
Chapter 4

NATURAL ENVIRONMENT

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The natural resources of Denali State Park have not been studied in great detail. Much of the information for this chapter is carried over from the 1975 and 1989 Management Plans. Additional information was summarized from the Final South Denali Implementation Plan and Environmental Impact Statement (2006) and by contacting experts in the respective fields addressed below.

Climate

Denali State Park is located in a transition zone between the maritime climate to the south and the continental climate to the north. Because the area is transitional, it exhibits characteristics of both zones. This is further complicated by the complex topography of the area, which creates a variety of microclimates.

There is little detailed climatic data for the state park itself, however, there are some general indicators that help outline what occurs in the area.

As generally outlined in a “Climatological Summary” prepared by the National Oceanic and Atmospheric Administration (NOAA) in 1976 and supplemented by a 1984 memo on Denali viewing weather, the south side of the Alaska Range is essentially open to weather systems from the Gulf of Alaska. The Denali State Park area receives most of the precipitation associated with maritime weather systems. Due to orographic lifting, the south side of the Alaska Range receives 2 to 3 times the snowfall that the north side of the Alaska Range receives.

Detailed weather information for the park is very limited, but there are records (1941-1976) for Summit, north of the park. Talkeetna has the longest records in the region, dating from 1931, and the Chulitna River Lodge (Milepost 156.6 inside the park) has been recording weather data since 1975. Talkeetna averages 27 inches of precipitation while the Chulitna River Lodge area appears to average approximately 32 inches annually.

Snowfall for the area averages approximately 180 inches with the snow being relatively deeper (1-2 feet) at the north end of the park than the south end. This relative snow depth increase from south to north is reflected in recent snow depth recordings along the Parks Highway. This is also fairly predictable, from the snow depth differential (noted in the 1984 NOAA memorandum) between Talkeetna (105.8”) and elevation 1250’ on the Chulitna River (180.1”).

Average temperatures in the park are highest in July at about 58 degrees Fahrenheit. June and August are slightly lower, averaging about 53-54 degrees, and September is the last of the obviously warmer summer months, averaging approximately 44 degrees. January and February are typically the coldest months in this area, with average daily temperatures slightly above 0 degrees.

Weather patterns have an obvious effect on views of Denali are very important. However, few viewing-day records have been collected for Denali State Park. The 1984 NOAA memorandum indicates that, based upon Summit weather data, the south side of the Alaska Range generally has nine more poor viewing days June - August than the north side of the Alaska Range. Viewing potential is generally greater during January, February, March and April.

Prevailing wind direction in the summer is from the south, with winds from the north/northeast the remainder of the year. Summit station data indicate that mean wind velocities April to October are fairly low, ranging from 7.4 to 8.3 miles per hour. November through March experience higher mean wind velocities, ranging from 11.1 to 15.1 miles per hour. January has the highest mean wind velocities.

Geology

The landforms and geology of the area are the result of a variety of occurrences. A sea occupied southcentral Alaska in the Paleozoic and early Mesozoic eras. Later, great uplifting and volcanic activity formed the igneous rock core of the Alaska Range. The Jurassic and Cretaceous eras witnessed extensive erosion, which resulted in deposition of sediments in the basins around the mountains. Foothill ridges (such as Kesugi-Curry Ridge) and river valleys (such as the Chulitna and Susitna) were formed later by uplifting, deformation and faulting activity. Most of this geologic activity was complete by the end of the Tertiary period. The current landscape was then created by four major glaciations in the Quaternary period.

Soils

Existing soils information for the South Denali planning area was obtained from existing soils maps for the upper Susitna Valley and regional soils information from the Soil Survey Geographic Database. This information was supplemented by recent aerial photography and satellite imagery. Soil map units were field verified within the planning area in 2004.

The three main areas examined during the 2004 soils survey, and for the purpose of this analysis are located near Peters Hills, Parks Highway (previously referred to as Cari Creek) and the soils surrounding Petersville Road. Only the generalized soils information is summarized below. For a more complete description of soils information, see the Final South Denali Implementation Plan and Environmental Impact Statement (2006).

All the soils in the geographic area are categorized within two primary landforms or geomorphic units: glacial till plains and mountainous uplands.

