

Ecological Census Techniques A Handbook

Protected areas have often been defined as the backbones of biodiversity conservation. Protected areas have often been defined as the backbones of biodiversity conservation. However, legitimate demands formulated by countries for their economic development, growing human populations, forest fragmentations, and needs of local communities for sustainable livelihoods are also pressing demands on protected areas, stringently pressuring conservation community to identify means to reconcile long term biodiversity conservation and communities' livelihoods. Hence, integrating conservation activities within the global framework of economic development of countries with high biodiversity had become part of conservation paradigms. Integrated development as a route to conservation, strict protected areas, community managed areas, etc. have been tried but resulted in debatable outcomes in many ways. The lukewarm nature of these results brought 'landscape approach' at the front of biodiversity conservation in Central Africa. Since the late 1990s the landscape approach uses large areas with different functional attributes and shifts foundational biodiversity conservation paradigms. Changes are brought to the role traditionally attributed to local communities, aligning sustainable development with conservation and stretching conservation beyond the confines of traditional protected areas. These three shifts need a holistic approach to respond to different conservation questions. There are only a few instances where the landscape experience has been scientifically documented and lessons learnt drawn into a corpus of knowledge to guide future conservation initiatives across Central Africa. To subjugate one biodiversity conservation landscape as one case study emerged as a matter of urgency to present the potential knowledge acquired throughout the landscape experiment, including leadership and management, processes tried, results (at least partially) achieved, and why such and such other process or management arrangement were been chosen among many other alternatives, etc. The challenges of the implementation of the conservation landscape approach needed also to be documented. This book responds to the majority of these questions; drawing its content from the firsthand field knowledge, it discusses these shifts and documents what has been tried, how successful (unsuccessful) it was, and what lessons learnt from these trials. Theoretical questions such as threat index, and ecological services, etc. are also discussed and gaps in knowledge are identified.

Globally, millions of hectares of tropical forests have been cleared and replaced with commercial plantations. Many of these plantations are abandoned or put to alternative use. Abandoned plantations provide opportunities that compensate to an extent, forest cover depletion in the tropics. However, restoration of such abandoned land to natural forests involves a complex interplay of ecological, socio-economic and legal issues. Apart from ecological issues of colonisation, there are social issues of rehabilitating people once they lose their livelihood, legal rights of the landowner, economics of abandonment and finally legal issues such as protected areas (PAs) act and legislation that can lead to abandonment. In the Western Ghats, tea plantations were established in the rainforest during the colonial rule and are owned by individuals or large companies. During the globalisation process, the demand for tea decreased and many small owners could not maintain their plantations due to labour and other issues which led to the abandonment of many such plantations. In addition, plantations established during the British rule are now inside PAs, and they face closure once the lease on the land expires. In the Trivandrum division alone, which has a large number of plantations, almost 55% have been abandoned. In areas that lie within PAs, forest managers are keen that the plantations should be annexed to the PA, but such large-scale abandonment of land provides a challenge to restoration of native species. This book addresses the ecological aspects of colonisation by native tree species in the abandoned plantations within a PA and suggests restoration activities from ecological and social perspectives, helpful to forest and plantation managers.

In this book there are entire chapters devoted to the most widely used bird counting techniques, and attempts to amalgamate other counting methodologies into major groups were made. Examples of the use of methods are provided wherever possible and the relative value of various approaches for answering specific questions is also addressed. A newly revised edition of the immensely successful Bird Census Techniques An entirely new chapter covering the census methods recommended for tropical habitats Provides a concise guide to various census techniques and their opportunities and pitfalls

Although all living beings modify their environment, human beings have acquired the ability to do so on a superlative space-time scale. As a result of industrialization and the use of new technologies, the anthropogenic impact has been increasing in the last centuries, causing reductions in the sizes or the extinction of numerous wild populations. In this sense, from the field of conservation genetics, various efforts have been made in recent decades to provide new knowledge that contributes to the conservation of populations, species, and habitats. In this book, we summarize the concrete contributions of researchers to the conservation of the Neotropical mammals using Molecular Ecology techniques. The book is divided into three major sections. The first section provides an up-to-date review of the conservation status of Neotropical mammals, the applications of the molecular markers in its conservation, and the use of non-invasive and forensic genetic techniques. The second and third sections present, respectively, a series of case studies in various species or taxonomic groups of Neotropical mammals.

