

*Development of a conservation
strategy for the critically endangered
Mekong giant catfish*



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First annual report

April 2006

Darwin Initiative

Annual Report

1. Darwin Project Information

Project Ref. No.	14/053
Project Title	Development of a conservation strategy for the critically endangered Mekong giant catfish
Country(ies)	Lower Mekong region (Cambodia, Laos, Thailand, Vietnam)
UK Organisation	Imperial College London
Partners organisations	Network of Aquaculture Centers in Asia-Pacific (NACA); Mekong River Commission (MRC); UNDP/IUCN/MRC Mekong Wetlands Biodiversity Programme (MWBP); FAO Fisheries Department; Royal Cambodian Department of Fisheries; Lao Department of Livestock and Fisheries; Royal Thai Department of Fisheries.
Darwin grant value	£ 86,752
Start/End dates	1 April 2005 to 31 March 2007
Reporting period	1 April 2005 to 31 March 2006 (First annual report)
Project website	www.aquaticresources.org/darwin14053.html
Author, date	Dr Kai Lorenzen, 29 April 2006

2. Project Background

Many species of freshwater fish are acutely threatened by overfishing and loss of habitat or habitat connectivity. Large and long-lived riverine species, which often migrate over long distances to complete their life cycle are particularly at risk. The Mekong giant catfish (*Pangasianodon gigas*) provides a striking case in point. Having historically supported a significant fishery, the wild population is now believed to number at best a few hundred individuals. The species has been listed as critically endangered in the 2003 IUCN Red List. Its precarious status is likely to be the result of excessive targeted and incidental harvesting over the past twenty years, and to a lesser extent habitat degradation.

A charismatic animal revered throughout the lower Mekong, the giant catfish has become the flagship species for aquatic biodiversity conservation in the Mekong river system. Given the critical state of the population, conservation and eventual recovery will require a combination of captive breeding, reduction in harvest, and conservation/restoration of critical habitat. A captive breeding programme has been instituted by the Thai Department of Fisheries, which in 2003 released 7200

juveniles into the Mekong. A buy and release scheme operated by the Mekong Fish Conservation Projects (an NGO) buys a significant share of the small number of adult catfish still caught in fisheries and releases these after tagging and tissue sampling for genetic analysis. However, significant incidental harvest of juveniles continues to be a problem. Information on giant catfish biology, habitat use and migrations has been assembled on a basin wide scale by the Mekong River Commission Fisheries Programme, and is being used to identify critical habitats. Despite of these promising initiatives, there is currently no overall conservation and recovery strategy for the giant catfish, and the effectiveness of measures taken so far is largely unknown.

3. Project Purpose and Outputs

The purpose of the project is to develop an overarching conservation strategy for the Mekong giant catfish integrating, as appropriate, supportive breeding with harvest and habitat management. This will involve (1) quantitative assessment of population status based on existing information, (2) quantitative assessment of the likely effectiveness of different conservation measures such as supportive breeding, harvest restrictions and habitat conservation/restoration which may be implemented separately or in combination; (3) review and improvement of captive breeding procedures; (4) promotion of appropriate adaptive policies for the further development of the strategy; and (5) definition of an overall conservation strategy in consultation with a broad range of target institutions. At the core of the project is the quantitative assessment of current population status, and of recovery trajectories given alternative conservation measures and extrinsic scenarios of harvest and habitat change. Population dynamics models are being developed and tested against existing historical catch, effort and habitat data, and results from release experiments with hatchery fish.

Some changes have been made to the original work plan in response to new insights gained during workshops. Principally, these involve a greater emphasis on genetic analysis and development of breeding plans for the captive population, and on workshop activities with a broad range of partners. The overall work plan, budget and outputs of the project are not be affected.

3. Progress

Overall progress of the project has been very good. A conservation strategy process has been initiated and is progressing rapidly with buy-in from all major stakeholders. Most outputs have been achieved as planned and the project has been enhanced by initiating molecular genetics work crucial to the development of better breeding strategies for the captive population. The following sections provide an overview of progress by purpose and individual outputs.

Purpose: conservation strategy development

A highly successful inception workshop was held in Bangkok in August 2005, bringing together representatives of the original project partners as well as several additional organisations. The meeting achieved a broad-based review of the species' status, conservation aims and measures, and research and information requirements. Most importantly, the meeting succeeded in establishing the Mekong Giant Catfish Working Group (MGCWG): a coalition of all major stakeholders, who have agreed to join forces in the development of an overarching conservation strategy. A joint conservation strategy process has been developed. The second major workshop in this strategy process was held in Phnom Penh in December,

hosted by our partners the MWBP and the Royal Cambodian Department of Fisheries. Virtually all existing information has been collated and preliminary analyses completed. The workshops have provided a number of important insights and new perspectives, which have prompted some changes in emphasis of the research activities proposed under the project. The conservation strategy process has proved to be effective and responsive, and enjoys broad support from stakeholders.

