2009 Annual Report of NWT WILDLIFE RESEARCH PERMITS

Photo Credit: Environment and Natural Resources

Northwest Territories Environment and Natural Resources

Table of Contents

continued next page

Table of Contents continued

2009 Annual Report of NWT WILDLIFE RESEARCH PERMITS

Under the *Wildlife Act* (section 24), a valid Wildlife Research Permit is required to study wildlife or wildlife habitat in the Northwest Territories (NWT). It is an offence to conduct a survey or census of wildlife or wildlife behaviour, administer drugs, collect or purchase specimens, or carry out any scientific research relating to wildlife without a permit.

The Department of Environment and Natural Resources (ENR) is responsible for issuing Wildlife Research Permits. Each year, researchers carry out studies on all types of wildlife and wildlife habitat, throughout the NWT. As a requirement of an NWT Wildlife Research Permit, researchers must submit a summary report of their activities and findings to ENR. These summary reports are published each year in an annual report.

This publication provides summary reports for wildlife research carried out during 2009. Contact information for the main investigator leading each project has been included if you wish to obtain more information on a specific project. For more information on Wildlife Research Permits, please go to www.enr.gov.nt.ca or contact your local Environment and Natural Resources office.

Photo Credit: Leslie Bol

Amphibian Population and Health Surveys in the South Slave, Northwest Territories, 2009

Period: June 24, 2009 to July 9, 2009

Main Investigator: Danna Shock, Keyano College

Wildlife Research Permit Number: WL004775

LOCATION:

Areas accessible near Fort Smith, Tsu Lake and surrounding areas; Wood Buffalo National Park (WBNP). Survey work in WBNP occurred on both sides of the Alberta /NWT border.

RATIONALE:

Very little information exists on the occurrence and occupancy of amphibians in the NWT. The NWT has two amphibians that are listed under the federal *Species at Risk Act* (SARA) as Special Concern: northern leopard frog, and the western toad. This project will increase our monitoring efforts for northern leopard frogs, along with the Canadian toad, boreal chorus frog, and wood frog. As well, red-sided garter snakes often occur in the same habitats as these amphibians and any encounters with this species will be included in the report to the NWT upon completion of the project.

The proposed monitoring efforts will provide recent data to the GNWT for the development of management plans under SARA. This monitoring will also provide information on the potential presence of amphibian diseases and infections, and provide information on landscape change and environmental degradation of some of the NWT's southern wetlands.

OBJECTIVES:

To improve our understanding of the distribution and abundance of all amphibian species found in the South Slave Region;

To collect recent data on western toads and northern leopard frogs to aid in developing NWT information for implementation of the federal *Species at Risk Act*;

To provide information on the presence of infectious diseases in NWT populations of amphibians, particularly chytrid fungus and ranaviruses, which are implicated in amphibian population declines worldwide (Collins and Storfer 2003). Both pathogens were detected in the NWT in 2007 and 2008: chytrid fungus was detected in wood frogs, boreal chorus frogs and western toads in the Fort Liard area. Ranavirus was detected in wood frogs in several locations, including the Fort Liard area and as far north as Norman Wells (Shock et al. 2010).

METHODS:

Field survey protocols followed those previously described for amphibian surveys in the Dehcho and Sahtu (Schock 2009). As with the surveys in the Dehcho and Sahtu, surveys in the South Slave involved taking tissue samples (toe clips or tail clips, depending on life stage) from amphibians to screen for infectious agents using PCR-based diagnostic tools. The tissue samples were collected in a non-lethal and aseptic manner, and amphibians were released at point of capture after tissue samples were taken. Detection of pathogens from tissue samples followed the protocol described in Schock (2009).

RESULTS AND MAIN CONCLUSIONS:

A total of 32 sites were visited during surveys in 2009. Amphibians were encountered at 28 of the 32 sites. Of the four sites where amphibians were not encountered, two sites were surveyed during cold, windy weather and could not be revisited during the 2009 study for logistical reasons.

Tissue samples were collected from a total of 256 wood frogs (46 tadpoles, 210 frogs), 57 boreal chorus frogs (24 tadpoles, 33 frogs), 11 northern leopard frogs (all frog stage), and 42 Canadian toads (38 tadpoles, four frogs) to screen for chytrid fungus and ranaviruses. Wood frog tadpoles with gross pathology consistent with ranavirus infections were encountered at Toadlet Pond in WBNP. PCR-based testing is ongoing at this time and preliminary results require further verification.

During the 2009 surveys in the South Slave, gross physical abnormalities were noticed in 11 frog-stage amphibians: 6/210 wood frogs, 2/33 boreal chorus frogs, 0/4 Canadian toads, and 3/11 northern leopard frogs. The abnormal frogs were encountered across a total of six sites. Abnormalities included missing eyes, curved spines, and malformed hind limbs.

RECOMMENDATIONS:

Recommendation for focused work to understand the true range, population size, and origin of northern leopard frogs in the South Slave. A combination of targeted population biology and population genetics studies is recommended.

Recommendation for research targeted at understanding the rates, distribution and cause(s) of amphibian malformations in the South Slave.

COMMUNITY INVOLVEMENT:

Survey work in the South Slave involved a collaborative effort by biologists with Environment and Natural Resources (ENR), biologists from Wood Buffalo National Park, and faculty members of Aurora College in Fort Smith.

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Ecology of Grizzly Bears in the Mackenzie Delta Oil and Gas Development Area

Period: May 2009 to April 2010

Main Investigator: Andrew E. Derocher, University of Alberta

Wildlife Research Permit Number: WL005598

LOCATION:

The study was based from Inuvik and covered the Inuvialuit Settlement Region (ISR) lands between Inuvik east to Sitidgi Lake, north to Tuktoyaktuk, and west to the edge of the Mackenzie Delta.

RATIONALE:

Development in the Mackenzie Delta encompasses a significant portion of the Inuvik and Tuktoyaktuk grizzly bear hunting area. In 2003, the University of Alberta began working with the Department of Environment and Natural Resources (ENR) to obtain current information on grizzly bears at a finer scale than has previously been recorded for this population. Since 2003, 42 grizzly bears (34 females:6 males) have been monitored up to two years per bear.

OBJECTIVES:

To update baseline ecological data and monitor grizzly bears over the pre-, during- and post-stages of development;

To describe distribution, habitat use and movement; and

To identify more important habitats (feeding and denning areas).

Data from collared bears is being used to build maps of important habitats.

METHODS:

Capture was conducted by helicopter based from Inuvik. Bears were caught by remote injection of the drug Telazol. Standard measurements were taken on each animal. The target was to deploy four GPS satellite telemetry collars. The collars provide six locations per day for the active period.

RESULTS AND MAIN CONCLUSIONS:

Several publications have been produced from this study and several additional works are underway.

Edwards, M.A., Nagy, J.A., Derocher A.E. 2009. Low site fidelity and home range drift in a wide-ranging large Arctic omnivore. Animal Behaviour. 77:23-28.

Barker, O., Derocher, A.E. 2009. Brown bear *(Ursus arctos)* predation of broad whitefish *(Coregonus nasus)* in the Mackenzie Delta Region, Northwest Territories. Arctic. 62:312-316.

Edwards, M.A., Nagy, J.A., and Derocher, A.E. 2008. Using subpopulation structure for barren-ground grizzly bear management. Ursus. 19:91-104.

LONG-TERM PLANS AND RECOMMENDATIONS:

The project was intended to run before, during, and after pipeline development. Given the delay in the pipeline, plans for this project will be re-assessed in winter 2010 pending discussions with the Inuvialuit Game Council. No collaring was planned for spring 2010.

PARTNERS:

Environment and Natural Resources, Inuvik Region

Polar Continental Shelf Project

ConocoPhillips Canada

Natural Sciences and Engineering Research Council of Canada

Canadian Circumpolar Institute – Circumpolar Boreal / Alberta Grant Award

COMMUNITY INVOLVEMENT:

We have reduced the number of bears collared and have reduced the level of monitoring until further development. We do not collar any male bears, in accordance with community input. Further, we no longer capture any bear we suspect of being a male to reduce interference with hunters.

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Adaptive Long-Term Fasting in Land and Ice-Bound Polar Bears

Period: October 15 – 31, 2009

Main Investigator: Merav Ben-David and Hank Harlow, Professors, University of Wyoming

Wildlife Research Permit Number: WL007408

LOCATION:

Beaufort Sea (BS) - approximately 100 to 900 km north of Kaktovik, Alaska.

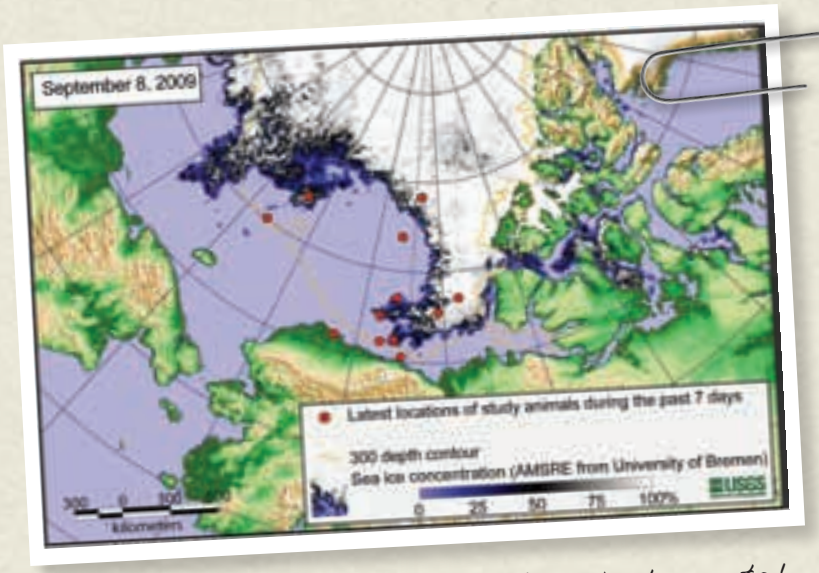

Figure 1 - distribution of polar bears instrumented with GPS satellite collars in the Beaufort Sea prior to the initiation of captures from the USCG Polar Sea in September - October 2009.

RATIONALE:

The largest segment of the world's polar bear *(Ursus maritimus)* population follow the retreating sea ice northward and spend much of the summer and early fall on the deep-water pack ice. These individuals likely contend with different conditions than those experienced by bears that spend the summer on shore. The cooler temperatures on the pack ice and potential opportunistic predation of ringed seals *(Phoca hispida)* may result in a higher activity profile and food intake, which may lead to lower skeletal muscle atrophy, reduced risk of heart disease by ingestion of omega-3 fatty acids, and maintenance of fat and protein reserves that could be allocated to reproduction. In contrast, land-bound bears that spend the summer on shore may be forced to fast and reduce their energetic demands by lowering activity and metabolic rates (i.e., adopting the "walking hibernation" strategy). Because the capacity of polar bears to withstand extended periods of fasting is finite, it is possible that the ability of these animals to remain on the pack ice year round minimizes the negative effects of reduced foraging opportunities associated with declines in annual sea ice and may buffer polar bears from the ill effects of climate change. Nonetheless, thinning of multi-year ice and continued ice loss in the Arctic may, in the near future, force all bears onto land and this physiological buffer will consequently be lost, rendering population projections based on current conditions incorrect.

OBJECTIVES:

To determine whether polar bears that follow the pack ice north of the continental shelf in the BS experience food deprivation similar to land-bound bears;

To estimate the ability for prolonged adaptive fasting and skeletal muscle protein and strength retention in polar bears that follow the pack ice in comparison with land-bound bears; and

To model the potential population changes of polar bears based on the proportion of ice-bound and land-bound animals in the population in relation to scenarios of future sea ice changes.

METHODS:

From April 20 to May 20, 2009, 19 adult polar bears were captured from helicopters off the coast of Alaska using standard procedures (Durner et al. 2009). These individuals were instrumented with GPS collars and implanted with loggers to measure body temperature. Blood, fat and muscle tissue, along with breath samples were collected. Six additional bears were captured on the North Slope of Alaska in August 2009. Eleven individuals retreated with the sea ice north (see Figure 1). During parallel operations on shore and off the ice breaker USCG M/V Polar Sea, 11 of the 24 adult bears initially captured and instrumented in April-May and August 2009 were recaptured; four on the sea ice and seven on shore. Two bears, instrumented with satellite collars by the USGS in 2007, and three new females were also captured and sampled on the sea ice. These adults were captured with 13 dependent young. Of these, two bears (32777 and 20905) were captured on October 19, 2009, west of Banks Island within Canadian jurisdiction. Both bears were single females. Bear 32777 was fully sampled, while blood, hair and feces were collected from bear 20905 when her old collar was removed.

Ten GPS collars and one glue-on tag were retrieved from bears captured on shore and on the ice. Six activity sensors were removed from collars and successfully downloaded. Muscle biopsies were conducted on nine of the 11 recaptured bears and three of the newly captured adults. Samples of breath, blood, and fat were collected from all captured adults and 11 of the dependent young. Eight abdominal and one subcutaneous rump temperature loggers were retrieved.

In April 2010, during regular capture-recapture operations by the United States Geological Survey (USGS) along the Alaska coast, five additional bears initially sampled as part of this project were encountered and captured. Abdominal temperature loggers were retrieved from three of these individuals.

RESULTS AND MAIN CONCLUSIONS:

Samples (muscle, hair, and fat) and data analyses are underway, with the expectation of completion over the next 12-24 months.

LONG-TERM PLANS AND RECOMMENDATIONS:

Lab and data analyses will continue in 2010 and 2011. Modeling the potential population changes of polar bears based on the proportion of ice-bound and land-bound animals in the population in relation to scenarios of future sea ice changes will commence in early 2011. Report and manuscript preparation is scheduled for 2011 and 2012.

PARTNERS:

This project is a collaborative effort between the University of Wyoming, United States Fish and Wildlife Service (USFWS), United States Geological Survey (USGS), and World Wildlife Federation (WWF). Biologists from these agencies participate in this project in various capacities. Dr. E. Regehr (USFWS), Mr. G. Durner (USGS), Mr. G. York (WWF), Ms. K. Simac (USGS), and Dr. S. Amstrup (USGS), all participated in bear captures in 2008 -2010. Mr. T. Evans (USFWS) conducted one of the aerial surveys in August 2008. Mr. D. Douglas (USGS) provided GIS and remote sensing support.

COMMUNITY INVOLVEMENT:

In response to a request by the local communities of the Northwest Territories, Canada, Mr. George Neakok from Barrow, Alaska, joined the Polar Sea Cruise on October 14th. He served as an observer for capture operations in Canadian waters.

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Assessment of Possible Impacts of Oil and Gas Activities on Polar Bears in the Outer Mackenzie Delta and Near Shore Southern Beaufort Sea

Period: March 14-31, 2009

Main Investigator: Evan Richardson, Wildlife Biologist, Environment Canada

Wildlife Research Permit Number: WL005591

LOCATION:

Coastal surveys for polar bear dens were conducted from March 14-31 between Herschel Island and Cape Dalhousie on the Tuktoyaktuk Peninsula.

RATIONALE:

This project was initiated in response to concerns regarding the potential impacts of onshore oil and gas development on denning female polar bears in the southern Beaufort Sea.

OBJECTIVES:

To collect information on the distribution and level of polar bear denning activity in the southern Beaufort Sea; and

To identify and protect potential polar bear maternity denning habitat using a landscape level denning habitat model and traditional ecological knowledge.

METHODS:

To identify and protect polar bear maternity denning habitat, both the location and the habitat requirements of denning female bears needs to be assessed. Den locations in the study area were located using three different sources of data:

- Aerial surveys conducted in the spring of each year when females and cubs are emerging from, and leaving, their dens sites;
- Personal interviews with Inuvialuit hunters directed at acquiring traditional ecological knowledge on past den locations and sightings of adult females accompanied by newborn young early in spring; and
- Satellite collar data from Canadian and Alaskan research programs.

Den site habitat characteristics were assessed in the summer by visiting known den sites that were located during spring aerial surveys.

RESULTS AND MAIN CONCLUSIONS:

During our aerial surveys in the spring of 2009 we located a total of six dens, five of which were located in the Inuvialuit Settlement Region. In the summer of 2009, a total of 97 ground control points were visited to validate the accuracy of our denning habitat model. Initial results indicate that the model accurately predicts the location of suitable polar bear maternity denning habitat in the Mackenzie Delta. A final report on this study will be produced in December of 2010.

LONG-TERM PLANS AND RECOMMENDATIONS:

This project is scheduled for completion in December of 2010. Results from this study will be used in the development of a range-wide management plan for polar bears in the southern Beaufort Sea to help mitigate the potential effects of oil and gas development on polar bears in the western Arctic.

PARTNERS:

Environment Canada

Environment and Natural Resources

Yukon Department of Environment

Inuvialuit Game Council, Polar Continental Shelf Project

United States Geological Survey

COMMUNITY INVOLVEMENT:

As part of this study, we conducted polar bear traditional knowledge interviews in the communities of Inuvik, Aklavik, and Tuktoyaktuk (n=46) to help collect local knowledge on the location of historical polar bear dens across the Inuvialuit Settlement Region.

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Populations and Sources of Recruitment for Polar Bears

Period: April 2009 to March 2010

Main Investigator: Andrew E. Derocher, University of Alberta

Wildlife Research Permit Number: WL005596

LOCATION:

The study was conducted based from Tuktoyaktuk on the sea ice from Demarcation Point to Cape Dalhousie to about 180 km offshore.

RATIONALE:

The study is intended to document the distribution, habitat use and movement patterns of polar bears in the southern Beaufort Sea relative to offshore oil development and climate change. The study was designed to examine the ecology of both subadult and adult females to expand our understanding of movement ecology.

OBJECTIVES:

To deploy GPS satellite collars on juvenile polar bears and adult females captured near their natal area and follow the bears for one to two years;

To provide insights into population movements and responses to the rapidly changing sea ice;

To test existing population boundaries with information from subadult polar bears; and

To use the data to assess the use of the offshore oil and gas development areas by polar bears.

METHODS:

Satellite telemetry collars using Geographical Position System (GPS, Telonics Ltd., Mesa, Arizona) and an ARGOS satellite uplink will be used (North American CLS Inc., Largo, Maryland). These collars provide six positions per day for 14-24 months. All collars will have a VHF beacon to assist with relocation of animals for recapture. All collars had CR-2a programmable breakaway collar release (Telonics, Mesa, Arizona). These are reliable units employing advanced technologies that incorporate a small actuator to initiate the release. As an additional means to ensure animal welfare, corrodible bolts will be used to ensure a degradable link is present.

All captures and handling were conducted by field staff with the leader having 25+ years of experience with the safe and humane capture and handling of polar bears. All handling protocols were approved by an animal welfare committee. Polar bears were caught between mid-April and mid-May in the Southern Beaufort Sea population. Polar bears (> one year of age) were caught using a helicopter and remote injection of the drug Telazol. A vestigial premolar tooth was extracted for age determination. The sex, reproductive status, and a series of standardized body measurements were collected. Blood, fat, skin, and hair samples were collected for future genetic and toxicological analyses.

Sampling priority was on young bears. Bears about 2.5 years of age in spring were the primary target for sampling as these animals likely reflect capture within their natal area. Bears aged three and four years of age were also considered suitable study animals, given that these bears are likely still in the process of settling and dispersing, although these will be considered a second priority. Adult females with their young were also caught to compare to the younger bears and to allow an improved understanding of habitat use as the sea ice conditions continue to change.

25 collars were deployed in 2009. All collars have built-in drop off links. Focal animals will include young bears and a sample of adult females to compare to data from the past 20 years in the southern Beaufort Sea.

RESULTS AND MAIN CONCLUSIONS:

Polar bears in the Southern Beaufort Sea population have moved much further than expected, with several bears moving into the Northern Beaufort Sea population and the Chukchi Sea population. Preliminary results suggest movement rate of subadults do not differ substantially from adult females. Resource selection function maps of habitat use are being generated and will be provided to the Inuvik Regional Office.

LONG-TERM PLANS AND RECOMMENDATIONS:

This study represents the only ongoing research on the Southern Beaufort Sea population. The area is undergoing rapid ecological change due to altered sea ice conditions. Plans for offshore oil exploration and development suggest continued research and monitoring would be advisable.

PARTNERS:

Environment Canada – Evan Richardson

COMMUNITY INVOLVEMENT:

Presentations made to the Inuvialuit Game Council and comments from the Hunter and Trappers Committees (HTCs) are incorporated into the research program.

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Population Management of Geese and Swans in the Inuvialuit Settlement Region Using Aerial Surveys and Banding Studies

Period: Summer 2009

Main Investigator: Myra Robertson, Waterfowl Biologist, Western Arctic, Canadian Wildlife Service

Wildlife Research Permit Number: WL007403

LOCATION:

Since 1989, the Canadian Wildlife Service (CWS) has conducted aerial surveys and banded geese throughout the Inuvialuit Settlement Region (ISR) to monitor the abundance and productivity of geese and swans in the area.

Aerial surveys were conducted at snow goose colonies in the Kendall Island and Anderson River Delta Migratory Bird Sanctuaries. Inuvik, Aklavik, and Tuktoyaktuk are all near the surveyed area (Figure 1).

Goose banding operations took place at known moulting areas (where previous banding occurred) from Kendall Island Bird Sanctuary to Anderson River Bird Sanctuary on the mainland of the ISR.

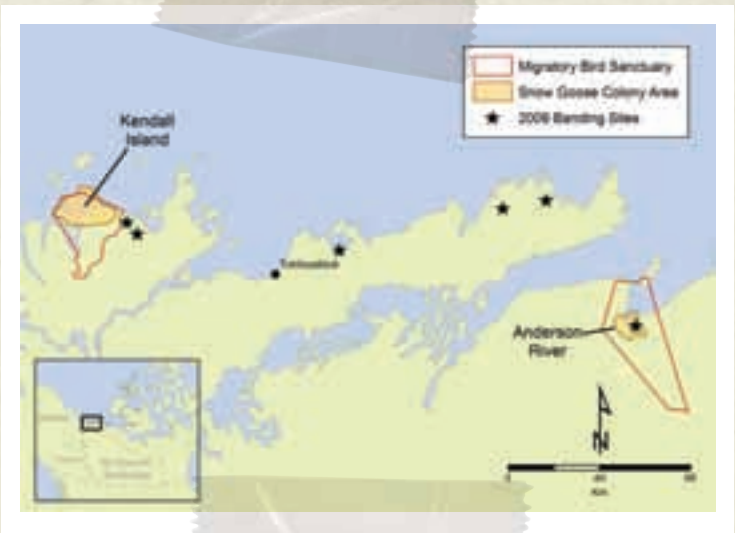


Figure 1. Location of aerial surveys flown in June and August and banding sites in July along the coastal ISR mainland.

RATIONALE:

The Inuvialuit Settlement Region of the Western Canadian Arctic is an important breeding and moulting area for greater white-fronted goose, Canada goose, lesser snow goose, brant, tundra swan, and several other species of waterfowl. Information on bird numbers, distribution, habitat requirements, survival, and productivity is needed to determine if current local and international harvest levels are sustainable, and to ensure that populations are conserved for the long-term use of the Inuvialuit and other people residing or hunting within the migratory range of these species. This information is also timely for establishing baseline population information for areas of potential oil and gas development in the Mackenzie Delta.

