

## 5-YEAR REVIEW

Short Form Summary

**Species Reviewed:** *Sesbania tomentosa* ('ohai)

**Current Classification:** Endangered

**Federal Register Notice announcing initiation of this review:**

[USFWS] U.S. Fish and Wildlife Service. 2013. Endangered and threatened wildlife and plants; Initiation of 5-year status reviews of 44 species in Oregon, Hawaii, Guam, and the Northern Mariana Islands. Federal Register 78(24):8185-8187.

**Lead Region/Field Office:**

Region 1/Pacific Islands Fish and Wildlife Office (PIFWO), Honolulu, Hawaii

**Name of Reviewer(s):**

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**Methodology used to complete this 5-year 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 March 4, 2013. The review was based on a review of current, available information since the last 5-year review for *Sesbania tomentosa* (USFWS 2010). The evaluation by Chelsie Javar-Salas, Plant Biologist, was reviewed by the Plant Recovery Coordinator. It was subsequently reviewed and approved by the Programmatic Deputy Field Supervisor.

**Background:**

For information regarding the species listing history and other facts, please refer to the Fish and Wildlife Service's Environmental Conservation On-line System (ECOS) database for threatened and endangered species at: [http://ecos.fws.gov/tess\\_public](http://ecos.fws.gov/tess_public).

**Review Analysis:**

Please refer to the previous 5-year review for *Sesbania tomentosa* published on August 27, 2010 (available at: [https://ecos.fws.gov/docs/five\\_year\\_review/doc3334.pdf](https://ecos.fws.gov/docs/five_year_review/doc3334.pdf)) for a complete review of the species' status, threats, and management efforts. No significant new information regarding the species' biological status has come to light since listing to warrant a change in the Federal listing status of *S. tomentosa*.

This short-lived perennial shrub or small tree in the pea family (Fabaceae) is endangered (USFWS 1999). It is known from Nihoa and Necker islands, part of the Papahānaumokuākea Marine National Monument, and all of the main Hawaiian Islands (Geesink *et al.* 1999). Currently, *Sesbania tomentosa* is known from Kauai, Molokai, Maui, Kahoolawe, Nihoa, Necker, Oahu, and Hawaii (USFWS 2012a). The status and trends for *S. tomentosa* are provided in the tables below.

New status information:

- On Kauai and Hawaii Island, *Sesbania tomentosa* is categorized as Rare on Island (ROI) species and is monitored by the Plant Extinction Prevention Program ([PEPP] 2009, 2010, 2011, 2012, 2014).
- On Kauai, 17 individuals were observed at Polihale (PEPP 2010). In 2011, a single mature individual with two seedlings was observed at Hanapepe Bay (National Tropical Botanical Garden [NTBG] 2015). In 2011, 11 mature individuals, 3 immature individuals, and 6 seedlings were known at Polihale (PEPP 2011). In 2012, 13 mature individuals, 1 immature individual, and 6 seedlings were observed at Polihale (PEPP 2012).
- On Oahu, there are two reintroduced locations totaling approximately 30 individuals at Kaena Point and Kaohikaipu islet (USFWS 2012b).
- On Molokai, one population of *Sesbania tomentosa* occurs within the Moomomi Preserve with the majority of populations located outside of the Preserve (The Nature Conservancy of Hawaii 2011). In 2013, there are two populations containing approximately 111 mature individuals of the arboreal form of *S. tomentosa* on Molokai (PEPP 2014). On Molokai, there is one population on the northwest shore from Moomomi to Nenehanaupo, totaling about 35 individuals, and about 1,000 or more individuals on the south coast scattered from Kamiloloa to the Kawela plain (USFWS 2012a).
- On Kahoolawe at Puu Koa Islet, approximately 10 large mature individuals and around 400 young healthy individuals were observed in 2011 (NTBG 2015). This population was noted to fluctuate between around 50 and 400 individuals during a given year and is highly dependent on rainfall (NTBG 2015). On Kahoolawe, about 300 individuals occur in the coastal ecosystem on Puu Koa Islet (USFWS 2012a). On West Maui, there are 3 populations totaling 80 individuals from Nakalele Point to Mokolea Point (USFWS 2012a). On East Maui, there is one population of 10 individuals (USFWS 2012a).
- On Hawaii Island in 2009, there were approximately more than 150 individuals of *Sesbania tomentosa* from Kamilo to South Point (PEPP 2009). On Hawaii Island, five populations containing approximately 50 to 100 mature individuals were known in 2013 (PEPP 2014).
- In 2011, the distribution of *Sesbania tomentosa* on Nihoa was common over much of the island (VanderWerf *et al.* 2011). Many plants appeared to have been chewed on and were missing most of their leaves, perhaps from herbivory by the nonnative gray bird grasshopper *Schistocerca nitens*, especially on Miller's Plateau (VanderWerf *et al.* 2011). In 2012, the distribution of *S. tomentosa* on Nihoa was common over much of the island (Marshall *et al.* 2012). Plants less than 0.6 meter (2 feet) in height were healthy and abundant throughout the island, and much more numerous than when it was observed 2011 (Marshall *et al.* 2012). Many dead, larger (about 1 meter [3 feet]) individuals were commonly distributed over the island, and new seedlings were observed in August 2012 (Marshall *et al.* 2012). In 2013, *S. tomentosa* had a low representation at a few bird monitoring stations on the western half of the island (Plentovich *et al.* 2013).
- The number of individuals has remained stable from the 1,600 to 2,000 known in the main Hawaiian Islands and 5,500 individuals known from the Northwestern Hawaiian Island in the previous 5-year review to an estimated 1,600 to 2,700 individuals known