Output 1: Conservation status of giant catfish assessed quantitatively

Detailed information on Mekong giant catfish catches over the past 20 years has been assembled, and analysed using mathematical population models. Preliminary results suggest that the mature population suffers a harvest rate of about 0.2-0.4 year⁻¹, a value that is moderate in absolute terms for a fished stock, but substantially higher than the estimated population growth rate of the giant catfish of about 0.05-0.1 year⁻¹. This suggests that the population has suffered long-term decline as a result of overfishing, and that the current wild population may number no more than 100-200 adults. However, such conclusions are very sensitive to various assumptions which can only be tested against longer-term data. Hence the project is currently reconstructing historical fishing practice and catch patterns from documents and interviews with old fishers. These data are expected to allow a more conclusive analysis of past decline and thus, prospects for population recovery.

Output 2: Scope for supportive breeding, habitat and harvest management evaluated quantitatively

Work on this output has progressed along two lines. Management options have been identified and their practical potential and limitations evaluated in two MGCWG workshops. Quantitative evaluation of the effectiveness of conservation options will be based on the models being developed under Output 1, and this work is due to be completed in June once the crucial historical information has been analysed. Results so far suggest that harvesting of giant catfish is concentrated in two locations, a targeted fishery for spawning fish in Chiang Khong (Thailand) and incidental catches in just one large Dai net in the Tonle Sap river (Cambodia). Harvesting in these locations would be relatively easy to control, and in fact the fishers of Chiang Khong have agreed to halt the targeted fishery for this year. Even with these harvest reductions, however, diffuse and entirely incidental harvesting may be too intensive to allow recovery of the critically endangered population. Such incidental catches are very rare and unpredictable, and there are no practicable countermeasures. This suggests that the continued existence of the species can only be secured on the basis of the captive population, which will also allow supplementation or re-introduction of the wild population in the future. Appropriate genetic management of the captive population is therefore crucially important (see Output 3). Habitat degradation is not thought to have played a major role in the decline of the catfish population, but may become a limiting factor in population recovery.

Output 3: Opportunities to improve captive breeding and translocation practices assessed

The captive breeding programme of the Thai Department of Fisheries has been reviewed. The captive population of Mekong giant catfish is far larger and more diverse than initially thought, holding almost 20,000 individuals in 22 age groups, derived from over 100 wild parents. This population is clearly a critical resource for conservation of the species, and may well contain greater genetic variation than the remnant wild population. Appropriate genetic management of the captive population is thus of crucial importance. In recognition of this, the project supports molecular

genetic analyses of those captive fish likely to reach maturity within the next five to ten years. The resulting data will be used to define a detailed breeding plan aimed at maintaining the greatest possible genetic diversity in the captive population. This work is carried out by Kasetsart University (Thailand) in close collaboration with Imperial College and NACA. A major review paper on issues surrounding captive breeding and domestication of fish has been completed and submitted.

Output 4: Adaptive management policies developed

Work on adaptive management policies will build on Outputs 1 and 2, and no specific activities have yet been carried out.

Work plan for next reporting period

Work during the next reporting period (April-September 2006) will focus on the completion of quantitative analyses of population status and recovery options. Historical information from archival searches and interviews with fishers will be available in May and analysis modelling will be finalized in June. Dr Naruepon Sukumasavin, Darwin Project coordinator and Chair of the MGCWG, will visit Imperial College for two weeks to work closely with the project leader on this task. The quantitative assessment will culminate in the third MGCWG workshop, to be held in Vientiane, Lao PDR in August 2006.

Molecular genetic analysis will continue throughout the period, to be completed in September/October 2006. The data will then be used to in conjunction with population genetics models in order to develop a detailed breeding plan for the next 5-10 years.

5. Actions taken in response to previous reviews (if applicable)

No particular issues have been raised by reviewers of the half-yearly report.

