July 11, 2016

Ms. Chelsey Young
NMFS Office of Protected Resources (F/PR3)
1315 East-West Highway
Silver Spring, MD 20910

RE: *NOAA-NMFS-2016-0041*

Dear Ms. Young:

On behalf of the Animal Welfare Institute (AWI), the Center for Biological Diversity (CBD) and WildEarth Guardians (Guardians), we submit the following comments on the positive 90-day finding published in the *Federal Register* (*89 FR 29515*) for the Taiwanese humpback dolphin (*Sousa chinensis taiwanensis*), regarding a petition to list this sub-species as endangered or threatened under the Endangered Species Act (ESA).

Specifically, the March 2016 petition submitted by AWI, CBD, and Guardians sought an endangered or threatened designation for this distinct and isolated sub-species. The best available scientific evidence suggests that the Taiwanese humpback dolphin qualifies for ESA protection based on the five ESA listing factors (*i.e.*, the present or threatened destruction, modification, or curtailment of habitat or range; overutilization for commercial, recreational, scientific, or educational purposes; disease or predation; inadequacy of existing regulatory mechanisms; and any other natural or manmade factors affecting the species' existence).

AWI, CBD, and Guardians assert that the content of the petition clearly demonstrates that the petitioned action is warranted. We have also attached several scientific papers that were not cited in our original petition, and which should prove useful in your determination.

<u>The Taiwanese humpback dolphin is a sub-species</u>

Taxonomists now recognize four species of *Sousa*: the Atlantic humpback dolphin (*Sousa teuzii*), the Indian Ocean humpback dolphin (*Sousa plumbea*), the Indo-Pacific humpback dolphin (*Sousa chinensis*) and the Australian humpback dolphin (*Sousa sahulensis*).[1] In 2014, the National Marine Fisheries Service (NMFS) decided that the Eastern Taiwan Strait (ETS) population of Indo-Pacific humpback dolphins was ineligible for listing as a distinct population segment in response to a petition submitted by Guardians.[2]

However, new scientific evidence shows that the Taiwanese humpback dolphin is a sub-species of *Sousa chinensis* (Wang et al. 2015) and this sub-species designation has been accepted by the scientific community.[1] The petition demonstrated through this new scientific evidence that *Sousa chinensis* is two sub-species: the Chinese humpback dolphin (*Sousa chinensis chinensis*)

[1] *See* List of Marine Mammal Species and Subpecies, available at https://www.marinemammalscience.org/species-information/list-marine-mammal-species-subspecies/ (last accessed July 11, 2016).
[2] 78 FR 69376, available at https://www.federalregister.gov/articles/2013/11/19/2013-27718/endangered-and-threatened-wildlife-90-day-finding-on-a-petition-to-list-19-species-and-3 (November 19, 2013).

and the Taiwanese humpback dolphin (*Sousa chinensis taiwanensis*) (Wang et al. 2015; Wang et al. 2016b), which are separated by the Taiwan strait (Wang et al. 2016b). Therefore, NMFS should grant ESA protection to the Taiwanese humpback dolphin, as it meets the criteria for protection under the ESA.

Population abundance is low

The Taiwanese humpback dolphin is found in shallow coastal waters (less than 25 m in depth and less than 3 km from shore), often close to estuaries and with a nearly linear distribution of approximately 200 km along Taiwan's west coast, centered on a narrow segment of coastal waters about 100 km long from the estuary of the Tsongsiao River to Taisi (Wang et al. 2016a).

The population of *Sousa chinensis taiwanensis* was estimated to number fewer than 75 individuals in 2010 (Wang et al. 2012). Recent analysis of surveys from July 2007 to September 2010, of approximately 20,232 km of coastal waters in the Eastern Taiwan Strait, and over 64,100 photographs, identified 71 unique individuals (Wang et al. 2016b). The disappearance of this sub-species would be an irremediable loss, given its limited distribution and unique physical and behavioral attributes. The Taiwanese humpback dolphin was assessed as Critically Endangered under the criteria of the IUCN Red List of Threatened Species.[3]

Photo-identification shows an isolated population

A comparison of approximately 137,658 photographs of dolphins of the Eastern Taiwan Strait and Xiamen and Kinmen waters in China from July 2007 to October 2014 found no matches between the mainland China and Taiwanese populations, strongly indicating that there is no movement or exchange of individuals across the Taiwan Strait (Wang et al. 2016b). This photo-identification survey effort, larger than any undertaken before for this region, strongly supports the conclusion that humpback dolphins in the Eastern Taiwan Strait are an entirely separate population.

