

MOUNTAIN LIONS IN NORTH DAKOTA

INTRODUCTION

It may be surprising to some that North Dakota has mountain lions, considering much of the state is open prairie where the big cats are scarce. The western part of the state, however, does have some suitable habitat and a small number of mountain lions are calling North Dakota home.

You may live or recreate in mountain lion country. Mountain lions are secretive animals that are active mostly at night and generally prefer to avoid people. But, like any wild animal, mountain lions can be dangerous. With a better understanding of mountain lions and their needs, we can share North Dakota with these amazing animals.

Mountain lions (*Puma concolor*), also commonly known as cougars, pumas and panthers, historically occurred in western North Dakota. They were found in the badlands, Killdeer Mountains and along the Missouri River in the late 1800s. At that time, mountain lions and their prey were not protected from indiscriminate killing. By the early 1900s, mountain lions were extirpated, or gone from the state.



Fig. 1 – A mountain lion in North Dakota.

NDGFD

From that time until 1958, the North Dakota Game and Fish Department did not document any mountain lions in the state. From 1958, when a mountain lion was sighted near Killdeer, to 1991, Department biologists confirmed 11 reports.

In 1991, after a young female mountain lion was shot in a barn near Golva, the state legislature classified mountain lions as a furbearer with a closed season.

By the early 2000s, the number of mountain lion reports increased to the point that it became apparent that a continued presence of mountain lions existed in western North Dakota.

Currently, western North Dakota has a relatively small mountain lion population. Occasionally, individual mountain lions are documented in other parts of the state.

IDENTIFICATION

Mountain lions have a typical cat physique, with a short nose and a long sleek body (*Fig. 1*). Their hind legs are longer than their front legs. They have a long tail (nearly as long as the body), with a black tip. Mountain lions are tan to light brown, with a lighter chin, chest and underbelly. Their ears are round and set widely apart on their head and are colored black on the back (*Fig. 2*). Adults measure 6-8 feet from the nose to the tip of the tail. Adult female mountain lions weigh 75-110 pounds and adult males weigh 120-170 pounds.

Mountain lion kittens are born with dark facial markings and black spots all over the body that are almost completely faded by the time they reach one year of age (*Fig. 3*).



Fig. 2 – Mountain lion ears are round and set widely apart on head.



Fig. 3 – Mountain lion kittens are spotted when born.



Occasionally mountain lions lose the tips of their ears and/or tails due to frostbite or injury.



Fig. 4 – The spotting on this subadult mountain lion has faded with age.



Fig. 5 – Faded spots on back legs of a subadult mountain lion.

There has never been a scientifically documented case of a melanistic, or black colored, mountain lion. In other words, a black mountain lion has never been trapped, shot, killed by an automobile, photographed or bred in a zoo in recorded history. Other cat species that on rare occasions produce melanistic individuals include bobcats, which occur in North Dakota, and jaguars or leopards, which do not occur in North Dakota. Mountain lions are often confused with other cat species as well as domestic dogs and cats (Fig. 6).

AGING

The age of a mountain lion can be estimated by looking at their teeth (Appendix 1) and pelts (Figs. 4-5).

