BEFORE THE SECRETARY OF THE INTERIOR

EMERGENCY PETITION TO LIST THE SULAWESI FOREST TURTLE (*Leucocephalon yuwonoi*) AS ENDANGERED UNDER THE ENDANGERED SPECIES ACT

CENTER FOR BIOLOGICAL DIVERSITY

MONITOR RESEARCH CONSERVATION SOCIETY

FEBRUARY 27, 2025

Notice of Petition

Honorable Doug Burgum
Secretary of the Interior
1849 C Street, NW
Washington, DC 20240
exsec@ios.doi.gov

Paul Souza
Acting Director
U.S. Fish and Wildlife Service
1849 C Street, NW
Washington, DC 20240
paul_souza@fws.gov

Rachel London
Manager
Branch of Delisting and Foreign Species
U.S. Fish and Wildlife Service, MS: ES
5275 Leesburg Pike
Falls Church, VA 22041-3803
rachel_london@fws.gov

Petitioner

Center for Biological Diversity
378 N Main Avenue
Tucson, AZ 85701 United States

The Center for Biological Diversity (the Center) is a non-profit, public interest environmental organization dedicated to the protection of native species and their habitats. The Center works through science, law, and creative media to secure a future for all species, great or small, hovering on the brink of extinction. The Center is supported by more than 1.7 million members and activists throughout the United States and abroad. The Center and its members are concerned with the conservation of imperiled species and the effective implementation of the Endangered Species Act. The Center's International Program works to protect global biodiversity by using U.S. and international law to hold governments accountable for threatening imperiled species wherever they are found.

Monitor Conservation Research Society
PO BOX 200,
Big Lake Ranch,
BC, V0L 1G0, Canada

The Monitor Conservation Research Society (Monitor) is a not-for-profit organization based in Canada established to combat the illegal and unsustainable trade in wildlife through sound research, strategic interventions, and publication of information critical to the conservation of threatened species. Monitor is made up of highly skilled and experienced experts in the field of

wildlife trade related conservation, situated around the world. Monitor staff members have authored numerous peer-reviewed publications on wildlife trade related issues and are recognized as leaders in this field. These outputs have resulted in increased enforcement efforts, a raised awareness amongst the public in key areas, improved legislation, and a general enhanced effort to reduce the illegal wildlife trade.

Submitted this 27th Day of February, 2025

Pursuant to Section 4(b) of the Endangered Species Act (ESA), 16 U.S.C. § 1533(b), Section 553(e) of the Administrative Procedure Act, 5 U.S.C. § 553(e), and 50 C.F.R. § 424.14(a), the Center for Biological Diversity and Monitor Conservation Research Society hereby petition the Secretary of the Interior and the U.S. Fish and Wildlife Service (FWS or the Service) to protect the Sulawesi forest turtle (*Leucocephalon yuwonoi*) as an endangered species under the ESA, 16 U.S.C. §§ 1531-1544.

As described in this Petition, the Sulawesi forest turtle is a rare, freshwater turtle endemic to the Minahasa peninsula of the island of Sulawesi, Indonesia (Hagen et al., 2009 p. 039.2; Riyanto, 2006 p. 322; Stanford & Hamidy, 2021 p. 2). Assessed as Critically Endangered by the International Union for Conservation of Nature (IUCN) in 2021, Sulawesi forest turtles have been impacted by over-collection for the international pet trade and habitat loss (Hagen et al., 2009 p. 039.5; Riyanto, 2006 p. 323; Stanford & Hamidy, 2021 p. 5). The species is estimated to have declined more than 80% over the past three generations (Stanford & Hamidy, 2021 p. 4-5). Researchers have identified the Sulawesi forest turtle as "a species of grave international conservation concern" (Hagen et al., 2009 p. 039.1).

Sulawesi forest turtles are inadequately protected in Indonesia and not protected in the United States, which imports the species for the pet trade. The species is listed under Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), so international trade of the species can continue.[1] Given the species' limited range and Critically Endangered status, we request that the Service immediately protect the Sulawesi forest turtle using its emergency listing authority under the ESA. 5 U.S.C. §§ 553(e), 555(b); 16 U.S.C. § 1533(b)(7).[2] We further request that if the Service chooses to emergency list the species, it promptly adopts a final rule for the species before the emergency listing expires.

This Petition presents substantial scientific and commercial information indicating that the Sulawesi forest turtle is in danger of extinction throughout all of its range.[3] *See* 50 C.F.R. § 424.14(h)(1)(i) ("substantial scientific or commercial information" refers to credible scientific or commercial information in support of the Petition's claims such that a reasonable person conducting an impartial scientific review would conclude that the action proposed in the Petition may be warranted). Therefore, the Secretary of the Interior, through the Service, should emergency list the species or at the very least make an initial finding "that the petitioned action may be warranted" within 90 days of receiving this Petition and make a subsequent finding that

[1] *See* https://speciesplus.net/species#/taxon_concepts/10665/legal.

[2] Where there is "any emergency posing a significant risk to the well-being of any species of fish or wildlife or plants," the Service need not comply with the regular listing process including notice and comment before issuing an emergency rule, so long as the agency publishes detailed reasons why such regulation is necessary and if the regulation applies to resident species of fish or wildlife, or plants, it gives actual notice of the regulation to the State agency of each State where the species is believed to occur. 16 U.S.C. § 1533(b)(7). The emergency listing takes effect after being published in the Federal Register. *Id*. Emergency listing is a temporary measure that ensures immediate protection in an emergency and expires 240 days following the date of publication unless the rulemaking procedures that apply for making a non-emergency listing determination were complied with during that time. *Id.*

[3] Because this species does not occur within the United States, the Center is not required to send notification to any U.S. state agency. 50 C.F.R. § 424.14(b).

listing is warranted within 12 months receiving this Petition, as required by law. 16 U.S.C. § 1533(b)(3)(A), (B).

The Service has a duty to protect the Sulawesi forest turtle by listing the species as endangered under the ESA, which would meaningfully contribute to conservation of the species by strictly regulating the import, export, and interstate commerce of the species and by highlighting conservation concerns for this species. *See* 16 U.S.C. § 1538(a)(1) (prohibiting the import, transport, and sale of endangered species with narrow exemptions).

Respectfully submitted,

Dianne DuBois
Staff Scientist
Center for Biological Diversity
ddubois@biologicaldiversity.org
+1-828-774-5637

Sarah Uhlemann
International Program Director and Senior Attorney
Center for Biological Diversity
suhlemann@biologicaldiversity.org
+1-206-327-2344

Dr Chris R. Shepherd
Executive Director
Monitor Conservation Research Society
chris.shepherd@mcrsociety.org
+1-250-243-0002

Table of Contents

I. Introduction

We are in the midst of a spiraling wildlife extinction crisis, and reptiles are declining globally (Gibbons et al., 2000 pp. 653-655). It is estimated that 21.1 percent of reptiles are threatened with extinction (Cox et al., 2022 p. 286). The International Union for Conservation of Nature (IUCN) has assessed 433 reptile species as Critically Endangered, 783 as Endangered, and 623 as Vulnerable (IUCN, 2022 unpaginated). These assessments likely underrepresent the actual number of imperiled reptiles (Gibbons et al., 2000 p. 653). An additional 21 percent have not been researched enough to make an assessment but may be deemed at risk of extinction if more data become available (Böhm et al., 2013 p. 20; Borgelt et al., 2022 p. 3). Gibbons et al. (2000 p. 655) states that given the global declines in reptiles, if there is no intervention, species will continue to face declines, extirpations, and extinctions.

Turtles are among the most threatened groups of vertebrates, with more than half of turtles globally threatened with extinction (Cox et al., 2022 p. 2-3; Lovich et al., 2018 p. 771; Rhodin et al., 2018 p.137). The biggest threats to turtles include overexploitation for the pet trade or human consumption, habitat loss or degradation, and climate change (Cox et al., 2022 p. 3; Lovich et al., 2018 p. 771-772; Rhodin et al., 2018 p. 147). Turtles have a slow life history, and populations depend on adult survival (Congdon et al., 1994 p. 406; Turtle Conservation Coalition, 2011 p. 3). Because of their slow life history traits, turtles are especially vulnerable to threats (Congdon et al., 1994 p. 406; Turtle Conservation Coalition, 2011 p. 3). Scientists have called for additional conservation efforts to protect turtles from the increasing threats they face (ICCTSC, 2022 p. 1-13; Pereira et al., 2022 p. 13). In 2022, 171 turtle scientists and conservationists called on countries to increase protections for turtles globally (ICCTSC, 2022 p. 1-13).

The Sulawesi forest turtle is a rare species endemic to the Minahasa Peninsula of the island of Sulawesi, Indonesia (Hagen et al., 2009 p. 039.2; Riyanto, 2006 p. 322; Stanford & Hamidy, 2021 p. 2). Sulawesi forest turtles can be found in dense, primary and second-growth forests near shallow, clear streams (Hagen et al., 2009 p. 039.4; Riyanto, 2006 p. 322; Simms et al., 2022 p. 462). They are semiaquatic and mostly nocturnal (Hagen & Ching 2005 as cited in Hagen et al., 2009 p. 039.4; Simms et al., 2022 p. 465). They have been observed foraging in streamside forests during the day and utilizing the water at night to rest, feed, and mate (Hagen & Ching 2005 as cited in Hagen et al., 2009 p. 039.4).

Sulawesi forest turtles have been impacted heavily by the international pet trade (Stanford & Hamidy, 2021 p. 1). Sulawesi forest turtles are not adequately protected in Indonesia or in the United States. The species has been listed under CITES Appendix II since 2003, and take, trade, and export appear to be illegal in Indonesia.[4] However, documented trade continues to occur, and IUCN assessed the species as Critically Endangered in 2021, despite Indonesian law. The United States is the main driver of demand globally as the world's largest importer of the species (Table 3). Sulawesi forest turtles are also threatened by habitat loss from commercial logging and agricultural expansion (Hagen et al., 2009 p. 039.5; Riyanto, 2006 p. 322-323; Stanford & Hamidy, 2021 p. 5). According to IUCN, the Sulawesi forest turtle "has suffered decreasing quality of much of the habitat in its range" (Stanford & Hamidy, 2021 p. 1).