Integrated Pest Management is an effective and environmentally sensitive approach that relies on a combination of common-sense practices. Its programs use current and comprehensive information on the life cycles of pests and their interactions with the environment. This information, in combination with available pest control methods, is used to manage pest damage by the most economical means and with the least possible hazard to people, property, and the environment.

A synthesis of contemporary analytical and modeling approaches in population ecology The book provides an overview of the key analytical approaches that are currently used in demographic, genetic, and spatial analyses in population ecology. The chapters present current problems, introduce advances in analytical methods and models, and demonstrate the applications of quantitative methods to ecological data. The book covers new tools for designing robust field studies; estimation of abundance and demographic rates; matrix population models and analyses of population dynamics; and current approaches for genetic and spatial analysis. Each chapter is illustrated by empirical examples based on real datasets, with a companion website that offers online exercises and examples of computer code in the R statistical software platform. Fills a niche for a book that emphasizes applied aspects of population analysis Covers many of the current methods being used to analyse population dynamics and structure Illustrates the application of specific analytical methods through worked examples based on real datasets Offers readers the opportunity to work through examples or adapt the routines to their own datasets using computer code in the R statistical platform Population Ecology in Practice is an excellent book for upper-level undergraduate and graduate students taking courses in population ecology or ecological statistics, as well as established researchers needing a desktop reference for contemporary methods used to develop robust population assessments.

This new textbook fills an important niche by offering a lively overview of the principles of ecology for a broad range of university-level science and biology courses. Written for those who need to understand key ecological concepts but may specialise in other fields, it is filled with many vivid examples of topical issues and current events. The Ecological World View briefly covers the history of ecology and describes the general approach of the scientific method, then takes a wide-ranging look at basic principles of population dynamics and applies them to everyday practical problems. Each chapter clearly presents key concepts and learning objectives, combined with thought-provoking, open-ended questions to facilitate discussion. Stimulating, appealing and written in non-technical language, this is an essential resource for understanding how the ecological world works.

The study of primate ecology and conservation has advanced rapidly in recent years. This practical volume brings together a group of distinguished primate researchers to synthesize field, laboratory, and

conservation management techniques for primate ecology and conservation. The synthesis focuses on new and emerging field methods alongside a comprehensive presentation of laboratory and data analysis techniques, as well as the latest methods for determining conservation status and conservation management. This book's particular focus is on innovative ways to study primates in a changing world, including emerging methods such as non-invasive genetic techniques and advanced spatial modeling. In addition to synthesizing field and lab methods, the authors also discuss data interpretation, as well as important guiding questions and principles for students and researchers to consider as they plan research projects in primate ecology and conservation such as: how to choose a field site, acquire research permits, connect with local authorities, communities and researchers, and many other considerations. Although three chapters are dedicated to conservation methods, consideration of conservation status and threats to primate populations are considered throughout this volume where appropriate. This latest publication in the Techniques in Ecology and Conservation Series aims to provide a practical empirical reference text with an international scope, appropriate for graduate students, researchers, and conservation professionals across the globe.

Vegetation Description and Data Analysis: A Practical Approach, Second Edition is a fully revised and up-dated edition of this key text. The book takes account of recent advances in the field whilst retaining the original reader-friendly approach to the coverage of vegetation description and multivariate analysis in the context of vegetation data and plant ecology. Since the publication of the hugely popular first edition there have been significant developments in computer hardware and software, new key journals have been established in the field and scope and application of vegetation description and analysis has become a truly global field. This new edition includes full coverage of new developments and technologies. This contemporary and comprehensive edition of this well-known and respected textbook will prove invaluable to undergraduate and graduate students in biological sciences, environmental science, geography, botany, agriculture, forestry and biological conservation. Fully international approach Includes illustrative case studies throughout Now with new material on: the nature of plant communities; transitional areas between plant communities; induction and deduction of plant ecology; diversity indices and dominance diversity curves; multivariate analysis in ecology. Accessible, reader-friendly style Now with new and improved illustrations

