

## Chapter 7 Freshwater Ecosystem Services

Fresh waters are disproportionately rich in species, and represent global hotspots of biodiversity. However, they are also hotspots of endangerment.

This book provides an overview of facts, theories and methods from hydrology, geology, geophysics, law, ethics, economics, ecology, engineering, sociology, diplomacy and many other disciplines with relevance for concepts and practice of water resources management. It provides comprehensive, but also critical reading material for all communities involved in the ongoing water discourses and debates. The book refers to case studies in the form of boxes, sections, or as entire chapters. They illustrate success stories, but also lessons to be remembered, to avoid repeating the same mistakes. Based on consolidated state-of-the-art knowledge, it has been conceived and written to attract a multidisciplinary audience. The aim of this handbook is to facilitate understanding between the participants of the international water discourse and multi-level decision making processes. Knowing more about water, but also about concepts, methods and aspirations of different professional, disciplinary communities and stakeholders professionalizes the debate and enhances the decision making.

Freshwater Ecology and Conservation Approaches and Techniques Oxford University Press

This latest Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) will again form the standard reference for all those concerned with climate change and its consequences, including students, researchers and policy makers in environmental science, meteorology, climatology, biology, ecology, atmospheric chemistry and environmental policy.

This book uses ecosystem services-based approaches to address major global and regional water challenges, for researchers, students, and policy makers.

St Lucia is the world's oldest protected estuary and Africa's largest estuarine system. It is also the centerpiece of South Africa's first UNESCO World Heritage Site, the iSimangaliso Wetland Park, and has been a Ramsar Wetland of International Importance since 1986. Knowledge of its biodiversity, geological origins, hydrology, hydrodynamics and the long history of management is unique in the world. However, the impact of global change has culminated in unprecedented challenges for the conservation and management of the St Lucia system, leading to the recent initiation of a project in support of its rehabilitation and long-term sustainability. This timely volume provides a unique source of information on the functioning and management of the estuary for researchers, students and environmental managers. The insights and experiences described build on over 60 years of study and management at the site and will serve as a valuable model for similar estuaries around the world.

This practical manual of freshwater ecology and conservation provides a state-of-the-art review of the approaches and techniques used to measure, monitor, and conserve freshwater ecosystems. It offers a single, comprehensive, and accessible synthesis of the vast amount of literature for freshwater ecology and conservation that is currently dispersed in manuals, toolkits, journals, handbooks, 'grey' literature, and websites. Successful conservation outcomes are ultimately built on a sound ecological framework in which every species must be assessed and understood at the individual, community, catchment and landscape level of interaction. For example, freshwater ecologists need to understand hydrochemical storages and fluxes, the physical systems influencing freshwaters at the catchment and landscape scale, and the spatial and temporal processes that maintain species assemblages and their dynamics. A thorough understanding of all these varied processes, and the techniques for studying them, is essential for the effective conservation and management of freshwater ecosystems.

This volume examines the topic of local biodiversity conservation in the Asia-Pacific region, one of the most rapidly changing areas in the world. With a focus on aquatic systems, this book offers insight on the state of local biodiversity, challenges in management and conservation of biodiversity, and newly developed methods for monitoring biodiversity. In addition, because the service provided by an ecosystem for humans is interlinked with conservation, the final part is dedicated to evaluating the socioeconomic aspect of ecosystem services, with special reference to local biodiversity. In effect, all contributions provide information that is invaluable for effective conservation and sustainable use of biodiversity. This work will interest all stakeholders in biodiversity conservation, including policy makers, NPOs, NGOs, environment-related industries, and biodiversity researchers, not only in the Asia-Pacific region, but also across the entire globe.