[4] *See* https://speciesplus.net/species#/taxon_concepts/10665/legal

The most recent assessment of Sulawesi forest turtles by IUCN in 2021 determined that the species is Critically Endangered and has suffered a population decline of "well over 80%" over the past three generations (Stanford & Hamidy, 2021 p. 4). As with other turtle species, Sulawesi forest turtles are particularly vulnerable to threats due to their slow life history and limited distribution (Hagen et al., 2009 p. 039.5; Riyanto, 2006 p. 322). Because these traits make it inherently difficult for populations to respond to overcollection, Hagen et al. (2009 p. 039.5) noted that "the concept of sustainable yield is probably not applicable." Hagen et al. (2009 p. 039.5) also noted that widespread collection of Sulawesi forest turtles for export is likely to "pose a grave threat to the continued survival of wild populations" (Hagen et al., 2009 p. 039.5). The United States must take responsibility as a consumer country and extend protections to Sulawesi forest turtles by promptly listing the species as endangered under the ESA.

II. Natural History

A. Taxonomy

The Sulawesi forest turtle was first described in 1995 from a specimen being sold by local people in Gorontalo, Sulawesi, Indonesia (McCord et al., 1995, full paper). McCord et al. (1995 p. 311) placed the Sulawesi forest turtle in the genus *Geoemyda* but recommended a more thorough phylogenetic analysis (McCord et al., 2000 p. 86). In 2000, McCord et al. (2000 p. 87) published results of a phylogenetic analysis of the entire Geoemydidae family. The researchers concluded that the Sulawesi forest turtle is morphologically and genetically distinct and described the species as *Leucocephalon yuwonoi* (McCord et al., 2000 p. 89). The species is also listed under CITES as *Leucocephalon yuwonoi*.[5]

Table 1. Taxonomy of *Leucocephalon yuwonoi*.

Kingdom	*Animalia*
Phylum	*Chordata*
Class	*Reptilia*
Order	*Testudines*
Family	*Geomydidae*
Genus	*Leucocephalon*
Species	*yuwonoi*

B. Description

The Sulawesi forest turtle is recognized by its low, elongate, moderately tricarinate carapace with orange-brown coloration and a serrated posterior margin (Hagen et al., 2009 p.039.2-039.3). The species has an unhinged and unstreaked plastron and a short intergular seam that is less than half of the length of the interanal seam (Hagen et al., 2009 p.039.2). Sulawesi forest turtles are also distinguished by their laterally cusped upper tomium and absent postorbital bar (Hagen et al., 2009 p.039.2).

[5] *See* https://cites.org/eng/app/appendices.php

Sexual dimorphism is present in Sulawesi forest turtles, notably in the size and head color (Hagen et al., 2009 p. 039.2; Ives et al., 2008 p. 245; Simms et al., 2022 p. 267). The average carapace length (CL) for females is at least 198mm, while males tend to be significantly larger with an average CL of 240mm (Ives et al., 245). In females, the head is mostly dark brown with a cream-colored tympanic region, a cream-yellow chin, and a cream-colored band across the beak (Hagen et al., 2009 p. 039.3). Males exhibit a dark brown color on the posterior dorsum of the head with a creamy yellow color on the anterior dorsum and upper tomium (Hagen et al., 2009 p. 039.3).

C. Life Cycle

The reproduction of Sulawesi forest turtles in the wild has not been studied (Hagen et al., 2009 p. 039.4; Stanford & Hamidy, 2021 p. 4). Based on observations of wild-caught hatchlings in captivity, Hagen et al. (2009 p. 039.4) estimated that wild Sulawesi forest turtles may reach maturity at about 7-10 years. Females that were sexually mature at 17.5cm CL and 18.4cm CL have been recorded (Riyanto, 2006 p. 322). According to Stanford & Hamidy (2021 p. 4) generation time is expected to be 20 or more years. In captivity, females usually lay one and sometimes two eggs per clutch and can lay multiple clutches in a year (Hagen et al., 2009 p. 039.4; Riyanto, 2006 p. 322).

D. Behavior

Sulawesi forest turtles are semiaquatic (Hagen & Ching 2005 as cited in Hagen et al., 2009 p. 039.4). They are mostly nocturnal with some daytime activity (Simms et al., 2022 p. 465). They have been observed foraging in streamside forests during the day and utilizing the water at night to rest, feed, and mate (Hagen & Ching 2005 as cited in Hagen et al., 2009 p. 039.4). Males are more active than females both at night and during the day, and males are more active during the dry season (Simms et al., 2022 p. 465). Local collectors observed Sulawesi forest turtles entering the water less often during times of greater moonlight (Hagen & Ching 2005 as cited in Hagen et al., 2009 p. 039.4). They have also been noted as skilled climbers that flee when approached (Hagen et al., 2009 p. 039.4).

Sulawesi forest turtles primarily eat leaves, stems, and ripe fruit in the wild (Hagen et al., 2009 p. 039.4; Riyanto et al., 2006 p. 88-89). Riyanto et al. (2006 p. 89) indicated that *Ipomoea aquatica*, *Alocasia macrorrhiza*, *Limnocharis flava*, and *Colocasia esculenta* are the main natural foods for the species.

E. Habitat

Sulawesi forest turtles prefer dense, second-growth forests near shallow, clear streams (Hagen et al., 2009 p. 039.4; Riyanto, 2006 p. 322; Simms et al., 2022 p. 462). The streams at observation sites often have some combination of a moderate gradient, occasional rock pools, woody debris, broadleaf plants, and a substrate of pebbles, gravel, and large stones (Hagen et al., 2009 p. 039.4; Riyanto, 2006 p. 322; Simms et al., 2022 p. 466). The stream banks may be heavily vegetated, providing cover for refuge (Hagen et al., 2009 p. 039.4; Simms et al., 2022 p. 466).

Some observations suggest that Sulawesi forest turtles may also be able to survive in modified habitats including near agricultural plantations (Hagen et al., 2009 p. 039.5; Riyanto, 2006 p. 322; Simms et al., 2022 p. 467). Simms et al. (2022 p. 467) mentioned that riparian vegetation may provide an important buffer zone for Sulawesi forest turtles existing near human-altered habitats. Riyanto et al. (2006 p. 88) observed Sulawesi forest turtles in Bangkir in the western part of Central Sulawesi and noted a higher density of the turtles in an area with more cultivation. The researchers hypothesized that this was either the result of more food present in the cultivated area or the fact that villagers in this area were more economically stable and less likely to collect the turtles for income (Riyanto et al., 2006 p. 88).

III. Distribution

The Sulawesi forest turtle is endemic to the Minahasa Peninsula, on the island of Sulawesi, Indonesia (Hagen et al., 2009 p. 039.2; Riyanto, 2006 p. 322; Stanford & Hamidy, 2021 p. 2). The Minahasa Peninsula includes the provinces of North Sulawesi and Gorontalo, as well as part of Central Sulawesi (Ives et al., 2008 p. 241). It is difficult to assess the species' past and current distribution due to a lack of comprehensive population surveys (Hagen et al., 2009 p. 039.4). However, the best available information indicates that Sulawesi forest turtles have experienced substantial declines. The species is estimated to have suffered a population decline of "well over 80%" over the past three generations (Stanford & Hamidy, 2021 p. 4). The following section provides a summary of surveys and local knowledge of the distribution of Sulawesi forest turtles.

A. Sightings, Surveys, and Local Knowledge of Sulawesi Forest Turtles

In 2019, Simms et al. (2022 p. 462) conducted capture-mark-recapture surveys of Sulawesi forest turtles along streams in Central Sulawesi during the wet and dry seasons. The researchers determined that the modeled population size in one stream was 17 turtles during the wet season (3.0 turtles per 100 m) and 10 turtles (2.0 turtles per 100 m) during the dry season (Simms et al., 2022 p. 465). Another stream had a modeled population size of 25 individuals (6.2 turtles per 100 m) during the wet season and 13 turtles (3.4 turtles per 100 m) during the dry season (Simms et al., 2022 p. 465). Almost half of the turtles captured were juveniles (Simms et al., 2022 p. 466). The exact locations of the surveys were not disclosed to protect the species from poaching (Simms et al., 2022 p. 462). Six turtles were not able to be located after a 10-week break between surveys, and the researchers indicated they may have been poached (Simms et al., 2022 p. 466). The researchers stated that the low population estimates and high numbers of juveniles relative to adults they encountered also raised concerns about poaching (Simms et al., 2022 p. 466).

Hagen et al. (2009 p. 039.4) states that local hunters indicated that five or six Sulawesi forest turtles could be collected from the same stream in a single night (Hagen et al., 2009 p. 039.4). They also stated that the species was common in the Kanggol River and its tributaries (Hagen et al., 2009 p. 039.5). At that time, they reported that repeated collections in the same area did not seem to have caused declines in capture rates (Hagen et al., 2009 p. 039.5).

Ives et al. (2008 p. 241) searched for Sulawesi forest turtles in the Palu Valley of Central Sulawesi near Lore Lindu National Park in June of 2006. They looked for the species at night in rocky streams and streamside vegetation and did not find any Sulawesi forest turtles (Ives et al., 2008 p. 243-244). The researchers also obtained information from interviews with local farmers, fishers, and others who had knowledge of turtle populations and the turtle trade in the area (Ives et al., 2008 p. 243). Based on the interviews, Sulawesi forest turtles may be present within Bogani Nani Wartabone National Park and Panua Nature Reserve, but additional research is needed to confirm the species' presence there (Ives et al., 2008 p. 245). Another conclusion the researchers drew from interviews was that the distribution of Sulawesi forest turtles on the Minahasa Peninsula may be more widespread than previously thought (Ives et al., 2008 p. 244). Villagers noted that they had seen Sulawesi forest turtles in a wide variety of habitats, including coastal palm swamps, grass swamps, and hillside bamboo forests (Ives et al., 2008 p. 244). However, that authors noted that there was confusion about species identification during the interviews, even when presenting interviewees with a photo array of species (Ives et al., 2008 p. 244). While other surveys indicate that Sulawesi forest turtles can exist in habitats other than riparian forests, we were unable to identify additional studies confirming the species' existence in these habitats.

