

ERMINE

Mustela erminea Linnaeus, 1758
(Mustelidae)

Ermine *Mustela erminea*:

Global rank G5 (18Nov1996)

State rank S5 (20Jun2006)

State rank reasons

Widespread distribution. Generally considered abundant with no reported declines in Alaska. Threats from trapping and habitat loss throughout most of range are minimal.

Subspecies of potential concern ranked below:

M. e. seclusa: S2S3Q (20Jun2006)

Island endemic, restricted to Suemez Island in southeastern Alaska. Population size and trends are unknown but suspected low. Moderate threats exist from high reliance on variable prey populations. A reevaluation of species taxonomy suggests this taxa is invalid and should be included under the name *haidarum*; further study needed.

M. e. celenda: S3Q (20Jun2006)

Island endemic, range restricted to Prince of Wales, Dall, and Long Islands in the southern part of the Alexander Archipelago. Population size and trends are unknown but needed for rank clarification. Moderate threats exist from high reliance on fluctuating prey populations. As with *seclusa*, a reevaluation of species taxonomy suggests this taxa is invalid and should be included under the name *haidarum*; further study needed.

Taxonomy

Twenty subspecies recognized in the New World, fewer in the Old World (King 1983). Of the seven subspecies that occur in Alaska, six are endemic to the state; *Mustela erminea arctica* occurs throughout mainland Alaska and northern Canada, *M. e. kadiacensis* only on the Kodiak archipelago, *M. e. salva* on Admiralty Island, *M. e. initis* on Chichagof and Baranof Islands, *M. e. alascensis* on the Southeast Alaska mainland and nearshore islands, and *M. e. celenda* and *M. e. seclusa* on several islands at the south end of the Alexander Archipelago (Hall 1981). Taxonomic status for many subspecies remains unclear and review based on more specimens is needed (e.g., recognition of *M. e. seclusa* as a subspecies was based on a single specimen; MacDonald and Cook 1996).



Recent studies of skull characteristics and ermine genetics suggest the existence of 3 clades (possibly 3 species) in North America, members of all of which are found in Southeast Alaska: a Beringian lineage including *M. e. salva* and *M. e. kadiacensis* distributed in Alaska, eastern Russia, Japan, and Ireland; a continental lineage including *M. e. initis* and *M. e. alascensis* occurring from Alaska and western Canada across the U.S. to Wisconsin, California and New Mexico; and an island lineage including *M. e. celenda* and *M. e. seclusa* distributed on Prince of Wales and adjacent islands in the Alexander Archipelago and Haida Gwaii (Queen Charlotte Islands), British Columbia (Eger 1990, Cook et al. 2001, Fleming and Cook 2002). Subspecies *M. e. haidarum* may be distinct enough to be reclassified as a separate species *Mustela haidarum* (previous name until 1951, Preble 1898), and under the rules of priority, would subsume both *celenda* and *seclusa* (MacDonald and Cook 2005).

See Eger (1990) for patterns of geographic skull variation in Nearctic populations.

General description

Ermine have a typical weasel form: long body, short legs, long neck supporting a triangular head, slightly protruding round ears, and long whiskers. Pelage is reddish-brown above and creamy white below in summer, completely white in winter; the tip of the tail remains black in all seasons. Males are generally 25% to 50% larger than females (King 1983, Lieb 1994); however, the sexes of ermine on Haida Gwaii (*M. e. haidarum*) are more similar in size (Foster 1965, Cowan 1989).

Length (cm) 34
Weight (g) 100-180

Diagnostic characteristics

Resembles the long-tailed weasel (*Mustela frenata*) in general appearance and coloration, but is smaller, has a shorter tail, and has white fur on the inner side of the hind legs. Least weasels (*Mustela nivalis*) are also similar in appearance to *M. erminea*, but are smaller and do not have any black on the tail (Fagerstone 1987).

Reproduction

Mates in late spring to early summer; implantation of fertilized ova delayed until early in the following spring; gestation about 4 weeks. One litter of 4-13 (average of 6) young born usually in April/May in North America (King 1983, Fagerstone 1987). Females care for young alone, lactation may continue until 7-12 weeks, although young begin to venture from the nest at 6-8 weeks. Nest is typically lined with rodent hair and is often a former burrow of a rodent, or may be in a rock pile, hollow log or crevice (Fagerstone 1987). Females sexually mature at 3-4 months, males likely at 12 months. Females may survive for at least two breeding seasons; males generally do not survive this long. Reproductive success highly dependent on food availability.

