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MozamSeq: Developing capacity for eDNA-based monitoring of coastal biodiversity and ecosystem health in Mozambique

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Abstract

Monitoring marine biodiversity is labour-intensive and expensive, requiring the use of many different survey methods to obtain data on different taxonomic groups. Despite significant survey effort, data remain patchy and incomplete, which hampers effective conservation of both species and ecosystems. Environmental DNA (eDNA) can capture the genetic footprint of an entire ecosystem from a water sample, using a simple filtration kit that can be used by non-specialists, such as engineers, citizen scientists, local communities and even school children.

In this project, we investigated the potential of eDNA data for helping local communities to better understand the distribution of fish species inside and outside of community-driven Marine Protected Areas and to support the community fishing councils and authorities in deciding how best to regulate fishing activity in Inhambane Bay, Mozambique. Live video training sessions were held to instruct members of the local fishing community on how to collect and filter water samples. In total, almost 50 samples were collected during the project, and we were able to obtain good quality DNA from the filters. We detected 303 fish operational taxonomic units (OTUs) across the samples using metabarcoding, and 28 % of these were identified to species level.

We were able to validate key stakeholders' interest in such a tool and demonstrated that our kits can be used by local fishing communities and conservationists to collect high quality data on marine vertebrates for decision making and monitoring. Our findings highlighted the importance of investing in the development of DNA reference libraries to underpin accurate naming of species detected by eDNA, and the role that communities can play in collecting informative biodiversity data.