Applying the wireless detection system (WDS)– a real-time monitoring tool for harbour porpoise activity around construction sites

Miriam J. Brandt, Caroline Höschle, Vladislav Kosarev, Ansgar Diederichs, Georg Nehls

e-mail: m.brandt@bioconsult-sh.de

INTRODUCTION:

In Germany, harbour porpoises are to be deterred with a consecutive use of pinger and sealscarer from the vicinity of offshore construction sites before the start of noise-intense activities. To date, the effectiveness of such deterrence measures is usually monitored by deploying CPODs to record porpoise echolocation activity. However, CPOD-data can only be examined after they are retrieved from the monitoring site. Here, another passive acoustic monitoring technique, the Seiche 'Wireless Detection System' (WDS) was used to verify a successful deterrence of harbour porpoises in real-time.

METHODS AND RESULTS:

Two studies testing the effectiveness of WDS:

1. WDS application (Fig.1) during construction of the windfarm NordseeOst, North Sea, Germany: during 28 out of 41 piling events porpoises were detected (68%). In these cases, deterrence measures were repeatedly applied (Fig.2).

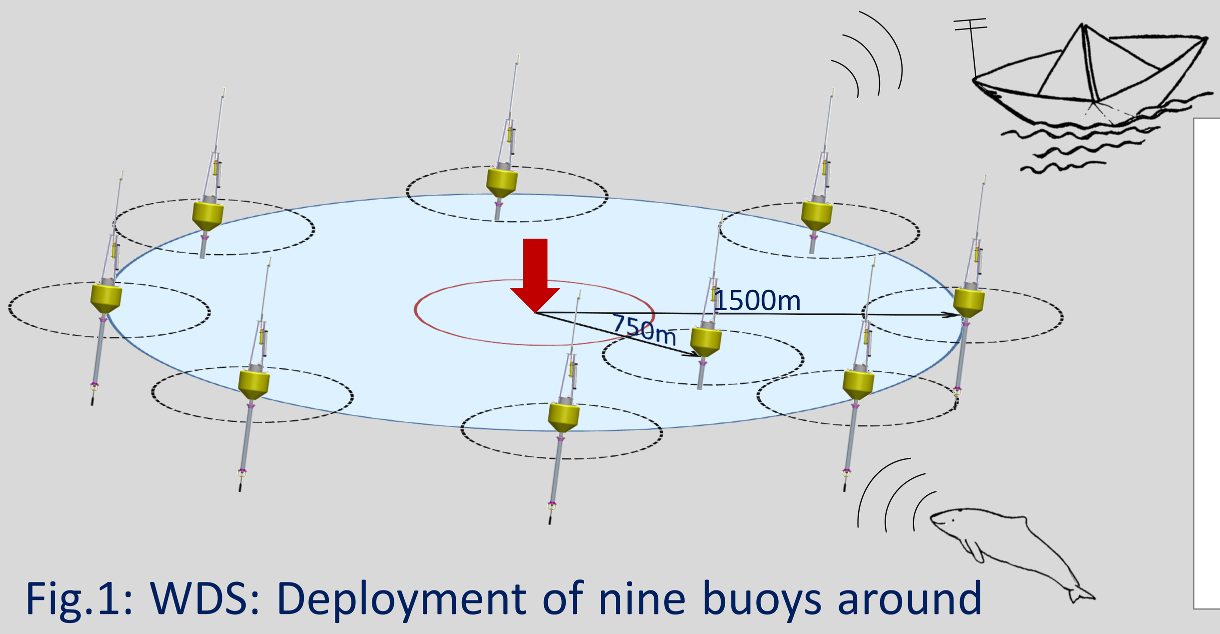

Fig.1: WDS: Deployment of nine buoys around the construction site, with hydrophone signals transmitted to the monitoring vessel via a radio frequency link.

