

**KINGDOM OF CAMBODIA  
NATION RELIGION KING**



MINISTRY OF AGRICULTURE FORESTRY AND FISHERIES  
DEPARTMENT OF FISHERIES

**CAMBODIAN**  
**MEKONG DOLPHIN**  
**Conservation Strategy**

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# INTRODUCTION LETTER

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Cambodia is a country blessed with rich natural resources, and one of the most important of all these resources is water. The waters of the Tonle Sap Great Lake and the Mekong River are fundamental to the livelihoods of millions of Cambodians and to the nation itself. Not only do they perform a fundamental role in supplying people with fish and rice, the two food staples for Cambodians, but they are also part of the cultural fabric of the country, as significant as Angkor in the history and development of the Cambodian people. For these same people, the identities of the Mekong and Tonle Sap are defined by a number of natural features such as the flooded forests of the Great Lake. For the river, the freshwater Irrawaddy Dolphin and the Mekong Giant Catfish are central features of its identity. These amazing creatures symbolize the magnificence and uniqueness of the Mekong River and should make us proud of their continued existence in our country.

However, the freshwater Irrawaddy Dolphin population is in serious decline, both in terms of its range and also its size. The population is threatened by accidental and deliberate killing, gillnet entanglement, boat noise and collision, dynamite and electric fishing, over-fishing of prey species, disturbance by tourist boats, live capture and pollution. We are now nearing the last chance for the population and the last chance for Cambodia to save one of its most important natural assets.

Recognizing the urgent need to conserve the Mekong River Irrawaddy Dolphin for the next generation, as well to maintain environmental sustainability within the whole Mekong ecosystem, the Department of Fisheries has been developing this conservation strategy.

On September 23, 2004, the Department, under the leadership of Mr Nao Thuok, held the "Mekong River Irrawaddy Dolphin Conservation and Management" workshop. The objectives of the workshop were to present information on the status of the dolphin, outline the conservation activities necessary to reverse the declines, and to formalize this within a strategy document. At the workshop a seven-point list of necessary next-steps was suggested. The seven steps are:

- 1/ To pass the new Fisheries Law
  - 2/ To finalise the Mekong River Irrawaddy Dolphin Conservation Strategy
  - 3/ To secure appropriate support for the implementation of the strategy
  - 4/ To establish permanent office space for the project within the Department of Fisheries
  - 5/ To improve co-operation between DoF and other relevant agencies
  - 6/ To initiate regional discussion, in particular on issues relating to the migration of the dolphins between Cambodia and Lao PDR.
  - 7/ To take an integrated approach to river management along the most important stretch of the Mekong in order to also protect its other global biodiversity values and to improve fisheries management.
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I would like to hereby express my sincere satisfaction at the work undertaken thus far and encourage all those interested in supporting the conservation of the freshwater Irrawaddy Dolphin in Cambodia to use this strategy to guide their efforts. Together, under the guidance of the Department of Fisheries and this document, we have the last chance to save an important part of Cambodia's natural heritage.



Chan Sarun  
Minister  
Ministry of Agriculture, Forestry and Fisheries

# BACKGROUND

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## **The Irrawaddy Dolphin, *Orcaella brevirostris* (Owen in Gray 1866)**

The earliest mention in the literature of the Irrawaddy dolphin is by Owen (in Gray 1866) who described a specimen that was found in 1852 at the mouth of the Vishakhapatnam River (formally Vizagapatam River) along the east coast of India. The Irrawaddy dolphin is a small delphinid, which has been little studied throughout its range. The dorsal fin is small and generally rounded, set behind the midpoint of the back. The head is blunt with no beak.

Recent morphological (Arnold and Heinsohn 1996; Beasley *et al.* 2002) and genetic research (Le Dec *et al.* 1997) have shown significant differences between Irrawaddy dolphin populations. Irrawaddy dolphins from Southeast Asia are likely to be a separate species, to the Australia/Papua New Guinea population. This has very important implications for conservation. It has previously been noted that efforts should be directed towards conserving the Australian population as a stronghold for the species (Perrin *et al.* 1996). New findings suggest that it is imperative that conservation priorities are also further developed in Asian countries. This may become regionally important within Asia, if further sub-species level differences are found between Asian freshwater and marine populations.

## **Distribution and Status**

Irrawaddy dolphins inhabit the tropical-subtropical Indo-west Pacific. Freshwater populations can be found in the Mahakam River of Indonesia, the Mekong River of southern Lao PDR and Cambodia and the Ayeyarwady River in Myanmar.

All riverine populations of the Irrawaddy dolphin are under severe threat (Smith *et al.* 2003). The Mahakam and Mekong River populations have recently received extensive study and a visual survey was undertaken in the Ayeyarwady River in December 2003. Recent studies in the Mahakam River have indicated an alarming population decline and possibly only 40-50 dolphins remain in the river (Kreb 1999; 2002). A survey of the entire length of the Ayeyarwady River in December 2002, recorded only eight dolphin groups and 37 individuals in a 373 km long segment. An intensive research program has been conducted in the Cambodian Mekong River since 2001. Research indicates the population now numbers 80-100 individuals, with an annual mortality rate of at least 14-18 individuals (2003 and 2004 respectively).

Irrawaddy dolphins are listed by CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora) as an Appendix I species.

# THREATS

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The known mortality of the Mekong River Irrawaddy dolphin population is significant and unsustainable. During 2003, a total of 14 dolphin carcasses were recovered (16 reported). In 2004, a total of 18 carcasses were recovered. This represents slightly more than 10% of the total population each year. In order to conserve the Mekong River Irrawaddy dolphin, it is essential that threats are accurately identified and solutions to these threats are effectively implemented.

## Previous Threats

The Mekong River Irrawaddy dolphin has been subject to a variety of threats over the years including:

- Hunting by Khmer Rouge during the Pol Pot regime (1975-1979) which was reported to have killed hundred of dolphins during the dry season to fuel the motor boats.
- Shot for target practice by Khmer and Vietnamese soldiers (1980-1995)
- Accidental gillnet entanglement with the advent of new fishing gears (1970 - present)

## Current Threats

Threats that currently have the greatest impact on the dolphin population include:

- Accidental entanglement in gillnets
- Catch in seine nets
- Illegal fishing (electric and dynamite fishing)
- Boat collision and harassment
- Environmental contaminants
- Dam / waterway construction

Additional factors that are 'currently' less threatening, but have the potential to cause serious problems in the future are:

- The use of dolphin body parts for traditional medicine
- Habitat degradation
- Over-fishing

A summary of threats (including potential threats) and the potential solutions are shown in Table 1.

