

Conservation Leadership Programme: Project Reporting

Final Report

0351311-Conservation of Threatened Fish Species of the Mekong Ramsar Site

Cambodia, Mekong Ramsar Site at Stung Treng

July 2011-July 2012

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February 16, 2013



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Acknowledgements

We are thankful to the villagers of Thmei, Koh Kei, O Svay, and Koh Pnov villages who participated in the interview, group discussions, and the provincial workshop. We especially would like to thank the village chief of Thmei village for her help with cooking while we were conducting the survey in the village. We would also like to thank helpers Seakmeng Ly, Malay Min, Vichet Nguon, Seap Sak, and Sochantrea Som for their assistance in the field data collection. We would also like to thank our advisor Michael Sorice for his help in the research design. Last but not least, we would like to thank our donor, the Conservation Leadership Programme. We thank the four organisations: BirdLife International, Conservation International, Fauna and Flora International, and Wildlife Conservation Society.

Section 1: **Summary**

In this project, we identified local perceptions and their knowledge of threatened fishes, of existing rules, and about fisheries conservation practices in the Mekong Ramsar site of the Stung Treng province in north eastern Cambodia. We conducted household surveys using face-to-face interviews. We asked local experts and villagers to identify threatened fish species and their perception about the trends and status of fish population as well as reasons for changes in the population trends. Results from the survey indicated that local villagers perceived population of the threatened fishes as declining due to many factors including illegal fishing activities that involved destructive fishing practices such as the use of bombs, changes of water level due to dam operation, etc. In addition to the household surveys, we also conducted fish motoring at landing sites to examine the presence of threatened fish in the catch. The monitoring results showed that several IUCN Red List species such as *Probarbus jullieni* and *P. labeamajor* (IUCN: Endangered) appeared at the landing sites. At the end of the project, a provincial workshop was organized to promote conservation awareness of threatened fishes among villagers and stakeholders in the study site. Participants attended the workshop were from diverse backgrounds including local fishers, teachers, students, NGOs staff, and government officers. They actively participated in learning and providing feedbacks for improving the conservation of threatened fish species in the study area.

Introduction

The Mekong River supports one of the world's highest diversities of fish species and a number of endangered species (Campbell 2009). Fish production from the Mekong River is estimated at 2 million tons per year (MRC 2003), which is about more than 20% of the world's inland capture (8.7 million tons) (FAO 2004). It also supports millions of people who heavily depend on resources from the river in the Indo-burma region (Hortle 2007). People from the Lower Mekong countries of Cambodia, Laos, Thailand, and Vietnam have the highest consumption of protein obtained from fish compared to other parts of the world (Hortle 2007). The Mekong fish population have been threatened and under pressure from human and development activities (Dudgeon 2011). Increased pressures due to rapid development have lead to habitat destruction and have threatented many fish species, some to the brink of extinction (Olden et al. 2007). The present project produces documentation of local ecological knowledge about threatened fish species of a globally important wetlands for biodiversity conservation. It provides information about the status and trends of threatened fish species in the Mekong Ramsar site, a globally important wetland for biodiversity conservation. The study site has been recognized as a RAMSAR site and an Important Bird Area.

This project was conducted by a research team from a national university, Royal University of Phnom Penh (RUPP) in collaboration with the Department of Environment (DoE) in Stung Treng province. Two faculty members and three students from RUPP together with two officers from DoE worked closely in both field data collection and in the organisation of a provincial workshop in Stung Treng province at the end of the project. This research helped to enhance the capacity of the team and their knowledge in research and conservation. The project directly involved local fishers and villagers in the household survey, focus group discussion, monitoring and workshop. Other stakeholders such as local authorities and NGO representatives were engaged in the roundtable discussion. Stakeholders were informed about the conservation of threatened fish speceis in the Mekong Ramsar Site during the provincial workshop.

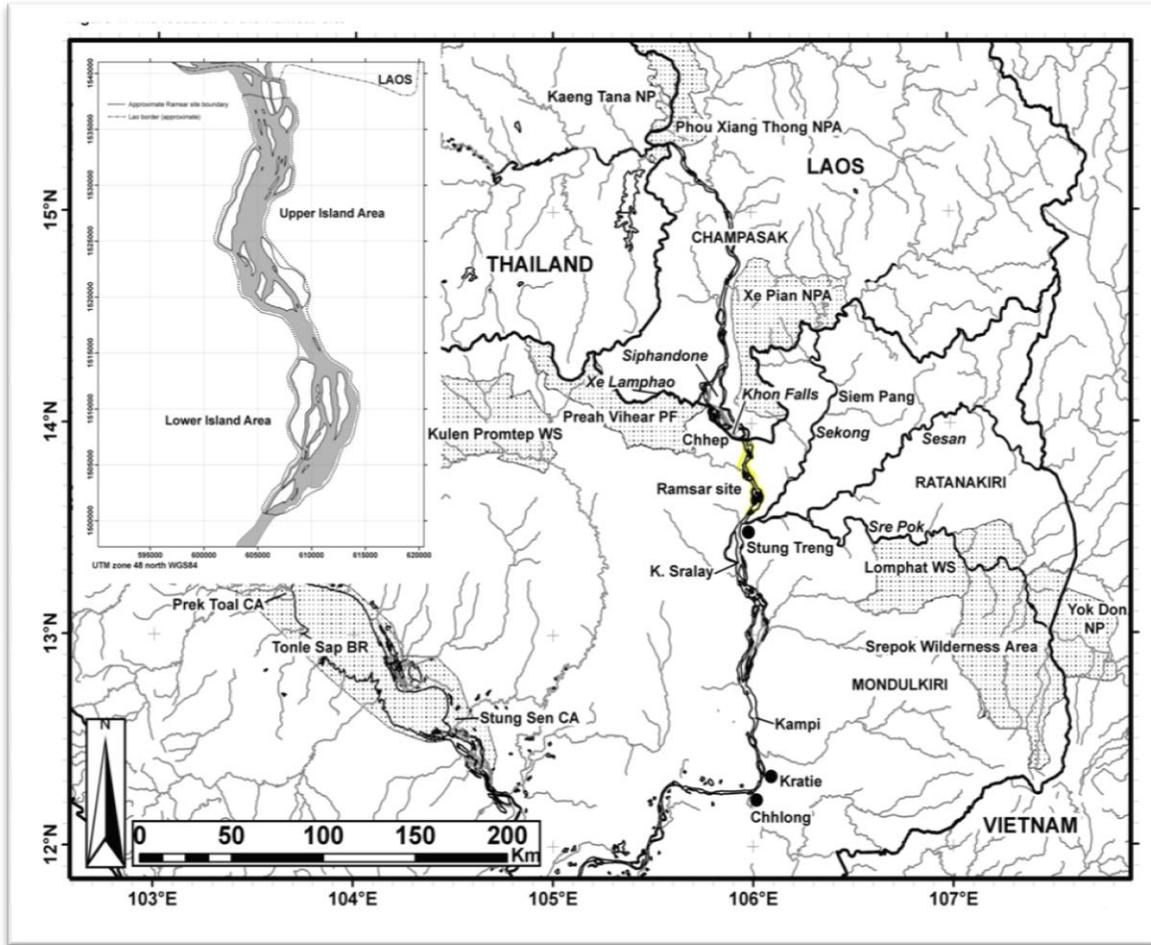


Fig 1. Map of the Mekong Ramsar Site at Stung Treng (highlighted in yellow)

Project members

List the project members, giving brief details of their relevant qualifications, experience, current occupation and employer, and their main roles in the project. Where relevant give an indication of the age group.

