

Neraudia sericea
(No common name)

**5-Year Review
Summary and Evaluation**

**U.S. Fish and Wildlife Service
Pacific Islands Fish and Wildlife Office
Honolulu, Hawaii**

5-YEAR REVIEW

Species reviewed: *Neraudia sericea* (No common name)

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5-YEAR REVIEW
***Neraudia sericea* (No common name)**

1.0 GENERAL INFORMATION

1.1 Reviewers

Lead Regional Office:

Region 1, Endangered Species Program, Division of Recovery, Jesse D'Elia,
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Lead Field Office:

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Cooperating Field Office(s):

N/A

Cooperating Regional Office(s):

N/A

1.2 Methodology used to complete the review:

This review was conducted by staff of the Pacific Islands Fish and Wildlife Office of the U.S. Fish and Wildlife Service (USFWS), beginning on April 8, 2010. The review was based on final critical habitat designation for *Neraudia sericea* and other species from the islands of Maui, Kahoolawe, Lanai, and Molokai (USFWS 2003a-c), as well as a review of current, available information. The Bernice Pauahi Bishop Museum provided an initial draft of portions of the review and recommendations for conservation actions needed prior to the next five-year review. The evaluation of Samuel Aruch, biological consultant, was reviewed by a recovery biologist and the Plant Recovery Coordinator. The document was then reviewed by the Recovery Program Leader and the Assistant Field Supervisor for Endangered Species before submission to the Field Supervisor for approval.

1.3 Background:

1.3.1 Federal Register (FR) Notice citation announcing initiation of this review:

[USFWS] U.S. Fish and Wildlife Service. 2010. Endangered and threatened wildlife and plants; 5-year review status of 69 species in Idaho, Washington, Hawaii, Guam, and the Commonwealth of the Northern Mariana Islands. Federal Register 75(67):17947-17950.

1.3.2 Listing history

Original Listing

FR notice: USFWS. 1994. Endangered and threatened wildlife and plants; endangered status for 12 plants from the Hawaiian Islands; final rule. Federal Register 59(217):56333-56351.

Date listed: November 10, 1994

Entity listed: Species

Classification: Endangered

Revised Listing, if applicable

FR notice: N/A

Date listed: N/A

Entity listed: N/A

Classification: N/A

1.3.3 Associated rulemakings:

USFWS. 2003a. Endangered and threatened wildlife and plants; designation of critical habitat for 60 plant species from the Islands of Maui and Kahoolawe, Hawaii; final rule. Federal Register 68(93):25934-26165.

USFWS. 2003b. Endangered and threatened wildlife and plants; final designation of critical habitat for three plant species from the island of Lanai, Hawaii; final rule. Federal Register 68(6):1220-1274.

USFWS. 2003c. Endangered and threatened wildlife and plants; final designations and nondesignations of critical habitat for 42 plant species from the island of Molokai, Hawaii; final rule. Federal Register 68(52):12982-13141.

Critical habitat was designated for *Neraudia sericea*, a multi-island species, on Maui in two units of 1,811 hectares (4,477 acres) on State and private lands (USFWS 2003a) and on Molokai in a single unit totaling 116 hectares (286 acres) on private lands (USFWS 2003c).

A proposed critical habitat designation for 5,861 hectares (14,482 acres) surrounding Lanaihale (Lanai D) for 28 plant species, including *Neraudia sericea*, was deferred because of a preexisting cooperative agreement between the USFWS and Castle and Cooke Resorts, LLC to manage the lands in proposed unit Lanai D, as well as adjacent lands, for the conservation benefit of the 28 listed species. Because large portions of proposed unit D were already being managed under the Lanai Forest and Watershed Partnership by Castle and Cooke on a voluntary basis in cooperation with the USFWS and the State of Hawaii to achieve important conservation goals, and critical habitat designation threatened to reduce the landowner's cooperation, it was decided that the benefits of excluding unit Lanai D from critical habitat designation outweighed the costs (USFWS 2003b).