The Mekong River Irrawaddy dolphin still has a good chance of survival due to the positive perceptions and high regard Cambodian and Lao PDR people hold for the dolphin. However, given the

Table 1: MAJOR THREATS AND SOLUTIONS SUMMARY

Threats	Current Threat Impact	Mitigation/Management Option	Potential Impact To Local Communities of Mitigation/Management Option
<b>CURRENT MAJOR THREATS</b>			
<b>Accidental Entanglement in Gillnets</b>	High	<p>Provide alternative sources of protein</p> <p>Diversify livelihoods</p> <p>Education and awareness</p> <p>Community-based dolphin conservation areas in which the use of gillnets is prohibited.</p> <p>Fisheries management options:</p> <ul style="list-style-type: none"> <li>- gear modification</li> <li>- use of pingers</li> <li>- modify fishing practices (e.g. tending nets constantly)</li> <li>- compensate fishers for losses (e.g. buy out program/net compensation to cut dolphin out of net)</li> </ul> <p>Increased national legislation</p> <p>Extension to all DoF offices</p> <p>Education and awareness</p> <p>Provide alternative sources of protein</p> <p>Diversify livelihoods</p> <p>Education and awareness</p> <p>Increased national legislation and enforcement</p> <p>Construction of dolphin monitoring posts</p> <p>Prohibit large scale commercial fish purchasing in the upper Cambodian Mekong River</p> <p>Speed restrictions in critical dolphin areas</p>	<p>High – positive benefit</p> <p>High - positive benefit</p> <p>Medium - positive benefit</p> <p>High – negative impact initially, through loss of fisheries. However, of positive benefit in the future through increased fish stocks.</p> <p>High - Negative</p> <p>High – negative impact (to violators)</p> <p>High – positive benefit (to general community)</p> <p>Low (virtually no impact initially, however potentially increased positive benefit through enforcement in the future)</p> <p>Medium – positive benefit</p> <p>High – positive benefit</p> <p>High - positive benefit</p> <p>Medium - positive benefit</p> <p>High – negative (violators)</p> <p>Low - there would be little direct impact to the general community, the majority of whom do not engage in illegal fishing.</p> <p>Low - Negative (to violators)</p> <p>Medium – Negative (to commercial fishers)</p> <p>Low</p>
<b>Direct Catch in Nets</b>	High		
<b>Direct Deaths through Illegal Fishing</b> (currently these activities occur less frequently than in previous years)	Low		
<b>Boat Collision and Harassment</b>	Medium		



Table 2: INFORMATION NEEDED TO BETTER UNDERSTAND OR ADDRESS THREATS

Threats	Current Threat Impact	Known/Likely/Potential	Information Needed	Importance	Schedule (Within xx Years)
<b>Accidental Entanglement in Gillnets</b>	High	Known	<ol style="list-style-type: none"> <li>1. Occurrence of by catch</li> <li>2. Level of by catch</li> <li>3. Fisheries practices</li> </ol>	High High High	1-5 1-5 1-5
<b>Direct Catch in Nets</b>	High	Known	<ol style="list-style-type: none"> <li>1. Occurrence of direct catch</li> <li>2. Level of direct catch</li> <li>3. Locations of direct catch</li> <li>4. Villagers involved in direct catch</li> </ol>	High High High High	1-5 1-5 1-5 1-5
<b>Direct Deaths Through Illegal Fishing</b>	Low	Potential	<ol style="list-style-type: none"> <li>1. Occurrence of direct deaths</li> <li>2. Level of direct deaths</li> <li>3. Locations of direct deaths</li> </ol>	High High High	1-5 1-5 1-5
<b>Boat Collision and Harassment</b>	Medium	Likely	<ol style="list-style-type: none"> <li>1. Boat traffic information</li> <li>2. Occurrence of collision</li> <li>3. Future plans for boat traffic</li> <li>4. Future cetacean watching plans and guidelines</li> </ol>	High High High High	1 1-5 1 1
<b>Contaminants</b>	High	Known	<ol style="list-style-type: none"> <li>1. Contaminant levels in prey</li> <li>2. Contaminant types and sources</li> <li>3. Contaminants in dolphins</li> <li>4. Occurrence of congenital defects in dolphins</li> </ol>	High High High High	1-2 1-2 1-2 1-5
<b>Reduction in Freshwater Flow (dam or waterway construction)</b>	Low-High	Potential	<ol style="list-style-type: none"> <li>1. Existing water use</li> <li>2. Planned water use</li> <li>3. Dolphin movements</li> </ol>	High High High	1
<b>Use of Dolphin Parts for Traditional Medicine</b>	Low	Known	<ol style="list-style-type: none"> <li>1. Occurrence of use</li> <li>2. Use type</li> <li>3. Level of use</li> </ol>	Low Low Low	1-2 1 1-2
<b>Habitat loss</b> (village construction, land development, sedimentation)	Medium-High	Likely	<ol style="list-style-type: none"> <li>1. Water level/depth of deep pool data</li> </ol>	Medium	1-2
<b>Depletion of Prey</b> (over-fishing, loss of prey habitat)	Low-High	Known	<ol style="list-style-type: none"> <li>1. Status of fish stocks</li> <li>2. Status of prey habitat</li> </ol>	Medium Medium	1-5 1-5

# The CONSERVATION STRATEGY

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threats described, it is essential that the outlined potential solutions are implemented as soon as possible. Furthermore, conservation activities should be conducted in parallel with education and awareness activities, in order for all community members to understand the significance of, and co-operate with, such activities.