Chouly Ou (project leader) is 31. She is a lecturer at the Department of Environmental Science of Royal University of Phnom Penh in Cambodia. She received a master's degree in natural resources management. Currently, she is completing her Ph.D. in Wildlife and Fisheries Sciences at Texas A&M University (expected to graduate in summer 2013). She has experience in biodiversity conservation, protected area management, and species population monitoring throughout Cambodia. Her specialty is in fish ecology of the Lower Mekong River Basin. Her role in this project involved compilation of reports, and provided coordination and supervision of all project activities.

Vin Spoann is 36 and he is also a lecturer at the Department of Environmental Science of Royal University of Phnom Penh. He graduated with a master's degree in Urban Environmental Management from Asian Institute of Technology. He is currently

pursuing a Ph.D. in Environmental Protection at Warsaw University. He has involved and coordinated a number of projects about social and ecological aspects. He also has trained undergraduate students in numerous courses related to environmental science and conservation. His main role in the project includes organisation of the provincial workshop, data analysis, and logistics.

Vanna Nuon is 34. He holds a master's degree in Aquaculture and Aquatic Resources Management. He was an officer of the Department of Environment at Stung Treng province. He is currently working as a project associate in the climate change and adaptation initiative program at the Mekong River Commission headquarters in Laos PDR. His role in the project involved field work coordination, data collection, and result compilation.

Section 2:

Aim and objectives

The project aimed to document local ecological knowledge of threatened fish species in the Mekong Ramsar, Cambodia. Specifically, we aimed to achieve the following objectives:

Objective 1: Determine anthropogenic drivers of threats to threatened fish species.

Objective 2: Explore local ecological knowledge (LEK) to a) identify perceived trends in fish populations; b) ascertain knowledge of existing rules and regulations; and c) understand local perceptions of fisheries conservation practices.

Objective 3: Promote awareness raising of conservation of threatened fish species

Methodology

To achieve the first objective, we conducted a literature review of available publications about threats on fish species population in the Lower Mekong River Basin. Knowing that there is limited publication on this topic, expert consultation is necessary. Therefore, we also conducted a roundtable discussion among local conservation groups and organisation representatives such as CEPA, Mlub Baitong, Stung Treng Fisheries Office, Department of Water Resources and Meteorology who are active stakeholders in the conservation activities in the RAMSAR site. We invited officials and experts who have worked in or have been involved in conservation work in the RAMSAR area to provide their perspectives and identify threats to the fish in the study region.

To achieve the second objective, we conducted household surveys and focus group discussions to explore local ecological knowledge. We used a standardized survey instrument for face-to-face interviews. A reconnaissance survey was conducted to pretest and modify the survey instrument before we started the interview. The interview was conducted in four villages namely: O Svay, Koh Key, Koh Phnov and Thmei village. We interviewed 178 households (aimed for 190 households). In each village, we randomly selected the first household and then systematically interviewed every second household. We interviewed the head of the household. Each interview took approximately 30 minutes to complete. We asked people about their local knowledge about fishing

locations, fishing gears, common fish species in their catch, and threatened fish population status and trends. Further we asked them about their knowledge of existing rules and regulations, and the practice of conservation of the threatened fish in their area. In addition to the household survey, we also conducted landing site fish monitoring to gather information on the presence of threatened fish species. During the monitoring, we took pictures and made measurements of any threatened fishes we encountered.

For the third objective, we organized a provincial workshop to promote public awareness for the conservation of threatened fish species in the study area. We invited local fishers through the village leaders. We invited local authorities, provincial department officers, local NGO representatives, RAMSAR authorities, and Cambodian Fishery Administration officials using written invitations and through our personal and professional networks. The workshop was led by our team member, Vin Spoann, who is experienced in organizing community-level workshops. During the workshop, we provided an open platform for stakeholders (fishers, biologists, social scientists, conservation practitioners, and decision makers) to share information, experiences and lessons learned about conservation of threatened fishes in the Mekong Ramsar site and from the project. To assess the influence and outcome of the workshop, we used evaluation form and interviewed a sample of participants before and after the workshop to understand changes in their knowledge of conservation regulation as well as to assess changes in their perceptions of and their willingness to conserve threatened fish species.

Outputs and Results

Outputs from objective 1

We met with officials and experts who have worked in or have been involved in conservation work in the Mekong RAMSAR area including the Stung Treng Department of Water Resources, Department of Fisheries, Department of Environment, and local non-governmental organisations (e.g. Mlub Baitong, CEPA) at Stung Treng province in north eastern Cambodia. They shared their expertise and knowledge about threats to fish species in the area as well as provided us with their perspectives on the status of threats and conservation of threatened fish species in the Lower Mekong River region. The experts identified a number of threats that put pressure on fishery in the Mekong River including dams, destruction of flooded forest, over fishing, destructive land use, use of fertilizers in agricultures, use of unregulated fishing gears or illegal fishing techniques (such as brush traps and floodplain fences). Amongst the mentioned factors, dam operations on the Mekong main channel and tributaries have been identified as major factors contributing to the fishery destruction.

This is consistent with our literature review. It has been suggested that hydropower development causes changes in flow regimes, floodplain habitats, flood pulse, nutrients, and food items (Orr et al. 2012). Migratory fishes are the most vulnerable group impacted by dams because they depend on natural flow for their migration for food and spawning (Dugan et al. 2010). The majority of the Mekong fish are migratory species (Rainboth 1996). It has been suggested that hydropower dams affect river organisms by fragmenting rivers in the longitudinal dimension, prohibiting colonization and community succession, and changing in the flow regime that maintains river productivity, reproduction, population dynamics, and consumer-resource interactions (Poff et al. 1997, Winemiller 2004, Poff et al. 2010). Many fisheries' scientists believe that dams will

inevitably have a major impact on the Mekong River fisheries productivity (Dugan et al. 2010, Dudgeon 2011).

Outputs from Objective 2

We conducted a household survey and focus group discussions to explore local ecological knowledge about threatened fish species in the Mekong Ramsar in Stung Treng province. In total, we interviewed 178 (we aimed for 190) households from four villages namely Thmei village, Koh Key, Osvay, and Koh Pnov. We asked each household head information about their fishing locations, fishing gears they use, common fish species they catch, their perceived fish populations trend, and reasons for population change. In particular, we asked them to assess the population trend of thirty fish species. We used fish pictures in addition to questionnaire as materials for the interview. The thirty species includes common species, rare species, threatened species, and exotic species. Exotic and common species were used as controlled groups (see questionnaire in appendices for species list). For each species, we asked about the frequency of the catch, population trends, and reasons of fish decline (if the trend assessed as decrease). We also asked about knowledge of existing rules and regulations, and the practice of conservation of the threatened fish in their area.

Fishing information

The results indicated that the majority (59%) of the respondents were only attended primary school. None of them went to college. It is very interesting to see that the majority of the villagers claim that their major income source is from agriculture or rice growing although all of them are fishers. This might be because they consider their fishing activities are for subsistence.

