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Candidate Petition Project

MAMMALS & BIRDS

PETITIONS TO LIST AS FEDERALLY ENDANGERED SPECIES

The following document contains the individual petitions for the 2 mammal species and 6 bird species to be listed as federally endangered species under the federal Endangered Species Act.

Sheath-tailed bat (Agijuan, Am. Samoa DPS)	***Emballonura semicaudata***
Coachella Valley round-tailed ground squirrel	***Spermophilus tereticaudus chlorus***
Band-rumped storm petrel (HI DPS)	***Oceanodroma castro***
Kauai creeper	***Oreomystis bairdi***
Elfin woods warbler	***Dendroica angelae***
Many-colored fruit dove	***Ptilinopus perousii perousii***
Friendly ground dove (American Samoa DPS)	***Gallicolumba stairi***
Spotless crake	***Porzana tabuensis***

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PETITION TO LIST

Pacific sheath-tailed bat
(Emballonura semicaudata)

AS A FEDERALLY ENDANGERED SPECIES

CANDIDATE HISTORY

CNOR 12/30/82:
CNOR 1/06/89:
CNOR 11/21/91:
CNOR 11/15/94:
CNOR 2/28/96: C
CNOR 9/19/97: C
CNOR 10/25/99: C
CNOR 10/30/01: C
CNOR 6/13/02: C

TAXONOMY

This species is a member of the Emballonuridae family, an Old World bat family that has an extensive distribution primarily in the tropics (Novak 1994). The classification of this species has received varied treatment, but the most thorough taxonomic evaluation for this species has been conducted by Koopman (Koopman 1997, Wiles and Worthington 2002). Koopman recognized four subspecies: *E. s. rotensis,* endemic to the Mariana Islands; *E.s. sulcata,* occurring in Chuuk and Pohnpei; *E.s. palauensis,* found in Palau; and *E.s. semicaudata,* occurring in American and
Western Samoa, Tonga, Fiji, and Vanuatu. The Pacific sheath-tailed bat (PSTB) was once common and widespread in Polynesia and Micronesia and is the only insectivorous bat recorded from a large part of this area (Hutson *et al*. 2001).

NATURAL HISTORY

Morphology

Sheath-tailed bats are small insectivorous bats weighing only about five grams and with a wingspan of nine inches.

Behavior

The PSTB is nocturnal and typically emerges around dusk to forage on insects (Hutson *et al*. 2001). The biology of this species, including habitat use and diet, is largely unknown (Hutson *et al*. 2001, Wiles and Worthington 2002).

Habitat

The PSTB is a small bat that appears to be cave-dependent, roosting in a wide-range of caves, including overhanging cliffs, crevices, and lava tubes (Grant 1993, Grant *et al*. 1994, Hutson *et al*. 2001). Large roosting colonies appear common in the Palau subspecies, but smaller aggregations may be more typical of at least the Mariana Island subspecies and perhaps other *Emballonura* (Flannery 1995, Nowak 1994, Wiles and Worthington 2002, Wiles *et al*. 1997).

Distribution

The Pacific sheath-tailed bat (*Emballonura semicaudata*) is historically known from the Mariana Islands, several of the Caroline Islands (Palau, Chuuk, and Pohnpei), Samoa (Western and American), Tonga, Fiji, and Vanuatu (Flattery 1995, Koopman 1997).

POPULATION STATUS

PSTB populations appear to be healthy in some locations, mainly in the Carolines, but have declined drastically in other areas, including Western and American Samoa, the Mariana Islands, and Fiji (Bruner and Pratt 1979, Grant *et al*. Wiles and Worthington 2002, Wiles *et al*. 1997). Two of the four subspecies occur in areas under the jurisdiction of the United States. The subspecies endemic to the Mariana Islands, *E. s. rotensis*, formerly occurred on Guam, and in the CNMI, on Rota, Aguigaun, Tinian, Saipan, and possibly Anatahan and Maug (Lemke 1986, Steadman 1999, Wiles and Worthington 2002). The single remaining population occurs on Aguiguan and survey work in 1995 indicates a population of roughly only 150-250 animals (Wiles and Worthington 2002).

The causes of the decline of *E. s. rotensis* are unclear and may vary between islands, however, a number of obvious factors are likely to have been involved (Hutson *et al*. 2001, Wiles and Worthington 2002). On Guam, the brown treesnake (*Boiga irregularis*) was accidentally introduced after World War II and has caused the decline and extinction of most of the native birds as well as having been involved in significant declines of the Mariana fruit bat (*Pteropus mariannus*) and various species of herps and invertebrates and is highly likely to be the primary cause of the loss of the PSTB on Guam (Wiles *et al*. 1995). Factors on the other islands include the use and degradation of cave habitats by humans, especially during WWII, and by introduced

ungulates, pesticide contamination, deforestation, introduced predators such as the monitor lizard (*Varanus indicus*), and typhoons (Drahos 1977, Engbring *et al*. 1986, Hutson *et al*. 2001, Wiles and Worthington 2002).

An even more drastic decline has occurred in American Samoa. Amerson et al. (1982) estimated a total population of around 11,000 PSTB in 1975-6, although this number may have been inflated somewhat by confusion of bats with the white-rumped swiftlet (Collocalia spodiopygia) which roost in the same caves as bats (R. Utzurrum, American Samoa Department of Marine and Wildlife Resources, pers. comm. 1998). Since then, far fewer animals have been observed. Knowles (1988) recorded about 200 in 1988, and in 1993, observers caught one bat and saw only 3 more (Grant et al. 1994). It is clear that the species may already be gone in American and Western Samoa (Grant et al. 1994). A series of severe typhoons has been identified as a possible contributing factor (Grant 1993, Grant *et al*. 1994, Hutson *et al*. 2001, Wiles and Worthington 2002). Caves where the bats were last known to roost, at Anape'ape'a Cove on Tutuila Island, were severely damaged by three typhoons between 1987-1992. These storms inundated the caves with water, and coral and other types of rubble filled entrances to caves, and it is suspected that the majority of PSTB in those caves were killed (Grant 1993, Grant et al. 1994). In addition, PSTB generally do not fly or feed in severe weather, and because of their high metabolism, bats may easily starve during typhoons of long duration (Grant 1993, Grant et al. 1994, Macdonald 1993).

The U.S. Fish and Wildlife Service classifies the Pacific sheath-tailed bat as a candidate for Endangered Species Act protection with a listing priority number of 3.

The Government of Guam has listed the species as endangered (5 GCA, Section 63205.(c), "The Endangered Species Act of Guam"). The PSTB, locally known as *payesyes*, was placed on the 1991 CNMI Endangered Species List pursuant to Public Law 2-51, 2 CMC 5108. In 1981, the acting Governor of Guam petitioned to list the Mariana Islands population of the PSTB though the petition was denied due to lack of information (Lemke 1986a, USFWS 1983). A biologist from the CNMI also petitioned the U.S. Fish and Wildlife Service to list the species as endangered in the Mariana Islands but the U.S. Fish and Wildlife Service subsequently determined that listing was not warranted (Lemke 1986b, USFWS 1988).

There is presently enough information to move forward with listing this species as endangered in the CNMI and in American Samoa (Wiles and Worthington 2002).

LISTING CRITERIA

A. *The present or threatened destruction, modification, or curtailment of its habitat or range.*

Historical Range: American and Western Samoa, Guam, Commonwealth of the Northern Mariana Islands, Caroline Islands, Tonga, Fiji, and Vanuatu

Current Range: In areas under the jurisdiction of the United States, this species currently occurs only on Aguiguan, Commonwealth of the Northern Mariana Islands (CNMI) and possibly on Tutuila, American Samoa

Land Ownership: The last known major roosting caves on Tutuila, American Samoa, are part of customary lands belonging to the village of Afono. Aguiguan Island (7 km^2), CNMI is public land.

The PSTB appears to be extirpated in Western and possibly American Samoa, from all but one island in the Marianas, and has been considerably reduced in Fiji (Grant *et al*. 1994, Hutson *et al*. 2001, Lovegrove *et al*. 1992, Park *et al*. 1992, Wiles and Worthington 2002). There is clear evidence of reduced range of the PSTB. The loss of roosting caves (through various means), the loss of foraging habitat due to deforestation, and possibly pesticide use are believed to be primary factors (Grant *et al*. 1994, Hutson *et al*. 2001, Wiles and Worthington 2002). Many caves in the Mariana Islands were heavily impacted by human occupation and warfare during World War II, during which time they were sometimes bombed or used as fortifications or habitation (Hutson *et al*. 2001, Wiles and Worthington 2002). After the war, and likely before, caves were often used by hunters, vandals, hikers, and guano miners (Hutson *et al*. 2001, U.S. Fish and Wildlife Service 1992, Wiles and Worthington 2002). It would be difficult to quantify such an impact, and to date, no such efforts have been undertaken, but it is believed that PSTB are very sensitive to disturbance in their caves (Grant 1993). Middle Black Noddy Cave, which harbors the largest number of PSTB on Aguiguan, is also apparently inaccessible to humans (Wiles and Worthington 2002). Hutson *et al*. (2001) also suggest that disturbances to caves and burning of forests has contributed to the decline of bats in Fiji. Whatever the ultimate causes of the decline of the species in the CNMI, the preservation of this bat hinges on the maintenance of forested habitat and safe roosting sites (Wiles and Worthington 2002).

