Collisions of Vessels with Cetaceans: How to mitigate an Issue with many Unknowns

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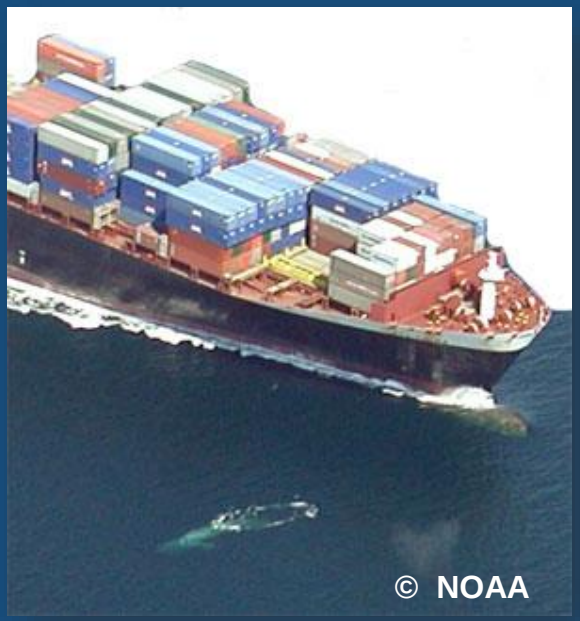
How do collisions occur?



Vessel types involved

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Species involved

Large whales

Small cetaceans

Cetacean images (except right whale): © MEER e.V.

Why do collisions occur?

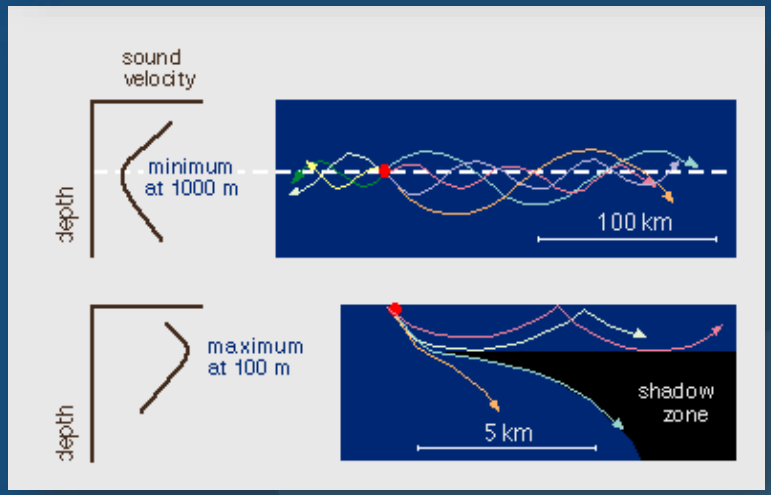
BEHAVIOUR OF CETACEANS

How do whales react? Or: why don't they react?

- Resting/sleeping
- Distraction by other behaviours
- Inter-species differences in responsiveness
- Reaction related to age/sex class or individuals
- Experience and learning
- Background noise, hearing damage (TTS, PTS)

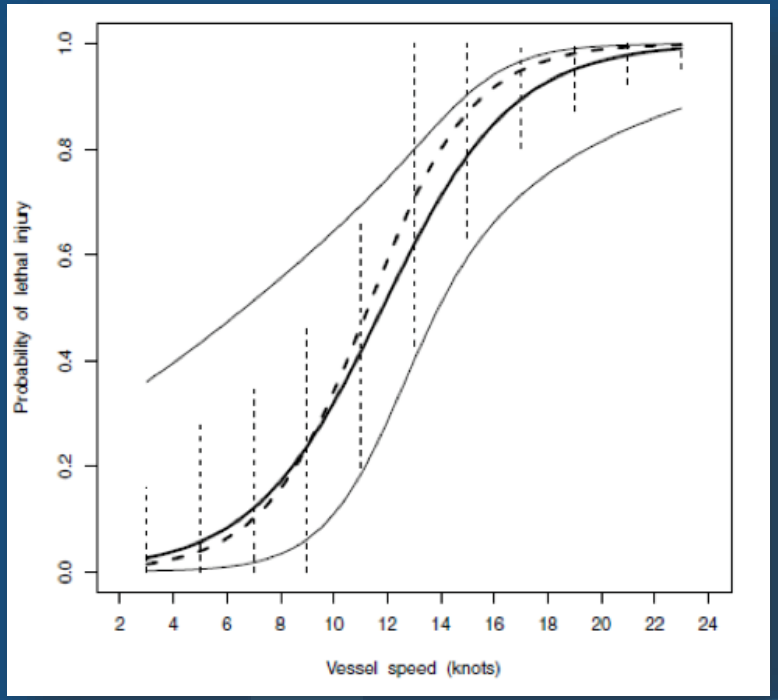
BEHAVIOUR OF SOUND IN WATER

- Refraction, bending, absorption
- Effects of bubbles, sound shadows, sound shielding
- Lloyd Mirror Effect, near field effects
- Cumulative noise from several sources