The survey results indicated that the majority of the villagers (90%) go fishing every day during the dry season. However, they go less frequently (less than three times/days a week) during the rainy season. This is due to two reasons; first it is not easy to catch fish when the water rises, and second villagers are busy with rice farming activities during the rainy season. The majority of the villagers spent more than 1 hour each time they go fishing. On a typical day, they would spend between 1-4 hours fishing.

Even though, villagers fish everywhere, all of them said they catch most of their fish from the pool (Veurn in local language: Veurn Sean, Veurn Sok, Veurn Chan, Veurn Ta Loun, Veurn Ta To) and near some islands (Koh in local language: Koh Treng, Koh Kang, Koh Key, Koh Sneng, Koh Pnov).

Fishing gears

There are many types of fishing gears used in the study region depending on their purposes, fish they target, and water level/season. For example long-handled scoop net (Thnornng chhrung in local language) is used in river with rocky rapids, cross-bow (Sna ban Trey in local language) is used in floodplain habitats, and horizontal cylinder trap (Lop prueh saiyeoun in local language) used in streams or shallow ponds. Large cylinder traps (lop prueh duen in local language) is used in riverbanks, while giant lift net (Chhnuok in local language) is used in river channel, deep pools or deep areas of floodplain habitats. Cast nets (Samnanh in local language) are used in shallow water habitats in the river channels. Similarly sein nets (Ourn in local language) are used in

river banks or shallow water habitats. The common fishing gears used by villagers in the study areas include cast nets, gill nets, seine nets, lines and hooks. Gill nets and cast nets are used at all sites and by all fishers with different mesh size depending on what species they target.

Common fish in catch

There are about five hundred fish species documented in Cambodia (Rainboth 1996). The common fish species reported by the villagers are species are carps and catfishes. These include: cyprinidae (*Cyclocheilichthys apogon*, *C. enoplos*, *C. furcatus*, *C. lagleri*, *C. mekongensis*, *Henicorhynchus lobatus*, *H. siamensis*, *Hypsibarbus lagleri*, *H. malcolmi*, *H. pierrei*, *H. wetmorei*, *Hemibagrus filamentus*, *H. nemurus*, *H. spilopterus*, *H. wyckii*, *H. wyckiodes*, *Labeo chrysophekadion*, *Labiobarbus siamensis*, *Morulius chrysophekadion*, *Mekongina erythropila*, *Lebeo pierrei*, *Bangana behri*, *Paralaubuca typus*, *Puntioplites falcifer*, *Scaphognathops bandanensis*, *S. Stejnegeri*, *Bagridae*(*Hemisilurus mekongensis*, *Kryptopterus micronema*, *K. moorei*, *K. cryptopterus*, *Micronema bleekeri*, *M. cheveyi*, *Ompok hypophthalmus*), *Pangasidae* (*Pangasius conchophilus*, *P. siamensis*, and *P. Larnaudii*) and *Sisoridae* (*Bagarius bagarius*, *B. Suchus*). *Henicorhynchus lobatus* and *H. siamensis* are the most common fishes in catch.

Local villager perception on threatened fish population status and trends

The survey results indicated that villagers perceived rare and threatened fishes in their areas/villages as in great decline, and also they have not seen or caught those fishes for many years (table 1). The majority (> 50%) of the villagers never saw certain several endangered fish species in the area they go fishing. These include both species that never present in the area (*Scleropages forosus*), those that are potentially extinct (*Pristis microdon*, *Puntius partipentazona*, *Balantiocheilos melanopterus*, *Pangasianodon gigas*), or those that are exotic species (*Lepisosteus oculatus*, *Oreochromis niloticus*, *Piaractus brachypomus*, *Hypsotomus plecostomus*, *Polyodon spathula*, and *Oncorhynchus mykiss*). For *Oreochromis niloticus*, they only have seen them in the local market because they are farmed fishes. Other species that they had seen in the past but never seen or catch them in the last several years are *Catlocarpio siamensis* and *Glyptothorax fuscus*. Other species that they occasionally catch are *Probarbus jullieni*, *Probarbus labeamajor*, *Osphronemus exodon*, *Osphronemus goramy*, *Datnioides undecimradiatus*, *Tenuialosa thibaudeaui*, *Wallago leeri*, *Lycotrhissa crocodiles*, *Mekongina erythropila*, and *Bangana behri*. Species that are frequently caught by villagers include *Channa striata*, *Parambassis siamensis*, *Anabas testudineus*, *Macrogathus siamensis*, and *Micronema cheveyi*.

We assessed the fish population status based on the information about catch frequency. Villagers generally do not know the trend of the fishes they never seen nor caught (see above). They perceived those rare and fish they occasionally catch as declining or highly decreasing in their population trend. However, the fishes that appear frequently in their catch (such as *Channa*, *Anabas*) are perceived as relatively stable (table 2).