Mountain lions less than six months of age will still have their deciduous

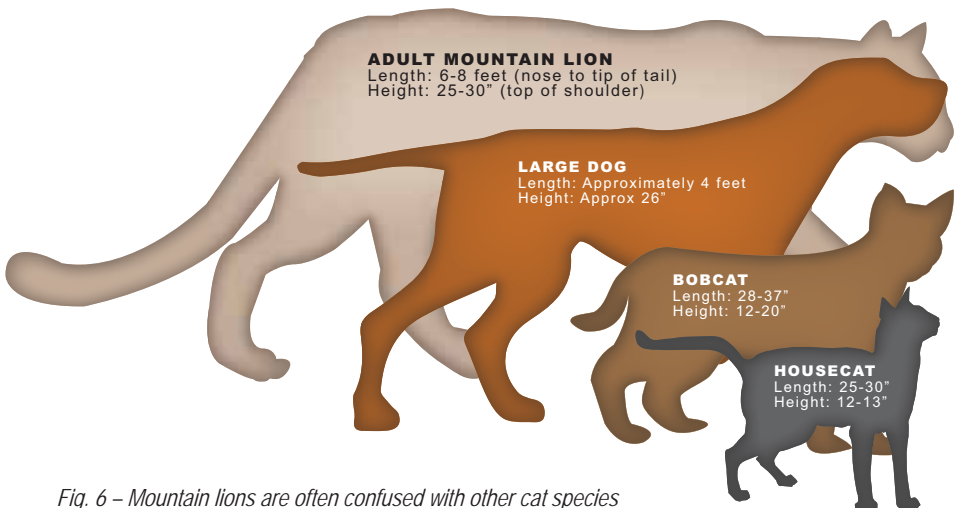


Fig. 6 – Mountain lions are often confused with other cat species as well as domestic dogs and cats.

or milk teeth, which are small, widely spaced and delicate compared to the permanent teeth that will replace them. The pelts of mountain lions of this age will still exhibit black or brown spotting.

The teeth of mountain lions between six months and one year of age will exhibit various stages of replacement as their deciduous teeth fall out and are replaced with permanent teeth. In some cases, permanent teeth may all be present, but the canines will not yet have grown out to their full lengths. The pelts of mountain lions in this age category will likely still exhibit some spotting, but most of the black spots will have faded to brown before fading away almost completely.

Mountain lions between one and three years of age are considered subadults, as they are not yet reproductively active. The teeth of subadults are bright white, with little yellowing or staining, their tips are pointed with no wear, and surrounding gums will not have yet recessed away from the canine ridges (*Appendix 1*).

Mountain lions three years of age or older will exhibit ever increasing amounts of staining, wear and gum recession as they get older (*Fig. 16, Appendix 1*).

In order to get an accurate estimate of age for adult mountain lions, biologists extract the second upper premolar from live-captured and hunter harvested mountain lions. These extracted teeth are sent to an aging lab, where the teeth are sectioned, stained and examined under a microscope for cementum annuli (*Fig. 7*). Cementum annuli are similar to growth rings on a tree, where a layer of cementum is added to the root of the tooth each year. In winter, the cementum deposits are darker, whereas the cementum added during the summer appears lighter. This allows for more accurate



SUBMITTED PHOTO

A common house cat mistaken for a mountain lion in North Dakota.

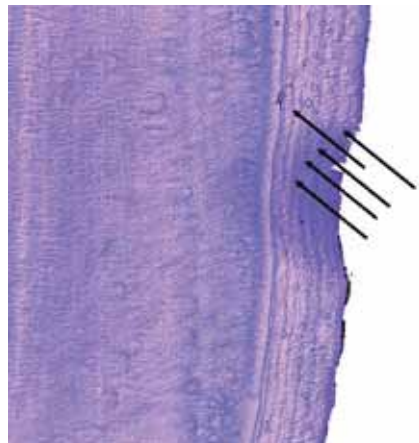


Fig. 7 – Microscopic view of cementum annuli layers on a mountain lion tooth.



NDGFD

Fig. 8 – Male genitals have a black spot of hair 3 inches below the anus.



NDGFD

Fig. 9 – Female genitals don't have a black spot of hair between the hind legs.



SUSAN BARD

Fig. 10 – A treed male mountain lion with male genitalia highlighted.

aging of adult mountain lions and other mammals.

SEXING

Determining the sex of a mountain lion is not as easy as most people think because male mountain lions have relatively inconspicuous genitalia.

Male mountain lions have a visible black spot of hair, about 1 inch in diameter or less, surrounding the opening to the penis sheath behind the hind legs, and about 3 inches or more below the anus (*Fig. 8*). Between the black spot and anus is the scrotum, which is usually inconspicuous and covered with white hair or a similar color to the surrounding area. The anus is usually hidden below the base of the tail.

