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The Biodiversity of the Wetlands in the Lower Mekong Basin

The 4,800 km long Mekong River originates in China, and flows through Myanmar, Lao PDR, Thailand and Cambodia before ending in the Mekong Delta of Vietnam. It is the twelfth longest river in the world, draining an area of 795,000 km². The four lower Mekong River basin countries have a total population of nearly 160 million people and with growth rates of over 2.5% in Cambodia and Lao PDR, this is expected to be more than 200 million people by 2010. With 80% of the population engaged in agriculture and fisheries in Cambodia, Lao and Vietnam, these extra people will need land to grow crops and apply additional pressure on the wetlands in the Mekong River basin

Direct economic values

Fisheries is an important economic activity for the region, and a 1998 estimate by the Mekong River Commission fisheries programme gives a total annual catch of approximately 900,000 tons for the lower Mekong River basin. Using an average market price of USD 1.5 per kilo, the total value attributed to the fishing industry in the lower Mekong River basin is 1,350 million US dollars per year. This does not take into account the value of other animals, and this can be substantial. For example, the price for a rare sub-species of box turtle can be USD 3,000 on the international market.

The Mekong delta is Vietnam's main rice producing area, with a yield of 13.5 million tonnes of rice in 1995 and an estimated yield of 16 million in 1999. Rice is also extensively grown in the wetlands of Cambodia, and in smaller quantities in Lao and the Mekong river basin in Thailand. At a market price of nearly 0.4 US dollars per kilo, the market value for 1999 rice production in the Mekong Delta only amounts to 6,400 million US dollars.

Biodiversity values

The Mekong River basin is of truly exceptional significance to international biodiversity conservation, even in comparison with other parts of tropical Asia. All new genera of large mammals discovered in the world in the past decade (*Pseudoryx*, *Megamuntiacus*, *Pseudonovibos*) have been found in Indochina. The area supports a very large number of bird species identified as globally threatened or globally near-threatened, including the famous Eastern Saurus Crane (*Grus antigone sharpii*), Giant Ibis (*Pseudibis gigantea*), White-shouldered Ibis (*Pseudibis davisoni*) and the Bengal Florican (*Eupodotis bengalensis*). A recent study carried out by IUCN lists the Mekong River as one of the nine richest watersheds for fish biodiversity globally, with 298 recorded species, including the endemic giant catfish (*Pangasianodon gigas*) and the giant Mekong barb (*Catlocarpio siamensis*) and several species of giant stingray. More recent estimates have raised this to over 480 species. The lower Mekong River is considered a biodiversity hot-spot for molluscs, with 160 species of which 72% are endemic to the Mekong. The Mekong River also harbours a highly endangered population of freshwater dolphins (*Orcaella brevirostris*), and Siamese crocodile (*Crocodylus siamensis*).

The Mekong wetlands also have a critical role as a staging post in the flyways for a number of migratory birds. The best known example is Tram Chim National Park in Vietnam, which hosts almost the entire world population of Eastern Sarus Crane (*Grus antigone sharpii*) during the dry season. The freshwater wetlands are also important for migratory egrets and shorebirds whilst the intertidal zones of the coastal areas are important for migratory shorebirds from north-east Asia.

All living natural resources in the Mekong River wetlands are increasingly under threat. Fishing practices in all countries include use of batteries, poison and explosives, as well as small mesh fishing nets. Other animals that are collected from wetlands include frogs, snakes and turtles, and their numbers are also

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dropping disturbingly. This is partially a result of trading wildlife products, particularly for the manufacturing of traditional Chinese medicine. Birds have been hunted, and are often victims of pollution by agro-chemicals.

The current status of all main flagship aquatic species in the Mekong River wetlands is near extinction, as described in the table below.

Species	Status
<i>Pangasianodon gigas</i>	Is now apparently extinct south of Khone falls, but is still seen in Lao and Thailand. Bred in captivity, but off-spring is sterile.
<i>Catlocarpio siamensis</i>	Declining in numbers and under threat of extinction in Lao PDR, but still reproducing naturally in Cambodia
<i>Orcaella brevirostris</i>	Extinct north of Khone Falls. Presumably no more than 100 individuals left in the Mekong River Basin south of Khone Falls, which may be too few to be a viable population
<i>Crocodylus siamensis</i>	"The world's most endangered crocodylian". Extinct in Vietnam. No viable population left in Thailand. Possibly remnant population in Lao PDR. No recent figures available for Cambodia.
<i>Grus antigone sharpii</i>	Globally near-threatened. Nearly extinct in Lao PDR Exists in Tram Chim National Park and Kien Giang Province, Vietnam. Exists in Cambodia.
<i>Eupodotis bengalensis</i>	Several hundred birds in Cambodia and few in Vietnam

Information from Maurice Kottelat, Ian Baird, BirdLife International and Wetlands International

Legal issues with regards to Wetland biodiversity conservation

The following table summarises the dates of ratification by the four countries of the five most important Multilateral Environmental Agreements with regards to biodiversity conservation. A dash means that the Convention has not yet been ratified.

- ✓ Convention on Biological Diversity - CBD (1992)
- ✓ Convention on Wetlands of International Importance Especially as Waterfowl Habitat - Ramsar Convention (1971)
- ✓ Convention Concerning the Protection of the World Cultural and Natural Heritage (1972)
- ✓ Convention on International Trade in Endangered Species of Wild Fauna and Flora - CITES (1973)
- ✓ Convention on the Conservation of Migratory Species of Wild animals - CMS (1979)

	Cambodia	Lao PDR	Thailand	Vietnam
CBD	1995	1996	-	1994
Ramsar	1999	-	1998	1989
World Heritage	1991	1987	1987	1987
CITES	1997	-	1983	1994
CMS	-	-	-	-

All four countries are a member of the Association of Southeast Asian Nations (ASEAN). Thailand and two other countries have ratified the ASEAN Agreement on the Conservation of Nature and Natural Resources (1985), but the agreement will not enter into force until all six original members of ASEAN have ratified it.

