rules governing permissible *ex parte* contacts.

For information regarding proper filing procedures for comments, see 47 CFR 1.415 and 1.420.

List of Subjects in 47 CFR Part 73

Television, Television broadcasting.

For the reasons discussed in the preamble, the Federal Communications Commission proposes to amend 47 CFR part 73 as follows:

PART 73—RADIO BROADCAST SERVICES

1. The authority citation for part 73 continues to read as follows:

Authority: 47 U.S.C. 154, 303, 334, 336.

§ 73.622 [Amended]

2. Section 73.622(i), the Post-Transition Table of DTV Allotments under New Mexico, is amended by adding DTV channel *8 and removing DTV channel *9 at Santa Fe.

Federal Communications Commission.

Clay C. Pendarvis,

Associate Chief, Video Division, Media Bureau.

[FR Doc. E9–16089 Filed 7–7–09; 8:45 am]

BILLING CODE 6712–01–P

FEDERAL COMMUNICATIONS COMMISSION

47 CFR Part 73

[DA 09–1432; MB Docket No. 09–111; RM–11541]

Television Broadcasting Services; Colorado Springs, CO

AGENCY: Federal Communications Commission.

ACTION: Proposed rule.

SUMMARY: The Commission has before it a petition for rulemaking filed by Gray Television Licensee, LLC (''Gray''), the licensee of station KKTV(TV), DTV channel 10, Colorado Springs, Colorado. Gray requests the substitution of DTV channel 49 for channel 10 at Colorado Springs.

DATES: Comments must be filed on or before July 23, 2009, and reply comments on or before August 3, 2009.

ADDRESSES: Federal Communications Commission, Office of the Secretary, 445 12th Street, SW., Washington, DC 20554. In addition to filing comments with the FCC, interested parties should serve counsel for petitioner as follows: John M. Burgett, Esq., Wiley Rein LLP, 1776 K Street, NW., Washington, DC 20006.

FOR FURTHER INFORMATION CONTACT: Joyce L. Bernstein, *Joyce.Bernstein@fcc.gov,* Media Bureau, (202) 418–1600.

SUPPLEMENTARY INFORMATION: This is a synopsis of the Commission's Notice of Proposed Rule Making, MB Docket No. 09–11, adopted June 25, 2009, and released June 26, 2009. The full text of this document is available for public inspection and copying during normal business hours in the FCC's Reference Information Center at Portals II, CY–A257, 445 12th Street, SW., Washington, DC 20554. This document will also be available via ECFS (*http://www.fcc.gov/cgb/ecfs/*). (Documents will be available electronically in ASCII, Word 97, and/or Adobe Acrobat.) This document may be purchased from the Commission's duplicating contractor, Best Copy and Printing, Inc., 445 12th Street, SW., Room CY–B402, Washington, DC 20554, telephone 1–800–478–3160 or via e-mail *http://www.BCPIWEB.com.* To request this document in accessible formats (computer diskettes, large print, audio recording, and Braille), send an e-mail to *fcc504@fcc.gov* or call the Commission's Consumer and Governmental Affairs Bureau at (202) 418–0530 (voice), (202) 418–0432 (TTY). This document does not contain proposed information collection requirements subject to the Paperwork Reduction Act of 1995, Public Law 104–13. In addition, therefore, it does not contain any proposed information collection burden ''for small business concerns with fewer than 25 employees,'' pursuant to the Small Business Paperwork Relief Act of 2002, Public Law 107–198, *see* 44 U.S.C. 3506(c)(4).

Provisions of the Regulatory Flexibility Act of 1980 do not apply to this proceeding. Members of the public should note that from the time a Notice of Proposed Rule Making is issued until the matter is no longer subject to Commission consideration or court review, all *ex parte* contacts are prohibited in Commission proceedings, such as this one, which involve channel allotments. *See* 47 CFR 1.1204(b) for rules governing permissible *ex parte* contacts.

For information regarding proper filing procedures for comments, *see* 47 CFR 1.415 and 1.420.

List of Subjects in 47 CFR Part 73

Television, Television broadcasting.

For the reasons discussed in the preamble, the Federal Communications Commission proposes to amend 47 CFR Part 73 as follows:

PART 73—RADIO BROADCAST SERVICES

1. The authority citation for part 73 continues to read as follows:

Authority: 47 U.S.C. 154, 303, 334, 336.

§ 73.622(i) [Amended]

2. Section 73.622(i), the Post-Transition Table of DTV Allotments under Colorado, is amended by adding DTV channel 49 and removing DTV channel 10 at Colorado Springs.

Federal Communications Commission.

Clay C. Pendarvis,

Associate Chief, Video Division, Media Bureau.

[FR Doc. E9–16128 Filed 7–7–09; 8:45 am]

BILLING CODE 6712–01–P

DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

[FWS-R1-ES-2009-0036; 92210-1111-0000-B2]

RIN 1018-AV47

Endangered and Threatened Wildlife and Plants; Proposed Endangered Status for Flying Earwig Hawaiian Damselfly (*Megalagrion nesiotes*) and Pacific Hawaiian Damselfly (*M. pacificum*) Throughout Their Ranges

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Proposed rule.

SUMMARY: We, the U.S. Fish and Wildlife Service (Service), propose to list two species of Hawaiian damselflies, the flying earwig Hawaiian damselfly (*Megalagrion nesiotes*) and the Pacific Hawaiian damselfly (*M. pacificum*), as endangered under the Endangered Species Act of 1973, as amended (Act). If we finalize this rule as proposed, it would extend the Act's protections to these species. We have determined that critical habitat for these two Hawaiian damselflies is prudent, but not determinable at this time.

DATES: We will accept comments received on or before September 8, 2009. We must receive requests for public hearings, in writing, at the address shown in the **FOR FURTHER INFORMATION CONTACT** section by August 24, 2009.

ADDRESSES: You may submit comments by one of the following methods:

• Federal eRulemaking Portal: *http://www.regulations.gov*. Follow the instructions for submitting comments to Docket No. FWS-R1-ES-2009-0036.

• U.S. mail or hand-delivery: Public Comments Processing, Attn: FWS-R1-ES-2009-0036; Division of Policy and Directives Management; U.S. Fish and Wildlife Service; 4401 N. Fairfax Drive, Suite 222; Arlington, VA 22203.

We will post all comments on *http://www.regulations.gov*. This generally means that we will post any personal information you provide us (see the Public Comments section below for more information).

FOR FURTHER INFORMATION CONTACT: Gina Shultz, Deputy Field Supervisor, Pacific Islands Fish and Wildlife Office, 300 Ala Moana Boulevard, Box 50088, Honolulu, HI 96850; telephone 808-792-9400; facsimile 808-792-9581. Persons who use a telecommunications device for the deaf (TDD) may call the Federal Information Relay Service (FIRS) at 800-877-8339.

SUPPLEMENTARY INFORMATION:

Public Comments

We intend that any final action resulting from this rule will be based on the best scientific and commercial data available and be as accurate and as effective as possible. Therefore, we request comments or suggestions on this proposed rule from the public, other concerned governmental agencies, the scientific community, industry, or any other interested party concerning this proposed rule. We particularly seek comments concerning:

(1) Biological, commercial trade, or other relevant data concerning threats (or lack thereof) to these species and regulations that may be addressing those threats;

(2) Additional information concerning the range, distribution, and population sizes of these species, including the locations of any additional populations of these species;

(3) Any information on the biological or ecological requirements of these species;

(4) Current or planned activities in the areas occupied by these species and their possible impacts on these species;

(5) Which physical and biological factors are essential to the conservation of each species and whether those features may require special management considerations or protections;

(6) Which specific areas area essential to the conservation of each species; and

(7) The reasons why any areas should or should not be designated as critical habitat as provided by section 4 of the Endangered Species Act of 1973, as amended (Act) (16 U.S.C. 1531 *et seq.*), including whether the benefits of designation would outweigh the threats to the species that designation could cause, such that the designation of critical habitat is prudent.

Please note that submissions merely stating support for or opposition to the action under consideration without providing supporting information, although noted, will not be considered in making a determination, as section 4(b)(1)(A) of the Act directs that determinations as to whether any species is a threatened or endangered species must be made ''solely on the basis of the best scientific and commercial data available.''

You may submit your comments and materials concerning this proposed rule by one of the methods listed in the **ADDRESSES** section.

If you submit a comment via *http://www.regulations.gov*, your entire comment—including any personal identifying information—will be posted on the website. If your submission is made via a hardcopy that includes personal identifying information, you may request at the top of your document that we withhold this information from public review. However, we cannot guarantee that we will be able to do so. We will post all hardcopy submissions on *http://www.regulations.gov*. Please include sufficient information with your comments to allow us to verify any scientific or commercial information you include.

Comments and materials we receive, as well as supporting documentation we used in preparing this proposed rule, will be available for public inspection at *http://www.regulations.gov*, or by appointment, during normal business hours, at the U.S. Fish and Wildlife Service, Pacific Islands Fish and Wildlife Office (see **FOR FURTHER INFORMATION CONTACT**).

You may obtain copies of the proposed rule by mail from the Pacific Islands Fish and Wildlife Office (see **FOR FURTHER INFORMATION CONTACT**) or by visiting the *Federal eRulemaking Portal* at *http://www.regulations.gov*.

Background

Previous Federal Actions

The candidate status of each of the two damselfly species proposed here for listing, the flying earwig Hawaiian damselfly and the Pacific Hawaiian damselfly, was most recently reassessed and affirmed in the December 6, 2007, Notice of Review of Native Species that are Candidates for Listing as Endangered or Threatened (CNOR) (72 FR 69034). Candidate species are those taxa for which the Service has sufficient information on their biological status and threats to propose them for listing under the Act, but for which the development of a listing regulation has been precluded by other higher priority listing activities.

Both the flying earwig Hawaiian damselfly and the Pacific Hawaiian damselfly were first listed as candidate species on May 22, 1984 (49 FR 21664). The flying earwig Hawaiian damselfly was listed as a Category 3A (C3A) species, while the Pacific Hawaiian damselfly was listed as a Category 2 (C2) species. The flying earwig was removed from the candidate list on November 21, 1991 (56 FR 58804), whereas the Pacific Hawaiian damselfly retained its status as a C2 species. On November 15, 1994 (59 FR 58982), the flying earwig Hawaiian damselfly was added back to the candidate list, this time as a C2 species, and the Pacific Hawaiian damselfly was reclassified as a Category 1 species. In the Candidate Notice of Review (CNOR) published on February 28, 1996, we announced a revised list of plant and animal taxa that were regarded as candidates for possible addition to the Lists of Threatened and Endangered Wildlife and Plants (61 FR 7595). This revision also included a new ranking system, whereby each candidate species was assigned a Listing Priority Number (LPN) from 1 to 12. Both the flying earwig Hawaiian damselfly and the Pacific Hawaiian damselfly were assigned an LPN of 2 on February 28, 1996 (61 FR 7595).

On May 4, 2004, the Center for Biological Diversity petitioned the Secretary of the Interior to list 225 species of plants and animals that were already candidates, including these two Hawaiian damselfly species, as endangered or threatened under the provisions of the Act. In our annual CNOR, dated May 11, 2005 (70 FR 24870), we retained a listing priority number of 2 for both of these species in accordance with our priority guidance published on September 21, 1983 (48 FR 43098). A listing priority number of 2 reflects threats that are both imminent and high in magnitude, as well as the taxonomic classification of each of these two Hawaiian damselflies as distinct species. At the time, we determined that publication of a proposed rule to list these species was precluded by our work on higher priority listing actions. Since then, we have published our annual findings on the May 4, 2004, petition (including our findings on these two candidate species) in the CNORs dated September 12, 2006 (71 FR 53756), December 6, 2007 (72 FR 69034), and December 10, 2008 (73 FR 75176).

In Fiscal year 2007, we determined that funding was available to initiate

work on listing determinations for these two species and that work on listing determinations was no longer precluded by higher priority actions. As such, this proposal constitutes our proposed listing determination for these two species.

Species Information

The Hawaiian Islands are well-known for several spectacular evolutionary radiations resulting in a unique insect fauna found nowhere else in the world. One such group, which began its evolution perhaps as long as 10 million years ago (Jordan *et al.* 2003, p. 89), is the narrow-winged Hawaiian damselfly genus *Megalagrion*. This genus appears to be most closely related to species of *Pseudagrion* elsewhere in the Indo-Pacific (Zimmerman 1948a, pp. 341, 345). The *Megalagrion* species of the Hawaiian Islands have evolved to occupy as many larval breeding niches as all the rest of the world's damselfly species combined, and in terms of the number of insular endemic (native to only one island) species, are exceeded only by the radiation of damselfly species of Fiji in the Pacific (Jordan *et al.* 2003, p. 91). Resembling slender dragonflies, damselflies are distinguished by folding their wings parallel to the body while at rest rather than holding them out perpendicular to the body.

Native Hawaiians apparently did not differentiate the various species, but referred to the native damselflies (and dragonflies) collectively as ''pinau,'' and to the red-colored damselflies specifically as ''pin ao ula.'' There has been no traditional European use of a common name for species in the genus *Megalagrion*. In his 1994 taxonomic review of the candidate species of insects of the Hawaiian Islands, Nishida (1994, pp. 4-7) proposed the name ''Hawaiian damselflies'' as the common name for species in the genus *Megalagrion*. Because this name reflects the restricted distribution of these insects and is nontechnical, the common name ''Hawaiian damselflies'' is adopted for general use here, and we use the accepted common names flying earwig Hawaiian damselfly and Pacific Hawaiian damselfly to identify the two individual species addressed in this proposed rule.

The general biology of Hawaiian damselflies is typical of other narrow-winged damselflies (Polhemus and Asquith 1996, pp. 2-7). The males of most species are territorial, guarding areas of habitat where females will lay eggs (Moore 1983a, p. 89). During copulation, and often while the female lays eggs, the male grasps the female behind the head with terminal abdominal appendages to guard the female against rival males; thus males and females are frequently seen flying in tandem.

In most species of Hawaiian damselflies, the immature larval stages (naiads) are aquatic, breathing through three flattened abdominal gills, and are predaceous, feeding on small aquatic invertebrates or fish (Williams 1936, p. 303). Females lay eggs in submerged aquatic vegetation or in mats of moss or algae on submerged rocks, and hatching occurs in about 10 days (Williams 1936, pp. 303, 306, 318; Evenhuis *et al.* 1995, p. 18). Naiads may take up to 4 months to mature (Williams 1936, p. 309), after which they crawl out of the water onto rocks or vegetation to molt into winged adults, typically remaining close to the aquatic habitat from which they emerged. The Pacific Hawaiian damselfly exhibits this typical aquatic life history.

The naiads of some species of Hawaiian damselflies are terrestrial or semi-terrestrial, living on wet rock faces or in damp terrestrial conditions, inhabiting wet leaf litter or moist leaf axils (the angled juncture of the leaf and stem) of native plants up to several feet above ground (Zimmerman 1970, p. 33; Simon *et al.* 1984, p. 13; Polhemus and Asquith 1996, p. 17). The naiads of these terrestrial and semi-terrestrial species have evolved short, thick, hairy gills and in many species are unable to swim (Polhemus and Asquith 1996, p. 75). The flying earwig Hawaiian damselfly is believed to exhibit this terrestrial or semi-terrestrial naiad life history.