Female mountain lions do not have a conspicuous black spot between the hind legs. The anus is directly below the base of the tail, and the vulva is directly below the anus. The vulva may have black hair surrounding it, but this spot is less than 1 inch from the anus (*Fig. 9*). The anus and vulva are usually hidden by the base of the tail.

Sexing a treed mountain lion can sometimes be determined with the naked eye, but using binoculars makes it easier and leads to more accurate determinations (*Fig. 10*).

TRACKS

Often, tracks left in snow or dirt are the only evidence that a mountain lion passed through an area. Mountain lion tracks are 3-5 inches wide, and generally are wider than they are long. Claws rarely

show in the tracks, but when they do they create narrow, knife-like indentations. The heel pad is large compared to the whole track and has two lobes on the leading edge and three lobes on the rear edge, creating an M-shaped heel pad. Mountain lion tracks are asymmetrical and the front two toes are not lined up side by side (*Appendix 2*).

Mountain lion tracks are often confused with tracks of large dogs (*Figs. 11-12*). Dog tracks differ from those of mountain lions, as claws almost always show in the tracks. Dog tracks generally are longer than they are wide, and the rear of the heel pads have only two lobes, creating a triangle-shaped heel pad. Also, dog tracks are symmetrical and the two front toes line up evenly (*Appendix 2*).



NDGFD

Mountain lion tracks.



NDGFD

Fig. 11 – Mountain lion tracks are wider than they are long.



NDGFD

Mountain lions have retractable claws that rarely show in a track.



NDGFD

Double-lobed heel pad

Fig. 12 – Dog tracks generally are longer than they are wide, and claws are clearly visible.



STEPHANIE TUCKER

Fig. 13 – Mountain lion habitat includes the rugged badlands of North Dakota.

HABITAT

Mountain lion habitat is characterized by vast areas of rugged country with dense vegetation (*Fig. 13*). Mountain lions need vegetative cover and extreme topographic variation, like rock outcroppings, boulder piles and steep slopes to successfully stalk and ambush prey. These landscape features also provide security while feeding, resting and caring for young.

Adult male mountain lions actively defend their territories from intruding males, which can result in the death of one of the animals. Males mark territory boundaries with piles of dirt and twigs, called scrapes, signaling to other lions that the area is occupied (*Fig. 14*). Adult males may also kill kittens if the mother is not actively



NDGFD

Fig. 14 – Mountain lion scrape.

defending them. Sometimes, females are also killed by dominant males. Females are not territorial, but will avoid other females.

In North Dakota, individual male and female mountain lions have territories varying in size from 25-50 square miles. Females with young kittens inhabit the smallest areas, and adult males have the largest territories. Home range size depends on terrain and how much food is available. In an established population, male home ranges include 3-5 adult females.

BEHAVIOR

Mountain lions are solitary animals. Adult males almost always travel alone and females are solitary when they are not raising young. Females and males only interact for brief periods during breeding, and males take no part in raising young. Males will breed with more than one female. Female mountain lions can breed and give birth at any time of the year, but most breeding activity takes place from February to March.

The gestation period for mountain lions is 92 days, after which the female will give birth to an average of 2-3 kittens, although litters with up to 5 kittens have been documented. Mountain lion kittens weigh approximately 2 pounds when born and have their eyes closed until about two weeks of age. When kittens are around 8 weeks old, the mother begins taking them to her kills to feed, and kittens are weaned at around 8-12 weeks.

Young mountain lions will remain with their mother until they are about 13-18 months old. During this time, she teaches them how to hunt and kill prey. Even though the young depend on their mother prior to this time, female mountain lions spend a considerable amount of time hunting by themselves. Young mountain lions are generally as big as or bigger than their mother by the time they disperse from their natal area.