Pigmentation patterns differ

Wang et al. (2015) revealed that the pigmentation pattern of the Taiwanese sub-species is consistently different from other Indo-Pacific humpback dolphins. This is particularly notable in the relative intensities of spotting on the dorsal fin and on the area of the body adjacent to the base of the dorsal fin (Fig. 1). Taiwanese humpback dolphins have dorsal fins that are equally or more intensely spotted than their bodies are, while dolphins from the waters of mainland China have dorsal fins that are noticeably less spotted than their bodies (Wang et al. 2015). Taiwanese humpback dolphins appear always to maintain some degree of spotting on their dorsal fins, which never become completely spotless. However, while dorsal fins of mainland China's humpback dolphins generally have no spots, they can also become completely spotless on their body. These differences in pigmentation can be used to reliably differentiate between the Taiwanese humpback dolphin and nearby Chinese populations (Wang et al. 2015, 2016b) under the widely accepted 75% criterion for sub-species delimitation

[3] Reeves, R.R., Dalebout, M.L., Jefferson, T.A., Karczmarski, L., Laidre, K., O'Corry-Crowe, G., Rojas-Bracho, L., Secchi, E.R., Slooten, E., Smith, B.D., Wang, J.Y. & Zhou, K. 2008. *Sousa chinensis (Eastern Taiwan Strait subpopulation)*. The IUCN Red List of Threatened Species 2008: e.T133710A3873928.http://dx.doi.org/10.2305/IUCN.UK.2008.RLTS.T133710A3873928.en. Downloaded on 11 July 2016. *See* IUCN Red List of Threatened Species, *Sousa chinesis* (eastern Taiwan Strait subpopulation), available at http://www.iucnredlist.org/details/133710/0 (accessed July 11, 2016).

(Amadon 1949).

Figure 1. Typical pigmentation patterns of Indo-Pacific humpback dolphins from the Taiwanese sub-species (left column) and the putative Pearl River Estuary population (right column). Presumed younger to older individuals are shown from top to bottom Photographs by John Y. Wang/Formosa Cetus Research and Conservation Group. *Figure and legend after Wang et al. 2016a.*

The difference in Taiwanese humpback dolphin pigmentation may be the result of a genetic bottleneck – based on the small size of this population – and the possibility that it represents a single ancestral social group. Small populations are more heavily influenced by genetic drift than large populations (Wang et al. 2015, 2016a).

Behavior and social organization are unique

Humpback dolphins usually have weak social associations, living in "fission-fusion" societies, but the Taiwanese sub-species is characterized by stronger, persistent relationships among individuals (Wang et al. 2016a). Unlike other *Sousa chinensis*, the Taiwanese humpback dolphin does not segregate into distinct social communities (Wang et al. 2016a). Its social structure involves pair-wise relationships, with a mixture of both short-and long-term associations (Dungan et al. 2015). The short-term associations, similar to other humpback dolphins, seem to occur on a scale of hours or days, yet long-term associations are stable and may last for years (Dungan et al. 2015). These uncharacteristic social patterns have been proposed as a response to limited resources in a spatially confined environment, where long-term relationships may maximize the transmission of relevant information such as location and temporal variation of prey patches and foraging or calf-care strategies (Dungan et al. 2015; Wang et al. 2016a).

The Taiwanese humpback dolphin is critically endangered

The Taiwanese humpback dolphin is critically endangered due to multiple threats of anthropogenic origin, primarily commercial activities. Because the humpback dolphin is a coastal species, with a fairly small home range and often associated with estuaries, it is especially susceptible to anthropogenic threats (Ross et al. 2010, Karczmarski et al. 2016). These threats are similar to those that affected the likely extinct Yangtze River dolphin or baiji (*Lipotes vexillifer*) (Dudgeon 2005).

Summary of factors threatening Sousa chinensis taiwanensis

Fisheries activities: Taiwanese humpback dolphins are indirectly affected by fisheries, through bycatch and entanglement in fishing gear (Wang et al. 2007b, 2007c, Ross et al. 2010, Dungan et al. 2011, Slooten et al. 2013). Thousands of vessels (about 6,300) use gillnets and trammel nets in waters inhabited by humpback dolphins along the west coast of Taiwan (Wang et al. 2007c, Slooten et al. 2013). It remains difficult to estimate the number of dolphins seriously injured or directly killed because of fisheries, given that fishers rarely report bycatch events. However, at least 30% of the Taiwanese humpback dolphin population has wounds or scars, many of which are almost certainly from encounters with fishing gear (Wang et al. 2007c). Fishing activities may also increase the likelihood of boat strikes due to increased boat traffic and indirectly deplete prey resources (Liu et al. 2015).