Critical habitat for *Neraudia sericea* was not designated on Kahoolawe because the footprint of available critical habitat on the damaged island was greatly reduced, and there were enough suitable sites on other islands within the species' historical range to accommodate the recovery goal of 8 to 10 populations (USFWS 2003a). Under management of the Kahoolawe Island Reserve Commission, should habitat conditions at some point in the future become favorable for the reintroduction of endangered taxa such as *N. sericea*, consideration could be given for introduction of genetic material from Molokai or Maui.

USFWS. 2012. Endangered and threatened wildlife and plants; listing 38 species on Molokai, Lanai, and Maui as endangered and designating critical habitat on Molokai, Lanai, Maui and Kahoolawe for 135 species. Federal Register 77(112):34464-34775.

Critical habitat revisions are currently proposed for *Neraudia sericea* (USFWS 2012).

1.3.4 Review History:

Species status review [FY 2010 Recovery Data Call (August 2010)]:
Declining

Recovery achieved:

1 (0-25%) (FY 2007 Recovery Data Call)

1.3.5 Species' Recovery Priority Number at start of this 5-year review:

3

1.3.6 Current Recovery Plan or Outline

Name of plan or outline: USFWS. 1999. Recovery plan for multi-island plants. U.S. Fish and Wildlife Service, Portland, Oregon. 206 pages + appendices. Available online at <<http://www.fws.gov/pacificislands/recoveryplans.html>>.

Date issued: July 10, 1999

Dates of previous revisions, if applicable: N/A

2.0 REVIEW ANALYSIS

2.1 Application of the 1996 Distinct Population Segment (DPS) policy

2.1.1 Is the species under review a vertebrate?

Yes
 No

2.1.2 Is the species under review listed as a DPS?

Yes
 No

2.1.3 Was the DPS listed prior to 1996?

Yes

No

2.1.3.1 Prior to this 5-year review, was the DPS classification reviewed to ensure it meets the 1996 policy standards?

Yes

No

2.1.3.2 Does the DPS listing meet the discreteness and significance elements of the 1996 DPS policy?

Yes

No

2.1.4 Is there relevant new information for this species regarding the application of the DPS policy?

Yes

No

2.2 Recovery Criteria

2.2.1 Does the species have a final, approved recovery plan containing objective, measurable criteria?

Yes

No

2.2.2 Adequacy of recovery criteria.

2.2.2.1 Do the recovery criteria reflect the best available and most up-to date information on the biology of the species and its habitat?

Yes

No

2.2.2.2 Are all of the 5 listing factors that are relevant to the species addressed in the recovery criteria?

Yes

No

2.2.3 List the recovery criteria as they appear in the recovery plan, and discuss how each criterion has or has not been met, citing information:

A synthesis of the threats (Listing Factors A, B, C, D, and E) affecting this species is presented in Section 2.3.2 and Table 2.

Stabilizing, downlisting, and delisting objectives are provided in the recovery plan for multi-island plants (USFWS 1999), based on whether the species is an annual, a short-lived perennial (fewer than 10 years), or a long-lived perennial. *Neraudia sericea* is a short-lived perennial, and to be considered stabilized, which is the first step in recovering the species, the taxon must be managed to control threats (e.g., fenced) and be represented in an *ex situ* (such as a nursery or arboretum) collection. In addition, a minimum of three populations should be documented on islands where they now occur or occurred historically. For the species to be considered stable, each of these populations must be naturally reproducing and increasing in number, with a minimum of 50 mature individuals per population.

This recovery objective has not been met.

For downlisting, a total of five to seven populations of *Neraudia sericea* should be documented on islands where they now occur or occurred historically. Each of these populations must be naturally reproducing, stable or increasing in number, and secure from threats, with a minimum of 300 mature individuals per population. Each population should persist at this level for a minimum of five consecutive years before downlisting is considered.

This recovery objective has not been met.

For delisting, a total of eight to ten populations of *Neraudia sericea* should be documented on islands where they now occur or occurred historically. Each of these populations must be naturally reproducing, stable or increasing in number, and secure from threats, with 300 mature individuals per population for long-lived perennials. Each population should persist at this level for a minimum of five consecutive years before delisting is considered.

This recovery objective has not been met.

