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Rosso Massimiliano

CIMA Research Foundation



European Pavilion

Digital Ocean

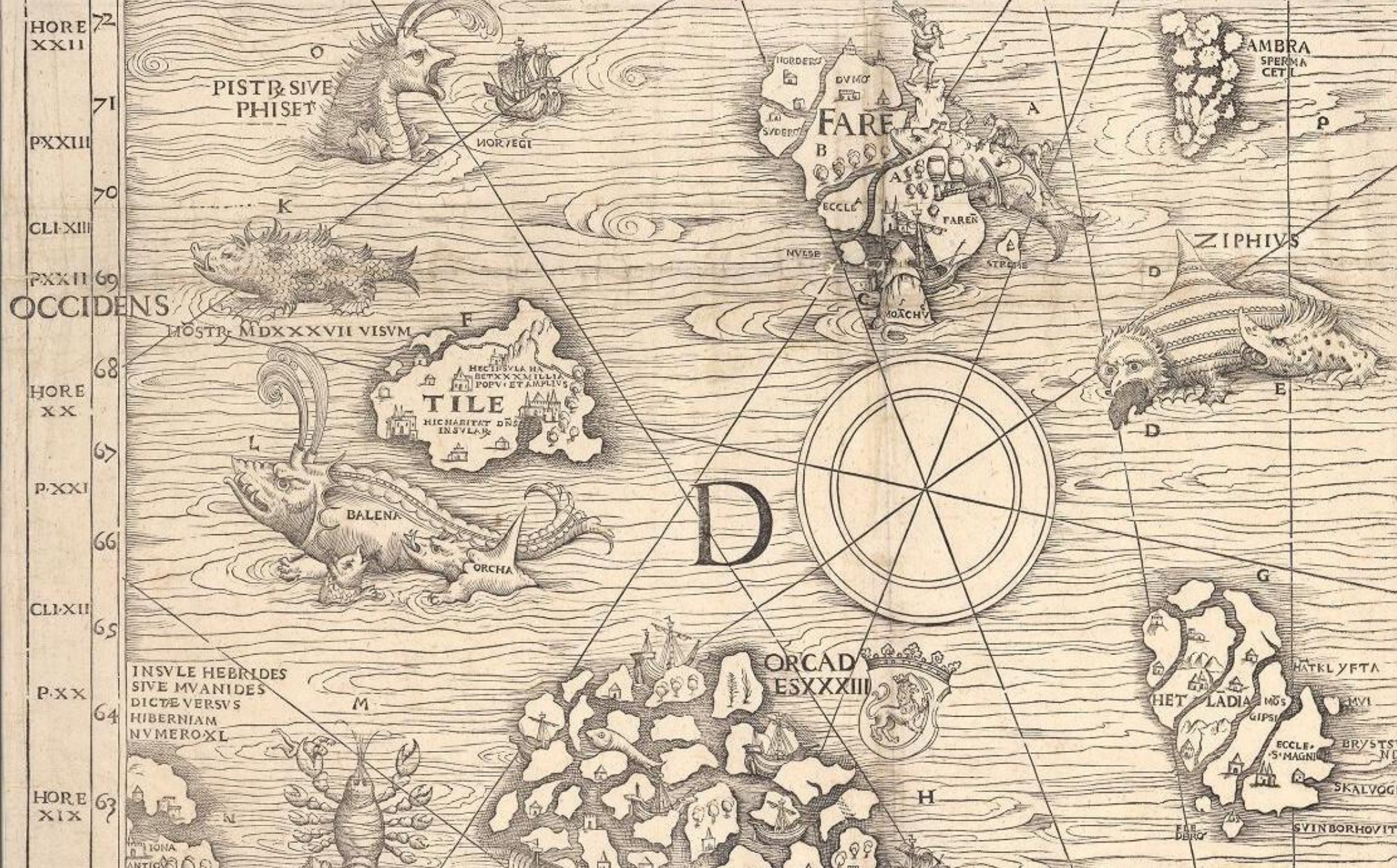
Nice | France
2 - 13 JUNE 2025

Cetacean Research in the Pelagos Sanctuary



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MAGNUS, Olaus. "Carta Marina" Venice, 1539 (Detail of woodblock "D")



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The Kraken sea monster...



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The Kraken sea monster...



Cooperative feeding
aggregation of humpback
whales

*(Megaptera
novaeangliae)*



The legend of the Unicorn...



© P. Nicklen

...a pod of narvals (*Monodon monoceros*)



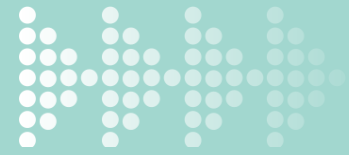
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The first Atypical Mass Stranding - 11th May 1963



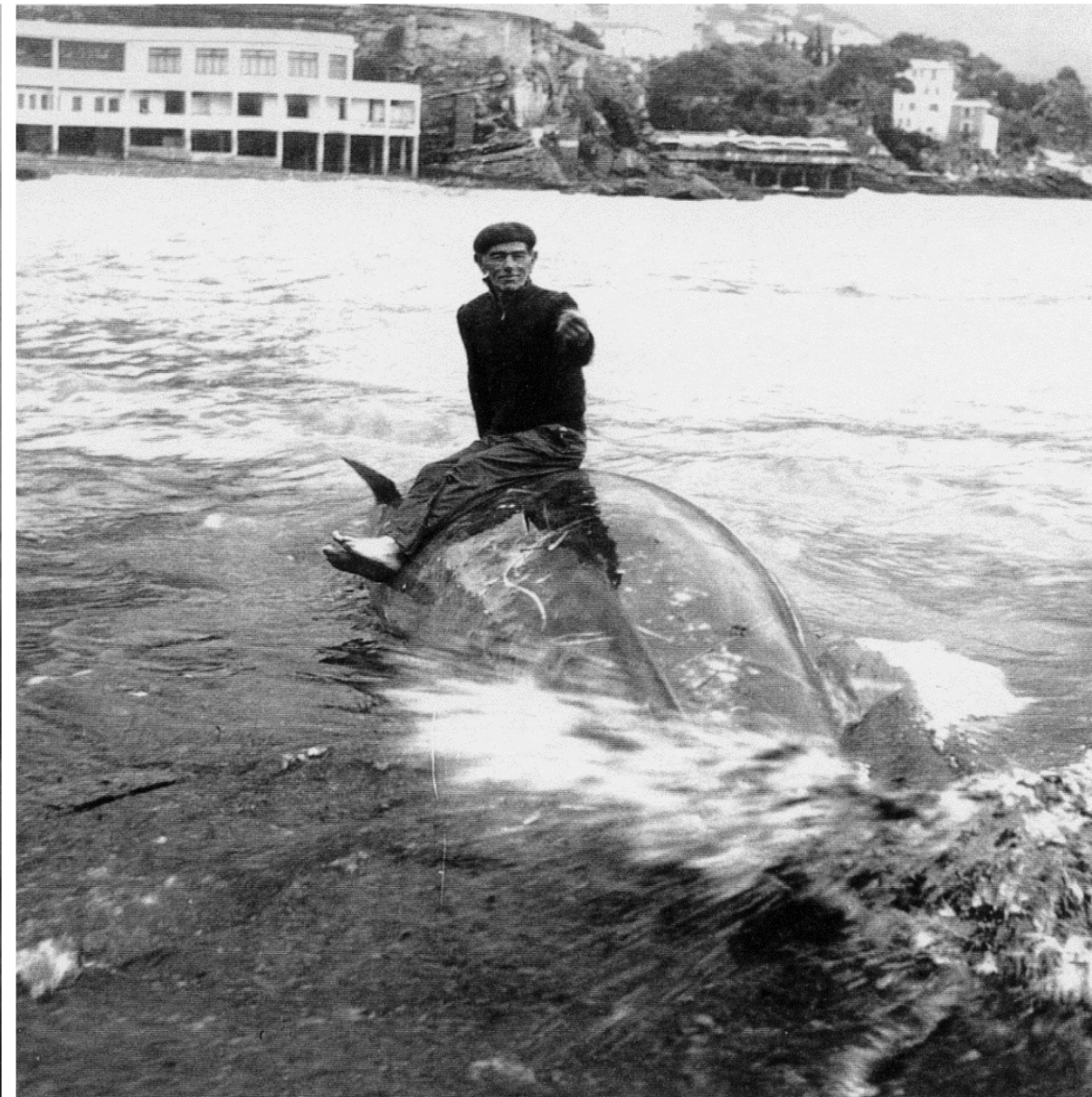
The first Atypical Mass Stranding - 11th May 1963