Pollution: River dams reduce freshwater outflow, unregulated industrial effluent discharges expose dolphins to toxins, and coastal air quality can be poor (Ross et al. 2010, Dungan et al. 2011, Wang et al. 2016a). Dolphins can inhale air-borne contaminants as they breathe and may be exposed to water-born contaminants through the skin and mucus membranes (Venn-Watson et al. 2015). However, the primary route of exposure to pollutants is through ingestion of contaminated prey (Hung et al. 2007). Pollutants—especially fat-soluble chemicals—may accumulate in the body tissues of dolphins (Chou et al. 2004, Hung et al. 2006, Ross et al. 2010). There is evidence that immune deficiencies may already be occurring in this sub-species, as 37% of photographed individuals were observed with epidermal conditions linked to water salinity and temperature irregularities, as well as exposure to contaminants (Yang et al. 2013). Taiwan also hosts some of the world's highest carbon dioxide-emitting power plants (Wang et al. 2007b).

Destruction of habitat: The Taiwanese humpback dolphin must contend with activities such as sand extraction, land reclamation, transportation, and recreation. It is also confronted with large quantities of industrial and municipal runoff. A 20% decline in natural coastline occurred in the habitat of humpback dolphin between 1995 and 2007 in the west coast of Taiwan due to measures taken for erosion and flooding control, and the expansion of fishing ports and other public facilities. Indeed, approximately 90% of Taiwan's 23 million people live in counties that border the west coast of Taiwan (Wang et al. 2007a, Wang et al. 2007b; Dungan et al. 2011; Ross et al. 2010).

Underwater noise: Taiwanese humpback dolphins are exposed to military activities, seismic research and percussive pile driving, all of which cause loud underwater noises (Dungan et al. 2011). Intense and chronic exposure to noise can cause temporary or permanent hearing threshold shifts and physiological stress in dolphins (Mooney et al. 2009, Pirotta et al. 2015).

Reduced water flow in estuaries: The Taiwanese sub-species appears to depend on estuaries, likely because their primary prey favor these habitats (Parra and Jedensjö 2014). Yet, many rivers that meet the sea have been diverted upstream to provide water for agriculture, industry, power generation, and household use (Wang et al. 2007b). Only one-third of the annual flow of the largest river of the country (Juoshuei River) reaches its historic estuary (Smith et al. 2009).

Legal protection

Despite efforts by local and international groups advocating for immediate conservation actions, there have been no real governmental efforts to mitigate any existing threats; indeed, some of these threats have worsened.

Taiwan's Wildlife Conservation Act: This law lists the humpback dolphin as a Level One Protected Species and provides a legal framework for the delineation and management of species-specific "important habitat" and for related designations of "habitat refuges." However, enforcement is ineffective (Wang et al. 2016a). An action plan was published several years ago, which began with a formal declaration of important habitat by the government (Wang et al. 2007b). This should have resulted in readily available resources to support conservation and enforcement, however, no real governmental policy to mitigate existing threats was realized. A trawling ban exists for the waters inshore of 5.5 km, but better enforcement of this prohibition is necessary (Slooten et al. 2013).

IUCN Red List of Threatened Species: The Taiwanese humpback dolphin was listed as Critically Endangered under the criteria of the IUCN Red List of Threatened Species. This designation provides no legal protection, but supports our claim that the species is imperiled and should be listed under the ESA.

Convention on International Trade in Endangered Species of Wild Fauna and Flora: All humpback dolphin sub-species are listed under Appendix I of CITES, which prohibits most international trade. Trade is not, however, a major threat for this sub-species; see below.

<u>The Taiwanese humpback dolphin should be listed under the ESA</u>

There is no doubt that *Sousa chinensis taiwanensis* meets all the requirements to be listed as endangered under the ESA. This proposed listing would convey a strong conservation message internationally and help prevent the extinction of this humpback dolphin sub-species in Taiwan waters.

