Chapter 2 Biodiversity Ecosystems And Ecosystem Services

How will biodiversity loss affect ecosystem functioning, ecosystem services, and human well-being? In an age of accelerating biodiversity loss, this timely and critical volume summarizes recent advances in biodiversity-ecosystem functioning research and explores the economics of biodiversity and ecosystem services. The book starts by summarizing the development of the basic science and provides a meta-analysis that quantitatively tests several biodiversity and ecosystem functioning hypotheses. It then describes the natural science foundations of biodiversity and ecosystem functioning research including: quantifying functional diversity, the development of the field into a predictive science, the effects of stability and complexity, methods to quantify mechanisms by which diversity affects functioning, the importance of trophic structure, microbial ecology, and spatial dynamics. Finally, the book takes research on biodiversity and ecosystem functioning further than it has ever gone into the human dimension, describing the most pressing environmental challenges that face humanity and the effects of diversity on: climate change mitigation, restoration of degraded habitats, managed ecosystems, pollination, disease, and biological invasions. However, what makes this volume truly unique are the chapters that consider the economic perspective. These include a synthesis of the economics of ecosystem services and biodiversity, and the options open to policy-makers to address the failure of markets to account for the loss of ecosystem services; an examination of the challenges of valuing ecosystem services and, hence, to understanding the human consequences of decisions that neglect these services; and an examination of the ways in which economists are currently incorporating biodiversity and ecosystem functioning research into decision models for the conservation and management of biodiversity. A final section describes new advances in ecoinformatics that will help transform this field into a globally predictive science, and summarizes the advancements and future directions of the field. The ultimate conclusion is that biodiversity is an essential element of any strategy for sustainable development.

Biodiversity in Drylands, the first internationally based synthesis volume in the Long-Term Ecological Research (LTER) Network Series, unifies the concepts of species and landscape diversity with respect to deserts. Within this framework, the book treats several emerging themes, among them: • how animal biodiversity can be supported in deserts • diversity's relation to habitat structure, environmental variability, and species interactions • the relation between spatial scale and diversity • how to use a landscape simulation model to understand diversity • microbial contributions to biodiversity in deserts • species diversity and ecosystem processes • resource partitioning and biodiversity in fractal environments • effects of grazing on biodiversity • reconciliation ecology and the future of conservation management In the face of global change, integration is crucial for dealing with the problem of sustaining biodiversity. This book promises to be a vital resource for students, researchers, and managers interested in integrative species, resource, and landscape diversities.

With a strong policy focus, the contributors synthesise the scientific approaches to PES, valuation, trade-offs, equity and the institutional requirements to operationalize a credible concept of economic value. The book also addresses the behavioral fo

Following the much acclaimed success of the first volume of Key Topics in Conservation Biology, this entirely new second volume addresses an innovative array of key topics in contemporary conservation biology. Written by an internationally renowned team of authors, Key Topics in Conservation Biology 2 adds to the still topical foundations laid in the first volume (published in 2007) by exploring a further 25 cutting-edge issues in modern biodiversity conservation, including controversial subjects such as setting conservation priorities, balancing the focus on species and ecosystems, and financial mechanisms to value biodiversity and pay for its conservation. Other chapters, setting the framework for conservation, address the sociology and philosophy of peoples' relation with Nature and its impact on health, and such challenging practical issues as wildlife trade and conflict between people and carnivores. As a new development, this second volume of Key Topics includes chapters on major ecosystems, such as forests, islands and both fresh and marine waters, along with case studies of the conservation of major taxa: plants, butterflies, birds and mammals. A further selection of topics consider how to safeguard the future through monitoring, reserve planning, corridors and connectivity, together with approaches to reintroduction and re-wilding, along with managing wildlife disease. A final chapter, by the editors, synthesises thinking on the relationship between biodiversity conservation and human development. Each topic is explored by a team of top international experts, assembled to bring their own cross-cutting knowledge to a penetrating synthesis of the issues from both theoretical and practical perspectives. The interdisciplinary nature of biodiversity conservation is reflected throughout the book. Each essay examines the fundamental principles of the topic, the methodologies involved and, crucially, the human dimension. In this way, Key Topics in Conservation Biology 2, like its sister volume, Key Topics in Conservation Biology, embraces issues from cutting-edge ecological science to policy, environmental economics, governance, ethics, and the practical issues of implementation. Key Topics in Conservation Biology 2 will, like its sister volume, be a valuable resource in universities and colleges, government departments, and conservation agencies. It is aimed particularly at senior undergraduate and graduate students in conservation biology and wildlife management and wider ecological and environmental subjects, and those taking Masters degrees in any field relevant to conservation and the environment. Conservation practitioners, policy-makers, and the wider general public eager to understand more about important environmental issues will also find this book invaluable.