In 2007, researchers surveyed seven sites in Central Sulawesi looking for Sulawesi tortoises (*Indotestudo forstenii*) and simultaneously conducted surveys for the Sulawesi forest turtle in some sites (Riyanto et al., 2008 p. 6). Surveys were conducted by four people spending three days surveying each site (Riyanto et al., 2008 p. 8). The researchers did not identify which sites were surveyed for Sulawesi forest turtles, but they did note that Sulawesi forest turtles were found at only three of the seven sites (Riyanto et al., 2008 p. 10-13). The canopy cover was dense in two sites where six Sulawesi forest turtles were found (Riyanto et al., 2008 p. 10-13). The third site where one Sulawesi forest turtle was found had a mix of dense canopy with some sunlight shining (Riyanto et al., 2008 p. 10-13). There were no sightings of Sulawesi forest turtles reported in habitats with open canopy, but it is unclear whether the researchers looked for them there (Riyanto et al., 2008 p. 8-13).

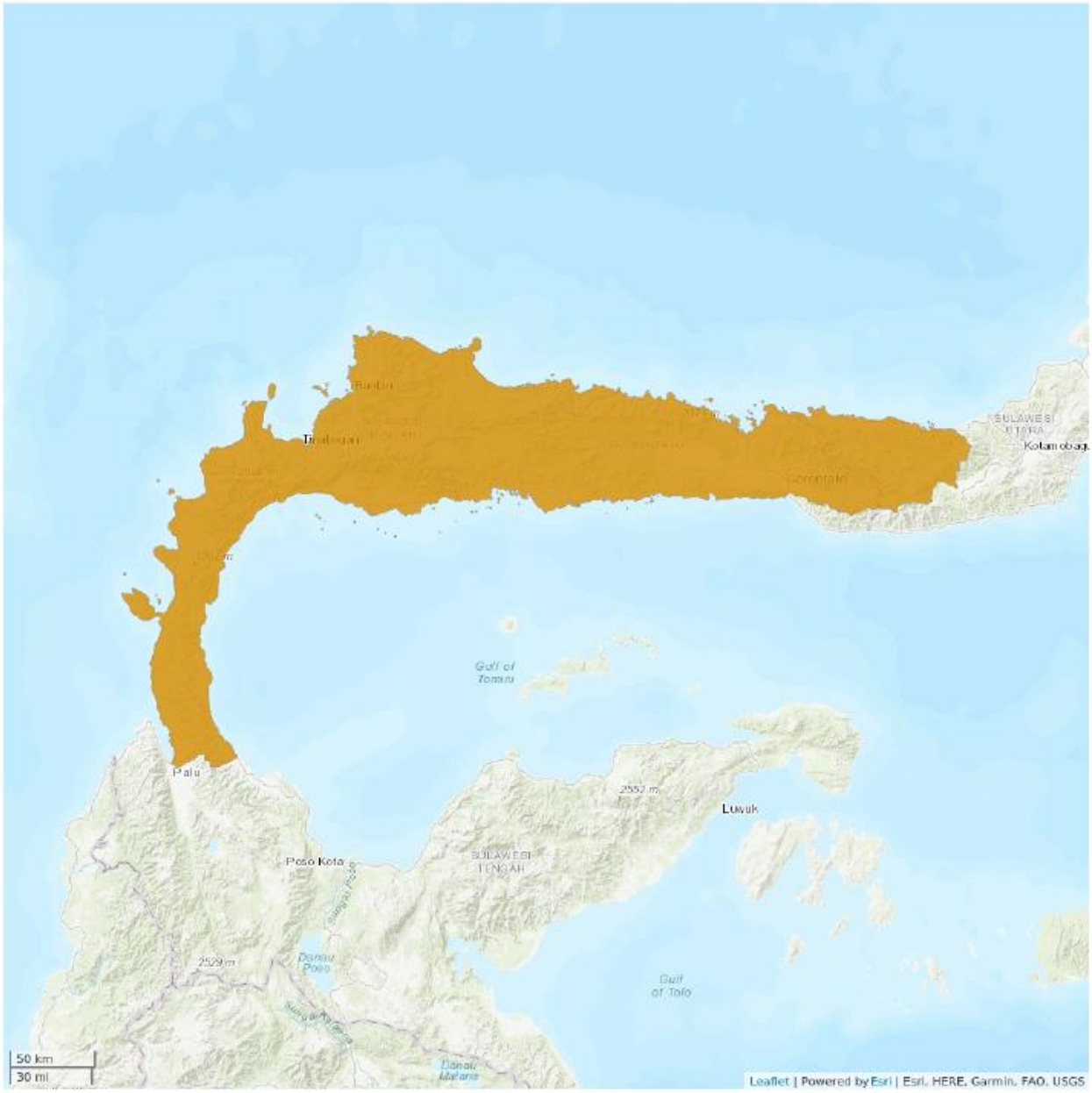


Figure 2. Range of the Sulawesi forest turtle. Extracted from (Stanford & Hamidy, 2021 p. 3).

IV. Conservation Status and Warranted Endangered Species Act Protection

The Endangered Species Act (ESA) is a "comprehensive scheme with the 'broad purpose' of protecting endangered and threatened species." *Ctr. for Biological Diversity v. U.S. Bureau of Land Mgmt.*, 698 F.3d 1101, 1106 (9th Cir. 2012) (quoting *Babbitt v. Sweet Home*, 515 U.S. 687, 698 (1995)). Congress' plain intent in enacting the ESA was "to halt and reverse the trend toward species extinction" *Tenn. Valley Auth. v. Hill*, 437 U.S. 153, 184 (1978). In doing so, the ESA requires that "all Federal departments and agencies shall seek to conserve

endangered species and threatened species and shall utilize their authorities in furtherance of [these] purposes." 16 U.S.C. § 1531(c)(1). Endangered and threatened species are "afforded the highest of priorities." *Tenn. Valley Auth.*, 437 U.S. at 174. Endangered species are species that are "in danger of extinction throughout all or a significant portion of its range," and threatened species and species that are "likely to become endangered species within the foreseeable future" throughout all or a significant portion of range. 16 U.S.C. §§ 1532(6), (20), 1533.

As demonstrated by the best available science on the species, the Sulawesi forest turtle meets the definition of endangered. The Sulawesi forest turtle was assessed as Critically Endangered by the IUCN Red List of Threatened Species (Stanford & Hamidy, 2021 p. 4). It is also listed under Appendix II of CITES, which is reserved for species that may become threatened with extinction without controls on trade. The wild population is expected to have declined "well over 80%" in the past three generations according to IUCN (Stanford & Hamidy, 2021 p. 4).

V. Current Threats

Under the ESA, the Service is required to list a species as "endangered" if it "is in danger of extinction throughout all or a significant portion of its range" or as "threatened" if it "is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range" based upon one or more threats or factors. 16 U.S.C. § 1532(6), (20). There are five statutory listing factors that the Service must analyze for the species: (A) the present or threatened destruction, modification, or curtailment of its habitat or range; (B) overutilization for commercial, recreational, scientific, or educational purposes; (C) disease or predation; (D) the inadequacy of existing regulatory mechanisms; and (E) other natural or manmade factors affecting its continued existence. *Id.* § 1533(a)(1). Based upon an analysis of these factors, the Sulawesi forest turtle should be protected as an endangered species under the ESA.

A. The Present or Threatened Destruction, Modification, or Curtailment of its Habitat or Range

Habitat destruction is a threat to Sulawesi forest turtles (Hagen et al., 2009 p. 039.5; Riyanto, 2006 p. 323; Stanford & Hamidy, 2021 p. 5). According to IUCN, the Sulawesi forest turtle "has suffered decreasing quality of much of the habitat in its range" (Stanford & Hamidy, 2021 p. 1). This is due to anthropogenic activity including commercial logging and agricultural expansion (Riyanto, 2006 p. 322; Riyanto et al., 2008 p. 14-15; Stanford & Hamidy, 2021 p. 5). Simms et al. (2022 p. 467) note that in the face of declining habitat due to agricultural expansion, the protection of remaining viable habitat is important for Sulawesi forest turtles, particularly given their slow life history.

Indonesia has experienced the highest deforestation rate in the world (Newman and Valentinus, 2005 p. 1). From 2000 to 2012, the country is estimated to have lost 157,850 km^2 of tree cover (Hansen et al., 2013 supplementary text, Table S1). From 1990-2018, the island of Sulawesi lost 18.90% of its forests (Rijal et al., 2019 p. 6). North Sulawesi Province, which is part of the Minahasa Peninsula and makes up part of the range of the Sulawesi forest turtle, lost 23.29% of its forest cover (Rijal et al., 2019 p. 6). North Sulawesi Province lost more forest cover than any other province on the island of Sulawesi during that time (Rijal et al., 2019 p. 6).

Although comprehensive population surveys before and after habitat destruction do not exist, the best information available shows that Sulawesi forest turtles are impacted by human-caused habitat destruction. Riyanto (2006, p. 322) noted two localities, Labonu and Karya Agung, where herbicides from farmland and logging activity had caused declines in the local Sulawesi forest turtle populations. In 2007, Riyanto et al. (2008 p. 14-15) noted that two sites where researchers found Sulawesi forest turtles were being cleared for logging and farmland.

As described above, some observations suggest that Sulawesi forest turtles may be able to survive in modified habitats including near agricultural plantations (Hagen et al., 2009 p. 039.5; Riyanto, 2006 p. 322; Simms et al., 2022 p. 467) and that a buffer of riparian vegetation may provide an important refuge for Sulawesi forest turtles existing near human-altered habitats (Simms et al., 2022 p. 467). Regardless of the species' ability to persist in human-altered habitats, scientists agree that habitat destruction is a threat to Sulawesi forest turtles (Hagen et al., 2009 p. 039.5; Riyanto, 2006 p. 323; Stanford & Hamidy, 2021 p. 5).

B. Overutilization for Commercial, Recreational, Scientific, or Educational Purposes

1. Sulawesi Forest Turtle Populations are Threatened by Trade

Large-scale illegal trade in tortoises and freshwater turtles within Indonesia and in exports from Indonesia has been well documented (Shepherd, 2000, full paper; Schoppe, 2009, full paper). While on paper Indonesia has adequate legislation to protect these species from over-exploitation, illegal trade continues to be common and widespread, often carried out openly (Shepherd and Nijman, 2007, full paper; Schoppe, 2009, full paper). While there is some local demand for these species, the international demand for meat and for pets continues to threaten all of Indonesia's tortoises and freshwater turtles (Shepherd, 2000, full paper, Schoppe, 2009, full paper, Lyons et al., 2013; Shepherd et al., 2020, full paper).