Wetlands serve many important functions and provide numerous ecological services such as clean water, wildlife habitat, nutrient reduction, and flood control. Wetland science is a relatively young discipline but is a rapidly growing field due to an enhanced understanding of the importance of wetlands and the numerous laws and policies that have been developed to protect these areas. This growth is demonstrated by the creation and growth of the Society of Wetland Scientists which was formed in 1980 and now has a membership of 3,500 people. It is also illustrated by the existence of 2 journals (*Wetlands* and *Wetlands Ecology and Management*) devoted entirely to wetlands. To date there has been no practical, comprehensive techniques book centered on wetlands, and written for wetland researchers, students, and managers. This techniques book aims to fill that gap. It is designed to provide an overview of the various methods that have been used or developed by researchers and practitioners to study, monitor, manage, or create wetlands. Including many methods usually found only in the peer-reviewed or gray literature, this 3-volume set fills a major niche for all professionals dealing with wetlands.

Practical overview of river ecology looking at natural and cultural environment.

Written by world experts in astacology, this book covers a range of aspects of the biology and ecology of freshwater crayfish. With a strong focus on wild crayfish, the book studies the taxonomy and genetics of this interesting group of animals. Under examination also are crayfish growth and reproduction, with detailed illustrations; behavior and chemical ecology of crayfish; diseases of crayfish; holistic understanding of drivers for crayfish population success; and methods for the control of non-native crayfish.

Environmental impact assessment (EIA) is now firmly established as an important and often obligatory part of proposing or launching any development project. Delivering a successful EIA needs not only an understanding of the theory but also a detailed knowledge of the methods for carrying out the processes required. Peter Morris and Riki Therivel bring together the latest advice on best practice from experienced practitioners to ensure an EIA is carried out correctly. This new edition: • explains how an EIA works and how it should be carried out • demonstrates the relationship of the EIA to socio-economic, environmental and ecological systems • includes completely updated legislative and policy contexts • has added explanations of shared and integrative methods including a new chapter on EIA and sustainability. Invaluable to undergraduate and MSc students of EIA in planning, ecology, geography and environment courses, this third edition of *Methods of Environmental Impact Assessment* is also of great use to planners, EIA practitioners and professionals seeking to update their skills.

Indispensable guide to the technical and practical aspects of field and laboratory methods for studying wild primates.

Field Methods in Marine Science: From Measurements to Models is an authoritative guide of the methods most appropriate for field research within the marine sciences, from experimental design to data analysis. Written for upper-level undergraduate and graduate students as well as early-career researchers, this textbook also serves as an accessible introduction to the concepts and practice of modeling marine system dynamics. This textbook trains the next generation of field scientists to move beyond the classic methods of data collection and statistical analysis to contemporary methods of numerical modeling; to pursue the assimilation and synthesis of information, not the mere recording of data. Boxes and side bars highlight important questions, interesting facts, relevant examples, and research techniques that supplement the text. Students and researchers alike will find the thorough appendices useful as a way of expanding comprehension of fundamental concepts.

This book provides both the conceptual basis and technological tools that are necessary to identify and solve problems related to biodiversity governance. The authors discuss intriguing evolutionary questions, which involve the sometimes surprising adaptive capacity of certain organisms to dwell in altered and/or changing environments that apparently lost most of their structure and functionality. Space and time heterogeneities are considered in order to understand the patterns of distribution and abundance of species and the various processes that mold them. The book also discusses at which level—from genes to the landscape, including individuals, populations, communities, and ecosystems—men should intervene in nature in order to prevent the loss of biodiversity.

Seeks To Acquaint Bird Watchers, Nature Lovers And Students Both From A Zoology And Non-Zoology Background With Ecology, Conservation Issues, Bird Study Principles And Methods Of Observing And Recording. Has 8 Chapters, A Glossary And Appendices. A Number Of Colour Illustrations And Line Drawings.

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 book introduces experimental design and data analysis / interpretation as well as field monitoring skills for both plants and animals. Clearly structured throughout and written in a student-friendly manner,

the main emphasis of the book concentrates on the techniques required to design a field based ecological survey and shows how to execute an appropriate sampling regime. The book evaluates appropriate methods, including the problems associated with various techniques and their inherent flaws (e.g. low sample sizes, large amount of field or laboratory work, high cost etc). This provides a resource base outlining details from the planning stage, into the field, guiding through sampling and finally through organism identification in the laboratory and computer based data analysis and interpretation. The text is divided into six distinct chapters. The first chapter covers planning, including health and safety together with information on a variety of statistical techniques for examining and analysing data. Following a chapter dealing with site characterisation and general aspects of species identification, subsequent chapters describe the techniques used to survey and census particular groups of organisms. The final chapter covers interpreting and presenting data and writing up the research. The emphasis here is on appropriate wording of interpretation and structure and content of the report.

