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

SCIENTIFIC NAME: *Eua zebrina*

COMMON NAME: Tutuila tree snail; sisi vao

LEAD REGION: Region 1

INFORMATION CURRENT AS OF: April 2010

STATUS/ACTION

___ Species assessment - determined we do not have sufficient information on file to support a proposal to list the species and, therefore, it was not elevated to Candidate status

___ New candidate

_X__ Continuing candidate

___ Non-petitioned

_X__ Petitioned - Date petition received: __May 11, 2004

_ 90-day positive - FR date:

_X_ 12-month warranted but precluded - FR date: _May 11, 2005

_N_ Did the petition request a reclassification of a listed species?

FOR PETITIONED CANDIDATE SPECIES:

a. Is listing warranted (if yes, see summary of threats below)? Yes

b. To date, has publication of a proposal to list been precluded by other higher priority listing actions? Yes

c. If the answer to a. and b. is "yes", provide an explanation of why the action is precluded.

Higher priority listing actions, including court-approved settlements, court-ordered and statutory deadlines for petition findings and listing determinations, emergency listing determinations, and responses to litigation, continue to preclude the proposed and final listing rules for the species. We continue to monitor populations and will change its status or implement an emergency listing if necessary. The "Progress on Revising the Lists" section of the current CNOR (*http://endangered.fws.gov/*) provides information on listing actions taken during the last 12 months.

_N__ Listing priority change

Former LP: ___

New LP: ___

Date when the species first became a Candidate (as currently defined): November 15, 1994

___ Candidate removal: Former LPN: ___

___ A – Taxon is more abundant or widespread than previously believed or not subject to the degree of threats sufficient to warrant issuance of a proposed listing or

continuance of candidate status.

___U – Taxon not subject to the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status due, in part or totally, to conservation efforts that remove or reduce the threats to the species.

___ F – Range is no longer a U.S. territory.

___ I – Insufficient information exists on biological vulnerability and threats to support listing.

___ M – Taxon mistakenly included in past notice of review.

___ N – Taxon does not meet the Act's definition of "species."

___ X – Taxon believed to be extinct.

ANIMAL/PLANT GROUP AND FAMILY: Snails; Family Partulidae (Snail)

HISTORICAL STATES/TERRITORIES/COUNTRIES OF OCCURRENCE: American Samoa, island of Tutuila.

CURRENT STATES/COUNTIES/TERRITORIES/COUNTRIES OF OCCURRENCE: American Samoa, islands of Tutuila and Ofu

LAND OWNERSHIP Land ownership in American Samoa generally follows a historic village tradition. Large sections of land around each village are controlled by the village for the use of the village residents. All known populations of the Tutuila tree snails are on village lands.

LEAD REGION CONTACT: Linda Belluomini, (503) 231-6283, linda_belluomini@fws.gov

LEAD FIELD OFFICE CONTACT: Pacific Islands Fish & Wildlife Office, Christa Russell (808) 792-9400, christa_russell@fws.gov

BIOLOGICAL INFORMATION

Species Description

The biology of Samoan partulid tree snails has not been extensively studied. However, there is considerable information (reviewed by Cowie 1992) on the partulid tree snails of the Mariana Islands (Crampton 1925a; Hopper and Smith 1992) and the Society Islands (Crampton 1925b, 1932; Murray *et al*. 1982; Johnson *et al*. 1986a, b). This family of snails is considered to be ovoviviparous, although viviparity may be a more accurate description, as considerable growth occurs *in utero*. Some species in the family are known to be self-fertile while other partulids, including *Samoana conica* of Tutuila, rely predominantly on out-crossing (Johnson *et al*. 1986a). In the genus *Partula*, shell length at birth is 0.12 to 0.14 inches (in) (3 to 3.5 millimeters (mm)) and sexual maturity is attained in less than 1 year at a shell length of 0.43 to 1.18 in (11 to 30 mm), depending on the species. Adults live about 5 years and give birth about every 20 days, producing about 18 offspring per year (Cowie 1992).