Sulawesi forest turtles have been highly impacted by overcollection for trade (Stanford & Hamidy, 2021 p. 1). They are sought after primarily for the international pet trade but also for food and medicinal markets (Ives et al., 2008 p. 241). According to the CITES Trade Database, the United States is the largest importer of Sulawesi forest turtles, almost doubling the number of imports to Japan, the next largest importer, over the last 20 years (Table 3).

Early trade in Sulawesi forest turtles led to an initial population decline due to high rates of collection from the wild. The species was first discovered in trade in the early 1990's (Stanford & Hamidy, 2021 p. 4). In 1998, an estimated 2,000-3,000 Sulawesi turtles were seized (Stanford & Hamidy, 2021 p. 1). By 1999, the number of turtles seized dropped to 100, which scientists interpret as a sign of a significant population decline in just a one-year period (Hagen et al., 2009 p. 039.5; Stanford & Hamidy, 2021 p. 1). Despite this warning sign, high numbers of Sulawesi forest turtles remained in trade. In 2002, it was estimated that 720 Sulawesi forest turtles were collected from one area in North-Central Sulawesi alone (Riyanto, 2006 p. 321). In 2006, Ives et al. (2008 p. 246) interviewed a reptile dealer in Palu who indicated that 50 Sulawesi forest turtles were collected from the wild each month in Central Sulawesi (Ives et al., 2008 p.

246). In 2007, researchers visited registered trading companies in Palu and found 25 Sulawesi forest turtles in one day in Depot Losari (Riyanto et al., 2008 p.8). They also identified 38 juvenile Sulawesi forest turtles in Ganonggol/Karya Agung ready to be shipped to Palu (Riyanto et al., 2008 p.8).

Information on the trade in Sulawesi forest turtles is available in the CITES Trade Database starting in 2003 when the species was listed under the Appendix II of the Convention. The total number of Sulawesi forest turtles reported in trade by all importing countries since 2003 is 602 individuals, while the number reported by all exporting countries is 1280 turtles (Table 3). The United States is the world's largest importer according to the CITES Trade Database (Table 3). The United States reported importing 302 Sulawesi forest turtles, while exporting countries reported shipping 604 Sulawesi forest turtles to the United States (Table 3). Hundreds[6] of these turtles were sourced from the wild (Table 3). Almost all the turtles imported into the United States were for commercial purposes: the United States reported importing two turtles for breeding in captivity or artificial propagation, while the remaining 300 were imported for commercial trade. During this same timeframe, exporters reported exporting 602 turtles for commercial trade (Table 3). Hagen et al. (2009 p. 039.5) noted that the number of Sulawesi forest turtles traded is likely higher than the number reported. This is due to illegal trade and wildlife inspectors lacking identification skills, particularly to tell the species apart from similar looking *Cyclemys* spp. and *Notochelys platynota* (Hagen et al., 2009 p. 039.5).

Wild populations of Sulawesi forest turtles continue to be impacted by collection for trade. As mentioned above, researchers conducting surveys of Sulawesi forest turtles in 2019 found that collection of the turtles from the wild may be impacting the demography of the wild population (Simms et al., 2022 p. 466). The results of their study, including small population estimates, a skewed age-class structure, and the loss of six turtles during the study raised concerns about poaching from wild populations (Simms et al., 2022 p. 466). Turtles were specifically lost from two streams that were near clove orchards, while the researchers reported no turtles lost from areas that were further away from clove orchards (Simms et al., 2022 p. 466). Locals informed the researchers that people visiting the area poach turtles, particularly during the clove harvest season (Simms et al., 2022 p. 466).

Sulawesi forest turtles are not suitable for commercial trade. Where collection of Sulawesi forest turtles occurs, there is a noticeable difference in the population indicating that the species cannot easily replace collected specimens (Riyanto, 2006 p. 322). Sulawesi forest turtles are particularly vulnerable to collection due to their slow life history, limited distribution, and preference for specialized habitats (Hagen et al., 2009 p. 039.5; Riyanto, 2006 p. 322). Because these traits make it inherently difficult for populations to respond to overcollection, Hagen et al. (2009 p. 039.5) noted that "the concept of sustainable yield is probably not applicable."

[6] According to the CITES Trade Database and as shown in Table 3, the United States reported importing 264 Sulawesi forest turtles that were sourced from the wild since 2003. However, the exporting country, Indonesia, reported exporting 371 Sulawesi forest turtles that were sourced from the wild to the United States since 2003.

2. Captive Breeding of Sulawesi Forest Turtles is Difficult and May Open Opportunities for Laundering

Based on the literature, captive breeding of Sulawesi forest turtles has been largely unsuccessful (Stanford & Hamidy, 2021 p. 4). In 2009, Hagen et al. (2009 p. 039.6) reported that about 150 adult Sulawesi forest turtles were in captivity globally. At the time, 10 hatchlings had been reported but some had died shortly after hatching (Hagen et al., 2009 p. 039.6). Mortality rates in captivity and during shipping vary, ranging from 25-100% (Innis et al. 2002 as cited in Hagen et al., 2009 p. 039.6). Breeding Sulawesi forest turtles in captivity is likely costly given the challenges with breeding and the low success rate, which makes the species more susceptible to laundering. High breeding costs make species more vulnerable because commercial captive breeding is less attractive than taking animals out of the wild and laundering them through captive breeding facilities (Lyons et al., 2013 p. 301).

According to the CITES Trade Database, almost all Sulawesi forest turtles imported by the United States since 2003 came from Indonesia. The United States reported imports of 50 Sulawesi forest turtles from Indonesia declared as bred or born in captivity and 264 imports that were declared from the wild (Table 3), while Indonesia reported exporting 226 turtles from captivity and 371 from the wild. It is possible that even specimens born in captivity may have originated from the wild given the difficulty breeding this species and the fact that laundering and other illegal activities are common along the trade chain in Indonesia (Nijman and Shepherd, 2015, full paper; Nijman and Shepherd, 2009, full paper). Natusch and Lyons (2012 p. 2905) stated that, despite Indonesia having restrictions and guidelines in place to regulate the wildlife trade, “few actors abide by these laws.” One study looking at python trade in Indonesia found that 92 percent of traders who were interviewed said that they could “easily circumvent laws and regulations by paying off officials” (Lyons & Natusch, 2011 p. 3), which is a common method for trading protected species and species without harvest quotas in Indonesia (Natusch & Lyons, 2012 p. 2902). Lyons and Natusch (2011, p. 6) confirmed that most green tree pythons exported annually from Indonesia reported as captive bred are actually wild caught. Additionally, researchers found that many protected species of amphibians and reptiles are laundered, with traders stating that collected wildlife was being sent to licensed captive breeding facilities where they would then be exported as captive-bred or sold to domestic pet shops (Natusch & Lyons, 2012 p. 2902). Other authors have frankly concluded that “[m]ost wildlife trade in Indonesia is illegal, yet enforcement is almost non-existent” (Eaton et al. 2015 p. 8).

Table 2. Sulawesi forest turtles for sale online in the United States.

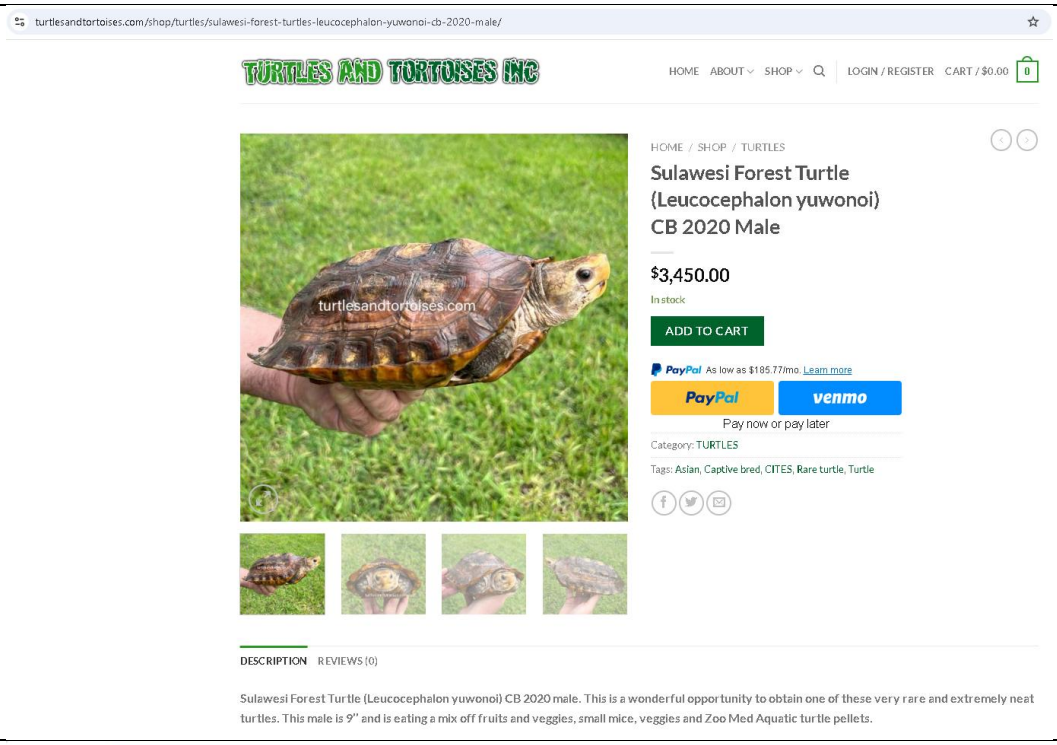
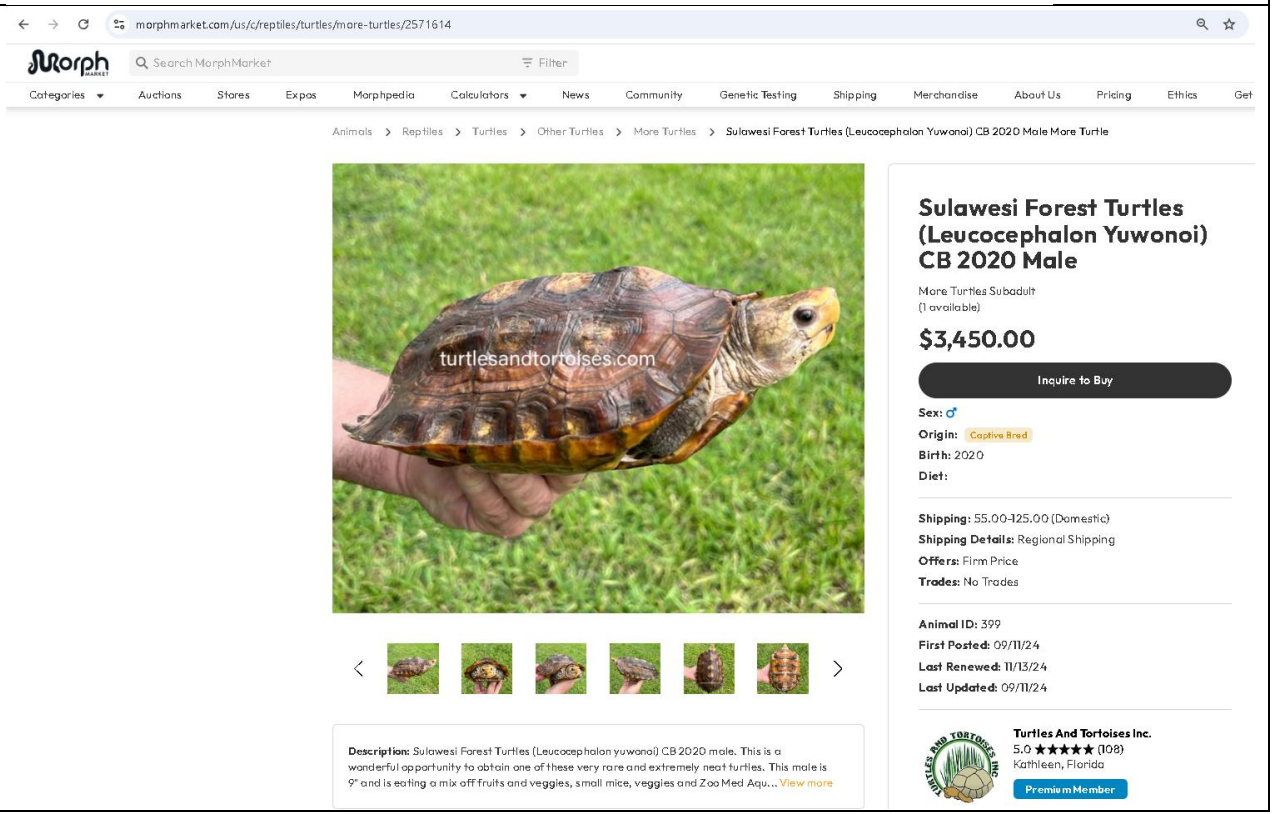
Turtles and Tortoises Inc. (Accessed November 18, 2024)	
Morph Market (Accessed November 18, 2024)	

