

Preface

This monograph presents the results of the assessment of the water quality conditions in the Hudson/Raritan Estuary and the New Jersey coastal waters, Two decades of research venture utilizing remotely sensed data. Components of the concept of assessment of water quality conditions using multispectral satellite, videography and imaging spectroscopy data in coordination with in situ measurements are discussed and results of such analysis are presented.

The focus of the study is the New Jersey estuarine and nearshore waters which is considered as a valued ecological, economic and recreational resource within the New York metropolitan area. These waters are enriched by increased nutrient loading from point, non-point sources such as agricultural and urban run-off causing eutrophication and pollution. Water pollution is a major global problem that requires continuing evaluation and revision of water resources policies at all levels. Moreover we are heading towards a water crisis, caused by climate change with significant impact on coastal environment; home to majority of population worldwide. To improve the quality of water and control the problem of excessive fertilization, regular monitoring of water quality is required. Currently there is no systematic management tool for operational monitoring and prediction of spreading of pollution in this area. Conventional shipboard sampling is both time consuming and labor intensive while there is a critical need for an economical management system for the estuary and its high susceptibility to the various sources of pollution and environmental hazards. Remote sensing can provide greater economy in many types of hydrologic surveys than using conventional methods. This is possible since certain bio-and geochemical constituents of surface/near-surface water produce changes in reflectance which can be measured by optical remote sensors.

The monograph details the development of a remote sensing water quality monitoring/management system with emphasis on the discrimination between organic and inorganic turbidity promoting eutrophication. It demonstrates the use of bio-optical modeling and retrieval techniques to derive the concentrations of important water quality parameters (chlorophyll, color dissolved organic matter and suspended sediments) in the study area. It illustrates methods and analysis approaches that have been used in the datasets to improve detection and

characterization of nearshore water quality issues in order to provide the managers and planners how to improve the conditions for reducing the frequency and extent of algal blooms and eutrophication. The work should further research and potentially lead to improved understanding of the characteristics of algal blooms important in global climate change studies.

The monograph is aimed at a wide audience, ranging from the graduate students and the working scientists to policy makers and managers. Efforts have been made to highlight general principles as well as the site-specific application. It also provides a detailed bibliography at the end of each chapter for those wishing to delve deeper into the field.

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Hyperspectral Remote Sensing of Nearshore Water
Quality

A Case Study in New York/New Jersey

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2017, X, 92 p. 40 illus., 38 illus. in color., Softcover

ISBN: 978-3-319-46947-8