This report describes the status and trends of biodiversity and ecosystem services in the Nordic region, the drivers and pressures affecting them, interactions and effects on people and society, and options for governance. The main report consists of two volumes. Volume 1 The general overview (this report) and Volume 2 The geographical case
studies. This study has been inspired by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystems Services (IPBES). It departs from case studies (Volume 2, the geographical case studies) from ten geographical areas in the Nordic countries (Denmark, Finland, Iceland, Norway, Sweden) and the autonomous areas of Faroe Islands, Greenland, and Åland. The aim was to describe status and trends of biodiversity and ecosystem services in the Nordic region, including the drivers and pressures affecting these ecosystems, the effects on people and society and options for governance. The Nordic study is structured as closely as possible to the framework for the regional assessments currently being finalised within IPBES. The report highlights environmental differences and similarities in the Nordic coastal areas, like the inhabitants’ relation to nature and the environment as well as similarities in social and policy instruments between the Nordic countries. This study provides background material for decision-making and it is shown that Nordic cooperation is of great importance for sustainable coastal management and should be strengthened in future work.

Protected areas (PAs) contain biodiversity and ecosystems of high conservation value. In addition, these areas provide a range of benefits, both direct and indirect, to our societies and economies, i.e. so called ecosystem services. These services include, for example, an ecosystem's ability to regulate floods and climate, purify water, secure the pollination of crops, and create opportunities for recreation, culture and tourism. This book offers a comprehensive introduction to the socio-economic benefits of PAs and PA networks and provides step-by-step practical guidance on identifying, assessing and valuing the various ecosystem services and related benefits provided by PAs. It also aims to improve the communication of PA benefits to different stakeholders and the general public. It is shown that identifying and valuing the socio-economic benefits of PAs can be beneficial for several reasons. Demonstrating socio-economic importance of a protected site can significantly increase political and stakeholder support for the site and resolve conflicts between different interest groups. This can lead to positive changes in policies and decision-making. Insights on PA benefits are also needed to identify a combination of actions and land use practices that best support the sustainable and equitable utilisation of these benefits, while retaining a site’s conservation goals. Finally, demonstrating different benefits can help to discover alternative and sustainable sources for financing the management of PAs.

'Should be essential reading for all those who wish to realize truly sustainable development in this new millennium.' From the foreword by Achim Steiner UN Under-Secretary General and Executive Director United Nations Environment Programme 'Fills a much needed gap in the literature ... The chapters include contributions by leading academics and policy experts which make for one of the most authoritative books in this field.' Andreas Kontoleon University Lecturer and Director of MPhil in Environmental Policy University of Cambridge This is the most comprehensive book to address the economic soci.

Advances in Ecological Research is one of the most successful series in the highly competitive field of ecology. Each volume publishes topical and important reviews, interpreting ecology as widely as in the past, to include all material that contributes to our understanding of the field. Topics in this invaluable series include the physiology, populations, and communities of plants and animals, as well as landscape and ecosystem ecology. Presents the most updated information on the field of ecology, publishing topical and important reviews Provides all information that relates to a thorough understanding of the field Includes data on physiology, populations, and communities of plants and animals New ideas on ES Integrative approach working across a variety of levels of biological organization and spatial and temporal scales Diversity of relevant subjects covered

Australia's Biodiversity

Ecologies are often examined from a ecological perspective because of the importance of biodiversity and ecosystem services. This book makes a case for ecosystem-based adaptation by arguing that ecosystems and its services are critical in the climate change and disaster risk reduction fields. Based on principles of the conservation and optimization of biodiversity and of equity and sustainability, this book focuses on the ecology of the coffee agroecosystem as a model for a sustainable agricultural ecosystem. It draws on the authors' own research conducted over the last twenty years as well as incorporating the vast literature that has been generated on coffee agroecosystems from around the world. The book uses an integrated approach that weaves together various lines of research to understand the ecology of a very diverse tropical agroforestry system. Key concepts explored include biodiversity patterns, metapopulation dynamics and ecological networks. These are all set in a socioeconomic and political framework which relates them to the realities of farmers' livelihoods. The authors provide a novel synthesis that will generate new understanding and can be applied to other examples of sustainable agriculture and food production. This synthesis also explains the ecosystem services provided by the approach, including the economic, fair trade and political aspects surrounding this all-important global commodity.

