
Conservation of the Baiji: No Simple Solution

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The fate of the baiji, or Yangtze River dolphin (*Lipotes vexillifer*), as the most endangered cetacean species and perhaps even the rarest large mammal on Earth (Dudgeon 2005), has recently attracted attention worldwide (Reeves & Gales 2006 [this issue]). Baiji are not a cause célèbre, however, as Yang et al. (2006 [this issue]) assert. Over the past 20 years, the possible conservation strategies to save the species have been discussed extensively at scientific meetings (Perrin et al. 1989; Zhou et al. 1994; Reeves et al. 2000; IWC 2001; Braulik et al. 2005) but have received little, if any, widespread public attention.

At the Workshop on Biology and Conservation of the Platanistoid Dolphins, held at Wuhan in 1986, three measures were proposed to protect the baiji (Chen & Hua 1989): in situ conservation, ex situ conservation in seminatural reserves, and intensification of breeding research in captivity. At the same meeting, Kaiya Zhou (a co-author of Yang et al.) and his colleague, stated “we believe that one of the immediate rescue measures needed is to remove some dolphins from the natural habitat in the Yangtze to waters where shipping and fishing are prohibited” (Zhou & Li 1989).

In June 1993, an International Baiji Population and Habitat Viability Assessment Workshop was held in Nanjing. Consensus of the workshop, largely based on detailed population modeling conducted by M. Bruford, was that if current trends continued, the baiji would be extinct within a few decades (Zhou et al. 1994). The preliminary report from this workshop, by Ellis, two coauthors of Yang et al., and S. Leatherwood (1993), concluded that the species would not survive without intervention (Leatherwood & Reeves 1994).

It has been credibly claimed, after surveys in the Yangtze River during the 1980s, that baiji could be the first dolphin species in history that humans have driven

to extinction (Würsig & Tershy 1989). A Conservation Action Plan for Cetaceans of the Yangtze River was approved by the Chinese Government in 2001 (Ministry of Agriculture 2001). This plan reemphasized the three measures identified at the 1986 workshop and was later adopted as the national policy for the conservation of baiji. Despite these discussions, there is still little money available for conservation work of any kind in China, be it in situ or ex situ. We hope that Yang et al.’s contribution and the published responses, written by people who have been active in baiji issues over the past decade, will open the discussion to a wider audience, resulting in greater global interest in saving this species and others living in the threatened Yangtze River ecosystem.

Baiji used to be distributed throughout 1700 km of the middle and lower reaches of the Yangtze River, from Yichang to the estuary near Shanghai and in appended Dongting and Poyang Lakes. Now the species appears limited to several short sections of the river (Zhang et al. 2003).

In China the Yangtze is known as the Golden Channel of the Country. Human uses and disturbance of the river include overfishing and illegal fishing, pollution, shipping and transportation, sand extraction, flood control dykes, and dam construction. More than 95% of known baiji mortality is accounted for by harmful fishing gear, collisions with boat propellers, explosion-related construction, and other harmful human activities (Chen et al. 1997).

Since 1986, five in situ natural reserves have been established in areas of the river containing populations of dolphins, and where there are concurrent high mortality rates. Two seminatural reserves were also established: (1) Tian-e-Zhou National Baiji Natural Reserve, proposed by the Baiji Research Group (1989), is located in a 21-km-long and 1-2-km-wide old channel of the Yangtze River near

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Paper submitted August 29, 2005; revised manuscript accepted February 16, 2006.

Shishou City in Hubei Province; (2) Tongling Reserve, proposed by Zhou (1989), was established in a small channel between two islands of the Yangtze River near Tongling City in Anhui Province. This channel is approximately 1.5-km long and 200-m wide. Even though there are no baiji in either seminatural reserve at present, specimens of another endemic and endangered cetacean, the Yangtze finless porpoise (*Neophocoena phocaenoides asiaorientalis*), have been moved into the reserves. In both reserves, the porpoises survive and reproduce naturally and successfully. These efforts represent the world's first attempt at housing a cetacean in a seminatural reserve and, so far, the only successful example of ex situ management of a cetacean species (Wang et al. 2005).

The Institute of Hydrobiology of the Chinese Academy of Sciences has housed a group of Yangtze finless porpoises in indoor pools since 1996. In July 2005, a captive-bred Yangtze finless porpoise calf was born (the first freshwater cetacean ever born in captivity [Wang et al. 2005]), suggesting that with more effort it may be possible to establish a breeding population in captivity.