Taxonomy

The Tutuila tree snail is a member of the family Partulidae, which is widely distributed throughout the high islands of Polynesia, Melanesia and Micronesia in the south- and west-

Pacific basin (Cowie 1992). Many of the 123 partulid species (Kondo 1968) are restricted to single islands or isolated groups of islands. The Samoan partulid tree snails are a good example of this endemism. Cowie's 1998 taxonomic work is the most recent and accepted taxonomy for this species.

Habitat/Life History

Cooke (1928) suggested that habitat partitioning may occur among the three partulids of Tutuila. *Samoana conica* and *S. abbreviata* were commonly found on trunks and branches, and the Tutuila tree snail was commonly found on leaves. A similar partitioning of habitat has been reported for the *Partula* of the Society Islands (Murray *et al*. 1982). The snails are typically found scattered on understory vegetation in forest with intact canopy 33 to 66 feet (ft) (10 to 20 meters (m)) above the ground (Cowie and Cook 1999; Cowie 2001).

Historical Range/Distribution

The Tutuila tree snail was historically known only from Tutuila.

Current Range/Distribution

The Tutuila tree snail is found on the islands of Tutuila and Ofu (Cowie and Cook 2001).

Population Estimates/Status

In a 1993 survey, 34 individuals of the Tutuila tree snails were seen alive; 11 at Sauma Ridge (400 to 551 ft [122 to168 m] elevation) and 23 on Nu'usetoga Island (239 ft [73 m]) elevation), about 328 ft (100 m) offshore of Tutuila) (Miller 1993). In a 1998 survey, the Tutuila tree snail was seen alive at 30 of 87 survey sites on the main island of Tutuila and at 1 of 58 sites in the Manua Islands (Cowie and Cook 1999; Cowie 2001).

Cowie (2001) compared the long term changes based on observations from his 1998 survey and earlier work done in 1993 (Miller 1993), 1975 (Solem 1975; Christensen 1980) and pre-1975. Of 12 endemic species recorded alive in 1975, living individuals of five species and the shells of two additional species were seen in 1993. In 1998 11 were seen alive and shells from one additional species were found. Cowie (2001) characterized 3 of these 12 species as being stable in numbers and the rest were described as declining in numbers, including all four of the *Partula* species found in American Samoa. These survey data indicate that the native snail fauna is declining and that the partulid tree snails and several other terrestrial and arboreal species are of particular concern (Cowie 2001).

In recent surveys of Tau and Ofu (Cowie and Cook 1999, 2001) the Tutuila tree snail was discovered on the island of Ofu. Eighty-eight individuals were recorded at the single locality. Ofu does not yet have *Euglandina rosea* (see section on Disease or Predation below). Hence the Ofu population of the Tutuila tree snail is of major conservation significance.

THREATS

A. The present or threatened destruction, modification, or curtailment of its habitat or range. The decline of the native tree snails in American Samoa have resulted, in part, from significant loss of native habitat to forestry and agriculture, loss of native forest structure to hurricanes, and

the establishment of alien weeds after these storms. These threats may interact to greatly exacerbate the loss of populations and species. All live Tutuila snails were found on understory vegetation beneath intact forest canopy. No snails were found in areas bordering agricultural plots or in forest areas that were severely damaged by three hurricanes (1987, 1990, and 1991) (Miller 1993). Under natural historic conditions, loss of forest canopy to storms did not pose a great threat to the long term survival of these snails and enough intact forest with healthy populations of snails would support dispersal back into newly regrown canopy forest. However, the presence of alien weeds such as *Mikania micrantha* (mile-a-minute vine) may reduce the likelihood that native forest will become reestablished in areas damaged by the hurricanes (Whistler 1992). This loss of habitat to storms is greatly exacerbated by an expanding agriculture needed to support one of the world's highest human population growth rates (Craig *et al*. 1993). Agricultural plots on Tutuila have spread from low elevation up to middle and some high elevations on Tutuila, significantly reducing the forest area and thus reducing the resilience of the native forest and its populations of native snails. Loss of forest habitat also increases the likelihood that future storms will lead to the extinction of populations or species that rely on the remaining canopy forest.