The major subdisciplines of ecology--population ecology, community ecology, ecosystem ecology, and evolutionary ecology--have diverged increasingly in recent decades. What is critically needed today is an integrated, real-world approach to ecology that reflects the interdependency of biodiversity and ecosystem functioning. From Populations to Ecosystems proposes an innovative theoretical synthesis that will enable us to advance our fundamental understanding of ecological systems and help us to respond to today's emerging global ecological crises. Michel Loreau begins by explaining how the principles of population dynamics and ecosystem functioning can be merged. He then addresses key issues in the study of biodiversity and ecosystems, such as functional complementarity, food webs, stability and complexity, material cycling, and metacommunities. Loreau describes the most recent theoretical advances that link the properties of individual populations to the aggregate properties of communities, and the properties of functional groups or trophic levels to the functioning of whole ecosystems, placing special emphasis on the relationship between biodiversity and ecosystem functioning. Finally, he turns his attention to the controversial issue of the evolution of entire ecosystems and their properties, laying the theoretical foundations for a genuine evolutionary ecosystem ecology. From Populations to Ecosystems points the way to a much-needed synthesis in ecology, one that offers a fuller understanding of ecosystem processes in the natural world.

The Economics of Ecosystems and Biodiversity (TEEB) study is a major international initiative drawing attention to local, national and global economic benefits of biodiversity, to highlight the growing costs of biodiversity loss and ecosystem degradation, the benefits of investing in natural capital, and to draw together expertise from the fields of science, economics and policy to enable practical actions. Drawing on a team of more than one hundred authors and reviewers, this book demonstrates the value of ecosystems and biodiversity to the economy, society and individuals. It underlines the urgency of strategic policy making and action at national and international levels, and presents a rich evidence base of policies and instruments in use around the world and a wide range of innovative solutions. It highlights the need for
new public policy to reflect the appreciation that public goods and social benefits are often overlooked and that we need a transition to decision making which integrates the many values of nature across policy sectors. It explores the range of instruments to reward those offering ecosystem service benefits, such as water provision and climate regulation. It looks at fiscal and regulatory instruments to reduce the incentives of those running down our natural capital, and at reforming subsidies such that they respond to current and future priorities. The authors also consider two major areas of investment in natural capital - protected areas and investment in restoration. Overall the book underlines the needs and ways to transform our approach to natural capital, and demonstrates how we can practically take into account the value of ecosystems and biodiversity in policy decisions - at national and international levels - to promote the protection of our environment and contribute to a sustainable economy and to the wellbeing of societies.

This book is part of a two-volume set that offers an innovative approach towards developing methods and tools for assigning conservation categories of threatened taxa and their conservation strategies by way of different phases of eco-restoration in the context of freshwater river systems of tropical bio-geographic zones. The set provides a considerable volume of research on the biodiversity component of river ecosystems, seasonal dynamics of physical chemical parameters, geo-hydrological properties, types, sources and modes of action of different types of pollution, river restoration strategies and methodologies for the ongoing ecological changes of river ecosystems. Volume 2 highlights biodiversity potential in aiding the resistance and resilience of riverine ecosystem functioning and their synergistic effects on ongoing environmental perturbations. Comprehensive information on the conservation of river-associated-wildlife is provided, covering the impacts of pollution, land-use changes, river policies, and ecosystem restoration strategies. The book offers an innovative approach towards developing methods and tools for assigning conservation categories of threatened taxa, and covers their conservation strategies by way of different phases of eco-restoration in the context of freshwater river systems of tropical bio-geographic zones.

