DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

RIN 1018–AG09

Endangered and Threatened Wildlife and Plants; Proposed Endangered Status for Three Plants From the Mariana Islands and Guam

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Proposed rule.

SUMMARY: We, the U.S. Fish and Wildlife Service (Service), propose endangered status pursuant to the Endangered Species Act of 1973, as amended (Act), for three plants (no common names): *Nesogenes rotensis, Osmoxylon mariannense,* and *Tabernaemontana rotensis. Nesogenes rotensis* and *O. mariannense* are found only on the island of Rota in the U.S. Commonwealth of the Northern Mariana Islands (CNMI). *Tabernaemontana rotensis* occurs on both Rota and the United States Territory of Guam. The three plant species and their habitats have been affected or are now threatened by one or more of the following: habitat degradation or destruction by feral deer and pigs; competition for space, light, water, and nutrients with introduced vegetation; road construction and maintenance activities; recreational activities; natural disasters or random environmental events; fire; vandalism; development of agricultural homesteads; resorts and golf courses; limited reproductive vigor; and potential insect, mouse, or rat predation. This proposal, if made final, would implement the Federal protection and recovery provisions of the Act.

DATES: Comments from all interested parties must be received by July 31, 2000. Public hearing requests must be received by July 17, 2000.

ADDRESSES: If you wish to comment, you may submit your comments and materials concerning this proposal by any one of several methods.

(1) You may submit written comments to the Field Supervisor, U.S. Fish and Wildlife Service, Pacific Islands Office, 300 Ala Moana Boulevard, Room 3–122, P.O. Box 50088, Honolulu, Hawaii 96850;

(2) You may send comments by e-mail to 3mplants__pr@fws.gov (see **SUPPLEMENTARY INFORMATION** for file formats and other information about electronic filing); or

(3) You may hand-deliver comments to our Pacific Islands Office, 300 Ala Moana Boulevard, Room 3–122, Honolulu, Hawaii 96850.

Comments and materials received, as well as supporting documentation used in the preparation of this proposed rule, will be available for public inspection, by appointment, during normal business hours at the above address.

FOR FURTHER INFORMATION CONTACT: Paul Henson, Field Supervisor, at the above address (telephone 808–541–3441; facsimile 808–541–3470).

SUPPLEMENTARY INFORMATION:

Background

Nesogenes rotensis, Osmoxylon mariannense, and *Tabernaemontana rotensis* occur on the island of Rota in the United States Commonwealth of Northern Mariana Islands (CNMI). *Tabernaemontana rotensis* also occurs in the United States Territory of Guam.

The island of Rota (lat. 14 degrees 01 minutes, long. 145 degrees) is located approximately 134 kilometers (km) (80 miles (mi)) northwest of the Territory of Guam. In general, the islands are raised limestone terraces on extinct volcanic peaks and slopes, with limited areas of volcanic soils protruding through limestone. Rota, 86 square kilometers (sq km) (33 square miles (sq mi)), is significantly smaller in area than Guam, which is approximately 500 sq km (200 sq mi), although both islands have similar maximum elevation of 490 meters (m) (1,612 feet (ft)) and 406 m (1,167 ft) above sea level, respectively.

The climate on Rota and Guam is tropical marine with high humidity and uniform temperatures throughout the year. Average daytime temperatures are approximately 26.4° Celsius (80° Fahrenheit) with approximately 200 centimeters (cm) (80 inches (in)) of rainfall and about 80 percent humidity. Rainfall averages 26.8 cm (10.7 in) per month during the wet season and 9.5 cm (3.8 in) per month during the dry season (Resources Northwest 1997). The dry season generally occurs from January to June, and trade winds of 24 to 40 km (15 to 25 mi) per hour from the east and northeast are common. The trade winds degenerate during the rainy season, which generally occurs from July to December. During this period, westward moving storms develop along and above the equator in an area known as the Intertropical Convergence Zone. These storms occasionally reach typhoon strength and can cause extensive damage to crops, homes, community infrastructure, and island forests (Resources Northwest 1997).

The vegetation of Rota and Guam falls into four general classes: forest, secondary vegetation, agroforest, and nonforest areas (Falanruw *et al.* 1989). The forest class includes five primary types: native limestone forest, introduced trees, mangrove (*Rhizophora* spp.) forest, ironwood (*Casuarina* sp.) forest, and atoll forest (Falanruw *et al.* 1989). Historically, native limestone forest varied from semidry forest to more or less dry-season deciduous forests on the lower terraces to wet cloud forest on the highest terraces. *Osmoxylon mariannense* occurs in the cloud forest on the highest terrace, or sabana, of Rota. *Tabernaemontana rotensis* occurs in or on the edges of the drier semideciduous limestone forests. *Nesogenes rotensis* occurs along the lowest terrace or coastal plain in strand vegetation on open limestone sea cliffs. Much of the original native forests on Rota and Guam was cleared for agriculture and timber harvest or by military activities, including bombing during World War II (Fosberg 1960). However, both Rota and Guam have extensive secondary native forests of medium stature that have regrown since the peak disturbance period associated with Japanese and American occupation of the islands during World War II. These forests, however, have subsequently been degraded by agricultural practices, logging, and development (Fosberg 1960).

These three plant species occur on private land, land owned by the CNMI (public park area), and Federal land (Andersen Air Force Base).

Discussion of the Three Plant Species

Nesogenes Rotensis

The type collection of *Nesogenes rotensis*, collected on April 23, 1982, by Derral Herbst and Marjorie Falanruw, was from Haaniya Point (Pona Point Fishing Cliff), Palie area, on the island of Rota, growing on exposed, dry raised limestone, at 100 m (328 ft) elevation (Fosberg and Herbst 1983). It was growing in association with *Scaevola sericea* (nanaso), *Terminalia samoensis* (talisai ganu), *Hedyotis strigulosa* (paodedo), *Pogonatherum paniceum,* and *Bikkia tetrandra* (gausali). Fosberg and Herbst (1983) formally described and published the name *Nesogenes rotensis* and placed it in the family Chloanthaceae, a largely Australian family. This placement was a change from the historic placement of the genus in the family Verbenaceae and its subsequent placement in its own family, Nesogenaceae. Presently, Mabberly (1990) recognizes *Nesogenes* as a genus of Verbenaceae, but states that it may simply be a matter of preference as to how to treat the genus *Nesogenes*.

