

Muskox Sex-Age Composition Monitoring Protocol for the Arctic Network: Standard Operating Procedure (SOP) #1: Preparing for muskox sex-age composition survey

Standard Operating Procedure # 1

Version 1.00. November 2018

Revision History Log

Previous Version #	Revision Date	Author	Changes Made	Reason for Change	New Version #
Add rows as needed for each change or set of changes associated with each version.					

Introduction

This SOP describes how to prepare for and conduct the muskox composition survey performed in March and April. Pre-season field tasks include:

- Scheduling personnel within NPS and with the Alaska Department of Fish and Game.
- Helicopter and pilot procurement;
- Generating a random list of muskox locations to survey for composition from the known muskox locations from the population survey.
- Preparing maps and pertinent muskox group information.
- Field gear.
- Obtaining park compliance and research permits for survey.

Scheduling Personnel

The project leader will coordinate with Alaska Department of Fish and Game (ADFG) staff, acquire an aircraft and pilot, produce communications and safety plans, oversee field operations, and ensure that data are managed properly during and after survey. In addition to the pilot, there are typically two observers (individuals experienced sexing and aging muskox) that will participate in this survey. Typically, the NPS project lead will be one of the observers and they will be accompanied by an ADFG employee. In some circumstances, there may be two NPS employees serving as observers. The composition survey will be scheduled for a 5 day period in March or April immediately after the muskox population survey is conducted. Park housing and food will be required for 2 - 3 people for 5 days in either Kotzebue or Nome.

Helicopter and Pilot Procurement

The preferred helicopter for this survey is the Robinson R44-II (R-44). The R-44 is advantageous in that it is available from vendors in Nome and Kotzebue or can be ferried to the works site from Fairbanks or Anchorage. In addition, relative to other helicopters, the R-44 is relatively quiet and burns aviation fuel which is locally available. Helicopters must be equipped with an: FM radio, GPS, and automated flight following equipment (AFF or Spidertracks). Pilots and aircraft must be approved by the Office of Aviation Services (OAS) to fly the mission. Use of fuel caches for helicopter operations requires that pilots carry a fuel pump with filters.

A limited number of R44 are available from vendors in Northwestern AK, so procurement should be completed well before the survey date. Generally, for a survey, procurement paperwork is initiated in early February. OAS aircraft procurement procedures change frequently; therefore, the project lead should work with the park Aviation Manager to review current policy and to complete and submit procurement paperwork. Once the task order has been issued to the aircraft vendor, the project lead should work directly with the vendor to schedule exact dates of the survey.

Generating a list of muskox locations

A muskoxen population survey is conducted prior to any sex-age composition survey. Typically, the population survey is conducted between 1 day and 4 weeks prior to the sex-age composition survey. Data collected during the population survey include GPS location, number of animals in the group, and

occasionally, the number of calves in the group. The number of animals in the group is used to classify each group into small, medium and large. Small, medium and large are defined just prior to each sex-age survey using the following criteria:

Small groups ~60% of the groups
 Medium groups ~25% of the groups
 Large groups ~20% of the groups

The ADFG biometrician will define the number of animals required for inclusion in each group size category after each population survey.

Data from the population survey is entered into a spread sheet during and following the population survey and is distributed to all cooperating biologists prior to the sex-age composition. This data can be sorted by group size to generate lists of small, medium and large. Groups of muskoxen in each list can then be assigned a random number and sorted to provide a priority number for inclusion in the survey. Random numbers can be generated in Excel for example by using the “Formulas” tab, navigating to “math and trig” function and selecting “RAND”. Each observed as well as the pilot should have a copy of the prioritized list of muskox groups to survey along with the number of animals in the group and the GPS coordinates (Fig. 1).

Group #	Adults	Calf	Total	LATITUDE	LONGITUDE	Group ^a size	Rand #	Survey # by Group
I	44	2	46	67.16091	-163.56541	Large	0.47	1
K	17	0	17	68.85258	-166.00216	Medium	0.93	1
D	26	2	28	67.28604	-162.49304	Medium	0.85	2
J	22	0	22	67.54604	-163.60613	Medium	0.09	3
F	3	0	3	68.70744	-166.05244	Small	0.99	1
H	15	0	15	67.17973	-163.25727	Small	0.90	2
E	2	0	2	67.13420	-163.42188	Small	0.89	3
B	2	0	2	67.36425	-162.38231	Small	0.86	4
A	14	0	14	68.72611	-166.09018	Small	0.63	5
G	8	0	8	68.01427	-164.45104	Small	0.60	6
L	1	0	1	67.16994	-162.97890	Small	0.45	7
C	2	0	2	67.49220	-163.77958	Small	0.44	8

^a Large >33, medium 33-17, small <17

Figure 1. Example of a priority list for sex-age composition categorized by group size and prioritized with random numbers.

Preparing maps

Maps of muskox locations are prepared following the muskox population survey and prior to the muskox sex-age composition survey. Maps are generated from the spreadsheet generated from the muskox population survey. Maps typically show the distribution of the groups of muskoxen, a GPS coordinate of their location and an expected group size (Fig. 2). Maps should be printed for each observer as well as the pilot. Maps are helpful when planning a flight route at the start of each day.

