



2008
Fish & Wildlife Inventory Program
Project Summaries

Cover Photo Ogilvie Mountains, March 2009. YG Photo

Results reported here are preliminary. Many projects are still underway. Please contact the person responsible for each project before using or quoting any information in this document.

Information compiled April 2009 and reflects the status of projects to March 31, 2009.

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Introduction

Land-use planning, wildlife management plans, resource development assessments – to be effective in resource management and planning processes we need to have good up-to-date information. With the inventory projects reported here we have begun to address many long-standing information gaps for a variety of species.

This document provides a snapshot look at the Fish and Wildlife Branch's inventory-funded projects for 2008-2009. Other Branch activities, such as management planning, harvest monitoring, and wildlife viewing, for example, fall outside of the inventory scope and are not reported here. Many inventory-funded projects are a component of much larger programs. For example, most elk management activities are not considered inventory projects, but the *Habitat Carrying Capacity for Elk* assessment is an inventory component of the larger program. Larger program reports will be compiled at appropriate milestones.

Some of the inventory projects reported here are ongoing, but the additional funds allocated to inventory has allowed some activities to be expanded or enhanced. For example, 5 different aerial moose inventory projects in one year would not have been possible without identified inventory funding.

Late winter often provides the ideal conditions to undertake many inventory activities. Animals that rely on key winter ranges, such as sheep and caribou, can be readily located on their traditional ranges and others, such as wolves, can be easily tracked in the snow. Because of reporting timelines, results of many late-winter projects presented here are preliminary only.

Readers are urged to contact the person responsible for each project for more information.

Moose

Lower Macmillan River Moose Survey

Traditional Territories: Selkirk, Na-Cho Nyäk Dun

Environment Yukon Management Region:
Northern Tutchone (Mayo)

Project leaders: Mark O'Donoghue, Northern Tutchone Regional Biologist, Environment Yukon, and Rick Ward, Moose, Elk and Deer Management Biologist, Environment Yukon,

Project funding partners: Selkirk First Nation co-funded the survey, and both the Selkirk First Nation and the First Nation of Na-Cho Nyäk Dun provided staff to help conduct it.

Management goal: To obtain information needed by Environment Yukon and its partners to sustainably manage the moose population in the region.

Background: The population of moose in this area was last surveyed with a low-intensity survey in 2000.

The Macmillan River is the main area used by Selkirk First Nation to harvest moose. Local knowledge indicates that moose numbers in the area have decreased and harvest pressures have increased in recent years. Concerns about high hunting pressure and fewer moose seen along the Macmillan River led to recommendations at Northern Tutchone May Gatherings that Environment Yukon conduct this survey.

Pelly Crossing has nominated an area along the river as a Habitat Protection Area (HPA). Data from this survey can be used for harvest management and contribute to a planning process if the area receives HPA status. The data can also be used to evaluate the potential effects of proposed developments in the area.

Residents of the Pelly Crossing area have consistently placed a high priority on monitoring the health of local moose populations. The need to more closely monitor moose along the Macmillan River has been repeatedly emphasised at Selkirk May Gatherings each year. The Selkirk First Nation and the Selkirk Renewable Resources Council have both devoted considerable time and resources to monitoring moose populations and harvest along the river.

This survey is part of the 5-year moose inventory plan developed between the regional biologists and the moose biologist.

Project objective: To determine the distribution and early winter habitats of moose and calculate an index of population density in the Lower Macmillan River Moose Management Unit.

Project description: The survey of moose along the lower Macmillan River took place between November 19 and 24, 2008 using fixed-wing aircraft. The entire study area covered about 3,500 km².



Biologist used a survey method called *intensive stratification*, which gives good information about the distribution and areas of concentration of moose over the whole survey area. It also allows the biologists to calculate an *index* or indirect indication of abundance of moose.

The survey area was divided into uniform rectangular blocks 15 to 16 km² in size. Observers flew over all the blocks, making about 4 passes through each block and classifying (or *stratifying*) them as having either high, medium, low, or very low expected moose abundance, based on local knowledge, number of moose seen, tracks, and habitat. Biologists counted and recorded a GPS location for each moose or group of moose they saw. Whenever possible, moose were classified by age (adult, yearling, or calf) and sex.

Project results: Moose were widely distributed in the survey area, but most moose were concentrated in hilly terrain in areas that had been burned with the last 15 to 20 years. Some moose (mostly cows) were in willow-rich habitats in lowlands in the main river valleys and associated ponds and sloughs.

The survey team counted 368 moose: 154 adult bulls, 173 adult and yearling cows, 5 yearling bulls, and 25 calves. An additional 11 adult moose could not be classified as either bulls or cows.

The survey team saw an average of 1 moose for every 5 minutes they searched in the survey area (about 0.20 moose for every minute). Biologists used this information to calculate a density of about 185 moose per 1,000 km² and a total estimated population for the survey area of 626 moose. It is important to note that these predicted densities are not as precise as those estimated from full censuses. Stratification surveys only give rough estimates of abundance and can only detect large changes in numbers. Repeated low-intensity surveys or a high-intensity census are necessary to more closely monitor the trend in moose numbers in this area.

Previous surveys estimated that the moose population in the survey area was 711 moose (estimated average density of 210 moose per 1,000 km²). The 2008 survey results do not suggest any large change in moose numbers in the survey area. Harvest of moose in this area appears to be sustainable at present levels.

Environment Yukon has prepared a survey report which is available to the public.

Next steps: The results of the survey have been presented at meetings of the Selkirk and Mayo District Renewable Resources Councils and will be presented at the 2009 May Gathering of the Northern Tutchone First Nations.

Environment Yukon intends to continue to monitor moose populations in this area using aerial and ground-based monitoring. No further studies are planned beyond ongoing monitoring.

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Estimate of Moose Abundance on the Old Crow Flats

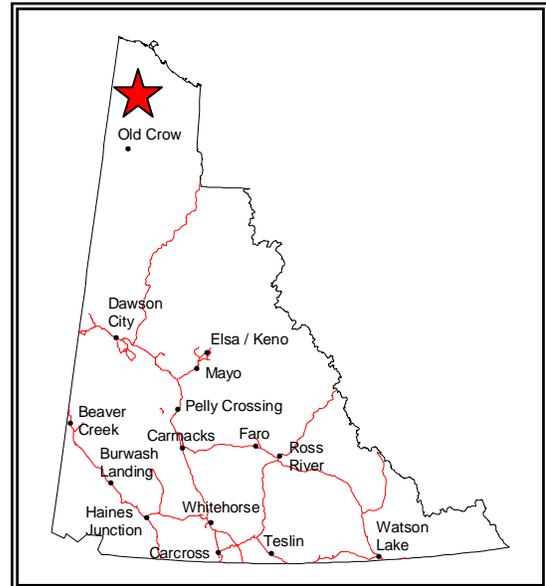
Traditional Territory: Vuntut Gwitchin

Environment Yukon Management Region:
Northern Yukon (Dawson)

Project leader: Dorothy Cooley, Regional Biologist, Northern Region, Environment Yukon

Management goal: To understand the ecology of moose in the Old Crow Flats.

Background: The Old Crow Flats (OCF) is the study area for a large inter-disciplinary ecological study involving many academic researchers. Led by the Vuntut Gwitchin First Nation and funded by the Canadian International Polar Year program, the project is called *Yeendoo Nanh Nakhweenjit K'atr'ahanahyaa (Looking after the land for the future): Environmental Change and Traditional Use of the Old Crow Flats* (YNNK). The project was developed in response to a concern about changing water levels in OCF observed by local people.



The objective for the moose component of YNNK is to study how changing water levels may affect moose and moose habitat within OCF. Moose probably favour drained lake basins with lots of shrubs, but they also use aquatic habitats. When lake water levels drop, vegetation changes from aquatic to terrestrial species such as willow, another favoured food plant so we need to understand how important each type of food is to moose. Environment Yukon is co-supervising the moose portion of this project with McGill University.

Information from previous field projects helped to develop this survey. Local knowledge and past resource inventory work indicate that many moose are in OCF in summer but almost none in winter. In 1995, staff from the U.S. Fish and Wildlife Service's Arctic National Wildlife Refuge put radio collars on 57 moose for a 5-year study. That study found that almost 72% of moose captured on winter ranges in Alaska migrate up to 250 km to spend the summer in OCF before returning in autumn to the same winter ranges. There were 2 types of moose: *migratory* and *non-migratory*. All moose that migrated did so every year and non-migratory moose never migrated. Migratory moose from Alaska mostly used the western half of OCF. Most migrants arrived on OCF by early May (calves were born on OCF) and most moose left by late August, before the rut and before any significant winter weather started.

Environment Yukon did late-winter aerial surveys in 1997 and 2003 over a wide corridor along the Porcupine River. This is an important hunting area in autumn for the Vuntut Gwitchin and the survey was done to obtain an index of moose abundance along the river. These surveys found many moose using the southeast corner of OCF in February, which indicates a different life history for moose using the western versus eastern half of OCF.

In July and August 2007, Environment Yukon placed satellite download GPS collars on 19 moose. Before doing this fieldwork Environment Yukon crews flew an aerial survey by fixed wing aircraft to get an overall view of where the moose were so that the distribution of the

collared moose would reflect the distribution of all moose on OCF. Nineteen north-south systematic transects were flown and groups of moose seen were mapped and the group size, composition, and general habitat were noted.

The abundance estimate done in 2008 will be used to further refine patterns of habitat use by moose by documenting the total number of moose that use OCF in summer and the habitats in which they are found.

Project objective: To obtain an estimate of moose abundance on the Old Crow Flats in summer.

Project description: The *Distance Sampling* method was chosen for this survey mainly because it is a relatively inexpensive, efficient method to calculate wildlife density with an estimate of precision and an estimate of sightability.

This survey was done in late July because good weather conditions and long day lengths provide lots of time to do the flights. Most migratory moose (as indicated in the Alaskan study) should have been present and dispersed into their traditional areas on OCF by late May. It is easy to record composition data in July because calves are still very small and bulls' antlers should easily be seen.

Twenty-four randomly selected transects, oriented northeast to southwest, were flown between July 8 and 11, 2008. Locations of moose groups and their distance from the transect line were recorded by GPS. Survey teams also noted group size and composition, habitat, vegetation cover present, and moose activity. This information can then be used to estimate the number of moose in the entire study area.

Project results: Data analysis is not yet complete. During the survey 261 moose in 172 groups were seen. This information as well as the location information will be used to estimate the number of moose in the entire survey area.

Preliminary results show a healthy number of bulls and sets of twin calves in the survey area, but the proportion of calves was lower than the biologists would have liked to see. As expected, moose were found mostly in open water and shrubby or leafy habitats. Almost half of the moose groups seen were in open water.

Next steps: Data analysis for the population estimate and a technical report will be completed by summer 2009. The survey results will be included in written reports distributed in the community and will be presented at the annual YNNK meeting scheduled for February 2010 in Old Crow.

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Local Ground-based Moose Monitoring - Mayo, Pelly and Carmacks

Traditional Territory: Na-Cho Nyäk Dun, Selkirk, and Little Salmon/Carmacks

Environment Yukon Management Region: Northern Tutchone (Mayo)

Project leader: Mark O'Donoghue, Northern Tutchone Regional Biologist, Environment Yukon

Management goal: To obtain ongoing information needed by Environment Yukon and its partners to sustainably manage the moose population in the participating region.

Background: Aerial surveys of moose are costly and can only be done about every 5 years in priority areas. In areas with significant harvest, more regular monitoring of moose populations is desirable. Ground-based monitoring is a cost-effective way of monitoring calf survival. It also actively involves the local community in keeping track of the health of the local moose population.

Environment Yukon has committed to this monitoring program in the *2004–2009 Community-based Fish & Wildlife Management Plan for the Little Salmon/Carmacks First Nation Traditional Territory* and in the *2002–2007 Community-based Fish & Wildlife Management Plan for the Na-Cho Nyäk Dun Traditional Territory*. Greater use of local monitoring of moose has been consistently recommended at Selkirk First Nation May Gatherings.

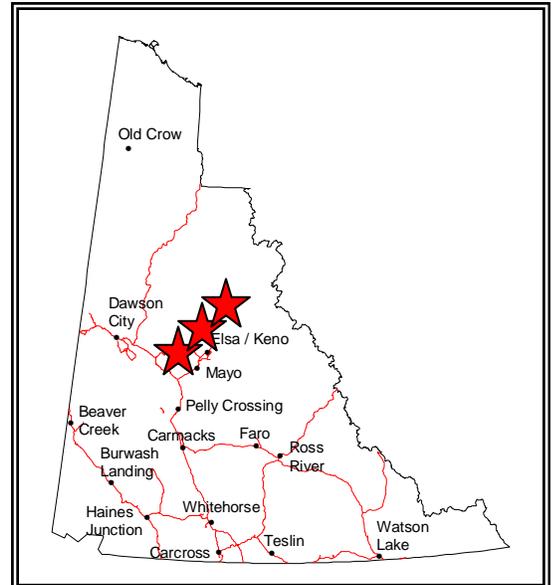
The ground-based monitoring program was started in the Mayo area in 2001 and has been done every year since then. This was the third year the ground-based monitoring has been done in Pelly Crossing and Carmacks. Local support for the ground-based monitoring has been consistently high in these communities.

This program actively involves local residents in monitoring the health of the moose population in their area. It provides valuable data on how well moose calves are surviving as well as a record of the participants' observations on the overall health of the moose population in these areas.

This is a cooperative project with support and expertise contributed by:

- Mayo District Renewable Resources Council and First Nation of Na-Cho Nyäk Dun;
- Selkirk Renewable Resources Council and Selkirk First Nation; and
- Carmacks Renewable Resources Council and Little Salmon/Carmacks First Nation

Project objective: To monitor the composition and health of the moose population in the Mayo, Pelly Crossing, and Carmacks areas, using ground-based methods.



Project description: In Mayo, the regional biologist distributed booklets to 20 local hunters in August; in Pelly Crossing and Carmacks, booklet distribution was handled by the Renewable Resources Councils. The booklets were collected in November and December.

Participating hunters were asked to use the booklets to record the moose they saw during the fall hunting season (August through October). Hunters recorded each observation of moose separately, noting the number, sexes, ages, and locations.

Project results: Twenty hunters reported a total of 400 moose in the Mayo area; about half (49%) of adult cows still had calves, indicating that calf survival was good this year. Hunters are still harvesting enough moose to satisfy their needs for food, but noted that hunting pressure is up and numbers of bulls seen are down in some areas.

Staff turnover at the Selkirk Renewable Resources Council resulted in very limited participation this year, with only 6 hunters in the Pelly Crossing area completing booklets, reporting 18 moose. Hunters in the Carmacks area did not participate in 2008 because of illness amongst the volunteers distributing the booklets. The monitoring programs will be reinstated in both communities in 2009.

The results of the monitoring were sent to all participants in the programs. More detailed data summaries were presented to each participating Renewable Resources Council. Each participating Renewable Resources Council holds the original copies of the completed booklets.

Next steps: The regional biologist is preparing a report summarizing the first 7 years of ground-based monitoring in the Mayo area.

Environment Yukon and its project partners intend to continue to conduct annual ground-based monitoring of moose in the Mayo, Pelly Crossing, and Carmacks areas.

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Alsek Moose Population Survey

Traditional Territory: Champagne and Aishihik, Carcross/Tagish, Kwanlin Dün

Environment Yukon Management Region: Kluane (Haines Junction)

Project leaders: Rick Ward, Moose, Elk and Deer Biologist, and Shawn Taylor, Kluane Regional Biologist, Environment Yukon

Management goal: To obtain updated moose distribution, abundance and population composition information needed by Environment Yukon to sustainably manage moose in the Haines Junction/Alsek district.

Background: The Haines Junction/Alsek district is an important moose harvesting area for Champagne and Aishihik First Nations hunters and, until the mid-1980s, for non-First Nations hunters as well. Moose surveys and traditional and local knowledge have confirmed that moose numbers have declined significantly in this area since the 1970s. As a result, hunting by non-First Nations hunters has been severely restricted through a Permit Hunt Authorization (PHA) system. The average annual reported harvest by non-First Nation residents and guided non-resident hunters is currently less than 6 moose per year. Low moose numbers in the area have also affected hunting opportunities for First Nations members.

The last reliable survey of moose population abundance and distribution for portions of this area was done in 2000. An intensive moose survey of the Alsek area was planned for November 2007 but had to be cancelled because of poor snow conditions.

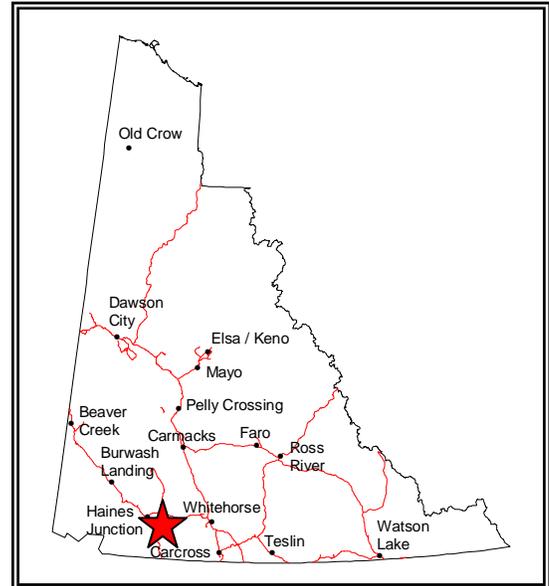
Current and reliable information on moose abundance and composition is needed to determine the status and trend of the moose population and to see if harvest levels are sustainable.

Project objective: To collect current information on moose distribution, abundance, and population composition in the Haines Junction/Alsek area.

