*Sparganium angustifolium*	Secure
Slender Bur-reed	*Sparganium minimum*	Undertermined
Many-staked Bur-reed	*Sparganium multipedunculatum*	Undertermined
Typhaceae		
Broad-lead Cattial	*Typha latifolia*	Secure
Umbelliferae		
Bulbous Water-Hemlock	*Cicuta bulbifera*	Secure
Mackenzie's Water-Hemlock	*Cicuta mackenzieana*	Undertermined
Spotted Water-Hemlock	*Cicuta maculata var. angustifolia*	Secure
Cow-parsnip	*Heracleum lanatum*	Secure
Water-parsnip	*Sium suave*	Secure
Urticaceae		
Stinging Nettle	*Urtica gracilis*	Undertermined
Violaceae		
Sand Violet	*Viola adunca*	Secure
Northern Marsh Violet	*Viola epipsila ssp. repens*	Sensitive
Northern Bog Violet	*Viola nephrophylla*	Sensitive
Smoth White Violet	*Viola pallens*	Undertermined
Alpine Marsh Violet	*Viola palustris*	Sensitive
Kidney-leaf White Violet	*Viola renifolia (var. Brainerdii)*	Secure
Woodsiaceae		
Smooth Woodsia	*Woodsia glabella*	Secure
Rusty Woodsia	*Woodsia ilvensis*	Secure

Appendix 2: Phytoplankton of Great Slave Lake (Rawson 1956). All species listed are likely to be found in the Kwets'ootł'àà candidate protected area. Species in bold were found in samples from the Kwets'ootł'àà vicinity and were rarely found elsewhere in the lake.

Phylum	Class	Family	*Scientific name*
Chlorophyta			
		Chaetophoraceae	
			Chaetophora incrassata
		Characiaceae	
			Characium gracilipes
		Cladophoraceae	
			Cladophora spp.
		Desmidiaceae	
			Closterium acerosum
			Closterium aciculare
			Closterium cornu
			Closterium moniliferum
			Cosmarium binum
			Cosmarium botrytis
			Cosmarium circulare
			Cosmarium impressulum
			Cosmarium margaritatum
			Cosmarium punctulatum
			Cosmarium pyramidatum
			Cosmarium rectangulare
			Cosmarium spp.
			Cosmarium subcrenatum
			Cosmarium subcucumis
			Cosmarium turpinii
			Hyalotheca dissiliens
			Hyalotheca mucosa
			Pleurotaenium trabecula
			Pleurotaenium truncatum
			Spondylosium planum
			Staurastrum anatinum
			Staurastrum anatinum var. curtum
			Staurastrum bullardii
			Staurastrum furcigerum var. armigerum
			Staurastrum polymorphum
		Hydrodictyaceae	
			Ankistrodesmus falcatus
			Ankistrodesmus spiralis
			Dictyosphaerium pulchellum
			Oocystis borgei
			Pediastrum boryanum
			Pediastrum duplex
			Pediastrum duplex var. clathratum
			Pediastrum duplex var. gracillimum
			Pediastrum glanduliferum
			Pediastrum kawraiskyi
			Pediastrum tetras
			Selenastrum westii
			Sorastrum americanum

Phylum	Class	Family	*Scientific name*
Chlorophyta			
		Mesotaeniaceae	
			Gonatozygon kihnahani
		Oedogoniaceae	
			Bulbochaete sp.
		Palmellaceae	
			Sphaerocystis schroeteri
		Scenedesmaceae	
			Crucigenia quadrate
			Crucigenia rectangularis
			Scenedesmus arcuatus
			Scenedesmus bijuga
		Tetrasporaceae	
			Tetraspora lubrica
		Ulotrichaceae	
			Ulothrix zonata
		Volvocaceae	
			Eudorina elegans
			Pandorina morum
			Volvox mononae
		Zygnemataceae	
			Mougeotis sp.
			Spirogyra spp.
			Zygnema spp.
Chrysophyta			
	Baccilariophyceae		
		Achnanthaceae	
			Cocconeis pediculus
			Cocconeis placentula
		Coscinodiscaceae	
			Cyclotella comta
			Cyclotella meneghiniana
			Cyclotella sp.
			Melosira arenaria
			Melosira islandica
			Melosira varians
			Stephanodiscus astrae
			Stephanodiscus niagarae
		Cymbellaceae	
			Amphora ovalis
			Cymbella aspera
			Cymbella cistula
			Cymbella cuspidata
			Cymbella cymbiformis
			Cymbella ehrenbergii
			Cymbella lanceolata
			Cymbella sp.
			Cymbella tumida
			Cymbella ventricosa
			Epithemia argus
			Epithemia hyndmanni
			Epithemia turgida

