"The problem is that no matter how many species you find, you can always go out tomorrow and find others that you have not seen before," says Dr Rainboth, working for the MRC Secretariat on the production of a new guide to fish species in the Mekong River.

As reported in the February issue of *Catch and Culture*, a field guide to identify Mekong fish species in Cambodia is being prepared for the Mekong River Commission by Dr Walter Rainboth of the Department of Biology, University of Wisconsin, Oshkosh, USA. "The Mekong Fishes of Cambodia" is being printed in cooperation with FAO and will include almost 500 species. The field guide will gradually be expanded to cover all the Lower Mekong Basin. Mr Jorgen G. Jensen talked to Dr Rainboth in March 1996, just before he boarded the plane back to the USA after having completed this season's studies in Cambodia.

**JGJ:** You have been participating in studies on the Mekong River fish for quite some time now. How did you get your start in this part of the world?

**Walter Rainboth:** I began studying Mekong fish when I was a graduate student in 1974, as part of the Mekong Basinwide Fishery Studies under the direction of Professor Karl F. Lagler. That project was contracted by the Mekong Committee, which at the time was mainly concerned with learning the effects of building reservoirs on local fish production. Unfortunately, the project had to be terminated when the USA withdrew financial support after the second of four planned years due to major political changes in the countries of the Lower Basin. To myself and the other field staff, this was frustrating, because things had really begun to run smoothly and the information we were getting was helping us to formulate questions and strategies for sampling that could help us examine seasonal fish distribution patterns. For the North Americans in the project, the year of 1975 in Thailand was the first chance to watch the full seasonal river and fish distribution cycle from a single vantage point.

**JGJ:** It sounds as if this experience fixed your attention on the Mekong forever?

**W.R.:** Whenever someone has to end a project prematurely, the things that could have and should have been done become more and more apparent over time. That certainly is the case with me, now that I have had over twenty years to think about the data we collected, what the data meant, and how we could have altered our protocols to explore the facts that were emerging.

**Complete Change in Species between High and Low Flow**

In retrospect, I can see that sampling the fish populations in reservoirs provided the least interesting information that we obtained. Even before we left Thailand in 1975, we knew that the really important study would be a survey of fish distributions over the course of a year along the entire length of the Mun River. That opinion was reinforced in the early 1980s when I tried to collaborate on a paper about Mekong fish for a book on river systems of the world. When I started putting together a huge data matrix of our collections, I realized that the main stem of the Mekong River has a complete change in species between periods of low flow and high flow. We had a daily series of collections during the seasonal transition from Ban Dan at the mouth of the Mun, supplemented with collections by different gear types at irregular intervals.

During the low flow period the water was clear, had aquatic plants and a fish fauna of mostly cyprinids and fish that are sight-oriented for feeding and schooling.

During the high flow period the water was muddy, lacked plants and had a fish fauna of tactile or taste-oriented catfish and filter feeders such as shad or anchovy.

The species turnover was striking and almost complete. The problem was that we just had one location that changed dramatically over time. We – could not tell where anything came from or went to. There were obviously very different nutrient cycling processes going on in the main stream, and the same would be true for the tributaries and temporarily inundated areas. These would all have cyclical patterns of fish distribution over the course of a year. A complex cyclical pattern such as this has important ramifications for development plans if we value the biological integrity of the river ecosystem.

**700 Species in Cambodia alone**

**JGJ:** During the last two dry sea- sons, you have been engaged in studying Cambodian fish. Could you describe your studies?
W.R.: The Cambodian work was done in order to prepare a book on the fish of the Cambodian Mekong to be published by FAD soon. They offered to include colour plates, so I have been taking numerous photos of fish in living conditions. Also, I have been bringing back collections to my laboratory in the USA so I can examine the specimens in detail to make certain that the distinguishing characteristics mentioned in the literature are correct, or if they are not, the best way to distinguish similar species. The problem is that no matter how many species you find, you can always go out tomorrow and find others that you have not seen before. As things stand, I have completely sorted and identified only half of the 1995 collections and I already have a dozen species that are not in the book and cannot be included because they would cause problems for the typesetters. There are just under 500 species in the book and the ones I have found since writing it, putting the number to over 500 in Cambodia alone. So far, I have only been able to look at a few places in the country, so that number could increase substantially. I expect the total number of species for Cambodia to reach about 700, which is phenomenal for a country that size!

Everyone Can Find “New” Species

JGJ: Speaking of phenomenal numbers, I heard that you have said that there are 1,200 species of fish in the Mekong Basin. Is that really true?

W.R.: It is definitely true. A few years ago, I sat down and began writing a key to the fish species in the Mekong. In it I included species from parts of adjacent river basins, such as the Chao Phya, that have been contiguous with the Mekong in the not so distant past. Sooner or later the species that come from upland reaches of the four main tributaries of the Chao Phya also show up in the Mekong of northern Laos or Thailand. Besides them, I included species reported from the Lancang Jiang in Yunnan Province of China, as well as those recorded upstream from Yunnan. Also, I included estuarine and shoreline species of the Meokong Delta because of the influence that the Mekong has on them. Much of that was based on the collections we made in 1974, which are still being identified. I included about 150 species of goby in the original key and cut the number for Cambodia down to include only thirty. Although that might seem to be too many, fully half of the species I caught in Cambodia were not among the original 150! Right now, the total number is anybody’s guess, and the more effort we put into looking, the higher the number will be.

JGJ: You have mentioned finding new species from the Mekong. How do you know that they are new, and does this happen very often?

W.R.: Yes, everyone who studies these fish finds undescribed species fairly often. You know you have an undescribed species if you have accounted for every available and potentially applicable name in your region. This is a large region that encompasses much more than the Mekong or even the South-East Asian mainland. Many of these species are found throughout parts of Indonesia. That means that you have to have a great deal of literature at your fingertips, as well as a fairly good memory of the contents of the last 175 years of fisheries literature. These undescribed species may be rare, locally occurring species, or they can be common widespread species. For instance, one of the Cambodian species of trey riel is undescribed even though it is abundant throughout much of the country.

Vast Areas Untouched by Fish Survey

JGJ: What was the result of your trip to Cambodia this time?

W.R.: This year I went to many places that I had not seen before and was able to obtain fish from many upland rivers and streams. As a result, it was possible to photograph about 100 species that I could not get in 1995. With the previous 150 photographs, this will make about 250 colour photographs for the Cambodia book. Also, I tried to collect various species by using different methods that I had used during the previous year, such as rotenone or electrofishing with a backpack unit. I am attempting to obtain relative abundance figures for species in different habitats. Eventually, I would like to look at patterns of biodiversity in various parts of the Mekong in relation to different types of environmental disturbance, although I do not know if I could finish that kind of analysis in time for inclusion in an expanded book on Mekong fish that covers Laos, Myanmar, Thailand, Viet Nam, and perhaps China. The main thing to accomplish with the expanded book that FAD would like to publish is to include the remaining Mekong species, and perhaps a section on the fisheries in each country.

JGJ: Where do you plan to go next?

W.R.: That depends on funding to some extent. I have been discussing the possibility of going to Laos or Viet Nam next. At this time, plans are not set, and each country has much more than I could sample in just a couple of months of the dry season. Even in Cambodia, there are vast areas that are untouched in terms of fish surveys. I expect the headwaters and upper reaches of upland Mekong tributaries will have large numbers of species that we almost never see in the lowlands. That was certainly true for the Ratanakiri and Mondolkiri Provinces in Cambodia. So, no matter where I go next, we will learn a lot!