Index of Species Information

WILDLIFE SPECIES: Canis lupus

Introductory

WILDLIFE SPECIES: Canis lupus

AUTHORSHIP AND CITATION :
Snyder, S. A. 1991. Canis lupus. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ [2010, February 18].

ABBREVIATION :
CALU

COMMON NAMES :
gray wolf
grey wolf
timber wolf
eastern timber wolf
Rocky Mountain wolf
lobo
buffalo wolf
brown wolf

TAXONOMY :
There are 32 subspecies of gray wolf worldwide; 24 of these occur in North America. They are differentiated by size, weight, color, cranial measurements, and geographic location [16,22,34]. However, these characteristics vary within each subspecies. Also their ranges can overlap and interbreeding occurs. Mech [22] stated that too many subspecies have been identified, and that some were distinguished from a small, insignificant sample size. All 24 North American subspecies are listed below. Those thought to be extinct are marked with an asterisk.

Canis lupus ssp. irremotus
C.l. ssp. columbianus Northern Rocky Mountain wolf
C.l. ssp. occidentalis British Columbia wolf
C.l. ssp. lycaon
C.l. ssp. nubilus* plains wolf
C.l. ssp. alces
C.l. ssp. pambasileus northern timber wolf
C.l. ssp. tundrarum barren ground or arctic wolf
C.l. ssp. hudsonicus Hudson Bay wolf
C.l. ssp. arctos American arctic or arctic tundra wolf
C.l. ssp. orion Greenland wolf
C.l. ssp. labradorius Labrador wolf
C.l. ssp. beothucus* Newfoundland wolf
C.l. ssp. ligoni Alexander Archipelago wolf
C.l. ssp. fuscus* Cascade wolf
C.l. ssp. crassodon
C.l. ssp. youngi* Southern Rocky Mountain wolf

C.l. ssp. mogollonensis* Mogollon Mountain wolf
C.l. ssp. monstrabilis* Texas gray wolf
C.l. ssp. baileyi Mexican gray wolf
C.l. ssp. bernardi Banks Island tundra wolf
C.l. ssp. mackenzii
C.l. ssp. manningi
C.l. ssp. griseoalbus Saskatchewan timber wolf

ORDER :
Carnivora

CLASS :
Mammal

FEDERAL LEGAL STATUS :
Endangered

OTHER STATUS :
The gray wolf is threatened in Minnesota [6]. Alaskan and Canadian gray wolf populations are considered viable [24]. The wolf is rare in Michigan's Upper Peninsula [28]. In Montana the gray wolf is recolonizing areas around Glacier and Yellowstone National Parks. It has also been seen denning in isolated areas of northern Washington [37] and is listed as endangered in that state [38].

WILDLIFE DISTRIBUTION AND OCCURRENCE

WILDLIFE SPECIES: Canis lupus

GENERAL DISTRIBUTION :
The gray wolf is found worldwide, ranging from across Europe to northern Asia; however, it has been extirpated from much of its former range. Formerly in North America, the gray wolf ranged from the southern fringe of Greenland south through mid-Mexico and from the Atlantic to the Pacific [34]. It occupied almost all regions of the United States except for deserts and high mountaintops [22,34]. Today the gray wolf occupies about 1 percent of its former range in the contiguous states [10]. It occupies northeastern Minnesota, northern Wisconsin, the Upper Peninsula of Michigan, northwestern Montana, central Idaho, and Washington's Cascade Mountains. In addition the gray wolf is abundant throughout Alaska and Canada. The ranges for the 24 subspecies follow [22,34]:

