Munitions clearing as possible cause of death for unusually high harbour porpoise stranding numbers

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• Explosions can kill porpoises
• Harbour porpoises require a vital hearing for their orientation and prey capture because they use their bio-sonar
• Permanent hearing loss by large explosions is increasingly likely at distances of 12 to 7 km (von Benda-Beckmann et al. 2015)
Microscopic investigation of inner ear tissues:

Perioticum (P)

Complete destruction of the inner ear with replacement by granulation tissue (x) (=indication of healing)

Inner ear with focal bone sequester of necrotic bone (x) and vital ear bone (←)

- This animal died in a fishing net
- Injuries of ear tissues can be determined only in fresh animals
- Wounds can possibly heal but the ear is no longer functional
- Reason for bycatches might be hearing impairment
- Pingers won’t work for deaf porpoises
- High number of strandings in Poland 2019
- Unknown origin of strandings
- State of carcasses indicate that animals could have died far away

- Average surface currents from West and North
- Reverse drifting model could help
- Daily surface current data are available (e.g. from BSH)
Munitions clearing as possible cause of death?

Nordstream 2 (26 August 2019 completion in RU, FI, SE, DE)
58 detonations May/June 2018 in Finland, bubble curtain used for large charges; 2019?
Denmark permission granted as late as October 2019

Swedish Navy 2019
„No detonations“ (but how about UXO companies?)

Danish Navy 2019
21 Detonations in Fehmarn Belt and Kiel Bight 13 Sep-26 Nov 2019 (only one in September)

NATO exercise 29 Aug – 18 Sep 2019
45 detonations in Germany (Fehmarn Belt) in harbour porpoise nursing area

Windfarm cluster Rönne Bank including cables

➢ Freely accessible contemporary data on explosions needed
Update on the NATO detonations in Natura 2000 site Fehmarn Belt in Aug 2019

- 45 detonations of British WWII ground mines in Fehmarn Belt in a MPA which is a harbour porpoise nursing area (during nursing period)
- Germany is still investigating the case
- Working group of Ministries of Defence, Environment and Transport
- Noise loggers and PODs were in the water during detonations
- Expected results: (1) Noise radiation model, (2) assessment of the (in-) effectiveness of mitigation measures conducted (i.e. deterrence), (3) results of ear examinations stranded harbour porpoises – Report will be published by the Federal Ministry for the Environment (BMU) in summer 2020 (in German)
More trouble ahead
Currently there are plans to explode a WWII mine 3 km off the coast of Gdynia in the entrance of Puck Bay (PL) next week!

- Puck Bay is an important area for the Baltic Proper harbour porpoise as indicated by sightings, bycatches and acoustic data (e. g., Skóra & Kuklik 2003).

- For mitigation, a German provider of bubble curtains offered a bubble curtain at no cost. It is now a matter of political willingness and quick decisions to avoid a disaster for harbour porpoises of the Baltic Proper population.

Planned detonation site and 10 km radius as a very rough approximation of possible hearing damage for harbour porpoises