Glacial Till Plains: Glacial till plains occur between alluvial terraces along the rivers and the adjacent mountains. The hilly terrain within these plain areas is well-drained and supports mixed forests of white spruce and birch, with an understory of alder and ferns. On the sloping terrain of this landform, the following soils are present:

- Kroto and Strandline silt loam soils
- Spenard silt loam soils
- Slikok muck soils: 0 to 5% slopes
- Chichanta peat soils: 0 to 8% slopes

Mountainous Upland: The second of the two major geomorphic units in the planning area, mountainous uplands, have soils on higher slopes. These soils are well-drained, except when adjacent to stream drainages and depressions. In this case, the tight glacial till prevents downward flow of water. Subalpine areas, which support grasslands and thick alder shrub communities, are composed of the following soils:

- Puntilla silt loam: 7 to 20% slopes
- Kliskon silt loam: 12 to 20% slopes

Typically, Puntilla soils occur on the steeper mountain sideslopes and support communities of Sitka alder, bluejoint reedgrass, ferns, and forbs. Kliskon soils generally occur in poorly drained areas, which are more gently sloping, and support herbaceous meadows of grass and ferns.

Soils in alpine areas at the higher elevations are generally uneven as a result of continual frost heaving and generally consist of the two soil series:

- Chuit silt loam: 3 to 30% slopes
- Nakochna silt loam: 3 to 30% slopes

These soil series are typically classified as “rubble lands” on the available soils maps. These “rubble land” map units consist of barren areas of loose rock, but also includes sizable patches of Chuit and Nakochna soils, and range in slope from 7 to 45 percent.

Slope and Slope Aspect

Slope is an important factor when evaluating areas for development. Slope is measured by rise (vertical gain) over run (horizontal distance). Slopes greater than 15% are considered too steep for development of major facilities, although they may be appropriate for less intense development such as public-use cabins, campsites, and trails.

As slope increases, development-related problems and project costs typically increase as well. The more obvious impacts relate to drainage and erosion, and the cut and fill areas required to create level development pads or road sections.

Slopes in the state park over 15% are generally found in the Peters and Dutch hills, the Alaska Range and the northwest- and southeast-facing slopes of the Curry-Kesugi Ridge system. Milder slopes are found along the Tokositna, Chulitna and Susitna river floodplains, benches and adjacent slopes. The top of Curry and Kesugi ridges also has large areas that are under 15% slope.

“Slope aspect” refers to the general direction a slope is facing. Aspect is important to development, especially in Alaska, because south-facing slopes receive almost twice as much sun as does level ground. South-facing slopes receive more than three times the sun of north-facing slopes.

Generally, facilities on a south-facing slope will be warmer, receive more light, and have a longer operational season. Slopes with a western aspect are rated next best in suitability, followed by eastern aspect, and, last, northern. There are still areas in the park that have permafrost, particularly north-facing slopes, higher elevations, and low-lying areas with black spruce.

Hydrology

Denali State Park has three major rivers within its boundaries, the Susitna, Chulitna and Tokositna. All are glacial, and have the high levels of sediments during summer but run clear in winter.

Within the park, the Chulitna and Tokositna rivers are fairly broad and braided, and are subject to seasonal flooding. Additionally, the Chulitna has experienced glacial out-burst flooding due to periodic glacial damming of the Fountain River at the Eldridge Glacier.

Information concerning subsurface hydrology is essentially non-existent for Denali State Park, however, it is speculated that the sands, gravels and other unconsolidated materials associated with the major drainages within the park would produce adequate quantities of groundwater of suitable quality for major facilities. Published reports estimate that water wells in the areas associated with major surface water sources would yield between 100 and 1000 gallons per minute.

Vegetation

Vegetation in Denali State Park has been divided into five major associations:

- Wetlands (bog - muskeg)
- Bottomland, spruce - poplar forest upland spruce - hardwood forest

- High brush
- Alpine tundra - barren

Wetlands. This association is found in river bottom lowlands and upland terraces throughout the park. Cottongrass tussocks, dwarf shrubs and sphagnum moss are the dominant species. This association provides essential habitat to waterfowl, such as trumpeter swans.

Bottomland, spruce - poplar forest. This association is comprised of evergreen and deciduous trees. Dominant species are spruce and poplar. Large cotton-wood trees are located in areas adjacent to river channels or less active flood plain zones. This association provides understory brush used as browse by moose. Moose often congregate in this association for cover and feeding.

Upland spruce - hardwood forest. This association is dominated by white spruce and Alaska paper birch and covers most of the lower elevations within Denali State Park. Understory species provide browse for moose and cover for larger mammals found within the park. This association is most suitable for location of any major facilities.

High brush. The high brush association is typical of the transition zone between treeline and alpine tundra. Vegetation cover in this association ranges from very dense to open with widely scattered spruce trees. Dominant species are willow and alder, with a variety of berry brushes also found. This association is an important habitat area as it provides browse and cover for large mammals. The berries located in this association are heavily used for food by bears, both black and grizzly. This association is also important for beaver.

Alpine tundra - barren. This association is typically found in the higher elevations, above the high brush transition area. It supports a variety of species, including grasses, sedges, dwarf shrubs and lichens. Crowberry, dwarf blueberry and low-bush cranberry attract a variety of animals, including black and grizzly bears. Other wildlife species that inhabit this association at some time during the year are ptarmigan, fox, coyote, ground squirrel and moose.