This conservation strategy is divided into the following four sections:

1. Conservation Activities
2. Education and Awareness
3. Research
4. Co-ordination and Regional Co-operation

## 1. CONSERVATION ACTIVITIES

- 1.1 Development of Formalised Conservation Strategy
- 1.2 Development of National Legislation
- 1.3 Enforcement of Regulations
- 1.4 Extension to all Cambodian DoF Offices and Relevant Agencies in Lao PDR and Vietnam
- 1.5 Development of Dolphin Conservation Areas
- 1.6 Development of Appropriate Management and Regulations regarding Dolphin-Watching Ecotourism (Cambodia and Lao PDR)
- 1.7 Construction of Dolphin Monitoring Posts
- 1.8 Establishment of Community Dolphin Committees
- 1.9 Development and Distribution of Educational Information to Tourists
- 1.10 Initiation of Sustainable Development Support in Villages near Critical Dolphin Habitats
- 1.11 Diversification of Livelihoods through Village Development Activities, Land-Based Fish Culture and Dolphin-Watching Eco-Tourism

### 1.1 Development of a Formalised Conservation Strategy

“develop a formalized strategy for the conservation and management of the Mekong River Irrawaddy dolphin population, in co-operation with regional and international experts”

This document represents an initial attempt to synthesise the relevant information necessary to develop an effective conservation strategy for the Mekong River Irrawaddy dolphin population. Implementation of these activities will begin as soon as possible through DoF. This conservation strategy will assist to co-ordinate conservation efforts nationally and regionally, as well as provide a solid basis for securing funds and regional partners.

## 1.2 Development of National Legislation

“assist development of effective national legislation for the legal protection of the Mekong River Irrawaddy dolphin population”

One of the major obstacles to effective dolphin conservation is the lack of national legislation for dolphin conservation and protection. The new Fisheries Law in Cambodia will provide full protection to all marine mammal species in Cambodia. In addition, a proposed Royal Decree (and subsequent Sub-Decree), currently under preparation by DoF will significantly assist conservation of cetaceans in Cambodian waters – particularly the Mekong dolphin population. This Royal Decree will recognise known biologically important areas of the river for dolphins where conservation efforts can be focused. It will be essential that co-operation exists between all ministries and government agencies and that information relevant to dolphin status and conservation is continuously forwarded to all relevant parties throughout the duration of the project.

## 1.3 Enforcement of Regulations

“establish conservation and enforcement teams to control illegal fishing in the Kratie to Lao PDR river section and in the established conservation areas”

Electric and dynamite fishing are illegal in the Mekong River and fishing with large mesh size gill-net is illegal in the upper reaches of the river. However, there is very little enforcement of regulations and community fisheries committees are often left to deal with violators independently. The control and prohibition of illegal fishing activities in the Kratie to Lao PDR/Cambodian border river section would be significantly assisted if the Fisheries Offices at Kratie and Stung Treng conducted regular patrols of this river section, particularly in critical dolphin habitats. In addition, once dolphin conservation areas are designated, enforcement of regulations within these areas should be encouraged through regular monitoring. Given the current lack of resources for Fisheries Offices, it is essential that both Kratie and Stung Treng Offices are supported to conduct monitoring activities. Each office will be responsible for reporting back to DoF and the funding agencies on the monitoring work undertaken.

## 1.4 Extension to all Cambodian DoF Offices and Relevant Agencies in Lao PDR and Vietnam

“ensure all Cambodian DoF offices south of Kratie (incl. Tonle Sap Great Lake) and relevant agencies in Lao PDR and Vietnam are aware of the regulations to conserve dolphins and the importance of reporting dolphins sighted alive or dolphin carcasses”

Results from boat and interview surveys throughout the Cambodian Mekong, suggest that there is very little awareness of the status of dolphins and the importance of reporting both live and dead dolphins. In order to obtain accurate information on dolphin mortality rates and causes in the Mekong River, it is essential that Fisheries Officers are aware that all dolphin carcasses must be reported to DoF. In addition, given the critical status of the population, every dolphin sighted below Kratie must also be reported to DoF, in order to assess current distribution and potential abundance. These extension activities should be extended to the relevant agencies in Lao PDR and Vietnam, once appropriate partners are identified.

## 1.5 Development of Dolphin Conservation Areas

“develop dolphin conservation areas, designated in co-operation with communities and with government support through the Royal Decree, and to clearly demarcate these areas so as enable effective community participation, enforcement and patrolling ”

Nine core zones on the Mekong River have already been defined by DoF in the Proposed Royal Decree as vital areas for Irrawaddy dolphin conservation.

Additional zones may be identified in the future, once data referring to dolphin sightings have been collated. The participation of local communities is very important in the designation of additional dolphin conservation core zones as their participation is essential for determining the fishing regulations appropriate for each zone.

It will be necessary to demarcate these areas so that it is clear where the conservation area boundaries lie. This demarcation will enable effective community participation, and monitoring and patrolling of these areas. The demarcation will first be undertaken using plastic buoys, followed by more permanent markers – such as concrete markers or permanent buoys, once areas are finalised.

## 1.6 Develop Appropriate Management and Regulations Regarding Dolphin-Watching Eco-Tourism (Cambodia and Lao PDR)

“the development of appropriate management and regulations regarding dolphin-watching eco-tourism to ensure its sustainability, encourage community development and to limit harassment to the dolphin population”

The potential financial benefit of eco-tourism to local communities and to the conservation of resources is undeniable. However, if the situation remains as it is currently, unmanaged and uncontrolled, it could disrupt local communities (through inequitable distribution of revenue generated and disturbance to daily activities) and contribute to a reduction of the very resources (i.e. dolphins and fisheries), on which the communities are dependent.

As a result of the establishment of an eco-tourism management system, significant benefits could be evident through:

- Less harassment to the dolphins
- Sustainable use of the resource (i.e. dolphins)
- Increased community benefit from tourism
- Subsequent increased conservation efforts by the local community
- Conservation of two important deep water pool habitats (Kampi and Chroy Bantey) used as spawning sites for migratory fish during the dry season
- Conservation of habitat for sedentary fish species, such as the Croaker – where conservation measures would directly benefit the local community
- Increased revenue generated for local agencies (such as DoF), which could be used to better monitor and patrol the area

### **1.7 Construction of Dolphin Monitoring Posts**

“encourage protection of dolphin conservation areas, through construction of monitoring/research posts overlooking important dolphin habitats”

In order to have a constant presence on the Kratie to Lao PDR/Cambodian border river section, the construction of dolphin monitoring posts is essential. Without these, undesirable activities, such as illegal fishing, will be difficult to control.