'A brilliant synthesis of ecology and economics that provides a sure guide to a sustainable future.' Charles Birch 'Written by an impressive list of experts across a number of disciplines, this readable text provides cross-cutting analysis but vigorous criticism-and answers.' Robyn Williams 'This book is such a useful guide to responsible decision-making that it should be supplied in bulk to senior government officials and managers in the private sector.' Ian Lowe 'This is a fine contribution to ecological economics coming from Australia, and of interest worldwide.' Herman E Daly Human well-being is wholly dependent upon the continued good health of the Earth's ecosystems. Human behaviour as it interacts with the biophysical environment is enormously complex, as governments (and individuals) who must make decisions about resource use are becoming increasingly aware. Human Ecology, Human Economy provides the basic concepts and tools for understanding how to analyse that interaction. The book is designed to be used as a text for undergraduate and graduate students in environmental studies, human and social ecology, ecological economics, futures studies, and science and technology studies. It is also intended for interested members of the public and for policy-makers working on environmental issues, especially where these intersect with economic policy. Human Ecology, Human Economy not only covers the basic concepts, but also moves to some of the frontiers of thinking in several case studies. It uses a problem and solution oriented approach which crosses disciplinary boundaries, drawing together elements from biology, economics, politics and political science. Professor Mark Diesendorf is Director of the Institute for Sustainable Futures at the University of Technology, Sydney and Vice President of the Sustainable Energy Industries Council of Australia. Among the books he has edited are The Magic Bullet and Energy And People. Dr Clive Hamilton is Executive Director of the Australia Institute, Canberra and teaches in the Public Policy Program at the Australian National University. His books include Capitalist Industrialisation In Korea, The Mystic Economist and The Economic Dynamics Of Australian Industry.

This textbook is written to bring about an awareness of a variety of environmental concerns. It covers a wide range of topics and issues about environmental science. It attempts to create a pro-environmental attitude and a behavioral pattern in society that is based on creating sustainable lifestyles. But a textbook can hardly be expected to achieve a total behavioral change in society. Conservation is best brought about through creating a love for nature. Natural resources are those gift which are directly from nature. India presents nature in all its splendour. Diversity in physical and climatic condition result in wide range of natural vegetation in different region. In their turn these provide habitat for different species of animals and birds, while rain forests are found in the Andaman, Cactus are found in the desert. Similarly there are alpine forests in the Himalayas where mangroves are grown in the saline soil of Andamans. Since the beginning of our civilisation the varied natural features with its flora and fauna have influenced the life and tradition of world and enriched their natural resources. It is always believed in the interrelationship among nature, environment and people. Therefore, the efforts for conservation of biodiversity and natural resources should be in tune with the processes and its occurrence in space and time from micro level to mega level. The present book is based on numerous materials, reports, and authors own extensive surveys and researchers of the nation. The book will be welcomed by all taxonomists, foresters, environmentalists and other decision makers. Contents Chapter 1: Introduction; Chapter 2: Importance of Biodiversity; Chapter 3: Ecosystems, Environment and Biodiversity; Chapter 4: Extinction of Species and Loss; Chapter 5: Conservation of Biodiversity; Chapter 6: General Aspects of Biodiversity; Chapter 7: Action Plant for National Biodiversity Strategy; Chapter 8: Gene Bank Conservation; Chapter 9: Information on Hot Spot; Chapter 10: Social Biota for Biodiversity; Chapter 11: Biodiversity and Neotropical Primates; Chapter 12: Biodiversity Loss and Threat; Chapter 13: Biodiversity in Farming; Chapter 14: Nature and Natural Resources Conservation; Chapter 15: Plant Protection International Convention; Chapter 16: Biological Diversity Convention; Chapter 17: Natural Biological Capital of the Earth; Chapter 18: Conservation of Biodiversity in Indian Scenario; Chapter 19: Conservation Biodiversity in Future Strategies for India; Chapter 20: Management of Wildland Biodiversity; Chapter 21: Biodiversity Issues Impact on Diversity; Chapter 22: Systematics and Biodiversity; Chapter 23: Biodiversity for Tropical Region; Chapter 24: Plant Species Richness and Global Warming; Chapter 25: Diversity in Community; Chapter 26: Bioresources Protection; Chapter 27: Diversity in Ecosystem; Chapter 28: Systems for Renewable Energy; Chapter 29: Environmental Monitoring (Biodiocndicators); Chapter 30: Environmental Priorities in India; Chapter 31: Environmental Organisations and Agencies. The world’s oceans cover 70% of the earth’s surface and are home to a myriad of amazing and beautiful creatures. However, the biodiversity of the oceans is incre- ingly coming under serious threat from many human activities including overfi- ing, use of destructive fishing methods, pollution and commercial aquaculture. In addition, climate change is already having an impact on some marine ecosystems. This book discusses some of the major threats facing marine ecosystems by cons- ering a range of topics, under chapters discussing biodiversity (Chapter 1), fisheries (Chapter 2), aquaculture (Chapter 3), pollution (Chapter 4) and the impacts of increasing greenhouse gas emissions.
The utilization of natural resources to satisfy worldwide growing consumption of goods and services has severe ecological consequences. Aside from the projected doubling of knowledge and guidance to drive forward the biodiversity conservation agenda for the next decade. Ecosystem services and biodiversity, and showing how these can be mainstreamed into public policies. This volume and subsequent TEEB outputs will provide the authoritative experts, represents the scientific state of the art, providing a comprehensive assessment of the fundamental ecological and economic principles of measuring and valuing by the United Nations Environment Programme to provide a comprehensive global assessment of economic aspects of these issues. This book, written by a team of international conventional economic system, so their loss is often not detected and continues unaddressed and unabated. This in turn not only impacts human well-being, but also seriously undermines the sustainability of the economic system. It is against this background that TEEB: The Economics of Ecosystems and Biodiversity project was set up in 2007 and led by the United Nations Environment Programme to provide a comprehensive global assessment of economic aspects of these issues. This book, written by a team of international experts, represents the scientific state of the art, providing a comprehensive assessment of the fundamental ecological and economic principles of measuring and valuing ecosystem services and biodiversity, and showing how these can be mainstreamed into public policies. This volume and subsequent TEEB outputs will provide the authoritative knowledge and guidance to drive forward the biodiversity conservation agenda for the next decade.