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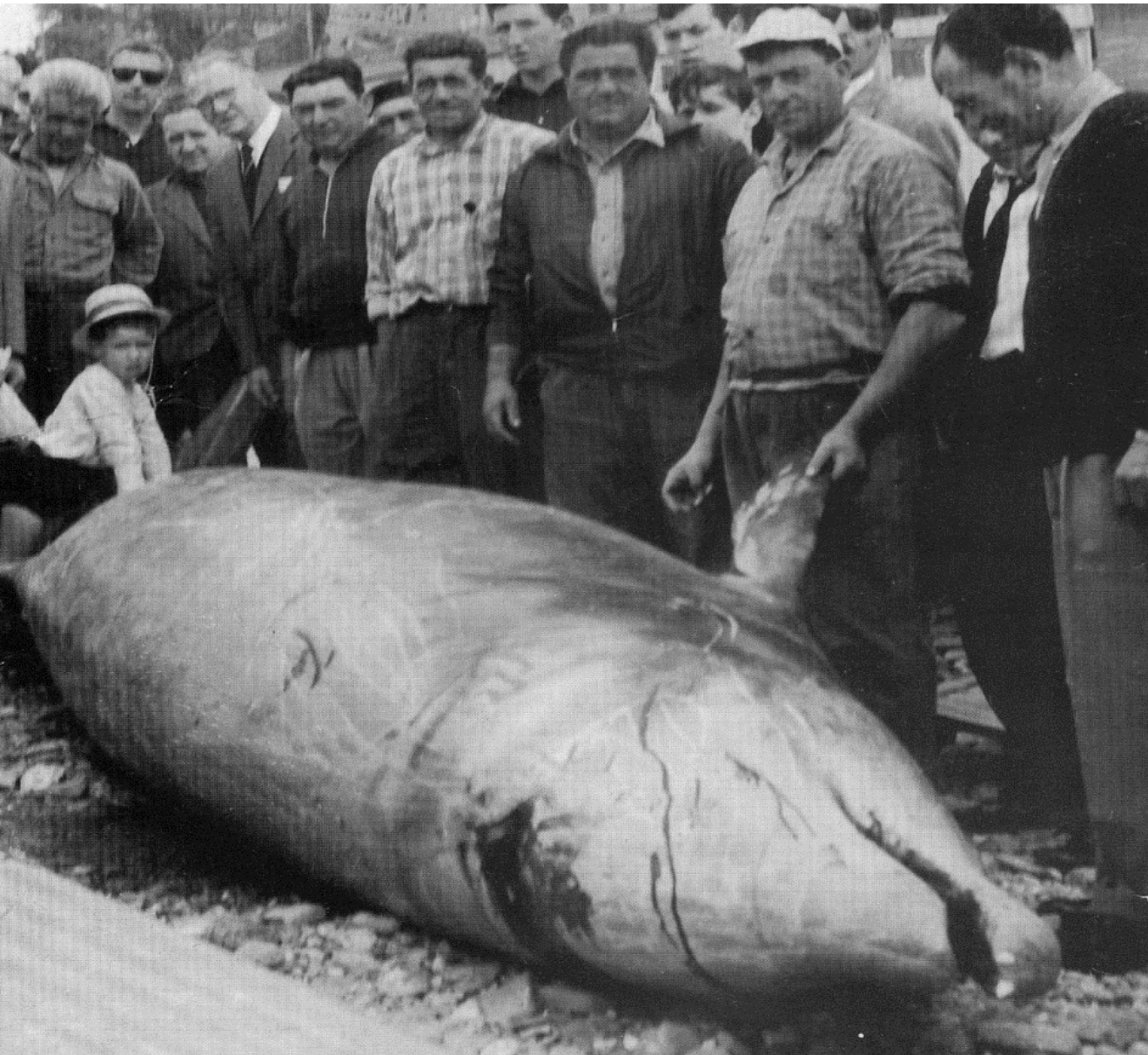
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The first Atypical Mass Stranding - 11th May 1963



The first Atypical Mass Stranding - 11th May 1963



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The first Atypical Mass Stranding - 11th May 1963



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"...probably the large pod of cetaceans came to die of starvation after accidentally entering the Mediterranean from the Atlantic..."

"Corriere Mercantile" newspaper
May 13, 1963





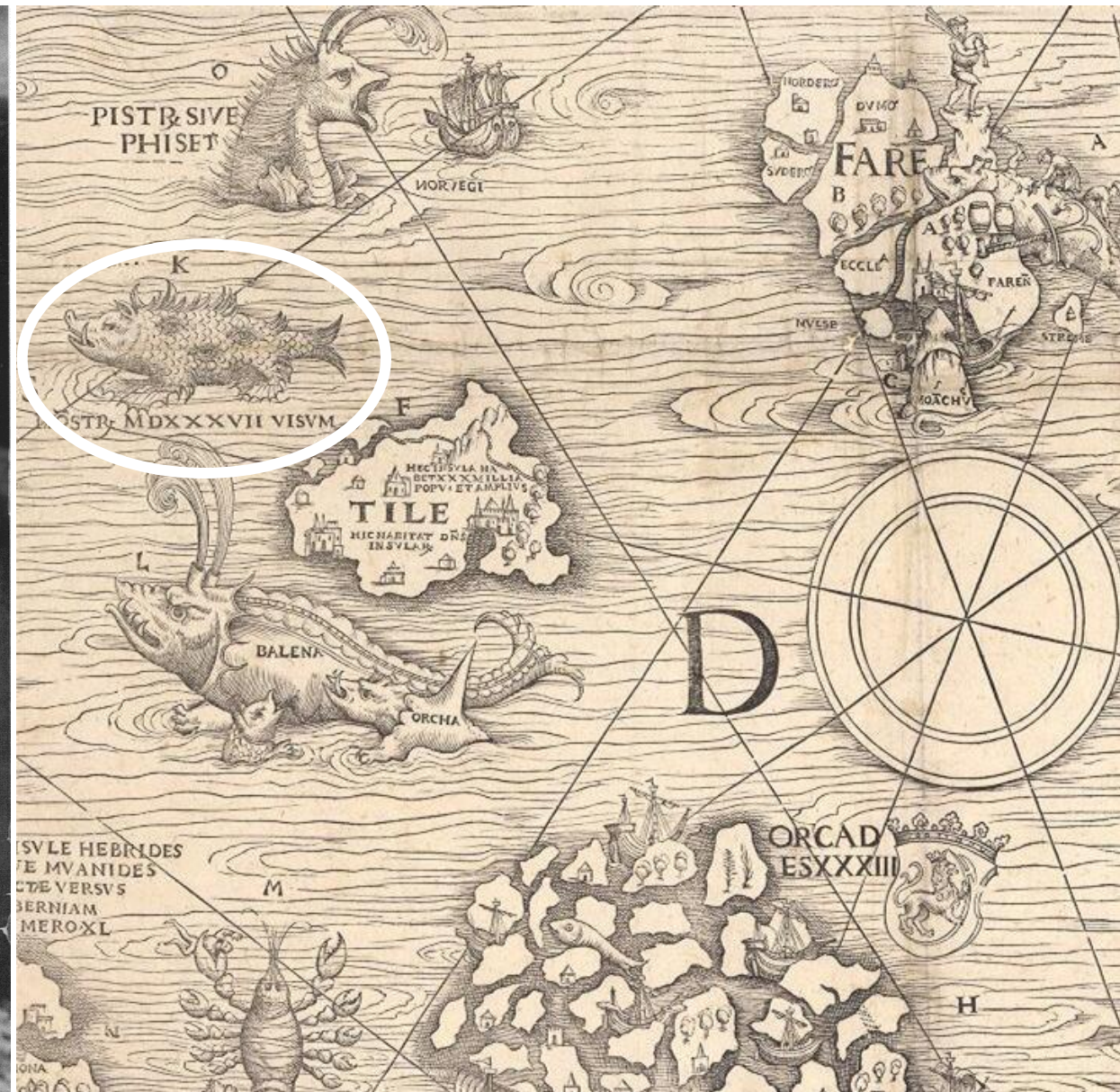
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“...probably the large pod of cetaceans came to die of starvation after accidentally entering the Mediterranean from the Atlantic...”

