Muskoxen

A guide to identification, hunting and viewing

Alaska Department of Fish and Game
Division of Wildlife Conservation, 2021

Muskoxen

A guide to identification, hunting and viewing

A Note to Readers

The information in this booklet will assist in identifying muskoxen, preparing for a muskox hunting trip, and provide interesting information about muskoxen in Alaska.

Details in the Muskox Information section are adapted from the Alaska Wildlife Notebook Series prepared by Tim Smith and revised by John Coady and Randy Kacyon. Alaska Wildlife Notebook Series, © 2008.

Many photos in this booklet are provided to aid in understanding of muskoxen and their habitat. Not all images are referenced within the text. Photos that indicate seasons illustrate the significant changes that occur to muskox appearance over the course of the year.

Additional information on muskoxen can be found at the Alaska Department of Fish and Game (ADF&G) website:

www.adfg.alaska.gov

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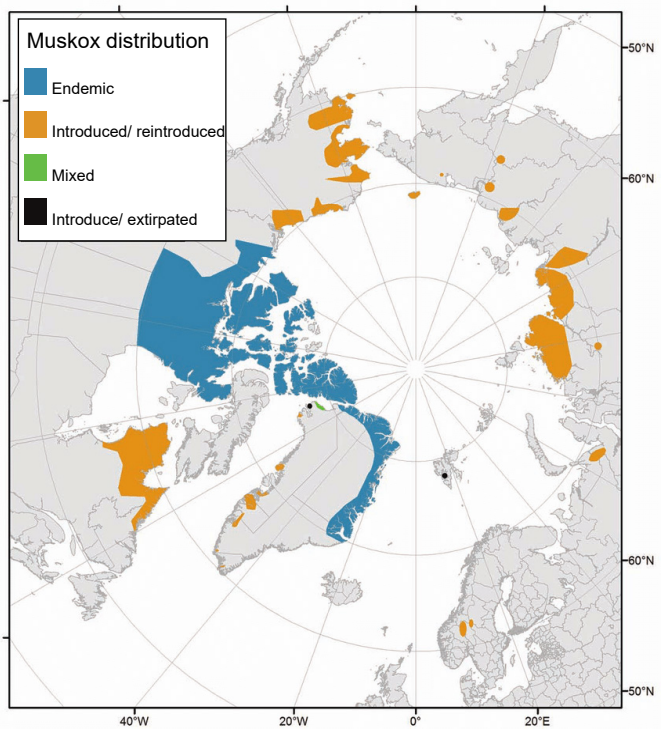
Muskox Information

Distribution

Muskoxen (*Ovibos moschatus*) are northern animals well adapted to life in the Arctic. At the end of the last ice age, muskoxen were found across northern Europe, Asia, Greenland and North America, including Alaska. By the mid-1800s, muskoxen had disappeared from Europe and Asia. By the late 1800s, muskoxen were no longer found in Alaska, leaving muskox populations only in Eastern Greenland and Arctic Canada. Through restoration and conservation efforts, muskoxen are once again found throughout the Arctic.



Adapted from Kutz et al. 2017 permission to reprint from the Arctic Institute of North America.

Physical Attributes

Muskoxen are stocky, long-haired mammals with a slight shoulder hump and a very short tail. Both sexes have horns; however, the horns of bulls are larger and heavier than those of cows. Mature bulls are about 5 ft high (1.5 m) at the shoulder and weigh 600–800 lbs (273–364 kg). Cows are smaller, averaging approximately 4 ft (1.2 m) in height and weighing 400–500 lbs (182–227 kg). An 800 lb (364 kg) bull will dress out at about 480 lbs (218 kg), providing roughly 275 lbs (125 kg) of meat.

Single calves, weighing 16-34 lbs (7.25–15.4 kg), are born in the spring/summer (April to August) by cows typically three years and older. Growth is rapid and the animals weigh 189-250 lbs (86–114 kg) at six months of age.

