Project: Eastern Yukon Flats Moose Population Estimation Survey Budget: 13K

CATG
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FWS Liaison: Wildlife Biologist Mark Bertram, 907/456-0446.

Purpose: The purpose of this project is to monitor annual trends in moose population size and composition in the eastern Yukon Flats. This project will provide data to support objectives outlined in the Yukon Flats Cooperative Moose Management Plan and for evaluating hunting regulations, proposed regulation changes, and subsistence, sport, and fire management policies.

Objective: 1) Estimate the moose population at a maximum confidence limit of plus or minus 25% at the 90% confidence interval.

2) Estimate standard sex and age composition ratios with adequate sample sizes as outlined in the plan.

Survey Areas: The primary survey area includes the core hunting areas in the 2,936 mi^2 eastern Yukon Flats. The area includes low elevation and upland habitat adjacent to the Yukon, Porcupine, and Black rivers, in an area extending from near the mouth of the Chandalar River east to the vicinity of Chalkyitsik, and from Shuman House on the Porcupine River south to the Sucker River drainage and Mardow Lake area southeast of Fort Yukon. The primary area will be given first consideration for survey.

The secondary survey area will include lands near the village of Venetic. The boundary of the survey area will be mutually agreed upon by ADFG, USFWS, and CATG. The secondary survey are can be surveyed when conditions are unfavorable in the eastern Yukon Flats or if time and funds allow both areas to be completed in the same survey year.

Procedures: The survey follows methods according to Gasaway et al. 1986 and Ver Hoef 2001.

<u>Personnel and aircraft requirements - qualifications - safety</u>

Pilots and observers experienced with low level flying in light utility aircraft are required. The observer must be trained in the identification of moose by age/sex classes. The pilot and aircraft must be OAS approved for low-level surveys. Due to the nature of this contract agreement U.S. Fish and Wildlife Service aircraft

and employees are not eligible to participate in the survey. Both pilots and observers must wear personal protection equipment when conducting low-level surveys. Personal protection equipment includes a helmet, fire-resistant clothing (nomex), all-leather or leather and nomex gloves, and leather boots. All aircraft must have required OAS survival kit, tent, sleeping bags and pads, cook stove, cook gear, and food. Refer to Department of Interior Manual, Aviation Policy, Parts 350-354 for aviation requirements. Personal survival equipment (fire source, ELT, etc.) is highly recommended for all survey participants.

Because of the skill and concentration required, a pilot with experience in wildlife surveys is required. Low level circling around moose for classification counts can be hazardous, and the pilot must have training and experience in safely performing these maneuvers. Moose surveys also require patience for flying parallel transect lines and frequent low level passes or circles to classify moose. If observers are unfamiliar with aerial transects, map orientation, and moose classification, an area with ample moose should be sampled for practice prior to starting the survey. Whenever possible inexperienced observers should be teamed with experienced pilots to conduct surveys. The project supervisor must conduct a pilot/observer briefing prior to initiating all surveys to maintain standardization of methods and to discuss logistics and safety considerations. Daily flight following is required to ensure safety for all participants. Survey pilots must flight follow with other survey aircraft throughout the survey or establish daily flight plans with Flight Service with the Federal Aviation Administration. To accomplish the survey in a timely manner, it is recommended that the survey include a minimum of three survey aircraft.

<u>Dates of inventory - times of day - weather conditions</u>

The area will be surveyed in the fall after snow cover is complete, and depth is about six inches. Arrival of sufficient snow cover in fall is highly variable year to year, and depending on winds and snowfall, may change for better or worse within a few days. It is critical for continuity in annual survey data that sightability of moose is high so presence of large patches of brown vegetation will preclude initiation of the survey. Ideally, the snow cover should include a few inches of fresh snow that will show recent moose trails through brush and tracks on the ground. Prior to the survey, reports from other pilots should be obtained, or a flight should be made to check whether snow cover is adequate. The usual date for moose surveys is from the last week of October until the end of November. By December diminishing daylight and increasing antler drop on bulls makes surveys more difficult and less reliable. By mutual agreement, the survey may be postponed until the spring of 2005, if fall conditions are not favorable.

Surveys must be conducted during times of good lighting, about one-half hour

after sunrise to one-half hour before sunset. Weather conditions should consist of high overcast or clear skies with visibility at least 5-10 miles. Frequent turbulence, heavy overcast with diminished visibility due to snow, or patchy low clouds are not suitable survey conditions, and surveys should not be initiated. Moose sightability is best on days with a high overcast after recent snowfall with snow on the bushes.

Methods

Survey design - The moose survey procedure and analysis will follow methods established by Gasaway et al. 1986 and Ver Hoef 2001 which have been utilized in the eastern Yukon Flats by Alaska Department of Fish and Game and Council of Athabascan Tribal Governments since 1999. The Geo-Statistical Population Estimator (GSPE) method as outlined in Ver Hoef 2001 will be followed which produces a statistically bounded population estimate based on a stratified random sample design.

The survey area is divided into 553 rectangular units, each encompassing two minutes of latitude and five minutes of longitude. Survey goals include the following: 1) Sample a minimum of 100 of the 553 units to include minimum of 60 high and 30 low density strata. 2) Observe a minimum of 25% of the estimated population (in order to attain the minimum number of observations it will be necessary to select sample units known to have moose in them and in a non random fashion). 3) Attain a population estimate with no greater confidence limit of plus or minus 25% at the 90% confidence interval.

