Ecological Methodology Krebs

#Ecological Methodology #Krebs Ecology #Ecological Research Methods #Population Ecology Techniques #Environmental Data Analysis

Explore comprehensive ecological methodology principles and techniques as presented by Krebs, a foundational text for understanding robust approaches to studying populations, communities, and ecosystems. This essential resource offers invaluable insights for environmental scientists and researchers aiming for precise and reproducible ecological investigations across various habitats.

Ecological Methodology

This coherent text translates the methods of statisticians into "ecological English" so that students may readily apply these methods to the real world. Ecological Methodology, Second Edition provides a balance of material on animal and plant populations. It teaches students of ecology how to design the most efficient tests in order to obtain maximum precision with minimal work. The first part of the text focuses on biological and technical issues in statistical methodology. Students learn about advances that have been made in designing better sampling devices, along with the techniques and equipment used for sampling. The second part deals with creating solid statistical design, and presents all methods that are well-known to statisticians in a language and context that students will easily understand.

U.S. Department of Transportation Federal Motor Carrier Safety Administration Register

Filled with many examples of topic issues and current events, this book develops a basic understanding of how the natural world works and of how humans interact with the planet's natural ecosystems. It covers the history of ecology and describes the general approaches of the scientific method, then takes a look at basic principles of population dynamics and applies them to everyday practical problems.

The Ecological World View

This best-selling majors-level book, by Charles Krebs, approaches ecology as a series of problems, which are best understood by evaluating empirical evidence through data analysis and application of quantitative reasoning. No otherbook presents analytical, quantitative, and statistical ecological information in an equally accessible style for students. Reflecting the way ecologists actually practice, the new edition emphasizes the role of experiments in testing ecological ideas and discusses many contemporary and controversial problems related to distribution and abundance. Introduction to the Science of Ecology, Evolution and Ecology, Behavioral Ecology, Analyzing Geographic Distributions, Factors That Limit Distributions I: Biotic, Factors That Limit Distributions II: Abiotic, Distribution and Abundance, Population Parameters and Demographic Techniques, Population Growth, Species Inter-

actions I: Competition, Species Interactions II: Predation, Species Interactions III: Herbivory and Mutualism, Species Interactions IV: Disease and Parasitism, Regulation of Population Size, Applied Problems I: Harvesting Populations, Applied Problems II: Pest Control, Applied Problems III: Conservation Biology, Community Structure, Community Dynamics I: Biodiversity, Community Dynamics II: Predation and Competition, Community Dynamics III: Nonequilibrium Communities, Ecosystem Metabolism I: Primary Production, Ecosystem Metabolism II: Secondary Production, Ecosystem Metabolism III: Nutrient Cycles, Ecosystem Dynamics under Changing Climates, Ecosystem Health: Human Impacts. Intended for those interested in learning the basics of ecology

Ecology

Filled with many examples of topic issues and current events, this book develops a basic understanding of how the natural world works and of how humans interact with the planet's natural ecosystems. It covers the history of ecology and describes the general approaches of the scientific method, then takes a look at basic principles of population dynamics and applies them to everyday practical problems.

Ecology

This best-selling majors ecology book continues to present ecology as a series of problems for readers to critically analyze. No other text presents analytical, quantitative, and statistical ecological information in an equally accessible style. Reflecting the way ecologists actually practice, the book emphasizes the role of experiments in testing ecological ideas and discusses many contemporary and controversial problems related to distribution and abundance. Throughout the book, Krebs thoroughly explains the application of mathematical concepts in ecology while reinforcing these concepts with research references, examples, and interesting end-of-chapter review questions. Thoroughly updated with new examples and references, the book now features a new full-color design and is accompanied by an art CD-ROM for instructors. The field package also includes The Ecology Action Guide, a guide that encourages readers to be environmentally responsible citizens, and a subscription to The Ecology Place (www.ecologyplace.com), a web site and CD-ROM that enables users to become virtual field ecologists by performing experiments such as estimating the number of mice on an imaginary island or restoring prairie land in Iowa. For college instructors and students.