2.3 Updated Information and Current Species Status

2.3.1 Biology and Habitat

2.3.1.1 New information on the species' biology and life history:

Little is known about the life history of *Neraudia sericea*. Its flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors remain unknown (USFWS 2003a, 2003b, 2003c). Hank Oppenheimer (Plant Extinction Prevention Program, pers. comm. 2010) questions whether *N. sericea* is properly classified as a short-lived perennial; he contends that individuals probably live longer than ten years.

2.3.1.2 Abundance, population trends (e.g. increasing, decreasing, stable), demographic features (e.g., age structure, sex ratio, family size, birth rate, age at mortality, mortality rate, etc.), or demographic trends:

Historically, *Neraudia sericea* was known from Kamalo and near Waianu on Molokai; Kaiholena on central Lanai; Olowalu Valley on West Maui (portions of which have been surveyed on several occasions without success [Hank Oppenheimer, pers. comm. 2010]) and the southern slopes of Haleakala on East Maui; and from an unspecified site on Kahoolawe (USFWS 1994). At the time of listing in 1994, two populations of this species were known to be extant, both on privately-owned land: a Molokai population below Puu Kolekole, along the bottom and lower slopes of Makolelau Gulch, containing 50 to 100 individuals; and a West Maui population from Pohakea Gulch of undetermined size (USFWS 1994). The one and only collection of the species on Lanai was made in 1913 by George Munro from Kaiholena (Hawaii Biodiversity and Mapping Program 2010), and it is likely extinct there. Similarly, the only collection of *N. sericea* from Kahoolawe was made in the 1860s (Hawaii Biodiversity and Mapping Program 2010), and it is almost certainly extinct there as well (USFWS 2003b).

On Molokai, Ken Wood vouchered a single reclining but healthy, 3-meter (10-foot) tall tree of *Neraudia sericea* from Kua Gulch at around 800 meters (2,625 feet) elevation in 1997, east of the known population at Makolelau (Wood and Perlman 2002). Steve Perlman also noted a few trees in Waiakuilani Gulch in 1995 at around 975 meters (3,200 feet) elevation (Ken Wood, National Tropical Botanical Garden, pers. comm. 2010). In 1999, Wood and Perlman (2002) were aware of around 30 individuals of *N. sericea* in the Makolelau region between 850 and 950 meters (2,790 and 3,115 feet) elevation, but noted that the region had been recently severely impacted by a huge feral goat (*Capra hircus*) population, which destroyed many of the rare elements that flourished within this once diverse mesic shrubland and forest community, and that the status of the Makolelau population of *Neraudia* was uncertain. A recent survey of private lands east and west of Makolelau by Hank Oppenheimer (pers. comm. 2010) did not locate individuals, and the species is considered possibly extinct (Plant Extinction Prevention Program 2010). A resurvey of the Makolelau region by Steve Perlman and Ane Bakutis in December 2010 relocated 22 individuals of *N. sericea* (A. Bakutis, Plant Extinction Prevention Program, pers. comm. 2010). Most of the individuals of *N. sericea* were mature individuals, however a single seedling was observed. Ken Wood (pers. comm. 2010) believes that immediate surveys in mesic gulches east of the goat-devastated Kamalo area from Wawaia and Kua to West and East Ohia Gulches may uncover additional individuals before feral goats destroy the habitat.

On Maui, there were an estimated five populations on State (Department of Hawaiian Home Lands) and privately-owned lands in Pohakea Gulch on West Maui and in Manawainui and Kamole Gulches on East Maui (USFWS 2003a). Hank Oppenheimer (pers. comm. 2010) has several times in the past ten years visited Pohakea Gulch, where *Neraudia sericea* was found in 1979, but has failed to relocate it and describes the habitat as overrun with introduced invasive plant species, mostly consisting of *Lantana camara* (lantana) and *Erigeron karvinskianus* (daisy fleabane); however, threats from cattle (*Bos taurus*) and feral pigs (*Sus scrofa*) in the habitat have been successfully removed due to the conservation efforts of the landowner (Wailuku Water Company) and the West Maui Mountains Watershed Partnership.