Mountain lions have an ingrained desire to disperse from their natal areas once they are able to support themselves, to reduce competition for



MIKE ANDERSON

This 1-month-old mountain lion kitten was tagged during research to track its survival.

resources and mates and avoid inbreeding. Female mountain lions tend to disperse only short distances from where they were born, sometimes they even stay in their mother's home range. Females usually won't breed until they are in their third year. Young males, on the other hand, usually disperse long distances as they seek to establish their own territories. Mountain lions are highly mobile and capable of roaming 10-20 miles in a single night. It is these animals that are most visible to the public and could turn up anywhere in North Dakota.

If you see more than one mountain lion at one time, or two sets of tracks traveling together, it is probably a female with young. Hunters are encouraged to avoid pursuing or shooting mountain lions that are not alone, as they are likely young mountain lions, or a female that has young still dependent upon her for survival.

ENCOUNTERS

Generally, mountain lions avoid people. They prefer to live in remote and undeveloped country. However, a number of factors are bringing mountain lions closer to people. In Western states, more people are moving into new housing developments built in or near high-quality mountain lion habitat. Also, a greater number of people are recreating – hiking, jogging, mountain biking, skiing, etc. – in mountain lion country. Not only are humans moving into their territory, but mountain lion populations also are expanding into formerly unoccupied habitats. For example, many areas now support higher



TY STOCKTON

densities of deer and other prey than in the past. Also, in some states, mountain lions were managed as a furbearer, or big game species with a closed season for a period of time, enabling populations to re-establish. Currently, most states manage mountain lions for sustainable harvest by hunters. These factors all increase the potential for human-mountain lion interactions.

Although human-mountain lion interactions are rare, people can take some precautions to help reduce or diffuse potential problems or dangerous situations.

If living or recreating in mountain lion country:

- Do not feed wildlife, especially deer. Mountain lions will follow their prey to feeding sites. Avoid landscaping with plants that deer prefer to eat.
- Keep pets under control. Roaming pets are easy prey for mountain lions. Bring pets in at night. If you leave your pet outside, keep it in a kennel with a secure top. Don't feed pets outside as this can attract raccoons and other animals that mountain lions eat. Store all garbage securely.
- Keep farmyard animals confined at night. Close doors to all outbuildings since inquisitive mountain lions may go inside for a look.
- Supervise children when outdoors. Make sure children are inside before dusk and not outside before dawn. Talk with children about mountain lions and teach them what to do if they encounter one.
- Walk in groups if you are hiking in mountain lion country. Consider carrying a sturdy walking stick as it can be used to ward off a mountain lion. Make sure children don't run ahead or lag behind.
- Avoid jogging alone, especially at dawn, dusk or night when mountain lions are most active.
- If you have a large dog, hike or jog with it leashed by your side.
- If you find a mountain lion kill, leave the area. Mountain lions bury their kills, and may remain close by.

