

SAINT LAWRENCE ISLAND SHREW

Sorex jacksoni Hall and Gilmore, 1932
(Soricidae)

Global rank G4 (reviewed 19Apr2006)

State rank S4 (14Nov2008)

State rank reasons

Distribution confined to St. Lawrence Island. Abundance is suspected to be high (> 10,000 animals); population trend is unknown. Due to restricted distribution, species is susceptible to localized perturbations; overall threats are minimal. Information is needed on total population size and trends, habitat preferences, reproductive capacity, and mortality factors. No protection needs are apparent at this time.

Taxonomy

Sorex jacksoni has been regarded as a subspecies of *S. tundrensis* and *S. cinereus*. Van Zyll de Jong (1982) regarded *S. jacksoni* as comprising 4 subspecies: *ugyunak* (Nearctic tundra), *portenkoi* (Siberian mainland tundra), *jacksoni* (St. Lawrence Island), and *leucogaster* (Paramushir Island in Kuril Islands off Siberia). Van Zyll de Jong (1983) recognized *ugyunak* as distinct at the species level. Jones et al. (1986) suggested that *jacksoni* and *ugyunak* may prove to be conspecific. Van Zyll de Jong (1991) regarded *S. jacksoni*, *S. leucogaster*, *S. portenkoi*, and *S. ugyunak* as distinct species, as did Hutterer (Wilson and Reeder 1993). Jones et al. (1992) treated *ugyunak* as distinct from *jacksoni*. Rausch and Rausch (1995) examined karyotypic and morphological characteristics of shrews on St. Lawrence Island and the Alaskan mainland and found no significant differences; they concluded that *S. jacksoni* should be regarded as a subspecies of *S. cinereus*. Van Zyll de Jong (Wilson and Ruff 1999) recognized *S. jacksoni* as a species. A study of mtDNA variation by Demboski and Cook (2003) found that *S. jacksoni* and *S. cinereus* are not sister species. The North American mammal checklist by Baker et al. (2003) cited Demboski and Cook (2003) in regarding *S. jacksoni* as a valid species.



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Demboski and Cook (2003) used DNA sequence data to examine phylogenetic relationships among 8 members of the *Sorex cinereus* group (*S. camtschatica*, *S. cinereus*, *S. haydeni*, *S. jacksoni*, *S. portenkoi*, *S. preblei*, *S. pribilofensis*, and *S. ugyunak*) and *S. longirostris*. Phylogenetic analyses recovered two major clades within the species group: a northern clade that includes the Beringian species (*S. camtschatica*, *S. jacksoni*, *S. portenkoi*, *S. pribilofensis*, and *S. ugyunak*), *S. haydeni*, and *S. preblei* and a southern clade that includes *S. cinereus* and *S. longirostris*. Mitochondrial DNA clades generally corresponded to previously identified morphological groups with two exceptions: inclusion of *S. longirostris* with *S. cinereus* in the southern clade and inclusion of *S. preblei* within the northern clade.

See George (1988) for an electrophoretic study of systematic relationships among *Sorex* species.

General description

Summer pelage is tricolor with a "clove brown" dorsal stripe; the sides are "wood brown and avellaneous;" the underparts are "smoke gray;" the tail is bicolor, clove brown above and light buff below; the feet are white with a pinkish tinge (Hall and Gilmore 1932). Body length 60 mm (range 54-68); tail length 34 mm (32-37); hind foot 12 mm (12-13) (Hoffmann and Peterson 1967).

Diagnostic characteristics

This is the only shrew on St. Lawrence Island. Jackson (1928) morphologically distinguished *S. jacksoni* from *S. hydrodromous* (*pribilofensis*) by the former having a maxillary breadth of more than 4.6 mm. See Carraway (1995) for a key to

western North American soricids based primarily on dentaries.

Length (mm) 60

Reproduction

The reproductive potential of the shrews is unknown. Other similar sized amphiberian shrews produce litters of up to 10 young and may have two to three litters per year (van Zyll de Jong 1983).

Ecology

This shrew is the only insectivorous mammal on the island and is the principal predator of leaf litter fauna (West 1991). Also feeds on carrion, and likely preys on avian and mammalian nestlings. Preyed on by arctic fox (*Alopex lagopus*), cats, dogs, gulls, jaegers, and raptors, although shrews caught by cats and dogs are often not consumed (Fay and Cade 1959, Stephenson 1970, Fay and Sease 1985). Their dietary value to avian predators is unknown. Voles (*Clethrionomys rutilus albiventer* and *Microtus oeconomus inuitus*), ground squirrels (*Spermophilus parryi lyratus*), and lemmings (*Dicrostonyx groenlandicus exsul*) are likely to compete for food and space (Hall and Gilmore 1932).

