

**Langford's Tree Snail**  
***(Partula langfordi)***

**5-Year Review**  
**Summary and Evaluation**

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

# **5-YEAR REVIEW**

## **Langford's tree snail/*Partula langfordi***

### **1.0 GENERAL INFORMATION**

#### **1.1 Reviewers**

Toni Mizerek, Biologist, Pacific Islands Fish and Wildlife Office (PIFWO)

John Vetter, Animal Recovery Coordinator, PIFWO

Megan Laut, Conservation and Restoration Team Manager, PIFWO

#### **Lead Regional or Headquarters Office**

Region 12, Portland Regional Office

#### **Lead Field Office:**

Pacific Islands Fish and Wildlife Office, 808-792-9400

#### **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 in January 2020. The review was based on the 2015 final rule listing this species; peer reviewed scientific publications; unpublished field observations by the USFWS, Territory of Guam and the Commonwealth of the Northern Mariana Islands (CNMI) and other experienced biologists; unpublished survey reports; notes and communications from other qualified biologists; as well as a review of current, available information. The evaluation completed by Toni Mizerek, Biologist, was reviewed by John Vetter, Animal Recovery Coordinator, and Megan Laut, Conservation and Restoration Team Manager.

#### **1.3 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/ecp>).

##### **1.3.1 FR Notice citation announcing initiation of this review:**

[USFWS] U.S. Fish and Wildlife Service. 2015. Endangered and Threatened Wildlife and Plants; Initiation of 5-Year Status Reviews for 156 Species in Oregon, Washington, Hawaii, Palau, Guam, and the Northern Mariana Islands. Federal Register 83(88): 20088–20092, May 7, 2018.

### 1.3.2 Listing history

#### Original Listing

**FR notice:** [USFWS] U.S. Fish and Wildlife Service. 2015. Endangered and Threatened Wildlife and Plants; Endangered Status for 16 Species and Threatened Status for 7 Species in Micronesia; Final Rule. Department of the Interior, Federal Register 80 (190): 59424-59497, October 1, 2015.

#### Original Listing

**FR notice** FR 80(190), 59424-59497

**Date listed:** October 1, 2015

**Entity listed:** *Partula langfordi*

**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

N/A

### 1.3.4 Review History

This is the first 5-year review for this species. *Partula langfordi* is a tree snail listed as endangered on October 1, 2015 (USFWS 2015). Critical habitat was not designated for this species. The draft recovery plan for this species is in preparation.

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

5

### 1.3.6 Current Recovery Plan or Outline

**Name of plan or outline:** Recovery Outline for 23 Mariana Island Species

**Date issued:** Feb 3, 2020

**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**

N/A

## **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:**

The Langford's tree snail is a member of the Partulidae family that is endemic to Aguigan. The tree snail needs cool, shaded forest habitat with high humidity and reduced air movement that prevents excessive water loss. All partulids including the Langford's tree snail need live and decaying plant material, as their diet consists of fungus and /or microalgae. Little information is available about vegetation that this species is most associated with; however, it has been observed on *Aglaia* sp. and *Guamia mariannae* (Smith 1995).

#### **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:**

Very little about the Langford's tree snail abundance, population trends, demographic features or demographic trends have been described. The species was first detected in 1952 and has not been found since 1992. However, when first collected, the Langford's tree snail was assumed to be a variant of the humped tree snail (*Partula gibba*), with which it was often found.

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

There is no genetic information for the Langford's tree snail.

#### **2.3.1.4 Taxonomic classification or changes in nomenclature:**

Langford's tree snail was discovered by Yoshio Kondo in 1952 and he described the species in 1970 (Kondo 1970).

#### **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.):**

The species has only ever been recorded from the island of Aguigan. The species has been found or was suspected to be found because of co-occurrence with the humped tree snail in at least seven forested sites in the northwest of Aguigan

(Smith 2013). In 2013, only dead shells were found at two of seven established survey sites and the condition of the shells indicated that they were very old (Smith 2013). The Langford's tree snail spatial distribution likely decreased long before its discovery in 1952 and the last observation in 1992.

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

Suitable habitat has been severely impacted and reduced on Aguiguan. Langford's tree snails require cool, shaded forest habitat. However, introduced goats (*Capra hircus*) have destroyed much of the forest on the island.

