

**Recovery Outline  
for  
Two Plants from Rota  
Commonwealth of the Northern Mariana Islands**

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**Species and** *Nesogenes rotensis* (no common name)

**Listing Status:** Endangered; listed April 8, 2004

*Osmoxylon mariannense* (no common name)

Endangered; listed April 8, 2004

**Recovery Priority Number:** 2 for both species (based on classification as full species, high degree of threat, high recovery potential, and absence of controversy)

**Population Trend:** Declining

**Scope of Recovery Effort:** Multi-species

**Lead Region:** Region 1, Portland, Oregon

**Lead Field Office:** Pacific Islands Fish and Wildlife Office  
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**Purpose and Use of this Recovery Outline:** In the interim between listing and recovery plan approval, a recovery outline provides preliminary strategies for conservation that conform to the mandates of the Endangered Species Act (16 U.S.C. 1531 *et seq.*). It organizes near-term recovery actions, provides rangewide conservation context for our decisions, and sets the stage for recovery planning and stakeholder involvement. The recovery outline is intended primarily for internal use by us, the U.S. Fish and Wildlife Service, to guide conservation actions until a draft recovery plan is developed and distributed for public comment prior to the approval of the final recovery plan.

**Note on Information Sources:** This recovery outline is based on available data contained in the final listing decision (69 FR 18499) for *Nesogenes rotensis* and *Osmoxylon mariannense* and the proposed listing rule (65 FR 35025) for *N. rotensis*, *O. mariannense*, and *Tabernaemontana rotensis*. Our knowledge of the natural history and ecology of these two plant species is very limited at this point in time; research to gather data critical for the conservation and recovery of these species is identified as a high priority need in this outline. The administrative record for the preparation of this outline and the recovery plan for these two plant species will be housed at our Pacific Islands Fish and Wildlife Office at the address above in Honolulu, Hawaii.

## I. Species Information

### Species Descriptions and Life History

***Nesogenes rotensis*:** *Nesogenes rotensis* is an herbaceous perennial plant in the Verbenaceae (Verbena family) (Figure 1-A). It has small, opposite, broadly lanceolate, coarsely toothed, and somewhat fleshy leaves. Flowers are white, axillary, and tubular. Fruits are fleshy when young and dry when mature. Plants typically branch near the base and their habit can be either prostrate or ascending. *N. rotensis* has been observed climbing over surrounding shrubs, and plants can achieve a diameter of almost 1 meter (3 feet). It appears that the above-ground portions of individual plants die back annually or in times of water stress. As far as we know, controlled propagation of *N. rotensis* has not been attempted.

***Osmoxylon mariannense*:** *Osmoxylon mariannense* is a spindly, soft-wooded tree in the Araliaceae (Ginseng family) (Figure 2). It has several ascending, gray-barked branches that bear conspicuous leaf scars and can reach heights of 10 meters (33 feet). Mature leaves are large, alternate or whorled, and palmately lobed. While leaf size can vary, they are typically 30 centimeters (1 foot) in length and 50 centimeters (1.7 feet) in width. The seven to nine lobes are coarsely toothed, with each lobe having a conspicuous, depressed mid-vein. Petioles are based in distinctive, conspicuous green multiple “sockets.” Flowers are yellow, dioecious (male flowers and female flowers are borne on separate individual trees), and are borne in compact, many-branched terminal cymes or umbels. The fruits are large, fleshy, globular, and maroon in color. *O. mariannense* can be propagated from seeds and air layering. From seed, plants germinate within 3 to 5 weeks.

### Present and Historical Distribution

Both species are found only on the island of Rota, the next island to the north of Guam in the Mariana Islands of the Pacific Ocean (Figure 3).

***Nesogenes rotensis*:** *Nesogenes rotensis* is endemic to Rota where it has been recorded at only one location, Poña Point Fishing Cliff (Haaniya Point). The single population, which was not discovered until 1982, occurs on exposed, dry seacliffs of raised limestone karst at approximately 100 meters elevation (330 feet). Here *N. rotensis* occurs in association with *Scaevola taccada* (nanaso), *Terminalia samoensis* (talisa ganu), *Hedyotis strigulosa* (paodédó), *Pogonatherum paniceum*, and *Bikkia tetrandra* (gausali) (Figure 1-B).