Speed and size of vessel matter

- The great majority of collisions leading to severe injury or death happened at speeds of 14 knots or more
- Most lethal or serious injuries are caused by large ships (80m length or more)
- 40 knots / whale at 600 m -> max. time for reaction = 30 seconds
- Large vessels might not be able to manouevre

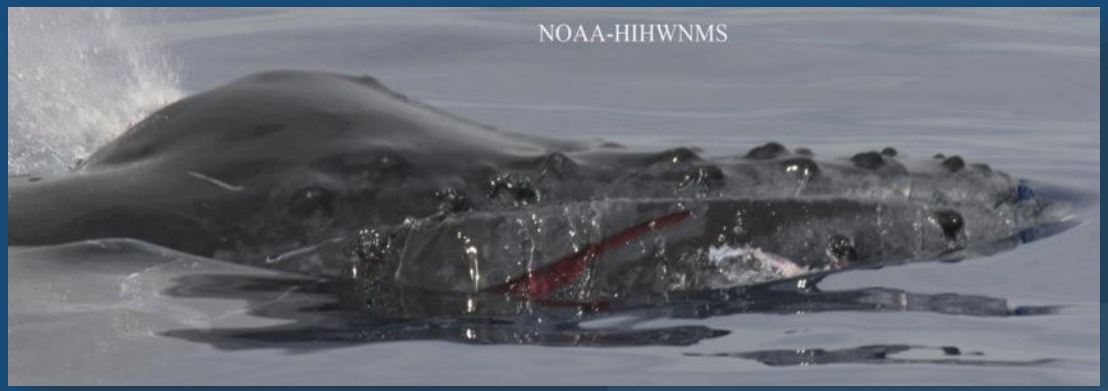


from Vanderlaan & Taggart (2007)

- Collisions may go unnoticed
- Injuries may not be identified at sea
- Collisions (purposely) may not be reported
- Animals may drift away and sink
- In stranded animals, collision may not be properly identified

Dark number

???



Photos: Courtesy David Matilla © NOAA

Technical mitigation measures

- SONAR — ***Only short range, additional source of noise***
- Acoustic Warning Devices — ***Additional source of noise, effectiveness?***
- Propeller guards, etc. — ***Technical & economic constraints***

- Night vision / Infrared systems / Thermal imaging

Limited range/effectiveness under adverse conditions

Alerting Tools

Passive acoustic monitoring off Boston (USA)

