Santa Catalina Island shrew, *Sorex ornatus willetti*

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Description: A moderately large (104-108 mm TL), dark brown shrew with a relatively long (41-43 mm), bicolored tail; pale smoke-gray ventrum; long skull and rostrum; and relatively narrow braincase (von Bloeker 1941, Collins and Martin 1985). Distinguished from sympatric *S. ornatus* of other subspecies by its slightly larger size, longer and slightly broader skull, and darker pelage (von Bloeker 1941, 1967).

Taxonomic Remarks: Von Bloeker (1941) first described the Santa Catalina Island shrew as *S. willetti*, and later relegated it to a subspecies of *S. ornatus* (von Bloeker 1967). Preliminary results from a taxonomic review of the species group indicate that *S. o. willetti* has been isolated on the order of 10,000 years, and that it is most closely related to populations in the southern part of the species' range (J. Maldonado pers. comm.).

Distribution: Santa Catalina Island shrews are known only from Santa Catalina Island (Williams 1983, Collins and Martin 1985). Based on the four specimen and four observational records, it appears to be widely distributed on the island. Single shrews were collected from Avalon Canyon on April 25, 1941 (von Bloeker 1941), from lower Cottonwood Creek 100 meters below Cottonwood Dam on January 13, 1983 (Williams 1983), from the south side of Cherry Valley Cove on March 16, 1991 (J. Maldonado pers. comm.), and from the Hancock Marine Research Station at Isthmus Cove (SBMNH-von Bloeker collection). Additional sightings of shrews are known from Middle Ranch Canyon below Thompson Dam (Williams 1983), the Bunk House at Middle Ranch, and the west end road 0.2 mi (322 m) west of the Isthmus Dump (Collins and Martin 1985). The most recent record is from Middle Canyon adjacent to the road to Ben Weston Beach on April 24, 1993 in (J. Maldonado pers. comm.). Based on these few records, the known elevational range extends from near sea level to approximately 600 ft.

Small mammal surveys of the larger islands off the coast of southern California over the past 25 years using both pitfall and live-trapping methods have failed to yield ornate shrews (Collins and Martin 1985), although the species potentially occurs there (von Bloeker 1967).

Ornate shrews were a member of the San Miguel fauna for at least 9,000 years, and may have become extinct recently (Guthrie 1993). A *Sorex* cranium was recovered in rock fissure (Walker 1980) and *Sorex ornatus* bones were recovered from column samples taken on the island (at Daisey Cave) (Guthrie 1993). Based on these skeletal materials, the ornate shrews on San Miguel Island were, like *S. o. willetti*, larger than mainland ornate shrew populations (Walker 1980, Guthrie 1993).

Life History: Little is known about the life history of the Santa Catalina Island shrew, but it is expected to be similar to that recorded for ornate shrews found on the adjacent mainland. Breeding probably occurs from late February through early June with a minor secondary breeding peak in mid-to-late September (Collins and Martin 1985). The low capture rates of intensive trapping surveys (Williams 1983, Collins and Martin 1985, J. Maldonado pers. comm.) suggests that it occurs in much lower densities than ornate shrews on the mainland (Collins and Martin 1985). Much of the potential shrew habitat on Santa Catalina Island is marginal (Williams 1983), partly or wholly because the woodland, riparian and wetland habitats have been severely degraded by more than a century of grazing by feral non-native herbivores (Collins and Martin 1985). Predation by feral cats (*Felis silvestris*), island foxes (*Urocyon littoralis*), and feral pigs (*Sus scrofa*) may also be having an adverse affect on remaining small, isolated extant populations (Collins and Martin 1985).

Habitat: The few recent captures of *S. o. willetti* occurred in riparian habitat with an overstory of cottonwood (*Populus*), willow (*Salix*), and elderberry (*Sambucus*), with a dense herbaceous understory (e.g., bulrush [*Scirpus* sp.], sedges, [*Carex* sp.] cattails [*Typha* sp.], horsetail [*Equisetum* sp.], grasses), and tangles of plant debris and tree roots, and in proximity to flowing water (Williams 1983, J. Maldonado pers. comm.). The earlier records lack detailed habitat descriptions beyond saying that shrews were in mesic habitats in major drainages on Santa Catalina Island. The available evidence indicates that this species has similar habitat requirements as ornate shrews on mainland California, namely mesic habitats with low, dense vegetation, heavy leaf litter, and soils with rich duff layers (Collins and Martin 1985). Such habitat provides cover for foraging and nesting, and protection from predators. The leaf litter and duff hold soil moisture during the dry season and provide a year-round supply of invertebrates for food (Collins and Martin 1985).

