

Fragile Tree Snail
(*Samoana fragilis*)

5-Year Review
Summary and Evaluation

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

5-YEAR REVIEW
Fragile tree snail/*Samoana fragilis*

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 The review was based on the final rule listing this species; peer reviewed scientific publications; unpublished field observations by the USFWS, Territory of Guam and the Commonwealth of the Northern Mariana Islands (CNMI) and other experienced biologists; unpublished survey reports; notes and communications from other qualified biologists; as well as a review of current, available information.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:

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.

FR notice FR 80(190), 59424-59497

Date listed: October 1, 2015

Entity listed: *Samoana fragilis*

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. *Samoana fragilis* is a tree snail listed as threatened 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 fragile tree snail is a member of the Partulidae family that is endemic to Guam and Rota. Relatively little is known about the biology and life history of the fragile tree snail. Information about the basic requirements, reproductive output, survival rates, longevity, and feeding behavior is needed. Generally, the fragile tree snail needs cool, shaded forest habitat with high humidity and reduced air movement that prevents excessive water loss. The snails do not appear to require specific host plants but can be found on many different species of large-leaved plants (trees, shrubs, herbaceous plants, and even ferns) both native and introduced. They need live and decaying plant material, as their diet consists of fungi and microalgae.

Partulidae are relatively slow-growing, long-lived and slow-reproducing land snails (Cowie 1992). Partulids are simultaneous hermaphrodites, meaning they have both male and female reproductive organs, which are functional at the same time. Like most land snails, partulids appear to be predominantly out-breeding hermaphrodites, in other words breeding occurs between unrelated individuals (Tompa 1984).

Morphological similarities of young snails sometimes make it difficult to distinguish between juveniles of *Samoana fragilis* and *Partula radiolata* (Hopper and Smith 1992).

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:

The most comprehensive study documenting the distribution of Marianas partulids was conducted by H. E. Crampton in 1920 (Hopper and Smith 1992). Crampton collected partulids from 38 locations on Guam and the fragile tree snail was found at only 14 of these locations. He described the species as rare but most prevalent on the northern limestone plateau (Crampton 1925).

Hopper and Smith (1992) revisited 34 of Crampton's 38 localities in 1989 and added 13 additional survey sites for their census. Of the 47 localities that were surveyed, only 16 supported living partulids, including only 9 of 34 of Crampton's collecting sites. The fragile tree snail was only found in the presence of the Guam tree snail (*Partula radiolata*) and occurred at six of the occupied sites. The fragile tree snail was more common in limestone habitats, but was found in volcanic areas as well.

Currently, there are seven known locations of the fragile tree snail on Guam, four in the north and three in the south (Fiedler unpublished data and GPEPP unpublished data). All populations appear to be small (<100 individuals) and narrowly dispersed, with the exception of the population at the northern portion of the Haputo Ecological Reserve Area at Finegayan (Fiedler, unpublished data). The original site from where this species was discovered and described on Rota was converted to agricultural fields, and no living snails were found there in 1995. In 1996, a new colony was discovered on Rota in a different location (Bauman 1996). At this site along the mountain slope of the Talakhaya region, the fragile tree snail co-occurs with another endemic *Partula* spp. (Fiedler 2019).

Changes in number and location of sites occupied may reflect differences of survey effort or differences in definition of population and may not represent changes in abundance. The Service defines tree snail populations based on their geographical regions. Populations are separated by geographical barriers such as cliffs and habitat fragmentation due to human development. Previous studies, particularly those in 1920 (Crampton 1925) and 1989 (Hopper and Smith 1992), as well as recent opportunistic surveys, may have defined populations differently. In addition, numbers of individuals per location throughout the range has rarely, if ever, been systematically surveyed, but instead is typically anecdotal or relative to other species or locations. Therefore, systematic comparisons of abundance or populations over time are not possible.

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

Lindstrom and Benedict (2014) found no genetic heterogeneity between two populations of fragile tree snails on Guam, suggesting that the species has possibly undergone a genetic bottleneck.

2.3.1.4 Taxonomic classification or changes in nomenclature:

This species was first described as *Partula fragilis* by Ferrussac in 1821 (Crampton 1925). It is the only species representing the genus of *Samoana* in the Mariana Islands. The fragile tree snail was first collected on Guam in 1819 by Quoy and Gaimard during the *Freycinet* expedition of 1817 to 1819 (Crampton 1925).

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 most extensive study of fragile tree snails occurred nearly a century ago and focused on the ecology, distribution and the variation between all partulid species in the Mariana Islands (Crampton 1925). Crampton suggested that this species was rare on Guam and more likely to be found in the northern limestone areas, but was also found in the southern volcanic areas.