Table 3. Trade in live Sulawesi forest turtles in the CITES Trade Database from the species' Appendix II listing in 2003 to 2021. Accessed December 4, 2024.

Year	Importer	Exporter	Importer reported quantity	Exporter reported quantity	Purpose	Source
2021	Japan	Indonesia		27	Commercial	Animals born in captivity (F1 or subsequent generations) that do not fulfil the definition of 'bred in captivity' in Resolution Conf. 10.16 (Rev.), as well as parts and derivatives thereof
2021	Austria	United States		4	Zoo	Animals born in captivity (F1 or subsequent generations) that do not fulfil the definition of 'bred in captivity' in Resolution Conf. 10.16 (Rev.), as well as parts and derivatives thereof
2021	Austria	United States	4		Zoo	Animals born in captivity (F1 or subsequent generations) that do not fulfil the definition of 'bred in captivity' in Resolution Conf. 10.16 (Rev.), as well as parts and derivatives thereof
2020	Croatia	Switzerland		1	Zoo	Pre-Convention specimens
2020	Croatia	Switzerland	1		Zoo	Pre-Convention specimens
2020	Japan	Indonesia		10	Commercial	Animals born in captivity (F1 or subsequent generations) that do not fulfil the definition of 'bred in captivity' in Resolution Conf. 10.16 (Rev.), as well as parts and derivatives thereof
2019	Austria	Switzerland		1	Zoo	Pre-Convention specimens
2019	United States	Czech Republic		1	Breeding in captivity or artificial propagation	Animals bred in captivity in accordance with Resolution Conf. 10.16 (Rev.), as well as parts and derivatives thereof, exported under the provisions of Article VII, paragraph 5
2019	United States	Indonesia		27	Commercial	Animals born in captivity (F1 or subsequent generations) that do not fulfil the definition of 'bred in captivity' in Resolution Conf. 10.16 (Rev.), as well as parts and derivatives thereof
2019	France	Indonesia		27	Commercial	Animals born in captivity (F1 or subsequent generations) that do not fulfil the definition of 'bred in captivity' in Resolution Conf. 10.16 (Rev.), as well as parts and derivatives thereof

2018	United States	Czech Republic	1	1	Breeding in captivity or artificial propagation	Animals bred in captivity in accordance with Resolution Conf. 10.16 (Rev.), as well as parts and derivatives thereof, exported under the provisions of Article VII, paragraph 5
2018	Taiwan	Indonesia		10	Commercial	Animals born in captivity (F1 or subsequent generations) that do not fulfil the definition of 'bred in captivity' in Resolution Conf. 10.16 (Rev.), as well as parts and derivatives thereof
2018	Japan	Indonesia		27	Commercial	Animals born in captivity (F1 or subsequent generations) that do not fulfil the definition of 'bred in captivity' in Resolution Conf. 10.16 (Rev.), as well as parts and derivatives thereof
2017	Austria	Japan		10	Commercial	Animals bred in captivity in accordance with Resolution Conf. 10.16 (Rev.), as well as parts and derivatives thereof, exported under the provisions of Article VII, paragraph 5
2017	Republic of Korea	Indonesia		30	Commercial	Animals bred in captivity in accordance with Resolution Conf. 10.16 (Rev.), as well as parts and derivatives thereof, exported under the provisions of Article VII, paragraph 5
2017	Philippines	Indonesia		15	Commercial	Animals born in captivity (F1 or subsequent generations) that do not fulfil the definition of 'bred in captivity' in Resolution Conf. 10.16 (Rev.), as well as parts and derivatives thereof
2017	Japan	Indonesia	1	22	Commercial	Animals born in captivity (F1 or subsequent generations) that do not fulfil the definition of 'bred in captivity' in Resolution Conf. 10.16 (Rev.), as well as parts and derivatives thereof
2016	United States	Indonesia		52	Commercial	Animals bred in captivity in accordance with Resolution Conf. 10.16 (Rev.), as well as parts and derivatives thereof, exported under the provisions of Article VII, paragraph 5
2016	Japan	Indonesia	2	20	Commercial	Animals bred in captivity in accordance with Resolution Conf.

						10.16 (Rev.), as well as parts and derivatives thereof, exported under the provisions of Article VII, paragraph 5
2016	Japan	Indonesia	4		Commercial	Animals born in captivity (F1 or subsequent generations) that do not fulfil the definition of 'bred in captivity' in Resolution Conf. 10.16 (Rev.), as well as parts and derivatives thereof
2015	Japan	Indonesia		30	Commercial	Animals bred in captivity in accordance with Resolution Conf. 10.16 (Rev.), as well as parts and derivatives thereof, exported under the provisions of Article VII, paragraph 5
2015	United States	Indonesia	2	12	Commercial	Animals bred in captivity in accordance with Resolution Conf. 10.16 (Rev.), as well as parts and derivatives thereof, exported under the provisions of Article VII, paragraph 5
2015	United States	Indonesia	12	14	Commercial	Animals born in captivity (F1 or subsequent generations) that do not fulfil the definition of 'bred in captivity' in Resolution Conf. 10.16 (Rev.), as well as parts and derivatives thereof
2015	Taiwan	Indonesia		22	Commercial	Animals born in captivity (F1 or subsequent generations) that do not fulfil the definition of 'bred in captivity' in Resolution Conf. 10.16 (Rev.), as well as parts and derivatives thereof
2015	Republic of Korea	Indonesia	25	30	Commercial	Animals born in captivity (F1 or subsequent generations) that do not fulfil the definition of 'bred in captivity' in Resolution Conf. 10.16 (Rev.), as well as parts and derivatives thereof
2015	Japan	Indonesia	27	31	Commercial	Animals born in captivity (F1 or subsequent generations) that do not fulfil the definition of 'bred in captivity' in Resolution Conf. 10.16 (Rev.), as well as parts and derivatives thereof
2014	United States	Indonesia	10		Commercial	Specimens taken from the wild
2014	United States	Indonesia		42	Commercial	Animals bred in captivity in accordance with Resolution Conf.