As of 2009, the population status of *Neraudia sericea* was reported as nine populations containing approximately 27 individuals, but acknowledges that the population trend is downward, and the species may be close to extinction (USFWS 2010).

2.3.1.3 Genetics, genetic variation, or trends in genetic variation (e.g., loss of genetic variation, genetic drift, inbreeding, etc.):

No new information.

2.3.1.4 Taxonomic classification or changes in nomenclature:

Neraudia sericea is a short-lived perennial shrub in the nettle family (Urticaceae) (USFWS 2003a-c). This mesic to dry forest, multi-island species has a historic distribution on Molokai, Lanai, Maui, and Kahoolawe (Wagner *et al.* 1999). The species was described by Charles Gaudichaud in 1851 from an unknown location on Maui. In 1888, Hillebrand reduced it to a variety of *N. melastomifolia* (*N. melastomifolia* var. *sericea*). He also described a new species, *N. kahoolawensis*, named for a specimen collected by J.M. Lydgate on the island of Kahoolawe (USFWS 1994). In a taxonomic revision of the genus *Neraudia*, Richard Cowan (1949) restored *N. sericea* to full species status and surmised that *N. kahoolawensis*, for which the type (and only) material was no longer available, was likely a Kahoolawe representative of *N. sericea*, based on its written description. Wagner *et al.* (1999) accepted *N. sericea* as a full species and synonymized *N. kahoolawensis* as a Kahoolawe population of *N. sericea*.

2.3.1.5 Spatial distribution, trends in spatial distribution (e.g. increasingly fragmented, increased numbers of corridors, etc.), or historic range (e.g. corrections to the historical range, change in distribution of the species' within its historic range, etc.):

No new information.

2.3.1.6 Habitat or ecosystem conditions (e.g., amount, distribution, and suitability of the habitat or ecosystem):

On Molokai, the general habitat of *Neraudia sericea* is described as gulch slopes and gulch bottoms in lowland dry to mesic *Metrosideros polymorpha* (ohia)-*Dodonaea viscosa* (aalii)-*Leptecophylla tameiameia* (pukiawe) shrubland or forest between 691 and 1,043 meters (2,266 and 3,421 feet) elevation, associated with *Alyxia oliviformis* (maile), *Coprosma* spp. (pilo), *Kadua* spp. (manono), or *Pleomele auwahiensis* (hala pepe) (USFWS 2003c). At Makolelau, species assemblages described for each separate collection are so different that one has to appreciate the remarkable diversity of the forest, but impacts from feral goats depredation have diminished this once dynamically diverse mesic shrubland and forest community (Wood and Perlman 2002; Hawaii Biodiversity and Mapping Program 2010; National Tropical Botanical Garden 2010b). The habitat at Kua Gulch is *Metrosideros waialealae* var. *fauriei* (ohia)-*Dicranopteris linearis* (uluhe) lowland mesic to wet forest on steep drainage walls associated with *Stenogyne bifida*, *Labordia triflora* (kamakahala), *Pleomele auwahiensis*, *Myrsine lessertiana* (kolea), *Psychotria mariniana* (kopiko), and *Sadleria cyatheoides* (amau) (Wood and Perlman 2002; National Tropical Botanical Garden 2010b).

On Lanai, the only collection from 1913 provided no habitat data (Bishop Museum 2010). The species was probably found on gulch slopes or gulch bottoms in dry to mesic or mesic forest between 693 and 869 meters (2,273 and 2,850 feet) elevation, associated with *Diospyros sandwicensis* (lama), *Dodonaea viscosa*, *Metrosideros polymorpha*, or *Nestegis sandwicensis* (olopua) (USFWS 2003b).

On Maui, the habitat is described as dry to mesic *Metrosideros polymorpha*-*Dodonaea viscosa*-*Leptecophylla tameiameia* shrubland or forest or *Acacia koa* (koa) forest between 198 and 1,658 meters (650 and 5,439 feet) elevation, associated with the following native species *Bobea* spp. (ahakea), *Coprosma* spp., *Cyrtandra* spp. (haiwale), *Diospyros* spp. (lama), *Kadua* spp., *Sida fallax* (ilima), or *Urera glabra* (opuhe) (USFWS 2003a).