Aquatic Functional Biodiversity: An Ecological and Evolutionary Perspective provides a general conceptual framework by some of the most prominent investigators in the field for how to link eco-evolutionary approaches with functional diversity to understand and conserve the provisioning of ecosystem services in aquatic systems. Rather than producing another methodological book, the editors and authors primarily concentrate on defining common grounds, connecting conceptual frameworks and providing examples by a more detailed discussion of a few empirical studies and projects, which illustrate key ideas and an outline of potential future directions and challenges that are expected in this interdisciplinary research field. Recent years have seen an explosion of interest in using network approaches to disentangle the relationship between biodiversity, community structure and functioning. Novel methods for model construction are being developed constantly, and modern methods allow for the inclusion of almost any type of explanatory variable that can be correlated either with biodiversity or ecosystem functioning. As a result these models have been widely used in ecology, conservation and eco-evolutionary biology. Nevertheless, there remains a considerable gap on how well these approaches are feasible to understand the mechanisms on how biodiversity constrains the provisioning of ecosystem services. Defines common theoretical grounds in terms of terminology and conceptual issues Connects theory and practice in ecology and eco-evolutionary sciences Provides examples for successful biodiversity conservation and ecosystem service management

Urbanization is a global phenomenon and the book emphasizes that this is not just a social-technological process. It is also a

social-ecological process where cities are places for nature, and where cities also are dependent on, and have impacts on, the biosphere at different scales from local to global. The book is a global assessment and delivers four main conclusions: Urban areas are expanding faster than urban populations. Half the increase in urban land across the world over the next 20 years will occur in Asia, with the most extensive change expected to take place in India and China. Urban areas modify their local and regional climate through the urban heat island effect and by altering precipitation patterns, which together will have significant impacts on net primary production, ecosystem health, and biodiversity. Urban expansion will heavily draw on natural resources, including water, on a global scale, and will often consume prime agricultural land, with knock-on effects on biodiversity and ecosystem services elsewhere. Future urban expansion will often occur in areas where the capacity for formal governance is restricted, which will constrain the protection of biodiversity and management of ecosystem services.

Nutrient recycling, habitat for plants and animals, flood control, and water supply are among the many beneficial services provided by aquatic ecosystems. In making decisions about human activities, such as draining a wetland for a housing development, it is essential to consider both the value of the development and the value of the ecosystem services that could be lost. Despite a growing recognition of the importance of ecosystem services, their value is often overlooked in environmental decision-making. This report identifies methods for assigning economic value to ecosystem services—“even intangible ones”—and calls for greater collaboration between ecologists and economists in such efforts.

As the Gulf of Mexico recovers from the Deepwater Horizon oil spill, natural resource managers face the challenge of understanding the impacts of the spill and setting priorities for restoration work. The full value of losses resulting from the spill cannot be captured, however, without consideration of changes in ecosystem services—the benefits delivered to society through natural processes. An Ecosystem Services Approach to Assessing the Impacts of the Deepwater Horizon Oil Spill in the Gulf of Mexico discusses the benefits and challenges associated with using an ecosystem services approach to damage assessment, describing potential impacts of response technologies, exploring the role of resilience, and offering suggestions for areas of future research. This report illustrates how this approach might be applied to coastal wetlands, fisheries, marine mammals, and the deep sea -- each of which provide key ecosystem services in the Gulf -- and identifies substantial differences among these case studies. The report also discusses the suite of technologies used in the spill response, including burning, skimming, and chemical dispersants, and their possible long-term impacts on ecosystem services.

Environmental and social impact assessment (ESIA) is an important and often obligatory part of proposing or launching any development project. Delivering a successful ESIA needs not only an understanding of the theory but also a detailed knowledge of the methods for carrying out the processes required. Riki Therivel and Graham Wood bring together the latest advice on best practice from experienced practitioners to ensure an ESIA is carried out effectively and efficiently. This new edition: • explains how an ESIA works and how it should be carried out • demonstrates the links between socio-economic, cultural, environmental and ecological systems and assessments • incorporates the World Bank's IFC performance standards, and best practice examples from developing as well as developed countries • includes new chapters on emerging ESIA topics such as climate change, ecosystem services, cultural impacts, resource efficiency, land acquisition and involuntary resettlement. Invaluable to undergraduate and MSc students of ESIA on planning, ecology, geography and environment courses, this internationally oriented fourth edition of *Methods of Environmental and Social Impact Assessment* is also of great use to planners, ESIA practitioners and professionals seeking to update their skills.