Project description: Between November 5 and 13, 2008, 2 survey teams made up of Environment Yukon and Champagne and Aishihik staff and local observers used standard survey techniques to count moose in the Alsek survey area. The study area extended from the Alaska Highway south to the B.C. border and from the Haines Road and southern portion of the Kluane Wildlife Sanctuary east to Kusawa Lake.

To count moose in such a large region, the survey area was divided into survey blocks, and only a selected number of the blocks were counted. Results from the selected blocks were then used to calculate a moose population estimate for the entire area.

Crews in 2 helicopters spent 65 hours searching for and counting moose. They also determined the sex of adult moose, the age class (mature, immature, or calves), and recorded the locations of all moose groups seen. About 30% of the entire Alsek study area was surveyed. Snow conditions and the weather were generally good, except for a few days of poor visibility because of low cloud or ice fog.



Project results: The survey teams counted 395 moose: 101 adult bulls, 221 adult and yearling cows, 21 yearling bulls, and 52 calves. These observations were used to calculate the population size, the sex ratio, and estimates of calf survival of moose over the entire survey area.

The population estimate was 806 moose. This is equal to a density of about 147 moose per 1,000 km² over the total survey area. This number is lower than the Yukon-wide average of 158 moose per 1000 km² and considerably lower than the moose density estimated in the same general area in 1998 (195 moose/1000 km²) and 2000 (165 moose/1000 km²).

Biologists estimated there were about 27 calves and 18 yearlings for every 100 adult cows in the Alsek area. This number suggests that survival of young moose has been relatively stable during the past 2 years. There were also about 43 adult bulls for every 100 adult cows in the survey area. This is lower than the Yukon average of 67 adult bulls per 100 adult cows, but higher than the minimum of 30 adult bulls per 100 adult cows needed to ensure that cows are successfully bred each year.

Survey information has been entered into the wildlife database and results are summarized in a draft report.

Next steps: Environment Yukon will prepare a final report summarizing the results of the survey for distribution to the Champagne and Aishihik, Carcross/Tagish and Kwanlin Dün First Nations, Renewable Resources Councils, Boards, and other interested parties.

Environment Yukon will meet with affected First Nations and Renewable Resources Councils to discuss the status and harvest of the moose population, particularly in the more accessible parts of the study area where harvest rates have the potential to cause a further decline in this population.

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North Canol Road Late Winter Moose Survey

Traditional Territory: Kaska Dena; Na-Cho Nyäk Dun

Environment Yukon Management Region: Liard (Watson Lake)

Project leaders: Rick Ward, Moose, Elk and Deer Biologist, and Troy Pretzlaw, Liard Regional Biologist, Environment Yukon

Management goal: To obtain baseline information to provide more effective input into land use planning and development impact assessment processes, in order to sustainably manage moose in the North Canol region

Background: The North Canol Road is frequently the focus of mineral exploration and mine development proposals. The lack of baseline information for this area continues to limit Environment Yukon's ability to provide effective input into the review of these development applications. The region also contains an intensively hunted population of moose and is an important moose harvesting area for Ross River Dena and non-First Nations hunters.



Recent mining proposals to construct haul roads from the North Canol Road to adjacent mine sites east and west of the road and on the Northwest Territories border underscores the need for this information. Such roads would provide access through the middle of approximately 10,000 km² of currently remote wilderness and create new challenges for managing the resulting increase in moose harvest.

This is a one-year project, with another survey planned for early-winter survey later this year.

Project objective: To obtain baseline information on late-winter moose distribution, relative abundance, and calf recruitment along the North Canol Road between Ross River and the Northwest Territories border.

Project description: From February 24 to 27, 2009, 2 survey teams consisting of Environment Yukon staff and 2 observers from the Kaska Dena First Nation used 2 fixed-wing aircraft to fly a 5006 km² study area straddling the North Canol Road from Ross River to the Northwest Territories border. The entire survey area was divided into survey blocks and flown at low search intensity to determine which blocks had high or low numbers of moose in them during late-winter.

Crews spent about 55 hours collecting data on the number of moose, their age and sex (where possible), and locations of the groups that they saw. Fresh snow had fallen 3 days before the start of the survey. There were clear, calm weather conditions for most of the survey period.

Project results: The survey teams counted 466 moose. In late winter it is difficult to age and sex moose because bulls do not have antlers at this time of year. The survey crews classified 312 moose as adults of unknown sex, 6 as yearling bulls, 19 as mature bulls, 65 as mature or yearling or cows, and 59 as calves. They could not determine the age or sex of 5 of the animals they saw.

Moose were generally found at lower elevations in mixed forest, old burn, and wetland/riparian habitats along the Ross River in the southern half of the study area. Their location was likely in response to the lower snow depth in these regions. A similar distribution of moose was observed during the late-winter moose stratification survey of the larger Macmillan Pass study area flown in March 1982.

Calf numbers were moderate, representing about 13% of the total number of moose observed. In general, at least 10 to 20% of animals in a population need to be calves to maintain a stable moose population. Late-winter calf recruitment surveys done in the North Canol region between 1997 and 2000 indicated a moderate to declining proportion of calves in the population (from 12–13% in 1998–1999, dropping to 9% in 2000). Current calf recruitment is similar to that observed 10 years ago, and suggests a stable to possibly declining population.

Next steps: The regional biologist is preparing a file report summarizing the 2009 survey results. The report will be distributed to the Ross River Dena, stakeholder groups, participants in the survey and other interested parties.

Environment Yukon is scheduled to conduct a second survey in this area in November 2009. By comparing the early and late winter results, we will obtain a better understanding of the number of moose that move into the North Canol Road area during the winter season.

Environment Yukon will continue discussions with affected First Nations about options for population monitoring and managing harvest of moose in this area.

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Teslin Moose Habitat Use Study

Traditional Territory: Teslin Tlingit, Kaska, Ta'an Kwäch'än, Kwanlin Dün

Environment Yukon Management Region: Southern Lakes (Whitehorse)

Project leaders: Rick Ward, Moose, Elk and Deer Biologist, Environment Yukon

Project funding partners: Teslin Tlingit Council, University of Northern British Columbia

Management goal: To obtain information on moose distribution, movement and habitat use patterns to support land use planning and development impact assessment.

Background: Historically, Environment Yukon has primarily gathered information on moose populations for harvest management purposes. This information has generally been limited to accessible areas near communities and to the early winter period.

To date, moose surveys have been done in only about 25% of the Yukon. These surveys generally provide only a "snap-shot" of early winter moose distribution and abundance. Little or nothing is known about moose movements or habitat use at other times of the year. There is no reliable information on moose abundance, distribution, or habitat use in any season, for the remaining 75% of the Yukon.

The current lack of information related to moose distribution, abundance, movement patterns and habitat use limits Environment Yukon's ability to contribute effectively to land use planning and development impact assessments. These processes require the identification of the potential impacts of land use activities on moose abundance and the design of appropriate mitigation measures associated with any development.

Environment Yukon chose the study area in order to be prepared for the development of a Land Use Plan for the Teslin region. There are also concerns about potential development in the area and the effects increased access could have on the moose population.

2008–2009 was the third year of this 4-year project. The project involves several activities, including radio-collaring and monitoring the movements of a sample of moose in the study area, mapping habitat types and quantifying their use by season, collecting local/ traditional knowledge on moose habitat use patterns, and assessing risk of harvest and predation in various habitat types along roads.

Twenty-seven moose (9 bulls, 18 cows) were fitted with GPS telemetry collars between February 26 and March 27, 2008. Data from the telemetry collars are being recorded 6–8 times per day and downloaded monthly to overhead satellites. The collars are providing location information which is used to gain a better understanding of moose distribution, critical ranges, and ecology.



Project objective: To obtain information on seasonal moose distribution, movement, habitat use patterns, and mortality risk factors in the Teslin study area using a combination of Global Positioning System (GPS) collars, and traditional and local knowledge.

Project description: Primary activities in this third year of the study were the development of data management and analysis protocols; monitoring the movement and habitat use patterns of radio-collared moose; monitoring calf survival throughout the year; and collecting moose kill site information from local hunters.

Project results: To date, Environment Yukon has recorded over 41,000 locations for the radio-collared moose. The results suggest significant differences in movement and habitat use patterns by bulls, cows, and cows with calves. Calf survival in the study area was poor in 2008–2009. Hunter interviews to collect information on moose kill site information were done by the Yukon Fish and Game Association in the Whitehorse area and by a private contractor in the Teslin area between December 2008 and March 2009.

Next steps: Environment Yukon will continue to collect information on movement, habitat use, and calf survival for collared moose. Traditional knowledge on moose movement and habitat use patterns will be collected and incorporated into the study. Preliminary findings are expected by March 2010. Environment Yukon will continue to produce and distribute regular project updates.

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Dawson East Intensive Moose Census

Traditional Territory: Tr'ondëk Hwëch'in

Environment Yukon Management Region: Northern Yukon (Dawson)

Project leaders: Dorothy Cooley, Regional Biologist, Northern Region, and Rick Ward, Moose, Elk, and Deer Biologist, Environment Yukon.

Management goal: To obtain an estimate of moose abundance and density in the Dawson East survey area in order to sustainably manage the population.

Background: The last moose census survey in the Dawson East Survey area was in 2002. Although survey conditions were not ideal at that time, Environment Yukon recorded a decline in moose numbers between 1989 and 2002.

However, information from more frequent trend surveys indicates that the number of moose is likely stable.

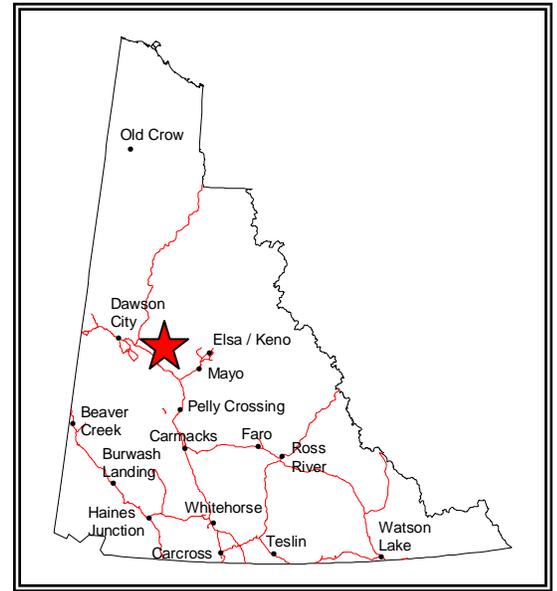
The survey area is in the heart of the Dawson Goldfields, which gets hunted quite heavily by local residents. This area is becoming increasingly popular with Whitehorse hunters as well. The Dawson Goldfields is also an area of high mineral exploration and mining activity, and is highly accessible with its complex road and trail systems.

Environment Yukon has done 3 surveys in this area. The estimated population size declined by 23% between 1989 and 2002; however the decline was not statistically significant. In 2005 and 2007, the area was resurveyed using relatively low intensity survey methods. This type of survey provides an index of population size based on the number of moose seen per minute of flying and is intended to show a trend in population size over time. When compared to density estimates obtained from previous low-intensity surveys, the results indicate that the population has remained relatively stable.

The Dawson Regional Land Use Planning process is slated to begin in 2009. Information on moose abundance and distribution will be a valuable contribution to the planning process.

Project objective: To conduct an aerial survey of moose in the Dawson East Moose Survey Area to estimate population size.

Project description: The total size of the 2008 survey area was about 5,900 km². The survey area was divided into sub-units of approximately 15 km². Most of the sub-units were already stratified during previous surveys as having high or low densities of moose. Some of these sub-units had burned during forest fires since the last survey and had to be stratified again before they were searched for moose. Sub-units were randomly selected for survey. A higher proportion of the high density sub-units (42) were surveyed than the low (29). Each of the sub-units selected were searched at relatively high intensity, covering the block in about 30 minutes (or about 2 to 2.5 minutes per km²). Moose locations were recorded by Global Positioning System (GPS) units. Moose were classified as males, females, or calves.



Project results: Field work took place between November 12 and 17, 2008 using 2 helicopters. Conditions were good during the 6 days of fieldwork.

Although biologists still need to complete the population estimate analysis, preliminary results show that about 330 moose were located during the flights. The number of moose seen in the high-density subunits that were surveyed will be used to estimate the number of moose in the high-density subunits that were not surveyed. The same calculation will be done for low-density subunits, with the end result being a population estimate for the entire area.

Next steps: Data analysis will be done over spring 2009 with a final report expected by the end of June. The survey report will be distributed to local First Nations, Renewable Resources Councils, and co-management boards.

Environment Yukon intends to do monitoring surveys that use low-intensity search methods every 2 years.

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Barren-ground caribou *Fortymile Caribou Herd Winter Distribution and Monitoring*

Traditional Territory: Tr'ondëk Hwëch'in

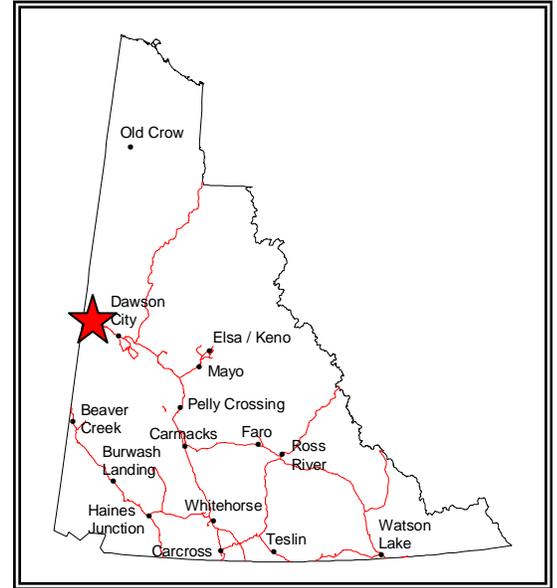
Environment Yukon Management Region: Northern Yukon (Dawson)

Project leader: Martin Kienzler, Fish and Wildlife Technician, Northern Region, Environment Yukon

Project partners: Alaska Department of Fish and Game

Management goal: To support the long-term growth and sustainability of the Fortymile caribou herd.

Background: In the early 1920s, estimates of the number of caribou in the Fortymile herd were as high as 600,000 animals. This herd ranged throughout central Alaska and much of the central and southern Yukon. A traditional knowledge study done by the Canadian Wildlife Service in the early 1990s documented that this herd once ranged as far south as Lake Laberge. Overharvest, poor weather, and predation severely reduced their numbers after the 1930s. Ranges in Yukon shrunk as herd size shrunk. In the early- to mid-1990s, caribou were barely crossing the border west of Dawson City.



Since the mid-1990s, the Fortymile caribou herd has been the focus of a population recovery program. This herd is primarily managed by the Alaska Department of Fish and Game (ADF&G) in Tok, Alaska, but a number of Alaskan and Yukon agencies have been working together to plan and implement strategies that support the herd's ability to grow and reoccupy ranges they abandoned years ago. The 1995 management plan identified range expansion as one important indicator of herd recovery.

The herd size increased between 1995 and 2000 but is now showing a slow decline. In 2007, the herd size was estimated at 38,364, down from over 43,000 in 2003. The caribou have established a pattern of moving into the Yukon after the rut. They are in their highest numbers in the Yukon in early winter, but then start to drift back to Alaska in mid- to late winter. Almost half of the herd wintered in the Yukon in 2003.

Environment Yukon began a monitoring program of winter range use in Yukon in 2003. Their contribution to the management of this shared herd is to document movements and range use if, and when, the caribou cross into the Yukon in the fall. Environment Yukon also documents caribou sightings reported by local travellers as well as the location of fresh caribou tracks seen during any flights.

Project objective: To obtain information on the distribution of the Fortymile caribou herd in the Yukon. This information is used by Environment Yukon and its partners to document important ranges and range use.

Project description: Yukon Environment conducted 2 telemetry flights. The first flight was in late October 2008, the second in mid-March 2009.

Project results: Early in October, telemetry flights by ADF&G determined that Fortymile caribou were moving into the Yukon in large numbers. Caribou were observed on the Top of

the World Highway as close as 15 km from Dawson City, with the largest groups around the Clinton Creek cutoff. Miners on the upper Sixty Mile River were seeing large groups of caribou, and pilots flying in the area reported caribou on Fish and California Creeks (Sixty Mile drainage) and Bell Creek (Yukon River drainage). Boaters observed caribou on islands and gravel bars of the Yukon River south of Dawson City between Bell and Garner Creeks.

During the telemetry flight in October, survey crews heard signals from 59 of the 74 Fortymile caribou collars. Thirty-four were located in Yukon, with concentrations along the Top of the World Highway near the border, the upper Sixty Mile River, Crag Mountain, and the mountain block between Fifty Mile and Matson Creeks. Signals heard from 25 collars were determined to be in Alaska. Those collared caribou that were fairly close to the border in Alaska were located, but the others were only noted as being to the west.

Early in November 2008, ADF&G personnel deployed 21 more collars on Fortymile caribou and provided Environment Yukon with distribution information. During the winter months (November through March) caribou were often seen along the Top of the World Highway and along the Yukon River upstream from Dawson.

During the March 2009 flight, the survey crew heard signals from 16 of the 95 Fortymile caribou collars. Nine collars were located in Yukon, concentrated near the border in the upper Sixty Mile River and on Crag Mountain. Seven of the collars were determined to be in Alaska. Those that were fairly close to the border in Alaska were located, but the others were only noted as being to the west. Five of the collars heard were on 'mortality mode', indicating that the caribou had not moved for at least several hours and had likely died. Four of the collars on the dead caribou were found in the Yukon but one was heard from the Alaska border and not located. All 5 of the dead caribou had been collared in November 2008 by ADF&G.