Common Name: Muskox
Scientific Name: *Ovibos moschatus*
Class: Mammal
Diet: Herbivore
Group Name: Herd
Plural: Muskoxen
Average life span in the wild: 12-20 yrs
Size: Height at shoulder 4-5 ft
Weight: 400-800 lbs

Muskox Information

Life History

Muskox herds may include groups of up to 75 animals. Smaller mixed groups contain from 5 to 15 females and immature males, with one dominant mature bull. Mature bulls can range long distances, becoming solitary individuals searching for a harem of females, before joining mixed-sex herds in winter. Some bulls segregate into bull-only bachelor groups during spring and summer.

The breeding season begins in late summer; mating takes place from August to October. Battles between bulls for herd or harem dominance are spectacular and violent. After a period of aggressive display, bulls can charge at top speed from distances of 50 yards (46m) and collide squarely on the horn bosses.

Following several clashes, they may resort to close contact, rapidly circling while trying to hook each other. Most fights are brief, but sometimes they become prolonged when bulls are evenly matched.

Did you know?

Bull muskoxen have heavily armored skulls to protect them from the shock of impact. Four inches of horn boss and three inches of bone lie directly over the brain. Bulls also have thick skin over their necks and shoulders to help protect against puncture wounds.

Muskox Information

Behavior

When danger approaches, muskoxen typically group together. If only one predator is approaching, the defense formation takes the form of a line with all muskoxen facing the predator. If several predators surround a group the formation becomes a compact circle with all adult muskoxen facing outward.

Occasionally, a bull will charge the predator. These charges are accompanied by loud snorting, blowing and the pounding of hooves to intimidate the predator. This defense strategy is particularly effective against wolves and bears. The presence of predators may make a herd run away in a stampede. During a stampede, individual muskoxen, especially calves are vulnerable.

Did you know?

Running to escape predators is a last resort for these animals, especially in the winter. Early hunters exploited this defensive behavior with the help of dogs to harvest entire herds. Commercial whalers and Arctic exploration parties also harvested muskoxen, leading to their disappearance from Alaska by the mid-1800s.

Muskox Information

History in Alaska

Over-hunting likely contributed to the disappearance of muskoxen in Alaska by the late-1800s. By the 1920s, their distribution was further reduced to Arctic Canada and East Greenland. Concern over declining muskox numbers throughout the Arctic led to a movement to restore the muskox population in Alaska.

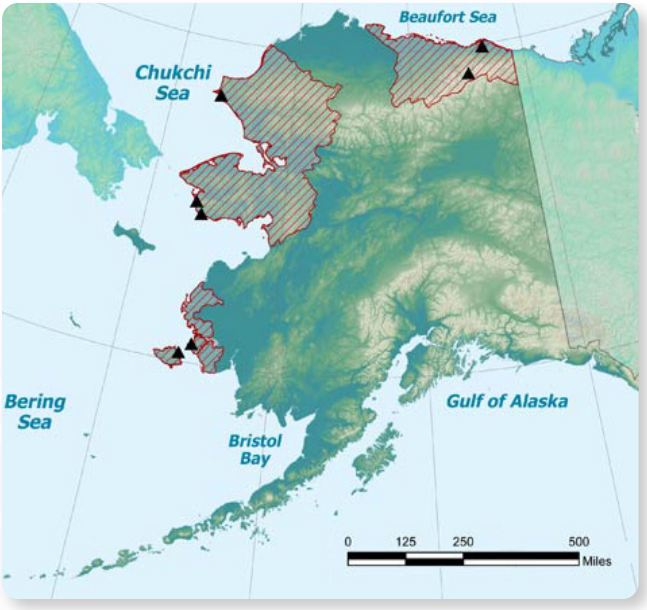
In 1930, 34 muskoxen captured in East Greenland were brought to Fairbanks. During 1935–1936, 31 of the surviving muskoxen and their calves were transported from Fairbanks to Nunivak Island. Today, muskoxen continue to thrive on Nunivak Island and increasing from 31 in 1936 to an estimated 856 in 2019. Nunivak Island muskoxen have been successfully transplanted around Alaska.