"Provides an in-depth review of current print and electronic tools for research in numerous disciplines of biology, including dictionaries and encyclopedias, method guides, handbooks, on-line directories, and periodicals. Directs readers to an associated Web page that maintains the URLs and annotations of all major Internet resources discussed in th

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.

Insects, when studied from the ecological perspective, provide a great opportunity for scientific studies emphasizing population theory. The simple fact of being successful organisms for their ability to colonize different habitats or even for their high reproductive potential, increases the interest of ecologists in conducting studies focused on population and community level. Mathematical models are powerful tools that can capture the essence of many biological systems and investigate ecological patterns associated to ecological stability dependent on endogenous and exogenous factors. This proposal comes from the idea of adding experiences of researchers interested in working at the interface between mathematical and computation theory and problems centered on entomology, showing how mathematical modelling can be an important tool for understanding population dynamics, behavior, pest management, spatial structure and conservation.

This practical handbook of reptile field ecology and conservation brings together a distinguished, international group of reptile researchers to provide a state-of-the-art review of the many new and exciting techniques used to study reptiles. The authors describe ecological sampling techniques and how they are implemented to monitor the conservation status and population trends of snakes, lizards, tuatara, turtles, and crocodylians throughout the world. Emphasis is placed on the extent of statistical inference and the biases associated with different techniques and analyses. The chapters focus on the application of field research and data analysis for achieving an understanding of reptile life history, population dynamics, movement patterns, thermal ecology, conservation status, and the relationship between reptiles and their environment. The book emphasises the need for thorough planning, and demonstrates how a multi-dimensional approach incorporates information related to morphology, genetics, molecular biology, epidemiology, statistical modelling, animal welfare, and biosecurity. Although accentuating field sampling, sections on experimental applications in laboratories and zoos, thermal ecology, genetics, landscape ecology, disease and biosecurity, and management options are included. Much of this information is scattered in the scientific literature or not readily available, and the intention is to provide an affordable, comprehensive synthesis for use by graduate students, researchers, and practising conservationists worldwide.

Forest conservation has become one of the most important environmental issues currently facing humanity, as a result of widespread deforestation and forest degradation. Pressures on remaining natural forests continue to intensify, leading to high rates of biodiversity loss. Understanding how human activities influence ecological processes within forests is essential for developing effective conservation action. This book describes research methods and techniques relevant to understanding forest ecology, with a particular focus on those that are relevant to practical conservation and sustainable forest management. This information is currently disparate and difficult to locate and, as with other books in this series, the intention is to provide a comprehensive synthesis for use by graduate students, researchers and practising conservationists. Methods are presented for assessing forest extent and condition, structure and composition, and forest dynamics at a variety of scales. Techniques for assessing genetic variation and reproductive ecology, and for evaluating the habitat value of forests are also described. Particular emphasis is given to state-of-the-art techniques such as remote sensing, GIS, computer modelling and molecular markers. However, traditional methods of forest mensuration and ecological survey are also presented. The methods and techniques described are generally applicable to all forest types, including both temperate and tropical forest ecosystems.

All the information researchers, students, and practitioners need to conducted innovative, state-of-the-art research on small mammals. Rodents and insectivores constitute the vast majority of mammals on our planet, yet we often overlook the importance of this group. As seed dispersers, prey species, and disease regulators, these animals are critical to the functioning of our ecological systems. While considerable material exists that describes these species, there has been no dedicated guide explaining how to effectively research them—until now. *Methods for Ecological Research on Terrestrial Small Mammals* is a one-stop resource compiling all the information readers need to conduct state-of-the-art research on small terrestrial mammals across the globe. The authors cover the full spectrum of issues, from capture, handling, identification, reproduction, demography, and taxonomy to behavior, diet, evolution, diseases, movements, morphometrics, and more. They also: • highlight the latest techniques while carefully explaining the tried-and-tested methods needed to conduct rigorous scientific inquiries; • provide step-by-step examples and case studies, demonstrating how the methods discussed can be used in actual research projects; • compare and contrast methodologies, analytical techniques, and software packages, helping researchers determine which pathways and tools will yield the best results for their studies. A comprehensive and invaluable resource, *Methods for Ecological Research on Terrestrial Small Mammals* is a must-have for any ecologist working on small mammals.

