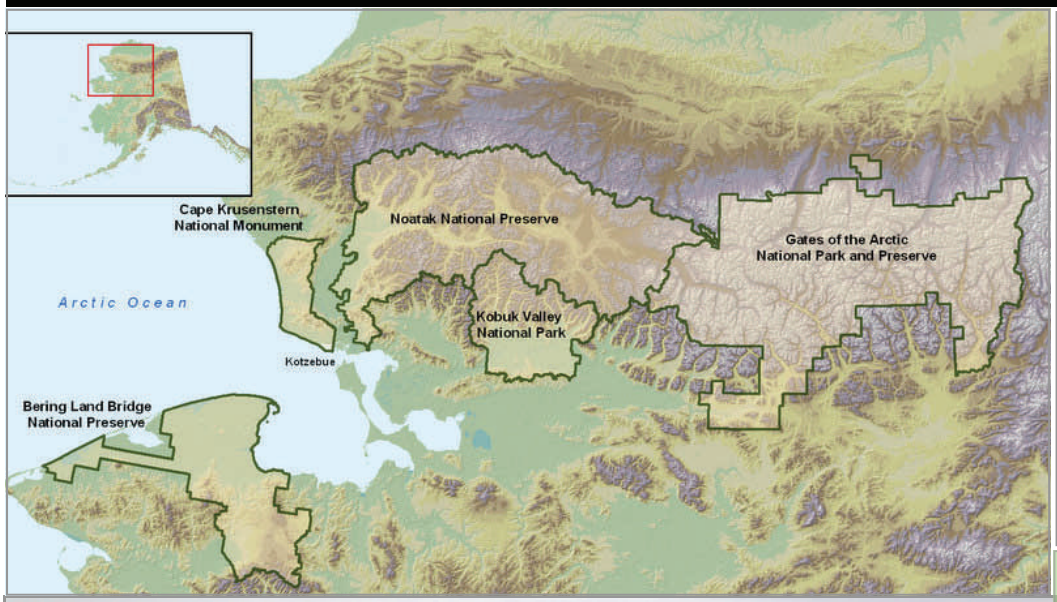
# Arctic Network Newsletter

**Alaska Region Inventory & Monitoring Program**
**National Park Service**

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## 2011 Spring and Summer Monitoring and Field Activities

### June

24-Jul 1 Dall's Sheep Foraging Study, Gates of the Arctic National Park and Preserve (GAAR, *K. Rattenbury*)
20-28 Yellow-billed Loon Survey, Bering Land Bridge National Preserve (BELA) and Cape Krusenstern National Monument (CAKR, *M. Flamme*)
28-30 Terrestrial Vegetation Node Study, Noatak National Park and Preserve (NOAT, *D. Swanson*)

### July

2-7 Dall's Sheep Survey, Itkillik Preserve, GAAR, (*K. Rattenbury*)
1-31 Terrestrial Vegetation Node Study, NOAT (*D. Swanson*)
5-14 Dall's Sheep Survey, NOAT (*K. Rattenbury*)
7-21 Shallow Lakes Monitoring, Kobuk Valley National Park (*A. Larsen*)
27-28 Ungulate Grazing Exclosures, BELA (*P. Neitlich, M. Holt*)

### August

1-10 Terrestrial Vegetation Node Study, NOAT (*D. Swanson*)
17-21 Muskox Group Composition Survey, BELA and CAKR (*J. Lawler*)
25-31 Yellow-billed Loon Productivity Survey, BELA and CAKR (*M. Flamme*)

### September

1-2 Yellow-billed Loon Productivity Survey, BELA and CAKR (*M. Flamme*)

**Barren-ground shrew (*Sorex cinereus*) in a pitfall trap**

## Science for the stewardship of Arctic Parklands



### Small creatures in a large landscape

Shrews are potentially the most diverse and abundant small mammals within ARCN and comprise an important component of arctic communities. Last summer, six species of shrews were found in ARCN parklands by University of New Mexico researcher Andrew Hope and his crew. Two closely related varieties- the masked shrew, a forest species, and the barren-ground shrew, a tundra species, come into contact where the boreal forest and tundra overlap (imagine a line extending from the Seward Peninsula eastward through the Brooks Range). Hope is investigating hybridization between masked and barren-ground shrews in ARCN to understand how both species respond to shifts in ecotones (ecological transitions) as a result of climate change. Dynamic change within parklands such as northward expansion of boreal forest species can be evidenced through changes in the small mammal communities. Past and present surveys will assist with future management.