Phylum	Class	Family	*Scientific name*
Chrysophyta			
		Cymbellaceae	
			Epithemia zebra
			Rhopalodia gibba
			Rhopalodia gibba var. ventricosa
		Eunotiaceae	
			Eunotia lunaris
			Eunotia pectinalis
			Eunotia praerupta
		Fragilariaceae	
			Asterionella formosa
			Asterionella gracillima
			Fragilaria capucina
			Fragilaria crotonensis
			Synedra acus
			Synedra acus var. radians
			Synedra ulna
			Synedra ulna var. danica
			Synedra spp.
		Gomphonemataceae	
			Gomphonema geminatum
		Naviculaceae	
			Ahphiprora ornata
			Gyrosigma acuminatum
			Gyrosigma attenuatum
			Gyrosigma kutzingii
			Navicula cuspidata
			Navicula cryptocephala
			Navicula gastrum
			Navicula gracillis
			Navicula grevillei
			Navicula lanceolata
			Navicula oblonga
			Navicula placentula
			Navicula pupula
			Navicula radiosa
			Navicula viridula
			Navicula spp.
			Neidium iridis
			Neidium productum
			Pinnularia borealis
			Pinnularia viridis
			Stauroneis phoenicenteron
		Nitzschiaceae	
			Hantzschia amphioxys
			Nitzschia sigma
			Nitzschia sigmoidea
			Nitzschia tryblionella
			Nitzschia vermicularis

Phylum	Class	Family	*Scientific name*
Chrysophyta			
		Rhizosoleniaceae	
			Rhizosolenia eriensis
		Surirellaceae	
			Campylodiscus hibernicus
			Cymatopleura elliptica
			Cymatopleura solea
			Denticula tenuis
			Surirella biseriata
			Surirella ovalis
			Surirella splendida
		Tabellariaceae	
			Diatoma elongatum
			Diatoma vulgare
			Tabellaria fenestrata
			Tabellaria flocculosa
	Chrysophyceae		
			Dinobryon divergens
			Dinobryon sertularia
			Dinobryon stipitatum
			Mallomonas alpina
	Xanthophyceae		
			Botryococcus braunii
			Characiopsis sp.
			Tribonema bombycinum
Cyanophyta			
		Chroococcacea	
			Chroococcus limneticus
			Chroococcus turgidus
			Coelosphaerium kuetzingianum
			Coelosphaerium naegelianum
			Gomphosphaeria aponina
			Gomphosphaeria lacustris
			Merismopedia elegans
			Merismopedia glauca
			Merismopedia punctata
			Merismopedia tenuissima
		Nostocaceae	
			Anabaena flos-aquae
			Anabaena lemmermanni
			Anabaena spiroides
			Aphanizomenon flos-aquae
		Oscillatoriaceae	
			Oscillatoria limosa
			Oscillatoria tenuis
Pyrrophyta			
			Ceratium hirundinella
			Peridinium tabulatum
Rhodophyta			
			Adouinella sp.

Appendix 3: Zooplankton of Great Slave Lake (Rawson 1956). All species listed likely occur in the Kwets'ootł'àà candidate protected area. Species in bold were found in samples from the Kwets'ootł'àà vicinity and were rarely found elsewhere in the lake.

Kingdom	Phylum	Subclass	*Scientific name*
Protista			
	Protozoa		
			Codonella cratera
Animalia			
	Rotatoria		
			Asplanchna priodonta
			Cephalodella gibba
			Conochilus unicornis
			Euchlanis deflexa
			Euchlanis dilatata
			Gastropus stylifer
			Kellicottia longispina
			Keratella cochlearis
			Keratella earlenae
			Keratella quadrata
			Lecane sp.
			Monostyla sp.
			Mytilina brevispina
			Notholca labis
			Notholca squalmula
			Ploesoma hudsoni
			Ploesoma truncata
			Polyarthra major
			Polyarthra remata
			Polyarthra sp.
			Polyarthra vulgaris
			Synchaeta spp.
			Synchaeta stylata
			Trichocerca carinata
			Trichotria intermedia
			Trichotria pocillum

Kingdom	Phylum	Subclass	*Scientific name*
Animalia			
	Arthropoda		
		Copepoda	
			Cyclops bicuspidatus
			Cyclops scutifer
			Cyclops strenuus
			Cyclops viridis brevispinosus
			Diaptomus ashlandi
			Diaptomus minutus
			Diaptomus sicilis
			Diaptomus tenuicaudata
			Diaptomus tyrelli
			Epischura lacustris
			Limnocalanus macrurus
			Moraria duthiei
			Senecella calanoides
		Phyllopoda	
			Alona affinis
			Bosmina obstusirostris
			Chydorus sphaericus
			Daphnia longispina
			Daphnia pulex
			Diaphanosoma brachyurum
			Holopedium gibberum
			Leptodora kindtii
			Polyphemus pediculus
			Sida crystallina
			Simocephalus vetulus

Appendix 4: Benthic organisms of Great Slave Lake (from Rawson 1953). All species listed likely occur in the Kwets'ootł'àà candidate protected area. Species in bold were found in samples from the Kwets'ootł'àà vicinity and were rarely found elsewhere in the lake.

Phylum	Class	Order	*Scientific name*
Porifera			
			Spongilla fragilis
			Spongilla lacustris
Cnidaria			
			Hydra sp.
Platyhelminthes			
			Dugesia spp.
Nematoda			
			Aphelenchus sp.
			Dorylaimus spp.
			Doryllium sp.
			Gordius sp.
			Hydromermis sp.
			Paragordius sp.
Molusca			
	Bivalvia		
		Unionida	
			Anodonta kennicotti
			Lampsilis siliquoidea
		Veneroida	
			Musculium ryckholti
			Musculium transversum
			Musculium winkleyi
			Pisidium compressum
			Pisidium conventus
			Pisidium fallax
			Pisidium idahoense
			Pisidium lermondi
			Pisidium lilljeborgi
			Pisidium medianum
			Pisidium milium
			Pisidium pauperculum
			Pisidium punctatum
			Pisidium subtruncatum
			Sphaerium striatinum
			Sphaerium tenue nitidum
	Gastropoda		
			Amnicola binneyana
			Fossaria obrussa
			Gyraulus hirsutus
			Gyraulus parvus
			Menetus exacuous
			Physa gyrina
			Stagnicola caperata
			Stagnicola catoscopium
			Valvata sincera
Annelida			
	Clitellata		
			Erpobdella atomaria
			Erpobdella punctata
			Glossiphonia complanata
			Haemopis marmoratus
			Helobdella fusca