### **1.8 Establishment of Community Dolphin Committees**

“establish village-based dolphin committees, to help ensure community support for the designation and protection of conservation areas”

In order to initiate the process of developing any dedicated dolphin conservation areas in the Kratie to Lao PDR/Cambodian border Mekong River section, it will be essential that community committees are established where currently none exist, or strengthened where committees currently exist. Discussions with these committees (and other members of the village), regarding the specifics of any potential conservation area (location and regulations) should be initiated as a matter of priority.

### **1.9 Development and Distribution of Educational Information to Tourists**

“encourage support for Mekong River Irrawaddy dolphin conservation and promote community development through distribution of educational information to tourists”

The number of local and international tourists visiting Kampi and Chiteal Pools is increasing every year. However, there is currently very little information available to them regarding the status of the dolphins, threats to the dolphin population, research currently underway or other important aspects of the Mekong River. Currently, at Kampi, an information board (in English and Khmer) provides some basic information. It is essential that more information is made available to tourists visiting both Kampi and Chiteal sites – preferably in exchange for an entrance fee, which is community managed. An increase in educational material, in Khmer, English and possibly the Japanese language would aim to:

1. provide relevant information on many aspects of the biology and ecology of the dolphins,
2. encourage tourists to pay an entrance fee to contribute towards community development, and,
3. elicit local and international support for conservation activities.

### **1.10 Initiation of Sustainable Development Support in Villages Near Critical Dolphin Habitats (Initially at Two Pilot Sites – Kampi and Chiteal)**

“encourage community support for conservation activities through sustainable development in villages near critical dolphin habitats”

The communities’ support for conservation activities will be essential if the Mekong River Irrawaddy

dolphin is to survive in the Mekong River. In parallel with the designation of conservation areas, two pilot projects will be initiated to provide sustainable development solutions to Kampi and Chiteal Villages. These projects will be undertaken to:-

1. provide the community with some tangible benefits from conservation activities and gear restrictions,
2. encourage community support for conservation activities and,
3. contribute towards reducing Irrawaddy dolphin by-catch through a reduction in fishing activities.

Prior to the launch of the pilot projects, it is essential that socio-economic surveys are conducted. These surveys will provide basic information on demographics, fishing methods, income, villagers' perception of dolphins and potential conservation areas and also help to assess development needs in the village.

If successful, these activities will be replicated in other villages adjacent to designated dolphin conservation areas. These activities will be undertaken in co-operation with the Cambodian Rural Development Team (CRDT), which has three years of successful development experience in Cambodia.

#### **1.11 Diversification of Livelihoods through Village Development Activities, Land-Based Fish Culture and Dolphin-Watching Eco-tourism**

"diversify local livelihoods and encourage a reduction in fishing to support conservation activities"

Diversification of local livelihoods enables villagers to continue to earn revenue, while not relying exclusively on the exploitation of fish stocks and natural resources. The community development project delivered in collaboration with CRDT will dramatically improve the food security and standard of living of the people of Kampi and Chiteal Villages. In parallel with the community development project, diversification of livelihoods through dolphin-watching eco-tourism will also be a focus. This will include training of local guides and boat operators, construction of food, drink and handicraft stalls and the appointment and designation of management staff. It is essential that all members of the villages gain some benefit from the dolphin-watching eco-tourism and it is acknowledged that attempting to diversify livelihoods may not be acceptable to people who would like to continue fishing. In addition, fish is the staple diet for most Cambodians. It is therefore essential that if fishing regulations are put in place on the Mekong, alternative sources of fish and other protein are made available. CRDT have significant experience in construction and maintenance of land-based fish ponds, which provide a readily available source of fish. As part of the two pilot projects (Kampi and Chiteal), CRDT will trial construction and sustainability of these ponds. CRDT also provides livestock vaccinations and training on how to care for livestock to those interested in obtaining alternative sources of protein.

## 2. EDUCATION AND AWARENESS

- 2.1 Village Workshops
- 2.2 School Visits
- 2.3 Awareness Raising Amongst Seine Net Fishers and Authorities South of Kratie to Phnom Penh
- 2.4 Provincial Workshops
- 2.5 General Community Awareness Raising
- 2.6 Integration of Monks into Environmental Education and Awareness Activities
- 2.7 Regional Co-Operation with Educational Activities

### 2.1 Village Workshops

“increase local awareness of dolphin and fisheries conservation and initiate discussions regarding local perceptions towards conservation activities”

It is imperative that local communities and villagers are made aware of the importance of dolphins, fisheries and conservation of the natural riverine environment. Education and awareness activities will therefore be conducted in schools and villages located near critical dolphin habitats. The primary activity will be a small, half-day village workshop to discuss results of the conservation project to date and the status of the dolphin population. Potential conservation activities will also be discussed as well as the dolphin conservation areas proposed in a Royal Decree being developed by DoF. Group discussions regarding community perceptions towards the threats to the dolphin population and potential conservation activities will be undertaken as a matter of priority. In association with the workshops, educational and awareness materials will be distributed.

### 2.2 School Visits

“raise awareness amongst local school children on the importance of dolphin and environmental conservation”

In association with the village workshops, local schools will be visited to:

1. discuss the importance of dolphins, fisheries and conservation of the natural riverine environment
2. to distribute educational and awareness materials
3. launch a colouring competition in every school to reinforce conservation discussions.

### 2.3 Awareness Raising amongst Seine Net Fishers and Authorities South of Kratie to Phnom Penh

“increase awareness of seine-net fishers of the importance of dolphin conservation, in an attempt to prevent any further unnecessary dolphin deaths”

Accidental entanglement in gillnets is now one of the most serious threats facing the Mekong dolphin population. In addition, it has become apparent that the few dolphins moving south of Kratie in the

wet season are persecuted by Cham (Cambodian Muslim) fishermen. Direct deaths through seine net entanglement are unnecessary, as the dolphins could be easily released unharmed. Through village meetings, it is essential that local fishers are made aware of:

1. the conservation and national importance of dolphins,
2. the importance of releasing dolphins caught accidentally in fishing gears,
3. the prohibitions on catching dolphins in seine nets (as stated in the Fisheries Law).