Table 1. Perceived trend of fish population

| No | Scientific Name | Overall | | Overall | | Overall | | Overall | | Overall | | Overall | |
|----|-------------------------------------|-----------------|------|----------|------|---------|------|----------|------|-----------------|------|------------|------|
| | | Highly increase | | Increase | | same | | decrease | | highly decrease | | Don't know | |
| | | Sum | F | Sum | F | Sum | F | Sum | F | Sum | F | Sum | F |
| 1 | <i>Scleropages forosus</i> | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 2 | 0.01 | 0 | 0.00 | 176 | 0.99 |
| 2 | <i>Pristis microdon</i> | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 178 | 1.00 |
| 3 | <i>Puntius partipentazona</i> | 0 | 0.00 | 4 | 0.02 | 5 | 0.03 | 11 | 0.06 | 45 | 0.25 | 113 | 0.63 |
| 4 | <i>Balantiocheilos melanopterus</i> | 0 | 0.00 | 7 | 0.04 | 8 | 0.04 | 23 | 0.13 | 116 | 0.65 | 24 | 0.13 |
| 5 | <i>Puntioplites bulu</i> | 2 | 0.01 | 51 | 0.29 | 34 | 0.19 | 49 | 0.28 | 26 | 0.15 | 16 | 0.09 |
| 6 | <i>Pangasianodon gigas</i> | 0 | 0.00 | 3 | 0.02 | 2 | 0.01 | 4 | 0.02 | 161 | 0.90 | 8 | 0.04 |
| 7 | <i>Catlocarpio siamensis</i> | 0 | 0.00 | 6 | 0.03 | 3 | 0.02 | 15 | 0.08 | 145 | 0.81 | 9 | 0.05 |
| 8 | <i>Probarbus jullieni</i> | 0 | 0.00 | 30 | 0.17 | 15 | 0.08 | 68 | 0.38 | 46 | 0.26 | 19 | 0.11 |
| 9 | <i>Probarbus labeamajor</i> | 0 | 0.00 | 12 | 0.07 | 6 | 0.03 | 59 | 0.33 | 89 | 0.50 | 12 | 0.07 |
| 10 | <i>Osphronemus exodon</i> | 2 | 0.01 | 15 | 0.08 | 16 | 0.09 | 78 | 0.44 | 45 | 0.25 | 22 | 0.12 |
| 11 | <i>Osphronemus goramy</i> | 1 | 0.01 | 14 | 0.08 | 16 | 0.09 | 70 | 0.39 | 50 | 0.28 | 27 | 0.15 |
| 12 | <i>Datnioides undecimradiatus</i> | 1 | 0.01 | 19 | 0.11 | 21 | 0.12 | 67 | 0.38 | 43 | 0.24 | 27 | 0.15 |
| 13 | <i>Tenualosa thibaudeaui</i> | 1 | 0.01 | 12 | 0.07 | 13 | 0.07 | 45 | 0.25 | 52 | 0.29 | 55 | 0.31 |
| 14 | <i>Glyptothorax fuscus</i> | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 13 | 0.07 | 31 | 0.17 | 134 | 0.75 |
| 15 | <i>Wallago leeri</i> | 1 | 0.01 | 4 | 0.02 | 8 | 0.04 | 58 | 0.33 | 72 | 0.40 | 35 | 0.20 |
| 16 | <i>Bagarius suchus</i> | 0 | 0.00 | 28 | 0.16 | 23 | 0.13 | 84 | 0.47 | 24 | 0.13 | 19 | 0.11 |
| 17 | <i>Lycotrisa crocodiles</i> | 0 | 0.00 | 19 | 0.11 | 20 | 0.11 | 70 | 0.39 | 41 | 0.23 | 28 | 0.16 |
| 18 | <i>Channa striata</i> | 0 | 0.00 | 17 | 0.10 | 93 | 0.52 | 59 | 0.33 | 5 | 0.03 | 4 | 0.02 |
| 19 | <i>Parambassis siamensis</i> | 0 | 0.00 | 23 | 0.13 | 90 | 0.51 | 50 | 0.28 | 4 | 0.02 | 11 | 0.06 |
| 20 | <i>Anabas testudineus</i> | 0 | 0.00 | 18 | 0.10 | 96 | 0.54 | 49 | 0.28 | 7 | 0.04 | 8 | 0.04 |
| 21 | <i>Mekongina erythrospila</i> | 1 | 0.01 | 23 | 0.13 | 23 | 0.13 | 71 | 0.40 | 38 | 0.21 | 22 | 0.12 |
| 22 | <i>Bangana behri</i> | 1 | 0.01 | 25 | 0.14 | 24 | 0.13 | 76 | 0.43 | 31 | 0.17 | 21 | 0.12 |
| 23 | <i>Macrogathus siamensis</i> | 0 | 0.00 | 23 | 0.13 | 94 | 0.53 | 45 | 0.25 | 8 | 0.04 | 8 | 0.04 |
| 24 | <i>Micronema cheveyi</i> | 0 | 0.00 | 20 | 0.11 | 89 | 0.50 | 52 | 0.29 | 9 | 0.05 | 8 | 0.04 |
| 25 | <i>Lepisosteus oculatus</i> | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 178 | 1.00 |
| 26 | <i>Oreochromis niloticus</i> | 0 | 0.00 | 0 | 0.00 | 2 | 0.01 | 3 | 0.02 | 0 | 0.00 | 173 | 0.97 |
| 27 | <i>Piaractus brachypomus</i> | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 178 | 1.00 |
| 28 | <i>Hypsotomus plecostomus</i> | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 178 | 1.00 |
| 29 | <i>Polyodon spathula</i> | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 178 | 1.00 |
| 30 | <i>Oncorhynchus mykiss</i> | 0 | 0.00 | 1 | 0.01 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 177 | 0.99 |

Table 2. Frequency of fish catches

| No | Scientific Name | Overall | | Overall | | Overall | | Overall | | Overall | | Overall | |
|----|-------------------------------------|------------|------|-------------|------|---------|------|--------------|------|------------|------|---------|------|
| | | Never seen | | Never catch | | Rarely | | Occasionally | | Frequently | | Always | |
| | | Sum | F | Sum | F | Sum | F | Sum | F | Sum | F | Sum | F |
| 1 | <i>Scleropages forosus</i> | 172 | 0.97 | 3 | 0.02 | 2 | 0.01 | 1 | 0.01 | 0 | 0.00 | 0 | 0.00 |
| 2 | <i>Pristis microdon</i> | 176 | 0.99 | 1 | 0.01 | 1 | 0.01 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 |
| 3 | <i>Puntius partipentazona</i> | 116 | 0.65 | 22 | 0.12 | 16 | 0.09 | 22 | 0.12 | 2 | 0.01 | 0 | 0.00 |
| 4 | <i>Balantiocheilos melanopterus</i> | 98 | 0.55 | 18 | 0.10 | 15 | 0.08 | 29 | 0.16 | 10 | 0.06 | 8 | 0.04 |
| 5 | <i>Puntioplites bulu</i> | 9 | 0.05 | 8 | 0.04 | 15 | 0.08 | 25 | 0.14 | 75 | 0.42 | 46 | 0.26 |
| 6 | <i>Pangasianodon gigas</i> | 129 | 0.72 | 32 | 0.18 | 9 | 0.05 | 2 | 0.01 | 3 | 0.02 | 3 | 0.02 |
| 7 | <i>Catlocarpio siamensis</i> | 58 | 0.33 | 75 | 0.42 | 33 | 0.19 | 9 | 0.05 | 0 | 0.00 | 3 | 0.02 |
| 8 | <i>Probarbus jullieni</i> | 2 | 0.01 | 13 | 0.07 | 25 | 0.14 | 78 | 0.44 | 39 | 0.22 | 21 | 0.12 |
| 9 | <i>Probarbus labeamajor</i> | 37 | 0.21 | 37 | 0.21 | 43 | 0.24 | 46 | 0.26 | 9 | 0.05 | 6 | 0.03 |
| 10 | <i>Osphronemus exodon</i> | 19 | 0.11 | 32 | 0.18 | 44 | 0.25 | 52 | 0.29 | 18 | 0.10 | 13 | 0.07 |
| 11 | <i>Osphronemus goramy</i> | 18 | 0.10 | 29 | 0.16 | 39 | 0.22 | 60 | 0.34 | 21 | 0.12 | 11 | 0.06 |
| 12 | <i>Datnioides undecimradiatus</i> | 7 | 0.04 | 16 | 0.09 | 43 | 0.24 | 71 | 0.40 | 31 | 0.17 | 10 | 0.06 |
| 13 | <i>Tenualosa thibaudeaui</i> | 38 | 0.21 | 30 | 0.17 | 35 | 0.20 | 54 | 0.30 | 17 | 0.10 | 4 | 0.02 |
| 14 | <i>Glyptothorax fuscus</i> | 0 | 0.00 | 162 | 0.91 | 13 | 0.07 | 3 | 0.02 | 0 | 0.00 | 0 | 0.00 |
| 15 | <i>Wallago leeri</i> | 22 | 0.12 | 46 | 0.26 | 52 | 0.29 | 45 | 0.25 | 8 | 0.04 | 5 | 0.03 |
| 16 | <i>Bagarius suchus</i> | 0 | 0.00 | 12 | 0.07 | 24 | 0.13 | 63 | 0.35 | 44 | 0.25 | 35 | 0.20 |
| 17 | <i>Lycotrisa crocodiles</i> | 25 | 0.14 | 22 | 0.12 | 35 | 0.20 | 58 | 0.33 | 26 | 0.15 | 12 | 0.07 |
| 18 | <i>Channa striata</i> | 2 | 0.01 | 14 | 0.08 | 13 | 0.07 | 33 | 0.19 | 94 | 0.53 | 22 | 0.12 |
| 19 | <i>Parambassis siamensis</i> | 9 | 0.05 | 17 | 0.10 | 15 | 0.08 | 28 | 0.16 | 90 | 0.51 | 19 | 0.11 |
| 20 | <i>Anabas testudineus</i> | 12 | 0.07 | 9 | 0.05 | 10 | 0.06 | 41 | 0.23 | 89 | 0.50 | 17 | 0.10 |
| 21 | <i>Mekongina erythrospila</i> | 1 | 0.01 | 33 | 0.19 | 63 | 0.35 | 57 | 0.32 | 19 | 0.11 | 5 | 0.03 |
| 22 | <i>Bangana behri</i> | 0 | 0.00 | 26 | 0.15 | 57 | 0.32 | 65 | 0.37 | 24 | 0.13 | 6 | 0.03 |
| 23 | <i>Macrognathus siamensis</i> | 4 | 0.02 | 15 | 0.08 | 23 | 0.13 | 25 | 0.14 | 86 | 0.48 | 25 | 0.14 |
| 24 | <i>Micronema cheveyi</i> | 6 | 0.03 | 11 | 0.06 | 16 | 0.09 | 34 | 0.19 | 81 | 0.46 | 30 | 0.17 |
| 25 | <i>Lepisosteus oculatus</i> | 164 | 0.92 | 5 | 0.03 | 4 | 0.02 | 5 | 0.03 | 0 | 0.00 | 0 | 0.00 |
| 26 | <i>Oreochromis niloticus</i> | 104 | 0.58 | 64 | 0.36 | 1 | 0.01 | 7 | 0.04 | 2 | 0.01 | 0 | 0.00 |
| 27 | <i>Piaractus brachypomus</i> | 137 | 0.77 | 39 | 0.22 | 1 | 0.01 | 1 | 0.01 | 0 | 0.00 | 0 | 0.00 |
| 28 | <i>Hypsotomus plecostomus</i> | 168 | 0.94 | 7 | 0.04 | 1 | 0.01 | 2 | 0.01 | 0 | 0.00 | 0 | 0.00 |
| 29 | <i>Polyodon spathula</i> | 177 | 0.99 | 0 | 0.00 | 1 | 0.01 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 |
| 30 | <i>Oncorhynchus mykiss</i> | 177 | 0.99 | 0 | 0.00 | 1 | 0.01 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 |

