Mekong River Irrawaddy dolphin conservation: developments 2010 - May 2011

Prepared by Gerry Ryan and Gordon Congdon, WWF Cambodia

For Peter Thomas, US Marine Mammal Commission

May, 2011

Introduction
This report details developments in Mekong River Irrawaddy dolphin conservation by WWF in Cambodia.

Specifically noting that Reeves et al. (2009) recommended:

- Photographic records be sent to specialists at the University of North Carolina, Wilmington for review of signs of interaction with fishing gears,
- A review be carried out of fishing gear use in and around dolphin range in the Mekong River,
- Clarify and implement regulations to prevent the use of gill nets and other hazardous fishing gears in dolphin habitat areas,
- Immediate enforcement of restrictions on the use of gill nets within dolphin habitat areas,
- The photographic identification catalogues of WWF and Isabel Beasley be cross-matched with the facilitation of an independent expert to resolve discrepant population estimates,
- Rapid collection of carcasses and on-site assessment, and
- Consolidation and collaboration among WWF, Fisheries Administration (FiA) and the Commission for Dolphin Conservation and Development of Ecotourism Zone (Dolphin Commission)

Key Developments

Research:

Dead dolphin photograph review
William McLellan of the University of North Carolina, Wilmington, reviewed photographs of 69 dead dolphins from 2001-2010 for signs of interaction with humans or fishing gears in mortality (McLellan 2010). Many carcasses were too decomposed to determine. Where determinable, signs of interactions with humans/fisheries were found in 75% of adult but only one calf/neonate. The vast majority of neonates were found to show a ventral neck lesion not associated with fisheries. McLellan’s findings are in close agreement with the records of WWF (Ryan 2011) and do not support the suggestion of Reeves et al. (2009) that fishing gears were responsible for most recorded calf mortalities.
**Heavy metal contaminants**

Heavy metal contaminant levels (As, Cd, Cu, Fe, Hg, methyl-Hg, Pb, Se, Zn) were tested in kidney and liver samples from 20 animals that died between 2005-2009 at the Institute of Public Health Ostrava, Czech Republic, and Galab Laboratories in Germany (Galab Laboratories 2010a, Institute of Public Health Ostrava 2010). These results were reviewed by Siebert and Das (2011), see Ecotoxicology specialist review, below.

**Organic contaminants**

Persistent organic pollutant levels (POPs) were tested in blubber samples from 20 animals that died between 2005-2009 at Galab Laboratories, Germany (2010b). Testing included brominated flame retardants (BFR), polychlorinated biphenyls (PCB), organochlorine pesticides (OCP) and dioxins and furans (PCDD/PCDF). An additional samples from 15 these animals were analyzed for Organotin compounds (OTC), perfluorinated tensides (PFOS/PFOA), Toxaphene and methyl parathion. These results were reviewed by Siebert and Das (2011), see Ecotoxicology specialist review, below.

**Histopathology**

Two sets of histological analyses were done. The Institute of Virology, Erasmus University, The Netherlands, studied comprehensive sets of tissue samples from 10 animals, dead between 2006-2009. The majority of samples were too degraded for analysis, however major findings were made for three animals: one of which died of pneumonia with *Aeromonas hydrophila* is considered a likely contributor, and another that died of pneumonia caused by likely bacterial or viral infection. The third died of meningitis. Additional significant findings showed that one neonate had suckled little or no milk prior to death, and the presence of fish in the stomach of another animal was interpreted as evidence that death was not the result of a severe inflammatory disease (Kuiken 2010).

The second set of histology consisted of two samples from one animal dead in 2006, analysed by the Institute of Pathology, Veterinary University of Hanover. The results suggested post-mortem bacterial infection with no evidence of infectious disease (Wohlsein 2010).

**Genetics**

The Institute for Zoo and Wildlife Research Berlin, Germany assessed genetic diversity from 23 Mekong dolphins that died from 2004-2009. (Ludwig & Liekfeldt 2010). The assessment found 4 haplotypes in the population, 2 of which were previously unknown. The report concluded that the population has “sufficient level of genetic variability making inbreeding less of a risk for their extinction at the moment”. The report recommended that “conservation programs should lead to the preservation of the entire genetic variation of the Mekong population. Therefore a systematic monitoring (e.g. age structure, health status, number of natural reproductions, and offspring survival rate) including individual genotyping (e.g. pedigree analyses) is strongly recommended. The transfer of animals from the coastal population and/or the Mahakam population should be avoided because our data indicates a genetic separation of the Mekong dolphins from both the coastal population as well as from the Mahakam dolphins.” These results were reviewed by Siebert and Das (2011), see Ecotoxicology specialist review, below.
Ecotoxicology specialist review

Marine mammal ecotoxicologists from the University of Kiel, Germany and University of Liege, Belgium, reviewed the outcomes of the contaminant, histological and genetic analyses outlined above (Siebert and Das 2011). Their key findings were:

- inbreeding is not an issue in this population,
- histopathological analyses did not support the hypothesis that Aeromonas hydrophila was infecting dolphins, and that gangrenous neck lesions were caused by post-mortem autolysis, and
- chemical contaminants are likely to be adversely affecting the health of dolphins, and while most POPs are not at levels significantly higher than many other cetacean populations in the coastal and riverine areas of Asia, the levels of DDT and congeners, and highly toxic methyl-mercury are of concern. The extent of likely impacts on health are unreported.

