

A conservation strategy for the Mekong giant catfish

By Kai Lorenzen and Naruepon Sukumasavin

The Mekong giant catfish *Pangasianodon gigas* is one of the world's largest freshwater fish and a charismatic animal revered throughout the lower Mekong. Its capture in fisheries is very rare, and invariably attracts great attention in the local and regional media. For this reason and the fact that its life history (long-lived, late-maturing and long-distance migrant) makes the species vulnerable to human disturbances from fishing to dam building, it is widely seen as a 'flagship species' for conservation of the lower Mekong ecosystem and its fisheries.

The Mekong giant catfish has long been considered rare and endangered. As early as in the 1940s, French investigators in Cambodia recommended that the species be afforded special protection. Since 2003 it is listed as 'critically endangered' on the IUCN Red List. The species is protected by national law in

most countries of the lower basin, and subject to a variety of conservation initiatives. Harvesting of the giant catfish is controlled throughout much of its range by a combination of laws and voluntary agreements. The Thai Department of Fisheries runs a captive breeding programme, and several organisations conduct work to identify and protect the species' habitat. Until recently the various conservation initiatives were at best loosely coordinated, and their effectiveness was often unknown. Some measures, such as the capture of wild spawners to establish a captive population, were highly controversial.

Mekong Giant Catfish Working Group

It was against this background that in 2005, the Mekong Giant Catfish Working Group (MGCWG) was set up to coordinate and evaluate conservation initiatives and develop an overarching conservation

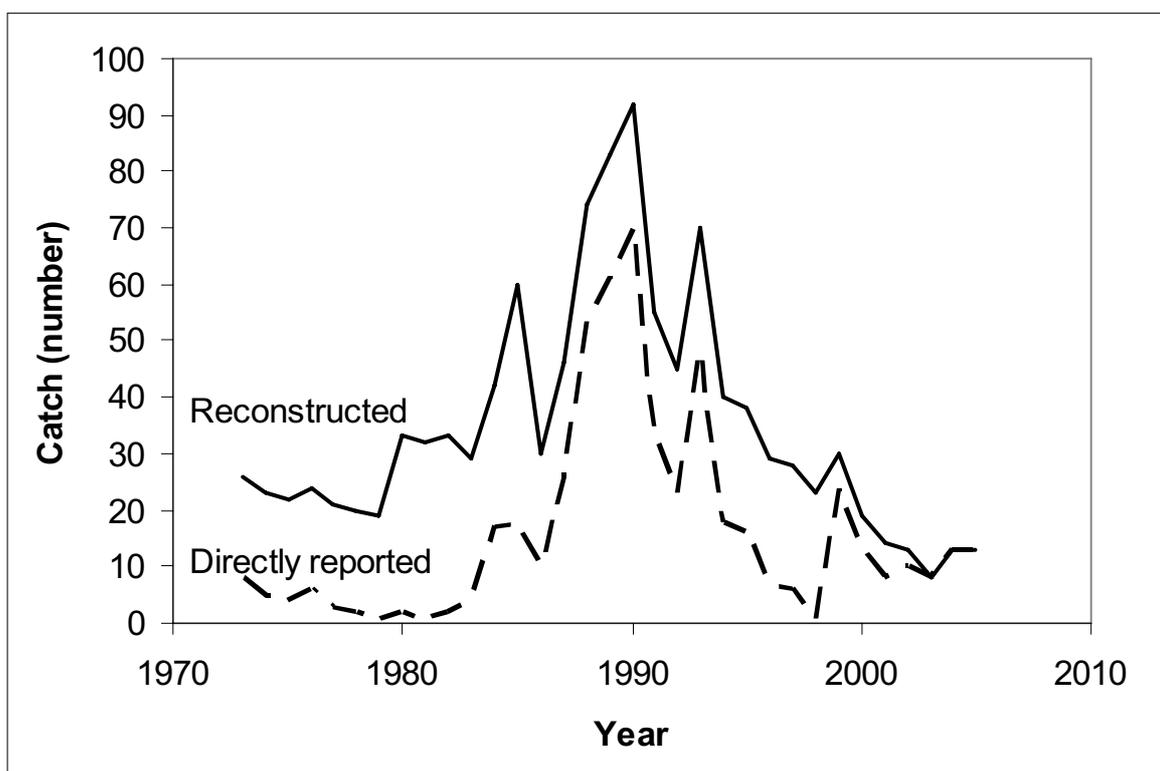


Figure 1. Reported and reconstructed catches of Mekong giant catfish since 1970.