Environment Yukon provided ADF&G with the location information from the 2 telemetry flights and anecdotal sightings were shared between agencies.

Next steps: ADF&G will summarize all the location information in a fieldwork report to distribute to local stakeholders and interested parties.

Environment Yukon intends to continue to use telemetry flights to document movements and range use in areas of the Yukon that are reoccupied by caribou, if and when they cross the border.

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Porcupine Caribou Herd Collaring and Composition Count

Traditional Territory: Tr'ondëk Hwëch'in, Vuntut Gwitchin

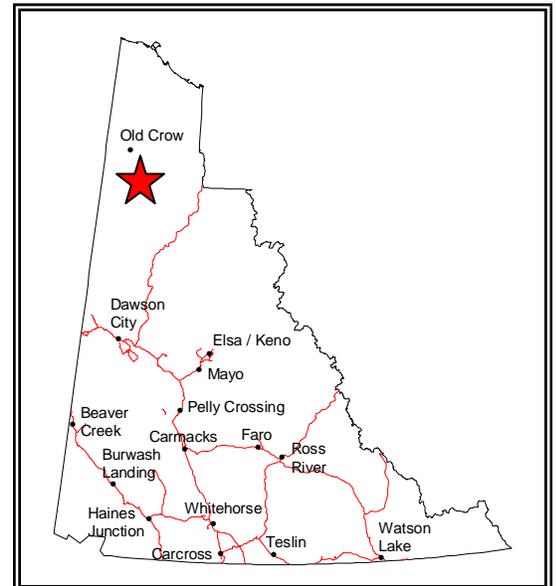
Environment Yukon Management Region: Northern Yukon (Dawson)

Project leaders: Dorothy Cooley, Regional Biologist, Environment Yukon

Project funding partners: Alaska Department of Fish and Game; Gwich'in Renewable Resource Board; Government of the Northwest Territories; Parks Canada (Ivvavik National Park, Vuntut National Park); and, U.S. Fish and Wildlife Service.

Management goal: To monitor the Porcupine caribou herd and obtain the updated population information needed to sustainably manage the population.

Background: The Porcupine Caribou Management Plan directs wildlife agencies to maintain conventional (VHS) radio and satellite collars on the herd. As caribou die of natural causes, biologists need to deploy new collars in order to maintain the overall number.



The caribou are collared for different reasons. Approximately 90 adult cow caribou are collared with conventional radio collars because biologists need to locate a minimum of 75 to document areas used for calving. To locate bull groups, several radio collars are deployed on adult bulls each winter before a census is done. Finally, between 10 and 15 satellite collars are maintained on adult cow caribou to document seasonal range use and migration patterns.

Partner agencies usually purchase collars and Environment Yukon deploys them. For the satellite program, partner agencies also contribute to satellite system and data retrieval fees. The U.S. Fish and Wildlife Service (USFWS) conducts most of the telemetry throughout the year, except for the calving surveys. These surveys are done by the Alaska Department of Fish and Game (ADF&G). Typically, all agencies are involved in the photocensus.

In the fall of 2008, there were 119 collared caribou, 105 with conventional radio collars and 14 with satellite collars. However, signals from 11 of the conventional radio collars had not been heard in more than a year. The radio collars are located by aircraft. Locations for satellite collars are received automatically via satellite.

Late winter composition counts have been done annually since 1993 to estimate the calf to cow ratio and document the survival rate of calves over winter.

Project objective: To maintain radio and satellite collars on the Porcupine caribou herd and to conduct an annual composition count, as part of a co-operative long-term population monitoring program.

Project description: This year, Vuntut National Park purchased 14 new conventional radio collars and USFWS refurbished 7 that were previously used and recovered. The Governments of the Northwest Territories and Yukon purchased 2 satellite collars each. USFWS refurbished 3 previously used satellite radio collars and provided 2 more that they had purchased in 2007.

Field work was funded by Environment Yukon and the Gwich'in Renewable Resource Board. Field work was done by Environment Yukon, ADF&G, and USFWS.

Telemetry flights were done by the USFWS prior to the March captures to determine the distribution of the herd and to relocate those caribou that needed to be recaptured and fitted with new collars. Captures were done by shooting a net over the caribou from a helicopter. No drugs were used during caribou captures. During the handling, biologists took 7 standard body measurements, recorded body condition, and took a blood sample from each caribou.

Project results: The herd was split into winter ranges in Alaska and Yukon again this year. Telemetry flights in October and November 2008 indicated that about two-thirds of the Porcupine caribou herd was wintering in Alaska and the remaining one-third was wintering in the Yukon. Due to lack of Alaska personnel, Environment Yukon staff assisted Alaskan field crews to capture caribou near Arctic Village, Alaska.

In Alaska there was significant overlap of Porcupine caribou with the Central Arctic caribou herd which limited capture opportunities. Seven recaptures were done in Alaska, 6 for the redeployment of satellite collars and 1 to exchange a conventional radio collar. Eight conventional radio collars were deployed on random caribou in areas outside of overlap between the 2 herds.

There was a large overlap with the Hart River Caribou herd in Yukon as well; however, the collars deployed on new (previously uncollared) caribou were in areas where the field crew was fairly confident that few Hart River caribou were located. Two satellite collars were deployed on caribou whose collars were due to be replaced, and 1 satellite collar replaced a conventional collar that had been placed on a short yearling in 2005. Twelve conventional collars were deployed on randomly selected caribou.

Between March 19 and 27, 2009, Environment Yukon deployed 21 conventional radio collars (17 on cows, 4 on bulls) and 9 satellite collars (all on cows) for a total of 30 new collars.

During the winter of 2008–2009, 8 caribou died. Following the fieldwork at the end of March 2009, there were 125 collared Porcupine caribou - 108 on cows (15 satellite and 93 conventional radio collars) and 17 on bulls (all conventional radio collars).

No composition count was done this year because of the significant overlap with other herds. When this overlap happens, survey crews cannot be sure that they are counting caribou from the Porcupine herd and not the Hart River or Central Arctic herds.

Next steps: Environment Yukon will send field work summaries out to all user communities in Yukon and Northwest Territories, co-management boards and partner agencies. Summaries will be presented to the Porcupine Caribou Management Board at their next meeting.

As directed in the management plan, Environment Yukon will continue to maintain conventional radio and satellite collars on the herd and conduct a late winter composition count each year.

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Woodland caribou

South Nahanni Caribou Herd – Fall Composition Survey and Radio-Collaring

Traditional Territory: Kaska (Yukon), Deh Cho (Northwest Territories)

Environment Yukon management region: Liard (Watson Lake)

Project leader: Troy Hegel, Caribou Biologist, Environment Yukon

Project funding partners: Department of Environment and Natural Resources (Government of Northwest Territories); Nahanni Butte Dene Band provided a member as an observer during the survey.

Management goal: To sustainably manage the South Nahanni caribou herd.

Background: The South Nahanni caribou herd is relatively accessible from the Nahanni Range Road and from a trail leading north along the Yukon - Northwest Territories border to Howard's Pass. The herd ranges across 3 management jurisdictions: Yukon, Northwest Territories, and Parks Canada. Sustainable harvest is a management concern for all 3 jurisdictions and the Liard First Nation. Survey results from previous years have indicated poor recruitment and low sex ratios (a low number of bulls compared to the number of cows). The low sex ratios may indicate possible overharvest. Additionally, there is increasing development in the herd's range which may impact the herd's growth.

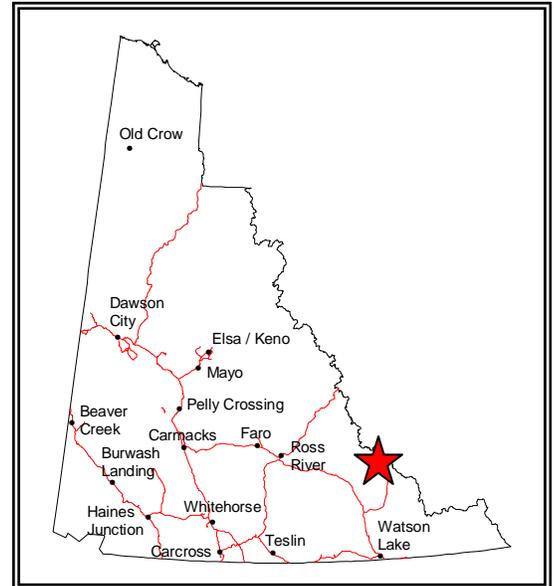
The South Nahanni caribou herd is part of the Northern Mountain population of woodland caribou. The Northern Mountain population has been given a 'special concern' designation under national Species at Risk legislation.

Project objective: (1) To determine the composition of the South Nahanni Caribou herd (number of bulls relative to the number of cows, and percent of cows with calves) and its distribution, as part of a long-term management strategy. (2) To capture and deploy satellite radio-collars on adult females to identify movement corridors, to facilitate differentiation between South Nahanni and adjacent herd ranges, and to assist with a planned population survey next year.

Project description: In late September 2008, the survey team used a helicopter for 13 hours to search for caribou in alpine areas. The weather conditions were good. However, there was little snow cover on the ground which made it more difficult to observe caribou from the air.

The survey team counted the numbers of bulls, cows, and calves in all groups of caribou seen. They also determined the age classes (mature or immature) of all the bulls they saw.

Immediately following the survey, a capture crew flew the herd range and deployed 30 satellite radio collars on adult cow caribou from a helicopter using a net-gun.



Project results: The survey team located 245 caribou in 24 groups. The recruitment rate for the herd was 9.5 calves per 100 cows. The sex ratio of the herd was 35.5 bulls per 100 cows. The sex ratio is near the minimum recommended level of 30 bulls per 100 cows identified in the Yukon Woodland Caribou Management Guidelines, and may indicate high bull harvest on the herd. The low recruitment rate was consistent with generally low recruitment rates for woodland caribou across the Yukon this year and is believed to be a result of poor weather conditions at calving this spring.

Thirty adult cow caribou were captured and fitted with radio collars. Collars are currently being monitored and location data collected frequently.

The Yukon caribou biologist has prepared a short file report for distribution to project partners.

Next steps: Environment Yukon, in conjunction with its partners, intends to continue this program to annually monitor radio collar location data. Next year, a population estimate of the herd is scheduled.

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Chisana Caribou Herd - Fall Composition Survey

Traditional Territory: White River

Environment Yukon Management Region: Kluane (Haines Junction)

Project leaders: Shawn Taylor, Kluane Regional Biologist, Environment Yukon

Project funding partners: Alaska Department of Fish and Game funded the composition count in Alaska and Wrangell-St. Elias National Park contributed funds for a pre-composition survey telemetry flight in Alaska. White River First Nation contributed an observer for the composition survey.

Management goal: To sustainably manage the Chisana caribou herd.

Background: The Chisana herd is a small population of caribou inhabiting east-central Alaska and southwest Yukon. The herd spends the summers almost entirely in Wrangell-St. Elias National Park and Preserve in Alaska. Much of the herd's winter range falls within Kluane Wildlife Sanctuary. The herd numbered as high as 3,000 animals in the early 1960s. Since 1989 the herd declined from about 1,800 to less than 700 animals by fall 2003. The decline in the population of Chisana caribou was caused by the combination of high predator success, low calf survival and an aging adult population.

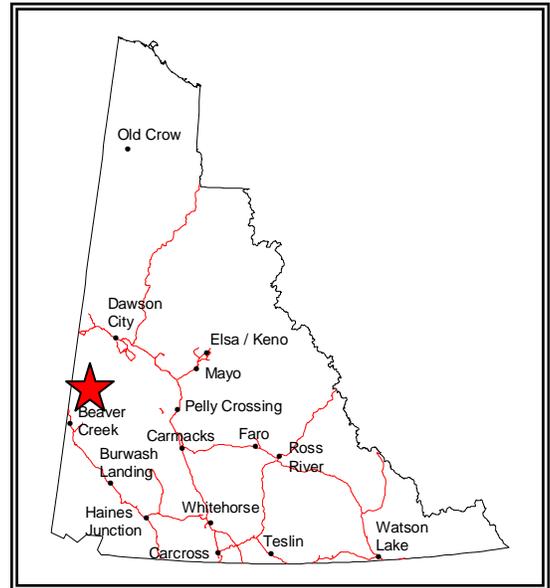
Recovery efforts began in spring 2002 with the establishment of the Chisana Recovery Team. The team includes representatives of Environment Yukon, White River First Nation, the Canadian Wildlife Service, the Alaska Department of Fish and Game (ADF&G), and Wrangell-St. Elias National Park. Chisana Recovery Team initiated the first captive-rearing project to increase calf survival in March 2003. The project continued for 3 years.

Environment Yukon has been monitoring the herd on the Canadian portion of its range and ADF&G monitors it on the Alaskan side. Continued monitoring of the herd is essential for managers to measure the success of the captive-rearing project and the recovery of the herd.

The Chisana caribou herd is part of the Northern Mountain population of woodland caribou. The Northern Mountain population has been given a *special concern* designation under national Species at Risk legislation.

Project objective: To determine the composition of the Chisana caribou herd (number of bulls relative to the number of cows, and percent of cows with calves) and its distribution, as part of a long-term management strategy.

Project description: In early October 2008, the Environment Yukon survey team used a helicopter for 12 hours over 2 days to search the Yukon portion of the Chisana herd's fall range (Wolverine Plateau to Klutlan Plateau) that the caribou traditionally use during the rutting season. They also surveyed St. Clare River and mountains at the headwaters of Koidern River. The use of telemetry could have provided larger sample sizes but funding arrangements to conduct pre-composition surveys in Yukon using fixed-wing telemetry were not secured. The weather was clear with light winds. Snow conditions ranged from continuous old snow on



Klutlan Plateau to brown, snow-free ground in the eastern part of the survey area. Most of the survey area had patchy thin snow, which made spotting animals difficult. The survey team counted the numbers of bulls, cows, and calves in all groups of caribou seen. They also determined the ages (mature or immature) of all the bulls they saw.

Project results: The survey crew located 20 small groups of caribou scattered throughout the survey area. The largest group had 25 animals. All groups were found above treeline. Klutlan Plateau, headwaters of Koidern River and lower St. Clare River drainage were noted as the most productive areas. The total count was 187 caribou: 93 cows, 31 calves, 33 immature bulls, and 30 mature bulls. This gives a ratio of 33 calves per 100 cows and 71 bulls per 100 cows. ADF&G from Tok counted the Alaskan side of the range west of the Yukon/Alaska border during the same week. Composition ratios on the Canadian side of the herd's range were higher relative to the U.S. This difference may be related to lasting effects of the Chisana caribou enhancement project involving penning and calf rearing. When data from the US and Canada were averaged, there were 21 calves per 100 cows and 44 bulls per 100 cows. These ratios are considered relatively low for most Northern Mountain caribou herds. However, the Chisana ratios have increased from previous years and likely indicate that declines have decreased. Total population census estimates have increased from 720 to 766 caribou in recent years (2003–2007).

Next steps: A management planning workshop for the Chisana Caribou herd was held February 17–18, 2009 in Tetlin National Wildlife Refuge, Tok, Alaska. Group members expressed a desire to continue annual composition surveys for the life of the plan (5 years) and to conduct a census if feasible in 2010. This plan will not be signed before March 2010.

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Coal River Caribou Herd – Fall Composition Survey

Traditional Territory: Kaska (Yukon), Deh Cho (Northwest Territories)

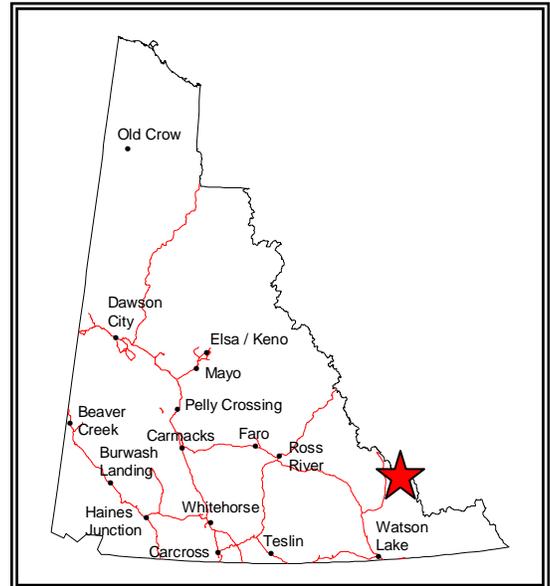
Environment Yukon management region: Liard (Watson Lake)

Project leader: Troy Hegel, Caribou Biologist, Environment Yukon

Project funding partners: Parks Canada, Department of Environment and Natural Resources (Government of Northwest Territories); Liard First Nation provided a member as an observer.

Management goal: To sustainably manage the Coal River caribou herd.

Background: The Coal River caribou herd is relatively accessible from the Nahanni Range Road. The herd ranges across 3 management jurisdictions: Yukon, Northwest Territories, and Parks Canada. Sustainable harvest is a management concern for all 3 jurisdictions and the Liard First Nation.



The Coal River caribou herd is part of the Northern Mountain population of woodland caribou. The Northern Mountain population has been given a *special concern* designation under national Species at Risk legislation.

This is only the second survey of the Coal River herd that has been done during the fall rutting season.

Project objective: To determine the composition of the Coal River caribou herd (number of bulls relative to the number of cows, and percent of cows with calves) and its distribution, as part of a long-term management strategy.

Project description: In early October 2008, the survey team used a helicopter for 11 hours to search for caribou in alpine areas. The weather conditions were good. However, there was no snow cover on the ground making it more difficult to observe caribou from the air.

The survey team counted the numbers of bulls, cows, and calves in all groups of caribou seen. They also determined the age classes (mature or immature) of all the bulls they saw.