Nesogenes rotensis is an herbaceous plant with small, opposite, broadly lanceolate, coarsely toothed leaves. Flowers are axillary and tubular, with five white petals; often a flowering branch grows upright, which might aid in pollination or seed dispersal (Raulerson and Rinehart 1997). Each plant typically branches near the base at about five to seven nodes, and is subprostrate to ascending, scrambling over appressed shrubs, with whole plants up to almost 1 m (3 ft) in diameter (Fosberg and Herbst 1983).

One population of fewer than 100 plants was reported in 1982 by Derral Herbst at the Pona Point Fishing Cliff, public park land owned by the CNMI (under jurisdiction of the CNMI Department of Land and Natural Resources (DLNR)) and the site of the only known population (Loyal Mehrhoff, Service, pers. comm. 1993). In 1994, Raulerson and Rinehart (1997) reported a population of about 20 plants, occupying 200 sq m (240 sq yards (yd)) of habitat, at the Pona Point Fishing Cliff. Apparently, this was the same population as was reported by Herbst in 1983; Herbst was uncertain of the original location when he made the herbarium sheet (D. Herbst, Bishop Museum, pers. comm. 1997).

Based on information from collections, *Nesogenes rotensis* flowered April 23, 1982 (Herbst and Falanruw 6739), and was fruiting and flowering in November 1994 (Raulerson 26222). In January (Dan Grout, Service, pers. comm. 1997) and February 1997 (Christa Russell, Service, *in litt.* 1997), no plants were found at this site. In January 1998, approximately 30 plants were observed in seed, but not in flower (Guy Hughes, Service, pers. comm. 1998). There were several volunteer seedlings near the larger plants, and the entire population was scattered over an area of approximately 200 sq m (240 sq yd). Many of the larger individuals were senescent, with many dried branches and only a few green leaves on one or a few of the branches. The dried branches were lined with cuplike structures that contained seeds. All the available information and recent observations suggest that these plants are perennials, but their above-ground parts die back annually.

The only known population of this species occurs in an area that has increasingly been overutilized by people. Because of activities, such as collecting, trampling by fishermen and tourists, or expansion of the park's facilities, human activities has become the primary threat to the species. The nonnative *Casuarina equisetifolia* (ironwood) is presently colonizing the Pona Point Fishing Cliff area and also represents a major threat to *N. rotensis*. *Casuarina equisetifolia* is a large, fast-growing tree that reaches up to 20 m (65 ft) in height (Wagner *et al.* 1990). It forms monotypic stands, shades out other plants, takes up much of the available nutrients, and possibly releases a chemical agent that prevents other plants from growing beneath it (Neal 1965, Smith 1985). In addition, given the limited distribution of *N. rotensis*, random environmental events, such as typhoons, storm surges, and high surf, also threaten the one remaining population.

Osmoxylon Mariannense

Osmoxylon mariannense was first collected on Rota by French naturalist Alfred Marche, an active botanical explorer in the Mariana Islands from 1887–1889 (Stone 1970). It was not until 1933, when a study of Marche's collection was made, that Kanehira first described the species as *Boerlagiodendron mariannense* (Kanehira 1933). In 1980, Fosberg and Sachet (1980) published the currently accepted recombination, *Osmoxylon mariannense,* which has been upheld by Raulerson and Rinehart (1991). *Osmoxylon mariannense,* endemic to Rota, is a spindly, soft-wooded tree in the Ginseng family (Araliaceae), which can reach 10 m (33 ft) in height. It has several ascending, gray-barked branches that bear conspicuous leaf scars. Leaves vary in size; mature leaves are palmately lobed and about 30 cm (1 ft) long and 50 cm (1.7 ft) wide. The seven to nine lobes are coarsely toothed, and each lobe has a conspicuous, depressed mid-vein. The leaves are alternate, or whorled, at branch tips; the petioles are 35–40 cm (1–1.5 ft) long and based in distinctive, conspicuous green multiple ''sockets'' (Raulerson and Rinehart 1991).

Historically, *Osmoxylon mariannense* occurred in dense primary forest at about 400 m (1,320 ft) elevation (Kanehira 1933). Reports from 1980 to 1995 indicate that approximately 20 individuals from one scattered population were in the same vicinity as reported by Kanehira (Lynn Raulerson, University of Guam, pers. comm. 1998; D. Grout and L. Mehrhoff, pers. comms. 1997). Currently, all known individuals of this species occur in small subpopulations along a simple system of unimproved roads crossing the top of the sabana (highest elevation terraces) of Rota. One of the larger subpopulations had approximately nine individuals in 1994, but typhoons appeared to have damaged many of the trees, and only two were visible in 1997 (Raulerson and Rinehart 1997).

Osmoxylon mariannense can be found on both private (approximately 2 individuals) and publicly owned (CNMI) (approximately 18 individuals) land in limestone forests. It occurs as an understory species in *Pisonia umbellifera* and *Hernandia labyrinthica* forests, and is often hard to see until some trunks are tall enough to mingle with the trunks of the other two species (Raulerson and Rinehart 1997). In January 1998, shortly after typhoon Paka, five of the subpopulations, containing a total of eight trees, were located along the sabana road (Estanislau Taisacan, CNMI, Division of Fish and Wildlife (DFW) and G. Hughes, pers. comms. 1998). The plants in each subpopulation were completely defoliated and damaged by the high typhoon winds. E. Taisacan [supported by Raulerson and Rinehart (1997)] indicated that the total population of *Osmoxylon mariannense* had significantly declined in the past 10 years (G. Hughes, pers. comm. 1998). Ten years before, many of the subpopulations visited in 1998 had several trees each (E. Taisacan, pers. comm. 1998). Almost all of these subpopulations have now been reduced to a single tree, and none of these trees are reproducing naturally (G. Hughes, pers. comm. 1998).

Due to several exacerbating factors, the primary threat to *Osmoxylon mariannense* is the lack of regeneration in disturbed forests. Although Rota has historically experienced typhoon disturbances, intense typhoons and super typhoons have occurred with high frequency in the past 10 years. These repeated storms have considerably opened the canopy of the sabana forest, creating conditions favored by invasive alien plants and vines and perhaps prohibiting the regeneration of *O. mariannense* (L. Mehrhoff, *in. litt.* 1995). For example, during the 1998 site visit, Taisacan indicated the once many-branched, 10 m (33 ft) high tree appearing in the photograph in Raulerson and Rinehart's (1991) *Guide to the Trees and Shrubs of the Mariana Islands*, had been reduced to a small stump 2 m (6.5 ft) high with scandent leaves after a decade of exposure to frequent typhoons (G. Hughes, pers. comm. 1998). Feral pigs (*Sus scrofa*) and deer (*Cervus mariannus*) occur on Rota, and their browsing and trampling are a potential threat to unfenced individuals (G. Hughes, pers. comm. 1998). Insect, mouse (*Mus musculus*), or rat (*Rattus* spp.) predation of seeds on the ground is a suspected cause of the lack of reproductive vigor exhibited by this

species. Since several individuals occur close to roadways, bulldozers could destroy plants during routine maintenance or road improvement. Finally, the identification of rare species through management activities such as fencing and signage may result in vandalism from individuals who perceive rare species as threats to development (Raulerson and Rinehart 1997).