in the main Hawaiian Islands in 2015 (USFWS 2012a; The Nature Conservancy of Hawaii 2011; PEPP 2012; PEPP 2014). We do not have a population estimate for Nihoa and Mokumanana (Necker) in the Papahānaumokuākea Marine National Monument, besides observations of the species commonly distributed across the island (VanderWerf *et al.* 2011; Marshall *et al.* 2012; Plentovich *et al.* 2013).

New threats:

- Overutilization for commercial, recreational, scientific, or educational purposes – *Sesbania tomentosa* that originated from natural populations, but is now grown from seed or vegetative propagules produced in nurseries, is available for sale by multiple nurseries and home improvement stores only within the State of Hawaii. Thus, a USFWS interstate permit under section 10(a)(1)(A) of the Endangered Species Act of 1973, as amended, is not required. The State of Hawaii Board of Land and Natural Resources regulates the commercial-use or sale of plants listed as threatened or endangered by the State of Hawaii through issuance of State licenses or permits, as authorized by the Hawaii Administrative Rules Chapter §13-104, §13-107, and §13-124, Hawaii Revised Statutes §195D, and all other applicable laws. Hawaii Revised Statutes §195D also known as the Hawaii Endangered Species Law, provides protection for all plants listed as threatened and endangered species by State and Federal laws on lands within the State of Hawaii.
- Slug herbivory – Herbivory by slugs have been reported as a new threat to this species on Molokai (PEPP 2014).

New management actions:

- Surveys / inventories
  - Between 2000 and 2005, a coastal survey of 50 sites on Molokai documented *S. tomentosa* within two sites that were categorized in the arid moisture zone (Warshauer *et al.* 2009). The distribution of the species was noted as depleted and not seen at all (Warshauer *et al.* 2009). This species was noted as planted, uncommon in the local areas at Kalani and Naaukahihi.
  - Between 2000 and 2005, a coastal survey of 19 sites on West Maui observed *S. tomentosa* at three sites within the moderately dry moisture zones (Warshauer *et al.* 2009). The species distribution was noted as uncommon in the local areas of Nakalele Point, Papanalahoā Point, and Mokolea Point (Warshauer *et al.* 2009).
  - Between 2000 and 2005, a coastal survey of 29 sites on Oahu observed *S. tomentosa* at a single site within the dry moisture zones (Warshauer *et al.* 2009). The species distribution was noted as occasional at Kaena Point (Warshauer *et al.* 2009).
- Ungulate monitoring and control / Predator / herbivory monitoring and control
  - The Kaena Point Ecosystem Restoration Project involved the construction of predator-proof fencing (2 meter [6.6 foot] tall) to prevent feral predators such as dogs, cats, mongoose, rats, and mice from entering into 20 hectares (50 acres) of coastal habitat within Kaena Point (Young *et al.* 2012). The project was the result of a partnership between the Hawaii Department of Land and Natural Resources, Divisions of Forestry and Wildlife and State Parks, the U.S. Fish and Wildlife Service, and the Hawaii Chapter of the Wildlife Society. The fence was