B. Overutilization for commercial, recreational, scientific, or educational purposes.
None known.

C. Disease or predation.
At present, the major existing threat to long-term survival of the native snail fauna in American Samoa is predation by the alien rosy carnivore snail *Euglandina rosea,* the most commonly recommended biological control agent of the giant African snail (*Achatina fulica).* Numerous studies show that the rosy carnivore snail feeds on endemic island snails and is a major agent in their declines and extinctions (van der Schalie 1969; Hart 1978; Hadfield and Mountain 1981; Howarth 1983, 1985, 1991; Clarke *et al*. 1984; Pointier and Blanc 1984; Hadfield 1986; Murray *et al*. 1988; Hadfield *et al*. 1989, 1993; Kinzie 1992; Cowie 2001).

At Sauma Ridge, the alien predatory snail *Euglandina rosea*, was found alive within meters of some of these snails (Miller 1993). Shells of the Tutuila tree snails and another Samoan partulid (*Samoana conica*) were found on the ground at several of the locations surveyed on Tutuila, along with numerous shells and an occasional live individual of *E. rosea* (Miller 1993).
The population of Tutuila tree snails on Nu'usetoga Island was probably isolated from an ancestral parent population on the main island of Tutuila in prehistoric time. No live *Euglandina rosea* were found on this offshore islet (Miller 1993). Thus, the Tutuila tree snails on this island are, for the moment, safe from predatory snails. However, predation by rats is a problem, and several rat-damaged shells were found (Miller 1993).

Recent surveys recorded partulid tree snail shells that were damaged in a fashion that is typical of rat predation; the shell is missing a large piece of the body whorl or the apex. Old shells may be weathered in a similar fashion, except that the fracture lines are not sharp and angular. Signs of rat predation were seen at Sauma Ridge and Nu'usetoga Island (Miller 1993). Studies in Hawaii (Hadfield *et al.* 1993) have shown that both rats and *Euglandina rosea* can quickly devastate tree snail populations. Live trapping in Hawaii has implicated the Polynesian rat (*Rattus exulans),* although the black rat (*R. rattus*) and the Norway rat (*R. norvegicus*) may also

be significant threats to native snail populations. All three rat species have been introduced throughout the Pacific islands.

In addition, predation by the Manokwar flatworm (*Platydemus manokwari*) is a likely threat to the Tutuila snail. The Manokwar flatworm has contributed to the decline of native tree snails, due to its ability to ascend into trees and bushes that support native snails. Areas with populations of the flatworm usually lack partulid tree snails or have declining numbers of snails (Hopper and Smith 1992). The predatory flatworm is reported on Tutuila (U. R. Tulafono, Director, Department of Marine Wildlife Resources, American Samoa, pers. comm. 2006).

D. The inadequacy of existing regulatory mechanisms.
The Tutuila snail currently receives no protection under the Federal Endangered Species Act (16 U.S.C. §1531-1544), or from the government of American Samoa.

E. Other natural or manmade factors affecting its continued existence.
None known.

CONSERVATION MEASURES PLANNED OR IMPLEMENTED
None known.

SUMMARY OF THREATS
Based on our evaluation of habitat degradation and loss and the effects of predation we conclude there is sufficient information to develop a proposed rule for this species due to the threat of habitat destruction or alteration by agriculture and nonnative invasive weeds, and predation by the rosy carnivore snail and rats. In addition, predation by Manokwar flatworms, is a likely threat to the Tutuila snail. We find that this subspecies is warranted for listing throughout all its range, and, therefore, find that it is unnecessary to analyze whether it is threatened or endangered in a significant portion of its range.