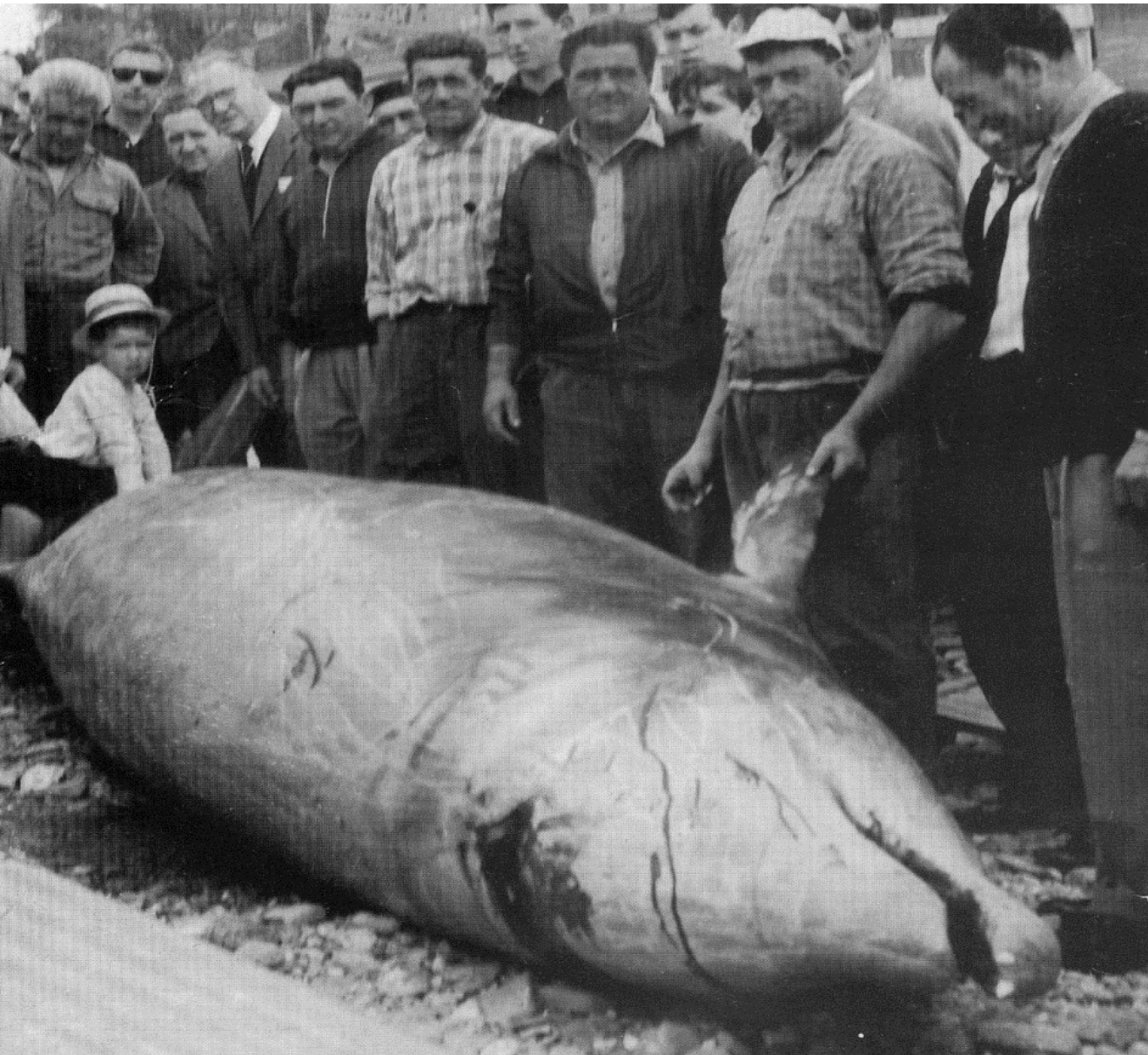
“*Corriere Mercantile*” newspaper
May 13, 1963





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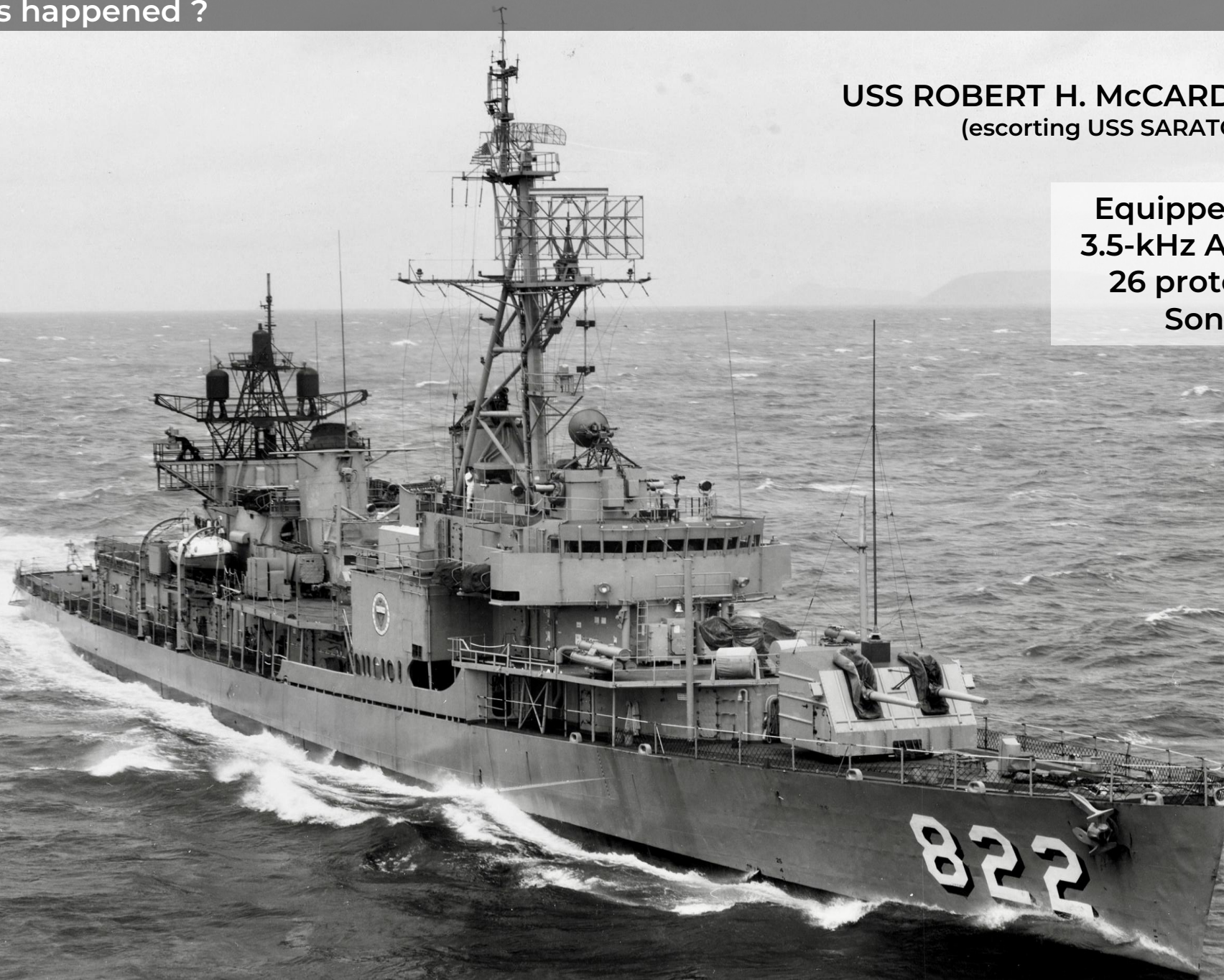


Cuvier's beaked whale
(*Ziphius cavirostris*)

What's happened ?