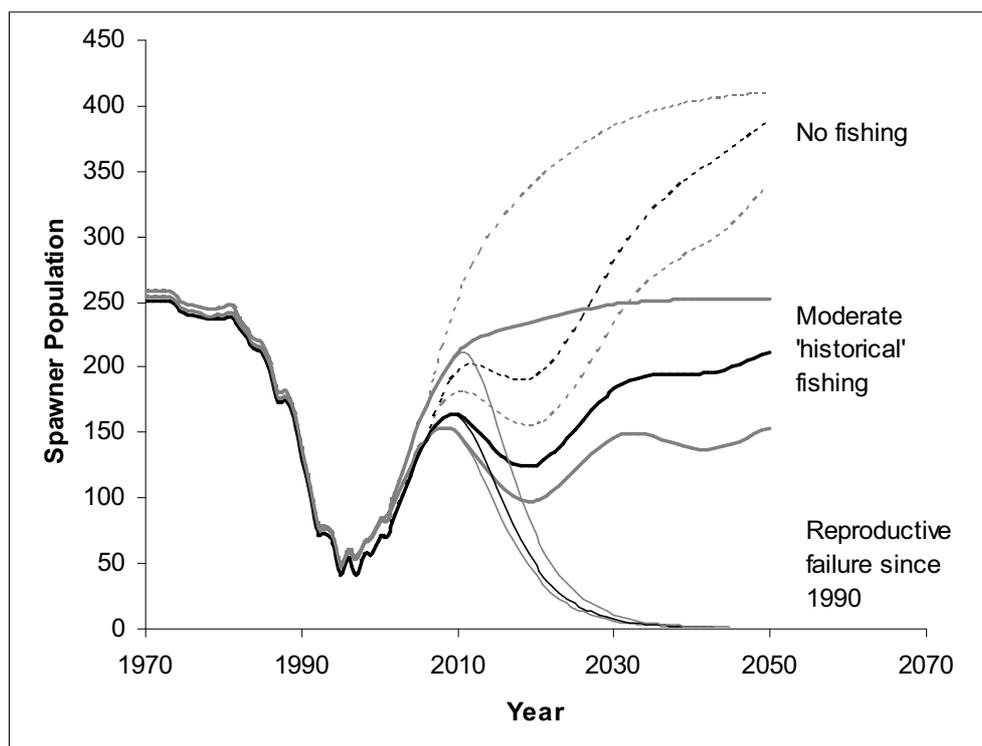


Figure 2. Spawner population numbers of Mekong giant catfish from 1970 to 2050. Numbers from 1970 to 2006 were estimated from fisheries data using a population model. Predictions to 2050 were obtained from the same model, for different assumptions regarding future fishing and reproductive success. Predictions are shown for different assumptions about the unknown degree of recruitment compensation at low population size.

strategy. The MGCWG brings together the major relevant organisations including the MRC Fisheries Programme, Mekong Wetlands Biodiversity Programme, Cambodian Fisheries Administration, Lao Department of Livestock and Fisheries, Thai Department of Fisheries, Network of Aquaculture Centers in Asia-Pacific, Kasetsart University, WWF, IUCN, and Imperial College London. The conservation strategy was developed through a series of workshops, combined with focused research to assess the status of the wild and captive populations and the likely effectiveness of management options. The conservation strategy process and the population assessment research informing it were supported by a two-year project from the UK Darwin Initiative.

Historical catches

To assess the status of the wild population, data on the history of catfish fishing (fishing practices, effort and catches) and environmental change in the Mekong basin were collated from multiple sources. The data indicate that the giant catfish is unlikely ever to have been caught in large numbers. For much of the 20th century the basin-wide catch averaged about 20-30 fish per year. Annual catches increased dramatically from the early 1980s to a maximum of 90 in 1990, but declined thereafter and are now well

below the pre-1980 average (Figure 1).

The changes in catches over the past 25 years reflect an intensification, and subsequent decline of the traditional fishery near the species' main spawning grounds at Chiang Khong/Houasai in Northern Thailand and Lao. The intensification of this fishery was linked to the initiation of the captive breeding programme, which directly increased demand for mature wild fish but also attracted great media attention and established the catfish fishing season at Chiang Khong as a national tourist attraction. The fishery eventually declined as the population became depleted and returns to fishing effort diminished. Environmental change in the Mekong basin has been gradual and of moderate magnitude until the very recent past, and is unlikely to have been a significant factor in past population change.