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The four lower Mekong Basin countries signed the Agreement on the Cooperation for the Sustainable Development of the Mekong River Basin on 5 April 1995, which established the Mekong River Commission (MRC).

There is no regional wetlands policy or strategy, although the MRC regional wetlands programme could provide the basis for such a strategy. The Ramsar Convention also calls for cross-border collaboration, but capacity to implement the convention is limited.

Few wetlands in the Mekong River basin are protected. In 1997, the total area for nature conservation in the four lower Mekong countries amounted to 148,000 km², or 11.7 % of the total land area. However, this comprises remarkably few wetland protected areas, with a total cover of less than 3,000 km². There are also very few Ramsar sites of international importance in the Mekong River basin and few other international classifications. The middle stretches of the Mekong River at Stoeng Treng and Boeng Chmaa lake in Cambodia are the only listed Ramsar sites, and the Tram Chim National Park in Vietnam is being considered by Government. Tonle Sap Lake in Cambodia is listed as a Biosphere Reserve under the UNESCO Man and Biosphere Programme. The mangrove forests of Can Gia in the Mekong Delta have also been recognised as a Biosphere Reserve for Vietnam. No wetlands in the Mekong River Basin have been nominated as World Heritage Sites.

Water management

There are widespread plans for improved management of the flow of the Mekong River, by constructing dams and related structures. China has planned 13 hydropower dams on the mainstream Lancang - Mekong River. The Manwan power station is already in operation, Dachaoshan power station is under construction and construction at two more sites will start soon. Lao PDR has planned 22 hydropower dams, mainly on tributaries to the Mekong River. In Cambodia, there is talk about constructing a dam on the mainstream Mekong River near Kratie, and several dams are planned for the tributaries. Vietnam will construct dams on the upstream reaches of the Srepok River and the Sesan River. All these constructions will result in reduced peak flows, increased storage of water during dry periods, and a resulting increase in dry season flow.

Construction of dams will be guided by detailed Environmental Impact Assessments (EIA). Vietnam has a national EIA system, controlled by the National Environment Agency, and Thailand has well established EIA procedures implemented through the Office for Environmental Policy and Planning. Lao PDR and Cambodia have introduced EIA procedures more recently. All these national EIA guidelines lack specific biodiversity assessments (an issue that has been raised by both the 1998 Conference of Parties of the CBD and the 1999 seventh Conference of Parties to the Ramsar Convention), and they do not take into account cross-border impacts of development projects.

The MRC has responsibilities for cross border conflict resolution, but they are not focusing on environmental impacts although this was incorporated in the 1998 MRC hydropower development strategy. To date, no strategic EIA has been carried out for the whole of the river, and therefore the cumulative impact of all planned dams and water management construction is not known.

The Tonle Sap ecosystem depends on annual flooding of the lake, which is due to a reverse flow of the Tonle Sap River from Phnom Penh. This reverse flow generally occurs during the month of June or early July, and the lake fills from August to December. The total area of the lake increases from 250,000-300,000 ha during the dry season to 1.3 million ha in the rainy season. The average depth increases from 1-2 m to 8-10m. Flooding submerges the forests on the bank of the lake, which in turn releases nutrients and creates the right conditions for fish spawning. Without the flood pulse from the Mekong River, and resulting change of flow in Tonle Sap River, the extent of flooding of Tonle Sap will be reduced and this will affect fish production.

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The water quality of the surface water in the Mekong Delta is deteriorating, due to pollution, oxidation of sulphate-rich soils and intrusion of seawater. Already, pH values of as little as 3.5 are being measured in the drainage channels around My Tho, and the likelihood that this will affect rice production cannot be ignored. Traditionally, the delta would be "flushed" during the annual flood, but with reductions in peak flow, however, this will no longer happen.

It is clear that the environmental well-being of Tonle Sap and the Mekong Delta depends on annual flooding. Further water flow control measures on the Mekong River will without doubt affect the flooding and thus the functioning of the freshwater wetland ecosystem.

There are also reasons why dams may be good for biodiversity conservation and local livelihoods. Our work in Lao PDR has shown that ensuring that the management of the Nam Theun 2 reservoir includes the protection of the catchment would safeguard the protection of the Nakai Nam Theun National Biodiversity Conservation Area. If this arrangement is implemented, profits from the management of the reservoir would be available for support to protected area management.

The question of dams on the Mekong River is partially an issue of economics, but also a question of stakeholders. Electricity generation is a national and regional issue, and the profits from hydropower developments will accrue to the Treasury. Fisheries and rice production are local activities, and benefit the local and national economies. On the other hand, flooding destroys houses and can damage agricultural crops, and the Government of Vietnam therefore has initiated flood control measures in the Mekong delta.

The issues are complicated and have many angles. In order to determine the cumulative effect of all proposed dams and water management structures in the whole of the Mekong River, it is important that a Strategic Environmental Assessment is carried out. IUCN is currently helping UNDP with funding from UNDP and the Global Environment Facility to develop a proposal that will address the conservation of biodiversity of the wetlands in the lower Mekong, and we hope that this project will provide the necessary information over the next years.

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