We completely agree with Yang et al. that preserving a species in its natural habitat should always be the first priority of species conservation. However, although rules to protect baiji habitats are in place, effective enforcement is an immense problem in such a huge river in a densely populated area of a developing country. Therefore, the success of in situ conservation is highly limited. For example, even though Dongting Lake is a protected reserve for the Yangtze finless porpoise, at least six died in the area between April and June 2004 due to the use of a chemical pesticide to control schistosomes (Wang et al. 2005).

Yang et al. suspect that an ex situ "program would not increase the probability of survival of the baiji as opposed to leaving the population intact in situ." However, as Zhou and Li (1989) explained as early as the late 1980s, it is very difficult to protect baiji in the river, and since then the situation has worsened. For example, the number of boats in the river has increased approximately fivefold since the late 1980s (Chen et al. 1993; D.W. et al., unpublished data). The population of finless porpoises decreased annually by approximately 7.3% from 1989 to 1999 (Wei et al. 2002). It is now considered highly unlikely that conditions in the river will improve in the foreseeable future (Zhou et al. 1998; Ministry of Agriculture 2001).

Given the evidence and data summarized above, some experts have recently claimed, "the prospects for its [the baiji] survival are extremely doubtful" (Reeves et al. 2003) and that "the baiji is certain to become extinct if left to languish in the Yangtze" (Dudgeon 2005). Because of this dire situation, the 2004 workshop, convened at the request of Chinese authorities, focused on ex situ options for conservation, but in situ measures were not ignored as Yang et al. claim. Workshop conclusions emphasized that "China's successful program of capture, translocat-

ion, and maintenance of finless porpoise in the Shishou oxbow has demonstrated its adequacy as an ex situ environment for cetaceans" (Braulik et al. 2005), but the report does not suggest that we should remove "all remaining individuals" (Yang et al.) to ex situ reserves, and it states clearly that "it is crucial that the ex situ baiji population is not seen as a substitute for conservation in the wild and that eventual reintroduction or restocking in the Yangtze River remains the ultimate objective of the ex situ effort." In fact, most participants believe that the two approaches are integral to a comprehensive management and recovery strategy and that they should continue concurrently. It is essential to maximize our future options by establishing a population to provide insurance against extinction by preserving at least some of the baiji (and thus their genetic material) in the oxbow.

We agree that capturing a viable group of baiji individuals for conservation is an enormous challenge. But, we are not willing to throw up our hands and declare that it is too difficult. Loss of the baiji means the loss of an entire mammalian family—an evolutionary lineage (Dudgeon 2005). Certainly, if ex situ measures had been carried out much earlier, in the 1980s when the baiji could be seen more frequently in the river, perhaps it would have been easier to reach our goals of eventual species recovery.

Although there may be a slim chance of success in collecting enough baiji to develop a viable ex situ program within seminatural reserves, we do not believe that sitting back and hoping that the Yangtze environment will improve quickly, against all the evidence to the contrary, is a satisfactory alternative. Furthermore, much as the giant panda (*Ailuropoda melanoleuca*) is a symbol for conservation of land animals, given its status as a national treasure of China, the baiji is a flagship species of aquatic animal conservation (Leatherwood & Reeves 1994). We hope conservation actions for baiji will attract the world's attention to environmental problems in China and help protect the Yangtze ecosystems and the species living within before it is too late.

The conservation of baiji can be furthered through the acceptance and/or consideration of the following points:

- (1) Because the Chinese economy is thriving and consumption of resources increasing, development of the Yangtze River is unavoidable. We cannot realistically expect a change for the better in the foreseeable future. The risk of losing the baiji is unacceptably high if we use a one-pronged strategy of leaving the animal alone in the river.
- (2) There are risks inherent in developing an ex situ conservation program, including capture, rearing, and breeding. However, Chinese cetacean managers have experienced many of these risks in previous attempts and have learned a great deal. Therefore, with input from international cetacean experts, at least some risks are at least partly predictable and

can be avoided or minimized with a carefully designed program with adequate resources.

- (3) In situ and ex situ conservation measures should be considered as complementary parts of a single conservation strategy. Ex situ measures must be implemented immediately as an emergency response.
- (4) Conservation of the Yangtze finless porpoise must be included in a comprehensive strategy with their conservation given high priority immediately. Otherwise, the porpoise will share the uncertain future of the baiji, and there will be no more marine mammals in China's mighty river.

We recognize that the chance of saving baiji from extinction is not as great as we would wish, yet we believe the potential benefits of establishing an ex situ program are worth the risks and costs, especially considering the option proposed by Yang et al. of letting the species quietly go extinct. We believe that no species should suffer the indignity of extinction simply because we consciously choose not to try and save it.

Acknowledgments

This work was supported by Chinese Academy of Sciences (CAS) (KSCX2-SW-118), the Institute of Hydrobiology of CAS (220103), and the Ministry of Science and Technology of China (2004DFB03000).

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