

Benefits of Real Time Passive Acoustic Monitoring for Mitigation

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Industrial activities pose threats to marine mammals due to impacts from noise pollution, and risks of ship strike and entanglement. Passive acoustic monitoring (PAM) is an established methodology that has been widely used to monitor marine mammals. PAM, when paired with real-time processing and communication, presents a powerful tool to monitor and mitigate industrial impacts. This can come in the form of flagging when noise abatement equipment is not working within norms, and can also be used as a tool to steer decisions on mitigation actions. This presentation provides three examples of real-time PAM used as a mitigation tool. These projects were all conducted using our autonomous Coastal Acoustic Buoys (CABs) which conduct edge computing using industry standard PAMGuard software, and relay results in real time. CABs automatically monitor noise levels in a range of metrics and detect marine species of interest, provide bearings when used individually, and localisations when deployed in tandem. 1) **Pile driving:** CABs were used to assess the extent of the modelled exclusion zone by providing field measurements in real-time to expedite pile-driving construction. A bubble curtain was used to mitigate noise levels to optimize the mitigation efficacy of their system. 2) **Offshore wind:** CABs detected playbacks of North Atlantic right whale upcalls to characterize their detection function for clearing offshore wind exclusion zones. This demonstrated that real-time animal localisation information reduces delays in construction, compared to non-bearing PAM systems by a factor of 6-12. 3). **Dredging:** CABs successfully detected dolphins and porpoise during dredging and disposal to meet regulatory requirements for a port expansion. Across applications, CAB uptime exceeded 98% and latency of audio clips, noise measurements and detections were <5 seconds. This highlights how robust and effective real-time PAM monitoring represents a powerful tool to reduce costs whilst enhancing regulatory compliance.