

# Threatened cetaceans off the coast of Israel and the long-range movement of a sub-adult male sperm whale

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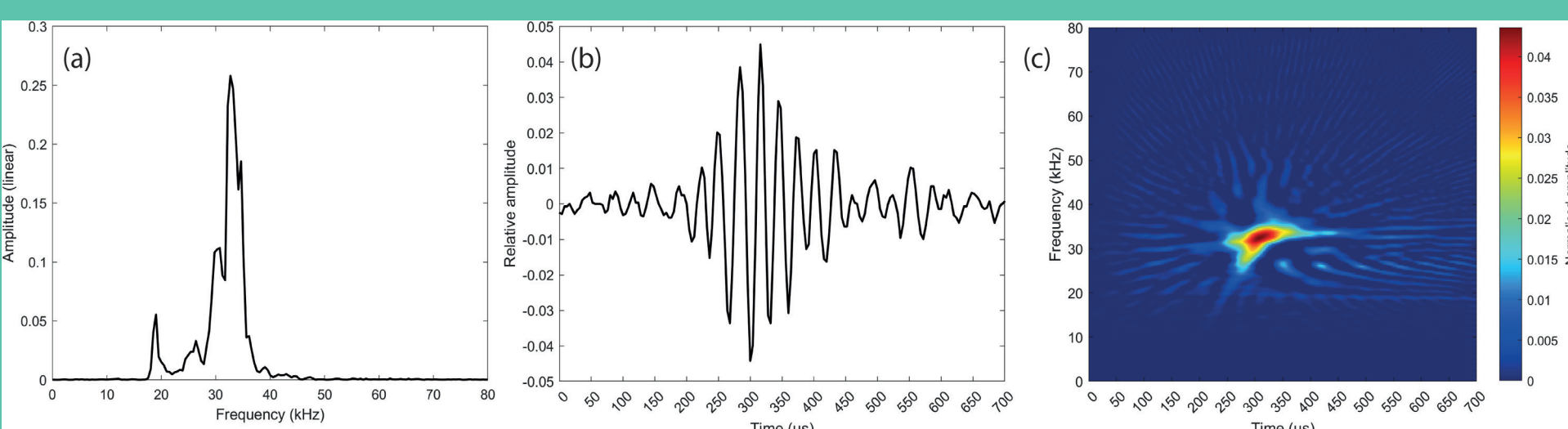
## Abstract

The Mediterranean Sea is impacted by anthropogenic pressures that interact synergistically with climate change. Cetacean communities are diverse, and some Mediterranean populations are globally distinct. Surveys in the western Mediterranean have shown that sperm whales (*Physeter macrocephalus*) and Cuvier's beaked whales (*Ziphius cavirostris*) are small, distinct populations that face numerous threats and are in decline. The Eastern Mediterranean is less well studied, and few surveys have investigated the composition of cetacean communities. In this study, we conducted visual-acoustic surveys off the coast of Israel during April–May 2022. We detected sperm whales (three encounters), Cuvier's beaked whales (one encounter), bottlenose dolphins (one encounter (*Tursiops truncatus*)) and unidentified delphinids (17 encounters). Sperm whales were feeding approximately 10 km off Haifa, at 370–1720m deep. Codas corresponded to the Mediterranean dialect. One sub-adult male photographed is known from ten previous encounters in the Ligurian Sea. Israeli water clearly provide habitat for cetaceans, including two globally threatened subpopulations – sperm and Cuvier's beaked whales – that are of conservation concern and negatively impacted by noise. Given the intensity of human activities in Israeli waters, we suggest more survey effort is urgently needed and urge caution in issuing new permits for oil and gas prospecting and extraction.