Population

Populations of muskoxen have been established following reintroduction efforts in Arctic and Western Alaska. As of 2019, the population of muskoxen in Alaska was estimated at approximately 4,300 individuals.

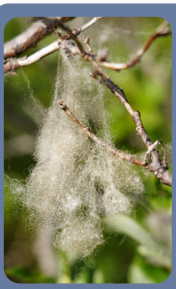
▲ **Muskox Release Sites**

Current Distribution



Muskoxen and Humans

Muskoxen are considered a unique and valuable wildlife species to many. Muskox meat is highly valued among those who eat it. Muskoxen are also an important attraction for tourists, photographers, researchers, and students of wildlife. However, there can be conflicts between people and muskoxen. Muskoxen can create a disturbance to homes, camps, and dogs. For more on living with muskoxen, turn to page 38.



Did you know?

The soft wool-like under fur of a muskox is called qiviut (qi·vi·ut | \ ˈkē-vē ət , -vē-ˌüt \ ). It is known to be one of the rarest fibers in the world and is softer, finer, and eight times warmer than wool. In early summer, people collect the naturally shed fur and spin it into yarn for making scarves, hats, and other warm garments.

Muskoxen with Other Animals

Muskoxen and *Rangifer* species (reindeer and caribou) use the same habitat but almost never mingle. Although these species are commonly found near each other, they seem to select different types of plants when feeding.

In summer, muskoxen occupy habitats that are also used by moose. Though their dietary relationships and forage selections are uncertain, there is little evidence of competition or displacement between these species.

Muskox Identification

Groups of Muskoxen

It is common to see muskoxen in groups. The following list describes the groups of muskoxen that you are likely to see:

Single or pairs
(these are almost always mature bulls)

Mixed sex/age group
(mature bulls, cows of different ages, and young muskoxen)

Bachelor bull groups
(five to ten bull muskoxen)

Not all groups are mixed-sex.
Remember, **not all groups have bulls and cows,** the biggest animal in the group might not be a bull and single sex groups do occur.

Did you know?

When a muskox group is threatened, cows and immature animals tend to be the first to bunch together. Bulls tend to stand slightly apart from the rest of the group. If the threat increases or the group becomes highly agitated, all individuals group very tightly together. Once muskoxen are clustered in a defensive circle, it can become difficult to identify the sex and age of muskoxen.

Muskox Identification

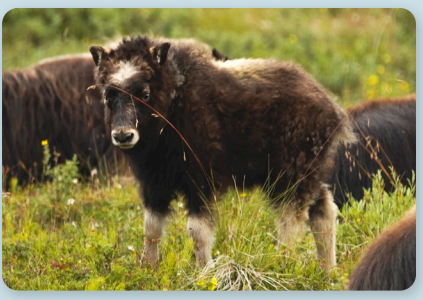
Calves (0–12 months)

Spring

Horns are not present and size can vary since calves are born between mid-April and mid-August.

Summer

Since the long guard hairs have not yet grown, the coat at this age appears very short.



Fall

Growth is rapid and the animals weigh 189–250 pounds (86–114 kg) as six-month-olds.

Yearlings (12-24 months)

Yearling muskox can change drastically from spring to fall.

Horns start growing in the late spring and are most visible on yearlings in the late summer.

Forehead is covered with white hair. Horns are short and no horn bases have developed.

Muskox Identification

Two-Year-Old Bulls

Spring

Dramatic growth has taken place and the horns are much thicker than cows. By spring, horns curve down slightly and point forward.

Summer

Horn tips point up and the downward curve of horns becomes more pronounced and forward in bulls.