Ornate shrews on the mainland also occur seasonally or year-round in low numbers in upland woodlands such as chaparral and coastal sage scrub (Owen and Hoffman 1983, Collins and Martin 1985). It is unknown whether Santa Catalina Island shrews occur in upland chaparral, grassland, oak woodland or coastal sage scrub habitats, or in brackish and saline marshes near sea level.

Status: Class II. The Santa Catalina Island shrew is rare and locally distributed on Santa Catalina Island. Surveys in the 1980s totaling 6780 trap-nights of effort have yielded a single Santa Catalina Island shrew (Williams 1983, Collins and Martin 1985). In 1993, two shrews were captured after 350 trap-nights of effort using Sherman live-traps (J. Maldonado pers. comm.). However, additional information is needed to determine if listing as Threatened or Endangered is appropriate. The species was probably not abundant in pristine conditions due to the arid climate and restricted well developed mesic woodland habitats (Williams 1983). However, a century of grazing by a variety of introduced ungulates sheep, cattle, feral goats and wild pigs has rendered the historical riparian and wetland habitats habitat marginal for shrews.

The most important factor in the decline of this species is the fragmentation, loss and general degradation of mesic woodland, riparian and marsh habitats from more than a century of grazing by feral ungulates, and from the diversion of water for urban and agricultural uses (Williams 1983, Collins and Martin 1985). Additional factors are loss of surface water resources from groundwater pumping and water diversions and predation from feral cats (Collins and Martin 1985).

Feral herbivores directly threaten this taxon by reducing the extent of suitable mesic woodland and marsh habitat, disrupting the understory mulch and detritus layer, compacting soils, and increasing the rate of erosion (Collins and Martin 1985). These factors combine to result in a drier microclimate in remaining pockets of mesic woodland and marsh habitats that under normal pre-grazing conditions, would probably have been able to support this taxon.

Most of Santa Catalina Island is owned and managed by the Santa Catalina Island Conservancy with the primary objective to preserve and protect the island's native biota. The Conservancy also benefits from the sale of bison and from commercial hunting of wild pigs, goats, and deer. However, continuing to maintain free-roaming, feral herbivores on the island is a major threat to the island's native biota and is a source of irreconcilable conflict of management objectives (Williams 1986). Feral pigs (*Sus scrofa*) are causing the most damage to the heavy leaf litter and duff overlaying soils of wetland and streamside communities, and woodlands (Collins and Martin 1985). Although the Conservancy has been conducting feral herbivore control efforts for more than two decades, they have not been able to completely eradicate feral pigs or goats from the island. Until the Conservancy is able to eliminate these feral herbivores from Santa Catalina, mesic habitats critical to the long-term survival of Santa Catalina Island shrews will continue to be degraded.

Management Recommendations: The highest priority is to protect wetland and riparian communities on Santa Catalina Island from feral animal grazing, wild pig rooting, and groundwater pumping, especially along Middle and Cottonwood Creeks. The primary management objective for the island should be to remove or otherwise control the impact of feral herbivores and introduced plants. The land steward [Catalina Conservancy] and the Department can work together to achieve this objective by eradicating introduced game animals (i.e., wild pig and mule deer) and continuing to reduce the bison herd. If a small herd of bison is maintained on the island, it should be fenced out of sensitive riparian and wetland habitats. The full impact of present and future water diversion and drawdown projects on riparian habitats should be studied and mitigated by the Southern California Edison Company, which owns the water rights on Santa Catalina Island, in consultation with the Department. The California Coastal Commission and the Los Angeles County Planning Commission should require that any future developments proposed for Santa Catalina Island carefully evaluate their potential for impacting wetland and riparian habitats critical for the Santa Catalina Island shrew. Informed management planning will require a better understanding of the species' distribution, the extent of remaining habitat, population status, habitat associations, abundance, reproductive biology, food habits, and factors affecting mortality.


Terrestrial Mammal Species of Special Concern in California, Brylski et al. 1998
SANTA CATALINA ISLAND SHREW
Sorex ornatus willetti
SAN LUIS OBISPO
KERN
SANTA BARBARA
SAN BERNARDINO
VENTURA
LOS ANGELES
San Miguel Island
Santa Cruz Island
Anacapa Island
Santa Rosa Island
ORANGE
RIVERSIDE
Santa Barbara Island
Santa Catalina Island
San Nicolas Island
SAN DIEGO
San Clemente Island
1,800,000
RESOURCES AGENCY
CALIFORNIA
DEPARTMENT
FISH & GAME
• Locations verified by authors
(captures, observations, museum records)
■ CNDDB 1979 - 1998
Wildlife Branch:KFien12109