2.3.1.7 Other:

No new information.

2.3.2 Five-Factor Analysis (threats, conservation measures, and regulatory mechanisms)

2.3.2.1 Present or threatened destruction, modification or curtailment of its habitat or range:

Threats:

- Ungulate degradation of habitat
 - On Molokai (USFWS 2003c)
 - Feral goats (*Capra hircus*) Wood and Perlman (2002) reported that the Makolelau region where the *Neraudia sericea* population lives had been severely impacted by a large feral goat population and that the status of the species was uncertain
 - Pigs (*Sus scrofa*)
 - On Lanai, axis deer (*Axis axis*) (H. Oppenheimer, pers. comm. 2010)
 - On Maui (H. Oppenheimer, pers. comm. 2010)
 - Feral pigs
 - Goats
 - Cattle (*Bos taurus*)
 - Axis deer
- Established ecosystem-altering invasive plant species degradation of habitat
 - On Molokai (USFWS 2003c, Wood and Perlman 2002)
 - *Melinis minutiflora* (molasses grass)
 - *Rubus rosifolius* (thimbleberry)
 - *Schinus terebinthifolius* (Christmasberry)
 - At Kaiholena Gulch, the only reported locality for the taxon on Lanai, is now virtually a monotypic forest of invasive *Psidium cattleianum* (strawberry guava) (H. Oppenheimer, pers. comm. 2010)
 - On Maui (USFWS 2003a; H. Oppenheimer, pers. comm. 2010)
 - *Melinis minutiflora*
 - *Pennisetum clandestinum* (Kikuyu grass)
 - *Lantana camara* (lantana)

- *Erigeron karvinskianus* (daisy fleabane)
 - Potential threats include *Cortaderia jubata* (pampas grass) and *Macaranga tanarius* (parasol leaf tree)
- Landslides and flooding – At Kua gulch on Molokai (Wood and Perlman 2002)

Current conservation efforts:

- Ungulate exclosure:
 - The East Molokai Watershed Partnership recently completed an 13.6 kilometer (8.5 mile) contour fence to protect 607 hectares (1,500 acres) of the most intact native montane wet and mesic forest systems on the south slopes of East Molokai, including the Makolelau region, and feral ungulate control has been initiated (H. Oppenheimer, pers. comm. 2010; Hawaii Association of Watershed Partnerships 2010).
 - Wood and Perlman (2002) reported that the Makolelau region where the *Neraudia sericea* population is found had been severely impacted by a large feral goat population and that the status of the species was uncertain; the situation should be alleviated now that the East Molokai Watershed Partnership has erected the fence line described earlier.
 - On Lanai, Castle and Cooke is constructing approximately 35 kilometers (22 miles) of fencing around the Lanaihale summit to control the depredations of feral axis deer. The fence will be completed in three increments. The first increment is completed and the second increment is well under construction (H. Oppenheimer, pers. comm. 2010).
- Ungulate control:
 - In Pohakea Gulch threats from cattle and pigs were successfully removed due to the efforts of landowner Wailuku Water Company and the West Maui Mountains Watershed Partnership (H. Oppenheimer, pers. comm. 2010).
 - The East Molokai Watershed Partnership is controlling ungulates within the fenced unit on the south slopes of East Molokai, including the Makolelau region (H. Oppenheimer, pers. comm. 2010; Hawaii Association of Watershed Partnerships 2010).
- Ecosystem-altering invasive plant species control – *Cortaderia jubata* (pampas grass), found near Pohakea Gulch and is being

controlled by the Maui Invasive Species Committee (H. Oppenheimer, pers. comm. 2010).

2.3.2.2 Overutilization for commercial, recreational, scientific, or educational purposes:

This is not a threat.

2.3.2.3 Disease or predation:

Threats:

- Ungulate predation or herbivory:
 - On Molokai (USFWS 2003c)
 - Feral goats
 - On Lanai, axis deer is a threat (H. Oppenheimer pers. comm. 2010)
 - On Maui (H. Oppenheimer, pers. comm. 2010)
 - Goats
 - Axis deer
- Rodent predation or herbivory – Introduced rats (*Rattus* spp.) have also been mentioned as a threat at Makolelau on Molokai (Hawaii Biodiversity and Mapping Program 2010); not reported as a threat on Maui or Lanai.