Project results: The survey team located 341 caribou in 42 groups. The recruitment rate for the herd was 12 calves per 100 cows. The sex ratio of the herd was 34.3 bulls per 100 cows. The sex ratio is near the minimum recommended level of 30 bulls per 100 cows identified in the Yukon Woodland Caribou Management Guidelines, and may indicate high bull harvest on the herd. The low recruitment rate was consistent with generally low recruitment rates for woodland caribou across the Yukon this year and is believed to be a result of poor weather conditions at calving this spring.

The Yukon caribou biologist has prepared a short file report for distribution to project partners.

Next steps: Environment Yukon, in conjunction with its partners, intends to continue this program to annually monitor the composition of the herd during the next few years.

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Population Surveys of the Aishihik and Kluane Caribou Herds

Traditional Territory: Champagne-Aishihik and Kluane First Nations

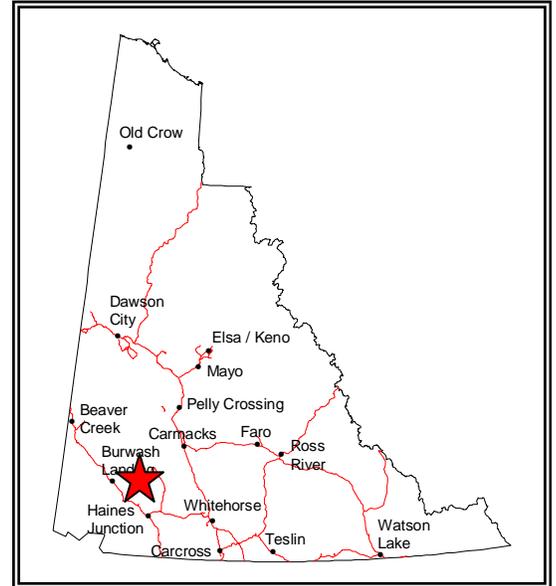
Environment Yukon management region: Kluane (Haines Junction)

Project leader: Troy Hegel, Caribou Biologist, Environment Yukon

Project funding partners: Champagne-Aishihik and Kluane First Nations provided community observers.

Management goal: To sustainably manage the Aishihik and Kluane caribou herds.

Background: The Aishihik and Kluane caribou herds are part of the Northern Mountain population of woodland caribou. The Northern Mountain population has been given a *special concern* designation under national Species at Risk legislation.



The Aishihik caribou herd was the focus of an intensive recovery program in the 1990s. Following that recovery effort, wildlife managers identified a management target of 2000 animals. Population surveys let Environment Yukon estimate the number of animals in the herd and assess its size relative to this post-recovery management target. The Aishihik caribou herd is moderately harvested under a permit hunt for licensed resident hunters. The sustainability of this hunt can also be assessed using results from this population estimate.

The Kluane caribou herd is one of the smallest herds in the Yukon. The most recent estimate of its size was 235 animals in 2003. Due to its small size it is at greater risk of decline and extirpation (becoming locally extinct) since it may not have a sufficient the number of animals to buffer itself against certain stressors. Because of its small size, it has an increased monitoring priority so that Environment Yukon can track its status more frequently.

Project objective: To estimate the size, calf productivity, and late-winter distribution of the Aishihik and Kluane caribou herds. Given the heavy snowfall this winter, locating high-use late-winter ranges can assist in identifying those areas that are critical to caribou during this time period.

Project description: Environment Yukon completed a mark-resight survey of the Aishihik herd in early March 2009. To begin with, animals were marked from a helicopter using a temporary dye. These marked animals were used to estimate detection rates during 2 subsequent resighting surveys in which the survey crew identified animal groups, and counted the marked and unmarked animals. Using the number of known marked animals allowed Environment Yukon to estimate the fraction of animals which were missed during the resight surveys. We adjusted the counts of animals observed during the resighting session to estimate an overall herd size. Calves were also counted to assess herd productivity in terms of a calf percentage for the herd.

Locations of animals were mapped with a GPS unit to identify important late winter ranges during this high snowfall year.

Project results: The survey estimated 2032 animals in the Aishihik herd. Calves represented 11.3% of the herd. The 2009 herd estimate represents an increase in size from the previous estimate of 1148 animals in 1997, and an average annual population growth rate of 4.9%. These results indicate that the post-recovery management target for the Aishihik herd of 2000 animals has been achieved. The largest concentrations of animals in the Aishihik herd were found at Little Buffalo Lakes; in the region between Aishihik and Sekulmun Lakes north of Borthwick Lake; and in the Macintosh, Dwarf Birch, Talbot, and Raft/Rockslide Creek drainages.

The survey estimated 181 animals in the Kluane herd. Calves represented 9.7% of the herd. The 2009 herd estimate represents a decrease in size from the previous estimate of 235 animals in 2003, and an average annual population rate of change of -4.3%. Virtually all animals in the Kluane herd were located along Tincup Creek, indicating the importance of this area as critical late-winter range.

Next steps: Environment Yukon, in conjunction with its First Nation partners, intends to continue to do annual fall composition surveys over the next few years to monitor the composition of the herds.

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Southern Lakes Caribou Herd Telemetry Studies

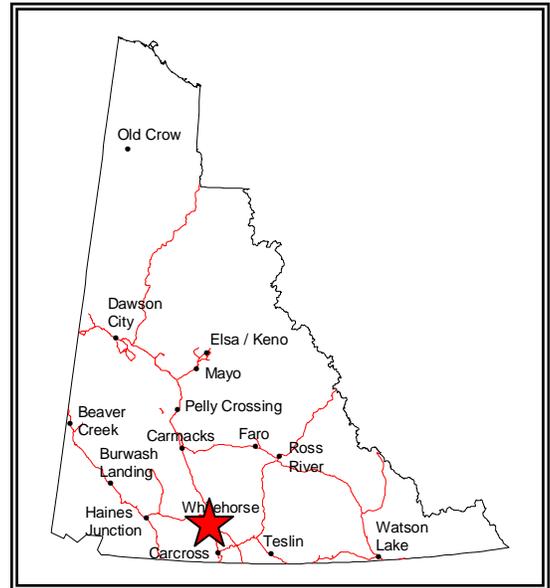
Traditional Territory: Carcross/Tagish, Kwanlin Dün, Teslin Tlingit, Ta'an Kwäch'än.

Environment Yukon Management Region:
Southern Lakes (Whitehorse)

Project leader: Jamie McLelland, A/ Southern Lakes Regional Biologist, Environment Yukon

Project funding partners: Ta'an Kwäch'än Council, Kwanlin Dün, Carcross/Tagish First Nations, Laberge Renewable Resources Council, Teslin Tlingit Council have all contributed to the Southern Lakes Caribou Recovery Program over the years.

Management goal: To recover and cooperatively manage caribou populations in the Southern Lakes region.



Background: Caribou in the Southern Lakes region consist of the Carcross, Ibex, Atlin, and Laberge herds. Their range spans the Yukon - B.C. border. This project is an ongoing management initiative to track the recovery of these caribou.

Southern Lakes Caribou Recovery Program began in 1993. A management action plan developed as part of the Recovery Program includes the employment of game guardians, land use and habitat evaluations, and voluntary and licensed harvest bans on caribou in these herds. Partners in the recovery of the Southern Lakes caribou have been the Carcross/Tagish, Kwanlin Dün, Ta'an Kwäch'än, Champagne and Aishihik, Teslin Tlingit, and the Taku River Tlingit First Nations, and Yukon and British Columbia governments.

When the Recovery Program began, biologist believed there were only about 200 caribou in the Ibex herd and about 250 in the Carcross herd. The objective of the Southern Lakes Caribou Recovery Program is to reach and maintain a population of 2000 animals within the Carcross and Ibex herd ranges.

A collaring program began in 1994. Caribou are radio-collared to determine their annual range use and distribution. Radio-collared caribou demonstrated not only herd affiliation but also identified areas where the caribou concentrated in the fall and winter. Knowing how caribou typically use the landscape helps biologists find the caribou for the fall composition surveys each year and for the census surveys that are generally done every 5 years. Census surveys establish the total population estimate and are used to evaluate recovery status and success.

Maintaining active GPS radio collars on these caribou allows Environment Yukon to provide land use applicants and regulators with up-to-date assessments of how caribou use the landscape and the key habitats. Map-based products of the radio collar locations are constantly in use for land use-based decision making around caribou habitat and winter range.

The caribou herds in the Southern Lakes area are part of the Northern Mountain population of woodland caribou. The Northern Mountain population has been given a *special concern* designation under national Species at Risk legislation.

Project objective: To track land and habitat use of Southern Lakes caribou.

Project description: Environment Yukon currently has 2 conventional VHF radio collars and 7 GPS radio collars deployed on caribou. GPS collars are recovered at pre-scheduled drop dates based on programmable drop off mechanisms. Collars are usually removed after they have been on a caribou for 2 years.

Project results: Environment Yukon did telemetry flights in October, December, February, and late March to locate the GPS and conventional VHF collars.

Environment Yukon field crew recovered 1 collar in December and 2 collars at the end of March. The December collar data has been downloaded and added to dataset. Results from each new GPS collar recovered reveals patterns of use by caribou that are unique in terms of corridors, parts of the winter range used, and proximity to boundaries and infrastructure. This information continues to demonstrate new patterns of range use and reaction to highways and other infrastructure.

Environment Yukon field crew deployed 5 new GPS collars at the end of March. Animals were collared based on known distribution of caribou and in areas and habitats that are poorly represented on the range.

Next steps: Environment Yukon will prepare a plain language report and maps summarizing the results of the location and movement information for distribution to partners.

Environment Yukon will re-evaluate radio-collar data distribution and habitat use in 2 years' time and make recommendation on the utility of continuing to monitor using GPS radio-collars.

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Southern Lakes Caribou Herd - Fall Composition Survey (Carcross/Laberge Herd)

Traditional Territories: Carcross/Tagish, Kwanlin Dün, Teslin Tlingit, Ta'an Kwäch'än.

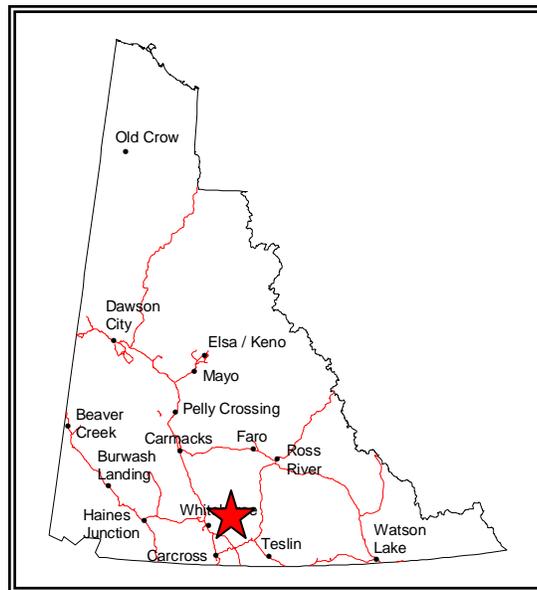
Environment Yukon Management Region: Southern Lakes (Whitehorse)

Project leader: Jamie McLelland, A/ Southern Lakes Regional Biologist, Environment Yukon

Project funding partners: Ta'an Kwäch'än Council, Kwanlin Dün, Carcross/Tagish First Nations, Laberge Renewable Resources Council, Teslin Tlingit Council have all contributed to the Southern Lakes Caribou Recovery Program over the years.

Management goal: To recover and cooperatively manage caribou populations in the Southern Lakes region.

Background: The caribou in the Southern Lakes region consist of the Carcross, Ibex, Atlin, and Laberge herds. Their range spans the Yukon - B.C. border.



Southern Lakes Caribou Recovery Program began in 1993. A management action plan developed as part of the Recovery Program includes the employment of game guardians, land use and habitat evaluations, and voluntary and licensed harvest bans on caribou in these herds. Partners in the recovery of the Southern Lakes caribou have been the Carcross/Tagish, Kwanlin Dün, Ta'an Kwäch'än, Champagne and Aishihik, Teslin Tlingit and the Taku River Tlingit First Nations, and Yukon and British Columbia governments.

When the Recovery Program began, biologist believed there were only about 200 caribou in the Ibex herd and about 250 in the Carcross herd. The objective of the Southern Lakes Caribou Recovery Program is to reach and maintain a population of 2000 animals within the Carcross and Ibex herd ranges.

Environment Yukon has done fall composition surveys annually since 1994 for the Carcross herd and since the mid 1980's for the Ibex herd.

A collaring program began in 1994. Caribou are radio-collared to determine their annual range use and distribution. Radio-collared caribou demonstrated herd affiliation and areas where the caribou could be counted in the fall and where winter range concentrations occurred for census surveys that are generally done every 5 years. Census surveys establish the total population estimate and are used to evaluate recovery status and success.

Environment Yukon annually monitors caribou distribution and calf survival to evaluate whether there are significant changes in range use, caribou numbers and group sizes and whether the population is predicted to be increasing stable or declining based on the survival of calves of the year.

The Carcross and Ibex caribou herds are part of the Northern Mountain population of woodland caribou. The Northern Mountain population has been given a 'special concern' designation under national Species at Risk legislation.

Project objective: To determine the composition for the Carcross/Laberge caribou herd (number of bulls relative to the number of cows, and percent of cows with calves) and its distribution, as part of a long-term recovery strategy.

Project description: On October 4 and 5, 2008 a helicopter was used for 7 hours to survey the Carcross/Laberge herd. A composition count on the Ibex herd was not possible due to budget restraints. The conditions were not ideal for the composition survey. On October 4 it was overcast with fog in the east around Jo and Byng Mountains and on October 5 it was sunny, but with wind up high and fog east of Marsh Lake. All areas surveyed were either completely snow covered or completely snow free. The snow conditions helped increase sightability although areas without snow required more flight time to spot animals.

Project results: Most caribou were seen above treeline and were distributed among the traditional rutting ranges for these herds. Some animals were also seen within some of the adjacent shrub dominated habitats.

In the Carcross/ Laberge herd, the survey crew counted 151 caribou – 85 cows, 19 calves, 9 immature bulls, 38 mature bulls – in 23 groups. These numbers give a ratio of 22 calves per 100 cows. Eighty percent of the bulls that were seen were mature.

Next steps: Environment Yukon will continue annual monitoring of the Southern Lakes caribou herds as directed by the recovery program.

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Ethel Lake Caribou Herd – Fall Composition Survey

Traditional Territory: Na-Cho Nyäk Dun, Selkirk

Environment Yukon Management Region: Northern Tutchone (Mayo)

Project leader: Mark O'Donoghue, Northern Tutchone Regional Biologist, Environment Yukon

Project funding partner: The First Nation of Na-Cho Nyäk Dun funded one of their Lands & Resources staff as an observer on this survey.

Management goal: To sustainably manage the Ethel Lake caribou herd.

Background: The Ethel Lake caribou herd is a small herd consisting of about 300 animals. Environment Yukon, Nacho Nyäk Dun First Nation, and the Selkirk First Nation are concerned about the low numbers of caribou being added to the herd as a result of several years of very low calf survival.



The low numbers of caribou surviving to adulthood in recent years means that the animals removed from the herd by hunting or natural causes are not being replaced. If this continues for more than a few years, the herd will decrease in size. The Mayo District Renewable Resources Council has recommended hunters avoid this herd until the rates of calf survival improve.

The Ethel Lake caribou herd is part of the Northern Mountain population of woodland caribou. The Northern Mountain population has been given a *special concern* designation under national Species at Risk legislation.

Environment Yukon also expressed an intention to do annual monitoring of this herd in the *2002–2007 Community-based Fish & Wildlife Management Plan for the Na-Cho Nyäk Dun Traditional Territory*. Regular monitoring of the herd is also recommended in the Ddhaw Ghro Habitat Protection Area Draft Management Plan.

This is the 14th survey of this herd done during rutting season since 1993.

Project objective: To determine the composition of the Ethel Lake caribou herd (number of bulls relative to the number of cows, and percent of cows with calves) and its distribution, as part of a long-term management strategy.

Project description: In late September 2008, the survey team used a helicopter for 4.5 hours to search the alpine and subalpine areas that the caribou traditionally use during the rutting season. All of the survey was completed in 1 day. There was patchy snow cover except at high altitudes which made it hard to see the caribou in much of the survey area.

The survey team counted the numbers of bulls, cows, and calves in all groups of caribou seen. They also determined the ages (mature or immature) of all the bulls they saw.

Project results: Caribou were found in all of the surveyed areas. The survey team located 271 caribou: 21 large bulls, 42 smaller bulls, 181 cows, and 27 calves.

These observations were used to calculate the sex ratio and calf survival rates of the herd. The sex ratio was determined to be 35 bulls for every 100 cows. This ratio is below average for lightly hunted caribou herds in the Yukon and is consistent with low sex ratios recorded for this herd since 2000. Management guidelines for woodland caribou in the Yukon aim for at least 30 bulls for every 100 cows.

Calf survival this year (15 calves for every 100 cows) is low compared to the 25–30 calves per 100 cows that biologists consider necessary for maintaining stable numbers. Biologists have been concerned about low recruitment into this herd following several years of very low calf survival. Survival of caribou calves appears to be generally poor for woodland caribou across the Yukon this year and is believed to be a result of poor weather conditions at calving this spring.

The Northern Tutchone regional biologist has prepared a short file report for distribution to the Na-Cho Nyäk Dun First Nation, Mayo District Renewable Resources Council, Selkirk First Nation, Selkirk Renewable Resources Council, and other interested parties. The results of the survey were also presented at meetings of the Mayo District and Selkirk Renewable Resources Councils.

Next steps: Environment Yukon intends to continue this program to annually monitor the composition of the herd. Environment Yukon will also continue to request a voluntary hunting closure for this herd until there is adequate recruitment for several years.