Adult damselflies are predaceous and feed on small flying insects such as midges. The adults of many of the Hawaiian *Megalagrion* spp. are unusual in that they have a highly developed behavior of feigning death when caught or attacked (Moore 1983b, pp. 161-165).

The Hawaiian damselflies are represented by 23 species and 5 subspecies, and are found on 6 of the Hawaiian Islands (Kauai, Oahu, Molokai, Maui, Lanai, and Hawaii). There are more species of *Megalagrion* on the geologically older islands (e.g., 12 species on Kauai) than on the geologically youngest island (e.g., 8 species on Hawaii), and there are more single-island endemic species on the older islands (e.g., 10 on Kauai) than on the youngest island (e.g., none on Hawaii) (Jordan *et al.* 2003, p. 91). Historically, *Megalagrion* damselflies were among the most common and conspicuous native Hawaiian insects. Some species commonly inhabited water gardens in residential areas, artificial reservoirs, and watercress farms, and were even abundant in the city of Honolulu, as noted by early collectors of this group (Perkins 1899, p. 76; Perkins 1913, p. clxxviii; Williams 1936, p. 304).

Beginning with the early alteration of streams and wetland systems by the colonizing Hawaiians, followed by extensive stream and wetland conversion, alteration, and modification, and by degradation of native forests through the 20th century, Hawaii's native damselflies, including the two species that are the subject of this proposal, experienced a tremendous reduction in available habitat. In addition, predation by a number of nonnative species that have been both intentionally and, in some cases, inadvertently introduced onto the Hawaiian Islands is a significant and ongoing threat to all native Hawaiian damselflies.

Flying Earwig Hawaiian Damselfly

The flying earwig Hawaiian damselfly was first described from specimens collected in the 1890s in Puna on Hawaii Island by R.C.L. Perkins (1899, p. 72). Kennedy (1934, pp. 343-345) described what was believed at the time to be a new species of damselfly based on specimens from Maui; these were later determined to be synonymous with the specimens collected by Perkins. The flying earwig Hawaiian damselfly is a comparatively large and elongated species. The males are blue and black in color and exhibit distinctive, greatly enlarged, pincer-like cerci (paired appendages on the rear-most segment of the abdomen used to clasp the female during mating). Females are predominantly brownish in color. The adults measure from 1.8 to 1.9 inches (in) (46 to 50 millimeters (mm)) in length and have a wingspan of 1.9 to 2.1 in (50 to 53 mm). The wings of both sexes are clear except for the tips, which are narrowly darkened along the front margins. Naiads of this species have never been collected or found (Polhemus and Asquith 1996, p. 69), but they are believed to be terrestrial or semi-terrestrial in habit (Kennedy 1934, p. 345; Preston 2007).

The biology of the flying earwig Hawaiian damselfly is not well understood, and it is unknown if this species is more likely to be associated with standing water or flowing water (Kennedy 1934, p. 345; Polhemus 1994, p. 40). The only confirmed population found in the last 6 years occurs along a steep, moist, riparian talus slope (a slope formed by an accumulation of rock debris), densely covered with *Dicranopteris linearis* (uluhe), a native

fern. Adults of the flying earwig Hawaiian damselfly have been observed to perch on vegetation and boulders, and to fly slowly for short distances. When disturbed, the adults fly downward within nearby vegetation or between rocks, rather than up and away as is usually observed with aquatic Hawaiian damselfly species. Although immature individuals have not been located, based on the habitat and the behavior of the adults, it is believed that the naiads are terrestrial or semi-terrestrial, occurring among damp leaflitter (Kennedy 1934, p. 345) or possibly within moist soil or seeps between boulders in suitable habitat (Preston 2007). The highest elevation at which this species has been recorded is 3,000 feet (ft) (914 meters (m)), but its close association with uluhe habitat suggests that its range may extend upward to close to 4,000 ft (1,212 m) (Foote 2007).

Historically, the flying earwig Hawaiian damselfly was known from the islands of Hawaii and Maui. On Hawaii, it was originally known from seven or more general localities. The species has not been seen on Hawaii for over 80 years, although extensive surveys within apparently suitable habitat in the Kau and Olaa areas were conducted from 1997 to 2008 (Polhemus 2008). On Maui, the flying earwig damselfly was historically reported from five general locations on the windward side of the island (Kennedy 1934, p. 345). Since the 1930s, however, the flying earwig Hawaiian damselfly has only been observed in a single area on the windward side of east Maui, despite surveys from 1993 through 2008 at several of its historically occupied sites. The last observation of the species on windward east Maui was in 2005 (Foote 2008); the species was not observed during the last survey at this location in 2008. No quantitative estimate of the size of this remaining population is available.

It is hypothesized that the flying earwig Hawaiian damselfly may now be restricted to what is perhaps suboptimal habitat, where periodic absences of the species due to drought may be expected and might explain the lack of observations of the species (Foote 2007). Some researchers also believe that overcollection of this species by enthusiasts may have impacted some populations in the past (Polhemus 2008). It is further possible that the individuals observed in this area are actually part of a larger population that may be located in the extensive belt of uluhe habitat located upslope, where the habitat is predominantly native shrubs and matted fern understory (Foote 2007; Hawaii Biodiversity and Mapping Program (HBMP) 2006). Unsurveyed areas containing potentially suitable habitat for this species include the Hana coast of east Maui, and the east rift zone of Kilauea and the Kona area on the island of Hawaii (Foote 2007).

Pacific Hawaiian Damselfly

The Pacific Hawaiian damselfly was first described by McLachlan (1883, p. 234) based on specimens collected by R.C.L. Perkins from streams on the islands of Lanai and Maui. This damselfly is a relatively small, dark-colored species, with adults measuring from 1.3 to 1.4 in (34 to 37 mm) in length and having a wingspan of 1.3 to 1.6 in (33 to 42 mm). Both adult males and females are mostly black in color. Males exhibit brick red striping and patterns, while females exhibit light green striping and patterns. The only immature individuals of this species that have been collected were early-instar (an intermoult stage of development) individuals, and they exhibit flattened, leaf-like gills (Polhemus and Asquith 1996, p. 83). This species is most easily distinguished from other Hawaiian damselflies by the extremely long lower abdominal appendages of the male, which greatly exceed the length of the upper appendages.

Historically, the Pacific Hawaiian damselfly was known from lower elevations (below 2,000 ft (600 m)) on all of the main Hawaiian Islands except Kahoolawe and Niihau (Perkins 1899, p. 64). This species was known to breed primarily in lentic (standing water) systems such as marshes, seepage-fed pools, large ponds at higher elevations, and small, quiet pools in gulches that have been cut off from the main stream channel (Moore and Gagne 1982, p. 4; Polhemus and Asquith 1996, p. 83). The Pacific Hawaiian damselfly is no longer found in most lentic habitats in Hawaii, such as ponds and taro (*Colocasia esculenta*) fields, due to predation by nonnative fish that now occur in these systems (Moore and Gagne 1982, p. 4; Englund *et al.* 2007, p. 215). Observations have confirmed that the Pacific Hawaiian damselfly is now restricted almost exclusively to seepage-fed pools along overflow channels in the terminal reaches of perennial streams, usually in areas surrounded by thick vegetation (Moore and Gagne 1982, pp. 3-4; Polhemus 1994, p. 54; Englund 1999, p. 236; Englund *et al.* 2007, p. 216; Polhemus 2007, p. 238). Adults usually do not stray far from the vicinity of the breeding pools, perching on bordering vegetation and flying only short distances when disturbed (Polhemus and Asquith 1996, p. 83). This species is rarely seen along main stream channels, and its ability to disperse long distances over land or water is suspected to be poor compared to other Hawaiian damselflies (Jordan *et al.* 2007, p. 254).

The Pacific Hawaiian damselfly is now believed to be extirpated from the islands of Oahu, Kauai, and Lanai (Polhemus and Asquith 1996, p. 83). On the island of Oahu, due to its occupation of particularly vulnerable habitat within sidepools of lowland streams, the Pacific Hawaiian damselfly was rare by the 1890s and appears to have been extirpated from this island since 1910 (Liebherr and Polhemus 1997, p. 494). It is unknown when the Kauai and Lanai populations of the Pacific Hawaiian damselfly disappeared. Until 1998, it was believed that the species may also have been extirpated from the island of Hawaii. That year, one population was discovered within a small stream located just above, but isolated from, Maili Stream, which is known to be occupied by nonnative fish (Englund 1998, pp. 15-16). By the late 1970s, fewer than six populations of the Pacific Hawaiian damselfly could be located on Maui and Molokai (Harwood 1976, pp. 251-253; Gagne 1980, pp. 119, 125; Moore and Gagne 1982, p. 1), and the conservation of this species was identified as a priority by the International Union for the Conservation of Nature and Natural Resources (Moore 1982, p. 209).

The Pacific Hawaiian damselfly is currently found in at least seven streams on Molokai and may possibly be extant in other, unsurveyed streams on Molokai's north coast that have not been invaded by nonnative fish (Englund 2008). On the island of Maui, the species is currently known from 14 streams. The Pacific Hawaiian damselfly is no longer found along the entire reaches of these Maui streams, but only in restricted areas along each stream where steep terrain prevents access by nonnative fish, which inhabit degraded, lower stream reaches (Polhemus and Asquith 1996, p. 13; Englund *et al.* 2007, p. 215). The species is known from a single population on the island of Hawaii, last observed in 1998.

No quantitative estimates of the size of the extant populations are available. Howarth (1991, p. 490) described the Pacific Hawaiian damselfly as the most common and most widespread of the native damselfly species at the end of the 19th century, and yet a decline in this species was observed as early as 1905 due to the effects of nonnative fish introduced for control of mosquitoes.

Summary of Factors Affecting the Species

Section 4 of the Act (16 U.S.C. 1531 *et seq.*) and its implementing regulations (50 CFR part 424) set forth the procedures for adding species to the Federal Lists of Endangered and Threatened Wildlife and Plants. A species may be determined to be an endangered or threatened species due to one or more of the five factors described in section 4(a)(1) of the Act. These five listing factors are: (A) The present or threatened destruction, modification, or curtailment of its habitat or range; (B) overutilization for commercial, recreational, scientific, or educational purposes; (C) disease or predation; (D) the inadequacy of existing regulatory mechanisms; and (E) other natural or manmade factors affecting its continued existence. Listing a species as a threatened or endangered species under the Act may be warranted based on any of the above threat factors, singly or in combination.

The threats to the flying earwig and Pacific Hawaiian damselfly species are summarized according to the five listing factors in Table 1, and discussed in detail below.

TABLE 1. SUMMARY OF THREATS TO THE FLYING EARWING AND PACIFIC HAWAIIAN DAMSELFLY SPECIES.

Threat	Factor	Flying Earwig Hawaiian Damselfly	Pacific Hawaiian Damselfly
Agriculture/urban development	A	X	X
Stream alteration	A	P	X
Habitat modification by pigs	A	X	
Habitat modification by nonnative plants	A	X	X
Stochastic events	A	X	X
Climate change	A	X	X
Overcollection	B	P	
Predation	C	A, BF (P)	A, B, F, BF
Inadequate habitat protection	D	X	X
Inadequate protection from nonnative aquatic species introduction	D	X	X
Limited populations	E	X	X

A = ants B = backswimmers F = fish BF = bullfrogs P = potential threat

Factor A. The Present or Threatened Destruction, Modification, or Curtailment of [Their] Habitat or Range

Freshwater habitats used by the flying earwig and Pacific Hawaiian damselflies on all of the main Hawaiian Islands have been severely altered and degraded because of past and present land and water management practices, including: agriculture and urban development; development of ground water, perched aquifer (aquifer sitting above main water table), and surface water resources; and the deliberate and accidental introductions of nonnative animals (Harris *et al.* 1993, pp. 12-13; Meier *et al.* 1993, pp. 181-183).

Habitat Destruction and Modification by Agriculture and Urban Development

Although there has never been a comprehensive, site-by-site assessment of wetland loss in Hawaii (Erikson and Puttock 2006, p. 40), Dahl (1990, p. 7) estimated that at least 12 percent of lowland to upper-elevation wetlands in Hawaii had been converted to non-wetland habitat by the 1980s. If only coastal plain (below 1,000 ft (305 m)) wetlands are considered, it is estimated that 30 percent have been converted for agricultural and urban development (Kosaka 1990). These marshlands and wetlands provided habitat for several damselfly species, including the Pacific Hawaiian damselfly.

Although extensive filling of freshwater wetlands is rarely permitted today, loss of riparian or wetland habitats utilized by the Pacific and flying earwig Hawaiian damselflies, such as smaller areas of moist slopes, emergent vegetations and narrow strips of freshwater seeps within anchialine pool complexes (landlocked bodies of water with a subterranean connection to the ocean), still occurs. In addition, marshes have been, and continue to be, slowly filled and converted to meadow habitat due to increased sedimentation resulting from increased storm water runoff from upslope development, the accumulation of uncontrolled growth of invasive vegetation, and blockage of downslope drainage (Wilson Okamoto & Associates, Inc. 1993, pp. 3-4 to 3-5).

The effects of future conversion of wetland and other aquatic habitat for agriculture and urban development are immediate and significant for the following reason: as noted above, an estimated 30 percent of all coastal plain wetlands in Hawaii have already been lost to agriculture and urban development, while the loss of lowland freshwater habitat in Hawaii already approaches 80 to 90 percent (Kosaka 1990). Lacking the aquatic habitat features that the damselflies require for essential life history needs, such as marshes, ponds, and sidepools along streams (Pacific Hawaiian damselfly) and riparian habitat (flying earwig Hawaiian damselfly), these modified areas no longer support populations of these two Hawaiian damselflies. Agriculture and urban development have thus contributed to the present curtailment of the habitat of these two Hawaiian damselflies, and we have no indication that this threat is likely to be significantly ameliorated in the near future.

Habitat Destruction and Modification by Stream Diversion

Stream modifications began with the early Hawaiians who diverted water to irrigate taro. However, early diversions often took no more than half the stream flow, and typically were periodic, to occasionally flood taro ponds year round, rather than continuously flood them (Handy and Handy 1972, pp. 58-59).

The advent of plantation sugarcane cultivation led to far more extensive stream diversions, with the first diversion built in 1856 on Kauai (Wilcox 1996, p. 54). These systems were designed to tap water at upper elevations (above 984 ft (300 m)) by means of a concrete weir in the stream (Wilcox 1996, p. 54). All or most of the low or average flow of the stream was, and often still is, diverted into fields or reservoirs, leaving many stream channels completely dry (Takasaki *et al.* 1969, pp. 27-28; Harris *et al.* 1993, p. 12; Wilcox 1996, p. 56).