2.3.2.4 Inadequacy of existing regulatory mechanisms:

Threats:

- Lack of adequate hunting regulation in areas with ungulates – The lack of adequate ungulate control and the existence of established hunting programs in areas where *Neraudia sericea* occurs continue to threaten this species.

2.3.2.5 Other natural or manmade factors affecting its continued existence:

Threats:

- Established invasive plant species competition
 - On Molokai (Hawaii Biodiversity and Mapping Program 2010)
 - *Fraxinus uhdei* (tropical ash)
 - *Ricinus communis* (castorbean)

- On Maui (USFWS 2003a)
 - *Cymbopogon refractus* (barbwire grass)
 - *Eragrostis* spp. (love grass)
 - *Holcus lanatus* (common velvet grass)
- Fire
 - On Molokai (USFWS 2003c; Hawaii Biodiversity and Mapping Program 2010)
 - On Maui a large fire in July 2010 burned 2,510 hectares (6,200 acres) in the Pohakea area, but Oppenheimer (pers. comm. 2010) is unsure whether the known *Neraudia sericea* population site was involved.
- Climate change may pose a threat to this species. However, current climate change analyses in the Pacific Islands lack sufficient spatial resolution to make predictions on impacts to this species. The Pacific Islands Climate Change Cooperative (PICCC) has currently funded climate modeling that will help resolve these spatial limitations. We anticipate high spatial resolution climate outputs by 2013.

Current conservation efforts:

- Captive propagation for reintroduction and translocation:
 - Maui Nui Botanical Garden (2011) reported four seeds in storage, collected from West Maui from a single wild individual. Hank Oppenheimer (pers. comm. 2010) notes that those seeds were actually from a *Neraudia melastomifolia* plant with unusually small leaves collected in Kauaula Valley.
 - National Tropical Botanical Garden (2010a) reported 1,070 seeds in storage from Molokai populations: 1,000 from Makolelau Gulch, 70 from Waiakuilani. In 2011 no seeds were reported in storage (National Tropical Botanical Garden 2011).
 - The Center for Conservation Research and Training Seed Storage Facility (2010) reported no seeds in storage for the species.
 - The Harold L. Lyon Arboretum (2010) had no micropropagation efforts for the species.
 - In December 2010, Ane Bakutis and Steve Perlman collected fruit from four individuals and cuttings from two individuals of *N. sericea* located in Makolelau, Molokai (A. Bakutis, pers. comm. 2010).

2.4 Synthesis

The interim stabilization goals for this species have not been met, as there are nine populations containing approximately 27 individuals. However, none of the populations contains more than 50 mature individuals (Table 1), and not all threats are being managed (Table 2). Therefore, *Neraudia sericea* meets the definition of endangered as it remains in danger of extinction throughout its range.

Table 1. Status of *Neraudia sericea* from listing through 5-year review.

Date	No. wild individuals	No. outplanted	Stabilization Criteria identified in Recovery Plan	Stabilization Criteria Completed?
1994 (listing)	>50-100	0	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 50 mature individuals each	No
1999 (recovery plan)	>50-100	0	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 50 mature individuals each	No
2003 (critical habitat)	>50-100	0	All threats managed in all 3 populations	No
			Complete genetic storage	No
			3 populations with 50 mature individuals each	No
2012 (5-year review)	27	0	All threats managed in all 3 populations	Partially (see Table 2)
			Complete genetic storage	Partially
			3 populations with 50 mature individuals each	No

Table 2. Threats to *Neraudia sericea* and ongoing conservation efforts.