***Osmoxylon mariannense*:** *Osmoxylon mariannense* is also endemic to the island of Rota where it historically occurred in dense primary limestone forest at an elevation of approximately 400 meters (1,320 feet). This species was first collected in the years between 1887 and 1889, but we do not have any information on its distribution at that time. *O. mariannense* was not formally described until 1933. It is found as an understory species in dense limestone forests composed of *Pisonia umbellifera* (umumu) and *Hernandia labyrinthica* (nonak) on the highest elevation terraces in the sabana region of the island.



**Figure 1-A.** *Nesogenes rotensis* in flower.



**Figure 1-B.** Habitat of *Nesogenes rotensis*.



**Figure 2.** *Osmoxylon mariannense*.

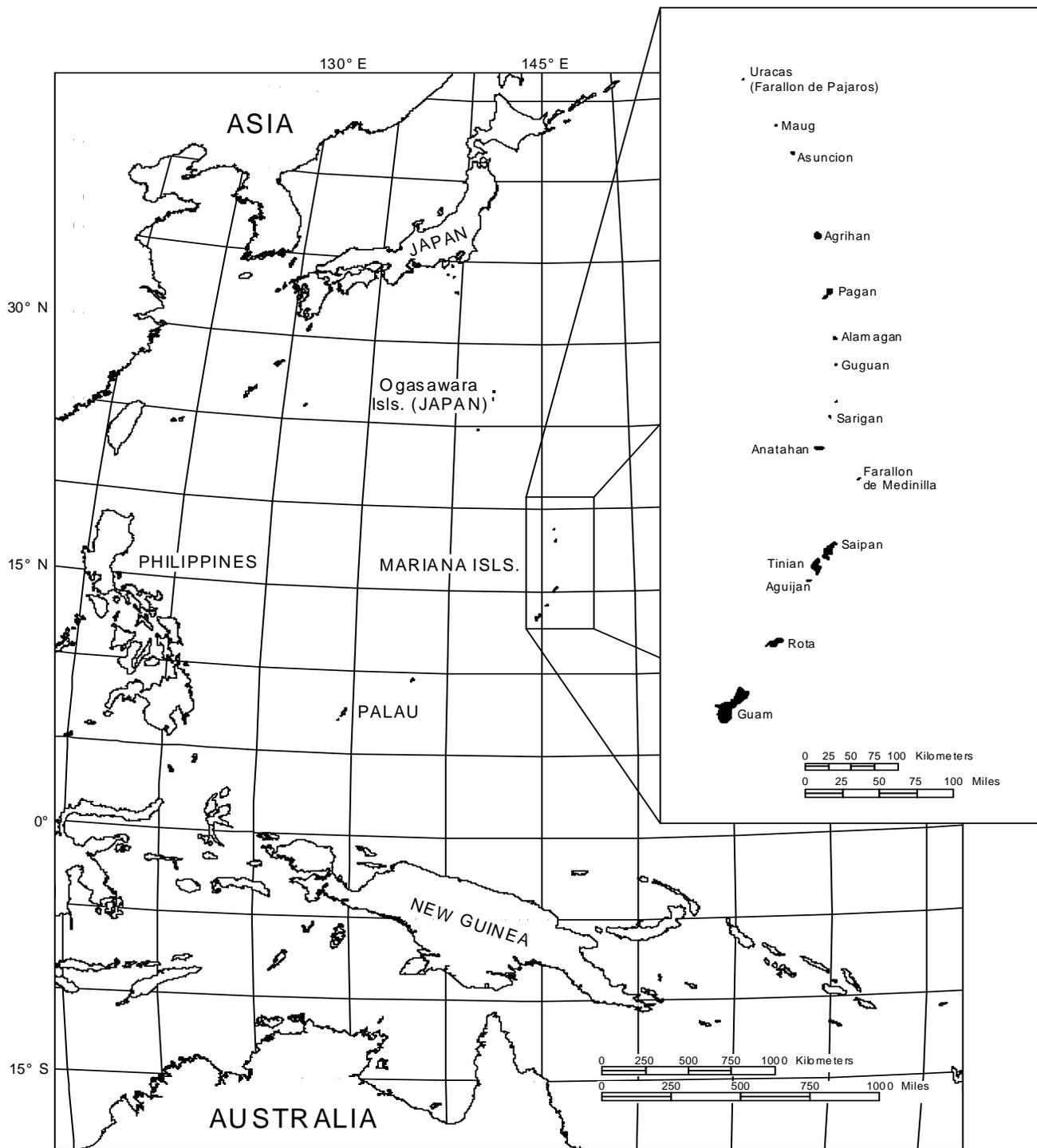


Figure 3. Map showing the location of Rota in the Mariana Islands, north of Guam.