Dispersal of plants and animals is one of the most fascinating subjects in ecology. It has long been recognized as an important factor affecting ecosystem dynamics. Dispersal is apparently a phenomenon of biological origin; however, because of its complexity, it cannot be studied comprehensively by biological methods alone. Deeper insights into dispersal properties and implications require interdisciplinary approaches involving biologists, ecologists and mathematicians. The purpose of this book is to provide a forum for researches with different backgrounds and expertise and to ensure further advances in the study of dispersal and spatial ecology. This book is unique in its attempt to give an overview of dispersal studies across different spatial scales, such as the scale of individual movement, the population scale and the scale of communities and ecosystems. It is written by top-level experts in the field of dispersal modeling and covers a wide range of problems ranging from the identification of Levy walks in animal movement to the implications of dispersal on an evolutionary timescale.

This book, dedicated to Konjev Desender and Jean-Pierre Maelfait, is made up of a collection of 30 papers presented at the XIV European Carabidologists' Meeting in Westerbork, the Netherlands (September, 2009). Seventy-five specialists from 20 countries of Europe and Asia attended the meeting. Traditionally, the proceedings volumes of the European Carabidologists Meeting have become important milestones outlining the latest trends and achievements in carabidology. The aim of the organisers was to invite specialists from different countries and scientific schools to present both traditional and innovative approaches and methods in studying ground beetles. This volume includes a wide range of topics, from the description of new species, taxonomy, a summary of the activities of carabidologists during the last 40 years, biogeographical issues, methodology, behaviour, indicators, environmental issues and conservation. The book will be of use to carabidologists, specialists in traditional and molecular systematics, general and applied ecology, conservation biology, bioindication, urban ecology and biogeography.

Most projects in Landscape Ecology, at some point, define a species-habitat association. These models are inherently spatial, dealing with landscapes and their configurations. Whether coding behavioral rules for dispersal of simulated organisms through simulated landscapes, or designing the sampling extent of field surveys and experiments in real landscapes, landscape ecologists must make assumptions about how organisms experience and utilize the landscape. These convenient working postulates allow modelers to project the model in time and space, yet rarely are they explicitly considered. The early years of landscape ecology necessarily focused on the evolution of effective data sources, metrics, and statistical approaches that could truly capture the spatial and temporal patterns and processes of interest. Now that these tools are well established, we reflect on the ecological theories that underpin the assumptions commonly made during species distribution modeling and mapping. This is crucial for applying models to questions of global sustainability. Due to the inherent use of GIS for much of this kind of research, and as several authors' research involves the production of multicolored map figures, there would be an 8-page color insert. Additional color figures could be made available through a digital archive, or by cost contributions of the chapter authors. Where applicable, would be relevant chapters' GIS data and model code available through a digital archive. The practice of data and code sharing is becoming standard in GIS studies, is an inherent method of this book, and will serve to add additional research value to the book for both academic and practitioner audiences.

The fate of much of the world's terrestrial biodiversity depends upon our ability to improve the management of forest ecosystems that have already been substantially modified by humans. Monitoring is an essential ingredient in meeting this challenge, allowing us to measure the impact of different human activities on biodiversity and identify more responsible ways of managing the environment. Nevertheless many biodiversity monitoring programs are criticised as being little more than 'tick the box' compliance exercises that waste precious resources and erode the credibility of science in the eyes of decision makers and conservation investors. The purpose of this book is to examine the factors that make biodiversity monitoring programs fail or succeed. The first two sections lay out the context and importance of biodiversity monitoring, and shed light on some of the key challenges that have confounded many efforts to date. The third and main section presents an operational framework for developing monitoring programs that have the potential to make a meaningful contribution to forest management. Discussion covers the scoping, design and implementation stages of a forest biodiversity monitoring program, including defining the purpose, goals and objectives of monitoring, indicator selection, and the process of data collection, analysis and interpretation. Underpinning the book is the belief that biodiversity monitoring should be viewed not as a stand-alone exercise in surveillance but rather as an explicit mechanism for learning about how to improve opportunities for conservation. To be successful in this task, monitoring needs to be grounded in clear goals and objectives, effective in generating reliable assessments of changes in biodiversity and realistic in light of real-world financial, logistical and social constraints.