Phylum	Class	Order	*Scientific name*
Annelida			
	Clitellata		
			Helobdella stagnalis
			Nephelopsis obscura
			Piscicola milneri
	Oligochaeta		
			Limnodrilus claparedeianus
			Limnodrilus spp.
Annelida			
	Oligochaeta		
			Lumbriculus inconstans
			Lumbriculus variegatus
			Mesoporodrillus sp.
			Tubifex spp.
Arthropoda			
	Arachnida		
		Actinedida	
			Arrenurus sp.
			Eylais sp.
			Hygrobates sp.
			Lebertia porosa
			Piona interrupta
			Unionicola crassipes
		Trombidiformes	
			Hydrachna cruenta
	Insecta		
		Diptera	
			Chironomus spp.
			Cryptochironomus spp.
			Pentaneura spp.
			Procladius spp.
			Spaniotoma spp.
			Tanytarsus spp.
		Ephemeroptera	
			Ephemera simulans
			Hexagenia occulta
		Plecoptera	
			Arcynopteryx compacta
			Capnia nearctica
			Isogenous frontalis
			Isoperla decolorata
			Nemoura arctica
			Pteronarcys dorsata
		Trichoptera	
			Agrypnia sp.
			Athripsodes sp.
			Hydropsyche separata
			Hydroptilidae sp.
			Limnephilidae sp.
			Limnephilus spp.
			Molanna flavicornis
			Phryganeidae sp.

Phylum	Class	Order	*Scientific name*
	Malacostraca		
		Amphipoda	
			Gammarus limnaeus
			Hyadella azteca
			Pontoporeia affinis
		Mysida	
			Mysis relicta
	Ostracoda		
			Candona crogmaniana
			Candona decora
			Candona sp.
			Cypriconcha barbata
			Limnocythere sp.
Bryozoa			
			Cristatella mucedo
			Fredericella sultana
			Paludicella articulata
			Plumatella repens var. typica

Appendix 5: Fish species occurring in Great Slave Lake summarized from existing literature.

Common name	*Scientific name*	COSEWIC	NWT conservation status	Source
Catostomidae				
Longnose sucker	*Catostomus catostomus*		Secure	1, 2, 5, 6, 7
White sucker	*Catostomus commersonnii*		Secure	1, 5, 6, 7
Cottidae				
Slimy sculpin	*Cottus cognatus*		Secure	1, 7
Spoonhead sculpin	*Cottus ricei*	Not at Risk	Secure	1, 7
Deepwater sculpin	*Myoxocephalus thompsonii*	Not at Risk	Sensitive	1, 4, 5, 7
Cyprinidae				
Lake chub	*Couesius plumbeus*		Secure	1, 7
Emerald shiner	*Notropis atherinoides*		Secure	1, 6, 7
Spottail shiner	*Notropis hudsonius*		Secure	1, 7
Fathead minnow	*Pimephales promelas*		Undetermined	6
Flathead chub	*Platygobio gracilis*		Secure	1, 5, 6, 7
Esocidae				
Northern Pike	*Esox lucius*		Secure	1, 2, 5, 6, 7
Gadidae				
Burbot	*Lota lota*		Secure	1, 2, 5, 7
Gasterosteidae				
Brook stickleback	*Culaea inconstans*		Secure	5, 6
Ninespine stickleback	*Pungitius pungitius*		Secure	1, 7
Hiodontidae				
Goldeye	*Hiodon alosoides*		Secure	1, 5, 6, 7
Percidae				
Walleye	*Sander vitreus*		Sensitive	1, 2, 5, 6, 7
Yellow perch	*Perca flavescens*		Undetermined	5, 6, 7
Percopsidae				
Trout-perch	*Percopsis omiscomaycus*		Secure	1, 7
Petromyzontidae				
Arctic Lamprey	*Lampetra camtschatica*		Undetermined	1, 5, 6, 7
Salmonidae				
Cisco (Lake herring)	*Coregonus artedi*		Secure	5, 7, 8
Lake whitefish	*Coregonus clupeaformis*		Secure	1, 2, 5, 6, 7
Least Cisco	*Coregonus sardinella*		Secure	8
Shortjaw Cisco	*Coregonus zenithicus*	Threatened	At Risk	3, 5, 8
Inconnu	*Stenodus leucichthys*		Sensitive	1, 2, 5, 6, 7
Arctic grayling	*Thymallus arcticus*		Sensitive	2, 5, 7
Chum salmon	*Oncorhynchus keta*		Undetermined	5, 7
Kokanee salmon	*Oncorhynchus nerka*		Vagrant	6
Lake trout	*Salvelinus namaycush*		Secure	1, 2, 5, 7
Round whitefish	*Prosopium cylindraceum*		Secure	1, 2, 5, 6, 7

Sources: [1] Rawson (1951); [2] Keleher (1963); [3] Todd (2003); [4] COSEWIC (2006); [5] Richardson et al. (2001); [6] Evans (2002); [7] Stewart (1997); [8] Vecsei (pers.com).