Ecology

Believed to be vole specialists, preying largely on *Microtus* voles (Simms 1979a, Fagerstone 1987). Female ermine are optimally-sized vole predators, able to pass through vole tunnels of any size (Simms 1979a). Home ranges of males are two to six times larger than females, and may overlap those of several females (Fagerstone 1987). Home ranges averaged 12-16 ha in Wisconsin (Jackson 1961). In southern Ontario, home ranges averaged 20-25 ha for males, smaller for females (Simms 1979b). Home range size varies with latitude; more southerly home ranges tend to be smaller than those in the north (Fagerstone 1987). Predators include raptors, humans and other carnivores, including larger species of weasel.

Food

Carnivore. Consumes mainly small mammals, especially voles (*Microtus* spp., *Clethrionomys* spp.) and mice (*Peromyscus* spp.; Fagerstone 1987). Shrews and rabbits may also be taken and occasionally other small vertebrates and insects. Ermine foraging strategies are particularly well-adapted to northern environments where

prolonged snow cover gives small individuals able to access under-snow tunnels a competitive advantage, and where voles are the most abundant prey species (Simms 1979a). On Kodiak Island, Alaska, resident tundra voles (*Microtus oeconomus*) provide the bulk of ermine food supply (Clark 1958), although this species has also been observed taking fish from a river (Feuer 1958).

Phenology

Ermine are active year-round. Although predominantly crepuscular and nocturnal, they may be seen any time of day (King 1983).

Habitat

Adapted to a wide variety of habitats. Prefers wooded areas with thick understory near watercourses. Rarely occurs in heavily forested regions; often occupies early-successional or forest-edge habitats, wet meadows, marshes, ditches, riparian woodlands, or river banks with high densities of small mammals and adequate subnivean foraging space (Simms 1979a, Simms 1979b, King 1983). Coastal ermine may exhibit a preference for low elevation riparian and marine shoreline and estuarine habitats (Reid et al. 2000). Well-adapted to snowy environments and range into alpine areas; they have been documented year-round living at 2,000-3,000 ft in the Sierra Nevada, California (Fagerstone 1987) and also successfully inhabit tundra habitats throughout northern Canada and Alaska.

Dens in hollow log or under log, stump, roots, brush piles, or rocks. Snow provides vital insulation against extreme air temperatures; in winter in southern Ontario, usually stay beneath snow surface (Simms 1979b). Males generally occupy a wider range of habitats than females and both males and females occupy a wider variety of habitat types during spring and summer than during fall and winter (Fagerstone 1987).

Subspecies *M. e. kadiacensis* occurs throughout the Kodiak archipelago, which is dominated by Sitka spruce coastal forests on northeast islands, grading to tundra, alder and willow habitats on the southwest island. Builds dens in fallen logs, rock piles or debris; has been observed throughout the archipelago, including areas of human habitation (Clark 1958, Feuer 1958), and is most often seen in tundra habitats (Zwiefelhofer pers. comm.).

Subspecies *M. e. seclusa* has been documented in varied habitat including old-growth and successional forest, brush, alpine meadows, marshes, and riparian areas (Hall 1951).

Global range

Circumboreal range throughout North America, Europe, and Asia, from Greenland and the Canadian and Siberian Arctic islands south to about 35°N (King 1983, Fagerstone 1987). In North America, found throughout Alaska and Canada south through most of northern U.S. to central California, northern Arizona, northern New Mexico, Iowa, the Great Lakes region, Pennsylvania, and northern Virginia (Fagerstone 1987).

State range

Occurs throughout Alaska from the mainland to islands in Southcentral and Southeast, excluding the Aleutian Islands. Recent reports of ermine occurrence on Evans Island, Prince William Sound (Lance pers. comm.) and possibly other islands of Prince William Sound are not yet verified, but taxonomic status (likely *M. e. arctica*) and genetic characteristics of specimens from these locations may be distinctive.

Six endemic subspecies are recognized in Alaska: *M. e. kadiacensis* occurs only on the Kodiak archipelago; *M. e. salva* occurs on Admiralty Island; *M. e. initis* on Chichagof and Baranof Islands; *M. e. alascensis* on the Southeast Alaska mainland and Revillagigedo, Mitkof, Zarembo, and Wrangell Islands; *M. e. celenda* occurs on Prince of Wales, Dall, and Long Islands in the southern part of the Alexander Archipelago; and *M. e. seclusa* occurs on Suemez Island (Hall 1981).

