



Policy change leads to reduction in use of acoustic deterrent devices on the west coast of Scotland

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This study quantified changes in the detection of acoustic deterrent devices (ADDs) over 17 years, utilising active listening data collected by more than 1,000 citizen scientists during cetacean line-transect surveys from Hebridean Whale and Dolphin Trust's (HWDTs) research vessel, *Silurian*.

INTRODUCTION

Acoustic deterrent devices (ADDs) have been used to minimise pinniped depredation at aquaculture sites across Scotland since the mid-1980s.

ADDs emit loud, mid-to high-frequency sounds (0.5 to 40 kHz) into the marine environment that can disturb target and non-target species, including European Protected Species (EPS), such as harbour porpoises (*Phocoena phocoena*).

The west coast of Scotland, where many fish farms are located, provides critical

habitat for many protected species of cetacean¹, including the Inner Hebrides and Minches Special Area of Conservation (SAC) for harbour porpoise, one of the largest of its kind in Europe.

Following a **change in policy by the Scottish Government in 2021²**, the use of ADDs at marine aquaculture sites now requires an **EPS license** or consents from Marine Scotland (MS) with proof that planned ADD deployment will not disturb marine mammals. Prior to this ADD use in Scotland was unregulated and largely undocumented³.

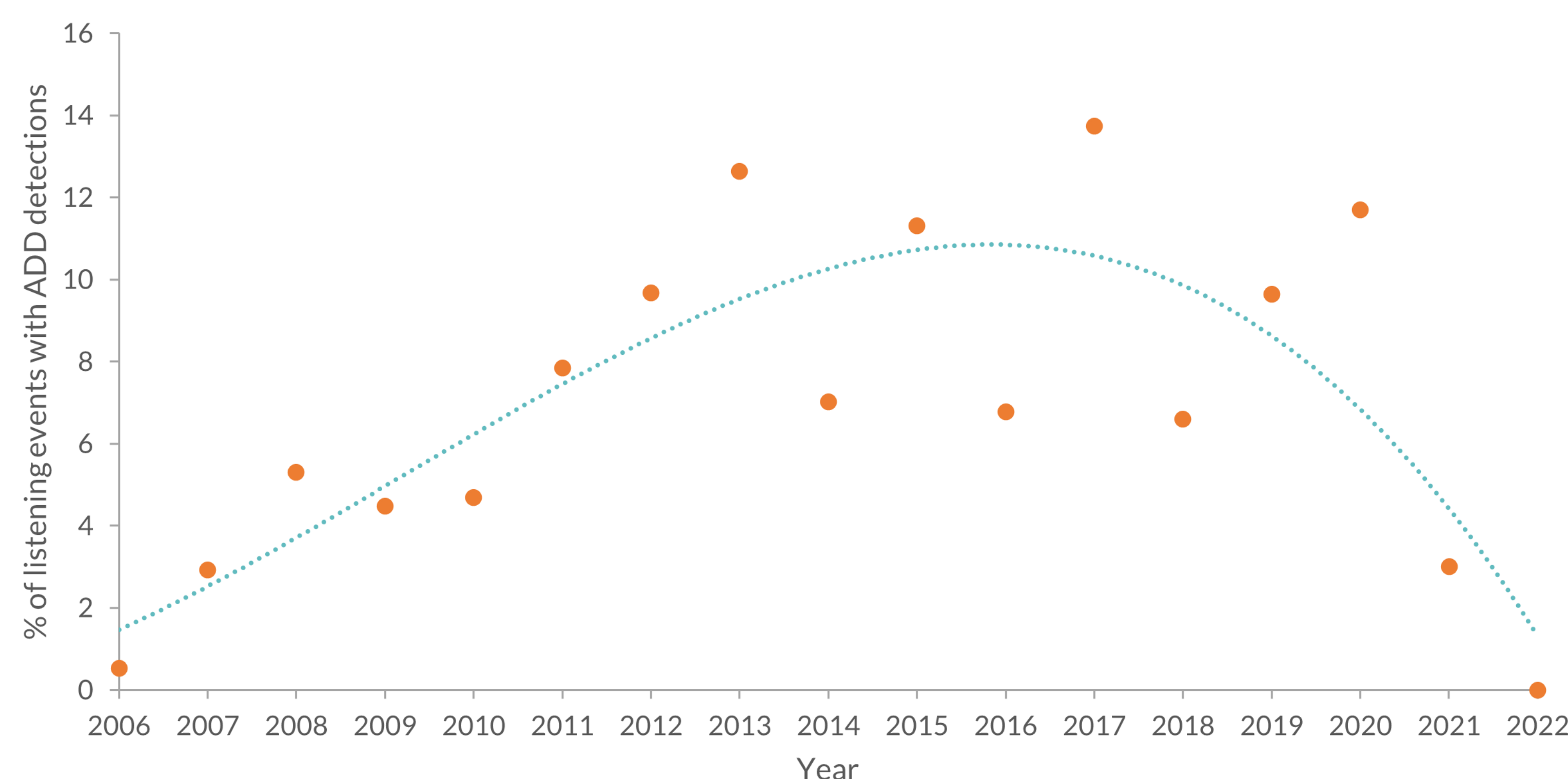


Figure 1 Relationship between the ratio of listening events with acoustic deterrent device (ADD) detections as a function of year (2006–2022) (blue dotted line). ADD detections represented here indicate presence only, not accounting for the ranking of the sound.

RESULTS

Acoustic point data were collected during listening stations carried out by trained volunteers via a towed hydrophone array from *RV Silurian*. Listening stations occurred at 15 minute intervals for 1 minute when each sound heard was ranked from 1 (just audible) to 5 (loud enough to obscure).

- 1) There was a steady increase in ADD detections from 2006 (0.05%) to 2020 (11.7%), with the highest number of detections in 2017 (13.74%) (Fig 1).
- 2) Between 2006 and 2022, a total of 30273 listening events were recorded (Fig 2) and ADD presence was detected in 2348 (7.76%) of these events.
- 3) Maps of ADD detections at listening events demonstrate the substantial geographic expansion across the west coast of Scotland³ and highlight that many areas were ensonified by ADDs (Fig 3).
- 4) A significant decline in the detection of ADDs was recorded in 2021 (3%) and 2022 (0%) following the introduction of a policy change by the Scottish Government.

