

## **Muskox Photo Survey East Arm of Great Slave Lake, March/April 2020: Initial Summary of Classification Results**

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### **1. Background:**

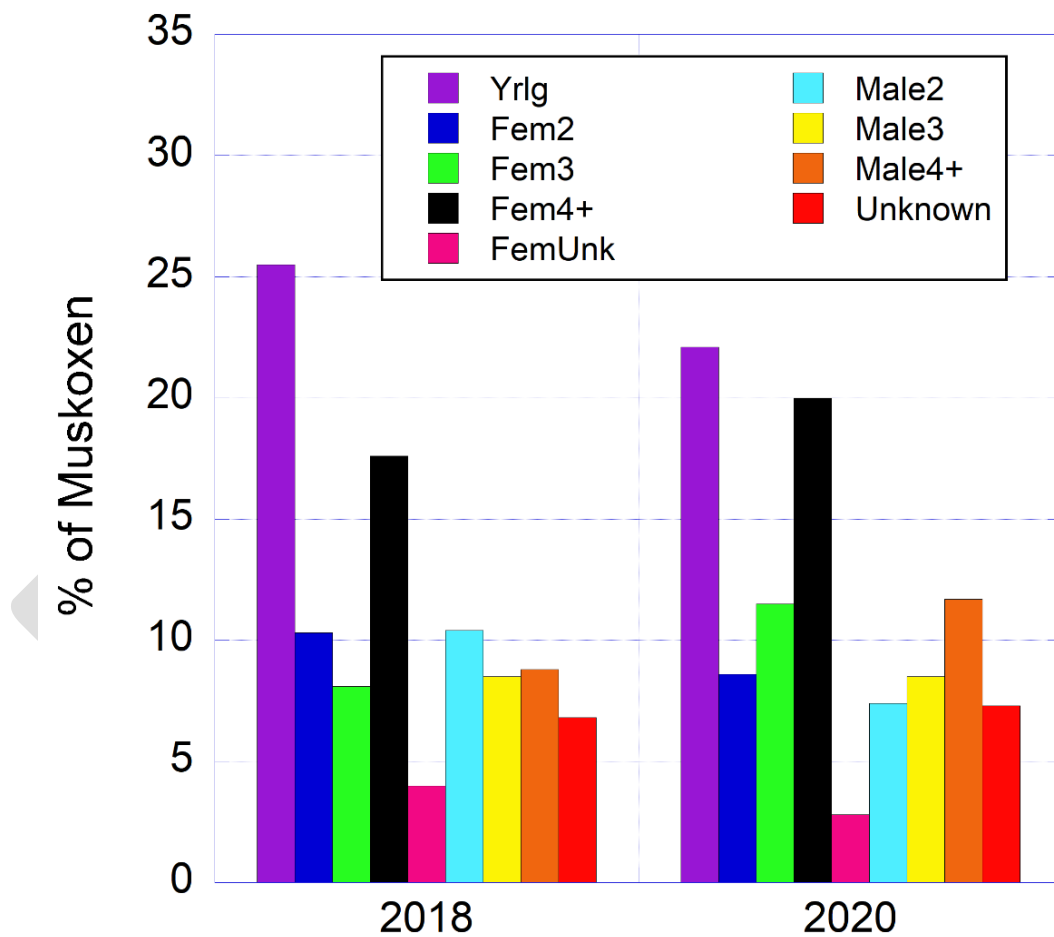
A muskox photo survey was flown in the East Arm area of Great Slave Lake by Dave and Kristen Olesen in an Aviat Husky, in late March and early April 2018, in conjunction with a larger regional muskox abundance survey led by N Slave regional biologist Dean Cluff. The purpose of the photo survey was to test an approach used in Alaska where a similar small, slow-flying aircraft (Supercub) has been used to take photos of muskox groups. Muskoxen can be identified to sex and age classes (calves or yearlings, females aged 2, 3 and 4 years old or older, and males aged 2, 3, and 4 years old or older) from the horns and size of the animals, if a good view of the head and horns is available (Alaska Department of Fish and Game 2010). Classifying a sample of the muskoxen in this way allows for a more in-depth understanding of the population's demographic status than simply counting groups. The 2018 East Arm muskox photo survey was successful in that about 75% of the groups were photographed in such a way that a high percentage of the muskoxen could be identified to these age and sex classes. Proportions of yearlings (calves born the previous year and nearly one year old) and 2 and 3 year old males and females were very high, consistent with a population growing rapidly. We are hoping to track the demographic profile of this population by continuing a series of photo classification surveys flown by Dave and Kristen in the East Arm area every second year, as these surveys are relatively low-cost and a good fit for the Olesens as the survey area is close to their home base at the Hoarfrost River. Results of the 2018 muskox photo survey are in Adamczewski et al. (2021).