USS ROBERT H. McCARD DD-822
(escorting USS SARATOGA CV-60)

Equipped with
3.5-kHz AN/SQS-
26 prototype
Sonar



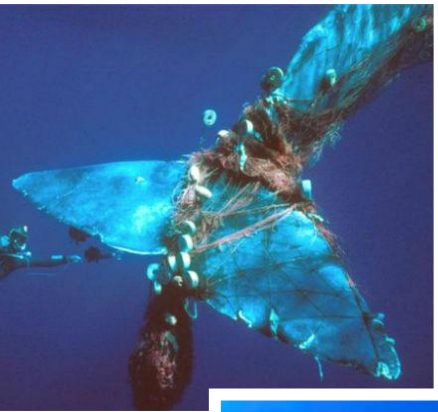
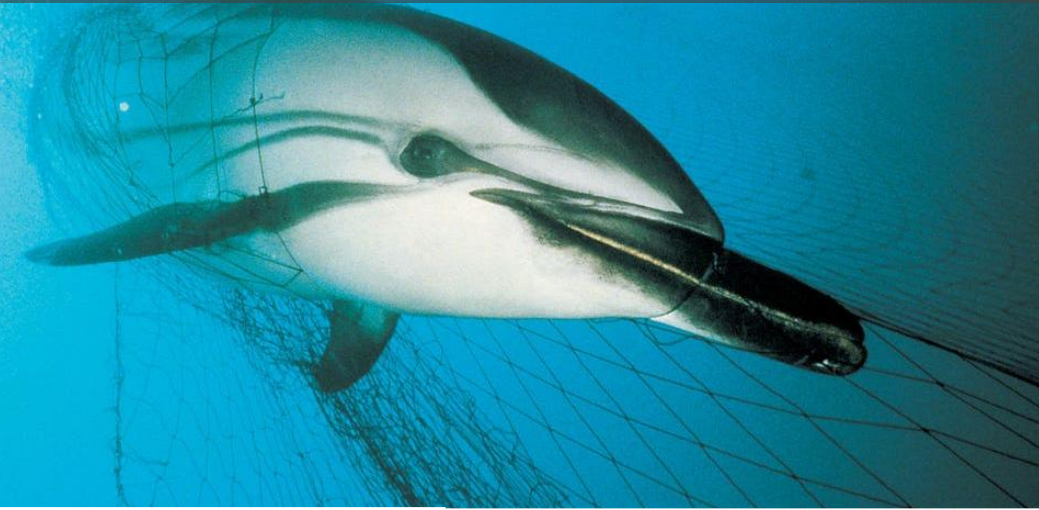
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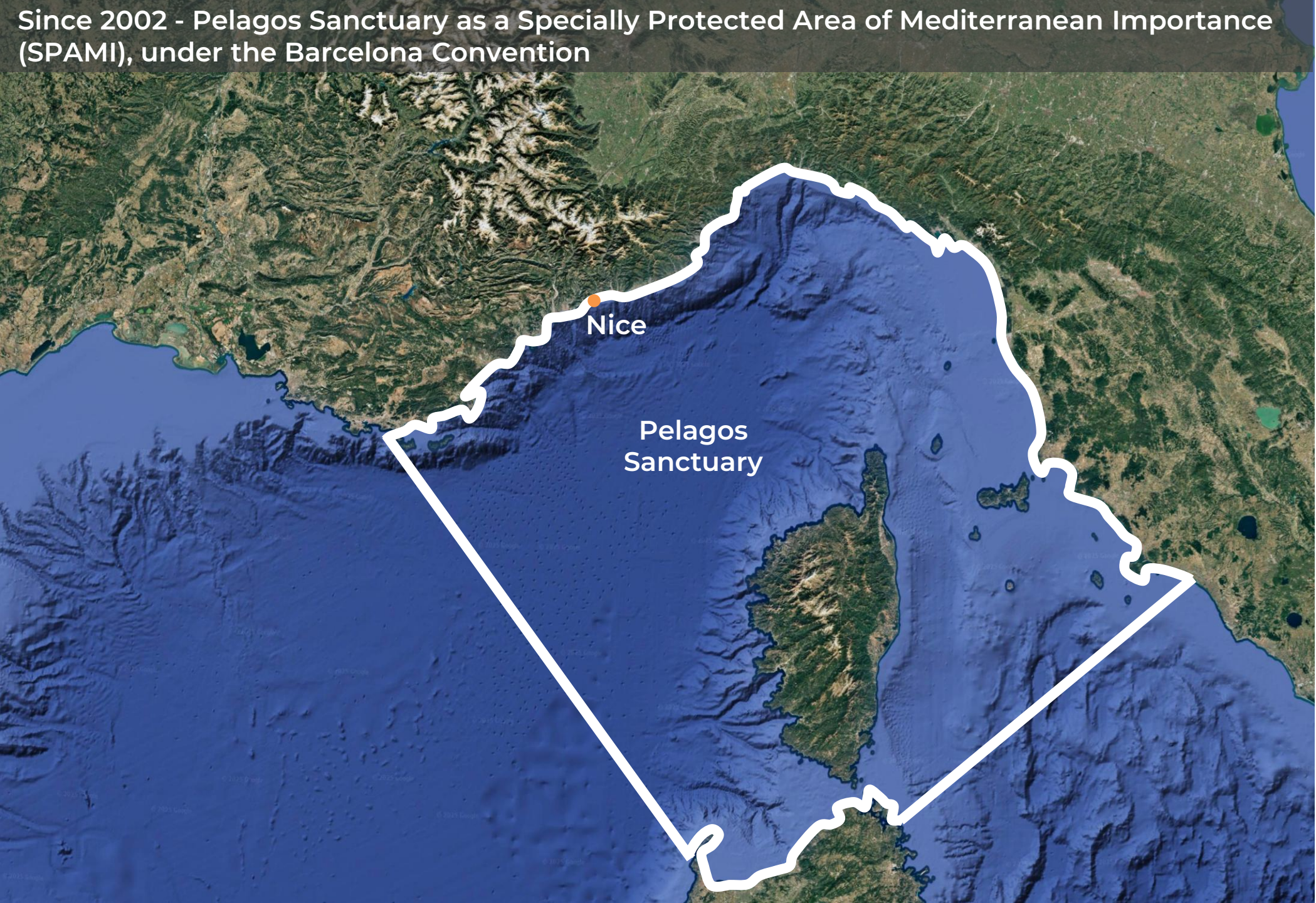
Since 1963 more than 500 beaked whale specimens have died in Atypical Mass Strandings

Pelagic drifting nets by-catch



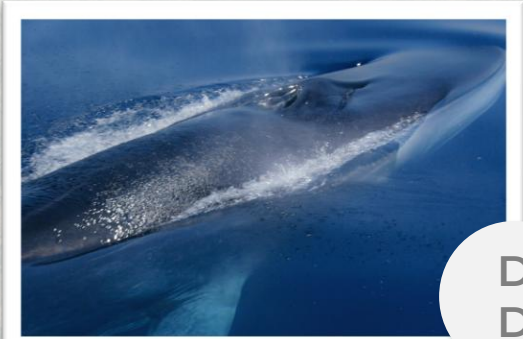
Since the 80's it was rising a widespread concern in Italy and France for the impact of pelagic driftnets and other human activities on cetacean populations in the area. These nets were finally banned in the 90'.





Since 2002 - Pelagos Sanctuary as a Specially Protected Area of Mediterranean Importance (SPAMI), under the Barcelona Convention





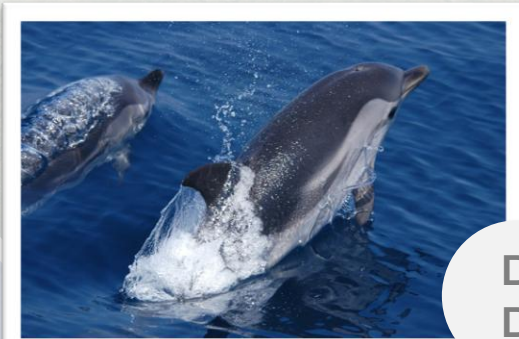
D
D

Fin whale (*Balaenoptera physalus*)



D
D

Common dolphin (*Delphinus delphis*)



D
D

Striped dolphin (*Stenella coeruleoalba*)



D
D

Sperm whale (*Physeter macrocephalus*)



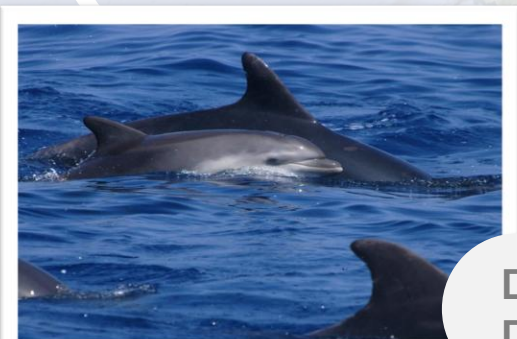
D
D

Cuvier's beaked whale (*Ziphius cavirostris*)



D
D

Risso's dolphin (*Grampus griseus*)