By the 1930s, water diversions had been developed on all of the main Hawaiian Islands, and by 1978 the stream flow in over one-half of all of the 366 perennial streams in Hawaii had been altered in some manner (Brasher 2003, p. 1055). Some stream diversion systems are extensive, such as the Waiahole Ditch, which diverts water from 37 streams within the range of the Pacific Hawaiian damselfly on the windward side of Oahu to the dry plains on the leeward side of the island via a tunnel cut through the Koolau mountain range (Stearns and Vaksvik 1935, pp. 399-403). On west Maui, as of 1978, over 49 mi (78 km) of stream habitat in 12 streams had been lost due to diversions, and all of the 17 perennial streams on west Maui are dewatered to some extent (Maciolek 1979, p. 605). This loss of stream habitat may have contributed to the extirpation of the Pacific Hawaiian damselfly population on west Maui. Given the affiliation of the flying earwig Hawaiian damselfly with riparian habitats, this loss of stream habitat may also potentially account for its absence on west Maui. Most lower-elevation stream segments on west Maui are now completely dry, except during storm-influenced flows (Maciolek 1979, p. 605). The extensive diversion of streams on Maui island-wide has reduced the amount of stream habitat available to the Pacific Hawaiian damselfly, and potentially to the flying earwig Hawaiian damselfly as well.

In addition to diverting water for agriculture and domestic water supply, streams in Hawaii have also been diverted for use in hydroelectric power. There are a total of 18 active hydroelectric plants operating on Hawaiian streams on the islands of Hawaii, Kauai, and Maui, only one of which is located on a stream where a historical population of the Pacific Hawaiian damselfly was known on Kauai (Waimea). Another 38 sites have been identified for potential hydroelectric development on the islands of Hawaii, Kauai, Maui, and Molokai (Hawaii Stream Assessment 1990, pp. xxi, 96-97). Three of the proposed sites include current populations of the Pacific Hawaiian damselfly. Notably, the single current remaining population site for the flying earwig Hawaiian damselfly on Maui is identified as a potential hydroelectric site. Any additional diversion of streams for use in hydroelectric power could contribute to further loss of stream habitat for the Pacific Hawaiian damselfly and for the flying earwig Hawaiian damselfly.

Habitat Modification and Destruction by Dewatering of Aquifers

In addition to the diversion of stream water and the resultant downstream dewatering, many streams in Hawaii have experienced reduced or zero surface flow as a result of the dewatering of their source aquifers. Often these aquifers, which previously fed the streams, were tapped by tunneling or through the injudicious placement of wells (Stearns and Vaksvik 1935, pp. 386-434; Stearns 1985, pp. 291-305). These groundwater sources were captured for both domestic and agricultural use and in some areas have completely depleted nearby stream and spring flows. For example, the Waikolu Stream on Molokai has reduced flow due in part to groundwater withdrawal (Brasher 2003, p. 1,056), which may have reduced stream habitat available to the Pacific Hawaiian damselfly. Likewise, on Maui, streams in the west Maui Mountains that flow into the Lahaina District are fed by groundwater leaking from breached, high-elevation dikes. Downstream of the dike compartments, stream diversions are designed to capture all of the low stream flow, causing the streams downstream to be frequently dry (U.S. Geological Survey 2008a, p. 1), likely impacting available habitat for the Pacific Hawaiian damselfly, and potentially for the flying earwig Hawaiian damselfly, in the Honolua and Honokohau streams.

The island of Lanai lies within the rain shadow of the west Maui Mountains, which reach 5,788 ft (1,764 m) in elevation. Lower in elevation than Maui, annual rainfall on Lanai's summit is 30 to 40 in (760 to 1,015 mm) but much less over the rest of the island (University of Hawaii Department of Geography 1998, p. 13). Flows of almost every spring and seep on Lanai have been diverted (Stearns 1940, pp. 73-74, 85, 88, 95). Surface waters in streams have also been diverted by tunnels in stream beds. Historically, Maunalei Stream was the only perennial stream on Lanai, and Hawaiians constructed taro loi (ponds for cultivation of taro) in the lower portions of this stream system. In 1911, a tunnel was constructed at 1,100 ft (330 m) elevation that undercuts the stream bed, diverting both the surface and subsurface flows and dewatering the stream from this point to its mouth (Stearns 1940, pp. 86-88). The Pacific Hawaiian damselfly, which depends on stream habitat, was historically known from Lanai but is no longer extant on this island, and was most likely impacted by the dewatering of this stream because it was the only permanent stream on Lanai prior to its dewatering. This example of the negative impact of dewatering leads us to conclude that dewatering poses a threat to the Pacific Hawaiian damselfly and the flying earwig Hawaiian damselfly on the remaining islands where the species persist.

Habitat Modification and Destruction by Vertical Wells

Surface flow of streams has also been affected by vertical wells drilled in pre-modern times, because the basal aquifer (lowest groundwater layer) and alluvial caprock (sediment-deposited harder rock layer) through which the lower sections of streams flow can be pierced and hydraulically connected by wells (Stearns 1940, p. 88). This allows water in aquifers normally feeding the stream to be diverted elsewhere underground. Dewatering of the streams by tunneling and earlier, less-informed well placement near or in streams was a significant cause of habitat loss, and these effects continue today. Historically, for example, there was sufficient surface flow in Makaha and Nanakuli streams on Oahu to support taro loi in their lower reaches, but this flow disappeared subsequent to construction of vertical wells upstream (Devick 1995). The inadvertent dewatering of streams through the piercing of their aquifers (which are normally separated from adjacent water-bearing layers by an impermeable layer), by tunneling or through placement of vertical wells, caused the loss of Pacific Hawaiian damselfly habitat, and contributed to the Pacific Hawaiian damselfly's extirpation on the islands of Oahu, Kauai, and Lanai. Such activities also reduced the extent of stream habitat

for the Pacific Hawaiian damselfly on the islands of Maui, Molokai, and Hawaii. Most lower-elevation stream segments on west Maui and leeward east Maui are now completely dry, except during storm-influenced flows (Maciolek 1979, p. 605). The flow of nearly every seep and spring on Lanai has been captured or bored with wells (Stearns 1940, pp. 73-74, 85, 88, 95). The inadvertent drying of streams from poor well replacement and other activities has contributed to the decline of the Pacific Hawaiian damselfly by reducing its habitat on all of the islands from which it was historically known. It should be noted that the Pacific Hawaiian damselfly was once among the most commonly observed aquatic insects in the islands (Howarth 1991, p. 40). The dewatering of streams on Maui and Hawaii may also have impacted habitat of the flying earwig Hawaiian damselfly.

Although the State of Hawaii's Commission on Water Resource Management is now more cognizant of the effects that ground water removal has on streams via injudicious placement of wells, the Commission still routinely reviews new permit applications for wells (Hardy 2009). All requests for new wells require a drilling permit and, in some cases, a use permit is additionally required, depending upon the intended allocation and anticipated amount of water to be pumped from the well. Water Management Areas have been designated over much of Oahu and in some areas on other neighboring islands. Within these areas, a use permit for a new well is also required, which automatically triggers a greater review of the potential impacts. Any request for a permit to drill a well within proximity of streams or dike rock located at the headwaters of streams automatically triggers additional review (Hardy 2009). Permits to drill wells near streams or within dike complexes are now unlikely to be granted because a new well would require the amendment of in-stream flow standards for the impacted stream. However, such amendments are sometimes approved. One example is the long-contested case involving the Waiahole Ditch on the island of Oahu (Hawaii Department of Agriculture 2002). In that case, the Commission continues to support the removal of several million gallons of water daily from windward Oahu streams (Hawaii Department of Agriculture 2002). In conclusion, although a regulatory process is in place that can potentially address the effects of new requests for ground water removal on streams, this process includes provisions for amendments that would result in adverse effects to ground water that supports streamside habitat for the Pacific Hawaiian damselfly, and potentially for the flying earwig Hawaiian damselfly.

Habitat Modification and Destruction by Channelization

In addition to the destruction of most of the stream habitat of the Pacific Hawaiian damselfly and the flying earwig Hawaiian damselfly, most remaining stream habitat has been, and continues to be, seriously degraded throughout the Hawaiian Islands. Stream degradation has been particularly severe on the island of Oahu where, by 1978, 58 percent of all the perennial streams had been channelized (lined, partially lined or altered) to control flooding (Brasher 2003, p. 1055; Polhemus and Asquith 1996, p. 24), and 89 percent of the total length of these streams had been channelized (Parrish *et al.* 1984, p. 83). The channelization of streams creates artificial, wide-bottomed stream beds and often results in removal of riparian vegetation, increased substrate homogeneity, increased temporal water velocity (increased water flow speed during times of higher precipitation including minor and major flooding), increased illumination, and higher water temperatures (Parrish *et al.* 1984, p. 83; Brasher 2003, p. 1052). Natural streams meander and are lined with rocks, trees, and natural debris, and during times of flooding, jump their banks. Channelized streams are straightened and often lack natural obstructions, and during times of higher precipitation or flooding, facilitate a higher water flow velocity. Hawaiian damselflies are largely absent from channelized portions of streams (Polhemus and Asquith 1996, p. 24). In contrast, undisturbed Hawaiian stream systems exhibit a greater amount of riffle habitat, canopy closure, higher consistent flow velocity, and lower water temperatures that are characteristic of streams to which the Hawaiian damselflies, in general, are adapted (Brasher 2003, pp. 1054-1057).

Channelization of streams has not been restricted to lower stream reaches. For example, there is extensive channelization of the Kalihi Stream, on the island of Oahu, above 1,000 ft (300 m) elevation. Extensive stream channelization has contributed to the extirpation of the Pacific Hawaiian damselfly on Oahu (Englund 1999, p. 236; Polhemus 2008).

Stream diversion, channelization, and dewatering represent significant and immediate threats to the Pacific Hawaiian damselfly for the following reasons: (1) They reduce the amount and distribution of stream habitat available to this species; (2) they reduce stream flow, leaving lower elevation stream segments completely dry except during storms, or leaving many streams completely dry year round, thus reducing or eliminating stream habitat; and (3) they indirectly lead to an increase in water temperature that leads to the loss of Pacific Hawaiian damselfly naiads due to direct physiological stress. Because the probability of species extinction increases when ranges are restricted, habitat decreases, and population numbers decline, the Pacific Hawaiian damselfly is particularly vulnerable to extinction due to such changes in its stream habitats. In addition, stream diversion, dewatering, and vertical wells have the potential to negatively impact, and in some cases may have impacted, the flying earwig Hawaiian damselfly.

Habitat Destruction and Modification by Feral Pigs

One of the primary threats to the flying earwig Hawaiian damselfly is the ongoing destruction and degradation of its riparian habitat by nonnative animals, particularly feral pigs (*Sus scrofa*) (Polhemus and Asquith 1996, p. 22; Erickson and Puttock 2006, p. 42). Pigs of Asian descent were first introduced to Hawaii by the Polynesian ancestors of Hawaiians around 400 A.D. (Kirch 1982, pp. 3-4). Western immigrants, beginning with Captain Cook in 1778, repeatedly introduced European strains (Tomich 1986, pp. 120-121). The pigs escaped domestication and successfully invaded all areas, including wet and mesic forests and grasslands, on all of the main Hawaiian Islands.

High pig densities and expansion of their distribution have caused indisputable widespread damage to native vegetation on the Hawaiian Islands (Cuddihy and Stone 1990, p. 63). Feral pigs create open areas within forest habitat by digging up, eating, and trampling native plant species (Stone 1985, p. 263). These open areas become fertile ground for nonnative plant seeds spread through the excrement of the pigs and by transport in their hair (Stone 1985, p. 263). In nitrogen-poor soils, feral pig excrement increases nutrient availability, enhancing establishment of nonnative weeds that are more adapted to richer soils than are native plants (Cuddihy and Stone 1990, p. 65). In this manner, largely nonnative forests replace native forest habitat (Cuddihy and Stone 1990, p. 65). In

addition, feral pigs will root and dig for plant tubers and worms in wetlands, including marshes, on all of the main Hawaiian Islands (Erikson and Puttock 2006, p. 42).

In a study conducted in the 1980s on feral pig populations in the Kipahulu Valley on Maui, the deleterious effects of feral pig rooting on native forest ecosystems was documented (Diong 1982, pp. 150, 160-167). Rooting by feral pigs was observed to be related to the search for earthworms, with rooting depths averaging 8 in (20 cm), and rooting was found to greatly disrupt the leaf litter and topsoil layers, and contribute to erosion and changes in ground topography. The feeding habits of pigs were observed to create seed beds, enabling the establishment and spread of invasive weedy species such as *Clidemia hirta* (Koster's curse). The study concluded that all aspects of the feeding habits of pigs are damaging to the structure and function of the Hawaiian forest ecosystem (Diong 1982, pp. 160-167).

It is likely that pigs similarly impact the native vegetation used for perching by adult flying earwig Hawaiian damselflies. On Maui, feral pigs inhabit the uluhe-dominated riparian habitat of the flying earwig Hawaiian damselfly. Through their rooting and digging activities, they have significantly degraded and destroyed the habitat of the adult flying earwig Hawaiian damselfly (Foote 2008).

In addition to creating conditions that enable the spread of nonnative plant species, Mountainspring (1986, p. 98) surmised that rooting by pigs depresses insect populations that depend upon the ground layer at some life stage or that exhibit diel (day and night) movements. As a result, it is likely that the presumed habitat (seeps or damp leaf litter) of the naiads of the flying earwig Hawaiian damselfly is negatively impacted by feral pig activity, including the uprooting and denuding of native vegetation (Foote 2008; Polhemus 2008).

Notwithstanding the above impacts, feral pigs are managed as a game animal for public hunting in the more accessible regions of the east Maui watershed (Jokiel 2008). In contrast to an eradication program, this action makes it likely that feral pigs will continue to exist on Maui, and thus likely that pigs will continue to destroy and degrade habitat of the flying earwig Hawaiian damselfly on the island of Maui.

The effects from introduced feral pigs are immediate and ongoing because pigs currently occur in the uluhe-dominated riparian habitat of the flying earwig Hawaiian damselfly. The threat of habitat destruction or modification from feral pigs is significant for the following reasons: (1) Trampling and grazing directly impact the vegetation used by adult flying earwig Hawaiian damselflies for perching and by the terrestrial or semi-terrestrial naiads; (2) increased soil disturbance leads to mechanical damage to plants used by adults for perching and by the terrestrial or semi-terrestrial naiads; (3) creation of open, disturbed areas, conducive to weedy plant invasion and establishment of alien plants from dispersed fruits and seeds, results over time in the conversion of a community dominated by native vegetation to one dominated by nonnative vegetation (leading to all of the negative impacts associated with nonnative plants, detailed below); and (4) increased watershed erosion and sedimentation further degrade habitat for the flying earwig Hawaiian damselfly. These threats are expected to continue or increase without control or elimination of pig populations in these habitats.