Stratification - The survey area was last stratified in 1999. In coordination with the ADF&G, if funding permits it is recommended that a complete stratification be conducted prior to sampling to ensure efficiency in reaching the goals outline above. If a stratification is not completed, it is likely that additional survey units will need to be sampled. A Cessna 185 or equivalent should be used for a stratification aircraft and will generally be flown in a low speed cruise configuration at 100 to 110 knots airspeed and 600 to 800 feet above ground level.

Unit sampling - Survey intensity and methodology should be consistent from year to year. The standard survey aircraft should be tandem seat, two place light utility aircraft with good slow flight and maneuvering characteristics such as the Piper Super Cub, Aviat Husky, Bellanca Scout, or Arctic Tern. The standard survey aircraft generally fly at between 300 and 500 feet (above ground level), with occasional lower passes as necessary to classify moose, and at an airspeed near 70 mph. Aircraft should never be operated at less than 65 mph. Flap settings should be that recommended by the aircraft manufacturer for best performance during maneuvering flight.

It is critical that units are sampled at a rate of intensity appropriate for the habitat being surveyed. Forested habitats will require a minimum search intensity of eight minutes per square mile while open riparian wetlands which may include lakes and other open terrain will require lower search intensities of four to six minutes per square mile. Given the amounts of forested areas in the study area, mean search intensities for all units sampled should be approximately six minutes per square mile.

Pilots navigate in and out of sample units using a GPS. Observer and pilot are each responsible for observing and classifying moose on their chosen side of the aircraft. The pilot should fly one or more circles around each observed moose to classify the moose by sex and age and to look for additional moose. All moose observed are classified into the following categories: yearling bull, medium bull, large bull, cow w/0 calf, cow w/1 calf, cow w/2 calves, cow w/3 calves, or lone calf. Bulls are separated as follows: yearlings-- spike, fork, or paddle antler (no brow tines, small antler bases, spread less than 30"); medium-- palmated antler with spread 30" to 50"; large-- palmated antler with spread over 50". Antler spread on bulls can be visually estimated on the premise that antler bases (or ears) on a small bull are 8" apart, and on a large bull are 10" apart. Observers and pilots should refer to "Aerial classification of bull moose based on antler development" by S. Dubois, W. Gasaway, and D. Roby (Source ADFG). Observations made outside the boundaries of sample units should be recorded and can latter be tabulated to boost sample size for sex and age composition statistics. Fatigue hampers survey effectiveness and safety and a stretch and eye/bladder relief break should be taken about every two to three hours during actual survey flying.

Recording data - Observers record data on a standard moose survey data form (Source ADFG). The header information on the data form is best completed while traveling to the survey area. Information on lighting, snow, and search time is important to record for comparing quality of surveys among years. Each moose or moose group observed is given a sequential index number and a latitude and longitude are recorded. For large moose groups it is important for pilot and observer to agree on total moose seen in each group and on the composition of the group. Incidental sightings of wolves, bears, kill sites, or other wildlife can be included in the margin of the data form. It is recommended that the observer complete moose totals on the form while flying back to the base camp for the evening, or as soon as possible thereafter, to rectify discrepancies. The data form must be fully completed and double checked for accuracy before turning it in to the project supervisor.

Report format - data analysis - archival - Data reporting format and analysis will

follow previous moose survey data reports prepared by Alaska Department of Fish and Game and Council of Athabascan Tribal Governments for the eastern Yukon Flats (Stephenson et al. 2000, 2001). Data will be analyzed by software programs Moosepop and the Geo-Statistical Population Estimator. A copy of the survey data files and data analyses will be provided to the Alaska Department of Fish and Game and U.S. Fish and Wildlife Service via a CD or electronic mail for review and archival.

Deliverables: A report will be prepared which includes a summary and analysis of data collected. The report format will follow the outline mentioned above.

Timeline: Moose survey data is important information to local residents of the Yukon Flats and it is necessary that the information be distributed in a timely manner.

Late October, early November, 2004 - Population survey conducted in the eastern Yukon Flats. (The Venetie area may be surveyed if conditions are unfavorable in the eastern Yukon Flats or if time and funds allow both areas to be surveyed.)

November 2004 to December 2004 - data is compiled and analyzed and a draft report is prepared.

December 31, 2004 - draft report is submitted to Yukon Flats National Wildlife Refuge for review and comment.

January 15, 2005 - report is finalized.

February 1, 2005 - report is distributed to resident and neighboring Yukon Flats residents, Yukon Flats village tribal councils, and government and non government agencies. Minimum mailing list will include Chiefs, Natural Resource Specialists, and School Principals of Beaver, Birch Creek, Canyon Village, Chalkyitsik, Circle, Fort Yukon, Stevens Village, and Venetie; Chair, Yukon Flats Fish and Game Advisory Committee; Chair, Eastern Interior Subsistence Regional Advisory Council; Director, Stevens Village Natural Resources Department; Director, TCC Wildlife and Parks; Executive Vice President, Lands and Natural Resources, Doyon Ltd; Fort Yukon Area Biologist, ADFG, Fairbanks; Regional Supervisor, ADFG, Fairbanks; Biologist, White Mountains Recreation Area, BLM, Fairbanks; Biologist, Yukon Charley National Park and Preserve, Fairbanks; Yukon Flats Refuge Manager, USFWS, Fairbanks; Refuge Supervisor, USFWS, Anchorage; Office of Subsistence Management, USFWS, Anchorage; Region 7 Librarian, USFWS, Anchorage. Yukon Flats Refuge staff can provide an electronic mailing list for above list.

(By mutual agreement, these timelines may be adjusted to account for delays

caused by lack of snow, inclement weather, etc.)