

5-YEAR REVIEW

Short Form Summary

Species Reviewed: *Nesogenes rotensis* (No common name)

Current Classification: Endangered

Federal Register Notice announcing initiation of this review:

[USFWS] U.S. Fish and Wildlife Service. 2014. Endangered and threatened wildlife and plants; initiation of 5-year status reviews of 5 species in Oregon, Palau, Guam, and the Northern Mariana Islands. Federal Register 79(32):9263-9264.

Lead Region/Field Office: Region 1/Pacific Islands Fish and Wildlife Office (PIFWO), Honolulu, Hawai`i

Name of Reviewer(s):

Peter McBride, Fish and Wildlife Biologist, PIFWO

Jacqueline Flores, Mariana Islands Team Manager, PIFWO

Lauren Weisenberger, Plant Recovery Coordinator, PIFWO

Gregory Koob, Conservation and Restoration Team Manager, PIFWO,

Kristi Young, Programmatic Deputy Field Supervisor, PIFWO

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). The review was based on the recovery plan for two plants from Rota (*Nesogenes rotensis* and *Osmoxylon mariannense*) (USFWS 2007), as well as a review of current, available information since the last 5-year review for *Nesogenes rotensis* (USFWS 2012). The evaluation by Peter McBride, Fish and Wildlife Biologist, was reviewed by the Mariana Islands Team Manager, Plant Recovery Coordinator, and Conservation and Restoration Team Manager before submission to the Programmatic Deputy Field Supervisor for review and approval.

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 (http://ecos.fws.gov/tess_public).

Review Analysis:

Please refer to the previous 5-year review for *Nesogenes rotensis* published on August 28, 2012 (available at http://ecos.fws.gov/docs/five_year_review/doc4073.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 *Nesogenes rotensis* as endangered.

Nesogenes rotensis is a low-growing, perennial herbaceous plant known to occur on rough limestone karst substrates in coastal locations on the island of Rota in the Commonwealth of the Northern Marianas Islands (CNMI). This species has not been recorded elsewhere, and is understood to be endemic to Rota. Since the time of listing

(2004) the species has been documented at two locations, the Poña Point Fishing Cliff along the south coast of the island, and Puntan Fina Atkos at the island's northeast tip.

Of these two confirmed populations, only the southern one (Poña Point) has been repeatedly surveyed and documented, providing some record of the species' response and eventual resilience to the typhoon disturbance to which it is subject. Earliest estimates of the pre-listing population here were somewhat variable, ranging from "about 20 plants" in 1994 (by Raulerson and Rinehart) up to 579 adult plants (by CNMI-DFW staff) in 2001 (these and other surveys detailed in USFWS 2007). In December 2002, Super-typhoon Pongsona devastated the site, removing essentially all vegetation. A year later some *Nesogenes* were again appearing there, although in somewhat different locations than where they had previously been observed; a total of 34 adult plants were found in December 2003. Two more typhoons impacted the site during the summer of 2004, and by March 2005 "about 20 individuals (both seedlings and adults)" were observed at Poña Point (Williams and Kremer 2006; USFWS 2007). Since 2005, there have been no complete population counts for *Nesogenes* at either confirmed location (USFWS 2012).

There is no new information (or any information since 2005) about the population at Puntan Fina Atkos.

The current status for *Nesogenes rotensis* is provided in Table 1 below. Threats to the species (Table 2) continue, including potential habitat degradation through invasive plant species, typhoons and potential climate change effects, and inadequacy of existing regulatory mechanisms.

New status information:

- In addition to the two above-described locations where the species has been confirmed since the 2004 listing, in the late 1970s or early 1980s *Nesogenes* was also observed at two other locations along the east coast of the island. These locations (Puntan As Fani and Puntan Haiña) were reported to be similar to Poña Point and Puntan Fina Atkos, in terms of similar coastal vegetation on exposed limestone karst (Estanislao Taisacan, pers. comm. 2016).
- Field surveys conducted at Poña Point by DLNR and CNMI-DFW staff documented in excess of 100 individual *Nesogenes* plants in February 2016 (Lainie Berry, CNMI Department of Lands and Natural Resources, pers. comm. 2016). That fieldwork was focused on distribution and was not a complete census.
- In August 2016, two groupings of *Nesogenes* plants were observed at Poña Point. Each cluster included at least 7-13 individuals, with the first group being located at the east end of the point, in the public park area most immediately accessible to the public, while the second group was located 325 m to the WSW of the first group. This was not a complete census. Both this and the previous February 2016 survey confirm that the current distribution of *Nesogenes* population(s) at Poña Point spans over 400m (Lainie Berry, CNMI Department of Lands and Natural Resources, pers. comm. 2016; and McBride field notes and GPS points, August 26, 2016).