						10.16 (Rev.), as well as parts and derivatives thereof, exported under the provisions of Article VII, paragraph 5
2014	United States	Indonesia	22	22	Commercial	Animals born in captivity (F1 or subsequent generations) that do not fulfil the definition of 'bred in captivity' in Resolution Conf. 10.16 (Rev.), as well as parts and derivatives thereof
2014	Taiwan	Indonesia		38	Commercial	Animals born in captivity (F1 or subsequent generations) that do not fulfil the definition of 'bred in captivity' in Resolution Conf. 10.16 (Rev.), as well as parts and derivatives thereof
2014	Russian Federation	Indonesia		2	Commercial	Animals born in captivity (F1 or subsequent generations) that do not fulfil the definition of 'bred in captivity' in Resolution Conf. 10.16 (Rev.), as well as parts and derivatives thereof
2014	Republic of Korea	Indonesia	14	4	Commercial	Animals born in captivity (F1 or subsequent generations) that do not fulfil the definition of 'bred in captivity' in Resolution Conf. 10.16 (Rev.), as well as parts and derivatives thereof
2014	Philippines	Indonesia		3	Commercial	Animals born in captivity (F1 or subsequent generations) that do not fulfil the definition of 'bred in captivity' in Resolution Conf. 10.16 (Rev.), as well as parts and derivatives thereof
2014	Philippines	Indonesia	3		Breeding in captivity or artificial propagation	Animals born in captivity (F1 or subsequent generations) that do not fulfil the definition of 'bred in captivity' in Resolution Conf. 10.16 (Rev.), as well as parts and derivatives thereof
2014	Japan	Indonesia	14	16	Commercial	Animals born in captivity (F1 or subsequent generations) that do not fulfil the definition of 'bred in captivity' in Resolution Conf. 10.16 (Rev.), as well as parts and derivatives thereof
2013	United States	Hong Kong	5		Commercial	Confiscated or seized specimens (may be used with another code)
2013	United States	Hong Kong		5	Commercial	Animals born in captivity (F1 or subsequent generations) that do not

						fulfil the definition of 'bred in captivity' in Resolution Conf. 10.16 (Rev.), as well as parts and derivatives thereof
2013	United States	Indonesia	14	27	Commercial	Animals born in captivity (F1 or subsequent generations) that do not fulfil the definition of 'bred in captivity' in Resolution Conf. 10.16 (Rev.), as well as parts and derivatives thereof
2013	Taiwan	Indonesia		14	Commercial	Animals born in captivity (F1 or subsequent generations) that do not fulfil the definition of 'bred in captivity' in Resolution Conf. 10.16 (Rev.), as well as parts and derivatives thereof
2013	Republic of Korea	Indonesia		10	Commercial	Animals born in captivity (F1 or subsequent generations) that do not fulfil the definition of 'bred in captivity' in Resolution Conf. 10.16 (Rev.), as well as parts and derivatives thereof
2013	Japan	Indonesia	20	23	Commercial	Animals born in captivity (F1 or subsequent generations) that do not fulfil the definition of 'bred in captivity' in Resolution Conf. 10.16 (Rev.), as well as parts and derivatives thereof
2013	Hong Kong	Indonesia	11	33	Commercial	Animals born in captivity (F1 or subsequent generations) that do not fulfil the definition of 'bred in captivity' in Resolution Conf. 10.16 (Rev.), as well as parts and derivatives thereof
2012	Japan	Indonesia	10		Commercial	Animals bred in captivity in accordance with Resolution Conf. 10.16 (Rev.), as well as parts and derivatives thereof, exported under the provisions of Article VII, paragraph 5
2012	Japan	Hong Kong	2	2	Commercial	Animals born in captivity (F1 or subsequent generations) that do not fulfil the definition of 'bred in captivity' in Resolution Conf. 10.16 (Rev.), as well as parts and derivatives thereof
2012	Japan	Indonesia	10		Commercial	Animals born in captivity (F1 or subsequent generations) that do not fulfil the definition of 'bred in captivity' in Resolution Conf. 10.16

						(Rev.), as well as parts and derivatives thereof
2012	Hong Kong	Indonesia	10		Commercial	Animals born in captivity (F1 or subsequent generations) that do not fulfil the definition of 'bred in captivity' in Resolution Conf. 10.16 (Rev.), as well as parts and derivatives thereof
2010	Japan	Indonesia		5	Commercial	Animals bred in captivity in accordance with Resolution Conf. 10.16 (Rev.), as well as parts and derivatives thereof, exported under the provisions of Article VII, paragraph 5
2010	Taiwan	Indonesia		10	Commercial	Animals bred in captivity in accordance with Resolution Conf. 10.16 (Rev.), as well as parts and derivatives thereof, exported under the provisions of Article VII, paragraph 5
2010	United States	Indonesia		25	Commercial	Animals born in captivity (F1 or subsequent generations) that do not fulfil the definition of 'bred in captivity' in Resolution Conf. 10.16 (Rev.), as well as parts and derivatives thereof
2009	Italy	Indonesia	20		Commercial	Animals born in captivity (F1 or subsequent generations) that do not fulfil the definition of 'bred in captivity' in Resolution Conf. 10.16 (Rev.), as well as parts and derivatives thereof
2008	United States	Indonesia	8		Commercial	Specimens taken from the wild
2008	Japan	Indonesia	4		Commercial	Specimens taken from the wild
2008	United States	Indonesia		5	Commercial	Animals born in captivity (F1 or subsequent generations) that do not fulfil the definition of 'bred in captivity' in Resolution Conf. 10.16 (Rev.), as well as parts and derivatives thereof
2008	Thailand	Indonesia		12	Commercial	Animals born in captivity (F1 or subsequent generations) that do not fulfil the definition of 'bred in captivity' in Resolution Conf. 10.16 (Rev.), as well as parts and derivatives thereof
2008	Japan	Indonesia		36	Commercial	Animals born in captivity (F1 or subsequent generations) that do not fulfil the definition of 'bred in

						captivity' in Resolution Conf. 10.16 (Rev.), as well as parts and derivatives thereof
2008	Italy	Indonesia		6	Commercial	Animals born in captivity (F1 or subsequent generations) that do not fulfil the definition of 'bred in captivity' in Resolution Conf. 10.16 (Rev.), as well as parts and derivatives thereof
2007	United States	Indonesia	44	83	Commercial	Specimens taken from the wild
2007	Japan	Indonesia	3	15	Commercial	Specimens taken from the wild
2007	Japan	Indonesia	52	43	Commercial	Animals born in captivity (F1 or subsequent generations) that do not fulfil the definition of 'bred in captivity' in Resolution Conf. 10.16 (Rev.), as well as parts and derivatives thereof
2006	United States	Indonesia	56	53	Commercial	Specimens taken from the wild
2006	United Kingdom	Indonesia		4	Commercial	Specimens taken from the wild
2006	Thailand	Indonesia	4	4	Commercial	Specimens taken from the wild
2006	Japan	Indonesia	24	25	Commercial	Specimens taken from the wild
2006	Germany	Indonesia		1	Commercial	Specimens taken from the wild
2005	United States	Indonesia	42	68	Commercial	Specimens taken from the wild
2005	Japan	Indonesia	13	25	Commercial	Specimens taken from the wild
2005	Germany	Indonesia		3	Commercial	Specimens taken from the wild
2004	United States	Indonesia	56	87	Commercial	Specimens taken from the wild
2004	Netherlands	Indonesia		6	Commercial	Specimens taken from the wild
2004	Japan	Indonesia		3	Commercial	Specimens taken from the wild
2004	Germany	Indonesia		8	Commercial	Specimens taken from the wild
2003	United States	Indonesia	48	80	Commercial	Specimens taken from the wild
2003	Switzerland	Indonesia	4	4	Commercial	Specimens taken from the wild
2003	Japan	Indonesia		4	Commercial	Specimens taken from the wild

C. Disease

More research is needed to determine whether disease is a threat to Sulawesi forest turtles.

D. Other Natural or Manmade Factors

1. Climate Change

Climate change is likely to be a threat to Sulawesi forest turtles. Reptiles are likely more susceptible to climate change than other taxa due to their limited ability to disperse to new habitats and reliance on ambient temperature to regulate body temperature (Root and Schneider, 2002 pp. 20-21). This is particularly true for the Sulawesi forest turtle as an island endemic. Temperature increases, precipitation changes, and increases in natural disasters are expected within the range of the Sulawesi forest turtle during this century (Christensen et al., 2007 p. 879; Measey, 2010 p. 38). Any of these changes has the potential to impact the Sulawesi forest turtle throughout most or all of its range.

Global surface temperature is projected to continue increasing until at least mid-century under all IPCC *Climate Change 2021* report scenarios (IPCC 2021). In Southeast Asia there is an expected median warming of 2.5°C by the end of the 21st century (Christensen et al., 2007 p. 883). Sulawesi forest turtles rely on ambient temperature to regulate body temperature, making them particularly vulnerable to these changes.

In addition to changes in temperature, changes in precipitation are expected to occur within the range of the Sulawesi forest turtle which may impact the species' habitat. Summer precipitation is expected to increase in South and Southeast Asia during this century and intense precipitation events are expected to occur more frequently (Christensen et al., 2007 p. 879). Extreme rainfall and winds from tropical cyclones are also expected to increase in South and Southeast Asia (Christensen et al., 2007 p. 879).

2. Parasites

Further research is needed on the impact of parasites on wild Sulawesi forest turtle populations. Riyanto (2006 p. 323) found that a population of Sulawesi forest turtles in North-Central Sulawesi was infected by the *Falcaustra kutcheri* nematode. Beyond this, we did not find any publications documenting wild Sulawesi forest turtles infected by parasites.

E. The Inadequacy of Existing Regulatory Mechanisms

Existing national and global regulatory mechanisms are inadequate to protect the Sulawesi forest turtle from the threats it faces. Demand for the species for the international pet trade is one of the biggest threats it faces, and enforcement of existing regulatory mechanisms have not been sufficient to ensure that the trade does not put the wild populations of Sulawesi forest turtles at risk of extinction. As discussed above, Sulawesi forest turtles have been harvested from the wild at an unsustainable rate and continue to be targeted for international trade despite being listed under CITES Appendix II since 2003, and additional protections are needed. Endangered Species Act protections, including a ban on imports of Sulawesi forest turtles into the United States, are necessary to protect this species from extinction.

2. Domestic Protections in Indonesia

i. Protected Species Regulation

Under Indonesia's Law Concerning Conservation of the Living Natural Resources and Its Ecosystem (No. 5/1990), animals may be listed as "protected," and the law prohibits the catching, killing, transporting, and trade of any protected species.[7] Government Regulation No. 7/1999 further provides that only non-protected fauna species "can be commercialized."[8] Government Regulation of the Minister of Environment and Forestry Number 20/2018 provides the list of protected species.[9] The Sulawesi forest turtle is not listed as protected, and therefore neither the conservation law nor the regulation is adequate for protecting the species.[10]

ii. Regulation of the Minister of Forestry No. 447/Kpts-11/2003 Concerning Administration Directive of Harvest or Capture and Distribution of the Specimens of Wild Plant and Animal Species

For all species not listed as "protected" in Indonesia, the Regulation of the Minister of Forestry No. 447/Kpts-11/2003 Concerning Administration Directive of Harvest or Capture and Distribution of the Specimens of Wild Plant and Animal Species sets requirements for take and trade.[11] The Regulation requires hunters and wildlife traders to register with regional offices of the Indonesian natural resources conservation agency and obtain permits for capturing, transporting, selling, and exporting wildlife (Natusch & Lyons, 2012 p. 2902).[12] If requested (Nijman et al., 2022 p. 4), authorities set a harvest or capture quota, and regional authorities distribute that quota through permits.[13] Accordingly, non-protected species like Sulawesi forest turtles can only be traded if a quota has been issued (Nijman et al., 2022 p. 4), and trade in species without a quota is illegal (Nijman et al., 2022 p. 4; Latinne et al., 2020 p. 10).[14]

---

[7] Law of the Republic of Indonesia, No. 5/1990 Concerning Conservation of the Living Natural Resources and Its Ecosystem, at Art. 21(2), available at: http://www.flevin.com/id/lgso/translations/JICA%20Mirror/english/4.05.1990.eng.qc.html. This law was amended in 2024, but the relevant provisions banning capture and trade remain applicable. *See* Law of the Republic of Indonesia, No. 32/2024 about amendment to law No. 5/1990 concerning conservation of natural resources and their ecosystems. Available at: https://peraturan.bpk.go.id/Details/295135/uu-no-32-tahun-2024

[8] Government Regulation of the Republic of Indonesia No. 8/1999 on Wild Flora and Fauna Exploitation, Art. 18. Available at https://sherloc.unodc.org/cld/uploads/res/document/regulation-8-of-1999_html/Regulation_8_of_1999.pdf.