Tabernaemontana Rotensis

Kanehira (1936) first described the species as *Ervatamia rotensis* from his type collection from Rota (Kanehira 3666). Stone (1965, 1970) recognized the species from the Rota and Guam collections (Stone 5256, Kanehira 3666, Hosokawa 9832) as *Tabernaemontana rotensis*. Leeuwenburg (1991) examined 1,400 specimens and adopted a very broad species concept when he lumped 52 species (including *T. rotensis*), ranging from China, Taiwan, Thailand, Java, Sabah, Australia, and Micronesia, into a single species, *T. pandacaqui*. However, Forster (1992) challenged Leeuwenberg's broad species concept for *Tabernaemontana* species in Australia. Forster's research led to the conclusion that there are two species in Australia, *T. orientalis* and *T. pandacaqui*. Based on Forster's analysis, Derral Herbst, Bishop Museum, speculated that Leeuwenberg's broad concept of lumping all *Tabernaemontana* species into one species is not valid (D. Herbst, pers. comm. 2000). This concept of combining species, which occur both on the Asian mainland and scattered, isolated islands covering a very wide geographic range, was also rejected by Dr. Fosberg of the Smithsonian Institution (L. Raulerson, pers. comm. 1997). In addition, no genetic investigations have been published that would support Leeuwenberg's conclusion. Therefore, although the taxonomy of this species is still in dispute, we have determined that we have sufficient information to consider *T. rotensis* as a species in its own right.

Tabernaemontana rotensis is a small tree in the Dogbane family (Apocynaceae). It grows to heights of perhaps 6 m (20 ft) and is rather weak and spindly in appearance, with large, yellow-green to dark-green leaves and thin, milky sap. The inflorescence consists of a few to over 30 flowers with 5 spirally arranged, united white petals that appear slightly folded until they flare at the tips. The fruits occur singly or twinned and have one to three ridges. Each fruit is relatively small, 3 to 7 cm (1.2 to 2.8 in) long, dehiscent (they open at maturity), and contains 4 to 10 seeds in a red pulp. Herbarium specimens show flowering in Guam plants has occurred in January, May, and July; specimens collected on Rota were in flower in October and November.

Historically, *Tabernaemontana rotensis* was known from lowland dry forest on Rota, where Kanehira (1936) described it as ''very abundant in the northern side of the island, but not found elsewhere.'' On Guam, *T. rotensis* was known from individual specimens in the limestone forests along clifflines at Asanite, on the University of Guam campus, and at the ''Japanese Overlook'' of the Naval Magazine (Raulerson and Rinehart 1997). While the tree at the University of Guam may possibly still exist, it has not recently been surveyed. However, the tree at the Naval Magazine was destroyed in a typhoon when other trees fell on it, and the tree at the Asanite cliffs was not found during a recent survey (Raulerson and Rinehart 1997).

Currently, there is one scattered population of *Tabernaemontana rotensis* on Rota, consisting of two individuals. One of the trees occurs in the Mochong area on CNMI land, and the other individual occurs in the Chenchon area on private land. Both individuals are located close to roads. In January 1998, both individuals were observed to be healthy and in flower, but it is not known if these plants have ever produced fruit (G. Hughes, pers. comm. 1998).

Regarding the population on Guam, Gary Wiles, Guam Division of Aquatic and Wildlife Resources (DAWR), recently reported a scattered population of about 28 mature trees from Pati Point westward to Ritidian Point within the overlay refuge on Andersen Air Force Base (G. Wiles, DAWR, pers. comm. 2000). The overlay refuge is part of the Guam National Wildlife Refuge (GNWR) that is on land owned and administered by Andersen Air Force Base, but managed for wildlife purposes through a Memorandum of Agreement with us. This population also includes 4 trees and approximately 30 saplings and seedlings within Area 50, a 24-hectare (ha) (60-acre (ac)) section of forest being intensively managed to determine the effects of removal of feral ungulates and brown tree snakes on native limestone forest habitat. In addition, 2 mature trees, approximately 30 saplings, and 70 seedlings have been located along the road to Ritidian Point within GNWR. Finally, a single tree exists under the powerline near the main road connecting the main airfield and the Munitions Storage Area on Andersen Air Force Base. Two trees are also known from the Ano Conservation Reserve, on Government of Guam land (G. Wiles, in litt. 1998).

The primary threat to *Tabernaemontana rotensis* is the lack of reproductive vigor and seed distribution due to reduced numbers of individuals. This situation includes a lack of observed seed production on Rota, which may be due to either the lack of a pollinator or predation by insects, mice, or rats (G. Hughes, pers. comm. 1998). On Guam, seeds have been observed to mold in the seed case without separating from the fruit, indicating that birds may be useful in distributing the seeds (G. Wiles, *in litt.* 1998). Competition with the nonnative vines *Momordica charantia* (balsam pear), *Mikania scandens* (mile-a-minute vine), and *Passiflora suberosa* (wild passionfruit) may threaten seedlings and saplings (G. Wiles, *in litt.* 1998). Since *T. rotensis* appears to be an edge species and now grows along roadsides, it is threatened by road widening or maintenance activities. One of the two remaining individuals on Rota was nearly destroyed by a bulldozer in the Chenchon area. Also, wildfires on Guam and fires apparently set by deer poachers on Rota have increased in frequency during the past decade and are a significant threat to this species. In 1996, an intentionally set fire burned nearby sections of the Chenchon area, one of the two known locations of this species on Rota (E. Taisacan, pers. comm. 1998). Signs of feral pig are abundant in the Northwest Field of Andersen Air Force Base, and browsing and trampling are a potential threat to unfenced individuals on Guam (G. Hughes, per. comm. 1998). Finally, this species is threatened by vandalism from local residents who perceive rare species as a threat to development, as a *T. rotensis* tree on Rota was cut down and set on fire after its location was given to people planning a golf course in the area (Raulerson and Rhinehart 1997).