#### **2.4 Provincial Workshops**

“ increase awareness of local provincial authorities regarding dolphin and fish conservation and elicit their full support for conservation activities”

It is also vital that provincial authorities and line-departments are aware of the status of the dolphins and the conservation initiatives. This will contribute significantly towards obtaining support for conservation and management. Due to the restricted dry-season distribution of dolphins in the Cambodian Mekong River (including at the Lao PDR/Cambodian border), provincial workshops are planned for Kratie and Stung Treng Provinces. As well as provincial authorities and relevant line-departments, the commune and district chiefs will be invited to attend, in order to facilitate extension activities after the workshop. Educational materials will be distributed at the workshop.

#### **2.5 General Community Awareness Raising**

“ increase awareness of the importance of dolphin conservation to the general Lao PDR, Cambodian and Vietnamese public, focusing on critical locations”

In order to solicit support for dolphin conservation, it is important that the general Lao PDR, Cambodian and Vietnamese public are made aware of the critical situation facing Irrawaddy dolphins in the Mekong River. Appropriate partners in Lao PDR and Vietnam need to be identified to initiate this process. Activities to be conducted in Cambodia include radio and television shows, news items, magazine articles and the wide distribution of educational materials. Community awareness-raising will also be facilitated by the provision of educational material at dolphin-watching tourism sites such as Kampi (Kratie) and Chiteal (Stung Treng).

#### **2.6 Integration of Monks into Environmental Education and Awareness Activities**

“encourage a dialogue with monks in Kratie and Stung Treng Provinces to elicit their support for dolphin conservation and extension to the general public”

Many Khmer in Cambodia regularly visit pagodas. Therefore, monks should be targeted as potential sources of support for dolphin conservation activities. A recent monk workshop held by Mlup Baitong emphasized the effectiveness of monks in providing environmental information. A variety of monk-based awareness and teaching materials are already available. Dialogue should be initiated with monks in Kratie and Stung Treng Province in order to facilitate potential co-operation.

## 2.7 Regional Co-operation with Educational Activities

“ increase regional co-operation with education and awareness activities”

Research and conservation efforts directed at the Mekong River Irrawaddy dolphin have been conducted in Cambodia since 2001. Regional co-operation with conservation efforts must now be emphasized – particularly in southern Lao PDR – to elicit regional support for conservation activities. Previous studies of the dolphin population in southern Lao PDR provide a good background for which conservation efforts can be continued.

## 3. RESEARCH

- 3.1 Mortality Rates and Causes
- 3.2 Surveys
- 3.3 Distribution Patterns
- 3.4 Government Agency and Relevant NGO Interviews
- 3.5 Effects of Dolphin-Watching Tourism on Dolphin Behaviour

### 3.1 Mortality Rates and Causes

“obtain detailed and accurate information on the mortality rates and causes of the Mekong River Irrawaddy dolphin population”

Essential information has been obtained on mortality rates and causes since 2001. Data and samples have been gathered on stranded dolphins that provide information on external, cranial and postcranial morphology, external colouration, genetic structure, contaminant levels, feeding behaviour and reproductive status. It is vital such data collection continues and to this end, all strandings and dolphin carcasses must be reported.

### 3.2 Surveys

“obtain accurate estimates of abundance and monitor the Mekong River Irrawaddy dolphin population”

**Up-river direct count boat surveys** to estimate Mekong River Irrawaddy dolphin population size have been conducted during each dry-season since 2001. The abundance estimates obtained provide a baseline for which future surveys can be compared and the population monitored. In order to efficiently monitor abundance estimates for the dolphin population, it will be essential that these surveys are continued using, whenever possible, the same methodology and experienced observers.

**Pool count surveys** to estimate dolphin population size have been conducted during each dry season since 2002. It is recommended that they are continued to compare abundance estimates with the up-river direct counts as well as to provide an opportunity for photo-identification and continued interaction and discussion with villagers (through checking the distribution calendars).

**Photo-identification** has been used successfully to identify individual dolphins in a wide variety of cetacean studies throughout the world. It was trialed for the Mekong River Irrawaddy dolphin population in 2001 and proved successful. Photo-identification should be continued as a matter of priority as it will be invaluable to helping to estimate abundance and compare these estimates to those obtained from boat surveys. In addition, photo-identification provides data on movements of individual dolphins. This information is essential when developing conservation initiatives and also provides a unique insight into the behaviour, social affiliations and calving rates of the dolphin population.

**Line-transect surveys** could possibly be undertaken during the wet season as water levels are higher and the whole river becomes more uniform (and dolphins more randomly distributed). These conditions may result in an opportunity to conduct line-transect surveys (within the Kratie to Khone Falls river section), to estimate population abundance and compare results to those obtained from other survey methodologies.

### 3.3 Distribution Patterns

“investigate dolphin population annual distribution patterns throughout its possible range and encourage local participation in dolphin conservation by continuing the dolphin distribution calendars”

Based on boat and interview surveys throughout the Cambodian Mekong since 2001, it is believed that the critical habitat for the Mekong River Irrawaddy dolphin population is now the Kratie to Khone Falls river section.

There are virtually no recent reports of dolphins being sighted in Tonle Sap River or Tonle Sap Great Lake. However, during the wet season of 2005, the Dai Fisheries must be interviewed to help determine whether dolphins have been sighted in the Tonle Sap River in recent years. One further survey of Tonle Sap Great Lake would also be useful to confirm results from previous surveys – particularly if conducted during the end of the wet-season (October-December).

There are occasional reports of dolphins being sighted downstream of Kratie to Phnom Penh – with virtually no reports of dolphins being sighted south of Phnom Penh to the Vietnamese border. It is essential that one further interview survey is undertaken south of Kratie to Phnom Penh and further south to the Vietnamese border, to further confirm these results.

Previously (1960s-1990s), dolphins were known to inhabit the Sekong, Srepok and Sesan River systems (river systems that join the mainstream Mekong just north of Stung Treng township). Recent boat and interview surveys have been conducted along only parts of these river systems. Reports indicate that dolphins have not been sighted in these areas for at least the past 3-4 years. A further set of boat and interview surveys should be conducted along the complete length of these rivers as a matter of priority (including the Lao PDR portion of the Sekong River), to establish present-day dolphin distribution and determine the causes of decline in these areas.

