

Deep diving cetaceans detected in the designated mining area of the Norwegian Sea during survey, August 2024

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Abstract

The Norwegian government recently designated the central region of the Norwegian Sea for potential deep-sea mining. The area is known to provide habitat to a high diversity of cetaceans who forage and migrate through the area. Few acoustic surveys of the area have been conducted. In August 2024, the *SY Witness* conducted a visual-acoustic survey in the designated mining area, during which we identified six species of cetacean: sperm whales (*Physeter macrocephalus*), white-beaked dolphins (*Lagenorhynchus albirostris*), minke whales (*Balaenoptera acutorostrata*), northern bottlenose whales (*Hyperoodon ampullatus*), killer whales (*Orcinus orca*), and fin whale (*Balaenoptera physalus*).

Introduction

- In January 2024, ~ **280,000 km²** in the Norwegian Sea was allocated as a **potential area for deep sea mining**, by the Norwegian government¹. In December 2024, the Norwegian prime minister called for a “**postponement**” of mining in these waters, underlining that preparatory work on regulation and environmental impact would continue.
- The mining area includes deep underwater **complex geological structures**, with **mid-Atlantic ridge systems** and **228 seamounts**, providing important **feeding habitats** for deep diving cetaceans and **migration corridor** for baleen whales².
- Due to deep-sea habitats associated with **vent systems**, a portion of the area has been identified as a “**particularly valuable and vulnerable area**” under the Norwegian government’s management plans³.
- Deep sea mining** has the potential to **disturb deep-diving cetaceans** through **noise pollution**, possible **biochemical impacts**, and by **altering food webs**^{4, 5, 6}.

Methods

- In August 2024, we conducted a **visual-acoustic survey** onboard the *SY Witness* from Ålesund, Norway to Longyearbyen, Svalbard.
- A standardised protocol for **passive acoustic monitoring** of cetaceans was conducted, using a towed directional hydrophone array^{7, 8}.
- Photoidentification images** of **sperm whales** collected during encounters.
- Acoustic data were processed in PAMGuard Viewer mode, according to Webber et al., 2022⁷.

Results

- A total of **211 hours** of acoustic data were recorded, over ~**2707 km**.
- Four species** were detected acoustically. Of the **42 acoustic encounters**, **35 were within the designated mining area** (Fig. 1, Fig. 3).
- 32 sightings** were recorded, which included **five species** of cetaceans and one unidentified whale species. **19 of the sightings were within the designated mining area** (Fig. 2, Fig 3).
- A total of **3 sperm whales** were photo-identified and images were uploaded to the online repository Happywhale (**See QR code below**).