The utilization of natural resources to satisfy worldwide growing consumption of goods and services has severe ecological consequences. Aside from the projected doubling of food consumption in the next fifty years, the growing trade of biofuels and other commodities is a global challenge as the economic activities in the primary sector (i.e. mining, human well-being relies critically on ecosystem services provided by nature. Examples include water and air quality regulation, nutrient cycling and decomposition, plant pollination and flood control, all of which are dependent on biodiversity. They are predominantly public goods with limited or no markets and do not command any price in the conventional economic system, so their loss is often not detected and continues unaddressed and unabated. This in turn not only impacts human well-being, but also seriously undermines the sustainability of the economic system. It is against this background that TEEB: The Economics of Ecosystems and Biodiversity project was set up in 2007 and led by the United Nations Environment Programme to provide a comprehensive global assessment of economic aspects of these issues. This book, written by a team of international experts, represents the scientific state of the art, providing a comprehensive assessment of the fundamental ecological and economic principles of measuring and valuing ecosystem services and biodiversity, and showing how these can be mainstreamed into public policies. This volume and subsequent TEEB outputs will provide the authoritative knowledge and guidance to drive forward the biodiversity conservation agenda for the next decade.

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fisheries, aquaculture, forestry and agriculture) can damage biodiversity and ecosystem services. This should be taken into account in the decision-making affecting the global value chains linking consumer, retailer, processor, and producer in the North and the South. To cover the topic of ecosystem services and global trade this book is organized into four major parts. Part 1 gives the theoretical framework from an ecological, economic and political perspectives. Part 2 explores how internationally traded biophysical commodities from agriculture, forestry and fisheries translates into a virtual flow of land, freshwater, and marine ecosystems. Part 3 describes how two widely used accounting tools (i.e., Life Cycle Assessment and Green National Accounts) deal with international aspects of ecosystem services, and Part 4 shows how instruments like labelling, bans, or payments for ecosystem services in the private and public sector can influence trade patterns and the management of ecosystem services. This collection is a valuable contribution to the global change science dealing with ecosystem services. It illustrates the consequences of international trade on global ecosystem services and provides an overview of accounting tools and of market-based policy instruments to address negative and positive externalities. The book is certainly innovative, because it brings together research findings from distinct disciplines especially Indigenous Ecology and Ecosystem Sciences, as well as Environmental Economics and Political Science.

between the diversity of plant and animal species and host/dependent agricultural systems. Biodiversity in Agroecosystems shows how biodiversity can be thought of not only as the rich make-up of a great number of related and competing species within an ecologically defined community, but also as the robust behavior and resilience of those species over time and as the endurance of their eco-community. This book brings to the fore new research on biodiversity in agricultural ecosystems at both micro and macro levels, heretofore available only in journals and proceedings papers.

