

## RECORDS OF SMALL CETACEANS IN CHINESE WATERS: A REVIEW

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### Abstract

There are confirmed records of 22 species of small cetaceans in Chinese waters (including Hong Kong, Macau, and Taiwan). The list includes a few cold temperate species and nearly all of those warm temperate and tropical species known from the Indo-Pacific region. Three species previously reported (Irrawaddy dolphin, Short-beaked common dolphin, and Harbour porpoise) are herein removed from the list, based on a critical review of information supporting the identifications. One or more of these three, as well as additional species of beaked whales, may ultimately be shown to occur in Chinese waters. In China, small cetaceans of many species are suffering from problems associated with habitat loss/degradation and kills in fisheries. Effective conservation efforts are needed to avoid the loss of stocks and even species.

### Introduction

China<sup>1</sup> is bordered by the Bohai, Yellow, East China and South China seas, adjacent to the western North Pacific (Fig. 1). China's Extended Economic Zone is large, and it has a coastline of over 18,000 km, not including that of the more than 5,000 islands on the continental shelf and slope and in oceanic waters. Chinese fisheries rank among the most productive anywhere, with worldwide annual marine catches of > 10 million tonnes. Extensive fisheries are known to operate in most coastal provinces and interactions between fishery operations and cetaceans are known to occur. Figure 2 is a map of Taiwan.

The extensive coastline of China is inhabited by a large number of species of small cetaceans. Other than work on the population status and biology of the Baiji (*Lipotes vexillifer* Miller) and, to a lesser extent, the Finless porpoise

(*Neophocaena phocaenoides* [Cuvier]), there has been little directed work on the small cetaceans of China. In the past few years, however, many research projects on marine cetaceans in mainland China, Taiwan and Hong Kong have been initiated and one for Macau is being planned (Perrin in press). Parsons *et al.* (1995) recently provided a checklist of cetaceans in Hong Kong. Several species of China's marine dolphins and both its species of freshwater small cetaceans are known to be caught incidentally in fisheries throughout the region (Zhou and Wang 1994; Chou *et al.* 1995). However, very little is known about the impacts of human activities on the small cetaceans of China. This paper reviews published information on the occurrence of each of the species recorded, presents some unpublished data, and discusses the current conservation status of small cetaceans in China.

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<sup>1</sup> In this paper, we use the term China to refer to the geographical region including mainland China, Taiwan, Hong Kong and Macau.

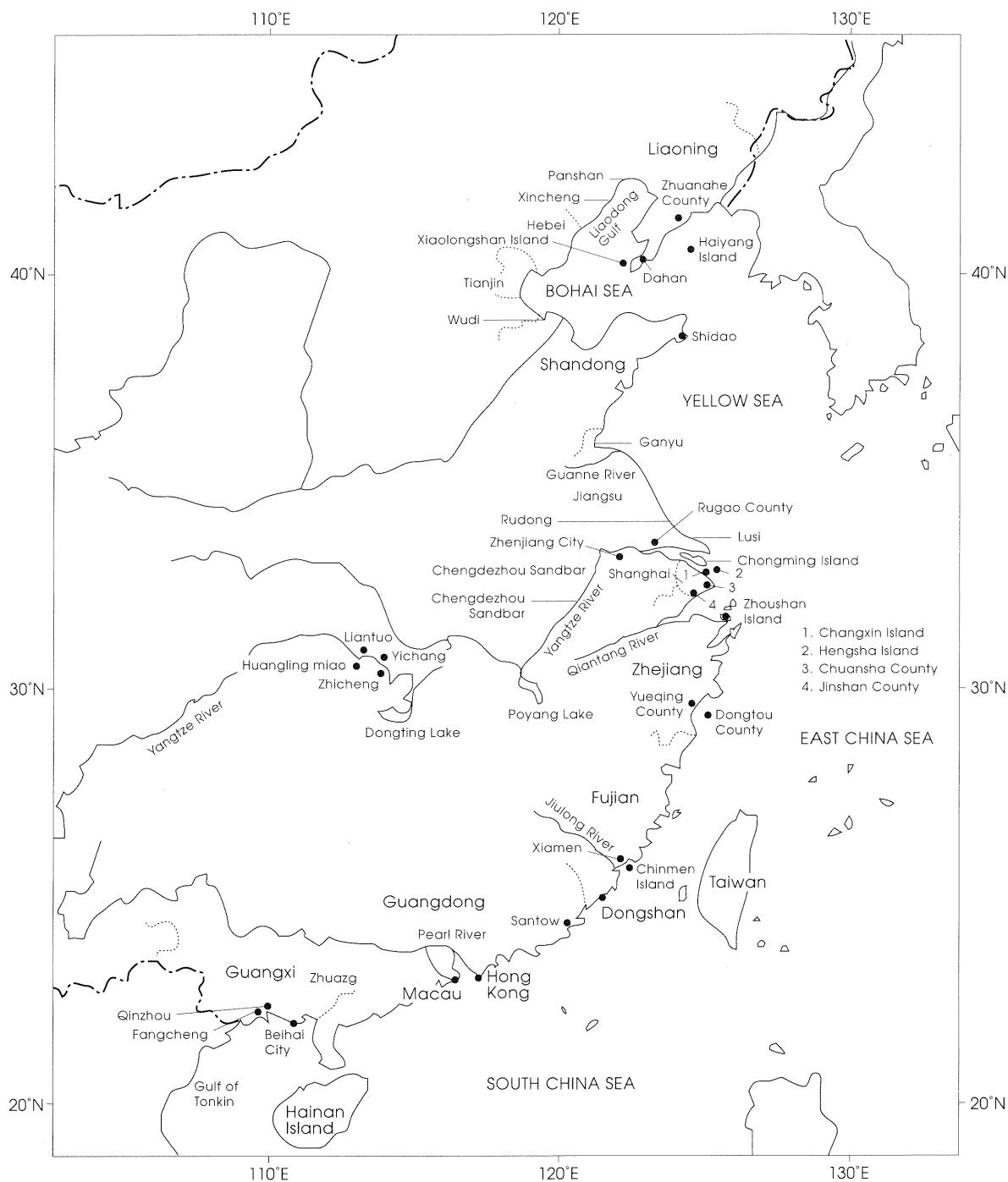


Fig. 1. Map of Chinese waters, showing some of the place names mentioned in the text.



Fig. 2. A map of Taiwan showing some of the place names mentioned in the text.

### Known species and their distributions

Examination of the published and unpublished literature indicates that 25 species of small cetaceans have been reported from Chinese waters. Twenty-two of these have been confirmed (Table 1). Of these, 13 have been recorded on both sides of the Taiwan Strait, four from mainland provinces and territories only, and five from Taiwan only. Chinese records of Irrawaddy dolphins (*Orcaella brevirostris* (Gray)), Short-beaked common dolphins (*Delphinus delphis* Linnaeus), and Harbour porpoises (*Phocoena phocoena* (Linnaeus)) are provisionally rejected, because of a lack of convincing evidence for their occurrence. However, all three are found along adjacent sections of coastline (Short-beaked common dolphins and Harbour porpoises to the north (Perrin in press), and Irrawaddy dolphins to the southwest (Lloze 1973) and may eventually be found to be a part of the cetacean fauna of China.

For most offshore species, we have only scattered stranding records, which are not indicative of their true ranges; we have therefore not provided distribution maps for these species. Although one or more stocks have been identified for at least 8 of the 21 species occurring in Chinese waters (Perrin and Brownell 1994), little is known about their geographic variation in China, except for the Finless porpoise and Bottlenose dolphin. Studies of stock structure are badly needed for most species of cetaceans that occur in the region.

#### *Pygmy sperm whale: Kogia breviceps* (de Blainville)

Pygmy sperm whales (Plate 1A) are represented in Chinese waters by reports of at least eight specimens, stranded in Taiwan at Keelung, Dashi, Tungkang, Kaohsiung, the Penghu Islands and Yehliu (Yang 1976; Chou *et al.* 1995; Chen *et al.* 1995). There are also at least three stranding records from Hong Kong (Parsons *et al.* 1995). It is possible that some of these reported specimens of *K. breviceps* were specimens of *K. simus*.