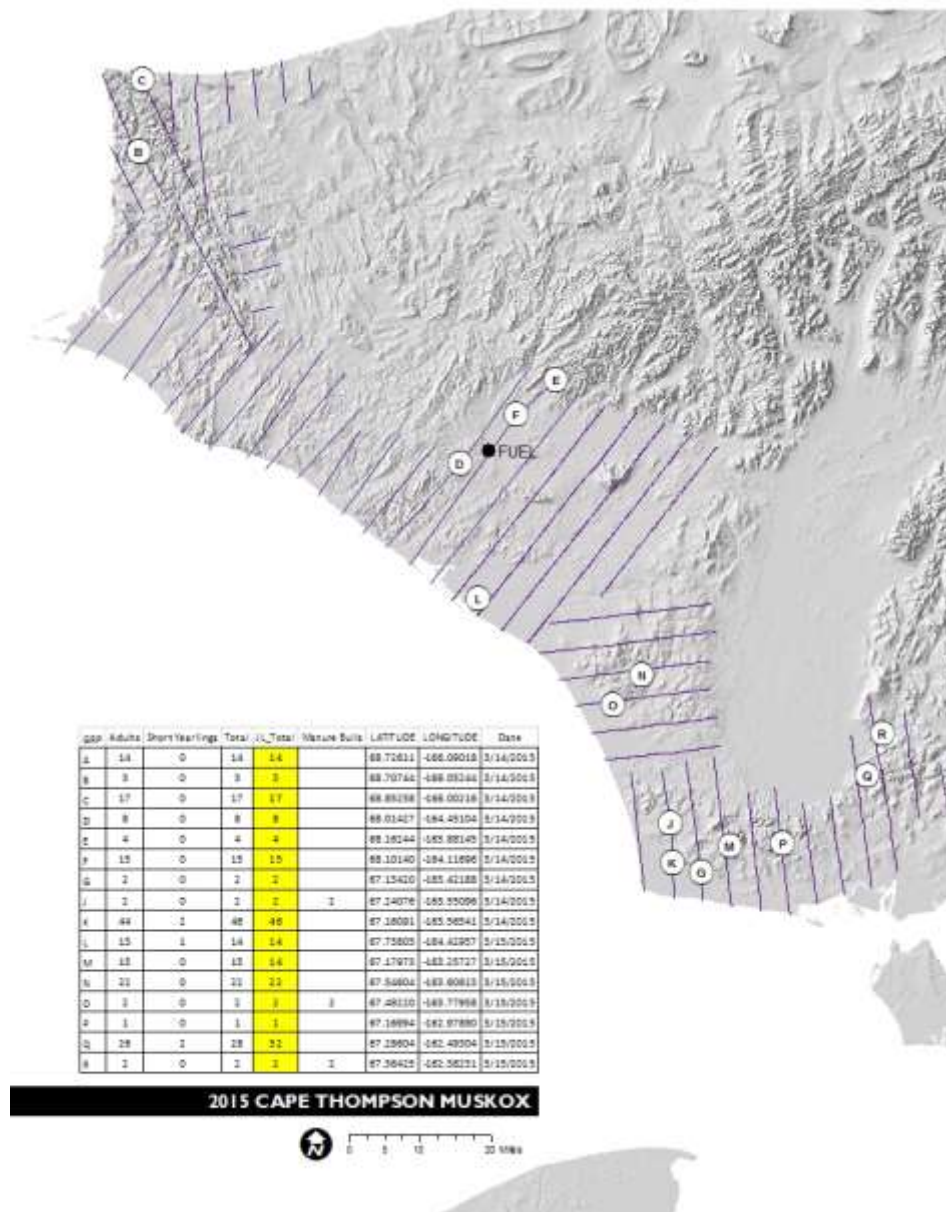


Figure 2. An example of a map used for the muskox sex-age composition survey North of Kotzebue, Alaska. The purple lines correspond with flight lines flown during the muskox population survey, and the white dots with letters inside correspond to muskox groups observed during the survey. These letters can be cross-referenced with the imbedded table.

Field Gear

Equipment Checklist

- Write in the rain notebook
- Pencils (with extra lead)
- Binoculars
- Spotting Scope

- Tripod
- Satellite phone
- Aviation PPE (flight helmet, vest, gloves, flight suit)
- Survival equipment (3 ways to start a fire: matches, lighter, flint; space blanket; knife; sleeping bag; extra food; water purification tablets; signaling device)
- Snowshoes (optional)
- Camera
- First aid kit
- Maps and coordinates of known muskoxen locations
- GPS unit
- Extra batteries for all electronics
- Project Aviation Safety Plan (PASP; see SOP 6)

Obtaining Park Compliance and Research Permits for Survey

Required permits for the Muskox sex-age composition survey include NPS park compliance and research permits for the park unit in which the survey will occur. For the Seward Peninsula survey, which includes Bering Land Bridge National Preserve (BELA), permits will be required from BELA. For the Cape Krusenstern National Monument (CAKR) and the Noatak National Preserve surveys, permits will be required from Western Arctic Parklands (WEAR). The permits must be obtained before conducting muskoxen sex-age composition surveys within park units. The call for permit applications usually comes in March of a given year and park permits usually require at least 60 days prior to the project start date. Applications for park permits can be submitted online through PEPC, and will be reviewed by the park unit-appropriate compliance team. A special-use permit from the affected park unit (e.g., BELA, WEAR) is required for remote fuel caches within park units. These are obtained through the affected park unit's environmental compliance specialist and require the specific cache locations for the evaluation process. The project PI(s) must ensure that permits are obtained well in advance of survey operations to avoid delays in collecting data. They must also ensure that all personnel have or are scheduled for appropriate training prior to conducting surveys.