Photo Identification Capture Mark Recapture Techniques For

This comprehensive book, rich with applications, offers a quantitative framework for the analysis of the various capture-recapture models for open animal populations, while also addressing associated computational methods. The state of our wildlife populations provides a litmus test for the state of our environment, especially in light of global warming and the increasing pollution of our land, seas, and air. In addition to monitoring our food resources such as fisheries, we need to protect endangered species from the effects of human activities (e.g. rhinos, whales, or encroachments on the habitat of orangutans). Pests must be be controlled, whether insects or viruses, and we need to cope with growing feral populations such as opossums, rabbits, and pigs. Accordingly, we need to obtain information about a given population’s dynamics, concerning e.g. mortality, birth, growth, breeding, sex, and migration, and determine whether the respective population is increasing , static, or declining. There are many methods for obtaining population information, but the most useful (and most work-intensive) is generically known as “capture-recapture,” where we mark or tag a representative sample of individuals from the population and follow that sample over time using recaptures, resightings, or dead recoveries. Marks can be natural, such as stripes, fin profiles, and even DNA; or artificial, such as spots on insects. Attached tags can, for example, be simple bands or streamers, or more sophisticated variants such as radio and sonic transmitters. To estimate population parameters, sophisticated and complex mathematical models have been devised on the basis of recapture information and computer packages. This book addresses the analysis of such models. It is primarily intended for ecologists and wildlife managers who wish to apply the methods to the types of problems discussed above, though it will also benefit researchers and graduate students in ecology. Familiarity with basic statistical concepts is essential.

Describes the latest methodologies used to study the ecology of amphibians throughout the world. Each of the 27 chapters explains a research approach or technique, with emphasis on careful planning and the potential biases of techniques. Statistical modelling, landscape ecology, and disease are covered for the first time in a techniques handbook.

An important first step in studying the demography of wild animals is to identify the animals uniquely through applying markings, such as rings, tags, and bands. Once the animals are encountered again, researchers can study different forms of capture-recapture data to estimate features, such as the mortality and size of the populations. Capture-rec

"A must read for anyone interested in the ecology of whales, this timely and creative volume is sure to stimulate new research for years to come."—Annalisa Berta, San Diego State University

Dugongs and manatees, the only fully aquatic herbivorous mammals, live in the coastal waters, rivers and lakes of more than 80 subtropical and tropical countries. Symbols of fierce conservation battles, sirenian populations are threatened by multiple global problems. Providing comparative information on all four surviving species, this book synthesises the ecological and related knowledge pertinent to understanding the biology and conservation of the sirenia. It presents detailed scientific summaries, covering sirenian feeding biology; reproduction and population dynamics; behavioural ecology; habitat requirements and threats to their continued existence. Outlining the current conservation status of the sirenian taxa, this unique study will equip researchers and professionals with the scientific knowledge required to develop proactive, precautionary and achievable strategies to conserve dugongs and manatees. Supplementary material is available online at: www.cambridge.org/9780521888288.

This thorough revision of the classic Encyclopedia of Marine Mammals brings this authoritative book right up-to-date. Articles describe every species in detail, based on the very latest

taxonomy, and a host of biological, ecological and sociological aspects relating to marine mammals. The latest information on the biology, ecology, anatomy, behavior and interactions with man is provided by a cast of expert authors – all presented in such detail and clarity to support both marine mammal specialists and the serious naturalist. Fully referenced throughout and with a fresh selection of the best color photographs available, the long-awaited second edition remains at the forefront as the go-to reference on marine mammals. More than 20% NEW MATERIAL includes articles on Climate Change, Pacific White-sided Dolphins, Sociobiology, Habitat Use, Feeding Morphology and more Over 260 articles on the individual species with topics ranging from anatomy and behavior, to conservation, exploitation and the impact of global climate change on marine mammals New color illustrations show every species and document topical articles FROM THE FIRST EDITION “This book is so good...a bargain, full of riches...packed with fascinating up to date information. I recommend it unreservedly it to individuals, students, and researchers, as well as libraries." --Richard M. Laws, MARINE MAMMALS SCIENCE "...establishes a solid and satisfying foundation for current study and future exploration" --Ronald J. Shusterman, SCIENCE