[9] Regulation of the Minister of Environment and Forestry Number 20/2018. Available at: http://ksdae.menlhk.go.id/assets/news/peraturan/P.20_Jenis_TSL_.pdf.

[10] Regulation of the Minister of Environment and Forestry, Republic of Indonesia, Number P.20/MENLHK/SETJEN/KUM.1/6/2018, Types of Plant and Animal Protected. Available at: https://leap.unep.org/sites/default/files/national-legislation/Reg%252020%25202018%2520Mi.pdf.

[11] Decree of the Ministry of Forestry 447 of 2003, Tata Usaha Atau Penangkapan Dan Peredaran Tumbuhan Dan Satwa Liar. Available at: http://www.flevin.com/id/lgso/translations/JICA%20Mirror/english/54.FORESTRY_%20447.2003_final.Eng.QC.html.

[12] Decree of the Ministry of Forestry 447 of 2003, Tata Usaha Atau Penangkapan Dan Peredaran Tumbuhan Dan Satwa Liar, Article 26(1).

[13] Decree of the Ministry of Forestry 447 of 2003, Tata Usaha Atau Penangkapan Dan Peredaran Tumbuhan Dan Satwa Liar, Article 13(1), (2), (3).

[14] Decree of the Ministry of Forestry 447 of 2003, Tata Usaha Atau Penangkapan Dan Peredaran Tumbuhan Dan Satwa Liar, Article 32(1); 54(a).

Indonesia has not issued an export quota for Sulawesi forest turtles.[15] Because there is no quota for the species, it is illegal to capture and trade Sulawesi forest turtles in Indonesia for domestic and international markets. However, the species' continued laundering and trade and critically endangered conservation status indicate that this prohibition does not provide adequate protection for Sulawesi forest turtles.

3. Protected Areas

According to Hagen et al. (2009 p. 039.5), Sulawesi turtles have not been collected from or observed in a protected area. Interviews with locals indicated that the species may be present in Bogani Nai Wartabone National Park and Panua Nature Reserve, but this had not been verified (Hagen et al., 2009 p. 039.5; Ives et al., 2008 p. 245). Ives et al. (2008 p. 245) noted that the species is also included on a checklist of species found in Lore Lindu National Park but emphasized that its presence there needs to be verified. Wanger et al. (2011 p. 21) includes Sulawesi forest turtles on a list of reptiles in Lore Lindu National Park. However, the researchers did not find Sulawesi forest turtles in their surveys of the park and cited Ives et al. for the species' occurrence there. Therefore, further verification is still needed to confirm the Sulawesi forest turtle's presence in Lore Lindu National Park.

Protected areas are not adequately protecting Sulawesi forest turtles given that the species' presence within protected areas has not been verified. Even if the species does exist within protected areas, those land designations have not effectively protected Sulawesi forest turtles because the species is still critically endangered and declining (Stanford & Hamidy, 2021 entire assessment).

4. Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)

The Sulawesi forest turtle was included in CITES Appendix II in 2003. Under Article IV of CITES, to trade an Appendix II species, exporting countries must issue an export permit, make a finding that "export will not be detrimental to th[e] species" and be satisfied that the specimen was not obtained illegally. CITES Art. IV(2)(a), (b). Indonesia initially set its own annual export quota of 100 Sulawesi forest turtles from 2003-2009 that was reported to CITES (Hagen et al. 2009 p. 039.5).[16] However, the quota was exceeded in at least 2007 (Hagen et al., 2009 039.5). Indonesia has not reported an annual quota to CITES for Sulawesi forest turtles since 2009.[17]

While regulation under CITES can be a powerful conservation tool, the listing of Sulawesi forest turtles under Appendix II is not sufficient to protect this species. As shown above, hundreds of Sulawesi forest turtles have been traded since the species was listed under

[15] See Indonesia's 2023 quotas: https://drive.google.com/file/d/1bC1mVKV_LCLWhWWEU2TgIRsLokCNTKhx/view?usp=sharing; While we were unable to identify a quota, Ives et al 2008 (p. 241) states that the species is protected and managed through export quotas.

[16] *See* https://speciesplus.net/species#/taxon_concepts/10665/legal

[17] *See* https://speciesplus.net/species#/taxon_concepts/10665/legal

Appendix II, including several hundred that were collected from the wild. There does not appear to have been any improvement in the species' conservation status since the species was listed under CITES Appendix II, as it was assessed as Critically Endangered by IUCN in its most recent assessment. As the largest importer, the United States can play an important role in addressing the demand and trade in this species by extending ESA protections to the species.

VI. Request for Regulations

Based on the best available information presented above, the Center and Monitor petition the Service to emergency list the Sulawesi forest turtle or list it as endangered under the Endangered Species Act. 16 U.S.C. § 1533(b). We further request that if the Service chooses to emergency list the species, it promptly adopts a final rule for the species before the emergency listing expires. Listing is warranted, as the Sulawesi forest turtle "is in danger of extinction throughout all or a significant portion of its range." *Id.* § 1532(6). Once listed as endangered, the ESA bans the import, transport, and sale of species with narrow exemptions. *Id.* § 1538(a)(1). These ESA protections are warranted to help prevent U.S. demand from driving this species' pending extinction and to assist in the species' ultimate recovery.

We note that, under the ESA, otherwise prohibited activities can continue for certain, legitimate conservation purposes. While the ESA generally bans the take, import, export, and sale of endangered species, there are several exemptions. For endangered species, the Fish and Wildlife Service can issue permits for scientific research or enhancement of propagation or survival of the species. 16 U.S.C. § 1539(a); 50 C.F.R. § 17.21. For threatened species for which take and sale are generally banned, the Service can issue permits for zoological exhibition, educational use, and special purposes consistent with the ESA. 50 C.F.R. § 17.32.

Additionally, individuals or entities may apply for a captive-bred wildlife registration. 50 C.F.R. §§ 17.21(g), 17.31(a). This registration allows for sale, transport, export, and re-import of live members of foreign species that were captive bred in the United States but only for the purpose of enhancing or propagating the species. 50 C.F.R. § 17.21(g)(1). The exemption does not cover import of the species.

Specifically, the following criteria must be met: the wildlife must be non-native to the United States,[18] the purpose must be to enhance the propagation or survival of the species, the activity cannot involve commercial interstate or foreign commerce in non-living specimens, specimens that are re-imported are marked (50 C.F.R. § 17.21(g)(1)(i)-(v)), the person registers with the Service and meets the registration criteria (50 C.F.R. § 17.21(g)(2)-(3)), and the person receives permission to export or engage in foreign commerce of specimens that will not remain in the person's care (50 C.F.R. § 17.21(g)(4)).

As the Service explains on its website, "[c]aptive-bred wildlife permits are not issued to keep or breed endangered or threatened animals as pets. Keeping protected species as pets is not consistent with the purposes of the ESA, which is aimed at conservation of the species and recovery of wild populations."[19]

[18] Separate regulations apply for species that are native to the United States.
[19] https://www.fws.gov/node/267045

VII. Conclusion

The Sulawesi forest turtle is at risk of extinction. The species is threatened by collection for the pet trade and habitat loss as the forests and healthy streams it relies on face threats from logging and conversion to agricultural land. On top of these threats, climate change is likely to have an impact on the Sulawesi forest turtle because it is an island endemic with limited dispersal potential. Current regulatory mechanisms are not adequate to protect the Sulawesi forest turtle or its habitat. The species was assessed as Critically Endangered by IUCN in 2021, close to 20 years after it was listed under CITES Appendix II.

The U.S. demand for exotic pets is a prominent force in the live wildlife trade, involving hundreds of millions of animals each year (Smith et al., 2017 p. 32). Some of the most imported species are reptiles, with close to 4,000 species of reptiles in the trade between 2000 and 2019 (Marshall et al., 2020 p. 2; Smith et al., 2017 pp. 32-33). The demand for live wildlife has been connected to the extirpation of reptile species from their type localities (Stuart et al., 2006 p. 1137). We are in a global extinction crisis with one million species headed toward extinction and millions more declining. Every time we lose a species, we lose the critical processes it maintains in its ecosystem and our natural systems unravel, impacting the wildlife and humans that depend on them. Addressing the U.S. demand for wild animals as pets must be a top priority in addressing this crisis and protecting biodiversity for future generations.

Sulawesi forest turtles fit the definition of an endangered species. Protections in Indonesia and through CITES have not been sufficient to protect Sulawesi forest turtles, and therefore it is imperative that the United States step up to address its role as the largest driver of demand for this species. We strongly urge the Service to swiftly list the Sulawesi forest turtle as endangered under the Endangered Species Act.

VIII. References

Please note that all references have been submitted on a jump drive and can also be found in this folder.

Böhm, M., Collen, B., Baillie, J. E., Bowles, P., Chanson, J., Cox, N., ... & Mateo, J. A. (2013). The conservation status of the world's reptiles. Biological conservation, 157, 372-385.

Borgelt, J., Dorber, M., Høiberg, M. A., & Verones, F. (2022). More than half of data deficient species predicted to be threatened by extinction. Communications biology, 5(1), 1-9.