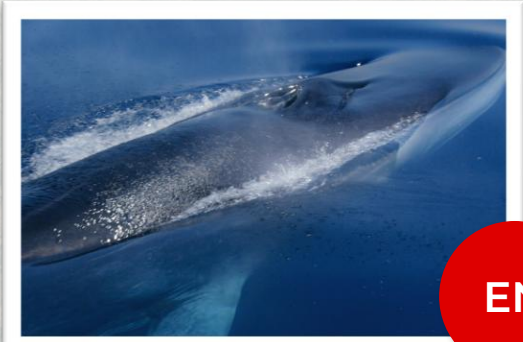
D
D

Bottlenose dolphin (*Tursiops truncatus*)



D
D

Long-finned pilot whale (*Globicephala melas*)



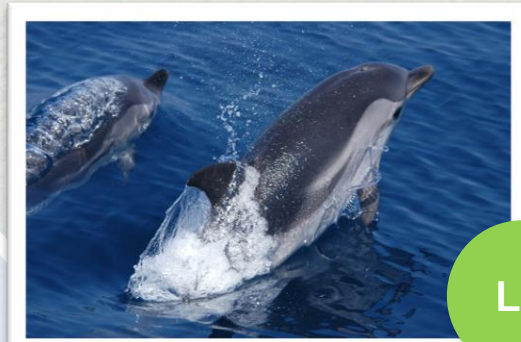
EN

Fin whale (*Balaenoptera physalus*)



EN

Common dolphin (*Delphinus delphis*)



LC

Striped dolphin (*Stenella coeruleoalba*)



EN

Sperm whale (*Physeter macrocephalus*)



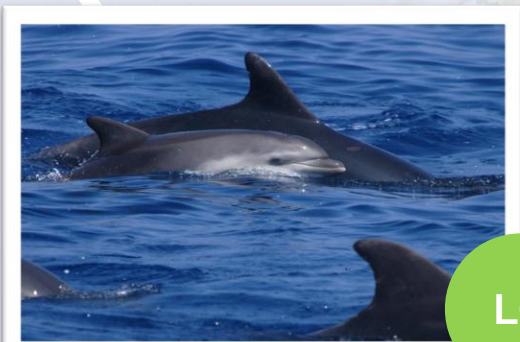
VU

Cuvier's beaked whale (*Ziphius cavirostris*)



EN

Risso's dolphin (*Grampus griseus*)



LC

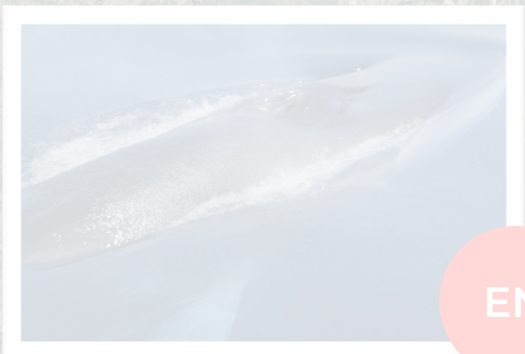
Bottlenose dolphin (*Tursiops truncatus*)



EN

Long-finned pilot whale (*Globicephala melas*)





EN

Fin whale (*Balaenoptera physalus*)



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Common dolphin (*Delphinus delphis*)



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Striped dolphin (*Stenella coeruleoalba*)



EN

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Cuvier's beaked whale (*Ziphius cavirostris*)



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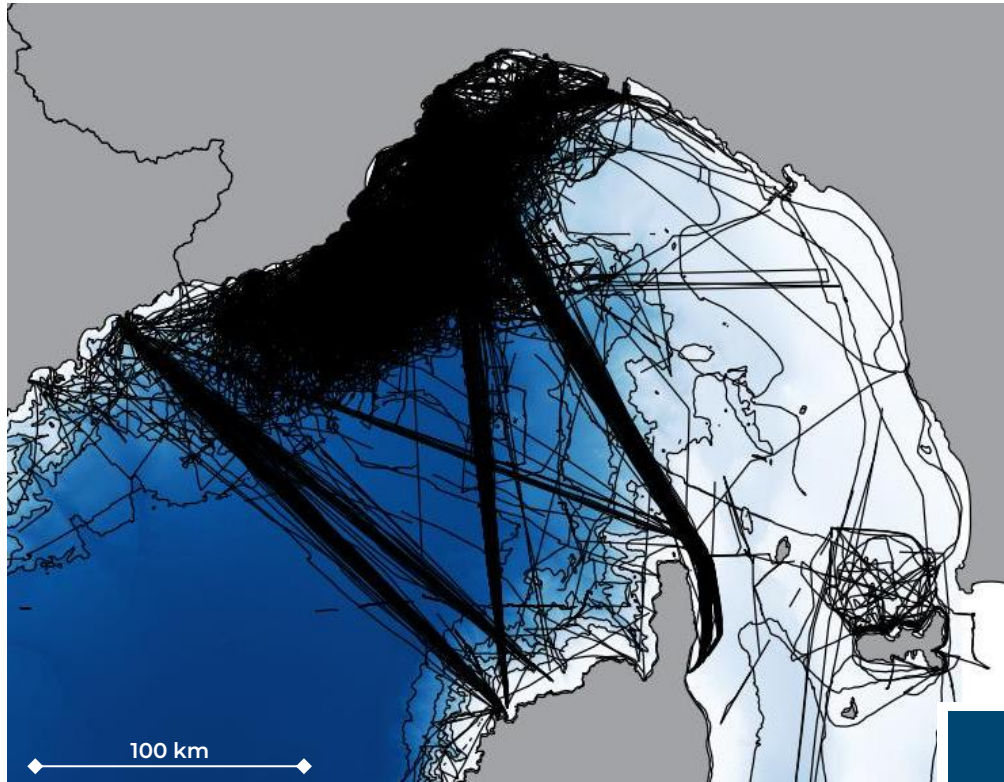


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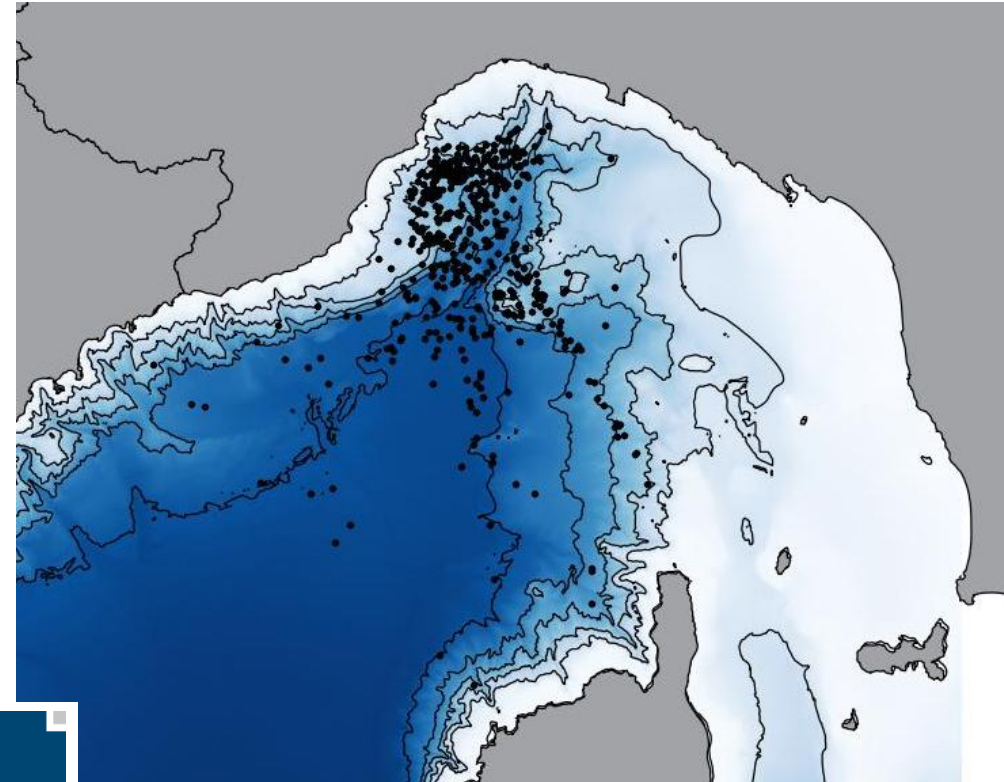
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**462.000 km of research effort
(2004 – 2024)**