The alpine tundra association is very fragile. Because it is easily damaged and recovers very slowly, care must to be taken when considering facilities in this association. Harsh environmental conditions, including very thin soils, short growing seasons, high winds and high desiccation value, contribute to the sensitivity of this association.

Wildlife

Denali State Park includes a wide variety of habitat types, and its wildlife is typical of that seen in much of southcentral Alaska. Published information is fairly limited, and has been supplemented by interviews with ADFG biologists, local residents, guides, rangers, and others familiar with the park.

Mammals. There is a variety of mammals within the park, however, their numbers are not well established. References to quantity are relative observations.

Large mammals include moose, grizzly bear, black bear and wolves. Caribou have been observed close to the park's northern boundary and frequently in the Broad Pass area. A small group of sheep have been reported to occasionally cross the Kesugi Ridge area, within the north end of the park. While no wolves are known to den within the park, they have been observed migrating through the park. They may enter the park from the north and/or the west to hunt.

Small mammals include wolverine, otter, mink, red fox, pine marten, lynx, snowshoe hare, red and flying squirrel, porcupine, marmot and coyote.

Moose range widely and have been observed from the river bottoms to the Curry Ridge area browsing for food. The Tokositna and Chulitna river bottoms are important habitat areas and provide good winter cover and browse.

Grizzly bear and black bear overlap in Denali State Park. Salmon streams and berry patches provide a good food source for both species. Most salmon streams are located at the southern end of the park, and probably explain the higher concentrations of bear observed here.

Grizzly bears den in many of the high valleys near the west end of the park. Black bears have been observed denning on well-drained hillside areas adjacent to the Chulitna River. Black bear denning areas, however, are not as specific as the grizzly bears.

Birds. A bird list (Table 4-1) prepared by a state park ranger indicates the variety of birds within Denali State Park. Migratory waterfowl are abundant, with trumpeter swans being of special note. Swans have been observed nesting in a variety of locations within the park, and the Tokositna River lowland area provides very important habitat for nesting and fledging.

The Tokositna River also provides sites for several active bald eagle nests. The nests have been observed in large trees adjacent to the river in lowland areas. Another important raptor, the merlin, has been observed nesting along the Susitna River.

Fish. Five species of Pacific salmon, as well as rainbow trout, Dolly Varden, burbot and arctic grayling, inhabit park waters. Byers Lake has limited numbers of rainbow trout, lake trout and burbot. Spink and Lucy Lakes have very small populations of lake trout.