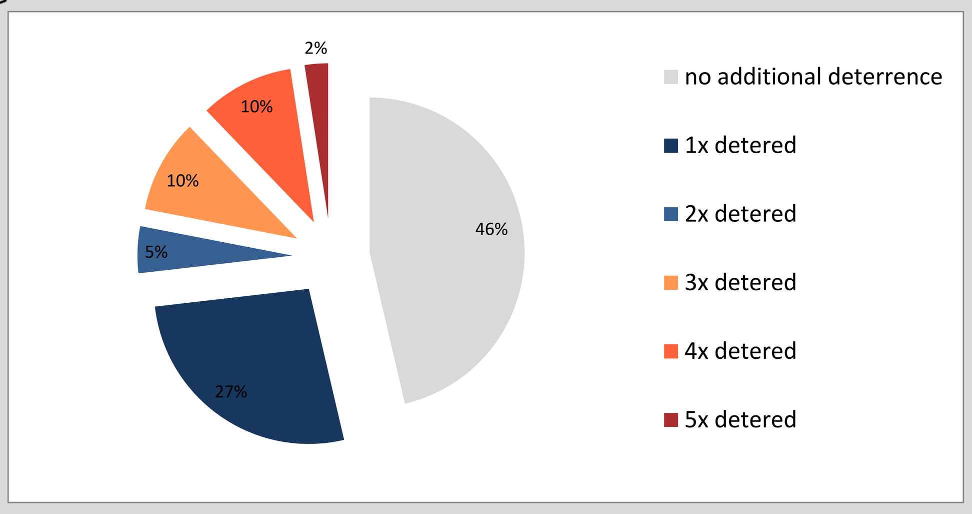

Fig.2: While in 46% of cases deterrence was successful after the first application, the sealscarer needed to be redeployed following porpoise detections during 56%.

2. Comparison of the detection range/ probability of porpoises by WDS buoy and CPOD using comparisons of visual tracking and echolocation recordings on both devices:

Av. maximum detection range (136 visually recorded tracks):

CPOD: 32 tracks: 106 ± 44 m (records only click trains)

WDS: 35 tracks: 140 ± 79 m (only clicks as trains)

52 tracks: 194 ± 97 m (all clicks)

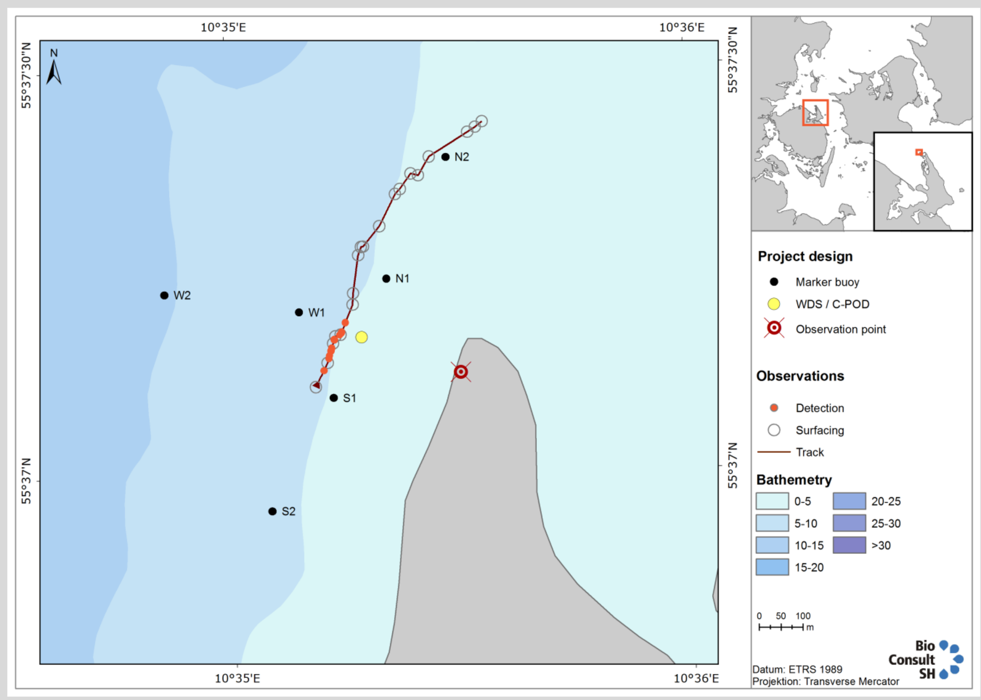

Fig.3: Swimming path of a porpoise and detections by the WDS.