A balanced review of differing approaches based on remote sensing tools and methods to assess and monitor biodiversity, carbon and water cycles, and the energy balance of terrestrial ecosystem. *Earth Observation of Ecosystem Services* highlights the advantages Earth observation technologies offer for quantifying and monitoring multiple ecosystem fun

By the year 2025 nearly 2 billion people will live in regions experiencing absolute water scarcity. In the face of this emerging crisis, how should the planet's water be used and managed? Current international policy sees nature competing with human uses of water. Hunt takes issue with this perspective. She suggests that nature is the source of water and only by making the conservation of nature an absolute priority will we have the water we need for human use in future. It is essential, therefore, to manage water in ways that maintain the water cycle and the ecosystems that support it. This book looks at the complexity of the problem. It provides a wide array of ideas, information, case studies and ecological knowledge - often from remote corners of the developing world -- that could provide an alternative vision for water use and management at this critical time. Essential and compelling reading for students on courses related to water resource management and development; water managers and decision makers, and non-specialists with an interest in global water issues.

Biodiversity is the variety of life in a given range. Today, the world is under tremendous threat of unprecedented loss of biodiversity. Issues like global warming, environmental pollution, recurrent natural calamities and human population rise are of major concern for scientists all over the world. The second edition of the book covers a complete range of the topics pertaining to the subject such as meaning of biodiversity, its history, importance of species diversity, systematics, determination of status of bioresources, pattern of distribution of global species, genetic diversity and ecosystem diversity. It also elaborates on various drivers that lead to biodiversity loss and its impact on global climate. Moreover, the topics on biopiracy, related laws and policies, and the importance of indigenous knowledge of several communities are also described in the text. The use of biotechnology-based methods and various measures to preserve natural resources and conserve biodiversity is the highlight of the text.

Moreover, the book provides a detailed account of the conservation measures of biodiversity, especially those implemented by the government. This book is primarily designed for the undergraduate and postgraduate students of Environmental Science, Zoology and Botany. Besides, it will also be useful for postgraduate diploma or other professional courses in Environmental Science and also for the researchers. **NEW TO THE SECOND EDITION** • ‘Project Tiger’ and ‘Project Elephant’ are introduced in the chapter on Conservation Practice. • Various sections have been revised and updated throughout the book. • A few figures have been added and many others have been replaced for better illustration. **KEY FEATURES** • Explains the contemporary topics such as green accounting and sustainable management of natural resources in an easy-to-understand manner. • Incorporates a number of photographs, flow charts, diagrams and tables. • Provides chapter-end review questions to help students check their understanding of the subject. • Includes MCQs (with answers given at the end of the book). • Gives an elaborate glossary of technical terms to acquaint the students with the related terminologies.

The Arab region already suffers adverse consequences from climate change. This book provides information on climate change and its impact, as well as technical guidance on climate adaptation options for policy makers.



**Multiple Stressors in River Ecosystems: Status, Impacts and Prospects for the Future** provides a comprehensive and current overview on the topic as written by leading river scientists who discuss the relevance of co-occurring stressors for river ecosystems. River ecosystems are subject to multiple stressors that threaten their ecological status and the ecosystem services they provide. This book updates the reader's knowledge on the response and management of river ecosystems to multi-stress situations occurring under global change. Detailing the risk for biodiversity and functioning in a case-study approach, it provides insight into methodological issues, also including the socioeconomic implications. Presents a case study approach and geographic description on the relevance of multiple stressors on river ecosystems in different biomes Gives a uniquely integrated perspective on different stressors, including their interactions and joint effects, as opposed to the traditional one-by-one approach Compiles state-of-the-art methods and technologies in monitoring, modeling and analyzing river ecosystems under multiple stress conditions

A new approach to water-resource for researchers, professionals and graduate students, focusing on global sustainability and socio-ecological resilience to change.

