



# Sensory Systems of Aquatic Mammals

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# Sensory Systems Of Aquatic Mammals

**Michael A. Castellini, Jo-Ann Mellish**



## **Sensory Systems Of Aquatic Mammals:**

*Marine Mammal Sensory Systems* Ronald A. Kastelein, Alexander Ya. Supin, Jeanette A. Thomas, 2012-12-06 This book is a collection of original research papers given at a symposium entitled Sensory Systems and Behavior of Aquatic Mammals hosted by the USSR Academy of Sciences The meeting was held in Moscow from 16 to 25 October 1991 and involved nearly 100 scientists from around the world The major headings of the book correspond to the session topics at the symposium This meeting was not the first dedicated to problems of sensory systems in aquatic mammals Experts in this field met several times previously to discuss important problems of sensory functions in echolocating animals symposia on biosonar systems were held in Frascati Italy in 1966 then in Jersey France in 1978 and in Helsingor Denmark in 1986 Papers presented at these meetings were published in books that advanced significantly the understanding of sensory systems Busnel and Fish 1980 Nachtigall and Moore 1988 Initially echolocating bats were the main subjects of consideration However studies on echolocating aquatic mammals whales and dolphins increased from one meeting to the next Indeed aquatic mammals are of exceptional interest for studying the adaptation of sensory functions for echolocation in specific aquatic environments As a natural consequence of these developments the 1989 symposium in Rome was devoted specifically to the sensory systems of cetaceans Thomas and Kastelein 1990 This symposium was held within the Fifth International Theriological Congress and was attended by many scientists

**The Sensory Physiology of Aquatic Mammals** Alexander Ya. Supin, Vladimir V. Popov, Alla M. Mass, 2012-12-06 This book is actually a product of efforts of many people not only of the authors Wide investigations of marine mammals began in Russia that time in the former Soviet Union in the 1960s when a few teams of enthusiasts founded in captivity experimental stations intended for keeping dolphins and seals and for performing experimental studies of these fascinating animals It was a time when attention of many people throughout the world was attracted to dolphins and other marine mammals due to appearance of oceanariums and dolphinariums which demonstrated unique capabilities of these animals So scientists in many countries concentrated on studies of them There was much to learn about the morphology physiology and psychology of marine mammals and investigators spending their time and efforts on studies in this field were rewarded by a number of surprising findings The authors of this book represent one of such research teams focused on the neuro and sensory physiology of marine mammals A few decades of studies naturally resulted in the idea to summarize in a book both the results of these studies and a large body of data in adjacent fields Our goal was to synthesize the many research findings and the present knowledge on sensory capabilities and mechanisms of sensory systems of aquatic mammals We realize however that the appearance of this book was made possible due to the help and assistance of many colleagues

**Biodiversity of Sensory Systems in Aquatic Vertebrates** Wayne Iwan Lee Davies, Shaun Collin, 2020-08-27

**Sensory Systems of Aquatic Mammals** Ronald A. Kastelein, Jeanette A. Thomas, Paul E. Nachtigall, 1995

*Marine Mammals* Annalisa Berta, James L. Sumich, Kit M. Kovacs, 2005-12-14 Berta and Sumich have

succeeded yet again in creating superior marine reading This book is a succinct yet comprehensive text devoted to the systematics evolution morphology ecology physiology and behavior of marine mammals The first edition considered the leading text in the field is required reading for all marine biologists concerned with marine mammals Revisions include updates of citations expansion of nearly every chapter and full color photographs This title continues the tradition by fully expanding and updating nearly all chapters Comprehensive up to date coverage of the biology of all marine mammals Provides a phylogenetic framework that integrates phylogeny with behavior and ecology Features chapter summaries further readings an appendix glossary and an extensive bibliography Exciting new color photographs and additional distribution maps

Physiology of Marine Mammals Michael Castellini,Jo-Ann Mellish,2023-07-05 Suppose you were designing a marine mammal What would they need to live in the ocean How would you keep them warm What design features would allow them to dive for very long periods to extreme depths Do they need water to drink How would they minimize the cost of swimming and how would they find their prey in the deep and dark These questions and more are examined in detail throughout Marine Mammal Physiology which explores how marine mammals live in the sea from a physiological point of view This undergraduate textbook considers the essential aspects of what makes a marine mammal different from terrestrial mammals beyond just their environment It focuses on the physiological and biochemical traits that have allowed this group of mammals to effectively exploit the marine environment that is so hostile to humans The content of this book is organised around common student questions taking the undergraduate s point of view as the starting point Each chapter provides a set of PowerPoint slides for instructors to use in teaching and students to use as study guides New Study Questions and Critical Thinking Points conclude each chapter which are each motivated by a Driving Question such as How do mammals stay warm in a cold ocean or How do mammals survive the crushing pressures of the deep sea Full colour images and comprehensive accessible content make this the definitive textbook for marine mammal physiology