Current pesticide levels do not appear to be a threat in the Mariana Islands, however, further investigation of pesticide levels in guano accumulations should be conducted to study their role in past declines (Grue 1985, Wiles and Worthington 2002). Pesticides may have caused a reduction in insect prey base availability as well as poisoning animals (Wiles and Worthington 2002). The loss of the PSTB on Guam is likely explained by the presence of the brown treesnake which has clearly lead to the extinction and decline of many native species (Wiles *et al*. 1995). In American Samoa, two caves at Anape'ape'a Cove were reported as roosting sites for most of the bats estimated in 1976-7. Both caves were severely damaged during several typhoons between 1987 and 1992 and no bats were reported there during 1993 surveys (Grant 1993, Grant *et al*. 1994). Only small numbers of bats have been observed in other caves during past surveys but there is no information on how many other caves there are or how many bats they could support (Grant 1993, Grant *et al*. 1994).

B. *Overutilization for commercial, recreational, scientific, or educational purposes.*

It is not known that intentional take is a threat to the Pacific sheath-tailed bat, but they may be threatened by human recreational use of caves (Wiles and Worthington 2002).

C. ***Disease or predation.***

As noted above, the brown treesnake is likely to have played a major role in the extirpation of the
PSTB on Guam. Introduced monitor lizards and rats (Rattus spp.) also represent potential predators of sheath-tailed bats on Aguigaun, but the extent of this possibility has not been studied
(Wiles and Worthington 2002). The role of disease in the species' decline is not known.

D. ***The inadequacy of existing regulatory mechanisms.***
Currently, no formal or informal protection is afforded to the sheath-tailed bat by Federal agencies or by private individuals or groups.

Current Conservation Efforts: The Government of American Samoa and the Commonwealth of the Northern Mariana Islands have been monitoring the status of the remaining populations. However, there is no management plan or standardized monitoring program in effect for either location.

E. ***Other natural or manmade factors affecting its continued existence.***

The low numbers of individuals in these populations and the few numbers of populations, place these vertebrate population segments at great risk of extinction from inbreeding, stochastic events, and storms. For example, the 1990 and 1991 typhoons in American Samoa were responsible for significant declines in the bat (Pepper Trail, Senior Forensic Scientist/Ornithologist/U.S. Fish and Wildlife Forensics Laboratory, pers. comm., 2002).

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PETITION TO LIST

Coachella Valley round-tailed ground squirrel (Spermophilus tereticaudus chlorus)

AS A FEDERALLY ENDANGERED SPECIES

CANDIDATE HISTORY

CNOR 9/18/85:
CNOR 1/6/89:
CNOR 11/21/91:
CNOR 11/15/94:
CNOR 10/25/99: C
CNOR 10/30/01: C
CNOR 6/13/02: C

TAXONOMY

The Coachella Valley round-tailed ground squirrel was first named as a full species *(Citellus chlorus*) in 1904 by Elliot (Hall 1981). Subsequently, in 1913, Grinnell reduced *Citellus chlorus* to a subspecies of *Citellus tereticaudas* (as *C. t. chlorus*). The genus Citellus has been replaced by Spermophilus. *Spermophilus tereticaudus chlorus* is recognized as a valid subspecies.

NATURAL HISTORY

Morphology
Round-tailed ground squirrels are relatively small in comparison to other ground squirrels. They have a small rounded head with small ears and large dark eyes (Ernest and Mares 1987). Round-tailed ground squirrels lack stripes and are even in coloration. Color phases include plain drab gray, pinkish cinnamon, or pale cinnamon brown (Ingles 1965, Ernest and Mares 1987). Unlike other ground squirrels, round-tailed ground squirrels have a relatively long tail which is round and not bushy. The Coachella Valley round-tailed ground squirrel is similar in size and coloration to other round-tailed ground squirrels and is the only round-tailed ground squirrel in the Coachella Valley. The antelope ground squirrel (*Ammospermophilus leucurus*) and the California ground squirrel (*Spermophilus beecheyi*) are the only other ground squirrels that inhabit the Coachella Valley. The antelope ground-squirrel is smaller than the Coachella Valley round-tailed ground squirrel, is grayish brown, and has one white stripe on each side of its body (Ingles 1965). The California ground squirrel is larger than the Coachella Valley round-tailed ground squirrel, is brownish gray with lighter flecks of gray over its back and sides, and has a gray mantle over its shoulders (Ingles 1965).

Behavior
Like other ground squirrels, round-tailed ground squirrels are active only during the day. In addition, like other ground squirrels, round-tailed ground squirrels have internal cheek pouches that are used to carry food. Round-tailed ground squirrels are omnivorous. They have been documented to feed on seeds and vegetation as well as insects (Bradley and Deacon 1971 cited in Earnest and Mares 1987). Reproduction starts as early as mid-January (Ryan 1968 cited in Ernest and Mares 1987). Their litters are born in the spring and range in size from 1 to 12 young (Reynolds and Turkowski 1972 cited in Ernest and Mares 1987).

In general, round-tailed ground squirrels typically emerge from their burrows in January and February. Young are typically born in April and May and the juveniles disperse during June and July. Round-tailed ground squirrels become inactive from August through January (Dunford 1975 cited in Ernest and Mares 1987). During the inactive period, they typically remain in their burrows.

Habitat
The Coachella Valley round-tailed ground squirrel inhabits typically sandy areas within creosote bush and alkali sink scrub (Ingles 1965) of the Coachella Valley, Riverside County, California. The Coachella Valley round-tailed ground squirrel also inhabits mesquite hummocks (personal observation 1996 cited in U.S. Fish and Wildlife Service candidate assessment form). Records for the subspecies include Cabazon, Whitewater Station, Coachella, Mecca, and Agua Caliente (Hall 1981).

The range for the subspecies essentially corresponds with the valley floor of the Coachella Valley. The valley floor encompasses approximately 130,051 hectares (ha) (321,363 acres (ac)) (personal communication 1998 cited in U.S. Fish and Wildlife Service candidate assessment form). Within the Coachella Valley, there are approximately 33,575 ha (82,965 ac) of urban

development and 20,296 ha (50,152 ac) of agricultural development (personal communication 1998 cited in U.S. Fish and Wildlife Service candidate assessment form). Therefore, approximately 76,181 ha (188,246 ac) of the animal's historic range remain. Because the animal occupies a variety of plant communities in the Coachella Valley (e.g., creosote bush scrub and alkali scrub) where the soils allow the construction of burrows, it is important to note that historic range approximates the extent and amount of suitable habitat (personal communication 1998 cited in U.S. Fish and Wildlife Service candidate assessment form).

The historical range of the Coachella Valley round-tailed ground squirrel coincides with the valley floor and extends from the vicinity of Cabezon to the general area surrounding Mecca, at the north end of the Salton Sea (Hall 1981). The habitat has been significantly reduced by agricultural conversion and urbanization. Overall, about 76,181 ha (188,246 ac) (58 percent) of suitable habitat remain.

POPULATION STATUS

About 42% of the Coachella Valley round-tailed ground squirrel's habitat has been destroyed by agricultural expansion and human developments including golf courses. The remaining habitat continues to fragmented and destroyed at a rapid rate.

The U.S. Fish and Wildlife Service classifies the Coachella Valley round-tailed ground squirrel as a candidate for Endangered Species Act protection with a listing priority number of 6.

LISTING CRITERIA

A. The present or threatened destruction, modification, or curtailment of its habitat or range.

Historical range:	Formerly ranged throughout the 321,363 acres of the Coachella Valley floor, extending from the vicinity of Cabezon to the general area surrounding Mecca, at the north end of the Salton Sea (Hall 1981).
Current range:	About 42% of the species habitat within the Coachella Valley has been lost, leaving 188,246 acres of suitable habitat.
Land ownership:	Federal and private. Approximately 15,380 acres are managed by the Bureau of Land Management, 8,220 acres by Native American nations tribal, and 297,763 acres by non-Federal land managers

The primary threat to the Coachella Valley round-tailed ground squirrel is destruction of habitat from expanding urbanization. Approximately 42 percent of its historic habitat has been destroyed by urban and industrial development (unpublished data cited in U.S. Fish and Wildlife Service candidate assessment form). Of the suitable habitat remaining, a minimum of 50 percent is at risk due to development currently provided for under Riverside County's General Plan

(Riverside County Planning Department 1985a,1985b), and the general plans of incorporated cities in this area (e.g., Desert Hot Springs, Palm Springs, Rancho Mirage, Palm Desert, Indio, Coachella). Based on information from the State of California Department of Finance, and the Southern California Association of Governments, the population in the Coachella Valley is projected to increase to 456,971 in 2020 (the population was 289,819 in 1997). Many projects are moving forward. For example, 157 ha (390 ac) of Coachella Valley round-tailed ground squirrel habitat is at risk due to the approved Shadowridge Creek Country Club (Riverside County Planning Department 1995). In Palm Springs, 40 ha (100 ac) of habitat is at risk due to the proposed Canyon Park Resort and Spa (Smith, Peroni, and Fox 1994). In Cathedral City, the Desert Star Golf Course will impact approximately 80 ha (200 ac) of suitable habitat (Terra Nova Planning and Research, Inc. 1998).

B. Overutilization for commercial, recreational, scientific, or educational purposes.

Not known to be a factor at this time.

C. Disease or predation.

Not known to be a factor at this time.

