

# RESEARCH ACTION PLAN FOR THE HUMPBACK DOLPHINS OF WESTERN TAIWAN



**Prepared by:** John Y. Wang, Shih-Chu Yang, Randall R. Reeves and the participants of an international workshop on the conservation and research needs of Indo-Pacific humpback dolphins, *Sousa chinensis*, in the waters of Taiwan.

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**Cover photo:** An Indo-Pacific humpback dolphin feeding in the waters of western Taiwan, 2002. *Photo by: John Y. Wang/FormosaCetus Research and Conservation Group.*

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(Also available from this website are the: *Report of the First Workshop on Conservation and Research Needs of Indo-Pacific Humpback Dolphins, *Sousa chinensis*, in the Waters of Taiwan* and *symposium program of the First Symposium and Workshop on the Conservation and Research of Indo-Pacific Humpback Dolphins, *Sousa chinensis*, of the Waters of Taiwan*)

# RESEARCH ACTION PLAN FOR THE HUMPBACK DOLPHINS OF WESTERN TAIWAN

A small population of Indo-Pacific humpback dolphins (*Sousa chinensis*) was discovered along the west coast of Taiwan in 2002. This discovery has evoked much scientific and conservation interest. It has also given Taiwan an unexpected opportunity to help conserve the diversity of life on Earth. However, this opportunity may not last long. Taiwan's humpback dolphins are threatened by a variety of things, some of which are plainly evident and others of which are poorly understood. Many of the dolphins bear evidence of serious injuries, at least some of which were caused by human activities. Without a doubt, action is urgently needed to protect these animals and their habitat. (Note: Under the Wildlife Conservation Law of Taiwan, humpback dolphins are already included amongst the species requiring the highest level of protection).

Indo-Pacific humpback dolphins occur discontinuously in near-shore marine and estuarine waters from the Indian Ocean coast of Africa eastward to the Pacific coasts of China and Australia. In Southeast Asia, they have been studied in only a few areas, most notably Hong Kong. In addition to the population recently discovered off the west coast of Taiwan, several populations are known to inhabit specific portions of the mainland Chinese coast.

The first international workshop on a cetacean conservation issue in Taiwan was conducted at the New Palace (Wuchi, Taichung County, Taiwan) on 25-27 February 2004. The overall aims of this workshop were to evaluate the status of the dolphin population, identify and rank threats, develop a research action plan, and suggest potential approaches to threat mitigation. The workshop was hosted by the National Museum of Marine Biology and Aquarium of Checheng (Pingtung County, Taiwan) and sponsored by the National Science Council of Taiwan, the Council of Agriculture of Taiwan and Ocean Park Conservation Foundation of Hong Kong. The workshop was convened and chaired by Dr. John Y. Wang (of the *FormosaCetus* Research and Conservation Group and National Museum of Marine Biology and Aquarium). He was assisted in preparing and editing this report by Dr. Randall R. Reeves (IUCN Cetacean Specialist Group Chair) and Miss Shih-Chu Yang (*FormosaCetus* Research and Conservation Group). Other participants included experts in cetacean science and conservation from Canada, the United States, Japan, Hong Kong, and New Zealand as well as representatives of the National Museum of Marine Biology and Aquarium and National Pingtung University of Science and Technology. Representatives of the Council of Agriculture had to cancel their plans to participate at the last minute so that they could deal with an environmental protest event.

## *Basic Information about Humpback Dolphins*

Two species of humpback dolphins are currently recognized: Atlantic (*S. teuszii*) and Indo-Pacific (*S. chinensis*). It is likely that further research on systematics of the genus will result in the latter's being split into at least two species. The colouration of humpback dolphins varies dramatically with age. In Asia, they are born dark grey and gradually become lighter in colour, with dark spotting developing as they age. The spotting diminishes as they approach adulthood, at which time at least the females

have few spots and appear pinkish white overall. In general, humpback dolphins are found in small groups (<10 individuals) and in shallow coastal waters (usually <20m deep), especially in regions associated with estuaries. They appear to have small home ranges and do not appear to migrate or to have pronounced seasonality in reproduction.

Although no rigorous abundance estimates exist for the vast majority of the species' range, it is likely that aggregate numbers are in the 10,000s and probably not more than 100,000. Also, it is likely that in many areas where fishing with gillnets has been intensive and where estuarine habitat has been degraded by human activities (e.g., chemical contamination, mangrove deforestation, river impoundment and diversion, extensive land reclamation), local humpback dolphin populations have been seriously reduced.

### *Humpback Dolphins in Taiwan*

During ship-based surveys conducted in 2002 and 2003, humpback dolphins were observed only in the coastal waters of Miaoli, Taichung, and Changhua counties in western Taiwan. There is also a stranding record from Taoyuan and credible sightings have been reported in the waters of Yunlin and Chiayi counties. Humpback dolphins have not been observed in water deeper than about 15m. They generally appear to be confined to a narrow strip within several kilometres of shore, and they are frequently found in waters <5m deep. Although group sizes tend to be small, one group of about 20 animals was seen in 2002. Like the humpback dolphins on the western side of the Taiwan Strait, those on the eastern side are usually found in or near estuaries.