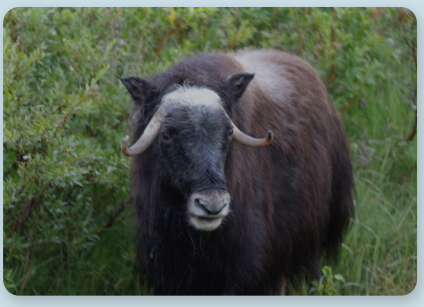
Fall

Forehead is covered with white curly hair. The horn boss has not begun to develop.

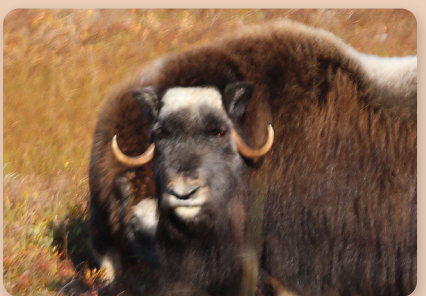
Two-Year-Old Cows

Horns on cows are more slender than males but otherwise very similar in shape. Horn tips curve up.

Horn tips curve up and the downward curve becomes more pronounced.



Forehead is covered with white curly hair and the horn base is not visible.



Muskox Identification

Three-Year-Old Bulls

Spring

The horn boss begins to develop but it does not cover the entire forehead.

Summer

Early, there is no boss development *(see above)* however later in the year, the boss will have expanded over the forehead *(see below).*

Fall

Horn boss has expanded over the forehead and increases in size. The horn hooks are much thicker on the male.

Three-Year-Old Cows

Horns are near full size and forehead is covered with white hair. Body size is approximately that of an adult.

Three-year-old cows have thin-tipped horns that curve upward with a considerable amount of fuzzy white hair between the horn bases.

The female has thin hooks that curve upward. Three-year-old cows may or may not be accompanied by a calf.

Muskox Identification Quiz

Remember to use more than one feature to identify the appropriate sex. Most confusion in identification occurs between **mature cows and immature bulls.**

Immature Bull (younger than 4 yrs)

Immature bulls have incomplete growth of the horn boss and show considerable amounts of white hair between the horn bases.

Mature Bull (4 yrs or older)

Mature bulls develop a thick boss at the base of each horn with little hair in the gap between the bosses.

Immature Cow (younger than 4 yrs)

Immature cows will not have a visible horn base, and will have considerable white hair between the horns.

Mature Cow (4 yrs or older)

Mature cows do not grow a boss. Instead, they will have horn bases. Horn bases are about the same thickness as the rest of the horn and are often touching.

Note: It is unreliable to identify sex based solely on the color of horn tips or presence of white hair between horns.

Muskox Identification Quiz

Bull or Cow?

Muskox Identification Quiz

Answers

Three-year-old bull, fall
Large horn boss develops by the fall.

Two-year-old bull, fall
Horns curve down and then forward and are much thicker than in an adult cows.

Three-year-old cow, spring
Horns are near full size and forehead is covered with hair. Body size approximately the size of an adult.

Three-year-old bull, spring
Well-developed horn bases have white hair in the middle and horns point upwards.

Mature cow
Horn bases in mature cows are fully developed, but do not reach the size and bulk of horn bosses grown by bulls.

Two-year-old bull, spring
Horn boss has not developed and no bases are present. The horn hooks are thick.

Hunter Requirements

Residents
Alaska residents 10 years of age and older are eligible to receive muskox hunting permits. Permanent licenses for residents who are age 60 or older are available at no cost. A locking-tag or permits may be required. Contact the nearest ADF&G office or consult the current Alaska Hunting Regulations for more information.

Nonresidents
Nonresident hunters 10 years of age and older must have a hunting license and may be eligible to receive permits for drawing and registration permit hunts. A locking-tag must be purchased prior to hunting.

Additional Youth Opportunities
Resident hunters age 10–17 who have successfully completed a Basic Hunter Education course are allowed to hunt on behalf of an adult permit holder, under the direct, immediate supervision of that adult. The adult permit holder must be a licensed hunter, 18 or older, and is responsible for ensuring all legal requirements are met.

