U.S. FISH AND WILDLIFE SERVICE SPECIES ASSESSMENT AND LISTING PRIORITY ASSIGNMENT FORM

Scientific Name:

Labordia lorenciana

Common Name:

Lead region:

Region 1 (Pacific Region)

Information current as of:

06/23/2014

Status/Action

___ Funding provided for a proposed rule. Assessment not updated.

___ Species Assessment - determined species did not meet the definition of the endangered or threatened under the Act and, therefore, was not elevated to the Candidate status.

_X_ New Candidate

___ Continuing Candidate

___ Candidate Removal

> ___ Taxon is more abundant or widespread than previously believed or not subject to the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status
>
> ___ Taxon not subject to the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status due, in part or totally, to conservation efforts that remove or reduce the threats to the species
>
> ___ Range is no longer a U.S. territory
>
> ___ Insufficient information exists on biological vulnerability and threats to support listing
>
> ___ Taxon mistakenly included in past notice of review
>
> ___ Taxon does not meet the definition of "species"
>
> ___ Taxon believed to be extinct
>
> ___ Conservation efforts have removed or reduced threats
>
> ___ More abundant than believed, diminished threats, or threats eliminated.

Petition Information

_X_ Non-Petitioned

___ Petitioned

90-Day Positive:

12 Month Positive:

Did the Petition request a reclassification?

For Petitioned Candidate species:

Is the listing warranted(if yes, see summary threats below)

To Date, has publication of the proposal to list been precluded by other higher priority listing?

Explanation of why precluded:

We find that the immediate issuance of a proposed rule and timely promulgation of a final rule for this species has been, for the preceding 12 months, and continues to be, precluded by higher priority listing actions (including candidate species with lower LPNs). During the past 12 months, the majority our entire national listing budget has been consumed by work on various listing actions to comply with court orders and court-approved settlement agreements; meeting statutory deadlines for petition findings or listing determinations; emergency listing evaluations and determinations; and essential litigation-related administrative and program management tasks. We will continue to monitor the status of this species as new information becomes available. This review will determine if a change in status is warranted, including the need to make prompt use of emergency listing procedures. For information on listing actions taken over the past 12 months, see the discussion of Progress on Revising the Lists, in the current CNOR which can be viewed on our Internet website (http://endangered.fws.gov/).

Historical States/Territories/Countries of Occurrence:

- **States/US Territories**:State(s) information not available
- **US Counties**:County information not available
- **Countries**:Country information not available

Current States/Counties/Territories/Countries of Occurrence:

- **States/US Territories**:State(s) information not available
- **US Counties**:County information not available
- **Countries**:Country information not available

Land Ownership:

This species occurs on State land within the Na Pali-Kona Forest Reserve and Alakai Wilderness Preserve.

Lead Region Contact:

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Lead Field Office Contact:

PACIFIC ISLANDS FISH AND WILDL OFC, Kristi Young, 808-792-9419, kristi_young@fws.gov

Biological Information

Species Description:

Labordia lorenciana is a small tree that grows between 3 and 4 meters (m) (9.8 to 13.1 feet (ft)) tall, and a trunk between 3 and 7 centimeters (cm) (1.1 and 2.8 inches (in)) in diameter at the base. The bark is grayish brown and mottled white or dark brown. Flowers are pale green to greenish yellow, sometimes white; with two deltate to ovate petals with acute to acuminate apex; and grow in open paniculate, pedunculate cymes. *L. lorenciana* most closely resembles the Oahu endemic species *L. kaalae* C. N. Forbes, from which it differs in having leaf bases deeply cordate to auriculate, adaxial leaf surfaces puberulent, and fruit valves 2.5-3.7 cm (1-1.5 in) long, and longitudinally striate (Wood et al. 2007, pp. 195-199).

Taxonomy:

Labordia lorenciana is a relatively newly described species discovered and validated by Wood et al. (2007, pp. 195-199).

Habitat/Life History:

Labordia lorenciana is known only from the island of Kauai, between 900 and 1,100 m (3,000 and 3,600 ft) elevation, in montane mesic forest (Wood et al. 2007, pp. 195-199).

Historical Range/Distribution:

Labordia lorenciana is known from only four individuals discovered in upper Kawaiiki Valley in the Na Pali-Kona Forest Reserve (Molhihi-Waialae Trail to Kaluahaulu in the Alakai Wilderness Preserve, below wind-swept rim into north-facing drainage) on the island of Kauai (Wood et al. 2007, pp. 195-199).