Appendix 6: Birds occurring within 200km of the Kwets'ootł'àà candidate protected area summarized from surveys of the area and species with overlapping ranges. Species in bold were recorded from within Kwets'ootł'àà CPA (NWT/NU Bird Checklist Surveys).

Common name	*Scientific name*	Evidence of breeding	COSEWIC	NWT conservation status	Source
Anatidae					
Northern Pintail	***Anas acuta***	**Yes**		**Sensitive**	**1, 2, 3, 4**
American Wigeon	***Anas americana***	**Yes**		**Secure**	**1, 2, 3, 4**
Northern Shoveler	***Anas clypeata***	**Yes**		**Secure**	**1, 2, 3, 4**
Green-winged Teal	***Anas crecca***	**Yes**		**Secure**	**1, 2, 3, 4**
Cinnamon Teal	*Anas cyanoptera*	No		Vagrant	3
Blue-winged Teal	*Anas discors*	No		Secure	3, 4
Eurasian Wigeon	*Anas penelope*	No		Vagrant	3
Mallard	***Anas platyrhynchos***	**Yes**		**Secure**	**1, 2, 3, 4**
American Black Duck	***Anas rubripes***	**No**		**Vagrant**	**3**
Gadwall	*Anas strepera*	Yes		Undetermined	1, 3
Greater White-fronted Goose	*Anser albifrons*	No		Secure	2
Lesser Scaup	***Aythya affinis***	**Yes**		**Sensitive**	**1, 2, 3, 4**
Redhead	*Aythya americana*	No		Secure	3
Ring-necked Duck	***Aythya collaris***	**Yes**		**Secure**	**2, 3, 4**
Greater Scaup	***Aythya marila***	**Yes**		**Secure**	**1, 2, 3**
Canvasback	***Aythya valisineria***	**Yes**		**Secure**	**1, 2, 3, 4**
Canada/Cackling Goose	***Branta canadensis, B. hutchinsii***	**Yes**		**Secure**	**1, 2, 3**
Bufflehead	***Bucephala albeola***	**Yes**		**Secure**	**1, 2, 3, 4**
Common Goldeneye	***Bucephala clangula***	**No**		**Secure**	**3**
Barrow's Goldeneye	*Bucephala islandica*	No		Secure	3
Lesser Snow Goose	*Chen caerulescens caerulescens*	No		Secure	2, 3
Long-tailed Duck	*Clangula hyemalis*	No		Sensitive	2, 3, 4
Trumpeter Swan	***Cygnus buccinator***	**No**	**Not at Risk**	**Sensitive**	**3**
Tundra Swan	***Cygnus columbianus***	**No**		**Secure**	**2, 3**
Harlequin Duck	*Histrionicus histrionicus*	No		May be at Risk	3
Hooded Merganser	*Lophodytes cucullatus*	No		Secure	3
American Scoter	*Melanitta americana*	No		Sensitive	2, 3, 4
White-winged Scoter	*Melanitta fusca*	No		Sensitive	2, 3
Surf Scoter	***Melanitta perspicillata***	**No**		**Sensitive**	**1, 2, 3, 4**
Common Merganser	*Mergus merganser*	No		Secure	2, 3
Red-breasted Merganser	***Mergus serrator***	**Yes**		**Secure**	**1, 2, 3**
Ruddy Duck	*Oxyura jamaicensis*	No		Secure	1, 3
King Eider	*Somateria spectabilis*	No		Sensitive	3
Phasianidae					
Ruffed Grouse	*Bonasa umbellus*	No		Secure	3
Spruce Grouse	*Falcipennis canadensis*	No		Secure	3
Willow Ptarmigan	*Lagopus lagopus*	No		Secure	3
Sharp-tailed Grouse	*Tympanuchus phasianellus*	No		Secure	3

Sources: [1] CWS Larid Surveys (1989-2010); [2] CWS Waterfowl Surveys (1989-2010); [3] NWT/NU Bird Checklist Surveys (1960-2009); [4] Breeding Bird Survey (1988-1999).