Hunters under the age of 10 (resident and nonresident) may only take big game on behalf of a licensed hunter at least 18 years of age, and they must be under the direct, immediate supervision of that hunter. The supervising adult hunter is responsible for ensuring all legal requirements are met, and must comply with big game locking-tag requirements, if applicable, and validate required permits.

Reporting

The hunt conditions for each permit hunt outline in detail where, when, and how to report your harvest and hunting activities. This is especially important for registration hunts, where hunts may be closed by emergency order when the quota has been filled.

Call the Game Management Unit (GMU) ADF&G office to report your hunt:

GMU 18 Bethel 800-425-2979, (907) 543-2839

GMU 22 Nome 800-560-2271, (907) 443-2271

GMU 23 Kotzebue 800-478-3420, (907) 442-3420

Trophy Destruction

Trophy destruction may be required for subsistence hunts. Regulations vary by hunt so be certain to check the current Alaska Hunting Regulations. If trophy destruction is required, the distal portion of each horn is cut within 2 inches of the eye and must be completed before leaving the kill site.

Labeling

Federal law requires that muskoxen transported out of the state of Alaska or between states must have the name and address of the shipper clearly visible. The package must contain an accurate list of contents by species and number of each species. This information must be attached to the shipping container or directly to the hide.

Hunt Information

Where to Hunt

Muskox hunting does not occur throughout all areas of the state where muskox are found. Up to date information about muskox hunting opportunities in Alaska can be found online at **hunt.alaska.gov** or by contacting your local ADF&G office.

Seasons and Bag Limits

Muskox seasons and bag limits may change annually. Seasons may be closed if the population cannot sustain additional hunter harvest. Please refer to the Alaska Hunting Regulations and the Federal Subsistence Regulations for specific information regarding seasons, bag limits, and permit requirements.

Don't Forget

- Have your hunting license, locking-tag (when required), and permit in possession while hunting
- Familiarize yourself with the Alaska Hunting Regulations and understand the different hunting opportunities
- Familiarize yourself with land ownership
- Report your harvest to ADF&G

Different Types of Hunts

Registration
Hunters are required to "register" with ADF&G and sign a permit with hunt conditions unique to the hunt area. Registration permits require a hunter to report their harvest within a short time period, stay within a special hunt boundary, or submit biological specimens to ADF&G. Registration permit hunts allow biologists to closely manage muskox hunts and issue emergency orders to close seasons when harvest quotas are reached.

Draw Hunts
Drawing permit hunts limit harvest by restricting the number of hunters. Hunters apply for permits in November and December and pay a nonrefundable application fee. Permits are selected by random lottery. A current hunting license or one that is valid at the time of the hunt is needed in order to apply for draw permits.

Tier II Hunts
Tier II permit hunts are held when there isn't enough game to satisfy all subsistence needs. Hunters submit applications with answers to questions about their history of hunting or eating muskoxen and the cost of food and fuel in the community in which they live. Applications are scored and permits are issued based on the highest score.

Hunt Planning

- The key to a successful hunt is careful planning and preparation. You'll find hunt planning pages including an equipment list in the back of the "Hunt Alaska" booklet available at your local Fish and Game Office or online.

- There are few road systems in muskox country. Access to muskox hunting areas is typically by boat, snowmachine or on foot. Aircraft may or may not be allowed for muskox hunts depending on the hunt type and area. Please check current regulations.

- In some instances it may be beneficial to use the services of a guide or transporter for your muskox hunt. A list of guides and transporters can be obtained from the Division of Occupational Licensing at (907) 465-2534 or **www.commerce.alaska.gov**

Land Ownership

It is important to understand land ownership boundaries to avoid trespassing or hunting on closed lands. Be familiar with the area you plan to hunt. For more information on land status and access contact:

BLM Public Information Center (907) 271-5960;
DNR Public Information Center (907) 269-8400 or visit DNR s website at **dnr.alaska.gov/mlw/index.htm**

State Lands

State lands are generally open to hunting, but may be closed by state, local, or municipal laws. Check with DNR or the local ADF&G office for up to date information.