Previous Federal Action

Federal action on these plants began with the publication on February 28, 1996, of the Notice of Review (NOR) of Plant and Animal Taxa (61 FR 7596). In this document, *Nesogenes rotensis, Osmoxylon mariannense,* and *Tabernaemontana rotensis* were considered candidate species. These three species were, again, listed as candidate species in the September 19, 1997, NOR (62 FR 49398). Candidate species are those for which we have sufficient information on biological vulnerability and threats to support proposals to list them as endangered or threatened species.

The processing of this proposed rule conforms with our Final Listing Priority Guidance published in the **Federal Register** on October 22, 1999 (64 FR 57114). The guidance clarifies the order in which we will process rulemakings. Highest priority is processing emergency listing rules for any species determined to face a significant and imminent risk to its well-being (Priority 1). Second priority (Priority 2) is processing final determinations on proposed additions to the lists of endangered and threatened wildlife and plants. Third priority (Priority 3) is processing new proposals to add species to the lists. The processing of administrative petition findings (petitions filed under section 4 of the Act) is the fourth priority (Priority 4). The processing of this proposed rule is a Priority 3 action.

Summary of Factors Affecting the Species

The procedures for adding species to the Federal Lists are found in section 4 of the Act (16 U.S.C. 1531 *et seq.*) and the accompanying regulations (50 CFR part 424). A species may be determined to be an endangered or a threatened species due to one or more of the five factors described in section 4(a)(1). The primary threats facing the three species in this proposed rule are summarized in Table 1.

TABLE 1.—SUMMARY OF PRIMARY THREATS

Species	Feral animals	Fire	Mice/rats	Non-native plants	Invertabrates	Development/ road work	Typhoons/ storms	Collecting/ trampling by humans	Vandalism	Limited numbers
Nesogenes rotensis.	.....	.....	.....	.....	.....	Significant threat.	Significant threat.	Significant threat.	Potential threat.	Significant threat.[1]
Osmoxylon mariannense.	Potential threat.	.....	Potential threat.	Significant threat.	Potential threat	Significant threat.	Significant threat.	.....	Potential threat.	Significant threat.[1]*
Tabernaemontana rotensis.	Potential threat.	Significant threat.	.....	Potential threat.	Potential threat	Significant threat.	Significant threat.	.....	Significant threat.	Significant threat.

*= No more than 25 individuals; 1 = No more than 1 population.

These factors and their application to *Nesogenes rotensis* Fosberg and Herbst, *Osmoxylon mariannense* (Kanehira) Fosberg & Sachet, and *Tabernaemontana rotensis* (Kanehira) Fosberg ex Stone are as follows:

A. *The present or threatened destruction, modification, or curtailment of its habitat or range.* Native vegetation on Guam and Rota has undergone extreme alteration because of past and present land use practices, including ranching, deliberate and unintentional alien animal and plant introductions, agricultural development, and military activities, including bombing, during World War II (Falanruw *et al.* 1989, Fosberg 1960). On Guam, land development and feral animals altered most of the island's native vegetation. Probably no more than 30 percent of Guam's land area is covered by native limestone and ravine forest; federally owned lands in northern Guam represent the largest contiguous forest areas.

Rota experienced extensive agricultural development by the Japanese prior to World War II, but was not invaded by allied forces during World War II. The absence of an invasion, combined with rugged topography, resulted in the persistence of stands of native forest. However, today, Rota retains less than 60 percent of its native forest (Falanruw *et al.* 1989). The continued loss of native forest is being exacerbated by the Agricultural Homestead Act of 1990, which allows for the distribution of 1-ha (2.5-ac) parcels of public land to eligible participants. Past land use plans have proposed approximately 45 percent of Rota should be designated private agricultural homestead land or as land likely to be converted to agricultural homesteads. Currently, about 324 ha (809 ac), or 4 percent of Rota, in the Chenchon area, where one of the two individuals of *Tabernaemontana rotensis* occurs, is being considered for future agricultural homesteads. This agricultural development, along with the completion of an 18-hole golf resort and plans for additional, large-scale development, continue to threaten the remaining limestone forest with fragmentation and degradation.

Throughout the Mariana Islands, goats, pigs, cattle, and deer have caused severe damage to forest vegetation by browsing on plants, causing erosion (Kessler 1997, Marshall *et al.* 1995), and retarding forest growth and regeneration (Lemke 1992). Thus, all of these islands retain only a fraction of their historical forested habitat, and this remaining habitat is threatened by the fragmentation and degradation associated with development of resorts, agricultural fields, and bulldozing for road maintenance and widening (D. Grout and L. Mehrhoff, pers. comms. 1997). For example, individuals of *Osmoxylon mariannense* and *Tabernaemontana rotensis* on Rota were almost destroyed during recent road-widening activities (D. Grout and L. Mehrhoff, pers. comms. 1997).

B. *Overutilization for commercial, recreational, scientific, or educational purposes.* At this time, overutilization is not known to be an important factor, but unrestricted scientific or horticultural collecting or excessive visits by individuals interested in seeing rare plants could seriously impact all three species, whose low numbers make them especially vulnerable to disturbances. In addition, the only known population of *Nesogenes rotensis*, located in a public park, is threatened with trampling by tourists and fishermen. Vandalism is also a threat to all three species, as evidenced by the destruction of a *Tabernaemontana rotensis* tree on Rota, which was hacked to the ground and set on fire after its location was given to people planning a golf course in the area (Raulerson and Rinehart 1997).

C. *Disease and predation.* No diseases or predators of these three species have been documented. However, an unidentified caterpillar was observed

causing defoliation damage to one *Tabernaemontana rotensis* tree (L. Mehrhoff and C. Russell, Service, pers. comms. 1997), and individuals of *Osmoxylon mariannense* have reportedly suffered defoliation by an unknown agent (E. Taisacan, pers. comm. 1997). Although why *O. mariannense* is declining is unclear, invertebrate pests, rats, or disease are suspected, judging by the poor health of the leaves, the lack of seedlings or juveniles, and the fact that several of the previously mapped older individuals have died in recent years (D. Grout, pers. comm. 1997).

In the Hawaiian Islands, two rat species, the black rat (*Rattus rattus*) and the Polynesian rat (*R. exulans*), and to a lesser extent other introduced rodents such as the European house mouse (*Mus domesticus*), eat large, fleshy fruits and strip the bark of some native plants (Cuddihy and Stone 1990, Tomich 1986, Wagner *et al.* 1985). Introduced rats (*R. tanezumi* and *R. exulans*) or house mice (M. musculus) on Rota also may be a threat to *Osmoxylon mariannense* and *Tabernaemontana rotensis*, since no regeneration of these species has been observed (Earl Campbell, U.S. Geological Survey, Biological Resources Division, pers. comm. 1998).