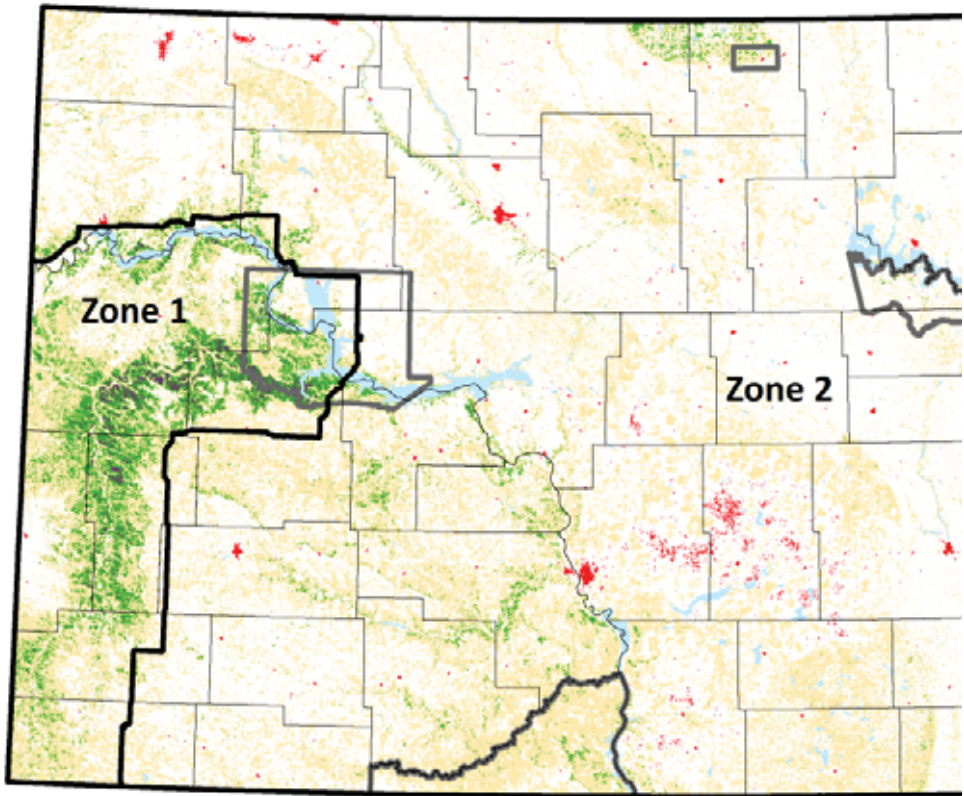
WHAT TO DO IF YOU SEE A MOUNTAIN LION

People rarely get more than a brief glimpse of a mountain lion in the wild because lions typically avoid people. However, in the unlikely event that you come upon a mountain lion, there are appropriate responses that might help reduce potential danger. Remember, every situation is different with respect to the individual lion, terrain, people and circumstances of the encounter.

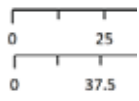
- Do not approach a mountain lion. While most lions will try to avoid confrontation and run away, a lion feeding on a kill, or a female with kittens, can be dangerous if approached.
- Stay calm. If you startle a mountain lion, or a lion approaches you, give it a way to escape. Talk to it calmly but firmly. Move slowly. Do not run. Try

to back away slowly. Running may stimulate a lion's instinct to chase and attack. If possible, try to position yourself uphill of the lion.

- Face the lion and stand upright. Do not turn your back on the lion.
- Do all you can to appear larger. Raise your arms. Open your jacket if you're wearing one. If you have small children along, pick them up so they won't panic and run.
- Convince the lion that you are not prey. Throw stones, branches, or whatever you can get your hands on without crouching down or turning your back. Wave your arms slowly and speak firmly or shout aggressively. Periods of long noises seem to deter lions better than short intermittent noises. If you act like prey, you will be treated like prey.
- If a lion attacks, fight back. Remain standing or try to get back up. People have successfully fought off lions with rocks, sticks, caps or jackets, and their bare hands.



Ranked Habitat Levels



County

REPORT MOUNTAIN LION ENCOUNTERS

To report a sighting, encounter or attack, contact one of the offices on the back page. For after-hours emergencies, call 701-328-9921.

POPULATION MANAGEMENT

If you or someone you know has seen a mountain lion or their sign (tracks or scat), contact the Game and Fish Department with the information. Mountain lion reports are collected and used to monitor trends. These reports are particularly useful when mountain lions are seen outside their typical range in North Dakota. It is especially helpful to provide some evidence to back up your sighting, such as a picture of the animal, its tracks or scat.

The first regulated hunting season for mountain lions in North Dakota occurred in 2005, with a harvest limit of five. Since that time, harvest limits have increased and decreased, and regulations have been modified as new information is discovered. For most of that time, North Dakota has had two management zones for hunting. Zone 1 is in western North Dakota and encompasses the badlands and Missouri River breaks regions. Zone 1 is the area of the state where there is enough contiguous, suitable habitat for mountain lions to maintain a breeding population (Fig. 15). Therefore, Zone 1 is managed using harvest limits to ensure a sustainable population that provides for a limited hunting season annually. Zone 2 is the remainder of the state and does not include any large blocks of suitable mountain lion habitat. Therefore, Zone 2 is managed with no harvest limits because mountain lions found in this area of the state are not part of the breeding population.