"Bay, sound and estuary (BSE) populations of bottlenose dolphins are common along the U.S. Atlantic and Gulf of Mexico coasts. NOAA Fisheries currently identifies 9 BSE stocks in the Atlantic and 32 in the northern Gulf of Mexico. Accurate abundance estimates for these stocks are an essential component of MMPA-mandated stock assessment, yet only three of these BSE stocks have up-to-date abundance estimates. Abundance estimates based on data more than 8 years old are not considered valid for management (i.e., to estimate PBR) under the MMPA and those more than 5 years old drop a stock assessment from adequate to inadequate under the NOAA Fisheries Stock Assessment Improvement Plan. For most stocks in U.S. waters, aerial and/or large vessel line-transect surveys provide the platforms for abundance estimation. Linetransect 'distance' analysis methods from vessels and planes are relatively well understood and these methods are more or less standardized. While line-transect surveys using small boats may be appropriate for some estuarine systems, such surveys are not suitable when working inside estuarine waters with complex topography and turbid waters. As a result, alternative methodologies have been utilized, most centered around the use of photo-identification (photo-ID) capture-mark-recapture (CMR) techniques"--Introduction.

This book gathers the most recent research findings on ecology and conservation of marine vertebrates in Latin America, making use of high technological methods to show readers the diversity of the marine research that has been conducted in these countries over the last decades. The book brings authors from more than 23 institutions of 7 different countries developing the most diverse research aiming at ocean conservation through the ecology of different vertebrate animals, such as whales, dolphins, manatees, turtles, seabirds and fish. This book deals with technological advances and innovation in the ecology and conservation of marine vertebrates in Latin America. This eclectic collection is broad in scope but provides detailed summaries of new methods that are deployed in the study of marine environmental conservation. Key issues revolve around the development and application of educational methodologies in the field of marine vertebrate research, which provide a rational basis for better management of marine environments using modern techniques associated with GIS, satellite tracking, aerial systems, bioacoustics, biogeochemistry, genetics, underwater videography, species photoidentification, molecular biology, trophic ecological methods, ethological methods, and behavioural ecology, among others. Discussion and elucidation of these kinds of techniques are aimed at university-level students and post-graduate researchers. The scope of this volume includes whales, sharks, rays, dolphins, tropical fishes, turtles, manatees as well as aspects of Latin American marine ecosystem conservation. Researchers in this biogeographic region, as well as others involved with marine vertebrate research, will find this work essential reading.

Interest in marine mammals has increased dramatically in the last few decades, as evidenced by the number of books, scientific papers, and conferences devoted to these animals. Nowadays, a conference on marine mammals can attract between one and two thousand scientists from around the world. This upsurge of interest has resulted in a body of knowledge which, in many cases, has identified major conservation problems facing particular species. At the same time, this knowledge and the associated activities of environmental organisations have served to introduce marine mammals to a receptive public, to the extent that they are now perceived by many as the living icons of biodiversity conservation. Much of the impetus for the current interest in marine mammal conservation comes from "Save the Whale" campaigns started in the 1960s by environmental groups around the world, in response to declining whale populations after over-exploitation by humans. This public pressure led to an international moratorium on whaling recommended in 1972 by the United Nations Conference on the Human Environment in Stockholm, Sweden, and eventually adopted by the International Whaling Commission ten years later. This moratorium largely holds sway to this day, and further protective measures have included the delimitation of extensive areas of the Indian Ocean (1979) and Southern Ocean (1994) as whale sanctuaries.

The charismatic mammals that live in the ocean are a constant source of interest, both for scientists and our society at large. Their biology, behavior, and conservation are of utmost importance, as a vast number of species are currently threatened. Intended for the upper-level undergraduate or graduate student within biology, marine biology, or conservation/environmental science, An Introduction to Marine Mammal Biology and Conservation provides a broad introduction to marine mammal biology using cutting edge information and student-friendly learning tools. The text begins with chapters on the evolution and classification of marine mammals and their general biology. It moves on to discuss the behavior and ecology of different groups of marine mammals, such as polar bears, otters, and cetaceans. Part 3 dives into many different conservation issues facing marine mammals, as well as discussions on how they can be addressed. Closing chapters provide information on how scientists study marine mammals, how society can enjoy observing the animals while making sure they are preserved, and a word to students looking to pursue a career with marine mammals.