From surveys conducted since 2001, the dolphin's dry-season distribution in Cambodia has been well documented. However, the dolphins' distribution patterns during the wet-season are still unclear, as are the critical wet-season dolphin areas. Surveys, continued during the wet-season, will be essential for documenting wet-season dolphin habitat preferences.

The dolphin daily distribution calendars provide an easy, effective method for villagers to assist in the collection of dolphin distribution data. It is recommended that these calendars are continued throughout the duration of the project, to assist in long-term data collection and to contribute to the establishment and continuation of positive community relations.

### **3.4 Government Agency and Relevant NGO Interviews**

“gather information from relevant government agencies and NGOs regarding their role in dolphin conservation”

There are various government agencies and NGOs that have a mandate or interest in the conservation of the Mekong River dolphin population. An essential step towards understanding these roles and responsibilities will be to prepare a document which succinctly outlines the relevant agencies involved, their role and/or mandate and relevant contact people within the agency. This information will then assist towards ensuring co-operation and collaboration of conservation efforts between all parties, nationally and regionally.

### **3.5 The Effects of Dolphin Watching-Tourism on Dolphin Behaviour**

Dolphin-watching tourism is known from previous studies around the world to cause significant disturbance to dolphin populations. It is essential that a research project is initiated to investigate the effects that dolphin watching tourism currently has on the dolphin groups living at Chiteal and Kampi Pools. This will contribute towards the management of current and future dolphin-watching activities and the overall conservation of the dolphin population.

**Table 3: PRIORITY BIOLOGICAL KNOWLEDGE REQUIRED**

adapted from Wang et al (2004)

Information On:	Importance	Methods	Current level of information	Logistically Feasible	Schedule (within xx years)
<b>Abundance</b>	High	Boat based surveys	Good	YES	1-5
		Land-based surveys	None	YES	1-5
		Photo-ID (mark-recapture)	Good	YES	1-5
		Aerial surveys	None	YES	1-2
		Genetic recapture	None	NO	
<b>Population Trends</b>	High	Historical research	Excellent	YES	1
		Repeated surveys	Good	YES	1-5
		Population modeling	None	YES	2-5
<b>Distribution</b>	High	Boat-based surveys	Excellent	YES	1-5
		Reports of sightings (interviews)	Excellent	YES	1-5
		Reports of sightings (public)	Poor	YES	1-5
		Aerial surveys	None	NO	
		Satellite/radio tagging	None	NO	
<b>Habitat Requirements</b>	High	Collection of environmental data	Good	YES	1-5
		Multivariate habitat analyses	Poor	YES	2-5
		Prey density and distribution	None	YES?	1-5
<b>Demography / Life History</b>	High	Age/sex structure of schools	Poor	NO	
		Carcass analyses	Good	YES	1-5
<b>Population Discreetness</b>	High	Morphology	Excellent	YES	1-2
		Genetics	Good	YES	1-2
		Movement (photo-identification)	Excellent	YES	1-5
		Parasite loads	None	YES	1-3
		Contaminant patterns	Poor	YES	1-5
<b>Individual Movements</b>	High	Distribution	Excellent	YES	1-5
		Photo-identification	Good	YES	1-5
		Telemetry	None	NO	
<b>Population Genetics (level of inbreeding)</b>	High	Carcass recovery	None	YES	1-5
<b>Feeding Ecology</b>	Medium	Stomach contents	None	YES	1-5

*Conservation strategy for the Mekong River Irrawaddy Dolphin*

		Direct observations of feeding Prey density	Poor None	YES NO	1-5
<b>Pathology</b>	Medium	Necropsy examination on all carcasses Laboratory investigation on fresh carcasses/tissues	Good None	YES YES	1-5 2-5
<b>Health Status</b> (body condition, scars, bio-markers, skin conditions)	Medium	Analysis of injuries and scars (photo-id) Analyses of body condition Analyses of prevalence of skin problems (photo-id)	Good Good Good	YES YES YES	1-5 1-5 1-5
<b>Behavioral Ecology</b>	Low	Ethological studies Acoustic studies Behavioural sampling Telemetry	None Poor None None	YES YES YES NO	3-5 3-5 3-5

## 4. CO-ORDINATION AND REGIONAL CO-OPERATION

- 4.1 Agreement on the Conservation Priorities of Chiteal Pool.
- 4.2 Identification of Responsible National Agencies
- 4.3 National Workshop on Mekong River Irrawaddy Dolphin Conservation Priorities
- 4.4 Regional Working Group Meeting (Southern Lao PDR/Cambodia/Vietnam)
- 4.5 Establishment of a Trans-Boundary Mekong River Irrawaddy Dolphin Management Committee (Lao PDR, Cambodia And Vietnam)

### 4.1 Agreement on the Conservation Priorities For Chiteal Pool.

“encourage regional co-operation with conservation activities at Chiteal Pool (Lao PDR/Cambodian border)”

Chiteal Pool on the Lao PDR/Cambodian border is a particular challenge for conservation, as trans-boundary co-operation is essential. Although approximately 25-30 dolphins could regularly be sighted in the area in 1997 (I. Beasley *pers. obs.*), it is estimated that there are now only eight dolphins inhabiting this deep water area – two of which are calves born in January 2004. It is vital that conservation activities are implemented as soon as possible in this area before the dolphin group becomes locally extinct. Preliminary activities in the area suggest that both Lao PDR and Khmer villagers are supportive of conservation activities.

### 4.2 Identification of Responsible National Agencies

“identify responsible national agencies to encourage and facilitate co-operation with dolphin conservation initiatives”

The identification of relevant national agencies will be essential towards developing effective conservation initiatives to conserve the Mekong River Irrawaddy dolphin population. Increased communication and co-operation between these agencies will be emphasized as a matter of priority.