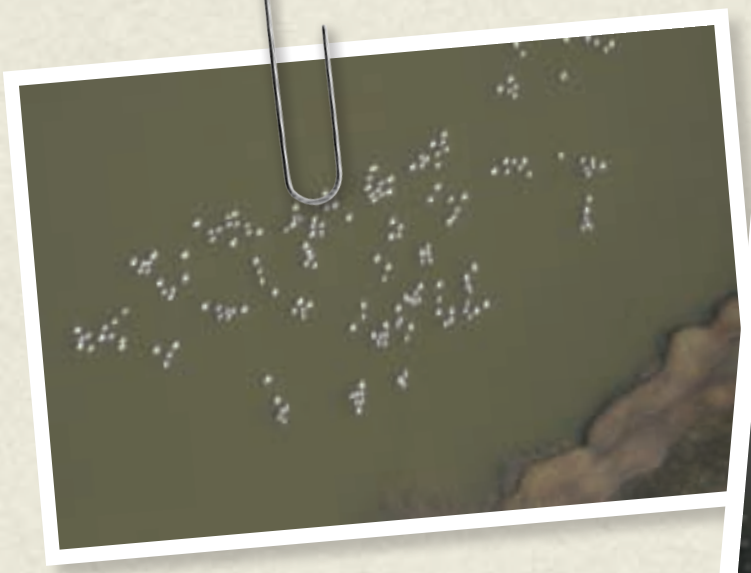
OBJECTIVES:

To monitor waterfowl populations in the ISR;

To monitor snow goose productivity in Kendall Island and Anderson River bird sanctuaries;

To evaluate the effect of harvest and other stressors on Western Arctic populations of waterfowl; and

To monitor migration routes, harvest rates, and survival rates of the ISR mainland geese populations.



METHODS:

Aerial surveys were conducted in the Kendall Island and Anderson River Delta Migratory Bird Sanctuaries in the spring, and once again in late summer, to monitor lesser snow goose productivity in the colonies. The aerial survey procedure involves flying straight transects in a Bell 206B or 206L helicopter at an elevation of 230 m and ground speed of 80-100 km/hr. Surveys are flown at this elevation so as to not create disturbance within the sanctuary and to facilitate the counting of large flocks of birds. Surveys are conducted with two observers, one seated in the left front seat and the other in the right rear seat (equipped with a bubble window for better viewing). All observations of snow geese are recorded, and photos of brood flocks are taken.

In July, flightless adult and young geese are captured through helicopter drives, banded with numbered metal leg-bands and fitted with neck collars. The information received by hunters helps determine the migration routes, seasonal distributions, survival, and harvest rates of these birds.

RESULTS AND MAIN CONCLUSIONS:

A total of 539 nesting pairs and 2,932 total adult snow geese were present at Kendall Island in mid-June. The total number of geese present in the colony was comparable to 2008, but a lower percentage of the geese present appeared to be nesting. Production surveys in early August indicated that nesting success was below average. A total of only 24 young were observed, much less than the 444 in 2008, and 3,600 young surveyed in 2007. In 2009, a total of 181 nesting pairs and 2,768 total adults were present at Anderson River in mid-June. This represents about one quarter the total nesting birds of 2008. A total of 60 young were counted, the lowest production since 2006.

In July 2009, over 800 greater white-fronted geese and 60 Canada/cackling geese were banded between the Mackenzie Delta and Anderson River. Twelve white-fronted geese were recaptured from our previous banding efforts in 2008.

Annual summary reports are sent to regional contacts with our wildlife research permit applications. CWS has recently published a document summarizing 10 years of waterfowl research in the ISR. Copies can be obtained through our office.

LONG-TERM PLANS AND RECOMMENDATIONS:

The plan for 2010 is to continue banding greater white-fronted and Canada/cackling geese on the ISR mainland to improve our understanding of survival rates and movement of waterfowl from the ISR region to staging and wintering areas in the south. This data aids in management decisions to ensure a sustainable harvest. Our data has been and continues to be, an important reference as interest in developing natural resources in the Mackenzie Delta region grows.

PARTNERS:

Wildlife Management Advisory Council (NWT)

Polar Continental Shelf Project

United States Fish and Wildlife Service

Arctic Goose Joint Venture

COMMUNITY INVOLVEMENT:

The Canadian Wildlife Service (CWS) has reviewed all concerns and comments provided by the communities and discussed solutions directly with them. The main concerns received by the communities are the spring waterfowl hunt and opportunities for local hiring. All aerial surveys are carried out after the communities have completed their spring waterfowl hunt. Helicopter surveys are weight restricted and therefore offer limited opportunity for local participation.

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Photo Credit: J. Recume

Latitudinal Impacts on Carry-Over Effects in a Neotropical Songbird (Dnedroica petechia)

Period: May 15, 2009 to July 20, 2009

Main Investigator: Dr. David Green, Simon Fraser University

Wildlife Research Permit Number: WL005593

LOCATION:

Inuvik, NT (68° 21'N x 133° 45'W).

RATIONALE:

Long-term declines in migratory bird abundance has led to renewed interest in whether migratory bird populations are most affected by events on their breeding grounds, on wintering areas, or on migration. Recent migratory songbird studies have shown that events on wintering grounds can carry-over into the breeding season and influence individual reproductive success and the dynamics of populations on the breeding grounds. This is important given long-term declines in many songbird species. By using direct monitoring of breeding pairs and by testing the stable isotope composition of their feathers, we plan to link reproductive success to locations and habitats these birds occupied in the winter. We will look at how variation in climatic conditions and winter habitat use influence the arrival times, condition and the number of offspring had by these birds.

OBJECTIVES:

To test the generality of winter habitat impacts on breeding success ("carry over" effects) in neotropical songbirds by studying a species on the western flyway; and

To determine whether there is a latitudinal impact on carry-over effects. It is expected that carry-over effects will be more pronounced for birds breeding in more northerly locations.

METHODS:

Yellow warblers were mist netted when they arrived in the Inuvik area. Each bird had standard body metrics taken, six feathers sampled-three greater coverts, (which are moulted on wintering grounds), two primary coverts and one retrace (moulted on breeding grounds), and was colour banded for identification purposes. Birds were then released and monitored: their territories identified, nests located and breeding success recorded (date of first egg, nestling number, nestling growth, and nestlings fledged). Forty breeding pairs (80 birds) were monitored from their arrival to when their young fledged. In total, 129 adult birds were given colour and federal bands and 134 fledglings were given federal bands.

RESULTS AND MAIN CONCLUSIONS:

Stable isotope data from feather samples are currently being analyzed. Results from the first year of study will be available in early 2010. Mean density of breeding birds in the study site in 2009 was 3.75 pairs/hectare, mean clutch size was 4.68, and fledge success was 73%.

LONG-TERM PLANS AND RECOMMENDATIONS:

We plan to continue monitoring this banded population for two more years. In addition to stable isotope data collected, band returns and productivity data will allow for the calculation of population demographics.

PARTNERS:

Canadian Wildlife Service, Environment Canada

Aurora Research Institute (logistical support)

COMMUNITY INVOLVEMENT:

Advice from local birders on high density breeding sites was obtained. Inuvik Town Council was consulted as recommended by the Wildlife Management Advisory Council (NWT). Town Council suggested youth involvement and our work included the participation of three summer students (employed through the IPY program at the Aurora Research Institute) in mist netting and banding activities. This year an elementary school-level talk on migration will be offered to the local school. Once data is available, follow up reports will be given to the Inuvik Hunter and Trappers Committee (HTC) and the Nihtat Gwich'in Renewable Resource Council (RRC).

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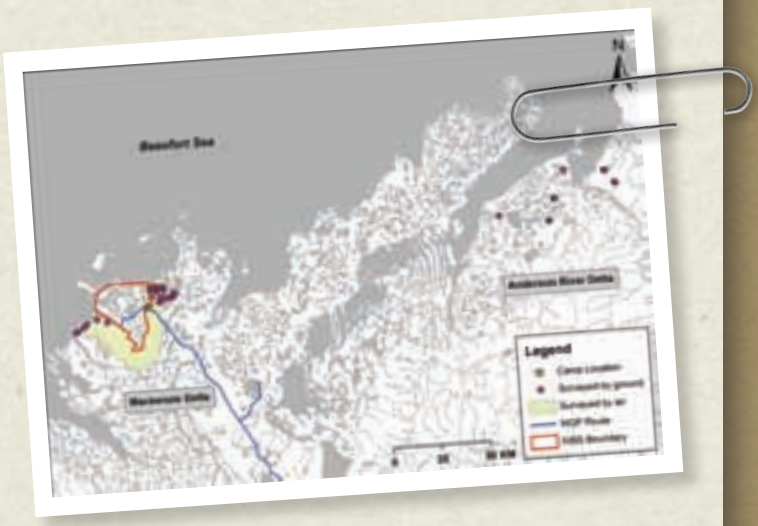
Shorebird Surveys in the Mackenzie Delta, Northwest Territories

Period: June 2009

Main Investigator: Canadian Wildlife Service, Environment Canada

Wildlife Research Permit Number: WL007402



LOCATION:

Research was conducted in the Mackenzie Delta, NWT, by a four person survey crew stationed at Taglu Tower on Fish Island.

This camp conducted rapid ground surveys just outside the eastern and western boundaries of the Kendall Island Bird Sanctuary (KIBS). They also conducted additional rapid surveys in the Anderson River Delta. Aerial surveys were conducted in a 10 km radius around KIBS.

RATIONALE:

Shorebird population counts along migration routes are continuing to show declines in most Arctic breeding shorebirds. As it is often difficult to monitor shorebirds along these routes, our goal is to monitor their populations on the breeding grounds to obtain accurate estimates of their population sizes. The data we have collected this year and over the previous four years is being used to help define the distribution and abundance of shorebird species that will be affected by the proposed Mackenzie Gas Project development and to determine where good quality shorebird breeding habitat can be found outside of the KIBS. This data is also being used for the Program for Regional and International Shorebird Monitoring (PRISM) to accurately determine shorebird breeding populations and to describe shorebird distribution, abundance and habitat relationships.

Photo by: Lisa Pirie, CWS Yellowknife

OBJECTIVES:

To estimate population sizes of shorebirds breeding in the Mackenzie Delta;

To determine distribution, abundance and habitat relationships for each species; and

To assess habitat adjacent to the Kendall Island Bird Sanctuary for shorebird use and distribution.

METHODS:

Rapid ground surveys were conducted for 12 ha. plots in habitat offset areas immediately east and west of the Kendall Island Bird Sanctuary. Surveys of each plot lasted one to two hours and were conducted by two people walking systematically through the plot at distances of 50 m apart, recording all of the birds observed. Rapid ground surveys were also conducted in the Anderson River Delta.

RESULTS AND MAIN CONCLUSIONS:

We surveyed 24 plots around KIBS in 2009. During these surveys we saw abnormally high numbers of shorebirds. Overall, we observed on average more shorebirds in the plots west of KIBS than in the eastern plots. The high number of shorebirds observed in the plots was due to the presence of large flocks of shorebirds that had not yet dispersed to their breeding sites.

We surveyed 10 plots in the Anderson River Delta where we observed fewer shorebirds. The majority of bird sightings in this region were songbirds.

Photo by: Jennie Rausch, CWS Yellowknife

LONG-TERM PLANS AND RECOMMENDATIONS:

The Mackenzie Delta is part of one of 20 regions for the PRISM shorebird monitoring program. The plan is to re-survey these regions every 10-15 years to determine shorebird population trends.

Further studies in the area are dependent on the outcome of the Joint Review Panel's decision on the Mackenzie Gas Project (MGP). Should the MGP be approved, further studies are necessary to monitor the impact of development on shorebirds breeding in the affected area.

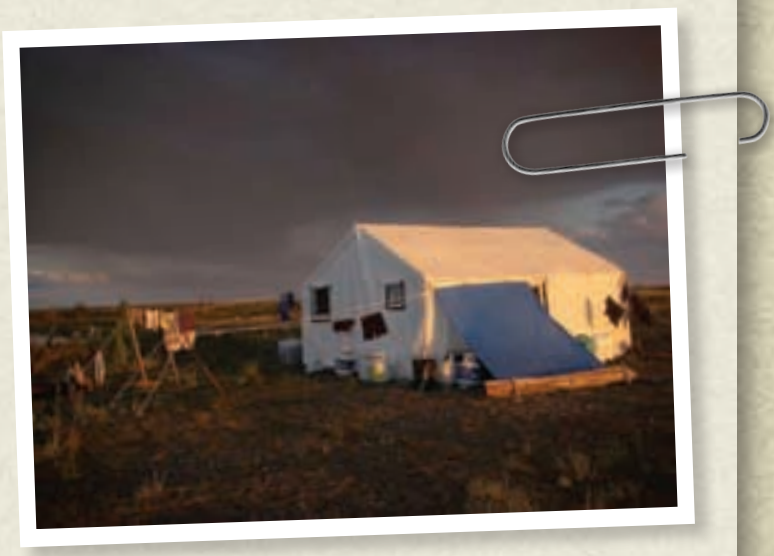


Photo by: Credence Wood, CWS Yellowknife

PARTNERS:

Canadian Wildlife Service (CWS)

Program for Regional and International Shorebird Monitoring (PRISM)

COMMUNITY INVOLVEMENT:

Since 2005, CWS Shorebird Program has hired several students from local communities including Fort McPherson, Yellowknife, Inuvik, and Tuktoyaktuk, for our research in the Mackenzie Delta. Our research is supported by the Wildlife Management Advisory Council (NT), the wildlife management board for the Inuvialuit Settlement Region. We meet annually with the Hunters and Trappers Committees to discuss our proposed projects and to obtain recommendations for research. In an effort to educate local communities about our research and our findings in the Mackenzie Delta, we conduct community presentations. In March 2009, we gave an evening public presentation and a presentation to the grade 2 and 3 students at Sir Alexander Mackenzie School in Inuvik.

CONTACT:

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Snow Goose Population Study on Banks Island

Period: Summer 2009

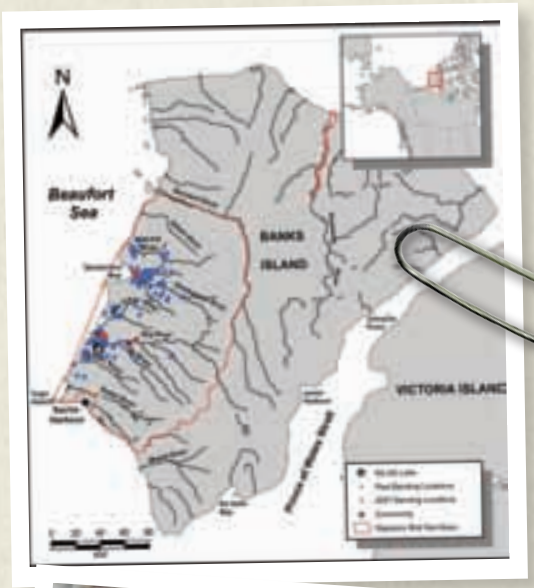
Main Investigator: Myra Robertson, Population Biologist for the Western Arctic, Canadian Wildlife Service

Wildlife Research Permit Number: WL007405

LOCATION:

Approximately every five years, aerial photo surveys are conducted in June over the snow goose colonies on Banks Island in the Inuvialuit Settlement Region of the Northwest Territories.

The aerial photo survey takes place within the Banks Island Migratory Bird Sanctuary #1, and Banks Island Migratory Bird Sanctuary #2. The nearest community is Sachs Harbour.



RATIONALE:

Snow geese, which migrate to and from Banks Island, are the most heavily harvested migratory bird in the Inuvialuit Settlement Region (ISR). An adequate population size and good nesting and brood-rearing habitat are important for sustaining these harvests.

Numbers of snow geese at the main colonies in the Western Arctic are counted periodically (about every five years) through air photo surveys carried out in collaboration with the U.S. Fish and Wildlife Service (USFWS). These photographs allow managers to track changes in population size and represent a valuable tool for managing the snow goose population of the ISR.

In June 2007, the USFWS conducted air photo counts of goose nesting areas on Banks Island and the smaller mainland colonies. Photo survey results indicate that the nesting population on Banks Island has declined dramatically between 2002 and 2007, from 570,000 to 300,000 geese. However, it is important to note that this photo survey only captures the breeding population at Egg River and Rotten Creek. It was also a wet spring on Banks Island, which may have resulted in a poor nesting year. A second photo survey was conducted in 2009 to further assess the population size on Banks Island and determine whether the decline on Banks Island is real or an artifact of a poor breeding season due to the late spring in 2007.

OBJECTIVES:

To estimate population size of the Banks Island snow goose colony using aerial photos.

METHODS:

An aerial photo survey of the snow goose colony was flown in June 2009 by USFWS in collaboration with CWS. A fixed-wing aircraft was flown at a height of 3,500 feet and high resolution photos were taken during the flight using a large format camera. Photos are being analyzed in the lab, and the data will be used to track changes in population size.

RESULTS AND MAIN CONCLUSIONS:

Excellent coverage of the Egg River colony on Banks Island was achieved during the photo surveys in 2009. Results from this survey are still being analysed and are not yet available at this time.

However, results from aerial photo surveys conducted in 2007 indicate that the number of breeding birds on Banks Island declined dramatically between 2002 and 2007, from 570,000 to 300,000 geese. It is important to note that this photo survey only captures the breeding population at Egg River and Rotten Creek. It was also a wet spring on Banks Island, which may have resulted in a poor nesting year. Photo counts of nesting snow geese on the mainland indicated comparable counts at Kendall Island and a slight increase at Anderson River from 2002-2007.

Annual summary reports are sent to regional contacts with our wildlife research permit applications. CWS has recently published a new report from data collected on Banks Island. Copies can be obtained through our office.

LONG-TERM PLANS AND RECOMMENDATIONS:

CWS recommends continued monitoring of this important colony through aerial photo surveys and periodic banding efforts.

No surveys or banding studies are scheduled to take place at Banks Island in 2010.

COMMUNITY INVOLVEMENT:

CWS has reviewed all concerns and comments provided by the Sachs Harbour Hunters and Trappers Committee (HTC) and discussed solutions directly with them. The main concern received by the community is opportunities for local hiring.

Opportunities for local participation during photo surveys are limited by US civil service hiring regulations, liability and legal issues, and weight restrictions associated with conducting aerial surveys.

Goose banding presents opportunities for local participation. Bridget Wolki, an experienced local from Sachs Harbour, was hired to help with our field operations in 2007. As no banding took place in 2009, opportunities for community involvement were limited.

PARTNERS:

Wildlife Management Advisory Council (NWT)

Polar Continental Shelf Project

United States Fish and Wildlife Service

Arctic Goose Joint Venture

CONTACTS:

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Paul Woodard, Waterfowl Technician
Canadian Wildlife Service
(P) 867-669-4762

Photo Credit: A. Levesque

Co-operative Waterfowl Population Surveys in the Northwest Territories

Period: Spring 2009

Main Investigator: James S. Wortham, Chief of Waterfowl Population Surveys, United States Fish and Wildlife Service

Wildlife Research Permit Number: WL005616

LOCATION:

Location of transects flown by small fixed-wing aircraft during annual breeding ground surveys of waterfowl in North America.

RATIONALE:

The Northwest Territories is one of the most important breeding and summering areas for ducks, geese, and swans in North America. Information on bird numbers, distribution, and population trend is needed to determine if current local and international harvest levels are sustainable, and to ensure that populations are conserved for the long-term use and appreciation by northern residents and all other people residing within the migratory range of these species.

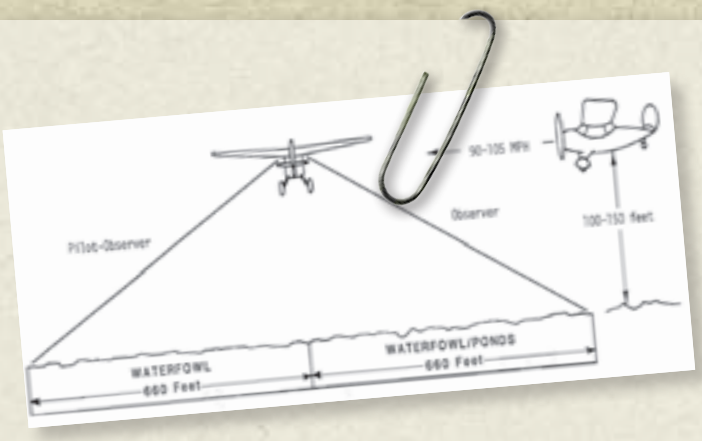
OBJECTIVES:

To determine the size and species composition of the breeding populations of ducks and other waterfowl in the Mackenzie River drainage.

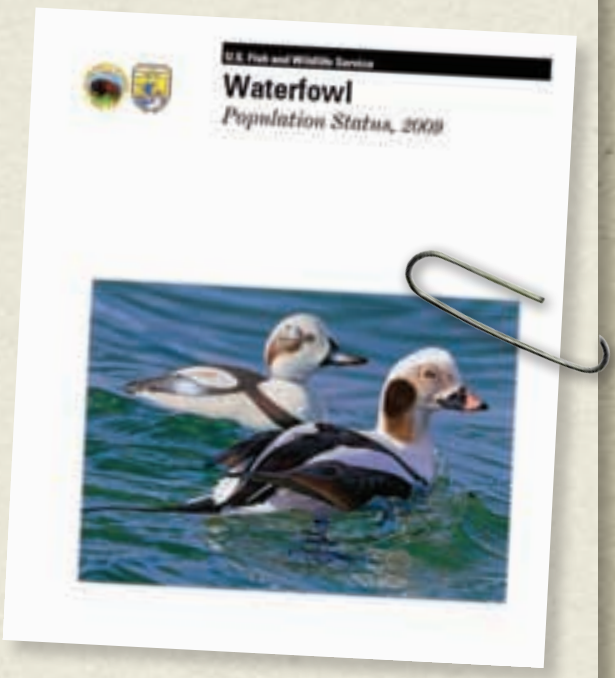
METHODS:

The survey procedure involves flying a single pass along straight transects in a single engine amphibious Cessna aircraft at a height of 150 feet. The procedures followed in conducting this survey are contained in the *"Standard Operating Procedures for Aerial Waterfowl Breeding Ground Population and Habitat Surveys in North America, Section III, revised 1987"* document.

Two observers record all waterfowl species observed within 200 m (or 660 feet) on each side of the aircraft. All observations are geo-referenced and can later be summarized at transect, strata, provincial / territorial and continental levels.



RESULTS AND MAIN CONCLUSIONS:



To successfully conserve and manage populations, waterfowl numbers have been monitored annually since 1955 in the NWT through low intensity surveys with a fixed-wing aircraft by the United States Fish and Wildlife Service.

Between June 1-20, 2009, 23 transects were flown in the NWT.

The surveys cover much of the Mackenzie Valley region from the southern border of the NWT to the Mackenzie Delta region.

The NWT surveys are part of a broader program which covers much of the important waterfowl breeding habitat in North America.

The 2009 total duck estimates in central and northern Alberta, northeastern BC, and the Northwest Territories remained unchanged from 2008 and the long-term average.

Counts of mallards, American wigeon, blue-winged teal, northern shoveler, and canvasbacks were all similar to last year and to the long-term averages. Northern pintail and scaup estimates were both similar to last year's, but both were 34% below their respective long-term averages.

The gadwall estimate was 39% below the 2008 estimate, but similar to the long-term average. Green-winged teal were similar to the 2008 estimate, but 61% higher than the long-term average. Redheads were 70% below the 2008 estimate, but similar to their long-term average.

In the bush regions of the traditional survey area (including the NWT), spring break-up was delayed by as much as three weeks relative to normal in 2009. The long lasting, severely cold winter caused a delayed ice breakup on the larger lakes, with areas east of Yellowknife especially slow to open. Overall habitat conditions in the Northwest Territories, northern Alberta, and Alaska were rates as "Good".

The 2009 Waterfowl Population Status report can be accessed online at:

http://www.fws.gov/migratorybirds/NewReportsPublications/PopulationStatus/Waterfowl/StatusReport2009_Final.pdf

LONG-TERM PLANS AND RECOMMENDATIONS:

The Waterfowl Population Survey Program has evolved into the largest and most reliable wildlife survey effort in the world. For more than 50 years cooperative waterfowl surveys have been performed by USFWS, CWS, state and provincial biologists, and non-government partners. Survey results determine the status of North America's waterfowl populations, play an important role in setting annual waterfowl hunting regulations, and help guide the decisions of waterfowl managers throughout North America.