D. The inadequacy of existing regulatory mechanisms.

No formal protection is currently available to this species across most of its range. The California Environmental Quality Act (CEQA) affords some protection to the Coachella Valley round-tailed ground squirrel indirectly by addressing impacts to other protected species, most notably, the federally threatened Coachella Valley fringe-toed lizard (Uma inornata). About 566 ha (1,400 ac) of suitable habitat, in part occupied by the Coachella Valley round-tailed ground squirrel, are currently protected or are in the process of being protected (Coachella Valley Fringe-toed Lizard Habitat Conservation Plan). However, the vast majority of occupied habitat continues to be threatened (see Factor A) and the species is consequently declining. In 1993, a multispecies plan was proposed in the Coachella Valley to address rare species including the Coachella Valley round-tailed ground squirrel. However, after 6 years of planning and negotiation, the plan has not resulted in any substantive protection of declining species found in the Coachella Valley in general, or for the ground squirrel in particular. Development proposals continue to place the habitat at risk. Additionally, it is uncertain what protection the proposed plan will eventually give the Coachella Valley round-tailed ground squirrel.

Current Conservation Efforts: Section 7 consultations and HCP's addressing other species have been completed at the behest of private land owners, mining interest, and the County of Riverside. These activities have not demonstrably resulted in conservation of the Coachella Valley round-tailed ground squirrel. Riverside County, the cities of the Coachella Valley, the U.S. Army Corps of Engineers, Bureau of Land Management, and Bureau of Indian Affairs, and the Agua Caliente Indian Reservation are aware of Service concerns regarding the Coachella Valley round-tailed ground squirrel.

E. Other natural or manmade factors affecting its continued existence.

Habitat for the Coachella Valley round-tailed ground squirrel has been severely reduced and fragmented by agricultural and urban development and related activities in the Coachella Valley. Habitat fragmentation results in loss of habitat, reduced habitat patch size, and an increasing distance between patches of habitat. As noted by Andren (1994) in a discussion of highly fragmented landscapes, reduced habitat patch size and isolation will exacerbate the effect of habitat loss on a species persistence. That is, the loss of species, or decline in population size, will be greater than expected from habitat loss alone. The loss of native vertebrates, including rodents, due to habitat fragmentation is well documented (e.g., Andren 1994; Bolger et al. 1997).

Isolated populations are subject to extirpation by manmade or natural events, such as floods and drought. Furthermore, small populations may experience a loss of genetic variability and experience inbreeding depression (Lacy 1997). Contributing to the fragmentation of Coachella Valley round-tailed habitat are roads, highways, and flood control channels. These structures appear to prevent movement of the Coachella Valley round-tailed ground squirrel between areas of suitable habitat.

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PETITION TO LIST

Band-rumped (Harcourt's) storm-petrel (Oceanodroma castro)

AS A FEDERALLY ENDANGERED SPECIES

CANDIDATE HISTORY

CNOR 11/21/91:
CNOR 11/15/94:
CNOR 10/25/99: C
CNOR 10/30/01: C
CNOR 6/13/02: C

TAXONOMY

Band-rumped storm-petrel specimens were collected by naturalists visiting Hawaii during the 1800s, but were not recognized as Oceanodroma castro until the 1900s (Henshaw 1902). Prior to 1900, the Hawaiian bird had been described as an "unnamed petrel" in the genus Thalassidroma (Dole 1869, 1879), as Cymochorea cryptoleucura (Ridgeway 1882), and as O. cryptoleucura (Stejneger 1888). After Henshaw's 1902 publication, the bird was commonly known as O. castro cryptoleucura, the Hawaiian storm-petrel (Harrison et al. 1990). Other common names for this species are the Harcourt's or Madeiran storm-petrel. The native Hawaiian names for the bird include oeoe, lupe`akeke, and `akë `akë (Harrison et al. 1990).

Although the Hawaiian population was previously recognized as a distinct subspecies, taxonomists today generally combine the various Pacific populations into a single taxon. Austin (1952) studied the taxonomy of the band-rumped storm-petrel and concluded that, although the various populations exhibited minor size differences, these differences were not significant and the populations were best considered as belonging to a single subspecies. After examining a series of specimens, Harris (1969) likewise concluded that, although the species showed considerable variation among populations, the differences were not significant. The American Ornithologists' Union (AOU) currently regards the species as monotypic with no recognized subspecies (Burt Monroe, Jr., AOU, in litt., 1989).

THE HAWAIIAN POPULATION OF BAND-RUMPED STORM PETREL CONSTITUTES A DISTINCT POPULATION SEGMENT

The definition of "species" in section 3(15) of the Act includes any distinct population segment(s) of any species of vertebrate fish or wildlife that interbreed when mature. For a

population to be listed under the Act as a distinct vertebrate population segment, three elements are considered--1) the discreteness of the population segment in relation to the remainder of the species to which it belongs, 2) the significance of the population segment to the species to which it belongs, and 3) the populations segment's conservation status in relation to the Act's standards for listing (i.e., is the population segment, when treated as if it were a species, endangered or threatened?) (61 FR 4722).

The available information indicates that distinct populations of band-rumped storm petrels are definable and that the distinct population segment of band-rumped storm-petrel in the Hawaiian Islands is discrete in relation to the remainder of the species as a whole. The population segment is distinct based on geographic and distributional isolation from other band-rumped storm-petrel populations in Japan, the Galapagos Islands, and the Atlantic Ocean. A population also can be considered "discrete" if it is delimited by international boundaries across which exist differences in management control of the species. The Hawaiian Islands population of the band-rumped storm petrel is the only population within U.S. borders or under U.S. jurisdiction.

A population segment is considered "significant" if its loss would constitute a significant gap in the range of the taxon. As discussed above, the Hawaiian Islands population constitutes the Central Pacific distribution of band-rumped storm petrels between the Galapagos and Japan populations. The loss of this population would cause a significant gap in the distribution of the band-rumped storm petrel in the Pacific, and could result in the complete isolation of the Galapagos and Japan populations without even occasional genetic exchanges. Based on the discreteness and significance of the Hawaiian Islands population, the U.S. Fish and Wildlife Service considers it to be a distinct vertebrate population segment which warrants review for listing under the Endangered Species Act.

NATURAL HISTORY

Morphology

The band-rumped storm-petrel (Oceanodroma castro) is a small seabird about 20 centimeters (8 inches) long. It is an overall blackish-brown bird with a white rump. Sexes are alike in size and appearance. There is little or no seasonal variation in plumage. Field identification can be difficult because several other species of storm-petrels are similar in size, color, and shape; however, vocalizations at breeding colonies are distinctive and can be used to identify the species (Allan 1962).

Behavior

The species is long-lived (15-20 years) and probably does not breed until its third year (Ainley 1984 in Harrison et al.1990). The species only fledges one chick per year. During the day, adults spend their time on the ocean foraging. Nests are placed in crevices, holes, and protected ledges along cliff faces, where a single egg is laid (Allan 1962; Harris 1969). Adults visit the nest site after dark, where they can be detected by their distinctive calls. The nesting season occurs during the summer months, with adults establishing nesting territories in April or May. The incubation period averages 42 days (Harris 1969) and the young reach fledging stage in 64 to 70 days (Allan 1962; Harris 1969). Food is taken from the ocean surface and consists mostly of small

fish, squid, crustaceans, oily scraps of marine animal carcasses, and garbage remnants (King 1967; Harris 1969).

The band-rumped storm-petrel, like many seabirds, is relatively small in size, lacks effective anti-predator behavior, and has a lengthy incubation and fledgling period, making the species highly vulnerable to predation by introduced mammals.

Habitat

The bird nests in bare rock, talus and scree, while burrowing in, and using soils. Flight activity is nocturnal in the nesting areas (Pratt et al. 1987)..

Distribution

The band-rumped storm-petrel is a wideranging species found in the subtropics of the Pacific and
Atlantic Oceans (Harris 1969). Breeding populations in the Atlantic are restricted to the eastern portions of the ocean, primarily in the Azores island group off north-western Africa (Cramp and Simmons 1977). Wintering populations may occur as far west as the mid-Atlantic, with small numbers regularly reaching the coasts of North and South America (Cramp and Simmons 1977). The Atlantic breeding and wintering populations are not within the borders of the United States (U.S.) or under U.S. jurisdiction. In the Pacific, there are three widely separated breeding populations--one in Japan, one in Hawaii, and one in the Galapagos (Harris 1969; Richardson 1957). Populations in Japan and the Galapagos are comparatively large and number in the thousands (Coulter 1984; Hasegawa 1984), while the Hawaiian birds represent a small, remnant population of possibly only a few hundred pairs (Harrison et al.1984; Harrison et al. 1990). The Hawaiian population of the band-rumped storm-petrel is the only population within U.S. borders or under U.S. jurisdiction.

Band-rumped storm-petrels in both the Atlantic and Pacific oceans are most commonly found in close proximity to breeding islands (King 1967). The three populations in the Pacific are separated by major distances across the ocean where band-rumped storm-petrels are not continuously found. Pitman (1986) found virtually no records of band-rumped storm-petrels from the Galapagos outside the immediate area of the Galapagos Islands. This indicates an at-sea distribution of band-rumped storm-petrels in the central Pacific that is disjunct from the other Pacific nesting colonies to the east and west. Extensive at-sea surveys of the Pacific near Hawaii have revealed a broad gap in distribution of the band-rumped storm-petrel to the east and west of Hawaii (Pitman 1986; Spear et al. 1994).