## Population Status

*Nesogenes rotensis*: At the time of its discovery in 1982, fewer than 100 individuals of *N. rotensis* were reported. Twelve years later in 1994, approximately 20 plants were documented to occur in an area of roughly 200 square meters (240 square yards). Seedlings were observed as well as mature plants. These individuals likely represent the same population reported in 1982. No plants were found at this site in January or February 1997, but approximately 30 plants were observed in fruit in January 1998. Since the year 2000, biologists with the Commonwealth of the Northern Mariana Islands Division of Fish and Wildlife have conducted biannual surveys for this species. That year, a direct count on June 27 identified 80 individuals within an area of approximately 800 square meters (960 square yards). In May and November 2001, direct counts identified 458 and 579 adult plants, respectively. Following supertyphoon Pongsona, no individuals of *N. rotensis* were observed in May or November of 2003. However, 34 adult plants were observed in December 2003; this is the current number of known individuals. To date, this species has not been propagated and does not exist in cultivation.

*Osmoxylon mariannense*: Reports for the period between 1980 and 1995 indicate that approximately 20 individual trees occurred as part of a single, widely scattered population in the same general area where the species was first described in 1933. One of the larger occurrences had approximately nine individuals in 1994; however, typhoons damaged many of the trees and only two individuals were identified in 1997. In 1998, shortly after typhoon Paka, a total of eight trees were identified along the sabana. In 2000, a survey conducted by biologists with the Commonwealth of the Northern Mariana Islands Division of Fish and Wildlife identified six living, and five dead, individuals. In 2002, a survey conducted in the same area confirmed eight living trees; this is the current number of known individuals. An unknown number of trees exist in cultivation and as outplantings.

## Distribution and Land Ownership Patterns

*Nesogenes rotensis*: This species occurs only at Haaniya Point (Poña Point Fishing Cliff) in the Palie area of Rota on public park land owned by the Commonwealth of the Northern Mariana Islands under the jurisdiction of the Department of Lands and Natural Resources, Division of Fish and Wildlife.

*Osmoxylon mariannense*: This species occurs only on privately-owned lands in the sabana, or highest elevation terraces, of the island of Rota. Many individuals occur in close proximity to undeveloped roads.

## Threats

*Nesogenes rotensis*: *Nesogenes rotensis* is not listed as an endangered or threatened species by the Commonwealth of the Northern Mariana Islands and has no formal protection from take under Federal law since it does not occur on Federal lands. Its coastal habitat is threatened by fragmentation and degradation associated with resort development, and potential beach park expansion and development of park facilities at the only known location of this species. It occurs in an area adjacent to a trail which is subject to bonfires, collecting, trampling by fishermen and tourists, and potential expansion of the park facilities. As such, increasing overuse of its habitat

by people has become the primary threat to this species. *Casuarina equisetifolia* (ironwood), a large-stature, fast-growing nonnative tree that tends to form monotypic stands, is colonizing the Poña Point Fishing Cliff area. With only one population of fewer than 40 individuals, *N. rotensis* is also highly vulnerable to extinction from random environmental events such as typhoons, storm surge, and high surf since it occurs in a low elevation coastal zone.

*Osmoxylon mariannense*: Although *Osmoxylon mariannense* is listed as a threatened or endangered species by the Commonwealth of the Northern Mariana Islands, there are no specific regulations that prohibit take of such listed species. The primary threat to *O. mariannense* is disturbance of its limestone forest habitat. Rota is subject to disturbance from typhoons; these events have occurred with greater frequency in the past decade. These repeated storms have opened up the canopy in the limestone forests of the sabana, creating conditions favorable to invasive nonnative shrubs and vines. These invasive species outcompete *O. mariannense*. Feral pigs (*Sus scrofa*) and deer (*Cervus mariannus*) are abundant on Rota and their browsing and trampling threaten unfenced individuals and facilitate the spread of invasive plant species. Seed predation by insects, house mice (*Mus musculus*), and/or rats (*Rattus* spp.) is also a suspected cause of reduced or lack of reproduction. Several individual *O. mariannense* occur in close proximity to roadways and routine road maintenance and/or improvement also threaten this species. Due to its restricted range and low numbers (only eight individuals remaining), this species is subject to potential extinction from one stochastic event.

## Key Information Needs for Recovery

### Range and Population Numbers

- Are there any additional populations of *O. mariannense* on Rota?
- Should additional populations of *N. rotensis* be established on Rota? If so, where?
- Where should additional populations of *O. mariannense* be established on Rota?
- How should additional populations of *N. rotensis* and *O. mariannense* be distributed on Rota to preclude species extinction from a single stochastic event?