Although no predation or trampling by ungulates has been documented, *Osmoxylon mariannense* and *Tabernaemontana rotensis* on both islands are potentially threatened by adverse effects from feral pigs and deer. Four of the *T. rotensis* trees on Guam are protected from ungulates inside Area 50, which is fenced, though whether the trees' occurrence in this location resulted from the exclusion of ungulates is not clear. However, three individuals of *T. rotensis* on Guam are not currently fenced and could be browsed or trampled by feral animals. On Rota, cooperative efforts between the Service and the Rota Division of Fish and Wildlife resulted in the construction of fenced exclosures around the two known *T. rotensis* trees and several individuals of *O. mariannense*.

D. *The inadequacy of existing regulatory mechanisms.* Currently, these species receive no formal protection from Federal, Government of Guam, or CNMI laws. While Government of Guam laws would prohibit the take of endangered species, the CNMI has no similar regulations to protect listed species, although they sometimes provide limited species protection to specific islands regardless of overall species distributions (*e.g.*, Mariana fruit bat). A Habitat Conservation Plan (HCP) for the island of Rota is now under development (Resources Northwest 1997) by the CNMI Government and local Rota residents with technical assistance from the U.S. Fish and Wildlife Service, Pacific Islands Office. Initiated largely for the conservation of the Mariana crow (*Corvus kubaryi*), most of the land that is under discussion for possible inclusion in conservation areas under the HCP is limestone forest, which may provide potential habitat for these three plant species. However, the HCP has not yet been submitted as part of an application for an Endangered Species Act section 10 permit, and we have not made any decision regarding whether it would meet statutory issuance criteria.

The Guam National Wildlife refuge overlay was established to develop and implement a long-term comprehensive program to conserve and restore endangered and threatened species and other native flora and fauna, consistent with the national defense mission of the Air Force. For example, some of the *Tabernaemontana rotensis* individuals occurring in the overlay refuge are within Area 50, a protected section of forest. However, as discussed in Factor C, other individuals of this species are not currently fenced and could be browsed or trampled by feral animals. In addition, while the Air Force consults with us on actions that may affect listed, proposed, and candidate species and their habitats, nothing in the cooperative agreements establishing the overlay refuge would prohibit the Air Force from carrying out its mission on such lands, consistent with applicable law. Therefore, military missions such as troop training actions that occur within habitat supporting candidate species (*e.g.*, *T. rotensis*) could take precedence over conservation of candidate species.

E. *Other natural or manmade factors affecting its continued existence.* The combination of increased storm disturbance frequency and competition from alien species may be significantly altering the condition of habitat occupied by *Tabernaemontana rotensis* and *Osmoxylon mariannense*. Guam and Rota have a long history of disturbances by tropical typhoons (Weir 1991), and the native biota may be adapted to these events; however, in the past decade, frequent typhoons have severely impacted both islands. In addition, all three species are threatened by competition from one or more nonnative plant species. *Tabernaemontana rotensis* may be threatened by *Momordica charantia*, *Mikania scandens*, and *Passiflora suberosa*. *Nesogenes rotensis* is threatened by *Casuarina equisetifolia*, which is becoming established in the coastal strand habitat at Pona Point Fishing Cliff. *C. equisetifolia* will likely spread and may significantly change the coastal scrubland into a forest habitat with no understory plants or available sunlight. Destruction of the sabana forest canopy by typhoons in recent years has not only destroyed individual *O. mariannense* trees (Raulerson and Rinehart 1997), but has also altered subcanopy habitat conditions over the long term by opening up and drying out older, closed forest habitat (E. Taisacan, pers. comm. 1998). In opened forest areas, various opportunistic, weedy vines such as *M. charantia*, *M. scandens*, and *P. suberosa* cover the ground (Fosberg 1960; Guy Hughes, pers. comm. 1998) and may not provide the conditions for seed germination and seedling growth as is provided in closed-canopy, high-stature forests covered with mosses and various epiphytic species like orchids.

The small number of individuals of the three species covered by this proposed rule increases the potential for extinction from natural or human-caused random events. The limited gene pool may depress reproductive vigor, or a single human-caused or natural environmental disturbance could destroy a significant percentage of the individuals or whole populations. For example, a typhoon could cause the destruction of the remaining individuals of *Tabernaemontana rotensis* on the Guam Naval Magazine, or a storm surge could destroy the only remaining population of *Nesogenes rotensis*.

We have carefully assessed the best scientific and commercial information available on the past, present, and future threats facing these species in determining to propose this rule. Based on this evaluation, we propose to list *Nesogenes rotensis*, *Osmoxylon mariannense*, and *Tabernaemontana rotensis* as endangered. These three species are threatened by one or more of the following: habitat degradation or destruction by feral deer and pigs; competition for space, light, water, and nutrients with naturalized, introduced plant species; road construction and maintenance activities; recreational activities; natural disasters or random environmental events; fire; vandalism; development of agricultural homesteads, resorts, and golf courses; limited reproductive vigor; and potentially insect, mouse, or rat predation. *Osmoxylon mariannense* is known from 1 scattered population of approximately 20 individuals, while *Nesogenes rotensis* is known from 1 population of approximately 30 plants. Only around 30 adult *Tabernaemontana rotensis* trees are known from two

scattered populations on Guam and Rota. Small population size and limited distribution make these species particularly vulnerable to extinction from reduced reproductive vigor or random environmental events.

Critical Habitat

Critical habitat is defined in section 3, paragraph (5)(A) of the Act as the specific areas within the geographical area occupied by a species, at the time it is listed in accordance with the Act, on which are found those physical or biological features essential to the conservation of the species and that may require special management considerations or protection; and specific areas outside the geographical area occupied by a species at the time it is listed in accordance with the provisions of section 4 of the Act, upon a determination by the Secretary that such areas are essential for the conservation of the species. ''Conservation'' means the use of all methods and procedures needed to bring the species to the point at which listing under the Act is no longer necessary.

Critical habitat designation, by definition, directly affects only Federal agency actions through consultation under section 7(a)(2) of the Act. Section 7(a)(2) requires Federal agencies to ensure that activities they authorize, fund, or carry out are not likely to jeopardize the continued existence of a listed species or destroy or adversely modify its critical habitat.

Section 4(a)(3) of the Act, as amended, and implementing regulations (50 CFR 424.12) require that, to the maximum extent prudent and determinable, we designate critical habitat at the time the species is determined to be endangered or threatened. Our regulations (50 CFR 424.12(a)(1)) state that designation of critical habitat is not prudent when one or both of the following situations exist—(1) the species is threatened by taking or other activity and the identification of critical habitat can be expected to increase the degree of threat to the species or (2) such designation of critical habitat would not be beneficial to the species.