Habitat Destruction and Modification by Nonnative Plants

The invasion of nonnative plants, including *Clidemia hirta,* further contributes to the degradation of Hawaii's native forests, including the riparian habitat of the flying earwig Hawaiian damselfly on Maui (Foote 2008). *Clidemia hirta* is the most serious nonnative plant invader within the uluhe-dominated riparian habitat where the flying earwig Hawaiian damselfly occurs on Maui and where it formerly occurred on the island of Hawaii (Foote 2008). *Clidemia hirta* can outcompete the native uluhe fern, and so is capable of altering the natural environment where the flying earwig Hawaiian damselfly occurs. A noxious shrub first cultivated in Wahiawa on Oahu before 1941, this plant is now found on all of the main Hawaiian Islands (Wagner *et al.* 1985, p. 41). *Clidemia hirta* forms a dense understory, shading out native plants and hindering their regeneration; it is considered a major nonnative plant threat in wet forest areas because it inhibits and eventually replaces native plants (Wagner *et al.* 1985, p. 41; Smith 1989, p. 64).

Presently, the most significant threat to natural ponds and marshes in Hawaii is the nonnative species *Urochloa mutica* (California grass). This sprawling perennial grass is likely from Africa (Erickson and Puttock 2006, p. 270). It was first noted on Oahu in 1924 and now occurs on all of the main Hawaiian Islands (O'Connor 1999, p. 1,504), where it is considered an aggressive invasive weed of marshes and wetlands (Erickson and Puttock 2006, p. 270). Found from sea level to 3,610 ft (1,100 m) in elevation (Erickson and Puttock 2006, p. 270), this plant forms dense, monotypic stands that can completely eliminate any open water by layering its trailing stems (Smith 1985, p. 186). Marshlands eventually convert to meadowland when invaded by *Urochloa mutica* (Polhemus and Asquith 1996, p. 23). At Kawainui Marsh, the most extensive marsh system remaining on Oahu, control of *Urochloa mutica* to prevent conversion of the marsh to meadowland is an ongoing management activity (Wilson, Okamoto and Associates, Inc. 1993, pp. 3-4; Hawaiian Ecosystems at Risk (HEAR) 2008, p. 1). The preferred habitat of the Pacific Hawaiian damselfly (primarily lowland, stagnant water, large ponds, and small pools) on all of the Hawaiian Islands has likely declined and continues to decline due to the spread of *Urochloa mutica*, which is causing the conversion of marshlands to meadowlands (Polhemus and Asquith 1996, p. 23).

Nonnative plants represent a significant and immediate and ongoing threat to the flying earwig Hawaiian damselfly through habitat destruction and modification for the following reasons: (1) They adversely impact microhabitat by modifying the availability of light; (2) they alter soil-water regimes; (3) they modify nutrient cycling processes; and (4) they outcompete, and possibly directly inhibit the growth of, native plant species; ultimately, native dominated plant communities are converted to nonnative plant communities (Cuddihy and Stone 1990, p. 74; Vitousek 1992, pp. 33-35). This conversion negatively impacts and threatens the flying earwig Hawaiian damselfly, which depends upon native plant species, particularly uluhe, for essential life history needs. Conversion habitat from marshlands to meadowlands by the nonnative *Urochloa mutica* also threatens the Pacific Hawaiian damselfly. These threats are expected to continue or increase without control or elimination of invasive nonnative plants in these habitats.

Habitat Destruction and Modification by Hurricanes, Landslides, and Drought

Stochastic (random, naturally occurring) events, such as hurricanes, landslides, and drought, alter or degrade the habitat of Hawaiian damselflies directly by modifying and destroying native riparian, wetland, and stream habitats (e.g., rocks and debris falling in a stream; mechanical damage to riparian and wetland vegetation), and indirectly

by creating disturbed areas conducive to invasion by nonnative plants that outcompete the native plants used by damselflies for perching. We presume these events also alter microclimatic conditions (e.g., opening the tree canopy that leads to an increase in stream water temperature; increasing stream sedimentation) so that the habitat no longer supports damselfly populations. Both the flying earwig Hawaiian damselfly and the Pacific Hawaiian damselfly may also be affected by temporary habitat loss (e.g., desiccation of streams, die-off of uluhe) associated with droughts, which are not uncommon on the Hawaiian Islands. With populations that have already been severely reduced in both abundance and geographic distribution, even such a temporary loss of habitat can have a negative impact on the species.

Natural disasters such as hurricanes and drought, and local, random environmental events (such as landslides), represent a significant threat to native riparian, wetland, and stream habitat and the two damselfly species addressed in this proposed rule. These types of events are known to cause significant habitat damage (e.g., Polhemus 1993, p. 86). Because the two species addressed in this proposed rule now persist in low numbers or occur in restricted ranges, they are more vulnerable to these events and less resilient to such habitat disturbances. Hurricanes, drought, and landslides are known and expected to occur at irregular intervals. Therefore, they pose an immediate and ongoing threat to the two damselfly species and their habitat.

Habitat Destruction and Modification by Climate Change

The information currently available on the effects of global climate change does not make sufficiently precise estimates of the location and magnitude of the effects. Consequently, the exact nature of the impacts of climate change and increasing temperatures on native Hawaiian ecosystems, including the aquatic and riparian habitats of the flying earwig Hawaiian damselfly and the Pacific Hawaiian damselfly, are unknown. However, they are likely to include the loss of aquatic habitat through reduced stream flow and evaporation of standing water, increased streamwater temperature, and the loss of native riparian and wetland plants that comprise the habitat in which these two species occur (Pounds *et al.* 1999, pp. 611-612; Still *et al.* 1999, p. 610; Benning *et al.* 2002, pp. 14,246 and 14,248).

Oki (2004, p. 4) has noted long-term evidence of decreased precipitation and stream flow in the Hawaiian Islands, based upon evidence collected by stream gauging stations. This long-term drying trend, coupled with existing ditch diversions and periodic El Niño-caused drying events, has created a pattern of severe and persistent stream dewatering events (Polhemus 2008). Future changes in precipitation and the forecast of those changes are highly uncertain because they depend, in part, on how the El Niño-La Niña weather cycle (a disruption of the ocean atmospheric system in the tropical Pacific having important global consequences for weather and climate) might change (Hawaii Climate Change Action Plan 1998, pp. 2-10).

The flying earwig Hawaiian damselfly and the Pacific Hawaiian damselfly may be especially vulnerable to extinction due to anticipated environmental change that may result from global climate change. Environmental changes that may affect these species are expected to include habitat loss or alteration and changes in disturbance regimes (e.g., storms and hurricanes), in addition to direct physiological stress caused by increased stream water temperatures to which the native Hawaiian damselfly fauna are not adapted. The probability of a species going extinct as a result of these factors increases when its range is restricted, habitat decreases, and population numbers decline (Intergovernmental Panel on Climate Change 2007, p. 8). Both of these damselfly species have limited environmental tolerances ranges, restricted habitat requirements, small population size, and a low number of individuals. Therefore, we would expect these species to be particularly vulnerable to projected environmental impacts that may result from changes in climate, and subsequent impacts to their aquatic and riparian habitats (e.g., Pounds *et al.* 1999, pp. 611-612; Still *et al.* 1999, p. 610; Benning *et al.* 2002, pp. 14,246 and 14,248). We believe changes in environmental conditions that may result from climate change will likely impact these two species and, according to current climate projections, we do not anticipate a reduction in this threat any time in the near future.

Summary of Factor A

The effects of past and present destruction, modification, and degradation of native riparian, wetland, and stream habitats threaten the continued existence of the flying earwig Hawaiian damselfly and the Pacific Hawaiian damselfly, which depend on these habitats, throughout their respective ranges. These effects have been or continue to be caused by: agriculture and urban development; stream diversion, channelization, and dewatering; introduced feral pigs; introduced plants; and hurricanes, landslides, and drought. The ongoing and likely increasing effects of global climate change are also likely to adversely impact, directly or indirectly, the habitat of these two species.

Agriculture and urban development, to date, have caused the loss of 30 percent of Hawaii's coastal plain wetlands and 80 to 90 percent of lowland freshwater habitat in Hawaii. Extensive stream diversions and the ongoing dewatering of remaining wetland habitats continue to degrade the quality of Pacific Hawaiian damselfly habitat and its capability to support viable populations of this species and may also negatively affect the habitat of the flying earwig Hawaiian damselfly. Ongoing habitat destruction and degradation caused by feral pigs in remaining tracts of uluhe-dominated riparian habitat promote the establishment and spread of nonnative plants which, in turn, lower or destroy the capability of the habitat to support viable populations of the flying earwig Hawaiian damselfly.

The above threats have caused the extirpation of many flying earwig Hawaiian damselfly and the Pacific Hawaiian damselfly populations; as a result, their current ranges are very restricted. The combination of restricted range, limited habitat quantity and quality, and low population size makes each of these species especially vulnerable to extinction. Thus we consider the present or threatened destruction, modification, or curtailment of the habitat and range of the flying earwig Hawaiian damselfly and the Pacific Hawaiian damselfly to pose an immediate and significant threat to these species.

Factor B. Overutilization for Commercial, Recreational, Scientific, or Educational Purposes

Individuals from what may be the single remaining population of the flying earwig Hawaiian damselfly were collected by amateur collectors as recently as the mid-1990s (Polhemus 2008). Although it is not known how many individuals were collected at that time, Polhemus (2008) believes this incident resulted in a noticeable decrease in the population size. Furthermore, if there is only one population of the species left, the decreased reproduction that would result from the removal of potentially breeding adults would have a

potentially significant negative impact on the species.

There is a market for damselflies that may serve as an incentive to collect them. There are internet websites that offer damselfly specimens or parts (e.g., wings) for sale. In addition, the internet abounds with ''how to'' guides for collecting and preserving damselfly specimens (e.g., Abbott 2000, pp. 1-3). After butterflies and large beetles, dragonflies and damselflies are probably the most frequently collected insects in the world (Polhemus 2009). A rare specimen such as the flying earwig Hawaiian damselfly may be particularly attractive to potential collectors (Polhemus 2008). Based on the history of collection of the flying earwig Hawaiian damselfly, the market for damselfly specimens or parts, and the vulnerability of this small population to the negative impacts of any collection, we consider the potential overutilization of the flying earwig Hawaiian damselfly to pose an immediate and significant threat to this species.

Unlike the flying earwig Hawaiian damselfly, which is restricted to one remaining population site and which is known to have previously been of interest to odonata enthusiasts (Polhemus 2008), we do not believe over-collection is currently a threat to the Pacific Hawaiian damselfly because it is comparatively more widespread across several population sites on three islands.

Factor C. Disease or Predation

The geographic isolation of the Hawaiian Islands restricted the number of original successful colonizing arthropods and resulted in the development of Hawaii's unusual fauna. Only 15 percent of the known families of insects are represented by native Hawaiian species (Howarth 1990, p. 11). Some groups of insects that often dominate continental arthropod fauna, including social Hymenoptera (e.g., ants and wasps) were absent during the evolution of Hawaii's unique arthropod fauna. Commercial shipping and air cargo, as well as biological introductions to Hawaii, have resulted in the establishment of over 3,372 species of nonnative insects (Howarth 1990, p. 18; Staples and Cowie 2001, p. 52), with an estimated continuing establishment rate of 20 to 30 new species per year (Beardsley 1962, p. 101; Beardsley 1979, p. 36; Staples and Cowie 2001, p. 52).

Nonnative arthropod predators and parasites have also been intentionally imported and released by individuals and governmental agencies for biological control of insect pests. Between 1890 and 1985, 243 nonnative species were introduced, sometimes with the specific intent of reducing populations of native Hawaiian insects (Funasaki *et al.* 1988, p. 105; Lai 1988, pp. 186-187). Nonnative arthropods, whether purposefully or accidentally introduced, pose a serious threat to Hawaii's native insects, including the flying earwig Hawaiian damselfly and the Pacific Hawaiian damselfly, through direct predation (Howarth and Medeiros 1989, pp. 82-83; Howarth and Ramsay 1991, pp. 81-84; Staples and Cowie 2001, pp. 54-57).

In addition to the problems posed by nonnative arthropods, the establishment of various nonnative fish, frogs, and toads that act as predators on native Hawaiian damselflies has also had a serious negative impact on the Pacific Hawaiian damselfly and flying earwig Hawaiian damselfly, as discussed below.

Predation by Nonnative Ants

Ants are not a natural component of Hawaii's arthropod fauna, and the native species of the islands evolved in the absence of predation pressure from ants. Ants can be particularly destructive predators because of their high densities, recruitment behavior, aggressiveness, and broad range of diet (Reimer 1993, pp. 17-18). The threat of ant predation on the flying earwig Hawaiian damselfly and the Pacific Hawaiian damselfly is amplified by the fact that most ant species have winged reproductive adults (Borror *et al.* 1989, p. 738) and can quickly establish new colonies in suitable habitats (Staples and Cowie 2001, p. 55). These attributes allow some ants to destroy otherwise geographically isolated populations of native arthropods (Nafus 1993, pp. 19, 22-23).

At least 47 species of ants are known to be established in the Hawaiian Islands (Hawaii Ants 2008, pp. 1-11), and at least 4 particularly aggressive species have severely impacted the native insect fauna, likely including native damselflies (Zimmerman 1948b, p. 173; Reimer *et al.* 1990, pp. 40-43; HEAR database 2005, pp. 1-2): the big headed ant (*Pheidole megacephala*), the long-legged ant (also known as the yellow crazy ant) (*Anoplolepis gracilipes*), *Solenopsis papuana* (no common name), and *Solenopsis geminata* (no common name). Numerous other species of ants are recognized as threats to Hawaii's native invertebrates, and an unknown number of new species of ants are established every few years (Staples and Cowie 2001, pp. 53). Due to their preference for drier habitat sites, ants are less likely to occur in high densities in the riparian and aquatic habitat currently occupied by the flying earwig Hawaiian damselfly and the Pacific Hawaiian damselfly. However, some species of ants (e.g., the long-legged ant and *Solenopsis papuana*) have increased their range into these areas.

The presence of ants in nearly all of the lower elevation habitat sites historically occupied by the flying earwig Hawaiian damselfly and the Pacific Hawaiian damselfly may preclude the future recolonization of these areas by these two species. Damselfly naiads may be particularly susceptible to ant predation when they crawl out of the water or seek a terrestrial location for their metamorphosis into the adult stage. Likewise, newly emerged adult damselflies are susceptible to predation until their wings have sufficiently hardened to permit flight, or when the adults are simply resting on vegetation at night (Polhemus 2008). In 1998, during a survey of an Oahu stream, researchers observed predation by ants upon another damselfly species, the orangeblack Hawaiian damselfly (*Megalagrion xanthomelas*) (Englund 2008).

The long-legged ant appeared in Hawaii in 1952, and now occurs on Kauai, Oahu, Maui, and Hawaii (Reimer *et al.* 1990, p. 42). It inhabits low to midelevation (less than 2,000 ft (600 m)) rocky areas of moderate rainfall (less than 100 in (250 cm) annually) (Reimer *et al.* 1990, p. 42). Direct observations indicate that Hawaiian arthropods are susceptible to predation by this species. Gillespie and Reimer (1993, p. 21) and Hardy (1979, p. 34) documented the impacts to native insects within the Kipahulu area on Maui after this area was invaded by the long-legged ant. Although only cursory observations exist, long-legged ants are thought to be a threat to populations of the Pacific Hawaiian damselfly in mesic areas within its elevation range (Foote 2008).