Ssp. irremotus - Idaho, western Montana, Wyoming, Alberta, and the western fringes of Washington and Oregon
Ssp. columbianus - British Columbia and southwestern Alberta; can move into the northwestern states
Ssp. occidentalis - northern Alberta and Saskatchewan, northeastern British Columbia, and central Manitoba, into the Yukon and the Northwest Territories
Ssp. lycaon - southeastern Manitoba, Ontario, Quebec, and the eastern United States, from the Atlantic to central Minnesota, south to northeastern Florida
Ssp. nubilus - thought to be extinct, although it may possibly occur in Minnesota [19]; from southern Manitoba and Saskatchewan, south through the Great Plains into northern Texas
Ssp. alces - the Kenai Peninsula, Alaska
Ssp. pambasileus - Yukon Territory and all but northern Alaska
Ssp. tundrarum - northern Alaska
Ssp. hudsonicus - along the Hudson Bay in the Northwest Territories and Manitoba
Ssp. arctos - Melville Island, Northwest Territories
Ssp. orion - Greenland
Ssp. labradorius - northern Quebec and Newfoundland
Ssp. beothucus - the island of Newfoundland
Ssp. ligoni - Alexander Archipelago, Alaska
Ssp. fuscus - the Cascade Mountains of Washington, Oregon, and California

Ssp. crassodon - Vancouver Island, British Columbia
Ssp. youngi - the southern Rocky Mountains of Utah, Arizona, New Mexico, Colorado, and Wyoming
Ssp. mogollonensis - central Arizona and westcentral New Mexico
Ssp. monstrabilis - Texas, Mexico, and southeast New Mexico
Ssp. baileyi - central Mexico into southern Arizona and New Mexico
Ssp. bernardi - Banks and Victoria Islands, Northwest Territories
Ssp. mackenzii - northern Northwest Territories and Yukon Territory
Ssp. manningi - Baffin Island, Northwest Territories
Ssp. griseoalbus - Alberta, Saskatchewan, Manitoba, Northwest Territories, and Newfoundland

ECOSYSTEMS :

FRES10 White-red-jack pine
FRES11 Spruce-fir
FRES18 Maple-beech-birch
FRES19 Aspen-birch
FRES20 Douglas-fir
FRES21 Ponderosa pine
FRES22 Western white pine
FRES23 Fir-spruce
FRES24 Hemlock-Sitka spruce
FRES25 Larch
FRES26 Lodgepole pine
FRES36 Mountain grasslands
FRES37 Mountain meadows

STATES :

AK ID MI MN MT WA WV WI WY

AB BC MB NB NF NT NS ON PE PQ

SK YT

BLM PHYSIOGRAPHIC REGIONS :

2 Cascade Mountains
8 Northern Rocky Mountains
9 Middle Rocky Mountains
16 Upper Missouri Basin and Broken Lands

KUCHLER PLANT ASSOCIATIONS :

K003 Silver fir - Douglas-fir forest
K004 Fir - hemlock forest
K008 Lodgepole pine - subalpine forest
K010 Ponderosa shrub forest
K011 Western ponderosa forest
K012 Douglas-fir forest
K013 Cedar - hemlock - pine forest
K014 Grand fir - Douglas-fir forest
K015 Western spruce - fir forest
K093 Great Lakes spruce - fir forest
K094 Conifer bog
K095 Great Lakes pine forest
K096 Northeastern spruce - fir forest
K106 Northern hardwoods
K107 Northern hardwoods - fir forest

SAF COVER TYPES :

1 Jack pine
5 Balsam fir
12 Black spruce
13 Black spruce - tamarack
15 Red pine
16 Aspen
17 Pin cherry
18 Paper birch
20 White pine - northern red oak - red maple
21 Eastern white pine

24 Hemlock - yellow birch
25 Sugar maple - beech - yellow birch
30 Red spruce - yellow birch
33 Red spruce - balsam fir
35 Paper birch - red spruce - balsam fir
37 Northern white cedar
38 Tamarack
107 White spruce
108 Red maple
201 White spruce
202 White spruce - paper birch
203 Balsam poplar
204 Black spruce
205 Mountain hemlock
206 Engelmann spruce - subalpine fir
208 Whitebark pine
210 Interior Douglas-fir
211 White fir
212 Western larch
213 Grand fir
215 Western white pine
217 Aspen
218 Lodgepole pine
220 Rocky Mountain juniper
221 Red alder
222 Black cottonwood - willow
223 Sitka spruce
224 Western hemlock
225 Western hemlock - Sitka spruce
230 Douglas-fir - western hemlock
235 Cottonwood - willow
237 Interior ponderosa pine
253 Black spruce - white spruce
254 Black spruce - paper birch