Issues in Global Environment—Biology and Geoscience: 2013 Edition is a ScholarlyEditions™ book that delivers timely, authoritative, and comprehensive information about Wildlife Research. The editors have built Issues in Global Environment—Biology and Geoscience: 2013 Edition on the vast information databases of ScholarlyNews.™ You can expect the information about Wildlife Research in this book to be deeper than what you can access anywhere else, as well as consistently reliable, authoritative, informed, and relevant. The content of Issues in Global Environment—Biology and Geoscience: 2013 Edition has been produced by the world's leading scientists, engineers, analysts, research institutions, and companies. All of the content is from peer-reviewed sources, and all of it is written, assembled, and edited by the editors at ScholarlyEditions™ and available exclusively from us. You now have a source you can cite with authority, confidence, and credibility. More information is available at http://www.ScholarlyEditions.com/.

Twenty years in the making by a distinguished dolphin expert and his associates, The Hawaiian Spinner Dolphin is the first comprehensive scientific natural history of a dolphin species ever written. From their research camp at Kealakeakua Bay in Hawaii, these scientists followed a population of wild spinner dolphins by radiotracking their movements and, with the use of a windowed underwater vessel, observing the details of their underwater social life. The authors begin with a description of the spinner dolphin species, its morphology and systematics, and then examine the ocean environment, the organization of dolphin populations, and the way this school-based society of mammals uses shorelines for rest and

instruction of the young. The dolphins' reproductive cycle, their vision, vocalization, hearing, breathing, and feeding, and the integration of the school are carefully analyzed. The authors conclude with a comprehensive evolutionary analysis of this marine cultural system, with its behavioral flexibility and high levels of cooperation. This absorbing book is the richest source available of new scientific insights about the lives of wild dophins and how their societies evolved at sea.

Occupancy Estimation and Modeling: Inferring Patterns and Dynamics of Species Occurrence, Second Edition, provides a synthesis of model-based approaches for analyzing presence-absence data, allowing for imperfect detection. Beginning from the relatively simple case of estimating the proportion of area or sampling units occupied at the time of surveying, the authors describe a wide variety of extensions that have been developed since the early 2000s. This provides an improved insight about species and community ecology, including, detection heterogeneity; correlated detections; spatial autocorrelation; multiple states or classes of occupancy; changes in occupancy over time; species co-occurrence; community-level modeling, and more. Occupancy Estimation and Modeling: Inferring Patterns and Dynamics of Species Occurrence, Second Edition has been greatly expanded and detail is provided regarding the estimation methods and examples of their application are given. Important study design recommendations are also covered to give a well rounded view of modeling. Provides authoritative insights into the latest in occupancy modeling Examines the latest methods in analyzing detection/no detection data surveys Addresses critical issues of imperfect detectability and its effects on species occurrence estimation Discusses important study design considerations such as defining sample units, sample size determination and optimal effort allocation

This volume comprises the proceedings of a symposium on marine mammal survey assessment methods, which took place in Seattle, Washington, USA.

Camera trapping is a powerful and now widely used tool in scientific research on wildlife ecology and management. It provides a unique opportunity for collecting knowledge, investigating the presence of animals, or recording and studying behaviour. Its visual nature makes it easy to successfully convey findings to a wide audience. This book provides a much-needed guide to the sound use of camera trapping for the most common ecological applications to wildlife research. Each phase involved in the use of camera trapping is covered: - Selecting the right camera type - Set-up and field deployment of your camera trap - Defining the sampling design: presence/absence, species inventory, abundance; occupancy at species level; capture-mark-recapture for density estimation; behavioural studies; community-level analysis - Data storage, management and analysis for your research topic, with illustrative examples for using R and Excel - Using camera trapping for monitoring, conservation and public engagement. Each chapter in this edited volume is essential reading for students, scientists, ecologists, educators and professionals involved in wildlife research or management.