A resurvey approximately 70 years later found that fragile tree snails were still not present at many sites surveyed (Hopper and Smith 1992). Only six of the 47 sites surveyed, which included some areas not previously surveyed, were occupied. The species always co-occurred with the Guam tree snail. Currently, the fragile tree snail is distributed across Guam, likely in at least seven locations (Crampton, 1925; Hopper and Smith 1992; Lindstrom and Benedict 2014; Fiedler unpublished data). The spatial distribution of fragile tree snails on Rota has been and remains restricted to one location. The area has sometimes been considered two populations separated by a relatively short distance; however, the distribution remains restricted enough for this to be considered one population (Curry 2020).

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

The fragile tree snail needs cool, shaded forest habitat with high humidity and reduced air movement that prevents excessive water loss. Stability of environmental factors (temperature, relative humidity and light) are critical factors for juvenile survival. Excess light and unstable temperatures and humidity had detrimental impacts on the survival of juvenile tree snails bred in captivity (Gouveia 2011). The snails do not appear to require specific host plants. Where they occur they can be found on many different species of large-leaved plants (trees, shrubs, herbaceous plants, and even ferns) both native and introduced.

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:

Development, military training, urbanization – The islands of Guam and Rota are 23% and 6% developed, respectively, which represents unsuitable habitat for the fragile tree snail (Spies et al. 2019). Ongoing military training also contributes to reduced available or less suitable habitat, primarily with the establishment of Marine Corps Base Blaz (USFWS 2015). The buildup associated with establishing this Base will result in a loss of approximately 1,219 acres of limestone forest, 613 acres of herbaceous scrub and 3,221 acres of developed/barren land.

Habitat Destruction from non-native animals – Feral ungulates trample

vegetation, contribute to erosion, graze often to the point of clearing understory vegetation and prevent regeneration by damaging or eating seeds or seedlings (USFWS 2015). Recent studies on Guam indicate that while pigs (*Sus scrofa*) and deer (*Cervus mariannus*) deer consume seed, pigs disperse many seeds while deer did not. Additionally, deer seem to have a disproportionate effect on seedlings compared to pigs (Gawel et al. 2018). Plant regeneration is also impacted by rats that eat fleshy fruits, seeds, flowers, stems, leaves, roots, and other plant parts (USFWS 2015). The introduction of the brown tree snake to Guam resulted in the loss or severe reduction of native birds that dispersed native seeds or pollinated native plants (USFWS 2015).

Habitat modification from non-native plants – Non-native plants degrade native habitats through a variety of processes including modifying: light availability, soil-water regimes, nutrient cycling and fire regimes and converting the plant communities from native to non-native dominated (USFWS 2015). These conversions to non-native dominated communities often shift the micro-habitat conditions that tree snails are dependent upon.

Wildfire – Fire threatens native species and native ecosystems, particularly on Guam (USFWS 2015). As of February 2020, 396 wildfires burned approximately 9,421-acres of private, Government and Federal lands (6.9% total area burned island-wide), which is a 2% increase from the previous year (FSRD 2020).

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 fragile tree snail are not well understood but climate change has had impacts in the tropical Pacific generally. Anticipated weather regime changes are likely to be one of the direct climate change impacts to the fragile 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 fragile 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 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 fragile tree snail (USFWS 2015). This predator exists on both islands where the fragile tree snail is currently found, Guam and Rota (Justine et al. 2014). There is also the potential for the aggressive little fire ant (*Wasmannia auropuncta*) to threaten this species on Guam or if it is introduced

in the CNMI; however, no studies have confirmed the little fire ant as a predator. Rats are also 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:

Guam's Endangered Species Act (ESA) recognized the fragile tree snail as locally endangered in 2009. The CNMI ESA does not include the fragile tree snail. However, the CNMI Division of Fish and Wildlife does identify the species as a species of greatest conservation need (Liske-Clark 2015). Regardless, existing regulatory mechanisms in both Guam and the CNMI are inadequate to address threats imposed upon the species, especially development and the manokwari flatworm predator. However, USFWS and GovGuam meet regularly to enhanced coordinated efforts to protect endangered tree snails.

2.3.2.5 Other natural or manmade factors affecting its continued existence:

Limited numbers – The numbers of fragile tree snails on Guam and Rota are so low and they occur in such restricted ranges that they are, therefore, less resilient to disturbances, rendering them highly vulnerable (USFWS 2015).

Intensive use of pesticides may negatively impact the fragile tree snail (DAWR 2019).