U.S. mariculture production of bivalve molluscs-those cultivated in the marine environment-has roughly doubled over the last 25 years. Although mariculture operations may expand the production of seafood without additional exploitation of wild populations, they still depend upon and affect natural ecosystems and ecosystem services. Every additional animal has an incremental effect arising from food extraction and waste excretion. Increasing domestic seafood production in the United States in an environmentally and socially responsible way will likely require the use of policy tools, such as best management practices (BMPs) and performance standards. BMPs represent one approach to protecting against undesirable consequences of mariculture. An alternative approach to voluntary or mandatory BMPs is the establishment of performance standards for mariculture. Variability in environmental conditions makes it difficult to develop BMPs that are sufficiently flexible and adaptable to protect ecosystem integrity across a broad range of locations and conditions. An alternative that measures performance in sustaining key indicators of ecosystem state and function may be more effective. Because BMPs address mariculture methods rather than monitoring actual ecosystem responses, they do not guarantee that detrimental ecosystem impacts will be controlled or that unacceptable impact will be avoided. **Ecosystem Concepts for Sustainable Bivalve Mariculture** finds that while performance standards can be applied for some broad ecosystem indicators, BMPs may be more appropriate for addressing parameters that change from site to site, such as the species being cultured, different culture methods, and various environmental conditions. This book takes an in-depth look at the environmental, social, and economic issues to present recommendations for sustainable bivalve mariculture.

Life itself as well as the entire human economy depends on goods and services provided by earth's natural systems. The processes of cleansing, recycling, and renewal, along with goods such as seafood, forage, and timber, are worth many trillions of dollars annually, and nothing could live without them. Yet growing human impacts on the environment are profoundly disrupting the functioning of natural systems and imperiling the delivery of these services. **Nature's Services** brings together world-renowned scientists from a variety of disciplines to examine the character and value of ecosystem services, the damage that has been done to them, and the consequent implications for human society. Contributors including Paul R. Ehrlich, Donald Kennedy, Pamela A. Matson, Robert Costanza, Gary Paul Nabhan, Jane Lubchenco, Sandra Postel, and Norman Myers present a detailed synthesis of our current understanding of a suite of ecosystem services and a preliminary assessment of their economic value. Chapters consider: major services including climate regulation, soil fertility, pollination, and pest control philosophical and economic issues of valuation case studies of specific ecosystems and services implication of recent findings and steps that must be taken to address the most pressing concerns **Nature's Services** represents one of the first efforts by scientists to provide an overview of the many benefits and services that nature offers to people and the extent to which we are all vitally dependent on those services. The book enhances our understanding of the value of the natural systems that surround us and can play an essential role in encouraging greater efforts to protect the earth's basic life-support systems before it is too late.

With the knowledge of possible outcomes, what kind of actions should we take? The Millennium Ecosystem Assessment scored 74 response options for dealing with declines in ecosystem services and biodiversity, and managing drivers such as climate change and nutrient loading. This third volume in the MA series analyzes the track record of past policies and the potential of new ones. The challenge of reversing the degradation of ecosystems while meeting increasing demands for their services can be met only with significant policy and institutional changes. However, a difficult set of obstacles stand in the way. Policy makers must keep in mind that there are both trade-offs and synergies between human well-being, ecosystems, and ecosystem services, and that decisions regarding these tradeoffs are difficult and often contentious. The Responses volume ultimately establishes which policy options have the greatest chance to overcome the obstacles and generate positive outcomes. It will serve as an invaluable guide to the creation of stronger policy frameworks for the future.