These surveys are to continue until a more cost effective way is discovered to manage the North American waterfowl population.

COMMUNITY INVOLVEMENT:

CWS has reviewed all concerns and comments provided by the communities and discussed solutions directly with them. The main concerns received by the communities are opportunities for local hiring and disturbance to wildlife. The USFWS is unable to hire local help because of liability and legal issues, as well as constraints in the US civil service hiring regulations. Also, there are relatively few transects flown over a vast area once a year. It is expected that the surveys will have a negligible effect on waterfowl and other wildlife.

PARTNERS:

United States Fish and Wildlife Service (USFWS), Canadian Wildlife Service (CWS)

CONTACTS:

Canadian Wildlife Service

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Photo Credit: Environment and Natural Resources

Identification of Beaufort Sea Migration Corridor for Sea Ducks

Period: August 2 – 12, 2009

Main Investigator: Lynne Dickson, Canadian Wildlife Service

Wildlife Research Permit Number: WL007401

LOCATION:

We captured moulting long-tailed ducks at McKinley Bay, Northwest Territories (69° 55.00'N x 113° 10.00'W). We set up a field camp at the east end of the airstrip at Atkinson Point.

RATIONALE:

The development of offshore oil production facilities is currently underway in important sea duck migration corridors along the Beaufort and Chukchi Sea. Various independent surveys of sea ducks in that area since the 1950s have documented the migratory passage of hundreds of thousands of king eiders, long-tailed ducks, and common eiders during fall and spring, between the breeding areas in western and central arctic Canada and the wintering areas offshore near Alaska and Russia. Existing data suggest dramatic declines in the western arctic breeding populations of all three species. If oil developments are situated within the migration corridors, large portions of sea duck populations could be affected. Detailed information on location and timing of use of the migration corridor is needed to better predict and mitigate any adverse effects of offshore oil development on sea ducks.

OBJECTIVES:

To determine specific migration routes for declining western Canadian breeding populations of long-tailed ducks;

To document temporal and spatial relationships of migrating long-tailed ducks to pack ice, islands, shorelines and other physical features of the Beaufort Sea; and

To identify wintering, staging and moulting areas, and their affiliation with specific breeding areas.

METHODS:

Moulting long-tailed ducks were captured from August 4-11, 2009. Flocks of ducks were herded using three to five boats and kayaks towards a monofilament gill net suspended in shallow water. Ducks were induced when they approached the net by generating loud noises or rushing towards the ducks with the boats. Ducks that became entangled in the net were quickly removed, and all captured ducks were fitted with metal leg bands issued by the U.S. Fish and Wildlife Service. A total of 211 long-tailed ducks were captured. Twenty-five ducks (23 female and two male) had satellite transmitters surgically implanted by a veterinarian, and avian influenza samples were taken from 194 ducks. All ducks were released after being processed or having recovered from surgery. There were no surgery or capture-related mortalities.

RESULTS AND MAIN CONCLUSIONS:

At the time of writing this report, most ducks were still near McKinley Bay, or they had moved slightly westward to offshore of the Mackenzie delta region. Satellite tracking data will be compiled over the next year or more for the battery life of the transmitters. Government and peer-reviewed journal publications will be produced from these data.

LONG-TERM PLANS AND RECOMMENDATIONS:

This was year two of a three year field project, and we plan to capture long-tailed ducks again at McKinley Bay in August 2010. We will likely have a meeting in Tuktoyaktuk again this winter to provide a project update. Once all data have been analyzed, we will be able to identify the major staging areas and migration corridors in the Chukchi and Beaufort Sea, and we will have information on migration timing. This information could be used to mitigate adverse effects of future offshore oil and gas developments.

PARTNERS:

Sea Duck Joint Venture

United States Fish and Wildlife Service

ConocoPhillips

COMMUNITY INVOLVEMENT:

A meeting was held in Tuktoyaktuk (the community nearest McKinley Bay) in January 2009, to discuss this proposed research; members of the local Hunters and Trappers Committee (HTC) and the general public were present. With the HTC's approval, we hired a licensed and insured outfitter, Chuck Gruben from Tuktoyaktuk. Chuck provided his boat, along with his services, for the duration of the time we were at McKinley Bay. Chuck assisted with all aspects of duck capturing and his knowledge of the area was invaluable.

CONTACT:

Lynne Dickson
Canadian Wildlife Service, Environment Canada

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Western Canada Cooperative Duck Banding Program at Willow Lake, Sahtu Settlement, NWT, 2009

Period: August 2009

Main Investigator: Richard Popko, Wildlife Technician, Environment and Natural Resources, GNWT, Sahtu Region

Wildlife Research Permit Number: WL005155

LOCATION:

Near the outlet of Willow Lake, situated about 40 km north of Tulita, NWT.

RATIONALE:

Dabbling ducks are migratory waterfowl that are hunted throughout their range. Banding large numbers of ducks across their summer range before the start of the hunting season and then documenting band returns from successful hunters allows us to plot the harvest distribution. The data is also useful in identifying migration and wintering grounds, which assists in efforts to protect habitats through joint ventures as part of the North American Waterfowl Management Plan.

OBJECTIVES:

The United States and Canada Cooperative Banding Program sets annual banding objectives. Our objective is to band 2,000 mallards, 2,000 northern pintails, and all incidentally captured waterfowl (preferably 1,000 per species), prior to the opening day of duck hunting season (September 1st).

METHODS:

Trap-sites have been selected in the Willow Lake area based upon the requirements of the traps, traditional environmental knowledge, and local knowledge of the area. Collapsible B-2 funnel traps are baited with germ-free cleaned barley. The traps are checked at least once a day and all captured ducks are removed, banded, documented, and released. Data entry of banding schedules is completed in Band It software and forwarded to the Canadian Wildlife Service in accordance with the conditions of the banding permit.

RESULTS AND MAIN CONCLUSIONS:

An annual report was presented to the Sahtu Renewable Resources Board (SRRB), Tulita Renewable Resources Council, United States Fish and Wildlife Service (USFWS), Canadian Wildlife Service (CWS) Banding Office, and other interested groups. Band recovery data was also entered into the Sahtu GIS project.

LONG-TERM PLANS AND RECOMMENDATIONS:

Consider trapping locations other than Willow Point in an attempt to meet stated banding objectives and to reduce predator concentrations at Willow Point.

Consider obtaining bands for tundra swans, and potentially attempt to band moulting tundra swans on Willow Lake.

Design and construct traps for potential scaup banding.

PARTNERS:

Environment and Natural Resources

United States Fish and Wildlife Service

CONTACTS:

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Western Canada Cooperative Pre-season Waterfowl Banding Program (Mills Lake, NT)

Period: August 1-26, 2009

Main Investigator: David Fronczak, Wildlife Biologist, United States Fish and Wildlife Service

Wildlife Research Permit Number: WL004801

LOCATION:

Mills Lake, NT, 21 miles WNW of Fort Providence, NT. Banding was conducted within the marsh on the east end of the lake. Operation was conducted between August 1st and August 26th of this year.

RATIONALE:

Pre-season waterfowl banding at Mills Lake, NT, has been an ongoing event since 1964. Within the 40 years of operations, over 88,000 waterfowl have been banded. Recovery information is used to help determine migration routes, assess harvest pressure, measure vulnerability to harvest pressure, estimate waterfowl production rates, and estimate survival rates of a breeding population. Mills Lake has proven to be an important area for the overall waterfowl population monitoring program by providing a cost effective way to sample a segment of the boreal breeding population.

OBJECTIVES:

To pre-season band 1000 mallards (of each cohort) for the combined banding effort within the Northwest Territories, Canada.

METHODS:

Waterfowl were trapped within baited wire funnel traps. Traps were placed in strategic areas within the marsh and checked daily after baiting had been initiated. Caught birds were herded into a catch box for processing. Biological information such as species, age, sex, date and location are recorded for each bird. A federal aluminum band is placed on the bird's leg and the bird is released. Each band has a unique number which links the collected biological information to that bird. Persons that encounter banded birds are highly encouraged to report the band number to a wildlife agency (GNWT) or to the Canadian Wildlife Service's Banding Office, 1-800-327-band or at www.reportband.gov.

RESULTS AND MAIN CONCLUSIONS:

A total of 2378 ducks were banded (915 mallards, 1282 northern pintails, 174 American green-winged teal, six American wigeon, and one northern shoveler) over an 18 day period (August 8 – 26). For mallard, northern pintail, and green-winged teal, the percentage of young totaled 17%, 25%, and 44% respectively. In addition, 13 mallard, six American green-winged teal, and one American wigeon, classified as local ducklings, were banded. Seventy-three

previously banded ducks were captured, consisting of 40 mallard and 33 northern pintail. Detailed information can be obtained from the *Mills Lake 2009 Pre-season Banding Report* from the South Slave Environment and Natural Resources, GNWT office.

LONG-TERM PLANS AND RECOMMENDATIONS:

Long-term plans include the continuation of annual pre-season banding at Mills Lake, NT. Mills Lake is a unique staging area for waterfowl and logistically feasible for gathering pertinent information on waterfowl for population monitoring/management that pertains specifically to the Mackenzie River's boreal forest region.

PARTNERS:

Environment and Natural Resources, South Slave Region (permits)

Fort Providence community (supplies, gas, and logistical assistance)

Canadian Wildlife Service (banding permit and bands)

CONTACT:

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United States Fish and Wildlife Service

Fort Snelling, MN
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(E-mail) dave_fronczak@fws.gov

Whooping Crane Ecology and Rehabilitation

Period: May 1, 2009 to October 31, 2009

Main Investigator: Brian Johns and Lea Craig-Moore, Canadian Wildlife Service

Wildlife Research Permit Number: WL004773

LOCATION:

The project took place within a 200 km radius circle centered on Latitude 60° 10′ Longitude 113° 20′.

Most whooping cranes breed within Wood Buffalo National Park, however, there are several nests north of the Nyarling River outside the northern park boundary and two nests in Lobstick marsh, which is just east of the Little Buffalo River, east of the park boundary.

RATIONALE:

Whooping Cranes are listed as an endangered species under the *Species At Risk Act* (SARA) 2003. Since 1966, the Canadian Wildlife Service (CWS) and United States Fish and Wildlife Service (USFWS) have increased management efforts for whooping cranes resulting in a population increase from a low of 21 birds in 1941 to the current population of 270 in the wild in Canada in 2008. In addition, surplus eggs were collected in Wood Buffalo National Park to establish a captive population which now numbers 151. Additional wild populations have been established from both captive and wild produced eggs that number an additional 119 birds. Additional management activities are expected to further increase the wild population.

OBJECTIVES:

There were three key objectives to this project:

Breeding pair surveys: to provide an accurate count of breeding pairs in the population which can be used to gauge the health and well-being of this flock;

Hatching success surveys: to provide an accurate count of chick production; and

Fledging success surveys: this survey tells us two things, one the mortality between hatch and fledging, and secondly, the number of family groups expected on the migration route and arriving in Aransas. A high percentage of the fledged young reach the wintering grounds in Texas.

METHODS:

Aerial surveys over the whooping crane summer range in and around Wood Buffalo National Park, NWT. Breeding pair surveys, May 1-30, hatching success surveys, June 5-20, and chick survival surveys, August 8-25, 2009.

Breeding pair counts by fixed-wing aircraft and/or helicopter between May 1 to 30 of each year.

- plot locations on aerial photographs
- record GPS coordinates for nests
- record band colours
- determine egg laying dates and clutch size

Fixed-wing aircraft surveys in June and August to determine hatching success, chick survival, and to locate nonbreeding cranes and pioneering nesting pairs.

- plot locations on aerial photographs
- record GPS coordinates
- record band colours

RESULTS AND MAIN CONCLUSIONS:

Twenty hours of whooping crane breeding pair surveys were carried out by the Canadian Wildlife Service (CWS) between May 16 and May 20. During the seven flights, 61 whooping crane nests were discovered. All but 3 nests (0901, 0902, and 0950) were discovered in Wood Buffalo National Park. Three pairs of cranes that had bred in previous years were also observed, for a total of 65 occupied territories.

The Canadian Wildlife Service, with the assistance of the United States Fish and Wildlife Service (USFWS), conducted 22 hours of hatching success surveys between June 16 and June 20, 2009. The June surveys were conducted after all but two nests had hatched. Judging by the small size of the chicks and the short distance families had moved from their nests, chicks were just days old. A total of 49 young were discovered during the surveys, including 10 pairs with two young each. An additional family was found where a nest had not been seen in May, bringing the total number of nests to 62.

Whooping crane fledging success surveys were carried out by the Canadian Wildlife Service from August 19 to August 21, 2008. A total of 22 young were discovered in 22 family groups.

During the winter of 2008-2009, a severe drought in Texas caused a shortage of fresh water and food resources, and resulted in a 21% mortality of whooping cranes. Previously documented food shortages have resulted in significant declines (e.g. 36%) in nesting effort. We were very surprised and pleased to find 62 nests in 2009, as this is the 5 year average. Perhaps the protracted spring allowed birds on migration to restore lost energy reserves or perhaps birds were able to cue into excellent habitat conditions on the nesting grounds.

LONG-TERM PLANS AND RECOMMENDATIONS:

It is very rare in wildlife ecology to be able to monitor an entire population and track individuals for extended periods of time. Due to the small size of the Wood Buffalo-Aransas whooping crane population, the birds' size and colour, and their high degree of territoriality, it has been possible to monitor it with great detail, paying attention to population and individual attributes. This long-term data has provided incredible insight to the populations' growth, obstacles and path to recovery.

Despite a healthy average annual growth rate of 4%, reaching the recovery goal of 1000 birds in the wild is many years away. The long-term plans for this project are to continue monitoring breeding effort and chick production. We would like to relate these variables to habitat conditions and quality, to better forecast future expansion of the breeding grounds and future impacts, such as global warming and changes in water quality and quantity.

Additionally, we plan on working collaboratively with partners in the United States in the coming years to band juvenile and adult whooping cranes. Birds will be banded with a satellite GPS transmitter that will transmit the birds' location 4 times a day for approximately 3 years. The objective of the project is to determine causes of mortality on migration, which is known to be the most vulnerable yet poorly understood portion of the whooping cranes' life cycle. Additional information, such as territory size, habitat use, nesting chronology, movement patterns, and breeding effort can also be gained from the satellite data gathered.

PARTNERS:

Parks Canada

United States Fish and Wildlife Service

COMMUNITY INVOLVEMENT:

There were no concerns raised by the community regarding this long-term project.

CONTACT:

Lea Craig-Moore
Canadian Wildlife Service, Environment Canada

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(P) 306-975-5404

Photo Credit: John Nagy

Collaring of Tuktoyaktuk Peninsula, Cape Bathurst, and Bluenose-West Barren-Ground Caribou

Period: March 2009

Main Investigator: Tracy Davison, Regional Biologist, Environment and Natural Resources, GNWT, Inuvik Region

Wildlife Research Permit Number: WL005592

LOCATION:

Range of the Tuktoyaktuk Peninsula, Cape Bathurst, and Bluenose-West barren-ground caribou herds.

RATIONALE:

Population estimates obtained for the Tuktoyaktuk Peninsula, Cape Bathurst and Bluenose-West indicate that these herds declined between 2000 and 2005, with continued declines in 2006. Due to these declines, management actions, recommended by the co-management boards, are being implemented. One of these recommendations was to do a photocensus in 2009.

Collars were used to conduct the photocensus along with providing detailed information on the movements and habitat use. Collars are also used to find caribou during other survey work.

OBJECTIVES:

To collar caribou of each herd for the photocensus in July 2009; and

To monitor of caribou movement and range use by GPS collars.

METHODS:

Fixed-wing flights were conducted to determine the distribution of caribou. Observations from these flights were used to find caribou and plan the deployment of GPS and satellite collars.

The caribou were captured with a net and immobilized with leg hobbles. Eye covers were used to help calm the animals. Each animal was initially examined to assess its condition and to check for any capture-related injuries. Samples collected from each animal included approximately 30 ml of blood (from the femoral vein in the foreleg), approximately 50 g of feces (either from the ground after defecation, or the rectum), and a sample of hair (with roots). Both eyes were checked for Besnoitia, and body measurements were taken (total body length, hind foot length, and neck circumference). The age class of each animal was also recorded.

RESULTS AND MAIN CONCLUSIONS:

Between March 10th and 31st, a total of 83 collars (78 Telonics International Inc. and five Loteck wireless) were deployed on adult caribou in the Tuktoyaktuk Peninsula (TP), Cape Bathurst (CB) and Bluenose-West (BW) barren-ground caribou herds. Collars were deployed in the known winter ranges of the herds, with 18 collars (14 cows, four bulls) deployed on TP animals, 13 collars (nine cows, four bulls) deployed on CB animals, and 52 collars (36 cows, 16 bulls) deployed on BW animals. The number of collared caribou in each herd may change depending on where the animals go during the calving/post-calving period.

LONG-TERM PLANS AND RECOMMENDATIONS:

Collars will continue to be monitored until they are set to release in August 2012.

PARTNERS:

Environment and Natural Resources

Parks Canada, Western Arctic Field Unit

COMMUNITY INVOLVEMENT:

There were field assistants hired from the communities of Paulatuk, Tuktoyaktuk and Inuvik to assist with the reconnaissance surveys.

CONTACT:

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Environment and Natural Resources, GNWT

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Photocensus, Late Winter Recruitment, and Fall Composition Surveys of the Tuktoyaktuk Peninsula, Cape Bathurst and Bluenose-West Barren-Ground Caribou Herds

Period: April 2009 to October 2009

Main Investigator: Tracy Davison, Regional Biologist, Environment and Natural Resources, GNWT, Inuvik Region

Wildlife Research Permit Number: WL005595

LOCATION:

Range of the Tuktoyaktuk Peninsula, Cape Bathurst and Bluenose-West barren-ground caribou herds.

RATIONALE:

Population estimates obtained for the Cape Bathurst and Bluenose-West indicate that these herds declined between 2000 and 2005, with continued declines in 2006. Due to these declines, the co-management boards recommended management actions. One of these recommendations was to do a photocensus in 2009.

Late winter (March-April) recruitment surveys provide estimates of the number of calf caribou that will enter the adult (1-year and older) population each year. Fall composition surveys provide adult sex ratios and the number of calves per 100 cows. Management actions included a bull dominated harvest for the Bluenose-West herd.

OBJECTIVES:

To obtain a current estimate of late winter recruitment for the Tuktoyaktuk Peninsula, Cape Bathurst and Bluenose-West barren-ground caribou herds;

To obtain current estimates of the number of caribou in the Tuktoyaktuk Peninsula, Cape Bathurst and Bluenose-West barren-ground caribou herds; and

To obtain current estimates of the fall composition of the Cape Bathurst and Bluenose-West barren-ground caribou herds, and caribou on the Tuktoyaktuk peninsula.

METHODS:

A helicopter was used to find groups of caribou that are classified in April for recruitment and in October for fall composition. Caribou are classified as cows, yearlings, and bulls.

For the photocensus, since all caribou collared for the survey were equipped with GPS or satellite collars, the caribou were mainly monitored remotely to determine mortalities and movements. Each collar was located prior to the census to determine the number of collars that were active for the photocensus (VHF beacon functioning properly).

When the caribou were suitably aggregated, groups were photographed from a fixed-wing aircraft. For each aggregation, the group number, a GPS coordinate, frequency of collars present, and the frame numbers of photographs taken were recorded. The digital images for each group were imported into the GPS software program OZI Explorer. Each photo was visually scanned and a waypoint created on top of each caribou. The waypoint count will give the number of caribou present on each photo.

Population size will be estimated using a method presented by Russel et. al. (1996), based on the Lincoln-Petersen Index as applied to radio-telemetry data by White and Garrot (1990).

RESULTS AND MAIN CONCLUSIONS:

During late winter recruitment, the number of calves per 100 cows was 43.7 ± 2.3 (Standard Error) for the Cape Bathurst herd, 41.9 ± 4.1 for the Tuktoyaktuk Peninsula herd, and 42.0 ± 2.6 for the Bluenose-West herd. The Bluenose-West fall composition survey was conducted only in the Sahtu, where the majority of the collared caribou were found. Work in the ISR was not conducted due to weather.

Population estimate results from photocensus were as follows:

Tuktoyaktuk Peninsula: 2,752 ± 276

Cape Bathurst: 1,934 ± 349

Bluenose-West: 17,897 ± 1310

The estimates for the Cape Bathurst and the Bluenose-West are not significantly different from the 2006 estimates (1,821 and 18,050 respectively). The 2009 Tuktoyaktuk Peninsula estimate was lower than 2006 (3,078 in 2006).

LONG-TERM PLANS AND RECOMMENDATIONS:

The herds will continue to be monitored, based on recommendations from the co-management boards. A management plan is being developed by all co-management boards and other partners that would outline the long-term monitoring required.

PARTNERS:

Environment and Natural Resources

Parks Canada, Western Arctic Field Unit

Inuvialuit Wildlife Studies Funds

Gwich'in Renewable Resource Board

COMMUNITY INVOLVEMENT:

Public meetings were held in every community following the photocensus to discuss the results. This was done in conjunction with the working group developing a management plan for the Cape Bathurst, Bluenose-West and Bluenose-East caribou herds, to gather input for the management plan.

Community members were hired to assist with recruitment and fall composition surveys.

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Pre-collaring Distribution Surveys, Caribou Collaring, Late Winter Recruitment Surveys, Photocensus and Fall Composition Surveys of the Bluenose-East and Bluenose-West Barren-Ground Caribou Herds

Period: February 21, 2009 to January 2010

Main Investigators: Boyan Tracz, Richard Popko, Alasdair Veitch, Marsha Branigan, Tracy Davison, Jan Adamczewski, Bruno Croft

Wildlife Research Permit Number: WL005615

LOCATION:

Ranges of the Bluenose-East and Bluenose-West barren-ground caribou herds.

RATIONALE:

Periodic surveys of barren-ground caribou herds are required to monitor population size and trends. Since 1986, estimates of the size of the Bluenose-West and Bluenose-East herds were obtained via photocensus surveys. Estimates of the size of the two herds in 2005 and 2006 showed both herds had declined since 2000. To obtain estimates of herd size by photocensus, a suitable sample size of radio collared caribou is required for each herd. Recruitment estimates provide an indication of the potential for future herd growth.

OBJECTIVES:

To map late-winter distribution of the two herds (Feb-Mar 2009);

To deploy sufficient collars to allow for estimates of herd size via photocensus (Mar 2009);

To estimate late winter recruitment for both herds (Mar-Apr 2009);

To estimate the number of caribou in the Bluenose East and Bluenose West barren-ground caribou herds by post-calving ground photocensus (Jul 2009); and

To estimate over-summer survival and the adult sex-ratio for both herds (Oct 2009).

METHODS:

Bluenose-West late-winter distribution was determined by line transect surveys flown in fixed-wing aircraft (Mar 2009) in the southern Inuvialuit Settlement Region (ISR) and northern Sahtu Settlement Area (SSA).

36 cows and 16 bulls from the Bluenose-West herd were collared March 10-13, 2009, in the southern ISR and northern SSA. 29 cows and 12 bulls from the Bluenose-East herd were collared March 11-21, 2009, in the southern and eastern SSA and northern North Slave Region. All caribou were captured using a net gun fired from a helicopter and all collars are GPS-tracked with pre-programmed drop-off mechanisms.

Bluenose-West recruitment was estimated by surveys on April 6-8, 2009 (Colville Lake, Sahtu), and on April 14-15, 2009 (Rendezvous Lake, ISR).