REPCET
Mediterranean Sea

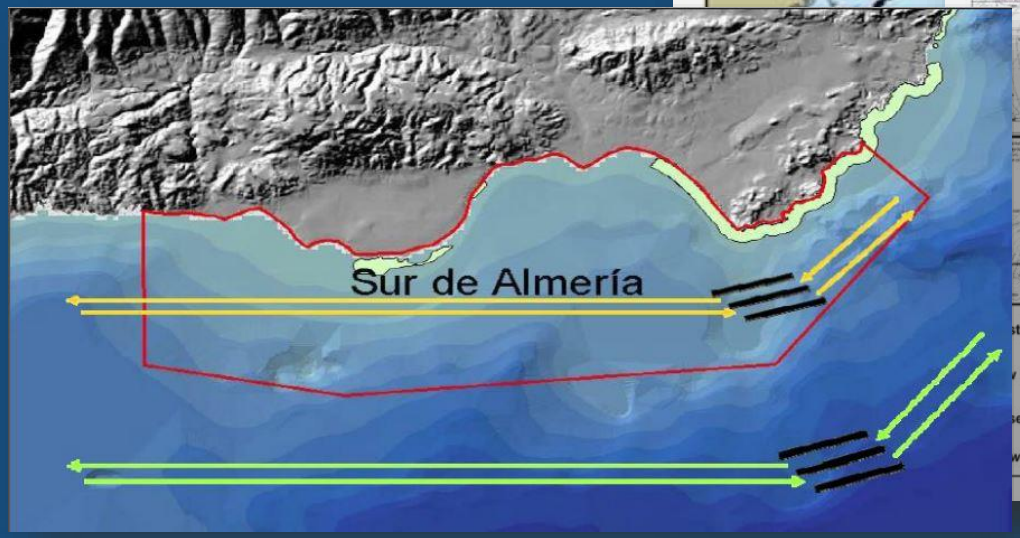
Whale Alert APP

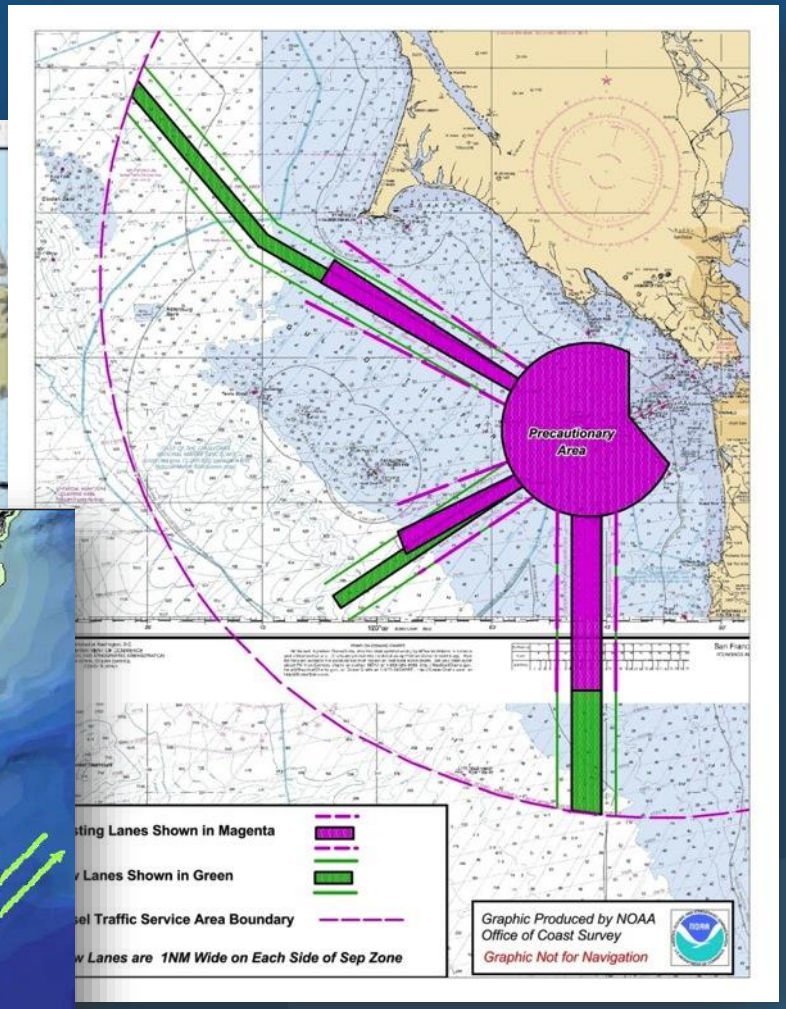
Onboard observers

Operational mitigation measures

Relocation of shipping lanes /
Traffic Separation Schemes

(IMO designation)