Biology of Marine Mammals John E. Reynolds,2013-08-06 Taking an integrated approach to the biology of marine carnivores cetaceans and sirenians twenty two prominent researchers compare marine mammals with one another and with terrestrial mammals providing a framework for fundamental biological and ecological concepts They describe functional morphology sensory systems energetics reproduction communication and cognition behavior distribution population biology and feeding ecology They also detail the physiological adaptations for such activities and processes as diving thermo regulation osmoregulation and orientation that enable marine mammals to exploit their aquatic environment

**Flow Sensing in Air and Water** Horst Bleckmann,Joachim Mogdans,Sheryl L. Coombs,2014-01-22 In this book leading scientists in the fields of sensory biology neuroscience physics and engineering explore the basic operational principles and behavioral uses of flow sensing in animals and how they might be applied to engineering applications such as autonomous control of underwater or aerial vehicles Although humans possess no flow sensing abilities countless aquatic e g fish cephalopods and seals terrestrial e g crickets and spiders and aerial e g

bats animals have flow sensing abilities that underlie remarkable behavioral feats These include the ability to follow silent hydrodynamic trails long after the trailblazer has left the scene to form hydrodynamic images of their environment in total darkness and to swim or fly efficiently and effortlessly in the face of destabilizing currents and winds      **Marine Mammals**

Randall W. Davis, 2019-11-14 This comprehensive book provides new insights into the morphological metabolic thermoregulatory locomotory diving sensory feeding and sleep adaptations of Cetacea whales and dolphins Pinnipedia seals sea lions and walrus Sirenia manatees and dugongs and sea otters for an aquatic life Each chapter reviews the discoveries from previous studies and integrates recent research using new techniques and technology Readers will gain an understanding of the remarkable adaptations that enable marine mammals to spend all or most of their lives at sea often while hunting prey at depth      **Radioactive Isotopes in Clinical Medicine and Research Xxiii** Helmar Bergmann, Horst Köhn, Helmut Sinzinger,      **Marine Mammals and Noise** W. John Richardson, Charles R. Greene Jr., Charles I. Malme, Denis H. Thomson, 2013-10-22 Many marine mammals communicate by emitting sounds that pass through water Such sounds can be received across great distances and can influence the behavior of these undersea creatures In the past few decades the oceans have become increasingly noisy as underwater sounds from propellers sonars and other human activities make it difficult for marine mammals to communicate This book discusses among many other topics just how well marine mammals hear how noisy the oceans have become and what effects these new sounds have on marine mammals The baseline of ambient noise the sounds produced by machines and mammals the sensitivity of marine mammal hearing and the reactions of marine mammals are also examined An essential addition to any marine biologist's library Marine Mammals and Noise will be especially appealing to marine mammalogists researchers policy makers and regulators and marine biologists and oceanographers using sound in their research      Sensory Biology of Aquatic Animals Jelle 1987, Richard R. Fay, William N. Tavolga, 2012-12-06 This volume constitutes a series of invited chapters based on presentations given at an International Conference on the Sensory Biology of Aquatic Animals held June 24-28 1985 at the Mote Marine Laboratory in Sarasota Florida The immediate purpose of the conference was to spark an exchange of ideas concepts and techniques among investigators concerned with the different sensory modalities employed by a wide variety of animal species in extracting information from the aquatic environment By necessity most investigators of sensory biology are specialists in one sensory system different stimulus modalities require different methods of stimulus control and generally different animal models Yet it is clear that all sensory systems have principles in common such as stimulus filtering by peripheral structures tuning of receptor cells signal to noise ratios adaption and disadaptation and effective dynamic range Other features such as hormonal and efferent neural control circadian reorganization and receptor recycling are known in some and not in other senses The conference afforded an increased awareness of new discoveries in other sensory systems that has effectively inspired a fresh look by the various participants at their own area of specialization to see whether or not similar principles apply This

inspiration was found not only in theoretical issues but equally in techniques and methods of approach The myopy of sensory specialization was broken in one unexpected way by showing limitations of individual sense organs and their integration within each organism For instance studying vision one generally chooses a visual animal as a model

**Glacier Bay National Park (N.P.) and Preserve, Vessel Quotas and Operating Requirements**, 2003 **Marine Mammals** Peter G.H. Evans, Juan Antonio Raga, 2012-12-06 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

Ocean Noise and Marine Mammals National Research Council, Division on Earth and Life Studies, Ocean Studies Board, Committee on Potential Impacts of Ambient Noise in the Ocean on Marine Mammals, 2003-06-22 For the 119 species of marine mammals as well as for some other aquatic animals sound is the primary means of learning about the environment and of communicating navigating and foraging The possibility that human generated noise could harm marine mammals or significantly interfere with their normal activities is an issue of increasing concern Noise and its potential impacts have been regulated since the passage of the Marine Mammal Protection Act of 1972 Public awareness of the issue escalated in 1990s when researchers began using high intensity sound to measure ocean climate changes More recently the stranding of beaked whales in proximity to Navy sonar use has again put the issue in the spotlight Ocean Noise and Marine Mammals reviews sources of noise in the ocean environment what is known of the responses of marine mammals to acoustic disturbance and what models exist for describing ocean noise and marine mammal responses Recommendations are made for future data gathering efforts studies of marine mammal behavior and physiology and modeling efforts necessary to determine what the long and short term impacts of ocean noise on marine mammals