SRM (RANGELAND) COVER TYPES :
NO-ENTRY

PLANT COMMUNITIES :
Gray wolves inhabit a variety of plant communities. Their territories usually contain a mix of forested and open areas. Gray wolves can also be found on the tundra. In the West, gray wolves have been known to follow ungulate herds from their lowland wintering grounds to their high summer pastures [16]. In the East, gray wolves inhabit a mix of coniferous and deciduous forests, which include balsam fir (Abies balsamea), black spruce (Picea mariana), white spruce (P. glauca), white-cedar (Thuja occidentalis), jack pine (Pinus banksiana), white pine (P. strobus), red pine (P. resinosa), tamarack (Larix laricina), sugar maple (Acer saccharum), yellow birch (Betula alleghaniensis), and eastern hemlock (Tsuga canadensis). In the West, gray wolves inhabit Douglas-fir (Pseudotsuga menziesii)-spruce (Picea spp.) forests, as well as ponderosa pine (Pinus ponderosa) and western larch (Larix occidentalis) forests [16,23,28].

REFERENCES :
NO-ENTRY

BIOLOGICAL DATA AND HABITAT REQUIREMENTS

WILDLIFE SPECIES: Canis lupus

TIMING OF MAJOR LIFE HISTORY EVENTS :
Mating - occurs from January to April
Gestation Period - 63 days
Litter Size - average five to six pups; weaned at 5 weeks
Breeding Age - 2 years, but often do not breed until 3 years due to

social structure of the pack; usually only dominant male and female breed
Life Span - up to 16 years, but 10 years is considered quite old
Pack Size - averages 2 to 15 individuals, although 36 individuals have been reported; packs structured in a dominance hierarchy
[10,21,22,35]

PREFERRED HABITAT :
Gray wolves' habitat preferences appear to be more prey dependent than cover dependent. Herman and Willard [16] summarized that gray wolves choose home territories with a variety of topographic features. Forests, open meadows, rocky ridges, and lakes or rivers all comprise a pack's territory. In the West gray wolves have been known to follow the seasonal elevational movements of ungulate herds [16]. In Minnesota, where territories encompass only subtle elevational changes, Fritts and Mech [10] observed no changes in territory use by gray wolves between summer and winter. In south-central Alaska Ballard and others [1] found that gray wolves do not follow migrating moose or caribou outside of their pack territories. Gray wolves do, however, follow moose and caribous' elevational movements within pack territories.

COVER REQUIREMENTS :
Gray wolves excavate natal dens in well-drained soils in meadows near water [16]. They may use the same den for several years. In Minnesota Fuller [11] found gray wolves denning in hollow logs (24 to 35 inches [60-90 cm] diameter). Gray wolves also den under tree roots, rock outcrops, or even in beaver lodges [11]. After 1 to 2 months these natal dens are abandoned for an open area called a rendez-vous site. Here the pups are guarded by a few adult pack members, while the rest of the pack hunts [1]. Herman and Willard [16] summarized that gray wolves need a large, remote area relatively free from human disturbance. Territory sizes range from 20 to 215 square miles (54-555 sq km) in Minnesota [10]. Average territory sizes in Minnesota have been reported to vary from 55 to 120 square miles (143-310 sq km) [29] and 25 to 29 square miles (64-75 sq km) [2]. In the West average territory sizes vary from 75 to 150 square miles (194-388 sq km) and are smaller in winter when ungulates are concentrated on their wintering grounds [16].

FOOD HABITS :
Gray wolves prey mainly on large ungulates, such as moose (Alces alces), deer (Odocoileus spp.), elk (Cervus elaphus), and caribou (Rangifer tarandus). They tend to prey on the young, old, and sick members of ungulate populations. Beaver (Castor canadensis) are a major supplement to gray wolves' diets [23]. Voigt and others [33] reported that gray wolves' diets vary, depending on relative prey abundance. Other prey species include mountain goats (Oreamnos americanus), bison (Bison bison), pronghorn (Antilocapra americana), various rodents, upland game birds and waterfowl, snowshoe hare (Lepus americanus), and black bear (Ursus americana) [6,10,21,23,25,33]. On Isle Royale seeds of wild sarsaparilla (Aralia nudicaulis) were found in gray wolf scat [7]. Occasionally gray wolves prey on domestic livestock.