- Both groupings of *Nesogenes* observed at Poña Point in August were growing in close association with *Scaevola taccada*, *Bikkia tetrandra*, and *Cassytha filiformis*. Considered as a threat in the 2012 five year review, *Cassytha filiformis* was observed to be abundant and often in close proximity to the *Nesogenes* observed during August 2016. *C. filiformis* was not among the 11 plant species recorded from plots around *Nesogenes* in 2005. (Williams and Kremer 2006; McBride field notes, photographs, and GPS points, August 26, 2016).

New management actions:

- In the spring of 2016, James Manglona of CNMI Forestry was able to successfully germinate *Nesogenes* seeds, in a sandy soil bed at the Rota Forestry nursery. Germination required approximately five months. The persistence and ultimate longevity of these seedlings is yet unknown. (James Manglona, CNMI Forestry, pers. comm. 2016)

Synthesis:

Downlisting and delisting objectives are provided in the recovery plan for *Nesogenes rotensis* (USFWS 2007). To be downlisted to threatened: 1) there must be at least two stable or increasing populations of *Nesogenes rotensis*, each containing at least 300 reproductive individuals; 2) sufficient habitat is protected and managed to achieve criterion 1 above; and 3) management and control of non-native species by local, regional, Commonwealth, and Federal authorities are demonstrated to be successful and sufficient to achieve criterion 1 above. All three criteria above must be achieved and maintained for a minimum of 10 consecutive years to consider downlisting the species.

The downlisting goals for this species have not been met, as there are presently only two known populations of *Nesogenes rotensis*, with a current total population size estimated to be around 100-120 individuals (Table 1). Neither of the populations contains 300 mature individuals. In addition, it has not been demonstrated that sufficient habitat has been protected and managed, or that management and control of non-native species is being conducted sufficiently to achieve these population goals (Table 2). Therefore, *Nesogenes rotensis* meets the definition of endangered as it remains in danger of extinction throughout its range.

Recommendations for Future Actions:

- Revisit and reconfirm the population at Puntan Fina Atkos, its current condition and numbers.
- Survey protocol development: Given the evident seasonal die-back exhibited by this species, and consequent variation in detectability through the calendar year, develop guidance defining season(s) when the species can be more reliably observed, and consistently counted.
- Survey for additional populations of *Nesogenes* in other areas of similar habitat, being the exposed limestone karst coastal cliffs that are common along the eastern

shore of Rota. Revisit and reconfirm the two historical occurrences of *Nesogenes* at Puntan Haiña and Puntan As Fani.

- Conduct systematic inventories of several suitable populations to measure progress toward recovery goals and determine if and when downlisting criteria have been met.
- Conduct studies to clarify whether *Nesogenes* functions hemi-parasitically, and if so, which host species may be essential for its survival.
- Conduct studies to determine if parasitic or pioneering plant species such as *Cassytha filiformis* or *Casuarina equisetifolia* are negatively affecting populations of *Nesogenes*, either directly or via impacts to potential host plant species.
- Regulatory protections – Revise the hunting regulations of CNMI’s Division of Fish and Wildlife to add *Nesogenes rotensis* to the list of protected wildlife and plant species.
- Review the recovery plan (USFWS 2007) to determine if any new information suggests any need to update the plan to more effectively attain recovery goals (e.g., if *Cassytha* is determined to be a substantial issue for recovery, then Recovery Criteria 3 may need to address parasitic and/or pioneering as well as non-native species.)
- Captive propagation for genetic storage and reintroduction:
 - Continue to collect cuttings or seed from tagged individuals, keeping close track of the maternal source for use in ex situ propagation.
 - Continue to collect seeds from all existing populations and send to at least two or three different venues for propagation and storage.
- Captive propagation protocol development – Conduct studies to determine how to propagate the species and maintain the species in nurseries.
- Reintroduction / translocation protocol development – Maximize the genetic variation among individuals at each reintroduction site, maintain detailed provenance information.
- Reintroduction / translocation site identification – While surveying for new populations, determine which sites are least invaded by invasive introduced plant species and which appear to have the highest likelihood of maintaining new reintroductions.
- Conduct research on the possible hemiparasitic nature of the species and determine its host species.
- If *Nesogenes* host species are identified, then seed areas of suitable habitat where the host species is present, but where *Nesogenes rotensis* is lacking.
- Population monitoring – Monitor annually the number of individuals in the Poña Point Fishing Cliff and Puntan Fina Atkos populations.
- Ecosystem-altering invasive plant species control – Monitor and control invasive nonnative plant species in the vicinity of both populations, paying particular attention to species not previously documented or those whose numbers appear to be increasing.
- Habitat requirements research – Conduct research on *Nesogenes rotensis* habitat requirements.
- Site / area / habitat protection – Develop and implement effective measures to reduce the impact of urban development, typhoons, and human disturbance.