Migration

Non-migratory. Within-island dispersal patterns unknown but suspected to be local.

Food

Eats insects, occasionally nesting rodents. Like most shrews, this species is likely to be an opportunistic feeder (West 1991). Fay and Sease (1985) noted that the shrews mainly inhabited tundra sites where terrestrial invertebrates were most likely to dominate their diet. In winter, may invade houses to feed on dried and frozen meats (Fay and Sease 1985).

Habitat

Bogs/wet tundra, alpine/fell-fields, and mesic tundra (Young 1971, Fay and Sease 1985). When preferred habitat is scarce, may be restricted to fell-field habitats and boulder scree, particularly near auklet nesting colonies (Hall and Gilmore 1932, Fay 1973, Fay and Sease 1985). Have also been found in old village sites where voles and insects were numerous (Murie 1936). In addition to feeding on insects, shrews

occasionally prey on nestling rodents (Eadie 1944); this is a possible reason for their preference for these areas (West 1991).

Global and state range

Under the current taxonomic arrangement, *S. jacksoni* is confined to St. Lawrence Island, Alaska (4,500 sq. km). The local distribution has not been described.

Global and state abundance

Unknown, but suspected to be high ($\geq 10,000$ individuals). Rausch (1953) found the species to be uncommon from 1950 to 1952. Fay (1973) and Fay and Sease (1985) reported shrew numbers to be highly variable during a period from 1952 to 1972, and that these fluctuations did not appear to be cyclic. No estimates of total population size have been made. Buckner (1966) estimated densities of *Sorex cinereus* to vary between 2 and 30 shrews per ha. Using the minimal value as a conservative estimate of shrew density on St. Lawrence Island (450,000 ha), the total estimated population would readily exceed 10,000 individuals.

Global and state trend

The population is presumed to be at undisturbed levels, although it apparently fluctuates substantially (West 1991, ADFG 2005). The population is believed to be extant since St. Lawrence became an island approximately 10,000 years ago (Hopkins 1967).

Global and state protection

No specific protection measures are in place for *S. jacksoni*. St. Lawrence Island is owned by Gambell and Savoonga Native Corporations. ADFG regulations regarding the taking of shrews as "unclassified game" require a hunting license, but there is no closed season or bag limit (NatureServe 2006).

Global and state threats

The distribution of *S. jacksoni* is naturally restricted and the population is small, therefore the species is vulnerable to localized perturbations. Habitat is largely intact, but human activities and climatic warming are of potential concern (ADFG 2005). Of the island's 4,500 sq. km, only about 0.2% has been developed. This

includes the villages of Gambell and Savoonga (combined population of about 1,000), and an airstrip and associated buildings. These facilities have had little impact, if any, on suitable shrew habitat, having been built on bare gravel. Fay and Sease (1985) suggested that the addition of organic matter and general disturbance may have had a slightly positive impact in creating some additional suitable shrew habitat. Greater than 80% of the land-based human activities are confined to the villages and areas within two miles of each village. Shrews are not harvested, but some may be trapped as pests when they invade homes and food caches during the winter to feed on stored meat. Although the effects of climate change on this species' habitat are unknown, these shrews are a relict, cold-adapted species that could be compromised by a warmer climate. There is additional possible threat from feral or introduced predators or competitors (ADFG 2005).

Global and state research needs

Research needed on taxonomic distinctness of this species (ADFG 2005). Factors affecting population size and distribution, including reproductive capacity and mortality factors, are unknown. More precise within-island distribution studies are needed to assess habitat use and preferences. Research also needed to evaluate interspecific interactions.

Global and state inventory needs

The population is currently not monitored. Population densities for many other small mammals are cyclical and/or eruptive; the extent of habitat used is greater when population densities are high, therefore, short-term estimations of density and extent of habitat use are not effective (ADFG 2005). Long-term monitoring at index locations is needed to accurately estimate population size, identify trends, and assess long-term viability.

Global and state conservation and management needs

Collect and archive material for genetic analyses to assess taxonomic distinctiveness and develop a fine scale delineation of this species' geographic distribution. Fay and Sease (1985) conducted a survey of the known taxonomic

and ecological status of the species through October 1985. They concluded that there was no need for management measures at that time. More recent data will aid in determining the current status of the *S. jacksoni* population.

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E.W.; updated by T.A.

Gotthardt and S. Schoen, Alaska Natural Heritage Program, Environment and Natural Resources Institute, University of Alaska Anchorage, Anchorage, AK,
<http://aknhp.uaa.alaska.edu>.

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