

Memo

To: Moray East
From: Paul Thompson, University of Aberdeen
Date: 6th March 2019

Subject: Noise monitoring requirements for Moray East UXO clearance

Purpose: This note summarises discussions during and following a meeting with Moray East on Weds 27th Feb 2019, where we reviewed advice and recommendations from SNH on UXO clearance, and explored how best to implement recommendations for noise monitoring.

Overview: Given previous experience of monitoring underwater noise in this area during the Moray Firth Marine Mammal Monitoring Programme (MMMP), I questioned the feasibility of trying to use over-the-side mid-water recordings to characterise the noise from these explosions. Given the findings of an In press paper that I co-authored with Gordon Hastie using previous recordings of impulsive noise ₁, I also queried the selection of distances at which recordings should be made if this was primarily to reduce uncertainty over the distance at which received levels ceased to be considered impulsive.

During the meeting with Moray East, I phoned Caroline Carter at SNH to explore if SNH would consider the alternative of using multiple bottom-mounted noise recorders at a broader range of distances. Caroline confirmed that this would be acceptable.

Following the meeting, I also phoned Nathan Merchant at CEFAS, who agreed that recordings from multiple bottom mounted noise recorders were more likely to provide reliable recordings for these analyses.

Proposal: Based on this, we propose to modify the timing and location of deployments of noise recorders which the University of Aberdeen are about to undertake for Moray East construction monitoring.

This will allow the following data to be collected with minimal additional resource requirements or boat time (estimated to be 2-3 days for a single vessel depending upon weather delays in the UXO clearance programme)

- Recordings of all 18 UXO events, at multiple distances from source using an array of bottom mounted Soundtrap and SM2M recorders (see Figs 1 & 2).
- Vessel based over-the-side recordings at approximately 5km from source for the largest UXO. These would be made at multiple depths using a 4-hydrophone array on a 4-channel Soundtrap.
- Simultaneous vessel based CTD surveys to assess how temperature, salinity and stratification may influence propagation.

Together, we suggest that this will provide a more complete picture of how the characteristics of noise from UXO clearance vary with distance and depth.

The vessel based data will be available for immediate analysis to provide an indication of maximum received levels, and recovery of other data at the end of UXO clearance will subsequently provide a more complete picture over a broader range of UXO clearance events.

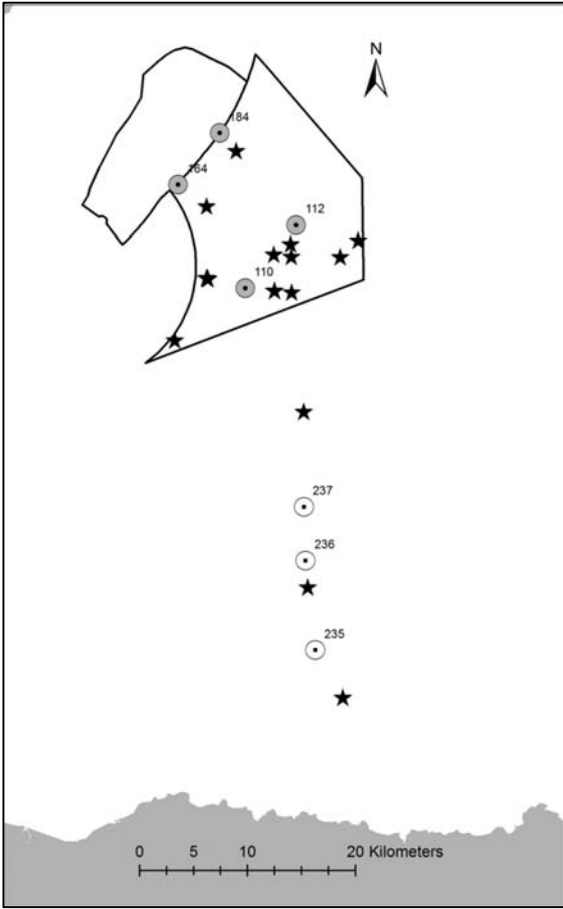


Fig 1. Map of the Moray Firth showing the Moray East and BOWL wind farm boundaries and the location of UXO (Black Stars). Four bottom mounted noise recorders (shaded circles) will be deployed within the Moray East site throughout the UXO clearance programme to record all events at multiple distances. Three bottom mounted noise recorders (open circles) will be deployed along the cable route for the minimum period required to capture the clearance of the larger UXOs in this area.

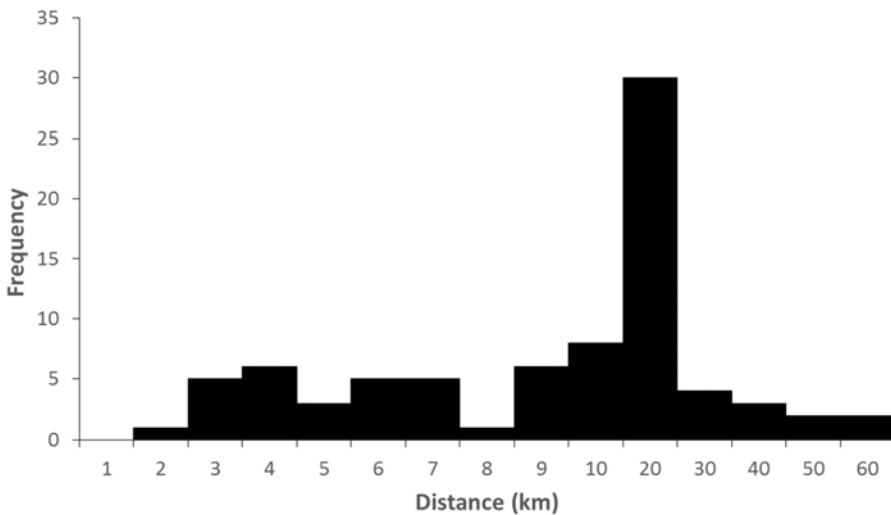


Fig. 2. Frequency distribution of distances between noise recorder locations and the 18 UXO devices. (Note the x axis is not linear to provide a clearer indication of variation in the near field).

1. Hastie, GD, Merchant, ND, Götz, T, Russell, DJF, Thompson, PM & Janik, VM (In Press) Effects of impulsive noise on marine mammals: investigating range-dependent risk. *Ecological Applications*.