

Animals in a noisy world

Almo Farina

Acoustic noise is a diffused phenomenon in nature, hampered by the recent increase of human intrusion into many ecosystems. Noise can be defined as sound characterized by poor information (high level of vibrational disorder) that masks other sounds and that affects, in such a way, the active space used by terrestrial and aquatic animals for acoustic communication. From a human perspective, noise is defined as an unwanted/unpleasant sound and considered a type of environmental pollution.

Noise sources may be generated by natural (geophonies: e.g. wind, heavy rain; biophonies: e.g. animal choruses) or man-made processes (technophonies: e.g. combustion engines, gear friction). In this latter case, transportation facilities and industries are the major sources of acoustic intrusion that represents, especially in urban areas, the second major source of social concern after poor air quality. The exposition of people to long periods of noise has been proved responsible for varying levels of annoyance and other negative effects (e.g. in communication, recreation, concentration and sleeping activities).

Acoustic noise impacts important functions in animals such as habitat selection, pair formation, resource tracking and prey-predator mechanisms, and according to a differentiated species-specific tolerance, it results in an important factor responsible for significant changes in community composition. To reduce such negative effects, adaptive mechanisms such as the increase of the amplitude of acoustic signals (Lombard effect) or the shift of the signal frequency have been observed in many acoustic animals.

If noise represents an important environmental cause of degradation and source of stress for several organisms, especially in rural and urban (metropolitan) areas, underwater noise in the marine system is one of the major environmental threats because it is not only confined to developed coasts but is largely diffused in oceans along trading routes. In addition, underwater noise, due to the major speed of the acoustic waves in liquids, has large influences in several marine systems, affecting mammals and pelagic fishes as well as posing true challenges in environmental mitigation, remediation and ecosystem conservation. In addition, oil spill and other seismic geological prospections, when carried out in remote territories and in oceans, are further important sources of noise affecting animal populations, producing changes in their behavior and consequences in the trophic webs.

In this paper, the ecological consequences of the acoustic noise are discussed in light of the recent theoretical principles and methodologies of ecoustics and soundscape ecology, with the goal of proposing guidelines to approaching this issue in practice and to contributing to the solution of the problems created by acoustic pollution – both in human populated areas and in remote and fragile areas.