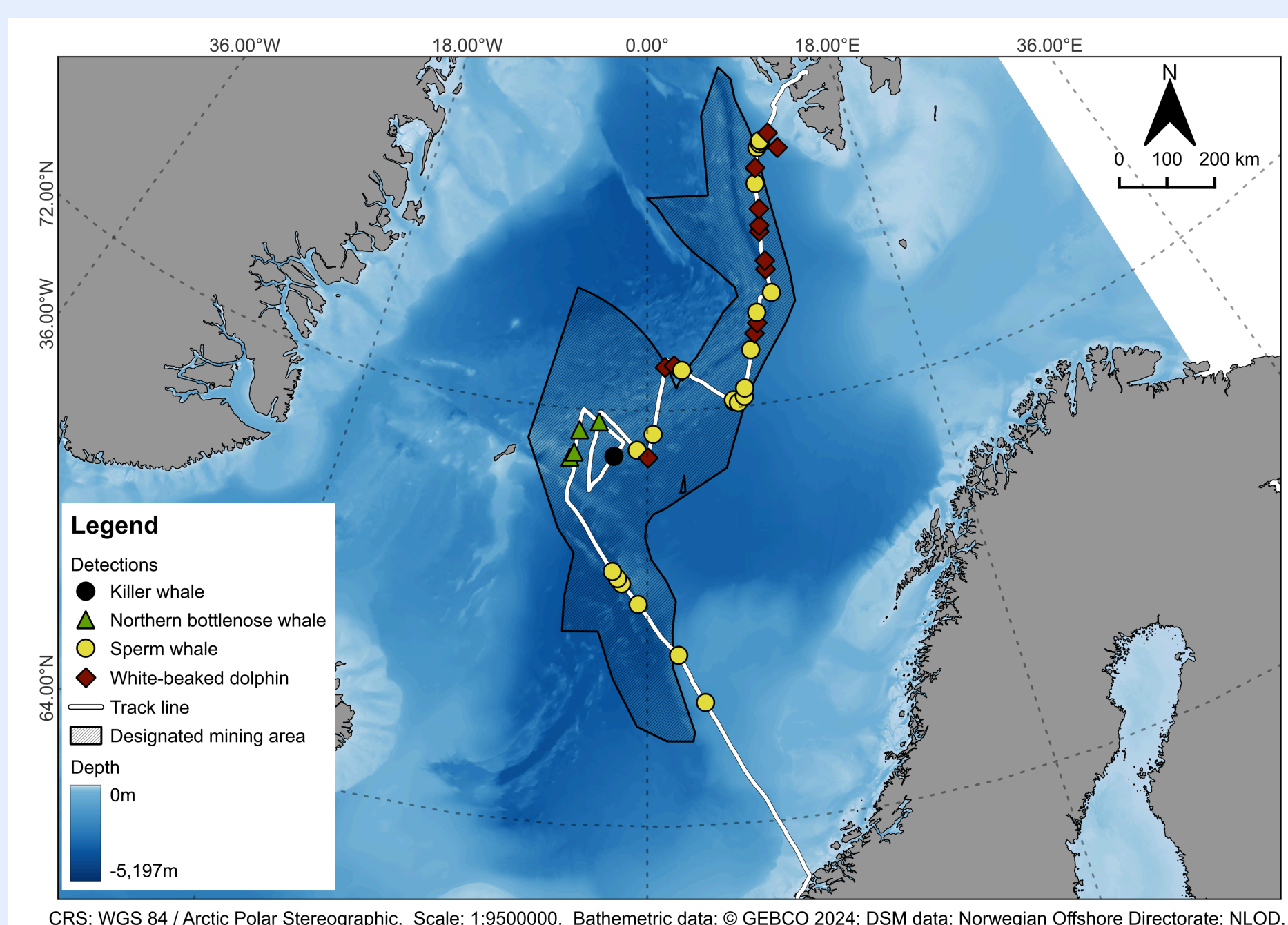


Figure 1. Acoustic survey conducted by the *SY Witness* during the survey from Ålesund, Norway, to Longyearbyen, Svalbard, during the period 30th July 2024 to 10th August 2024

