Animal Communication and Noise
Henrik Brumm
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The book, *Animal Communication and Noise*, which is edited by Henrik Brumm, is a great resource for advanced undergraduates, graduate students and professionals who have an interest in how animals solve the issue of communicating in noisy environments. It is a handy reference for those interested in how animals deal with the natural world and the noise in which they have evolved, as well as how they attempt to compensate for a world of increasing noise pollution.

The book begins with a short review of signal detection theory and presents the premise for the evolution of communication as it relates to both the animal producing the signal, the intended receiver and the potential for errors in communication between the two. This is followed by a number of chapters on the most apparent condition of the communication-in-noise problem, that of acoustical communication. Examples of challenges faced by the signal producer and the receiver, as well as solutions to those challenges, are provided for insects, fish, anurans, birds and marine mammals. The Lombard effect, frequency shifting, temporal variation in calling and comodulation masking release are but a few of the topics discussed in various animal-specific contexts which is useful for understanding how these generalized phenomena vary in use by the niche that each animal exploits. Not to be overlooked, the book also contains several chapters addressing communication in noise from a perspective of visual, electrical and chemical communication.

The book concludes with a chapter on the issue of anthropogenic sound and conservation. The chapter rightly opens discussion of the issue from the different perspectives of conservation and anthropogenic noise in the terrestrial and marine environments. The marine environment has received more attention than terrestrial environments in this regard which might seem surprising given the relative ease with which habitat perturbation can be seen in terrestrial habitats. Yet, sound travels much more effectively underwater than in air and some marine organisms may have acoustic active spaces that range in excess of tens of kilometers, well beyond the air-borne acoustic range of terrestrial mammals. Couple this with some of the dramatic stranding events involving charismatic whales exposed to high-powered sonar systems and it is easy to understand how public opinion has more aggressively pushed noise the conservation effort in the oceans. The chapter discusses the various approaches to trying to determine how anthropogenic sound impacts animals including a discussion of several specific models currently employed. The difficulties of relating acoustic disturbances to predicting biological impacts to individuals and populations are presented and subsequently linked to mitigation and management practices. The inherent difficulty of mitigation and management, in light of little supporting scientific information, is an important topic of study for any scientist interested in the noise pollution issue.

This book is an excellent resource for individuals interested in the emerging issue of the impact of anthropogenic sound on animals, those interested in how animals have evolved to mitigate noise interference in communication and comparative biologists and bioacousticians interested in evolutionary solutions to noise across taxa. The book has a place on my bookshelf right next to *Marine Mammals and Noise* and complements it well with the updates it contains on the ocean noise issue.

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