A fixed-wing aircraft to survey the Bluenose-West herd was stationed in Paulatuk on July 2, 2009. On July 12-13, caribou aggregated sufficiently to allow photographs to be taken to estimate herd size.

A fixed-wing aircraft to survey the Bluenose-East herd was stationed in Kugluktuk, NU on July 1, 2009. The crew flew 15 days between July 1-23; however, poor weather (cold, snow, low cloud) never provided suitable conditions for adequate photography and a population estimate could not be obtained.

An aerial helicopter survey was flown out of Colville Lake (Sahtu) from October 27-29, 2009.

RESULTS AND MAIN CONCLUSIONS:

The calf:cow ratio was estimated to be 42.0 calves per 100 cows (1738 caribou classified), which was essentially unchanged from 41.9:100 in 2008. Bluenose-East recruitment was estimated by surveys on March 27- 31, 2009. The calf:cow ratio was estimated to be 38 calves per 100 cows, which was down slightly from 48:100 in 2008.

A total of 16,595 caribou were counted on the photographs; 50 of 54 available radio collars were in 59 total groups that were photographed. The population estimate was 17,897 ± 1,310 non-calf caribou, which is unchanged from the 2006 estimate of 18,050 ± 528 non-calf caribou.

An estimated 70 bulls and 51.8 calves per 100 cows (4661 caribou) were classified for the Bluenose-West herd.

While recruitment estimates for both herds provide some hope for the future of the herds, we also require good harvest information (especially the proportion of the total harvest that is cows).

The Bluenose-West herd seems quite stable in numbers since 2005 & 2006, but current management actions should remain in place until the next estimate of herd size, which is planned for 2012.

We were unsuccessful in obtaining an estimate of the size of the Bluenose-East herd (this also occurred in 2001 for the same reason – poor weather) and another effort to obtain an estimate should be made in 2010.

LONG-TERM PLANS AND RECOMMENDATIONS:

Maintain a sufficient sample of radio collars (ca. 50-60) for tracking movements and seasonal distributions of each herd, but most particularly for the Bluenose-East herd for another photo-estimate survey in 2009.

Fly recruitment surveys of both herds in April 2010.

Use both calving ground and post-calving ground surveys for Bluenose-East herd in 2010 to increase likelihood of obtaining an estimate of herd size and to compare techniques.

Obtain reasonable estimates of harvest for both herds.

Maintain current management actions for Bluenose-West herd until next estimate of herd size in 2012.

Continue work on a management plan for Bluenose-West, Bluenose-East, and Cape Bathurst caribou herds.

COMMUNITY INVOLVEMENT:

Bluenose-West Herd: Inuvik HTC observers (Mar 2009): Tommy Chicksi, Desmond Rogers; Tuktoyaktuk HTC observers (Mar 2009): David Nasogaluak, Robin Felix; Paulatuk HTC observers (Mar 2009): John Nakimavik; Colville Lake observers (Apr 2009): Johnny Blancho, Charlie Oudzi, JB Gully, Jimmy Kochon; Fort Good Hope observers (Jul 2009): Charlie Tobac, Angus Shae, Gabe Kochon; Colville Lake observers (Jul 2009): Richard Kochon, JB Gully, Joseph Kochon; Colville Lake observers (Oct 2009): Gene Oudzi, Charlie Oudzi, Terry Eddibar, Daniel Tutcho, Wilbert Kochon.

Bluenose-East Herd: Gameti observers (Apr 2009): Amanda Takazo, Nelson Zoe.

PARTNERS:

Marsha Branigan, ENR, Inuvik; Tracy Davison, ENR, Inuvik; Wendy Wright, ENR, Inuvik; Ian Ellsworth, ENR, Inuvik; Richard Popko, ENR, Norman Wells; Bruno Croft, ENR, North Slave Region; Jan Adamczewski, ENR, Yellowknife; Mathieu Dumond, Nunavut Wildlife Division, Kugluktuk; Allen Niptanatiuk, Nunavut Wildlife Division, Kugluktuk.

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Monitoring of the Bathurst Caribou Herd

Period: Late winter and October of 2009

Main Investigator: Bruno Croft, Manager Research and Monitoring, Environment and Natural Resources, GNWT, North Slave Region

Wildlife Research Permit Number: WL005672

LOCATION:

The late winter 2009 composition survey took place between March 25-28, 2009, and most of the caribou classified were located between Gametì, Wekweètì and Yellowknife.

No fall composition survey was conducted in 2009.

RATIONALE:

Monitoring and documenting over-winter calf survival provides a measure of net recruitment of new animals into the caribou herd and is one important indicator to assess status of a caribou herd. The monitoring actions are conducted every year in late March and/or early April.

The fall composition survey conducted during the rut provides a measure of the number of bulls compared to the number of cows in a caribou herd and is also an important indicator of herd status.

OBJECTIVES:

To determine movement and distribution of the caribou;

To determine spring calf survival; and

To determine sex and age ratio, as well as early fall calf survival.

METHODS:

A preliminary fixed-wing reconnaissance survey is conducted first to determine locations of caribou in relation to collared cows. Once caribou numbers and location are determined, a team of biologists and community observers classify caribou using a helicopter to land near animals and a spotting scope.

RESULTS AND MAIN CONCLUSIONS:

5,163 caribou were classified in late winter. The calf:cow ratio was 39 per 100.

LONG-TERM PLANS AND RECOMMENDATIONS:

The late winter and fall composition surveys are two important indicators of population status and will be continued on an annual basis until herd recovery is demonstrated.

PARTNERS:

Tłı̨chǫ Government and the community of Gametì.

COMMUNITY INVOLVEMENT:

Information from the communities was used to interpret movements and locate caribou for spring and fall composition counts. Aboriginal hunters were part of the survey teams to help assess overall condition of animals classified.

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Distribution and Movements of the Ahiak and Beverly Herds

Period: March 15, 2008 to March 31, 2009

Main Investigator: Deborah Johnson, Regional Biologist, Environment and Natural Resources, GNWT, South Slave Region

Wildlife Research Permit Number: WL004762

LOCATION:

Ahiak and Beverly barren-ground caribou range.

RATIONALE:

The combined range of the Ahiak and Beverly barren-ground caribou herds is one of the largest in North America and ranges from northern Saskatchewan to the Queen Maud Gulf in Nunavut. A recent surge in mineral exploration, due to the increased price of base metals and proposed hydroelectric projects, is occurring on their collective spring and fall migration corridors, calving, post-calving, fall rutting and wintering areas in the NWT and Nunavut, and there are mines and winter roads on their southern winter range in northern Saskatchewan. Collars are the most cost effective and least intrusive method for obtaining information on caribou movements and distribution to assess the cumulative impacts of human activity and natural disturbances. Collar technology is an invaluable tool to collect information on seasonal movements and range use patterns and to aid in surveying population parameters.

OBJECTIVES:

To gather baseline information on the location and annual variation in the movement rates, seasonal range use patterns and migration routes used by the Ahiak and Beverly herds;

Where industrial activity does occur, to compare Ahiak and Beverly movement rates to human activities;

To describe the movement and distribution of the Ahiak and Beverly herds in relation to wildfires on the winter range;

To assess Ahiak and Beverly herds' habitat selection to ensure the long-term availability and appropriate distribution of seasonal caribou habitats;

To examine the fidelity of Ahiak and Beverly female caribou to specific habitats, such as calving grounds; and

To compare Ahiak and Beverly herd distribution with the Bathurst and Qamanirjuaq herds to improve the assignment of harvest to each herd.

METHODS:

Deploy an additional 30 collars on the Beverly / Ahiak winter range. Caribou are live-captured by an experienced capture crew using a net gun fired from a helicopter. Noise and touching are kept to a minimum. Caribou are assessed for any injuries and monitored throughout the handling process. A collar is fastened around the animal's neck and then blood and fecal samples are collected when possible. Handing lasts less than ten minutes and immobilizing drugs are not used.
Movements of collared caribou are monitored via GPS-satellite transmitters. Data is retrieved using the ARGOS system every three days and various types of analysis are performed on the data.

RESULTS AND MAIN CONCLUSIONS:

Thirty GPS collars (Telonics TGW-3680) were deployed in March 2008 in the Ahiak/Beverly herd winter range. Two of the collared cows were on the traditional Beverly calving ground during the 2008 calving season. The remaining cows collared in 2008 were on or near the Ahiak calving ground (Queen Maud Gulf area) in June 2008, except for one collared Bathurst cow.

Less than half (13 out of 30) of the cows collared were pregnant in March, which is a very low pregnancy rate for caribou. Fewer cows reached the core calving areas in 2008, which is consistent with a low pregnancy rate.

As of March 2009, there are 38 GPS collars on Ahiak and Beverly cows: 10 from a March 2006 deployment (drop date Jan 2011); seven collars from a July 2007 deployment (drop date May 2012); and 21 collars from the April 2008 deployment (drop date Jan 2013). GNWT biologists are analyzing the collar data.

LONG-TERM PLANS AND RECOMMENDATIONS:

Continue to collect information on seasonal movements and range use patterns, and to use collar data to aid in surveying population parameters. Spring composition and fall sex ratio surveys are planned for 2009.

Ahiak and Beverly calving ground delineation surveys will be conducted in June 2009.

Work cooperatively with the Governments of Nunavut and Saskatchewan, affected communities and the Beverly Qamanirjuaq Caribou Management Board to identify monitoring actions and census techniques and to better understand the current status of the Ahiak and Beverly herds.

COMMUNITY INVOLVEMENT:

The initial motion to collar the Beverly herd was accepted and moved by the Beverly Qamanirjuaq Caribou Management Board (BQCMB) in November 2005. The BQCMB has representation from the communities on the caribou range, specifically from the Dene Nation and the NWT Métis Nation in the NWT, and from Uranium City, Black Lake, and Wollaston Lake in northern Saskatchewan.

The Lutsel K'e, Salt River, Deninu K'ue and Smith Landing First Nations and the Fort Smith and Fort Resolution Local Métis Councils were consulted on this project through application for a wildlife research permit.

PARTNERS:

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Health, Condition and Contaminant Monitoring of the Ahiak and Beverly Barren-Ground Caribou Herds

Period: February 2009 to May 2009

Main Investigator: Allicia Kelly, Regional Biologist, Environment and Natural Resources, GNWT, South Slave Region

Wildlife Research Permit Number: WL004768

LOCATION:

Collections occurred at two locations on the winter range of the Ahiak and Beverly caribou from February 22-28, 2009.

Below the treeline: south of Reliance (62.5569 N, 108.981 W).

Above the treeline: east of Artillery Lake near Ford Lake (63.2061 N, 107.513 W).

RATIONALE:

This project was initiated to collect baseline and trend information on the health, condition and reproductive status of Ahiak caribou. Understanding what types and levels of parasites, diseases and contaminants are present in these herds is important in determining whether these factors may be contributing to individual animal and population health of the Beverly and Ahiak herds.

OBJECTIVES:

To assess current health status and provide baseline data for ongoing community monitoring and future scientific collections;

To collect information on body condition and pregnancy rates of caribou located below and above the treeline on the Ahiak and Beverly caribou late winter range;

To collect information on the diseases and parasites to assess current status and monitor trends over time;

To collect information on the presence of environmental contaminants, to assess current exposure and trends over time; and

To compare this information to previous information from the Beverly and other caribou herds across the North, using a standardized protocol developed by the CircumArctic Rangifer Monitoring & Assessment Network (CARMA) and previous collections by GNWT, ENR.

METHODS:

Collection locations were established based on the location and distribution of caribou, determined by location of collars, advice from the communities, and reconnaissance flights. Caribou were collected from both above and below treeline to obtain samples from cows distributed across the traditional winter range of these herds. Local hunters harvested and butchered the caribou, and a sampling crew collected detailed measurements and samples from each animal. The below-treeline collection was coordinated with Aurora College's Natural Resource and Technology Program (NRTP) Winter Camp. NRTP students harvested and butchered caribou and assisted with the sample collection.

Field sampling and laboratory testing followed standardized protocol developed by the CircumArctic Rangifer Monitoring & Assessment Network (CARMA) and previous collections by GNWT, ENR. Level 1 sampling (basic measurements and samples) was conducted at the NRTP camp. Level 3 (intensive) sampling was done above treeline. Level 3 samples include a wide range of tissues: blood (whole blood & filter paper), lymph nodes, tonsils, lung, heart, spleen, adrenal, kidney (left) with fat, liver (caudate lobe), 4th stomach (abomasums), testicle or ovaries, metatarsus bone with skin on, feces, hair. Some measurements are done in the field (e.g. body weight), and other samples were returned to be processed in Fort Smith and outside laboratories. Samples are stored where required for future testing needs.

RESULTS AND MAIN CONCLUSIONS:

10 caribou (four cows, four bulls, two yearlings) were harvested below treeline. All four adult cows and one yearling were pregnant. Back fat ranged from 0 to 12 mm.

26 caribou (24 cows, two bulls) were harvested above treeline. 22 of 24 (94%) adult cows were pregnant. Back fat ranged from 0 to 26 mm.

Pregnancy rate was very good. Condition varied between animals, but overall animals were in good shape for the time of year. Warbles per animal ranged from 0 to 330. Teania cysts (liver) were observed on four of 36 caribou. No other parasites (nose bots, liver worms, heart cysts, lung cysts, lung worms, Setaria) were observed. Samples have been processed and shipped to outside labs for further analysis.

LONG-TERM PLANS AND RECOMMENDATIONS:

Recommend a second collection in 2010 to contribute to an adequate sample size for providing baseline data on the health and condition of Ahiak and Beverly barren-ground caribou.

Results from the Joint Caribou Monitoring Pilot Project with northern Saskatchewan communities will be combined with this data to gain a broader picture of the health and condition status of caribou on the Ahiak and Beverly herd winter range.

PARTNERS:

Environment and Natural Resources

Aurora College Natural Resources and Technology Program (NRTP)

COMMUNITY INVOLVEMENT:

Communities were consulted through the application for a research permit. Students and instructors from Aurora College's NRTP program harvested caribou below treeline and collected samples. A local hunter harvested caribou above the treeline and a biologist from northern Saskatchewan (partnership position with the Prince Albert Grand Council and Saskatchewan Ministry of Environment) assisted with sampling. The meat was distributed to Lutsel K'e First Nation, Salt River First Nation and the Fort Smith Métis Association. Preliminary results have been presented at the May 2009 meeting of the Beverly Qamanirjuaq Caribou Management Board, which has representatives from communities throughout this caribou range.

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Photo Credit: Tom Jung

Ecology of Boreal Woodland Caribou in the Lower Mackenzie Valley, NT

Period: April 2009 to March 2010

Main Investigator: Tracy Davison, Regional Biologist, Environment and Natural Resources, GNWT, Inuvik Region

Wildlife Research Permit Number: WL005594

LOCATION:

Gwich'in Settlement Region.

RATIONALE:

Boreal woodland caribou has been listed as "threatened" under the federal *Species at Risk Act*. A national Recovery Strategy is being developed and an NWT Action Plan has been completed. Those processes requires sound baseline scientific and traditional knowledge.

Until recently, little scientific knowledge was available for boreal ecotype woodland caribou *(Rangifer tarandus caribou)* that occur along the Mackenzie River Valley from the NWT/Alberta border to the area of the Mackenzie Delta.

OBJECTIVES:

To obtain estimates of home range size and seasonal movements of adult females and adult males;

To determine patterns of habitat use and selection, including use of areas burned by wildfires and use of area in relationship to manmade linear features, such as seismic lines;

To map the relative probability of occurrence of boreal woodland caribou across the Gwich'in Settlement Area using caribou use (satellite tracking) data and existing Landsat TM based vegetation maps;

To identify seasonal habitats that may be limiting for boreal woodland caribou in the Gwich'in Settlement Area; and

To obtain estimates of productivity, recruitment, and survival (calf and adult female) rates.

METHODS:

Telemetry flights were conducted three times a year (April, May/June, and October) to locate collared cow caribou. Composition of the group and whether the collared cow has a calf at her side are recorded. GPS and satellite collars are monitored remotely throughout the year.

RESULTS AND MAIN CONCLUSIONS:

Late winter 2009, 16 collared caribou were located and there was an over-winter calf survival rate of 56%. During calving 2009, 14 collared caribou were located with a calving rate of 78%. In the fall eight collared caribou were located with a calf survival rate of 62%.

Two of the collared caribou died during the year and two of the collars released.

LONG-TERM PLANS AND RECOMMENDATIONS:

Collared caribou will continue to be monitored until last planned collar release date of August 2011. There are no plans to collar additional boreal woodland caribou in the region at this time.

PARTNERS:

Environment and Natural Resources

Gwich'in Renewable Resource Board (GRRB)

COMMUNITY INVOLVEMENT:

Assistants are hired from local communities of Inuvik and Tsiigehtchic. Results presented to GRRB and Renewable Resource Councils (RRCs).

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Continued Monitoring and Deployment of Satellite Collars on Dehcho Boreal Caribou

Period: 2009

Main Investigator: Nic Larter, Regional Biologist, Environment and Natural Resources, GNWT, Dehcho Region

Wildlife Research Permit Number: WL004972

LOCATION:

The study area includes both the south central and north central portions of the Dehcho, roughly bounded to the north by Blackwater Lake, to the south by the 60th parallel, to the east by the Redknife Hills (south) and the Horn Plateau (north), and to the west by the Liard Highway 7 (south) and the Mackenzie River (north).

RATIONALE:

Boreal caribou are listed as Threatened in Canada under the federal *Species at Risk Act*. The cumulative effects of natural and man-made disturbance have been implicated in the declining numbers of this species. Similar studies were initiated during 2002-2004 throughout the range of boreal caribou in the NWT, including the Inuvik, Sahtu, South Slave and Dehcho regions.

In partnership with Sambaa K'e Dene Band, Environment and Natural Resources (ENR) initiated this study in March 2004 by deploying radio collars on caribou in the Sambaa K'e traditional lands. The main study goal was to assess the basic ecology of boreal caribou and collect baseline data on caribou inhabiting areas subjected to limited human disturbance. In partnership with Liidlii Kue First Nation and the Fort Simpson Métis, ENR extended the study in March 2005 when radio collars were deployed on caribou in the Ebbutt Hills area.

Preliminary DNA analyses indicate that the historical gene flow of boreal caribou in the NWT occurred in both a north-south and east-west direction. Boreal caribou, residing in the central Dehcho, provided an opportunity to collect key genetic data on historical gene flow corridors of boreal caribou and to collect important ecological baseline data in an area of their range that already has one pipeline traversing it and falls within the proposed route of the Mackenzie Gas Pipeline.

With the success of the initial deployment of collars in 2004 and 2005, there was interest by other Dehcho First Nations in having collars deployed in their traditional lands. Following community consultations, deployments in 2006 and 2007 included caribou residing in the traditional lands of Jean Marie River First Nation, Pehdzeh Ki First Nation, Nahanni Butte Dene Band, and Acho Dene Koe Band.

OBJECTIVES:

To ensure enough collars are deployed on female caribou to document seasonal range use of female caribou over multiple years in areas of the boreal caribou range which have had limited fire and seismic disturbance and areas of the boreal caribou range which have had industrial impacts like the Enbridge Pipeline;

To ensure enough collars are deployed on female caribou to document seasonal movements of female caribou over multiple years, thus permitting us to assess the fidelity in seasonal movements and range use over a maximum 4-year period;

To ensure enough collars are deployed on female caribou to determine the period of calving and whether or not boreal caribou in this area tend to congregate in calving areas;

To collect detailed daily movements of individual females residing in strategic areas of caribou range (Arrowhead, Celibeta Lake, Willow Lake River, and Jean Marie River) over a minimum 3-year period;

To provide empirical data to test the predictions and robustness of a previous study completed to predict high-value boreal caribou habitats in the Dehcho;

To provide baseline information on caribou ecology prior to the construction phase of the proposed Mackenzie Gas Pipeline, and possibly during the construction phase, and provide the opportunity to compare with animals collared after the pipeline construction phase;

To provide baseline information on caribou ecology in the Arrowhead area prior to additional industrial exploration and activity;

To document seasonal female:calf ratios of caribou and to estimate adult female survival;

To provide additional ecological data on boreal caribou as part of the requirements for procuring Protected Area status for lands of interest in the Trout Lake area; and

To ensure an adequate sample size of functioning collars on caribou for future population monitoring.

METHODS:

Adult female caribou were live-captured using net-gunning techniques approved by the ENR Animal Care Committee and used in previous collar deployments; all collars will be deployed on female caribou in February 2009.

A limited number of biological samples were collected from each female caribou based upon the opportunity provided during each individual live-capture. Samples included blood, feces, and neck measurements.

Collars deployed in 2008 included a new satellite collar TAW-4610H that provides daily locations during the predicted calving period (1 May to 14 June) and locations every three days for the rest of the year and seven GPS collars (TGW-3680) that provide three locations daily for an approximate 40-month life span. They are equipped with VHF beacons and release mechanisms.

All collars were deployed in areas requested by First Nations involved in the project.

Blood and fecal samples were submitted for a variety of lab analyses.

Collars were retrieved from deceased animals and refurbished for redeployment.

Aerial relocation flights were conducted to monitor calf production and overwinter calf survival, and to locate animals wearing VHF collars.

RESULTS AND MAIN CONCLUSIONS:

Posters showing caribou ranges over a three month period are produced quarterly and distributed to all partners on an ongoing basis.

Community meetings and consultation are conducted annually on an ongoing basis.

The results of helicopter calf counts in June, and class counts in February, have been circulated to all partners.

The lab analyses of biological samples is ongoing.

A paper on the presence of diseases and parasites in boreal caribou is being prepared.

The Dehcho Boreal Caribou Progress Report (April 2009) was circulated to all partners and was posted on the ENR website.

A complete review of all results of the program were presented, discussed, and well received at the biannual Dehcho Regional Wildlife Workshop in October 2008.

A presentation was made at the Naxehcho (elders) and Harvesters Gathering.

LONG-TERM PLANS AND RECOMMENDATIONS:

Monitoring collars should remain ongoing, with flights to retrieve collars being made as required. Retrieved satellite and GPS collars should continue to be refurbished for re-deployment.

Flights to determine the number of calves born to satellite collared caribou and to classify animals should continue to be conducted annually and with a helicopter to get accurate information as efficiently as possible.

GPS collared caribou need not be surveyed post calving because analysis of their movement patterns can determine if and when they calved.

Meetings to discuss the caribou program with our partners will be ongoing.

At the Dehcho Regional Wildlife Workshop (October 2008), the program was reviewed and critiqued by representatives from all Dehcho First Nations, recommendations to continue the program were made.

The 2010 Regional Wildlife Workshop will have an open forum review of the program.

PARTNERS:

Environment and Natural Resources

Sambaa K'e Dene Band

Nahanni Butte Dene Band

Jean Marie River First Nation

Fort Simpson Métis Local

Liidlii Kue First Nation

Pehdeh Ki First Nation

Acho Dene Koe Band

COMMUNITY INVOLVEMENT:

At annual community meetings and biannual regional wildlife workshops, the caribou program is discussed in an open forum format. Community issues and concerns are addressed and collar deployment is based on direction from these meetings. An annual application for wildlife research permitting provides additional avenues for community input. Local residents have participated in collar retrievals and in aerial reconnaissance flights, when and if recommended by local First Nations. Because we all want to minimize animal harassment, collar deployment is contracted out to a professional team.

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Deployment of GPS and Satellite Collars on Dehcho Boreal Caribou

Period: April 1, 2009 to March 30, 2010

Main Investigator: Nic Larter, Regional Biologist, Environment and Natural Resources, GNWT, Dehcho Region

Wildlife Research Permit Number: WL004974

LOCATION:

This is an ongoing study, initiated in March 2004, that has increased in size and scope to include the traditional areas of eight Dehcho First Nations and includes that area of the Dehcho Region east of the Mackenzie Mountains. The study area is adjacent to the North and South Cameron Hills study areas where female boreal caribou have been collared by the South Slave regional office of Environment and Natural Resources (ENR). The 18 collars deployed under this permit were deployed within the area indicated on the map. Only three of these 18 collars were newly purchased units. The remaining 15 units were retrieved after programmed release, or retrieved from animals that had died. All of these units were refurbished and the satellite collars reprogrammed to provide more movement information during the now documented calving dates.