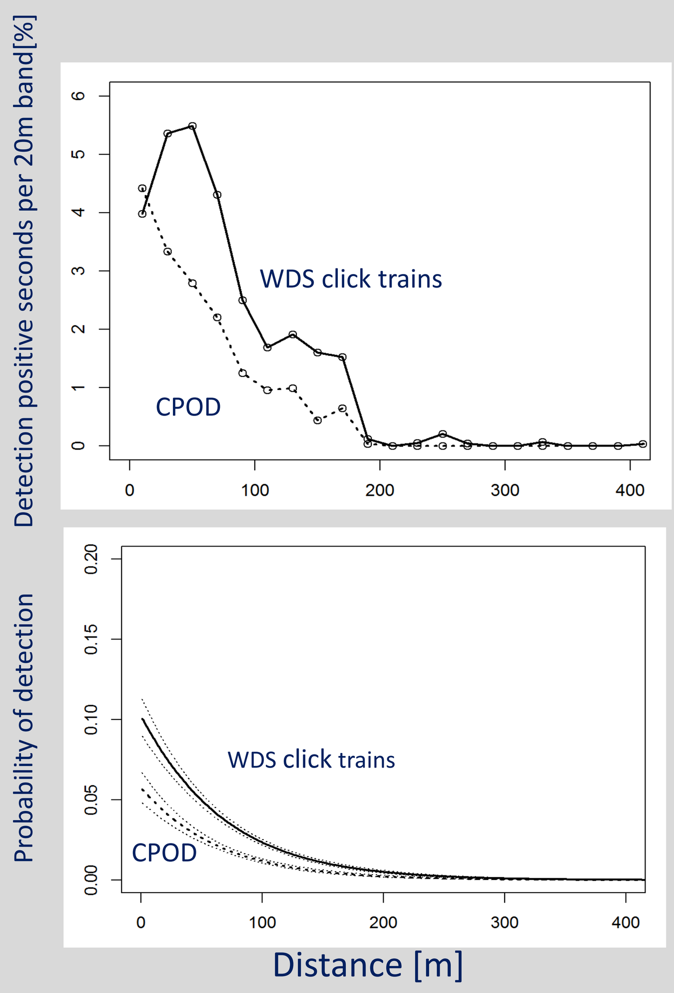

Fig.4: % of porpoise seconds (upper) and modelled detection probability (lower) by WDS and CPOD relative to all seconds that porpoises spent at a given distance, pooled for 20 m bands for all tracks in relation to distance.

Similarly decreasing detection probability with distance by WDS and CPOD (Fig.4) with only few detections at distances greater than 200m.

Within the 200m range porpoise tracks/recordings were examined in more detail. Out of 80 tracks the WDS detected a total of 39 tracks (48.8 %), the CPOD detected 32 tracks (40 %); 22 tracks (27.5 %) were detected by both devices, 17 (21.3 %) by the WDS only and 10 (12.5 %) by the CPOD only.

In order to be detected with a 50% probability by the recording device, porpoises had to spend on average 271 sec within a 200m around the WDS and 398 sec within 200m around the CPOD (Fig.5).

Therefore, the probability of detecting porpoises is greater for the WDS than the CPOD.

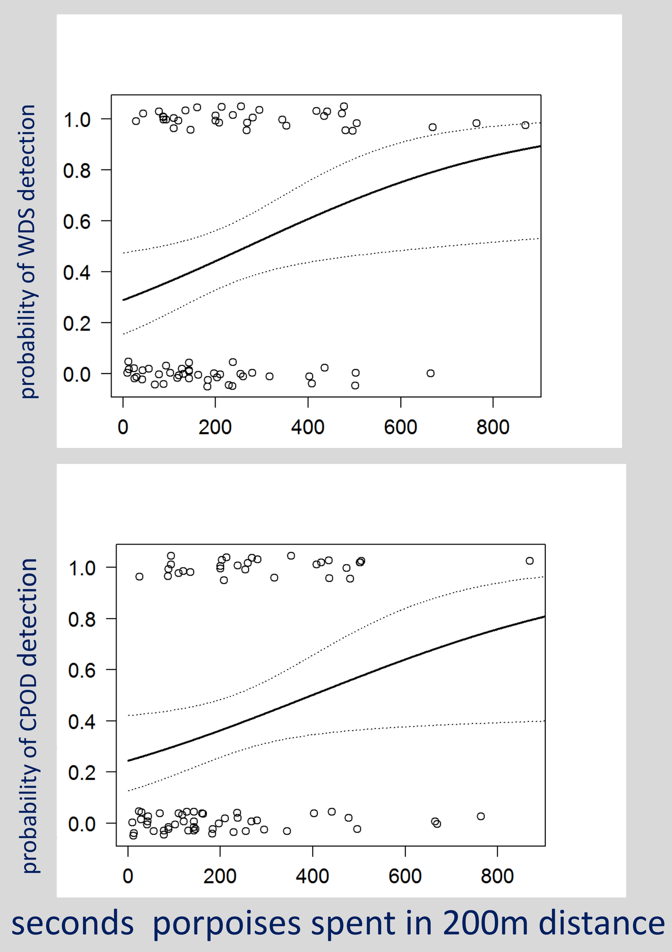

Fig.5: Detection function within 200m.

CONCLUSION:

The WDS is an effective tool for real-time detection of harbour porpoises within the vicinity of offshore construction sites. Real-time detection allows to immediately respond to porpoise presence with effective deterrence measures. A system with 9 buoys provides a good spatial coverage of the impact area. Detection range by the WDS is about 200m and porpoise presence of 4-5 min within this range is required for a 50% detection probability. Averaged maximum detection range and detection probability is larger for the WDS than the CPOD. The present information enables to adapt the deployment design according to specific needs during construction projects.

Acknowledgements:
This study was funded by RWE. Thanks to Seiche and all persons involved in the study.

BioConsult SH, Schobüller Str. 36, D-25813 Husum