Masked shrew (*Sorex ugyunak*)

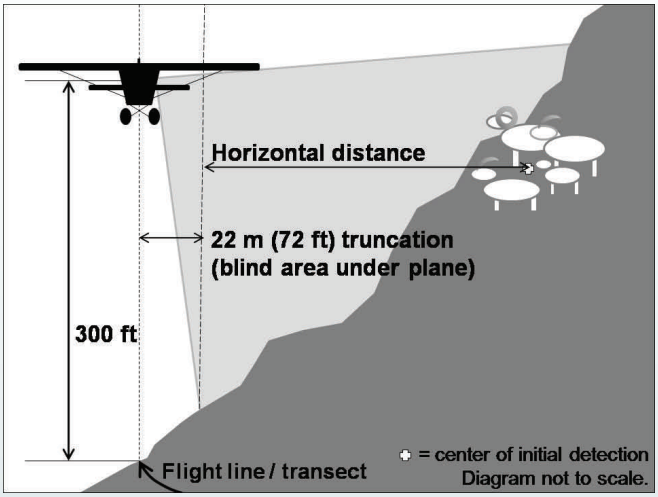
For more information, please contact: ahope@unm.edu

# ESTIMATING DALL'S SHEEP ABUNDANCE IN ALASKA'S PARKLANDS

The NPS is using a combination of distance sampling and hierarchical modeling to estimate Dall's sheep abundance in GAAR, NOAT, KOVA, DENA, WRST and LACL. Distance sampling has been used for wildlife and vegetation surveys since the mid 1970s. It is an efficient and cost-effective method that produces unbiased estimates of abundance and accounts for detection probability (the unknown number of animals not detected during a survey).

## IN THE FIELD

For wildlife that live in mountainous terrain, distance sampling is conducted by flying transects that follow elevational contours. Pilot-observer teams work together to search for sheep uphill from the line (pictured right). When a group of sheep is detected, the pilot flies over and records the group's location with GPS. The observer records information about group composition, behavior, and weather on a laptop.




## CALCULATING DENSITY ESTIMATES

The horizontal distances between detected groups and their respective transects (pictured right) are used to estimate density per transect, which is then extrapolated for a park-wide estimate using hierarchical modeling. The model allows us to include elevation, group size, sheep distribution, and other factors that may influence detection and abundance.

Dall's sheep can consume between 50-120 species of vegetation, primarily forbs, grasses, and sedges during summer. Mineral licks are important for them to compensate for mineral deficiencies. ARCN will collect and analyze Dall's sheep fecal material from the Itkillik Preserve, GAAR to investigate summer diet composition and quality.

## RECENT ESTIMATES

Recent surveys show that Dall's sheep numbers in Alaska's northernmost parks are recovering from a large-scale decline observed in the 1990s. These parks are home to 12-13% of the world's Dall's sheep. In Gates of the Arctic National Park and Preserve (GAAR) we estimated 8,412[a] sheep in 2009 and 10,072[b] sheep in 2010. Within the Itkillik Preserve of GAAR we estimated 1,898[c] and 1,854[d] sheep in 2009 and 2010, respectively. In the western Baird Mountains of NOAT survey teams* counted 823 sheep in 2009, with an estimate of 936[e] sheep after correcting for detection.

95% Confidence Interval: [a] 6,517-11,090 in 2009, [b] 8,081-12,520 in 2010, [c] 1,412-2,578, [d] 1,342-2,488, [e] 890-1,000,

*ARCN, WEAR, ADF&G

## SURVEY FEASIBILITY

The 2009 and 2010 surveys showed that these methods are logistically feasible, cost 70-80% less than aerial minimum count surveys and produced precise abundance estimates. We found that distance sampling and hierarchical modeling can increase the statistical rigor and spatial extent of Dall's sheep surveys throughout Alaska, while reducing overall survey costs and improving harvest management.

For more information, please contact kumi_rattenbury@nps.gov or joshua_schmidt@nps.gov
http://science.nature.nps.gov/im/units/arcn/documents/documents/RB_ARCN_DSheep_2010-10-15.pdf

**About the Arctic Network Inventory and Monitoring Program (ARCN)**

Our mission is to collect scientifically sound information through natural resource monitoring to contribute to park management and facilitate park preservation for future generations. We work in Bering Land Bridge National Preserve (BELA), Cape Krusenstern National Monument (CAKR), Gates of the Arctic National Park and Preserve (GAAR), Kobuk Valley National Park (KOVA), and Noatak National Preserve (NOAT).

**More Acronyms**

WEAR: Western Arctic Parklands (BELA, CAKR, KOVA, NOAT)
YUGA: Yukon-Charley Rivers/Gates of the Arctic
DENA: Denali National Park and Preserve
CAKN: Central Alaska Network
WRST: Wrangell St. Elias National Park
ADF&G: Alaska Department of Fish and Game
USFWS: US Fish and Wildlife Service
USGS: US Geological Survey
LACL: Lake Clark National Park and Preserve

## Education, Outreach, and Information Exchange

*Kotzebue*– High school freshmen China Kanter and Ember Ek received 4 awards for their high school science project about the drainage of KOVA lakes. They won first place in the earth and planetary science category at their high school science fair, an award from the American Indian Science and Engineering Society (AISES), an award from the Centers for Ocean Sciences Education Excellence, and the National Park Service Northwest Alaska Natural History award. Their study, conducted with help from Amy Larsen (CAKN aquatic ecologist), integrated lake science with traditional knowledge about Silver Dollar Lake in KOVA.