Current Range Distribution:

Labordia lorenciana is currently known from only four individuals in the back of Waimea Valley (Na Pali-Kona Forest Reserve, upper Kawaiiki, and Molhihi-Waialae Trail to Kaluahaulu, and below the wind-swept rim into the north-facing drainage) on the island of Kauai. *L. lorenciana* is also being cultivated at the National Tropical Botanical Gardens on Kauai with the intent to be outplanted in the future (Wood et al. 2007, pp. 195-199).

Population Estimates/Status:

Currently, *Labordia lorenciana* is limited to four individuals in the lower drainage banks in Kawaiiki Valley on a 330 degree north facing slope in montane mixed mesic forest (Wood et al. 2007, pp. 195-199). Additional surveys to find more individuals of *L. lorenciana* have not been successful; however, experts believe more extant individuals may exist in similar rich montane mesic forests on Kauai (Wood et al. 2007, p. 198). Scientific research directed toward specific species in Hawaii is limited because of their rarity and the generally challenging logistics associated with conducting field work in Hawaii (e.g., areas are typically remote, difficult to survey in a comprehensive manner, and the target species are exceptionally uncommon).

Threats

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

We acknowledge that the specific natures of the threats to individual native Hawaiian plant species are not completely understood. Scientific research on native Hawaiian plant species is limited because of their rarity and the challenging logistics associated with conducting field work in Hawaii (e.g., areas are typically remote, difficult to access and work in, and expensive to survey in a comprehensive manner). However, there is information available on many of the threats that act on Hawaiian ecosystems, and, for some ecosystems, these threats are well studied and understood. Each of these native species is exposed to those threats to varying degrees. For the purposes of our candidacy determination, our assumption is that the threats that act at the ecosystem level also act on each of the species that occur in those ecosystems. Some native Hawaiian species, including the plant *Labordia lorenciana*, are components of the native ecosystems that have shown declines in number of individuals, number of occurrences, or changes in species abundance and species composition that can be reasonably attributed to the threats discussed below.

The Hawaiian Islands are located over 2,000 mi (3,200 km) from the nearest continent. This isolation has allowed the few plants and animals that arrived in the Hawaiian Islands to evolve into many highly varied and endemic species (species that occur nowhere else in the world). The only native terrestrial mammals in the Hawaiian Islands are two bat taxa, the extant Hawaiian hoary bat (*Lasiurus cinereus semotus*) and an extinct, unnamed insectivorous bat (Ziegler 2002, p. 245). The native plants of the Hawaiian Islands, therefore, evolved in the absence of mammalian predators, browsers, or grazers. As a result, many of the native species have lost unneeded defenses against threats such as mammalian predation and competition with aggressive, weedy plant species that are typical of continental environments (Loope 1992, p. 11; Gagne and Cuddihy 1999, p. 45; Wagner et al. 1999d, pp. 36). For example, Carlquist (in Carlquist and Cole 1974, p. 29) notes that Hawaiian plants are notably free from many characteristics thought to be deterrents to herbivores (toxins, oils, resins, stinging hairs, coarse texture). Native Hawaiian plants are therefore highly vulnerable to the impacts of introduced mammals and alien plants. In addition, species restricted and adapted to highly specialized locations (e.g., *Labordia lorenciana*) are particularly vulnerable to changes (e.g., nonnative species, hurricanes, fire, and climate change) in their habitat (Carlquist and Cole 1974, pp. 2829; Loope 1992, pp. 36; Stone 1992, pp. 88102).

The following constitutes a list of ecosystem-scale threats that may affect *Labordia lorenciana* in the wet ecosystems on Kauai:

1) Foraging and trampling of native plants by goats (*Capra hircus*), pigs (*Sus scrofa*), and black-tailed deer (*Odocoileus hemionus*) results in severe erosion of watersheds because these mammals inhabit terrain that is often steep and remote (Cuddihy and Stone 1990, p. 63). They destabilize soils that support native plant communities, bury or damage native plants, and adversely affect water quality due to runoff over exposed soils. They also destroy the seeds and seedlings of native plant species (Cuddihy and Stone 1990, p. 63), which facilitates the conversion of disturbed areas from native to nonnative vegetative communities.
2) Disturbance of soils by feral pigs creates fertile seedbeds for nonnative species (Cuddihy and Stone 1990, p. 65).
3) Nutrient availability increases as a result of pigs rooting in the nitrogen-poor soils, thus facilitating the establishment of nonnative invasive weeds. Invasive weeds are more adapted to nutrient rich soils than native plants (Cuddihy and Stone 1990, p. 63), and rooting activity creates open areas in forests allowing alien species to completely replace native stands.
4) Rodents damage plant propagules, seedlings, or native trees, which changes forest composition and

