

Preface

Wetlands and Habitats is the third volume of *The Handbook of Natural Resources, Second Edition (HNR)*. This volume consists of 30 chapters authored by 52 contributors from 7 countries. The contents are organized in three sections: *Riparian Zone and Management* (13 chapters); *Wetland Ecosystem* (8 chapters); and *Wetland Assessment and Monitoring* (9 chapters).

Wetland is a universal term used to describe a variety of flooded or saturated environments. Wetlands include a diverse assemblage of highly complex ecosystems subjected to hydrologic regimes, climatic conditions, soil formation processes, geomorphologic settings, and support high rates of annual carbon sequestration. The variety of seasonal and perennial wetlands provides environmental conditions for highly distinctive fauna and flora.

Freshwater wetlands are habitats with vegetation especially adapted to prolonged water saturation or shallow flooding of the soils. Wetlands are usually highly productive, support high biodiversity, and provide numerous direct and indirect ecosystem services and societal benefits. Tidal wetlands are some of the most dynamic areas of the Earth and are found at the interface between the land and sea. Salinity, regular tidal flooding, and infrequent catastrophic flooding due to storm events result in complex interactions among biotic and abiotic factors for tidal marshes, mangroves, and freshwater forested wetlands. Riparian wetlands are critical ecosystems that perform functions and provide services disproportionate to their extent in the landscape. Vegetated riparian zones are a common management practice used to reduce nitrate delivery to coastal waters. Because of their position between terrestrial and aquatic ecosystems, vegetated riparian zones provide opportunities for nitrate transformation before emerging to surface water. River deltas form on shorelines where sediment can accumulate faster than it is taken away and are recognized by the presence of a distributary channel network that protrudes from the shoreline. Peatlands, although occupying only 3% of the global terrestrial surface, hold 10% of the world's drinking water, and contain a thick layer of peat that stores about one-third of the Earth's soil carbon and 10% of the world's soil nitrogen. Peatlands are sensitive to both climatic and anthropogenic disturbances, which could change the long-term peatland carbon sink into a source of carbon to the atmosphere. Wetlands are subject to alteration and loss. Humans have dramatically changed marshes for agriculture, development, and resource extraction. The future of wetland resources depends on conservation, restoration, and climate. Protection and conservation of wetland resources are among priorities in land management decision and practice in all scales.

With the challenges and concerns, the 30 chapters in this volume cover topics in *Wetland Ecosystem*, including wetland classification, ecosystems, biodiversity, fresh water and tidal wetlands, effects of wetlands in urban environment, and declining ecosystem service in responding of wetland loss; in *Riparian Zone and Management*, including riverine floods, riparian wetlands, riparian zone groundwater nitrate cycling, riparian wetland mapping, floodplain management, salt and brackish marshes, tidal wetlands, peatlands, perennial and seasonal streams, vernal pool, nonpoint source pollution, groundwater salinity, and assessment of environmental integrity of riparian zone; and in *Wetland Assessment and Monitoring*, including wetland economic value, indices of biotic integrity (IBI), assessment of wetland health status

by vegetation-IBI, remote sensing in wetland mapping, monitoring of wetland water dynamics, and wetland conservation and policy impacts.

The chapters provide updated knowledge and information in general environmental and natural science education and serve as a value-added collection of references for scientific research and management practices.

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