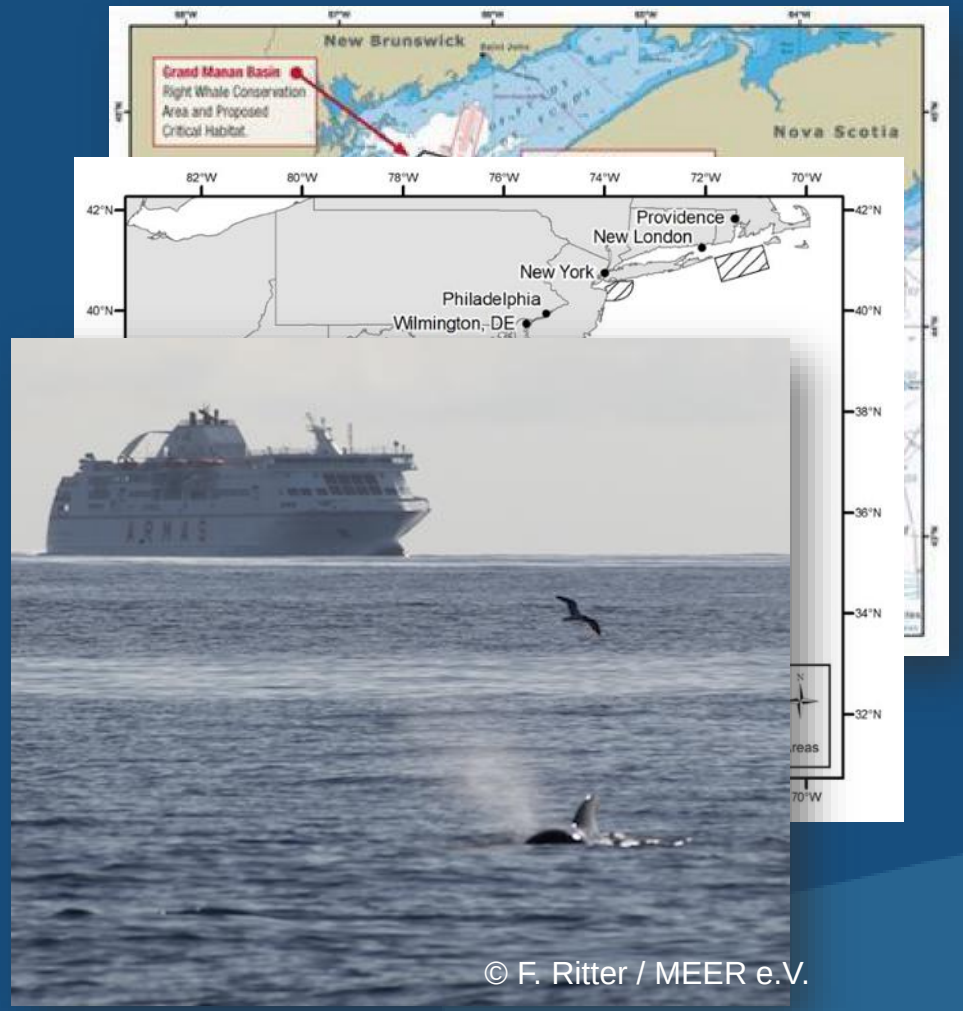
Mitigation: Operational Measures

Areas to be avoided, ATBAs (IMO designation)

Recommended / mandatory speed reductions (e.g. Strait of Gibraltar, Alaska, East coast US)