The Japanese population, which breeds on islets off the east coast of Japan, appears to range mostly east and south of Japan (Harrison 1983), within about 1,400 kilometers (km) (860 miles (mi)) of the breeding colonies. The lack of birds to the west of Hawaii was confirmed by Pyle and Engbring (1985) by an absence of records from western Micronesia, suggesting that these waters are seldom used by band-rumped storm-petrels, suggesting a distributional gap between the Japanese and Hawaiian populations.

In Hawaii, there are a number of visual records in coastal waters around Kauai, including reports

of regular concentrations of storm-petrels at various distances offshore from possible nesting colonies (Harrison et al. 1990; Tom Telfer, State of Hawaii, pers. comm.,1997). These "rafts," which number from a few birds to perhaps a hundred, may be birds awaiting nightfall before coming ashore to the breeding colonies. Concentrations of birds found near the equator, almost due south of the Hawaiian Islands and in the Marshall islands (Spear et al.1994), may be part of the Hawaiian population. Assignment of these central Pacific birds to an exact breeding location is speculative, but since studies at both the Galapagos and Japan colonies indicate that the band-rumped storm-petrel stays relatively close to its breeding areas, the Hawaiian population is the most likely source of these birds.

The band-rumped storm-petrel demonstrates high fidelity to nest chambers, suggesting a mechanism for genetic isolation of colonies (Allan 1962; Harris 1969). The actual degree of genetic isolation of the Hawaiian population is not known, and it is not likely that any genetic studies will be completed soon. A limited amount of dispersal, restricted mostly to pre-breeding young, may occur. Harris (1969) states that populations are "probably distinct with little mixing." The Japanese population is over 6,400 km (4,000 mi) west of Hawaii, and the Galapagos population is a similar distance to the east. Investigations into the genetic relationships of the Hawaiian dark-rumped petrel (Pterodroma phaeopygia sandwichensis), a related species with disjunct breeding populations in the Galapagos and Hawaii, has shown no genetic interchange between the two locations (Browne et al. 1997). Browne et al. (1997) concluded that if one of the Pacific populations is lost, natural recolonization following from the other population is unlikely.

Evidence of extant nesting populations of band-rumped storm-petrels in the Hawaiian Islands is based on detection of adult birds during breeding season surveys and by retrieval of fledglings in the fall. Band-rumped storm-petrels, as with other storm-petrels, make very distinctive calls throughout the breeding season as they approach their nesting colonies. These calls can be detected during nocturnal surveys and used to locate and identify nesting colonies. Fledglings have been retrieved on the islands of Hawaii and Kauai, and provide additional evidence of nesting colonies within the Hawaiian archipelago (Harrison et al. 1990). On Hawaii band-rumped
storm-petrels most likely nest in barren lava fields above 2,130 meters (m) (7,000 feet (ft)) elevation. On Kauai, Wood et al. (2001) heard band-rumped storm-petrels in Pohakuao Valley, an isolated hanging valley on the Na Pali coast, and estimated that 50-60 birds were nesting on cliffs 368-457 m (1,200-1,500 ft) in elevation.

POPULATION STATUS

Kauai

Despite the suggestion that the island of Kauai has the largest population in the islands (Harrison et al. 1990), breeding bird surveys on Kauai in 1992 by the U.S. Fish and Wildlife Service (Service, unpublished data 1992) detected only a few band-rumped storm-petrels, and only along the north shore in Nualolo Valley. Harrison et al. (1990) reported many band-rumped storm-petrels over the last 12 years on the south and southwest side of Kauai at the mouths of Waimea Canyon and Hanapepe Valley, and concluded that band-rumped storm-petrels probably nested

along the cliffs of these two valleys and elsewhere on the island. A search of Hanapepe Valley in 1980 by J. Sincock revealed what appeared to be burrows, feathers, and feces on the cliff face 50-70 m (165-230 ft) from the top of the cliff (Harrison et al. 1990). In 1992, almost the same location was occupied by common mynas (Acridotheres tristis), and band-rumped storm-petrels were not heard during nocturnal surveys (Service, unpublished data 1992). Crossin (1974) found band-rumped storm-petrels off the southern coast of Kauai but speculated that the population on the island "cannot be large."

In September 2001, Wood et al. (2001) heard band-rumped storm-petrels in Pohakuao Valley, an isolated hanging valley on the Na Pali coast, and estimated that 50-60 birds were nesting on cliffs 368-457 m (1,200-1,500 ft) in elevation. Additional trips are planned to search these cliffs for nest sites and to more carefully document the number of birds present.

Hawaii

Band-rumped storm-petrels nest on the upper western slopes (1,830-3,050 m (6,000-10,000 ft) of Mauna Loa on the island of Hawaii (Banko et al. 1991; Service, unpublished data 1992), but only in small numbers. The northern and southern portions of Mauna Loa were examined during surveys over multiple nights in 1992, but these efforts failed to locate any colonies. Surveys of other portions of Hawaii failed to discover any birds, even with the use of marine radar and night-vision optics (Cooper et al. 1996; Reynolds et al. 1997; Reynolds et al. 1997).

Kahoolawe

Olson (1992) reported the historical presence of band-rumped storm-petrels on Kahoolawe Island and speculated that the species may still exist there; however, rat populations on this island likely would limit any successful breeding.

Maui

On Maui, band-rumped storm-petrels were detected during breeding season surveys at Haleakala Crater in 1992 (Service, unpublished data 1992). This survey confirmed past records of a small number of storm-petrels vocalizing during the breeding season at this location (Pyle 1984; Warren B. King, pers. comm. in Harrison et al. 1990). Despite extensive work in the darkrumped petrel colonies within Haleakala National Park, no band-rumped storm-petrel nest sites have ever been located (C. Natividad-Hodges, Haleakala National Park, pers. comm., 1997).

Breeding season surveys from the early 1990s on Hawaii, Maui, and Kauai, as well as reports of fledglings picked up on Hawaii and Kauai, confirm that remnant populations still exist on these Hawaiian islands. Harrison et al. (1990) states that estimates of the total State-wide population could exceed 100 pairs if viable breeding populations exist on Maui and Hawaii. Although remnant populations do occur on Maui and Hawaii, it is not possible to determine if they are viable; certainly they are not large and they represent a fraction of pre-historic distribution.

Predation by introduced species has played a significant role in reducing storm-petrel numbers

and in exterminating colonies in the Pacific and other locations worldwide (Flint in press; Moors and Atkinson 1984). There is ample evidence documenting the devastating effect of introduced predators on seabirds (Flint in press; Moors and Atkinson 1984). In New Zealand, petrel species are common on islands free of Polynesian rats, but are rare or absent on neighboring islands inhabited by this predator (Robertson and Bell 1984). Olson (1992) reported the historical presence of the band-rumped storm-petrel on Kahoolawe Island and speculated that it may still exist there; however, rat populations on Kahoolawe would limit any successful breeding. Small ground/burrow nesting seabirds such as storm-petrels, as well as their eggs and young in such nests, are highly susceptible to predation by rats and other mammalian predators larger than mice (Flint in press). The band-rumped storm-petrel, like many seabirds, is relatively small in size, lacks effective anti-predator behavior, and has a lengthy incubation and fledgling period, making the species highly vulnerable to predation by introduced mammals.

A significant impact to the band-rumped storm-petrel results from the effects of artificial lights on fledgling young and, to a lesser degree, adults. Artificial lighting of roadways, resorts, ballparks, residences, and other development in lower elevation areas both attracts and confuses night-flying storm-petrel fledglings, resulting in "fall-out" (Harrison et al. 1990) and collisions with buildings and other objects (Banko et al. 1991).

Hawaiian birds represent a small, remnant population of possibly only a few hundred pairs (Harrison et al.1984; Harrison et al. 1990). In September 2001, band-rumped storm-petrels were observed calling and flying in Pohakuao Valley, Kauai, and 50-60 birds were estimated to be nesting in the area (Wood et al. 2001). The observers have planned additional surveys in 2002 to locate nests and more accurately survey the number of birds, and have requested partial support of the project from the U.S. Fish and Wildlife Service.

The U.S. Fish and Wildlilfe Service classifies the band-rumped storm-petrel as a candidate for Endangered Species Act protection with a listing priority number of 3.

LISTING CRITERIA

A. ***The present or threatened destruction, modification, or curtailment of its habitat or range.***

Historical range: Hawaii, islands of Maui, Molokai, Oahu, Hawaii, and Kauai. The band-rumped storm-petrel was probably common on all of the main Hawaiian Islands when aboriginal Polynesians arrived about 1,500 years ago (Berger 1972; Harrison et al. 1990; Pyle 1984). As evidenced by abundant storm-petrel bones found in middens on the island of Hawaii (Harrison et al. 1990), and in excavation sites on Oahu and Molokai (Olson and James 1982), band-rumped storm-petrels once were numerous enough to be used as a source of food and possibly feathers (Harrison et al. 1990). Given the current lack of breeding colonies in Hawaii compared to pre-historic population levels, the band-rumped storm-petrel probably was significantly reduced in numbers upon the settlement of aboriginal

Polynesians in the Hawaiian Islands. This likely was the beginning of a decline in the band-rumped storm-petrel population that has continued towards the low numbers found today in the Hawaiian Islands.

