CAMBODIA

Project Title: **Biodiversity Assessment of Stoeng Treng RAMSAR Site**
Study Leader: **Mr. Sok Vong, Department for Nature Conservation and Protection, Cambodia**

This one-year project is a collaboration of different local government and non-government organisations in Cambodia. It is aimed at conducting a preliminary assessment of biological resources particularly plant, fish, mammal, bird and reptile species, in Stoeng Treng RAMSAR Site; identifying major threats to biodiversity conservation; and providing policy recommendations for future management of the RAMSAR Site. Collaborating institutions include the Department of Nature Conservation and Protection, Faculty of Fisheries, the Royal University of Agriculture, Wildlife Conservation Society, and the Department of Fishery. Succeeding discussions will deal on the background of the project and the initial assessments of biological resources particularly the bird, mammal and plant species within the Stoeng Treng RAMSAR Site.

Project background. Cambodia has over three million hectares of either permanently- or seasonally-inundated wetlands and some 80% of the population depending on wetland resources for their livelihood. Cambodia therefore is of high priority for action. Activities began with the translation of two important wetland publications into Khmer. This was followed by surveys of some of the country's most important wetlands, including Tonle Sap Lake. Through these activities, strong cooperation was established with the Ministry of the Environment, with which a multi-sectoral national workshop for the development of a National Wetland Action Plan was successfully implemented in the early part of 1995.

Tonle Sap Lake

As a result, in 1999, Cambodia became a Contracting Party to the RAMSAR Convention – a major achievement for the programme. UNESCO has informed the RAMSAR Bureau that on 23 June 1999, Cambodia completed the necessary formalities for its accession to the Convention. As amended by the Paris Protocol of 1982 and the amendments to Articles 6 and 7 (the "Regi0nal Amendments", 1987), Cambodia thus became the 116th Party to the Convention, with the treaty coming into force for Cambodia on 23 October 1999. Three wetlands of international importance were designated at the time of accession: the Boeng Chhmar and Associated River System (28,000 ha), the Koh Kapik and Associated Islets (12,000 ha) and the Middle Stretches of the Mekong River North of Stoeng Treng (14,600 ha).

"Middlle Stretches of the Mekong River North of Stoeng Treng" is a stretch of the river characterised by a strong turbulent flow with numerous channels between rocky and sandy islands that are completely inundated during high water and higher alluvial islands that remain dry. It lies about 5 km from the town of Stoeng Treng where the Tonle Sap joins the Mekong northwards to the south of the Laos border. The site qualifies under the old Criterion 1(d) on wetland types that are unusual in the biogeographical region, as well as under the old Criterion 2 © and 2(2) on the special value as habitat for plants or animals at a critical stage of their biological cycle. The river bed and its islands as Wetland RAMSAR site is under the jurisdiction of the Department of Nature Conservation and Protection, Ministry of Environment; the surrounding areas are sparsely populated. The site is extremely important for biodiversity and also for transport (as there are few roads in the areas), and the flooded forest provides refuge for rare species of fish, dolphins, and birds. It promotes the wise use of the wetland "Wise Use Principle".

However, there are no researches on the biodiversity, the natural resources, or inventory within the site that would determine how many, and what species of bird, plant, mammal, fish and reptile are found there as well as a map of their distribution. There is no information on whether species are migratory or endemic, rare or endangered, and their significance regionally or globally. In other words, there is no management or specific conservation plan as well as zoning for management specific purposes for sites.

Bird species. The first survey was taken in the upper Mekong River Ramsar Site, Stoeng Treng Province,

northeast of Cambodia, covering 14,300 ha. There were 132 species recorded. The list includes globally threatened and near threatened species such as Grey-headed Fish Eagle (*Ichthyophaga ichthyophaga*), Green Peafowl (*Pavo muticus*), Alexandine Parakeet (*Psittacula eupatria*), Hill Myna (*Gracula religiosa*) and Great Adjutant (*Leptoptilos dubius*). Habitat loss and degradation and hunting/poaching are considered the direct threats to bird species. In terms of conservation issues, hunting and wildlife poaching, especially of *Psittacidae* and *Columbidae,* for food and trade are the most serious ones. Sharp strong sounds coming from boats are also considered a disturbance to birds.