A second muskox photo survey was flown by Dave and Kristen in late March and early April 2020. It appears that muskox numbers are continuing to increase in the area; Kristen took over 1000 photos and there were 135 muskox groups recorded. This is an initial summary on the classification of these muskox groups from 2020. A more detailed report will follow, and the muskox numbers seen on flight-lines will be used to generate an estimate of muskox abundance in the survey area.

### **2. Numbers and Classification of Mixed Muskox Groups:**

Classification of muskoxen in a group was only carried out if at least 80% of the muskoxen could be identified to sex and age classes. This was also done for the 2018 East Arm photo survey. If only a few or half the muskoxen can be identified, then it is likely that some types of muskoxen, such as large bulls or yearlings, will be relatively easy to identify and the sample would be biased toward those classes. There were more groups in 2020 than 2018 where classification was not practical, to a large extent because many groups were in relatively thick forest with many individuals obscured by trees. Bull-only groups were generally easy to classify compared to mixed groups, in part because bull-only groups tend to be smaller and in part because large bulls are easy to identify. This will need to be considered in reporting the classification results. In total, 836 muskoxen were classified in 35 mixed groups from the 2020 survey, compared to 843 muskoxen in 39 mixed groups in 2018. The proportion of muskoxen classified as unknown was 7.3% in 2020, very similar to the 6.8% unknown in 2018. In addition, 2.8% of the

muskoxen were identified as unknown females in 2020; these were muskoxen whose thin horns and body size identified them as females but it was not quite clear if they were mature females (4+ years) or younger. Flights were carried out on March 19, 20, 24, 25, 28, 29, 30 and 31; and on April 1, 4 and 5 in 2020. Initial results are graphed as percentages below, with the equivalent results from 2018. Overall, the results were similar, but the proportion of yearlings was a little lower (22.1% vs 25.5) and the proportion of mature females was a bit higher (20.0% vs 17.6%), as was the proportion of mature males (11.7% vs 8.8%). The ratio of yearlings to females (including all ages of females as well as unknown females) was lower in 2020 than in 2018 (51.2 yearlings: 100 females vs 63.8 yearlings: 100 females). Numbers classified and percentages are also included in the table below. Overall, these results are consistent with a population still growing rapidly but if the trends continue, may suggest a slowing of the growth rate.



**Figure 1.** Percentages of sex and age classes of muskoxen classified in the East Arm area of Great Slave Lake in March and April 2020, in mixed groups. Bull-only groups are reported separately. Yrlg = calves born in 2019 and nearly a year old; Fem2 = 2-year-old females; Fem3 = 3-year-old females; Fem4+ = females 4 years old or older; FemUnk = females of unknown age; Male2 = 2-year-old males; Male3 = 3-year-old males; Male4+ = males 4 years old or older; Unknown = muskoxen counted as part of the group but not identified to sex or age.

**Table 1.** Numbers and percentages of muskox sex and age classes classified in the East Arm area of Great Slave Lake in March/April 2018 and 2020 in mixed groups. Bull-only group results are reported separately

Year	Yearlings	2-year-old females	3-year-old females	Females at least 4 years old	Females unknown age	All females total	2-year-old males	3-year-old males	Males at least 4 years old	All males total	Unknown muskoxen	Overall Total
2018 Number	215	87	68	148	34	337	88	72	74	234	57	843
2018 %	25.5	10.3	8.1	17.6	4.0		10.4	8.5	8.8		6.8	100
2020 Number	185	72	96	168	23	358	62	71	98	230	61	836
2020 %	22.1	8.6	11.5	20	2.8		7.4	8.5	11.7		7.3	100