Current range: Hawaii, islands of Maui, Hawaii, and Kauai. Fledglings have been retrieved on the islands of Hawaii and Kauai, and provide additional evidence of nesting colonies within the Hawaiian archipelago (Harrison et al. 1990). On Kauai, Wood et al. (2001) heard band-rumped storm-petrels in Pohakuao Valley, an isolated hanging valley on the Na Pali coast, and estimated that 50-60 birds were nesting on cliffs 368-457 m (1,200-1,500 ft) in elevation.

Land ownership: Land ownership of sites include Haleakala and Hawaii Volcanoes National Parks on the islands of Maui and Hawaii, respectively, State, and private land.

The rocky cliffs where band-rumped storm-petrels are thought to nest on Kauai are too steep for development, and there is no development in the higher elevation lava fields on Mauna Loa, Hawaii, where storm-petrel colonies are believed to occur. Feral goats may occasionally forage along cliffs, but such grazing would not be expected to significantly affect the quality of nesting habitat.

B. ***Overutilization for commercial, recreational, scientific, or educational purposes.***

Overutilization is not a threat to the band-rumped storm-petrel. Currently, the species is not known to be taken or used for commercial, recreational, scientific, or educational purposes.

C. ***Disease or predation.***

Introduced predators are the most serious threats facing the band-rumped storm-petrel. The Polynesian rat (Rattus exulans) was introduced to the Hawaiian Islands by Polynesians prior to the arrival of Europeans, and the rat probably was one of the first serious predators introduced to these islands. Since the arrival of Europeans, a number of additional predators have been introduced, including the feral or domestic cat (Felis catus), mongoose (Herpestes auropunctatus), common barn owl (Tyto alba), and two additional species of rats, the black rat (R. rattus) and Norway rat (R. norvegicus). These predators are generally found throughout the main Hawaiian Islands, with the exception of the mongoose, which has not spread to Kauai.

The effect of these predators, particularly the cat, on the band-rumped storm-petrel is likely devastating, given the evidence on the islands of Hawaii and Maui of predation on the Hawaiian dark-rumped petrel, a related seabird that suffers huge losses to introduced predators and nests in close proximity to the suspected location of band-rumped storm-petrel nests (Hodges and Nagata 2001; Hu et al. 2001). During surveys on Mauna Loa, Hawaii in 1992, several caches of Hawaiian dark-rumped petrel carcasses associated with feral cat predation have been recorded in

the same areas where band-rumped storm-petrel vocalizations were recorded (Service, unpublished data 1992). Population modeling of the Hawaiian dark-rumped petrel indicates that predation levels as low as 10 percent in a single season would require a recovery period of at least 7 years (Natividad-Hodges 1994). The Hawaiian dark-rumped petrel study sites on Mauna Loa and Haleakala are in areas where band-rumped storm-petrels have been detected during night-time surveys. The effects of introduced predators on the breeding success of Hawaiian dark-rumped petrels are probably similar to the effects on band-rumped storm-petrel breeding success since these birds are equally vulnerable and nest in the same areas.

Of particular concern is the threat of accidental introduction of the brown tree snake (Boiga irregularis) from Guam, Saipan or the Solomon Islands. The brown tree snake is an aggressive predator of birds that has caused a significant decline in avifauna on some Pacific Islands and has
been detected on the island of Oahu.

There have been no studies conducted on the impact of disease in band-rumped storm-petrels and
the significance of such threats as a factor limiting the population is presently unknown. However, avian diseases have had a devastating effect on many endemic Hawaiian forest birds, many of which have little resistance to introduced diseases. Avian pox (Poxvirus avium) causes lesions on the feet, legs, and bills, and is transmitted by physical contact or through vectors such as mosquitoes. Avian malaria (Plasmodium relictum capistranoae) is vectored by the southern house mosquito (Culex quinquefasciatus), and clearly limits the distribution of many Hawaiian birds (Service 1984; Atkinson et al. 1993). Widespread species of seabirds are more resistant to these diseases than are endemic forest birds, but without any direct evidence from band-rumped storm-petrels the importance of this threat is unknown.

D. ***The inadequacy of existing regulatory mechanisms.***

The band-rumped storm-petrel is currently protected under Federal law by the Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703-712). The MBTA regulates most aspects of take, possession, transport, sale, purchase, barter, export, and import of migratory birds including the band-rumped storm-petrel. These regulations protect the species from killing, capturing, and collecting (without appropriate permits) individuals, eggs, and nests unless such action is authorized by permit. While the MBTA does prohibit actions that directly kill a covered species, unlike the Endangered Species Act, it does not prohibit habitat modification that indirectly kills or injures a covered species. Therefore, the MBTA affords no habitat protection when the birds are not present.

The Hawaiian population of the band-rumped storm-petrel is also listed by the State of Hawaii as an endangered species under Hawaii State Endangered Species Act (HSESA) (Hawaii Revised Statutes (HRS), Sect. 195D-4(a)). The HSESA prohibits take, possession, sale, transport, or export of adults, eggs, or young, except as authorized by law, license, or permit. However, the HSESA provides for no protection of band-rumped storm-petrel habitat.

Although these regulations offer significant protection if storm-petrels were taken for commercial, recreational, or other reasons, they contribute minimally to the active management and recovery of a species. The chance of implementing conservation measures that would lead to recovery of the species would be improved if the band-rumped storm-petrel were federally listed as endangered. As a species covered under the Act, the band-rumped storm-petrel would benefit from an approved recovery plan that would guide recovery efforts, identify responsible agencies, and support agencies in obtaining funding for needed recovery actions. Further, the State may enter into agreements with Federal agencies to administer and manage any area required for the conservation, management, enhancement, or protection of endangered species (HRS, Sect. 195D-
5(c)). Funds for these activities could be made available under section 6 of the Act (via State Cooperative Agreements). Listing of this species would therefore reinforce and supplement the protection available under State law. Since many of the band-rumped storm-petrels may nest on National Park Service lands, the provisions of section 7 of the Act would be applied to any actions authorized, funded, or conducted by the National Park Service that may affect the band-rumped storm-petrel.

Current Conservation Efforts: The Hawaiian population of the band-rumped storm-petrel is listed by the State of Hawaii as an endangered species under Hawaii State Endangered Species Act (HSESA) (Hawaii Revised Statutes (HRS), Sect. 195D-4(a)). The HSESA provides for no protection of band-rumped storm-petrel habitat.

E. ***Other natural or manmade factors affecting its continued existence.***

A significant impact to the band-rumped storm-petrel results from the effects of artificial lights on fledgling young and, to a lesser degree, adults. Artificial lighting of roadways, resorts, ballparks, residences, and other development in lower elevation areas both attracts and confuses night-flying storm-petrel fledglings, resulting in “fall-out” (Harrison et al. 1990) and collisions with buildings and other objects (Banko et al. 1991). Artificial lights modify the night sky through which the fledgling birds must navigate after leaving the nest to reach the open sea. Over a 12-year period, from 1978 to 1990, Harrison et al. (1990) reports that 15 band-rumped storm-petrels, 13 of which were young, were recovered on Kauai as a result of fall-out. The actual extent of such loss and its overall impact on the population is not known because the majority of bird that “fall-out” are likely scavenged and consumed by predators such as feral cats and thus not detected (see discussion under Factor C for more information on predators), but any loss in such a small population is significant. The impact from artificial lighting is expected to increase as human population grows and development continues on Kauai and other Hawaiian Islands. The human population on Kauai increased by 24 percent between 1970 and 1980 (Department of Geography, University of Hawaii 1983). The County of Kauai has recognized the potential threat caused by artificial lighting and is using shields on street lights in the vicinity of some presumed storm-petrel nesting areas (Reed et al. 1985; T. Telfer, pers. comm., 1997). Unstudied factors that could affect the continued existence of the band-rumped storm-petrel include commercial fisheries interactions or alteration of the prey base upon which the storm-petrel depends.

Commercial fisheries are known to adversely affect certain species of seabirds (Furness and Ainley 1984). Prey items taken by the storm-petrel are small, and there are no commercial fisheries that are known to compete directly for this resource. However, the effect of large drift nets, purse seines, long lines, and other fishing methods on the pelagic ecosystem is not clearly understood.

Pollution of the open oceans by plastics and other debris that can be mistaken as food by storm-petrels (Harrison et al. 1990), also may pose a threat to the population. Although a study by Spear et al. (1995) found no evidence of plastic ingestion by band-rumped storm-petrels, the sample size was small and many closely related seabirds did suffer ill effects from plastic ingestion. The effects of plastic ingestion include physical damage to the digestive tract and the introduction of toxins. Some evidence also indicates that birds that are already in poor health may eat more plastic particles than healthy individuals.

The small size of the extant Hawaiian population of band-rumped storm-petrels, perhaps not more than a few hundred birds, could be a threat to this species. Small population are more susceptible to stochastic, genetic, environmental, and demographic events that can lead to extinction.

A single human-caused action such as the accidental introduction of mongoose to Kauai, or a natural environmental disturbance such as a hurricane during the breeding season, could destroy a significant percentage of the known extant individuals and cause reproductive failure, and prevent recovery of the population.

The combined effects of these factors can degrade band-rumped storm-petrel habitat or result in increased competition or predation, leading to a gradual decline in population size and further increasing the effects that naturally occurring events have on the population.

