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Preface

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The ecological, social, and economic importance of wetlands has been recognized around the world. Wetlands serve as sources, sinks, and transformers of a multitude of chemical, biological, and genetic materials, provide habitat for fish and wildlife, stabilize water supplies, cleanse polluted waters, protect shorelines, and recharge groundwater aquifers (Mitsch and Gosselink 2000). The diversity of Asian wetlands is reflected in its intertidal mudflats, swamp forests, natural lakes, open marshes, artic tundra, and mangrove forests (Mitsch et al. 1994).

Most Asian countries have several features in common including high population density coupled with high growth rates, rapid urbanization and industrialization, and a seasonal climate influenced by monsoons. Water resources in this region are under increasing pressure as the demand for domestic supplies, agricultural use, and hydroelectric power increases (Figures 1 and 2). Past water resource and agricultural management practices have resulted in rapid loss and degradation of natural wetlands throughout the region. Regulation of rivers and streams through embankments and dams (Figure 3) has eliminated floodplains and reduced groundwater recharge. Changing hydrological regimes have increased flooding during the rainy season and reduced availability during dry periods. Water resource management has often resulted in numerous man-made wetlands such as reservoirs and paddy fields that have very different functions and values than natural wetlands, and are in no way a substitute for natural wetlands, particularly floodplain wetlands.

The Chinese government has recognized the importance of wetland conservation and their State Forestry Administration is developing a National Wetland Conservation Plan focusing on wetland restoration and rehabilitation in key areas with guidelines that emphasize sustainability. Leaders recognize that the restoration of floodplain wetlands is of crucial importance to the efficient management of water resources and other ecological values in the region.

In September 2002, an International Wetlands Symposium entitled "Wetland Restoration and Management: Addressing Asian Issues Through International Collaboration" was held in Nanjing, China. The conference was a joint meeting hosted by the Society of Wetland Scientists, the Wetland Research Center of the Chinese Academy of Sciences, the International Peat Society, the International Mire Conservation Group, and the Chinese Ecological Society. The conference was sponsored by the US Forest Service, US Geological Survey, Institute of Geography – Chinese Academy of Sciences, Nanjing Forestry University, and the World Wildlife Fund for Nature. The objective of this conference was to provide a forum for synthesizing existing knowledge about ecosystem processes as a foundation for effective wetland restoration and management in Asia. This conference provided a forum to exchange information on approaches for effective, functional ecosystem restoration and management. Well-known wetland ecologists from around the world presented papers on wetland sciences, restoration ecology, and contemporary issues of global change, sustainability, conservation biology, and clean water resources to provide developing Asian countries with information they could use in formulating effective restoration and management strategies. As an example, the paper by Joy Zedler describes an alternative approach, "adaptive restoration", that leads to clearer cause-effect relationships, while simultaneously accomplishing

Figure 1. Dongting Lake is a major rice production area in China. Because of flooding problems almost every year, farmers suffer serious losses and have now moved to flood-free grounds. The World Wildlife Fund has started a pilot project to demonstrate the feasibility of restoring the wetlands while providing enhanced agricultural values to farmers. This large-scale restoration project is exemplary for integrating ecosystem and social sciences.

Figure 2. Taihu Lake is the fourth largest lake in China and is site of the Taihu Laboratory for Lake Ecological Research. Visiting scientists were given an overview of point and non-point pollution, aquaculture, transportation, and water management issues affecting the lake ecosystem.

the goal of revegetation in restoration projects. Middleton and McKee examine productivity relationships in impounded wetlands to illustrate what can happen when hydrological changes are made in natural ecosystems. This is especially important since the hydrology of the majority of the world's riverine ecosystems has been altered.

The rest of the papers in this special issue reflect the diversity of topics and perspectives that are germane to Asian wetlands. These contributions

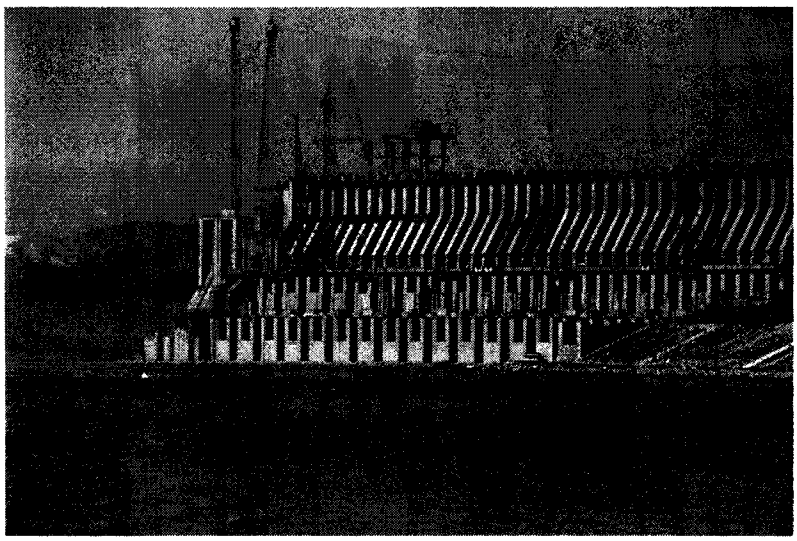

Figure 3. The Yangtze River is the largest river in China and fourth largest in the world. Under construction is the Three Gorges dam which, when competed, will be the largest dam in the world. Conference participants were given the opportunity to discuss the many complex social and ecological issues associated with lands above and below the dam.

from five countries consider wetland issues at multiple scales (microbial to regional) reflecting a variety of topics (wildlife to global change). On the smallest scale, Zhang et al. describe phosphorus losses from rice fields and how alternative planting schedules and use of fertilizers might minimize eutrophication problems in lake areas of China, while Zhaofu et al. determined that daily changes and seasonal fluctuations in soil-surface CO_2 fluxes are significantly affected by soil temperatures. In a seasonal wetland in Australia, Qui et al. found high spatial and temporal variability in microbe activity as a result of differences in temperature, moisture, and litter leaching. Benthic polychaetes in a tropical estuary in India were examined by Sarkar et al. as possible markers of different environmental conditions. Flamingo populations in an Indian lagoonal system were examined by Ramesh and Ramachandran and found to be concentrated in areas where fish biomass, algal biomass, and benthic faunal biomass were greatest. Fish populations in the Everglades (USA) were examined by Hussam et al. and a time-concentration-effect model was used to assess long-term effects of PCBs on survival and reproduction. On the vegetation level, Hotes et al. examined *Phragmites* die-back in a mire in Japan and report that increased brackish water flooding has most probably led to changes in vegetative community structure. At the other extreme, Saharjo and Munoz examined landowner use of fire in peatland areas in order to evaluate land preparation practices, determine restoration methods, and recommend policy reforms for small farmers. The last paper in this special issue examines agroforestry in China. Agroforestry is widely practised in the country, especially in floodplain areas. The economic benefits of this practise are detailed, and a call for more study on the impact on ecological processes and site productivity is encouraged.

It was evident during the course of the conference that the questions and needs far exceed the number of professionals addressing the wetland resource issues. Collaboration and information exchange will enhance the capacity of Asian scientists to solve their problems. This volume represents one step in that direction.

References

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