We propose that critical habitat is prudent for *Nesogenes rotensis, Osmoxylon mariannense*, and *Tabernaemontana rotensis*. In the last few years, a series of court decisions have overturned Service determinations regarding a variety of species that designation of critical habitat would not be prudent (*e.g.*, *Natural Resources Defense Council* v. *U.S. Department of the Interior* 113 F. 3d 1121 (9th Cir. 1997); *Conservation Council for Hawaii* v. *Babbitt*, 2 F. Supp. 2d 1280 (D. Hawaii 1998)). Based on the standards applied in those judicial opinions, we believe that the designation of critical habitat for these species would be prudent.

Due to the small population sizes, the three species are vulnerable to unrestricted collection, vandalism, or other disturbance. We remain concerned that these threats might be exacerbated by the publication of critical habitat maps and further dissemination of locational information. However, although we are aware of specific evidence of vandalism, we do not believe that the designation of critical habitat will increase the degree of threat. In addition, we have not found specific evidence of collection or trade of these species or any similarly situated species. Consequently, consistent with applicable regulations (50 CFR 424.12(a)(1)(i)) and recent case law, we do not expect that the identification of critical habitat will increase the degree of threat to these species of taking or other human activity.

In the absence of a finding that critical habitat would increase threats to a species, if any benefits would result from critical habitat designation, then a prudent finding is warranted. In the case of these species, some benefits may result from designation of critical habitat. The primary regulatory effect of critical habitat is the section 7 requirement that Federal agencies refrain from taking any action that destroys or adversely modifies critical habitat. While a critical habitat designation for habitat currently occupied by this species would not be likely to change the section 7 consultation outcome because an action that destroys or adversely modifies such critical habitat would also be likely to result in jeopardy to the species, in some instances section 7 consultation might be triggered only if critical habitat is designated. Examples could include unoccupied habitat or occupied habitat that may become unoccupied in the future. Designating critical habitat may also provide some educational or informational benefits. Therefore, we find that critical habitat is prudent for these three species.

However, we cannot propose critical habitat designations for these species at this time. Our Hawaiian field office, which would have the lead for such proposals, is in the process of complying with the court order in *Conservation Council for Hawaii* v. *Babbitt*, CIV NO. 97–00098 ACK (D. Haw. Mar. 9 and Aug. 10, 1998). In that case, the United States District Court for the District of Hawaii remanded to the Service its ''not prudent'' findings on critical habitat designation for 245 species of Hawaiian plants. The court ordered us not only to reconsider these findings, but also to designate critical habitat for any species for which we determine on remand that critical habitat designation is prudent. Proposed designations or nondesignations for 100 species are to be published by November 30, 2000. Proposed designations or nondesignations for the remaining 145 species are to be published by April 30, 2002. Final designations or nondesignations are to be published within 1 year of each proposal. Compliance with this court order is a huge undertaking involving critical habitat determinations for over one-fifth of all species that have ever been listed under the Endangered Species Act, and over one-third of all listed plant species. In addition, we have been ordered to include in this effort critical habitat designations for an additional 10 plants that are the subject of another lawsuit. See *Conservation Council for Hawaii* v. *Babbitt*, CIV. NO. 99–00283 HG. We cannot develop proposed critical habitat designations for these three plant species without significant disruption of the field office's intensive efforts to comply with these court orders.

To attempt to do so could also affect the listing program Region-wide. Administratively, the Service is divided into seven geographic regions. These three species are under the jurisdiction of Region 1, which includes California, Oregon, Washington, Idaho, Nevada, Hawaii, and other Pacific Islands. About one-half of all listed species occur in Region 1. Region 1 receives by far the largest share of listing funds of any Service region because it has the heaviest listing workload. Region 1 must also expend its listing resources to comply with existing court orders or settlement agreements. In fact, in the last fiscal year, all of the Region's funding allocation for critical habitat actions were expended to comply with court orders. If we were to immediately prepare proposed critical habitat designations for these 3 species notwithstanding the court order pertaining to 245 Hawaiian plant species, efforts to provide protection to many other species that are not yet listed would be delayed. While we believe there may be some benefits to designating critical habitat for these species, these benefits are significantly fewer in comparison to the benefits of listing a species under the Endangered Species Act because, as discussed

above, the primary regulatory effect of critical habitat is limited to the section 7 requirement that Federal agencies refrain from taking any action that destroys or adversely modifies critical habitat.

As explained in detail in the Final Listing Priority Guidance for FY2000 (64 FR 57114), our listing budget is currently insufficient to allow us to immediately complete all of the listing actions required by the Act. We plan to employ a priority system for deciding which outstanding critical habitat designations should be addressed first. We will focus our efforts on those designations that will provide the most conservation benefit, taking into consideration the efficacy of critical habitat designation in addressing the threats to the species, and the magnitude and immediacy of those threats. Deferral of a proposal to designate critical habitat for these three species will allow us to concentrate our limited resources on higher priority critical habitat and other listing actions, while allowing us to put in place protections needed for the conservation of these three Mariana Islands plants without further delay. Therefore, given the current workload in Region 1 and, particularly, the Hawaiian field office, we expect that we will be unable to develop a proposal to designate critical habitat for these three plants until FY2004.

We will make the final critical habitat determination with the final listing determination for these three species. If this final critical habitat determination is that critical habitat is prudent, we will develop a proposal to designate critical habitat for these species as soon as feasible, considering our workload priorities.

Available Conservation Measures

Conservation measures provided to species listed as endangered or threatened under the Act include recognition, recovery actions, requirements for Federal protection, and prohibitions against certain practices. Recognition through listing encourages and results in conservation actions by Federal, State, and private agencies, groups, and individuals. The Act provides for possible land acquisition and cooperation with the States and requires that recovery actions be carried out for all listed species. The protection required of Federal agencies and the prohibitions against taking and harm are discussed, in part, below.

Section 7(a) of the Act, as amended, requires Federal agencies to evaluate their actions with respect to any species that is proposed or listed as endangered or threatened and with respect to its critical habitat, if any is being designated. Regulations implementing this interagency cooperation provision of the Act are codified at 50 CFR part 402. Section 7(a)(4) of the Act requires Federal agencies to confer informally with us on any action that is likely to jeopardize the continued existence of a proposed species or result in destruction or adverse modification of proposed critical habitat. If a species is subsequently listed, section 7(a)(2) requires Federal agencies to ensure that activities they authorize, fund, or carry out are not likely to jeopardize the continued existence of such a species or to destroy or adversely modify its critical habitat. If a Federal action may affect a listed species or its critical habitat, the responsible Federal agency must enter into formal consultation with us.