#### *Dwarf sperm whale: Kogia simus* Owen

Dwarf sperm whales (Plate 1B) are known only from off the coast of Taiwan, although they probably also occur elsewhere in Chinese waters. A female was found dead on the beach of Miaoli County, Taiwan, in June 1986 (Chou 1989). A skull collected from Suao<sup>2</sup> was deposited in the collection of the National Taiwan Ocean University (NTOU) (Mizue 1988; Wang, P. 1991). There are two recent stranding records, one each from Ilan and Taoyun, Taiwan (Chou *et al.* 1995).

#### *Cuvier's beaked whale: Ziphius cavirostris* Cuvier

A male Cuvier's beaked whale was found stranded on the beach at Lukang, Taiwan, in October 1961 (Yang 1976). The skull of this specimen is now

<sup>2</sup> The so-called Suao fish market is actually located in the small village of Nan Fang Au, just south of Suao. Presumably, most or all records reported from Suao are actually from this fish market.

**Table 1. Areas of confirmed records of small cetaceans in Chinese waters.**

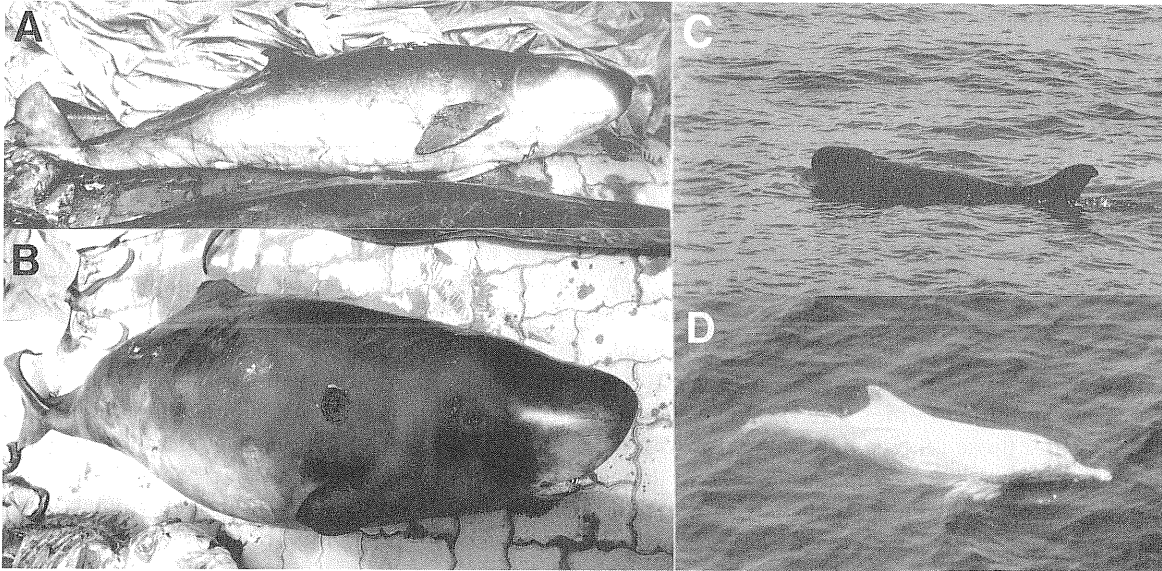
Species	Region							
	SCS	ECS	YS	BS	YR	T	HK	M
<i>Kogia breviceps</i>	X	X				X	X	
<i>Kogia simus</i>		X				X		
<i>Ziphius cavirostris</i>	X	X				X		
<i>M. densirostris</i>		X				X		
<i>Mesoplodon ginkgodens</i>	X	X	X			X		
<i>Orcinus orca</i>	X	X	X	X		X		
<i>Globicephala macrorhynchus</i>	X							
<i>Pseudorca crassidens</i>	X	X	X	X	X	X	X	
<i>Feresa attenuata</i>	X	X				X		
<i>Peponocephala electra</i>	X	X				X		
<i>Sousa chinensis</i>	X	X			X		X	X
<i>Steno bredanensis</i>	X	X	X			X	X	
<i>Lagenorhynchus obliquidens</i>		X						
<i>Grampus griseus</i>	X	X				X	X	
<i>Tursiops truncatus</i>	X	X	X	X		X	X	
<i>Stenella attenuata</i>	X	X				X	X	
<i>S. longirostris</i>	X	X				X		
<i>S. coeruleoalba</i>	X	X				X	X	
<i>Delphinus capensis</i>	X	X				X	X	
<i>Lagenodelphis hosei</i>	X	X				X	X	
<i>Neophocaena phocaenoides</i>	X	X	X	X	X	X	X	
<i>Lipotes vexillifer</i>					X			

Region abbreviations: SCS, South China Sea; ECS, East China Sea; YS, Yellow Sea; BS, Bohai Sea; YR, Yangtze River; T, Taiwan territorial waters; HK, Hong Kong territorial waters and M, Macau territorial waters.

housed at the Tawian Fisheries Research Institute, Kaohsiung (TFRIK) (Jefferson pers. observ.) Several specimens were also obtained from Suao and Hengchun, Taiwan (Yang 1976; Wang, P. 1991). There are records of six recent strandings from Taiwan, at Miaoli, Hualien, Lu Tao, Lan Yu, and Taitung (Chou *et al.* 1995; Chen *et al.* 1995).

***Baird's beaked whale: Berardius bairdii***  
Stejneger

A complete skeleton of a Baird's beaked whale is housed in the Zhejiang Museum of Natural History (Wang Yu pers. comm.). A museum staff member said it was collected by the Zhoushan Marine Fisheries Company at the end of the



**Plate 1.** A, Pygmy sperm whale from the east coast of Taiwan; B, Dwarf sperm whale from the east coast of Taiwan; C, False killer whale observed off Hualien, Taiwan, on 19 June 1995; D, Indo-Pacific hump-backed dolphin off Hong Kong.

1950s, but the collection locality is not known, and it may not have come from China. Baird's beaked whale is primarily a cold temperate species and it probably does not occur off southern China, Hong Kong, Macau, or around Taiwan. It may, however, occur seasonally in colder, northern, waters.

**Blainville's beaked whale:** *Mesoplodon densirostris* (de Blainville)

Blainville's beaked whales have been recorded along the Chinese mainland and Taiwan. A specimen was found stranded at Changxin Island, Shanghai, in the estuary of the Yangtze River, in 1994 (Zhou unpubl. data). Two specimens were found at the fish markets in Peikang and Tungkuang, Taiwan, in 1968 (Kasuya and Nishiwaki 1971; Yang 1976).

**Ginkgo-toothed beaked whale:** *Mesoplodon ginkgodens* Nishiwaki and Kamiya

A female Ginkgo-toothed beaked whale was found stranded on the Yellow Sea coast at Zhuanghe County, Liaoning Province, in August 1980 (Shi

and Wang 1983). Local fisheries around the Penghu Islands and Xiaoliuqiuyu Island, Taiwan, took two specimens in the early 1960's (Yang 1964, 1976). Another specimen was found at the fish market in Kaohsiung, Taiwan, in 1969 (Yang 1976). There is also a single record of a whale of this species having been taken by commercial whalers in southern Taiwan (Yu 1995).

**Other beaked whales (Ziphiidae)**

Although there are confirmed records thus far of only two species of *Mesoplodon* from Chinese waters, it is likely that other species occur there. For example, photographs of a beaked whale skull from Taiwan (Yang 1976: fig. 22), identified by the author as a Blainville's beaked whale, show what is probably another species of *Mesoplodon*, possibly a Hubbs' beaked whale (*M. carlhubbsi* Moore) or a Stejneger's beaked whale (*M. stejnegeri* True).