structure (Cuddihy and Stone 1990, p. 67).
5) Nonnative insects feed on and defoliate native plants which reduces the geographic range of some species (Cuddihy and Stone 1990, p. 71). Nonnative insects also predate native insect pollinators, which can affect the reproductive success of native plant species (Cuddihy and Stone 1990, p. 71).
6) Large numbers of nonnative invertebrates such as earthworms, ants, slugs, isopods, millipedes, and snails can cause significant changes in nutrient cycling processes resulting in changes to the composition and structure of plant communities (Cuddihy and Stone 1990, p. 73).
7) Nonnative plants displace native Hawaiian species by competing for water, nutrients, light and space; or they may produce a chemical that inhibits growth of other plants (Smith 1985, pp. 180-250; Vitousek et al. 1987 in Cuddihy and Stone 1990, p. 74).

Climate change may pose a threat to the ecosystem that supports this species. Fortini et al. (2013, pp. 1-134) conducted a landscape-based assessment of climate change vulnerability for native plants of Hawaii using high resolution climate change projections. Climate change vulnerability is defined as the relative inability of a species to display the possible responses necessary for persistence under climate change. The assessment by Fortini et al. (2013, p. 79) concluded that *Labordia lorenciana* is highly vulnerable to the impacts of climate change. Therefore, additional management actions may be needed to conserve this taxon into the future.

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

None known at this time.

C. Disease or predation:

Predation by rats (*Rattus rattus* and *R. exulans*) on the seeds of *Labordia lorenciana* has been documented by Wood et al. (2007, pp. 195-199).

D. The inadequacy of existing regulatory mechanisms:

The capacity of Federal and State agencies and their nongovernmental partners in Hawaii to mitigate the effects of introduced pests, such as ungulates, rodents, and weeds, is limited due to the large number of taxa currently causing damage (Coordinating Group on Alien Pest Species (CGAPS) 2009). Invasive weeds are a concern in the Hawaiian Islands because their ranges, though currently small, are expanding. Although additional funding has recently been approved by the State legislature for the Hawaii Invasive Species Committee (HB1716), resources available to reduce the spread of these species and counter their negative ecological effects are still quite limited. Control of established pests is largely focused on a few invasive species that cause significant economic or environmental damage to public and private lands. Comprehensive control of an array of invasive pests and management to reduce disturbance regimes that favor certain invasive species remains limited in scope. If current levels of funding and regulatory support for invasive species control are maintained on Kauai, the Service expects existing programs to continue to exclude or, on a very limited basis, control invasive species only in high-priority areas. Threats from established pests (e.g., nonnative ungulates, weeds, and invertebrates) are ongoing and expected to continue into the future.

Currently, four agencies are responsible for inspection of goods arriving in Hawaii: Hawaii Department of Agriculture (HDOA), U.S. Department of Homeland Security-Customs and Border Protection (CBP), U.S. Department of Agriculture-Animal and Plant Health Inspection Service-Plant Protection and Quarantine (USDA-APHIS-PPQ), and the Service (CGAPS 2009). The HODA inspects domestic cargo and vessels, and focuses on pests of concern to Hawaii, especially insects or plant diseases not yet known to be present in the State (HDOA 2009). The CBP is responsible for inspecting commercial, private, and military vessels and aircraft, and related cargo and passengers arriving from foreign locations. The CBP focuses on a wide range of quarantine issues involving non-propagative plant materials (processed and unprocessed); wooden packing materials, timber, and products; internationally regulated commercial species under the Convention on

International Trade in Endangered Species of Wild Fauna and Flora (CITES); seeds and plants listed as noxious; soil; and pests of concern to the greater United States, such as pests of mainland U.S. forests and agriculture. The USDA-APHIS-PPQ inspects propagative plant material, provides identification services for arriving plants and pests, conducts pest risk assessments, trains CBP personnel, conducts permitting and preclearance inspections for products originating in foreign countries, and maintains a pest database. The Service inspects arriving wildlife products, with the goal of enforcing the injurious wildlife provisions of the Lacey Act (18 U.S.C. 42; 16 U.S.C. 3371 et seq.), and CITES.