This book describes the biodiversity and biogeography of northern Mexico, documents the biological importance of regional ecosystems and the impacts of human land use on the conservation status of plants and wildlife. It should become the standard source document for the conservation status of species and ecosystems in this region, which is of unusual biological interest because of its high biodiversity and highly varied landscape and biological zonation.

The Alboran Sea represents a regional Mediterranean space where North and South worlds merges, creating a geopolitical region where marine resources and maritime activities should be managed from a national and international perspectives. It is widely known, that currently the planet is suffering a global change, and it is also affecting the Alboran Sea, its ecosystems and populations. An important first step to update a paramount vision on this region is to understand the climatic, geologic and oceanographic, including biochemical cycles, process which shapes the rich geodiversity, biodiversity, the productivity, and the sustainable use of the marine resources from Alboran Sea. The fisheries management system should take into account marine environmental variability to achieve biological sustainability of marine resources. Well-funded policy-makers’ decisions require a sound science based knowledge of the interaction between the marine environment and commercial stocks. This is because the role of marine environment in the evolution of fish stocks is sometimes even more important than the one played by fishers in the commercial exploitation of them. Finally, we should analyze the different aspects of political context that could affect the management of the resources from Alboran Sea in the context of climate change. This book reviews different aspects of the Alboran Sea to help understand the current situation from the original Tethis Ocean. The book is divided into four blocks: (i) Oceanographic, geological and ecological context (chapters 2 to 7), (ii) biodiversity and ecosystems distribution (chapters 8 to 12), (iii) fisheries resources and aquaculture (chapters 13 to 20), and (iv) conservation, management and marine polices (chapters 21 to 25).

A critical synthesis of key concepts for understanding human impacts on marine ecosystems and for decision-making based on ecosystem services. Biodiversity is usually explored at three levels which work together to create the complexity of life on our planet ¿ genetic diversity, species diversity and ecosystem diversity. It is estimated that there are 13.6 million species of plants, animals and micro-organisms on Earth. Australia has about one million of these ¿ over 7% of the world's total and more than twice the number of species in Europe and North America combined. As a developed nation, Australia has a special responsibility for biodiversity conservation and management. Of global concern are the environmental threats of loss of habitat and loss of species caused by greenhouse pollution, climate change, extinction and overpopulation. Current biodiversity conservation practice clearly acknowledges that it is far more efficient to conserve whole ecosystems which encompass biodiversity at all levels, rather than focus on a few highly visible and popular species in isolation.

What are the features of Australia’s biodiversity and what are we currently doing to conserve it for future generations? Can we achieve ecological sustainability?Chapter 1: Understanding Biodiversity

This book uses ecosystem services-based approaches to address major global and regional water challenges, for researchers, students, and policy makers. Ecosystems provide services that are crucial and beneficial to the human population. The management and conservation of these services can assure the wellbeing of the local population. Climate Change and Its Impact on Ecosystem Services and Biodiversity in Arid and Semi-Arid Zones is an essential reference source that studies the effects of climate change on biodiversity and ecosystem services in dry regions and examines various strategic local, national, and international policy developments to help overcome these impacts. Featuring research on topics such as poverty reduction, adaptation, climate change, and adaption policies, this book is ideally designed for environmentalists, policymakers, government officials, academicians, researchers, and technology developers who want to improve their understanding of climate change impact, vulnerability, and sustainability, and the strategic role of adaptation and mitigation.

This book is a product of the TEEB study (The Economics of Ecosystems and Biodiversity). It provides important evidence of growing corporate concern about biodiversity loss and offers examples of how leading companies are taking action to conserve biodiversity and to restore ecosystems. This book reviews indicators and drivers of biodiversity loss and ecosystem decline, and shows how these present both risks and opportunities to all businesses. It examines the changing preferences of consumers for nature-friendly products and services, and offers examples of how companies are responding. The book also describes recent initiatives to enable businesses to measure, value and report their impacts and dependencies on biodiversity and ecosystem services. The authors review a range of practical tools to manage biodiversity risks in business, with examples of how companies are using these tools to reduce costs, protect their
brands and deliver real business value. The book also explores the emergence of new business models that deliver biodiversity benefits and ecosystem services on a commercial basis, the policy enabling frameworks needed to stimulate investment and entrepreneurship to realize such opportunities, and the obstacles that must be overcome. The book further examines how businesses can align their actions in relation to biodiversity and ecosystem services with other corporate responsibility initiatives, including community engagement and poverty reduction. Finally, the book concludes with a summary and recommendations for action.