Population modelling

A mathematical model was used to reconstruct the dynamics of the population since 1970, and to predict its future development under different scenarios (Figure 2). Reconstructed spawner abundance shows a relatively stable population of about 240 animals prior to 1983. Intensification of the Chiang Khong / Houasai fishery then depleted the population by 80%



The Mekong giant catfish, an iconic species from the Mekong River system, is one of the world's largest freshwater fishes.

PHOTO: ZEB HOGAN

to just 50 in 1995. The model predicts that the population has since recovered significantly, largely due to maturation of fish that were spawned prior to 1990. The current spawner abundance is estimated at 155-185 animals, depending on the (unknown) degree of compensation in the species' stock-recruitment relationship. Spawner abundance in the absence of fishing has been estimated at 400-730 animals, and this is broadly consistent with an independent assessment of genetically effective population size based on molecular genetic techniques.

The population is predicted to return to its pre-1980 abundance if moderate 'historical' levels of fishing are maintained, but is unlikely to do so until well after 2050. If fishing ceased completely, the population would increase faster and exceed its pre-1980 abundance by 2030. Given the species' longevity and late maturation, reproductive failure due to environmental factors or depletion of the spawning stock would become evident in the spawner population only after about 20 years (Figure 2).

Threats

While the threat of fishing is now largely controlled, new and potentially severe threats to the wild population are emerging. The most important is the accelerating and increasingly significant environmental change in the Mekong basin.

Navigational improvements including 'rapid blasting', the commissioning of hydropower dams, and land use change in seasonally flooded areas are among the factors likely to affect much of the species' habitat over the next decade. Multiple initiatives are under way to control these developments, but the new threat is undoubtedly serious and much less quantifiable than the impact of fishing. In this situation of great uncertainty for the wild population, the captive breeding programme provides a vital safeguard for the species' existence.

A second new threat may arise from escapes of giant catfish from commercial aquaculture, and the ecological and genetic interactions of partially domesticated animals with wild fish. At present, giant catfish farming is not a major industry and the threat of escapes is low, but this situation should be monitored.

Conservation strategy

Based on population assessment and extensive consultations, the MGCWG has developed a conservation strategy with the following key elements: (1) Very restricted harvesting of giant catfish (less than 10 animals per year basin-wide at the current, depleted state of the population, and no more than 20 per year in the long term). At present this target is being met, and institutional arrangements to manage

fishing pressure are largely in place.

(2) Conservation of essential habitat. Given that habitat use and migration patterns of the species are poorly known, the spawning grounds north of Chiang Khong / Houasai is the only area that can be clearly identified and demarcated as essential habitat. However, maintaining the wider Mekong ecosystem (flows, physical habitats and connectivity) clearly is important in ensuring the long-term survival of the species in the wild.

(3) Maintenance of a viable and genetically representative captive population for eventual supplementation or re-introduction, should the wild population decline further. Genetic analysis shows that the population maintained by the Thai Department of Fisheries will meet this aim, provided that it is carefully managed. A management strategy to this end has been developed. However, no releases of captive-bred fish into the Mekong basin are recommended while the wild population has the capacity to recover naturally.

(4) The development of commercial aquaculture of giant catfish should be monitored, and measures taken to minimise escapes into the Mekong basin should the industry expand significantly.

(5) Regular monitoring of threats and the population will be undertaken under the auspices of the MGCWG, and conservation measures adapted as required. The strategy will be implemented by multiple institutions, hopefully with the MRC Technical Advisory

Body for Fisheries Management (TAB) assuming a coordinating function and conducting annual reviews of monitoring information.

The Mekong giant catfish conservation strategy is an important milestone in the conservation of the basin's large migratory fish. It provides an example of a systematic, science-based and consultative conservation planning process for a large freshwater fish that is likely to be applicable to other species in the region and elsewhere in the tropics. It also shows how long-term monitoring data, such as that being collected under the MRC Fisheries Programme, can be utilized to support rigorous assessment and better decision making in resource management. Last but not least, it sets an example of constructive engagement between multiple organisations, from government departments to NGOs, for the purpose of freshwater conservation.

Further reading:

Documents relating to Mekong giant catfish population modelling and the conservation strategy can be found on:

<http://www.aquaticresources.org/mekongcatfish.html>.

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