Threat	Listing factor	Current Status	Conservation/ Management Efforts
Ungulates – Degradation of habitat, herbivory	A, C, D	Ongoing	Partially: Ungulate exclosures have been constructed at East Molokai (Makolelau) and Lanaihale. Ungulates are controlled at Makolelau and Pohakea Gulch, Maui.
Established ecosystem-altering invasive plant species degradation of habitat	A	Ongoing	Partially: Ecosystem-altering invasive plant species controlled at Pohakea Gulch on Maui
Landslides and flooding	A	Ongoing	No
Rodent predation or herbivory – Rats	C	Ongoing	No
Fire	E	Ongoing	No
Established invasive plant species competition	E	Ongoing	No
Climate change	A, E	Increasing	No

3.0 RESULTS

3.1 Recommended Classification:

Downlist to Threatened

Uplist to Endangered

Delist

Extinction

Recovery

Original data for classification in error

No change is needed

3.2 New Recovery Priority Number:

Brief Rationale:

3.3 Listing and Reclassification Priority Number:

Reclassification (from Threatened to Endangered) Priority Number: _____

Reclassification (from Endangered to Threatened) Priority Number: _____

Delisting (regardless of current classification) Priority Number: _____

Brief Rationale:

4.0 RECOMMENDATIONS FOR FUTURE ACTIONS

- Captive propagation for genetic storage and reintroduction:
 - Continue to collect seeds from all existing populations and send to at least two or three different venues for propagation and storage.
 - A portion of the seeds stored at National Tropical Botanical Garden should be used for germination trials.
- Reintroduction / translocation protocol development – Maximize the genetic variation among individuals at each reintroduction site.
- Reintroduction / translocation site identification – While surveying for new populations or reintroduced populations, determine which sites are least invaded by invasive introduced plant species and which appear to have the highest likelihood of maintaining new reintroductions.
- Ungulate control:
 - Now that the East Molokai fence line is complete, control feral ungulates inside the fence. Once the Lanaihale fencing project is complete, remove feral ungulates from inside the fence.
- Ungulate exclosure:
 - Continue to construct ungulate-proof fenced exclosures around each population.
 - Complete the Lanaihale fencing project.
 - Monitor all fences for any signs of breaching.
- Ecosystem-altering invasive plant species control – Control invasive introduced plant species around all populations.
- Predator / herbivore control – Implement effective control methods for rodents.
- Surveys / inventories:
 - Continue to search for *Neraudia sericea* in habitats where it has historically been found on Molokai and Maui.
 - On Molokai, also investigate mesic gulches east of Kamalo, from Wawaia to East Ohia Gulches. Survey for remaining individuals of *N. sericea* within the fenced exclosure at East Molokai.
- Competitive invasive plant species control – Control invasive introduced plant species in the immediate vicinity of *Neraudia sericea* populations.
- Threats monitoring – Investigate the status of the Pohakea, Maui, population, following the July 2010 fire.
- Site / area / habitat protection – Implement erosion control measures to prevent landslides.

- Fire protection – Develop and implement fire management plans for all wild and reintroduced populations.
- Population biology research:
 - Study *Neraudia sericea* populations with regard to population size and structure, geographical distribution, flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors.
 - Research the life history of *Neraudia sericea* in reference to designating the taxon from a short-lived perennial to long-lived perennial.
- Alliance and partnership development – Work with the Hawaii Division of Forestry and Wildlife and other land managers to initiate planning and contribute to implementation of ecosystem-level restoration and management to benefit this species.
- Threats research – Assess the modeled effects of climate change on this species, and use to determine future landscape needed for the recovery of the species.

5.0 REFERENCES

- Center for Conservation Research and Training Seed Storage Facility. 2010. Seed bank inventory. Honolulu, Hawaii. Microsoft Access database. Unpublished.
- Cowan, R.S. 1949. A taxonomic revision of the genus *Neraudia* (Urticaceae). *Pacific Science* 3:231-270.
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U.S. FISH AND WILDLIFE SERVICE
5-YEAR REVIEW of *Neraudia sericea* (No common name)

Pre-1996 DPS listing still considered a listable entity? N/A

Recommendation resulting from the 5-Year Review:

Delisting
 Reclassify from Endangered to Threatened status
 Reclassify from Threatened to Endangered status
 No Change in listing status

Appropriate Listing/Reclassification Priority Number, if applicable: _____

Review Conducted By:

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Date 8/28/2012