As the impacts of anthropogenic activities increase in both magnitude and extent, biodiversity is coming under increasing pressure. Scientists and policy makers are frequently hampered by a lack of information on biological systems, particularly information relating to long-term trends. Such information is crucial to developing an understanding as to how biodiversity may respond to global environmental change. Knowledge gaps make it very difficult to develop effective policies and legislation to reduce and reverse biodiversity loss. This book explores the gap between global commitments to biodiversity conservation, and local action to track biodiversity change and implement conservation action. High profile international political commitments to improve biodiversity conservation, such as the targets set by the Convention on Biological Diversity, require innovative and rapid responses from both science and policy. This multi-disciplinary perspective highlights barriers to conservation and offers novel solutions to evaluating trends in biodiversity at multiple scales.

Natural resource depletion and adverse impacts from environmental degradation, including loss of biodiversity and ecosystem services and their associated knowledge, add to and exacerbate the list of challenges which humanity faces. In order to address these challenges, policy makers need credible and independent information that take into account the complex relationships between biodiversity, ecosystem services and people. To meet these needs this book "Intergovernmental Science Policy Platform on Biodiversity and Ecosystem Services" (IPBES) was established in 2012. Its purpose is to assess the state of the planet's biodiversity, its ecosystems and essential services they provide for human well-being. This report is the result of an introductory and scoping study, laying the foundation for a Nordic Assessment of Biodiversity and Ecosystem Services based on IPBES methods and procedures. This is the first volume of the five-volume book series "Engineering Tools for Environmental Risk Management" dealing with the following topics: types and management of environmental deterioration, particularly pollution; environmental toxicology as a versatile tool in monitoring and risk management; risk assessment of chemical substances and c
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
The Amazonia is the largest continuous river basin and rainforest ecosystem in the world. In all aspects it is a natural wonder, and the rainforest with its billions of trees is a vital carbon store that slows down the advance of global warming. It is home to one million indigenous people and some three million species of plants and animals. There have been many climate fluctuations during the last 55 million years of its existence, but never before have "the lungs of the world" been at greater risk than they are today due to uncontrolled fires, expanding agriculture and heavy industrial development in the forms of oil drilling, mining and large hydroelectric dams. In twelve chapters, this book describes the anthropological, biological and industrial problems facing the Amazonia, and seeks to find new solutions.
Biodiversity is under global threat and available evidence suggests that we are headed towards another mass extinction. There exists a need for tools to assess and protect biodiversity because each level of biodiversity, from genes to ecosystems, requires a unique set of tools to solve challenges in biodiversity conservation. The goal of the work herein provides technical advances for assessing genetic biodiversity for a species of endangered fairy shrimp, Branchinecta lynchi (Chapter 1), application of a universal genetic tool to assess taxa diversity of communities of alpine benthic macroinvertebrates (Chapter 2), and an assessment of a novel law that is used in the state of California to ensure protection of biodiversity (Chapter 3). Each chapter increases our knowledge of tools that can be used to assess and protect biodiversity in unique ways and in total spans all levels of biodiversity. Chapter one describes eight novel microsatellite markers for the vernal pool fairy shrimp, Branchinecta lynchi, which has been extirpated from 90% of its range. These genetic loci were developed for the purpose of evaluating genetic diversity and population structure of remaining populations, as well as providing a new tool for assisting in the delineation of management areas that will hopefully aid in their conservation and recovery. These markers can also be used for the study of their evolution and a few loci are potentially useful in other Branchinecta species. Chapter two evaluates a process that is often taken for granted as being something that is easily done. Namely, in many community ecological studies the goal is to produce a species list from a sample of individuals. In this study we compared a newer method by which individuals can be identified (i.e., genetic barcode identification) to the use of established morphological tools and estimated taxonomic resolution gained by a combined use of both methods. We further tested whether a change in taxonomic resolution significantly altered richness estimates for benthic macroinvertebrates sampled from ten lakes in Sequoia National Park, USA. Across all lakes, 81 unique taxa were identified and 42% (34) were reliably identified to species using both barcode and morphological identification. Of the 34 taxa identified to species with both methods of identification, 70% (25) were identified using only their barcodes. The increased resolution of 28%, on average per lake sampled, resulted in a significant difference in estimated richness within a lake at the order, family, genus, and species levels of taxonomy, and suggests that if only morphology is used to create species lists for benthic macroinvertebrates we are potentially underestimating richness. Our results demonstrate that a combined identification approach improves accuracy of benthic macroinvertebrate species lists in alpine lakes and subsequent estimates of richness. Chapter three moves from development and use of genetic tools to evaluate biodiversity to a social construct for how to protect biodiversity. In this chapter we evaluated socioeconomic and political barriers to plan implementation for conservation plans under the Natural Community Conservation Planning (NCCP) Act of California. The NCCP Act is a proactive approach to resolve an important challenge in conservation: achieving protection of biodiversity in the face of human economic growth and development. We evaluated conservation plans that included over 300 species and the potential protection of nearly seven million acres of habitat and assessed potential barriers in the planning process that may impede implementation. Data pertaining to socioeconomic and ecological characteristics in planning areas was aggregated and then used to characterize plans at different stages (e.g., implemented or abandoned). Second, we evaluated stakeholder involvement used for the planning process. Lastly, we surveyed county and city elected officials from California to assess their opinions regarding the trade-off between conservation and economic development and the value of NCCPs to resolve this trade-off. We found that implemented plans were characterized by higher population density and human development index, lower median housing value, higher number of community types included in plans, and higher average involvement of stakeholders when compared to abandoned plans. Politicians from the regions where NCCPs are implemented were more likely to think that NCCPs are an effective tool for conservation of California's native biodiversity when compared to politicians from places where planning for an NCCP has been abandoned. The methodology used to assess the planning process of the NCCP program, as well as the findings, will inform future NCCP program efforts and can be a model for how to assess other planning efforts in conservation management.
Ecosystem Services: Global Issues, Local Practices covers scientific input, socioeconomic considerations, and governance issues on ecosystem services. This book provides hands-on transdisciplinary perspectives by administrators and sector representatives involved in the ecosystem service community. Ecosystem Services develops shared approaches and scientific methods to achieve knowledge-based
sustainable planning and management of ecosystem services. Professionals engaged in ecosystem service implementation have two options: de-emphasize the ecological and socioeconomic complexity and advance in the theoretical, abstract field, or try to develop research that is policy relevant and inclusive in an uncertain environment. This book provides a wide overview of issues at stake, of interest for any professional wishing to develop a broader view on ecosystem service science and practice. Examines a broad scope of relevant issues to create common understanding in the ecosystem services community Includes contributions from several backgrounds, providing a broad, multidisciplinary view Offers recommendations to develop a thorough understanding and management of ecosystem services based on tools and research in larger territories as well as on local scales