Fig. 15 – Habitat suitability map for mountain lions in North Dakota, including management areas.

Hunters are prohibited from taking kittens, defined as mountain lions with visible spots, or females accompanied

by kittens. Mountain lions can give birth during any time of the year, although most kittens are born during July-August. Therefore, it is possible that female mountain lions may have dependent kittens during the hunting season. As such, hunters are encouraged to make an attempt to determine the sex of a mountain lion and avoid taking female mountain lions whenever possible. The fewer number of females taken during the hunting season, the larger the harvest the population can sustain from one year to the next.

Hunters play an important role in collecting demographic information about mountain lions that can be used to monitor population trends. It is mandatory that hunters turn in the carcasses from all harvested mountain lions. These carcasses provide valuable data on survival and reproduction.

RESEARCH

From 2011-17, the North Dakota Game and Fish Department conducted research on mountain lions in western North Dakota. Research objectives included determining causes of mortality and survival rates, food habits, habitat



NDGFD

Biological information is collected from harvested animals.



NDGFD

Fig. 16 – Mountain lion radio-collared to track its movements in western North Dakota.

use, home range size and movements. To collect this information, mountain lions were live-captured and radio-collared and/or ear-tagged (*Fig. 16*).

Results from this research indicated that humans caused the majority of mountain lion mortalities in North Dakota, particularly hunter harvest. Other causes of mortality included depredation removals, automobile collisions and poaching.

Research also confirmed that deer make up the majority (77 percent) of the diets of mountain lions in North Dakota, including both mule deer and white-tailed deer. Beavers and porcupines made up the next largest proportions of their diets, but mountain lions are opportunistic and will eat a variety of available prey, including elk, bighorn sheep, coyotes, wild turkeys, etc. Overall, mountain lions scavenged food about 7 percent of the time.

In only one instance, which equaled less than 1 percent of total prey consumed, did the research document a mountain lion preying on livestock. In that particular case, it was an adult male mountain lion that was preying on calves.

APPENDIX 1

Mountain lions are typically lumped into one of three age classes: kittens (0-1 years old), subadults (1-3 years old) and adults (more than 3 years old). These general age-class determinations usually are made by looking at tooth eruption patterns, staining and wear. Mountain lions begin growing their deciduous or milk teeth at approximately one month of age. Their deciduous teeth are small, dainty and widely spaced from one another. At approximately six months old, their permanent teeth will begin growing in and replacing their deciduous teeth. At this stage, the teeth may seem short because the canines have not fully erupted and/or both deciduous and permanent teeth may be present. At one year of age, their deciduous teeth will be gone and their permanent teeth will have erupted fully. Teeth at this age look pointed and bright white with no staining. Additionally, the gums will still be fully distended and no canine ridge will be present. At 2 years old, their teeth may look slightly worn at the tips of the canines and/or lateral incisors, they may show some yellowing or staining, and their gums may have started recessing. After this point, mountain lion teeth progressively develop more staining, wear and gum recession as the animals age. However, variation in individual diets and history of injuries can make it difficult to accurately differentiate ages of older, adult mountain lions.