Common name	*Scientific name*	Evidence of breeding	COSEWIC	NWT conservation status	Source
Gaviidae					
Common Loon	***Gavia immer***	**Yes**	**Not at Risk**	**Secure**	**2, 3, 4**
Pacific Loon	***Gavia pacifica***	**No**		**Secure**	**2, 3, 4**
Red-throated Loon	*Gavia stellata*	Yes		Secure	1, 2, 3, 4
Whooping Crane	*Grus americana*	No	Endangered	At Risk	3
Podicipedidae					
Horned Grebe	*Podiceps auritus*	Yes	Special Concern	Sensitive	2, 3, 4
Red-necked Grebe	***Podiceps grisegena***	**Yes**	**Not at Risk**	**Secure**	**2, 3, 4**
Eared Grebe	*Podiceps nigricollis*	No		Vagrant	3
Pied-billed Grebe	*Podilymbus podiceps*	No		Sensitive	3
Phalacrocoracidae					
Double-crested Cormorant	*Phalacrocorax auritus*	No	Not at Risk	Undetermined	3
Pelecanidae					
American White Pelican	*Pelecanus erythrorhynchos*	No		May be at Risk	3
Ardeidae					
Great Egret	*Ardea alba*	No		Vagrant	3
Great Blue Heron	*Ardea herodias*	No		Vagrant	3
American Bittern	***Botaurus lentiginosus***	**No**		**Sensitive**	**3, 4**
Pandionidae					
Osprey	***Pandion haliaetus***	**No**		**Secure**	**2, 3**
Accipitridae					
Cooper's Hawk	*Accipiter cooperii*	No		No Status	3
Northern Goshawk	*Accipiter gentilis*	No	Not at Risk	Secure	3
Sharp-shinned Hawk	***Accipiter striatus***	**No**	**Not at Risk**	**Secure**	**3, 4**
Golden Eagle	*Aquila chrysaetos*	No	Not at Risk	Secure	2, 3
Red-tailed Hawk	***Buteo jamaicensis***	**No**	**Not at Risk**	**Secure**	**2, 3, 4**
Rough-legged Hawk	*Buteo lagopus*	No	Not at Risk	Secure	2
Ferruginous Hawk	*Buteo regalis*	No	Threatened	No Status	3
Swainson's Hawk	*Buteo swainsoni*	No		Undetermined	3
Northern Harrier	***Circus cyaneus***	**No**	**Not at Risk**	**Secure**	**2, 3**
Bald Eagle	***Haliaeetus leucocephalus***	**Yes**	**Not at Risk**	**Secure**	**2, 3, 4**
Falconidae					
Merlin	***Falco columbarius***	**Yes**	**Not at Risk**	**Secure**	**1, 2, 3**
Peregrine Falcon	*Falco peregrinus*	No	Non-active	Sensitive	3
Gyrfalcon	*Falco rusticolus*	No	Not at Risk	Secure	3
American Kestrel	*Falco sparverius*	Yes		Secure	1, 2, 3, 4
Rallidae					
Yellow Rail	***Coturnicops noveboracensis***	**No**	**Special Concern**	**May be at Risk**	**3**
American Coot	*Fulica americana*	No	Not at Risk	Secure	3, 4
Sora	*Porzana carolina*	No		Secure	3, 4
Gruidae					
Sandhill Crane	***Grus canadensis***	**No**		**Secure**	**2, 3, 4**

Sources: [1] CWS Larid Surveys (1989-2010); [2] CWS Waterfowl Surveys (1989-2010); [3] NWT/NU Bird Checklist Surveys (1960-2009); [4] Breeding Bird Survey (1988-1999).

Common name	*Scientific name*	Evidence of breeding	COSEWIC	NWT conservation status	Source
Charadriidae					
Eurasian Dotterel	*Charadrius morinellus*	No		No Status	3
Semipalmated Plover	*Charadrius semipalmatus*	No		Secure	3
Killdeer	*Charadrius vociferus*	No		Secure	3, 4
American Golden Plover	*Pluvialis dominica*	No		Sensitive	3
Black-bellied Plover	*Pluvialis squatarola*	No		Sensitive	3
Scolopacidae					
Spotted Sandpiper	***Actitis macularius***	**Yes**		**Secure**	**1, 2, 3, 4**
Ruddy Turnstone	*Arenaria interpres*	No		Sensitive	3
Sanderling	*Calidris alba*	No		Sensitive	3
Dunlin	*Calidris alpina*	No		Sensitive	3
Baird's Sandpiper	*Calidris bairdii*	No		Secure	3
White-rumped Sandpiper	*Calidris fuscicollis*	No		Secure	3
Stilt Sandpiper	*Calidris himantopus*	No		Undetermined	3
Pectoral Sandpiper	*Calidris melanotos*	No		Secure	1
Least Sandpiper	*Calidris minutilla*	No		Sensitive	1, 3
Semipalmated Sandpiper	*Calidris pusilla*	No		Sensitive	3
Wilson's Snipe	***Gallinago delicata***	**No**		**Secure**	**3, 4,**
Short-billed Dowitcher	*Limnodromus griseus*	No		Undetermined	3
Long-billed Dowitcher	*Limnodromus scolopaceus*	Yes		Sensitive	3
Hudsonian Godwit	*Limosa haemastica*	No		Sensitive	3
Eskimo Curlew	*Numenius borealis*	No	Endangered	At Risk	3
Whimbrel	*Numenius phaeopus*	No		Sensitive	3
Red-necked Phalarope	*Phalaropus lobatus*	No		Sensitive	1, 3
Wilson's Phalarope	*Phalaropus tricolor*	No		Undetermined	3
Lesser Yellowlegs	***Tringa flavipes***	**No**		**Sensitive**	**2, 3, 4**
Greater Yellowlegs	*Tringa melanoleuca*	No		Undetermined	3
Willet	***Tringa semipalmata***	**No**		**Vagrant**	**3**
Solitary Sandpiper	*Tringa solitaria*	No		Undetermined	3
Buff-breasted Sandpiper	*Tryngites subruficollis*	No		Sensitive	3
Laridae					
Black Tern	*Chlidonias niger*	No	Not at Risk	Sensitive	2, 3
Bonaparte's Gull	***Chroicocephalus philadelphia***	**Yes**		**Secure**	**1, 2, 3, 4**
Caspian Tern	*Hydroprogne caspia*	Yes	Not at Risk	Sensitive	1, 2, 3
Herring Gull	***Larus argentatus***	**Yes**		**Secure**	**1, 2, 3, 4**
California Gull	***Larus californicus***	**Yes**		**Secure**	**1, 3, 4**
Mew Gull	***Larus canus***	**Yes**		**Secure**	**1, 2, 3, 4**
Ring-billed Gull	***Larus delawarensis***	**Yes**		**Secure**	**1, 3, 4**
Glaucous Gull	*Larus hyperboreus*	No		Secure	3
Thayer's Gull	*Larus thayeri*	No		Secure	3
Franklin's Gull	*Leucophaeus pipixcan*	No		Undetermined	3
Common Tern	***Sterna hirundo***	**Yes**	**Not at Risk**	**Secure**	**1, 3, 4**
Arctic Tern	***Sterna paradisaea***	**Yes**		**Secure**	**1, 3, 4**
Sabine's Gull	*Xema sabini*	No		Secure	3

