

Protocol Development Summary

Protocol: Western Arctic Caribou Herd [short name: Caribou]

Parks Where Protocol will be Implemented: BELA, KOVA, CAKR, NOAT, GAAR

Justification/Issues being addressed:

Caribou (*Rangifer tarandus*) have consistently ranked high as a vital sign for ARCN. At an estimated population size of over 490,000 animals, the Western Arctic Herd (WAH) are a significant ecological force in Northwestern Alaska and are the largest caribou herd in Alaska. The WAH has a substantial cultural impact in that the heritage and traditions of Native Alaskans in approximately 40 subsistence based communities in the region have been shaped by the availability of these caribou (Western Arctic Herd Working Group 2003). The availability of WAH also affects the economics of this region. The presence and relative abundance of WAH caribou have substantial impacts on the populations of wolves, bears, and wolverines in the area. Caribou are good integrators of regional conditions in northwestern Alaska because of their migratory nature. Caribou may have substantial effects on plant and lichen communities and by extension wildlife communities, either directly through browsing and grazing or indirectly through biogeochemical cycling. Key reasons for monitoring the WAH in network parks are that caribou are: (1) an extremely important subsistence species that occur in all park units within this network; (2) specifically identified in the management objectives of GAAR, KOVA and NOAT; (3) directly impact reindeer and reindeer herders in BELA; (4) considered good indicators of the condition of park ecosystems because they consume lichens and fungi making them good bio-indicators of environmental toxins; and (5) the focus of national and international datasets for caribou herds and caribou ecology across the Arctic region. Successful monitoring of the WAH by ARCN and NPS staff will require integration with existing efforts currently be done by the Alaska Department of Fish and Game (ADF&G), US Fish and Wildlife Service (FWS) and the Bureau of Land Management (BLM).

Specific Monitoring Questions and Objectives to be Addressed by the Protocol:

Some of the specific monitoring questions that will be addressed by this protocol include:

1. Are the movements and distribution of WAH caribou changing in ARCN?
2. What is the late winter physical condition of the WAH?
3. What is the long-term trend in parturition in the WAH?
4. How do caribou affect plant and lichen communities?*

** Note: It is recognized that the affect of caribou on plant and lichen communities may not be considered baseline monitoring. This question, however, will be addressed through integrating with other vital signs and other natural resources activities in the ARCN parks and will not cost additional funds other then staff time.*

Objectives are as follows:

Core Program

- Capture and radiocollar WAH caribou to maintain a sample size of 30-40 GPS collars.
- Obtain frequent (>2/day) location data via GPS-satellite telemetry.
- Membership, attendance and activity on the WAH Working Group Technical Committee.
- Attendance and involvement at WAH Working Group meetings.
- Obtain calf retention data by radiotracking in October and April.
- Obtain herd composition count (June).
- Define seasonal ranges (calving, insect relief, summer, winter).
- Define migratory corridors.
- Detect changes in range distribution over time.
- Detect changes in survivorship over time.
- Detect changes in migration routes and phenology over time.
- Detect changes in the location and timing of calving (using GPS data).
- Detect changes in composition count (June).

Supplemental Program

- Obtain neonate weights (June).
- Obtain DNA samples (hair and/or blood) from captured caribou for analyses.
- Obtain body condition data (isotope, winter).
- Obtain body condition data and disease assessment (necropsy, captures).
- Detect changes in neonate weights (June).
- Detect changes in body condition data (September).
- Detect changes in the genetic makeup over time.

Basic Approach:

The ADF&G has taken the lead role in monitoring WAH caribou for a number of years. In recent years other natural resource agencies, including the Alaska Department of Natural Resources (ADNR), BLM, FWS and NPS have become more involved. This involvement, as well as the involvement of a number of stakeholders is apparent in the development of the Western Arctic Caribou Herd Working Group and the Western Arctic Caribou Herd Technical Committee. The working group was developed to exchange information and reach consensus on recommendations for research, monitoring, regulation, allocation and enforcement (Western Arctic Caribou Herd Working Group 2003). The basic approach, questions and objectives presented in this protocol development summary are taken from the Western Arctic Caribou Herd Cooperative Management Plan (Western Arctic Caribou Herd Working Group 2003). Many of these questions and objectives are also being asked at the international level by the CircumArctic *Rangifer* Monitoring and Assessment Network (CARMA; <http://www.rangifer.net/carma/>).

ARCN will cooperate with the ADF&G, ADNR, BLM and FWS to monitor caribou where possible. Monitoring of WAH caribou in ARCN will employ the use of

radiocollars and radiotelemetry. The use of radiotelemetry is standard throughout Alaska and parts of Canada for monitoring caribou populations. In past years the NPS has contributed to monitoring WAH caribou by purchasing satellite and conventional radiocollars that have been deployed by ADF&G. ARCEN will establish a more coherent plan of cooperation with the other cooperators. We will continue to purchase radiocollars but we will begin to add satellite GPS collars to those currently being deployed. The use of satellite GPS collars will minimize the time and money spent on aircraft to radiotrack animals. GPS radiocollars will aid in locating groups of caribou for ADF&G photocensus work as well as sex and age composition, recruitment and calving monitoring. GPS telemetry data can also be used to track the timing and direction of seasonal movements. The availability of location data from GPS collars provides the opportunity to collaborate with outside researches that may be interested in detailed habitat work for the WAH.

Body condition will be monitored in one of two ways. Either body weights, measurements and blood samples will be taken if caribou captures are undertaken by the NPS using helicopters. Under supplemental protocols, fecal samples and urine samples will be collected annually in the late winter to assess the late winter body condition of WAH caribou using stable isotopes. Fecal nitrogen is derived from undigested nitrogen and endogenous secretions (Barboza and Parker unpublished data). Stable isotopes in urea are a result of metabolic processes within the animals and can indicate the relationship between dietary nitrogen supply and body protein stores (Parker 2003; Parker et al. 2005). The isotopic signatures of urea and fecal pellets can thus be used to evaluate the late winter body condition of caribou.

Habitat condition for the WAH will be monitored as part of the monitoring efforts for other Arctic Network's vital signs such as Terrestrial Vegetation and Soils, Fire Extent and Severity, and Weather and Climate.

As mentioned above, many protocols for monitoring WAH caribou have already been developed by ADF&G, CARMA and other groups. An important component of tracking this vital sign by the ARCEN network will be to gather the data produced by other natural resource agencies as well as local users. In addition, collaboration with other natural resources agencies and local users will be a critical component in making this monitoring effort successful.

Principal Investigators and NPS Lead:

Principal investigator for the NPS will be Kyle Joly. We anticipate other principal investigators will include Jim Dau (ADF&G), Kimberlee Beckmen (ADF&G), Tina Moran (FWS), and Erica Craig (BLM).

Development Schedule, Budget, and Expected Interim Products:

Protocols exist for monitoring caribou populations. Protocols development will not require field research and will consist primarily of writing a protocol that meets NPS standards (Oakley et al. 2003) and through establishment of cooperative agreements. Protocol development will be done through coordination and consultation with the University of Alaska (UAF), the Alaska Department of Fish and Game (ADF&G), the

US Fish and Wildlife Service (FWS) and the Bureau of Land Management (BLM). Full development of this protocol will progress on the following schedule:

- Summer 2008: Final Protocol testing and evaluation (\$60,000)
- December 2009: Draft protocol ready for peer review.
- Summer 2009: Finalize and implement protocol (\$60,000).