- completed on March 30, 2011. All predators except mice were eradicated from within the reserve within three months (Young *et al.* 2012). Mice took an additional six months to remove them from the reserve and that was completed in the fall of 2011 (Young *et al.* 2012).
- In 2014, a fence was built at Kawela to protect individuals of *S. tomentosa* (PEPP 2014).
  - The State Division of Forestry and Wildlife's Kamiloloa plant sanctuary fenced enclosure was inspected (PEPP 2013).
  - Invasive plant monitoring and control – *Leucaena leucocephala* (haole koa) was removed from the fenced enclosure at Kawela (PEPP 2014).
  - Predator / herbivore monitoring and control – In 2010, coretect was applied to the population at Polihale on Kauai to control mealy bugs and scales (PEPP 2011). In 2013, coretect was reapplied to the Polihale population to control seed boring insects and scales (PEPP 2013).
  - Population viability monitoring and analysis
    - In 2009, 17 plants were monitored and seeds were collected from those plants located at Polihale Beach on Kauai (PEPP 2010). In 2010, only 12 mature and 4 seedlings were observed including the discovery of 2 new seedlings (PEPP 2010). In 2010, 4 plants were dead possibly because of mealy bugs (PEPP 2011). Another individual was noted as being damaged by an all-terrain vehicle; fortunately, the plant did not perish (PEPP 2011). In 2011, the plants at Polihale were monitored again and seeds were collected (PEPP 2012). A single individual was noted as dead due to damage from an all-terrain vehicle. In 2013, 13 mature and 2 seedlings were monitored at Polihale (PEPP 2013).
    - The population of *S. tomentosa* at Apua Point at Hawaii Volcanoes National Park showed a dramatic decline during more than a year of monitoring (Pratt *et al.* 2011). The loss of almost half of the monitored plants and the decrease in plant size of the remaining survivors were evidence that this population is declining at the coastal site. The decline detected in 2006 to 2007 at Apua did not seem to be related to low rainfall, as a nearby lowland weather station at Puuloa recorded greater than average rainfall.
    - In conjunction with monitoring populations of *Solanum nelsonii* (candidate species) in March 2014, populations of *S. tomentosa* were also monitored from Naaukahihi (Hawaiian Homes Moomomi) to Kalani Beach in the Moomomi preserve (The Nature Conservancy of Hawaii 2014).
    - On Nihoa, densities of *Schistocerca nitens* were observed in stands of vegetation where either *Sida fallax* (ilima) or *S. tomentosa* were dominant, particularly on the eastern side of the island (VanderWerf *et al.* 2011). It was observed that new growth on many *S. tomentosa* appeared insect-eaten, although this pattern was not ubiquitous. While it seems likely that damage to *S. tomentosa* is attributable to *Schistocerca nitens*, the action of herbivory was not directly observed (VanderWerf *et al.* 2011).
    - On Kauai, a single individual was monitored at Hanapepe (PEPP 2013).
    - In 2013, 6 individuals of the arboreal form were observed at Kawela on Molokai (PEPP 2013). In 2014, 4 individuals were monitored at Kawela (PEPP 2014).