The Ecological World View

Now in its fourth edition, this text continues to present ecology as a series of problems for students to analyze critically. The author emphasizes the role of experiments in testing ecological ideas, discusses many contemporary, controversial problems, and explains all mathematical concepts of ecology and reinforces concepts with research references and chapter-ending review questions. This edition has been updated and reviewed by experts in the field to feature coverage of the emerging areas of behavioural and physiolgical ecology and a more in-depth discussion of population genetics, mutualism and succession. It also includes a new two-colour format, four-colour insert, and new features to aid learning.

Ecology

Community ecology has undergone a transformation in recent years, from a discipline largely focused on processes occurring within a local area to a discipline encompassing a much richer domain of study, including the linkages between communities separated in space (metacommunity dynamics), niche and neutral theory, the interplay between ecology and evolution (eco-evolutionary dynamics), and the influence of historical and regional processes in shaping patterns of biodiversity. To fully understand these new developments, however, students continue to need a strong foundation in the study of species interactions and how these interactions are assembled into food webs and other ecological networks. This new edition fulfils the book's original aims, both as a much-needed up-to-date and accessible introduction to modern community ecology, and in identifying the important questions that are yet to be answered. This research-driven textbook introduces state-of-the-art community ecology to a new generation of students, adopting reasoned and balanced perspectives on as-yet-unresolved issues. Community Ecology is suitable for advanced undergraduates, graduate students, and researchers seeking a broad, up-to-date coverage of ecological concepts at the community level.

Ecology

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.

Ecology

4th edition of this classic Ecology text Computational methods have largely been replaced by descriptions of the available software Includes procedure information for R software and other freely available software systems Now includes web references for equipment, software and detailed methodologies

FORTRAN Programs for Ecological Methodology

This book brings together a set of approaches to the study of individual-species ecology based on the analysis of spatial variations of abundance. Distribution ecology assumes that ecological phenomena can be understood when analyzing the extrinsic (environmental) or intrinsic (physiological constraints, population mechanisms) that correlate with this spatial variation. Ecological processes depend on geographical scales, so their analysis requires following environmental heterogeneity. At small scales, the effects of biotic factors of ecosystems are strong, while at large scales, abiotic factors such as climate, govern ecological functioning. Responses of organisms also depend on scales: at small scales, adaptations dominate, i.e. the ability of organisms to respond adaptively using habitat decision rules that maximize their fitness; at large scales, limiting traits dominate, i.e., tolerance ranges to environmental conditions.

Community Ecology

The present biodiversity crisis is rife with opportunities to make important conservation decisions; however, the misuse or misapplication of the methods and techniques of animal ecology can have serious consequences for the survival of species. Still, there have been relatively few critical reviews of methodology in the field. This book provides an analysis of some of the most frequently used research techniques in animal ecology, identifying their limitations and misuses, as well as possible solutions to avoid such pitfalls. In the process, contributors to this volume present new perspectives on the collection, analysis, and interpretation of data. Research Techniques in Animal Ecology is an overarching account of central theoretical and methodological controversies in the field, rather than a handbook on the minutiae of techniques. The editors have forged comprehensive presentations of key topics in animal ecology, such as territory and home range estimates, habitation evaluation, population viability analysis, GIS mapping, and measuring the dynamics of societies. Striking a careful balance, each chapter begins by assessing the shortcomings and misapplications of the techniques in question, followed by a thorough review of the current literature, and concluding with possible solutions and suggested guidelines for more robust investigations.