The status of many carnivore populations is of growing concern to scientists and conservationists, making the need for data pertaining to carnivore distribution, abundance, and habitat use ever more pressing. Recent developments in “noninvasive” research techniques—those that minimize disturbance to the animal being studied—have resulted in a greatly expanded toolbox for the wildlife

practitioner. Presented in a straightforward and readable style, Noninvasive Survey Methods for Carnivores is a comprehensive guide for wildlife researchers who seek to conduct carnivore surveys using the most up-to-date scientific approaches. Twenty-five experts from throughout North America discuss strategies for implementing surveys across a broad range of habitats, providing input on survey design, sample collection, DNA and endocrine analyses, and data analysis. Photographs from the field, line drawings, and detailed case studies further illustrate on-the-ground application of the survey methods discussed. Coupled with cutting-edge laboratory and statistical techniques, which are also described in the book, noninvasive survey methods are effi cient and effective tools for sampling carnivore populations. Noninvasive Survey Methods for Carnivores allows practitioners to carefully evaluate a diversity of detection methods and to develop protocols specific to their survey objectives, study area, and species of interest. It is an essential resource for anyone interested in the study of carnivores, from scientists engaged in primary research to agencies or organizations requiring carnivore detection data to develop management or conservation plans.

Analysis and Management of Animal Populations deals with the processes involved in making informed decisions about the management of animal populations. It covers the modeling of population responses to management actions, the estimation of quantities needed in the modeling effort, and the application of these estimates and models to the development of sound management decisions. The book synthesizes and integrates in a single volume the methods associated with these themes, as they apply to ecological assessment and conservation of animal populations. Integrates population modeling, parameter estimation and decision-theoretic approaches to management in a single, cohesive framework Provides authoritative, state-of-the-art descriptions of quantitative approaches to modeling, estimation and decision-making Emphasizes the role of mathematical modeling in the conduct of science and management Utilizes a unifying biological context, consistent mathematical notation, and numerous biological examples

Using Science to Improve the BLM Wild Horse and Burro Program: A Way Forward reviews the science that underpins the Bureau of Land Management's oversight of free-ranging horses and burros on federal public lands in the western United States, concluding that constructive changes could be implemented. The Wild Horse and Burro Program has not used scientifically rigorous methods to estimate the population sizes of horses and burros, to model the effects of management actions on the animals, or to assess the availability and use of forage on rangelands. Evidence suggests that horse populations are growing by 15 to 20 percent each year, a level that is unsustainable for maintaining healthy horse populations as well as healthy ecosystems. Promising fertility-control methods are available to help limit this population growth, however. In addition, science-based methods exist for improving population estimates, predicting the

effects of management practices in order to maintain genetically diverse, healthy populations, and estimating the productivity of rangelands. Greater transparency in how science-based methods are used to inform management decisions may help increase public confidence in the Wild Horse and Burro Program.

Sea Turtle Research and Conservation: Lessons From Working in the Field is a comprehensive reference of experiences with sea turtle species from global experts. This book looks at the human side of protecting and studying these unique animals around the world, as well as the challenges involved, such as cultural differences and conducting research in remote locations. Led by a renowned expert in sea turtle conservation, this book addresses the largest issues the sea turtle species are facing currently. Nearly all species of sea turtles are endangered due to illegal hunting, getting caught in fishing gear, climate change, and more. Chapters in this book range from the use of cutting-edge technology to learn more about this elusive reptile, to working with communities with long histories of sea turtle trade and consumption. It provides readers with firsthand accounts of sea turtle conservation efforts from conservationists based around the world and offers important suggestions and solutions for ensuring the future of these sea turtle species. Sea Turtle Research and Conservation: Lessons From Working in the Field is a valuable resource for field biologists, marine conservationists, and policymakers, especially those connected with marine conservations, wildlife protection, and sustainable development Offers examples of groundbreaking technology to conduct noninvasive sea turtle research Written by global experts working in the field to study and protect sea turtle species Includes human-to-human case studies and advice for collaborating with cultures and communities to save these endangered animals

This volume outlines the major findings from the Norwegian research programme on whales and seals in Norwegian waters. A wide range of topics are covered, including physiological aspects, social organization, population dynamics, stock assessment and management. The book will be of great value to scientists and managers, as well as to members of the general public interested in environmental issues.