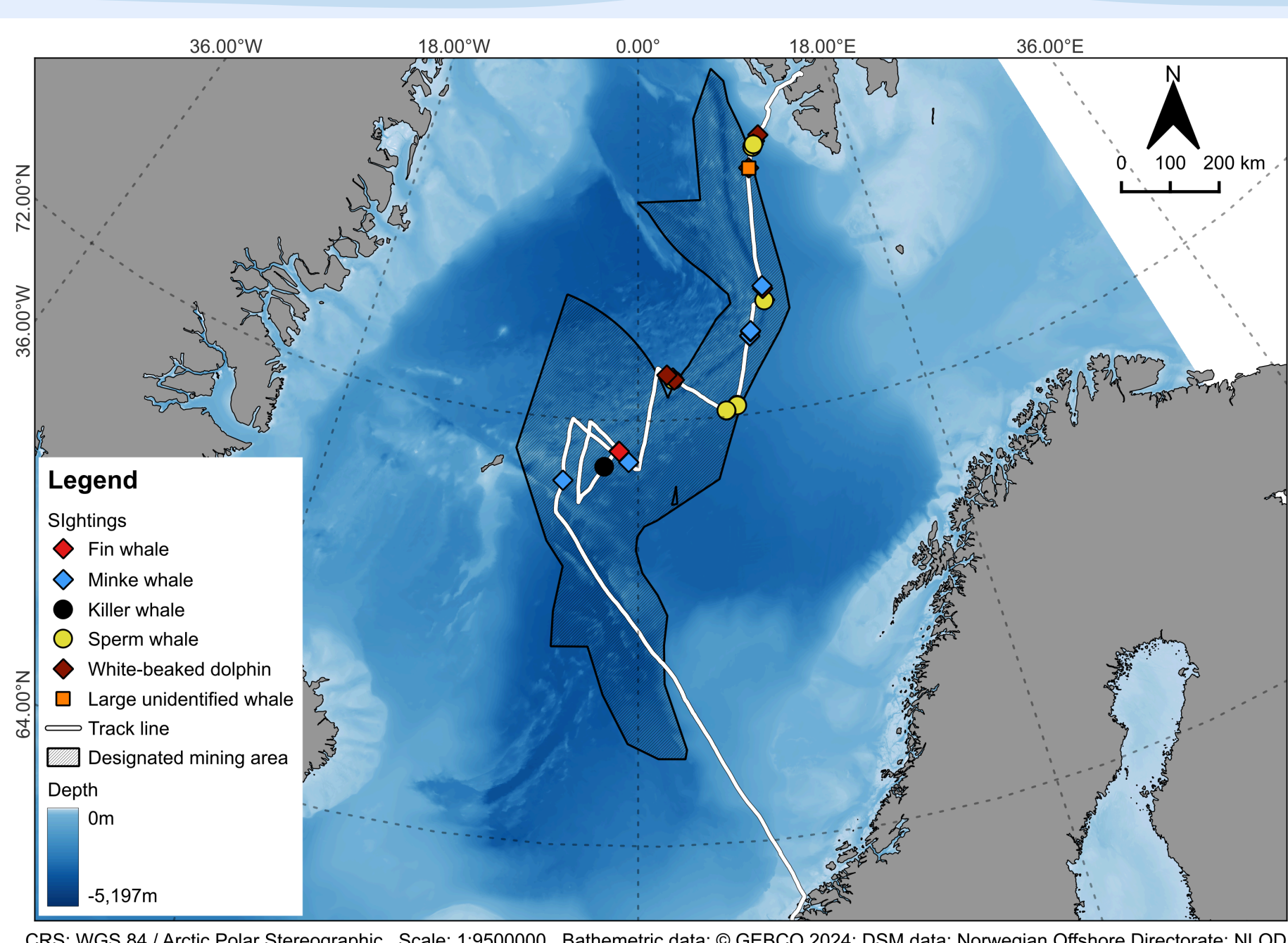


Figure 2. Visual survey conducted by the *SY Witness* during the survey from Ålesund, Norway, to Longyearbyen, Svalbard, during the period 30th July 2024 to 10th August 2024