It should be noted that several sightings and possible captures of Bottlenose whales (*Hyperoodon* sp.) have been made in the tropical Indo-Pacific (Leatherwood *et al.* 1992; Perrin in press; R. L. Pitman pers. comm.), and it is feasible that Bottlenose whales could occur in China.

**Irrawaddy dolphin:** *Orcaella brevirostris*  
(Gray)

The occurrence of the Irrawaddy dolphin in the coastal waters of Taiwan was reported by Chou (1994), from interviews with fishermen. We consider these to be cases of mistaken identity, however. There is no convincing evidence that dolphins of this species occur around the island of Taiwan, and it is best not to consider Taiwan as part of their range.

Sightings of two pods of small, blunt-headed dolphins in Hong Kong were reported as Irrawaddy dolphins (Viney 1993). However, we also consider these records unreliable. Irrawaddy dolphins are known from southern Vietnam; there are suggestions that they also occur in the Red River in the north, but there are no confirmed records north and east of Vietnam (see Smith *et al.* 1995).

**Killer whale:** *Orcinus orca* (Linnaeus)

Killer whales have been recorded from Chinese waters as follows: from Xiaolongshan Island (Shedao Island), near Dalian City, Liaoning, in the Bohai Sea (Wang 1979), from Haiyang Island, Liaoning, and Shidao, Shandong, in the Yellow Sea (Wang 1979; Shi and Wang 1983), and from Zhoushan Island, Zhejiang, in the East China Sea (Wang 1984). They have also been reported from Pingtung and Kaohsiung, Taiwan, in the East China Sea, and from the South China Sea (Yang 1964, 1976). There is also a record, supported by photographs, of a Killer whale having been taken by commercial whalers in southern Taiwan (Yu 1995).

**Short-finned pilot whale:** *Globicephala macrorhynchus* Gray

There is only one known record of Short-finned pilot whales from Chinese waters. This was a stranding at Xisha, Hainan Province, in July 1991 (Wang 1993). Miyashita *et al.* (1995) reported a sighting from oceanic waters off the east coast of Taiwan, just outside the border of our study area.

Presumably these animals are more common than the scarcity of records indicates.

**False killer whale:** *Pseudorca crassidens*  
(Owen)

False killer whales (Plate 1C) have been recorded from the Bohai, Yellow, East China, and South China seas. There are records from the waters off Liaoning, Shandong, Zhejiang, Fujian, and Guangxi Zhuang provinces (Wang 1990; Zhou *et al.* 1982), Taiwan (Nishiwaki and Yang 1961; Yang 1976), and Hong Kong (Parsons *et al.* 1995). They reach estuaries and occasionally enter rivers in the Chinese mainland. Tens of animals were reported 50 km up the Guanhe River, Jiangsu Province, on 16 June 1994, solitary individuals were discovered 220 km and 300 km up the Yangtze on 13 February 1991 and 2 March 1991, respectively (Zhou unpubl. data), and three were reported 30 km up the Qiantang River, Zhejiang Province, in April 1957 (Zhou *et al.* 1982). A False killer whale swam into the harbour at Taichung, Taiwan, in 1986 and died despite attempts to save it (Jeng 1986). There have been additional strandings in recent years in Taiwan (Chou *et al.* 1995), and many small groups were observed at sea off Hualien, east coast of Taiwan, on 19 June 1995 (Jefferson unpubl. data).

The largest directed kills of False killer whales in Chinese waters were by the drive fishery in the Penghu Islands, Taiwan. Dozens of whales were driven into a fishing port on the Islands and captured in March 1990, along with unspecified numbers in previous years. Six of the animals were bought by Ocean World in Yehliu, Taiwan, in 1990 for display. The killing and capturing of cetaceans has been banned in Taiwan since August 1990.

**Pygmy killer whale:** *Feresa attenuata* Gray

The skull of a Pygmy killer whale was collected from Suao, Taiwan, in 1987 (Mizue 1988; Wang, P. 1991). Recently, a pod of between 10 and 20 whales of this species swam into a navy harbour

in southern Taiwan and remained there for many days before swimming back out to sea (R. Chen and J. Y. Wang pers. comm.).

**Melon-headed whale:** *Peponocephala electra* (Gray)

Specimens of the Melon-headed whale were found at fish markets in Peikang, Tungkang, and Kaohsiung, Taiwan, in the 1950s and 1960s (Yang 1976). It is now known that the mass stranding of 109 small cetaceans at Hengchun, Taiwan, originally reported as Harbour porpoises, was actually a herd of Melon-headed whales (Yang 1976; H. Yang pers. comm.). There are three recent Taiwanese records, from Tainan and Kaohsiung (Chou *et al.* 1995; Chen *et al.* 1995).

**Indo-Pacific hump-backed dolphin:** *Sousa chinensis* (Osbeck)

Indo-Pacific hump-backed dolphins (Plate 1D) inhabit waters off the coast of the Chinese mainland, from the Gulf of Tonkin to the estuary of the Yangtze River (Fig. 3). They are present year round in Hong Kong waters (Parsons *et al.* 1995) and Xiamen Harbour and in the Gulf of Tonkin (Beibu Gulf) (Wang and Sun 1982). They are known to occur in Macau (O. Pinto, Museo Maritimo de Macau, pers. comm.) and there are reports, at least from the past, from reliable observers of sightings in other parts of the Pearl River (also called the Zhujiang River) Delta (Zhou *et al.* 1980; Zhou 1991; D. Melville pers. comm.; L. J. Porter pers. comm.). There are records from the coastal waters of Guangxi Zhuang, Guangdong, and Fujian provinces (Huang *et al.* 1978; Wang and Sun 1982). A female was found stranded on the beach in Yueqing County, Zhejiang, on 19 February 1995 (Zhou unpubl. data). A male was captured near Hengsha Island, in the Yangtze estuary, in September 1982 (Huang and Fu 1984). The known northern limit of 32°N is represented by a female found on the river bank in Rugao County, in February 1987, 220 km from the mouth of the Yangtze (Zhou 1991). There are no records from the island of Taiwan, but they do

occur off the mainland coast around the Chinmen Islands (Chou *et al.* 1995).