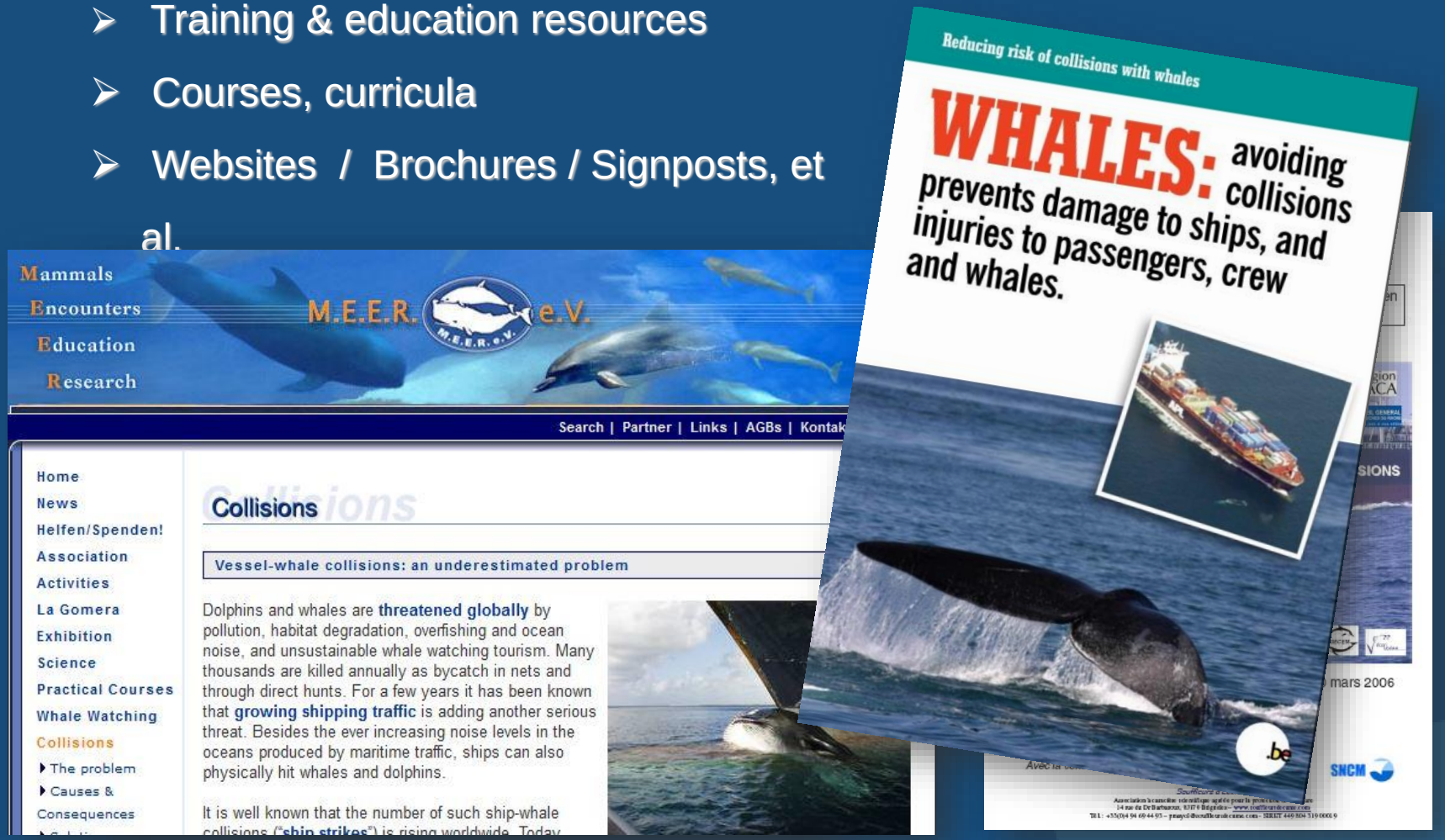
Mandatory reporting

Avoidance manoeuvres (?)