2.3.3 Current Management Actions:

- Surveys and inventories – Listed tree snail species, including the fragile tree snail are searched for in suitable habitat that may be cleared or degraded for various projects.
- Surveys and inventories – Joint Region Marianas surveyed for ESA-listed tree snails at the Naval Munitions Site and Naval Base Guam Telecommunication Site. Surveys were conducted to document locations and estimate tree snail population densities in sites that are proposed for ungulate exclusion and forest restoration.
- Habitat protection – An island-wide Habitat Conservation Plan for Guam that would provide a collaborative and comprehensive approach to endangered species conservation on non-federal lands in Guam is just beginning to be developed (USFWS 2020).
- Habitat protection – A 2020 Memorandum of Understanding between Joint Region Marianas (JRM) and the USFWS outlined a mutual understanding regarding the intentions and future considerations of a Department of Defense Readiness and Environmental Protection Integration Initiative (REPI) to address conservation of upland vegetation communities for the fragile tree snail, as well as other federally listed species on Guam (DON and USFWS 2020).
- Habitat protection – Deer and pigs will be excluded from 165 acres of North Haputo Ecological Reserve Area with ungulate fencing (USFWS 2017).
- Invasive species control – Surveys for little fire ant (LFA) have been

conducted at: Andersen South, Andersen South Annex, Naval Munitions Site, and Haputo trailhead on Naval Base Guam Telecommunication Site. Where LFA are detected, they are delimited, eradicated and monitored (JRM 2019).

- 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 fragile tree snail from listing through current 5-year review.

Date	Information Source	Number of populations	Number of individuals	Population trend
1920	Crampton 1925	14 on Guam	unknown	unknown
1989	Hopper and Smith	6 on Guam	unknown	
2020	Fiedler unpub. Data & GPEPP unpub. data	7 on Guam 1 on Rota	~100 per population?	unknown

Table 2: Threats to the fragile tree snail and ongoing conservation efforts.

Threat	Listing Factor	Current Status	Conservation / Management Efforts
Development, military training, urbanization	A	Ongoing	Development of HCP, REPI habitat protection
Nonnative animals (ungulates)	A	Ongoing	Ungulate fencing and eradication
Invasive plants	A	Ongoing	None
Wildfire	A	Ongoing	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, little fire ant, predatory snail)	C	Ongoing	Surveys and control of predators
Inadequate existing	D	Ongoing	CNMI establishing

regulatory mechanisms			working group to address management actions; enhanced coordination between USFWS and GovGuam
Reduced viability due to low numbers	E	Ongoing	None

2.4 Synthesis -

Downlisting and delisting criteria have not yet been established for this species.

There are populations of the fragile tree snail across a small number of areas of Guam and one area on Rota. The number of individuals is unknown but may be approximately 100 per population. It has repeatedly been reported that the fragile tree snail is rare across its range (see Hopper and Smith 1992). However, there have not been systematic, repeated surveys to quantify changes in either population or abundance. Past surveys have differed on methodology and population definitions, making it difficult to compare efforts across years to determine trend.

Threats to the fragile tree snail remain serious. Habitat loss due to development and ungulate damage, as well as predation by the manokwari flatworm, are the most significant threats and remain far from being controlled. Development continues, primarily on Guam with sometimes inadequate oversight over natural resources protection, including the fragile tree snail, through regulatory mechanisms. There have not been any methods found or even suggested to control the flatworm predator. Few ungulate exclusion areas have been established. Establishing ungulate proof areas can take a significant amount of time and benefits to the ecological community within ungulate proof areas takes additional time. Thus, the fragile tree snail continues to meet the definition of endangered.

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

- Determine and establish recovery criteria in a recovery plan for the fragile tree snail.
- Expand the CNMI partulid snail working group to include Guam, so that lessons learned are shared and adapted, especially since the species range includes Guam.
- Introduced predators – Survey for manokwari flatworm presence in suitable tree snail habitat. Implement an area wide control for the flatworm in areas where this species is known to or may occur.
- Identify other predators, quantify the impacts and implement control measures.
- Surveys and inventories- Determine the current population size, structure and distribution of the fragile tree snail on each island within the species current and historical range.
- Captive breeding – Evaluate the feasibility of a captive breeding program for tree snails, including the fragile tree snail, to be able to restore the population (i.e. reintroduction and translocation) and eliminate any possible extinction throughout the range.
- Research- Track individual snails using telemetry to determine their ability to disperse and their activity patterns. Develop a Habitat Suitability Index or other model to predict habitat suitability.
- Habitat degradation and loss- Control and monitor land clearing and prevent wildfires to preserve the native forest habitat for this species. Reforest native flora and control ungulates in the habitat where snails are found will allow the required preservation of this species. Plan and implement protection and enhancement of colonies as appropriate (i.e. ungulate/predator exclosures, rat trapping, and/or vegetation management).

5.0 REFERENCES

Bauman, S. 1996. Diversity and decline of land snails on Rota, Mariana Islands. *American Malacological Bulletin*. 12:13–27.

Cowie, R. H. 1992. Evolution and Extinction of Partulidae, Endemic Pacific Island Land Snails. *Philosophical Transactions: Biological Sciences*. 335:167–191.