### 3. Bull-Only Muskox Groups in 2020 and 2018

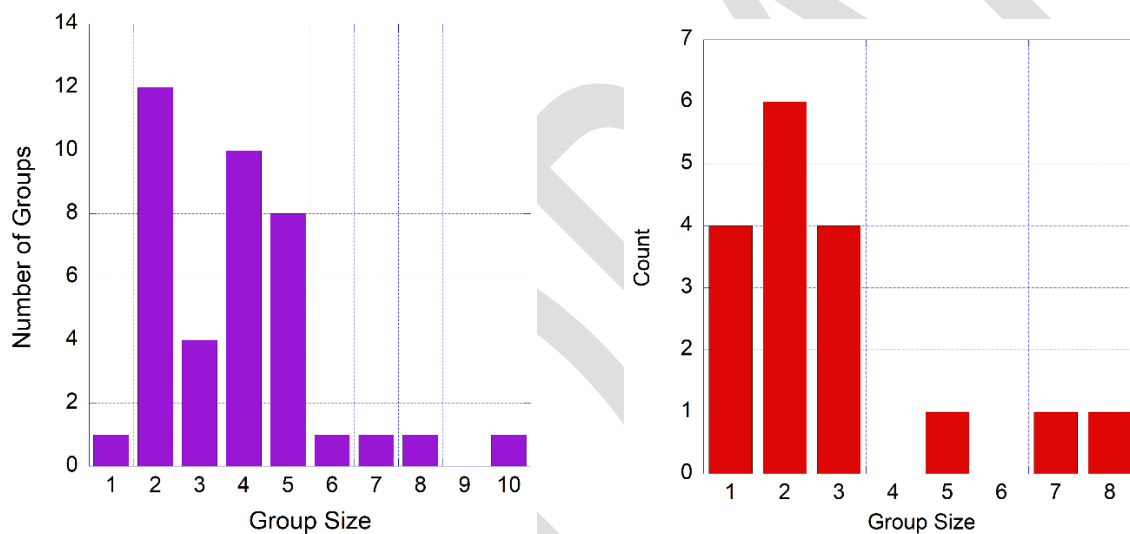
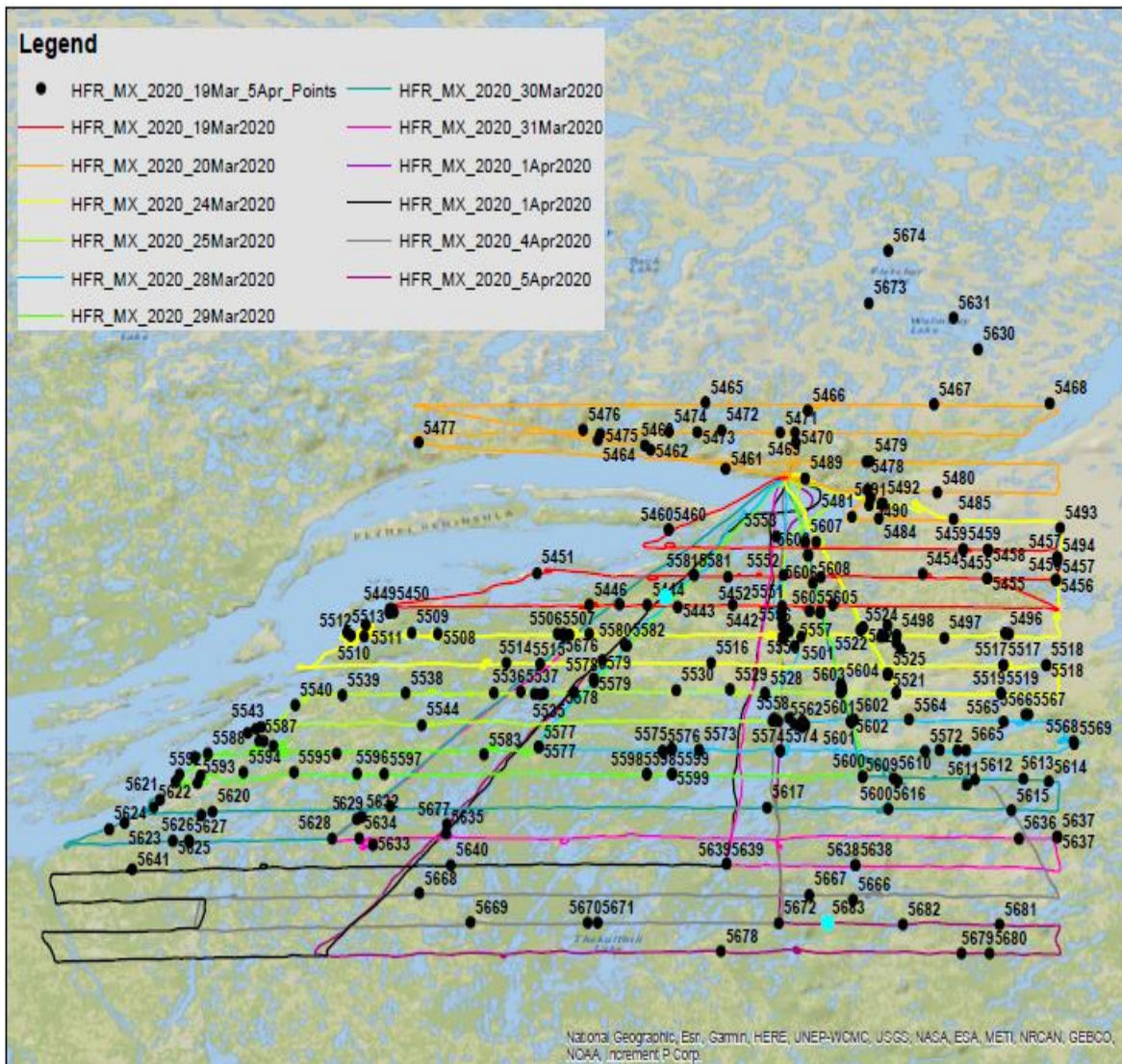