Local knowledge of existing rules and regulations and their perceptions of fisheries conservation practices

Along with the interviews, we conducted one focus group discussion in each village before we started our interview. In each focus group discussion, we asked local villagers to draw a village map illustrating locations where they go fishing. In addition, we also asked them to identify areas where they spot endangered and endemic species (e.g. *Mekongina erythrospila*, *Bangana behri* are endemic species and are often found in deep pool or Veurn in local language). In general, they fish everywhere in the river and

there are certain areas where they would go regularly during dry season (see maps in the appendices). The majority of the people claimed that villagers are compliance to the rule and regulations of fishing activities or practices. However, when we asked about the place where they went fishing, and about the locations prohibited from fishing, it appears that there were a lot of overlaps.

In the group discussion, the majority of the villagers agreed that rule and regulation for conservation were somehow not effective in protecting the fishes because they are not sufficiently enforced. All of them approved that all fishes should be conserved especially for those that are at risk of extinction. However, they believed it was hard to give up fishing especially for some of the high valued fish such as *Probarbus jullieni/labeamajor*, *Mekongina erythrospila*, *Bangana behri*, *Osphronemus goramy*, and *Osphronemus exodon*. One main reason was that fishing was their main livelihood and those high valued fish contributed a great amount to their income even though they told us that income from rice farming was the main income.

Results from Fish monitoring

In addition to the in interview, we conducted fish monitoring at landing sites where fishers brought their fish to sell to the middle men from markets. We took pictures and made measurement of fishes we found at the sites. The landing site monitoring found several IUCN Red List species such as *Probarbus jullieni* and *P. labeamajor* (IUCN: Endangered) that appeared at the landing sites frequently. Among 29 aquatic species protected by the sub-decree of Cambodian fisheries law signed on August 12, 2009, 19 of them are fish species. These species include: *Scleropage formosus* (Asian bonytongue), *Pristis microdon* (small-tooth sawfish), *Puntius partipentazona* (tiger barb), *Balantiocheilos melanopterus* (Bala sharkminnow), *Puntioplites bulu* (Bulu barb), *Pangasianodon gigas* (Mekong giant catfish), *Catlocarpio siamensis* (Giant barb), *Probarbus jullieni* (Isok barb), *Probarbus labeamajor* (thicklip barb), *Probarbus labeaminor* (thinlip barb), *Osphronemus exodon* (elephant ear gourami), *Osphronemus goramy* (giant gourami), *Datnioides undecimradiatus* (narrow barred tiger perch), *Tenualosa thibaudeaui* (Laotian shad), *Glyptothorax fuscus*, *Wallago leeri*, *Bagarius bagarius* (dwarf goonch), *Bagarius suchus* (crocodile catfish), *Bagarius yarrelli* (Goonch). Among these protected species, we observed 10 species of them appeared at landing sites including *Probarbus jullieni* (Isok barb), *Probarbus labeamajor* (thicklip barb), *Probarbus labeaminor* (thinlip barb), *Osphronemus exodon* (Elephant ear gourami), *Osphronemus goramy* (giant gourami), *Datnioides undecimradiatus* (Narrow barred tiger perch), *Glyptothorax fuscus*, *Wallago leeri*, *Bagarius bagarius* (Dwarf goonch), and *Bagarius suchus* (crocodile catfish) (see appendices).

Outputs from objective 3

We, in collaboration with the Department of Environment of Stung Treng province, organized a provincial workshop to promote public awareness about the conservation of threatened fish species. The workshop was a great opportunity for multi-disciplinary discussions among local community, teachers, students, nongovernment and government officers, researchers, professors, and local authorities. The workshop provided a platform for researchers, local villagers, non-governmental organization staff and responsible agencies to share their perspectives, experience and learn from one

another about conservation of fishes in their area. The participants who attended the workshop included: (i) local villagers from the four villages where we conducted the survey, (ii) representatives from government agencies, (iii) representatives from NGOs in Stung Treng and (iv) students and faculty members from Royal University of Phnom Penh. The workshop provided an opportunity for stakeholders not only to gain knowledge from the presentation and group discussions, but also to build networks, and strengthen collaboration, coordination and functions of their organizations for better management of the fishery resources of the Mekong Ramsar Site.

In the workshop, there were four main speakers from different agencies presenting about the Mekong RAMSAR site and its values, fisheries law and resources management, fish monitoring, and the threatened fish species of Cambodia. After the presentation, all participants were divided into separate discussion groups that consisted of members from different backgrounds. Each group was asked to: i) list threatened fish species of their area, ii) identify threats on threatened fish species; and iii) determine how those threatened fish species can be managed or protected (see table 3).