PREDATORS :
Humans are the only significant predator of the gray wolf and have eradicated it from almost all of its former range worldwide [27,34]. Pimlott and others [26] noted black bear preying on gray wolf cubs and adults.

MANAGEMENT CONSIDERATIONS :
Organized efforts to kill all the remaining gray wolves in the western United States began in the 1860's. Yellowstone and Glacier National Parks established an official predator-control policy between 1914 and 1926 [27]. Today both parks are included in the Northern Rocky Mountain Wolf Recovery Plan as two areas capable of sustaining viable wolf populations. Bunnell and Kremsater [4] concluded that wolves need about 7,818 square miles (20,250 sq km) to maintain a viable population of 50 individuals. Fear of livestock depredation seems to be the single most cause of opposition to gray wolf recovery. Also hunters worry that game will be less available if gray wolves were to recolonize their former ranges. In Minnesota, northwestern Montana, central Idaho, and the Greater Yellowstone Ecosystem, livestock owners are reimbursed for animals taken by gray wolves [27]. An economic analysis conducted by Duffield [36] concluded that gray wolf reintroduction could possibly reduce the number of hunting permits, but that revenues lost would not exceed revenues gained from tourism in and around Yellowstone Park, due to the increase in photographers, filmmakers, and others wanting to see gray wolves.

REFERENCES :
NO-ENTRY

FIRE EFFECTS AND USE

WILDLIFE SPECIES: Canis lupus

DIRECT FIRE EFFECTS ON ANIMALS :
No direct fire effects on gray wolves have been noted.

HABITAT RELATED FIRE EFFECTS :
The effect of fire on gray wolf habitat is best defined by how fire affects gray wolves' prey. Beaver, elk, moose, and deer are fire-dependent species, requiring the plant communities that persist following frequent fires [14,17]. Edwards [8] reported that after fire moose populated the area around Wells Gray Park, British Columbia, where they were previously unknown. This was followed by a marked increase in gray wolves. Other studies in Alaska, Michigan, Minnesota, and Canada show an increase in moose populations following fire [14,15,32].

Now absent from the old-growth forests of Minnesota, caribou once were an important prey for gray wolves here. These forests do not provide enough food to sustain other ungulates for gray wolves to prey on. Due to fire exclusion, these old-growth forested areas have increased, checking ungulate populations and consequently limiting gray wolf populations [15].

FIRE USE :
Fire can be used to create browse for ungulates which, in turn, provides prey for gray wolves. In Minnesota Heinselman [15] concluded that enough early postfire plant communities must exist within a gray wolf pack's territory to support a surplus of deer, moose, and beaver for prey. Adequate hiding cover should be maintained for the ungulates. If they are abundant then gray wolf populations have a better chance of thriving. Gray wolves prosper best when they have a large area, relatively free from human disturbance, in which to roam, and when there is a surplus of ungulates [16]. Frequent fires that promote ungulate browse in and around areas that are at least moderately remote offer ideal gray wolf habitat.

REFERENCES :
NO-ENTRY

References for species: Canis lupus

1. Ballard, Warren B.; Whitman, Jackson S.; Gardner, Craig L. 1987. Ecology of an exploited wolf population in south-central Alaska. Wildlife Monographs No. 98. Washington, DC: The Wildlife Society. 54 p. [13865]

2. Berg, William E.; Kuehn, David W. 1982. Ecology of wolves in northeast Minnesota. In: Harrington, Fred H.; Paquet, Paul C., eds. Wolves of the world: Perspectives of behavior, ecology, and conservation.