The State of Hawaiis unique biosecurity needs are not recognized by Federal import regulations. Under the USDA-APHIS-PPQs commodity risk assessments for plant pests, regulations are based on species considered threats to the mainland United States and do not address many species that could be pests in Hawaii (Hawaii Legislative Reference Bureau (HLRB) 2002, pp. 1109; USDA-APHIS-PPQ 2010, pp. 188; CGAPS 2009, pp. 114). Interstate commerce provides the pathway for invasive species and commodities infested with non-Federal quarantine pests to enter Hawaii. Pests of quarantine concern for Hawaii may be intercepted at Hawaiian ports by Federal agents, but are not always acted on by them because these pests are not regulated under Federal mandates. Hence, Federal protection against pest species of concern to Hawaii has historically been inadequate. It is possible for the USDA to grant Hawaii protective exemptions under the Special Local Needs Rule, when clear and comprehensive arguments for both agricultural and conservation issues are provided; however, this exemption procedure operates on a case-by-case basis. Therefore, that avenue may only provide minimal protection against the large diversity of foreign pests that threaten Hawaii. Adequate staffing, facilities, and equipment for Federal and State pest inspectors and identifiers in Hawaii devoted to invasive species interdiction are critical biosecurity gaps (HLRB 2002, pp. 114; USDA-APHIS-PPQ 2010, pp. 188; CGAPS 2009, pp. 114). State laws have recently been passed that allow the HDOA to collect fees for quarantine inspection of freight entering Hawaii (e.g., Act 36 (2011) H.R.S. 150A5.3). Hawaii Act 202(11), passed and enacted on July 8, 2011 (H.B. 1568), now requires commercial harbors and airports in Hawaii to provide biosecurity and inspection facilities to facilitate the movement of cargo through the ports. This enactment is a significant step toward optimizing the biosecurity capacity in the State of Hawaii; however, Act 202(11) is currently in the planning phase and has not yet been implemented. From a Federal perspective, there is a need to ensure that all civilian and military port and airport operations and construction are in compliance with Act 202(11). The introduction of new pests to the State of Hawaii is a significant risk to federally listed species.

On the basis of the above information, existing State and Federal regulatory mechanisms are not adequately preventing the introduction of nonnative species to Hawaii via interstate and international mechanisms, or intrastate movement of nonnative species between islands, and watersheds, and thus do not adequately protect native plants from the threat of new introductions of nonnative species, or from and the continued expansion of nonnative species populations on and between islands and watersheds. Nonnative species may prey upon, modify, or destroy habitat, or directly compete with native species for food, space, and other necessary resources. The impacts from these introduced threats are ongoing and are expected to continue into the future.

The State of Hawaii provides game mammal (feral pigs, goats, cattle, sheep, and mouflon sheep) hunting opportunities on over 100 State-designated public hunting areas, which includes lands in State Forest Reserves and Natural Area Reserves (H.A.R. 13-123; Mello 2011, pers. comm.). The States management objectives for game animals range from maximizing public hunting opportunities (e.g., sustained yield) in some areas to removal by State staff, or their designees, in other areas (H.A.R. 13-123). Often, endemic Hawaiian plants occur in areas where terrestrial habitat may be manipulated for game enhancement and where game populations are maintained at prescribed levels using public hunting (H.A.R. 13123). Public hunting areas are not fenced, and game mammals have unrestricted access to most areas across the landscape, regardless of underlying land-use designation. While fences are sometimes built to protect areas from game

mammals, the current number and locations of fences are not adequate to prevent habitat degradation and destruction for many threatened and endangered species. The State game animal regulations are not designed nor intended to provide habitat protection, and there are no other regulations designed to address habitat protection from ungulates.

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

Labordia lorenciana is threatened by having a small number of individuals and populations. Species that are endemic to single islands or small island groups are inherently more vulnerable to extinction than are widespread species, because of the increased risk of genetic bottlenecks, random demographic fluctuations, climate change effects, and localized catastrophes such as hurricanes, drought, rockfalls, landslides, and disease outbreaks (Pimm et al. 1988, p. 757; Mangel and Tier 1994, p. 607). These problems are further magnified when populations are few and restricted to a very small geographic area, and when the number of individuals in each population 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 (Gilpin and Soule 1986, pp. 2434). Small, isolated populations often exhibit reduced levels of genetic variability, which diminishes the species capacity to adapt and respond to environmental changes, thereby lessening the probability of long-term persistence (e.g., Barrett and Kohn 1991, p. 4; Newman and Pilson 1997, p. 361). Very small, isolated populations are also more susceptible to reduced reproductive vigor due to ineffective pollination, inbreeding depression, and hybridization. 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 (e.g., nonnative plants and animals, drought, or fire).

Conservation Measures Planned or Implemented :

The National Tropical Botanical Gardens on Kauai has several propagated individuals (Wood et al. 2007, pp. 195-199). Current efforts are directed toward creating a reproductively successful ex situ stock (Wood et al. 2007, pp. 195-199), which if successful, will likely be outplanted in suitable habitat.