Sources: [1] CWS Larid Surveys (1989-2010); [2] CWS Waterfowl Surveys (1989-2010); [3] NWT/NU Bird Checklist Surveys (1960-2009); [4] Breeding Bird Survey (1988-1999).

Common name	*Scientific name*	Evidence of breeding	COSEWIC	NWT conservation status	Source
Stercoraiidae					
Long-tailed Jaeger	*Stercorarius longicaudus*	No		Undetermined	3
Parasitic Jaeger	***Stercorarius parasiticus***	**Yes**		**Undetermined**	**1, 2, 3**
Alcidae					
Black Guillemot	*Cepphus grylle*	No		Undetermined	3
Columbidae					
Rock Pigeon	*Columba livia*	No		Alien	3
Mourning Dove	*Zenaida macroura*	No		Vagrant	3
Strigidae					
Boreal Owl	***Aegolius funereus***	**No**	**Not at Risk**	**Secure**	**3**
Short-eared Owl	*Asio flammeus*	No	Special Concern	Sensitive	3, 4
Long-eared Owl	*Asio otus*	No		Undetermined	3
Snowy Owl	*Bubo scandiacus*	No	Not at Risk	Secure	3
Great Horned Owl	***Bubo virginianus***	**No**		**Secure**	**3, 4**
Great Gray Owl	*Strix nebulosa*	No	Not at Risk	Secure	3
Barred Owl	*Strix varia*	Yes		Undetermined	3
Northern Hawk Owl	*Surnia ulula*	No	Not at Risk	Secure	3
Caprimulgidae					
Common Nighthawk	***Chordeiles minor***	**No**	**Threatened**	**At Risk**	**3, 4**
Trochilidae					
Ruby-throated Hummingbird	*Archilochus colubris*	No		No Status	3
Rufous Hummingbird	*Selasphorus rufus*	No		Vagrant	3
Alcedinidae					
Belted Kingfisher	***Megaceryle alcyon***	**No**		**Secure**	**2, 3, 4**
Picidae					
Northern Flicker	***Colaptes auratus***	**No**		**Secure**	**2, 3, 4**
Pileated Woodpecker	*Dryocopus pileatus*	No		Secure	3
Black-backed Woodpecker	*Picoides arcticus*	No		Secure	3
American Three-toed Woodpecker	*Picoides dorsalis*	No		Secure	3
Downy Woodpecker	*Picoides pubescens*	No		Secure	3
Hairy Woodpecker	*Picoides villosus*	No		Secure	3
Yellow-bellied Sapsucker	*Sphyrapicus varius*	No		Secure	3
Tyrannidae					
Olive-sided Flycatcher	***Contopus cooperi***	**No**	**Threatened**	**At Risk**	**3, 4**
Western Wood-Pewee	*Contopus sordidulus*	No		Secure	3
Alder Flycatcher	*Empidonax alnorum*	No		Secure	3, 4
Yellow-bellied Flycatcher	*Empidonax flaviventris*	No		Secure	3
Least Flycatcher	***Empidonax minimus***	**No**		**Secure**	**3, 4**
Eastern Phoebe	***Sayornis phoebe***	**Yes**		**Secure**	**3, 4**
Eastern Kingbird	*Tyrannus tyrannus*	No		Secure	3, 4
Laniidae					
Northern Shrike	*Lanius excubitor*	No		Secure	3

Sources: [1] CWS Larid Surveys (1989-2010); [2] CWS Waterfowl Surveys (1989-2010); [3] NWT/NU Bird Checklist Surveys (1960-2009); [4] Breeding Bird Survey (1988-1999).