Solenopsis papuana is the only abundant, aggressive ant that has invaded intact mesic to wet forest from sea level to over 2,000 ft (600 m) on all of the main Hawaiian Islands, and is still expanding its range (Reimer 1993, p. 14). It is likely, based on our knowledge of the expanding range of this invasive ant, that it threatens populations of the Pacific Hawaiian damselfly in mesic areas up to 2,000 ft (600 m) elevation as well (Foote 2008).

The rarity or disappearance of native damselfly species, including the two species in this proposal, from historical observation sites over the past 100 years

is likely due to a variety of factors. While there is no documentation that conclusively ties the decrease in damselfly observations to the establishment of nonnative ants in low to montane, and mesic to wet, habitats on the Hawaiian Islands, the presence of nonnative ants in these habitats and the decline of damselfly observations in these habitats suggest that nonnative ants may have played a role in the decline of some populations of the two damselflies that are the subject of this proposal.

In summary, observations and reports have documented that ants are particularly destructive predators because of their high densities, broad range of diet, and ability to establish new colonies in otherwise geographically isolated locations because the reproductive adults are able to fly. Damselfly naiads are particularly vulnerable to ant predation when they crawl out of water or seek a terrestrial location for metamorphosis into adults, and newly emerged adults are susceptible to predation until they can fly. In particular, the long-legged ant and *Solenopsis papuana* are two aggressive species reported from sea level to 2,000 ft (610 m) in elevation on all of the main Hawaiian Islands. Since their range overlaps that of both damselfly species, we consider these introduced ants to pose an immediate and significant threat to both damselfly species. Unless these aggressive nonnative ant predators are eliminated or controlled, we expect this threat to continue or increase.

Predation by Nonnative Backswimmers

Backswimmers, so-called because they swim upside down, are aquatic ''true bugs'' (Heteroptera). Backswimmers are voracious predators and frequently feed on prey much larger than themselves, such as tadpoles, small fish, and other aquatic insects including damselfly naiads (Heads 1985, p. 559; Heads 1986, p. 369). Backswimmers are not native to Hawaii, but several species have been introduced. *Notonecta indica* (no common name) was first collected on Oahu in the mid-1980s and is presently known from Oahu, Maui, and Hawaii. Species of *Notonecta* are known to prey on damselfly naiads and the mere presence of this predator in the water can cause naiads to reduce foraging (which can reduce naiad growth, development, and survival) (Heads 1985, p. 559; Heads 1986, p. 369). While there is no documentation that conclusively ties the decrease in damselfly observations to the establishment of nonnative backswimmers in Hawaiian streams and other aquatic habitat, the presence of backswimmers in these habitats and the concurrent decline of damselfly observation in some areas suggest that these nonnative aquatic insects may have played a role in the decline of some damselfly populations, including those of the Pacific Hawaiian damselfly.

We consider predation by nonnative backswimmers to pose a significant and immediate threat to the Pacific Hawaiian damselfly since this species has an aquatic naiad life stage. In addition, the presence of these predators in damselfly aquatic habitat causes naiads to reduce foraging, which in turn reduces their growth, development, and survival. Backswimmers are reported on all of the main Hawaiian Islands except Kahoolawe. In the absence of the elimination or control of nonnative backswimmers, we expect this threat to continue or increase over time.

Predation by Nonnative Fish

Predation by nonnative fish is a significant threat to Hawaiian damselfly species with aquatic life stages, such as the Pacific Hawaiian damselfly. The aquatic naiads tend to rest and feed near or on the surface of the water, or on rocks where they are exposed and vulnerable to predation by nonnative fish. Hawaii has only five native freshwater fish species, comprised of gobies (Gobiidae) and sleepers (Eleotridae), that occur on all of the major islands. Because these native fish are benthic (bottom) feeders (Kido *et al.* 1993, pp. 43-44; Ego 1956, p. 24; Englund 1999, pp. 236-237), Hawaii's stream-dwelling damselfly species probably experienced limited natural predation pressure due to their avoidance of benthic areas in preference for shallow side channels, sidepools, and higher velocity riffles and seeps (Englund 1999, pp. 236-237). While fish predation has been an important factor in the evolution of behavior in damselfly naiads in continental systems (Johnson 1991, pp. 8), it is speculated that Hawaii's stream-dwelling damselflies adapted behaviors to avoid the benthic feeding habits of native fish species. Additionally, some species of damselflies, including some of the native Hawaiian species, are not adapted to cohabitate with some fish species, and are found only in bodies of water without fish (Henrickson 1988, p. 179; McPeek 1990a, p. 83). The naiads of the aquatic Pacific Hawaiian damselfly tend to occupy more exposed positions and engage in conspicuous foraging behavior, thereby increasing their susceptibility to fish predation (Englund 1999, p. 232), unlike damselflies which co-evolved with predaceous fish (Macan 1977, p. 48; McPeek 1990b, p. 1,714). In laboratory studies, Englund (1999, p. 232) found that naiads of the orangeblack Hawaiian damselfly and the Pacific Hawaiian damselfly invariably were eaten due to their behavior of swimming to the water surface when exposed to two nonnative freshwater fish. In the same study, naiads of nonnative damselfly species avoided predation by the same fish species by remaining still and avoiding surface waters (Englund 1999, p. 232).

Over 70 species of nonnative fish have been introduced into Hawaiian freshwater habitats (Devick 1991, p. 190; Englund 1999, p. 226; Staples and Cowie 2001, p. 32; Brasher 2003, p. 1,054; Englund 2004, p.27; Englund *et al.* 2007, p. 232); at least 51 species are now established in the freshwater habitats of Hawaii (Freshwater Fishes of Hawaii 2008). The initial introduction of nonnative fish to Hawaii began with the release of food stock species by Asian immigrants at the turn of the 20th century; however, the impact of these first introductions to Hawaiian damselflies cannot be assessed because they predated the initial collection of damselflies in Hawaii (Perkins 1899, pp. 64-76).

In 1905, three species of fish within the Poeciliidae family, including the mosquito fish (*Gambusia affinis*) and the sailfin molly (*Poecilia latipinna*), were introduced for biological control of mosquitoes (Van Dine 1907, p. 9; Englund 1999, p. 225; Brasher 2003, p. 1054). In 1922, several additional species were introduced for mosquito control, including the green swordtail (*Xiphophorus helleri*), the moonfish (*Xiphophorus maculatus*), and the guppy (*Poecilia reticulata*). By 1935, some Oahu damselfly species, including the orangeblack Hawaiian damselfly, were becoming less common, and fish introduced for mosquito control were the suspected cause of their decline (Williams 1936, p. 313; Zimmerman 1948b, p. 341). Current literature clearly indicates that the extirpation of the Pacific Hawaiian damselfly from the majority of its historical habitat sites on the main Hawaiian Islands is the result of predation by nonnative fish (Moore and Gagne 1982, p. 4; Liebherr and Polhemus 1997, p. 502; Englund 1999, pp. 235-237; Brasher 2003, p. 1,055; Englund *et al.* 2007, p. 215; Polhemus 2007, pp. 238-239). From 1946 through 1961, several additional nonnative fish were introduced for the purpose of controlling nonnative aquatic plants, and for angling (Brasher 2003, p. 1,054). In the early 1980s, several additional species of nonnative fish began appearing in stream systems, likely

originating from the aquarium fish trade (Devick 1991, p. 189; Brasher 2003, p. 1,054). By 1990, there were an additional 14 species of nonnative fish established in waters on Hawaii, Maui, and Molokai. By 2008, there were at least 17 nonnative freshwater fish established on one or more of these islands, including several aggressive predators and habitat-altering species such as the channel catfish (*Ictalurus punctatus*) and cichlids (*Tilapia* sp.) (Devick 1991, pp. 191-192; FishBase 2008).

Currently, the Pacific Hawaiian damselfly is found only in portions of stream systems without nonnative fish (Liebherr and Polhemus 1997, pp. 493-494; Englund 1999, p. 228; Englund 2004, p. 27; Englund *et al.* 2007, p. 215). There is a strong correlation between the absence of nonnative fish species and the presence of Hawaiian damselflies in streams on all of the main Hawaiian Islands (Englund 1999, p. 225; Englund *et al.* 2007, p. 215), suggesting that the damselflies cannot coexist with nonnative fish. The distribution of some Hawaiian damselfly species are now reduced to stream reaches less than 312 ft (95 m) in length and that lack invasive fish species (Englund 1999, p. 229; Englund 2004, p. 27). In 2007, a statewide survey that included 15 streams on the islands of Hawaii, Maui, and Molokai found that the flying earwig Hawaiian damselfly was not found in streams where the introduced Mexican molly (*Poecilia mexicana*) was present (Englund *et al.* 2007, pp. 214-216, 228). On Oahu, researchers found that the Oahu-endemic Hawaiian damselflies only occupied habitat sites without nonnative fish. For two of these species, a geologic or manmade barrier (e.g., waterfalls, steep gradient, dry stream midreaches, or constructed diversions) appears to prevent access by the nonnative fish species. For this reason, researchers have recommended that geologically isolated sites, such as isolated anchialine ponds and high-gradient streams interrupted by manmade diversions and those entering the coast as waterfalls, be used as restoration sites for damselflies on all of the Hawaiian Islands (Englund 2004, p. 27).

Of the two damselfly species considered in this proposal, the aquatic Pacific Hawaiian damselfly appears to have had the greatest range contraction due to predation by nonnative fish (Englund 1999, p. 235; Polhemus 2007, p. 234, 238-240). Once found on all of the main Hawaiian Islands, it is now found only on Molokai, Maui, and one stream on the island of Hawaii below 2,000 ft (600 m) in elevation; all are in stream habitat sites free of nonnative fish. The Pacific Hawaiian damselfly was extirpated from Oahu by 1910 (Liebherr and Polhemus 1997, p. 502), although Englund (1999, p. 235) found that Oahu still has abundant and otherwise suitable lowland and coastal water habitat to support this species. However, this aquatic habitat is infested with nonnative fish, with some nonnative species occurring up to 1,300 ft (400 m) elevation. Englund (1999, p. 236) found that even at sea level, artificial wetlands (resulting from taro cultivation) on the island of Molokai can support populations of the Pacific Hawaiian damselfly because nonnative fish are absent.

Even the geographically isolated stream headwaters and other aquatic habitats where the Pacific Hawaiian damselfly remains extant are not secure from the threat of predation by introduced fish species. There are many documented cases of people moving nonnative fish from one area to another (Brock 1995, pp. 3-4; Englund 1999, p. 237). Once nonnative fish species are introduced to aquatic habitats previously free of nonnative fish, they often become permanently established (Englund and Filbert 1999, p. 151; Englund 1999, pp. 232-233; Englund *et al.* 2007). An example of facilitated fish movement occurred in 2000, when an uninformed maintenance worker introduced *Tilapia* sp. into pools located on the grounds of Tripler Hospital that were maintained for the benefit of the remaining Oahu population of the orangeblack Hawaiian damselfly (Englund 2000).

The continued introduction and establishment of new species of predatory nonnative fish in Hawaiian waters, and the possible movement of these nonnative species to new streams and other aquatic habitat, is an immediate and significant threat to the survival of the aquatic Pacific Hawaiian damselfly. Unless nonnative predatory fish are eradicated or effectively controlled in the habitats utilized by the Pacific Hawaiian damselfly, we have no reason to believe that there will be any significant reduction in this threat at any time in the near future. The flying earwig Hawaiian damselfly is not known to be threatened by predation from nonnative fish species, due to its presumed more terrestrial habitats.

Predation by Introduced Frogs and Toads

Currently, there are three species of introduced aquatic amphibians known on the Hawaiian Islands: the North American bullfrog (*Rana catesbeiana*), the cane toad (*Bufo marinus*), and the Japanese wrinkled frog (*Rana rugosa*). The bullfrog is native to the eastern United States and the Great Plains region (Moyle 1973, p. 18; Bury and Whelan 1985 in Earlham College 2002, p. 10), and was first introduced into Hawaii in 1899 (Bryan 1931, p. 63) to help control insects, specifically the nonnative Japanese beetle (*Popillia japonica*), a significant pest of ornamental plants (Bryan 1931, p. 62). Bullfrogs were first released and quickly became established in the Hilo region on the island of Hawaii (Bryan 1931, p. 63). Bullfrogs have demonstrated great success in establishing new populations wherever they have been introduced (Moyle 1973, p. 19), and now occur on the islands of Hawaii, Kauai, Lanai, Maui, Molokai, and Oahu (U.S. Geological Survey 2008b, p. 8). This species is flexible in both habitat and food requirements (Bury and Whelan 1985 in Earlham College 2002, p. 11), and can utilize any water source within its temperature range (60 to 75 oFarenheit (oF) (16 to 24 oCelsius (oC)) (DesertUSA 2008). Introduced to areas outside its native range, the bullfrog's primary impact is typically the elimination of native frog species (Moyle 1973, p. 21). In Hawaii, where there are no native frogs, the bullfrog has not been definitively implicated in the extirpation of any particular native aquatic species, but Englund *et al.* (2007, pp. 215, 219) found a strong correlation between the presence of bullfrogs and the absence of Hawaiian damselflies in their 2006 study of streams on all of the main Hawaiian Islands. As the bullfrog prefers habitats with dense vegetation and relatively calm water (Moyle 1973, p. 19; Bury and Whelan 1985 in Earlham College 2002, p. 9), it is likely of particular threat to the Pacific Hawaiian damselfly because this species also prefers calm water habitat that is surrounded by dense vegetation. Capable of breeding within small pools of water, bullfrogs are also a potential threat to the flying earwig Hawaiian damselfly within its uluhe-covered, steep, riparian, moist talus slope habitat on Maui.

Because the effects of possible predation by the cane toad and the Japanese wrinkled frog on the flying earwig Hawaiian damselfly and the Pacific Hawaiian damselfly are unknown at this time, the magnitude or significance of this potential threat cannot be determined.

We consider predation by bullfrogs to pose a significant and immediate threat to the Pacific Hawaiian damselfly, since Englund *et al.* (2007, pp. 215, 219) found a strong correlation between the presence of predatory nonnative

bullfrogs and the absence of Hawaiian damselflies, and the preferred habitat of the bullfrog overlaps with that of the Pacific Hawaiian damselfly. Within its riparian habitat, the flying earwig Hawaiian damselfly may also be threatened by the bullfrog, which is capable of breeding within small pools of water. In the absence of the elimination or control of nonnative bullfrogs, we expect that this threat will continue or increase in the future.

Summary of Factor C

Predation by nonnative animal species (ants, backswimmers, fish, and bullfrogs) poses an immediate and significant threat to the Pacific and flying earwig Hawaiian damselflies throughout their ranges, for the following reasons:

• Damselfly naiads are vulnerable to predation by ants, and the ranges of both the Pacific and flying earwig Hawaiian damselflies overlap that of particularly aggressive, nonnative, predatory ant species that currently occur from sea level to 2,000 ft (610 m) in elevation on all of the main Hawaiian Islands. We consider both of the Hawaiian damselflies that are the subject of this proposed rule to be threatened by predation by these nonnative ants.