Summary of Threats :

Introduced, nonnative animals damage and destroy plants and seeds, modify habitat, create habitat more conducive to alien plant introductions, and spread nonnative plant seeds. Nonnative plants displace and outcompete native species. We therefore consider introduced, nonative plants and animals to be a serious and ongoing threat to *Labordia lorenciana*, exacerbated by the continued inadequacy of existing protective regulations. In addition, we consider the threat from limited number of populations and few (less than 100) individuals to be a serious and ongoing threat to the *L. lorenciana* because (1) this species may experience reduced reproductive vigor due to ineffective pollination or inbreeding depression; (2) this species may experience reduced levels of genetic variability, leading to diminished capacity to adapt and respond to environmental changes, thereby lessening the probability of long-term persistence; and (3) a single catastrophic event may result in extirpation of remaining populations and extinction of the species. Climate change may pose a threat to the ecosystems that support these species, thus exacerbating the effects of the aforementioned threats. These threats apply to the entire range of this species.

For species that are being removed from candidate status:

_____ Is the removal based in whole or in part on one or more individual conservation efforts that you determined met the standards in the Policy for Evaluation of Conservation Efforts When Making Listing Decisions(PECE)?

Recommended Conservation Measures :

Continue to survey for populations of *Labordia lorenciana* in areas of potentially suitable habitat.

Continue propagation efforts for maintenance of genetic stock.
Reintroduce individuals into suitable habitat within historic range that is being managed for additional known threats (e.g., nonnative animals and plants) to this species.

Priority Table

Magnitude	Immediacy	Taxonomy	Priority
High	**Imminent**	Monotypic genus	1
		Species	**2**
		Subspecies/Population	3
	Non-imminent	Monotypic genus	4
		Species	5
		Subspecies/Population	6
Moderate to Low	Imminent	Monotype genus	7
		Species	8
		Subspecies/Population	9
	Non-Imminent	Monotype genus	10
		Species	11
		Subspecies/Population	12

Rationale for Change in Listing Priority Number:

Magnitude:

This species is highly threatened by low number of individuals (see Factor E, above).

Imminence :

The threats to *Labordia lorenciana* associated with low number of individuals are considered imminent because they are ongoing.

__Yes__ Have you promptly reviewed all of the information received regarding the species for the purpose of determination whether emergency listing is needed?

Emergency Listing Review

__No__ Is Emergency Listing Warranted?

The species does not appear to be appropriate for emergency listing at this time because the immediacy of the threats is not so great as to imperil a significant proportion of the taxon within the time frame of the routine listing process. In addition, individuals of *Labordia lorenciana* will benefit from conservation actions initiated by the Hawaii Plant Extinction Prevention Program, funded in part by the FWS. These conservation actions may include monitoring, propagation, and outplanting. If it becomes apparent that the routine listing process is not sufficient to prevent large losses that may result in this species' extinction, then the emergency rule process for this species will be initiated. We will continue to monitor the status of *Labordia lorenciana* as new information becomes available. This review will determine if a change in status is warranted, including the need to make prompt use of emergency listing procedures.

Description of Monitoring:

Much of the information on this form is based on the data collected by the Hawaii Plant Extinction Prevention Program. In addition, we incorporated additional information on this species from our files and the Manual of Flowering Plants of Hawaii (Wagner et al. 1999, pp. 816-817).

List all experts contacted in 2014:

Name Date Affiliation

Yoshioko, Joan 04/10/14 Plant Extinction Prevention Program Coordinator
Bakutis, Ane 04/10/14 Plant Extinction Prevention Program, Molokai
Ching, Susan 04/10/14 Plant Extinction Prevention Program, Oahu
McDowell, Wendy 04/10/14 Plant Extinction Prevention Program, Kauai
Oppenheimer, Hank 04/10/14 Plant Extinction Prevention Program, Maui Nui

Indicate which State(s) (within the range of the species) provided information or comments on the species or latest species assessment:

Hawaii

Indicate which State(s) did not provide any information or comment:

none

State Coordination:

The most recent data for this species was received from PEPP on April 10, 2014. PEPP is a multi-agency (including State) program operated by the University of Hawaii that functions to prevent extinction of Hawaiis rarest and most threatened plants.

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Approval/Concurrence:

Lead Regions must obtain written concurrence from all other Regions within the range of the species before

recommending changes, including elevations or removals from candidate status and listing priority changes; the Regional Director must approve all such recommendations. The Director must concur on all resubmitted 12-month petition findings, additions or removal of species from candidate status, and listing priority changes.

Approve: 06/18/2014
Date

Concur: 11/18/2014
Date

Did not concur: _____ _____
Date

Director's Remarks: