Range-Wide Yangtze Freshwater Dolphin Expedition: The Last Chance to See Baiji?

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Abstract

Background, Aim and Scope. There are two species of freshwater cetaceans surviving in the Yangtze River system in China: Baiji (Lipotes vexillifer) and Yangtze finless porpoise (Neophocaena phocaenoides asiaeorientalis). As a result of the expansion of human activities on the river, their distribution ranges appear to be decreasing and in the case of the Baiji, are even being restricted to several sections. The Baiji is the world’s most critically endangered cetacean species with a population estimated at only a few tens of individuals. The Yangtze finless porpoise is the world’s only freshwater-adapted population of the species, and it has been estimated that only around 1,000 individuals remain in the river system. In order to prevent the extinction of Baiji and a sharp decline in the abundance of the porpoise, in situ conservation (i.e. in situ) and two ex situ conservation (i.e. in semi-natural reserves and in captivity) strategies were proposed and have been implemented since the early 1990s. In view of both the severely endangered status of the animals and the severely degraded conditions of their habitats, the feasibility and actual status of these two strategies are raised for discussion.

Main Features. The threats faced by the cetaceans are mainly from the uncontrolled exploitation of the river’s resources. In the past 20 years, five nature reserves have been established along the river. Imposing maximum prohibition of harmful and illegal fishing methods in the reserves might prolong the process of extinction of these cetaceans in the wild, but so far, the administrative measures taken in the reserves have not yet kept the abundance from sharply declining. As human use of the river and its resources is expected to intensify for many decades into the future, the ability of the river to continue to support these species is certainly undecided. Therefore, rescuing animals from the river and establishing viable breeding populations in semi-natural reserves, in which the environment is similar to the main stream of the river, and in captivity, has to be considered urgently as the short-term goal of ex situ strategies. Since the abundance of porpoises is higher than that of the Baiji, we have first established breeding populations of them in the semi-natural reserves and in captivity. But, considering the extremely low density of Baiji in the river, an immediate range-wide Yangtze Baiji survey is an urgent need for locating and capturing sufficient Baiji for successfully establishing a breeding population of them in semi-natural reserves.

Results. Two semi-natural reserves (in Shishou, Hubei Province, and Tongling, Anhui Province) have been set up along the river in order to establish breeding populations of the Baiji and the porpoises. So far, several small groups of porpoises that were caught in the main stream of the river have successively been introduced into the semi-natural reserves. Under careful management, these animals in both of the semi-natural reserves not only survive, but can also reproduce naturally and successfully. At least one or three calves were born in each reserve each year. Additionally, a breeding group of porpoises is being established at the Baiji Dolphinarium at the Institute of Hydrobiology, Chinese Academy of Sciences, Wuhan. There are presently four adults and one calf living in the Dolphinarium. The calf, born in July, 2005, is the first captive bred Yangtze Finless Porpoise in the world. In preparation for the range-wide Yangtze cetacean survey, a 9-day pilot expedition on the river near Wuhan was conducted in March, 2006, in order to develop methods for locating the Baiji. No Baiji were expected to be seen in such a short period but about 40 porpoise sightings were observed. Results of the pilot survey indicated that traditional visual and acoustical survey methods for cetaceans should be adapted to find the elusive Baiji in the river. Currently, the range-wide Yangtze cetacean survey is in preparation. The survey will cover over 1,700 km of the Yangtze River from Yichang to Shanghai, and is expected to provide detailed information on Baiji and porpoise numbers and distribution patterns in the river.

Discussion. Although the short-term goal of ex situ conservation is to rescue cetaceans from the river and to establish viable breeding populations in semi-natural reserves and in captivity, the long-term goal of releasing the animals back into the river when the threats have decreased and the natural environment has been improved, should not be neglected. Moreover, the in situ conservation efforts in the natural reserves, and even in the entire Yangtze River system, including the lakes, should not be ignored or abandoned at any time. The activities contributing to the conservation of the Baiji and the porpoise in the wild have the incidental effect of benefiting the entire Yangtze ecosystem and other rare threatened species. The dynamics of the groups of porpoises in semi-natural reserves should be monitored continually, in order to guide the establishment of breeding groups of Baiji in these semi-natural reserves in the near future.

Conclusions. Under the existing severely degraded conditions of the Yangtze system, the sharply fall populations of Baiji and porpoises will not be suspended in the foreseeable future. Therefore, ex situ conservation should be emphasized, and the severely threatened Baiji in the river should be removed and translocated to semi-natural reserves for establishing viable breeding populations. The successful program of capturing, translocating and maintaining finless porpoises in the Shishou semi-natural reserve has demonstrated its adequacy as an ex situ environment for cetaceans. Following the successful pilot survey in the river, the immediate range-wide Yangtze cetacean survey is pro-
Introduction

The Yangtze River of China is quite unique in terms of biodiversity. For example, there are two species of freshwater cetaceans, the Yangtze River Dolphin, locally called the Baiji (Lipotes vexillifer) and the Yangtze finless porpoise (Neophocaena phocaenoides asiaeorientalis), surviving in this river system and several appended large lakes and tributaries. They both are endemic and endangered. The Baiji is the world’s most threatened cetacean (Reeves et al. 2005), and may be the rarest large mammal species on the earth (Dudgeon 2005). Furthermore, it is a relict species and the only living representative of the family Lipotidae (Rice 1998). The Baiji is classified by the IUCN as Critically Endangered (Reeves et al. 2005), meaning that the species is facing a very high risk of extinction in the wild in the near future (Reeves et al. 2000). As the only known freshwater population and sub-species of the finless porpoise, the Yangtze finless porpoise are sympatric with Baiji. This sub-species is listed as Endangered by the IUCN (Cetacean Specialist Group 1996). Population sizes of both cetaceans in the river are declining continuously, and distribution ranges have rapidly become reduced in the past few decades. The threats faced by the Baiji and porpoise are mainly from the unfettered exploitation of the river’s resources and the severe pressure caused by the human population. Undoubtedly, human activities along the river and commercial uses of the river are unavoidable, and cannot be realistically expected to change for the better in the near future. Therefore, the fate of the Baiji and the porpoises in the river is very worrying. In fact, the severe status of the animals has attracted worldwide attention, and the possible strategies to protect them from extinction have been discussed extensively at scientific meetings over the past 20 years (Zhou et al. 1994, Perrin et al. 1989, Reeves et al. 2000, IWC 2001, Braulik et al. 2006, Samuel et al. 2006). These protection strategies include in situ conservation, ex situ conservation, and intensification of breeding research in captivity. Recently, the issues on feasibility and realities of the strategies have been presented for disputation (Wang et al. 2006, Reeves and Gales 2006, Yang et al. 2006). Although no simple solution for the conservation of the Baiji is available, the actual and applicable conservation measures should be implemented immediately.

In the present paper, the status quo of Baiji and Yangtze finless Porpoise, threats faced by them in wild, the in situ and ex situ conservation measures proposed, the achievement reached in past 20 years, and the recent conservation actions, including the completed pilot Baiji survey in the river near Wuhan and the range-wide Yangtze cetacean survey currently being prepared are briefly reported (Fig. 1 and Fig. 4, see Appendix).

1 Distribution and Population Status of the Baiji and Yangtze Porpoise

The Baiji (Fig. 2, see Appendix) was locally well-known throughout Chinese history (Zhou et al. 1977), and once had a wide geographic range of distribution in China. Some individuals once occurred in the Fuchun River during the great flood of 1955 but disappeared from that area after construction of a hydropower station in 1957 (Liu et al. 2000, Zhou 2002). Baiji also occurred historically in Dongting and Poyang Lakes (Zhou et al. 1977, Chen et al. 1980), but apparently no longer exist in these areas (Yang et al. 2000, Zhang et al. 2003). Historically, their upstream limit in the Yangtze was the Three Gorges area approximately 35 km above Gezhouba Dam near Yichang (Zhou 2002), and the downstream limit was the river mouth near Shanghai (Zhou and Li 1989). Currently, the distribution range of the Baiji changes rapidly, and the range is very limited to several short sections (Zhang et al. 2003). The upper range limit is 150 km downstream of the Gezhouba Dam, near Jingzhou (Liu et al. 2000), and the lower limit is near Jiangyin, 256 km upstream from the river mouth (Zhang et al. 2003). During the most recent surveys, Baiji were found mainly in several sections of the river between Tongling City and Dongting Lake, such as the Tongling section, the Poyang Lake mouth area, and the Honghu section (Wang 2000, Zhang et al. 2003). The distribution range of the porpoise is relatively wide compared to the Baiji. The porpoises occurred in not only the middle and lower reaches of the river, but also in the appended Dongting and Poyang Lakes as well as in some of the larger tributaries (Wang et al. 2000). Even so, the areas with particularly high densities of porpoises were still limited (Wang et al. 2000, Zhou et al. 2000), meaning that the porpoises have almost disappeared in some of their original habitats, and tend to concentrate onto a few specific sections more frequently.

Zhou (1982) made the first estimation of Baiji abundance based on survey data from 1978 to 1981, and found about 400 animals in the whole area. On the basis of surveys conducted in 1985 and 1986, the estimated population was around 300 individuals (Chen and Hua 1989). Currently, the numbers are much reduced. Various expert groups have concluded that fewer than 100 Baiji may now remain in the river (IWC 2001, Zhang et al. 2003, Reeves et al. 2003, Braulik et al. 2006, Samuel et al. 2006). The most recent direct count is from 1997, when only 13 individuals were
sighted during a series of intensive range-wide boat surveys (Zhang et al. 2003). A boat-based survey was conducted in March 2006 (Fig. 1 and Fig. 4, see Appendix), but no Baiji were sighted between Wuhan and Dongting Lake (Barrett et al. 2006). The population estimation of the porpoises, referring to the period 1984–1991, was made in 1993, amounted to 2,700 individuals (Zhang et al. 1993). Surveys in 1990–1992 suggested a total porpoise population of about 700 animals in a 421 km segment of the lower reaches of the river (Zhou et al. 2000). A survey conducted in segments from 1991–96 indicated a drastic decrease in the number of porpoises (Wang et al. 2000). During surveys in the spring of 1991 and 1992, the sighting rate in the segment of river between Wuhan and Xinchang declined from 0.14 porpoises/km to 0.07 porpoises/km (Wang et al. 2000). In the other section, the encounter rates appeared to decrease yearly (Wang et al. 2000). The population of finless porpoises in Balijiang decreased annually by approximately 7.3% from 1989 to 1999 (Wei et al. 2002). The last survey in the section between Wuhan and Yueyang, as well as Dongting and Poyang Lakes indicated that the density in Dongting Lakes was relatively higher than that in the river section, where there were 1,020 individuals/km² and 0.085 individuals/km² respectively (Barrett et al. 2006). Additionally, the observation conducted in 2005–2006 indicated that the density of porpoises in Poyang Lake is considerably higher than that in the adjacent section of the river. A population viability analysis suggested that the Yangtze finless porpoise (Fig. 3, see Appendix) will become extinct within 24–94 years if no effective protection measures are taken (Zhang and Wang 1999).

2 Threats Faced by Baiji and Yangtze Porpoise

The range contraction and the decline in Baiji and the porpoise abundance were caused by a combination of factors mainly stemming from increased human activities. The threats include over-fishing and illegal fishing, vessel traffic and underwater noise, water project development, underwater explosions, and water pollution (Wang et al. 2006, Reeves et al. 2005).

During the 1970s to 1980s, at least half of the mortality observed for Baiji might have been caused by fishing gear (Lin et al. 1985, Zhou and Li 1989, Chen 1989, Chen et al. 1997). In the 1990s, twelve Baiji deaths were recorded, and illegal fishing using electricity accounted for 40% (Zhang et al. 2003). Although electric fishing is strictly banned in the Yangtze River, it is widely practiced, particularly in the center of the current distribution (IWC 2001, Reeves et al. 2005). By the early 2000s this fishing method had been the most important and immediate direct threat to the Baiji’s survival (Zhang et al. 2003). The electric shocks kill not only the Baiji itself but also the porpoise and the other aquatic organisms including the prey of Baiji and porpoises.

It was also reported that propeller strikes killed and injured Baiji (Zhou and Zhang 1991, Chen et al. 1997). Propeller strikes should be considered as an increasing threat in view of the rapid expansion of vessel traffic on the Yangtze. Additionally, the underwater noise from the vessel traffic might be a threat to the Baiji and porpoises because it can disturb the acoustic communication and echolocation of the species. The Yangtze is known as ‘The Golden Channel’ of the country. The traffic and noise oppression to the animals in the river will increase rapidly as the number and types of vessels increase in the future. The river traffic in the lower Yangtze is much heavier than that in the middle river, and has almost doubled every 10 years (Zhou and Li 1989), so the threat from vessel traffic in the lower reaches is growing more serious year by year.

Underwater explosions used to deepen or widen navigation channels or used for fishing is another cause of cetacean mortality in the river (IWC 2001). Six Baiji were killed in explosions during channel maintenance in Honghu and Yaohu in 1974, and seven Baiji were killed in explosions in a section between Honghu to Wuhan in 1984 (Chen and Hua 1989). Zhou and Li (1989) once reported that explosions caused 19.4% of deaths during illegal fishing operations in the lower reaches of the river in 1979–1981.

The increasing rate of water project development, including construction of dams and floodgates in the middle and lower reaches of the river, has resulted in blockages between the river and the lakes, and has transformed the cetacean’s habitat (Reeves et al. 2005). For cetaceans in the river system, the dams interrupted their movements upstream of the dams, and eliminate their access to tributaries and appended lakes (Chen and Hua 1989, Liu et al. 2000). They also caused a notable reduction in fish resources (Zhou and Li 1989). The world’s largest dam, the Three Gorges Dam, has been inserted in the middle of a hot spot of bio-diversity in south-central China. Although the Three Gorges Dam is located upstream from the existing Gezhouba Dam, which is the upper limit of the distribution of the Yangtze cetaceans, operation of the Three Gorges Dam will cause an alteration of hydrographic conditions in downstream reaches of the river, which will affect the habitats of Baiji and porpoises (Chen et al. 1997).

Water pollution is becoming a serious threat to the cetaceans. Pollutant loads in the Yangtze are expected to increase with industrialization and the spread of modern agricultural practices (Reeves et al. 2005). Approximately 40% of China’s industrial and agricultural output come from the Yangtze basin, with more than 16 billion cubic meters of wastewater discharged into the river annually, of which more than 12 billion cubic meters is industrially polluted and largely untreated (Zhou et al. 1998). Even though Dongting Lake is a protected reserve for the Yangtze finless porpoise, at least six have died in the area between April and June 2004 due to the use of a chemical pesticide used to control Schistosomae (Wang et al. 2005). The porpoise is a top predator in the food web of the river and lakes, and is considered to be the most in danger of the accumulation of mercury. It was demonstrated that mercury concentrations increased positively with the age of the porpoises, and that the transfer efficiency of mercury from mothers to babies in the porpoise was remarkable. The porpoise in Eastern Dongting Lake had much higher total-mercury levels than those reported for other Phocoenidae species. Such mercury was accumulated from the aquatic environment to the porpoise’s liver, reaching a bioaccumulation factor of 4.3×105 in the Eastern Dongting Lake ecosystem (Dong et al. 2006).
Another threat to the porpoise that has not yet been mentioned in the past is the sand-digging activity in Poyang Lake. Because such activity has been prohibited in most of the sections of the river, most of the sand-digging vessels have moved into the lake. There are a few thousand vessels working in the lake for sand-digging and sand-transporting (Wang and Wang, unpubl. data). These activities destroy the habitats of fishes and porpoises, and make the clear water become very muddy. The muddy water might prevent reproduction in primary organisms that serve as food resources to fishes. Additionally, the heavy vessel traffic in the outlet channel waters of Poyang Lake might badly affect the movement of the porpoises between the lake and the river.

3 Implementing the Recovery Programme for the Baiji and Porpoise

In view of the facts that the Baiji’s range appears to be dwindling and its numbers at most only extend to a few hundred animals, some conservation measures were proposed at the Workshop on Biology and Conservation of the Platanistoid Dolphins, held at Wuhan in 1986 (Chen and Hua 1989). These measures were in situ conservation, ex situ conservation in semi-natural reserves, and intensification of breeding research in captivity. Meanwhile, the applicability of these measures to conservation of the porpoises were emphasized at a Workshop to Develop a Conservation Action Plan for the Yangtze River Finless, held at Hong Kong in 1997 (Reeves et al. 2000, Wang et al. 2000, Samuel et al. 2006). As the national policy for the conservation of Baiji and porpoises, a Conservation Action Plan for Cetaceans in the Yangtze River was developed by Chinese scientists and was approved by the Chinese government in 2001 (Ministry of Agriculture 2001). This plan re-emphasized the three measures identified at the 1986 workshop.

The Baiji and porpoise are designated, respectively, in the First and Second Category of National Key Protected Wildlife Species in China, and have full legal protection throughout their range. Since 1986, five natural reserves and two semi-natural reserves have been established along the middle and lower reaches of the river (Wang et al. 2006). The natural reserves are located in areas of the river and appended lakes containing populations of cetaceans, and where there are concurrently high mortality rates. Although these reserves cannot thoroughly prevent the occurrence of incidental death, their establishment has, at a very minimum, slowed down the process of extinction by banning both the use of harmful and illegal fishing methods (Wang et al. 2005). In the Workshop held in Hong Kong in 1997, Chinese scientists concluded that conditions in the Yangtze River will continue to deteriorate in the foreseeable future and that the decline in the finless porpoise population will therefore continue (Reeves et al. 2000). Although nature reserves have been established, the Baiji and porpoise population are still declining, and the ability of the river to continue to support these species is certainly undecided in current conditions. Human use of the river and its resources is expected to intensify for many decades into the future. Considering that the present use of the river is unsustainable, the porpoise and the Baiji population will probably continue to decline (Reeves et al. 2000). Therefore, there is urgent need for the cetaceans, especially for the Baiji, to be protected in some fully monitored and controlled semi-natural reserves. It is fortunate that two semi-natural reserves along the river have been established to use for the translocation of the Baiji. Because only establishing refuges in the river provided inadequate protection, it is necessary to move some individuals or groups into semi-natural reserves under complete protection, so as to protect them and enable them to reproduce naturally and successfully. One of the semi-natural reserves is located in Shishou, Hubei Province, and the other is located in Tongling, Anhui Province.

The Shishou semi-natural reserve or Tian-e-Zhou semi-natural reserve is located in a 21 km long and 1–2 km wide, old channel of the Yangtze River near Shishou City. After a complete investigation of the biological and environmental background, a group of porpoises were introduced into the reserve in 1990 for observation in order to make sure whether the environment and conditions were suitable for the Baiji’s survival. The group of porpoises and the individuals that moved into the reserve later not only survive but also reproduce naturally and successfully in the reserve. So far, the group of porpoises in the reserve has increased to more than 30 individuals. This effort represented the world’s first attempt and a successful example of ex situ preservation of a cetacean species (Wang et al. 2005). Braulik et al. (2006) concluded that China’s successful program of capture, translocation and maintenance of finless porpoises in the Shishou semi-natural reserve has demonstrated its adequacy as an ex situ environment for cetaceans. Another semi-natural reserve, Tongling semi-natural reserve is located in a channel between two islands in the vicinity of Tongling City in Anhui Province. The channel is 1,600 m long and up 200 m wide. The porpoise group in the channel can also reproduce naturally and successfully. There are five individuals in the reserve now. The success of the semi-natural reserve in maintenance of porpoises provides a solid foundation for the future conservation of the Yangtze finless porpoise, and may also provide a basis for conservation of the more threatened Baiji (Wang et al. 2005). In the Workshop on the Conservation of the Baiji and Yangtze Finless Porpoise, held in Wuhan in 2004, ex situ conservation of Baiji was the positive focus of participants and was discussed constructively and thoroughly (Braulik et al. 2006, Samuel et al. 2006).

The third measure is conservation in captivity. Great efforts on captive conservation of the Baiji and the porpoise have been made since the 1980s. In 1980, a male Baiji (named Qi Qi) was rescued from fishing gear and rehabilitated in Baiji Dolphinarium at the Institute of Hydrobiology of the Chinese Academy of Sciences in Wuhan (Gui and Wang 2005, Chen and Liu 1989). This animal remained in its dolphinarium tank until it died because of old age in 2002. Because Qi Qi was the only one Baiji ever kept in captivity for years, a great part of our knowledge about physiology, acoustics, and ethology of Baiji was from Qi Qi (Chen et al. 1997). Since 1996, porpoises have been kept successfully in the dolphinarium for research. The group originally consisted of two males and two females. On July 5, 2005, the first captive bred Yangtze Finless Porpoise calf was born in the dolphinarium (Wang et al. 2005).
2005). This is the first freshwater cetacean to ever be born in captivity. The success indicated that reproduction in captivity and releasing of individuals into the wild could be possible in the near future. Moreover, the successful establishment of breeding groups of porpoises in semi-natural reserves and in captivity, indicate that we may have a hope for the conservation of the Baiji and porpoises before the environment deterioration in the river can be improved.

4 The Range-wide Yangtze Freshwater Cetaceans Expedition

The range-wide Baiji and porpoise survey has been recommended by the participants at all the International conferences on Baiji and porpoise conservation held in the past 20 years (Perrin et al. 1989, Reeves et al. 2000, Braulik et al. 2006, Samuel et al. 2006). Such a survey will be multipurpose (Braulik et al. 2006). Firstly, it will make an evaluation of the number of Baiji and porpoises in the river system, and determine the degree of isolation of schools or subpopulations along the river, and monitor the population trends. Secondly, it will discover the high-density distributions of the cetaceans and possible routes in order to conduct long-term monitoring of the animals at these sites, and guide site selection for Baiji and porpoise capture operations. Thirdly, it will help to establish a standard methodology and survey procedures for observation of freshwater dolphins living in river systems.

During the past 20 years, many survey methods were employed in the Yangtze for the observation of the cetaceans (Zhang et al. 2003), including single or multi-vessel surveys, observation from the banks, opportunistic photo-identification, radio and satellite tracking, acoustical survey, behavioral and acoustic data logger tracking and simultaneous multi-vessel survey. Because of the difficulty in observing the Baiji and the porpoise and the different methods used, it is not surprising that estimated numbers vary considerably. Therefore, before a range-wide survey is conducted, suitable methods should be selected.

In order to develop methodology designed for locating the Baiji in the Yangtze River, a 9-day pilot survey was conducted in March 2006 (Barrett et al. 2006). During the entire nine-day pilot expedition a total of 40 Yangtze finless porpoise sightings were made and approximately 83 individuals were found. The density of Yangtze finless porpoises in Dongting Lake appeared to be much higher than that of the Yangtze River. Sightings were made frequently near to the banks of the river and this could indicate that Yangtze finless porpoises have a preference for inhabiting in-shore areas (Barrett et al. 2006). It is concluded that traditional observational and acoustical survey methodologies for cetaceans would have to be significantly modified in order to find the elusive Baiji in a habitat that has become a super-highway for China’s booming economy (Barrett et al. 2006).

The range-wide Yangtze cetacean expedition will be launched in November 2006, and it will cover the Baiji’s entire historical range, the 1,700 km section of the Yangtze River between Yichang and Shanghai. The expedition will start in the first week of November and is expected to take four weeks to complete. The team will be prepared to continue surveying for a further two to four weeks to compensate for sub-optimal surveying conditions. Two ships will take a team of Chinese and international scientists and conservationists down the Yangtze River from Yichang to Shanghai and back to Yichang. The visual and acoustical surveys are expected to produce the first accurate estimates of cetacean abundance and of their distribution in the river since 1997. The information from the survey will help create a reliable information platform for Chinese decision makers to design both a workable conservation strategy for the cetaceans and find the sustainable management factors for the threatened freshwater ecosystem.

5 Conclusions

The Baiji and Yangtze finless porpoise are endemic to the China’s Yangtze River system. Extremely human utilization of the river and resources has caused the animals to sharply decline in abundance, or even become extinct in the near future. Under the existing severely degraded conditions of the Yangtze system, the sharply falling populations of the Baiji and the porpoises will not be suspended in the foreseeable future. Therefore, in situ conservation should be emphasized without abandoning in situ conservation, and the severely threatened Baiji in the river should be removed and translocated to semi-natural reserves in order to establish viable breeding populations. The successful program of capturing, translocating and maintaining finless porpoises in the Shishou semi-natural reserve has demonstrated its adequacy as an ex situ environment for cetaceans. Following the successful pilot survey in the river in March, 2006, the immediate range-wide Yangtze cetacean survey was proposed and is currently in preparation. Traditional visual and acoustical survey methods for cetaceans will be modified to find the elusive Baiji and their habitats in the river. The range-wide survey will cover a section of over 1,700 km of the river from Yichang to Shanghai, and is expected to ensure that the remaining Baiji are reliably found during the survey, and successfully captured after the survey is completed.

6 Recommendations and Perspectives

It is really necessary to continuously monitor the population dynamics of porpoise in the semi-natural reserves, in order to ensure their sustainable population growth for a long time. Additionally, the need to establish new semi-natural reserves for porpoises should be placed on the agenda of local and central governments in the near future. The Yangtze finless porpoises are sympatric with Baiji naturally in the river, so both the species will be expected to share these semi-natural reserves to which the porpoises were introduced at an earlier time. During the range-wide survey, the Baiji, porpoises as well as their habitats should be investigated based on visual and acoustical methods modified to the river environment. Meanwhile, the threat levels to the Baiji and porpoises should be evaluated at each area where Baiji or porpoises can be reliably sighted. Capture efforts should be targeted on the areas where the animals are suffering the maximum risk of injury or death. The immediate tracking for the Baiji should be carried out once a Baiji has been sighted during the range-wide survey in order to obtain the accurate movement routes of the animals, which is crucial information for a successful capture operation.

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Lipotes vexillifer


Gui J, Wang D (2005): The Institute of Hydrobiology of the Chinese Academy of Sciences. We thank Mr. Alfred Hickey for improving the English on a previous draft of the manuscript.

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Appendix

Fig. 1: The expedition team undertaking the Pilot Yangtze Survey in March, 2006 (Dr. Ding Wang, the third from left in the front row)

Fig. 2: The Baiji named ‘Qi Qi’, rescued from fishing gear in the Yangtze River and rehabilitated in Baiji Dolphinarium for 22 years

Fig. 3: The Yangtze finless Porpoise, reared and reproduced successfully in Baiji Dolphinarium

Fig. 4: The principle team members, Dr. Ding Wang, Mr. August Pfluger, and Dr. Xianfeng Zhang (from left to right) and the research vessel ‘Kekao No. 1’