Over the past three years, DoF has been working closely with the provincial departments of the Ministry of Tourism and Ministry of Environment in Kratie and Stung Treng to help protect the dolphin from tourism-related disturbance and environmental pollution. Further cooperation is needed with the Ministry of Tourism and Ministry of Industry, Mines and Energy to improve the livelihoods of local communities by developing tourism activities and controlling mining activities on the upper tributary near Kampi.

To improve public awareness, DoF is also working with the Ministry of Transport with a view to showing videos of the dolphins on the express boat from Kompong Cham to Kratie and Kratie up to Stung Treng province.

DoF has also been working with several NGOs such as CAA (Community Aid Abroad) and CRDT (Cambodian Rural Development Team), and will develop this co-operation over the next five years.

#### **4.3 National Workshop on Mekong River Irrawaddy Dolphin Conservation Priorities**

“endorse the conservation strategy at national and provincial levels to encourage co-operation and support for conservation initiatives”

In association with the development of this conservation strategy, it will be essential that a workshop is conducted to discuss the implementation of the conservation priorities. This will also provide an opportunity to update stakeholders on the status of the dolphin population and the threats to its survival.

#### **4.4 Regional Working Group Meeting (Southern Lao PDR/Cambodia/Vietnam)**

“conduct a regional working group meeting to discuss dolphin status and conservation in the Mekong River and to further develop effective conservation initiatives”

A regional working group meeting will be an important first step in bringing all relevant agencies together and developing effective conservation initiatives. International experts on river dolphins or Irrawaddy dolphins should be invited. This meeting will focus on:-

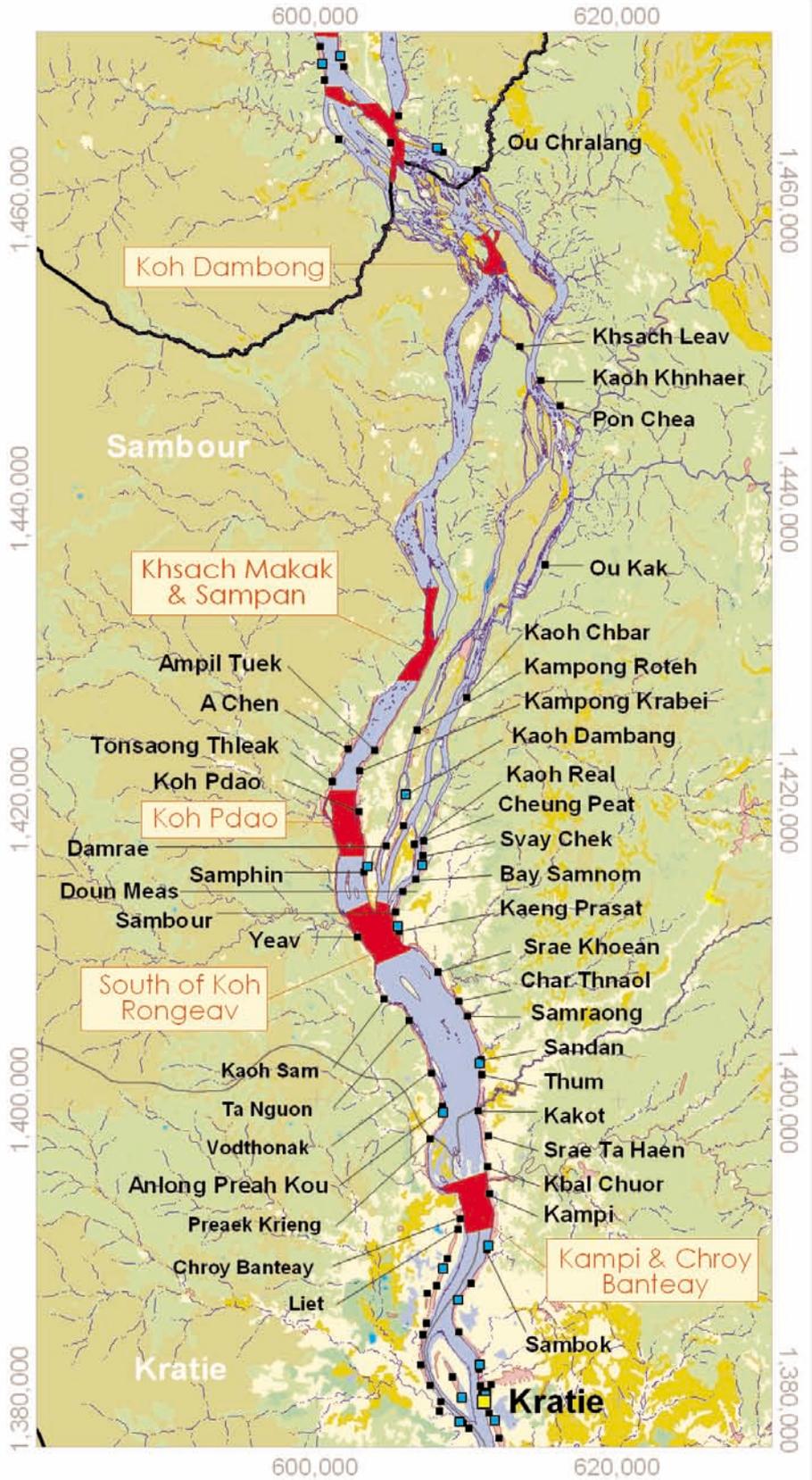
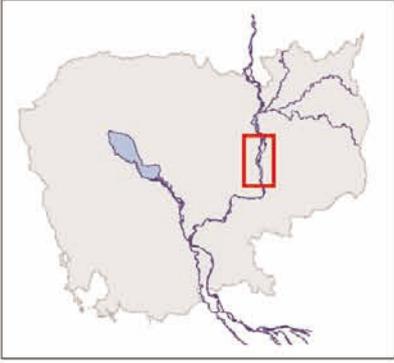
1. presenting and discussing current research and knowledge regarding Mekong River Irrawaddy dolphin status, threats and conservation activities already initiated,
2. establishing national working groups,
3. further developing a species conservation action plan (outlining priority sites and management actions),
4. discussing case studies from other locations to provide guidance on potentially effective conservation initiatives.