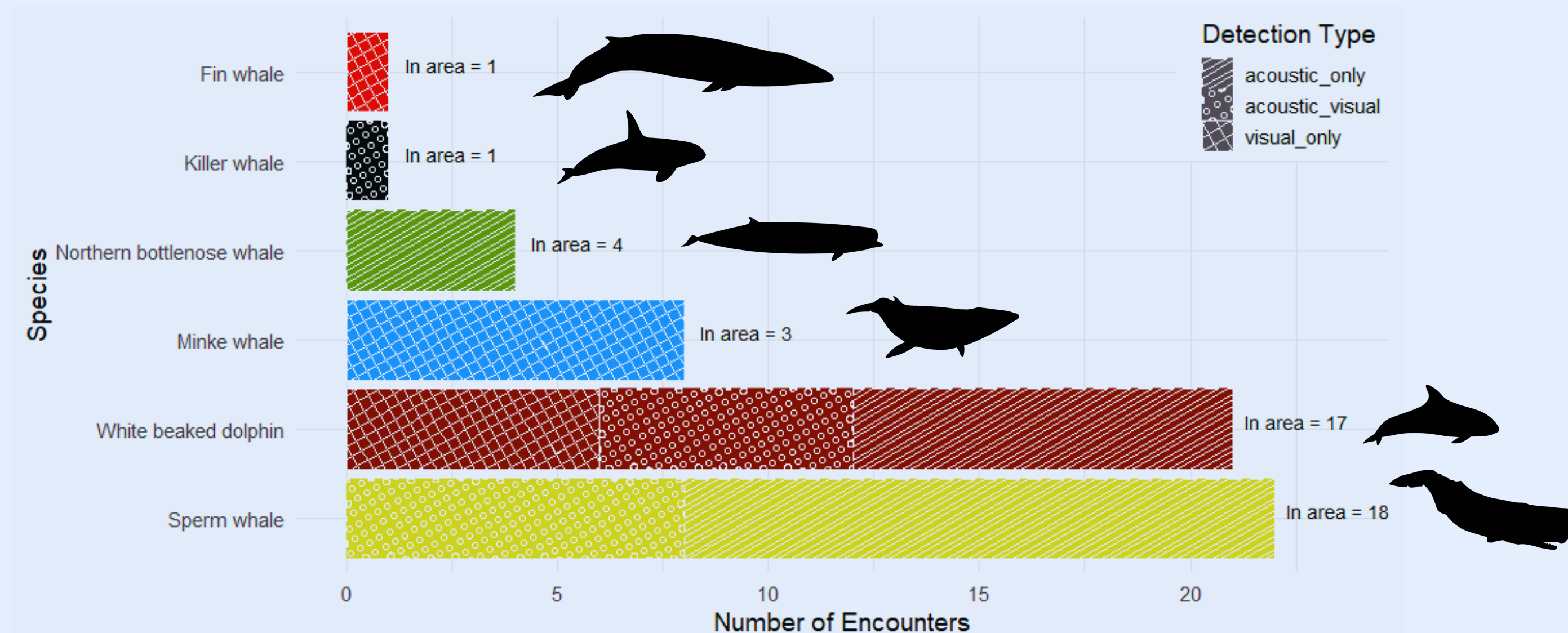
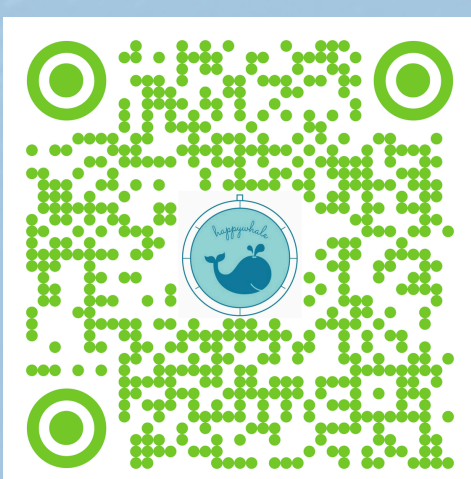


Figure 3. Species encounters by detection type, acoustic and visual, during the survey conducted by the *SY Witness* from Ålesund, Norway, to Longyearbyen, Svalbard, during the period 30th July 2024 to 10th August 2024.

Discussion

- We confirmed the presence of **multiple cetacean species** in the **proposed licensing areas**, including species **sensitive to noise** such as northern bottlenose whales, white-beaked dolphins, and sperm whales.
- The extent to which a future commercial deep-sea mining industry in the Norwegian Sea could impact cetacean species is **currently unknown**, with **underwater noise** identified as a **possible source of disturbance**⁹.
- Additional data** on the distribution, density, and habitat use of deep-diving species are **urgently needed** to understand the risk of harm that may arise from **human activities**, including **deep-sea mining**.

Sperm whales PhotoID



Acknowledgments
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