**2.3.1.7 Other:**

**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:**

Habitat Destruction from ungulates – Feral goats browse on native and non-native plants throughout the island. Browsing goats have created an extremely open forest understory and effectively limited regeneration of new forest. Plant regeneration is also impacted by rats that eat fleshy fruits, seeds, flowers, stems, leaves, roots, and other plant parts (USFWS 2015).

Habitat modification from non-native plants – Native forest has been replaced by non-native weeds and plants, primarily *Chromolaena odorata* (no common name) and *Lantana camara* (lantana) across much of Aguiguan. Nonnative ungulates prevent regeneration of native forest, where the Langford's tree snail is most likely to inhabit (Liske-Clark 2015).

Development – Habitat loss and degradation due to development was identified as a threat to Langford's tree snail in 2015 when listed; however, there has not been development recently and there are no plans likely for development in the near future.

Wildfire – Fire threatens native species and native ecosystems and has the potential to directly harm individuals of the species or their habitat (USFWS 2015).

Typhoons and Climate Change – The Mariana Islands lie in the world's most prolific typhoon basin. Typhoons cause a number of impacts to native species and native ecosystems. Disturbed or destroyed vegetation due to typhoons modifies light availability and creates space for invasion by nonnative pest species and nonnative plant species that compete for space, water, and nutrients, and alter basic water and nutrient cycling processes (USFWS 2015). The impacts of

climate change on the Langford's tree snail are not well understood but climate change has impacted the tropical Pacific generally. Anticipated weather regime changes are likely to be one of the direct climate change impacts to the Langford's tree snail.

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

Overutilization — The collection of tree snail shells for trade or market was identified as a threat to the Langford tree snail (USFWS 2015). Given the history of collecting Pacific tree snails and current market for snail shells both from the Marianas and world-wide, overutilization is considered a threat to the species.

#### **2.3.2.3 Disease or predation:**

Predation by non-native invertebrates - Predation by the manokwari flatworm (*Platydemus manokwari*) is a threat to the Langford's tree snail (USFWS 2015). In 1992, the flatworm was discovered on Aguiguan, in areas where the Langford's tree snail was found (Justine et al. 2014).

Predation by non-native vertebrates – Predation by rats is a threat to the Langford's tree snail (USFWS 2015). Rats are as responsible for the extinctions of various snail species and prey upon Pacific island endemic arboreal snails (USFWS 2015).

#### **2.3.2.4 Inadequacy of existing regulatory mechanisms:**

The CNMI ESA does not include the Langford's tree snail. However, the CNMI Division of Fish and Wildlife does identify the species as a species of greatest conservation need (Liske-Clark 2015). Additionally, existing regulatory mechanisms in the CNMI are inadequate to address threats imposed upon the species, especially habitat damage due to ungulates and the manokwari flatworm predator.

#### **2.3.2.5 Other natural or manmade factors affecting its continued existence:**

Limited numbers – The numbers of Langford's tree snails on Aguiguan is limited, if present, and occurs in a restricted range so the species is therefore less resilient to disturbances, rendering it highly vulnerable (USFWS 2015).

#### **2.3.3 Current Management Actions:**

- Ungulate control and non-native plant removal – Discussions of ungulate control and plant management on Aguiguan are ongoing. As part of the Mariana Islands Training and Testing Biological Opinion, this project is intended primarily to create additional megapode habitat. However, this management action will benefit other species, including the Langford's tree snail, if implemented (USFWS 2018).
- Adequacy of regulatory mechanisms – The CNMI government is establishing a working group that would support the development of an adaptive framework for managing extant populations of partulid snails

across their ranges in the CNMI. Potential working group topics include recovery planning, colony monitoring, predator control, and other direct management strategies.