Ecological Census Techniques

This accessible and timely book provides a comprehensive overviewof how to measure biodiversity. The book highlights newdevelopments, including innovative approaches to measuringtaxonomic distinctness and estimating species richness, andevaluates these alongside traditional methods such as speciesabundance distributions, and diversity and evenness statistics. Helps the reader quantify and interpret patterns of ecologicaldiversity, focusing on the measurement and estimation of speciesrichness and abundance. Explores the concept of ecological diversity, bringing newperspectives to a field beset by contradictory views andadvice. Discussion spans issues such as the meaning of community in thecontext of ecological diversity, scales of diversity anddistribution of diversity among taxa Highlights advances in measurement paying particular attentionto new techniques such as species richness estimation, applicationof measures of diversity to conservation and environmentalmanagement and addressing sampling issues Includes worked examples of key methods in helping people tounderstand the techniques and use available computer packages moreeffectively

Ecological Methods

Global temperatures and seawater levels rise; the world’s smallest porpoise species looms at the edge of extinction; and a tiny emerald beetle from Japan flourishes in North America—but why does it matter? Who cares? With this concise, accessible, and up-to-date book, Charles J. Krebs answers critics and enlightens students and environmental advocates alike, revealing not why phenomena like these deserve our attention, but why they demand it. Highlighting key principles in ecology—from species extinction to the sun’s role in powering ecosystems—each chapter introduces a general question, illustrates that question with real-world examples, and links it to pressing ecological issues in which humans play a central role, such as the spread of invasive species, climate change, overfishing, and biodiversity conservation. While other introductions to ecology are rooted in complex theory, math, or practice and relegate discussions of human environmental impacts and their societal implications to sidebars and appendices, Why Ecology Matters interweaves these important discussions throughout. It is a book rooted in our contemporary world, delving into ecological issues that are perennial, timeless, but could not be more timely.

Distribution Ecology

There are few books available that provide a good introduction tothe methods and techniques for ecological research. This book willbe invaluable to lecturers teaching field courses and studentsundertaking project work in ecology. Each chapter will focus on an ecological technique. It will havean introductory section that describes the ecological principlesand theory. This will then be followed by example applications.These will focus on three most common habitats where teachers takestudents for fieldwork; the seashore, ponds and lakes, fields andwoodland. Gives specific worked examples from the main ecosystems usedfor undergraduate study - seashore, lakes/ponds, field andwoodland. Only introductory text specifically focused on fieldtechniques. Great 'how-to' guide that will show student exactly how tocarry out each method. Only text to emphasise the principles behind the techniques -taking a methods based approach rather than a taxonomic approach(eg chapters split into population measures, biodiversity measures,species richness measures rather than methods for invertebrates,methods for mammals, methods for birds etc). Greater emphasis on the equipment involved - how to make it,where to buy it. Good references to further reading and advancedtechniques.

Research Techniques in Animal Ecology

Ecology Is A Fascinating Subject. This Is A Book To Introduce You To It And The Problems Ecologists Try To Analyze. Above All It Is An Attempt To Present The Subject In A Direct, Simple Form Without Including The Detail That Is Necessary In A More Conventional Textbook And Without Burdening The Subject With Abstruse Definitions Or Voluminous Statistics. So Do Not View This Book As A Text But As Supplemental Reading Designed For An Introductory Biology Course Or For A First Course In Ecology.

Tree Diversity Analysis

By joining phylogenetics and evolutionary ecology, this book explores the patterns of parasite diversity while revealing diversification processes.

Measuring Biological Diversity

This is a comprehensive textbook for A-level students and first-year undergraduates taking courses in biology, geography and Earth sciences.

Why Ecology Matters

The first detailed collation of the evolution, ecology and conservation of some of South America's least-known, and most endangered, primates.

Practical Methods in Ecology

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.

The Message of Ecology

This technical reference applies to monitoring situations involving a single plant species, such as an indicator species, key species, or weed. It was originally developed for monitoring special status plants, which have some recognized status at the Federal, State, or agency level because of their rarity or vulnerability. Most examples and discussions in this technical reference focus on these special status species, but the methods described are also applicable to any single-species monitoring and even some community monitoring situations.We thus hope wildlife biologists, range conservationists, botanists, and ecologists will all find this technical reference helpful.