• Nonnative backswimmers prey on damselfly naiads in streams and other aquatic habitat, and are considered a threat to the Pacific Hawaiian damselfly since this species has an aquatic naiad life stage. In addition, the presence of backswimmers inhibits the foraging behavior of damselfly naiads, with negative consequences for development and survival. Backswimmers are reported on all of the main Hawaiian Islands except Kahoolawe.

• The absence of Hawaiian damselflies, including the aquatic Pacific Hawaiian damselfly, in streams and other aquatic habitat on the main Hawaiian Islands is strongly correlated with the presence of predatory nonnative fish as documented in numerous observations and reports (Englund 1999, p. 237; Englund 2004, p. 27; Englund *et al.* 2007, p. 215), thereby suggesting that nonnative predatory fishes eliminate native Hawaiian damselflies from these aquatic habitats. There are over 51 species of nonnative fishes established in freshwater habitats on the Hawaiian Islands from sea level to over 3,800 ft (1,152 m) in elevation (Devick 1991, p. 190; Staples and Cowie 2001, p. 32; Brasher 2003, p. 1054; Englund 1999, p. 226; Englund and Polhemus 2001; Englund 2004, p. 27; Englund *et al.* 2007, p. 232). Predation by nonnative fishes is considered to pose a significant and immediate threat to the Pacific Hawaiian damselfly due to its aquatic habit.

• Englund *et al.* (2007, pp. 215, 219) found a strong correlation between the presence of nonnative bullfrogs and the absence of Hawaiian damselflies. Bullfrogs are reported on all of the main Hawaiian Islands, except Kahoolawe and Niihau. The Pacific Hawaiian damselfly is likely threatened by bullfrogs, due to their shared preference for similar habitat, and the flying earwig Hawaiian damselfly may also be threatened within its riparian habitat by the bullfrog, which is capable of breeding within small pools of water.

Factor D. The Inadequacy of Existing Regulatory Mechanisms

Inadequate Habitat Protection

Currently, there are no Federal, State, or local laws, treaties, or regulations that specifically conserve or protect the flying earwig Hawaiian damselfly or the Pacific Hawaiian damselfly from the threats described in this proposed rule. The State of Hawaii considers all natural flowing surface water (streams, springs, and seeps) as State property (Hawaii Revised Statutes 174c 1987), and the Hawaii Department of Land and Natural Resources (DLNR) has management responsibility for the aquatic organisms in these waters (Hawaii Revised Statutes Annotated, 1988, Title 12; 1992 Cumulative Supplement). Thus, damselfly populations associated with streams, seeps, and springs are under the jurisdiction of the State of Hawaii, regardless of the ownership of the property across which the stream flows. This includes all populations of the Pacific Hawaiian damselfly.

The State of Hawaii manages the use of surface and ground water resources through the Commission on Water Resource Management (Water Commission), as mandated by the 1987 State Water Code (State Water Code, Hawaii Revised Statutes Chapter 174C-71, 174C-81-87, and 174C-9195 and Administrative Rules of the State Water Code, Title 13, Chapters 168 and 169). In the State Water Code, there are no formal requirements that project proponents or the Water Commission protect the habitats of fish and wildlife prior to issuance of a permit to modify surface or ground water resources.

The maintenance of instream flow, which is needed to protect the habitat of damselflies and other aquatic wildlife, is regulated by the establishment of standards on a stream-by-stream basis (State Water Code, Hawaii Revised Statutes Chapter 174C-71 and Administrative Rules of the State Water Code, Title 13, Chapter 169). Currently, the interim instream flow standards represent the existing flow conditions in streams in the State (as of June 15, 1988, for Molokai, Hawaii, Kauai and east Maui; and October 19, 1988, for west Maui and leeward Oahu) (Administrative Rules of the State Water Code, Title 13, Chapter 169-44-49). However, the State Water Code does not provide for permanent or minimal instream flow standards for the protection of aquatic wildlife. Instead, modification of instream flow standards and stream channels can be undertaken at any time by the Water Commission or via public petitions to revise flow standards or modify stream channels in a specified stream (Administrative Rules of the State Water Code, Title 13, Chapter 169-36). Additionally, the Water Commission must consider economic benefits gained from out-of-stream water uses, and is not required to balance these benefits against instream benefits to aquatic fish and wildlife. Consequently, any stabilization of stream flow for the protection of Pacific Hawaiian damselfly habitat is subject to modification at a future date.

The natural value of Hawaii's stream systems has been recognized under the State of Hawaii Instream Use Protection Program (Administrative Rules of the State Water Code, Title 13, Chapter 169-20(2)). In the Hawaii Stream Assessment Report (1990), prepared in coordination with the National Park Service, the State Water Commission identified high quality rivers or streams, or portions of rivers or streams that may be placed within a wild and scenic river system. This report recommended that streams meeting certain criteria be protected from further development. However, there is no formal or institutional mechanism within the State's Water Code to designate and set aside these streams, or to identify and protect stream habitat for Hawaiian damselflies.

Existing Federal regulatory mechanisms that may protect Hawaiian damselflies and their habitat are also inadequate. The Federal Energy Regulatory Commission (FERC) has very limited jurisdiction in Hawaii. Hawaii's streams are isolated on individual islands and run quickly down steep volcanic slopes. There are no interstate rivers in Hawaii, few if any streams crossing Federal land, and no Federal dams. Hawaii's streams are generally not navigable. Thus, licensing of hydroelectric projects in Hawaii generally does not come under the purview of FERC, although hydropower developers in Hawaii may voluntarily seek licensing under FERC.

The U.S. Army Corps of Engineers (COE) also has some regulatory control over modifications of freshwater streams in the United States. For modifications (e.g., discharge of fill) of streams with an average annual flow greater than 5 cubic ft per second (cfs), the COE can issue individual permits under section 404 of the Clean Water Act. These permits are subject to public review, and must comply with the Environmental Protection Agency's 404(b)(1) guidelines and public comment requirements. However, in issuing these permits, the COE does not establish instream flow standards as a matter of policy. The COE normally considers that the public interest for instream flow is represented by the state water allocation rights or preferences (Regulatory Guidance Letter No 85-6), and project alternatives that supersede, abrogate, or otherwise impair the state water quantity allocations are not normally addressed as alternatives during permit review.

In cases where the COE district engineer does propose to impose instream flow standard on an individual permit, this flow standard must reflect a substantial national interest. Additionally, if this instream flow standard is in conflict with a State water quantity allocation, then it must be reviewed and approved by the Office of the Chief Engineer in Washington, D.C. (Regulatory Guidance Letter No 85-6). Currently, the setting of instream flow standards sufficient to conserve Hawaiian damselflies is not a condition that would be considered or included in a Hawaii Department of Agriculture individual permit (DLNR, Commission on Water Resource Management 2006, p. 2).

The COE may also authorize the discharge of fill into streams with an average annual flow of less than 5 cfs. These discharges are covered under a nationwide permit (33 CFR 330). This permit is designed to expedite small-scale activities that the COE considers to have only minimal environmental impacts (33 CFR 330.1(b)). The Service and the Hawaii DLNR have only 15 days to provide substantive site-specific comments prior to the issuance of a nationwide permit. Given the complexity of the impacts on Hawaiian damselflies from stream modifications and surface water diversions, the remoteness of project sites, and the types of studies necessary to determine project impacts and mitigation, this limited comment period does not allow time for an adequate assessment of impacts.

One population of the Pacific Hawaiian damselfly occurs in Palikea Stream on Maui, which flows through Haleakala National Park. On Molokai, populations of this damselfly species occur at the mouth of Pelekunu Stream, which flows through a preserve managed by The Nature Conservancy, and in lower Waikolu Stream, which flows through Kalaupapa National Historic Park. However, the landowners do not own the water rights to any of the streams, and thus cannot fully manage the conservation of any of these damselfly populations.

Because there are currently no Federal, State, or local laws, treaties, or regulations that specifically conserve or protect habitat of the flying earwig Hawaiian damselfly or the Pacific Hawaiian damselfly from the threats described in this proposed rule, all of these threats remain immediate and significant. The habitat of both species continues to be reduced, degraded, and altered by past and present manmade alterations to streams and riparian zones and by the indirect impacts of nonnative plant and animal species to remaining habitat areas.

Inadequate Protection from Introduction of Nonnative Species

As discussed above (see *Factor C. Disease or Predation*), predation by nonnative species (fish, insects, and bullfrogs) is one of the most significant threats to the survival of the flying earwig Hawaiian damselfly and the Pacific Hawaiian damselfly.

Based on historical and current rates of aquatic species introductions (both purposeful and accidental), existing State and Federal regulatory mechanisms are not adequately preventing the spread of nonnative species between islands and watersheds in Hawaii. The Hawaii Department of Agriculture has administrative rules in place that address importation of nonnative species and establish a permit process for such activities (Hawaii Administrative Rules §4-71). The Division of Aquatic Resources within the Hawaii Department of Land and Natural Resources (HDLNR) has authority to seize, confiscate, or destroy as a public nuisance, any fish or other aquatic life found in any waters of the State and whose importation is prohibited or restricted pursuant to rules of the Department of Agriculture (Section 187A-2(4 H.R.S.§187A-6.5)). Although State and Federal regulations are now firmly in place to prevent the unauthorized entry of nonnative aquatic species into the State of Hawaii, movement of species between islands and from one watershed to the next remains problematic even while prohibited (HDOA 2003, pp. 2/12 – 2/14). For example, while unauthorized movement of an aquatic species from one watershed to the next may be prohibited, there simply is not enough government funding to adequately enforce such regulation or to provide for sufficient inspection services and monitoring, although this priority need is recognized (Cravalho 2009). Furthermore, due to the complexity of the pathways of invasion by aquatic species (i.e., intentional, inadvertent, and by forces of nature), many components contributing to the problem may be better addressed through greater public outreach and education (Montgomery 2009).

On the basis of the above information, existing regulatory mechanisms do not adequately protect the flying earwig Hawaiian damselfly or the Pacific Hawaiian damselfly from the threat of established nonnative species (particularly fish and insect species) spreading between islands and watersheds, where they may prey upon or directly compete with the two damselfly species for food and space. Because current Federal, State, and local laws, treaties, and regulations are inadequate to prevent the spread of nonnative aquatic animals between islands and watersheds, the impacts from these introduced threats remain immediate and significant. From habitat-altering nonnative plant species to predation or competition caused by frogs, nonnative fish, and insect species, the Pacific Hawaiian damselfly and the flying earwig Hawaiian damselfly are immediately and significantly threatened by former and new plant and animal introductions within the damselflies' remaining habitat.

Summary of Factor D

The aquatic habitat of the flying earwig and the Pacific Hawaiian damselflies is under the jurisdiction of the State of Hawaii, which also has management responsibility for aquatic organisms. However, the State Water Code has no regulatory mechanism in place to protect these species or their habitat. The State Water Code does not provide for permanent or minimum instream flow standards for the protection of aquatic ecosystems upon which these damselfly species depend, and does not contain a regulatory mechanism for identifying and protecting damselfly habitat under a wild and scenic river designation.

To date, administration of the Clean Water Act permitting program by the U.S. Army Corps of Engineers has not provided substantive protection of damselfly habitat, including any requirements for retention of adequate instream flows.

Existing State and Federal regulatory mechanisms are not preventing the spread of nonnative animal species between islands and watersheds. Predation by nonnative animal species poses a major ongoing threat to the flying earwig and the Pacific Hawaiian damselflies. Because existing regulatory mechanisms are inadequate to maintain aquatic habitat for the damselflies and to prevent the spread of nonnative species, the inadequacy of existing regulatory mechanisms is considered to be a significant and immediate threat.

Factor E. Other Natural or Manmade Factors Affecting [Their] Continued Existence

Small Numbers of Populations and Individuals

Species that are endemic to single islands or known from few, widely dispersed locations are inherently more vulnerable to extinction than widespread species because of the higher risks from genetic bottlenecks, random demographic fluctuations, climate change, and localized catastrophes such as hurricanes, landslides, and drought (Lande 1988, p. 1,455; Mangel and Tier 1994, p. 607; Pimm *et al.* 1988, p. 757). These problems are further magnified when populations are few and restricted to a limited geographic area, and the number of individuals is very small. Populations with these characteristics face an increased likelihood of stochastic extinction due to changes in demography, the environment, genetics, or other factors, in a process described as an ''extinction vortex'' by Gilpin and Soulé (1986, pp. 24-25). Small, isolated populations often exhibit a reduced level of genetic variability or genetic depression due to inbreeding, which diminishes the species' capacity to adapt and respond to environmental changes, thereby lessening the probability of long-term persistence (e.g., Frankham 2003, pp. S22-S29; Soule 1980, pp. 151-169). The problems associated with small population size and vulnerability to random demographic fluctuations or natural catastrophes are further magnified by synergistic interactions with other threats, such as those discussed above (Factors A–C).

Jordan *et al.* (2007, p. 247) showed in their genetic and comparative phylogeography analysis (study of historical processes responsible for genetic divergence within a species) of four *Megalagrion* species that the Pacific Hawaiian damselfly may be more susceptible to problems linked to low genetic diversity compared to other Hawaiian damselfly species. Both Maui and Molokai populations of this species were analyzed, and results suggested that the Pacific Hawaiian damselfly may not disperse well across both land and water, which may have led to the low genetic diversity observed in the two populations sampled. The authors proposed that populations of the Pacific Hawaiian damselfly be monitored and managed to understand the conservation needs of this species and the threat of population bottlenecks (Jordan *et al.* 2007, p. 258). Unfortunately, this study did not include an analysis of the flying earwig Hawaiian damselfly. However, given that this species may now be reduced to a single population, the potential loss of genetic diversity is a concern for the flying earwig Hawaiian damselfly as well.

The small number of remaining populations of the flying earwig Hawaiian damselfly (now possibly reduced to a single remaining population) puts this species at significant risk of extinction from stochastic events, such as hurricanes, landslides, or prolonged drought (Jones *et al.* 1984, p. 209). For example, Polhemus (1993, p. 87) documented the extirpation of a related damselfly species, *Megalagrion vagabundum*, from the entire Hanakapiai Stream system on Kauai as a result of the impacts from Hurricane Iniki in 1992. Such stochastic events thus pose the threat of immediate extinction of a species with a very small and geographically restricted distribution, as in the case of the flying earwig Hawaiian damselfly.

Summary of Factor E

The threat to the flying earwig and Pacific Hawaiian damselflies from limited numbers of populations and individuals is significant and immediate for the following reasons:

- Each of these species is subject to potentially reduced reproductive vigor due to inbreeding depression, particularly the flying earwig Hawaiian damselfly which is now apparently restricted to one population;
- Each of these species is subject to reduced levels of genetic variability that may diminish their capacity to adapt and respond to environmental changes, thereby lessening the probability of their long-term persistence;
- Since there may be only one remaining population of the flying earwig Hawaiian damselfly that occurs in a relatively restricted geographic location, a single catastrophic event, such as a hurricane or landslide, could result in the extinction of the species. Likewise, the Pacific Hawaiian damselfly, with several small, widely dispersed populations, would be vulnerable to the extirpation of remaining populations; and
- Species with few populations and a small number of individuals, such as the Pacific Hawaiian damselfly and flying earwig Hawaiian damselfly, are less resilient to threats that might otherwise have a relatively minor impact on a larger population. For example, the reduced availability of breeding habitat or an increase in predation of naiads that might be absorbed in a relatively large population could result in a significant decrease in survivorship or reproduction of a relatively small, isolated population. The small population size of these two species thus magnifies the severity of the impact of the other threats discussed in this proposed rule.