Federal agency actions that require conference and/or consultation as described in the preceding paragraph may include, but not be limited to: Army Corps of Engineers projects, such as the construction of roads, firebreaks and bridges; various U.S. armed forces activities on Guam, and possibly the northern Mariana Islands, such as combat and mobility training, and construction; Natural Resource Conservation Service projects; Federal Emergency Management Agency activities; and U.S. Department of Housing and Urban Development projects. Conservation of these plant species may be consistent with some ongoing operations at these sites; however, the proposed listing of these species in Guam and the CNMI could result in some restrictions on certain activities and the use of certain lands.

Listing *Nesogenes rotensis, Osmoxylon mariannense*, and *Tabernaemontana rotensis* provides for the development and implementation of a recovery plan for these species. These plans will bring together Federal, State, and regional agency efforts for conservation of the species. Recovery plans will establish a framework for agencies to coordinate their recovery efforts. The plans will set recovery priorities and estimate the costs of the tasks necessary to accomplish the priorities. They will also describe the site-specific management actions necessary to achieve conservation and survival of these species.

The Act and its implementing regulations, found at 50 CFR 17.61, 17.62, and 17.63, set forth a series of general prohibitions and exceptions that apply to all endangered plant species. Under these prohibitions, it is illegal for any person subject to the jurisdiction of the United States to import or export, transport in interstate or foreign commerce in the course of a commercial activity, sell or offer for sale in interstate or foreign commerce, or remove any such species from areas under Federal jurisdiction. In addition, the Act prohibits the malicious damage or destruction of areas under Federal jurisdiction and the removal, cutting, digging up, or damaging or destroying of such plants in knowing violation of any State/Commonwealth/Territory law or regulation, or in the course of a violation of State/Commonwealth/Territory criminal trespass law. Certain exceptions to the prohibitions apply to our agents and State conservation agencies.

The Act and 50 CFR 17.62 and 17.63 also provide for the issuance of permits to carry out otherwise prohibited activities involving endangered plant species under certain circumstances. Such permits are available for scientific purposes and to enhance the propagation or survival of the species. We anticipate that few permits would ever be sought or issued because these three species are not common in cultivation or in the wild.

Our policy, as published in the **Federal Register** on July 1, 1994 (59 FR 34272), is to identify, to the maximum extent practicable, those activities that would or would not constitute a violation of section 9 of the Act if a species is listed. The intent of this policy is to increase public awareness as to the effects of the listing on future and ongoing activities within a species' range. Only one of these species, *Tabernaemontana rotensis,* has a population on Federal land under U.S. Air Force jurisdiction within the Guam National Wildlife Refuge. Collection, damage, or destruction of this species on Federal land is prohibited without a Federal permit. Such activities involving any of the three species on non-Federal lands would constitute a violation of section 9 if conducted in knowing violation of Government of Guam or CNMI laws or regulations. The Service is not aware of any trade in these species.

Questions regarding whether specific activities would constitute a violation of section 9 should be directed to the Field Supervisor of the Pacific Islands Office (see **ADDRESSES** section). Requests for copies of the regulations for listed plants and inquiries about prohibitions and permits may be addressed to the Fish and Wildlife Service, Ecological Services, Permits Branch, 911 N.E. 11th Avenue, Portland, Oregon 97232–4181 (telephone 503–231–2063; FAX 503–231–6243).

Public Comments Solicited

We intend that any final action resulting from this proposal will be as accurate and effective as possible. Comments or suggestions from the public, other concerned governmental agencies, the scientific community, industry, or any other interested party concerning this proposed rule are requested. Comments are particularly sought concerning:

(1) Biological, commercial trade, or other relevant data concerning any threat (or lack thereof) to these species;

(2) The location of any additional populations of these species and reasons why any habitat should or should not be designated as critical habitat;

(3) Additional information on the range, distribution, and population size of these species; and

(4) Current or planned activities in the subject area and their possible impacts on these species.

Final issuance of regulations for these three species will take into consideration the comments and any additional information received by the Service, and such communications may lead to a final regulation that differs from this proposal. In accordance with interagency policy published on July 1, 1994 (59 FR 34270), upon publication of this proposed rule in the **Federal Register**, we will solicit expert reviews by at least three specialists regarding pertinent scientific or commercial data and assumptions relating to the taxonomic, biological, and ecological information for the three species. The purpose of such a review is to ensure that listing decisions are based on scientifically sound data, assumptions, and analyses, including the input of appropriate experts. We will summarize the opinions of these reviewers in the final decision document. The final determination may differ from this proposal based upon the information we receive.

You may request a public hearing on this proposal. Your request for a hearing must be made in writing and filed within 45 days of the date of publication of this proposal in the **Federal Register**. Address your requests to the Field Supervisor (see **ADDRESSES** section).

Our practice is to make comments, including names and home addresses of respondents, available for public review during regular business hours. Individual respondents may request that we withhold their home address from the rulemaking record, which we will honor to the extent allowable by law. In some circumstances, we would withhold from the rulemaking record a respondent's identity, as allowable by law. If you wish for us to withhold your name and/or address, you must state this request prominently at the beginning of your comment. However, we will not consider anonymous comments. We will make all submissions from organizations or businesses, and from individuals identifying themselves as representatives or officials of organizations or businesses, available for public inspection in their entirety.

Electronic Access and Filing

You may send comments by e-mail to 3mplants_pr@fws.gov. Please submit these comments as an ASCII file and avoid the use of special characters and any form of encryption. Please also include ''Attn: RIN 1018–AG09'' and your name and return address in your e-mail message. If you do not receive a confirmation from the system that we have received your e-mail message, contact us directly by calling our Pacific Islands Office at phone number 808–541–3441.

Executive Order 12866

Executive Order 12866 requires each agency to write regulations that are easy to understand. We invite your comments on how to make this rule easier to understand including answers to the following: (1) Are the requirements of the rule clear? (2) Is the discussion of the rule in the Supplementary Information section of the preamble helpful to understanding the rule? (3) What else could we do to make the rule easier to understand?

National Environmental Policy Act

We have determined that preparation of an environmental assessment or environmental impact statement, as defined under the authority of the National Environmental Policy Act of 1969, is not necessary when issuing regulations adopted under section 4(a) of the Endangered Species Act of 1973, as amended. We published a notice outlining our reasons for this decision in the **Federal Register** on October 25, 1983 (48 FR 49244).