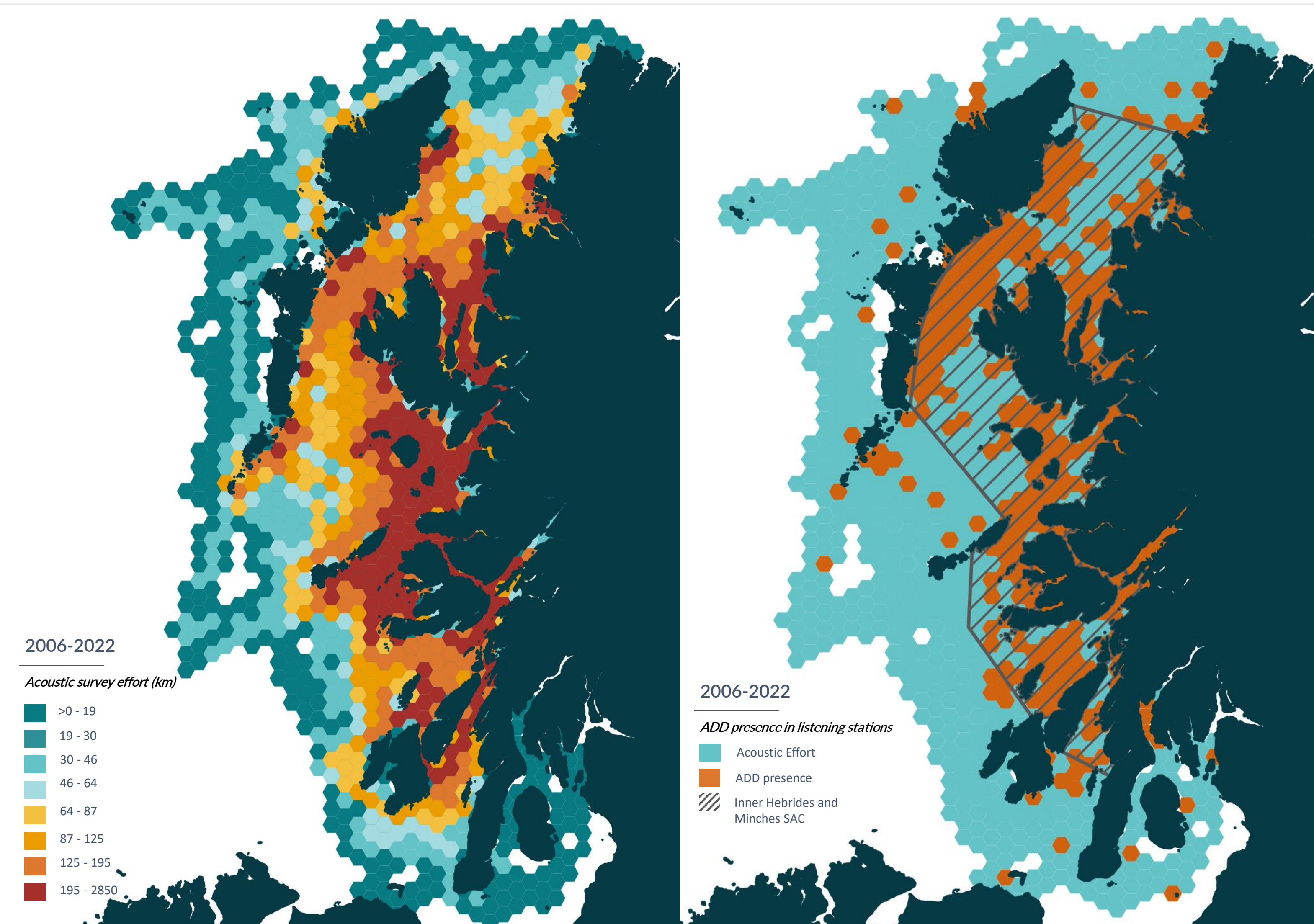


Figure 2. Acoustic survey effort for the years 2006 – 2022, where effort was measured as the number of kilometres surveyed.

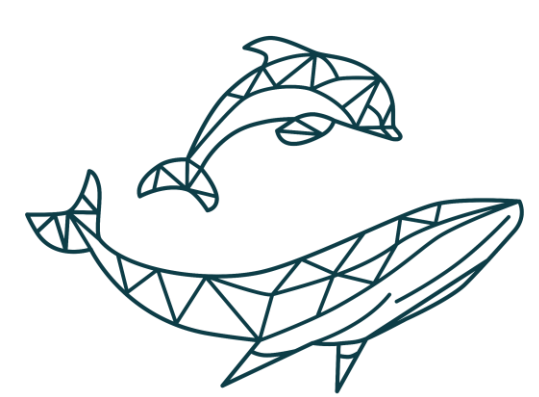
Figure 3. ADD presence in listening stations from *RV Silurian* for the years 2006 – 2022, within and outwith the Inner Hebrides and Minches SAC for harbour porpoise.

CONCLUSIONS

There were no ADD detections during HWDT surveys in 2022 following the clarification of licensing regulations by Marine Scotland.

Increased long-term monitoring and enforcement are vital to continue the cessation of ADD use in Scotland and identify new and emerging threats, such as new ADD types.

HWDT's long-term monitoring will be an essential tool in quantifying the impacts of underwater noise as the aquaculture industry adapts to new legislation.



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1. Hebridean Whale and Dolphin Trust (2018). Hebridean Marine Mammal Atlas. Part 1: *Silurian*, 15 years of marine mammal monitoring in the Hebrides.
2. Scottish Government (2021). Aquaculture - Acoustic Deterrent Device (ADD) use: parliamentary report.
3. Findlay, C.R., Ripple, H.D., Coomber, F., Froud, K., Harries, O., van Geel, N.C.F., Calderan, S.V., Benjamins, S., Risch, D. and Wilson, B., 2018. Mapping widespread and increasing underwater noise pollution from acoustic deterrent devices. *Marine Pollution Bulletin*, 135, pp.1042-1050.