This book includes invited contributions presenting the latest research on the oceanography and environment of the Red Sea. In addition to covering topics relevant to research in the region and providing insights into marine science for non-experts, it is also of interest to those involved in the management of coastal zones and encourages further research on the Red Sea

Studying the population parameters of marine mammals requires that individuals be identified both spatially and temporally. Traditionally, to identify individuals in the field, animals have been captured and physically marked with a unique feature, allowing the individual to be identified in the future. This method known as Capture-Mark-Recapture (CMR) has been widely utilized to analyze marine mammal populations. While quite effective, traditional CMR is invasive and poses potential risk for both animals and researches. More recently, with advanced technology and camera equipment a far less

invasive and more cost effective method of Photo-identification based Mark Recapture has been developed (PMR). To assess the efficacy of computer aided matching software and the applicability of such software for future pinniped studies, a photographic based mark recapture study was conducted across the 2011-2014 harbor seal seasons using both manual and computer aided methods to determine if the Long Island, NY population display site fidelity, in that they return to the same haul-out location over multiple seasons. Additionally, manual and computer methods were compared for accuracy and their potential use in future pinniped studies.

This book constitutes the refereed proceedings of the 5th Mexican Conference on Pattern Recognition, MCPR 2013, held in Huatulco, Mexico, in June 2013. The 36 revised full papers and two keynotes presented were carefully reviewed and selected from 81 submissions and are organized in topical sections on computer vision; image processing; pattern recognition and artificial intelligence; neural networks; document processing.

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 crocodilians 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.

Inspired by the International White Shark Symposium in 2010, Global Perspectives on the Biology and Life History of the White Shark incorporates the most important contemporary research findings into a single peer-reviewed book. This beautifully illustrated reference represents a historic change in the context of White Shark (Carcharodon carcharias) research. Once considered one of the most poorly understood and difficult sharks to study, this timely book recognizes a new sophisticated focus on the White Shark, raising its status from obscurity to enlightenment. The Global Perspectives on the Biology and Life History of the White Shark celebrates the White Shark as the most studied shark in the sea. Within the chapters one can find new insights into a vast range of topics, such as behavior, physiology, migration patterns, habitat preferences, daily activity patterns, molecular genetics, reproductive biology and new research methods. The book also delves into population monitoring and policy options for managers and researchers.

Radio Tracking and Animal Populations is a succinct synthesis of emerging technologies and their applications to the empirical and theoretical problems of population assessment. The book is divided into sections designed to encompass the various aspects of animal ecology that may be evaluated using radiotelemetry technology - experimental design, equipment and technology, animal movement, resource selection, and demographics. Wildlife biologists at the leading edge of new developments in the technology and its application have joined forces.

Remote photography and infrared sensors are widely used in the sampling of wildlife populations worldwide, especially for cryptic or elusive species. Guiding the practitioner through the entire process of using camera traps, this book is the first to compile state-of-the-art sampling techniques for the purpose of conducting high-quality science or effective management. Chapters on the evaluation of equipment, field sampling designs, and data analysis methods provide a coherent framework for making inferences about the abundance, species richness, and occupancy of sampled animals. The volume introduces new models that will revolutionize use of camera data to estimate population density, such as the newly developed spatial capture–recapture models. It also includes richly detailed case studies of camera trap work on some of the world's most charismatic, elusive, and endangered wildlife species. Indispensible to wildlife conservationists, ecologists, biologists, and conservation agencies around the world, the text provides a thorough review of the subject as well as a forecast for the use of remote photography in natural resource conservation over the next few decades.

Children's Pool Beach in La Jolla, CA is a Pacific harbor seal (Phoca vitulina richardsi) rookery at the center of a large legal controversy. Due to the heated contention surrounding this rookery, very few scientific studies have been done on the population of harbor seals that use this haul-out site. Maximum daily haul-out counts rarely exceed 200, and management decisions have been framed around the assumption of a largely resident population of no more than approximately 250 seals. In this study I used photo-identification and mark-recapture methods to estimate the total population of Pacific harbor seals that used Children's Pool Beach as a haul-out site during January - October 2008. I photographed the ventral surfaces of adult harbor seals at Children's Pool Beach, and then entered each good to high quality photograph into an interactive computer-assisted photograph-matching system for individual identification. Each individual identification was confirmed by both a trained volunteer and myself, resulting in a 4% visual matching error rate. After analysis concluded, 480 unique adult harbor seals were individually identified after applying the 4% visual matching error rate. Abundance estimation was calculated using the Chapman-Petersen capture-recapture model. My calculations yielded a population estimate of 596 individuals during January - October 2008, which is two to three times larger than previously believed. These findings suggest a population that is at least partially open with considerable coastal movement, suggesting that Children's Pool Beach is potentially part of a regional network of interconnected haul-out site.