Table 3. Summary of group discussion during the workshop

| | |
|---|--|
| 1. To identify fish species become threatened | <i>Pangasianodon gigas, Catlocapio siemensis, Lycothrissa crocodilus, Probarbus labeamajor, Probarbus jullieni, Wallago leeri, Bagarius yarrelli, Puntius partipentazona, Boesemania microlepis, Hemibagrus wyckioides</i> |
| 2. To identify the factors or threats on threatened fish species | <ul style="list-style-type: none"> • Illegal fishing (ex. Explosion, electric shock gear and prohibited small size net or equipment, poisoning, fish hunting with modern diving equipment) • Increased number of fishers • Seasonal fishing abuse (close fishing season) • Change in flow regime and increasing sediment • Water Pollution • Flood forest destruction and increasing alien species • Sedimentation and shallowing river and bank erosion • Cross-river barrier |
| 3. To what extents and how the threatened fish species can be managed or protected? | <ul style="list-style-type: none"> • Promote Fishery law and environmental awareness raising among local villagers • Build local capacity for pool protection • Strengthen the role of community fishery • Establish local guard for protection of threatened fish and crack down illegal fish activities • Create clear zoning for conservation and sustainable use areas along the river • Enhance law enforcement • Promote coordination with related agencies and local communities • Collaborate among agencies to establish effective planning for fish species management • Provide training and special skills to the villagers to generate alternative job opportunities so that fishery pressure reduced • Invite more comprehensive ecological study and research on fish species and ecology in the region |

In addition, at the beginning and at the end of the workshop we also did a pre-and-post workshop survey to evaluate the outcomes/output of the workshops. The evaluation results indicated that the workshop had positive outcomes. The participants' knowledge about: natural resources law, fisheries law and regulation, threatened fish species, threats on fish, Ramsar site, threats on RAMSAR site significantly increased after the workshop (table 4).

Table 4: Results of pre- and post-workshop evaluation on participants' knowledge

| Knowledge on | Pre-Evaluation | | | Post-Evaluation | | |
|----------------------------------|----------------|----------|------|-----------------|----------|------|
| | Low | Moderate | High | Low | Moderate | High |
| | (%) | (%) | (%) | (%) | (%) | (%) |
| Natural Resource Law | 28 | 43 | 28.5 | 12.5 | 56 | 31.5 |
| Fisher law | 25 | 31 | 44 | 4.3 | 50 | 45 |
| Ramsar site | 0 | 15.4 | 84.5 | 7 | 0 | 93 |
| Threaten Fish Species | 6 | 37 | 56.5 | 4 | 22 | 73 |
| Threats on Threaten Fish species | 0 | 57 | 43 | 12.5 | 25 | 62.5 |
| Threats on Ramsar sites | 12.5 | 49 | 37 | 6 | 12 | 82 |

Achievements and Impacts

In the present project, we aimed to identify local perceptions and knowledge of threatened fishes, of existing rules, and about fisheries conservation practices in the Mekong Ramsar site of Stung Treng province in north eastern Cambodia. The results suggested that local people are not well informed about the existing regulation of the threatened fish species in the area. For example, although there are 19 species being protected from fishing, the majority of the villagers are only aware of a couple fish species that are prohibited from fishing. They named *Catlocarpio siamensis* (Mekong giant barb: *kol rang*), *Probarbus jullieni*/J. *Labeamajor*/ *P. Labeaminor* (Isok/thicklip/thinlip barb: *trosok*), and *Pangasianodon gigas* (Mekong giant catfish: *reach*) when they were asked about threatened fish species in the region. Apparently, our monitoring results indicated that at least 10 species of the protected fish are being caught by villagers. Further, among the threatened fish species that we surveyed, the results suggested that the currently IUCN red list species are very rare or possibly becoming locally extinct. The majority of the villagers claim that they had never seen or caught them for so many years. These species include the Mekong giant catfish and Mekong giant barb.

We successfully organized an awareness raising workshop about conservation of threatened fish among participants from diverse backgrounds including local villagers, teachers, students, local government staff, NGO staff and researchers. We produced and distributed a number of educational materials including 1000 note books and 800 posters that contained pictures of threatened fish species. The educational materials helped stakeholders to recognize and correctly identify threatened fish species. They also assisted the local villagers to understand the important of conservation and better aware of regulation and rules related to fishery management and protection (as shown in table 4) that their knowledge about these rules were significantly increased as the results of the

work shop. This could lead to their building of love for the threatened fish species which aids to the conservation purpose of those species. Our project has reached at least 800 people through poster distribution, a provincial workshop, a number of village meetings/group discussions, and report dissemination.

Section 3: **Conclusion**

Our project adds to our understanding of local ecological knowledge of threatened fish species in the Mekong Ramsar site of Stung Treng province. It provides important information that serves as guidance for conservation efforts for the threatened fish species in the region. Our results highlight the need for enhancing local knowledge about existing rules and regulation of fishery and for improving their knowledge about identification of threatened fish species. In addition, the results call for immediate actions for effective conservation strategy to conserve and manage the endangered species as well as the species that are declining.

Problems encountered and lessons learnt

We did not encounter any major problems in our project. The main issue was related to weather. The project's main activities (e.g. household survey and fish monitoring) were slowed down due to continuous heavy rain, monsoon storm and severe flooding in the villages where we were conducting the survey, focus group discussion, and fish landing site monitoring. These weather barriers made our travel more difficult and longer than we planned. Our field activities were interrupted many times by heavy rain fall and floods. So, we spent more time in the field collecting data than we originally planned for.

The other challenges involved data collection and fish monitoring because they took more time than we expected. We could not start our data collection immediately after we arrived at each village. We realized people did not trust us and were not willing to talk with us at the beginning. So we spend at least a couple of days to build trust in each village by just hanging out and chatting with them about their daily life. It was also difficult to conduct fish monitoring in the village because it was dangerous to go to the sites due to storm and flooding.

Another issue is related to the project planning. We learned that working with local people need a plan B. It was hard to find enough people for interview during the rainy season which was also growing season. People went to their rice field which was far away from their home. So we went to their house early in the morning before they left for their rice farming and in the evening once they return home from the rice field. Some came home for lunch if their fields were close by. Due to the above weather barrier and difficulty in finding enough people for interview, we spent twice the time we planned for our interview.

Future plan

We recommend the future project to focus on training local villagers to identify threatened fish species. We also recommend work to assist local authorities to establish local conservation group for effectively protection fish species in the RAMSAR site. We also suggest the study on pools where villagers catch the endangered fishes. These pools

can be considered as local biodiversity hot spots sustaining and supporting the diversity of fish in the river. More promotions of conservation awareness among local villagers through workshop and outreach are also recommended. Monitoring of more landing sites, local markets will also aid important information for the future project. We plan to apply for the conservation follow up award to continue conservation activities in the areas. We integrated the project output into a course curriculum (Biodiversity Conservation) at the team's university (Royal University of Phnom Penh).

