



Workshop Summary: Application of Magnetic and Electric Deterrents to Reduce Elasmobranch Bycatch

Joint LIFE PROMETHEUS – LIFE CIBBRiNA Online Workshop | 2 March 2026 | 55 participants

Background and Context

The workshop brought together researchers and practitioners from LIFE PROMETHEUS and LIFE CIBBRiNA to exchange experiences on the use of electromagnetic deterrents for reducing elasmobranch bycatch across European fisheries. The meeting was moderated by Zaira Da Ros (LIFE PROMETHEUS) and opened with context-setting presentations from both projects. Emanuela Fanelli (LIFE PROMETHEUS coordinator, UNIVPM, Italy) outlined the alarming conservation status of Mediterranean elasmobranchs – 39 out of 73 assessed species are threatened. Martin Pastoors (co-coordinator case studies LIFE CIBBRiNA) provided an overview of CIBBRiNA's deterrent-related case studies

Science of Deterrents

Alexander Coram (University of St. Andrews, UK) presented a comprehensive state-of-the-art review of electromagnetic deterrents. Three main technological approaches are currently in use: permanent magnets (e.g. neodymium iron boron), electro-positive metals (e.g. lithium, magnesium), and electric field devices (e.g. SharkGuard). All three have produced mixed results across studies, and the effectiveness of deterrence is known to vary by species, animal size, individual variation, water temperature, hunger motivation, competition, and habituation. Importantly, deterrents exploit the unique electroreception of elasmobranchs while leaving teleost target species unaffected, making this a highly targeted approach. Pelagic sharks appear less sensitive than benthic species. Sawssen Slimani (UNIGE, Italy) followed with a presentation on magnetic field mapping methodologies to better characterise detection ranges – typically around 20–50 cm for the magnet configurations tested.

Case Study Results

Field trials were presented from multiple contexts. In trammel nets in the Balearic Islands (Xisco Ordinas, IEO-CSIC, Spain), neodymium magnets attached every 50 cm showed a significant reduction in *Myliobatis aquila* catches in December 2025, though February 2026 data were still being analysed.

Trials in the ecologically sensitive Amvrakikos Gulf (Martina Ciprian, iSea, Greece) used 300 m of magnet-equipped trammel net against 1,200 m of controls. In Italian longline fisheries, Carlo Cattano (SZN Unit of Sicily, Italy) demonstrated the use of Sharkguard electric deterrents in the Pelagic Archipelago (Southern Mediterranean Sea), with video camera monitoring to assess elasmobranch behaviour relative to deterrent-equipped hooks. Results from the Ligurian Sea (Francesco Giovannelli, UNIGE, Italy) were still preliminary but suggested that embedding magnets inside artificial baits could simplify on-board operations, though overall bycatch numbers remained too low to draw firm conclusions.



Sebastian Uhlmann (ILVO, Belgium) presented CIBBRiNA's work on sensory deterrents in demersal trawls targeting rays in the North Sea, using a three-tiered approach covering avoidance, capture-phase mitigation, and sorting-phase mitigation.

Niels Hintzen (PFA, The Netherlands) reported on trials of SharkGuard devices aboard a pelagic freezer-trawler, finding no observed impact on bycatch and noting limited footage of sharks around the trawl grid, low industry trust in the technology, and an expected mismatch between the device's voltage output and the pelagic fishing context.

Conclusions and Next Steps

The discussion focused on operational, economic and environmental considerations.

Regarding economic feasibility, participants agreed that electric deterrent devices and battery-charging systems may represent a substantial cost for fisheries operators. In contrast, permanent magnets could offer a more affordable mitigation option, although further research and validation are required. The potential environmental impacts of this approach also need to be carefully considered. Participants further emphasized the importance of adopting a bottom-up process that actively involves fishers, as this is essential for improving acceptability and increasing the likelihood of successful uptake of mitigation technologies.

The wrap-up highlighted four key priorities:

1. the need for more controlled laboratory research, with ILVO's work cited as a model, noting that LIFE funding structures may constrain such work. May be Horizon programmes could be the alternative here.
2. the importance of expanding field trials with more replicates, despite budget constraints.
3. the need to consider socio-economic aspects and affordability for fishers.
4. attention to potential environmental trade-offs, including contamination from electro-positive metals and derelict gear.

Participants agreed on the value of developing a priority matrix of the most promising combinations of target species, bycatch species, gear type, and deterrent technology.

Closer collaboration between PROMETHEUS and CIBBRiNA was encouraged, with interest in expanding joint activities.