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Hart River Caribou Herd Monitoring

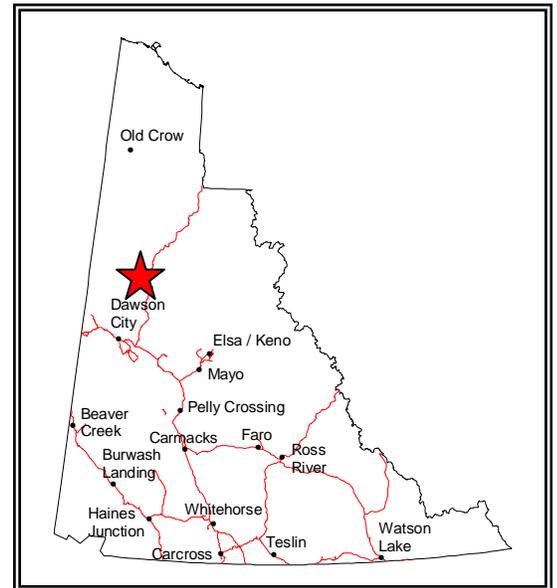
Traditional Territory: Na-Cho Nyäk Dun, Tr'ondëk Hwëch'in

Environment Yukon management regions: Northern Yukon and Northern Tutchone

Project leaders: Mark O'Donoghue, Northern Tutchone Regional Biologist, and Dorothy Cooley, Northern Regional Biologist, Environment Yukon

Management goal: To obtain updated population information needed by Environment Yukon and its partners to sustainably manage the Hart River caribou herd.

Background: Radio-collared caribou in the Hart River herd have been monitored since 1998 to determine the status of the herd, its movements, and distribution. This information is compared to the adjacent Clear Creek (woodland caribou) and Porcupine (barren-ground caribou) herds to map herd ranges and manage harvest.



Biologists have captured enough caribou to maintain an average of about 30 active collars on Hart River caribou in most years. Results from regular monitoring during all seasons between 1998 and 2003 were used to determine that Hart River and Clear Creek caribou were distinct herds. Monitoring of radio-collared caribou during the fall and winter has been used to manage harvest along the Dempster Highway since 2006.

A census done by Environment Yukon in the fall of 2006 estimated the size of the Hart River herd at 2200 animals. The rates of calf survival were good but the ratio of bulls to cows was fairly low. Due to its accessibility along the Dempster Highway, the Hart River herd is vulnerable to overharvest.

Caribou in the Hart River herd have recently increased their use of habitat along the Dempster Highway, leading to concerns about possible overharvest. In years when few Porcupine caribou migrate into the range of the Hart River herd in the late fall and winter, Hart River caribou may be the only caribou accessible from the highway.

Hart River caribou often range into game management subzones where allowable harvest levels are based on sustainable limits for the much larger Porcupine caribou herd (i.e. 2 caribou of either sex, and a hunting season that remains open to January 31). As a result, Hart River caribou may be inadvertently harvested under the more liberal Porcupine caribou regulations.

Monitoring of radio-collared Hart River caribou allows Environment Yukon to respond to any threats to the herd due to over-harvesting, including a hunting closure if needed. For example, in 2006–2007 and 2007–2008, Porcupine caribou did not move into the range of the Hart River herd. Environment Yukon enacted an emergency hunting closure in the overlap area in the winter ranges, to provide protection to the animals in the much smaller woodland Hart River herd.

Environment Yukon also expressed its intention to monitor this herd in the *2002–2007 Community-based Fish & Wildlife Management Plan for the Na-Cho Nyäk Dun Traditional*

Territory. During recent discussions on the renewal of the plan, Environment Yukon has expressed its intention to maintain the monitoring.

The Hart River caribou herd is part of the Northern Mountain population of woodland caribou. The Northern Mountain population has been given a *special concern* designation under national Species at Risk legislation.

Project objective: To monitor radio-collared Hart River caribou in the late fall and winter to determine their distribution, and to determine the overlap between Hart River and Porcupine caribou herds during the licensed hunting season. The monitoring program also provides information needed to map the herd's important rutting and winter habitats and to determine over-winter survival of caribou.

Project description: This is an ongoing project. Survey crews use a fixed-wing airplane to search for and locate all radio-collared Hart River caribou and Porcupine caribou in the overlap area at least 3 times per year.

Environment Yukon did the first surveys of 2008–2009 on October 26 and 27. Weather conditions were fairly good, and it was possible to cover most of the survey area.

The next flight was done on November 11, 2008 in the overlap area along the southern Dempster Highway. Weather conditions were excellent and it was possible to cover the survey area at an altitude suitable for radio telemetry.

Because of the mixed results of these first 2 surveys, a third flight was flown in the overlap zone along the highway on November 20, 2008. Weather conditions for this flight were also excellent. High level telemetry was done to locate radio collars. In addition, several low level passes were made along the highway to assess caribou numbers and tracking, as well as try to determine direction of movement of the caribou.

Environment Yukon did late-winter telemetry flights on March 4 and 6, 2009 to locate Hart River caribou, and to determine the extent of overlap between Hart and Porcupine caribou on their winter ranges.

Project results: The survey crew located 29 Hart River caribou and 24 Porcupine caribou on the flights in late October. Hart River caribou were widely dispersed over their range, including several further west than they had ever been found before, in the Fifteen-mile River drainage; 7 collared animals were in the overlap zones along the Dempster Highway. There were large numbers of Porcupine caribou in the overlap zone as well.

By mid-November, almost all Porcupine caribou had moved north out of the overlap zone along the highway. On the November 11 flight, the survey crew got good locations on 18 Hart River caribou and 5 Porcupine caribou. While 6 collared Hart River caribou remained along the Dempster Highway, only 1 collared Porcupine caribou remained. The flight on November 20 confirmed the pattern observed earlier in the month of Hart River caribou remaining in areas along the Dempster Highway, while most Porcupine caribou had moved north and west. During the November flights, the survey crew determined that many Hart River caribou were still well west of the Dempster Highway in the upper Fifteen-mile and upper Ogilvie River basins.

The information from these flights was used to assess the risk of overharvesting Hart River caribou along the Dempster Highway. Because few Porcupine caribou remained along the highway while Hart River animals were present, hunting along the Dempster Highway in overlap zones was closed on November 28, 2008. The closure did not affect First Nation hunters.

During the March flights, the survey crew located 26 of the 31 radio-collared Hart River caribou. Good locations were obtained on all but 1 of them. Of the 5 collars not heard, 3 of them had not been located since March 2008, while the other 2 had been heard in October 2008.

For the most part, the Hart River caribou were concentrated in the core of their winter range near the confluence of the Hart River and Rae Creek. Collared Hart River caribou were also spread out in the mountains between the Blackstone and Hart Rivers. One collared caribou had moved east to the Little Wind River where they have been found most years. Three Hart River caribou remained west of the Dempster Highway in the mountains just north of Seela Pass.

During the flight the survey crew also listened for collars on Porcupine caribou that had been found in the Yukon in October and November 2008. Of 28 collars listened for, 9 were located, generally distributed slightly north of where Hart Caribou were wintering. One Porcupine caribou was heard on mortality mode, indicating that this caribou had died since the fall of 2008.

Short file reports on each flight were prepared by the regional technician in Dawson.

Next steps: Environment Yukon will continue to maintain active radio collars on caribou in the Hart River herd and monitor them during fall and winter. This allows in-season adjustment of regulations when necessary to protect the herd by managing the harvest.

The information obtained during the surveys will be added to the database of caribou locations and used to map key rutting and wintering areas for the Hart River herd.

Survival rates for the Hart River caribou will be estimated from survival rates of collared animals, using standard survival analyses techniques.

A technical report on population characteristics (abundance, composition, and survival), distribution, and important habitats will be prepared after several more years of monitoring these caribou.

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Tay River Herd – Winter Distribution and Composition Survey

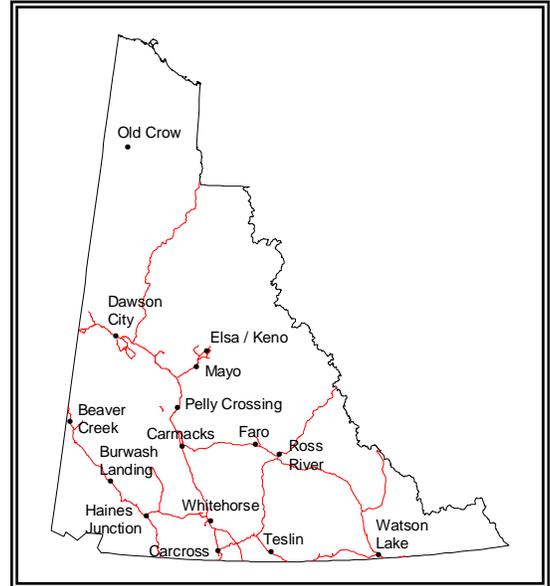
Traditional Territory: Kaska (Yukon), Na-Cho Nyäk Dun

Environment Yukon management region: Liard (Watson Lake)

Project leader: Troy Pretzlaw, Liard Regional Biologist, Environment Yukon

Management goal: To sustainably manage the Tay River caribou herd.

Background: The Tay River caribou herd mostly ranges away from roads and are accessible only to back country hunters. There is mining exploration, the potential for development, and extensive recent fires in this herd's range. The herd is a potential source of food security for the Ross River Dena people as the Finlayson caribou herd declines.



The Tay River herd has only been surveyed twice, in 1991 and in 2001. Environment Yukon's knowledge of this herd is limited. The information from this composition count and survey is essential to determine whether this herd can sustain increased harvest and to accurately predict impacts of current and future mining development.

Environment Yukon needs to prepare for information requests concerning wildlife values from environmental consultants employed by mining companies, from First Nations, and from Yukon Environmental and Socio-economic Assessment Board (YESAB). Ongoing monitoring of caribou populations also provides important baseline information for post development impact assessment.

The Tay River caribou herd is part of the Northern Mountain population of woodland caribou. The Northern Mountain population has been given a *special concern* designation under national Species at Risk legislation.

Project objective: To determine caribou distribution and proportion of calves during a late winter period.

Project description: In mid-March 2009, the survey team used a helicopter for 12 hours to search for caribou in forested areas. The weather conditions were good. However, the forest cover in this region is thick making the spotting and aging of caribou more difficult.

The survey team counted the numbers of adults and calves in all groups of caribou seen.

Project results: The survey team located 654 caribou in 50 groups. These caribou were mostly located along the Tay River. Survey crews found that there has been a substantial loss of winter range due to fire since the last time this herd was surveyed.

Biologists calculated that in late winter, there were 7.5 calves per 100 caribou. Although this number is low, it is consistent with generally low calf production for woodland caribou across the Yukon this year and is believed to be a result of poor weather conditions at calving this spring.

Next steps: Environment Yukon would like to determine if the herd's winter range has shifted substantially or shrunk in response to recent fires. Environment Yukon also wants to obtain an estimate of the total number of caribou in the herd to determine if the carrying capacity (the number of caribou the land can support) has declined due to these forest fires, which will have implications for input provided to the environmental assessment process as well as the sustainable harvest. This will require further survey work in future years.

Environment Yukon will prepare a file report for this survey that will be used to guide harvest management and inform environmental assessment processes.

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Grizzly bears

Kluane Region Grizzly Bear Program

Traditional Territory: Champagne and Aishihik

Environment Yukon Management Region: Kluane (Haines Junction)

Project leader: Ramona Maraj, Carnivore Biologist, Environment Yukon

Project funding partners: Alsek Renewable Resources Council, Champagne and Aishihik First Nations

Management goal: To maintain a sustainable grizzly bear population in the Kluane region.

Background: The draft 2007–2012 Champagne and Aishihik Fish and Wildlife Management Plan identifies a number of local community concerns regarding the management of the grizzly bears in the Kluane region.

The draft plan states that a better understanding of the bear population is needed to be able to make better management decisions. The draft plan also identifies a concern about human-bear conflict. Parties to the plan share a strong common interest in reducing human-bear conflicts within the Champagne and Aishihik Traditional Territory (CATT). Reducing conflicts will improve community safety and will reduce bear mortality.

Residents of the Haines Junction area say they are encountering grizzly bears more often than in the past. This increase in sightings has led many people to believe that the population is on the rise and to call for more hunting opportunities. In contrast, there is considerable existing scientific research that indicates the grizzly bear population in the Kluane region may be in decline and human-caused mortality rates are higher than sustainable. This discrepancy in the appraisal of the population's status has produced differing opinions as to what management approaches are necessary and justifiable.

In May 2002, the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) re-examined and confirmed their designation of the northwestern population of grizzly bears as a *species of concern* but the federal government has not yet added them to the List of Species at Risk in Canada. There is considerable international attention directed toward how agencies in Canada are managing this species.

Early in 2008, Environment Yukon developed a Strategic Communication Plan to guide the development and delivery of information related to the overall program. A Partners Working Group was formed consisting of representatives from the Champagne and Aishihik First Nations (CAFN), the Alsek Renewable Resources Council (ARRC), and Environment Yukon to facilitate community involvement and contribute to the development of the program. The overlapping interest among parties naturally supports a collaborative framework for developing management solutions.



Project objective: To implement programs that will support the sustainable management of grizzly bears in the Kluane region.

Project description: In the spring of 2008, Environment Yukon proposed a study to determine population size, understand why cub survival is exceedingly low in the region, assess the age structure of the population, understand the role of immigration and emigration in affecting the population dynamics of the region, and understand the mechanisms that affect the discrepancy between local knowledge of bears and scientific information. In response, the ARRC and the CAFN undertook consultations over the summer and fall of 2008 to assess community support for the proposed project before making a decision on how the program should proceed.

Community consultations (by ARRC and CAFN) determined that initiating a program to reduce bear-human conflict in the region is the priority among residents.

In 2008–2009, initiatives directed towards reducing bear-human conflict included:

(1) Environment Yukon led a project that sampled vegetation around Haines Junction to determine how varying degrees of spruce beetle infestation influenced forage for grizzly bears. Sampling was done in areas of high, moderate, and low beetle infestation within 50 km of the community in the summer of 2008. Measurements were also done in areas that were *FireSmarted* in Haines Junction to determine how FireSmarting affects forage for grizzly bears.

(2) In March 2009, Environment Yukon (in cooperation with the ARRC and CAFN) hosted an evening of presentations and discussion about reducing bear-human conflict in the Kluane area. Three guest speakers from B.C. and Alberta talked about what is being done in other communities to reduce bear human conflict. All of the speakers specialize in working with communities that are living with bears.

(3) In March 2009, Environment Yukon (in cooperation with the ARRC and CAFN) hosted a 1-day workshop with invited key participants to identify local issues and develop local solutions to reduce bear human conflict in the area.

Project results: (1) Environment Yukon sampled 200 vegetation plots and established 16 permanent plots in the 3 classes of spruce beetle infestation. An analysis of the vegetation plots is underway.

(2) The public meeting introduced the 30+ participants to activities that have been successfully implemented in other jurisdictions to reduce bear-human conflict. The meeting also provided an opportunity for the public to comment (express opinions and concerns, make suggestions) on activities to reduce bear-human conflict.

(3) The workshop participants included representatives of agencies that have the ability and/or mandate to address the issues related to reducing bear-human conflict in the area. The guest speakers from the previous evening's public meeting served as resource people. The workshop provided a forum for the discussion of issues and the initiation of a multi-party workplan that details a strategy for reducing bear human conflicts in the area.

Next steps: Environment Yukon will work with Champagne and Aishihik First Nations and the Alsek Renewable Resources Council to implement projects to reduce bear-human conflict in the CATT. These projects include a variety of public awareness and action initiatives, and the monitoring of the vegetation plots for long-term changes to the forest structure from beetle infestation, with particular emphasis on changes in forage for grizzly bears. Environment Yukon has cancelled plans to conduct a bear population study.

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Wolves

Coast Mountains Wolf Inventory

Traditional Territories: Champagne and Aishihik, Carcross Tagish, Kwanlin Dün, and Ta'an Kwäch'än.

Environment Yukon Management Region: Southern Lakes (Whitehorse)

Project leaders: Alan Baer, Wolf Management Program Coordinator, Environment Yukon

Management goal: To monitor the relative abundance of wolves in the Coast Mountain area

Background: Wolf populations in the Coast Mountain range were last monitored in the 1980s.

Over the last few years the Environment Yukon and the Southern Lakes Caribou Steering Committee have been considering approaches to managing wolves as part of a strategy to recover moose populations.

Community boards and councils have increasingly expressed concerns over moose numbers and the need to limit wolves as predators of moose. The Southern Lakes Wildlife Coordinating Committee recently identified a need to update wolf inventories in advance of making recommendations on moose recovery. Any plan to recover moose in the Coast Mountains needs to take into account wolf population trends, and any plan for moose recovery needs to proceed with a clear understanding of wolf predation as a possible recovery impediment.

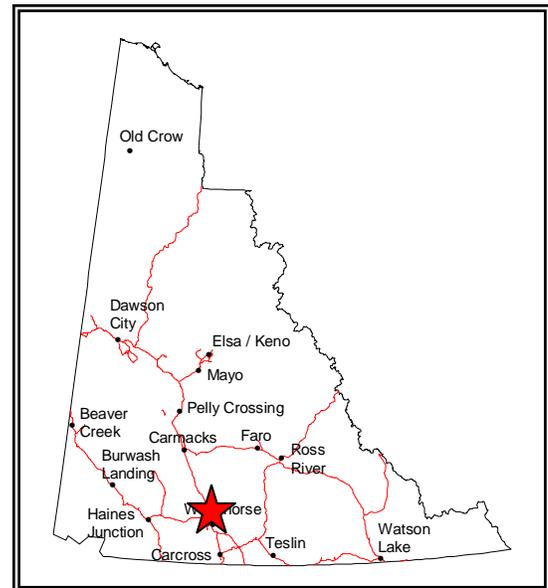
This was a 1 year inventory project.