### Habitat

- Develop list of areas which contain important and potentially suitable habitat for *N. rotensis* and *O. mariannense* and which would be suitable for the outplanting of propagated material.
- In addition to where populations are extant, which habitat areas are most important for the protection and recovery of *O. mariannense* and, potentially, *N. rotensis*?

### Life History and Ecology

- Determine the life history of *N. rotensis* and *O. mariannense*.
- Identify pollination mechanisms, pollinators and their habitat, methods of seed production and seed dispersal, germination requirements, and survival and mortality rates for *N. rotensis* and *O. mariannense*.
- Determine effective propagation methods for *N. rotensis*.

**Threats**

- Update current threats to *N. rotensis* and *O. mariannense* and determine mechanisms to reduce or eliminate them.
- To what degree are seed predation and disease adversely affecting *N. rotensis* and/or *O. mariannense*?
- The effect of seed predation from nonnative rats and mice should be determined. If significant, control measures should be developed and implemented and their results monitored.

**II. Anticipated Recovery Goals and Actions**

Research, surveys, monitoring of extant populations, and habitat protection represent key components for recovery of *Nesogenes rotensis* and *Osmoxylon mariannense*. Current threats to these species need to be better understood, monitored, and minimized. Public outreach, coordination with landowners and land managers, and cooperation with conservation organizations are also important to the recovery of the species.

**Recovery Goals**

Because we have only limited knowledge of the life histories of these two species, we have based tentative broad recovery goals on the criteria recommended by the Hawaii and Pacific Plants Recovery Coordinating Committee (Table 1). More specific population targets, including numbers of individuals and distribution of populations, will be developed in conjunction with the draft recovery plan in addition to the more general goals outlined here.

**Table 1.** Recovery Goals for *Nesogenes rotensis* and *Osmoxylon mariannense*.

Objective	
Interim Stability	All major threats must be controlled and each population must be naturally-reproducing and fully represented in an <i>ex situ</i> collection.
Downlisting	All populations must be stable, secured from threats, and naturally-reproducing for a minimum of 5 consecutive years.
Delisting	All populations must be stable, secured from threats, and naturally-reproducing for a minimum of 5 consecutive years. Species-specific management actions must no longer be necessary.

**Anticipated Research/Studies**

Initial recovery actions will involve additional survey work and research on the life histories for *Nesogenes rotensis* or *Osmoxylon mariannense* as little specific information is known about the biology and life history of either species. An understanding of both species’ life histories, habitat requirements, distribution, and ecology is necessary to address the recovery needs of these two plants. Systematic, island-wide surveys of potentially suitable habitat should be initiated to identify any additional populations of *N. rotensis* or *O. mariannense*. This information will allow us to refine the recovery objectives for these two species.

## **Enhancement, Protection, and/or Acquisition of Habitat**

*Nesogenes rotensis*: Habitat at Haaniya Point (Poña Point Fishing Cliff) needs to be adequately protected to allow for the expansion of the single population of *Nesogenes rotensis* to levels necessary for downlisting and recovery. This may entail rerouting of recreational traffic in this area and the control of invasive nonnative plant species.

*Osmoxylon mariannense*: Extant occurrences on private land should be secured and protected such that no additional trees are lost. Suitable habitat needs to be secured and protected to allow for the expansion of this species to achieve population numbers necessary for downlisting and recovery. This may entail control of feral ungulates, construction of fenced enclosures, and control of invasive nonnative plant species.

## **Outreach**

Outreach is an important component of the recovery planning process. The general public is likely unaware of *Nesogenes rotensis* and *Osmoxylon mariannense*. Outreach activities will be conducted in order to build community support for relevant recovery actions.

## **Coordination and Consultation with Federal Agencies**

There is no Federal ownership of land on Rota; however, should an action be federally funded, authorized, or carried out that may affect a listed species on Rota, section 7 of the Endangered Species Act would require that the authorizing Federal agency consult with us on those actions. We would also need to conduct an interagency consultation with ourselves, the U.S. Fish and Wildlife Service, should we undertake or authorize such an action as well.

## **Coordination with State Agencies and Local Governments**

We should work with the Division of Fish and Wildlife on Rota in support of the listing of *Nesogenes rotensis* as a threatened or endangered species by the Commonwealth of the Northern Mariana Islands. We should also work with the government of the Commonwealth of the Northern Mariana Islands to direct funding available under section 6 of the Endangered Species Act towards recovery projects for *Nesogenes rotensis* and *Osmoxylon mariannense*.