**Table 1: Status and trends of the Langford’s tree snail.**

Date	Information Source	Estimated Number	Population Trend	Notes
1985	Smith 1995	5	Declining	
1992	Smith 1995	1	Declining	The last survey in which the species was detected in the wild
2006 and 2008	Smith 2013	0	Possibly extinct	

**Table 2: Threats to the Langford’s tree snail and ongoing conservation efforts.**

Threat	Listing Factor	Current Status	Conservation / Management Efforts
Non-native animals (ungulates)	A	Ongoing	Ungulate control (fencing and partial removal of goats) has been proposed but has not been implemented.
Invasive plants	A	Ongoing	Proposed clearing areas of lantana monoculture and planting native overstory trees or allowing native trees to regenerate naturally.
Development	A	None likely	None
Wildfire	A	Potential	None
Typhoons and climate change	A	Ongoing	None
Overutilization	B	Potential	None
Predation by nonnative vertebrates (rats)	C	Ongoing	None
Predation by nonnative invertebrates (flatworm)	C	Ongoing	None

Inadequate existing regulatory mechanisms	D	Ongoing	Working group being established to address management actions.
Reduced viability due to low numbers	E	Ongoing	None

## 2.4 Synthesis

The most recent observation of a Langford's tree snail, a single island endemic, was in 1992. Two surveys since the last observation resulted in no new sightings, suggesting that the species could possibly be extinct. However, surveys in the past have found as many as 31 individuals on the underside of a leaf, suggesting that surveys need to be thorough to determine the status of Langford's tree snail.

Given the limited amount of suitable habitat on Aguiquan for tree snails and the lack of actions to reduce the impacts of nearly all threats, there have been no significant changes since the species was listed in 2015. Therefore, the Langford's tree snail meets the definition of endangered as it remains in danger of extinction throughout its range.

## 3.0 RESULTS

### 3.1 Recommended Classification:

- Downlist to Threatened  
 Uplist to Endangered  
 Delist  
 No change is needed

### 3.2 New Recovery Priority Number: N/A

**Brief Rationale:**

### 3.3 Listing and Reclassification Priority Number, if reclassification is recommended N/A

**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 -

- Surveys and inventories – The status of the Langford’s tree snail on Aguiguan needs to be determined with intensive surveys.
- Invasive plant and animal monitoring and control – Reducing or eliminating goats and lantana from Aguiguan will promote native forest regeneration that the Langford’s tree snail depends on.
- Survey to determine the distribution and density of the manokwori flatworm, a known predator of partulid snails.
- Establish and finalize recovery criteria for the species.
- Establish a captive breeding program for Langford’s tree snail if rediscovered.

## 5.0 REFERENCES -

Justine, J.-L., L. Winsor, D. Gey, P. Gros, and J. Thévenot. 2014. The invasive New Guinea flatworm *Platydemus manokwari* in France, the first record for Europe: Time for action is now. *PeerJ*, 2, e297. <https://doi.org/10.7717/peerj.297>

Kondo, Y. 1970. Some aspects of Mariana Islands Partulidae (Mollusca, Pulmonata). Occasional Papers of Bernice P. Bishop Museum, 24:73-90.

Liske-Clark, J. 2015. Wildlife Action Plan for the Commonwealth of the Northern Mariana Islands, 2015-2025. CNMI-DLNR-Division of Fish and Wildlife, Saipan, MP.

Smith, B. 1995. Status of the endemic tree snail fauna (Gastropoda: Partulidae) of the Mariana Islands. 19 pp. Prepared for the U.S. Fish and Wildlife Service.

Smith B. 2013. Taxonomic inventories and assessments of terrestrial snails on the islands of Tinian and Aguiguan in the Commonwealth of the Northern Mariana Islands. University of Guam Marine Laboratory Technical Report 154, September 2013. 36 pp

U.S. Fish and Wildlife Service (USFWS) 2015. Endangered and Threatened Wildlife and Plants; Endangered Status for 16 Species and Threatened Status for 7 Species in Micronesia; Final Rule. Federal Register, October 1, 2015. 75pp.

USFWS. 2018. Statement of Work. Invasive Ungulate Control with Plant Management on Aguiguan, Commonwealth of the Northern Mariana Islands (CNMI).

**U.S. FISH AND WILDLIFE SERVICE**  
**5-YEAR REVIEW of *Partula langfordi***

**Current Classification:** Endangered

**Recommendation resulting from the 5-Year Review:**

- Downlist to Threatened
- Uplist to Endangered
- Delist
- No change needed

**Appropriate Listing/Reclassification Priority Number, if applicable:**

**Review Conducted By:** Toni Mizerek, Biologist  
John Vetter, Animal Recovery Coordinator  
Megan Laut, Conservation and Restoration Team Manager

**FIELD OFFICE APPROVAL:**

for \_\_\_\_\_ Date \_\_\_\_\_  
**Lead Field Supervisor, Fish and Wildlife Service**