- These plants are part of a larger population containing more than 100 individuals (PEPP 2014).
- Thirteen individuals were observed at Kamooalii on Hawaii Island in 2013 (PEPP 2014). Seeds were collected from 4 individuals and will be used for future reintroduction efforts (PEPP 2014).
  - At Kanaio on Maui, 1 immature individual and 24 seedlings of the arboreal form were observed in 2014 (PEPP 2014). While at the site, it was noted that all of the mature plants were dead, but many seedlings have germinated (PEPP 2014).
  - More than 100 individuals were monitored at the Kamilola Plant Sanctuary (PEPP 2013). Seeds were collected from 35 individuals.
  - Population biology research
    - At Hawaii Volcanoes National Park individuals of *S. tomentosa* were studied for more than two years to determine their stand structure, short-term mortality rates, patterns of reproductive phenology, success of fruit production, seed germination rates in the greenhouse, presence of soil seed bank, and survival of both natural and planted seedlings (Pratt *et al.* 2011). Stand structure and mortality of natural *S. tomentosa* could not be determined at Kipuka Nene, but half of monitored plants died over one year at coastal Apua Point. *Sesbania tomentosa* showed distinct seasonal patterns in their reproductive phenology. At the upland site containing *S. tomentosa*, peak bud and flower production occurred in spring and summer, and greatest fruit abundance was in summer and winter months. The coastal site for this species showed greatest flowering in the fall and mature fruit were persistent all year (Pratt *et al.* 2011).
    - The most important limiting factors identified for *S. tomentosa* were loss of seeds to rodent predation and low seedling recruitment. Other limiting factors included the loss of flowers to nonnative insect predation and displaying very low fruit set caused by either a lack of effective pollination or self-compatibility problems.
    - Pollination studies for *S. tomentosa* at Kipuka Nene determined that six insect species were floral visitors, and native *Hylaeus* (yellow-faced bees) and *Apis mellifera* honeybees were found to be transporting pollen of the rare plant (Pratt *et al.* 2011). The remaining four species participated in less than 10 percent of all floral visits and they include the nonnative *Linepithema humile* (Argentine ant), *Plagiolepis alluaudi* (little yellow ant), nonnative *Conocephalus saltator* (longhorned grasshopper), and *Lampides boeticus* (bean butterfly). Caterpillars of *Lampides boeticus* destroyed a high percentage of flowers.
  - Threats – predator / herbivore research – The role of rodents as fruit and seed predators was evaluated using exclosures and seed offerings in open and closed cages (Pratt *et al.* 2011). Rodents were excluded from 50 randomly selected branches of *S. tomentosa*, and flower and fruit production were compared to that of adjacent unprotected plants. Tagged *S. tomentosa* fruit were also monitored monthly to detect rodent predation. Rodents were found to be seed predators of *S. tomentosa*. A third of tagged seedpods of *S. tomentosa* displayed signs of rat predation, and another third disappeared.
  - Captive propagation protocol development – Seed germination rates determined by greenhouse studies were moderately high for *S. tomentosa* (Pratt *et al.* 2011). The trials using soaked seeds in hot water for 6 hours prior to planting showed much

higher rates of germination than did those with untreated seeds. Field-sowed seeds of *S. tomentosa* germinated 31 percent during seed-sowing trials. No difference in germination or seedling survival was observed for *S. tomentosa* in plots with and without grass. A small seed bank was detected for *S. tomentosa* during one season at both Kipuka Nene and Apua Point. Seeds could persist for almost three years in the soil and germinate under favorable rainfall conditions. Planted seedlings at two sites along Hilina Road had very high mortality, as did seedlings that germinated at seed plots at Kipuka Nene.

- Captive propagation for genetic storage and reintroduction
  - The Lyon Arboretum's Seed Conservation Laboratory (2014) has more than 30,000 seeds in storage from Kauai, Oahu, Kahoolawe, Maui, Molokai, and Nihoa. In 2014, 400 seeds were withdrawn from the Lyon Arboretum's Seed Conservation Laboratory by the Kahoolawe Island Reserve Commission for outplanting on Kahoolawe (State of Hawaii Department of Land and Natural Resources [DLNR] 2014).
  - The Lyon Arboretum's Micropropagation Conservation Laboratory (2013) has 8 propagules in their facilities.
  - The State of Hawaii's Division of Forestry and Wildlife Dillingham Nursery (2014) has 300 seeds in storage and 150 plants growing in their nursery.
  - Hawaii Volcanoes National Park (2014) has 23 plants growing in their nursery and 300 seeds in storage.
  - Kalaupapa National Historical Park (2014) has hundreds of seeds in storage from Moomomi.
  - The Maui Nui Botanical Gardens (2014) has hundreds of seeds in storage and five plants growing in their gardens. There are also 31 seeds in storage for the Plant Extinction Prevention Program.
  - The National Tropical Botanical Garden (2014) has more than 14,000 seeds in storage. There are 7 individuals growing at McBryde Garden and 12 individuals propagated at their South shore restoration site (NTBG 2014).
  - The Volcano Rare Plant Facility (2014) has 159 seeds in storage from Kona and 422 seeds in storage collected from 4 outplanting sites.
  - The Kokee Rare Plant Facility has 29 individuals in their nursery representing two founders (DLNR 2013).
  - There are 14 individuals of *S. tomentosa* at the Waimea Valley (2014).
- Reintroduction / translocation
  - The Kokee Rare Plant Facility propagated 18 individuals of *S. tomentosa* in their nursery and those individuals were reintroduced at Kawaiiele Bird Sanctuary (DLNR 2013).
  - In 2014, 310 individuals were reintroduced at Kaena Point and Kaiwi on Oahu (State of Hawaii's Division of Forestry and Wildlife Dillingham Nursery 2014).
  - In 2010, an unknown number of individuals of *S. tomentosa* were reintroduced at Moomomi (The Nature Conservancy of Hawaii 2011).
  - In 2014, 50 individuals were reintroduced within the Kalaupapa Peninsula East Coast Management zone (Kalaupapa National Historical Park 2014).
  - There are 26 outplanted individuals of *S. tomentosa* at Waikoloa Dry Forest Initiative (J. Lawson, Waikoloa Dry Forest Initiative, pers. comm. 2015). Many