An ecosystem services (ES) approach seems to entail two different, but intertwined, mechanisms: (1) the adoption of the conceptual framework of ES, as a particular (instrumental) angle from which to analyze the linkages between people and the environment; and (2) the experimentation with a set of ES (e)valuation tools and instruments in order to reduce complexities through the adoption of economic/monetary values wherever suitable. This chapter explores both mechanisms—with respect to the conceptualization and to the valuation of ES—at the level of Belgian environmental policy making. Ecosystems can be considered as dynamic and interactive clusters made up of plants, animals and micro-organism communities. Inevitably, mankind is an integral part of each ecosystem and as such enjoys all its provided benefits. Driven by the increasing necessity to preserve the ecosystem productivity, several ecological studies have been conducted in the last few years, highlighting the current state in which our planet is, and focusing on future perspectives. This book contains comprehensive overviews and original studies focused on hazard analysis and evaluation of ecological variables affecting species diversity, richness and distribution, in order to identify the best management strategies to face and solve the conservation problems.

The present book “Biodiversity, Traditional Knowledge and Intellectual Property Rights” elaborates principles of biodiversity right from definitions and concepts to strategies for conservation of biodiversity. It also explains the roles and functions of international organizations like CBD in biodiversity conservation. The unique feature of this book is it connects biodiversity, traditional knowledge and intellectual property rights. Different aspects of biodiversity related traditional knowledge and international initiatives undertaken to protect the rights of traditional knowledge holders are discussed.