



## Mekong Wetlands Biodiversity Conservation and Sustainable Use Programme

### Mekong Giant Catfish (*Pangasianodon gigas*) - Observation and Comments about Handling and Suggestions for Improvement

Technical information of the Mekong Wetlands Biodiversity Conservation and Sustainable Use Programme

#### BACKGROUND

Fishing mortality is a significant threat to the Mekong Giant Catfish as fishermen continue to catch and sell the fish despite the fact that the species is critically endangered. The Tonle Sap River bagnet (dai) fishery is one of the two places where wild Giant Catfish are caught on a regular basis. Without regulation, fishing mortality from bagnets equals approximately 5-10 fish per year.

The Mekong Wetlands Biodiversity Conservation and Sustainable Use Programme (MWBP), in cooperation with the Cambodian Department of Fisheries and the MRC Fisheries Programme, is re-implementing a Giant Catfish tag and release project in Cambodia in order to study the migratory behaviour of *P. gigas*. The tag and release programme was first implemented in 2001. The fish caught in the dais are bought from the dai operators, tagged and released. This buy and release approach provides a low cost, short-term solution to fishing mortality. The scheme does not harm the fisher's livelihood and provides an opportunity for additional research (e.g. tissue sampling for genetics studies).

During the 2004 dai season three out of five Giant Catfish caught in the dai fishery died after release (table 1). The continued

mortality of a significant percentage of bagnet-caught Mekong Giant Catfish indicates that the methodology of the buy and release programme needs to be reworked.

Location	Tag Number	Length (cm)	Weight (kg)	Condition when released
Dai 2D	2890	64	3.4	good
Dai 2D	2124	179	90	good
Dai 5C	2111	260	230	Fish died
Dai 2A	2139	253	200	good
Dai 2D	2966	250	200	good
Chong Kneas, Siem Reap	2969	134	30	good

**Table 1.** Mekong Giant Catfish captured in the Tonle Sap River bagnet fishery and Tonle Sap Lake fishing lots, October – December 2005. Of the five Giant Catfish captured in the dai, one died before release because the bagnet owners would not sell the fish to the Department of Fisheries and two died after release, presumably due to capture stress.

It has been standard practice for the tag and release programme to rely on the bagnet operators to remove fish from the nets, transport them to holding area, and wait for our tagging team to arrive. Typically, the project uses "local" methods - fish are most often transferred from the net to the bottom of

a boat, and then taken to a net pen underneath or to the side of a floating house. The fish receive no medicine and are released immediately after tagging - in the belief that minimising handling time minimises stress. Up until now, the project has had no veterinarian.

The exact reason for the death of the Mekong Giant Catfish is unknown, but it seems that capture in the dai net harms the fish. Generally speaking, the size of the fish and its chances of survival are inversely correlated (i.e. the larger the fish, the less likely it is to survive).

Based on comments from Martin Gilbert (field veterinarian, WCS Cambodia), and Jim Robinett and the veterinarian staff of the Shedd Aquarium in Chicago (USA), the damage is likely done before the fish makes it to the tagging team. The problem may be severe lactic acidosis event due to overexertion during capture. If so, these mortalities are related to exertional rhabdomyolysis or "capture myopathy". This explains the slight delay in the actual death of the fish which is a typical feature of capture myopathy.

The presence/absence of lactic acidosis can be tested by sampling the fish's blood for pH, lactic acid, O<sub>2</sub>, and CO<sub>2</sub> levels. Capture myopathy can also be confirmed by histological exam of the skeletal muscle from one of the dead animals. If the cause of death is capture myopathy, then the capture method must be modified and/or the fish need to be given intravenous injections of isotonic fluids and an alkalinising agent such as sodium bicarbonate or sodium acetate as soon as possible post-capture.

Other factors that could contribute to the poor health of the fish may include:

- 1) the length of time that the fish is in the dai;
- 2) handling of the fish as it is removed from the dai;
- 3) length of time that the fish is held after it is removed from the dai but before it is released;
- 4) the method that the fish is held (e.g. tied by rope through the mouth, etc.);
- 5) handling during tagging, measurement, and photography, including removal of the fish from the water for weight measurements,

- or;
- 6) disease/infection post-release.

Capture-related stress seems to be a more likely cause of mortality than post-capture stress, because mortality rates are about 50% regardless of whether or not efforts are taken to minimise post-capture stress.

## RECOMMENDATIONS

The following steps may reduce future fish mortality (or at least reduce post-capture stress): 1) initiation of 24 hour surveillance of the dais by fisheries staff; 2) oversight by an on-call veterinarian available during the peak giant catfish season; 3) construction of a holding pen for rehabilitation of captured fish; 4) use of medicine to speed recovery; and 5) training of dai operators and labourers about gentle handling procedures post-capture. If these steps are not effective in limiting fish mortality, the suspension of dai operations from 15 October to 1 December every year would prevent Mekong Giant Catfish from being caught and killed in the dai fishery.

## HOLDING PENS FOR REHABILITATION

**1. Wooden Cage:** The dai operators store fish using two methods, either in net pens underneath their floating houses or in floating wooden cages. To date, dai owners have not offered to keep the giant catfish in the cages underneath their house, perhaps because it would be nearly impossible to recapture the fish. Wooden cages do not seem like a good option because, in general, they are too small to allow the fish to swim freely. One variation on a wooden cage is the huge wooden "cage boats" that fish merchants use to transport fish from the Tonle Sap Lake to the Tonle Sap River. These cages can be in excess of 10 metres wide and 30 metres long.