**987 Cuvier's beaked whale sightings
(2004 – 2024)**





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A Photo-ID effort to catalogue individual whales has been ongoing since 2003

(more than 200 individuals catalogued)

2003

Aramir ID 3030921



2016



2024



M. Rosso photos – CIMA RF

Venus ID 3110603 with calf ID 3110603-2

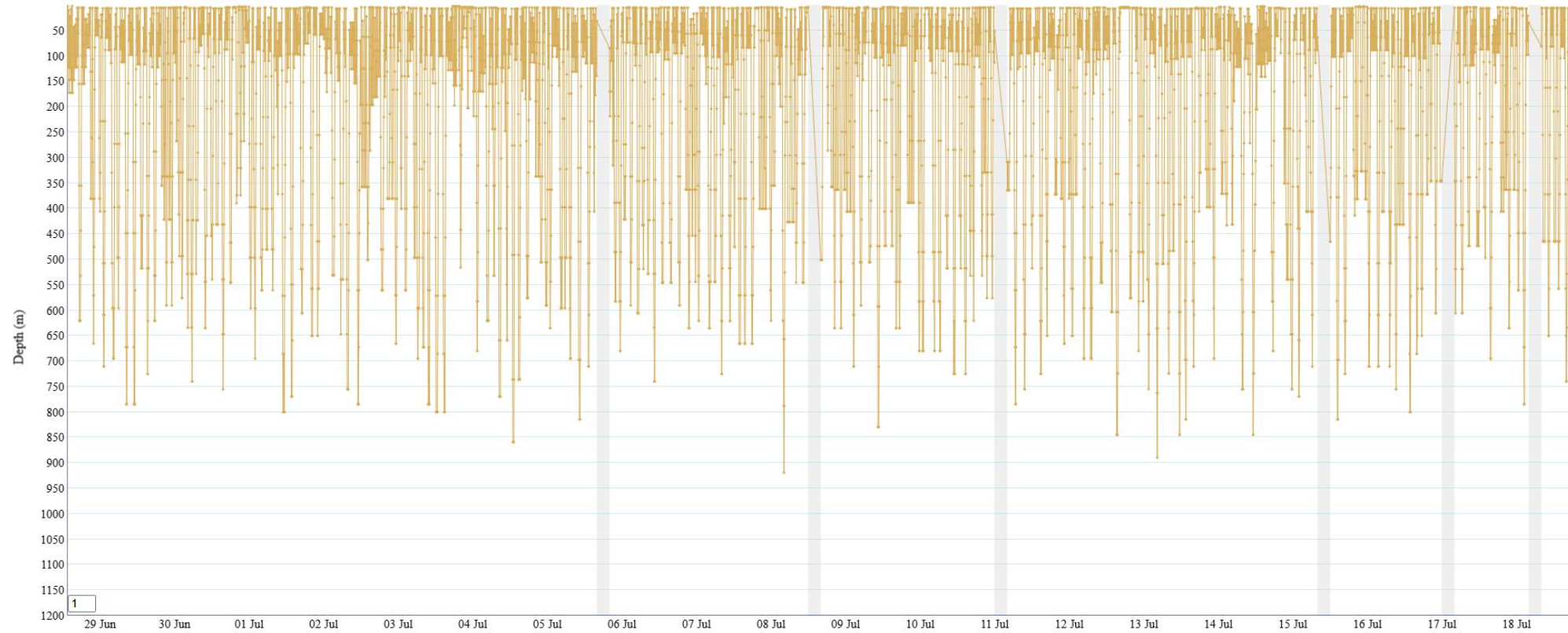


We have
already
entered
the 3rd
generatio
n of
whales!