Figure 2. Numbers of bull-only muskox groups in March/April 2020 (left) and March/April 2018 (right).

There were 39 bull-only muskox groups in the East Arm survey in March/April 2020. Groups between 2 and 5 were the most common and the largest bull-only group had 10 bulls. In total there were 121 large bulls in bull-only groups. By comparison, in 2018 there were 48 large bulls in bull-only groups in the East Arm area. The increase is likely an index of the continuing increase in muskox abundance in the East Arm area.

#### 4. Numbers and locations of muskox groups on March/April 2020 East Arm photo composition survey



**Figure 3.** Flight lines and locations of muskox groups photographed in March and April 2020 in the East Arm area of Great Slave Lake.

The locations of muskox groups photographed in March and April 2020 are shown in Figure 3, along with the flight lines of the Aviat Husky piloted by D. Olesen. In total 135 groups of muskoxen and 2,144 muskoxen were recorded in the survey area. Several of these groups were seen on ferry lines, some were seen from the survey lines and some were found by snow-tracking, where signs of use by



muskoxen were used to find muskox groups not initially visible from the survey line. An example of a group of muskoxen photographed in March 2020 is in Figure 4. A more complete analysis of numbers and densities of muskoxen will be included in the full survey report. These initial results suggest that the densities of muskoxen in the East Arm area in 2020 were among the highest yet recorded in the NWT.



**Figure 4.** A mixed group of muskoxen in the East Arm area of Great Slave Lake, March 2020. Photo K. Olesen, Hoarfrost River Huskies.

**References:**

Adamczewski, J., K. Olesen, D. Olesen, J. Williams, D. Cluff, and J. Boulanger. 2021. Late winter 2018 muskox photo composition survey, East Arm of Great Slave Lake. Environment and Natural Resources, Government of Northwest Territories, Yellowknife, Northwest Territories, Canada. Manuscript Report 296.

Alaska Department of Fish and Game (ADFG). 2010. Muskox: a guide to identification, hunting and viewing. Alaska Department of Fish and Game, PO Box 1148, Nome, Alaska.