RATIONALE:

Baseline data on boreal caribou in the Dehcho are lacking. Oil and gas exploration is anticipated to continue and increase in the future, especially with the proposed Mackenzie Gas Pipeline. To ensure informed land use decisions are made in regard to the stability of boreal caribou populations in the Dehcho, radio-collars were deployed on female boreal caribou starting in March 2004.

A combination of satellite, GPS and VHF collars have been deployed on female boreal caribou to document seasonal range use, seasonal movements, detailed daily movements, and fidelity to calving areas of female caribou over multiple years in areas of boreal caribou range which have had limited to moderate fire and seismic disturbances.

These data will be used to assess impacts of potential development and to determine thresholds of tolerance to disturbance.

OBJECTIVES:

The key objective of the deployment was to maintain the sample size of at least 30 collared female boreal caribou in the study area and to increase the number of GPS collars or newly programmed satellite collars. Both of these collar types are capable of providing multiple daily locations during the calving period so a calving date can be determined, thus precluding the need for post-calving aerial surveys. The study objectives follow:

To document seasonal range use of female caribou over multiple years in areas with a range of seismic and fire disturbance history;

To document seasonal and detailed daily movements of female caribou over multiple years in areas with a range of seismic and fire disturbance history;

To determine the calving period and the degree of fidelity of female caribou to calving areas over multiple years in areas with a range of seismic and fire disturbance history;

To provide baseline information on boreal caribou ecology of interest to local First Nations and for use in detailed analyses and modeling exercises to assess the impacts of disturbance by various landuse practices; and

To provide empirical data to test predictions and the robustness of other studies predicting high value boreal caribou habitats.

METHODS:

Adult female caribou were live-captured by a professional net-gunning team using techniques that have been approved by the ENR Animal Care Committee and used in previous collar deployments. The net is fired by a gunner in the helicopter and captures the caribou.

Blood, hair and fecal samples, a neck girth measurement and photos of the teeth were collected from each female caribou as long as the opportunity was provided.

RESULTS AND MAIN CONCLUSIONS:

Collars were deployed successfully on 18 female boreal caribou throughout the Dehcho Region. An additional nine GPS collars and nine newly programmed satellite collars were deployed. The GPS units will provide locations three times daily through to summer 2013. The newly programmed satellite collars will provide location data over a varying time period through to summer 2015. Both types of collars will provide data that will allow us to determine an accurate calving date, thereby precluding the need for post-calving surveys and this additional disturbance.

LONG-TERM PLANS AND RECOMMENDATIONS:

Monitoring of collared caribou will continue through the life of the collars that have currently been deployed to better refine local and landscape seasonal patterns of use over extended periods of time. Detailed analyses are currently being conducted with results to be used for environmental assessments of landuse activities, among other things. The program will be reviewed, critiqued, and results updated at the 5th biannual Dehcho Regional Wildlife Workshop in October 2010.

WEBSITE: http://www.enr.gov.nt.ca/_live/documents/documentManagerUpload/Dehcho_Boreal_Caribou_Study-Apr.09.pdf

PARTNERS:

Indian and Northern Affairs Canada

Environment Canada

Sambaa K'e Dene Band

Liidlii Kue First Nation

Fort Simpson Métis Local

Jean Marie River First Nation

Pehdzeh Ki First Nation

Nahanni Butte Dene Band

Acho Dene Koe Band

Ka'a'gee Tu First Nation

COMMUNITY INVOLVEMENT:

The eight local First Nation partners provided information on where they would like caribou collared and indicated that animals currently collared be used for locating other caribou to capture for collar deployment. Local community harvesters were hired as observers on the aerial reconnaissance flights made prior to and during the capture operation. These flights were necessary because of poor weather conditions and distribution of caribou into more treed habitats.

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Photo Credit: John Nagy

Boreal Caribou Population Trends and Habitat Use in the North and South Cameron Hills Area

Period: January 1, 2009 to December 31, 2009

Main Investigator: Allicia Kelly, Regional Biologist, Environment and Natural Resources, GNWT, South Slave Region

Wildlife Research Permit Number: WL004772

LOCATION:

The combined study area is bounded by Hay River to the east, the Mackenzie River and Great Slave Lake to the north, the Redknife and Kakisa Rivers to the west and the Hay River to the south.

Hay River Lowlands

The Hay River Lowlands study area lies immediately to the north of the Cameron Hills, west of the Hay River, south of the Mackenzie River/Great Slave Lake and is bounded to the west by the Redknife and Kakisa Rivers.

Cameron Hills/Bistcho Lake

The Cameron Hills study area encompasses the Cameron Hills, is bounded to the east and south by the Hay River, and to the west by the BC border.

RATIONALE:

Boreal caribou are listed as a threatened species under the federal *Species at Risk Act*. The cumulative effects of habitat destruction, hunting, disturbance by humans (including roads, seismic lines, and pipelines) and predation (by wolves and black bears) are implicated in the decline of boreal caribou. The results from this study will assist in assessing the status of this nationally threatened species in the NWT. A proactive approach to monitoring is needed to ensure boreal caribou do not become a species at risk in the NWT and to ensure boreal caribou continue to be sustainable in the NWT.

OBJECTIVES:

To measure baseline adult female and calf survival rates;

To determine seasonal use of habitat by adult cow caribou; and

To map predicted boreal caribou occurrence at various scales.

METHODS:

Since March 2003, 60 boreal caribou cows have been collared in the Hay River Lowlands areas, and 51 boreal caribou cows have been collared in the Cameron Hills/Bistcho Lake area.

Calf production is determined by assessing pregnancy rates collected from blood serum during the capture of cows while collaring, and by assessing movement rates of GPS-collared cows during the calving period (period of low movement rates is indicative of calving) or visual surveys for VHF collared cows.

Cow survival is monitored with GPS collars and by visually locating cows during fixed-wing radio-tracking at the end of calving, mid-summer, fall and late winter.

Calf recruitment is determined from aerial surveys in March by counting the number of calves and adults in each range associated with collared caribou. Other caribou found with the collared cow are classified as adult female, mature male and calf. Recruitment is expressed as ratio of calves per 100 adult cows.

RESULTS AND MAIN CONCLUSIONS:

No additional collars were deployed in 2009. As of December 31, 2009, there are 17 active collars in the Hay River Lowlands study area (10 VHF, 5 Satellite and 2 GPS) and 15 active collars in the Cameron Hills study area (4 VHF, 1 Satellite and 10 GPS).

Adult female survival from April 2008 to March 2009 was 0.91 (SE=0.05) in the Hay River Lowlands and 0.79 (SE=0.07) in the Cameron Hills.

The mean calf:cow ratio observed during the 2009 late winter composition survey was 0.19 (SE=0.03) (or 19 calves:100 cows) in the Hay River Lowlands and 0.13 (SE=0.04) in the Cameron Hills.

Analysis of collar and survey data is ongoing and information from this study has been included in draft papers that will be submitted to scientific journals.

Presentations of findings have been delivered to communities at the 2008 Dehcho regional wildlife workshop and the 2009 South Slave regional wildlife workshop.

LONG-TERM PLANS AND RECOMMENDATIONS:

Recommend that this program continue to collect information on seasonal movements and habitat use and continue monitoring demographic parameters in 2010.

This study was initiated to collect data on boreal caribou which were previously listed as data deficient in the NWT. This baseline study will continue for one more year (with existing collars), at which time boreal caribou research and monitoring needs in the South Slave region will be evaluated. A new program will be developed based on monitoring requirements and information gaps.

COMMUNITY INVOLVEMENT:

This project was initially discussed at a meeting held in Kakisa in January 2003. In 2007, study results were presented at meetings in Hay River and Fort Providence. Study results were presented at the Dehcho wildlife workshops in Fort Simpson in 2004, 2006 and 2008, and at the South Slave regional wildlife workshop in 2009. Community members have participated as observers on some surveys. Local First Nations (Kakisa, Hay River and Fort Providence) review this project annually through the application for a wildlife research permit.

PARTNERS:

Environment and Natural Resources

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Greater Nahanni Caribou Population Monitoring

Period: September 2009 to October 2009

Main Investigator: Troy Hegel, Caribou Biologist, Yukon Government

Wildlife Research Permit Number: WL005621

LOCATION:

This survey took place in the South Nahanni river watershed, the trans-boundary area north of the Cantung mine, and in and adjacent to the Nahanni National Park Reserve east of the Flat River.

RATIONALE:

The South Nahanni and Coal River mountain caribou herds are both readily accessible, with all-season roads located within their ranges. Previous surveys and counts of the South Nahanni herd suggest that the herd may be heavily harvested, based on lower bull:cow sex ratios. This potentially high harvest level is coupled with recruitment rates that are lower than average for other mountain caribou herds throughout the Yukon Territory. Given the concern over the population dynamics of the herd, additional yearly monitoring of population parameters is warranted to gain a more complete assessment of the herd's health, compared to what can be inferred from a single year's estimate.

Photo Credit: Tom Jung

Furthermore, information on the space use of the South Nahanni herd is relatively sparse. The South Nahanni herd is bordered by three other herds: Coal River (south), Finlayson (west), and Redstone (north). Obtaining a better understanding of seasonal range delineation will reduce the likelihood that animals from other herds are included in monitoring and/or population estimation activities. Additionally, given the high amount of industrial activity occurring along the YT-NT border, a more comprehensive understanding of landscape use by this herd may provide information to better mitigate impacts of development.

OBJECTIVES:

To estimate the composition of the South Nahanni and Coal River mountain caribou herds, specifically recruitment (calf:cow) and sex (bull:cow) ratios; and

To estimate the size of the South Nahanni caribou herd.

METHODS:

Composition Counts – A helicopter was used to fly at or above tree line, focusing on high plateaus, which are areas known to be used by mountain caribou during the rut. Routes were flown and areas chosen to avoid double-counting animals. When a group was observed, its composition was assessed and animals were classified into one of five categories: calf, adult female, immature male, mature male, or unclassified.

Mark – Re-sight Survey – A mark – re-sight approach was used to estimate the size of the South Nahanni herd. Marked animals were those that were radio-collared with the yellow collars in 2008. During the fall, three separate re-sighting surveys were flown in which the numbers of marked and

unmarked animals were counted. Using information from the detailed locations of the radio-collared animals, and the recorded flight tracks of the re-sighting surveys, we were able to identify which marked animals were and were not observed during a session.

RESULTS AND MAIN CONCLUSIONS:

Composition Counts – During the survey we observed 58 groups of animals, with an average group size of 9.0 animals (range: 1-33). We classified a total of 518 animals, over twice the number classified in 2008 (n=245). The recruitment rate for the herd was 16.4 calves:100 cows. This year's sex ratio, 41.0 bulls:100 cows, was slightly higher than the 2008 estimate of 35.5 bulls:100 cows.

Mark – Re-sight Survey – Twenty-four marked animals in total were distributed across the survey area during the surveys. Data analysis is currently on-going and a formal population estimate will be available in 2010.

LONG-TERM PLANS AND RECOMMENDATIONS:

Satellite collars will be monitored during the next three years to provide more precise estimates of seasonal distribution and movement patterns. During the next two years, composition counts will be carried out on both the South Nahanni and Coal River herds to provide a more accurate assessment of the condition of the herd then can be obtained with only one year's estimate. This South Nahanni herd size estimate, in conjunction with parameters collected during composition counts, will be used to assess the sustainability of the harvest at current levels.

PARTNERS:

Environment and Natural Resources

Parks Canada - Nahanni National Park Reserve, Park Establishment Branch

Environment, Yukon Government

COMMUNITY INVOLVEMENT:

During both composition counts, observers from local communities participated in survey operations. During the South Nahanni surveys, Darrel Betsaka (Nahanni Butte) and Joseph Ayah (Tulita), assisted the survey crews, and Christina Guillemette (Watson Lake) assisted during the Coal River survey. When feasible, community members will be invited to participate in future years' surveys. Results from this year's work may be presented at the future Dehcho wildlife workshop and this report will be distributed to communities in both the Yukon and Northwest Territories.

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Moose Census for Buffalo Lake and River

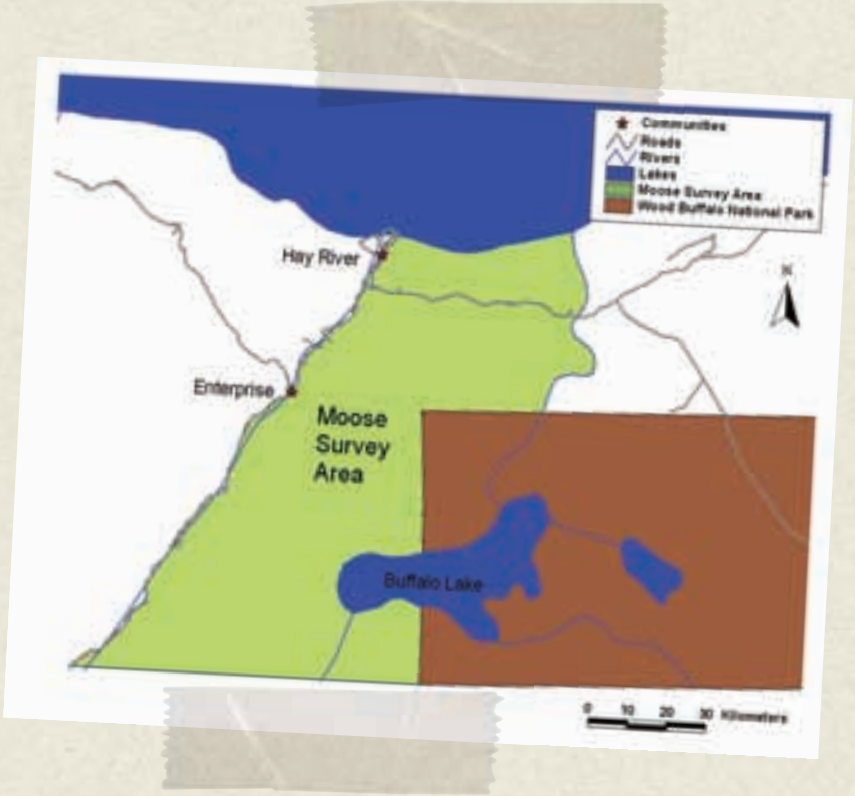
Period: November 29, 2009 to December 9, 2009

Main Investigator: Claudia Haas, Protected Areas Strategy Biologist, Environment and Natural Resources, GNWT

Wildlife Research Permit Number: WL004802

LOCATION:

The survey was conducted in the area between the Hay River, Buffalo River and the portion of Buffalo Lake outside of Wood Buffalo National Park.



RATIONALE:

Moose are an important food source for Aboriginal hunters. Moose densities are low in the NWT, ranging from one to 17 moose/100 km^2, and the extent of the subsistence hunt is unknown. At the 2008 Dehcho Regional Wildlife Workshop, the K'átł'odeeche First Nation requested a moose survey be conducted in the Buffalo Lake and River area, since no moose census had been conducted in this area. Areas around Buffalo Lake and the Hay River have previously been identified as areas important to moose in the region.

OBJECTIVES:

To identify the approximate distribution of moose in the study area from community observations. This information will be used to assist in a stratification of habitats to assist in aerial surveys;

To estimate the number and density of moose around Buffalo Lake and River; and

To estimate the bull:cow and calf:cow ratios for population monitoring.

METHODS:

The need for consistent moose survey techniques among regions led to a workshop on moose population assessment in Yellowknife in May 2003. The result of that workshop established the geospatial survey method as the standard for the Northwest Territories. This spatial technique is an extension of the "Gasaway" method developed earlier in Alaska, but with some important modifications on grid pattern and block size.

A map of the survey area for moose was developed in consultation with elders, hunters, and wildlife officers. The final area equals 5,707 km^2. Once the boundaries of the survey were finalized, a rectangular grid based on 2° latitude and 5° longitude (approx. 16 km^2) was overlaid on the survey area. Grid cells were then stratified as either high or low moose density. Stratification was based on sighting records of moose, harvest statistics, remotely sensed habitat assessment, community consultation, and expert opinion. Grid cell stratification will be repeated to incorporate recent information. Essentially, grid cells are ranked based on the yes/no assessment by biologists and hunters on whether a moose would likely occupy that area. Positive responses are assigned a high density, and negative responses would be ranked low density. Once stratified, approximately 60 sample blocks were selected. Selection of grid cells was determined randomly for the first 90%, after which the remaining grid cells will be selected non-randomly to fill in areas that were not covered or lightly sampled from the random selection.

A fixed-wing aircraft flew the survey counts in November/December 2009 with two observers on either side of the plane to sight moose. Navigation was facilitated by GPS to display grid cell corners and display GPS tracking logs as they are flown. This helped ensure complete visual coverage of the selected grid cell for moose in association with the type of habitat encountered. All locations of animal sightings were recorded. Sex and age class of moose were recorded to estimate bull:cow and calf:cow ratios.

RESULTS AND MAIN CONCLUSIONS:

In total, 75 moose were observed in the study area, including 28 moose sighted in between survey blocks. Of the entire study area of 5,707 km^2, 981.5 km^2 was surveyed, which is about 17% of the entire study area. Taking into account that, generally, areas with a higher expectance of moose were surveyed more often, we are generally confident that the number of moose in the entire study area, based on what was sampled, is between 204 and 368 moose with an average of 286 moose (with a 80% confidence interval). This would equal about five moose/100 km^2 on average. Of all the moose observed, 36 were bulls, 27 were cows, and 13 were calves. There is an approximate ratio of 53 calves per 100 cows (S.E. 17) and 123 bulls per 100 cows (S.E. 40) for the entire study area. No cows with twin calves were observed, giving a twinning rate of 0%.

LONG-TERM PLANS AND RECOMMENDATIONS:

This information may be used to detect changes in the status of moose in the Buffalo Lake area. The information will also be included in the Phase 2 Ecological Assessment for Buffalo Lake, River and Trails, Candidate Critical Wildlife Area. It will be used along with the breeding bird, waterfowl, and vegetation work that was conducted in June 2009 and an upcoming survey of muskrat push-ups in the Candidate Area.

COMMUNITY INVOLVEMENT:

A K'átł'odeeche First Nation elder/harvester and a Hay River Métis local harvester participated in the survey, were vital observers, and provided on-the-land skills and knowledge of the area for this project. The final report will be provided to all communities who request copies, including the K'átł'odeeche First Nation and NWT Métis Nation.

PARTNERS:

EBA Engineering

K'átł'odeeche First Nation

Hay River Métis Local

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Photo Credit: Dean Cluff

Dall's Sheep, Grizzly Bear and Wolf Interactions in the Richardson Mountains (Collar Retrieval)

Period: October 10, 2009

Main Investigator: Catherine Lambert Koizumi, University of Alberta

Wildlife Research Permit Number: WL007406

LOCATION:

We studied the spatial and indirect predation interactions between Dall's sheep, grizzly bears and wolves in the northern Richardson Mountains, between 2006 and 2009. Animals are no longer being monitored, but we needed to recover collars from the ground to collect all the location data. The collars retrieved in 2009 were in the Aklavik range, within the Gwich'in Settlement Area.

RATIONALE:

This project examines the spatial and dynamic relationships between Dall's sheep, grizzly bears and wolves in the Richardson Mountains. We deployed GPS collars on animals from the three populations in 2006 and 2007, and needed to retrieve collars that fell on the ground through a programmed self-release mechanism. We planned to recover nine collars (one wolf and eight grizzly bear collars) from the field in summer and/or fall 2009, and potentially in early summer 2010, if bad weather prevented collar recovery in the fall. No animal handling was involved. This is the last fieldwork component of this project. The recovery of the collars will provide us with detailed locations of the animals, which are needed for the analysis of spatial dynamics.

Photo Credit: K. Callaghan

OBJECTIVES:

Our objective for 2009 was to recover the collars on the ground to proceed to spatial analyses, which will help:

To document home ranges, movements and habitat use of Dall's sheep, grizzly bears and wolves;

To quantify the interactions between the three species, focusing on spatial dynamics, predation, nutritional ecology of grizzly bears and wolves, and behaviour (predator avoidance strategies) of Dall's sheep through complementary analyses and observations done in precedent years; and

To understand how landscape features (vegetation, topography), time of the year, climate, human harvest and other disturbances may affect the interactions between the three species.

Photo Credit: K. Callaghan

METHODS:

The Gwich'in Renewable Resources Board's (GRRB) wildlife biologist, Kristen Callaghan, and two Aklavik community members, Edward and Samuel McLeod, participated in a helicopter flight on October 10, 2009, to retrieve the remaining collars from the Richardson Mountains. The helicopter was piloted by Jeremy Giroux, of Gwich'in Helicopters.

RESULTS AND MAIN CONCLUSIONS:

Two of eight grizzly bear collars were retrieved. The wolf collar could not be located. Two grizzly bear collars were no longer transmitting and could not be located under the snow cover, despite an extensive search for each. The remaining four collars could not be retrieved, as changing weather conditions that brought high winds and low clouds after mid-day made it too dangerous, both to land and to fly within hiking distance of the collar locations. These six bear collars will need to be retrieved in the early summer of 2010, after snow melt. During the flight the crew also searched for the VHF radio frequencies of three wolf collars from the project that had been lost since 2006, but did not pick up any signals from these collars, which are likely no longer functioning. Moose, muskoxen and Dall's sheep were all sighted during the flight and their position was recorded.

LONG-TERM PLANS AND RECOMMENDATIONS:

The main investigator is currently analyzing the data collected in this project, and shall complete her PhD program this coming year. Published results will be distributed as soon as available.

PARTNERS:

Gwich'in Renewable Resources Board

Ehdiitat Renewable Resources Council

Tetlit Renewable Resources Council

COMMUNITY INVOLVEMENT:

The crew consisted of Kristen Callaghan, Wildlife Biologist at the GRRB, and two Aklavik community members, Edward and Samuel McLeod. Project updates were provided to the communities at the annual GRRB meeting during fall 2009 and spring 2010.

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NWT Wolverine Carcass Collection

Period: January 2009 to December 2009

Main Investigator: Robert Mulders, Wildlife Biologist, Carnivore and Furbearers, Environment and Natural Resources, GNWT

Wildlife Research Permit Number: WL005613

LOCATION:

All NWT regions (Inuvik region is covered under a separate WRP).

RATIONALE:

In the Inuvik, Sahtu and North Slave regions, there is increasing interest in providing opportunities for non-resident and non-resident alien hunters to participate in guided wolverine hunts. To determine if an increased harvest is sustainable, we require a better understanding of the current level, distribution and composition of wolverines being harvested. To do this, ENR is conducting a multi-year wolverine carcass collection. This effort will provide information on the age, sex, body condition, reproductive parameters and seasonal diet of the animals harvested. This data is needed to address a range of management issues facing this species.

OBJECTIVES:

To document the level and pattern of wolverine harvest in the NWT;

To assess the age, sex ratios, condition, seasonal diet, and reproductive parameters of the wolverines harvested across the NWT; and

To use genetic material to compare wolverine populations across the NWT, and to complement DNA hair-snagging efforts.

METHODS:

Environment and Natural Resources (ENR) is conducting an NWT-wide wolverine carcass collection. All hunters in the NWT are encouraged to participate and are offered financial compensation to bring in each complete skinned-out carcass and provide information on harvest date and location. This initiative will involve close collaboration with regional staff in terms of administering payment to hunters and in using a standardized necropsy protocol:

- Whole wolverine carcasses will be weighed and measured;
- Tooth removal for age analysis;
- Skulls removed, cleaned and measured;
- Stomach contents collected for diet analysis;
- Intestines to be examined for parasites;
- Body condition to be assessed;
- Female reproductive tracts examined; and
- Tissues collected for genetic analysis.