Park Ridge, NJ: Noyes Publications: 4-11. [13868]

3. Bernard, Stephen R.; Brown, Kenneth F. 1977. Distribution of mammals, reptiles, and amphibians by BLM physiographic regions and A.W. Kuchler's associations for the eleven western states. Tech. Note 301. Denver, CO: U.S. Department of the Interior, Bureau of Land Management. 169 p. [434]

4. Bunnell, Fred L.; Kremsater, Laurie L. 1990. Sustaining wildlife in managed forests. Northwest Environmental Journal. 6(2): 243-269. [12830]

5. Burt, William H.; Grossenheider, Richard P. 1976. A field guide to the mammals. Boston, MA: Houghton Mifflin. 289 p. [13685]

6. Cohn, Jeffrey P. 1990. Endangered wolf population increases. Bioscience. 40(9): 628-632. [13887]

7. Edwards, Joan. 1985. Effects of herbivory by moose on flower and fruit production of Aralia nudicaulis. Journal of Ecology. 73: 861-868. [13626]

8. Edwards, Joan. 1985. Effects of herbivory by moose on flower and fruit production of Aralia nudicaulis. Journal of Ecology. 73: 861-868. [13626]

9. Eyre, F. H., ed. 1980. Forest cover types of the United States and Canada. Washington, DC: Society of American Foresters. 148 p. [905]

10. Fritts, Steven H.; Mech, L. David. 1981. Dynamics, movements, and feeding ecology of a newly protected wolf population in northwest Minnesota. Wildlife Monographs No. 80. Washington, DC: The Wildlife Society. 79 p. [13863]

11. Fuller, Todd K. 1989. Population dynamics of wolves in northcentral Minnesota. Wildlife Monographs No. 105. Washington, DC: The Wildlife Society. 41 p. [13864]

12. Fuller, Todd K. 1988. Denning behavior of wolves in northcentral Minnesota. The American Midland Naturalist. 121: 184-188. [13867]

13. Garrison, George A.; Bjugstad, Ardell J.; Duncan, Don A.; [and others]. 1977. Vegetation and environmental features of forest and range ecosystems. Agric. Handb. 475. Washington, DC: U.S. Department of Agriculture, Forest Service. 68 p. [998]

14. Hansen, H. L.; Krefting, L. W.; Kurmis, V. 1973. The forest of Isle Royale in relation to fire history and wildlife. Tech. Bull. 294; Forestry Series 13. Minneapolis, MN: University of Minnesota, Agricultural Experiment Station. 44 p. [8120]

15. Heinselman, Miron L. 1973. Fire in the virgin forests of the Boundary Waters Canoe Area, Minnesota. Quaternary Research. 3: 329-382. [282]

16. Herman, Margaret, Willard, E. Earl. 1978. Rocky Mountain wolf and its habitat. Missoula, MT: U.S. Department of Agriculture, Forest Service, National Forest System Cooperative Forestry, Forestry Research, Region 1. 17 p. [16522]

17. Kramp, Betty A.; Patton, David R.; Brady, Ward W. 1983. The effects of fire on wildlife habitat and species. RUN WILD: Wildlife/ habitat relationships. Albuerque, NM: U.S. Department of Agriculture, Forest Service, Southwestern Region, Wildlife Unit Technical Report. 29 p. [152]

18. Kuchler, A. W. 1964. Manual to accompany the map of potential vegetation of the conterminous United States. Special Publication No. 36. New York: American Geographical Society. 77 p. [1384]

19. Mech, L. David; Frenzel, L. D., Jr. 1971. The possible occurrence of the great plains wolf in

northeastern Minnesota. In: Mech, L. David; Frenzel, L. D., Jr., eds. Ecological studies of the timber wolf in northeastern Minnesota. Res. Pap. NC-52. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Forest Experiment Station: 60-62. [13891]

20. Mech, L. David; Frenzel, L. D., Jr.; Ream, Robert R.; Winship, John W. 1971. Movements, behavior, and ecology of timber wolves in northeastern Minnesota. In: Mech, L. David; Frenzel, L. D., Jr., eds. Ecological studies of the timber wolf in northeastern Minnesota. Res. Pap. NC-52. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Forest Experiment Station: 1-35. [13888]

21. Mech, L. David. 1973. Wolf numbers in the Superior National Forest of Minnesota. Res. Pap. NC-97. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Forest Experiment Station. 10 p. [13885]