Project objective: To estimate the number of wolves in the Coast Mountains.

Project description: Estimates of wolf numbers are done by snow tracking wolves in mid- to late-winter using a fixed-wing Super Cub aircraft. Survey crews either see wolf packs or estimate pack size based on trail and track characteristics. This method results in a minimum count estimate and is considered a reasonably effective way to inventory wolf populations under certain snow and tree cover conditions.

Project results: Environment Yukon crews flew 17 flights between February 5 and March 26, 2009, for a total of 76 hours of surveying. Crews visually located 3 packs. Crews were able to determine that there were 6 more packs based on the trails they followed. In total, crews estimated that there were about 40 wolves in the 9 packs. Estimates of the numbers of lone wolves bring the late winter population to about 45 wolves. A final population estimate will be done once Environment Yukon receives information requested from trappers about wolf observations on their traplines.

Wolf numbers in the Coast Mountains have declined since 2004, when we estimated 13 groups and about 82 wolves. The decline in numbers is likely due to the long term decline in moose numbers in the same area. This decline has caused wolves to shift their predation away from moose to sheep and caribou which are able to maintain large wolf group size.



Next steps: Environment Yukon is currently assessing the results of the survey to estimate the population. A survey report of results will be provided to the Southern Lakes Wildlife Coordinating Committee and the co-management partners

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Sheep

Dall sheep in the Miners Range

Traditional Territory: Ta'an Kwäch'än

Environment Yukon Management Region: Southern Lakes (Whitehorse)

Project leaders: Jamie McLelland, A/Southern Lakes Regional Biologist and Bruce McLean, Senior Biologist, Habitat Protection, Environment Yukon

Project funding partners: Laberge Renewable Resources Council, Ta'an Kwäch'än First Nation

Management goal: To sustainably manage the sheep population in the Miners Range.

Background: The Laberge Renewable Resource Council and the public have raised concerns regarding the potential effects of increasing off-road vehicle (ORV) use on sheep populations in the Miners Range. The Miners Range is one of the areas near Whitehorse that has seen a heavy and increasing use of off-road vehicles. Wild sheep are known to be among the wildlife species most susceptible to human disturbances. Recreational activity has the ability to disrupt habitat as well as displace wildlife. A significant level of recreational activity, especially in the alpine, can have negative effects on animal distribution.

In response to this concern, Environment Yukon has begun a program to assess and monitor the impacts of ORV access and other human caused changes on the area's habitat and wildlife. 2008 was the second year of a 3-year program.

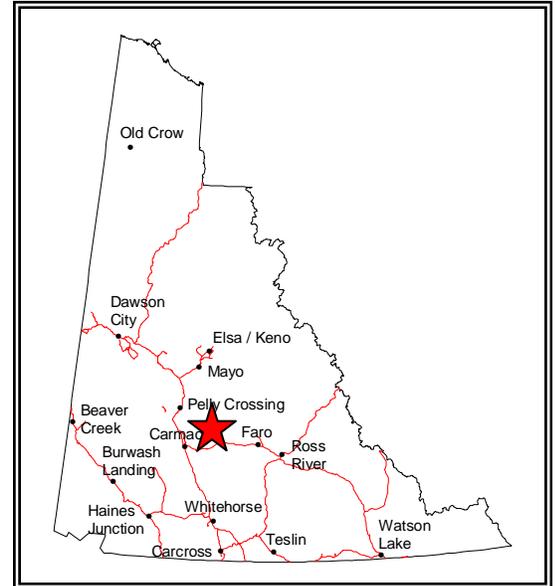
The Dall sheep population on the Miners Range has been counted for over 30 years, starting in 1975. The average population size has been 150 sheep, but Environment Yukon estimates that currently the population is about 170. This is the only Dall sheep population in the Ta'an Kwäch'än First Nation Traditional Territory.

Information collected from this study can also be used to inform local area and land use planning.

Project objective: To (1) count the number of sheep in the Miners Range and, (2) assess the impacts of increasing off-road vehicles on the Dall sheep population and their habitat on Pilot Mountain (Miners Range) by monitoring the use of ORVs in the area during the summer and hunting season.

Project description: Environment Yukon completed a 1-day helicopter survey of the Miners Range on June 13, 2008. The survey crew counted the number of sheep and classified them as rams, nursery (ewes and yearlings) and lambs.

Two motion sensing cameras were set up to monitor activity on Pilot Mountain – one on the Little River trail and one on the Sod Farm trail. Both cameras were in place between August 5 and October 21, 2008. The date and time were recorded on each photo allowing for a more detailed description of trail use. From the photos, ORVs were classified either as recreational or



hunting. If a rifle and camouflage clothing were visible, then the activity was termed hunting. If only camouflage clothing or a rifle was visible then the activity was termed recreational. Individuals walking, hiking, on bicycles and horses were categorized as recreational users. Totals from each trail were added together to determine trail use.

Project results: During the aerial survey 163 sheep were observed, including 38 rams, 101 nursery sheep, and 24 lambs.

Between August 5 and October 21 2008, 73 people were photographed using the Little River trail (32 recreating, 41 hunting) and 92 on the Sod Farm trail (75 recreating, 17 hunting). People were using ATVs, Argos, trucks, and horses as well as hiking and biking to get into the monitored area.

Next steps: Environment Yukon will continue to map existing trails and monitor current use in 2009. Environment Yukon will also work with the Laberge RRC and the Yukon Fish and Wildlife Management Board on potential regulation changes

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Dall Sheep Winter Range Survey in the Ogilvie Mountains

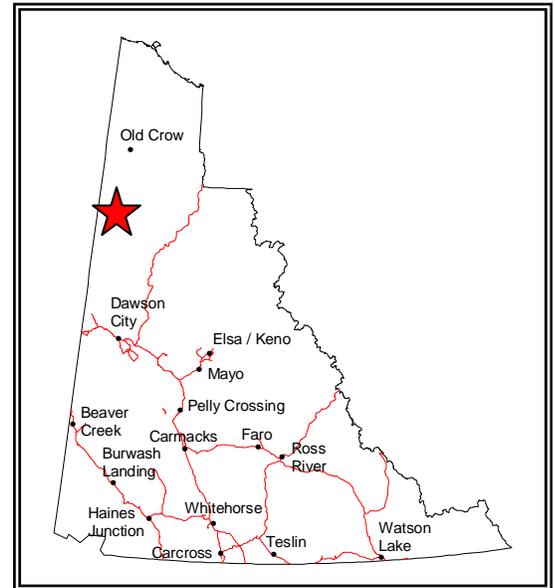
Traditional Territory: Tr'ondëk Hwëch'in

Environment Yukon Management Region: Northern Yukon (Dawson)

Project leaders: Dorothy Cooley, Regional Biologist, Northern Region, and Jean Carey, Sheep Biologist, Environment Yukon.

Management goals: To obtain information needed to map and describe Dall sheep winter ranges in the Ogilvie Mountains.

Background: The Yukon Land Use Planning Council has identified the Dawson Region as 1 of 8 proposed land use planning regions in the Yukon. This survey is part of a broader initiative to assess ecological (biodiversity, wildlife, and habitat) values in the Dawson Regional Land Use Planning region. The eco-regional planning approach requires information on species and/or communities that are endangered, rare, or of limited distribution.



One of the limiting factors of Dall sheep populations is their access to winter ranges and therefore information on seasonal sheep distribution will be a valuable contribution not only to the planning process but is also important for environmental assessments. Sheep winter range was mapped in Tombstone Territorial Park as part of that planning process, but in most of the region key winter range information is broadly described and labelled as "anecdotal".

Key area mapping relies on the presence of animals at specific times of year to indicate those locations that are important during key points in their life cycle. This method relies heavily on aerial surveys, and it is impossible to cover the entire Yukon. In areas where there are mapped habitat types, it is possible to create maps that show whether an area is likely to be good sheep winter range based on aspect, slope steepness, habitat type, and when possible, known sheep distributions. Such a map will be needed for the Dawson Regional Land Use Plan, but the habitat work is not yet done.

Project objectives: To map occupied sheep winter range to refine areas already identified in the wildlife key area database and to see if the sheep winter range habitat suitability computer model developed for the Wernecke Mountains is also valid for use in the Ogilvie Mountains.

Project description: The survey crew used a helicopter to fly almost 24 hours over 4 days in mid-March. Environment Yukon relied on the extensive local knowledge of the community observer to help locate sheep, and also noted areas that he indicated as having been used as winter range under different weather conditions.

The survey crew noted the location of sheep or any sheep tracks using a GPS. As the crew was not trying to count all of the sheep in the region, time spent near sheep could be deliberately minimized to avoid stressing them at an already stressful time of year. Photographs were taken throughout the survey to help describe what sorts of terrain the sheep were found in. The photographs will be especially valuable when Environment Yukon develops the habitat suitability computer model.

Project results: Environment Yukon has not yet analyzed the survey information. However, several interesting observations were made during the flight. Typically, winter ranges are expected to be found on broad, wind-swept slopes with a south-southwest aspect, but these slopes were almost non-existent in the Ogilvie Mountains. Here, the one notable windswept slope identified as winter range was north facing, suggesting that the computer model developed for the Wernecke Mountains will not be able to predict areas potentially suitable for winter range.

Sheep groups were found in much smaller groups than elsewhere and in very small pockets of steep escape terrain. The size of the winter ranges seems so small that they may not be detectable at the mapping scales used for computer modeling.

Much of this area falls within Beringia, and the lack of glaciation has likely contributed to how sheep use this landscape. The differences between how this population uses winter range and how other populations use winter range will add to our general understanding of sheep biology and evolutionary history.

Next steps: Environment Yukon will complete a file report; prepare maps with geo-referenced photos; update Wildlife Key area database; provide information to Dawson Land use planning; build habitat suitability computer model when habitat information becomes available, and; compare this information with that collected in the Peel River drainage to try to explain the differences and similarities.

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Freshwater Fish

Peel Watershed Fisheries Investigations

Traditional Territory: Na-Cho Nyäk Dun

Environment Yukon management region:
Northern Tutchone (Mayo)

Project leaders: Nathan Millar, Senior Fisheries Biologist, and Aaron Foos, Fisheries Technician, Environment Yukon

Management goal: To identify priority fish conservation areas to support land use planning in the Peel Watershed.

Background: The Peel Watershed Planning Commission requires information on fish population distribution, status, and habitat use of the area to support land use planning and decision-making across the region. In recent years, Environment Yukon has been actively engaged in fisheries assessments to address identified data gaps and deficiencies.



Environment Yukon currently has 4 years of site-specific information for areas of the Peel watershed. Prior field work by Environment Yukon investigated fish species diversity and abundance in various headwater lakes and streams in Tombstone Territorial Park and along the Dempster Highway, as well various lakes in the headwaters of the major watersheds. Work on fish distribution had also been completed in the Bonnet Plume watershed. Recent work has focused on collecting fish distribution and habitat information in the upper reaches of the major drainages of the Peel: the Snake, Bonnet Plume, Wind, Hart and Ogilvie rivers.

Information gathered in this study will be used to develop and verify a habitat suitability model for fish species. The model will identify important habitats for fish in the Peel watershed and will feed into planning processes. Habitat suitability modeling is a very cost effective approach to gathering distribution data from large areas with difficult and expensive access such as the Peel.

Project objective: To collect fish distribution information related to habitat features in select tributary streams in the Peel watershed.

Project description: The focus of the 2008 field work was on small headwater tributary streams to the Ogilvie, Blackstone, Hart, and Wind River watersheds. Field work followed similar techniques as those used in 2007. Sampling was done in early August when fish were at their maximal distribution and aquatic food resources at their peak. Environment Yukon crews use electro-shocking, minnow trapping, seining, angling, gill netting and visual observation to determine fish presence. Some biological samples were taken for genetic analysis.

Field crews collected benthic invertebrates, tested water quality, and obtained other hydrology and morphology data, according to standard methods. This information is important for the development of the habitat suitability classification model.

Project results: The following species were caught: within the Ogilvie drainage - Arctic grayling and slimy sculpin; within the Wind drainage - Dolly Varden and slimy sculpin; and within the Hart drainage - Dolly Varden, slimy sculpin, and Arctic grayling. Dolly Varden have been confirmed as being the northern form, a sub-species presently being assessed by the Committee On the Status of Endangered Wildlife in Canada (COSEWIC).

New records of species presence add to the information on the distribution of the species and to the species diversity found in a drainage. Because fish move throughout aquatic systems, but are not present in all habitats at all times, the absence of a species in a sample does not preclude the fish being present nearby. Habitat suitability models avoid this error by answering the question, "based on the best available information, what species are likely to be present in an area given the habitat it contains?"

Next steps: Further sampling is scheduled for the summer of 2009. The information collected by Environment Yukon will continue to be used in conjunction with past survey results to develop a maps and models of fisheries habitat (value components) for use, amongst other things, in the Peel Watershed Regional Land Use Planning process.

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Assessment of Northern Pike (Jackfish) in Lhutsaw Lake

Traditional Territory: Selkirk

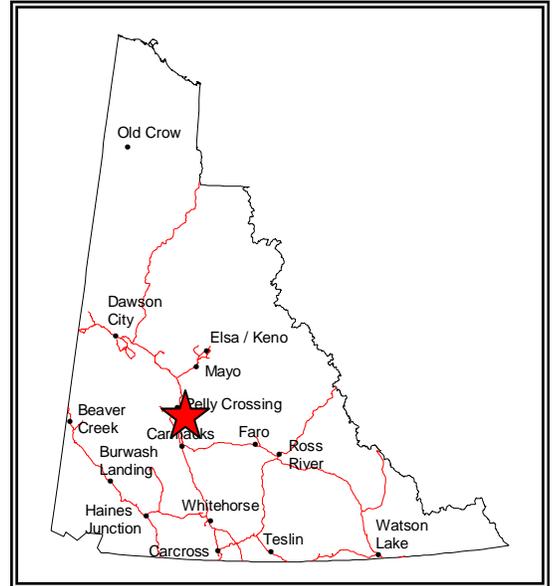
Environment Yukon Management Region: Northern Tutchone (Mayo)

Project leader: Nathan Millar, Senior Fisheries Biologist, Environment Yukon

Project funding partners: Little Salmon Carmacks First Nation

Management goal: To maintain a sustainable population of Northern pike in Lhutsaw Wetland Habitat Protection Area.

Background: The Lhutsaw Wetland Habitat Protection Area (LWHPA) was established as a Special Management Area in accordance with the Selkirk First Nation Final Agreement in 1997. The LWHPA was created to conserve fish, wildlife, and their habitat for the benefit of Yukoners, to recognize the importance of the area to Selkirk People, and to encourage public awareness of and appreciation for the natural resources of the area.



There are several lakes and ponds in the LWHPA. The 2 largest lakes are known locally as Jackfish Lake and Rock Island Lake.

Surface waters in the LWHPA are ice-covered for approximately 8 months of the year. Northern pike are the only fish species known to occur in the LWHPA, inhabiting Jackfish Lake, Rock Island Lake, and possibly Cow Moose Lake. These lakes contain numerous invertebrates, including freshwater shrimp that are the preferred food of the Northern pike.

Each spring, spawning Northern pike can be seen in a small stream that connects Rock Island Lake with Jackfish Lake. This stream is the site of a historical and present-day fishery and is an important source of food for families of Selkirk First Nation.

Traditional and local knowledge report a recent decline in the number of spawning fish and the size of fish that live in Jackfish Lake. The Selkirk First Nation has voluntarily reduced their harvest of fish at this site.

Project objective: To assess the population of Northern pike in Rock Island Lake and Jackfish Lake relative to historic levels and to determine the health of the population.

Project description: Over the years, Environment Yukon has done several studies on the Lhutsaw system including:

2003 - Dissolved oxygen profile of Lhutsaw, Rock Island, and Long lakes

2004 - Small mesh netting on Lhutsaw and Rock Island lakes

2006 - Small mesh netting on Lhutsaw, Long, and Rock Island lakes

Work done this year includes the collection of traditional knowledge on Northern pike in the Lhutsaw system and the compilation of all existing information related to this issue.

Currently, Selkirk First Nation has collected traditional knowledge from harvesters of Northern pike of the LWHPA. A community member was hired to interview knowledge holders and ask them questions about harvests of pike, population trends, population health, and fish movements.

Project results: Environment Yukon is currently compiling the results.

Next steps: Once the traditional knowledge study is finished, Environment Yukon will compile the results and all the scientific information collected to date, and prepare a summary report. Once prepared, Environment Yukon will use it to make a decision about future work and next steps. The report will be used as a reference for monitoring, planning, and management of the area.

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Braeburn Lake Whitefish Monitoring

Traditional Territory: Little Salmon/Carmacks

Environment Yukon Management Region:
Northern Tutchone (Mayo)

Project leader: Aaron Foos, Fisheries Technician,
Environment Yukon

Management goal: To investigate and assess the potential causes of lake whitefish decline in Braeburn Lake and learn about lake whitefish population dynamics in a small Yukon lake.

Background: According to local residents there has been a noticeable decline in lake whitefish in Braeburn Lake. Such a decline can limit the harvest of this species. A decline also has implications for the fish community as a whole because lake whitefish are an important food for fish-eating predators. Suggested causes for the decline include changes in water chemistry, sewage inputs, or water levels (due to beaver dam removal). Other potential factors may be overharvest, impacts on deposited eggs by in-stream vehicle traffic and changes in water temperature regimes.