RESULTS AND MAIN CONCLUSIONS:

The main investigation is currently analyzing the data collected in this project. Results will be distributed as soon as available.

LONG-TERM PLANS AND RECOMMENDATIONS:

No long-term plans or recommendations submitted.

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Wolverine DNA Sampling on the Central Barrens

Period: January 2009 to December 2009

Main Investigator: Robert Mulders, Wildlife Biologist, Carnivore and Fur Bearers, Environment and Natural Resources, GNWT

Wildlife Research Permit Number: WL005674

LOCATION:

Areas surrounding Daring Lake, Ekati Diamond Mine, Diavik Diamond Mine, Kennady Lake Mine.

RATIONALE:

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) has identified wolverines as a conservation concern. On the central barrens, activities relating to mining exploration and sport hunting have increased. Agencies governing activities and wildlife monitoring have expressed concerns over the adverse cumulative effects on wolverine populations, habitat loss, disturbance and increasing mortality.

OBJECTIVES:

To determine wolverine abundance and density estimates at Daring Lake using a standard hair snagging sampling design; and

To obtain demographic data to monitor long-term changes in the wolverine populations.

RESULTS AND MAIN CONCLUSIONS:

The main investigation is currently analyzing the data collected in this project. Results will be distributed as soon as available.

LONG-TERM PLANS AND RECOMMENDATIONS:

No long-term plans or recommendations were submitted.

PARTNERS:

Environment and Natural Resources

Yellowknives' Dene First Nation

Integrated Ecological Research (John Boulanger)

Wildlife Genetics International (Dr. David Paetkau)

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Photo Credit: Danny Allaire

Monitoring of the Nahanni Wood Bison Population

Period: April 1, 2009 to March 31, 2010

Main Investigator: Nic Larter, Regional Biologist, Environment and Natural Resources, GNWT, Dehcho Region

Wildlife Research Permit Number: WL005026

LOCATION:

This is an ongoing study monitoring baseline population demography and disease presence in the Nahanni Wood Bison population. This study was initiated in 2002. The population ranges over NE British Columbia, SE Yukon Territory and SW Northwest Territories, with the majority of the range in SW Northwest Territories along and adjacent to the Liard and lower reaches of the South Nahanni River Valleys.

RATIONALE:

Annual composition surveys provide data on calf production and juvenile overwinter survival, and ratio of breeding age males to females. This data is useful for evaluating the impact of selective hunting, herd productivity, causes of death, predation on calves, and population survey estimates.

Recently, bison presence in communities has become an issue. To address the issue in part, GPS, satellite and VHF collars have been deployed on adult male and female bison to better identify animal movements, frequency of river crossings, population range, seasonal range, and animals frequenting communities, and to test the effectiveness of reflective collars along road corridors. Due to the recent increases in the presence of bison in Fort Liard, there is a need to assess different measures to mitigate bison presence and any perceived threats to human safety.

OBJECTIVES:

To measure calf, yearling, and bull:cow ratios during the post-calving period;

To monitor annual calf production and estimate overwinter survival of calf bison;

To collect biological samples as and when available from harvested animals or those involved in motor vehicle collisions;

To document seasonal movement patterns and range use of male and female bison throughout the range;

To document the frequency of river crossings by collared animals;

To identify and monitor the presence and movements of "town" male bison;

To monitor the presence and behaviour of bison in communities;

To document the year-round diet of Nahanni wood bison; and

To monitor the Nahanni wood bison population for the presence of brucellosis, tuberculosis and Johne's disease.

METHODS:

In mid-July we conduct a boat-based survey of bison along the Liard and South Nahanni Rivers from the British Columbia (BC) border to Blackstone. Bison are classified as calves, yearlings, cows, juvenile bulls, sub-adult bulls and mature bulls. Fresh fecal samples are collected during the survey.

Female and male bison were chemically immobilized following an approved ENR Wildlife Care Committee protocol. GPS and satellite collars were deployed on females, satellite and reflective VHF collars were deployed on males. Blood samples were collected and analyzed for disease.

Chemical immobilization darting from a helicopter and/or by ground-based stalking techniques was completed.

Blood samples were collected from hunter-killed bison (community quota) and analyzed for the presence of *Brucella abortus* antibodies. Teeth, fecals and lymph nodes were also collected. Hunters inspected carcasses for tuberculosis lesions or signs of brucella.

Any available biological samples were collected from dead or euthanized animals resulting from collisions with motor vehicles or other accidents.

RESULTS AND MAIN CONCLUSIONS:

125 bison were classified in July 2009; the number of calves and yearlings/100 females and overwinter survival estimates were average.

Lab analyses of fecal samples were completed and the bison diet database was updated accordingly.

Collared bison have been very adept at dropping their collars within their first year. Fortunately we have been able to retrieve the majority of these collars. However, this has created real problems in assessing seasonal movements and range use. Currently only 2 individuals have data collected over more than 1 year.

A difficulty in accessing immobilizing drugs has limited our ability to re-deploy radio collars that have been retrieved.

With the release of the Draft *Wood Bison Management Strategy for the Northwest Territories*, community meetings were held in Nahanni Butte and Fort Liard to review and critique the document. All concerns and suggestions voiced at these community meetings were forwarded to ENR Headquarters.

LONG-TERM PLANS AND RECOMMENDATIONS:

Continued monitoring of population demography with another aerial survey to estimate the population to be completed by 2011. Continued collaboration with Yukon Territorial Government and British Columbia Government on population monitoring and annual sex/age classification surveys.

Re-deploy as many radio collars on bison as possible in the near future to better assess seasonal range use.

Continued monitoring of collared wood bison and of animals frequenting communities. Working with communities to develop the *Wood Bison Management Strategy for the Northwest Territories*.

Continued monitoring for disease and the collection of biological samples from hunter-killed, darted or deceased animals as the opportunities arise.

PARTNERS:

Environment and Natural Resources

Yukon Territorial Government

British Columbia Provincial Government

COMMUNITY INVOLVEMENT:

The project was initiated based upon community requests. Local residents have participated as river guides for surveys. Local residents are hired to assist with the collection of biological samples and distribution of meat from animals euthanized in or near communities. At annual community meetings and biannual Regional Wildlife Workshops, the program is evaluated and critiqued by local First Nations and program comments are discussed and addressed.

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Photo Credit: G. Court

Bison Control Area Program, 2009

Period: January 1, 2009 to December 31, 2009

Main Investigator: Terry Armstrong, Bison Biologist, Environment and Natural Resources, GNWT, South Slave Region

Wildlife Research Permit Number: WL004767

LOCATION:

Mackenzie River and Great Slave Lake to Alberta border between Buffalo River and Trout River.

RATIONALE:

Bison herds in Wood Buffalo National Park and the Slave River Lowlands are infected with bovine tuberculosis and brucellosis, while both the Nahanni and Mackenzie bison populations are free of these livestock diseases. To help protect the disease-free status of these two populations, the Government of the Northwest Territories implemented the Bison Control Area (BCA) program in 1987 to reduce the probability of disease transmission between infected and uninfected populations. The program is jointly funded by Wood Buffalo National Park, and its objective is to prevent bison from moving through, or establishing herds within a large area south of the Mackenzie River between the Trout and Buffalo Rivers. To accomplish this, aerial surveys are flown to search for bison, and the public is encouraged to report any sightings or signs of bison within the BCA.

Photo Credit: T. Armstrong

OBJECTIVES:

To conduct aerial surveys during the winter months to search for bison in the BCA;

To remove any bison found or reported in the BCA; and

To confirm disease status of any bison found within the BCA.

METHODS:

Eleven shoreline flight patrols, a semi-comprehensive survey and a comprehensive survey, were flown between December 19, 2008 and April 24, 2009. Personnel included a pilot and one observer for shoreline patrols, and a pilot, a navigator, and two observers on semi-comprehensive and comprehensive surveys.

Photo Credit: Jane Harms

RESULTS AND MAIN CONCLUSIONS:

The 13 surveys were completed in 77.9 hours of flying over 19 days. No bison, bison tracks, or feeding craters were seen or reported within the BCA in the 2008-09 season, nor were there any reports of bison submitted by the public.

LONG-TERM PLANS AND RECOMMENDATIONS:

It is recommended that the BCA program continue until such time as the risk of disease transmission no longer exists, or a better method of reducing that risk is discovered.

PARTNERS:

Environment and Natural Resources

Parks Canada Agency

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Slave River Lowlands Bison Population Monitoring

Period: March 4-9, 2009

Main Investigator: Terry Armstrong, Bison Biologist, Environment and Natural Resources, GNWT, South Slave Region

Wildlife Research Permit Number: WL004769

LOCATION:

Slave River Lowlands area.

RATIONALE:

There are two bison herds in the Slave River Lowlands, the Hook Lake herd east of the Slave River and the Little Buffalo / Grande Detour herd west of the Slave River. These herds have declined to low densities since 1970 when there were about 2500 bison in the Lowlands. A prescribed fire program was implemented in the Hook Lake range in 1992 and the Fox Holes in 1999. One of the goals of the program was to increase the amount of forage for bison. Population size and age/sex data is monitored to provide insight into population dynamics, herd productivity and juvenile recruitment. These data will be used in development of long-term management plans. The most recent count of the Slave River Lowlands bison population was in February 2000, when 600 bison were observed in a survey of both sides of the Slave River.

OBJECTIVES:

To do a census of the Slave River Lowlands bison population.

METHODS:

An aerial census was carried out March 4-9, 2009. Personnel included a navigator, two observers and a pilot. The census zone included the entire known distribution of bison in the Slave River Lowlands between Fort Smith and Fort Resolution. The area was flown at 150 m above ground level following linear transects spaced at 2.5 km intervals. Bison were counted along 0.5 km strips on either side of the aircraft, under the aircraft and off transect. An estimate of population size was calculated from observations of bison seen on transect. A total count was also derived.

RESULTS AND MAIN CONCLUSIONS:

Weather conditions during the survey were very good, making bison highly visible from the air. We counted over 1000 bison in total, which is substantially higher than in 2000. Data analysis for a final estimate of density and confidence limits is in progress. A file report is in preparation.

LONG-TERM PLANS AND RECOMMENDATIONS:

Recommend estimating population size every four years to detect potential problems in time to act on them and to reveal trends in population size.

PARTNERS:

Environment and Natural Resources

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Mackenzie Wood Bison Population Monitoring Project, 2009

Period: March 11, 2009 to December 31, 2009

Main Investigator: Terry Armstrong, Bison Biologist, Environment and Natural Resources, GNWT, South Slave Region

Wildlife Research Permit Number: WL004771

LOCATION:

Fort Providence area.

RATIONALE:

The Mackenzie bison population is currently afforded a measure of protection against infection with *Brucella abortus* (causes brucellosis) and *Mycobacterium bovis* (causes tuberculosis) by the Bison Control Area program, which is designed to prevent contact with infected bison from the Wood Buffalo National Park area. Monitoring the Mackenzie population for these diseases provides a measure of the effectiveness of the program in addition to the assessment of disease status.

The current sampling and testing done in conjunction with the limited entry draw hunts has helped in determining the effectiveness of the Bison Control Area program. Collecting and testing 15 to 20 mature bulls each March for three years would increase confidence in health status.

Composition surveys provide data that help us detect changes in the ratio of breeding age males to females and in herd productivity. These data are useful for evaluating the impact of selective hunting, differential mortality due to anthrax, and other causes of death. Surveillance flights over the area during summer to search for bison killed by anthrax enable us to respond to anthrax outbreaks.

OBJECTIVES:

To measure calf, yearling and bull:cow ratios during the post-calving period;

To test for the presence of brucellosis, tuberculosis and other diseases and parasites common to bison; and

To monitor for anthrax related mortalities in summer.

METHODS:

In June, bison were classified as calves, yearlings, cows, juvenile bulls, subadult bulls and mature bulls during a helicopter survey of the area.

Blood samples were collected from hunter-killed bison to test for the presence of antibodies to *Brucella abortus*. Hunters were requested to collect blood, teeth and lymph nodes, in addition to inspecting carcasses for signs of disease.

GNWT employees, with the assistance of local hunters and representatives from the Western College of Veterinarian Medicine, collected 20 mature male bison in 2009 for disease surveillance; blood samples, lymph nodes, tissue and fecal samples, and teeth, in addition to inspecting the carcasses for tuberculosis lesions and signs of brucellosis.

In coordination with the composition survey, we also conducted biweekly fixed-wing flights of the core range to determine whether there were any fresh bison carcasses during the summer anthrax season.

RESULTS AND MAIN CONCLUSIONS:

Fifteen bison were taken for disease surveillance in March 2009. There were no signs of tuberculosis or brucellosis, but final results are not yet available from diagnostic labs.

A survey to estimate age and sex composition of the population was completed in late June, 2009. We observed 42 calves, 24 yearlings, and 88 males per 100 cows. The ratio of yearlings to cows was the same in 2008, the calf ratio was higher than in 2008, and the male to female ratio was slightly lower than the previous year.

We found no bison carcasses in the summer of 2009 during anthrax surveillance flights. The Mackenzie bison range continues to experience widespread flooding due to a high water level event that began in the early 2000. Formerly dry lakes that were the core of the range and provided the best grazing habitat are now flooded.

LONG-TERM PLANS AND RECOMMENDATIONS:

Intensive surveillance for tuberculosis and brucellosis is planned to continue until 2011. Annual composition surveys and anthrax surveillance should continue indefinitely. It is recommended that no action be taken concerning water levels in the area because bison numbers have declined only 20% and this is a naturally occurring event in this ecosystem. Dry lake beds provide excellent habitat for bison, but they are maintained by periodic flooding and drying events.

PARTNERS:

Environment and Natural Resources

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Validating a Technique to Salvage Semen from Infected Wood Bison, April 6-9, 2009

Period: March 11, 2009 to December 31, 2009

Main Investigator: Terry Armstrong, Bison Biologist, Environment and Natural Resources, GNWT, South Slave Region

Wildlife Research Permit Number: WL004770

LOCATION:

Fort Smith, NT – Grande Detour area.

RATIONALE:

Wood bison populations re-established elsewhere in the NWT, Alberta, BC, and Yukon are currently free of tuberculosis (TB) and brucellosis. The NWT and Alberta have established management areas between their uninfected herds and Wood Buffalo National Park (WBNP) to serve as buffer zones to reduce the risk that healthy herds will become infected. All of these healthy herds were established from a small number of founders so they have lower genetic diversity than the Slave River Lowlands (SRL) and WBNP herds. Presence of TB and brucellosis has prevented transfer of animals from these herds to increase genetic diversity in re-established herds.

The Wood Bison Reproductive Research Group is composed of scientists from the Western College of Veterinary Medicine (WCVM), University of Calgary, the GNWT and Parks Canada. The group is developing techniques to securely store frozen semen from infected wood bison and use reproductive technologies to regenerate the genetics of infected source animals in disease-free calves. They have already developed procedures to obtain acceptable levels of live sperm from semen and freeze it free from infectious agents. A method has been developed to remove pathogens from human semen and brucellosis from cattle semen. The purpose of this study is to test the procedure on semen recovered from infected wood bison. Tests on semen from non-infected bison showed that cleaning bison semen with the test procedure had no harmful effect on sperm survival after freezing.

OBJECTIVES:

To collect semen from bison infected with bovine tuberculosis or bovine brucellosis; and

To evaluate a method to remove pathogens like tuberculosis and brucellosis from the collected semen.

METHODS:

To efficiently test this procedure, we collected six potentially infected wood bison males from the Slave River Lowlands (the Grande Detour area). Individuals and small groups of male bison were located from the air before the hunting operations began. A hunter from Fort Smith killed bison bulls. Disease status of the bison was evaluated on-site. Epididymides were collected and stored in a sealed container containing phosphate buffered saline and kept at 20°C and transported to ENR's lab in Fort Smith. Bison epididymal spermatozoa were retrieved and sperm concentration, motility and morphology were evaluated. One aliquot of epididymal semen was treated using the cleaning procedure and a second

aliquot was left untreated. The aliquots were then frozen using a protocol previously developed in the WCVM laboratory. Blood, lymph nodes, tissue samples and fecal samples were collected in addition to inspecting carcasses for signs of brucellosis or tuberculosis. Samples were transported to Prairie Diagnostic Services at the WCVM in Saskatoon for culture of suspected pathogens.

RESULTS AND MAIN CONCLUSIONS:

None of the six animals collected had signs of tuberculosis or brucellosis upon post-mortem examination. Preliminary lab analysis cultured bacteria from the Mycobacterium group which may be typed to *M. Bovis*.

LONG-TERM PLANS AND RECOMMENDATIONS:

Research on reproductive technologies is planned to continue for this technique to become useful in bison conservation.

PARTNERS:

Environment and Natural Resources

Agriculture and Agri-Food Canada, Saskatoon, SK

Parks Canada

University of Calgary

COMMUNITY INVOLVEMENT:

One community representative was hired to participate in the research program by assisting with the hunt.

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Bathurst Caribou Health, Condition and Contaminant Monitoring

Period: January 1, 2009 to December 31, 2009

Main investigator: Bruno Croft, Manager, Research and Monitoring, Environment and Natural Resources, GNWT, North Slave Region

Wildlife Research Permit Number: WL005671

LOCATION:

The joint spring scientific and community collection took place near Strachan Lake, just a few km west of Wekweètì, in early April 2009.

There was no fall collection in the fall of 2009.

RATIONALE:

Health, body condition, and disease and parasite status of barren-ground caribou provide important information on the status of the herds and on the potential for population growth. Samples taken from animals harvested for health assessment permit current levels of environmental contaminants to be determined and trends over time assessed.

OBJECTIVES:

To collect information on the health, diseases and parasites of Bathurst caribou to assess current status and monitor trends over time;

To collect information on body condition of caribou on the Bathurst range during the fall, which can be used to assess nutritional status and predict pregnancy rates;

To collect information on the presence of environmental contaminants in caribou, to assess current exposure and trends over time; and

To compare this information to previous information from the Bathurst caribou herd and other caribou herds across the north using a standardized protocol developed by the CircumArctic Rangifer Monitoring & Assessment Network (CARMA) and previous collections by Environment and Natural Resources (ENR).

METHODS:

Health, condition and contaminant sampling was conducted on caribou harvested by community hunters on the Bathurst caribou range in late winter and in the fall of 2008. A field camp was established based on the location and distribution of caribou, determined by location of collars and advice from the communities. Local hunters harvested and butchered the caribou, and detailed measurements and sampling were conducted on each animal to examine health, disease and parasites, condition and contaminants. Meat was returned by plane for distribution within local communities. Field sampling and laboratory testing were done using a standardized protocol developed by the CircumArctic Rangifer Monitoring & Assessment Network (CARMA) and previous collections by GNWT, ENR. Samples were collected in the field and stored in a manner consistent with future testing needs. Samples included a wide range of tissues: blood (whole blood & filter paper), metatarsus bone with skin on, kidney (left) with fat, liver (caudate lobe), 4th stomach (abomasums), intestinal samples (small intestine, caecum & colon sample), urine, feces, and hair. Some measurements were done in the field (e.g. body weight), and other samples were processed in Yellowknife (e.g. kidney fat index) and outside laboratories (e.g. contaminants, tooth aging). As part of this protocol, the following measurements and samples were taken:

Diseases & Parasites:

Exposure to diseases such as brucellosis, besnoitia, toxoplasma & Johne's disease (blood serology, tissue culture, fecal culture); and

Presence of parasites of importance to caribou health (Wisconsin fecal flotation, Baerman's technique, DNA analysis of recovered larvae, muscle examination, examination of hide/throat).

Body Condition:

Age (tooth eruption & wear pattern, tooth cementum analysis);

Body measurements (carcass weight, body measurements, gastrocnemius muscle weight, leg measurements, and jaw measurements);

Body fat indices: back fat, kidney fat (total & Riney fat index), bone marrow fat (%);

Genetics (hair sample for DNA);

Environmental contaminants; and

Kidney & liver levels of heavy metals.

RESULTS AND MAIN CONCLUSIONS:

28 cows, 1 bull and 1 calf were collected during the spring collection. 25 of the 28 females were pregnant. All caribou were in decent shape.

Final results of the analyses are not completed yet, but preliminary assessments of the data suggest absence of abnormal level of parasites, diseases or below average condition.

LONG-TERM PLANS AND RECOMMENDATIONS:

These initiatives are part of the monitoring actions identified in the *Bathurst Caribou Management Plan* (2004). The long term objective is to continue to assess health and condition of caribou using a less detailed sampling protocol that can be carried out at the community level.

PARTNERS:

Tłı̨chǫ Government and the community of Wekweètì (spring hunt).

COMMUNITY INVOLVEMENT:

Information from the communities was used to help select a site to collect caribou and we worked with hunters in the field to discuss the health and condition of caribou that were collected and tested.

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Caribou Body Condition and Health Monitoring

Period: April 2009 to March 2010

Main Investigator: Tracy Davison, Regional Biologist, Environment and Natural Resources, GNWT, Inuvik Region

Wildlife Research Permit Number: WL005597

LOCATION:

Inuvik Region.

RATIONALE:

Population estimates obtained for the Tuktoyaktuk Peninsula, Cape Bathurst and Bluenose-West barren-ground caribou herds indicate that these herds declined between 2000 and 2005, with continued declines in 2006. The Porcupine caribou herd has not had a successful population estimate since 2001, however, it is believed that the herd is declining based on other indicators. This project will use specific samples from hunter-killed caribou to track the general body condition of barren-ground caribou.

OBJECTIVES:

To monitor the estimated body weight, body fat, and body protein of adult cow caribou over the winter and monitor trends over time;

To monitor selected fat deposits of adult bull caribou over the winter to document trends over time;

To further investigate the relationship of these trends to other indicators, such as pregnancy rate, calf survival, herd size, timing of spring thaw, fall storm patterns, and winter range snow depth; and

To compare body condition to other herds being monitored using the same standardized system across the North.

METHODS:

We follow the CARMA protocol presented in the draft Rangifer Health and Body Condition Monitoring manual and protocol documents. Kits will be made available to hunters through local Renewable Resource Council (RRC), Hunters and Trappers Committee (HTC), Environment and Natural Resources (ENR) offices, and the highway check station.

Pre-printed shipping tags will be distributed to interested hunters prior to their hunt. Tags will be a form for the hunter to record hunter name, community, herd, date, location, sex, reproductive / lactational status, hunter assessment of condition, depth of backfat using a ruler printed right on the tag. Once received, we will record the four standard mandible measurements, assign an age class, determine the cementum age of the caribou and extract and measure the mandible fat. Blood samples will be analyzed for a standard set of diseases.

RESULTS AND MAIN CONCLUSIONS:

Samples are still being analyzed. Additional work is needed to increase hunter participation in the program.

LONG-TERM PLANS AND RECOMMENDATIONS:

The herds will continue to be monitored based on recommendations from the co-management boards.

PARTNERS:

Environment and Natural Resources

Parks Canada – Western Arctic Field Unit

Inuvialuit Wildlife Studies Funds

Gwich'in Renewable Resource Board

Circumpolar Rangifer Monitoring and Assessment Network (CARMA - IPY)

COMMUNITY INVOLVEMENT:

Samples are submitted by local hunters and they are compensated for their time and effort. Local community members were also involved with the highway check station to hand out kits and collect them from hunters.

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Wildlife Health and Genetic Monitoring

Period: January 1, 2009 to December 31, 2009

Main Investigator: Brett Elkin, Disease and Contaminants Specialist, Environment and Natural Resources, GNWT

Wildlife Research Permit Number: WL005614

LOCATION:

NWT-wide.