Christensen, J.H., B. Hewitson, A. Busuioc, A. Chen, X. Gao, I. Held, R. Jones, R.K. Kolli, W.-T. Kwon, R. Laprise, V. Magaña Rueda, L. Mearns, C.G. Menéndez, J. Räisänen, A. Rinke, A. Sarr and P. Whetton, 2007: Regional Climate Projections. In: Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor and H.L. Miller (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

Congdon, J. D., Dunham, A. E., & Sels, R. V. L. (1994). Demographics of common snapping turtles (*Chelydra serpentina*): implications for conservation and management of long-lived organisms. American Zoologist, 34(3), 397-408.

Cox, N., Young, B. E., Bowles, P., Fernandez, M., Marin, J., Rapacciuolo, G., ... & Xie, Y. (2022). A global reptile assessment highlights shared conservation needs of tetrapods. Nature, 605(7909), 285-290.

Eaton, J. A., Shepherd, C. R., Rheindt, F. E., Harris, J. B. C., Van Balen, S., Wilcove, D. S., & Collar, N. J. (2015). Trade-driven extinctions and near-extinctions of avian taxa in Sundaic Indonesia. *Forktail*, (31), 1-12.

Gibbons, J. W., Scott, D. E., Ryan, T. J., Buhlmann, K. A., Tuberville, T. D., Metts, B. S., ... & Winne, C. T. (2000). The Global Decline of Reptiles, Déjà Vu Amphibians. BioScience, 50(8), 653-666.

Hagen, C., Platt, S., & Innis, C. (2009). *Leucocephalon yuwonoi* (McCord, Iverson, and Boeadi 1995) – Sulawesi Forest Turtle, Kura-Kura Sulawesi. Conservation Biology of Freshwater Turtles and Tortoises: A Compilation Project of the IUCN/SSC Tortoise and Freshwater Turtle Specialist Group, 039.1-039.7.

Hansen, M. C., Potapov, P. V., Moore, R., Hancher, M., Turubanova, S. A., Tyukavina, A., ... & Townshend, J. (2013). High-resolution global maps of 21st-century forest cover change. science, 342(6160), 850-853.

Intergovernmental Panel on Climate Change (IPCC), Summary for Policymakers. In: Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (2021), https://www.ipcc.ch/report/sixth-assessment-report-working-group-i/ at SPM-17.

International Coalition of Concerned Turtle Scientists and Conservationists (ICCTSC) (2022). Supplemental Freshwater Turtle Species Proposals' Information Package. Letter submitted to CITES Cop19 by ICCTSC, Chelonian Research Foundation, and Wildlife Conservation Society. 13 pp.

Ives, I. E., Platt, S. G., Tasirin, J. S., Hunowu, I., Siwu, S., & Rainwater, T. R. (2008). Field surveys, natural history observations, and comments on the exploitation and conservation of *Indotestudo forstenii*, *Leucocephalon yuwonoi*, and *Cuora amboinensis* in Sulawesi, Indonesia. Chelonian Conservation and Biology, 7(2), 240-248.

Latinne, A., Saputro, S., Kalengkongan, J., Kowel, C. L., Gaghiwu, L., Ransaleleh, T. A., ... & Pamungkas, J. (2020). Characterizing and quantifying the wildlife trade network in Sulawesi, Indonesia. Global ecology and conservation, 21, e00887.

Lovich, J. E., Ennen, J. R., Agha, M., & Gibbons, J. W. (2018). Where have all the turtles gone, and why does it matter?. BioScience, 68(10), 771-781.

Lyons, J. A., & Natusch, D. J. (2011). Wildlife laundering through breeding farms: illegal harvest, population declines and a means of regulating the trade of green pythons (Morelia viridis) from Indonesia. Biological Conservation, 144(12), 3073-3081.

Lyons, J. A., Natusch, D. J. D., & Shepherd, C. R. (2013). The harvest of freshwater turtles (Chelidae) from Papua, Indonesia, for the international pet trade. Oryx, 47(2), 298-302.

Marshall, B. M., Strine, C., & Hughes, A. C. (2020). Thousands of reptile species threatened by under-regulated global trade. Nature communications, 11(1), 1-12.

McCord, W. P., Iverson, J. B., & Boeadi. (1995). A New Batagurid Turtle from Northern Sulawesi, Indonesia. Chelonian Conservation and Biology, 311-316.

McCord, W. P., Iverson, J. B., Spinks, P. Q., & Shaffer, H. B. (2000). A new genus of geoemydid turtle from Asia. Hamadryad, 25, 86-90.

Measey, Mariah. "Indonesia: A Vulnerable Country in the Face of Climate Change," n.d., 15.

Natusch, D., and Lyons, J (2012). "Exploited for Pets: The Harvest and Trade of Amphibians and Reptiles from Indonesian New Guinea." *Biodiversity and Conservation* 21, no. 11: 2899–2911. https://doi.org/10.1007/s10531-012-0345-8.

Newman, J. & Valentinus, A. (2005). The Last Frontier: Illegal Logging in Papua and China's Massive Timber Theft. Telapak: EIA.

Nijman, V. and Shepherd, C. R. (2009). *Wildlife trade from ASEAN to the EU: Issues with the trade in captive-bred reptiles from Indonesia*. TRAFFIC Europe report for the European Commission, Brussels, Belgium.

Nijman, V. and Shepherd, C. R. (2015). *Adding up the numbers: an investigation into commercial breeding of Tokay Geckos in Indonesia*. TRAFFIC. Petaling Jaya, Malaysia.

Nijman, V., Morcatty, T. Q., Feddema, K., Campera, M., & Nekaris, K. A. I. (2022). Disentangling the Legal and Illegal Wildlife Trade–Insights from Indonesian Wildlife Market Surveys. Animals, 12(5), 628.

Pereira, A. G., Antonelli, A., Silvestro, D., & Faurby, S. (2022). Two major extinction events in the evolutionary history of turtles: one caused by a meteorite, the other by hominins. bioRxiv, 2022-07.

Rhodin, A. G., Stanford, C. B., Van Dijk, P. P., Eisemberg, C., Luiselli, L., Mittermeier, R. A., ... & Vogt, R. C. (2018). Global conservation status of turtles and tortoises (order Testudines). Chelonian conservation and biology, 17(2), 135-161.

Rijal, S., Barkey, R. A., Nasri, & Nursaputra, M. (2019). Profile, level of vulnerability and spatial pattern of deforestation in Sulawesi period of 1990 to 2018. Forests, 10(2), 191.

Riyanto, A. (2006). Notes on exploitation, population status, distribution, and natural history of the Sulawesi forest turtle (Leucocephalon yuwonoi) in north-central Sulawesi, Indonesia. Chelonian Conservation and Biology, 5(2), 320-323.

Riyanto, A., Farajallah, A., & Arisona, J. (2008). The Endangered Sulawesi Tortoise (Indotestudo forstenii): Behavior, habitat, population in the wild and the harvest level.

Riyanto, A., Wirdateti, W., & Soemarno, S. (2006). Observations on Natural Foods and Nutrition Content of Critically Endangered Turtle (Leucocephalon yuwonoi) in Central Sulawesi. Biota: Jurnal Ilmiah Ilmu-Ilmu Hayati, 87-91.

Root, T. L., & Schneider, S. H. (2002). Climate change: overview and implications for wildlife. Wildlife responses to climate change: North American case studies, 10(2002), 765-766.

Schoppe, S. (2009). Status, trade dynamics and management of the Southeast Asian Box Turtle in Indonesia TRAFFIC Southeast Asia, Petaling Jaya, Selangor, Malaysia.

Shepherd, C. R. (2000). Export of Live Freshwater Turtles and Tortoises from North Sumatra and Riau, Indonesia: a Case Study. In: van Dijk, P.P., Stuart, B. L., and Rhodin, A. G. J. (eds), 2000. Asian Turtle Trade; Proceedings of a Workshop on Conservation and Trade of Freshwater Turtles and Tortoises in Asia. Chelonian Research Monographs, No. 2.

Shepherd C. R. and Nijman, V. (2007). An overview of the regulation of the freshwater turtle and tortoise pet trade in Jakarta, Indonesia. TRAFFIC Southeast Asia, Petaling Jaya, Malaysia.

Shepherd, C. R., Gomez, L. and Nijman, V. (2020). Illegal wildlife trade, seizures and prosecutions: A 7.5-year analysis of trade in pig-nosed turtles *Carettochelys insculpta* in and from Indonesia. Global Ecology and Conservation, 24, https://doi.org/10.1016/j.gecco.2020.e01249

Simms, A., Whiting, M. J., Doody, J. S., Nilawati, J., Tantu, F. Y., Walde, A., ... & Clulow, S. (2022). Preliminary Insights on the Spatial Ecology, Population Demography, and Sexual Dimorphism of the Critically Endangered Sulawesi Forest Turtle (*Leucocephalon yuwonoi*). Journal of Herpetology, 56(4), 461-469.

Smith, K. M., Zambrana-Torrelio, C., White, A., Asmussen, M., Machalaba, C., Kennedy, S., ... & Karesh, W. B. (2017). Summarizing US wildlife trade with an eye toward assessing the risk of infectious disease introduction. EcoHealth, 14(1), 29-39.

Stanford, C.B. & Hamidy, A. 2021. Leucocephalon yuwonoi. The IUCN Red List of Threatened Species 2021: e.T40761A2933851. https://dx.doi.org/10.2305/IUCN.UK.2021-1.RLTS.T40761A2933851.en

Stuart, B. L., Rhodin, A. G., Grismer, L. L., & Hansel, T. (2006). Scientific description can imperil species. Science, 312(5777), 1137-1137.

Turtle Conservation Coalition [Rhodin, A.G.J., Walde, A.D., Horne, B.D., Van Dijk, P.P., Blanck, T., AND Hudson, R. (EDS.)]. 2011. Turtles in Trouble: The World's 25+ Most Endangered Tortoises and Freshwater Turtles—2011. Report by IUCN/SSC Tortoise and Freshwater Turtle Specialist Group, Turtle Conservation Fund, Turtle Survival Alliance, Turtle Conservancy, Chelonian Research Foundation, Conservation International, Wildlife Conservation Society, and San Diego Zoo Global, 54 pp.

Wanger, T. C., Motzke, I., Saleh, S., & Iskandar, D. T. (2011). The amphibians and reptiles of the Lore Lindu National Park area, Central Sulawesi, Indonesia. Salamandra, 47(1), 17-29.