- Hunting regulation revisions – Revise the hunting regulations of CNMI’s Division of Fish and Wildlife to add *Nesogenes rotensis* to the list of protected wildlife and plant species.
- Alliance and partnership development – Work with Commonwealth of the Northern Mariana Islands Division of Fish 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.

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

Date	No. wild individuals	No. outplanted	Downlisting Criteria identified in Recovery Plan	Downlisting Criteria Completed?
2004 (listing)	34	0	2 populations with 300 mature individuals each	No
			Sufficient habitat is protected and managed to achieve criterion	No
			Management and control of nonnative species	No
2007 (recovery plan)	35-40	0	2 populations with 300 mature individuals each	No
			Sufficient habitat is protected and managed to achieve criterion	No
			Management and control of nonnative species	No
2012 (5-year review)	30-40	0	2 populations with 300 mature individuals each	No
			Sufficient habitat is protected and managed to achieve criterion	Partially (see Table 2)
			Management and control of nonnative species	No
2016 (5-yr review)	100-120	0	2 populations with 300 mature individuals each	No
			Sufficient habitat is protected and managed to achieve criterion	Partially (see Table 2)
			Management and control of nonnative species	No

Table 2. Threats to *Nesogenes rotensis* and ongoing conservation efforts.

Threat	Listing factor	Current Status	Conservation/ Management Efforts
Established ecosystem-altering invasive plant species degradation of habitat	A	Increasing	No
Agricultural and urban development	A	Ongoing	No
Inadequacy of existing regulatory mechanisms	D	Ongoing	No
Human disturbance	E	Ongoing	Partially: Existing population management and restoration at Puntan Fina Atkos
Typhoon	E	Ongoing	No
Climate change	A, E	Increasing	No

References:

See previous 5-year review for a full list of references. Only references not listed in that document are provided below.

U.S. Fish and Wildlife Service. 2012. *Nesogenes rotensis* (No common name) 5-year review summary and evaluation. U.S. Fish and Wildlife Service, Pacific Islands Fish and Wildlife Office, Honolulu, HI. 17 pp.

U.S. Fish and Wildlife Service. 2014. Endangered and threatened wildlife and plants; initiation of 5-year status reviews of 5 species in Oregon, Palau, Guam, and the Northern Mariana Islands. Federal Register 79(32): 9263-9264.

Williams, L. and S. Kremer. 2006. CNMI Traditional Section 6 Final Report E-1-R-1 FY2006. Division of Fish and Wildlife, Department of Lands and Natural Resources, Commonwealth of the Northern Mariana Islands. 28pp.

Personal communications:

Berry, Lainie and Bethany Chagnon. 2016. Endangered Species Program Manager, CNMI Department of Lands and Natural Resources, and Biologist, CNMI Division of Fish and Wildlife. In-person interview August 25, 2016, and follow-up email to Peter McBride, U.S. Fish and Wildlife Service, dated September 2, 2016. Subject: *Nesogenes* field data.

Manglona, James. 2016. Forester, CNMI Forestry, and Rota Rare Plants Project lead. In-person interview on August 26, 2016. Subject: Propagation & native regeneration of *Serianthes nelsonii*, *Osmoxlon mariannense*, and *Nesogenes rotensis*.

Taisacan, Estanislao. 2016. Retired, CNMI Division of Fish and Wildlife; and Rota Rare Plants Project participant. In-person interview on September 1, 2016. Subject: Field surveys of *Serianthes nelsonii*, *Osmoxlon mariannense*, and *Nesogenes rotensis*.

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Nesogenes rotensis

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

Field Supervisor, Pacific Islands Fish and Wildlife Office



Date 10/28/16