**Stream Ecosystems in a Changing Environment** synthesizes the current understanding of stream ecosystem ecology, emphasizing nutrient cycling and carbon dynamics, and providing a forward-looking perspective regarding the response of stream ecosystems to environmental change. Each chapter includes a section focusing on anticipated and ongoing dynamics in stream ecosystems in a changing environment, along with hypotheses regarding controls on stream ecosystem functioning. The book, with its innovative sections, provides a bridge between papers published in peer-reviewed scientific journals and the findings of researchers in new areas of study. Presents a forward-looking perspective regarding the response of stream ecosystems to environmental change Provides a synthesis of the latest findings on stream ecosystems ecology in one concise volume Includes thought exercises and discussion activities throughout, providing valuable tools for learning Offers conceptual models and hypotheses to stimulate conversation and advance research

On 21 May 2019, it was officially recognized that we are now living in the Anthropocene, our earth's latest geological epoch, named for the 'unmistakable imprint of human activities'. This announcement came almost 60 years after the publication of Rachel Carson's landmark work of environmental writing, *Silent Spring*, and next year (2022) it will be 50 years since the first UN Conference on the Human Environment, held in Stockholm in June 1972. This book, **Our Earth Matters: Pathways to a Better Common Environmental Future**, is a special issue of the journal *Environmental Policy and Law*, which was first published in 1975. It presents 21 invited contributions by outstanding scholars from around the world, which examine existing global regulatory approaches, processes, instruments and institutions for the protection of the global environment. The articles are grouped under four headings: Prognoses, Processes, Problematique and Prospects, and in them the authors have sought to explore answers to the existential environmental crisis. They urge us to ponder our reckless destruction of natural spaces, endangering of plant and animal species, poisoning of the environment, and general disturbance of our essential ecological processes. The primary objective of the book is to raise the awareness of the global audience by inspiring scholars and decision-makers to re-examine current global approaches to environmental issues and explore the future trajectory with new ideas and frameworks for international environmental governance in the 21st century and beyond. The book will be of interest to all those working to secure the sustainable future of the human race on our only abode, planet Earth. Bharat H. Desai is Professor of International Law and Jawaharlal Nehru Chair in International Environmental Law, Centre for International Legal Studies, School of International Studies, Jawaharlal Nehru University, New Delhi; Editor-in-Chief of the journal *Environmental Policy & Law* (Amsterdam: IOS Press) and of the *Yearbook of International Environmental Law* (Oxford: OUP).

Biodiversity observation systems are almost everywhere inadequate to meet local, national and international (treaty) obligations. As a result of alarmingly rapid declines in biodiversity in the modern era, there is a strong, worldwide desire to upgrade our monitoring systems, but little clarity on what is actually needed and how it can be assembled from the elements which are already

present. This book intends to provide practical guidance to broadly-defined biodiversity observation networks at all scales, but predominantly the national scale and higher. This is a practical how-to book with substantial policy relevance. It will mostly be used by technical specialists with a responsibility for biodiversity monitoring to establish and refine their systems. It is written at a technical level, but one that is not discipline-bound: it should be intelligible to anyone in the broad field with a tertiary education. Drawing on historical and contemporary evidence, this book argues that growing environmental degradation and wealth inequality are linked to how nature is exploited to create economic wealth. Ending the under-pricing of natural capital and insufficient human capital accumulation is essential to overcoming structural imbalance in modern economies.