Study of fishing gear use

WWF commissioned a review of fishing gear, specifically gillnet, use in the Mekong to be done by the Inland Fisheries Research and Development Institute (IFReDI). The report, based on interviews with gillnet fishers in villages near dolphin habitat, found widespread, high levels of gillnet use, throughout the year and in all areas. Fishermen showed awareness of an attempt to curb gill net use by authorities, and displayed behavioural patterns to avoid detection (i.e., fishing at night). Over 1% of gillnet fishermen reported they had found dead dolphins in their own gill nets, and almost 5% reported to have seen dolphins entangled in the nets of others. Illegal fishing methods such as electric, poison and explosive fishing, dangerous to dolphins were also reported (Penh and Nam 2011). Based on this evidence, fishing activity continues to represent a significant threat to Irrawaddy dolphins in the Mekong River, and greater enforcement is necessary to protect them.

Photo ID cross-matching

In mid-2010 Isabel Beasley and WWF exchanged photographic identification catalogues. Initial cross-matching was done, which was reviewed by independent mediator Paula Olson from NOAA (Olson 2010). There remain a number of unresolved matches. A meeting of all parties is now confirmed for June 9-11, 2011.

Population demography

Gerry Ryan from WWF and Paul Doherty from Colorado State University completed a demographic study of the Mekong River Irrawaddy dolphin population based on photographic identification surveys from April 2007 to April 2010 (Ryan et al. In press). The key findings of this study were:

- The population is estimated at 85 individuals, 95% CI 78-91, excluding young calves,
- Recruitment is very close to zero; while births occur, few animals survive to adulthood,
- Population ‘growth rate’ is 0.978, showing a slow decline,
- The population seems to be slowly disappearing with no effective replacement.

Impacts of hydropower development

Proposed dams on the mainstream of the Mekong River are one of the most significant current threats to the river ecosystem. WWF assessed the impact of proposed mainstream
hydropower projects on the Irrawaddy dolphin population (Ryan and Goichot 2011). The analysis found that the proposed dams at Don Sahong, Stung Treng, and Sambor posed a high risk of extinction to dolphins in the Mekong. The proposed Don Sahong dam posed a high risk to the sub-population in the trans-boundary deep pool area on the Lao-Cambodia border. Thakho, a hydropower water diversion scheme in this area was predicted to pose minimal risk to dolphins. The proposed dams at Stung Treng and Sambor pose a high risk of extinction to the dolphins found between Stung Treng and Kratie.

Carcass recovery
WWF was last able to necropsy a dolphin in January 2010. Since then at least 9 dolphins are known to have died. Since that time WWF have been routinely denied access to carcasses by the Dolphin Commission, symptomatic of a much wider conflict; see Management below.

Management:

MoU with Dolphin Commission
In late 2009 and early 2010 WWF and the Dolphin Commission attempted to agree on a Memorandum of Understanding to work together on dolphin conservation issues, and in particular to enforce restrictions on fishing gear use in dolphin habitat areas. The process was labored and ultimately unsuccessful as parties could not find terms mutually reasonable and acceptable. This has hindered the conservation work by WWF including the recovery of carcasses, community awareness meetings, and the conduct of population surveys.

Enforcement
WWF’s investigation into the legal tools available for dolphin conservation has revealed that there is no clear and simple way to reduce or eliminate the use of gill nets. The Dolphin Commission is making attempts to reduce the use of gill nets in some of the dolphin pools, but they are doing so without clear legal authority. Currently the use of gill nets of mesh size 1.5 - 15 cm is expressly permissible by fishery law except in designated conservation zones. Currently no conservation zones have been established.

Protected area development
WWF has been working with the Fisheries Administration to develop protected areas for dolphin habitat, particularly to restrict the use of harmful fishing gear such as gill nets in these areas. The Fisheries Administration is currently assessing the declaration of such areas. Protected areas under current fishery law exclude all types of fishing, which will not engender community support in the relatively populated areas under consideration, and is likely to be impractical to enforce. WWF and FiA are currently exploring alternative means to protect dolphin habitat that would ban or restrict the use of gill nets, but allow for the use of traditional fishing gear.

Partnership with Association of Buddhists for the Environment
In order to build community support for dolphin conservation, and other conservation activities in the area, WWF has begun a new partnership with the Association of Buddhists for the Environment (ABE). ABE will conduct work in pagodas and monasteries along the upper Mekong building the capacity of local monks to promote environmental awareness among the community and generate support for conservation activities.
Comments
In the last 12 months WWF and FiA have compiled a great deal of information on the population size and threats to Mekong dolphins. We have been less successful in resolving the problems caused by the lack of cooperation and coordination between WWF and FiA on one side and the Dolphin Commission on the other side. WWF has recently appealed to the highest levels of the Cambodian government for assistance in resolving this dispute. If the dispute is resolved we would like to work closely with the governments of Cambodia and Lao PDR, local communities, regional partners, and with international cetacean experts to develop and implement a conservation strategy that will reverse the decline of dolphins in the Mekong. This will be a difficult challenge, but we believe there is strong support for dolphin conservation in the Mekong and that we have a good chance of success.

Literature Cited

Siebert, Ursula and Krishna Das. 2010. Evaluation of the ecotoxicological effects of POPs and heavy metals, reflecting pathological, microbiological and genetic analyses, on the Mekong River population of Irrawaddy dolphins (Orcaella brevirostris).