The *2004–2009 Community-based Fish & Wildlife Management Plan for the Little Salmon/Carmacks First Nation Traditional Territory* identified a need to find out why the lake whitefish population in Braeburn Lake appeared to be declining. During this planning process, Environment Yukon agreed to do a whitefish study that collects local knowledge about whitefish spawning areas, monitors water quality and counts juvenile whitefish.

Field work began in late 2005. To date, activities have included monitoring lake whitefish spawning activities, spawning duration, egg dispersal, the timing of fry emergence, juvenile abundance, and distribution. Measurements of water chemistry and temperature have also been recorded through different times of year. The study is focusing on determining if adult lake whitefish numbers are low compared to similar Yukon lakes as well as to historical records. Environment Yukon is also trying to gain an understanding of lake whitefish population structure and the factors affecting recruitment success of lake whitefish within Braeburn Lake.

Recent work has resulted in the collection of valuable information about lake whitefish spawning behaviour in Klusha Creek.

Project objective: To sample and monitor the lake whitefish in Braeburn and Little Braeburn lakes to obtain information on the factors that may be causing their decline.

Project description: Since 2007, field work has involved water chemistry testing and water temperature logging. Egg development status has been monitored and Klusha Creek has been surveyed looking for recruitment areas.

During the summer months, the lake whitefish population in Braeburn and Little Braeburn lakes are sampled using beach seining, electro-fishing, minnow trapping, trawling techniques, and small mesh netting. Each of these methods provides different types of information about the population abundance, distribution, and age structure. Water chemistry and temperature measurements continued.

During the early winter, field work included the identification and monitoring of lake whitefish spawning areas.

Environment Yukon contracted a resident from the Braeburn Lake area to monitor the spawning of lake whitefish in Klusha Creek. Information on the timing and duration of spawning and the numbers of spawning fish was collected. Information about traffic crossing Klusha Creek was also collected.

Project results: Data analysis of water chemistry, temperature, spawning timing and duration is underway. Information collected on the traffic crossing Klusha Creek is being used to determine its effect on lake whitefish eggs and fry.

Next steps: A community focus group/workshop is planned in winter 2009 to present preliminary data and information gathered through this project and to obtain local and traditional knowledge of Braeburn Lake whitefish populations and their use.

Once the data analysis is complete, Environment Yukon will prepare a data report for distribution to interested parties.

Future activities include continued monitoring of spawning activity and traffic patterns at the Klusha Creek crossing. Environment Yukon will also pursue options to mitigate the destruction of lake whitefish eggs at this location.

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North Yukon (Old Crow) Freshwater Fish Assessment

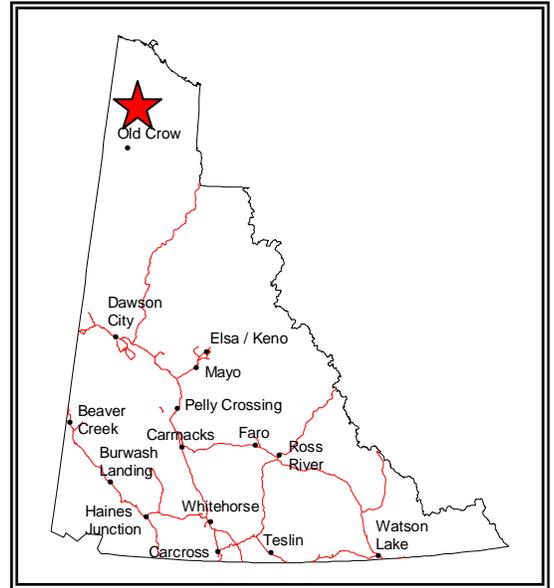
Traditional Territory: Vuntut Gwitchin First Nation.

Environment Yukon Management Region: Northern Yukon (Dawson)

Project Leaders: Susan Thompson, Fisheries Biologist and Dorothy Cooley, Regional Biologist, Environment Yukon.

Management Goal: To identify and sustainably manage freshwater fish in the Vuntut Gwitchin Traditional Territory.

Background: In the North Yukon Fish and Wildlife Management Plan, the Yukon Government and the Vuntut Gwitchin First Nation (VGFN) are assigned a task to “check out freshwater fish species and assess various streams, creeks and lakes”. Scientific information for the area is limited and traditional knowledge from Elders is not readily available since they do not go out on the land as much as in the past. Although freshwater fish are not harvested as much as they used to be, the community still views fish as a critical resource, especially in years when caribou or other food is scarce.



The action item in the Plan gives few details, stating only that there is a need to “keep track of fresh water fish species and populations for management purposes”. Interest in potential stocking and assessing freshwater fish in the river was recorded during discussions of the mid-term review of the plan in 2003 and researchers were asked to concentrate on areas close to town that are important for fishing activity. In March 2006 representatives of VGFN, North Yukon Renewable Resources Council, Old Crow Community Steward, Environment Yukon and several community members held a joint meeting to discuss the objectives and prioritize areas for study. They also developed a 3-year strategy to assess freshwater fish in the region.

The first year, rivers and creeks along with a few lakes accessible from the Porcupine River were surveyed, while the second and third years’ work were done within the Old Crow Flats. 2008 was the third and final year of study.

There are several other ongoing research initiatives in the area. Where possible, the field work is coordinated with work by Parks Canada in Vuntut National Park and the International Polar Year project leaders (2007–2009) working within the Old Crow Flats. Information collected is shared and also contributes to ecological monitoring activities in the region.

Project objective: To gather information on freshwater fish and their distribution in creeks, streams and lakes in selected areas of the Vuntut Gwitchin Traditional Territory, in order to update general information on species present and relative abundance, and to document various biophysical parameters important to fish.

Project description: All sampled lakes are located in the Old Crow Flats. Sample sites were selected by Elders and community members at various meetings. Priority was given to those sites that were generally fished or where a limited amount of information was available. Environment Yukon selected additional lakes as there is value in assessing un-fished lakes and

streams to gather information of species presence. Attempts were made to survey lakes that have been surveyed by the IPY scientists so that more information could be gathered about these lakes. Lakes were also selected if it was apparent that they had outlet connections to creeks and had adequate depth to over-winter fish.

In 2008, Environment Yukon completed the assessment survey from August 11 to 15. Similar sampling techniques were followed as used in the previous years. Methods included minnow trapping, beach seining, angling, small mesh gill netting, and visual observation.

The field crew measured conductivity, pH, and water temperature and collected information on lake depth. The bottom of lakes and streams were sampled to determine the presence of benthic invertebrates.

Project results: The field crews sampled 22 lakes and set minnow traps on 3 major streams. Crews were able to spend between a half day and a full day at each lake. Northern pike, Arctic grayling, lake whitefish, longnose sucker, and least cisco were caught in the netting program. Seining caught round whitefish, Arctic grayling, longnose sucker, and slimy sculpin. No fish were caught in the minnow traps. Field crews were able to determine depth contours at each lake. Lake depth in all lakes was fairly consistent, averaging between 1.5 and 2.5 m. The deepest lake was 4.8 m.

Next steps: Laboratory work is in progress and biological samples will be analyzed to determine age, stomach contents, and, in the case of cisco samples, genetic verification. Data reports are written for individual year's surveys. Environment Yukon will produce a final report once all biological analysis is completed.

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Fisheries Assessment Surveys

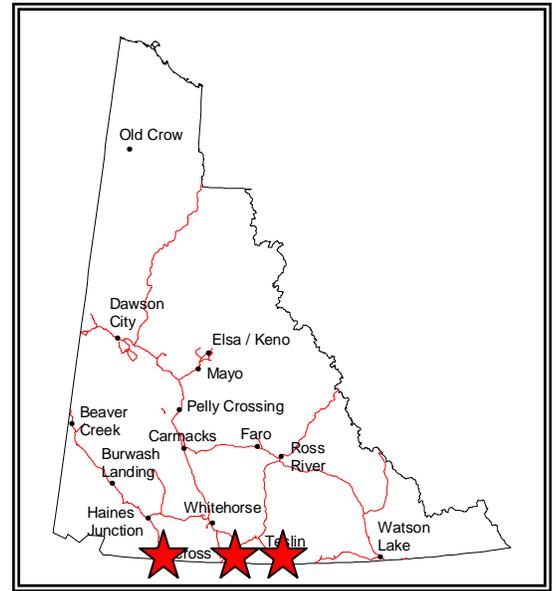
Traditional Territory: Multiple

Environment Yukon Management Region: Multiple (selected lakes throughout the Yukon are sampled once every 5 years)

Project leader: Susan Thompson, Fisheries Biologist, Environment Yukon

Project funding partners: Depending on the lakes surveyed, funding partners have included First Nations, Renewable Resources Councils, and Parks Canada (Kluane National Park).

Management goal: To maintain a sustainable population of fish in Yukon lakes by assessing and monitoring the status of stocks and their habitats over the medium- to long-term.



Background: Environment Yukon has been conducting assessments of fish stocks since 1996. Each year about 10 to 15 different lakes are selected for study. Lakes are surveyed at approximately 5-year intervals.

Stock assessments focus on lake trout, which are considered an indicator species of the health of a lake or system. Lake trout are the most sought after by harvesters and are the most sensitive to environmental factors and exploitation because of their ecology and biology. Lake trout mature at an old age and grow very slowly once mature. Lake trout live for a long time, but have a very low rate of reproduction. Once lake trout stocks have declined, recovery can take many decades. Ongoing regular monitoring of important stocks is necessary to detect changes and to take management actions in a timely manner.

The location of the assessments is determined by a number of factors. Important lake trout lakes are assessed once every 5 years. In some other cases, lakes are given priority because of concerns from First Nations and local Renewable Resources Councils, or because of commitments made as part of the management planning process. Road accessible and remote fishing lodge lakes with relatively high levels of fishing effort and harvest are often included as well. In addition, a number of unexploited remote lakes are surveyed to get baseline information on populations in lakes where little or no fishing occurs.

Environment Yukon has surveyed 117 different lakes. Some of these have been surveyed 2 or 3 times each since the program began. The surveys allow Environment Yukon to detect trends in fish populations and then respond to ensure healthy stocks and sustainable harvest opportunities.

Project objective: To maintain an ongoing assessment of fish populations in Yukon lakes using catch per unit effort methods.

Project description: In May and June 2008, field crews did surveys on Morley, Chadburn, Crag, Mush, Bates and Louise lakes. These lakes were last surveyed in 2003. The sampling is done at this time of year because the water temperatures are relatively cold (6–10°C) and lake trout are in shallow water.

Crews spent 1 or 2 days on these small lakes conducting netting, water quality and other biological sampling as required before and after fish capture. Crews followed the same techniques they have used in previous years. The field crew set standard gangs of small-mesh gillnets along shorelines at regular intervals for a period of 1 hour. These mesh sizes are used because fish are caught by the teeth. This makes it easier and safer to release them without harm. Consistency is most important, with crew members performing the same tasks at each site selected in an unbiased manner and using standard methods.

Project results: An analysis of the information is underway. By looking at the number of fish caught over a set amount of time, biologists can use different calculations to determine fish abundance. This information makes it possible for them to make comparisons of the fish populations over time and between lakes. Long-term information is used to determine changes that may be occurring due to human use and impacts, as well as by environmental factors such as climate change.

Next steps: The analysis of the information will continue. All information will be entered into a fisheries management database. Individual reports are produced for large lakes and lakes of concern. These reports summarize trend information. Stock assessments will continue on a rotational basis and/or as required.

Stock assessment inventory for 2009 is in the pre-planning stage, with a number of large lakes scheduled. Working together with individual First Nations and Renewable Resource councils will provide new information for our ongoing database system. Lakes scheduled will be finalized in early April 2009.

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Bison

Aishihik Wood Bison Herd Inventory and Monitoring

Traditional Territories: Champagne and Aishihik, Little Salmon/ Carmacks

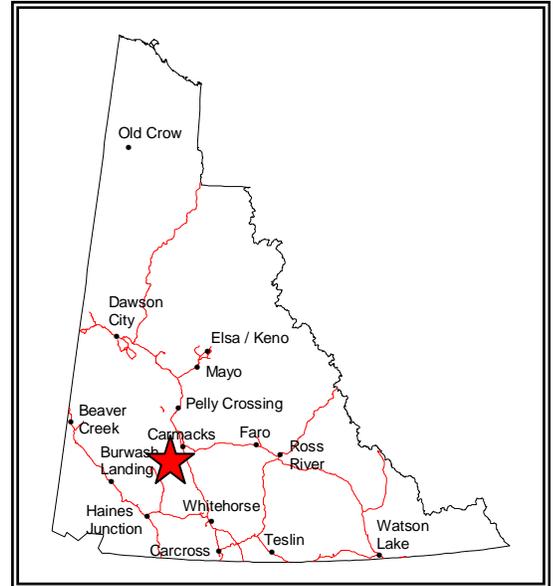
Environment Yukon Management Region: Kluane (Haines Junction)

Project leader: Tom Jung, Senior Wildlife Biologist (Biodiversity), Environment Yukon

Project funding partners: Canadian Wildlife Service and University of Alberta

Management goal: To sustainably manage the Aishihik wood bison herd in southwestern Yukon and learn about the impact of their reintroduction on other wildlife species.

Background: Nationally, wood bison populations are rather unique: at the same time they can be considered a *threatened* species (under the federal Species at Risk Act), a big game species, and a game-farmed species. This is the situation in Yukon, where reintroduced populations contribute significantly to the global recovery of the species and provide meat to local people through harvest.



The Government of Yukon reintroduced wood bison to the Nisling River area from 1986 to 1998. Since then, the herd has grown at an estimated rate of 18 to 20% per year and now occupies an annual range of about 9,000 km². Environment Yukon and the Yukon Fish and Wildlife Management Board made a management decision to limit the size of the herd through hunting. Harvest of wood bison began in 1998.

There are significant community concerns over the potential impact of reintroduced wood bison to other valued wildlife (i.e. moose, caribou) and the land. All of these factors mean that wood bison must be managed very carefully. The challenge is to manage populations in a manner that provides for the recovery of the species (as required by the federal Species at Risk Act), while addressing community concerns and allowing for local peoples to benefit from the resource, primarily through hunting opportunities. To do so requires cooperation, commitment, and good information.

Project objective: To (1) monitor the size, distribution, composition, survival rates and movement of the Aishihik wood bison herd; (2) to monitor the health and genetic status of wood bison, and; to (3) assess the impact of reintroduced wood bison on caribou and moose

Project description:

Environment Yukon did 7 telemetry flights throughout the year to locate radio-collared bison. Eleven radio-collars on bison were replaced, maintaining a marked population to facilitate inventory, monitoring, and research. Samples of blood, feces, and hair were collected from wood bison handled during radio-collaring operations. Fecal samples from bison will be compared with samples from moose and caribou to see how much the diets of these animals overlap in late winter.

Project results: Environment Yukon has added the information obtained during the study to existing databases but no analysis has been done to date. Reporting of results will begin in late 2009, once data are analyzed. Preliminary results were shared via local media interviews and presentations to the Yukon Wood Bison Technical Team. Some preliminary information was presented in a semi-annual newsletter of the Yukon Wood Bison Technical Team ("The Bison Banter"). Environment Yukon created maps to aid hunters in locating areas where bison were likely to be found.

Next steps: Environment Yukon plans to:

- Conduct a mark-resight population estimate in July 2009 and report the results by late 2009.
- Maintain a small group of marked wood bison with radio-collars
- Continue to monitor movements, distribution, and survival of radio-collared animals using aerial telemetry. Information will be added to ongoing database and maps made for hunters.
- Continue to collect genetic and other samples to monitor herd health. Information will be added to ongoing databases
- Continue to collect data on dietary overlap with moose and caribou and report results in mid 2010
- Examine spatial overlap with moose and caribou and report results in mid 2010.
- Continue to share results of studies with the Yukon Wood Bison Technical Team.

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Furbearers

Old Crow Flats Muskrat Survey

Traditional Territory: Vuntut Gwitchin

Environment Yukon Management Region:
Northern Yukon (Dawson)

Project leader: Dorothy Cooley, Regional Biologist,
Northern Region

Management goal: To assess the number of muskrats in the Old Crow Flats.

Background: In North Yukon Fish and Wildlife Management Plan identifies a concern that muskrat populations are down. Based on original study population fieldwork done in 1985–86 on the Old Crow Flats (OCF), Environment Yukon did an aerial count of muskrat pushups in 2006.



The Old Crow Flats (OCF) is the study area for a large inter-disciplinary ecological study involving many academic researchers. Led by the Vuntut Gwitchin First Nation and funded by the Canadian International Polar Year program, the project is called *Yeendoo Nanh Nakhweenjit K'atr'ahanahtyaa (Looking after the land for the future): Environmental Change and Traditional Use of the Old Crow Flats* (YNNK). The project was developed in response to a concern about changing water levels in OCF observed by local people. The broad objectives of the overall YNNK project are to examine how climate and the OCF have changed over the past several thousand years, how moose and muskrats currently use OCF, and how climate change might change how moose and muskrats use OCF in the future.

Early in the year, Environment Yukon changed the survey plans and did complete counts of individual lakes rather than flying the 19 transects as was done in the 1980s study and in 2006. This change allowed Environment Yukon to target lakes that were being trapped by local trappers who were also submitting muskrat samples.

Project objective: To obtain an index of muskrat abundance by estimating the number of pushups for specific lakes.

Project description: This survey was somewhat time sensitive. Flights needed to be done after the snow melted but while lake ice was still land-fast. Target lakes were those that local trappers were actively trapping in spring 2009 and lakes that were being studied by cooperating YNNK researchers (hydrologists).