Environmental and Pollution Science, Third Edition, continues its tradition on providing readers with the scientific basis to understand, manage, mitigate, and prevent pollution across the environment, be it air, land, or water. Pollution originates from a wide variety of sources, both natural and man-made, and occurs in a wide variety of forms including, biological, chemical, particulate or even energy, making a multivariate approach to assessment and mitigation essential for success. This third edition has been updated and revised to include topics that are critical to addressing pollution issues, from human-health impacts to environmental justice to developing sustainable solutions. Environmental and Pollution Science, Third Edition is designed to give readers the tools to be able to understand and implement multi-disciplinary approaches to help solve current and future environmental pollution problems. Emphasizes conceptual understanding of environmental systems and can be used by students and professionals from a diversity of backgrounds focusing on the environment Covers many aspects critical to assessing and managing environmental pollution including characterization, risk assessment, regulation, transport and fate, and remediation or restoration New topics to this edition include Ecosystems and Ecosystem Services, Pollution in the Global System, Human Health Impacts, the interrelation between Soil and Human Health, Environmental Justice and Community Engagement, and Sustainability and Sustainable Solutions Includes color photos and diagrams, chapter questions and problems, and highlighted key words Rapid economic development has been a boon to human well-being, but comes at a significant cost to the fertile soils, forests, coastal marshes, and farmland that support all life on earth. If ecosystems collapse, so eventually will human civilization. One solution is inclusive green growth--the efficient use of natural resources. Its genius lies in working with nature rather than against it. Green Growth That Works is the first practical guide to bring together pragmatic finance and policy tools that can make investment in natural capital both attractive and commonplace. Pioneered by leading scholars from the Natural Capital Project, this valuable compendium of proven techniques can guide agencies and organizations eager to make green growth work anywhere in the world.

Fundamentals of Tropical Freshwater Wetlands: From Ecology to Conservation Management is a practical guide and important tool for practitioners and educators interested in the ecology, conservation and management of wetlands in tropical/subtropical regions. The book is written in such a way that, in addition to scientists and managers, it is accessible to non-specialist readers. Organized into three themed sections and twenty-three chapters, this volume covers a variety of topics, exposing the reader to a full range of scientific, conservation and management issues. Each chapter has been written by specialists in the topic being presented. The book recognizes that wetland conservation, science and management are interlinked disciplines, and so it attempts to combine several perspectives to highlight the interdependence between the various professions that deal with issues in these environments. Within each chapter extensive cross-referencing is included, so as to help the reader link related aspects of the issues being discussed. Contributed to by global experts in the field of tropical wetlands Includes case studies and worked examples, enabling the reader to recreate the work already done Focuses on tropical systems not available in any other book Tropical Stream Ecology describes the main features of tropical streams and their ecology. It covers the major physico-chemical features, important processes such as primary production and organic-matter transformation, as well as the main groups of consumers: invertebrates, fishes and other vertebrates. Information on concepts and paradigms developed in north-temperate latitudes and how they do not match the reality of ecosystems further south is expertly addressed. The pressing matter of conservation of tropical streams and their biodiversity is included in almost every chapter, with a final chapter providing a synthesis on conservation issues. For the first time, Tropical Stream Ecology places an important emphasis on viewing research carried out in contributions from international literature. First synthetic account of the ecology of all types of tropical streams Covers all of the major tropical regions Detailed consideration of possible fundamental differences between tropical and temperate stream ecosystems Threats faced by tropical stream ecosystems and possible conservation actions Descriptions and syntheses life-histories and breeding patterns of major aquatic consumers (fishes, invertebrates)

Synthesizes the ecology and natural history of North American freshwater mussels for scientists, natural resource professionals, students and natural history enthusiasts.

The aim of Ecosystem Services and Global Ecology is to give an overview and report from the frontiers of research of this important and interesting multidisciplinary area. Ecosystem services as a concept plays a key role in solving global environmental and human ecological crises and associated other problems, especially today when the sixth major extinction event of the history of the biosphere is in progress, and humanity can easily become a victim of it. Human activity is rapidly transforming the surface of the Earth, its biosphere, atmosphere, soil, and water resources. Ecological processes happen over a long time scale, thus damage caused by human activity will be perceptible after decades or even centuries. We hope that our book will be interesting and useful for researchers, lecturers, students, and anyone interested in this field.

Integrating research into freshwater biodiversity and the role of keystone species, this fascinating book presents freshwater crayfish as representatives of human-exacerbated threats to biodiversity and conservation. It uses examples from these and other large decapod invertebrates to explore how communities function and are controlled, alongside the implications of human demands and conflicts over limited resources, notably the severe impacts on biodiversity. The discussion is structured around three key topics – the present situation of crayfish in world freshwater ecosystems, the applications of science to conservation management and knowledge transfer for successful crayfish management. It outlines the historic exploitation of crayfish, addressing the problems caused by invasive alien forms and explaining the importance of correct identification when dealing with conservation issues. Offering a global perspective on freshwater systems, the book ultimately highlights how the conservation of such large and long-lived species will help protect ecosystem quality in the future.

