

From monitoring to conservation: linking acoustic biodiversity data with soundscape data

Jacobs, ER; Nielsen, MLK; Griffiths, ET; Debusschere, E; Hartmann, D; Thomas, L; Tyack, P; and
Tougaard, J

Ellen Jacobs

elja@ecos.au.dk

Aarhus University, Denmark

In compliance with the Marine Strategy Framework Directive, EU countries are required to monitor and report on 11 descriptors and assess the degree to which Good Environmental Status (GES) has been achieved. Monitoring for descriptor 11 is primarily about quantifying a physical pressure factor (underwater sound) but ultimately about mapping and quantifying impact on marine organisms. Organisms are themselves monitored for descriptor 1 (biodiversity), which in turn requires close coordination of monitoring and assessment of the two descriptors. Large amounts of broadband passive acoustic monitoring (PAM) data are collected and analyzed specifically for descriptor 11, then typically discarded or stored indefinitely, effectively rendering data "single use." However, broadband acoustic recordings taken over long periods in consistent locations can, if analyzed using automated species detectors, create a singularly valuable dataset of animal detections in an area over time, directly applicable to descriptor 1. With the introduction of automated species detectors into the workflow of large-scale noise monitoring projects and storage of such detections in a centralized database, soniferous species could be monitored in an efficient and cost-effective manner. Large-scale PAM data allows for remote observation of species on biologically relevant scales, supporting analysis of spatiotemporal patterns of abundance, movement patterns over entire habitats, and changes in acoustic behavior linked to environmental drivers. As part of the EU Horizon project, Digital Twin Ocean, we present a use case for previously collected PAM data from diverse contributors. We use existing architecture of the European Tracking Network to create a large-scale database of harbor porpoise detection data, starting with pure detection data from C & F-PODs and expanding later to store full-spectrum acoustic data, such as that collected through descriptor 11 monitoring. Through collaboration between VLIZ and AU, the initial dataset focuses on the North Sea with plans to expand across European waters. This aggregation of standardized, quality-assured data allows us to model harbor porpoise (*Phocoena phocoena*) distribution, movement and behavior. This spatial information is itself valuable for descriptor 1 monitoring, but also available for overlaying with soundscape data from descriptor 11 to conduct assessment of GES according to recommendations from the European Commission.