A.D. Sechi photo – CIMA RF

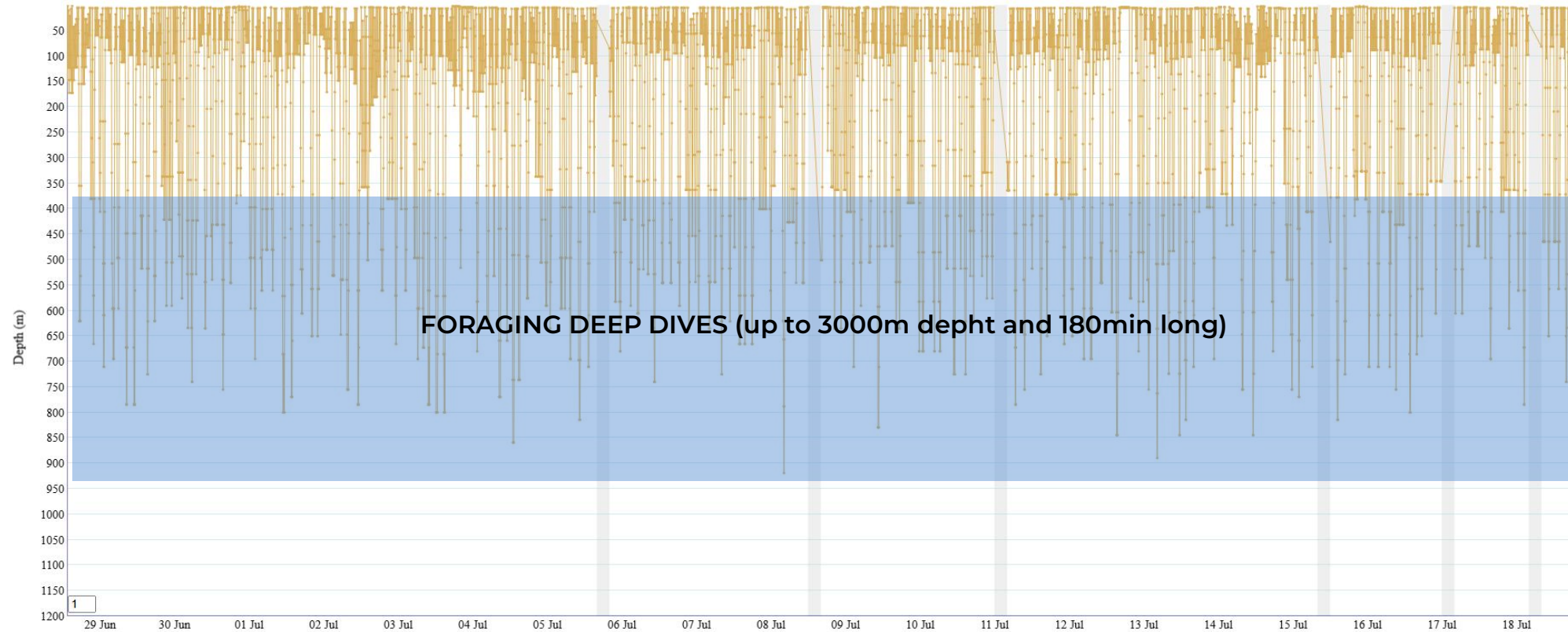


Satellite-linked telemetry to study diving behaviour and feeding ecology





Satellite-linked telemetry to study diving behaviour and feeding ecology



The prey: mesopelagic squids



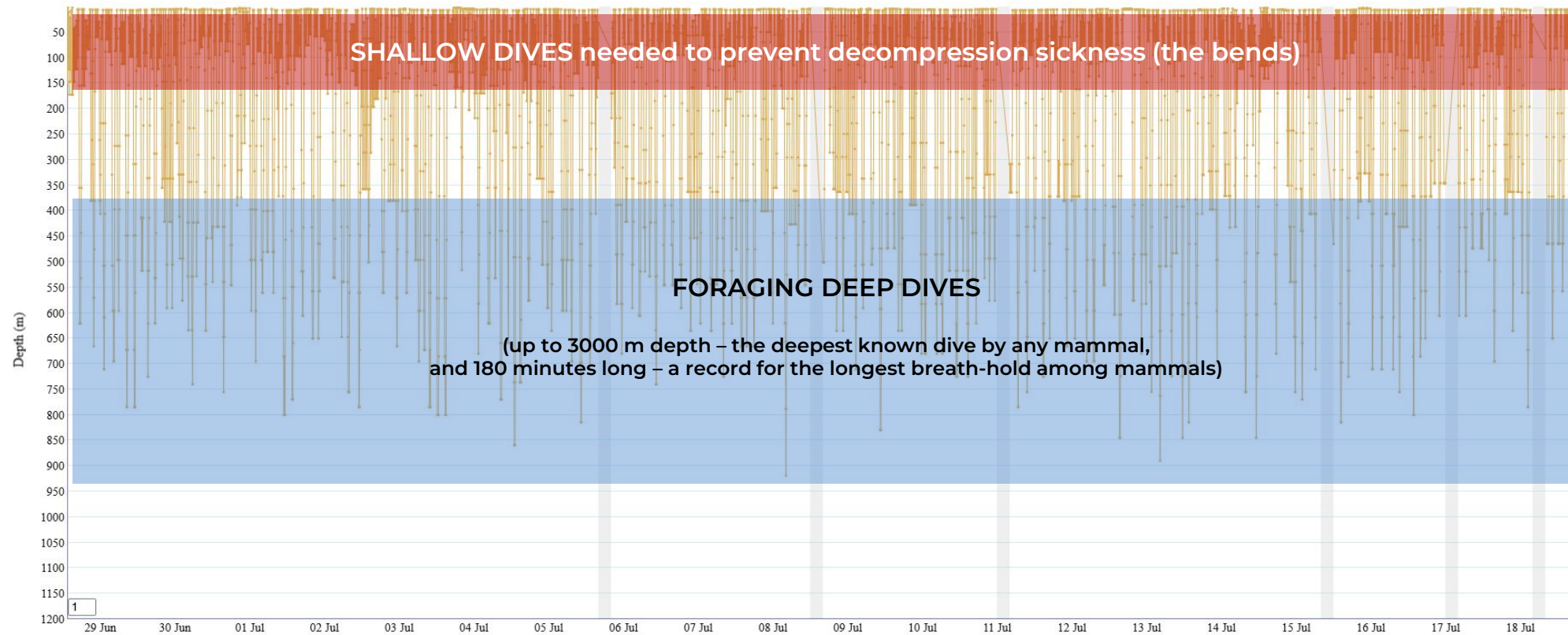
Artificially lit...



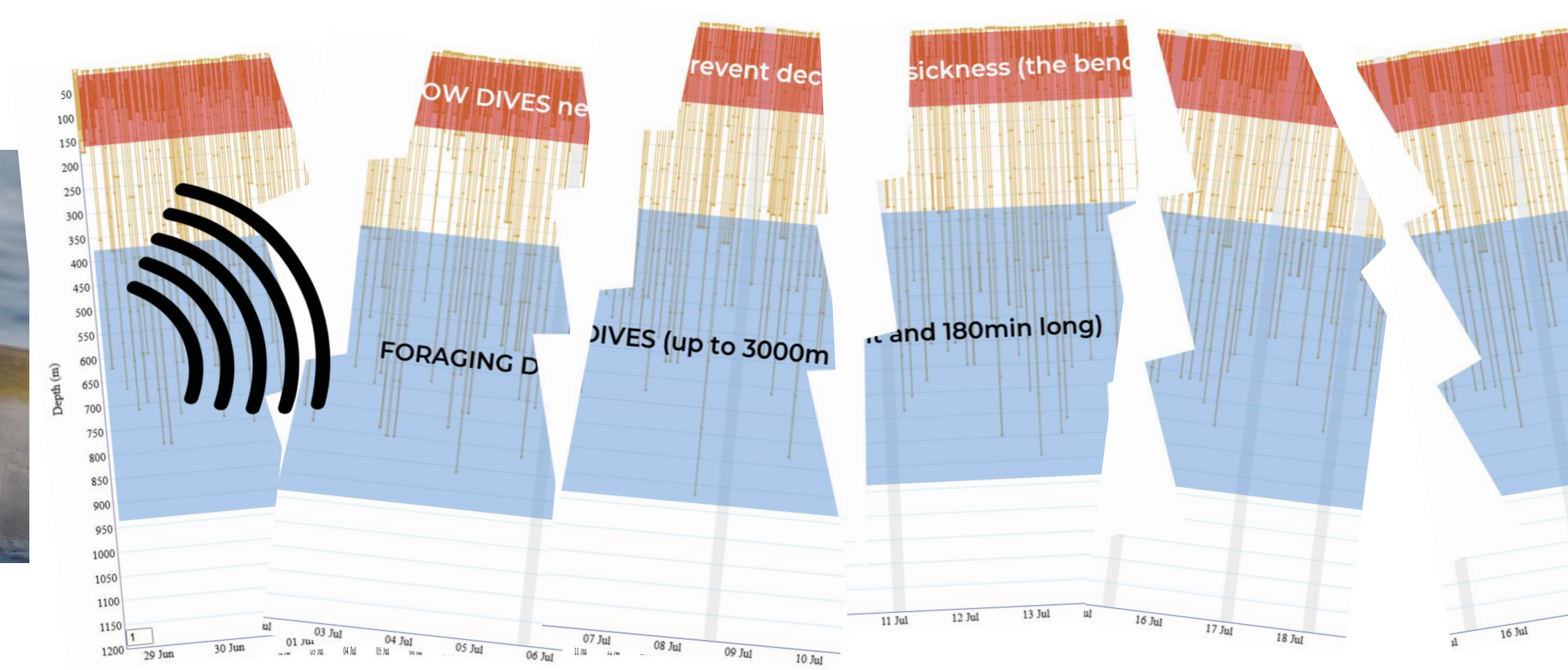
...as they look at depth



Satellite-linked telemetry to study diving behaviour and feeding ecology

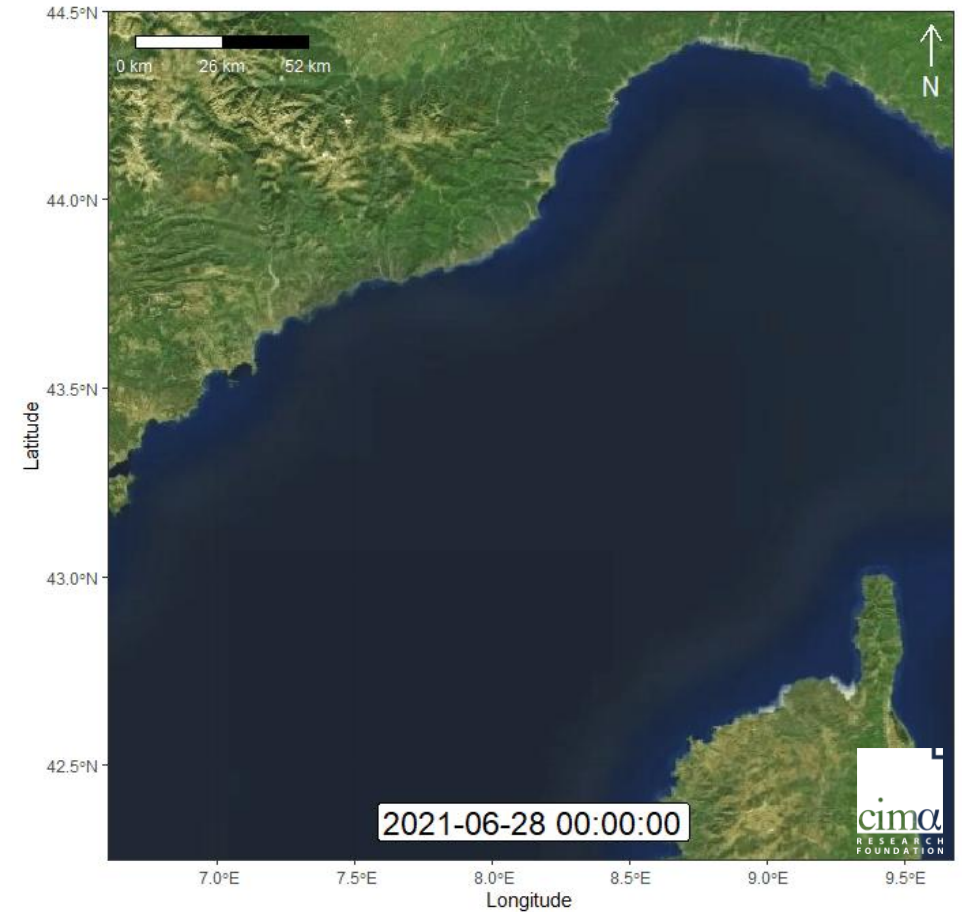


When exposed to sonar (e.g. MFAS) exhibit a range of strong avoidance and stress-related behaviors



...which can lead to decompression sickness due to gas emboli.