Global abundance

Populations are known to fluctuate with cyclic populations of voles, their primary food source (Fagerstone 1987). Estimates of population density range from 4 adults/km² in northern Alberta (Soper 1919) to 11 adults/km² in Ontario (Simms 1979b).

State abundance

Population size unknown but likely abundant. Populations likely fluctuate with cyclic populations of voles, their primary food source in Alaska (Fagerstone 1987).

Global trend

In Canada, fur yields have declined since the 1930s; however, this trend may simply reflect changes in fur value instead of population declines; research into short-term and long-term population trends is needed (Fagerstone 1987).

State trend

Unknown.

Global protection

Subspecies *M. e. haidarum* (Queen Charlotte Islands population) designated as Threatened by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) in 2001, based on recent apparent declines and the threat of habitat destruction caused by introduced mammals (COSEWIC 2005).

State protection

Habitat protected where species occurs in national and state parks, preserves, and national wildlife refuges. Trapping or shooting ermine in Alaska requires a permit and is regulated by the Alaska Department of Fish and Game. Pelt sealing is not required for this species.

Global threats

Threatened by unrestricted trapping and habitat loss due to timber harvest or natural disturbance (Fagerstone 1987).

Subspecies *M. e. haidarum* of the Queen Charlotte Islands, British Columbia apparently declining as a result of habitat destruction caused by introduced mammals (COSEWIC 2005).

State threats

Potential threats include increased access and unrestricted trapping by humans, habitat loss and fragmentation, interactions with introduced species, and changes in prey availability (Fagerstone 1987).

In general, mustelids are highly vulnerable to trapping, and not only to traps set specifically for them (Proulx 2000). Compared to other furbearers, ermine may be less threatened by habitat change from timber harvest or fire disturbances due to their preference for early-successional stage communities and aversion to dense forest. However, clear-cut logging may be a threat to this species in Alaska, especially in unproductive, mid-successional regrowth forests which may be favored habitat (MacDonald and Cook 2005).

The restricted range of many Alaska subspecies increases vulnerabilities associated with all island endemics, such as susceptibility to disease, local habitat disturbance, extreme weather events, and changes in prey populations. The loss of genetic integrity and transmission of parasites and pathogens (such as canine distemper) from introduced or native stocks of other carnivores is also of concern.

Global research needs

Research into ermine coexistence with least weasels and long-tailed weasels is needed, with special attention given to habitat and prey selection, as well as a comparison of possible threats and examination of declines in these three species. Continued study of morphology and genetics is needed to clarify subspecific taxonomic status, and to identify evolutionarily significant populations requiring special conservation.

State research needs

Continued study of morphology and genetics needed to clarify subspecific taxonomic status (especially for populations in Prince William Sound and the Alexander Archipelago), and to identify evolutionarily significant populations requiring special conservation. Research needed on population dynamics in relation to prey populations. Methods for estimating population size should be studied and improved.

Global inventory needs

Population surveys are needed to determine distribution and abundance.

State inventory needs

Long-term monitoring of population dynamics and ecology is needed. Inventory of islands adjacent to known populations is needed to better determine distribution and population size, in combination with continued morphological and genetic studies to clarify taxonomic status of subspecies. Pelt sealing requirements could provide information about levels of trapping harvest and trends in abundance for this species.

Global conservation and management needs

Forest management for creation of habitat mosaics of early, mid- and late-successional stages interspersed with openings and riparian habitat would benefit ermine as well as other mustelids (Proulx 2000).

State conservation and management needs

Forest management for creation of habitat mosaics of early, mid- and late-successional stages interspersed with openings and riparian habitat would benefit ermine as well as other mustelids (Proulx 2000). Required pelt sealing for this species, especially for island populations, could aid monitoring of trapping harvest. Harvest data should be interpreted in terms of catch per unit effort (CPUE) in order to make temporal and spatial comparisons and determine population trends (Proulx 2000).