Mammal species. Assessments on mammals have been on existing threatening conditions such as the loss of habitat, hunting for meat and trading, and lack of education. Among the assessed species were Sunda Pangolin (*Manis javanica*), Long-tailed Macaque (*Macaca fascicularis*), Asian wild dog (*Cuon alpinus*), Southern Serow (*Naemorphedus sumastraensis*), East Asian Porcupine (*Hystrix brachyuran*), Wild Boar (*Sus scrofa*), and *Sambar cervus*.

Plant species. Surveys were conducted using the random of quadrats in the different habitat types such as dry deciduous forest, mixed deciduous forest, bamboo thickets, and flooded forest. The project assessed the vegetation structure, life-form attributes, tree density and para-taxonomic identifications. The Operational Taxonomic Unit (OUT) was used as a technical tool to count the abundance of plant species and other plant forms such as herbs, grasses, epiphytes, semi-epiphytes and lianas.

Project Title: **Ecotourism Management Option for Improved Waterbird Conservation in the Core Areas of Tonle Sap Biosphere Reserve**
Study Leader: **Dr. Neou Bonheur, Tonle Sap Biosphere Secretariat, Cambodia**

The Project aims to: study the population, species diversity, behaviour, and ecological needs of rare waterbirds; assess the impact of ecotourism on waterbird ecology and its carrying capacity; study ecotourism potential and economic benefit; and develop a management policy for ecotourism promotion. This paper discusses the Tonle Sap Lake and its significance to biodiversity and some conservation issues.

Tonle Sap Lake. It lies in the central floodplain of Cambodia territory with a total catchment of 80,000 km^2. The Lake is surrounded by six provinces, which have a total population of 3.41 million. The topography is relatively flat within national roads N5 and N6, ranging from one to 10 meters above sea level. The water regime is characterised by the high water fluctuation between the dry and wet season, which varies from one to nine meters with the volume increasing from 1.3 to 70 billion m^3. Similarly, the Lake surface also changes from 2,500-13,000 km^2, resulting in wide flooded areas that even include the national roads. It has been mentioned that the Lake originated about 5,000 years ago (Shinji T 1998), when the Tonle Sap Lake began its connection with the Mekong Rivers.

The Tonle Sap represents one of the richest wetland ecosystems in the world, providing a robust resource base for the country's economy and people's livelihood for centuries now. The unique hydrological regime of the Tonle Sap and the Mekong waters plays a significant role not only in the perpetuation of productive biodiversity, such as fish, wildlife, and forest, but also in the present land use pattern and diverse cultural landscapes.

Cambodian culture is adopted and flourished in harmony with the Tonle Sap Lake and Mekong, which serve as a source for spiritual and material needs. The present farming and fishing activities, taste, and traditions are closely connected with the rise and fall of the Tonle Sap waters. The ancient sculpture depicted at the base reliefs of Bayon Temple bears witness to the dependence of Cambodia people on the Tonle Sap Lake. Today, about half of the Cambodia population directly or indirectly benefit from the Lake's resources.

Biodiversity Significance and Conservation Issues. The immense seasonal flooding caused by the inflow of the Mekong waters and tributaries plays a very important role in the reproduction and maintenance of the abundance and richness of biodiversity in the Tonle Sap Lake. The flooded vegetation comprising submerged grass, floating aquatic plants and emerged shrubs and tall forests is considered the most important feeding and breeding habitats for a great diversity of life. Nearly 60% of the Lake's floodplain is covered by flooded vegetation listing about 190 species (McDonald 1996). The flooded forests are widely used by local communities for different purposes such as firewood, fishing, construction and medicine. The flooded forest is also converted to farmland for rice and other crop productions.