#### **4.5 Establishment of a Trans-boundary Mekong River Irrawaddy Dolphin Management Committee (Lao PDR, Cambodia and Vietnam)**

“encourage regional co-operation with dolphin conservation initiatives through the establishment of a trans-boundary Mekong River Irrawaddy Dolphin Management Committee”

An essential outcome of the regional working group meeting would be the establishment of a dedicated trans-boundary Mekong River Irrawaddy Dolphin Management Committee. This would further encourage regional co-operation and development of conservation initiatives – and attempt to ensure that these conservation initiatives are implemented successfully and sustainably.

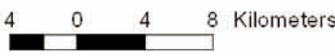
## Proposed Mekong Deep Pool Conservation Areas Kratie Province



**LEGEND**

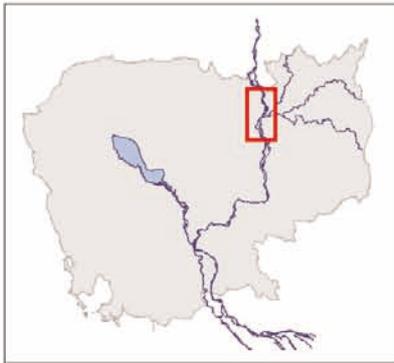
- Proposed Conservation Areas
  - Provincial capital
  - Commune centre
  - Villages
  - Permanent rivers
  - Seasonal rivers & streams
  - Provincial boundary
  - District boundary
- FOREST**
- Evergreen forest
  - Deciduous forest
  - Flooded forest
- NON-FOREST**
- Shrubland
  - Grassland
  - Agriculture
  - Settlement
  - Marsh & swamp
  - Open water

**COORDINATE SYSTEM**  
 - Projection: UTM  
 - Zone: 48N  
 - Horizontal Datum: Indian 1960  
 - Spheroid: Everest



Prepared by  
 WCS Cambodia  
 January 2005

## Proposed Mekong Deep Pool Conservation Areas Stueng Treng Province



### LEGEND

- Proposed Conservation Areas
  - Provincial capital
  - Commune centre
  - Villages
  - Permanent rivers
  - Seasonal rivers & streams
  - Provincial boundary
  - District boundary
- FOREST**
- Evergreen forest
  - Deciduous forest
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- Shrubland
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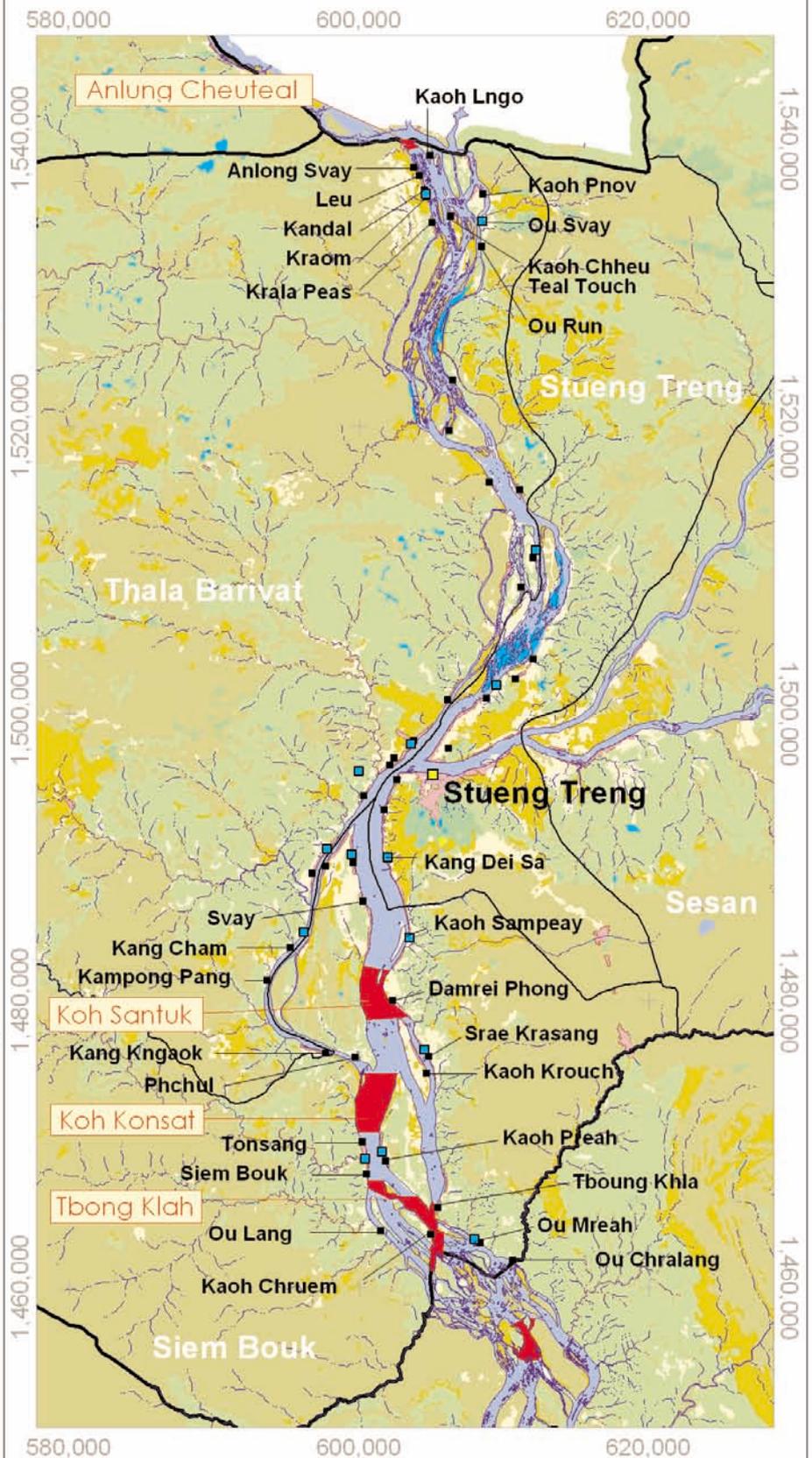
### COORDINATE SYSTEM

- Projection: UTM
- Zone: 48N
- Horizontal Datum: Indian 1960
- Spheroid: Everest



4 0 4 8 Kilometers

Prepared by  
WCS Cambodia  
January 2005



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