Common name	*Scientific name*	Evidence of breeding	COSEWIC	NWT conservation status	Source
Vireonidae					
Warbling Vireo	*Vireo gilvus*	No		Secure	4
Red-eyed Vireo	***Vireo olivaceus***	**No**		**Secure**	**3, 4**
Blue-headed Vireo	*Vireo solitarius*	No		Secure	3, 4
Corvidae					
American Crow	***Corvus brachyrhynchos***	**No**		**Secure**	**2, 3**
Common Raven	***Corvus corax***	**No**		**Secure**	**2, 3, 4**
Gray Jay	***Perisoreus canadensis***	**No**		**Secure**	**3, 4**
Black-billed Magpie	***Pica hudsonia***	**Yes**		**Secure**	**2, 3**
Alaudidae					
Horned Lark	*Eremophila alpestris*	No		Secure	3
Hirundinidae					
Barn Swallow	*Hirundo rustica*	No	Threatened	Sensitive	3, 4
Cliff Swallow	*Petrochelidon pyrrhonota*	No		Secure	3
Bank Swallow	*Riparia riparia*	No		Secure	3
Tree Swallow	*Tachycineta bicolor*	No		Secure	3, 4
Paridae					
Black-capped Chickadee	***Poecile atricapillus***	**No**		**Secure**	**3**
Boreal Chickadee	*Poecile hudsonicus*	No		Sensitive	3
Sittidae					
Red-breasted Nuthatch	*Sitta canadensis*	No		Secure	3
Troglodytidae					
Marsh Wren	*Cistothorus palustris*	No		Undetermined	3
Winter Wren	*Troglodytes hiemalis*	No		Secure	3
Regulidae					
Ruby-crowned Kinglet	***Regulus calendula***	**No**		**Secure**	**3, 4**
Golden-crowned Kinglet	*Regulus satrapa*	No		Undetermined	3
Turdidae					
Hermit Thrush	*Catharus guttatus*	No		Secure	3, 4
Gray-cheeked Thrush	*Catharus minimus*	No		Secure	3
Swainson's Thrush	***Catharus ustulatus***	**No**		**Secure**	**3, 4**
Mountain Bluebird	*Mountain Bluebird*	No		Undetermined	3
Townsend's Solitaire	*Myadestes townsendi*	No		Secure	3
American Robin	***Turdus migratorius***	**No**		**Secure**	**3, 4**
Mimidae					
Gray Catbird	*Dumetella carolinensis*	No		Vagrant	3
Brown Thrasher	*Toxostoma rufum*	No		Vagrant	3
Sturnidae					
European Starling	*Sturnus vulgaris*	No		Alien	3
Motacillidae					
American Pipit	***Anthus rubescens***	**No**		**Sensitive**	**3**
Yellow Wagtail	*Motacilla flava*	No		Presence Expected	3
Bombycillidae					
Cedar Waxwing	*Bombycilla cedrorum*	Yes		Secure	3

Sources: [1] CWS Larid Surveys (1989-2010); [2] CWS Waterfowl Surveys (1989-2010); [3] NWT/NU Bird Checklist Surveys (1960-2009); [4] Breeding Bird Survey (1988-1999).

Common name	*Scientific name*	Evidence of breeding	COSEWIC	NWT conservation status	Source
Bohemian Waxwing	*Bombycilla garrulus*	No		Secure	3
Calcariidae					
Snow Bunting	*Plectrophenax nivalis*	No		Secure	3
Parulidae					
Yellow-rumped Warbler	***Setophaga coronata***	**No**		**Secure**	**3, 4**
Magnolia Warbler	*Setophaga magnolia*	No		Secure	3, 4
Palm Warbler	***Setophaga palmarum***	**No**		**Secure**	**3, 4**
Yellow Warbler	***Setophaga petechia***	**Yes**		**Secure**	**1, 3, 4**
Blackpoll Warbler	*Setophaga striata*	No		Sensitive	3, 4
Cape May Warbler	*Setophaga tigrina*	No		Secure	3
Common Yellowthroat	*Geothlypis trichas*	No		Secure	3, 4
Black-and-white Warbler	*Mniotilta varia*	No		Secure	3
Orange-crowned Warbler	***Oreothlypis celata***	**No**		**Secure**	**3, 4**
Tennessee Warbler	*Oreothlypis peregrina*	No		Secure	3, 4
Northern Waterthrush	***Parkesia noveboracensis***	**No**		**Secure**	**3, 4**
Ovenbird	*Seiurus aurocapillus*	No		Secure	3
American Redstart	*Setophaga ruticilla*	No		Secure	3
Wilson's Warbler	*Cardellina pusilla*	No		Secure	3, 4
Thraupidae					
Western Tanager	*Piranga ludoviciana*	No		Secure	3
Emberizidae					
Le Conte's Sparrow	***Ammodramus leconteii***	**No**		**Secure**	**3, 4**
Nelson's Sparrow	*Ammodramus nelsoni*	No		Undetermined	3
Lapland Longspur	*Calcarius lapponicus*	No		Secure	3
Smith's Longspur	*Calcarius pictus*	No		Undetermined	3
Dark-eyed Junco	***Junco hyemalis***	**No**		**Secure**	**3, 4**
Swamp Sparrow	***Melospiza georgiana***	**Yes**		**Secure**	**3, 4**
Lincoln's Sparrow	***Melospiza lincolnii***	**No**		**Secure**	**3, 4**
Song Sparrow	***Melospiza melodia***	**No**		**Undetermined**	**3**
Savannah Sparrow	***Passerculus sandwichensis***	**Yes**		**Secure**	**1, 3, 4**
Fox Sparrow	*Passerella iliaca*	No		Secure	3, 4
American Tree Sparrow	*Spizella arborea*	No		Sensitive	3, 4
American Tree Sparrow	*Spizella arborea*	No		Sensitive	3
Clay-coloured Sparrow	*Spizella pallida*	No		Undetermined	3, 4
Chipping Sparrow	***Spizella passerina***	**No**		**Secure**	**3, 4**
White-throated Sparrow	***Zonotrichia albicollis***	**No**		**Sensitive**	**3, 4**
Golden-crowned Sparrow	*Zonotrichia atricapilla*	No		Secure	3
White-crowned Sparrow	***Zonotrichia leucophrys***	**Yes**		**Secure**	**1, 3, 4**
Harris's Sparrow	*Zonotrichia querula*	No		Sensitive	3
Cardinalidae					
Rose-breasted Grosbeak	*Pheucticus ludovicianus*	No		Secure	3

Sources: [1] CWS Larid Surveys (1989-2010); [2] CWS Waterfowl Surveys (1989-2010); [3] NWT/NU Bird Checklist Surveys (1960-2009); [4] Breeding Bird Survey (1988-1999).