Humpback dolphins in Taiwan's waters appear to have a consistently different color pattern from the dolphins in mainland Chinese waters. Also, the deeper portions of the Taiwan Strait appear to represent a barrier to dispersal for populations of this highly coastal species. Therefore, at least provisionally, the humpback dolphins in Taiwan's waters should be regarded as a separate, isolated population. Early indications from surveys in 2002 and 2003 suggest that the total abundance is at least 30 and possibly in the low hundreds of individuals.

It is not possible to make even a crude estimate of historical abundance. For a number of reasons, however, it must be assumed that the present-day population is a relatively small remnant that occupies only a fraction of its historical range in Taiwan. This assumption is based on the belief that the widespread and intensive use of gillnets, large-scale modification of the shoreline by industrial development, and, perhaps most importantly, the near-total elimination of freshwater discharge from the rivers of western Taiwan, have had a devastating effect on the dolphin population.

### *Threats*

The workshop participants identified numerous known or suspected threats to humpback dolphins off western Taiwan. These included:

- **Loss of freshwater discharge from rivers.** Because this species is closely associated with, and presumably reliant upon, estuarine habitat, the near-total

elimination of freshwater input to estuaries must severely limit the amount of suitable habitat available.

- **Large-scale modification of shoreline habitat** by land reclamation, industrial development, seawall construction, and sand mining. Effects on the dolphins are uncertain, but possibly important.
- **Incidental mortality in fishing gear.** Wherever gillnets are used and dolphins are present, dolphins die from entanglement.
- **Toxic contamination** from industrial, agricultural, and municipal discharge. Both the dolphins and their prey are likely to experience impaired health (e.g., reproductive disorders, compromised immune systems) as a result of chemical pollution of estuarine and nearshore waters.
- **Prey depletion** from over-fishing and habitat degradation. Although formal stock assessment is lacking for most coastal fish species in western Taiwan waters, there is reason to believe that many populations have been depleted (e.g., the scarcity of locally caught fish in local fish markets such as Wuchi Harbour). Again, effects on the dolphins are uncertain, but the quantity and quality of their prey base may be reduced.

In addition to threats from ongoing human activities, the dolphins are potentially at risk from the effects of small population size (reduced genetic and demographic variability), disease (epizootic events that can lead to massive die-offs), single catastrophic events (e.g., large oil or chemical spills), and climate change (e.g., increased frequency and severity of typhoons, drier conditions in watersheds leading to further reductions of freshwater flow in estuaries).

### *Research Priorities*

The workshop participants identified the highest-priority research of immediate importance to the conservation of humpback dolphins in Taiwan, notably:

- Abundance estimation.
- Determination of total distribution, seasonal movements, and habitat preferences of this population.
- Improved understanding of the nature, distribution, and scale of threats, such as:
  - fishing effort (by gear type, number of vessels, days at sea).
  - development projects that will affect the freshwater regime and shoreline integrity.
- Improved understanding of point-source pollution in western Taiwan in order to identify potentially high risks of exposure to toxins

The first two items are needed to better characterize the status of this dolphin population and its habitat requirements, while the last two items are needed to improve the abilities of conservationists and resource managers to provide advice on environmental impact assessment and mitigation planning.

### *Approaches to Conservation*

In the immediate term, it is crucial to provide as much protection as possible to the surviving animals in this population. To ensure effectiveness, the design and implementation of mitigation measures needs to involve stakeholder participation at the individual, municipal, county, and national levels. The process should involve

individuals representing a wide range of interests, e.g., regulatory agencies, scientific institutions, nongovernmental organizations, fishery organizations, industry, trade associations, tour-boat operators, humpback dolphin scientists, and the general public. One approach to achieving the goals of effectiveness and inclusiveness would be to establish a multi-stakeholder oversight body, e.g., a “Humpback Dolphin Advisory Group,” to initiate and monitor mitigation and research efforts. As is true of all action plans, this one will require close monitoring to ensure implementation and track progress. In this regard, the workshop recommended that the second workshop on Taiwan’s humpback dolphins should be held in 2007.

### *Summary*

Although only limited information is available for the Taiwanese population of the Indo-Pacific humpback dolphin, rough estimates of abundance and distribution suggest that immediate mitigation measures are needed to prevent its extinction/extirpation. Several serious and growing threats to these small cetaceans, their prey, and their habitat are apparent, and highlight the urgency of a threat-directed conservation action plan. This workshop drew on local and international knowledge to characterize: 1) humpback dolphin biology in Taiwanese coastal waters; 2) humpback dolphin ecology (habitat needs, feeding ecology) in Taiwanese coastal waters; 3) the major direct and indirect threats to these dolphins, their prey, and their habitat; and 4) knowledge gaps and research needed to refine conservation goals and identify mitigation measures that are applicable to the Taiwanese situation.