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PETITION TO LIST

Kauai creeper or Akikiki
(*Oreomystis bairdi*)

AS A FEDERALLY ENDANGERED SPECIES

CANDIDATE HISTORY.

CNOR 11/15/94:
CNOR 2/28/96: C
CNOR 9/19/97: C
CNOR 10/25/99: C
CNOR 10/30/01: C
CNOR 6/13/02: C

TAXONOMY

The taxonomic status of the Kauai creeper as a valid species is uncontroversial (e.g., Pratt et al. 1987; American Ornithologists' Union 1998).

NATURAL HISTORY

This species is endemic to the island of Kauai, and is most common in mesic and wet forests from 600 m to 1,600 m elevation. It generally forages on trunks, branches, and twigs of live and dead trees, and occasionally forages in sub-canopy shrubs. It feeds primarily on insects, insect larvae, and spiders gleaned and extracted from bark, lichens, and moss (Foster et al. 2000).

POPULATION STATUS

In the late 1800s, the Kauai creeper was considered common from high to low elevation in native forests (Perkins 1903). As late as the early 1960s, it was locally abundant in and near the Alakai Swamp (Richardson and Bowles 1964). In 1968-1973, the island-wide population was estimated to number 6,832 ± 966 birds (Sincock et al. 1984). In 1981, the Hawaii Forest Bird Survey estimated there were approximately 1650 ± 450 Kauai creepers in a 25 km² area of the southeastern Alakai, in the vicinity of what is now known as Sincock's Bog (Scott et al. 1986). Sincock et al. (1984) had estimated the population in this same area to be 2300 ± 700 birds.

However, the range of the population has been contracting, resulting in an overall decline in numbers (Department of Land and Natural Resources 1986; Foster et al. 2000). Results of surveys conducted in 1989, 1994, and 2000 currently are being analyzed by USGS-BRD researchers and will allow examination of more recent population trends.

This species is listed as critically endangered by BirdLife International (2000) because of its extremely small and declining range, in which it is threatened by the effects of exotic taxa and unpredictable weather.

The U.S. Fish and Wildlife Service classifies the Kauai creeper as a candidate for Endangered Species Act protection with a listing priority number of 5.

LISTING CRITERIA

A. ***The present or threatened destruction, modification, or curtailment of its habitat or range.***

Historical range: The island of Kauai (Hawaiian Islands).

Current range: The island of Kauai (Hawaiian Islands).

Land ownership: The remaining populations of this species are located on State and private lands.

Feral pigs and goats have had a long-term damaging effect upon native forest habitat in the Alakai region, opening space for weeds and transporting weed seeds into the forest. The negative impacts of feral ungulates on forested ecosystems in Hawaii include soil erosion, disruption of beneficial plant regeneration, and spreading of alien weeds (Cabin et al. 2000). Continued habitat degradation resulting from the invasion of many non-native weeds is likely to continue to change the forest structure and integrity.

B. ***Overutilization for commercial, recreational, scientific, or educational purposes.***

Not known to be a threat.

C. ***Disease or predation.***

Avian diseases transmitted by the introduced southern house mosquito (*Culex quinquefasciatus*), including both pox (*Poxvirus avium*) and malaria (*Plasmodium relictum*), are thought to play a major role in limiting the distribution of the Kauai creeper. Mosquitoes are present to the highest elevations on Kauai (personal communication cited in U.S. Fish and Wildlife Service candidate assessment form). Mistnetting of forest birds from 1994-97 at three locations, Pihea-Alakai Swamp Trail, Koiae Camp, and Sincock's bog, documented 2-5% of all birds with active malaria infections and up to 12% with malarial antibodies (unpublished data cited in U.S. Fish and Wildlife Service candidate assessment form). Malarial infection rates were highest in the west, at

Pihea, and lowest in Sincock's Bog. To date, 10 Kauai creepers have been tested for disease. Of these, none had either active infections or evidence of past infection with malaria (unpublished data cited in U.S. Fish and Wildlife Service candidate assessment form). However, it is impossible to assess from these limited data how serious disease is as a limiting factor for this species; low infection rates could reflect either low transmission rates or high mortality of infected birds.

Predation on Kauai creepers and their nests has not been documented. However, introduced mammals such as black rats (*Rattus rattus*), Polynesian rats (*R. exulans*), Norway rats (*R. norvegicus*), and feral cats (*Felis domesticus*) are present in the Alakai swamp on Kauai (Tweed et al. 1999) and are potential predators on roosting or incubating adults, nests, and young. Two species of owls, the native Pueo (*Asio flammeus sandwichensis*) and the introduced Barn Owl (*Tyto alba*), are known to prey on forest passerines (unpublished data cited in U.S. Fish and Wildlife Service candidate assessment form).

D. ***Inadequacy of existing regulatory mechanisms.***

There are no protective regulations for this species.

Current Conservation Efforts: The Hawaii Forest Bird Recovery Team, assembled by the U.S. Fish and Wildlife Service, is in the process of revising the Hawaiian Forest Bird Recovery Plan, which will include the Kauai creeper as a candidate species. A draft of the revised plan is currently being reviewed by the U.S. Fish and Wildlife Service Region 1 office in Portland, Oregon (B.L. Woodworth *in litt.* August 2002).

In March 2000, the Hawaii State Division of Foresty and Wildlife, USGS-BRD, and the U.S. Fish and Wildlife Service conducted a systematic survey of forest bird populations throughout the Alakai. The surveys included the majority of intact native forest on Kauai above about 1200 m. Once analyzed, these data will provide: (1) an up-to- date population estimate for the Kauai creeper; (2) an analysis of population trends over the past 20 years; (3) an up-to-date distribution map; and (4) a habitat suitability map for the Kauai creeper.

The Forest Reserve Act of 1903 and subsequent predator control were important actions that have protected watersheds in Hawaii. The Act has been strengthened and re-titled DLNR Title 13, Chapter 104 Rules Regulating Activities Within Forest Reserves and provides protection to native forest values from certain degrading factors caused by human activities. The Hawaii Department of Land and Natural Resources Regulation (Administrative Rule No. 1, Chapter 3), established the 9,939 acre Alakai Wilderness Preserve in 1964, recognizing the pristine forest values of that area and the need to control potential degrading factors.

Dr. Carter Atkinson of the USGS-BRD has initiated forest bird disease studies on several of the main Hawaiian islands, including Kauai, focusing primarily on blood borne diseases within the range of endangered and candidate Hawaiian forest birds, including the Kauai creeper. This research is aimed at understanding the significance of disease and evaluating the long held theory that diseases brought to Hawaii by introduced exotic birds, and the establishment of alien vectors

of disease such as mosquitoes, have played a major part in the decline and extinction of native birds in Hawaii.

E. ***Other natural or manmade factors affecting its continued existence.***

Hurricanes in 1983 and 1992 significantly reduced habitat by destroying forests and promoting the spread of alien weeds.

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PETITION TO LIST

Elfin-woods warbler
(*Dendroica angelae*)

AS A FEDERALLY ENDANGERED SPECIES

CANDIDATE HISTORY

CNOR 12/30/82:
CNOR 9/18/85:
CNOR 1/6/89:
CNOR 11/21/91:
CNOR 11/15/94:
CNOR 10/25/99: C
CNOR 10/30/01: C
CNOR 6/13/02: C

TAXONOMY

The taxonomic status of the elfin-woods warbler (*Dendroica angelae*) as a valid species is uncontroversial (e.g., American Ornithologists' Union 1998).

NATURAL HISTORY

Morphology
The elfin-woods warbler is about 12.5 centimeters (4.9 inches) in length, and entirely black and white. It is distinguished by the thin, white eyebrow stripe, white patches on ear-covers and neck, incomplete eye ring, and black crown. The immature bird is similar to the adult, but black is replaced by grayish-green on the back, and yellowish-green on the head and underparts.

Behavior
The elfin-woods warbler builds a compact cup nest, usually close to the trunk and well hidden among the epiphytes of a small tree. The breeding season extends from March to June (Raffaele et al. 1998). The species forages in the middle part of trees, gleaning insects from leaves in the outer portion of the tree crown (Cruz and Delannoy 1984).

Habitat and distribution
The elfin-woods warbler was discovered in 1971 in the elfin (dwarf) forest of the Caribbean

National Forest in the Luquillo Mountains of Puerto Rico. It was described by Kepler and Parkes (1972) and was initially thought to occur only in the Luquillo Mountains. It was later observed in the Sierra de Cayey and the Cordillera Central. In the Cordillera Central, it was reported from the Maricao and Toro Negro Commonwealth Forests. It was at first thought to occur only in the high elevation elfin forests (640 to 1,030 meters (2,099 to 3,378 feet)), but it has since been found at lower elevation tabonuco and palo colorado forest types (370 to 600 meters (1,213 to 1,968 feet)). Little information is available concerning the species' presence in the Sierra de Cayey and the Toro Negro Forest. Arroyo-Vazquez (1991) did not find the species in the Toro Negro Forest in surveys conducted following Hurricane Hugo in 1989. It has been more extensively studied in the Maricao Commonwealth Forest and the Caribbean National Forest.