RATIONALE:

Although most wild animals are healthy, diseases and parasites do occur in any wildlife population. Some diseases and parasites are naturally occurring and appear to cause little problem in their host, while others have the potential to impact wildlife at both the individual animal and population level. Some of these diseases and parasites can also affect people and domestic animals.

Samples from animals harvested by hunters and trappers, found dead, or handled during wildlife research or management activities by ENR staff, other wildlife agencies or university researchers, can provide valuable health, condition and genetic information on wildlife populations. These samples provide an opportunity to monitor diseases of particular importance to wildlife and human health, and to identify new and emerging diseases. Taking advantage of samples from these existing activities provides additional valuable information for making wildlife management decisions and providing public information.

OBJECTIVES:

To determine the cause of sick or dead wildlife found, harvested or handled by hunters, trappers, biologists, wildlife researchers, Renewable Resource Officers, or the general public;

To assist hunters and trappers by testing samples from harvested wildlife to determine what diseases or parasites are present, and the implications for consumption of the carcass;

To work co-operatively with hunters, trappers, biologists, Renewable Resource Officers and members of the general public to monitor the occurrence of diseases and parasites in wildlife on an ongoing basis;

To identify the types, relative levels and geographical distribution of diseases, parasites and abnormalities found in wildlife across the Northwest Territories;

To increase community awareness of diseases and parasites; and

To collect genetic information that will contribute to the understanding and management of wildlife populations.

METHODS:

Samples are collected in several different ways.

Local hunters, trappers and Renewable Resource Officers frequently submit samples from harvested wildlife. They generally provide detailed information on the animal and the particular case, and often provide additional information on the occurrence and patterns of similar cases within their harvest areas.

Members of the general public, wildlife biologists, or Renewable Resource Officers may also submit samples from wildlife that are sick or found dead.

Samples from animals handled during wildlife research or management activities by biologists, technicians, other wildlife researchers, or Renewable Resource Officers are also submitted for disease testing.

Samples of the affected tissues or body parts are collected, as well as other samples necessary to determine health status, body condition and age.

Samples are analyzed for diseases, parasites, condition and/or genetics. In many cases, this requires the shipment of samples to specialized laboratories to determine the cause of the abnormality. Results of the testing are provided to the individual(s) who submitted the sample, and recorded in an NWT disease database to monitor disease trends across the NWT and over time.

RESULTS AND MAIN CONCLUSIONS:

Hunter submitted samples in 2009 (laboratory tested).

Samples Submitted for Disease Surveillance:

National Avian Influenza Surveillance - Birds (not detected)

National West Nile Virus - Birds & Mosquitoes (not detected)

Baseline health survey of small mammals (520 tested)

Health & condition surveillance of Bathurst & Ahiak Caribou (87 tested)

Brucellosis & TB surveillance in wood bison (184 tested)

Trichinella Surveillance – multiple species

Toxoplasma Surveillance – multiple species (155 submitted)

Rabies Surveillance (57 submissions, 5 positive)

Anthrax Surveillance in MBS & SRL (not detected)

Contaminant Testing in Caribou (43 samples submitted)

Sahtu Community Wildlife Health Monitors

Products Produced:

Results reported to individual hunters and trappers

NWT wildlife disease surveillance & database

NWT rabies surveillance & database

Wildlife Anthrax Database developed with CCWHC

Participation in national Avian Influenza & West Nile Virus surveillance programs

LONG-TERM PLANS AND RECOMMENDATIONS:

Wildlife disease surveillance is ongoing every year.

Long term testing will continue on any hunter submitted samples, animals found dead, and the investigation of disease cases or outbreaks. Results of this testing will be used to provide information and recommendations to individual harvesters, the public, and wildlife management agencies and wildlife co-management boards.

PARTNERS:

Local hunters and trappers

Members of the general public

Environment and Natural Resources - biologists and Renewable Resource Officers

Canadian Cooperative Wildlife Health Centre

Canadian Food Inspection Agency

COMMUNITY INVOLVEMENT:

Hunters and trappers frequently bring in samples or provide reports of diseases, parasites or abnormalities in harvested wildlife. Identification of the diseases or parasites involved in these cases can be important to make decisions on consumption of meat from the affected animal. Sick or dead animals are also found periodically in the wild, and testing is required to determine the cause of death and potential significance for other wildlife and people. Information provided by hunters and trappers on the occurrence of diseases and parasites can also be used to identify areas requiring further monitoring or testing.

Local hunters, trappers, and members of the general public are encouraged to submit samples of any abnormalities they find in the wildlife they harvest. Results of testing are provided back to the individuals submitting the samples, following diagnostic testing.

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Photo Credit: Patricia Handley

Small Mammal and Hare Transect Surveys

Period: June 2009 to September 2009

Main Investigator: Suzanne Carrière, Wildlife Biologist, Biodiversity, Environment and Natural Resources, GNWT

Wildlife Research Permit Number: WL005620

LOCATION:

Sahtu

Norman Wells:	65° 18′ N; 127° 20′ W
Tulita:	64° 54′ N; 125° 34′ W *

North Slave

Yellowknife:	62° 24′ N; 114° 26′ W
Bliss Lake:	62° 34′ N; 113° 20′ W *
Gordon Lake:	63° 00′ N; 113° 10′ W
Daring Lake:	65° 00′ N; 111° 30′ W

Dehcho

Fort Liard:	60° 39′ N; 117° 29′ W *
Fort Simpson:	62° 00′ N; 122° 00′ W

South Slave

Fort Smith:	60° 01′ N; 111° 54′ W
Fort Resolution	61° 10′ N; 113° 40′ W
Tsu Lake (Aurora College)	60° 35′ N; 111° 53′ W

Inuvialuit-Gwich'in

Inuvik:	68° 18′ N; 133° 29′ W

* Survey not performed in 2009 due to personnel unavailability.

All surveys were done between 1 June – 31 August 2009.

OBJECTIVES:

The NWT small mammal survey monitors changes in density of voles, mice, lemmings, and shrews across five ecozones in the territory. The hare transect survey monitors snowshoe hare density across all forested ecozones.

METHODS:

Small mammal data is collected using snap-traps or live traps and reported as the number of trapped specimens per 100 trap-nights (capture index). Monitoring is done on standardized permanent trap lines. Usually, 100 traps are out for five nights. Trap lines are checked at least each morning before 10:00 a.m. The trapping is planned for August each year, but at some sites the survey is performed in June, July or September if other activities require a change in timing.

Hare data is collected on four transects at each site. Each transect consists of 20 permanent quadrats measuring 5.1 cm X 305.0 cm oriented along the transect and evenly spaced 15 to 30 m apart. Hare fecal pellets deposited within each quadrat are counted and cleared from the quadrat. The number of pellets per quadrat is correlated to an estimate of hare density (number of hare per hectares) at each site.

RESULTS AND MAIN CONCLUSIONS:

In summer 2009, small mammal numbers were low in all sites in the NWT except Inuvik where a high in numbers occurred, with higher numbers than ever measured before.

Peaks in hare numbers occurred in the NWT every 10 years or so, in 1962, 1971, 1980, 1990, and then in 1999-2000. Hare populations across the NWT remained low between 2002-2006, but are increasing rapidly in 2009 and will reach a peak in numbers in 2010.

All specimens of small mammals frozen since 2005 were sent to the University of Alaska - Museum of the Arctic - for permanent storage. Some specimens were used in a study on parasites by students with N. Jane Harms DVM, VetSc, Veterinary Anatomic Pathology Resident, University of Saskatchewan, Western College of Veterinary Medicine.

LONG-TERM PLANS AND RECOMMENDATIONS:

The survey should expand to the tundra (Banks Island, Victoria Island and the mainland) to track small mammal numbers in those areas. Environment and Natural Resources (ENR) is looking for people interested in conducting the small mammal survey (five days in August) near Ulukhaktok, Sachs Harbour, or Paulatuk.

This survey is part of long-term efforts to monitor the natural fluctuations in both forested and tundra ecosystems in the NWT. Plans are to continue the survey and expand the number of sites with community advice.

The information from both hare and small mammal surveys is used in many other projects, for example to predict furbearer abundance in the NWT. Other agencies or organizations also rely on results from the small mammal survey (SMS) and hare surveys to complement their studies. Survey data are used to study the relationship between small mammal fluctuations and weather (C. Krebs, University of British Columbia; Krebs et al. 2002).

Hare data was used to study the relationships between chemical defences of paper birch against herbivory, hare browsing, and forest fire frequency at a continental scale. This study was accepted for publication in the journal *American Naturalist* (J. Bryant and J. Cook, Univ. of New Mexico).

Small mammal data is also used to assess natural changes in annual predation rates on eggs and young of alternate prey species, such as whooping crane (Brian Johns, CWS, Wood Buffalo National Park) and other waterfowl species.

Website: www.enr.gov.nt.ca

COMMUNITY INVOLVEMENT:

Over the years, biologists from government, co-management boards and non-profit organizations, Renewable Resources Officers, academic researchers, and environmental consultants have participated in data collection for both projects. At some sites, students assisted in data collection during research camps or school field courses.

Data from Tsu Lake camp (Aurora College) are now integrated into the NWT small mammal and hare surveys. Historical data from that site have been collected by students in most years since 1989. The success of the NWT small mammal survey and hare survey is possible because of the combined efforts of all project participants.

PARTNERS:

Participating agencies and organizations in 2009 included the Department of Environment and Natural Resources (Government of the NWT), Deninu K'ue First Nation, Sahtu Renewable Resources Board, Gwich'in Renewable Resources Board, and Ducks Unlimited Canada.

CONTACTS:

Norman Wells: Richard Popko (Wildlife Technician, Environment and Natural Resources, Sahtu Region, GNWT)

Yellowknife: Suzanne Carrière (Biologist, Environment and Natural Resources, Wildlife Division, GNWT), Robert Reid (INAC), Tess Alain (summer student), and Bonnie Fournier (Data Analyst, Environment and Natural Resources Wildlife Division)

Bliss Lake: North Slave Office, Environment and Natural Resources, GNWT

Gordon Lake: Suzanne Carrière (Biologist, Environment and Natural Resources, Wildlife Division, GNWT), Aryn Franklin (Data Analyst, Environment and Natural Resources Wildlife Division), Jana Ebersbach (volunteer, Germany)

Daring Lake: Steve Matthews (Biologist, Environment and Natural Resources, Wildlife Division, GNWT) and students at Daring Lake Tundra Science Camp

Fort Simpson: Danny Allaire (Wildlife Technician, Environment and Natural Resources, Dehcho Region, GNWT) and Steve Gooderham

Fort Smith: Heather Sayine-Crawford (Environment and Natural Resources, South Slave Region, GNWT),

Tsu Lake: Terry Armstrong (Aurora College, now Environment and Natural Resources, GNWT)

Fort Resolution: Heather Sayine-Crawford (Environment and Natural Resources, South Slave Region, GNWT),

Inuvik: Tracy Davison, (Biologist, Environment and Natural Resources, Inuvik Region, GNWT), Kristen Callaghan (Gwich'in Renewable Resources Board)

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Photo Credit: Environment and Natural Resources

Protected Area Strategy - Shúhtagot'íné Néné

Period: June 6, 2009 to December 31, 2009

Main Investigator: Kevin Kardynal, Canadian Wildlife Service

Wildlife Research Permit Number: WL005154

LOCATION:

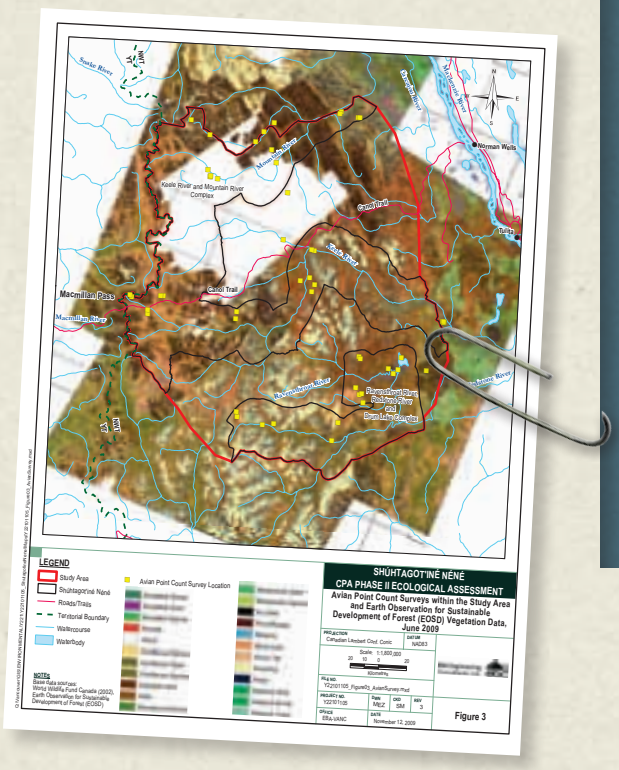
Shúhtagot'íné Néné Candidate Protected Area, Mackenzie Mountains, west of Tulita, Northwest Territories.

RATIONALE:

This research was performed for a Phase II Ecological Assessment as part of the Northwest Territories Protected Areas Strategy (PAS).

OBJECTIVES:

Few data exist on the avifaunal richness of the Shúhtagot'íné Néné candidate protected area. Filling this knowledge gap is important in determining the conservation value of the area for many bird species, including several species at risk. The objectives of this research were to document the distribution and abundance of birds (particularly passerines, waterfowl and cliff-nesting raptors) and provide baseline data for future bird studies in the area.



METHODS:

Systematic surveys for passerines were performed using a sampling grid with three 10 minute point count stations placed within a homogenous habitat type at least 300 m from each other. Several point counts were simultaneously recorded with omni-directional microphones for future reference and to allow for identification of unknown vocalizations. Observers accessed each sampling area by helicopter due to their remote location and to increase the efficiency of the surveys. Surveys were conducted from June 15-26, when most songbird species exhibit territorial behaviour. Species, sex and behaviour (e.g. flushed, territorial display, flyover) of each bird and their abundance were recorded for each bird observation wherever possible. Habitats were surveyed in apparent proportion to their availability on the landscape based on the Canadian Forest Service's Earth Observation for the Sustainable Development of Forests (EOSD) digital land classification. Surveys were conducted in seven general habitat types, including alpine tundra, conifer forest (open and closed), deciduous/mixed wood forest, rock/talus, low shrub (wet, dry), tall shrub (wet, dry, alpine) and wetland. Opportunistic aerial waterfowl and cliff surveys were performed whenever suitable habitats (wetlands, river, and cliffs) were encountered (e.g., in transport).

RESULTS AND MAIN CONCLUSIONS:

This research was valuable in determining the distribution and abundance of birds that nest in the Shúhtagot'íné Néné candidate protected area. A total of 1,082 birds representing 115 species were detected on avian point-counts (51 point count plots, 153 point-counts), aerial waterfowl and cliff surveys, and incidental observations. A total of 692 waterfowl representing 27 species were observed, including ring-necked duck, Canada goose, mallard, American wigeon and (lesser or greater) scaup. The horned grebe (recently listed on the *Species at Risk Act* (SARA) as a species of special concern)

was observed four times. Species detected within the study area and outside of their breeding range include red-throated loon, harlequin duck, Barrow's goldeneye, long-tailed duck, trumpeter swan and American coot. Several rare shorebird species were observed including stilt sandpiper, wandering tattler and Baird's sandpiper. Two soras were also detected aurally, which represents a major extension of its range. A total of 41 raptor observations were made representing 11 species including golden eagle, bald eagle, short-eared owl and northern harrier, northern goshawk, osprey, peregrine falcon, red-tailed hawk and sharp-shinned hawk. Rock and willow ptarmigan were observed 14 times. A total of 1,569 passerine observations representing 52 passerine species were recorded, of which the five most common were white-crowned sparrow, Savannah sparrow, yellow-rumped warbler, American tree sparrow and dark-eyed junco. Several passerine species at risk (olive-sided flycatcher, Harris's sparrow) and several species outside of their published ranges (eastern phoebe, least flycatcher, palm warbler, song sparrow, golden-crowned sparrow) were observed. Twenty-seven rusty blackbirds (Special Concern) were detected with several exhibiting nesting behaviour. A Phase II Ecological Assessment is currently being written that includes a detailed review of the findings of our research. Due to the high richness of bird species and the unique bird community assemblage documented with our research, the Shúhtagot'iné Néné is of high conservation value to these species and to the ecology of the area.

LONG-TERM PLANS AND RECOMMENDATIONS:

The Canadian Wildlife Service (CWS; Environment Canada) recently sponsored the candidate protected area and is recommending it be permanently protected as a National Wildlife Area under the *National Wildlife Act*. CWS is currently planning a possible second field season in the area in June 2010 to expand on the 2009 surveys.

PARTNERS:

Government of the Northwest Territories

COMMUNITY INVOLVEMENT:

We hired a local aboriginal community member who is a Sahtu beneficiary from Tulita, NT, and another individual from Norman Wells, NT. These personnel assisted with the two week field work component of the project. We also hired Canadian Helicopters and North Wright Air from Norman Wells to transport ourselves and fuel to our field sites within the Mackenzie Mountains.

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WEBSITES:

Canadian Wildlife Service Prairie and Northern Region:
http://www.pnr-rpn.ec.gc.ca/nature/ecb/index.en.html

Northwest Territories Protected Areas Strategy: http://www.nwtpas.ca

Phase 2 Ecological Assessment for Buffalo Lake, River and Trails – Breeding Birds, Waterfowl and Vegetation Surveys

Period: June 1-5, 2009

Main Investigator: Claudia Haas, Protected Areas Strategy Biologist, Environment and Natural Resources, GNWT

Wildlife Research Permit Number: WL004774

LOCATION:

The survey was conducted in Buffalo Lake, River and Trails Candidate Area to survey the breeding birds, waterfowl, and plants in the area.

RATIONALE:

This project was conducted to collect information for the Phase 2 Ecological Assessment for the Buffalo Lake, River and Trails Candidate Critical Wildlife Area. This information is used, along with information on the economic and cultural interests, by the Candidate Area Working Group to make decisions on whether the area should or should not be established as a protected area, what the boundaries should be, and what management and monitoring should occur if the area is established as a protected area.

OBJECTIVES:

The objective of this study is to create a current inventory of the breeding birds, waterfowl, and vegetation in the Buffalo Lake, River and Trails Candidate Area, based on as broad a sampling program as possible within time and financial limits available.

This was accomplished through direct observation of the plants and animals, bird surveys, and aerial reconnaissance. Specific aspects of the inventory included:

- plant community classification and description;
- breeding bird surveys;
- waterfowl surveys;
- identification of areas of significance, such as waterfowl staging areas, raptor territories/nests, etc.;
- photograph plant communities and special features;
- incidental observations of other wildlife; and
- species list of plant, bird and mammal species observed, augmented by a hypothetical species list based on relevant literature.

METHODS:

The research group included Claudia Haas (biologist for the Protected Areas Strategy), Pat Martel (K'átł'odeeche First Nation elder), Steve Moore (biologist from EBA Engineering), and Robert Moody (helicopter pilot). Between June 2nd and June 5th, 2009, they left Hay River between 4 am and 5 am and flew to the candidate area, making stops along the way to conduct breeding bird and vegetation surveys in as many habitats as they could, while also flying survey lines for waterfowl and looking for other ecologically significant areas.

RESULTS AND MAIN CONCLUSIONS:

For the second half of the survey the weather got quite cool, dipping below zero degrees overnight, and most likely this impacted how many birds were calling. Also, in general, spring was late arriving this year and so the plants were not as far along, nor had as many birds returned from their breeding grounds as is usually the case.

A total of 18 sites were assessed for vegetation, with 10 plant communities described and over 200 plant observations made, including 66 plant species. At these same 18 sites, a total of 194 bird observations were made (including calls, observations, and signs), including 46 different bird species. The highest number of bird species occurred in the wetland and mixed forest plant communities. The top seven common bird species observed during breeding bird surveys were palm warbler, hermit thrush, swamp sparrow, yellow-rumped warbler, Wilson's warbler, ruby-crowned kinglet, and Le Conte's sparrow.

During the waterfowl surveys, 105 waterfowl observations were made, which represented 12 different species. The six most common waterfowl species were mallard, bufflehead, lesser scaup, Canada goose, northern shoveler, and American wigeon.

LONG-TERM PLANS AND RECOMMENDATIONS:

The next steps for this Phase 2 Ecological Assessment for the Buffalo Lake, River and Trails Candidate Area is to help conduct a moose survey in the Hay River Area, which overlaps the Candidate Area, and to conduct a survey of muskrat push-ups in the Candidate Area. Now that the Buffalo Lake, River and Trails has received sponsorship by Environment and Natural Resources (ENR) as a Candidate Critical Wildlife Area under the NWT *Wildlife Act*, a Working Group is being assembled who will discuss what, if any, further studies are required for them to be able to make a decision.

PARTNERS:

Ducks Unlimited

K'átł'odeeche First Nation

COMMUNITY INVOLVEMENT:

A K'átł'odeeche First Nation elder/harvester participated in the survey, was a vital observer, and provided on-the-land-skills and knowledge of the area for this project. The Phase 2 Ecological Assessment report will be provided to all communities that request it, including the K'átł'odeeche First Nation and the Deninu Kue First Nation, who have requested copies via the wildlife permit application consultation.

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Wildlife Reconnaissance of Candidate Sambaa K'e Protected Area

Period: March 2009

Main Investigator: Danny Allaire, Wildlife Technician II, Environment and Natural Resources, GNWT, Dehcho Region

Wildlife Research Permit Number: WL004973

LOCATION:

The study was done in the South western portion of the Dehcho Region during late-winter (March 2009).

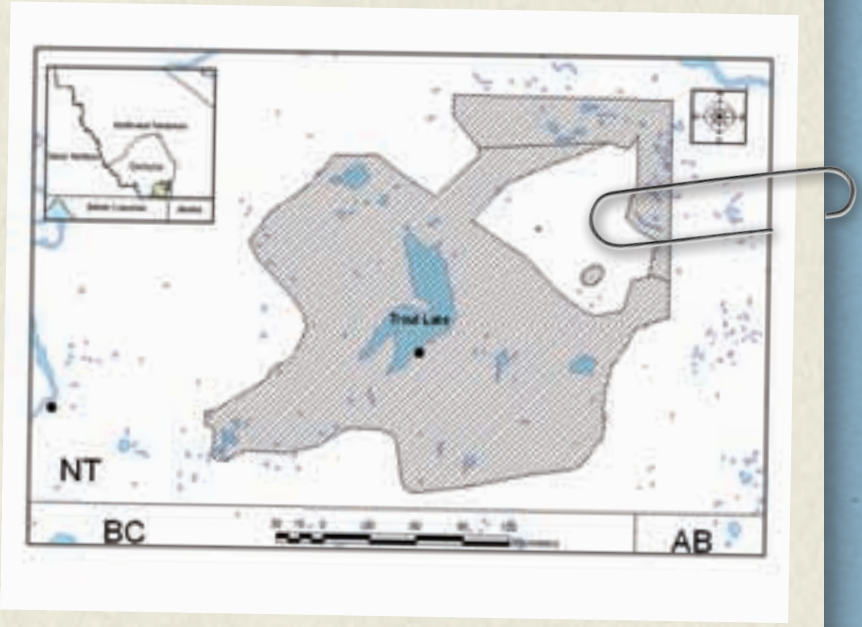
RATIONALE:

An ecological assessment of the Sambaa K'e Candidate Protected Area (SKCPA) and vicinity is required as part of the Northwest Territories Protected Area Strategy. The Working Group for the SKCPA requested that as part of Phase 2 Ecological Assessment, an aerial wildlife survey of the SKCPA and vicinity be conducted. Community members worked with Environment and Natural Resources (ENR) to design the aerial survey and participated as observers. The survey area was covered by parallel line transects running north-south and spaced 10 km apart, except for areas around Cormack and Celibeta Lakes where flight lines were spaced 5 km apart.