**Principles of Marine Bioacoustics** Whitlow W. L. Au, Mardi C. Hastings, 2009-07-30 Humans have always been fascinated by marine life from extremely small diatoms to the largest mammal that inhabits our planet the blue whale However studying marine life in the ocean is an extremely difficult

proportion because an ocean environment is not only vast but also opaque to most instruments and can be a hostile environment in which to perform experiments and research. The use of acoustics is one way to effectively study animal life in the ocean. Acoustic energy propagates in water more efficiently than almost any form of energy and can be utilized by animals for a variety of purposes and also by scientists interested in studying their behavior and natural history. However, underwater acoustics have traditionally been in the domain of physicists, engineers, and mathematicians. Studying the natural history of animals is in the domain of biologists and physiologists. Understanding behavior of animals has traditionally involved psychologists and zoologists. In short, marine bioacoustics is and will continue to be a diverse discipline involving investigators from a variety of backgrounds with very different knowledge and skill sets. The inherent interdisciplinary nature of marine bioacoustics presents a large challenge in writing a single text that would be meaningful to various investigators and students interested in this field. Yet we have embarked on this challenge to produce a volume that would be helpful to not only beginning investigators but to seasoned researchers.

Marine Mammals: Fisheries, Tourism and Management Issues Nicholas Gales, Mark Hindell, Roger Kirkwood, 2003-10-22. *Marine Mammals: Fisheries, Tourism and Management Issues* brings together contributions from 68 leading scientists from 12 countries to provide a comprehensive up-to-date review on the way we manage our interactions with whales, dolphins, seals, and dugongs. The book examines how we have fared conserving the world's marine mammal populations with a focus on the key issues of fisheries and tourism. From a unique southern hemisphere perspective, the authors consider how science informs the culling debate, how wild fisheries and aquaculture interact with marine mammal populations, and how we might manage the effects of whale, dolphin, and seal watching industries. The authors also address other issues such as the way in which ethics, genetics, acoustics, ecosystem models, and pollution influence the management and conservation of marine mammals. *Marine Mammals* is an invaluable and accessible resource for all those involved with marine mammals, including scientists, managers, policy makers, industry representatives, and students. Winner of a 2004 Whitley Award.

*The Senses: A Comprehensive Reference*, 2020-09-30. *The Senses: A Comprehensive Reference*, Second Edition, Seven Volume Set is a comprehensive reference work covering the range of topics that constitute current knowledge of the neural mechanisms underlying the different senses. This important work provides the most up-to-date, cutting-edge comprehensive reference, combining volumes on all major sensory modalities in one set. Offering 264 chapters from a distinguished team of international experts, *The Senses* lays out current knowledge on the anatomy, physiology, and molecular biology of sensory organs in a collection of comprehensive chapters spanning 4 volumes. Topics covered include the perception, psychophysics, and higher-order processing of sensory information, as well as disorders and new diagnostic and treatment methods. Written for a wide audience, this reference work provides students, scholars, medical doctors, as well as anyone interested in neuroscience, a comprehensive overview of the knowledge accumulated on the function of sense organs, sensory systems, and how the brain processes sensory input. As with the first

edition contributions from leading scholars from around the world will ensure The Senses offers a truly international portrait of sensory physiology The set is the definitive reference on sensory neuroscience and provides the ultimate entry point into the review and original literature in Sensory Neuroscience enabling students and scientists to delve into the subject and deepen their knowledge All inclusive coverage of topics updated edition offers readers the only current reference available covering neurobiology physiology anatomy and molecular biology of sense organs and the processing of sensory information in the brain Authoritative content world leading contributors provide readers with a reputable dynamic and authoritative account of the topics under discussion Comprehensive style content in depth complex coverage of topics offers students at upper undergraduate level and above full insight into topics under discussion Marine Mammal Physiology Michael A. Castellini, Jo-Ann Mellish, 2015-11-18 Suppose you were designing a marine mammal What would you need to think about to allow it to live in the ocean How would you keep it warm What would you design to allow it to dive for very long periods to extreme depths Where would it find water to drink How would you minimize the cost of swimming and how would it find its prey in the deep an **Sensory Evolution on the Threshold** J. G. M. Thewissen, Sirpa Nummela, 2008-02-04 Ranging from crocodiles and penguins to seals and whales this synthesis explores the function and evolution of sensory systems in animals whose ancestors lived on land It explores the dramatic transformation of smell taste sight hearing and balance that occurred as lineages of reptiles birds and mammals returned to aquatic environments



Uncover the mysteries within is enigmatic creation, Embark on a Mystery with **Sensory Systems Of Aquatic Mammals** . This downloadable ebook, shrouded in suspense, is available in a PDF format ( \*). Dive into a world of uncertainty and anticipation. Download now to unravel the secrets hidden within the pages.

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