**Rough-toothed dolphin:** *Steno bredanensis* (Lesson)

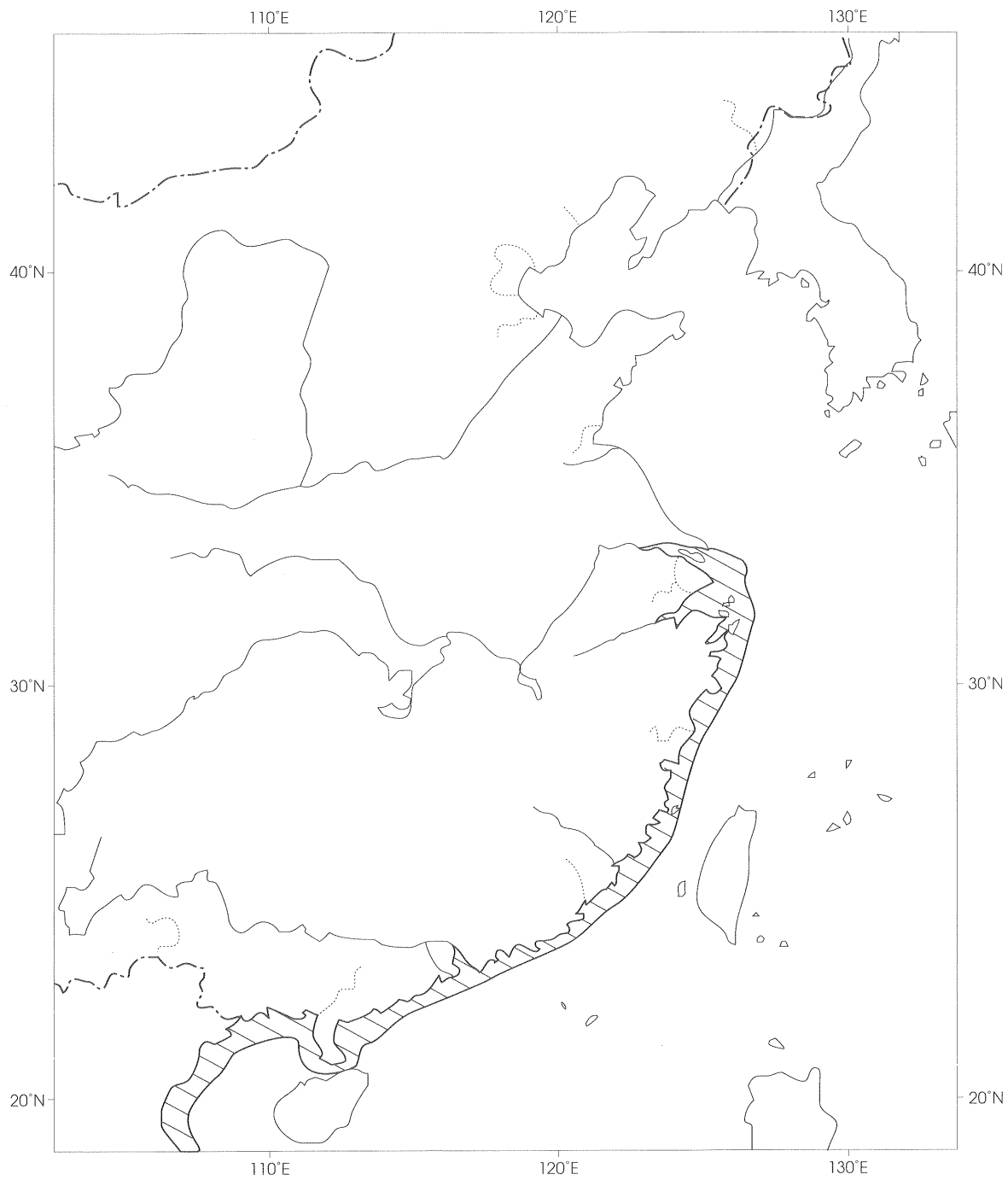
Rough-toothed dolphins are distributed in the East China and South China seas. A female was found stranded on the beach of Chuansha County, Shanghai, in October 1973 (Huang 1980). A carcass of this species washed aground on East Sharp Island, Hong Kong, in March 1982 (Parsons *et al.* 1995). Two rough-toothed dolphins, collected in Taiwanese waters, were found at the fish markets in Keelung and Kaohsiung in the 1950s and 1960s (Yang 1976). There is a skull from an animal collected at the Suao fish market in 1987 at the NTOU (Mizue 1988) and another from Lukang is at the TFRK (Jefferson pers. observ.).

**Pacific white-sided dolphin:** *Lagenorhynchus obliquidens* Gill

The only Pacific white-sided dolphin specimen reported in Chinese waters was a female taken from the East China Sea, beyond the mouth of the Yangtze River in 1958 (Huang and Tang 1979). The second-hand report by Hammond and Leatherwood (1984) of a sighting in Hong Kong is well south of the species' known range (Leatherwood *et al.* 1984) and was almost certainly a mis-identification. It is unlikely that White-sided dolphins occur this far south along the Chinese coast.

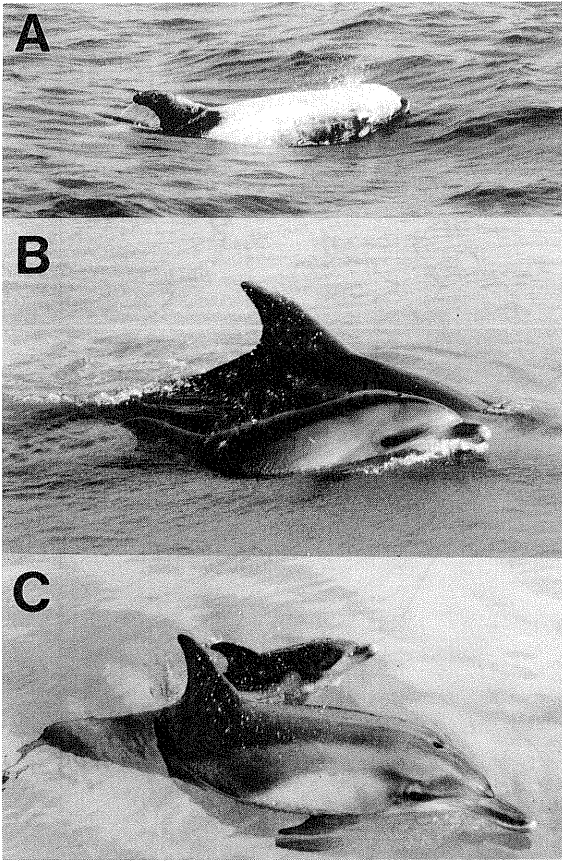
**Risso's dolphin:** *Grampus griseus* (Cuvier)

Five specimens of Risso's dolphins (Plate 2A) were found in Keelung, Tungkang, and Kaohsiung, Taiwan, in the 1950s and 1960s (Yang 1976). In Hong Kong, strandings of four individuals in June 1986 and one individual in September 1988 were recorded (Parsons *et al.* 1995). A female Risso's dolphin was collected on the beach in Dongtou County, Zhejiang Province, in August 1988 (Wang, Y. 1991). Five additional



**Fig. 3.** Approximate distribution of the Indo-Pacific hump-backed dolphin in Chinese waters.





**Plate 2.** A, Risso's dolphin observed off Hualien, Taiwan, on 18 June 1995; B, captive *truncatus*-type bottlenose dolphins captured off Shakang, Penghu Islands, Taiwan; C, captive *aduncus*-type bottlenose dolphins captured near the Penghu Islands, Taiwan.

Taiwanese records have been reported, from Taipei, Pingtung, and Tainan (Chou *et al.* 1995; Chen *et al.* 1995). At the NTOU, there is also a skull of this species, collected from the Suao fish market (Mizue 1988). Several small herds of Risso's dolphins were observed off Hualien, Taiwan, on 18 and 19 June 1995 (Jefferson unpubl. data).

**Bottlenose dolphin:** *Tursiops truncatus* (Montagu)

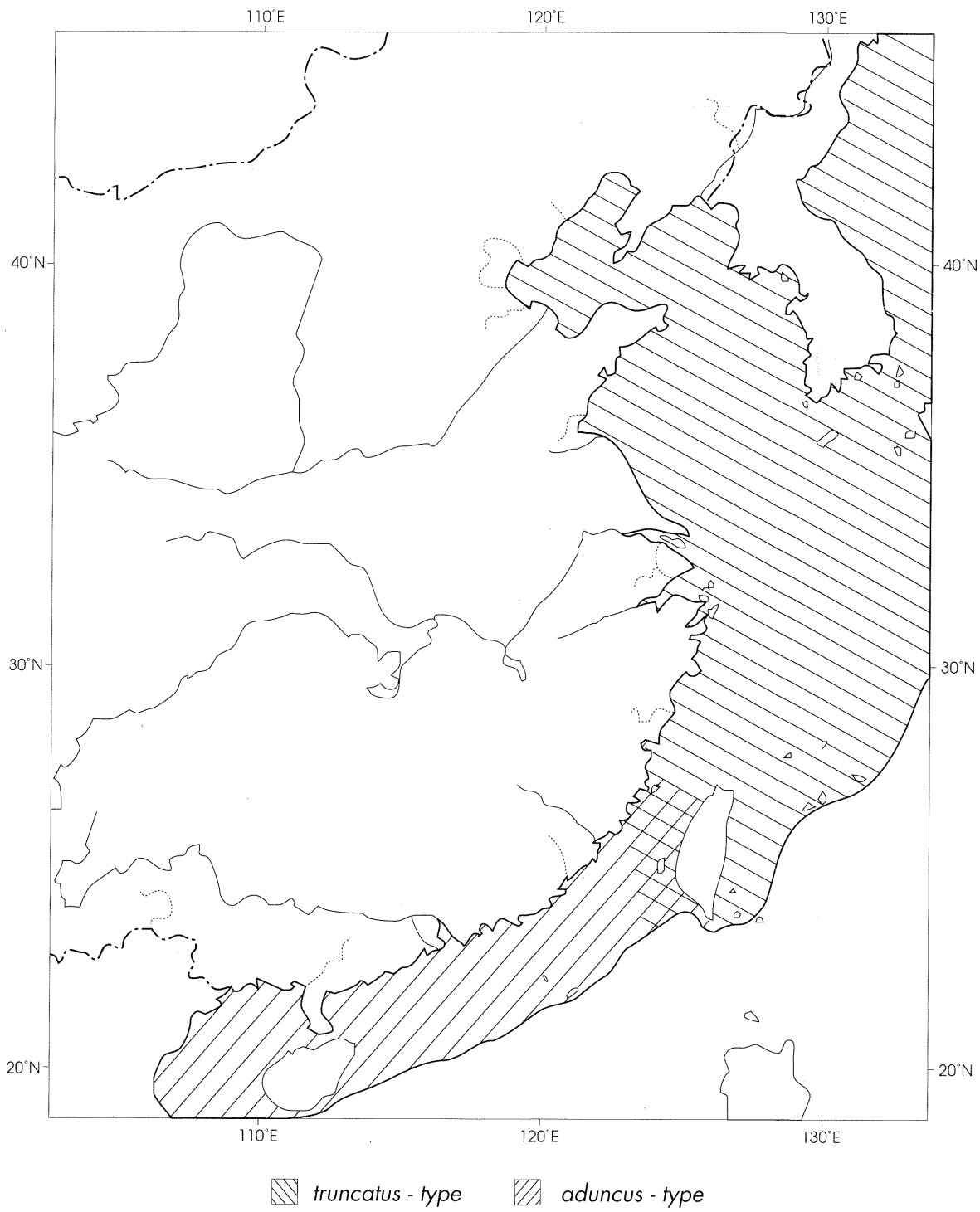
Bottlenose dolphins are widely distributed in Chinese waters (Fig. 4). A larger form (*truncatus*-

or *gilli*-type — Plate 2B) and a smaller form (*aduncus*-type — Plate 2C) are recognized (Zhou 1987; Wang *et al.* 1995). The former occurs in the Yellow, Bohai, and East China seas. The latter occurs in the South China and East China seas (Zhou and Qian 1985). Bottlenose dolphins have been recorded from Liaoning, Shandong, Jiangsu, Zhejiang, Fujian, Guangdong, and Guangxi Zhuang provinces and from Hong Kong (Meng *et al.* 1981; Shi and Wang 1983; Wang 1990; Zhou 1965, 1987; Zhou *et al.* 1982; Zhou and Wang 1994; Parsons *et al.* 1995). All of the specimens stranded in Hong Kong have been of the *truncatus*- or *gilli*-type (Leatherwood pers. observ.).

The largest directed kill of Bottlenose dolphins in Chinese waters was in the drive fishery in the Penghu Islands, Taiwan (Chen *et al.* 1976). Some individuals taken in the drives were sold to oceanaria in the 1980s for display (Hammond and Leatherwood 1984; Reeves *et al.* 1994). Both forms occur sympatrically around the Penghu Islands, where there is both shallow and moderately deep water (Wang *et al.* 1995). Bottlenose dolphins have also been recorded from Keelung and Tungkang, Taiwan (Yang 1976). For all sufficiently documented records from the east coast of Taiwan, where water depths drop off quickly, the specimens appear to be of the larger *gilli*-type (Jefferson pers. observ.).

**Pantropical spotted dolphin:** *Stenella attenuata* (Gray)

Pantropical spotted dolphins (Plate 3A) are distributed in the South and East China seas. Specimens were caught about 300 km southeast of Shantou in 1978 (Zhou *et al.* 1980) and off Qinzhou, Guangxi Zhuang, in 1988 (Wang 1990). A dolphin carcass from Keelung was reported by Yang (1976) to have been a specimen of *Stenella frontalis*, but the published photos show that it was a Pantropical spotted dolphin. A carcass, apparently of this species, was found in December 1987, on Lantau Island, Hong Kong (Parsons *et al.* 1995). Spotted dolphins are also known from Taiwanese waters, based on several recent strandings (Chen *et al.* 1995; Chou *et al.* 1995)



**Fig. 4.** Approximate distribution of two types of bottlenose dolphin in Chinese waters.

and from captures by fishermen (Mizue 1988). Two herds were observed a few kilometres off the coast of Hualien, northeast Taiwan, on 19 June 1995 (Jefferson unpubl. data). This appears to be one of the most common species of oceanic small cetacean off the east coast of Taiwan.

**Spinner dolphin:** *Stenella longirostris* (Gray)

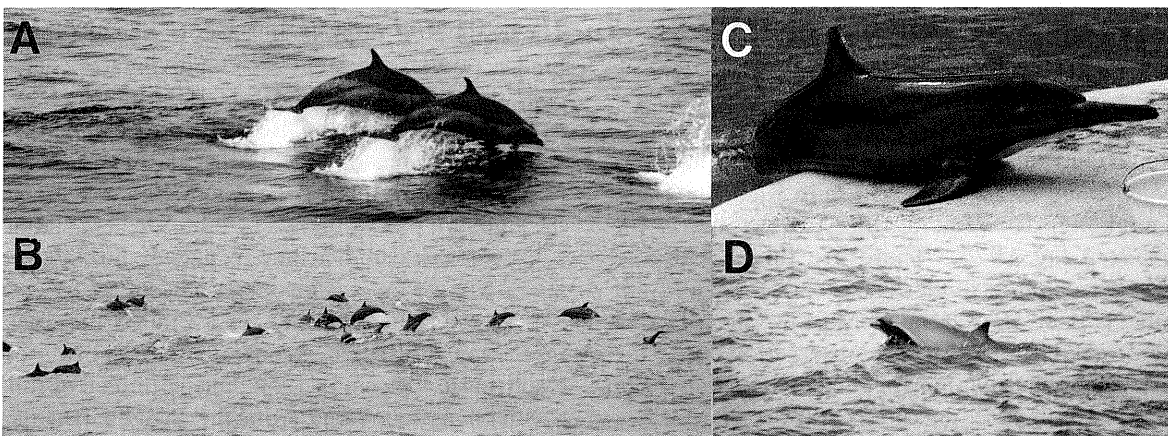
Two specimens of Spinner dolphins (Plate 3B) were captured off the coast of Fangcheng County, Guangxi Zhuang, in the Gulf of Tonkin in 1988 (Wang 1990). Illegally caught Spinner dolphin carcasses from Hainan Island were intercepted in Hong Kong in 1993 (Parsons *et al.* 1995). For Taiwan, there are stranding records of Spinner dolphins from Kaohsiung (Yang 1976), Ilan (Chou *et al.* 1995), and an unknown locality (Chen *et al.* 1995). Three skulls in the collection of the NTOU were collected at the Suao fish market, Taiwan (Mizue 1988). Dolphins of this species were frequently encountered just a few kilometres off the coast of Hualien, Taiwan, during two days of vessel surveys in June 1995 (Jefferson unpubl. data). From observations of live animals at sea and from examination of several skulls, it is clear that Taiwanese Spinner dolphins are not of the dwarf form, but of the pantropical subspecies, *S. longirostris longirostris* (see Perrin 1990).

**Striped dolphin:** *Stenella coeruleoalba* (Meyen)

A male Striped dolphin was found at the fish market in Suao, Taiwan, in 1964 (Yang 1976). The collection of the NTOU in Taiwan also contains the skull of a Striped dolphin collected at the Suao fish market (Mizue 1988). There have been four Striped dolphin strandings in Hong Kong, one each in 1988, 1989, 1992, and 1994 (Parsons *et al.* 1995).

**Common dolphins** (*Delphinus* spp.)

Currently two species of common dolphins are recognized, the Short-beaked common dolphin (*Delphinus delphis* Linnaeus) and the Long-beaked common dolphin (*D. capensis* Gray — Plate 3C) (Heyning and Perrin 1994). Groups of tens to hundreds of common dolphins have been recorded from the Bohai and Yellow seas along the coast of the Chinese mainland (Wang 1984). Two specimens were captured from the northern Yellow Sea in 1963 and 1978 and are housed in the Dalian Natural History Museum (Shi and Wang 1983). An adult female was killed in the Gulf of Tonkin in 1976 (Zhou *et al.* 1980). Five specimens were collected from Beihai City, Guanxi Zhuang, between 1981 and 1988, and two were captured in the same area in 1981 and 1985



**Plate 3.** A, Pantropical spotted dolphins observed off Hualien, Taiwan, on 19 June 1995; B, part of a herd of Spinner dolphins off Hualien, Taiwan, on 18 June 1995; C, captive Long-beaked common dolphin captured off the Penghu Islands, Taiwan; D, Fraser's dolphin observed off Hualien, Taiwan, on 19 June 1995.

(Wang 1990). All of the seven *Delphinus* skulls measured by Zhou (including the specimen in Zhou *et al.* 1980) had ratios of rostral length to zygomatic width outside the range of *D. delphis*, and are presumably of the long-beaked species. The single confirmed specimen of a common dolphin from Hong Kong also appears to be referable to *D. capensis* (Parsons *et al.* 1995). There are several reports of both *D. delphis* and *D. capensis* from Taiwan (Yang 1976; Chen *et al.* 1995; Chou *et al.* 1995), but the specimens have not been re-examined to confirm their specific identity since the taxonomy of the genus was clarified (Heyning and Perrin 1994). Both records from Taiwan that can be identified to species, i.e., a single animal reported by Mizue (1988) and an individual captured alive at the Penghu Islands and held in captivity at Ocean World for several years (R. Chen pers. comm.), appear to be Long-beaked common dolphins. In addition, van Bree and Gallagher (1978) and Kasuya (1973) reported specimens of Long-beaked common dolphins from Taiwan.

Short-beaked common dolphins are not yet known to occur in Chinese waters. All of the confirmed records are of exceedingly long-beaked animals, either an extremely long-beaked variety of *D. capensis*, or members of the nominal species *D. tropicalis* (van Bree and Gallagher 1979). The taxonomic status of the *tropicalis* form has not yet been established (Heyning and Perrin 1994). Clarification will require study of additional specimens, ideally coupled with genetic work.

**Fraser's dolphin:** *Lagenodelphis hosei* Fraser

Single specimens of Fraser's dolphins (Plate 3D) were found at the fish markets in Kaohsiung and Tungkang, Taiwan, in 1969 (Tobayama *et al.* 1973; Yang 1976). There are three skulls of Fraser's dolphins in the NTOU collection, all from Suao (Mizue 1988). One herd of this species was observed during a cetacean observation cruise off the coast of Hualien, Taiwan, on 19 June 1995 (Jefferson unpubl. data). In addition, there was a recent stranding of this species in Hong Kong (Parsons *et al.* 1995).

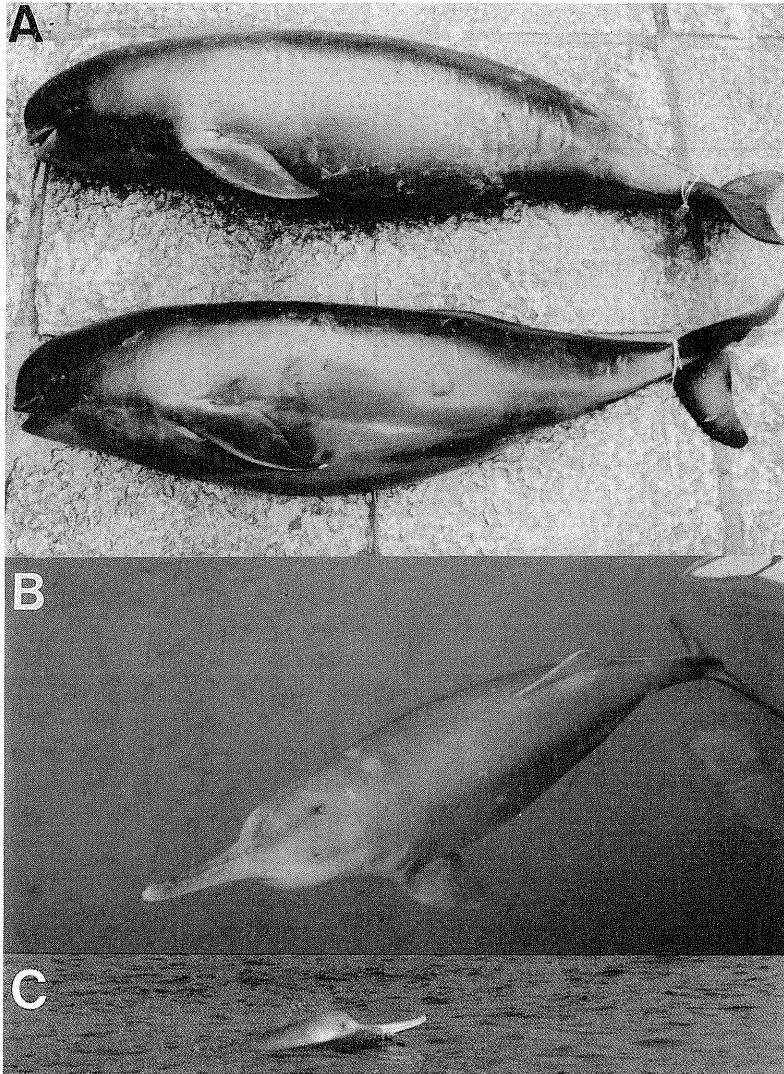
**Harbour porpoise:** *Phocoena phocoena* (Linnaeus)

The accuracy of the record of Harbour porpoises from Hengchun, Taiwan (Yang 1964) was doubted by the same author (Yang 1976), and this species was subsequently deleted from the list of Chinese cetaceans (Zhou 1986, 1991). We now know the original record to have been a mis-identification of the Melon-headed whale (Yang 1976: fig. 17). Reports of the species in Taiwan, provided by fishermen (Chou 1994), are also considered to involve identification errors. We think it unlikely that this cold temperate species occurs in Chinese waters.

**Finless porpoise:** *Neophocaena phocaenoides* (Cuvier)

The Finless porpoise (Plate 4A) inhabits waters off the coast of mainland China from the Gulf of Tonkin, in the South China Sea, to the Liaodong Gulf, in the Bohai Sea (Fig. 5). Three subspecies have been described, based on morphological differences (Gao 1991; Gao and Zhou 1995), and these designations are supported by preliminary analysis of mitochondrial DNA (cytochrome *b*) sequences (Wang 1995). The Yangtze Finless porpoise (*N. p. asiaeorientalis*) occurs in the middle and lower reaches of the Yangtze River and its adjacent lakes. This is the only Finless porpoise population known to inhabit freshwater. The estimated population size of the Yangtze Finless porpoise is about 2,700 individuals (Zhang *et al.* 1993). The northern Finless porpoise (*N. p. sunameri*) inhabits the Bohai, Yellow and East China seas. The southern Finless porpoise (*N. p. phocaenoides*) inhabits the South China Sea and the southern part of the East China Sea. This latter subspecies is also distributed sparsely throughout Hong Kong waters (Parsons *et al.* 1995).

Yang (1976) reported on a Finless porpoise that was collected from Tainan, north of Kaohsiung, Taiwan, in 1958. One specimen of this species was recovered from the Penghu Islands, Taiwan, in 1987, and is now in the NTOU collection (Mizue 1988); another from the same



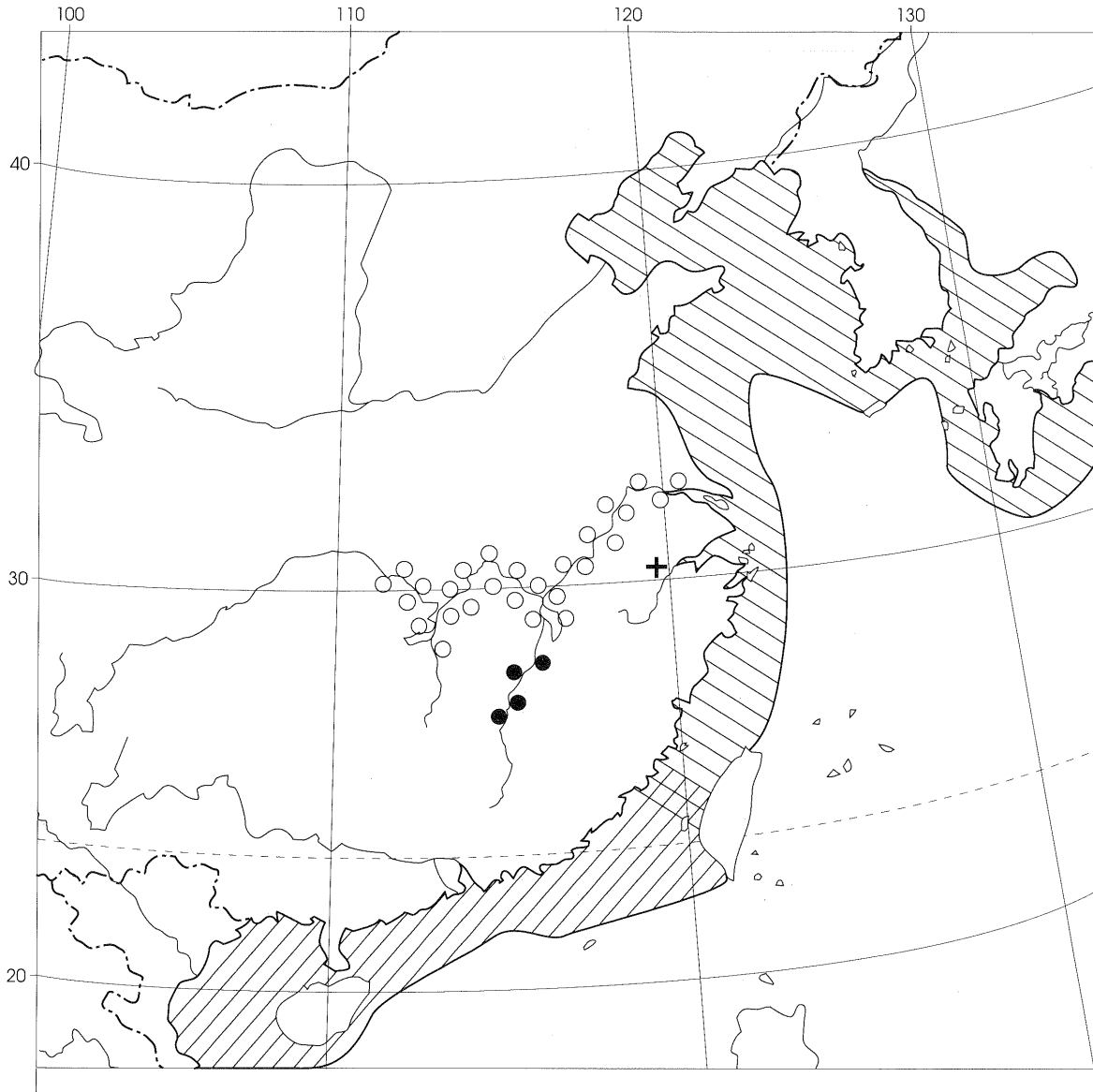
**Plate 4.** A, Finless porpoises captured in gillnets off mainland China; B, captive Baiji 'Qi Qi' at the Wuhan Institute of Hydrobiology; C, free-ranging Baiji in the Yangtze River.

locality is at the TFRIC (Jefferson pers. observ.). There are two additional stranding records, from Hsinchu and an unknown locality in Taiwan (Chou *et al.* 1995; Chen *et al.* 1995). Finless porpoises, which are shallow water animals, probably do not occur off the east coast of Taiwan, where deep water is found immediately offshore.

**Baiji:** *Lipotes vexillifer* Miller

Baiji (Plate 4B,C) are found mainly in the

mainstem of the middle and lower reaches of the Yangtze River, although individuals might occasionally enter some tributary lakes during intense flooding (Fig. 6). In the 1940s, the uppermost records in the Yangtze River were at Huanglingmiao and Liantuo, in the Three Gorges area. In the 1970s and 1980s, however, the upper limit was no farther upstream than Zhicheng, Hubei (Chen and Hua 1989; Zhou *et al.* 1977). Results of recent surveys of almost all the species' previous range, Shanghai to Yichang, suggest that



**Fig. 5.** Approximate distribution of the three described subspecies of the finless porpoise in Chinese waters.

- ▨ *N. p. sunameri*    ▩ *N. p. phocaenoides*    ○ *N. p. asiaeorientalis*  
● Locality where *N. p. asiaeorientalis* is recorded occasionally  
+ Locality where *N. p. sunameri* is recorded occasionally

the range is continuing to contract and that the population is very small and is still declining (Liu *et al.* in prep.). At the lower end of the river, specimens of Baiji were obtained at the Yangtze estuary, off the eastern end of Chongming Island, Shanghai, in the 1950s and 1960s. Baiji were also seen in the Qiantang River during the great flood of 1955 (Zhou *et al.* 1977), but disappeared from that area after the construction of a hydropower station in 1957 (Zhou 1989).

### Exploitation and conservation of small cetaceans in Chinese waters

Dolphin fisheries began in the Penghu Islands, off the west coast of Taiwan, in ancient times. Dozens, perhaps hundreds, of small cetaceans — mostly Bottlenose dolphins, but also False killer whales and dolphins of a few other species — were taken annually by drive, harpoon, and gillnet fisheries. The largest recorded catch by the drive fishery was 1,200 individuals in January 1956 (Chen *et al.* 1976). The catch declined to a few tens of animals per year in 1989 and 1990. The Taiwanese Wildlife Conservation Law of 1989 was amended in August 1990, making the capture of cetaceans illegal in Taiwan (Mok *et al.* 1992). Despite this, the last drive occurred in the winter of 1992-1993. Many of the fishermen involved, however, were prosecuted and all of the animals were released alive.