- of the reintroduced individuals have reached reproductive maturity and are producing fruits (J. Lawson pers. comm. 2015).
- Reintroduced / translocated population management and monitoring – On Kauai at Nualolo Kai, 41 reintroduced plants were monitored in 2013 (PEPP 2013).
  - Climate change adaptation strategy – Fortini *et al.* (2013) 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) concluded that *S. tomentosa* is moderately vulnerable to the impacts of climate change. Therefore, additional management actions are needed to conserve this taxon into the future.
  - Listing and critical habitat designation
    - Fifteen units of critical habitat were designated for *S. tomentosa* on Oahu in the coastal ecosystem (USFWS 2012b).
    - Nine units of critical habitat were proposed in the coastal and lowland dry ecosystems on Maui for *S. tomentosa* (USFWS 2012a). Five units of critical habitat were proposed in the coastal and lowland dry ecosystems on Kahoolawe (USFWS 2012a). On Molokai, 10 units of critical habitat were proposed in the coastal, lowland dry, and lowland mesic ecosystems (USFWS 2012a). On Lanai, critical habitat for *S. tomentosa* was proposed in five units in the coastal and lowland dry ecosystems. The final rule for these critical habitat designations has not been published at the time of this review.

### **Synthesis:**

Stabilizing, downlisting, and delisting objectives are provided in the recovery plan for the 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. *Sesbania tomentosa* is a short-lived perennial, and to be considered stable, the taxon must be managed to control threats (e.g., fenced) and be represented in an *ex situ* (at other than the plant's natural location, 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. Each of these populations must be naturally reproducing and increasing in number, with a minimum of 50 mature individuals per population.

The interim stabilization goals for this species have not been met in terms of obtaining three populations with more than 50 mature individuals (Table 1). However, all threats are not being sufficiently managed throughout all of the populations (Table 2).

For downlisting, a total of five to seven populations of *Sesbania tomentosa* 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.

The downlisting goals for this species have not been met, as only two known populations may contain more than 300 mature individuals (Table 1). In addition, all threats are not being sufficiently managed throughout all of the populations (Table 2). Therefore, *Sesbania tomentosa* meets the definition of endangered as it remains in danger of extinction throughout its range.

**Recommendations for Future Actions:**

- Surveys / inventories – Survey geographical and historical range for a current assessment of the species’ status.
- Captive propagation for genetic storage and reintroduction
  - Continue collection of genetic resources for storage, propagation, and reintroduction into protected suitable habitat within historical range.
  - Evaluate genetic resources currently in storage to determine the need to place additional genetic resources in long-term storage due to this species’ vulnerability to climate change.
- Ungulate monitoring and control – Maintain existing exclosures and monitor for potential incursions.
- Invasive plant monitoring and control – Eradicate invasive introduced plants within ungulate exclosures and maintain exclosures free of invasive plants.
- Population viability monitoring and analysis – Continue monitoring wild and reintroduced individuals.
- Fire monitoring and control – Develop and implement a fire management plan at the existing exclosure.
- Climate change adaptation strategy – Research the suitability of habitat for reintroducing this species in the future due to the impacts of climate change.
- Alliance and partnership development – Initiate planning and contribute to implementation of ecosystem-level restoration and management to benefit this taxon.