AAP Prose Award Finalist 2018/19 Key features: Covers all aspects of marine mammal veterinary practice Written by internationally acknowledged experts Adds new chapters on Ophthalmology, Dentistry, Ethics, Oil Spill Response, Health Assessments, Whale Entanglement Response, Dive Response, and Biotoxins Richly illustrated in color throughout the new edition including updated

anatomical drawings and extensive photographs of ocular lesions Provides guidance to websites that regularly present updated information and images pertinent to current marine mammal medicine such as imaging and stranding network contacts Discusses ethics and animal welfare For three decades, this book has been acknowledged as the most respected scientific reference specifically devoted to marine mammal medicine and health. Written by approximately 100 contributors who are recognized globally as leaders in their respective fields, the CRC Handbook of Marine Mammal Medicine, Third Edition continues to serve as the essential guide for all practitioners involved with marine mammals including veterinarians, technicians, biological researchers, students, managers, keepers, curators, and trainers. The 45 chapters provide essential information for the practitioner on pathology, infectious diseases, medical treatment, anesthesia, surgery, husbandry, health assessment, species-specific medicine, medically pertinent anatomy and physiology, and global health concerns such as strandings, oil spills, and entanglements of marine mammals. The book guides the reader through the veterinary care of cetaceans, pinnipeds, manatees, sea otters, and polar bears. In addition to summaries of current knowledge, chapters provide information on those digital resources and websites which present the latest information as it emerges in the field. The CRC Handbook of Marine Mammal Medicine, Third Edition gives a call to action for scientists to experiment with new endeavors to engage and inspire current and future generations to care for marine mammals and the marine environment, and work together to find solutions. As the most trusted reference for marine mammal conservation medicine and for marine mammal medical facilities around the world, this book needs to be in your library.

"This report contains information regarding studies conducted on beluga whales, gray whales, humpback whales, and harbor seals."--P. i

Any aspect of image and video computing computer vision, image processing, visualisation and computer graphics

Every day, biologists in parkas, raincoats, and rubber boots go into the field to capture and mark a variety of animal species. Back in the office, statisticians create analytical models for the field biologists' data. But many times, representatives of the two professions do not fully understand one another's roles. This book bridges this gap by helping biologists understand state-of-the-art statistical methods for analyzing capture-recapture data. In so doing, statisticians will also become more familiar with the design of field studies and with the real-life issues facing biologists. Reliable outcomes of capture-recapture studies are vital to answering key ecological questions. Is the population increasing or decreasing? Do more or fewer animals have a particular characteristic? In answering these questions, biologists cannot hope to capture and mark entire populations. And frequently, the populations change unpredictably during a study. Thus, increasingly sophisticated models have been employed to convert data into answers to ecological questions. This book, by experts in capture-

recapture analysis, introduces the most up-to-date methods for data analysis while explaining the theory behind those methods. Thorough, concise, and portable, it will be immensely useful to biologists, biometricians, and statisticians, students in both fields, and anyone else engaged in the capture-recapture process.

Spatial Capture-Recapture provides a comprehensive how-to manual with detailed examples of spatial capture-recapture models based on current technology and knowledge. Spatial Capture-Recapture provides you with an extensive step-by-step analysis of many data sets using different software implementations. The authors' approach is practical – it embraces Bayesian and classical inference strategies to give the reader different options to get the job done. In addition, Spatial Capture-Recapture provides data sets, sample code and computing scripts in an R package. Comprehensive reference on revolutionary new methods in ecology makes this the first and only book on the topic Every methodological element has a detailed worked example with a code template, allowing you to learn by example Includes an R package that contains all computer code and data sets on companion website

Much of our knowledge about marine mammals is derived from a long-term and dedicated research effort that is evolving rapidly due to the introduction and invention of new methods.This book reflects the inventiveness of marine researchers as they try to find ways around the problems presented to them by these unusual and challenging animals.