

Workshop “Deep-water shark perceptions and map validation with fishers”

3rd Azores workshop – São Miguel Island – 30/05/2026

Marine Beacon – WP4.4 and WP8

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The Azores host a diverse community of deep-sea sharks, with 25 species currently recorded in the region. Many of these species are characterised by biological traits such as slow growth, late maturity and low reproductive rates, making them particularly sensitive to fishing pressure. Although the capture and landing of several deep-sea shark species is currently prohibited, accidental captures continue to occur in a range of fisheries. Since these species cannot legally be landed, very little information is available on the frequency of these interactions, the number of individuals being caught, or the mortality associated with bycatch events. Improving knowledge on these fisheries interactions is therefore an important step towards supporting conservation assessments and identifying realistic bycatch mitigation options.

Following the workshops previously held on Terceira and Faial Islands, a third workshop was organised on São Miguel Island (Azores) as part of the Marine Beacon project. The objective remained the same: to continue collecting information on interactions between fisheries and deep-sea sharks and gather data that can support ongoing work on bycatch mitigation and fisheries vulnerability assessments.

The workshop consisted of two main components: 1) an interactive survey and 2) a validation exercise.

1) Interactive survey

During the interactive survey, participants shared their experiences regarding encounters with deep-sea sharks, the impacts these interactions may have on fishing activities, and the practices currently used when these species are accidentally caught.

Seventeen participants took part in the workshop, including professional fishers, recreational fishers, and several participants not currently involved in fishing activities. Participants used a variety of fishing gears, including handlines, bottom

longlines, pole-and-line fisheries, and recreational fishing gear. Fishing depths varied substantially, with most fishers fishing between 200 and 600 meters but some going to more than 1000 meters.

Participants reported frequent interactions with deep-sea sharks, although responses varied depending on fishing activity. Several participants indicated encountering sharks regularly, particularly those operating in deeper waters, while others reported less frequent interactions.

When asked about spatial patterns, participants provided mixed responses. Some fishers reported encountering sharks more frequently in specific offshore areas, while others did not recognise any clear geographic pattern. Similarly, responses regarding depth-related patterns varied, although some participants associated shark captures with deeper fishing grounds, from 600 to 800 meters.

The most frequently reported period for shark captures was during the night, although some participants associated captures with daytime fishing.

All participants demonstrated awareness that deep-sea sharks are protected species and that capture and landing of many species is prohibited under current regulations.

Regarding depredation, most participants reported regularly retrieving catches that were partially or completely consumed, with several indicating that this occurs frequently or almost every time they fish.

Participants expressed a wide range of perceptions regarding deep-sea sharks. While some considered that these species do not represent a direct problem, others argued that sharks should be commercially exploited, that their abundance has increased excessively, or that population reduction measures should be considered. Economic impacts were frequently reported, with participants citing damage to fishing gear, losses in captured fish and time lost during fishing operations. Only a small number of participants reported not experiencing any direct economic impacts associated with shark interactions.

Participants were also asked whether they modify their fishing practices to avoid shark interactions. Responses were divided. Some reported not using any avoidance strategy, while others described changing fishing location, altering fishing depth or adjusting the time at which they fish. In contrast with the previous workshops, most participants considered avoiding deep-sea shark interactions to be difficult.

Discussions around mitigation technologies suggested that participants were generally receptive to the idea of deterrent devices as a potential way to reduce shark interactions. Interest appeared to be highest for light-based deterrents,

followed by electric deterrents, suggesting that most participants were open to solutions of this kind. However, willingness to actually purchase these devices was lower than the initial level of interest expressed. Among participants who were less willing to adopt these technologies, the main reasons mentioned were the elevated cost of the equipment and, for some fishers, the perception that shark interactions did not represent a sufficiently important problem to justify this type of investment.

When deep-sea sharks are caught, the most frequently reported practice was using the animals as bait, despite regulations prohibiting this practice. Other participants reported cutting the line and releasing the animal immediately, while some indicated removing the hook prior to release.

Most participants indicated that sharks usually arrived at the vessel clearly alive, although some participants also reported moribund individuals, animals arriving dead, or situations in which it was difficult to determine the shark's condition. Following release, some participants reported sharks sinking immediately after release while others observed slower descents.

Participants were also asked about the adoption of additional release measures, such as a release cage. Most participants indicated that they would not be willing to use a release device, mainly because they did not see it as a practical option. Opinions were more evenly divided regarding improved handling and release practices, with roughly half of participants reporting willingness to adopt such measures if guidance were available.

Because capture and landing of many deep-sea shark species is prohibited, there are currently limited official data available regarding bycatch frequency and post-capture mortality. For this reason, participants were also asked whether they would be willing to contribute to a self-sampling programme aimed at improving data collection on accidental shark captures. Responses were evenly divided, with half of participants expressing willingness to participate. Among those receptive to the idea, photo-based reporting was clearly the preferred method, followed by mobile application-based reporting.

2) Validation exercise

As in the previous workshops, participants were asked to review and validate key parameters currently being used in the EASI-Fish framework to assess the vulnerability of two deep-water sharks species, the Arrowhead dogfish (*Deania profundorum*) and the Birdbeak dogfish (*Deania calcea*), including fishing depth ranges, annual fishing activity patterns and the spatial distribution of fishing effort.

For bottom longline fisheries, participants indicated that fishing activity typically occurs between approximately 100 and 1200 meters. Participants reported that there is essentially no period of the year during which fishing activity completely

stops, noting that there is always at least some fishing activity taking place. According to participants, even during periods of reduced activity, the maximum number of days during which no vessels operate would likely not exceed around 30 days per year.

During the mapping exercise, participants were divided into two bottom longline groups and asked to validate fishing effort maps derived from vessel monitoring system (VMS) data. Overall, both groups considered the maps to be representative of bottom longline fishing activity around São Miguel and suggested very few corrections.

Participants were also asked to review predicted overlap maps between bottom longline fisheries and the distribution of the two shark species currently being studied, the Arrowhead dogfish (*Deania profundorum*) and the Birdbeak dogfish (*Deania calcea*). Regarding *Deania profundorum*, participants did not suggest any modifications and generally agreed that this species is more commonly associated with areas around offshore banks. Similarly, for *Deania calcea*, participants did not propose changes to the predicted distribution areas shown in the maps.

For handline fisheries, participants reported fishing across a broad depth range, from shallow waters to approximately 400 metres, although around 250 metres was described as the most common operating depth. As in previous workshops, participants indicated that handline fisheries operate relatively consistently throughout the year, as vessels can usually continue fishing by moving closer to the islands when weather conditions worsen.

During the mapping exercise, participants identified fishing grounds concentrated mainly around São Miguel, within 6 nautical miles of the island, but also highlighted several offshore banks and waters surrounding the island of Santa Maria. Participants were also asked to review species distribution maps for *Deania profundorum* and *Deania calcea*. Overall, participants largely agreed with the predicted distribution areas, highlighting in specific areas.

Conclusion

This third workshop provided further insight into how fishers across the Azores experience interactions with deep-sea sharks. Compared with the previous workshops carried out on Terceira and Faial, participants from São Miguel reported more frequent shark interactions, stronger economic impacts associated with depredation, and different perceptions on potential mitigation measures. Together, the results collected so far illustrate the variability in experience that exists across Azorean fisheries. This continued data collection is important for building a representative understanding of these interactions at the scale of the archipelago.