6. Partnerships

Partnerships between UK and host country organisations have been positive and effective. The project faced a somewhat challenging situation initially, given that giant catfish conservation is a high profile and controversial issue in the Mekong region. It was thus necessary to find a constructive way of bringing stakeholders together despite opposing views and rivalries. The project has achieved this very effectively by establishing a new forum not directly associated with any existing stakeholder: the Mekong Giant Catfish Working Group. Current members include the Fisheries Departments of Cambodia, Laos, Thailand and Vietnam, the Network of Aquaculture Centers in Asia-Pacific, FAO, Mekong River Commission, Mekong Wetlands Biodiversity Project, WWF Indochina, Kasetsart University (Bangkok), and Imperial College London. The group is an informal association that has drawn in all major stakeholders and set its own framework and mode of working. Its major outputs are jointly 'branded', thus avoiding rivalry and encouraging commitment. So far this setup has worked extremely well, with all stakeholders contributing to the joint process and assuming ownership of the outputs.

The project has benefited from linkages with a DFID project (also led by Dr Kai Lorenzen) developing a decision support tool for fish stocking programmes. The tool can be applied to the analysis of supplementation strategies. Many of the Darwin project partners have been trained in the use of the decision tool.

7. Impact and Sustainability

The project enjoys a very high profile among major stakeholders, due to its role in establishing and maintaining the MGCWG. All stakeholders are enthusiastic about the development of an overarching, long-term conservation strategy and have contributed activities and staff time and effort. Apart from coordinating many ongoing activities, the project has started significant new initiatives including historical, molecular genetics, and population dynamics studies. By establishing the MGCWG the project has created a self-sustaining entity that has already been adopted as the central forum for giant catfish conservation and is supported by the major stakeholders. The MGCWG is now chaired by Dr Naruepon Sukumasavin of the Thai Department of Fisheries (Darwin Project Officer), who will continue in this role after project completion.

The conservation strategy process has the support of the major stakeholders, and many components of the evolving strategy are sufficiently resourced for the intermediate future. The captive breeding programme clearly is the most expensive activity, and improved stock management will require additional resources. This issue is being addressed by incorporating economic considerations into the management plan, and by helping the partner to prepare applications for additional funding. Overall, prospects for the long-term sustainability of project outputs are thus excellent.

8. Outputs, Outcomes and Dissemination

On the whole, outputs have been achieved to plan (table 1). A planned paper on the population dynamics of supportive breeding has not yet been completed, due to greater emphasis being given in the first year to setting up the MWGC and initiating the molecular genetics study. The latter work will result in additional outputs, while the supportive breeding paper will be completed in the next reporting period.

It was originally planned to issue quarterly project newsletters. This was proposed at the WMGC inception meeting, but participants felt that it would be more useful to include information on the project in existing regional newsletters (which are well established and reach a wide audience). The decision was thus made not to start a new newsletter and this output has been dropped.

Dissemination activities have included the first MGCWG report, a newsletter article, a press release, and a website that is currently being populated with Mekong giant catfish conservation information.

Table 1. Project Outputs (In brackets: to be achieved in the next year)

Code No.	Description	Year 1 Total	Year 2 Total	Year 3 Total	Year 4 Total	TOTAL
5	Staff from host countries to receive long-term training	5	(continuing)			(5)
8	Weeks UK staff spent in host countries	7	(9)			(16)
9	Management plan for Mekong giant catfish	0	(1)			(1)
11B	Peer-reviewed papers submitted	1	(3)			(4)
14A	Workshops organized	2	(1)			(3)
14B	Conferences/workshops attended	1	(1)			(2)
15B	Press releases in host country	1				None in proposal
16A	Newsletters	0	0			Output dropped (see 8)
17B	Number of dissemination networks established or enhanced	1	(continuing)			(1)
23	Contributions in kind from host countries, NACA and FAO	42,000	(46,000)			(88,000)

Table 2: Publications

Type *	Detail	Publishers	Available from	Cost £
(e.g. journals, manual, CDs)	(title, author, year)	(name, city)	(e.g. contact address, website)	
Report	<i>(*)MGCWG (2005) Development of a conservation strategy for the critically endangered Mekong giant catfish: joint inception and planning workshop. Mekong Giant Catfish Working Group Report 1. 31 pp.</i>	MGCWG/N ACA	www.aquaticresources.org/darwin14053.html	Free

9. Project Expenditure

Table 3: Project expenditure during the reporting period (Defra Financial Year 01 April 2005 to 31 March 2006)

Item	Budget (please indicate which document you refer to if other than your project schedule)	Expenditure	Balance
Rent, rates, heating, overheads etc	9,801	9,801	0
Office costs (e.g. postage, telephone, stationery)			
Travel and subsistence	1,500	4,279	-2779
Printing			
Conferences, seminars, etc			
Capital items/equipment	0	524	-524
Others	21,400	18,097	3,303
Salaries (specify)	9,075	9,075	0
TOTAL	41,776	41,776	0

There has been a small reduction in the partner costs and increase in travel. This reflects lower than expected partner costs due small changes in allocation, and travel support for a PhD student undertaking historical survey work.