In the face of decreasing biodiversity and ongoing global changes, maintaining ecosystem functioning is seen both as a means to preserve biological diversity as well as for safeguarding human well-being by securing the services ecosystems provide. The concept today is prominent in many fields of ecology and conservation biology, such as biodiversity research, ecosystem



management, or restoration ecology. Although the idea of ecosystem functioning is important, the concept itself remains rather vague and elusive. This book provides a novel analysis and integrated synthesis of different approaches to conceptualising and assessing ecosystem functioning. It links the natural sciences with methodologies from philosophy and the social sciences, and introduces a new methodology for a clearer and more efficient application of ecosystem functioning concepts in practice. Special emphasis is laid on the social dimensions of the concept and the ways it influences research practice. Several case studies relate theoretical analyses to practical application.

In 2005, The Millennium Ecosystem Assessment (MA) provided the first global assessment of the world's ecosystems and ecosystem services. It concluded that recent trends in ecosystem change threatened human wellbeing due to declining ecosystem services. This bleak prophecy has galvanized conservation organizations, ecologists, and economists to work toward rigorous valuations of ecosystem services at a spatial scale and with a resolution that can inform public policy. The editors have assembled the world's leading scientists in the fields of conservation, policy analysis, and resource economics to provide the most intensive and best technical analyses of ecosystem services to date. A key idea that guides the science is that the modelling and valuation approaches being developed should use data that are readily available around the world. In addition, the book documents a toolbox of ecosystem service mapping, modeling, and valuation models that both The Nature Conservancy and the World Wide Fund for Nature (WWF) are beginning to apply around the world as they transform conservation from a biodiversity only to a people and ecosystem services agenda. The book addresses land, freshwater, and marine systems at a variety of spatial scales and includes discussion of how to treat both climate change and cultural values when examining tradeoffs among ecosystem services.

Eutrophication continues to be a major global challenge and the problem of eutrophication and availability of freshwater for human consumption is an essential ecological issue. The global demand for water resources due to increasing population, economic developments, and emerging energy development schemes has created new environmental challenges for global sustainability. Accordingly, the area of research on eutrophication has expanded considerably in recent years. Eutrophication, acidification and contamination by toxic substances are likely to pose increasing threats to freshwater resources and ecosystems. The consequences of anthropogenic-induced eutrophication of freshwaters are severe deterioration of surface waters and growing public concern, as well as new interest among the scientific community. "Eutrophication: causes, consequences & control" provides the latest information on many important aspects of the processes of natural and accelerated eutrophication in major aquatic ecosystems around the world. This book offers a cutting-edge resource for researchers and students alike who are studying eutrophication in various ecosystems. It presents the latest trends and developments in the field, including: global scenarios and local threats to the dynamics of aquatic ecosystems, economics of eutrophication, eutrophication in the great lakes of the Chinese pacific drainage basin, photoautotrophic productivity in eutrophic ecosystems, eutrophication's impacts on natural metal remediation in salt marshes, phytoplankton assemblages as an indicator of water quality in seven temperate estuarine lakes in southeast Australia, biogeochemical indicators of nutrient enrichments in wetlands – the microbial response as a sensitive indicator of wetland eutrophication, and ultraviolet radiation and bromide as limiting factors in eutrophication processes in semi-arid climate zones. Written by respected experts and featuring helpful illustrations and photographs, "Eutrophication: causes, consequences & control" provides a concise and practical update on the latest developments in eutrophication.

An overview of the benefits and services that nature offers to people. The contributors present a detailed synthesis of our current understanding of a suite of ecosystem services and a preliminary assessment of their economic value.

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