Conclusion and Proposed Listing Determination

We have carefully assessed the best scientific and commercial information available regarding the past, present, and future threats to the flying earwig Hawaiian damselfly and the Pacific Hawaiian damselfly. We find that both of these species face immediate and significant threats throughout their ranges:

- Both the Pacific Hawaiian damselfly and the flying earwig Hawaiian damselfly face threats from past and present destruction, modification, and curtailment of their habitats, primarily from: agriculture and urban development; stream diversion, channelization, and dewatering; feral pigs and nonnative plants; and from stochastic events like hurricanes, landslides, and drought. The changing environmental conditions that may result from climate change (particularly rising temperatures) are also likely to threaten these two damselfly species (compounded because of the two species' small population sizes and limited distributions), although currently there is limited information on the exact nature of these impacts (see discussion under Factor A).
- The only known population of the flying earwig Hawaiian damselfly is immediately and significantly threatened by potential recreational collection (Factor B).
- Both the flying earwig Hawaiian damselfly and the Pacific Hawaiian damselfly are subject to an immediate and significant threat of predation by nonnative insects (ants) and bullfrogs. The Pacific Hawaiian damselfly is also similarly threatened by backswimmers and nonnative fish (Factor C).
- The inadequacy of existing regulatory mechanisms (e.g., inadequate

protection of stream habitat and inadequate protection from the introduction of nonnative species) poses a threat to both species of Hawaiian damselfly, as discussed under Factor D above.

• Both of these species face an immediate and significant threat from extinction due to factors associated with small numbers of populations and individuals as discussed under Factor E above.

All of the above threats are exacerbated by the inherent vulnerability of the flying earwig Hawaiian damselfly and the Pacific Hawaiian damselfly to extinction from stochastic events at any time because of their endemism (indigenousness), small numbers of individuals and populations, and restricted habitats.

The Act defines an endangered species as any species that is ''in danger of extinction throughout all or a significant portion of its range'' and a threatened species as any species ''that is likely to become endangered throughout all or a significant portion of its range within the foreseeable future.'' We find that each of these two species endemic to Hawaii is presently in danger of extinction throughout its entire range, based on the immediacy, severity, and scope of the threats described above. Therefore, on the basis of the best available scientific and commercial information, we propose listing the flying earwig Hawaiian damselfly and the Pacific Hawaiian damselfly as endangered in accordance with sections 3(6) and 4(a)(1) of the Act.

Under the Act and our implementing regulations, a species may warrant listing if it is threatened or endangered throughout all or a significant portion of its range. Each of the two endemic damselfly species proposed for listing in this rule is highly restricted in its range and the threats occur throughout its range. Therefore, we assessed the status of each species throughout its entire range. In each case, the threats to the survival of these species occur throughout the species' range and are not restricted to any particular significant portion of that range. Accordingly, our assessment and proposed determination applies to each species throughout its entire range.

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 activities. Recognition through listing results in public awareness and conservation actions by Federal, State, Tribal, and local agencies, private organizations, and individuals. The Act encourages cooperation with the States and requires that recovery actions be carried out for all listed species. The protection required by Federal agencies, and the prohibitions against certain activities are discussed, in part, below.

The primary purpose of the Act is the conservation of endangered and threatened species and the ecosystems upon which they depend. The ultimate goal of such conservation efforts is the recovery of these listed species, so that they no longer need the protective measures of the Act. Subsection 4(f) of the Act requires the Service to develop and implement recovery plans for the conservation of endangered and threatened species. The recovery planning process involves the identification of actions that are necessary to halt or reverse the species' decline by addressing the threats to its survival and recovery. The goal of this process is to restore listed species to a point where they are secure, self-sustaining, and functioning components of their ecosystems.

Recovery planning includes the development of a recovery outline shortly after a species is listed, preparation of a draft and final recovery plan, and revisions to the plan as significant new information becomes available. The recovery outline guides the immediate implementation of urgent recovery actions and describes the process to be used to develop a recovery plan. The recovery plan identifies site-specific management actions that will achieve recovery of the species, measurable criteria that determine when a species may be downlisted or delisted, and methods for monitoring recovery progress. Recovery plans also establish a framework for agencies to coordinate their recovery efforts and provide estimates of the cost of implementing recovery tasks. Recovery teams (comprised of species experts, Federal and State agencies, non-government organizations, and stakeholders) are often established to develop recovery plans. When completed, the recovery outline, draft recovery plan, and the final recovery plan will be available from our website (*http://www.fws.gov/endangered*), or from our Pacific Islands Fish and Wildlife Office (see **FOR FURTHER INFORMATION CONTACT**).

Implementation of recovery actions generally requires the participation of a broad range of partners, including other Federal agencies, States, non-governmental organizations, businesses, and private landowners. Examples of recovery actions include habitat restoration (e.g., restoration of native vegetation), research, captive propagation and reintroduction, and outreach and education. The recovery of many listed species cannot be accomplished solely on Federal lands because their range may occur primarily or solely on non-Federal lands. To achieve recovery of these species requires cooperative conservation efforts on private and State lands.

If these species are listed, funding for recovery actions will be available from a variety of sources, including Federal budgets, State programs, and cost share grants for non-Federal landowners, the academic community, and non-governmental organizations. In addition, pursuant to section 6 of the Act, the State of Hawaii would be eligible for Federal funds to implement management actions that promote the protection and recovery of the flying earwig Hawaiian damselfly and the Pacific Hawaiian damselfly. Information on our grant programs that are available to aid species recovery can be found at: *http://www.fws.gov/grants*.

Although the flying earwig Hawaiian damselfly and the Pacific Hawaiian damselfly are only proposed for listing under the Act at this time, please let us know if you are interested in participating in recovery efforts for these species. Additionally, we invite you to submit any new information on these species whenever it becomes available and any information you may have for recovery planning purposes (see **FOR FURTHER INFORMATION CONTACT**).

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 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 with the Service on any action that is likely to jeopardize the continued existence of a species proposed for listing or result in destruction or adverse modification of proposed critical habitat. If a species is listed subsequently, section 7(a)(2) of the Act requires Federal agencies to ensure that activities they authorize, fund, or carry out are not likely to jeopardize the continued existence of the species or 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 the Service.

Federal agency actions within the species' habitat that may require

conference or consultation or both as described in the preceding paragraph include, but are not limited to: Army Corps of Engineers involvement in projects, such as the construction of roads, bridges, and dredging projects, subject to section 404 of the Clean Water Act (33 U.S.C. 1251 *et seq.*) and section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 401 *et seq.*); U.S. Environmental Protection Agency authorized discharges under the National Pollutant Discharge Elimination System (NPDES); U.S. Department of Agriculture involvement in the release or permitting of the release of biological control agents under the Federal Plant Pest Act (7 U.S.C. 150aa-150jj); military training and related activity carried out by the U.S. Department of Defense; and projects by the Natural Resources Conservation Service, National Park Service, U.S. Fish and Wildlife Service, Federal Highways Administration, and the U.S. Department of Housing and Urban Development.

The Act and its implementing regulations set forth a series of general prohibitions and exceptions that apply to all endangered and threatened wildlife. The prohibitions of section 9(a)(2) of the Act, codified at 50 CFR 17.21 for endangered wildlife, in part, make it illegal for any person subject to the jurisdiction of the United States to take (includes harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt any of these), import, export, ship in interstate commerce in the course of a commercial activity, or sell or offer for sale in interstate or foreign commerce any listed species. It is also illegal to possess, sell, deliver, carry, transport, or ship any such wildlife that has been taken illegally. Certain exceptions apply to our agents and State conservation agencies.

We may issue permits to carry out otherwise prohibited activities involving endangered and threatened wildlife species under certain circumstances. Regulations governing permits are codified at 50 CFR 17.22 for endangered species, and at 17.32 for threatened species. With regard to endangered wildlife, a permit must be issued for the following purposes: for scientific purposes, to enhance the propagation or survival of the species, and for incidental take in connection with otherwise lawful activities.

It is our policy, as published in the **Federal Register** on July 1, 1994 (59 FR 34272), to identify to the maximum extent practicable at the time a species is listed, those activities that would or would not constitute a violation of section 9 of the Act. The intent of this policy is to increase public awareness of the effect of a proposed listing on proposed and ongoing activities within the range of species proposed for listing. The following activities could potentially result in a violation of section 9 of the Act; this list is not comprehensive:

(1) Unauthorized collecting, handling, possessing, selling, delivering, carrying, or transporting of the species, including import or export across State lines and international boundaries, except for properly documented antique specimens of these taxa at least 100 years old, as defined by section 10(h)(1) of the Act;

(2) Introduction of nonnative species that compete with or prey upon the two damselflies, such as the introduction of competing, nonnative insects or predatory fish to the State of Hawaii;

(3) The unauthorized release of biological control agents that attack any life stage of these species;

(4) Unauthorized modification of the channel or water flow of any stream or removal or destruction of emergent aquatic vegetation in any body of water in which the flying earwig Hawaiian damselfly and the Pacific Hawaiian damselfly are known to occur; and

(5) Unauthorized discharge of chemicals or fill material into any waters in which the flying earwig Hawaiian damselfly and the Pacific Hawaiian damselfly are known to occur.

Questions regarding whether specific activities would constitute a violation of section 9 of the Act should be directed to the Pacific Islands Fish and Wildlife Office (see **FOR FURTHER INFORMATION CONTACT**). Requests for copies of the regulations concerning listed animals and general inquiries regarding prohibitions and permits may be addressed to the U.S. Fish and Wildlife Service, Endangered Species Permits, 911 N.E. 11th Avenue, Portland, OR 97232-4181 (telephone 503-231-2063; facsimile 503-231-6243).

If these two Hawaiian damselflies are listed under the Act, the State of Hawaii's Endangered Species Act (HRS, Sect. 195D–4(a)) is automatically invoked, which would also prohibit take of these species and encourage conservation by State government agencies. 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 (Cooperation with the States). Thus, the Federal protection afforded to these species by listing them as endangered species will be reinforced and supplemented by protection under State law.

Critical Habitat

Background

Critical habitat is defined in section 3 of the Act as:

(i) 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

(I) essential to the conservation of the species and

(II) which may require special management considerations or protection; and

(ii) specific areas outside the geographical area occupied by the species at the time it is listed, upon a determination that such areas are essential for the conservation of the species.

Conservation, as defined under section 3 of the Act, means to use and the use of all methods and procedures that are necessary to bring an endangered or threatened species to the point at which the measures provided under the Act are no longer necessary. Such methods and procedures include, but are not limited to, all activities associated with scientific resources management such as research, census, law enforcement, habitat acquisition and maintenance, propagation, live trapping, and transplantation, and, in the extraordinary case where population pressures within a given ecosystem cannot be otherwise relieved, may include regulated taking.

Critical habitat receives protection under section 7 of the Act through the prohibition against Federal agencies carrying out, funding, or authorizing the destruction or adverse modification of critical habitat. Section 7(a)(2) of the Act requires consultation on Federal actions that may affect critical habitat. The designation of critical habitat does not affect land ownership or establish a refuge, wilderness, reserve, preserve, or other conservation area. Such designation does not allow the government or public access to private lands. Such designation does not require implementation of restoration, recovery, or enhancement measures by the landowner. Where a landowner seeks or requests Federal agency funding or authorization that may affect a listed species or critical habitat, the consultation requirements of section 7(a)(2) of the Act would apply, but even in the event of a destruction or adverse modification finding, the Federal action

agency's and landowner's obligation is not to restore or recover the species, but to implement reasonable and prudent alternatives to avoid destruction or adverse modification of the critical habitat.

For inclusion in a critical habitat designation, habitat within the geographical area occupied by the species at the time it was listed must contain the physical and biological features essential to the conservation of the species, and be included only if those features may require special management considerations or protection. Critical habitat designations identify, to the extent known using the best scientific and commercial data available, habitat areas containing the physical and biological features, which are the Primary Constituent Elements (PCEs) laid out in the appropriate quantity and spatial arrangement that are essential to the conservation of the species. Under the Act and regulations at 50 CFR 424.12, we can designate critical habitat in areas outside the geographical area occupied by the species at the time it is listed only when we determine that those areas are essential for the conservation of the species and that designation limited to those areas occupied at the time of listing would be inadequate to ensure the conservation of the species.

Section 4 of the Act requires that we designate critical habitat on the basis of the best scientific and commercial data available. Further, our Policy on Information Standards Under the Endangered Species Act (published in the **Federal Register** on July 1, 1994 (59 FR 34271)), the Information Quality Act (section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001 (Pub.L. 106-554; H.R. 5658)), and our associated Information Quality Guidelines, provide criteria, establish procedures, and provide guidance to ensure that our decisions are based on the best scientific data available. They require our biologists, to the extent consistent with the Act and with the use of the best scientific data available, to use primary and original sources of information as the basis for recommendations to designate critical habitat.

Habitat is often dynamic, and species may move from one area to another over time. Furthermore, we recognize that critical habitat designated at a particular point in time may not include all of the habitat areas that we may later determine are necessary for the recovery of the species. For these reasons, a critical habitat designation does not signal that habitat outside the designated area is unimportant or may not be required for recovery of the species.

Areas that are important to the conservation of the species, but are outside the critical habitat designation, will continue to be subject to conservation actions we implement under section 7(a)(1) of the Act. Areas that support populations are also subject to the regulatory protections afforded by the section 7(a)(2) jeopardy standard, as determined on the basis of the best available scientific information at the time of the agency action. Federally funded or permitted projects affecting listed species outside their designated critical habitat areas may still result in jeopardy findings in some cases. Similarly, critical habitat designations made on the basis of the best available information at the time of designation will not control the direction and substance of future recovery plans, habitat conservation plans (HCPs), or other species conservation planning efforts if new information available at the time of these planning efforts warrants otherwise.

Prudency Determination

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, the Secretary designate critical habitat at the time a 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 human activity, and 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.

In the absence of finding that the designation of critical habitat would increase threats to a species, if there are any benefits to a critical habitat designation, then a prudent finding is warranted. We find that the designation of critical habitat for the two damselfly species addressed in this rule will benefit them by: (1) Triggering consultation under section 7 of the Act for Federal actions where consultation would not otherwise occur because, for example, the affected area has become unoccupied by the species or the occupancy is in question; (2) focusing conservation efforts on the most essential habitat features and areas; (3) providing educational benefits about the species to State or county governments or private entities; and (4) preventing people from causing inadvertent harm to the species.