## Methods

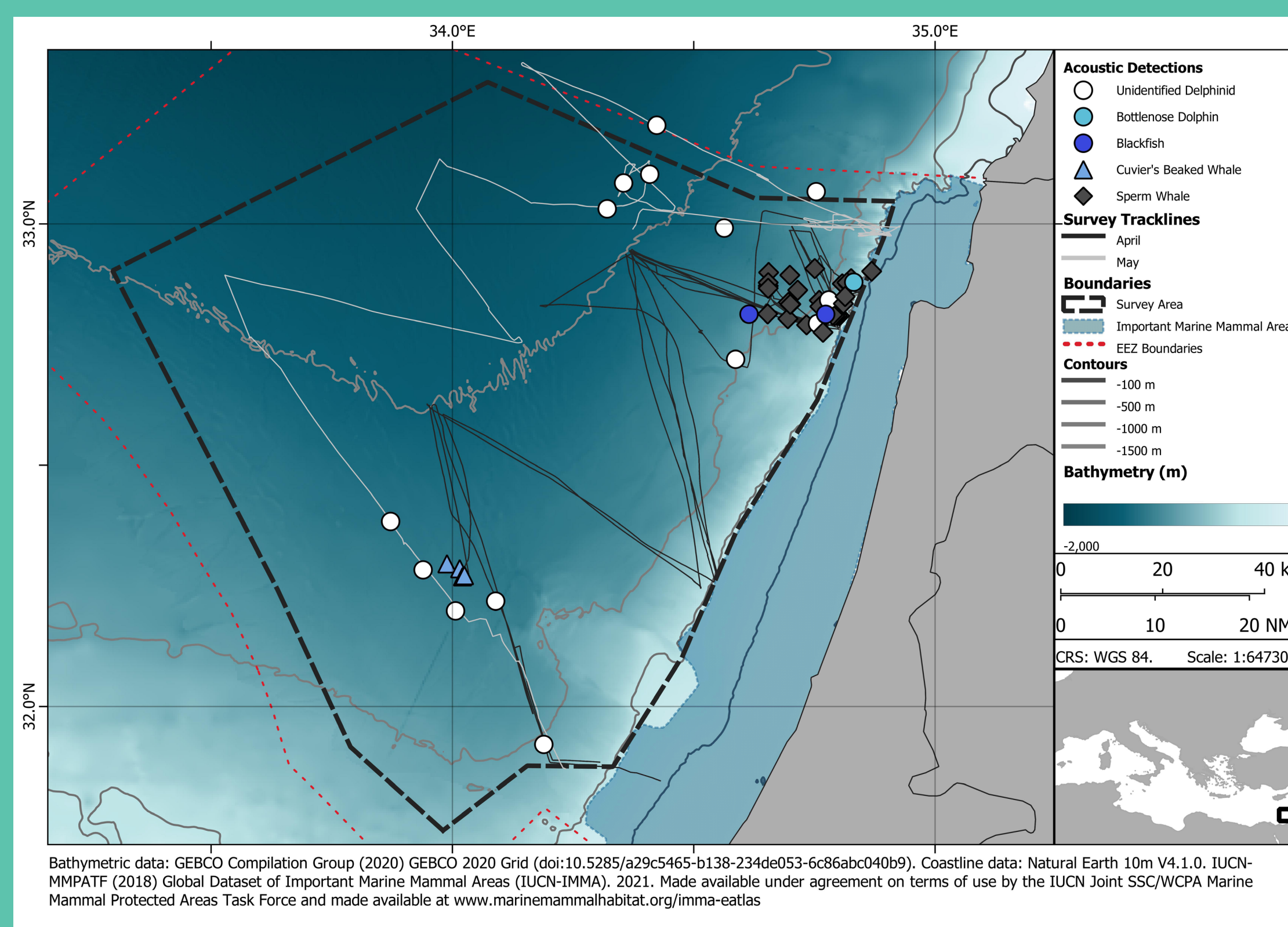
- **Two passive acoustic surveys were carried out during April and May** onboard the Greenpeace vessel SY Witness from the 500 m bathymetry contour to the 1500 m, as permitted by the Israeli Navy (Fig. 1).
- **Acoustic data were collected using a towed hydrophone array** (Vanishing Point Ltd, UK). Acoustic .wav files were processed by a single analyst using PAMGuard in Viewer Mode [1]. The click train detector module within PAMGuard was used to link clicks into trains [2].
- Appropriate settings for this module were determined through trial and error; using **a small subset of data** to maximise the number of true click trains and minimise false trains. See Webber et al. (2022) for more details [3].
- **A non-systematic visual survey was conducted during daylight hours** to provide additional information on cetacean presence and data on: species identity, location, numbers of animals and behaviour.

**Figure 1 (top right).** Acoustic detections of cetaceans from the SY Witness during both survey periods (April and May 2022) of the offshore area within the EEZ of Israel.



**Figure 2 (above).** Acoustic characteristics of a Cuvier's beaked whale detected during the April survey conducted by the SY Witness. Panels (a) example spectrum (peak frequency 32.7 kHz), (b) waveform and (c) Wigner plot.

**Figure 3 (right).** Male subadult 'Elia-Onda-Kim' characteristic markings. (a) Photoidentification image from Ligurian Sea catalogue, Onda, credit: Tethys Research Institute (b) Israel catalogue, Kim, credit: Kim Kobo, University of Haifa. (c) Right flank, credit: Biagio Violi, Menkab (d) Left flank credit: Biagio Violi, Menkab, Italy.



## Results

- A total of **22 acoustic events** were recorded during both surveys (12 during April and 10 during May) (**Fig. 1**). **Cuvier's beaked whales (Fig. 2), sperm whales (Fig. 3), one bottlenose dolphin** (seen with sperm whale) and a total of 17 unidentified delphinids.
- The **sperm whale groups** were tracked acoustically and were **moving along the shelf break in water depths between 370 m and 1220 m deep**.
- They were heard making 'creaks', indicating that the whales were feeding.
- **Coda vocalisations were '3+1' codas**, the dominant coda in the Mediterranean dialect.
- One sperm whale photographed was a sub-adult male based on its size and head shape.
- **Comparison with four other Mediterranean catalogues** in the Ligurian Sea (Tethys Research Institute, MENKAB, Pelagos Reserach Institute, Golfo Paradiso Whale Watch) has confirmed that **this whale has been photographed on nine earlier occasions off the coast of Italy** – five times in 2018 (north Pelagos Sanctuary, Ligurian Sea), twice in 2019 (northwest Pelagos Sanctuary), and twice in 2020 (north Pelagos Sanctuary).

## Conclusions

- **The offshore, deeper waters of the Israeli EEZ clearly provide habitat for cetaceans** and more survey effort is urgently needed to examine whether there are any seasonal differences in distributions or densities.
- **Israel waters are the focus of intense shipping [4], military sonar, oil and gas exploration and extraction [5].** These threats can cumulatively affect cetacean populations [6,7,8] and, given the presence of two globally threatened populations of sperm and Cuvier's beaked whales, **we urge for caution in issuing new permits for gas prospecting and extraction.**

## References:

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