Fish is the most abundant and richest biological feature of the Tonle Sap Lake. Fish production is estimated at 170,000 tons per annum, accounting for

60% of the total inland fish output. Of the 1,200 fish species identified in the Mekong River, about 500 fish species are believed to be from the Lake. Fisheries-related activities provide a major source of income to about 10,000 fishermen living in the inundated areas of the Lake. With the prevailing peaceful condition, the number of fishery-dependent people is gradually increasing, thereby putting the fishery resources under a growing pressure.

The forest habitat together with abundant fish is an attractive home for a large number of wildlife species, some of which are globally significant. Of particular interest is the presence of large waterfowls such as pelicans, adjutants, painted storks, fishing eagles and white winged ducks. Different mammal and reptile species are subjected to intensive hunting by local communities for subsistence livelihoods.

Considering the ecological, economical, and socio-cultural values of the Lake, the Royal Government of Cambodia designated the whole Tonle Sap as Biosphere Reserve in October 1997. The Lake has been divided into three zones: three core areas, a buffer zone, and a transition zone. The three core areas are the most important for biodiversity conservation. The biosphere reserve concept provides an improved institutional, legal and policy framework for conservation and sustainable use of natural resources. It paves the way for the conservation of biodiversity and critical habitats.

Following the designation, the Ministry of Environment, in collaboration with relevant agencies, international and local NGOs, has initiated conservation programmes for some selected areas. The first Environment Research Station was established as a pilot project in Prek Toal Core Area with the primary objective of promoting environmental activities at the grassroots level. With the assistance of UNESCO and the Wildlife Conservation Society, significant progress has been made towards the conservation of wildlife, especially waterbirds in Prek Toal. Observation posts were constructed inside the forests for monitoring and safeguarding the nesting sites of waterbirds. Several major steps have been undertaken especially by FAO regarding conservation of flooded forests and fisheries. However, there is still much work to be done to overcome constraints and risks encountered by the Tonle Sap Lake.

Fisheries are the central issues of biodiversity conservation in the Tonle Sap Lake. The present fishery management is based on three fishing categories: fishing lot, middle scale fishing, and family fishing. Regulation and organisation of the flow of fishery resources among relevant stakeholders in a rational and equitable manner is a determining factor of the flow of other resources.

The fishing lot system is normally auctioned for exclusive rights to fishing with the objective to generate revenue. With limited resources and weak enforcement, it is unlikely to impose strict control over the catch, which is generally driven by market demand.

The community fishery organisation has recently been introduced in the Lake. Based on communal ownership, the fishery communities are given the rights to manage and exploit the resources for the benefit of all community members. But the present legal status has yet to be adopted and is far from efficient. The major problem relates to the rights granted to communities for the control, exploitation, and sharing of the resources. As fish is a fugitive resource, capture of this resource from the communities' managed areas needs special regulations and admission. For example, communities in the upstream may wish to block the fish from migrating to the downstream area to increase their catch. The downstream communities, on the other hand, would not be happy with less catch because of the upstream blocking, and thus may lead to disincentive for future participation. Resources control is not an easy task for communities without sufficient financial and human resources.

The fishery domain is not clear with other land uses, such as agriculture and conservation areas. Unclear land tenure in the inundated areas together with uncontrolled agricultural encroachment leads to the degradation of forest and water quality. Some fishing lots overlap with the present core areas of Tonle Sap Biosphere Reserve, where their fishing operations contradict with conservation plans. For example, pumping the streams or ponds for fish catch dries up the areas, resulting in loss of water and food for other wildlife to survive. Some fishing practices require cutting and burning the forest that causes degradation of fishery and wildlife habitats. A large proportion of inundated communities depend on other resources including wildlife, firewood, and agriculture as subsistence to fish. Collection of birds' eggs and chicks continues to be practiced by communities. The rangers in the Prek Toal area, have for example, confiscated some 1,400 eggs of cormorants in 2001 and, about 100 of pelicans' eggs in 2002. The balanced use of these resources requires coherent policy and knowledge. Introduction of alternative livelihoods can be sustained, provided compensation and generated income can outstrip conventional practices. Ecotourism is considered one of the alternatives as a win-win solution to conservation, though careful adaptation is needed. ■