## **Coordination with Private Entities**

We should work with private landowners to secure and protect all extant individuals of *Osmoxylon mariannense* and the habitat necessary for its survival and recovery. Many of our conservation partnership programs have funding available for this type of recovery effort on private lands. Private landowners should be encouraged to allow outplanting activities to occur on their lands. This may require control of feral ungulates.

Should an island-wide Habitat Conservation Plan be prepared for the island of Rota, *Nesogenes rotensis* and *Osmoxylon mariannense* should be included, as this would allow funding from a greater variety of Federal sources to be allocated for their recovery.

### **Interim Recovery Activities**

- Secure and protect all extant occurrences of *Nesogenes rotensis* and *Osmoxylon mariannense*.
- Conduct surveys for new occurrences of *Nesogenes rotensis* and *Osmoxylon mariannense*, recording all new locations using a global positioning system (GPS) coordinate system. Habitat information should be recorded and any threats noted.
- Increase outreach efforts to inform the public of these endangered botanical resources on Rota.

### **III. Recovery Plan Preparation**

#### **Recovery Plan Development**

Our Pacific Islands Fish and Wildlife Office will take the lead in the preparation of the draft recovery plan for *Nesogenes rotensis* and *Osmoxylon mariannense* beginning in fiscal year 2005. This recovery outline is the initial step in this process and provides a strategy and timeline for the recovery planning effort.

#### **Recovery Plan Authorship**

Our staff will provide primary authorship of the recovery plan, with the assistance of species experts and stakeholders. It is not anticipated that a recovery team will be convened; however, we will seek input from all persons interested in, or potentially affected by, recovery efforts for *Nesogenes rotensis* and *Osmoxylon mariannense*. Interested individuals will serve as a source of information and may provide additional perspective on the issues of importance to recovering these two species. In addition to the Commonwealth of the Northern Mariana Islands, stakeholders may include other Federal agencies, non-governmental organizations, species experts, and private landowners who may be able to assist with the recovery and/or have an interest in the protection of these species.

#### **Recovery Plan Coordination**

The identity and number of private landowners in the sabana region of Rota is currently unknown. Coordination with these private landowners is discussed in a previous section. It is anticipated that these persons will be identified and coordinated with to determine their ability and willingness to assist in recovery actions for *Osmoxylon mariannense*. Aside from the private landowners, the following people are potential stakeholders in the recovery of this species and *Nesogenes rotensis* and may assist in gathering information relevant to recovery and provide input throughout the planning process. They may be asked to attend meetings or participate in phone conferences to provide their opinions and to serve as sources of additional information and expertise as the recovery plan is drafted. This is not meant to be an exhaustive list and will be updated as additional stakeholders are identified. In addition, a public comment period will open

when a notice of availability for the draft recovery plan is published in the *Federal Register*. We will also seek peer review from at least three independent experts during this comment period.

- Jonathan Bennett, Arnold Arboretum, Harvard University
- Derral Herbst, Bishop Museum, Honolulu, Hawai'i
- James Manglona, Division of Fish and Wildlife, Commonwealth of the Northern Mariana Islands
- Loyal Mehrhoff, National Park Service
- Lynn Raulerson, University of Guam
- Richard Seman, Division of Fish and Wildlife, Commonwealth of the Northern Mariana Islands
- Estanislau Taisacan, Division of Fish and Wildlife, Commonwealth of the Northern Mariana Islands (retired)
- Warren Wagner, Smithsonian Institution
- Laura Williams, Division of Fish and Wildlife, Commonwealth of the Northern Mariana Islands
- Greg Witteman, University of Guam

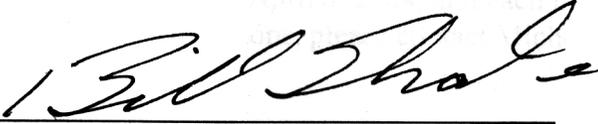
### Recovery Plan Completion

Technical/Agency draft anticipated date of completion: October 2005.

Final recovery plan anticipated date of completion: April 2006.

Approval:

(ACTING)

  
Regional Director, Region 1  
U.S. Fish and Wildlife Service

9/14/04  
Date

### Citation

U.S. Fish and Wildlife Service. 2004. Recovery Outline for Two Plants from Rota, Commonwealth of the Northern Mariana Islands. Portland, Oregon. 11 pp.