**Table 1. Status and trends of *Sesbania tomentosa* from listing through current 5-year review.**

<b>Date</b>	<b>No. wild indivs</b>	<b>No. outplanted</b>	<b>Downlisting Criteria identified in Recovery Plan</b>	<b>Stability Criteria Completed?</b>
1994 (listing)	2,600-2,700/several thousands	0	All threats managed in all 5-7 populations	No
			Complete genetic storage	No
			5-7 populations with 300 mature individuals each	No
			Naturally reproducing, stable, and increasing in number	Unknown
			Stable for five consecutive years	Unknown
1999 (recovery plan)	2,000-3,000/several thousands	200	All threats managed in all 5-7 populations	Partially
			Complete genetic storage	Partially
			5-7 populations with 300 mature individuals each	No
			Naturally reproducing, stable, and increasing in number	Unknown
			Stable for five consecutive years	Unknown
2003 (critical habitat)	2,700/several thousand	200	All threats managed in all 5-7 populations	Partially
			Complete genetic storage	Partially
			5-7 populations with 300 mature individuals each	No
			Naturally reproducing, stable, and increasing in number	Unknown
			Stable for five consecutive years	Unknown
2011 (5-yr review)	1,600-2,000/1,000-5,500	128-419	All threats managed in all 5-7 populations	Partially
			Complete genetic storage	Partially
			5-7 populations with 300 mature individuals each	No
			Naturally reproducing,	Unknown

<b>Date</b>	<b>No. wild indivs</b>	<b>No. outplanted</b>	<b>Downlisting Criteria identified in Recovery Plan</b>	<b>Stability Criteria Completed?</b>
			stable, and increasing in number	
			Stable for five consecutive years	Unknown
<b>2012 (critical habitat)</b>	<b>0 (Oahu only)</b>	<b>30</b>	<b>All threats managed in all 5-7 populations</b>	<b>Partially</b>
			Complete genetic storage	Partially
			5-7 populations with 300 mature individuals each	No
			Naturally reproducing, stable, and increasing in number	No
			Stable for five consecutive years	No
<b>2012 (critical habitat-proposed)</b>	<b>1,000-2,000 (Molokai, Maui, &amp; Kahoolawe)</b>	<b>n/a</b>	<b>All threats managed in all 5-7 populations</b>	<b>Partially</b>
			Complete genetic storage	Partially
			5-7 populations with 300 mature individuals each	Partially
			Naturally reproducing, stable, and increasing in number	No
			Stable for five consecutive years	No
<b>2015 (5-yr review)</b>	<b>&gt;1,600-2,700 (main Hawaiian Islands only)</b>	<b>~475</b>	<b>All threats managed in all 5-7 populations</b>	<b>Partially</b>
			Complete genetic storage	Partially
			5-7 populations with 300 mature individuals each	Partially
			Naturally reproducing, stable, and increasing in number	No
			Stable for five consecutive years	No

**Table 2. Threats to *Sesbania tomentosa* and ongoing conservation efforts.**

<b>Threat</b>	<b>Listing factor</b>	<b>Current Status</b>	<b>Conservation/ Management Efforts</b>
Ungulates – degradation of habitat and herbivory	A, C, D, E	Ongoing	Partially, Kawela, Kamiloloa, and Kaena are fenced
Invasive introduced plants	A, E	Ongoing	Partially, weeds controlled at Kawela
Human disturbance - Hiking and trail maintenance impacts	A	Ongoing	None
Off-road vehicle degradation of habitat	A	Ongoing	Partially, Kaena is fenced
Agricultural and urban development loss or degradation of habitat	A	Ongoing	None
Overutilization for commercial purposes	B	Ongoing	None
Rodent predation or herbivory – rats and mice	C	Ongoing	Partially, predator-proof fence at Kaena
Invertebrate predation or herbivory – twig borers, scales, aphids, gray bird grasshopper ( <i>Schistocerca nitens</i> )	C	Ongoing	Partially, treated at Polihale
Ant predation – black ants	C	Ongoing	None
Slug herbivory	C	Ongoing	None
Drought	E	Ongoing	None
Loss of mutualists	E	Ongoing	None
Fire	E	Ongoing	None
Low numbers	E	Ongoing	Partially, captive propagation for genetic storage and reintroduction
Climate change	A, E	Increasing	None

**References:**

See previous 5-year review for a full list of references (USFWS 2010). Only references for new information are provided below.

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Subject: Request for info for 5-year reviews.

**U.S. FISH AND WILDLIFE SERVICE**  
**SIGNATURE PAGE for 5-YEAR REVIEW of *Sesbania tomentosa* ('ohai)**

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: \_\_\_\_\_

*for* Programmatic Deputy Field Supervisor, Pacific Islands Fish and Wildlife Office

*Miriam Buegman*

Date *2015-08-25*