22. Mech, L. David. 1974. Canis lupus. Mammalian Species. 37: 1-6. [13866]

23. Mech, L. David; Karns, Patrick D. 1977. Role of the wolf in a deer decline in the Superior National Forest. Res. Pap. NC-148. St. Paul, MN: U.S. Department of Agriculture, Forest Service,North Central Forest Experiment Station. 23 p. [13886]

24. Mech, L. David. 1982. The IUCN-SSC wolf specialist group. In: Harrington, Fred H.; Paquet, Paul C., eds. Wolves of the world: Perspectives of behavior, ecology, and conservation. Park Ridge, NJ: Noyes Publications: 327-333. [13870]

25. Meehan, William R. 1974. The forest ecosystem of southeast Alaska: 4. Wildlife habitats. Gen. Tech. Rep. PNW-16. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Forest and Range Experiment Station. 32 p. [13479]

26. Pimlott, D. H.; Shannon, J. A.; Kolenosky, G. B. 1969. The ecology of the timber wolf in Algonquin Provincial Park. Ottawa, ON: Candian Forestry Service, Department of Lands and Forests. 91 p. [13904]

27. Ream, Robert R.; Mattson, Ursula I. 1982. Wolf status in the northern Rockies. In: Harrington, Fred H.; Paquet, Paul C., eds. Wolves of the world: Perspectives of behavior, ecology, and conservation. Park Ridge, NJ: Noyes Publications: 362-381. [13871]

28. Robinson, William L.; Werner, J. Kirwin. 1975. Vertebrate animal populations of the McCormick Forest. Res. Pap. NC-118. St. Paul, MN: U.S. Department of Agriculture, Forest Service,North Central Forest Experiment Station. 25 p. [13484]

29. Scott, Barbara M. V.; Shackleton, David M. 1982. A preliminary study of the social organization of the Vancouver Island wolf. In: Harrington, Fred H.; Paquet, Paul C., eds. Wolves of the world: Perspectives of behavior, ecology, and conservation. Park Ridge, NJ: Noyes Publications: 12-24. [13869]

30. U.S. Department of the Interior, Fish and Wildlife Service. 1990. Final listing rules approved for 14 species. Endangered Species Technical Bulletin. 15(10): 11. [16592]

31. Van Ballenberghe, Victor. 1992. Conservation and management of gray wolves in the USA: status, trends, and future directions. In: McCullough, Dale R.; Barrett, Reginald H., eds. Wildlife 2001: populations. New York: Elsevier Applied Science: 1140-1149. [24226]

32. Viereck, Leslie A.; Schandelmeier, Linda A. 1980. Effects of fire in Alaska and adjacent Canada--a literature review. BLM-Alaska Tech. Rep. 6. Anchorage, AK: U.S. Department of the Interior, Bureau of Land Mangement, Alaska State Office. 124 p. [7075]

33. Voigt, Dennis R.; Kolenosky, George B.; Pimlott, Douglas H. 1976. Changes in summer foods of wolves in central Ontario. Journal of Wildlife Management. 40(4): 663-668. [13862]

34. Young, Stanley P.; Goldman, Edward A. 1944. The wolves of North America: parts I and II. New York: Dover Publishers. 636 p. [13861]

35. Zeveloff, Samuel I.; Collett, Farrell R. 1988. Mammals of the Intermountain West. Salt Lake, UT: University of Utah Press. 365 p. [13860]

36. Duffield, J. 1992. An economic analysis of wolf recovery in Yellowstone: Park visitor attitudes and values. In: Varley, J. D.; Brewster, W. G., eds. Wolves for Yellowstone? A report to the United States Congress. Vol. 4. Research and analysis. Yellowstone National Park, WY: U.S. Department of the Interior, National Park Service: pp. 2-35 to 2-87. [29422]

37. Fritts, Steven H. 1991. Wolves and wolf recovery efforts in the northwestern United States. Western Wildlands. 17(1): 2-6. [14252]

38. Washington Department of Wildlife. 1994. Species of special concern in Washington - state and federal status. Olympia, WA: Washington Department of Wildlife. 41 p. [25414]

FEIS Home