ESA standards

A species must be listed under the ESA if it is threatened or endangered due to **any** of the following five factors:

- present or threatened destruction, modification, or curtailment of its habitat or range;
- over-utilization of the species for commercial, recreational, scientific, or educational purposes;
- disease or predation;
- inadequacy of existing regulatory mechanisms; and
- other natural or manmade factors affecting its continued existence.

The law requires that determinations be made based solely on the best scientific and commercial information available. These factors are addressed below with respect to *Sousa chinensis taiwanensis:*

Threatened habitat (*e.g.*, destruction, modification): As much as 80% of the west coast of Taiwan has been altered to build ports, industrial facilities, power plants, and wastewater discharge channels, reducing the natural habitat suitable for dolphins (Wang et al. 2007b). Windfarms are planned as well (Wang, J. Y., pers. comm.). High pollution levels (especially mercury) in the water and in prey species result in harmful consequences for the immune, reproductive, and endocrine systems (Jefferson and Hung 2004; Hung et al. 2006; Ross et al. 2010).

Bycatch: Bycatch is a huge threat to humpback dolphins, especially from the grey mullet fishery (Wang et al. 2007a). Over 30% of the animals in this small population have scars and wounds likely caused by fishery interactions (Wang et al. 2004).

Disease or predation: Photographs of humpback dolphins in Taiwan showed that 37% (n = 97) had at least one, and sometimes several, skin conditions, including lesions caused by protozoans, bacteria and fungus (Yang et al. 2013). Several environmental factors contribute to this, including salinity, temperature, and contaminants (Yang et al. 2013).

Inadequacy of existing regulatory mechanisms: Existing local regulatory mechanisms have been in place for years but have not reversed the population's decline. The species is in Appendix I of CITES, but trade is only a minor threat.

Other natural or anthropogenic factors affecting its continued existence: Additional threats may include climate change and ocean acidification, but their impacts at this time are unknown.

Listing *Sousa chinensis taiwanensis* under the ESA would result in a prohibition on import, export or possession of this species by US individuals and corporations. It may also increase collaboration between US and local scientists and managers and leverage resources needed to protect this rapidly disappearing sub-species.

Modeling predicts local extinction as population declines and threats continue

The Taiwanese humpback dolphin needs stronger protection. Using the Potential Biological Removal (PBR) metric, which measures the maximum number of individuals that can be removed from a population without depleting it, the human-caused removal of one individual every seven to eight years is unsustainable (Slooten et al. 2013). This critical situation has also been evaluated with a population viability analysis (PVA), where population dynamics can be simulated under different threat scenarios.

The first PVA (Araujo et al. 2014) for *Sousa chinensis taiwanensis* examined different scenarios of bycatch mortality and habitat loss/degradation. This analysis showed the sub-species had a decreasing growth rate under the present situation, with a predicted population size smaller than the initial population size in more than 76% of all model runs, reaching ≤ 1 individual within 100 years in about 66% of runs (Araujo et al. 2014). A more pronounced decline was predicted for scenarios where additional bycatch mortality occurs.

A second PVA using individual-based models shows that the subspecies may exhibit drastic population decline under current conditions (Huang et al. 2014). Based on the most optimistic assumptions, approximately 60% of the model simulations predicted that decline of the subspecies may exceed 80% within three generations, and over 50% within one generation of the current population numbers (Huang et al. 2014). Estimates of extinction risk substantially increased when threats such as habitat loss were incorporated in the models (Huang et al. 2014). This study strongly suggests that habitat destruction—such as fragmentation and modification of coastal environments—is the greatest threat to population viability and potential recovery, and must be immediately addressed.

Several measures should be enforced and facilitated by better international protection of the sub-species, including:

- Avoiding habitat fragmentation and coastal development which directly impacts their habitat;
- Prohibiting the use of gillnets and trammel nets in nearshore waters;
- Limiting tourism focused on humpback dolphin-watching to shore-based platforms;
- Disclosing pollutant concentrations and other environmental data;
- Enforcing the pre-existing ban on trawling within 3 nm of shore; and
- Compensating affected fishers and supporting those transitioning to more wildlife-friendly fisheries.

Conclusion

New information and evidence (*see* Wang et al. 2016a) make clear that the Taiwanese humpback dolphin is a sub-species of *Sousa chinensis*, making it crucial for these animals to be fully protected under the ESA. Such a listing will improve the chances of reaching the immediate conservation goal of increasing the population from less than 75 individuals to approximately 100 by 2030 (Wang et al. 2016a), a minimum goal that we endorse.

Thank you for your consideration of our comments on this important matter.

Sincerely,

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