

# Decline in Endangered Species as an Indication of Anthropogenic Pressures: The Case of European Mink *Mustela lutreola* Western Population

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**ABSTRACT** / Populations of threatened species, especially predators at the top of the food chain, may be affected by anthropic pressures. The endangered western population of European mink *Mustela lutreola* has shown a large decline over 50% of its natural range. *M. lutreola* disappeared from northwestern France between 1984 and 1997, and the decline was associated with an increase in mustelid trapping, changes in watercourse quality, and habitat modifications due to agricultural practices. The pattern of decline showed a frag-

mentation restricting the minks into very small areas. Trapping was the first known cause of mortality. Although feral American mink *Mustela vison* may compete with autochthonous carnivores, *M. lutreola* had disappeared from streams before the introduction of the American species, suggesting that competitive interactions were not responsible. Furthermore, American mink has never been found or has remained rare in 62.4% of the area from which *M. lutreola* has disappeared. During the past 25 years, permanent grassland surfaces were reduced by 40%, whereas fodder culture increased by 470%, causing considerable habitat changes. Furthermore, 55.7% of water courses were classified as being of bad quality or polluted. Therefore, our data suggests that a conjunction of intensive trapping, alterations in water quality and habitat modification was critical for the European mink's decline. Although there are difficulties in ascribing specific cause to distribution changes in a top predator, this decline can be regarded as an indication for anthropic pressures on natural habitats.

No one can predict how the extinction of a single species will affect natural ecosystems, but the decline of a species could be regarded as a possible indicator of habitat degradation. During the past decades, modifications of agricultural practices have considerably changed the landscape in Europe. The bioaccumulation of toxicants in trophic webs could have a considerable impact on animal communities (Primack 1993), but habitat changes could also affect wildlife by fragmenting populations and by reducing available habitats (Frankel and Soulé 1981). The search for bioindicators allowing the assessment of the effects of these pressures constitutes a real challenge for environmental preservation. Because of their high sensitivity, some species can be regarded as good bioindicators. This is especially the case of top predators acting as keystone species in freshwater ecosystems according with Paines's original definition (Paines 1969). Thus, mustelids, such as otters or minks, were both at the top of the food

chain and required precise habitat qualities. Furthermore, only with difficulty these territorial mustelids could avoid bad environmental conditions.

Populations of European mink, *Mustela lutreola* L. 1761 (Carnivora, Mammalia), have suffered a decline all over Europe (Youngman 1982). The species has been extinct in central Europe since the beginning of the century (last data from Germany 1948; Saint-Girons 1991; from Hungary 1952; Szunyoghy 1974) and the minks' range is actually fragmented into two population units: an eastern population unit ranging from the Urals and Estonia to the Black Sea (Maran and Henttonen 1995), a population that is already subdivided into small units, and a western population (Youngman 1982, Saint-Girons 1991). Observed since 1820 in the Poitou region (Didier and Rode 1935), the European mink's western population was actually restricted to the Atlantic seaboard (from Brittany to the Pyrénées) until 1984 (Bree and Saint-Girons 1966, Youngman 1982, Saint-Girons 1991), although some individuals were mentioned for the first time in northern Spain in 1951 (Ondarra 1955). Since then, the species has disappeared from the northern half of its range (Maizeret and others 1998). In Brittany, the last known mink were

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