OBJECTIVES:

To collect information on March distribution and relative densities of a variety of large mammals in the SKCPA as part of the Phase 2 Ecological Assessment; and

To document large mammal distributions in March that verify and supplement the results from previous traditional knowledge and scientific studies conducted in different parts of the Candidate Protected Area.



METHODS:

A line transect survey, conducted in a north-south direction as requested by local residents, will cover the Candidate Protected Area, and areas within that have not been included in the current Candidate Protected Area.

Survey aircraft will provide for a maximum number of local observers to participate in the survey and for an efficient coverage of the survey area.

RESULTS AND MAIN CONCLUSIONS:

See: ENR Manuscript Report #189. Larter N.C. and D.G. Allaire. 2009. *Aerial Wildlife Survey of the Sambaa K'e Candidate Protected Area, March 2009*. 31 pp.

http://www.enr.gov.nt.ca/_live/pages/wpPages/Manuscript_reports.aspx

LONG-TERM PLANS AND RECOMMENDATIONS:

See: ENR Manuscript Report #189. Larter N.C. and D.G. Allaire. 2009. *Aerial Wildlife Survey of the Sambaa K'e Candidate Protected Area, March 2009*. 31 pp.

http://www.enr.gov.nt.ca/_live/pages/wpPages/Manuscript_reports.aspx

PARTNERS:

Canadian Wildlife Service

Environment and Natural Resources

COMMUNITY INVOLVEMENT:

Local residents participated in the design and delineation of the survey and helped with logistics, travel and airplane refueling. They also were able to go flying with us as observers during the survey.

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Ecological Assessment of the Ka'a'gee Tu Candidate Protected Area

Period: Spring, summer and fall 2009

Main Investigator: Paul Latour, Habitat Biologist for the Western Arctic, Canadian Wildlife Service

Wildlife Research Permit Number: WL005617

LOCATION:

Ka'a'gee Tu Candidate Protected Area is located in the Dehcho Region and surrounds the community of Kakisa, NWT.

Beaver Lake is located in the northeast section of Ka'a'gee Tu and is an area of known importance to waterfowl and waterbirds. Beaver Lake is a widening of the Mackenzie River at the outlet of Great Slave Lake, separated at the east end by a large island, Big Island. The channels on the north and south ends of Big Island are spotted with many small islands which provide good habitat for waterfowl. Beaver Lake is a favoured resting and feeding area of swans and ducks, particularly during the spring and fall.

RATIONALE:

Ka'a'gee Tu is a candidate National Wildlife Area being proposed through the NWT Protected Areas Strategy (Mackenzie Valley 5-year Action Plan). It is a partnership between the Canadian Wildlife Service and the Ka'a'gee Tu, K'atl'odeeche, Deh Gah Gotie, and Dehcho First Nations. As part of Step 5 of the NWT Protected Areas Strategy process, an ecological assessment must be conducted to identify the key ecological components in the candidate area before a final decision can be made to proceed with legally designating the site. Ecological values within Ka'a'gee Tu area are generally poorly known, including the spectrum of migratory birds that use the area.

Beaver Lake, an area within the Ka'a'gee Tu Candidate Protected Area, is an area of known importance to migratory waterfowl and waterbirds, and is listed as Canadian Wildlife Service (CWS) Key Migratory Bird Terrestrial Habitat Site. This designation is based on very old data, and waterfowl surveys conducted as part of the ecological assessment of Ka'a'gee Tu will help to provide current information for this site.

OBJECTIVES:

To conduct an ecological inventory of Ka'a'gee Tu Candidate Protected Area:

To verify and describe the main habitat components (vegetation types);

To develop an inventory of flora and fauna, list key species and assess their importance for conservation;

To provide information for the identification of important ecological sites within the area;

To generate baseline data for the Candidate Protected Area; and

To determine the size and species composition of the spring / fall staging populations of waterfowl and waterbirds at Beaver Lake, NT.

METHODS:

An assessment of staging waterfowl at Beaver Lake was conducted via aerial surveys using a single engine fixed-wing aircraft. Surveys were conducted with two observers, one seated in the right front seat, and the other in the left rear seat. A total of 24 surveys were flown between May 14 and October 30, to capture the spring and fall migration, and summer moult periods.

All bird observations within 250 m of the flight path were recorded. Songbird surveys were conducted at sites selected according to vegetation classification types within the Ka'a'gee Tu Candidate Protected Area. Field workers travelled to sites via helicopter, and recordings of birdsongs were taken using E3A Bioacoustic Monitoring recording units for later analysis.

RESULTS AND MAIN CONCLUSIONS:

Over the course of the survey period, we observed over 128,000 birds at Beaver Lake. This number consists primarily of waterfowl (ducks, geese, and swans), but also includes gulls, terns, raptors, shorebirds and waterbirds such as loons, grebes, and pelicans.

Songbird and vegetation surveys were conducted at 50 sites within the Ka'a'gee Tu Candidate Protected Area. Results from these surveys are not yet available as data are still being analyzed.

LONG-TERM PLANS AND RECOMMENDATIONS:

The information from this study will be used in the decision whether to proceed with the Ka'a'gee Tu protected areas designation process, and the preparation of a subsequent Management Plan.

Additional songbird surveys are planned for the spring of 2010; however, aerial waterfowl surveys at Beaver Lake will not be conducted.

PARTNERS:

Kakisa Dene Band

Fort Providence Dene Band

Katlodeeche Dene Band

Ducks Unlimited Canada

COMMUNITY INVOLVEMENT:

There has been extensive community consultation associated with developing the Ka'a'gee Tu Candidate Protected Area proposal and the community is aware of the need to conduct resource assessments in the candidate area.

Field work involving aircraft is weight/space restricted and therefore offers limited opportunity for local participation.

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Paul Woodard, Waterfowl Technician
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Photo Credit: Patricia Handley

Summer Field Assessment and Advance Barging and Staging Project: 2008-2011

Period: Summer 2009

Main Investigator: Shirley Maaskant, MGM Energy Corp.

Wildlife Research Permit Number: WL007404

LOCATION:

In July 2009, a biophysical study (the Program), was conducted by MGM in the Oguknang area, north of Inuvik, NWT, near Reindeer Station and the Ikhil gas plant.

RATIONALE:

The study examined three potential well sites and two proposed potential access roads, one north and one south, for a future drilling program. The sites were examined to determine if sensitive biophysical resources may potentially be affected by winter drilling activity.

OBJECTIVES:

The investigation component focused on characterizing wildlife habitat potential at proposed future development locations. Information collected was used in planning and determining appropriate location for 2009/2010 winter activity.

METHODS:

Prior to field investigations, the potential locations were subject to desktop review, to identify any known area of concern.

Each location was surveyed to characterize the wildlife habitat potential at project locations. Potential locations were further refined during the field work by consultation with representatives of the drilling and construction operators. Field investigations focused on the presence of signs of wildlife use. Using the results of the biophysical survey, the wildlife habitat characterization focused primarily on key habitat attributes observed in the Program area. Based on these results, combined with a desktop review of species potentially occurring in the Program area, specific mitigation measures are recommended to reduce the potential effects of the winter drilling program on wildlife.

RESULTS AND MAIN CONCLUSIONS:

The proposed well sites and access roads support key water bird nesting and foraging habitat. The planned winter drilling program will mean that sensory disturbances associated with the Project will not impact most of the bird species as they will no longer be active in the area. While present in the late spring, summer and early fall, water bird species may use vegetation present at proposed well sites and access roads for nesting. As a result, the amount of vegetation removal resulting from the winter drilling program will be minimal.

One location examined provides suitable terrestrial mammal foraging habitat (i.e. barren-ground caribou, grizzly bear, and moose). The second location provides suitable foraging habitat for moose. Vegetation at the third location provides suitable foraging habitat for grizzly bear and key water bird nesting habitat. However, because this particular location does not provide key grizzly bear denning habitat, impacts of winter drilling activities are predicted to be minimal. The north access road provides key denning habitat for grizzly bear and meso-carnivores, and a grizzly bear den was found 450 m east of the proposed access road site; this den location should not be disturbed.

LONG-TERM PLANS AND RECOMMENDATIONS:

The winter drilling program is not predicted to have significant adverse effects on wildlife in the Program area. MGM will limit sensory disturbances, vegetation clearing and subsequent habitat loss. Avoidance will be the primary mitigation and wildlife monitors will be present and consulted during activities. MGM will liaise with Environment and Natural Resources (ENR) and Canadian Wildlife Service (CWS) prior to conducting field activity.

PARTNERS:

Kavik-Axys Inc. – Calgary / Inuvik

COMMUNITY INVOLVEMENT:

MGM informed the Hunters and Trappers Committee of the planned activity on the land and a local wildlife monitor was a member of the team.

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2009 Wildlife Monitoring Program for the Diavik Diamond Mine

Period: June 25, 2009 to June 25, 2010

Main Investigator: Colleen English, Superintendent, Environment, Diavik Diamond Mines Inc.

Wildlife Research Permit Number: WL005678

LOCATION:

The wildlife monitoring program will be conducted in the Diavik wildlife study area, centered around Lac De Gras, NWT.

RATIONALE:

To monitor wildlife within the vicinity of the mine.

OBJECTIVES:

To verify the accuracy of the predicted effects determined in the Environmental Effects Report (Wildlife 1998) and the Comprehensive Study Report (June 1998); and

To ensure that management and mitigation measures for wildlife and wildlife habitat are effective in preventing significant adverse impacts to wildlife.

METHODS:

The object is to collect appropriate information that will assist Diavik in verifying predicted effects and to determine the effectiveness of mitigation measures.

Barren-ground caribou: scanning observations, GPS locations, ground based observation surveys, and road observations.

Grizzly bear: based on diet selection and seasonally preferred habitats, the presence of bear sign within and adjacent to seasonal high quality habitats (sedge wetland in June and riparian shrub in August) was used as an index of habitat utilization by grizzly bears within the Diavik study area.

Wolverine: snow track surveys, DNA research, regular inspections of food and waste compliance, incidental observations, and wolverine mortalities associated with mining activity are reported and documented.

Waterfowl and other aquatic birds: ground based surveys

Raptors: surveys and monitoring conducted for infrastructure nesting, incidental observations documented.

RESULTS AND MAIN CONCLUSIONS:

Successful implementation of aerial and ground based surveys. No mortalities of wildlife occurred during 2009.

LONG-TERM PLANS AND RECOMMENDATIONS:

Diavik Diamond Mines Inc. (DDMI) has been working collectively with the Government of the Northwest Territories (GNWT), other diamond mining companies, and their respective environmental advisory boards to review the existing wildlife programs at the mines and determine areas for improvement. During 2009, working groups met to discuss the objectives of each program and opportunities to align monitoring programs for consistency and regional benefit. A workshop involving government, industry, three advisory boards, and community representatives was held in September 2009 to further discuss potential changes to wildlife monitoring programs for all the mines. Additionally, DDMI has been visiting communities to inform them of the results and status of the current programs.

COMMUNITY INVOLVEMENT:

Northern residents will continue to be an integral part of the wildlife monitoring program in the Lac de Gras area by providing assistance, local knowledge, and a northern perspective to the program.

For 2009, the Environment Department has hired seasonal Aboriginal Environment Technicians, as in past years. This will assist in incorporating local participation and knowledge from different communities into the various monitoring programs, as well as provide an opportunity for community members to work on the land and better understand mining developments.

Additional community assistants are recruited from communities to assist with various environmental programs, as required.

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De Beers Snap Lake Mine: Wildlife Effects Monitoring Program

Period: February 18, 2009 to December 31, 2009

Main Investigator: John Virgl, De Beers Snap Lake Mine

Wildlife Research Permit Number: WL005670

LOCATION:

All wildlife studies took place within a study area of 31 km radius around the Snap Lake Mine, a total area of 3,019 km^2. These studies occurred at various times from February 18, 2009 to December 31, 2009.

RATIONALE:

The Wildlife Effects Monitoring Program (WEMP) is a requirement of the mine's Environmental Agreement (Article VII, 7.2c) and Land Use Permit (Condition 36).

The annual Snap Lake WEMP was designed to detect, measure, and manage mine related impacts on wildlife habitat, wildlife presence, behaviour and distribution, and wildlife injuries and mortalities. The WEMP is intended to provide information for the mine's Environmental Management System (EMS) to adaptively manage the mine to protect wildlife and wildlife habitat, and to contribute to regional monitoring information that may then be used to assess cumulative effects of mining on wildlife.

OBJECTIVES:

To determine annual variability of the following species indicator variables (endpoints) within the study area:

The density, distribution, group composition and behaviour of caribou;

The relative activity (presence) and distribution of grizzly and black bears;

The relative activity (presence) and distribution of wolverines;

The presence, distribution, and production of wolves (not part of the WEMP, data is provided to ENR); and

The distribution, nest occupancy, nest success, and production of raptors.

METHODS:

A summary of the methods used and approximate dates are provided below. Further details on methods can be found in the annual Wildlife Effects Monitoring Program reports, the Snap Lake Wildlife Monitoring Plan, and the Snap Lake Wildlife Management Plan.

Two aerial surveys were flown on May 11th and October 1st. Data gathered is used to monitor caribou abundance, distribution, group composition, and behaviour within the study area.

Bear activity was documented by ground surveys for fresh bear sign in pre-selected plots located in preferred grizzly bear habitat. Forty plots were surveyed from August 13th to 18th.

A wolverine snow track survey was completed from April 15th to 21st to document wolverine activity and distribution in the study area. The wolverine survey included 50 transects, 4 km in length, distributed throughout the study area. The survey was completed by two observers, each on snow machine.

A helicopter survey for raptor nests and wolf dens was completed on June 11th and July 13th to determine occupancy and productivity of identified nest and den sites.

Interactions with wildlife on site are documented and managed by the De Beers environmental staff, and this information is reported in the annual Wildlife Effects Monitoring Program report.

RESULTS AND MAIN CONCLUSIONS:

Results of the 2009 WEMP will be presented in the 2010 annual Wildlife Effects Monitoring Report. Although there continue to be interactions with wildlife on site, there has been no caribou, wolf, grizzly bear, black bear or wolverine mortalities at the Snap Lake Mine.

LONG-TERM PLANS AND RECOMMENDATIONS:

Wildlife monitoring will continue during the entire operational period of the Snap Lake Mine, as per the Snap Lake Mine Wildlife Effects Monitoring Plan.

COMMUNITY INVOLVEMENT:

Community feedback on WEMP has been provided through the Snap Lake Environmental Monitoring Agency (SLEMA). Community involvement in the field studies included aerial caribou surveys with community elders (August Enzoe and Mike Drygeese). Pete Enzoe of Lutselk'e was involved in the wolverine track surveys.

PARTNERS:

De Beers Canada Inc.

Golder Associates Ltd.

Snap Lake Environmental Monitoring Agency

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2008-2010 Baseline Studies for Avalon Ventures Proposed Thor Lake Rare Earth Metals Project – Wildlife Component

Period: April 1, 2009 to October 31, 2009

Main Investigator: Peter Lennie-Misgeld, Jacques Whitford Environmental Ltd.

Wildlife Research Permit Number: WL005673

LOCATION:

Yellowknife, Fort Resolution, and Lutselk'e, NT

RATIONALE:

The objectives of the wildlife component are to provide comprehensive characterization of the baseline wildlife and wildlife habitat conditions in and around the Thor Lake project site, which will form the basis for an environmental impact assessment. Determining which species (or groups of species) should be evaluated through field surveys was based upon a gas analysis, a review of two earlier wildlife studies, and a review of current species rankings, socio-economic and substance values, ecological importance, and susceptibility to project effects.

OBJECTIVES:

Species inventory and relative abundance for breeding/staging waterfowl, and species inventory and spatial distribution of aquatic mammals for the project footprint and local and regional study areas;

Species inventory, presence / absence, and relative abundance of breeding songbirds for the project footprint and local study area; and

Inventory of nests and dens in the project footprint and local study area, description of activity and spatial arrangement.

METHODS:

Aerial and ground-based surveys of waterfowl and aquatic mammals, raptor nests and mammal dens are proposed for the project footprint, and local and regional study areas.

Point count surveys are a commonly used method for sampling songbirds, especially in areas comprising different habitat types that are either grouped or patchily distributed. Based on preliminary knowledge of the study area, 10-50 point count stations will be established in the project footprint and local study area combined.

RESULTS AND MAIN CONCLUSIONS:

No results or conclusions were submitted.

LONG-TERM PLANS AND RECOMMENDATIONS:

No long-term plans or recommendations were submitted.

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Photo Credit: Alasdair Veitch

Terrestrial Environment Baseline Studies for the Lutselk'e Mini Hydro Project

Period: September 3 – 30, 2009

Main Investigator: Dan Coulton, Golder Associated, Ltd.

Wildlife Research Permit Number: WL005680

LOCATION:

The area investigated included the site of a proposed hydro development on the Snowdrift River, roughly 18 km southeast of Lutselk'e, at a site known locally as Second Rapids. A proposed all-season access road to the site was also investigated.

RATIONALE:

Environmental baseline studies were required to support future permit applications for the proposed hydro development.

OBJECTIVES:

To document the terrestrial environment in the area of the proposed development;

To determine if there exist any sensitive environmental features;

To document current land use in the area; and

To suggest mitigation to reduce any adverse environmental impacts from the project.

METHODS:

A two-day field investigation was conducted. Dan Coulton and Pete Enzo travelled the proposed access route by air traffic control (ATC), and investigated the site of the proposed mini-hydro plant at the Second Rapids site on the Snowdrift River. All wildlife and wildlife sign observed were recorded. Vegetation communities along the road and at the Second Rapids site were documented. All evidence of land use by residents of Lutselk'e was recorded. No samples were collected.

RESULTS AND MAIN CONCLUSIONS:

The area of the proposed development is dominated by spruce and mixed wood forest. No cliffs, raptor nests, or wolf dens were noted in the proposed project area, though there is some forested esker on the access road. A range of mitigation was proposed to reduce environmental impacts. It was concluded that, if mitigation is implemented, the project could proceed without causing significant effects to the local environment or land use.

LONG-TERM PLANS AND RECOMMENDATIONS:

NWT Energy Corporation will continue to investigate the feasibility of a mini-hydro plant on the Snowdrift River. The results of these studies may eventually form part of a land use permit application.

COMMUNITY INVOLVEMENT:

Pete Enzo of Lutselk'e assisted with the field investigations.

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Quantifying Boreal Bird and Mammal Response to Human Land Use Practices in the Northwest Territories

Period: May 15, 2009 to October 5, 2009

Main Investigator: Dr. Erin Bayne, University of Alberta

Wildlife Research Permit Number: WL005619

LOCATION:

This study was conducted across the Dehcho territory in the Northwest Territories, in traditional Dehcho lands in NE British Columbia, and in northwest AB. In the NWT, mammal work was conducted near Fort Liard, Jean Marie River, Fort Providence, Kakisa, and Hay River. Bird work was conducted near Fort Liard. Research was from May to October 2009.

RATIONALE:

Demand for oil and gas has resulted in a substantial increase in energy sector activity in the boreal forest. In the NWT concerns regarding how development can be done in an economically-viable, yet ecologically-sustainable manner have led to discussions around thresholds. Under a threshold-based management approach, development is capped at designated densities to protect valued natural resources like wildlife. In the Dehcho, this approach has been incorporated by setting seismic line density thresholds. However, we do not have a good understanding of how seismic lines actually impact wildlife or the long term recovery trajectories of lines. Thus, we do not know how many seismic lines are too many. We need to understand which seismic lines are disturbances and which have recovered sufficiently to be "taken off the books" to estimate appropriate threshold density targets and to determine when those targets have been reached.

OBJECTIVES:

The objectives of this project are to determine how forest birds and mammals perceive and respond to seismic lines and line density at multiple spatial scales. Specifically, our objectives are:

To determine whether forest passerines and mammals use or avoid seismic lines at different states of vegetation recovery compared to undisturbed forest interior locations;

To determine the effects of line width on bird & mammal use; and

To determine how landscape level density of seismic lines influences birds and mammals.

These data will enable us to (a) identify the relationship between increasing seismic line density and changes in community structure and species occupancy rates, and (b) identify which lines are "disturbances" and which lines are recovered.

METHODS:

Birds were sampled using a combination of point counts and spot mapping; mammals were sampled using remote cameras. All point count and camera sample locations were stratified *a priori* by habitat, seismic line type and cumulative seismic line density; and were paired between "line" and "interior" locations. Using a Geographical Information System (GIS), habitats were stratified into upland deciduous and mixed wood forest types, and lowland coniferous forest types. Seismic line types were categorized as either one of three recovery categories, or one of three width categories using a combination of GIS analysis and visual estimation in the field. Cumulative line density was determined in a GIS.

RESULTS AND MAIN CONCLUSIONS:

In 2008 and 2009 we conducted a total of >400 point counts for forest passerines and spot-mapped 46 ovenbird territories across each seismic line recovery treatment. A total of 1,037 cameras were deployed (518 camera pairs) across each of six line treatments over the same period. Cameras were also clustered to test for how line density influences species occupancy at larger spatial scales. Results from birds will be forthcoming in our next report.

The probability of detecting mammals at a seismic line compared to an undisturbed interior location varied by species and line type. Marten are detected on open lines significantly less often. However, as lines regenerate this difference diminishes until there is no statistical difference between heavily regenerated lines and forest interiors, suggesting marten avoid open lines but will again reuse lines with sufficient regeneration. On the other hand, black bear detection is significantly greater on any line type compared to the forest interior, suggesting bears use even lines with advanced recovery. For narrower, low-impact line types, the probability of detecting either marten or bear did not differ between interior locations and lines < 2 m wide. However, both species responded to the wider categories of low-impact lines as they did for open conventional lines: marten detection significantly less, and bear detection significantly more probable. These data suggest there is a minimum line width below which species do not "perceive" or respond to lines.

LONG-TERM PLANS AND RECOMMENDATIONS:

Our research focus in 2010 will revolve around:

Increasing our point count sample size in lowland black spruce habitats;

Continuing to collect vegetation data at all sample locations; and

Collecting vegetation at lines of known vintage and construction technique.

Our long-term plans for this research are to determine more precisely which vegetation attributes correlate to line "recovery" for a variety of bird and mammal species, and to determine exactly how much time is required for a line to reach that state of recovery, given surrounding habitat and construction technique. Further, we will use these data with remote sensing techniques to determine the overall state of recovery of seismic lines in NWT.

PARTNERS

University of Alberta

Environment and Natural Resources

Environment Canada – Canadian Wildlife Service

Paramount Resources, Ltd.

Environmental Studies Recovery Fund

Horn River Basin Producers Group

British Columbia, Ministry of Environment

COMMUNITY INVOLVEMENT:

All appropriate actions and contacts were made with required communities and groups as outlined on the ENR website. All communities were contacted prior to beginning research activities. Responses were favourable and permission was granted without conditions.

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Index

Permits issued in the Inuvik region (includes the communities of Aklavik, Fort McPherson, Ulukhaktok, Inuvik, Paulatuk, Sachs Harbour, Tsiigehtchic and Tuktoyaktuk).

Permits issued in the Sahtu region (includes the communities of Colville Lake, Délı̨nę, Fort Good Hope, Norman Wells, and Tulita).

Permits issued in the North Slave region (includes the communities of Behchokǫ̀, Gametì, Luselk'e, Wekweètì, Whatì, and Yellowknife).

continued next page

Index continued

Permits issued in the Dehcho region (includes the communities of Fort Liard, Fort Providence, Fort Simpson, Jean Marie River, Nahanni Butte, Trout Lake, and Wrigley).

Permits issued in the South Slave region (includes the communities of Fort Providence, Fort Resolution, Fort Smith, and Hay River).