In general, noise pollution has an impact on this species

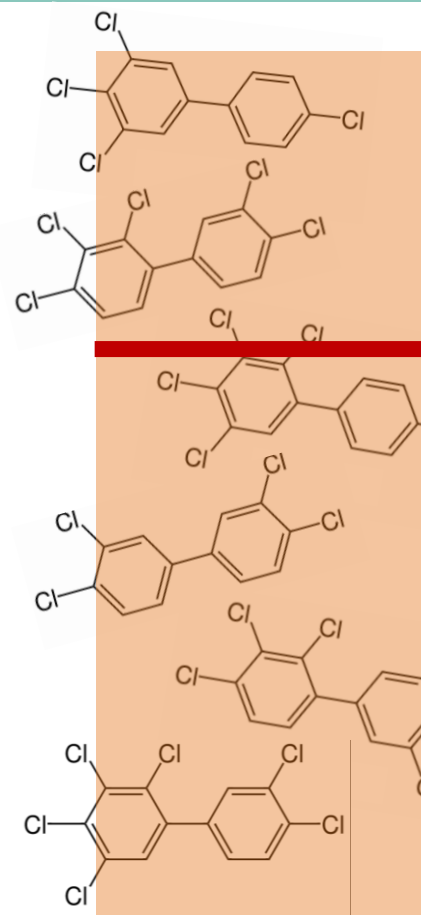


The noise generated by propeller cavitation masks prey echolocation, preventing the animal from hunting.

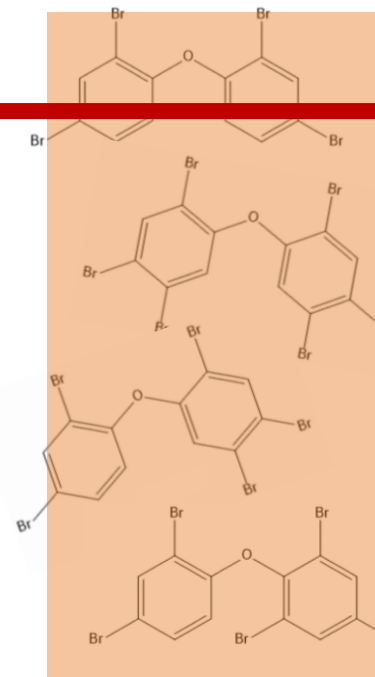


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Polychlorinated Biphenyls (PCBs)



Polybrominated Diphenyl Ethers (PBDEs)

9 mg/kg

**toxicity
threshold for
physiological
effects**

**over 80% of the whales analyzed
exceeded the toxicity threshold**

e.g. see Baini, Rosso, M. et al. 2020. First assessment of POPs and cytochrome P450 expression in Cuvier's beaked whales (*Ziphius cavirostris*) skin biopsies from the Mediterranean Sea. *Scientific Reports*, 10(1), p.21891.



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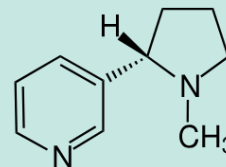
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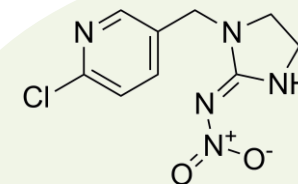
The immune system of Mediterranean cetaceans is compromised due to chemical pollution

Emerging contaminants:

drugs



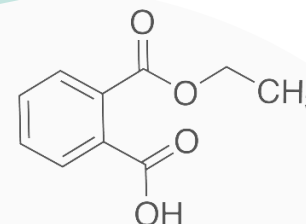
nicotine



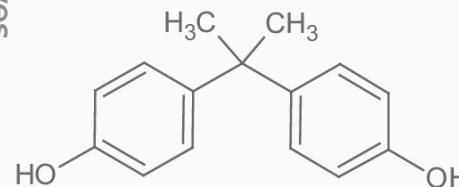
imidacloprid

insecticides

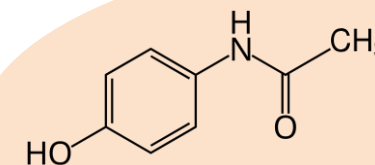
plastic additives



monoethyl phthalate



bisphenol A



paracetamol

pharmaceutical

Fossi MC, Limonta G, Baini M *et al.* Fin Whale as a Sink of Legacy and Emerging Contaminants: First Integrated Chemical Exposomics and Gene Expression Analysis in Cetaceans. *Environmental Science & Technology*, IN PRESS



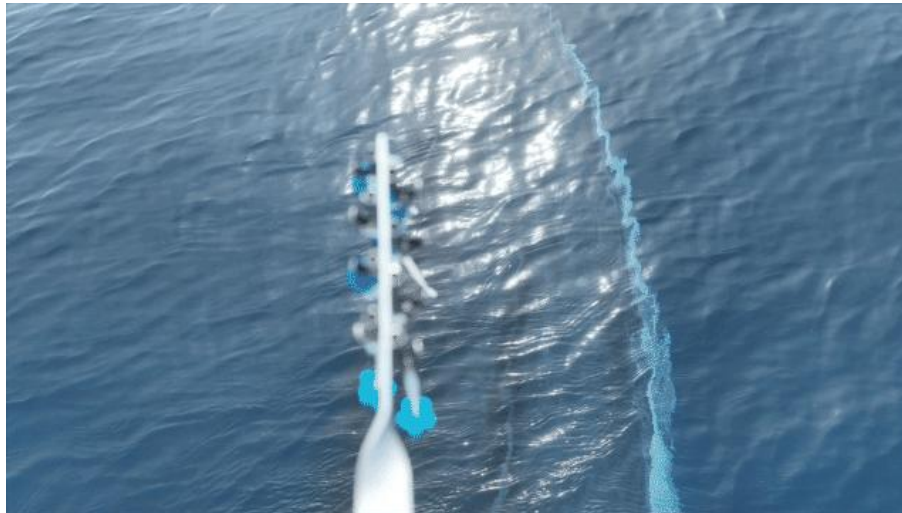
UNIVERSITÀ
DI SIENA
1240

Photogrammetry



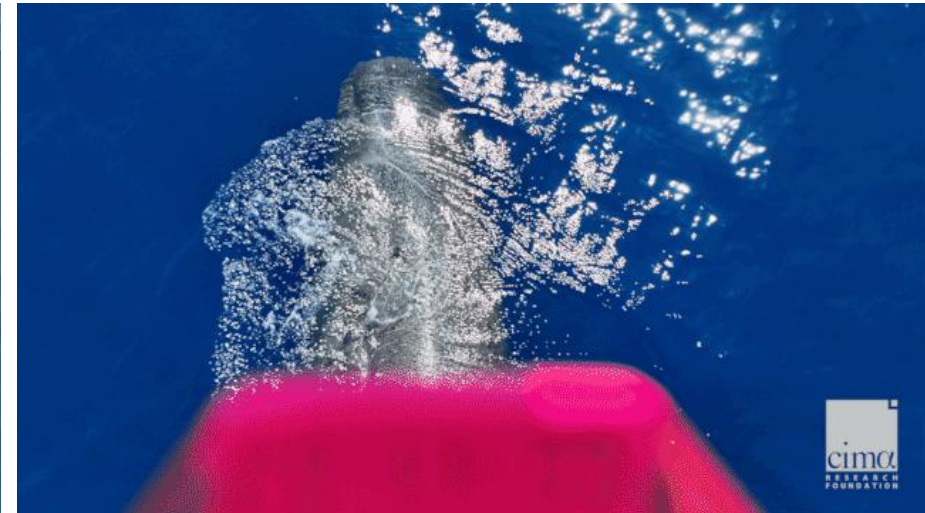
To assess body dimensions and nutritional status

Blow sampling



To monitor the microbiome and identify pathogens or spillover events

Biologging



To assess how nutritional status affects diving behavior



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Atypical mass strandings occurred in the past...



© Photo: Eva Maria / Equinac

...but unfortunately, they still occur today.



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- Cetaceans in the Mediterranean are facing multiple threats, and their conservation is at risk.
- There is an urgent need for behavioral studies to inform the development of effective mitigation strategies.
- A comprehensive identification of the various stressors acting upon these populations, along with an evaluation of their cumulative and synergistic effects, is essential for evidence-based conservation planning.
- Preserving cetaceans and other apex predators is critical, as their bottom-up regulatory role within the trophic web contributes significantly to the resilience and stability of (offshore) marine ecosystems.
- A proactive and measurable commitment from the private sector, especially maritime and marine-dependent industries, is essential to achieving conservation objectives and ensuring the long-term health of marine ecosystems.