The Maricao Commonwealth Forest, managed by the Puerto Rico Department of Natural and Environmental Resources, is located in the Cordillera Central in western Puerto Rico. It is approximately 4,150 hectares (ha) (10,250 acres) in size and is divided into two segments. The forest overlies serpentine derived soils, low in water holding capacity and low in fertility, resulting in a more xeric vegetation than might be expected given the amount of rainfall (2,550 cm (994 inches) annually). Vegetation types have been identified as dry slope forest, slope forest, mixed hardwood, exposed ridge woodland (elfin forest), and *Podocarpus* mixed woodland (Department of Natural Resources 1976). The Caribbean National Forest, managed by the U.S. Forest Service, is located in the Luquillo Mountains in eastern Puerto Rico. It is approximately 11,300 ha (27,911 acres) in size, with elevations ranging from 100 to 1,075 meters (328 to 3,526 feet). Forest types have been described as tabonuco, colorado, palm forest, and elfin forest. The elfin forest is characterized by high rainfall, high humidity, low insolation, low temperatures, and constant winds. Found on the summits of the mountains, it is composed of dense stands of short, small diameter, twisted trees and shrubs. The plants and forest floor are covered with mosses and epiphytes. Plant species richness is low compared to other forest types in the Luquillo Mountains (Brown et al. 1983).

POPULATION STATUS

Cruz and Delannoy (1984) stated that the present distribution of the elfin-woods warbler is probably related to the habitat destruction that has occurred in the past. In the Luquillo Mountains, this warbler is rare in the areas of El Yunque and Mt. Britton and more common along the Trade Winds Trail to El Toro, and in the upper part of the Icacos Valley. Intermediate numbers are found along the Caimitillo Trail and along the road to El Yunque. Even where it is more abundant, the species is among the most uncommonly encountered species in the elfin woods (Waide 1995).

In the Maricao Forest, the warbler is known from elevations ranging from 650 to 900 meters (2,132 to 2,952 feet). In this area, the species is found in a variety of habitats, including those that have been altered by humans. Population densities varied, with the highest densities being recorded from Los Viveros (20.9/25 ha (51.6/61.7 acres)) and significant lower densities from Rosario Alto (3.0/25 ha (7.4/61.7 acres)) and Campamento Santana (1.2/25 ha (2.9/61.7 acres)). The Los Viveros area is a *Podocarpus*-mixed hardwood forest with a continuous canopy at 15 to

20 meters (49.2 to 65.6 feet). The latter two areas are a mixture of plantation (*Eucalyptus robusta* (eucalyptus) and *Calophyllum calaba* (maría)) and elfin forest on the ridges (Cruz and Delannoy 1984). Arroyo-Vazquez (1991) found similar densities in surveys conducted in 1989 and 1990. The results of this study suggest that the species migrates vertically in elevation, moving toward the north facing valleys during the months of heaviest rainfall.

BirdLife International (2000) lists the elfin-woods warbler as vulnerable due to its very small range and very small population.

The U.S. Fish and Wildlife Service classifies the elfin-woods warbler as a candidate for Endangered Species Act protection with a listing priority number of 5.

LISTING CRITERIA

A. ***The present or threatened destruction, modification, or curtailment of its habitat or range.***

Historical range: Montane forests of Puerto Rico.

Current range: Uncommon and local at several sites in Puerto Rico, notably the Maricao Commonwealth Forest in the Cordillera Central and the Caribbean National Forest in the Sierra de Luquillo.

Land ownership: The Maricao Commonwealth Forest is managed by the Puerto Rico Department of Natural and Environmental Resources. The Caribbean National Forest is managed by the U.S. Forest Service. Adjacent areas are in private ownership.

Cruz and Delannoy (1984) stated that the elfin-woods warbler was probably more widely distributed in the past, but that it had become restricted in distribution as a result of the destruction and modification of its habitat for a variety of purposes. Today, it has been documented from only four locations, two of which have little information available. Post-Hurricane Hugo studies in Toro Negro did not reveal the presence of the species. A large portion of elfin forest in both the Maricao Commonwealth Forest and the Caribbean National Forest has been destroyed for the construction of telecommunication towers. Any expansion of these facilities would result in the elimination of additional habitat. Areas adjacent to the forests, previously planted in shade coffee, are now being converted to sun coffee. The elimination of this overstory results in the reduction of available wildlife habitat. Because the species may migrate vertically, utilizing lower elevation areas at times, it is essential to conserve these habitats.

Waide (1995) suggested that areas of high pedestrian use have fewer birds. Thus, the expansion of trail or road systems in either forest or the increased use of those presently existing may pose a threat to the species. Timber management is not conducted in the elfin forest, but the species also occurs at lower elevations, for example, in the colorado forest in the Luquillo Mountains. Timber management may reduce overstory tree species diversity and canopy cover, two characteristics

that are positively associated with the density of the species (Cruz and Delannoy 1984; Waide 1995).

B. ***Overutilization for commercial, recreational, scientific, or educational purposes.***

These factors have not been documented as threats to the species.

C. ***Disease or predation.***

The presence of recreational and communications facilities in the Caribbean National Forest has led to a proliferation of feral animals, such as cats and dogs. These and other introduced species, such as rats (*Ratus ratus*), are potential nest predators of the elfin-woods warbler. Native species such as the pearly-eyed thrasher (*Margarops fuscatus*) and the sharp-shinned hawk (*Accipiter striatus*) may prey on the species (Arroyo-Vazquez 1991, Waide 1995).

D. ***Inadequacy of existing regulatory mechanisms.***

Although the Commonwealth of Puerto Rico has a regulation that protects threatened and endangered species, the elfin-woods warbler is not currently on the Commonwealth list. Federal listing would provide protection under the Endangered Species Act, and, in accordance with the existing cooperative agreement under section 6, it would ensure the warbler's addition to the Commonwealth list. No management plan is currently available for the Maricao Commonwealth Forest. Despite its protection as a public forest, development projects continue to be proposed. Recently, although the action was stopped, an adjacent municipality initiated the construction of a road through the forest and destroyed a large tract of forested vegetation.

Current Conservation Efforts: Studies of the breeding biology, foraging behavior, abundance, and distribution of the species have been completed during several investigations and status surveys.

E. ***Other natural or manmade factors affecting its continued existence.***

Arroyo-Vazquez (1991) suggested that the warbler had a specific nesting requirement, aerial leaf litter, and that the species may be affected by a shortage of optimal nest sites. Catastrophic events such as hurricanes may affect the abundance and distribution of the warbler. Following Hurricane Hugo in 1989, Arroyo-Vazquez (1991) did not find any individuals in the Toro Negro Commonwealth Forest or in Luquillo. Waide (1995) suggested that the abundance of birds in the lower elevation forests of the Icacos Valley might be a temporary response to disturbance, given the severe damage incurred by the dwarf forest during Hugo.

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PETITION TO LIST

many-colored fruit dove
(*Ptilinopus perousii perousii*)

AS A FEDERALLY ENDANGERED SPECIES

CANDIDATE HISTORY

CNOR 11/15/94:
CNOR 2/28/96: C
CNOR 9/19/97: C
CNOR 10/25/99: C
CNOR 10/30/01: C
CNOR 6/13/02: C

TAXONOMY

Ptilinopus perousii perousii is found in American Samoa on the four main islands of Tutuila, Olosega, Ofu, and Tau, as well as in Western Samoa. A second subspecies, *P. p. mariae,* is found in Fiji and Tonga (Baptista et al. 1997).

NATURAL HISTORY

This species is found primarily in large tracts of mature rainforest, and occasionally in isolated stands of fruiting trees. It feeds primarily on fruits of several types of fig trees (*Ficus* spp), which appear to provide a key food resource for this species (Watling 1982; Engbring and Ramsey 1989).

POPULATION STATUS

The total population for all islands in American Samoa was estimated at 85 birds in 1986 (Engbring and Ramsey 1989). Over 50 specimens were collected in 1923-24 during the Whitney South Sea Expedition (Murphy 1924; Banks 1984), suggesting a population decline. This species is described by Baptista et al. (1997) as rare and local in Samoa. Populations in American Samoa

are threatened by loss of rainforest habitat due to urbanization and agriculture, the small number of individuals known, catastrophes (hurricanes), and hunting. The population in American Samoa is the only population of this species under U.S. jurisdiction. The status of populations in other areas is not known.

The U.S. Fish and Wildlife Service classifies *P. p. perousii* as a candidate for Endangered Species Act protection with a listing priority number of 6.

LISTING CRITERIA

A. ***The present or threatened destruction, modification, or curtailment of its habitat or range.***

Historical range: American Samoa (all islands)

Current range: American Samoa (all islands)

Land ownership: Private.

Habitat destruction is the primary threat to this species, which requires large tracts of native rainforest containing mature *Ficus* trees (Engbring and Ramsey 1989). Clearing and development of land reduces the amount of habitat available on Tutuila, Ofu, and Olosega. Hurricanes pose an additional threat to remaining forest habitat on all islands.

B. ***Overutilization for commercial, recreational, scientific, or educational purposes.***

Bird hunting may be a potentially significant threat. This.species is less preferred as game than larger birds, but its flocking behavior and tendency to congregate at fruiting trees may make it vulnerable to hunting (Banks 1984, Engbring and Ramsey 1989).

C. ***Disease or predation.***

Nest predation by rats is an important threat to many Pacific island birds (Atkinson 1977, 1985), and may play a role in limiting populations of the many-colored fruit dove. Little is known about the distribution or importance of avian diseases in American Samoa (Atkinson 2000), but introduced diseases are a serious threat to birds in the Hawaiian Islands (Warner 1968, van Riper et al. 1986, Atkinson et al. 1995).

