



A synopsis of passive acoustic monitoring studies in the Swan River

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ABSTRACT

Passive acoustic monitoring (PAM) can capture information on biological, anthropogenic and geophysical sources at temporal scales from seconds to decades and spatial scales from metres to ocean basins. In combination with recent technological advances, reduced cost of application, and a greater global appreciation for the importance of sound to aquatic life, these benefits of PAM as a sampling technique have led to substantial increases in its application in the aquatic realm. Semi-confined water provides a useful arena for testing and characterising the utility of PAM to study marine fauna and their responses to anthropogenic activities. The Swan-Canning River system in southwest Western Australia is one such environment. Here, a handful of soniferous fishes (including mullet; *Argyrosomus japonicus*), snapping shrimp, a community of approximately 20-25 Indo-Pacific bottlenose dolphins (*Tursiops aduncus*) and Australian sea lions (*Neophoca cinerea*) can be found at various times. Further, with more than 65,000 vessels of ≤ 7.5 m length and 8,500 vessels of > 7.5 m length registered in Perth, the Swan River also experiences significant vessel noise. Over the last two decades, monitoring and technical PAM projects in the Swan River have provided information on the call characteristics, distribution, abundance, and behaviours of fish (e.g., Parsons et al. 2012, 2013), dolphins (e.g., Marley et al., 2017a, 2017b), vessels (Parsons et al., 2020, 2021), and even planes in the air, and trains on land (Erbe et al., 2018), as recorded underwater. The Swan River soundscape is characterised by biological sounds, particularly from a small selection of species that use acoustic cues in vital life-functions. However, anthropogenic noise that disrupts natural behaviours and reduces communication spaces is ubiquitous, highest in the downstream regions of the river, coinciding with space used by the fish, invertebrates, and mammals. To improve conservation practices, it is, therefore, necessary to record baselines and understand the noise budgets at key locations to assess future developments or additional vessels along the river.

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