**2. Net Pen:** The net pan is the traditional method of holding fish in the Tonle Sap Lake. Giant Catfish have been held in net pens in the Tonle Sap Lake for several weeks. Net pens may be the best option as holding pens for rehabilitation of Mekong Giant Catfish. The main constraint is finding a location for the net pen. The location would need to be large enough to hold a giant catfish, close to the dais, and secure.

**3. Holding Pond:** Giant Catfish have been held successfully in ponds in Cambodia and Thailand. The main constraint is finding a secure location for the holding pond. Water quality could also be a problem unless it is closely monitored.

**4. Plastic Holding Tank:** A large plastic tank could be partially submerged in the river next to the dais. Giant Catfish could be placed in the pond with clean, medicated water to observe recovery.

**5. Sling for Holding the Fish:** The Mekong River Commission Fisheries Programme (Chris Barlow) and others have recommended transporting the fish by stretcher rather than holding them on the end of a rope (figure 1). While it is easy enough to transport the fish by plastic trap, it is not that easy to use a stretcher for the largest fish. The largest fish are too massive to fit in a normal size stretcher or to be lifted by less than four adults. It also should be noted, as mentioned previously, that fish appear to be injured during capture, not during handling.

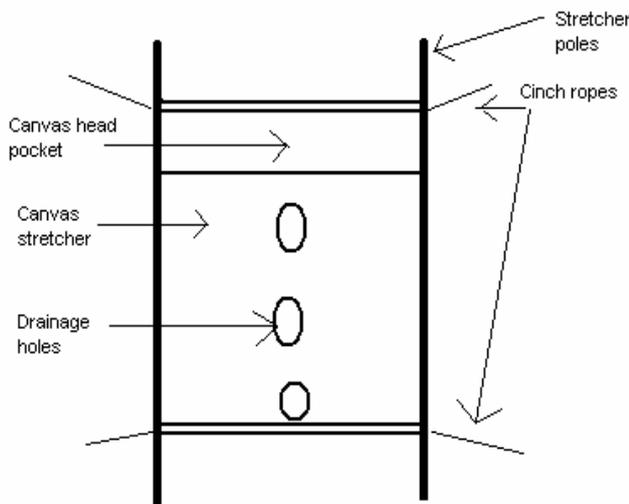


Figure 1: A simple sling for holding a fish during transport.

**MEDICINE TO AID FISH RECOVERY**

1. High dose anti oxidants: Vitamin B complex (3-5ml/100kg), Vitamin C, Vitamin E (10 IU/kg), Selenium
2. Anti-inflammatories: Banamine (0.3mg/kg), Dexamethasone (1-2 mg/kg)  
ATP Glucose Mn Mg Zn Injectable  
combination: Biosolomine  
NaHCO<sub>3</sub> (parenteral and oral to a total dose of 2 meq/kg)
3. Cimetidine to decrease gastric acid secretion
4. Prophylactic antibiotic : potentiated penicillin and Amikacin (2.5mg/kg)

**References Related to Capture Stress:**

Manire et al. 2001. Serological changes associated with gill-net capture and restraint in three species of sharks. *Trans Am Fish Soc* 130: 1038-1048.

Cliff G, Thurman GD. 1984. Pathological and physiological effects of stress during capture and transport in the juvenile dusky shark, *Carcharhinus obscurus*. *Comp Biochem Physiol* 78A: 167-173.

Wells RMG, Davie PS. 1985. Oxygen binding by the blood and hematological effects of capture stress in two big game-fish: mako shark and striped marlin. *Comp Biochem Physiol* 81A: 643-646.

Wells et al. 1986. Physiological stress responses in big gamefish after capture: observations on plasma chemistry and blood factors. *Comp Biochem Physiol* 84A: 565-571.

*The information above has been compiled by Dr. Zeb Hogan, catfish component coordinator of the MWBP with the help of the Mekong River Commission Fisheries Program, the Wildlife Conservation Society, and the Shedd Aquarium.*



## Mekong Wetlands Biodiversity Conservation and Sustainable Use Programme

The Mekong Wetlands Biodiversity Conservation and Sustainable Use Programme (MWBP) is a joint programme of the four riparian governments of the Lower Mekong Basin – Cambodia, Lao PDR, Thailand and Viet Nam – managed by the United Nations Development Programme (UNDP), IUCN – The World Conservation Union (IUCN) and the Mekong River Commission (MRC), in collaboration with other key stakeholders. With funding from the Global Environment Facility (GEF), UNDP, the Royal Netherlands Government, MRCS, the Water and Nature Initiative (WANI) and other donors, the programme addresses the most critical issues for the conservation and sustainable use of natural resources in the Mekong wetlands. MWBP aims to strengthen the capacity of organisations and people to develop sustainable livelihoods and manage wetland biodiversity resources wisely. It is a five-year (2004-2009) intervention at three levels – regional, national and local – with demonstration wetland areas in each of the four countries: in the Songkhram river basin, Thailand; in Attapeu province in southern Lao PDR; in Stung Treng, Cambodia; and in the Plain of Reeds in the Mekong Delta, Viet Nam. The programme aims to:

- Improve coordination for wetland planning from regional to local levels
- Strengthen policy and economic environments for wetland conservation
- Generate and share information
- Train and build capacity for the wise use of wetlands
- Create alternative options for sustainable natural resource use and improve livelihoods

The programme, a partnership between governments, aid agencies and NGOs, provides a framework for complementary work for wetland conservation and sustainable livelihoods in the Lower Mekong Basin.

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