Parasite Diversity and Diversification

The monitoring of benthic diatoms, macrophytes, macroinvertebrates and fish will be the backbone of future water management in Europe. This book describes and compares the relevant methodologies and tools, based on a large data set covering rivers in most parts of Europe. The 36 articles presented will provide scientists and water managers with a unique insight into background and application of state-of-the-art monitoring tools and techniques.

Ecology

What is ecology?; Introduction to the science of ecology; The problem of distribution: populations; Methods for analyzing distributions; Factors limiting distributions: dispersal; Factors limiting distributions: behavior, interrelations with other organisms, temperature, moisture, other physical and chemical; The problem of abundance: populations; Population parameters; Demographic techniques; Population growth; Species interactions: competition, predation, herbivory; Natural regulation of population size; Some examples of population studies; Some examples of population studies; Applied problems: 1. the optimum-yield problem, 2. biological control; Distribution and abundance at the community level; Community parameters; The nature of the community; Community structure; Community change; Species diversity; Community organization; Community metabolism: 1. primary production, 2. secundary production; Nutrient cycles.

Evolutionary Biology and Conservation of Titis, Sakis and Uacaris

Ecology is an historical science in which theories can be as difficult to test as they are to devise. This volume, intended for ecologists and evolutionary biologists, reviews ecological theories, and how they are generated, evaluated, and categorized. Synthesizing a vast and sometimes labyrinthine literature, this book is a useful entry into the scientific philosophy of ecology and natural history. The need for integration of the contributions to theory made by different disciplines is a central theme of this book. The authors demonstrate that only through such integration will advances in ecological theory be possible. Ecologists, evolutionary biologists, and other serious students of natural history will want this book.

Practical Field Ecology

Evolutionary Behavioral Ecology presents a comprehensive treatment of theevolutionary and ecological processes shaping behavior across a wide array of organisms and a diverse set of behaviors and is suitable as a graduate-level text and as a sourcebook for professional scientists.

Measuring and Monitoring Plant Populations

This open access book identifies and discusses biodiversity’s contribution to physical, mental and spiritual health and wellbeing. Furthermore, the book identifies the implications of this relationship

for nature conservation, public health, landscape architecture and urban planning – and considers the opportunities of nature-based solutions for climate change adaptation. This transdisciplinary book will attract a wide audience interested in biodiversity, ecology, resource management, public health, psychology, urban planning, and landscape architecture. The emphasis is on multiple human health benefits from biodiversity - in particular with respect to the increasing challenge of climate change. This makes the book unique to other books that focus either on biodiversity and physical health or natural environments and mental wellbeing. The book is written as a definitive ‘go-to’ book for those who are new to the field of biodiversity and health.

The Ecological Status of European Rivers: Evaluation and Intercalibration of Assessment Methods

Worldwide, Population Ecology is the leading textbook on this titled subject. Written primarily for students, it describes the present state of population ecology in terms that can be readily understood by undergraduates with little or no background in the subject. Carefully chosen experimental examples illustrate each topic, and studies of plants and animals are combined to show how fundamental principles can be derived that apply to both species. Use of complex mathematics ia avoided throughout the book, and what math is necessary is dealt with by examination of real experimental data rather than dull theory. The latest edition of this leading textbook. Adopted as an Open University set text.