10. Monitoring, Evaluation and Lessons

At a basic level, project performance has been monitored against the indicators specified in the proposal (see above). More importantly, the MGCWG maintains a transparent planning and review process to which all partners subscribe. At each workshop, a detailed work plan is defined for the period up to the next workshop, and outputs are review at that workshop (see the MGCWG Report 1 for an example of planning). In this way the process provides strong incentives to complete contributions in time and incorporate them into the process. All activities are clearly focused on providing key inputs to the strategy, while also encouraging and facilitating immediate conservation action. Already, fishing pressure on the remnant wild stock is being reduced, and the data required to improve management of the captive population are being generated.

11. OPTIONAL: Outstanding achievements of your project during the reporting period (300-400 words maximum)

■ I agree for ECTF and the Darwin Secretariat to publish the content of this section

Within its first year, the project has succeeded in forming the Mekong Giant Catfish Working Group (MGCWG), bringing together all relevant organisations and initiating a joint conservation strategy process. With so many organisations contributing their activities and resources into the joint initiative, progress has been rapid and significant. The analysis and planning process is in full swing, and expected to result in a well-founded and widely supported long-term strategy by early 2007. All existing information on the giant catfish has been collated and synthesized. Primary research is being carried out to fill important gaps in knowledge. This includes Darwin Initiative funded studies on the historical ecology of the giant catfish, a genetic inventory and breeding plan for the captive population, and mathematical modelling of population management options. Other partners are supporting complementary studies, for example on the behaviour and migrations of released hatchery fish. The Mekong Giant Catfish Working Group has also provided a forum for open and constructive discussion between key stakeholders. In Thailand, this has facilitated an agreement between fishers, the Fisheries Department and several conservation NGOs to halt the targeted fishery for giant catfish on their spawning migration in the Chiang Khong area. This agreement will significantly reduce overall fishing mortality on the remnant wild stock. In the past this fishery was the main source of wild broodfish for the captive breeding programme, but the captive population is now so large that, with appropriate management, the survival of the species in captivity can be assured without further broodfish capture. The Darwin project is providing crucial scientific input into the breeding and supplementation programme to ensure that the latter are well managed. By the time the long-term conservation strategy is finalized in 2007, the prospects for conserving this critically endangered fish will have been significantly enhanced through reduced fishing pressure and improved management of the captive stock.

Annex 1 Report of progress and achievements against Logical Framework for Financial Year: 2005/2006

Project summary	Measurable Indicators	Progress and Achievements April 2005-Mar 2006	Actions required/planned for next period
<p>Goal: To draw on expertise relevant to biodiversity from within the United Kingdom to work with local partners in countries rich in biodiversity but poor in resources to achieve</p> <ul style="list-style-type: none"> • The conservation of biological diversity, • The sustainable use of its components, and • The fair and equitable sharing of the benefits arising out of the utilisation of genetic resources 			
<p>Purpose</p> <p>Effective conservation strategy for the Mekong giant catfish developed and promoted</p>	<p>Strategy document available and taken up by target institutions</p>	<p>MGCWG established and strategy process proceeding as planned, specific outputs progressing</p>	<p>Joint working group approach highly successful, excellent cooperation among parties despite historical disagreement and rivalry. Process to be maintained.</p>
<p>Outputs</p>			
<p>1. Conservation status of giant catfish assessed quantitatively</p>	<p>Conservation status assessed using population models</p>	<p>Preliminary analysis completed, study ongoing to resolve questions regarding historical fishing</p>	<p>Decline must be analysed over historical time frame, this will be completed based on new data by July 2006.</p>
<p>2. Scope for supportive breeding, habitat and harvest management evaluated quantitatively</p>	<p>Effectiveness and feasibility of conservation measures</p>	<p>Options and stakeholder preferences established, preliminary analysis completed.</p>	<p>Management projections to be carried out when model incorporating historical information is available, quantitative assessment workshop in August 2006.</p>

3. Opportunities to improve captive breeding and translocation practices assessed	Captive breeding procedures reviewed, and improvements identified by	Overview report completed, molecular genetic analysis to define breeding plan ongoing (enhancement of initial proposal).	Captive population is larger and more diverse than previously thought, detailed breeding strategy based on genetic analysis to be completed by December 2006.
4. Adaptive management policies developed	Adaptive management policies defined	Options and stakeholder preferences established, no specific work yet	Adaptive policy work follows quantitative assessment workshop, to be completed December 2006.

Note: Please do NOT expand rows to include activities since their completion and outcomes should be reported under the column on progress and achievements at output and purpose levels.