Project results: On May18–19, 2008, Environment Yukon flew a fixed wing aircraft to targeted lakes and also counted lakes opportunistically. The survey crew recorded the number of pushups and the percent of the lake still covered by ice for 167 lakes distributed throughout OCF.

Next steps: Data will be analyzed as part of the larger muskrat report for the YNNK project and for the annual YNNK meetings in Old Crow.

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Wolverine Monitoring

Environment Yukon Management Region: Multiple

Traditional Territories: Multiple

Project leader: Tom Jung, Senior Wildlife Biologist (Biodiversity), Environment Yukon

Project funding partner: Laurentian University

Management goal: To obtain knowledge on wolverine health and population status in order to maintain sustainable wolverine populations.

Background: Wolverine are a species of special management interest across their range because they are both a species at risk and, in most places, a valued furbearer. Within Canada, wolverine are listed by the Committee on the Status of Endangered Wildlife in Canada as a species of *Special Concern*; globally, they are on the IUCN Red List as *Vulnerable*.

Wolverine usually occur at very low densities, occupy large home ranges, and are considered rare and elusive. Getting information on the basic biology and conservation status of wolverine has proven to be a challenge. Traditional population monitoring methods such as mark-recapture or probability sampling, if applied to wolverine often lack precision because animals are normally distributed in exceedingly low densities and they or their sign are rarely observed. While intensive methodologies such as aerial snow tracking or DNA tagging can provide very good information, these data are often limited to small areas for short periods of time.

Because wolverine are harvested across much of their range in northern Canada and Alaska, Environment Yukon decided to use trapper-submitted carcasses to track their conservation status. The use of carcasses is useful and efficient because samples are collected from a broad geographic region each year for the fur harvest. Similar carcass collection programs for other carnivores, including wolverine, have been ongoing elsewhere (e.g. Northwest Territories and Nunavut) as a means of tracking the age and sex structure of the harvested population.

This project has largely been a collaborative effort between Yukon trappers, Environment Yukon, and Laurentian University.

Project objective: To conduct territory-wide assessment of the health and status of a harvested population of wolverines in the Yukon.

Project description: In 2005, Environment Yukon initiated the Yukon Wolverine Carcass Collection Program. This is a 5-year pilot study on the usefulness of using trapper-submitted carcasses to: (1) provide better information on harvested animals which may assist in making harvest management decisions (e.g. season adjustments, quotas, etc.); (2) assess the usefulness of carcasses to help in tracking the conservation status of wolverine (using animal health and body condition as the main metrics); and (3) learn more about the natural history and biology of this rare and elusive species.

Since 2005 almost 300 carcasses have been submitted by Yukon trappers. Environment Yukon has taken many samples in order to examine things like: age, diet, reproductive output, fat levels, disease presence, parasite loads, population genetics, growth and developmental patterns, and traumas endured. Northwest Territories and Yukon biologists share necropsy protocols. These samples are currently being analyzed by various scientific labs across North America.

Some of the laboratory and analytical work is being done by researchers at various labs, particularly Laurentian University. Researchers hope to integrate knowledge obtained in the Yukon with similar information from the Northwest Territories and Nunavut to adjust and expand the scope of the conclusions.

Project results: In 2008–2009 Environment Yukon received and necropsied over 80 trapper-submitted carcasses and sent samples to various laboratories.

Three undergraduate Honours theses have been written by students at Laurentian University using information obtained from this project. The subjects were the development of an index of physical condition in wolverine, winter diets, and tooth damage.

Next steps: This is a long-term monitoring program and will be continued next year with the same mandate and protocols. At the end of Year 5 (2010/2011 trapping season) Environment Yukon will conduct an assessment of the data.

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Elk

Habitat Carrying Capacity for Elk

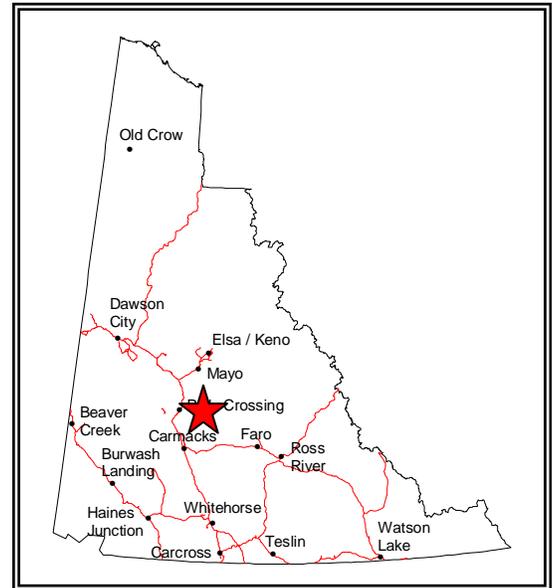
Traditional Territory: Little Salmon/Carmacks, Ta'an Kwäch'än, Kwanlin Dün

Environment Yukon Management Region: Southern Lakes (Whitehorse)

Project leader: Val Loewen, Habitat Inventory Coordinator, Environment Yukon

Management goal: To maintain a healthy, self-sustaining, stable population of free-ranging elk in the Yukon.

Background: With the exception of periodic sightings in the southeast Yukon, elk are not native to Yukon. The 2 herds currently occupying the Takhini Valley and Braeburn areas in southwest Yukon are the result of introductions from Elk Island National Park, Alberta in the 1950s and 1990s. Elk in Yukon are at the northernmost extent of their range in North America.



The Braeburn elk herd ranges along the North Klondike Highway between Fox Lake and Carmacks. There are about 85 elk in this herd. Takhini Valley elk herd mainly ranges in the Takhini Valley west of Whitehorse as far as the Aishihik River. There are about 225 elk in this herd.

After relatively low and stable populations for many years, elk appear to be increasing in the Yukon. More and more, elk are coming into conflict with human activities, particularly agriculture. To better understand and manage elk/human conflicts, biologists need to be able to determine how many elk can survive on the natural food that is available within their range.

This study will help wildlife managers understand the size of elk population that can be supported in an area. It is important to have this information when determining population targets, harvest limits, and the habitat required to support the population.

This is the first year of a 2-year project. The project supports the action in Draft Elk Management Strategy to “estimate carrying capacity for elk within their range”.

A graduate student from the University of Calgary is determining the carrying capacity for elk in the Takhini Valley based on vegetation abundance and biomass of vegetation, as well as nutritional analysis. Once the carrying capacity of the Takhini Valley has been determined, recommendations will be developed to suggest ways in which the vegetation could be managed to maximize forage availability and help ensure the sustainability of the elk population.

Project objective: To determine the distribution and abundance of forage for elk in the habitat types of the Braeburn elk herd range.

Project description: Environment Yukon used a land cover map developed from satellite imagery to identify different habitat types in the core range of the Braeburn herd. Where possible, the same habitat types were used as those identified by the graduate student for the Takhini Valley. The same vegetation sampling methods were used as well. Field crews established plots (20 m X 30 m) in the different habitat types. A 30 m transect was run through the center of each plot and shrub and herb species cover was estimated from 5 quadrats along the transect. Tree cover was estimated within the large plot and a sample of trees was measured for size and age. The field crew also recorded site characteristics at each of the plots.

Project results: Over 6 days in July, an Environment Yukon field crew sampled 24 plots, focusing on the grassland slope and aspen forest habitat types. Unknown plants that were collected during the field season were later identified. Data entry occurred during winter and spring of 2008/2009.

In October, 2008 the University of Calgary graduate student produced a summer field report describing her plot locations and the amount of sampling achieved over the summer in the Takhini Valley elk range.

The 2008 sampling provided Environment Yukon with information about the kinds of habitat types in the area. This knowledge can be used for planning future sampling.

Next steps: Additional sampling will be done in 2009 that will focus on the 1998 burn, wetlands, and the roadside habitats.

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Ecosystem Monitoring

The Effects of Temperature Variation on Alpine Plants

Traditional Territory: Kwanlin Dün

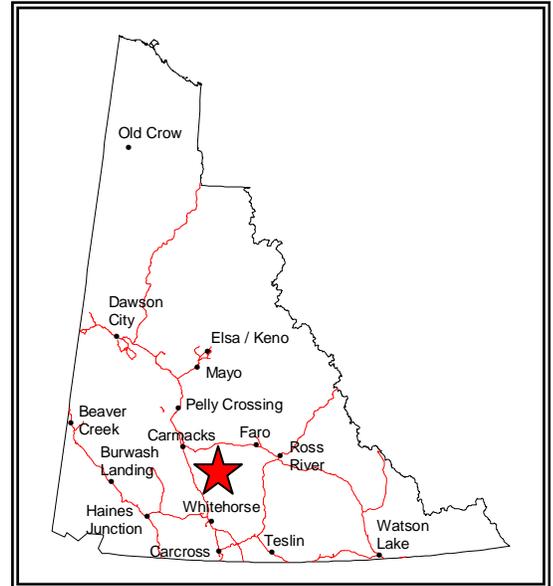
Environment Yukon Management Region: Southern Lakes (Whitehorse)

Project leaders: Val Loewen, Habitat Inventory Coordinator, Environment Yukon and Mike Gill, Biologist, Environment Canada

Project funding partner: Environment Canada

Management goal: To assess the effects of temperature variation on community composition, reproduction and growth of alpine plants, as part of an international monitoring program

Background: The International Tundra Experiment (ITEX) is a scientific network of experiments focusing on the impact of climate change on selected plant species in tundra and alpine vegetation. There are more than 2 dozen circumpolar sites, many of which are in Canada. At each site, researchers are carrying out similar, multi-year experiments to learn about the responses of Arctic tundra plants and ecosystems to predicted global climate change.



An ITEX site was set up in the alpine area near Wolf Creek, just outside of Whitehorse, in 1998. There are 20 plots, 10 control plots and 10 with open-topped greenhouses that are intended to increase the temperature. Growth and reproduction are measured for 4 plant species; reproductive output is measured for all species, and every 5 years the composition of the plant community is measured. Methods follow the standard ITEX protocols.

This project supports the monitoring objectives in the Government of Yukon's Climate Change Strategy. Results from this project will provide the public and decision-makers with timely information on the state of the environment.

This project helps fill a large geographical gap in the International Tundra Experiment and will contribute to understanding potential impacts of climate warming at the local level, as well as on a much larger scale.

A graduate student from the University of Saskatchewan is undertaking a Master's degree at the site.

Project objective: The graduate student will be using the data collected since 1998 to examine and: (1) to test the effects of experimental warming and natural temperature variation on the growth and reproduction of 4 common species, and (2) to determine the response of an alpine plant community to experimental warming and natural temperature variation.

Project description: Annual growth and reproductive output was measured for individually tagged plants of Arctic Lupine, Arctic Willow, Mountain Avens, and Alpine Bistort. Reproductive structures were counted for all plant species within the plots. Using a point frame, community composition was measured for the second time since the initial measurement in 1998. Data

loggers record air and soil temperature in 8 plots. In 2008 leaf biomass and seed viability were assessed to better understand the biological significance of plant-level changes.

Project results: Data analysis completed to date by the graduate student indicate that there is no significant temperature difference between the control and the greenhouse plots. She found no significant difference in growth of plants between treatments. There were some differences in reproductive output between treatments, but these were not consistent. Differences were observed in relation to annual temperature variation, with the most dramatic results observed in 2004, a particularly warm year.

Next steps: Field studies will continue in 2009. To address the issue of the lack of warming by the greenhouses, researchers will seal the bottoms of the greenhouses to the ground to reduce wind effects. They will also measure humidity and evapo-transpiration to test whether differences in moisture might be affecting the temperature.

The usual growth and reproductive measurements will be done in July. The graduate student will return in the middle of August to do another collection of seeds and leaves. The graduate is aiming to complete her thesis by December 2009.

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Ecological Monitoring Strategy Development

Traditional Territory: Multiple

Environment Yukon Management Region: Multiple

Project leader: Wendy Nixon, Manager, Biodiversity Programs. Environment Yukon

Management goal: To develop a monitoring strategy for Environment Yukon Fish and Wildlife Branch and Parks Branch that provides guidance regarding why and what to monitor and assess.

Background: In Yukon, it is possible that stresses on ecosystems will result in landscape scale changes to flora and fauna. Tools are in place to protect the environment (e.g., Wildlife Act and Regulations; harvest quotas; protected areas; Yukon Environment and Socio-economic Assessment Act), but there is need for a comprehensive approach that evaluates the overall success of those protection measures, and assesses the impacts of change (e.g., climate change). The Yukon Ecological Monitoring Strategy will provide a centralized reference point upon which decision makers and public can determine the state of Yukon's biodiversity, the effects of stressors on ecosystems, and the monitoring gaps that need to be addressed.

Project objective: To host 2 meetings to prioritize goals and objectives of a Yukon-wide monitoring strategy, review existing monitoring programs, and set an outline for the overall content of the Strategy and identify some of the ecological characteristics that should be monitored, which may not be monitored at this time.

Project description: Environment Yukon hosted a 1-day workshop in February, 2009 that provided a forum for representatives from Environment Canada, Yukon College, and Environment Yukon to discuss the needs and implementation of a monitoring program in the territory. Workshop participants considered the reasons for monitoring and its goals; reviewed existing regional monitoring programs (outside of Yukon) and reviewed success/failures and goals/rationale and practicalities for the Yukon, and; determined current gaps and ways to realistically address them in the long term. A second meeting was held in March to set an outline for the overall content of the Strategy, and identify some of the ecological characteristics that should be monitored.

Project results: Workshop participants drafted the goals and objectives of a Yukon-wide monitoring strategy, as well as a broad overview of the content of the strategy, and ecological characteristics that should be monitored.

Next steps: The content of the strategy will be developed in 2009–2010, and reviewed internally before end of March 2010.

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Non-Game Species

Bat Monitoring

Traditional Territories: Kaska; Carcross Tagish, Kwanlin Dün, Tr'ondëk Hwëch'in.

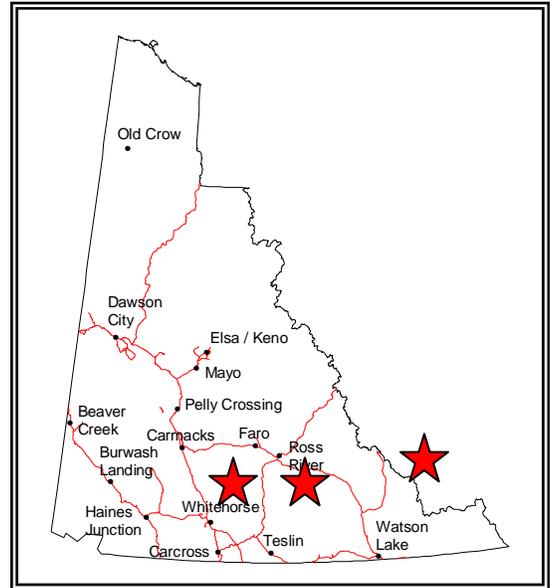
Environment Yukon Management Region: Southern Lakes (Whitehorse) and Liard (Watson Lake)

Project leader: Tom Jung, Senior, Wildlife Biologist (Biodiversity), Environment Yukon

Project funding partners: Northern Research Institute (Yukon College) and Yellowstone to Yukon (Y2Y) Conservation Initiative

Management goal: To inventory, monitor and conserve bat populations in southern and central Yukon.

Background: Environment Yukon has directed little monitoring or conservation effort towards non-game mammals in the Yukon. This project addresses gaps in what is known about the diversity and distribution of bats in the Yukon and monitors key populations of bats.



Bats are an interesting group of species to wildlife managers from several perspectives. They fulfill a unique and important ecological role by regulating nocturnal insects. Bats are a good species to assess the impact of climate change on populations. They are also sensitive to landscape changes, such as logging, and are a key focal species in the North American forest industry. Bats hold much public appeal, are readily observable, and provide fantastic wildlife viewing opportunities. They roost in people's buildings, providing an interesting opportunity to engage home owners in wildlife conservation and increase their appreciation of non-game species. Despite all of this, very little is known about the bats of the Yukon.

Project objectives: To (1) obtain information on the diversity and distribution of Yukon's bats; (2) conserve key maternity colonies of bats by installing bat houses where maternity colonies cause problems and are at risk, and; (3) monitor bat populations across the Yukon at selected maternity colonies to track annual changes due to climate or other environmental variables.

Project description: Bat experts used live-capture and acoustic monitoring techniques to assess bat species diversity and distribution at selected sites in south-central and southwestern Yukon.

Known key bat roosts have been visited annually (some since 1997) to track colony size and reproduction, using a program of live-trapping and wing-banding.

Bat houses were built and installed to protect important colonies.

The project also included public outreach events and education on bats.

Project results: Bats were inventoried at Coal River Springs Territorial Park, Agay Mene Territorial Park, and the Teslin Lake area. Three summer STEP students were trained in bat inventory techniques.

Environment Yukon coordinated the installation of bat houses to conserve a few important colonies that are threatened with removal or cause problems (e.g. Squanga Lake campground; Watson Lake airport; Drury Creek Highway Maintenance Camp). Most of these bat houses were built by the Challenge Program.

Some key maternity colonies were monitored and additional bats were banded. Data were added to ongoing databases.

Public outreach activities included bat talks as part of the Wildlife Viewing Program in Whitehorse and Haines Junction. Presentations were made at Golden Horn School. A talk on the work that is underway in territorial parks was given at the Yukon Biodiversity Forum. Several local media interviews on bats were delivered.

Environment Yukon staff prepared several technical reports and journal papers for publication.

Next steps: Several additional bat houses will be installed at key colonies in spring 2009. Population monitoring in bat houses will be continued in summer 2009. Environment Yukon will continue field sampling of bat diversity in southern Yukon parks. Data will be compiled, analyzed, and interpreted and further reports will be completed. Public outreach and education on bats will continue.

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