0 Year Front Teeth – Male



0 Year Side Teeth – Female



0 Year Front Teeth – Female



0 Year Front Teeth – Female

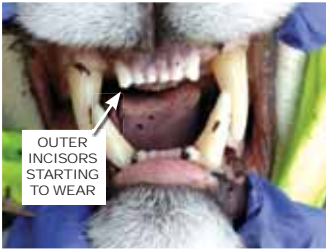


1 Year Front Teeth – Male



1 Year Side Teeth – Male

NDGFD PHOTOS



2 Year Front Teeth – Female



3 Year Front Teeth – Female



5 Year Front Teeth – Male



6 Year Canine Ridge – Female



INDGFD PHOTOS

Appendix 2

Mountain lion tracks are often confused with tracks of large dogs (canines). They can be similar in size and both have four toes and a heel pad. Although, there are subtle differences between the two that a person can look for to determine whether the tracks are from a mountain lion or canine. Below are some side-by-side comparisons describing these subtle differences.

Front foot of a mountain lion.



NDGFD

Rear foot of a mountain lion.



NDGFD

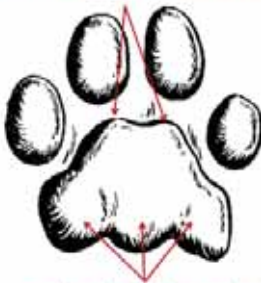
Fig. 16

MOUNTAIN LION

VS.

CANINE

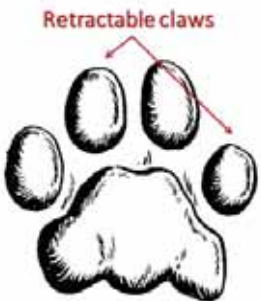
Heel pad: 2 lobes on front



Heel pad: 1 lobe on front



Heel pad: 3 lobes on back



Heel pad: 2 lobes on back



Occasionally claw marks may be seen in mountain lion tracks

Toes point forward



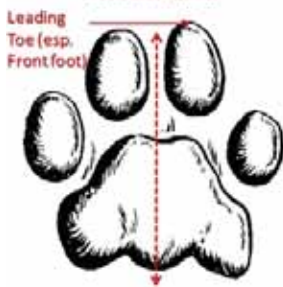
Toes point outward



Round or wider than long



Longer than wide

2 halves of foot
not identical2 halves of foot
generally identicalSpace between toes forms
an "H" patternSubstrate does not squish
up between toes and heelSpace between toes
forms an "X" patternSubstrate squishes up
between toes and heel

Email: ndgf@nd.gov – web: gf.nd.gov

**Game and Fish
Headquarters Office**
100 N. Bismarck Expy.
Bismarck, ND 58501
(701) 328-6300

Devils Lake Office
7928 45th St. NE
Devils Lake, ND 58301
(701) 662-3617

Dickinson Office
225 30th Ave. SW
Dickinson, ND 58601
(701) 227-7431

**Lonetree WMA
Headquarters**
1851 23rd Ave. NE
Harvey, ND 58341
(701) 324-2211

Riverdale Office
406 Dakota Ave.
Riverdale, ND 58565
(701) 654-7475

Jamestown Office
3320 E Lakeside Rd.
Jamestown, ND 58402
(701) 253-6480

Williston Office
5303 Front St. W
Williston, ND 58801
(701) 774-4320



The NDGFD receives Federal financial assistance from the US Fish and Wildlife Service. In accordance with Title VI of the Civil Rights Act of 1964, Section 504 of the Rehabilitation Act of 1973, Title II of the Americans with Disabilities Act of 1990, the Age Discrimination Act of 1975, and Title IX of the Education Amendments of 1972, the NDGFD joins the US Department of the Interior and its Bureaus in prohibiting discrimination on the basis of race, color, national origin, age, disability, sex (in education programs or activities) and also religion for the NDGFD. If you believe you have been discriminated against in any program, activity, or facility as described above, or you desire further information, please write to: ND Game and Fish Department, Attn: Chief Administrative Services, 100 N. Bismarck Expressway, Bismarck, ND 58501-5095 or to: U.S. Fish and Wildlife Service, Attn: Civil Rights Coordinator, 4401 N. Fairfax Drive, Mail Stop: MBSP-4020, Arlington, Virginia 22203. The TTY/TTD (Relay ND) number for the hearing or speech impaired is 1-800-366-6888.