Section 4:
Appendices

Appendix 1: Project expenditure

| Itemized expenses | Total CLP requested (USD) | Total CLP used (USD) |
|--|---------------------------|----------------------|
| PHASE I - PROJECT PREPARATION | | |
| Administration | | |
| Communications (telephone/internet/postage) | 200.00 | 180.00 |
| Books and printing journal articles/materials | 300.00 | 47.00 |
| Insurance | 330.00 | 0.00 |
| Visas and permits | 70.00 | 55.00 |
| Team training | 200.00 | 375.00 |
| Reconnaissance | | |
| Medical supplies/first aid | 50.00 | 79.00 |
| Equipment | | |
| Scientific/field equipment and supplies | 150.00 | 0.00 |
| Photographic equipment (Fish photos prints) | 300.00 | 75.00 |
| Camping equipment (Please detail main items: life jackets, hammock, lighter, knives) | 0.00 | 145.00 |
| Field guides | 0.00 | 45.00 |
| Maps | 0.00 | 15.00 |
| Boat/engine/truck | 0.00 | 0.00 |
| Fuel | 0.00 | 0.00 |
| PHASE II - IMPLEMENTATION EXPENSES | | |
| Administration | | |
| Insurance | 0.00 | 0.00 |
| Transportation | | |
| Fuel | 0.00 | 0.00 |
| Field vehicle maintenance | 0.00 | 0.00 |
| Accommodation for team members and local guides | 1,500.00 | 840.00 |
| Food for team members and local guides | 1,500.00 | 2,100.00 |
| Transportation (boat trips and motorbike rental) | 3,000.00 | 2,850.00 |
| Customs and port duties | 0.00 | 0.00 |
| Workshops | | |
| Workshops (venue rental, transportation, snack and meals for participants) | 2,400.00 | 1,940.00 |
| Outreach and education materials (posters, notebooks) | 900.00 | 1,450.00 |
| PHASE III - POST-PROJECT EXPENSES | | |
| Administration | | |
| Report production and results dissemination | 1,100.00 | 1,810.00 |
| Other (Please detail:) | | |
| Total | 12,000.00 | 12,006.00 |

Appendix 2: Bibliography

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Appendix 3: Consent Protocol Script

Hello, my name is Chouly Ou and I am a student doing a research project on local perceptions about the fish of the Mekong River.

Is the head of the household home? Could I speak to him/her?

<<To head of household>>

Hello, my name is Chouly Ou and I am a student conducting a research project. I would like to learn about fish in this area. The purpose of my project is to understand local perceptions about fish populations in the Mekong. I would like to talk to you and get your opinions on this. It will only take 20 to 30 minutes. Your participation is completely voluntary. There is no penalty or reward for not participating. Are you interested in helping me out?

IF NO: Ok, thank you for your time. Have a good day.

IF YES:

This is just a short interview where I ask you some questions about fishing and your opinions on certain types of fish. I am interested in your honest opinion so I am not keeping any record of your name or address--the answers you give cannot be connected directly to you. You are free to skip any questions you do not want to answer and you can withdraw from the interview at any time.

Do you understand or have any questions?

IF YES: Answer questions

IF NO: Where do you want the interview to be conducted?

<Participant chooses the place.>

Let's go to "place name".

Now, let's get started. READ QUESTION 1

Appendix 4: Research Protocol (Cultural Evaluation)

Office of Research Compliance
750 Agronomy Rd., Ste. 3501
1186 TAMU
College Station, Tx 77843-1186

PROTOCOL TITLE: 2011-0517 – Conservation of threatened fish species of the
Mekong Ramsar Site
SUBMISSION: New Protocol

To whom it may concern:

I am proposing to conduct a research in my home country, Cambodia where I was born and grew up. I am confident that the method and settings used in this research are culturally appropriate and minimizes risk to participants. Face-to-face interviews are culturally appropriate because majority of the potential participants are illiterate. The interview will be conducted in their own houses or places of their own choice where they feel comfortable and where their privacy protected.

The questionnaires and script have been translated to “Khmer” the language used by people in the country and people who live the study area. I will read the script to the participants before I start the interviews (script attached). I will obtain their verbal consent immediately prior to the interviews. Participation in the interview is completely voluntary and this is clearly outlined in the script used to approach people. There is no penalty or reward for not participating.

I certify that my research involves no more than minimal risk of harm to the participants. There is no additional safeguard required to protect the rights and welfare of subjects. It is clearly stated in the script that participation is purely voluntary and discontinue participation can occur at any time during the course of the interview without penalty. I will interview each household head individually which will minimize pressure from the community. There is no alteration in procedure that will lower the risks to participants. It's an anonymous survey and the level of privacy is high. I will not record their names and house numbers.

Yours sincerely,

Chouly Ou

Appendix 5: Survey Questionnaire

| | | |
|------------------------------|-----------------------------|-----------------------|
| DATE: | RESPONDENT ID: | |
| INTERVIEWER ID: | | |
| VILLAGE | COMMUNE | DISTRICT |

Read consent protocol script <<see above>>.

I. First, I'd like to start with some general questions about yourself:

A. How many years have you been living in <<village name>>?

.....month (s) or year (s)

B. I'd like to know what languages you speak. Do you speak?

1. Khmer 2. Laotian 3. Cham 4. Chinese 5. Vietnamese

6. Other

a. *If speak >1 language: What language do you speak most often?*

.....

C. Tell me about your education. What is the highest grade you completed at school?

1 Primary 2 Junior high 3 High school 4 College or higher

5 Informal education

6. Other

D. What is your main source of income?

.....

E. Do you have other sources of income?

0. No (skip to II)

1. Yes, what are they?

.....

.....

II. In this next section I would like to ask about fishing

A. Think about the last 10 years, from 2001 to now, in what year did you capture the most fish?

.....

B. Still thinking about the last 10 years. Have you noticed that your fish harvest has increased, decreased, or stay about the same?

0. Stay the same (skip to C)

1. Increase, when did it start increasing?
.....
2. Decrease, when did it start decreasing?
.....

C. Now I want to know how many times you go fishing per month?

1. In dry season.....times/month
2. In wet season.....times/month

D. How many hours do you spend each time when you go out fishing?

.....hours

E. What fishing gear do you use when you go fishing?

.....
.....

F. Here is a map of your village and area around it. <<Show map and current location>> Please show me three places on the map where you go fishing most often?

- Place #1 (record grid line coordinates)
 Place #2 (record grid line coordinates)
 Place #3 (record grid line coordinates)

G. What are the five most common fish you catch? (write down the names of each species)

1.....; 2.....; 3.....; 4.....; 5.....

H. Do you observe any increase or decline in the capture of any of them?

0. No
1. Yes, what are the main causes for the increase or decline?
 Species 1.....
 Species 2.....
 Species 3.....
 Species 4.....
 Species 5.....

III. In the following questions, I want to ask about your knowledge about rules related to fishing

A. Is there any fishing gear you are not allowed to use?

0. No –(skip to question B)
1. Yes, what are they?

B. What is the minimum legal size of fish net allowed?

.....(in meter)

C. Can you fish all year?

0. No, when is the closing season--from what month to what month?

1. Yes.

D. What are the fishes that are not allowed to catch and if caught need to be released? Please name as many as you can think of.

.....
.....