Federal Lands

If you are planning to hunt on federal public lands, consult the Federal Subsistence Management Regulations on Federal Public Lands in Alaska at **www.doi.gov/subsistence** or contact the Office of Subsistence Management for information.

Private Lands

A portion of the state of Alaska is owned by individuals or corporations. If you intend to hunt on private land in Alaska, make sure you have permission from the landowner.

Native Corporation Lands

The largest private landowners in the state are Native village and regional corporations. If you wish to hunt on these private lands, you must contact the appropriate land management office to determine if a land use permit and/or fees are required. Some of these lands are closed to use by non-shareholders. Many corporations have land status maps available.

Meat Care

Before the Hunt

- Refresh your knowledge about hunting, butchering and meat care from your local library, butcher, or ADF&G online materials.

- Double check your equipment and collect materials for butchering, hauling, and caring for your meat. Items to consider: skinning knife, butchering knife, trimming knife, sharpener, bone saw, tarp, heavy-duty game bags, gear bags, heavy-duty backpack, sled, paper towels, rope, gloves and a first-aid kit. If trophy destruction is required make sure you have a saw to complete the task.

- Inventory your freezer and contact a local butcher or have your equipment ready for home butchering. Be sure you have enough room in your freezer or someone to receive the meat.

- Before shooting, determine if you can get it back to camp and don't forget packs, sleds, tarps, and game bags to help bring your meat home.

Cool, Clean, and Dry

However you butcher meat, remember to keep it cool, clean, dry, and in breathable cloth bags. Heat is the greatest threat to good meat and muskox hair is insulating. To cool the meat, remove the hide as quickly as possible. Hang meat with a tarp suspended above it while it develops a hard crust.

Preventing Wounding Loss

Proper Caliber

To assure the most efficient killing capability and to reduce the chances of wounding loss, a rifle cartridge with a minimum .30 caliber bullet or larger is recommended. When hunting muskoxen, hunters should be proficient with the firearm they plan on using and avoid poor shot placement.

Take your time

Use good judgment and strive for a clean shot while muskox hunting. Patience is a necessity because it is common for muskoxen to group up after the disturbance of a shot. This makes identification of the wounded animal for follow up shots very difficult. Take your time, know what lies behind your target, wait for muskoxen to disperse, and allow your first shot to be the best shot for a clean kill.

Shooting

Common Mistakes

- Shooting before a clear shot is available.
- Failure to notice smaller animals hidden behind larger animals.
- Shooting at one muskox and killing or wounding other animals in the process.
- Misidentification of animals age and sex.

Improved Actions

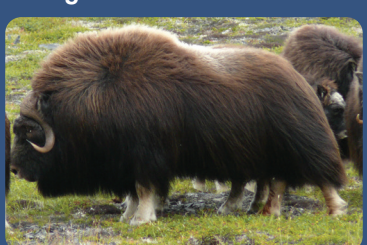
Study the photos in the booklet and take the online muskox identification quiz at www.hunt.alaska.gov. If harvesting a bull, we recommend hunting an all-bull group of muskox and not a mixed-sex group.

After the first shot, the targeted muskox may walk back into the group. By taking your time and waiting-out the injured animal, you will avoid the unnecessary risk of wounding other animals.

Smaller animals are commonly hidden behind larger animals. Be sure to look for extra legs before shooting. Look closely at the photo below. Do you see extra legs behind the bull?

Notice the legs behind the bull

Don't Shoot! Wait for the animals to disperse.