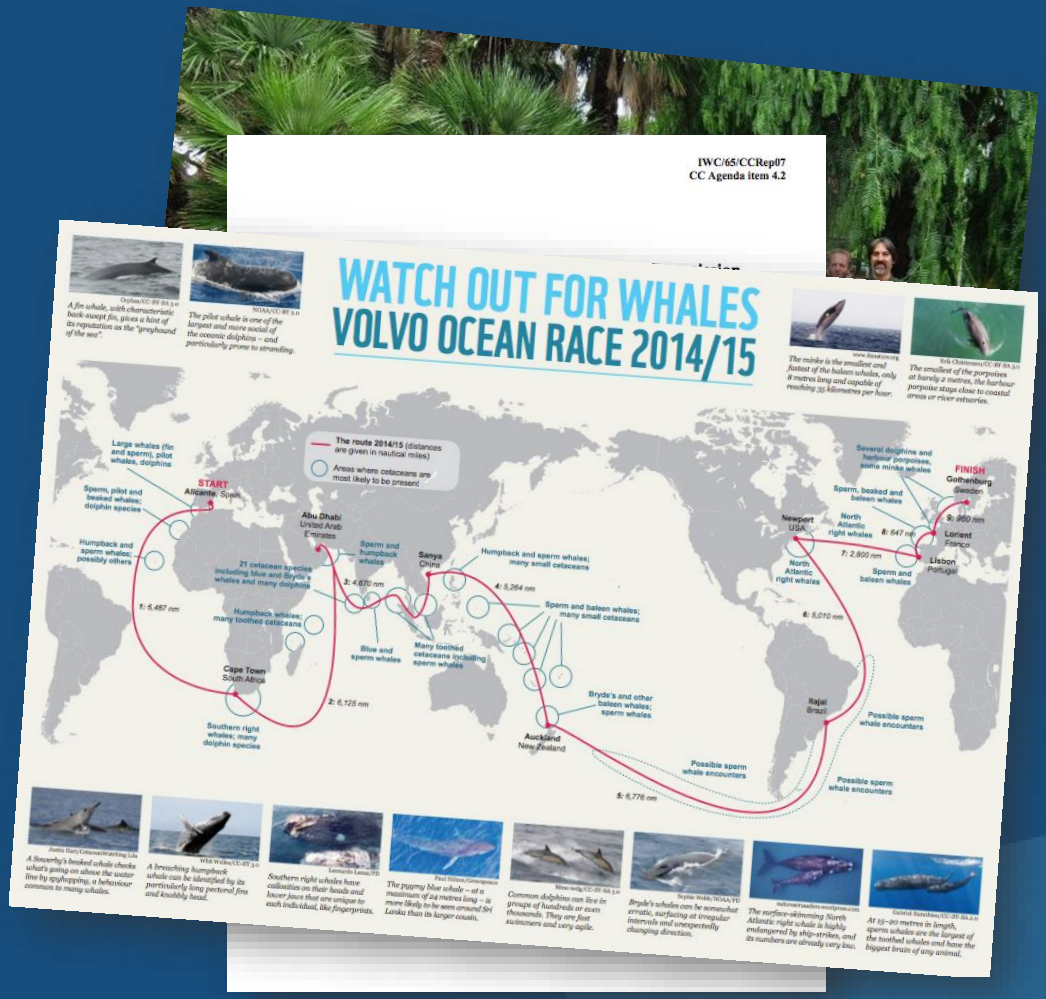
Mitigation: Educational Measures

- Training & education resources
- Courses, curricula
- Websites / Brochures / Signposts, et al.



The Role of IWC

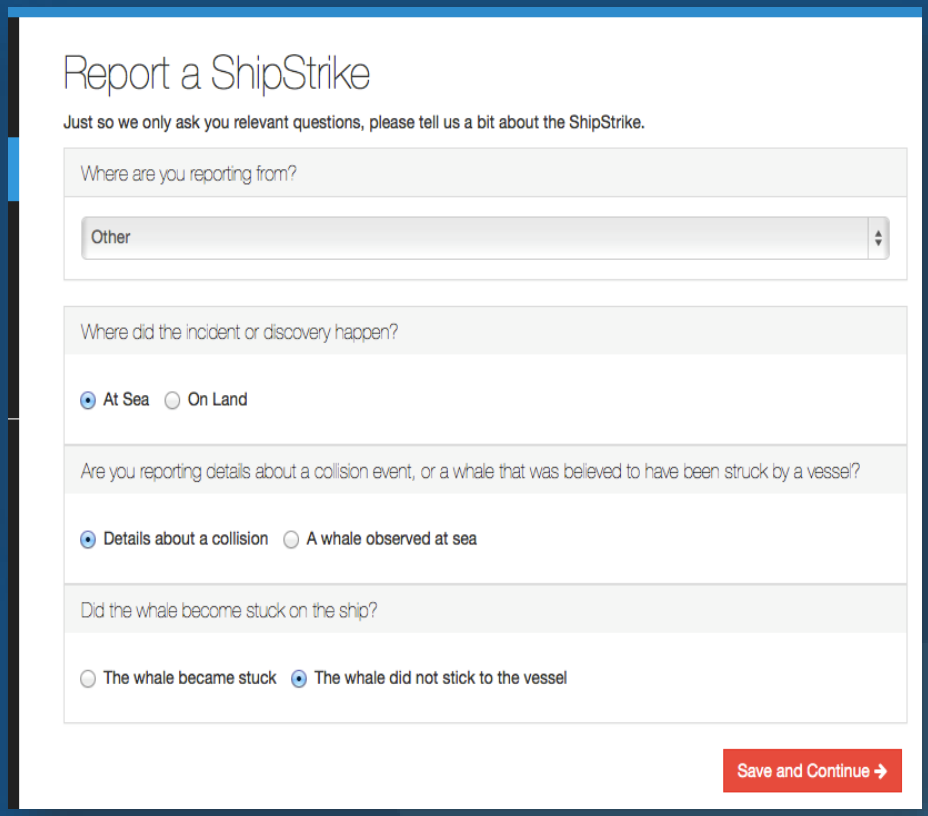
- Ship Strike Working Group
- Scientific Committee
- International Workshops:
  2010 – Beaulieu sur Mer (F)
  2014 – Panama
- Regular reports
- Guidance documents
- Collaborations



Reporting is essential !

IWC global ship strike data base

http://iwc.int/ship-strikes



Approx. 1,200 incidents

... and counting

Recommendations

- ✓ ***Separate vessels from whale***
- ✓ ***Reduce speed in whale area***
- ✓ ***Place on-board observers***
- ✓ ***Train crew & personnel, inform yourself***
- ✓ ***Report to IWC data base: http://iwc.int/ship-strikes***

Thank You! Merci! Gracias! Grazie! Dankeschön!