*Dalton Highway Podcast Tour*– In collaboration with the Bureau of Land Management and the U.S. Fish and Wildlife Service, GAAR staff Michael Letzring (pictured here) and Tracie Pendergrast are finalizing 20 podcasts filmed last summer about public lands along the Dalton Highway corridor (Fairbanks to Deadhorse). These 3-5 minute videos will be completed by August and will inform visitors about natural and cultural resources, field science activities, and recreational opportunities found along the road corridor. A new map-based, interactive website called *Dalton Highway Discoveries: Journey into Alaska's Arctic* is being designed in cooperation with Alaska Geographic to feature the podcasts. This virtual tour of the Dalton Highway will be completed in early 2012 and made available on the Fairbanks Alaska Public Lands Information Center website (www.alaskacenters.gov/fairbanks.cfm). To see a podcast about ARCN visit http://science.nature.nps.gov/im/units/arcn/.

*ARCN presents*–In March, ARCN scientists attended the George Wright Society Meeting in the vibrant city of New Orleans, LA. Kumi Rattenbury and Scott Miller presented work on Dall's sheep and Database Management respectively, while Jim Lawler chaired a session of presentations focused on climate change in Arctic Parklands.

## Science and Monitoring Plans Reviewed

*Climate Monitoring* –The Environmental Assessment for establishing long-term remote climate stations in GAAR, NOAT, KOVA, CAKR, and BELA is complete and supports ARCN plans to erect 9 climate stations (pictured here) as early as summer 2011 in these parklands. The weather observations from these stations, transmitted hourly, will be posted to the Western Regional Climate Center's (WRCC) website (*www.wrcc.dri.edu/NPS.html*) in near real-time. After 5 years of data have been collected and analyzed, the stations' utility in future climate monitoring efforts will be reassessed.

*3rd Year Review*-This past winter, ARCN completed and passed the 3-year start-up review of its Inventory and Monitoring (I&M) Program. The program received positive feedback from the I&M national review team on the monitoring efforts underway for 17 vital signs.

For more information about ARCN's Climate Monitoring Program and Inventory and Monitoring Plan visit (*http://science.nature.nps.gov/im/stunits/arcn/*).

## Staff Updates

*Tara Whitesell* (*Biotechnician*) is almost fully recovered from having hip replacement surgery last winter and will be back in the field this summer! She also graduated this spring from University of Alaska, Fairbanks (UAF) with a Bachelor's degree in Biological Science.

*Kristin DeGroot* (*Biotechnican, pictured below with a female and male lesser scaup*) finished her Master's thesis: Body condition and reproductive strategies of female lesser scaup in the boreal forest of Alaska. She graduated from UAF this spring.

*Kate Schaefer* (*Asst. Data Manager*) left ARCN and returned to UAF to work on a Master's degree in Geography.

*Ken Hill,* our physical scientist charged with deploying climate stations, left ARCN this spring to work for the Greenland Survey– a long term ecological monitoring program in Nuuk, Greenland. As their main field scientist, he will maintain the program's network of climate and hydrology and soil sensors.

**Arctic Network Coordinator**

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Peter Neitlich, WEAR plant ecologist, and acting Chief of Natural Resources, 509-996-3917
Tom Liebscher, YUGA Chief of Resources, 907-455-0620

**Additional NPS Collaborators**

Kyle Joly, YUGA Wildlife Biologist
Marci Johnson, WEAR Biologist
Melanie Flamme, YUGA Wildlife Biologist
Josh Schmidt, CAKN Data Manager
Laura Weaver, CAKN Visual Information Specialist
Maggie MacCluskie, CAKN Coordinator
Zac Richter, GAAR Interpretive Ranger

## MUSKOXEN PERISH IN STORM SURGE AND ICING EVENT

At least 33 muskoxen were killed in late February 2011 during a storm surge that brought strong winds and extreme tidal surges along the icy shores of the northern Seward Peninsula. The carcasses were discovered in March during a routine radio-tracking flight. Four of the animals were among those collared for a study of muskox population dynamics and ecology led by Layne Adams (USGS) and Joel Berger (Wildlife Conservation Society, University of Montana). Prior to the storm, photos taken by NPS staff of the muskox group suggest there may have been as many as 55 killed, leaving many buried deep beneath the ice.

### Monitoring Muskoxen

Last March, NPS and ADF&G biologists conducted fixed-wing aerial surveys for muskoxen using a distance sampling method (similar to the Dall's sheep surveys) for both the Seward Peninsula and Cape Thompson populations including BELA, CAKR, and areas extending up the Noatak River drainage and onto the North Slope. ARCN conducted a herd sex and age composition survey in BELA and CAKR by helicopter in April. Population estimates and group composition figures will be available this summer and provide valuable information for managing muskoxen in northwestern Alaska. For more information, please contact marci_johnson@nps.gov.

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