Winter Hunts and Tough Meat

When hunting in the winter, cold shortening may affect the quality of your meat. Cold shortening occurs when the meat is allowed to freeze too quickly. Before the rigor-relaxation process occurs, the muscle can shrink due to loss of water, vitamins, minerals, and water soluble proteins, resulting in tough meat. Consider leaving the skin on the meat or pack it with snow to prevent it from chilling too quickly.

When meat is hung it can be sprayed with citric acid. Mix two ounces of citric acid to one quart of water, and spray the meat until the mixture runs off. The mixture should dry quickly and will help prevent bacterial growth. Food grade citric acid can be purchased from pharmacies or feed stores.

What you can't use, give away

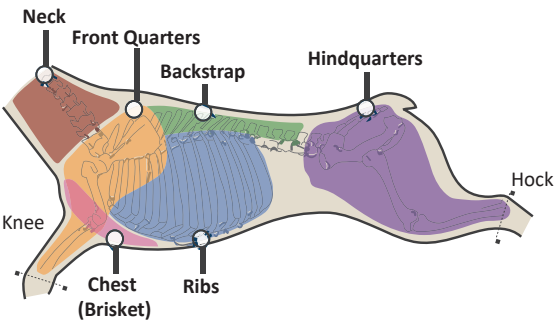
After transporting meat from the field, you can butcher it yourself, take it to a professional, or give it away. If you choose to give meat away before it has been processed for human consumption, make sure that you fill out a "Transfer of Possession" form (available in the Alaska Hunting Regulations), keep a copy and give one to the recipient of the meat. Meat you give away should be in the same or better condition as the meat you keep.

Meat Salvage

To be Legal

Muskox meat you must salvage includes:

- all of the neck meat
- all of the brisket (chest meat)
- all of the meat of the ribs
- front quarters as far as the distal joint of the radius-ulna (knee)
- hindquarters as far as the distal joint of the tibia-fibula (hock)
- all of the meat along the backbone between the front and hindquarters (backstrap and tenderloins)



You are not required to salvage the meat of the head, guts, bones, sinew, meat left on the bones after close trimming, or meat that has been damaged and made inedible by the method of take. These portions of the animal may be left in the field because they are not included in the definition of edible meat that must be salvaged.

You are required to salvage meat from sick animals. Please contact the local ADF&G office for information on safe handling and disease.

*** Improper salvage or wanton waste of big game meat is a serious offense punishable by a fine of up to $10,000 and one year in jail.**