Ecology

A new book in the acclaimed Nutrition Society Textbook Series, Nutrition Research Methodologies addresses the rapidly advancing field of nutrition research. It covers the diverse methodologies required for robust nutritional research to ensure thorough understanding of key concepts, both for students at undergraduate and postgraduate levels and for scientists working in nutrition research. Combining theory with practical application, Nutrition Research Methodologies addresses both traditional research methods and new technologies, and focuses on a range of complex topics, including energy compensation, nutrient-gene interactions and metabolic adaptation. It also considers statistical issues as well as application of data to policy development. Provides the reader with the required scientific basics of nutrition research in the context of a systems and health approach Written specifically to meet the needs of individuals involved in nutrition research Combines the viewpoints of world-leading nutrition experts from academia and research with practical applications Accompanied by a companion website with a range of self-assessment material (www.wiley.com/go/lovegrove/nutritionresearch)

Ecological Understanding

The boreal forest is one of the world's great ecosystems, stretching across North America and Eurasia in an unbroken band and containing about 25% of the world's closed canopy forests. The Kluane Boreal Forest Ecosystem Project was a 10-year study by nine of Canada's leading ecologists to unravel the impact of the snowshoe hare cycle on the plants and the other vertebrate species in the boreal forest. In much of the boreal forest, the snowshoe hare acts as a keystone herbivore, fluctuating in 9-10 year cycles, and dragging along secondary cycles in predators such as lynx and great-horned owls. By manipulating the ecosystem on a large scale from the bottom via fertilizer additions and from the top by predator exclosures, they have traced the plant-herbivore relationships and the predator-prey relationships in this ecosystem to try to answer the question of what drives small mammal population cycles. This study is unique in being large scale and experimental on a relatively simple ecosystem, with the overall goal of defining what determines community structure in the boreal forest. Ecosystem Dynamics of the Boreal Forest: The Kluane Project summarizes these findings, weaving new discoveries of the role of herbivores-turned-predators, compensatory plant growth, and predators-eating-predators with an ecological story rich in details and clear in its findings of a community where predation plays a key role in determining the fate of individuals and populations. The study of the Kluane boreal forest raises key questions about the scale of conservation required for boreal forest communities and the many mammals and birds that live there.

Evolutionary Behavioral Ecology

This annotated bibliography documents literature addressing the design and implementation of vegetation monitoring. It provides resources managers, ecologists, and scientists access to the great volume of literature addressing many aspects of vegetation monitoring: planning and objective setting, choosing vegetation attributes to measure, sampling design, sampling methods, statistical and graphical analysis, and communication of results. Over half of the 1400 references have been annotated.

Keywords pertaining to the type of monitoring or method are included with each bibliographic entry. Keyword index.

Biodiversity and Health in the Face of Climate Change

Race and Sport in Canada: Intersecting Inequalities is the first anthology to explore intersections of race with the constructions of gender, sexuality, class, and ability within the context of Canadian sport settings. Written by a collection of emerging and established scholars, this book is broadly organized around three interrelated areas: historical approaches to the study of race and sport in Canada; Canadian immigration and the study of race and sport; and the study of race and sport beyond Canada's borders. Within these themes, a variety of relevant topics are discussed, including black football players in twentieth-century Canada, the structural barriers to sports participation faced by immigrants arriving to Atlantic Canada, and NCAA scholarships and Canadian athletes. Race and Sport in Canada will be of interest to the general reader as well as to instructors and students in the fields of sport studies, sociology, critical race studies, cultural studies, and education.

Population Ecology

The availability or lack of nutrients shapes ecosystems in fundamental ways. From forest productivity to soil fertility, from the diversity of animals to the composition of microbial communities, nutrient cycling and limitation are the basic mechanisms underlying ecosystem ecology. In this book, Peter Vitousek builds on over twenty years of research in Hawai'i to evaluate the controls and consequences of variation in nutrient availability and limitation. Integrating research from geochemistry, pedology, atmospheric chemistry, ecophysiology, and ecology, Vitousek addresses fundamental questions: How do the cycles of different elements interact? How do biological processes operating in minutes or hours interact with geochemical processes operating over millions of years? How does biological diversity interact with nutrient cycling and limitation in ecosystems? The Hawaiian Islands provide the author with an excellent model system for answering these questions as he integrates across levels of biological organization. He evaluates the connections between plant nutrient use efficiency, nutrient cycling and limitation within ecosystems, and nutrient input-output budgets of ecosystems. This book makes use of the Hawaiian ecosystems to explore the mechanisms that shape productivity and diversity in ecosystems throughout the world. It will be essential reading for all ecologists and environmental scientists.