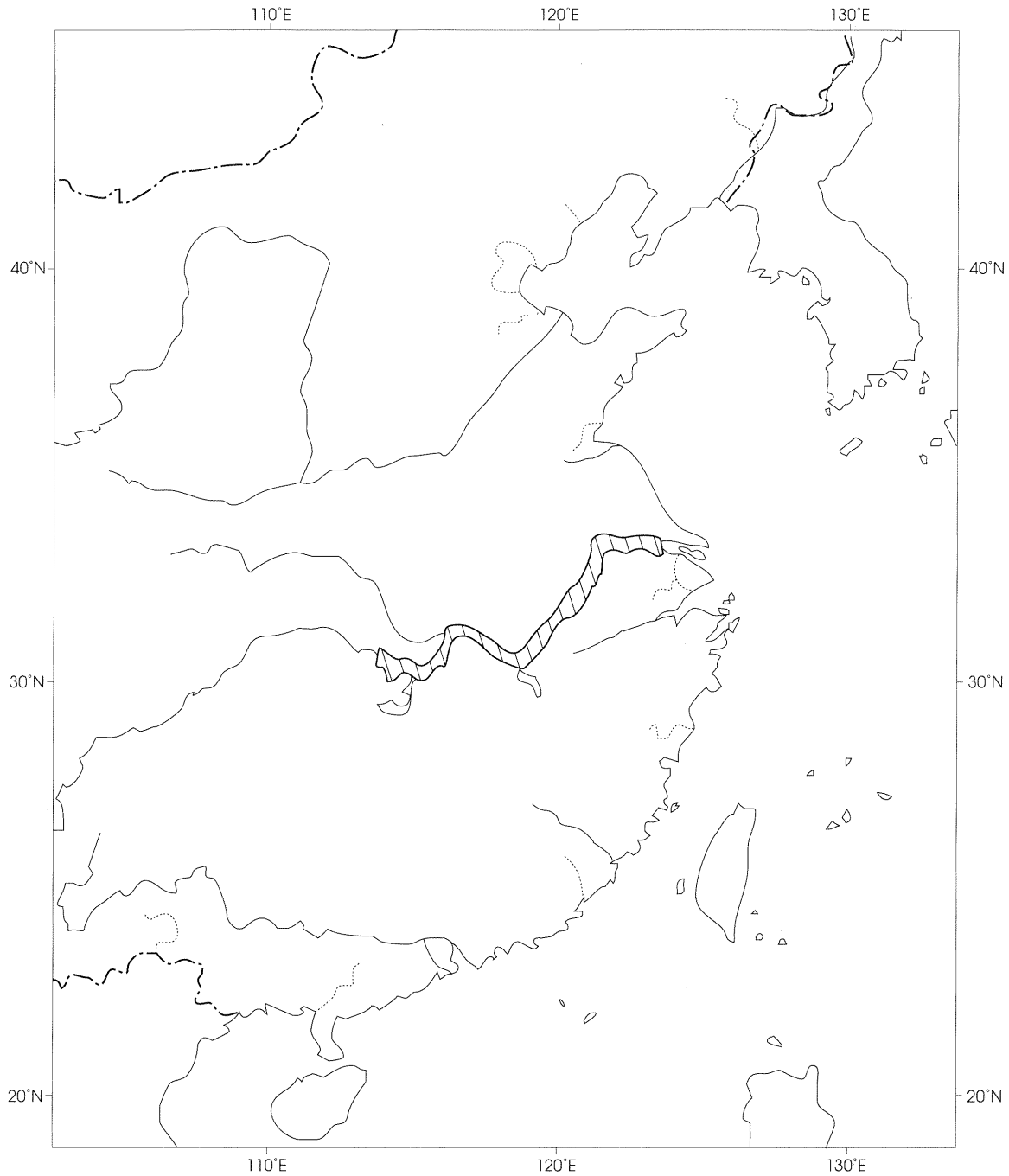
The Taiwanese legislation has now apparently been effective in eliminating the Penghu drive fishery. However, during a recent two-month visit to Taiwan, Jefferson saw evidence that direct captures of cetaceans still occur (harpoon wounds on some animals), at least off the east coast of Taiwan. In addition, incidental catches of small cetaceans in gillnets and longlines continue, apparently unabated. Taiwanese government officials in the Council of Agriculture contend that the problem has been solved by passage of the new law. In reality, it is likely that this law has little or no effect on the actions of most fishermen. Incidental catches (arguably involving more species of small cetaceans than the drive fishery at the Penghu Islands ever did) continue to occur. Until an observer programme is established and

the law is rigorously implemented, and sustainable catch limits are imposed, the problem of human-caused mortality of small cetaceans in Taiwan cannot be considered solved. Such a programme may actually be easy to initiate because all vessels in Taiwan are required to check in with government officials upon leaving and returning to port.

No direct exploitation of small cetaceans is known to occur in other parts of China. When one considers the number of fishermen and the extent of the coastline, it seems likely that some direct exploitation has occurred, and still does occur, in other Chinese waters. Hong Kong fishermen have been reported to capture dolphins in the Gulf of Tonkin and sell them to local residents (Parsons *et al.* 1995). Passive fishing gear and incidental catches of small cetaceans in Chinese waters were reviewed by Zhou and Wang (1994). Finless porpoises, False killer whales, Bottlenose dolphins and common dolphins are known to be caught incidentally in the fisheries. It is probable that other species are taken as well.

Finless porpoises are probably killed in considerable numbers; recorded incidental catches suggest that dozens, perhaps hundreds, have been caught annually in gillnets, driftnets, trammel nets, stow nets and pound nets along the coasts of Liaoning, Hebei, Shandong, Jiangsu and Fujian provinces. Finless porpoises are known to be taken in various gillnet fisheries throughout their range (Zhou and Wang 1994; Jefferson and Curry 1994). Usually the carcasses of entangled Finless porpoises are sold to local people for use as livestock feed. Individuals of the Yangtze Finless porpoise are caught incidentally in rolling hook longlines and encircling gillnets. The latest recorded death of a Yangtze Finless porpoise, of which we are aware, was a rotting carcass found on the river bank of Zhenjiang City, Jiangsu Province, on 28 May 1995, and that of a northern Finless porpoise a newborn found on a dyke along the coast of Jinshan County, Shanghai, on 29 June 1995 (Zhou unpubl. data).

Baiji are killed by rolling hook longlines, gillnets, and fish traps in the Yangtze River and some individuals are known to have been killed by explosives and by collisions with boat hulls and propellers (Zhou and Li 1989; Chen and Hua



**Fig. 6.** Approximate distribution of the Baiji in Chinese waters.



1989). Perrin and Brownell (1989) reported that, in the past, some dolphins stranded on sandbars were beaten to death by local residents. No directed exploitation is known, although capture teams from the Institute of Hydrobiology and Tongling Seminatural Reserve are actively searching for Baiji to live capture for captive breeding programmes (Liu *et al.* in prep.).

There are no reliable population estimates for Baiji and the best that can be surmised from the various reports of surveys is that rates of encounter and, presumably, also numbers, have declined precipitously since the late 1970s, and that the population is 'small and presumably still declining' (Zhou *et al.* 1994). The first rigorously designed and conducted surveys covered most of the river between Shanghai and Yichang in the last quarter of 1994. They used three vessels, a ship in mid-channel and a ship along each shore, and only five animals were seen. This suggested to the participants that the population numbered fewer than 100 individuals, perhaps no more than a few dozen (Liu *et al.* in prep.).

Live captures and removals of small cetaceans must be included in assessments of the effects of exploitation. To date, as far as we know, only a few Baiji, Finless porpoises, and Bottlenose dolphins have been live-captured in mainland China waters for either display or research. In Taiwan, although there has been no live-capture fishery, Bottlenose dolphins and False killer whales have been purchased for display in association with the former drive fishery at the Penghu Islands. The number of species that have been affected by live-removals is thus far relatively small. There is, however, the potential for greatly increased future impacts, as we are aware of at least nine dolphinariums under construction in mainland China (one each in Qingdao, Shanghai, Guangzhou, Shenzhen, Wuxi, Xiamen, and Dalian and two in Beijing) and two additional ones in Taiwan (Taichung and Keelung).

The Chinese Government at various levels has

enacted a series of laws and provisions to protect wildlife including small cetaceans (Zhou 1992). The capture, killing, selling, or buying of the national key protected aquatic animals, including Baiji, is strictly prohibited. Most of the provinces along the mainland coast and in the Yangtze River have issued either their own laws or regulations for the implementation of the national laws and regulations. In Taiwan, there is now legal protection for all cetaceans. But, in China, as elsewhere, laws have little or no effect if people do not know about them and if they are not enforced humanely and consistently.

The wide variety of cetaceans that occur along the various coastlines and rivers of mainland China, Taiwan, Hong Kong, and Macau represent a valuable natural treasure. They can only be conserved for future generations with education and laws suited to the needs of humans and wildlife alike. We hope that public officials and citizens will take note of this fact and push for strict and effective measure to conserve all cetacean species in Chinese waters.

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**Appendix I. List of place names mentioned in the text, which have multiple spellings.**


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<i>Spelling used in Taiwan</i>	<i>Spelling used in Mainland China</i>
Kaohsiung	Gaoxiang
Tungkuang	Donggang
Keelung/Chilung	Jilong
Dashi	Daxi
Lukang	Lugang
Pingtung	Pingdong
Peikang	Beigang
Taipei	Taibei
Hsinchu	Xinzhu
Hualien	Hualian
Ilan	Yilan
Taichung	Taizhong
Taitung	Taidong
Taoyun	Taoyuan
Yehliu	Yeliu
Lu Tao	Ludao Island
Chinmen	Jinmen

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