The primary regulatory effect of critical habitat is the section 7(a)(2) requirement that Federal agencies refrain from taking any action that destroys or adversely modifies critical habitat. On the island of Maui, one population of the Pacific Hawaiian damselfly occurs in a stream that flows through Haleakala National Park, and on the island of Molokai, one population of this species occurs in the lower section of a stream that flows through Kalaupapa National Historical Park. The National Park Service regulations and Federal laws protect all animals in national parks from harassment or destruction. Nevertheless, lands that may be designated as critical habitat in the future for this species may be subject to Federal actions that trigger the section 7 consultation requirement, such as the granting of Federal monies for conservation projects or the need for Federal permits for projects, such as the construction and maintenance of aqueducts and bridges subject to section 404 of the Clean Water Act (33 U.S.C. 1251 *et seq.*). There may also be some educational or informational benefits to the designation of critical habitat. Educational benefits include the notification of landowners, land managers, and the general public of the importance of protecting the habitat of these species. Critical habitat may play a role in protecting habitat for future reintroductions of a species as well. For example, although the flying earwig Hawaiian damselfly formerly inhabited areas that are not currently occupied by the species, if those currently unoccupied areas are determined to be essential to the survival and recovery of the species, they may be proposed for designation of critical habitat. This would alert the public that these areas are important for the future recovery of the species, as well as invoke the protection of these areas under section 7 of the Act with regard to any possible Federal actions in that area. These aspects of critical habitat designation would potentially benefit the conservation of both the flying earwig Hawaiian damselfly and the Pacific Hawaiian damselfly. Although collection has been identified as a threat to the flying earwig Hawaiian damselfly, we believe that collection poses a potential threat to this rare species regardless of the designation of critical habitat. Therefore, since we have determined that the identification of critical habitat will not increase the degree of threats to these species and because the designation may provide

some measure of benefit, we find that designation of critical habitat is prudent for both the flying earwig Hawaiian damselfly and the Pacific Hawaiian damselfly.

Critical Habitat Determinability

As stated above, section 4(a)(3) of the Act requires the designation of critical habitat concurrently with the species' listing ''to the maximum extent prudent and determinable.'' Our regulations at 50 CFR 424.12(a)(2) state that critical habitat is not determinable when one or both of the following situations exist:

(A) Information sufficient to perform required analyses of the impacts of the designation is lacking, or

(B) The biological needs of the species are not sufficiently well known to permit identification of an area as critical habitat.

When critical habitat is not determinable, the Act provides for an additional year to publish a critical habitat designation (16 U.S.C. 1533(b)(6)(C)(ii)).

In accordance with section 3(5)(A)(i) and 4(b)(1)(A) of the Act and the regulations at 50 CFR 424.12, in determining which areas occupied by the species at the time of listing to designate as critical habitat, we consider the physical and biological features essential to the conservation of the species which may require special management considerations or protection. These include, but are not limited to:

(1) Space for individual and population growth, and for normal behavior;

(2) Food, water, air, light, minerals, or other nutritional or physiological requirements;

(3) Cover or shelter;

(4) Sites for breeding, reproduction, rearing (or development) of offspring; and generally

(5) Habitats that are protected from disturbance or are representative of the historical geographical and ecological distributions of a species.

As required by 50 CFR 424.12(b), we are to list the known primary constituent elements (PCEs) with our description of critical habitat. The the physical and biological features are the PCEs laid out in the appropriate quantity and spatial arrangement, which are essential to the conservation of the species. These may be based upon, but are not limited to: roost sites, nesting grounds, spawning sites, feeding sites, seasonal wetlands or drylands, water quality or quantity, vegetation type, plant host species and associated pollinators, geological formations, tides, and specific soil types.

We are currently unable to identify the physical and biological features that are considered essential to the conservation of either damselfly species, because information on these is not available at this time. Key features of the life histories of these damselfly species, such as longevity, larval stage requirements, and fecundity, remain unknown. The aquatic and associated upland habitats where the populations of the Pacific Hawaiian damselfly are found have been modified and altered by development and agriculture; stream diversions, channelization, dewatering; and nonnative plants. In addition, introduced ants, backswimmers, bullfrogs, and predatory nonnative fish have altered and degraded the habitat for the Pacific Hawaiian damselfly. Likewise, the uluhe moist talus slope habitats where populations of the flying earwig Hawaiian damselfly once occurred have been modified and altered by agriculture; stream diversions, channelization, dewatering; and the presence of feral pigs, nonnative plants, and introduced ants and bullfrogs. Historically, both of these damselfly species were much more widespread and occurred in habitats found on several different islands. Because over a century has elapsed since these species were observed in an unaltered environment, the optimal conditions that provide the biological or ecological requisites of these species are not known. As described above, we can surmise that habitat degradation from a variety of factors and predation by a number of nonnative species has contributed to the decline of these species; however, we do not know the physical or biological features that are essential for either of the two damselflies addressed in this proposed rule. As we are unable to identify the physical and biological features essential to the conservation of these species, we are unable to identify areas that contain these features.

Although we have determined that the designation of critical habitat is prudent for the flying earwig Hawaiian damselfly and the Pacific Hawaiian damselfly, the biological needs of these species are not sufficiently well known to permit identification of the physical and biological features that may be essential for the conservation of the species, or those areas essential to the conservation of the species. Therefore, we find that critical habitat for the flying earwig Hawaiian damselfly and the Pacific Hawaiian damselfly is not determinable at this time. We intend to continue gathering information regarding the essential life history requirements of the flying earwig Hawaiian damselfly and the Pacific Hawaiian damselfly to facilitate identification of essential features and areas. We will evaluate the needs of the flying earwig Hawaiian damselfly and the Pacific Hawaiian damselfly within the ecological context of the broader ecosystems in which they occur, similar to the approach that we recently used in our proposal to designate critical habitat for 47 species endemic to the island of Kauai (October 21, 2008; 73 FR 62592), and will consider the utility of using this approach for these species as well.

Peer Review

In accordance with our joint policy published in the **Federal Register** on July 1, 1994 (59 FR 34270), we will seek the expert opinions of at least three appropriate independent specialists regarding this proposed rule. The purpose of peer review is to ensure that our proposed rule is based on scientifically sound data, assumptions, and analyses. We have posted our proposed peer review plan on our website at *http://www.fws.gov/pacific/informationquality/index.htm*. We will send these peer reviewers copies of this proposed rule, immediately following publication in the **Federal Register**. We have invited these peer reviewers to comment during this public comment period on our specific assumptions and conclusions in this proposal to list two Hawaiian damselfly species as endangered and our decision regarding critical habitat for these species.

We will consider all comments and information we receive during the comment period on this proposed rule during preparation of a final determination. Accordingly, the final decision may differ from this proposal.

Public Hearings

The Act provides for one or more public hearings on this proposal, if requested. Requests must be received within 45 days after the date of of publication of this proposal in the **Federal Register**. Such requests must be sent to the address shown in the **FOR FURTHER INFORMATION CONTACT** section. We will schedule public hearings on this proposal, if any are requested, and announce the dates, times, and places of the hearing, as well as how to obtain reasonable accommodations, in the **Federal Register** and local newspapers at least 15 days before the hearing.

Persons needing reasonable accommodations to attend and participate in a public hearing should contact the Pacific Islands Fish and Wildlife Office at 808-792-9400, as soon as possible. To allow sufficient time to

process requests, please call no later than one week before the hearing date. Information regarding this proposed rule is available in alternative formats upon request.

Required Determinations

Clarity of the Rule

We are required by Executive Orders 12866 and 12988 and by the Presidential Memorandum of June 1, 1998, to write all rules in plain language. This means that each rule we publish must:

(a) Be logically organized;

(b) Use the active voice to address readers directly;

(c) Use clear language rather than jargon;

(d) Be divided into short sections and sentences; and

(e) Use lists and tables wherever possible.

If you feel that we have not met these requirements, send us comments by one of the methods listed in the ''**ADDRESSES**'' section. To better help us revise the rule, your comments should be as specific as possible. For example, you should tell us the numbers of the sections or paragraphs that are unclearly written, which sections or sentences are too long, the sections where you feel lists or tables would be useful, etc.

Paperwork Reduction Act of 1995 (44 U.S.C. 3501 et seq.)

This rule does not contain any new collections of information that require approval by Office of Management and Budget (OMB) under the Paperwork Reduction Act of 1995 (44 U.S.C. 3501 *et seq.*). This rule will not impose recordkeeping or reporting requirements on State or local governments, individuals, businesses, or organizations. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number.

National Environmental Policy Act

We have determined that environmental assessments and environmental impact statements, as defined under the authority of the National Environmental Policy Act of 1969, need not be prepared in connection with regulations adopted pursuant to section 4(a) of the Act. We published a notice outlining our reasons for this determination in the **Federal Register** on October 25, 1983 (48 FR 49244).

References Cited

A complete list of all references cited in this rule is available on the Internet at *http://www.regulations.gov* or upon request from the Field Supervisor, Pacific Islands Fish and Wildlife Office (see **FOR FURTHER INFORMATION CONTACT**).

Author(s)

The primary authors of this document are the staff members of the Pacific Islands Fish and Wildlife Office.

List of Subjects in 50 CFR Part 17

Endangered and threatened species, Exports, Imports, Reporting and recordkeeping requirements, and 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. Amend § 17.11(h) by adding entries for ''Damselfly, flying earwig Hawaiian'' and ''Damselfly, Pacific Hawaiian'' to the List of Endangered and Threatened Wildlife in alphabetical order under Insects to read as follows:

§17.11 Endangered and threatened wildlife.

* * * * *

(h) * * *

Species		Historic range	Vertebrate population where endangered or threatened	Status	When listed	Critical habitat	Special rules
Common name	Scientific name						
* * * * * * *							
INSECTS							
* * * * * * *							
Damselfly, flying earwig Hawaiian	*Megalagrion nesiotes*	U.S.A. (HI)	NA	E	TBD	NA	NA
Damselfly, Pacific Hawaiian	*Megalagrion pacificum*	U.S.A. (HI)	NA	E	TBD	NA	NA
* * * * * *							

Dated: June 25, 2009.

Marvin E. Moriarty,

Acting Director, U.S. Fish and Wildlife Service

[FR Doc. E9–16087 Filed 7–7– 09; 8:45 am]

BILLING CODE 4310–55–S

DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

[FWS–R4–ES–2009–0022; 92210–1117–000–B4]

Endangered and Threatened Wildlife and Plants; 90–Day Finding on a Petition To List the Coqui Llanero (Eleutherodactylus juanariveroi) as Endangered

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Notice of petition finding and initiation of status review.

SUMMARY: We, the U.S. Fish and Wildlife Service (the Service), announce a 90-day finding on a petition to list coqui llanero (*Eleutherodactylus juanariveroi*), a tree frog, as threatened or endangered under the Endangered Species Act of 1973, as amended (Act). Following our review of the petition, we find that it provides substantial scientific or commercial information indicating that listing this species may be warranted. Therefore, with the publication of this notice, we initiate a status review to determine if listing the coqui llanero is warranted. To ensure that the status review is comprehensive, we request scientific and commercial data and other information regarding this species. We will initiate a determination on critical habitat for this species if and when we initiate a listing action.

DATES: We made the finding announced in this document on July 8, 2009. To allow us adequate time to conduct this review, we request that information be submitted on or before September 8, 2009.

ADDRESSES: You may submit information by one of the following methods:

- *Federal eRulemaking Portal: http://www.regulations.gov.* Follow the instructions for submitting comments.
- *U.S. mail or hand-delivery:* Public Comments Processing, *Attn:* FWS–R4–ES–2009–0022; Division of Policy and Directives Management; U.S. Fish and Wildlife Service; 4401 N. Fairfax Drive, Suite 222, Arlington, VA 22203.

We will post all information we receive on *http://www.regulations.gov.* This generally means that we will post any personal information you provide us (see the Information Solicited section below for more details).

FOR FURTHER INFORMATION CONTACT: Edwin E. Muñiz, Field Supervisor, Caribbean Ecological Services Field Office, P.O. Box 491, Boquerón, PR 00622; by telephone, (787) 851–7297; or by facsimile, (787) 851–7440. Persons who use a telecommunications device for the deaf (TDD) may call the Federal Information Relay Service (FIRS) at 800–877–8339.

SUPPLEMENTARY INFORMATION:

Information Solicited

When we make a finding that a petition presents substantial information indicating that listing a species may be warranted, the Act (16 U.S.C. 1531 *et seq.*) requires us to promptly commence a review of the status of the species. To ensure that the status review is complete and based on the best available scientific and commercial information, we seek information on the coqui llanero. We request information from the public, other concerned governmental agencies, Native American Tribes, the scientific community, industry, or any other interested parties concerning the status of the coqui llanero. We seek information regarding:

(1) The species' historical and current status and distribution, its biology and ecology, and ongoing conservation measures for the species and its habitat;

(2) Information relevant to the factors that are the basis for our making any listing determination for a species under section 4(a) of the Act, which are:

(a) The present or threatened destruction, modification, or curtailment of the species' habitat or range;

(b) overutilization for commercial, recreational, scientific, or educational purposes;

(c) disease or predation;

(d) the inadequacy of existing regulatory mechanisms; or

(e) other natural or manmade factors affecting its continued existence and threats to the species or its habitat; and

(3) Information on the effects of climate change, sea-level change, and water temperature change on the distribution and abundance of the species.

If we determine that listing the species is warranted, we intend to propose critical habitat to the maximum extent prudent and determinable at the time we propose the listing. Therefore, with regard to areas within the geographical range currently occupied by the coqui llanero, we also request data and information on what may constitute physical or biological features essential to the conservation of the species, where these features are currently found, and whether any of these features may require special management considerations or protection. In addition, we request data and information regarding whether there are areas outside the geographical area occupied by the species that are essential to the conservation of the species. Please provide specific comments and information as to what, if any, critical habitat you think we should propose for designation if the species is proposed for listing, and why such habitat meets the requirements of the Act.

Please note that submissions merely stating support for or opposition to the action under consideration without providing supporting information, although noted, will not be considered in making a determination, as section 4(b)(1)(A) of the Act (16 U.S.C. 1531 *et seq.*) directs that determinations as to whether any species is a threatened or endangered species must be made ''solely on the basis of the best scientific and commercial data available.'' Based on the status review, we will issue a 12-month finding on the petition, as provided in section 4(b)(3)(B) of the Act.

You may submit your information concerning this status review by one of the methods listed in the **ADDRESSES** section.

If you submit information via *http://www.regulations.gov,* your entire submission—including any personal identifying information—will be posted on the Web site. If your submission is made via a hardcopy that includes personal identifying information, you may request at the top of your document that we withhold your personal information from public review. However, we cannot guarantee that we will be able to do so. We will post all hardcopy comments on *http://www.regulations.gov.*

Information and materials we receive, as well as supporting documentation we used in preparing this finding, will be available for public inspection on *http://www.regulations.gov,* or by appointment, during normal business hours, at the U.S. Caribbean Ecological Services Field Office (*see* **FOR FURTHER INFORMATION CONTACT** section).

Background

Section 4(b)(3)(A) of the Act requires that we make a finding on whether a petition to list, delist, or reclassify a species presents substantial scientific or commercial information indicating that