The need for a code of practice for mosquito management in European wetlands

Bringing together multidisciplinary expertise, Martinou et al. build a framework that aims to balance the priorities of wetland conservation and mosquito control.

Wetlands provide essential resources to human societies, and the associated biodiversity associated with wetlands has an estimated value ranging from US $44,597- ($)195,478 per hectare per year. Governments around the world have enacted legislation, policies and regulations including the Clean Water Act (United States) and the Water Act (Australia) to protect wetlands from a variety of human activities. In Europe, many wetlands and species are now protected through the Natura 2000 network, which includes about 18 % of the EU's land area and almost 9.5% of its marine territory.

Major threats to wetlands and their surroundings include urbanisation, agricultural intensification, invasive alien species and climate change. People do not generally perceive wetlands as desirable habitats and consequently there can be a tendency for neglect and misuse, including disposal of rubbish and waste materials.

An example of wetlands wildlife: black-winged stilt in the Akrotiri salt marshes, Cyprus. Video: Mr Varnavas Michael (Akrotiri Environmental Education Centre)

Mosquitoes, an integral part of the wetland biodiversity, further exacerbate the negative perceptions about wetlands. People are often unaware of the role of mosquitoes as prey for a number of aquatic species and as pollinators. Mosquito presence and abundance are often ignored when decisions are made regarding wetland conservation or management. This can be particularly problematic as it can create conflict between biodiversity conservation and public health, leading to ill-informed decision-making and subsequent actions. For cases where there is an interest for development around wetlands in particular, mosquito nuisance or mosquito-borne diseases are either not considered, or are seen as a problem that one can deal with at a later stage. This can create pressure for public health agencies to deploy chemical treatments e.g. pyrethroids in urban sites adjacent to wetlands, despite the fact that such products are only recommended by the World Health Organisation in the case of mosquito-borne disease.

Recognising the potential conflicts between wetland conservation and mosquito control, we brought together experts from many countries to collaboratively develop a code of practice for mosquito management in wetlands. So-called integrated vector management is critical. It is essential to consider a variety of different strategies, multidisciplinary expertise and considerable resources in terms of personnel, funding and equipment.

Managing mosquitoes while protecting wetland habitats requires collaboration among many diverse stakeholders, including local residents. Working across borders and sharing experiences with specialists in mosquito management and wetland managers is essential for tackling the problem of mosquitoes efficiently, sustainably and environmentally. Understanding the needs of people while increasing awareness, through effective education and communication strategies, is important to ensure everyone has a shared understanding of what actions are realistic and achievable. People need to understand there are many different scenarios relating to the threat to them from mosquitoes. In some cases

mosquitoes are no more than a minor nuisance and in others they may cause disease. The appropriate action will be context dependent.

Read the full, open access Practitioner's Perspective, A call to arms: Setting the framework for a code of practice for mosquito management in European wetlands, in *Journal of Applied Ecology.*

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