LITERATURE CITED

- Clark, W.K. 1958. The land mammals of the Kodiak Islands. *Journal of Mammalogy* 39:574-577.
- Committee on the Status of Endangered Wildlife in Canada (COSEWIC). 2005. Species Database: Ermine *haidarum* subspecies. Available online at: http://www.cosewic.gc.ca/eng/sct5/index_e.cf.m. Accessed 12Aug2005.
- Cook, J.A., A.L. Bidlack, C.J. Conroy, J.R. Demboski, M.A. Fleming, A.M. Runck, K.D. Stone, and S.O. MacDonald. 2001. A phylogeographic perspective on endemism in the Alexander Archipelago of southeast Alaska. *Biological Conservation* 97:215-227.
- Cowan, I. McT. 1989. Birds and mammals on the Queen Charlotte Islands. Pp. 175-186 in: Scudder, G.G.E. and N. Gessler (Eds.). *The outer shores*. Queen Charlotte Islands Press, Skidegate, B.C.
- Eger, J.L. 1990. Patterns of geographic variation in the skull of Nearctic ermine (*Mustela erminea*). *Can. J. Zool.* 67:1241-1249.
- Fagerstone, K.A. 1987. Black-footed ferret, long-tailed weasel, short-tailed weasel, and least weasel. Pp. 548-573 in: Novak, M., J.A. Baker, M.E. Obbard, and B. Malloch (Eds.). *Wild furbearer management and conservation in North America*. Ontario Ministry of Natural Resources, Ottawa, ONT. 1150 pp.
- Feuer, R.C. 1958. Mammals collected in the Karluk Lake Region, Kodiak Island, Alaska. *Murrelet* 39:37-39.

- Fleming, M.A. and J.A. Cook. 2002. Phylogeography of endemic ermine (*Mustela erminea*) in southeast Alaska. *Molecular Ecology* 11:795-807.
- Foster, J.B. 1965. The evolution of the mammals of the Queen Charlotte Islands. *Occasional Papers British Columbia Provincial Museum* 14:1-30.
- Hall, E.R. 1951. American weasels. Univ. Kansas Publications, Museum of Natural History. 466 pp.
- Hall, E.R. 1981. *The Mammals of North America*, Vols. I & II. John Wiley & Sons, New York, NY. 1181 pp.
- Jackson, H.H. 1961. *Mammals of Wisconsin*. University of Wisconsin Press, Madison, WI. 504 pp.
- King, C.M. 1983. *Mustela erminea*. *Am. Soc. Mamm., Mammalian Species No.* 195. 8 pp.
- Lance, E. 2005. Personal communication via email between Ellen Lance, USFWS, and Jodi McClory, Alaska Natural Heritage Program, regarding ermine observations in Prince William Sound, AK, 12Sep2005.
- Lieb, J. 1994. *Weasels: Wildlife Notebook Series*. Alaska Department of Fish and Game.
- MacDonald, S.O. and J.A. Cook. 1996. The land mammal fauna of southeast Alaska. *The Canadian Field-Naturalist* 110:571-598.
- MacDonald, S.O. and J.A. Cook. 2005. Proposed additions to the U.S. Forest Service, Alaska Region, Sensitive Species List. *Museum of Southwestern Biology, University of New Mexico, Albuquerque, NM*.
- NatureServe. 2006. *NatureServe Explorer: An online encyclopedia of life* [web application]. Version 4.7. NatureServe, Arlington, Virginia. Available <http://www.natureserve.org/explorer>. Accessed: 22Jun2006.
- Preble, E.A. 1898. Description of a new weasel from the Queen Charlotte Islands, B.C. *Proc. Biol. Soc. Wash.* 12:169-170.
- Proulx, G. 2000. The impact of human activities on North American mustelids. Pp. 53-75 in: Griffiths, H.I. (Ed.). *Mustelids in a modern world: management and conservation aspects of small carnivore: human interactions*. Backhuys Publishers, Leiden, The Netherlands.
- Reid, D.G., L. Waterhouse, P.E.F. Buck, A.E. Derocher, R. Bettner, and C.D. French. 2000. Inventory of the Queen Charlotte Islands ermine. In: Darling, L.M. (Ed.). *Proceedings of a conference on the biology and management of species and habitats at risk, Kamloops, B.C., 15-19 Feb. 1999*. Volume One. B.C. Ministry of Environment, Lands and Parks, Victoria, B.C. and University College of the Cariboo, Kamloops, B.C. 490 pp.
- Simms, D.A. 1979a. North American weasels: resource utilization and distribution. *Can. J. Zool.* 57:504-520.
- Simms, D.A. 1979b. Studies of an ermine population in southern Ontario. *Can. J. Zool.* 57:824-832.
- Soper, J.D. 1919. Notes on Canadian weasels. *Canadian Field-Naturalist* 33:43-47.
- Zwiefelhofer, D.C. 2002. Personal communication between Denny Zwiefelhofer, U.S. Fish and Wildlife Service, Kodiak National Wildlife Refuge, Kodiak, AK, and staff of the Alaska Natural Heritage Program, Anchorage, AK.

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