References Cited

A complete list of all references cited herein is available upon request from the Pacific Islands Ecoregion Office. (See **ADDRESSES** section.)

Author: The author of this proposed rule is Guy D. Hughes (see **ADDRESSES** section) (808/541–3441).

List of Subjects in 50 CFR Part 17

Endangered and threatened species, Exports, Imports, Reporting and recordkeeping requirements, Transportation.

Proposed Regulation Promulgation

Accordingly, we propose to amend part 17, subchapter B of chapter I, title 50 of the Code of Federal Regulations, as set forth below:

PART 17—[AMENDED]

1. The authority citation for part 17 continues to read as follows:

Authority: 16 U.S.C. 1361–1407; 16 U.S.C. 1531–1544; 16 U.S.C. 4201–4245; Pub. L. 99–625, 100 Stat. 3500; unless otherwise noted.

2. Section 17.12(h) is amended by adding the following, in alphabetical order under FLOWERING PLANTS, to the List of Endangered and Threatened Plants:

§ 17.12 Endangered and threatened plants.

* * * * *

(h) * * *

Species		Historic range	Family	Status	When listed	Critical habitat	Special rules
Scientific name	Common name						
FLOWERING PLANTS							
*	*	*	*	*	*	*	
Nesoqenes rotensis	None	Western Pacific Ocean—U.S.A. (Commonwealth of the Northern Mariana Islands).	Verbenaceae	E		NA	NA

Species		Historic range	Family	Status	When listed	Critical habitat	Special rules
Scientific name	Common name						
*	*	*	*	*	*	*	
Osmoxylon mariannense.	None	Western Pacific Ocean—U.S.A. (Commonwealth of the Northern Mariana Islands).	Araliaceae	E		NA	NA
*	*	*	*	*	*	*	
Tabernaemontana rotensis.	None	Western Pacific Ocean—U.S.A. (Commonwealth of the Northern Mariana Islands and Guam).	Apocynaceae	E		NA	NA
*	*	*	*	*	*	*	

Dated: May 2, 2000.

Jamie Rappaport Clark,

Director, Fish and Wildlife Service.

[FR Doc. 00–13707 Filed 5–31–00; 8:45 am]

BILLING CODE 4310–55–P

DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

RIN 1018–AGO4

Endangered and Threatened Wildlife and Plants; Proposed Endangered Status for the Buena Vista Lake Shrew

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Proposed rule.

SUMMARY: We, the U.S. Fish and Wildlife Service (Service), propose to list the Buena Vista Lake shrew, *Sorex ornatus relictus*, as endangered pursuant to the Endangered Species Act of 1973, as amended (Act). Prior to 1986, this subspecies had not been observed since it was first described in 1932. In 1986, three Buena Vista Lake shrews were observed at a permanent pond located within a former preserve, approximately 26 kilometers (km) (16 miles (mi)) south of Bakersfield, CA. No more than 38 individuals have been observed since they were rediscovered in 1986. The only known extant Buena Vista Lake shrew population is threatened primarily by agricultural activities, modifications and potential impacts to local hydrology, uncertainty of water delivery, possible toxic effects from selenium poisoning, and random naturally occurring events. This proposal, if made final, would implement the Federal protection and recovery provisions afforded by the Act for the Buena Vista Lake shrew.

DATES: We must receive comments from all interested parties by July 31, 2000. Public hearing requests must be received by July 17, 2000.

ADDRESSES: Send your comments and materials concerning this proposal to the Field Supervisor, Sacramento Fish and Wildlife Office, U.S. Fish and Wildlife Service, 2800 Cottage Way, Rm W–2605, Sacramento, California 95825. Comments and materials received, as well as the supporting documentation used in preparing the rule, will be available for public inspection, by appointment, during normal business hours at the above address.

FOR FURTHER INFORMATION CONTACT: Dwight Harvey, Sacramento Fish and Wildlife Office (see **ADDRESSES** section) (telephone 916/414–6600; facsimile 916/414–6710).

SUPPLEMENTARY INFORMATION:

Background

The Buena Vista Lake shrew, *Sorex ornatus relictus,* is one of nine subspecies within the ornate shrew *Sorex ornatus* species complex known to occur in California (Hall 1981; Owen and Hoffmann 1983; Maldonado 1992). *Sorex ornatus* belongs to the order Insectivora and family Soricidae, subfamily Soricinae, and the tribe Soricini, with three subgenera (Owen and Hoffmann 1983; Junge and Hoffmann 1981).

Sorex ornatus relictus are primarily insectivorous mammals that are the approximate size of a mouse. They have a long snout, tiny bead-like eyes, ears that are concealed, or nearly concealed, by soft fur, and five toes on each foot (Ingles 1965; Burt and Grossenheider 1964). *Sorex ornatus relictus* are active day or night. When they are not sleeping, they are searching for food. These shrews eat more than their own weight each day (Burt and Grossenheider 1964) to withstand starvation and maintain their body weight at high rates of metabolism (McNab 1991). *Sorex ornatus relictus* can have an impact on surrounding plant communities by consuming large quantities of insects, slugs, and other invertebrates that can influence such things as plant succession and control the irruptions of pest insects (Maldonado 1992; Williams 1991). *Sorex ornatus relictus* also may be an important prey species for raptors, snakes, and carnivores (Maldonado 1992).

Grinnell (1932) was the first to describe *Sorex ornatus relictus*. According to Grinnell's description, the Buena Vista Lake shrew's back is predominantly black with a buffy-brown speckling pattern, its sides are more buffy-brown than the upper surface, and its underside is smoke-gray. The tail is faintly bicolor and blackens toward the end both above and below. The Buena Vista Lake shrew weighs approximately 4 grams (g) (0.14 ounces (oz)) (Kathy Freas, Stanford University, pers. comm. 1994) and has a total length ranging from 98 to 105 millimeters (mm) (3.85 to 4.13 inches (in.)) with a tail length of 35 to 39 mm (1.38 to 1.54 in.) (Grinnell 1932). The Buena Vista Lake shrew differs from its geographically closest subspecies, the ornate shrew *Sorex ornatus* spp. *ornatus*, by having darker, grayish-black coloration, rather than brown. In addition, *S. o.* ssp. *relictus* has a slightly larger body size; shorter tail; skull with a shorter, heavier rostrum; and a higher and more angular brain-case in dorsal view than *S. o.* ssp. *ornatus* (Grinnell 1932).

Ornate shrews, on the average, rarely live longer than 12 months, and evidence indicates that the normal