Nutrition Research Methodologies

Although diversity is one of the central themes of ecology there is considerable disagreement ab out how it should be measured. I first encountered this problem 10 ycars ago whcn I started my research career and spent a long time pouring ovcr the literature in order to find the most useful techniques. The intervening decade has seen a further increasc in the number ofpapers devoted to the topic of ecological diversity but has led to no consensus on how it should be measured. My aim in writing this book is therefore to provide a practical guide to ecological diversity and its measurement. In a quantitative subject such as the measurement of diversity it is inevitable that some mathematics are involved, but at all times these are kept as simple as possible, and the emphasis is constantly on ecological reality and practical application. I hope that others ente ring thc fascinating ficld of ecological diversity will find it hclpful. This book grew out of my work in The School of Biological and Environmental Studies at the New University ofUlster, Coleraine, Northern Ircland. I am indebted to all the ecologists there for pro vi ding a stimulating atmosphere. Foremost among these were Amyan Macfadyen and Palmer Newbould. A number of the figures and tables in the book are based on data collected in Northern Irish woodlands.

Ecosystem Dynamics of the Boreal Forest

Large Carnivores and the Conservation of Biodiversity brings together more than thirty leading scientists and conservation practitioners to consider a key question in environmental conservation: Is the conservation of large carnivores in ecosystems that evolved with their presence equivalent to the conservation of biological diversity within those systems? Building their discussions from empirical, long-term data sets, contributors including James A. Estes, David S. Maehr, Tim McClanahan, Andrès J. Novaro, John Terborgh, and Rosie Woodroffe explore a variety of issues surrounding the link between predation and biodiversity: What is the evidence for or against the link? Is it stronger in marine systems? What are the implications for conservation strategies? Large Carnivores and the Conservation of

Biodiversity is the first detailed, broad-scale examination of the empirical evidence regarding the role of large carnivores in biodiversity conservation in both marine and terrestrial ecosystems. It contributes to a much more precise and global understanding of when, where, and whether protecting and restoring top predators will directly contribute to the conservation of biodiversity. Everyone concerned with ecology, biodiversity, or large carnivores will find this volume a unique and thought-provoking analysis and synthesis.

Vegetation Monitoring

How did rodent outbreaks in Germany help to end World War I? What caused the destructive outbreak of rodents in Oregon and California in the late 1950s, the large population outbreak of lemmings in Scandinavia in 2010, and the great abundance of field mice in Scotland in the spring of 2011? Population fluctuations, or outbreaks, of rodents constitute one of the classic problems of animal ecology, and in Population Fluctuations in Rodents, Charles J. Krebs sifts through the last eighty years of research to draw out exactly what we know about rodent outbreaks and what should be the agenda for future research. Krebs has synthesized the research in this area, focusing mainly on the voles and lemmings of the Northern Hemisphere—his primary area of expertise—but also referring to the literature on rats and mice. He covers the patterns of changes in reproduction and mortality and the mechanisms that cause these changes—including predation, disease, food shortage, and social behavior—and discusses how landscapes can affect population changes, methodically presenting the hypotheses related to each topic before determining whether or not the data supports them. He ends on an expansive note, by turning his gaze outward and discussing how the research on rodent populations can apply to other terrestrial mammals. Geared toward advanced undergraduate students, graduate students, and practicing ecologists interested in rodent population studies, this book will also appeal to researchers seeking to manage rodent populations and to understand outbreaks in both natural and urban settings—or, conversely, to protect endangered species.

Race and Sport in Canada

Ecology; the Experimental Analysis of Distribution and Abundance