Ecology is in a challenging state as a scientific discipline. While some theoretical ecologists are attempting to build a definition of ecology from first principles, many others are questioning even the feasibility of a general and universal theory. At the same time, it is increasingly important that ecology is accurately and functionally defined for a generation of researchers tackling escalating environmental problems in the face of doubt and disagreement. The authors of Theory-Based Ecology have written a textbook that presents a robust, modern, and mathematically sound theory of ecology, maintaining a strong link between empirical data, models, and theory. It is firmly based in Darwinian thought, since it was Darwin who first revealed the ecological principles of the origin of species, and gave the evolution of diversity a process-based, mechanistic explanation. The authors base their synthetic theory of Darwinian ecology on seven key principles: exponential growth, growth regulation, inherited individual differences, finiteness and stochasticity, competitive exclusion, robust coexistence, and constraints and trade-offs. Within this solid conceptual framework, they integrate classic and actual empirical knowledge from ecology and evolutionary biology, clarifying methodological and mathematical detail in clear and helpful text boxes. A wealth of illustrated examples pertaining to different organisational levels (alleles, clones and species) helps to explain how the principles operate. This is an invaluable resource for graduate level students as well as professional researchers in the fields of ecology, genetics, evolutionary ecology, and mathematical biology.

A concise guide to the techniques for estimating population numbers in plants and animals.

Outlining the main methods and techniques available to ornithologists, this book brings together in one authoritative source contributions containing information on avian ecology and conservation.

This second edition provides authoritative guidance on research methodology for plant population ecology. Practical advice is provided to assist senior undergraduates and post-graduate students, and all researchers, design their own field and greenhouse experiments and establish a research programme in plant population ecology.

The Great Indian Desert is characterized by harsh climatic conditions and different habitats, from grassland to abandoned human habitations. This book examines the regional climate and microclimatic regime of this desert and its diverse faunal inhabitants.

Winner of the IENE Project Award 2016. This authoritative volume brings together some of the world's leading researchers, academics, practitioners and transportation agency personnel to present the current status of the ecological sustainability of the linear infrastructure – primarily road, rail and utility easements – that dissect and fragment landscapes globally. It outlines the potential impacts, demonstrates how this infrastructure is being improved, and how broad ecological principles are applied to mitigate the impact of road networks on wildlife. Research and monitoring is an important aspect of road ecology, encompassing all phases of a transportation project. This book covers research and monitoring to span the entire project continuum – starting with planning and design, through construction and into maintenance and management. It focuses on impacts and solutions for species groups and specific regions, with particular emphasis on the unique challenges facing Asia, South America and Africa. Other key features: Contributions from authors originating from over 25 countries, including from all continents Each chapter summarizes important lessons, and includes lists of further reading and thoroughly up to date references Highlights principles that address key points relevant to all phases in all road projects Explains best-practices based on a number of successful international

case studies Chapters are "stand-alone", but they also build upon and complement each other; extensive cross-referencing directs the reader to relevant material elsewhere in the book Handbook of Road Ecology offers a comprehensive summary of approximately 30 years of global efforts to quantify the impacts of roads and traffic and implement effective mitigation. As such, it is essential reading for those involved in the planning, design, assessment and construction of new roads; the management and maintenance of existing roads; and the modifying or retrofitting of existing roads and problem locations. This handbook is an accessible resource for both developed and developing countries, including government transportation agencies, Government environmental/conservation agencies, NGOs, and road funding and donor organisations. This is an updated version of the best selling first edition, Ecological Census Techniques, with updating, some new chapters and authors. Almost all ecological and conservation work involves carrying out a census or survey. This practically focussed book describes how to plan a census, the practical details and shows with worked examples how to analyse the results. The first three chapters describe planning, sampling and the basic theory necessary for carrying out a census. In the subsequent chapters international experts describe the appropriate methods for counting plants, insects, fish, amphibians, reptiles, mammals and birds. As many censuses also relate the results to environmental variability, there is a chapter explaining the main methods. Finally, there is a list of the most common mistakes encountered when carrying out a census.

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