Common name	*Scientific name*	Evidence of breeding	COSEWIC	NWT conservation status	Source
Icteridae					
Red-winged Blackbird	***Agelaius phoeniceus***	**Yes**		**Secure**	**2, 3, 4**
Rusty Blackbird	***Euphagus carolinus***	**No**	**Special Concern**	**Sensitive**	**3, 4**
Brewer's Blackbird	*Euphagus cyanocephalus*	No		Undetermined	3
Brown-headed Cowbird	*Molothrus ater*	No		Secure	3
Common Grackle	***Quiscalus quiscula***	**No**		**Secure**	**3, 4**
Yellow-headed Blackbird	*Xanthocephalus xanthocephalus*	No		Vagrant	3
Fringillidae					
Common Redpoll	*Acanthis flammea*	No		Secure	3, 4
Purple Finch	*Carpodacus purpureus*	No		Secure	3
Evening Grosbeak	*Coccothraustes vespertinus*	No		Secure	3
Red Crossbill	*Loxia curvirostra*	No		Secure	3
White-winged Crossbill	***Loxia leucoptera***	**No**		**Secure**	**3, 4**
Pine Grosbeak	*Pinicola enucleator*	No		Secure	3
Pine Siskin	*Spinus pinus*	No		Secure	3
Passeridae					
House Sparrow	*Passer domesticus*	No		Alien	3

Sources: [1] CWS Larid Surveys (1989-2010); [2] CWS Waterfowl Surveys (1989-2010); [3] NWT/NU Bird Checklist Surveys (1960-2009); [4] Breeding Bird Survey (1988-1999).

Appendix 7: Mammals occurring within the Kwets'ootł'àà candidate protected area summarized from existing literature, overlapping ranges and consultation with local biologists.

Common name	Scientific name	COSEWIC	NWT conservation status	Source
Bovidae				
Wood Bison	*Bison bison athabascae*	Threatened	At Risk	1, 2, 3
Cervidae				
Moose	*Alces americanus*		Secure	1, 2, 3
Boreal Woodland Caribou	*Rangifer tarandus caribou*	Threatened	Sensitive	3
Bathurst & Bluenose East barren-ground caribou	*Rangifer tarandus groenlandicus*		Sensitive	3
Canidae				
Coyote	*Canis latrans*		Secure	3
Gray Wolf	*Canis lupus (arctos & occidentalis)*	arctos - Data Deficient; occidentalis - Not at Risk	Secure	1, 3
Red Fox	*Vulpes vulpes*		Secure	1, 3
Felidae				
Canada Lynx	*Lynx canadensis*	Not at Risk	Secure	1, 3
Mustelidae				
Wolverine	*Gulo gulo*	Special Concern	Sensitive	2, 3
North American River Otter	*Lontra canadensis*		Secure	1, 3
American Marten	*Martes americana*		Secure	3
Ermine (Stoat or Short-tailed Weasel)	*Mustela erminea*		Secure	3
Least Weasel	*Mustela nivalis*		Secure	3
American Mink	*Neovison vison*		Secure	3
Ursidae				
Black Bear	*Ursus americanus*	Not at Risk	Secure	1, 2, 3
Leporidae				
Snowshoe Hare	*Lepus americanus*		Secure	1, 3
Castoridae				
Beaver	*Castor canadensis*		Secure	3
Erithizontidate				
North American Porcupine	*Erethizon dorsata*		Secure	3
Cricetidae				
Meadow Vole	*Microtus pennsylvanicus*		Secure	3
Taiga Voles	*Microtus xanthognathus*		Secure	3
Red-backed Voles	*Myodes gapperi or rutilus*		Secure	3
Common Muskrat	*Ondatra zibethicus*		Secure	3
North American Deer Mouse	*Peromyscus maniculatus*		Secure	3
Eastern Heather Voles	*Phenacomys ungava*		Secure	3
Northern Bog Lemming	*Synaptomys borealis*		Secure	3
Sciuridae				
Northern Flying Squirrel	*Glaucomys sabrinus*		Secure	3
Soricidae				
Arctic Shrew	*Sorex arcticus*		Secure	3
Cinereus (Masked) Shrew	*Sorex cinereus*		Secure	3
American Pygmy Shrew	*Sorex hoyi*		Secure	3
Dusky Shrew	*Sorex monticolus*		Secure	3
Amercian Water Shrew	*Sorex palustris*		Secure	3
Tundra Shrew	*Sorex tundrensis*		Undetermined	3
Red Squirrel	*Tamiasciurus hudsonicus*		Secure	3

Sources: [1] CWS Waterfowl Surveys 1989-2010; [2] ENR Wildlife Management Information System; [3] ENR NWT Species INFOBASE