



Jérôme Chladek

# Listen to your PAL!

## Innovative alerting device significantly reduces western Baltic harbour porpoise bycatch

Jérôme Chladek<sup>1\*</sup>, Lotte Kindt-Larsen<sup>2</sup>, Boris Culik<sup>3</sup>, Matthias Conrad<sup>4</sup> and Christian von Dorrien<sup>1</sup>

### Background

Western Baltic harbour porpoises bycatch mortalities through gillnets are very high and should be reduced. Conventional pingers, devices emitting loud artificial noises, do deter harbour porpoises away from gillnets but can have serious drawbacks:

- Habitat exclusion from areas with gillnets equipped with pingers
- „Silencing” echolocation in harbour porpoises
- Increased bycatch rates near faulty pingers
- Possible long-term habituation to pinger signals with no prior learning association of pinger signal to gillnet presence
- Possibly decreasing long-term effectivity as a bycatch mitigation device

### New approach

The new approach tested in this study is to alert – not to deter – harbour porpoises, using a new kind of acoustic alerting device (**P**orpoise **A**lert, **PAL**), which emits a life-like synthetic harbour porpoise communication signal instead of artificial noise. The signal induces harbour porpoises to increase distance from the sound source as well as echolocation rate<sup>5</sup>. But does this translate to bycatch reduction of harbour porpoises in commercial gillnet fisheries? This question was investigated in this study.

### Differences PAL to pinger

- Signal known to harbour porpoises: **Alerting not deterring**
- Allows learning association of **PAL-signal = gillnet-presence**

Funded by the German Federal Ministry of Food and Agriculture (BMEL) Grant Nr. 2819100612 to F<sup>3</sup>, Boris Culik and Grant Nr. 2819100512 to Thünen Institute, Christian von Dorrien. We thank the participating fishermen for their continuous and dedicated engagement.



### Methods

Paired experiments at 1 Danish and 2 German commercial gillnetters during normal fishing: 50 % nets without PAL and 50 % with PAL

- Net characteristics (mesh size, length & height) same between net pairs
- Setting & hauling of each net pair during same fishing trips
- Data registration: Self-Sampling, on-board observer and remote electronic monitoring (REM) on one German and the Danish vessel

### Results: PAL-Project harbour porpoise bycatch

In total, 967 net hauls were analysed. Overall, 17 harbour porpoise were bycaught in normal nets, while only 5 harbour porpoises were bycaught in nets equipped with PALs. The results reveal a significant effect of the PAL (Fisher's exact test, two-tailed,  $p = 0.0163$ ). This 71 % bycatch reduction shows that PAL are effective as a harbour porpoise bycatch mitigation tool. In a wider perspective

the PAL development can be considered as proof of concept to develop successful alerting devices; following 3 major steps:

1. Identification of population-specific signal types through behavioural studies
2. Test of signal effect on population in situ<sup>5</sup>
3. Test in commercial fisheries