Crampton, H. E. 1925. *Studies on the Variation, Distribution, and Evolution of the Genus partula* (Vol. 228A). Carnegie Institution of Washington.

- Curry, Bronson. 2020. CNMI DLNR. Personal communication with Toni Mizerek, Pacific Islands Fish and Wildlife Office, email dated March 2, 2020. Subject: # of Samoana popn's on Rota?.
- Guam Division of Aquatic and Wildlife Resources. 2019. Guam Wildlife Action Plan. 318 pp.
- Gawel, A. M., H. S. Rogers, R. H. Miller, and A. M. Kerr. 2018. Contrasting ecological roles of non-native ungulates in a novel ecosystem. *Royal Society Open Science*. 5:170151.
- Department of the Navy (DON) and U.S. Fish and Wildlife Service (USFWS). 2020. Memorandum of Understanding for Guam Region-Wide Conservation of Forest Resources under the Readiness and Environmental Protection Integration Program. April.
- Fielder, George. 2019. University of Guam. Personal communication with Michelle Clark, Pacific Islands Fish and Wildlife Office, email dated June 18, 2019. Subject: Marianas Tree Snails Populations.
- Guam Forestry & Soil Resources Division (FSRD) and US Forest Service Pacific Southwest Region. 2020. State and Private Forestry Fact Sheet. Guam 2020.
- Gouveia A. 2011. Investigation of the Factors Affecting the Population Dynamics of Captive Partula Snails. Phd Thesis. Imperial College London, Department of Life Sciences, Division of Biology, Silwood Park Campus, Ascot, Berkshire, SL5 7PY, U.K.
- [DAWR] Guam Division of Aquatic and Wildlife Resources. 2019. Guam Wildlife Action Plan 319 pp. Department of Agriculture, Government of Guam.
- Hopper, D. R., and B. D. Smith. 1992. Status of Tree Snails (Gastropoda: Partulidae) on Guam, with a Resurvey of Sites Studied by H.E. Crampton in 1920. *Pacific Science*, 46:77–85.
- Joint Region Marianas (JRM). 2019. Final Environmental Assessment. Joint Regional Marianas Integrated Natural Resources Management Plan for Joint Region Marianas-administered and Leased Lands on Guam, Tinian, and Farallon de Medinilla.
- 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>
- Lindstrom, D. P. and J. C. Benedict. 2014. Federal Candidate Species Surveys on Guam (Prepared for NAVFAC MAR) 195pp. University of Guam.
- Liske-Clark, J. 2015. Wildlife Action Plan for the Commonwealth of the Northern Mariana Islands 2015-2025. CNMI DLNR-Division of Fish and Wildlife.

- Sischo, D. R. and M. G. Hadfield. 2017. Phylogeographic relationships among multi-island populations of the tree snail *Partula gibba* (Partulidae) in the Mariana Islands. *Biological Journal of the Linnean Society* 121:731–740. <https://doi.org/10.1093/biolinnean/blx031>
- Smith, B. D. 1995. Status of the endemic tree snail fauna (Gastropoda: Partulidae) of the Mariana Islands. 19 pp.
- Smith, B. D. 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 154:36.
- Spies, N.P., T. Mizerek, M. K. Reeves, F. Amidon, and S. E. Miller. 2019. Developed Systems in the Mariana Islands Archipelago. U.S. Fish and Wildlife Service, Pacific Islands Fish and Wildlife Office. Reference Module in Earth Systems and Environmental Sciences. 10.1016/B978-0-12-409548-9.12045-7.
- Tompa, A.S. 1984 Land snails (Stylommatophora). In *The Mollusca*. vol. 7 (Reproduction) (ed. A. S. Tompa, N. H. Verdonk & J. A. M. van den Biggelaar), pp. 47-140. London: Academic Press.
- [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. *Federal Register* 80:59424–59497.
- [USFWS] U.S. Fish and Wildlife Service. 2017. Reinitiation of the 2015 Biological Opinion on the Department of the Navy’s Relocation of U.S. Marine Corps from Okinawa to Guam and Associated Activities on Guam.
- [USFWS] U.S. Fish and Wildlife Service. 2020. FY 2019 Cooperative Endangered Species Conservation Fund Habitat Conservation Plan (HCP) Planning Assistance Grant Award Concurrence and Financial Assistance Review Approval. FWS/AES/DBTS/BBS/071 345

**U.S. FISH AND WILDLIFE SERVICE
5-YEAR REVIEW of *Samoana fragilis***

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, Pacific Island Fish and Wildlife Office
(PIFWO)
John Vetter, Animal Recovery Coordinator, PIFWO
Megan Laut, Conservation and Restoration Team Manager, PIFWO

FIELD OFFICE APPROVAL:

for _____
Lead Field Supervisor, Fish and Wildlife Service

Date _____