Figure 2
BIRD CHECKLIST FOR DENALI STATE PARK

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|-----------------------------------|--|---------------------------------------|
| <i>Common Loon</i> , U, S | <i>White-tailed Ptarmigan</i> , U, P | <i>Cliff Swallow</i> , U, S |
| <i>Pacific Loon</i> , U, S | Sandhill Crane, C, M | Gray Jay, C, P |
| Red-throated Loon R, M | <i>Semipalmated Plover</i> , U, S | <i>Black-billed Magpie</i> , C, P |
| Red-necked Grebe, R, S | <i>American Golden Plover</i> , U, S | <i>Common Raven</i> , C, P |
| Horned Grebe, R, S | Hudsonian Godwit, R, M | <i>Black-capped Chickadee</i> , A, P |
| Tundra Swan, U, M | <i>Whimbrel</i> , U, S | <i>Boreal Chickadee</i> , C, P |
| <i>Trumpeter Swan</i> , U, S | Upland Sandpiper, R, M | <i>Brown Creeper</i> , U, P |
| Canada Goose, C, M | <i>Greater Yellowlegs</i> , C, S | <i>American Dipper</i> , U, P |
| Greater White-fronted Goose, U, M | <i>Lesser Yellowlegs</i> , U, S | <i>American Robin</i> , A, S |
| Snow Goose, U, M | <i>Solitary Sandpiper</i> , U, S | <i>Varied Thrush</i> , C, S |
| <i>Mallard</i> , C, S | <i>Spotted Sandpiper</i> , U, S | <i>Hermit Thrush</i> , U, S |
| <i>Northern Pintail</i> , U, S | <i>Wandering Tattler</i> , R, S | <i>Swainson's Thrush</i> , C, S |
| <i>Green-winged Teal</i> , C, S | <i>Red-necked Phalarope</i> , U, S | <i>Gray-checked Thrush</i> , U, S |
| <i>Northern Shoveler</i> , U, S | <i>Wilson's Snipe</i> , A, S | <i>Wheatear</i> , R, S |
| <i>American Wigeon</i> , C, S | Long-billed Dowitcher, U, M | Townsend's Solitaire, R, S |
| Canvasback, R, S | <i>Surf bird</i> , R, S | <i>Arctic Warbler</i> R, S |
| Ring-necked Duck, R, S | Western Sandpiper, R, M | <i>Golden-crowned Kinglet</i> , U, P |
| <i>Greater Scaup</i> , C, S | <i>Least Sandpiper</i> , C, S | <i>Ruby-crowned Kinglet</i> , A, S |
| Lesser Scaup, R, S | Pectoral Sandpiper, U, M | <i>American Pipit</i> , C, S |
| <i>Common Goldeneye</i> , U, S | <i>Long-tailed Jaeger</i> , U, S | <i>Bohemian Waxwing</i> , U, S |
| <i>Barrow's Goldeneye</i> , U, S | <i>Herring Gull</i> , U, S | <i>Northern Shrike</i> , U, P |
| <i>Bufflehead</i> , U, S | <i>Mew Gull</i> , C, S | <i>Orange-crowned Warbler</i> , C, S |
| <i>Harlequin Duck</i> , U, S | Bonaparte's Gull, U, S | <i>Yellow Warbler</i> , U, S |
| <i>Long-tailed Duck</i> , U, S | <i>Arctic Tern</i> , C, S | <i>Yellow-rumped Warbler</i> , A, S |
| <i>White-winged Scoter</i> , R, S | <i>Great Horned Owl</i> , U, P | <i>Townsend's Warbler</i> , R, S |
| Surf Scoter, R, M | Snowy Owl, R, W | <i>Blackpoll Warbler</i> , C, S |
| Black Scoter, R, M | <i>Northern Hawk Owl</i> , U, P | <i>Northern Waterthrush</i> , C, S |
| <i>Common Merganser</i> , U, S | <i>Great Gray Owl</i> , R, P | <i>Wilson's Warbler</i> , C, S |
| Red-Breasted Merganser, R, S | Short-eared Owl, U, M | <i>Rusty Blackbird</i> , R, S |
| <i>Nothorn Goshawk</i> , U, P | <i>Boreal Owl</i> , U, P | <i>Pine Grosbeak</i> , U, P |
| <i>Sharp-shinned Hawk</i> , U, S | <i>Belted Kingfisher</i> , C, S | <i>Gray-crowned Rosy Finch</i> , R, S |
| Red-tailed Hawk, R, S | Rufous Hummingbird R,S | Hoary Redpoll, R, W |
| Rough-legged Hawk, U, M | <i>Northern Flicker</i> , R, S | <i>Common Redpoll</i> , C, P |
| Golden Eagle, U, S | <i>Hairy Woodpecker</i> , C, P | <i>Pine Siskin</i> , U, S |
| <i>Bald Eagle</i> , C, S | <i>Downy Woodpecker</i> , U, P | <i>White-winged Cross bill</i> , U, P |
| Northern Harrier, C, M | <i>American Three-toed Woodpecker</i> , U, P | <i>Savannah Sparrow</i> , C, S |
| <i>Osprey</i> , U, S | <i>Black-back Woodpecker</i> , R, P | <i>Dark-eyed Junco</i> , A, S |
| Gyr Falcon, R, S | <i>Say's Phoebe</i> , R, S | <i>Tree Sparrow</i> , C, S |
| Peregrine Falcon, R, S | <i>Alder Flycatcher</i> , A, S | <i>White-crowned Sparrow</i> , A, S |
| <i>Merlin</i> , U, S | <i>Olive-sided Flycatcher</i> , R, S | <i>Golden-crowned Sparrow</i> , C, S |
| <i>American Kestrel</i> , R, S | <i>Horned Lark</i> , C, S | <i>Fox Sparrow</i> , A, S |
| <i>Spruce Grouse</i> , C, P | <i>Violet-green Swallow</i> , C, S | <i>Lincoln's Sparrow</i> , U, S |
| <i>Willow Ptarmigan</i> , C, P | <i>Tree Swallow</i> , C, S | Lapland Longspur, C, M |
| <i>Rock Ptarmigan</i> , U, P | <i>Bank Swallow</i> , U, S | Snow Bunting, C, M |

-----**Key**

Italic type = Probable Breeder
 S = Summer Resident
 M = Migrant

A = Abundant
 U = Uncommon

P = Permanent Resident C = Common
 W = Winter Resident R = Rare
 * Prepared by Ranger David K. Porter

Figure 3
VEGETATION

Figure 4
WILDLIFE DISTRIBUTION
Moose, Beaver, Sheep

Figure 5
WILDLIFE DISTRIBUTION
Bears

Figure 6
WILDLIFE DISTRIBUTION
Bald Eagles, Trumpeter Swans

Figure 7
FISH DISTRIBUTION