E. Do people in the village generally follow this rule?

- 0. No
- 1. Yes

F. Is there any place where you are prohibited from fishing?

- 0. No (skip to IV)
- 1. Yes. Here is the map of your village and area around it. <<*Show map and current location*>> Please show me where you are not allowed to fish?
 - Place #1 (record grid line coordinates)
 - Place #2 (record grid line coordinates)
 - Place #3 (record grid line coordinates)
 - a. Would you say people in your village:
 - i. Completely follow the rule
 - ii. Follow the rule most of the time
 - iii. Only follow the rule sometimes
 - iv. Completely ignore the rule

IV. In this part, I want to ask about the water in the Mekong River in your village.

A. Have you noticed any change in water level in the river?

- 0. No –(skip to V)
- 1. <<If Yes>>
 - a. In what year did you notice the change?
.....
 - b. How many times in a year does this change occur?
.....times/year

V. This is the final part of the questionnaire. I want to know your perceptions about fish in your area. I am going to show you the photos of some fish and ask you how often you catch them and whether you think they are increasing, decreasing or not changing. <<Show photo of fish>>

1. Have you ever seen this fish?

- 0. No <<Go to the next fish>>
- 1. Yes <<Continue>>

2. Would you say that you?

- a. Almost always catch it
- b. Usually catch it
- c. Sometimes catch it, or
- d. Rarely catch it

3. Does it differ by whether it is the dry or wet season?

- 0. No <<Go to the next question>>
- 1. Yes , would you say you catch it more in the

- a. Dry season, or
- b. Wet season

4. Think about fishing since you started would you say this <<name of fish>> has:

- a. Decreased a lot <<Go to question 5>>
- b. Decreased some <<Go to question 5>>
- c. Has not increased or decreased <<Go to next fish>>
- d. Increased some <<Go to next fish>>, or
- e. Increased a lot <<Go to next fish>>

5. Why do you think it has decreased?

.....
.....

| No | Scientific name | Capture frequency | | | | Trends | | | | | Reasons for decline |
|----|-------------------------------------|-------------------|------------|--------------|------------|-----------------|----------|----------|----------|----------------|---------------------|
| | | Regularly | Seasonally | Occasionally | Never seen | Highly declined | Declined | observed | Increase | ingny increase | |
| 1 | <i>Scleropages forosus</i> | | | | | | | | | | |
| 2 | <i>Pristis microdon</i> | | | | | | | | | | |
| 3 | <i>Puntius partipentazona</i> | | | | | | | | | | |
| 4 | <i>Balantiocheilos melanopterus</i> | | | | | | | | | | |
| 5 | <i>Puntioplites bulu</i> | | | | | | | | | | |
| 6 | <i>Pangasianodon gigas</i> | | | | | | | | | | |
| 7 | <i>Catlocarpio siamensis</i> | | | | | | | | | | |
| 8 | <i>Probarbus jullieni</i> | | | | | | | | | | |
| 9 | <i>Probarbus labeamajor</i> | | | | | | | | | | |
| 10 | <i>Osphronemus exodon</i> | | | | | | | | | | |
| 11 | <i>Osphronemus goramy</i> | | | | | | | | | | |
| 12 | <i>Datnioides undecimradiatus</i> | | | | | | | | | | |
| 13 | <i>Tenualosa thibaudeaui</i> | | | | | | | | | | |
| 14 | <i>Glyptothorax fuscus</i> | | | | | | | | | | |
| 15 | <i>Wallago leeri</i> | | | | | | | | | | |
| 16 | <i>Bagarius suchus</i> | | | | | | | | | | |
| 17 | <i>Lycothrissa crocodiles</i> | | | | | | | | | | |
| 18 | <i>Channa striata</i> | | | | | | | | | | |
| 19 | <i>Parambassis siamensis</i> | | | | | | | | | | |
| 20 | <i>Anabas testudineus</i> | | | | | | | | | | |
| 21 | <i>Mekongina erythrospila</i> | | | | | | | | | | |
| 22 | <i>Bangana behri</i> | | | | | | | | | | |
| 23 | <i>Macragnathus siamensis</i> | | | | | | | | | | |
| 24 | <i>Micronema cheveyi</i> | | | | | | | | | | |
| 25 | <i>Lepisosteus oculatus</i> | | | | | | | | | | |
| 26 | <i>Oreochromis niloticus</i> | | | | | | | | | | |
| 27 | <i>Piaractus brachypomus</i> | | | | | | | | | | |
| 28 | <i>Hypsotomus plecostomus</i> | | | | | | | | | | |
| 29 | <i>Polyodon spathula</i> | | | | | | | | | | |
| 30 | <i>Oncorhynchus mykiss</i> | | | | | | | | | | |

This is the end of the interview questions, thank you for your valuable time!

Appendix 6: Workshop Agenda

| Time | Activities | Resource Persons | Facilitator |
|-------------|---|--|---|
| 7:30-08:00 | Registration | Graduate student from RUPP | |
| 8:00-08:10 | Open speech | Mr. Eng Phirong, Head of provincial department of Environment, Steung Treng Province (DoEST) | Mr. Ly Seak Meng, Dept of Environment (DoEST) |
| 8:10-8:15 | Introduction to the workshop | Mr. Spoann Vin, Lecturer of RUPP | |
| 8:15-8:25 | Introduction to Participants | All participants | |
| 8:25-08:40 | Coffee break and refreshment | | |
| 8:40-8:55 | Pre-workshop assessment | Mr. Noun Vanna, DoEST officer | Mr. Ly Seak Meng, Dept of Environment (DoEST) |
| 8:55-09:15 | Presentation 1: Overview of the conservation of threaten fish species project and results from case study | Ms. Ou Chouly, Doctoral student and project coordinator | |
| 9:15-9:45 | Presentation 2: Overview of Mekong Ramsar site and its importance | Mr. Hak Vimean, Deputy head of DoEST and Chief of Mekong Ramsar site | |
| 9:45-10:10 | Presentation 3: Fishery resource and Fish catch practice in Cambodia | Mr. Putrea Solida, Fishery Administration officer | Mr. Ly Seak Meng, Dept of Environment (DoEST) |
| 10:10-10:35 | Presentation 4: Fishery Law and Threaten fish species in Cambodia | Mr. Kim Sokha, fishery officer in Steung Treng | |
| 10:35-10:45 | Grouping and introduction to discussion questions | Mr. Noun Vanna, DoEST officer | |
| 10:45-11:10 | Group discussion (cont'd) | All participants | Mr. Ly Seak Meng, Dept of Environment (DoEST) |
| 11:10-12:00 | Group presentation | Representative | |
| 12:00-12:10 | Post-workshop evaluation | Mr. Noun Vanna, DoEST officer | |
| 12:10 | Conclusion and closing remark | Mr. Spoann Vin, RUPP | |
| 12:10 | Lunch | All are invited | |

Appendix 7: Project activities photographs



Figure 1. Conservation Awareness Raising Workshop at Stung Treng



Figure 2. Villagers looking at threatened fish posters



Figure 3. CLP member (right) interview a villager



Figure 4. CLP team travel on a boat to the a village on island



Figure 5. A family looking at threatened fish poster



Figure 6. CLP team members walking in the village



Figure 7. One of the house where we conducted our interview



Figure 8. Rice field in the village



Figure 9. A house where the owner (the whole family) left to the rice field



Figure 10. CLP leader with two villagers (interviewee) at one of the villager's grocery store



Figure 11. A villager and rice ??? in front of his house



Figure 12. A villager drawing a map of the village in focus group discussion



Figure 13. Fishes caught from the Mekong River ready to be sold in a local market



Figure 14. CLP team members at fish landing site