Living with Wildlife
Sharing the Country with Muskoxen

The following are a few pointers to help you avoid unpleasant encounters

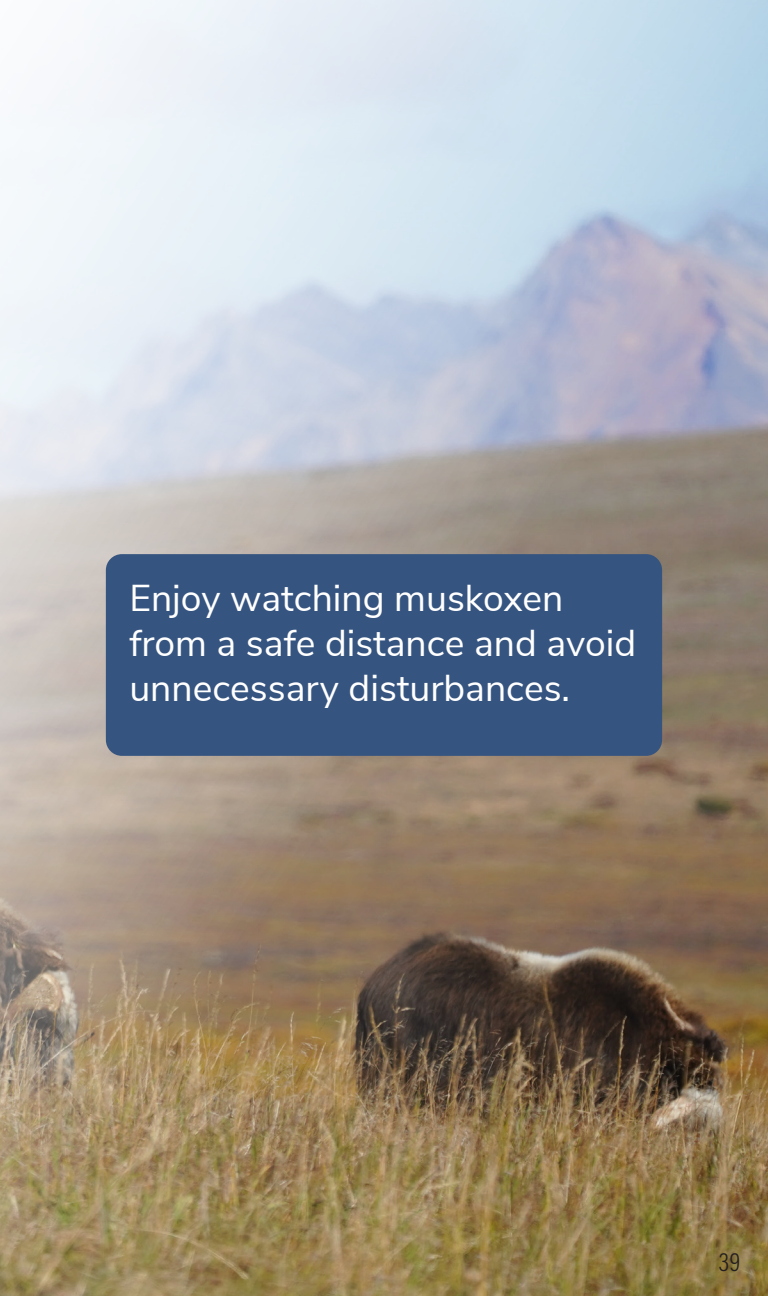
Give space - A muskox that has stopped feeding, walking or resting has noticed you. This change in behavior is their way of letting you know you are close enough. If approached further, they may become agitated and react defensively.

Do not surprise - Avoid walking through dense, tall vegetation where visibility is limited. If these areas are unavoidable, make loud noises and announce your presence. Always scan your surroundings for muskoxen and their sign. Avoid areas where muskoxen may be congregated.

Do not disturb - Female muskoxen are very protective of their young and may react defensively if threatened. Do not approach young muskoxen, even if you think they may be orphaned or abandoned. If you have a situation that you feel needs to be reported, contact ADF&G.

Caution with dogs - Keep dogs under control at all times in muskox country. Do not leave dogs outside unattended. Dogs that must be left outside should be housed in a securely anchored, freestanding, chain-link enclosure.

Know how to react - If charged: Run. Do not stand your ground. Get away as fast as you can. If possible, run for cover behind a large structure, such as a house, car, or rock.



Enjoy watching muskoxen from a safe distance and avoid unnecessary disturbances.

Additional Resources

The resources below can be found on the Alaska Department of Fish and Game website at www.adfg.alaska.gov

Muskox Species Profile

- General description, photo gallery, sounds and signs

Muskox Hunting in Alaska

- Hunting opportunities
- Harvest statistics
- Harvest reporting

Online Muskox Identification Quiz

- Information on identification and hunting

Living With Muskoxen

- Wildlife safety
- Muskox wildlife safety coloring page

Notes:

All images provided by ADF&G, unless noted below:
Tom Kohler; cover, page 14 spring, 23 row 3
Jim Dau; page 4, 10, 40
Peter Bente; page 6, 13, 17 spring
Sue Steinacher; page 22 row 1
Curtis Nayokpuk; page 30

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Hunters are important founders of the modern wildlife conservation movement. They, along with trappers and sport shooters, provided funding for this publication through payment of federal taxes on firearms, ammunition, and archery equipment, and through state hunting license and tag fees.

www.adfg.alaska.gov