For species that are being removed from candidate status:
____Is the removal based in whole or in part on one or more individual conservation efforts that you determined met the standards in the Policy for Evaluation of Conservation Efforts When Making Listing Decisions (PECE)?

RECOMMENDED CONSERVATION MEASURES
- Develop and implement long-term monitoring surveys for the Tutuila snail
- Develop and implement nonnative predatory snail removal and control program
- Conduct rat control and removal
- Develop and implement nonnative flatworm control program
- Conduct habitat restoration

LISTING PRIORITY

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

Rationale for listing priority number:

Magnitude:
This species is highly threatened throughout its limited range by habitat loss and alteration and by predation from nonnative predatory snails and rats. In addition, the Tutuila snail is likely threatened by a nonnative predatory flatworm. The small number of individuals and the small number of populations also make this species very susceptible to the negative effects of random natural events such as typhoons and drought. These threats occur range-wide.

Immediacy of Threats:
Threats to the Tutuila tree snail from habitat loss and predation by rats and the rosy carnivore snail are on-going and thus considered to be imminent.

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

Is Emergency Listing Warranted? No. The species does not appear to be appropriate for emergency listing at this time because the immediacy of the threats is not so great as to imperil a significant proportion of the taxon within the time frame of the routine listing process. If it becomes apparent that the routine listing process is not sufficient to prevent large losses that may result in extinction, then the emergency rule process for this species will be initiated. We will continue to monitor the status of the Tutuila snail as new information becomes available. This review will determine if a change in status is warranted, including the need to make prompt use of emergency listing procedures.

DESCRIPTION OF MONITORING

We conducted literature searches for recent articles on this species and contacted relevant species experts, and University of Hawaii researchers regarding the current status of this species. No new information was found. Existing data regarding the species' status was verified.

This level of monitoring is appropriate to update the status of the species because a thorough literature search was conducted as well as relevant species experts contacted. Information contained in this assessment form was verified and any updated information incorporated.

List of Experts Contacted:

Name	Date	Affiliation
Robert Cowie	February 1, 2010	University of Hawaii
Ray Tulafono	January 29, 2009	American Samoa Dept. of Marine & Wildlife Resources

This species is listed as critically endangered (EN) in the International Union for Conservation of Nature and Natural Resources (IUCN) Red Data List database (IUCN 2006). The Tutuila snail is included in the list of species in American Samoa's Comprehensive Strategy for Wildlife Conservation (Department of Marine and Wildlife Resources Revised 2006).

COORDINATION WITH STATES

On January 29, 2010, we sent a letter to the American Samoa Department of Marine and Wildlife Resources requesting their review and comment on our most recent candidate assessment of this species. No response was received.

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Personal Communications

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APPROVAL/CONCURRENCE: Lead Regions must obtain written concurrence from all other Regions within the range of the species before recommending changes, including elevations or removals from candidate status and listing priority changes; the Regional Director must approve all such recommendations. The Director must concur on all resubmitted 12-month petition findings, additions or removal of species from candidate status, and listing priority changes.

Approve:

Acting Carolyn A. Bohan 5/18/10
Regional Director, Region 1, Fish and Wildlife Service Date

Lowell W Hould
ACTING
Director, Fish and Wildlife Service October 22, 2010

Concur:

Do not concur: _____
Director, Fish and Wildlife Service Date

Director's Remarks:

Date of annual review: April 13, 2010
Conducted by: Lorena Wada, Pacific Islands FWO
Biologist, Prelisting and Listing Program

Comments:
PIFWO Review

Reviewed by: Christa Russell Date: April 23, 2010
Prelisting and Listing Program Coordinator

Marilet Zablan Date: April 26, 2010
Assistant Field Supervisor, Endangered Species Division

Gina Shultz Date: April 30, 2010
Acting Field Supervisor