D. ***Inadequacy of existing regulatory mechanisms.***

Currently, there is no formal or informal protection given to this species.

Current Conservation Efforts: The U.S. National Park of American Samoa may provide some protection for this bird. Researchers from the United States Geological Survey, Biological

Resources Division are beginning a study to assess the severity and urgency of the risk from avian diseases, especially avian malaria (*Plasmodium relictum*), in the National Park of American Samoa (Atkinson 2000).

E. ***Other natural or manmade factors affecting its continued existence.***

Naturally occurring demographic or genetic events can cause instability in small populations, and may threaten populations of the many-colored fruit dove in American Samoa. Populations are at risk from hurricanes, random variation in sex ratio, and inbreeding depression, a decrease in vigor and viability often associated with low population numbers.

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PETITION TO LIST

friendly ground-dove (American Samoa population) (*Gallicolumba stairi*)

AS A FEDERALLY ENDANGERED SPECIES

CANDIDATE HISTORY

CNOR 11/15/94:
CNOR 2/28/96: C
CNOR 9/19/97: C
CNOR 10/25/99: C
CNOR 10/30/01: C
CNOR 6/13/02: C

TAXONOMY

The taxonomic status of *Gallicolumba stairi* as a valid species is uncontroversial (e.g., Pratt et al. 1987; BirdLife International 2000). Pratt et al. (1987) noted the inappropriateness of the common name "friendly ground-dove" given this bird's shy and secretive habits. They proposed instead the name "shy ground-dove", which has now been accepted by some other authors (e.g., BirdLife International 2000), but "friendly ground-dove" is still used by the U.S. Fish and Wildlife Service.

NATURAL HISTORY

The preferred habitat of the friendly ground-dove, native forest on steep talus slopes, is rare in American Samoa, which may limit the distribution of the species. The friendly ground-dove feeds on the ground or in the understory on a variety of foods, including seeds, fruit, buds, young leaves, insects, and snails (Baptista et al. 1997).

POPULATION STATUS

The friendly ground-dove has been found in American Samoa on Ofu, where it was first reported in 1976 (Amerson et al. 1982), with a most recent sighting in 1993 (Baptista et al. 1997).

Amerson et al. (1982) and Engbring and Ramsey (1989) suggested this species might also be found on Olosega, and indeed it was observed there in 1996 (C. Solek per H. Freifeld *in litt* 1999 cited in BirdLife International 2000). The total Ofu population was estimated to number about 100 birds when it was first reported (Amerson et al. 1982). Subsequently, Engbring and Ramsey (1989) described the population on Ofu as "very small," but did not attempt a population estimate. Recent estimates indicate that fewer than 10 individuals are present (U.S. Fish and Wildlife Service candidate assessment form).

The population in American Samoa is threatened due to the low number of individuals, catastrophes (hurricanes), and development of its preferred habitat for rock quarries and agriculture. The Ofu (American Samoa) population is the only population of this species under U.S. jurisdiction.

BirdLife International lists the friendly ground-dove as globally vulnerable, noting that it is dwindling or extirpated throughout much of its range (BirdLife International 2000).

The U.S. Fish and Wildlife Service classifies the American Samoa population of the friendly ground-dove as a candidate for Endangered Species Act protection with a listing priority number of 6.

LISTING CRITERIA

A. ***The present or threatened destruction, modification, or curtailment of its habitat or range.***

Historic range: American Samoa (exact islands uncertain)

Current range: The islands of Ofu and Olosega (American Samoa)

Land ownership: Populations are located on private land.

The species' very limited habitat is Friendly ground dove. These activities can be expected to have a significant negative impact on this population. Clearing of lowland rainforests has been implicated as a limiting factor for these populations. Habitat loss is the primary threat to this species. This species is unusually sensitive to disturbance, usually leaving areas with logging or planting activity within a few days of its initiation and staying away even five years after the cessation of human activity (J. Kretzschmar *in litt*. 2000 cited in BirdLife International 2000). The U.S. Army Corps of Engineers has a potential project in the vicinity of the only known population. The Corps has been notified that their actions may affect the survival or habitat of this species.

B. ***Overutilization for commercial, recreational, scientific, or educational purposes.***

Incidental shooting of this species by hunters has been suggested as an important threat, but as

noted above, the friendly ground-dove is actually rather shy and secretive, so it is not likely that hunting is a primary threat.

C. *Disease or predation.*

Nest predation by rats is an important threat to many Pacific island birds (Atkinson 1977, 1985), and may play a role in limiting populations of another Pacific island dove, the many-colored fruit dove (*Ptilonopus perousii*). Little is known about the distribution or importance of avian diseases in American Samoa (Atkinson 2000), but introduced diseases are a serious threat to birds in the Hawaiian Islands (Warner 1968; van Riper et al. 1986; Atkinson et al. 1995).

D. *Inadequacy of existing regulatory mechanisms.*

There are no regulations that provide protection to this species. While hunting bans have been instituted in American Samoa, it is important to note that they are not based on laws, and hence "bans" are not enforceable.

Current Conservation Efforts: The American Samoa government is actively conducting field surveys of habitat and has imposed a 3-year hunting ban to help all pigeons, doves, and bats recover from Hurricanes Ofa and Val. Researchers from the United States Geological Survey, Biological Resources Division are beginning a study to assess the severity and urgency of the risk from avian diseases, especially avian malaria (*Plasmodium relictum*), in the National Park of American Samoa (Atkinson 2000).

E. *Other natural or manmade factors affecting its continued existence.*

This population is at great risk of extinction due to the low number of individuals and the high frequency of catastrophic events (hurricanes). Inbreeding and/or reduced likelihood of locating mates are potential threats.

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PETITION TO LIST

spotless crake (American Samoa population) (*Porzana tabuensis*)

AS A FEDERALLY ENDANGERED SPECIES

CANDIDATE HISTORY

CNOR 11/15/94:
CNOR 2/28/96: C
CNOR 9/19/97: C
CNOR 10/25/99: C
CNOR 10/30/01: C
CNOR 6/13/02: C

TAXONOMY

The taxonomic status of *Porzana tabuensis* as a valid species is uncontroversial (e.g., Pratt et al. 1987; Taylor 1996).

NATURAL HISTORY

The spotless crake is found in the Philippines, Australia, Fiji, Tonga, Society Islands, Marquesas, Western Samoa, and American Samoa. It prefers rank vegetation near water (Watling 1982). All sightings of this species in American Samoa are from the island of Ta'u in marshy habitat or tall, moist, grassy swales.

POPULATION STATUS

A series of 10 specimens was collected from Ta'u in 1923 during the Whitney South Sea Expedition (Murphy 1924; Banks 1984). However, this species was not found during surveys in 1976 (Amerson et al. 1982). It was subsequently reported as extirpated on Ta'u (Muse and Muse 1982), but between 1985 and 1987 as many as three individuals were found on Ta'u (Engbring and Engilis 1988; Engbring and Ramsey 1989). There have been no recent reports of this species

from American Samoa (personal communication 2001 cited in U.S. Fish and Wildlife Service candidate assessment form).

The American Samoan spotless crake population is threatened by the extremely low number of individuals, catastrophes (hurricanes), and predation. The population rediscovered on Ta'u in 1985 is the only known population of spotless crake under U.S. jurisdiction. It is very small, with fewer than 20 individuals known (*fide* U.S. Fish and Wildlife Service candidate assessment form) and is probably decreasing as potential habitat is reduced due to agricultural expansion (Taylor 1996). The status of populations in other areas is not known.

The U.S. Fish and Wildlife Service classifies the American Samoa population of the spotless crake as a candidate for Endangered Species Act protection with a listing priority number of 6.

LISTING CRITERIA

A. ***The present or threatened destruction, modification, or curtailment of its habitat or range.***

Historical range: Island of Ta'u (American Samoa)

Current range: Island of Ta'u (American Samoa)

Land ownership: Habitat is located on private lands.

Loss of wetland habitat is the primary threat to this species, as almost all wetlands have been lost or converted to taro fields. Clearing of land for agriculture severely alters the already limited habitat. Hurricanes also modify the limited habitat.

B. ***Overutilization for commercial, recreational, scientific, or educational purposes.***

Overutilization is not a threat. The species is not known to be taken for commercial, recreational, scientific, or educational purposes.

C. ***Disease or predation.***

Predation by rats may pose a significant threat, a common problem for Pacific island birds. As the number of human dwellings expands, predation by rats is expected to increase.

D. ***Inadequacy of existing regulatory mechanisms.***

This species is not protected by local, State, or Federal regulations or laws. While American Samoa has some restrictions on modifying wetlands, these restrictions are rarely applied in cases of development for subsistence-type living, which is largely the case where the remaining habitat for this species is found (personal communication 1999 cited in U.S. Fish and Wildlife Service

candidate assessment form); consequently habitat loss continues to occur.

Current Conservation Efforts: The American Samoa Government has conducted some surveys of likely habitat on Ta'u Island.

E. ***Other natural or manmade factors affecting its continued existence.***

The low number of individuals in this population (<20) places this species at great risk of extinction from inbreeding and stochastic events (e.g., hurricanes). Hurricanes may cause the direct and indirect mortality of some birds, as well as modify the already limited habitat.

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