“Dinner-bell” effect and audibility of different pinger sounds in grey seals *(Halichoerus grypus)*

Andrea Cabrera

INTRODUCTION

Pingers (acoustic deterrent devices) are considered to serve as “dinner bells” to seals, attracting them to gillnets, as they have learned to associate pinger sounds with potential food (i.e. the so-called “dinner-bell” effect). The seal-fisheries conflict arises because seals follow the pinger sounds and feed on the fish caught in the nets, not only causing catch losses but also expensive gear damage. The present study aimed to test the audibility of three different pinger sounds in grey seals in order to find a pinger sound that is inaudible to seals (i.e. does not produce a “dinner-bell” effect).

METHODS

PART I: IN THE WILD

Study site: Bay of Bråviken, Sweden.

Experimental design: Twenty stations baited with fish were serviced from Aug to Nov 2017.

Treatments: - Aquamark100 pinger 

- Aquatec 2446 pinger 

- Banana pinger 

- Control (no pinger)

PART II: IN CAPTIVITY

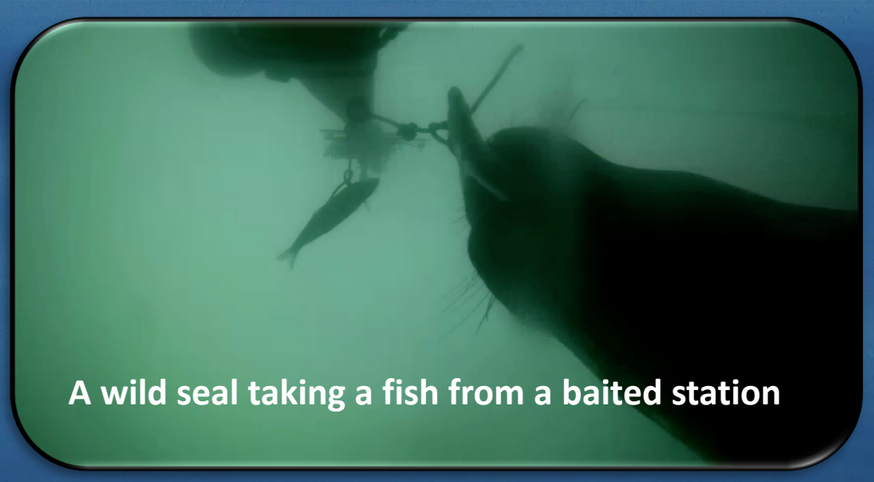
Study site: University of Southern Denmark’s Marine Biological Research Centre. Kerteminde, Denmark.

Experimental design: Audibility tests of pingers were carried out using a go/no-go procedure. If the seal detected a sound, it touched the response target with its snout. If it did not detect a sound, it remained on its position.

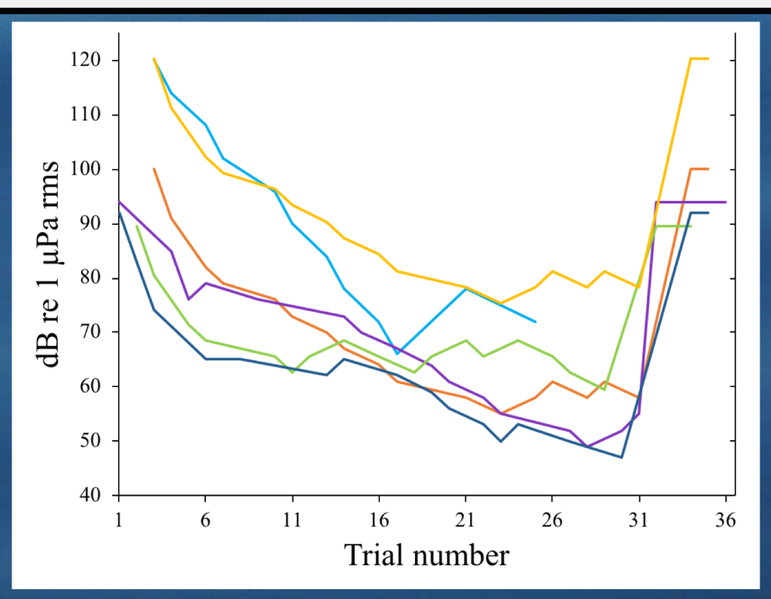
Treatment: Aquamark100 pinger sound 

RESULTS & DISCUSSION

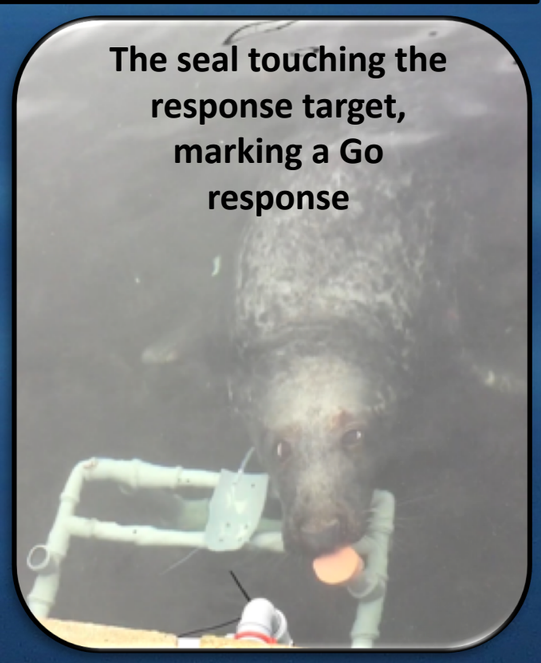
- No significant difference was found between frequencies of fish taken in the different treatments (Aquamark100, Aquatec 2446, Banana pingers, and Control) in the study in the wild. Perhaps seals were either (i) not so abundant in the study areas in Bråviken; or (ii) they were not hungry enough to take the fish bait.
- The audibility study in captivity revealed that the Aquamark100 pinger should be heard up to distances of more than 2 km. Based on published audiograms and taking the frequency spectrum of the Aquatec 2446 and Banana pingers into account it is suggested that these pingers are audible only for 58 and 76 m in theory, thus, that their possible “dinner-bell” effect would be very limited.
- Future similar studies may benefit from the use of live fish as bait, testing sites of usual conflict between seals and fisheries, and the use of fishing gear.
- Further investigation of the behavioural ecology of seals in relation to the “dinner-bell” effect, and to fishing gear as well as obtaining an updated audiogram for grey seals is crucial to contribute in solving the seal-fisheries conflict.



A wild seal taking a fish from a baited station



Successive hearing thresholds in 6 sessions for Aquamark100 sounds
(Multiharmonic sound with frequency range: 20-120 kHz, peaking at 70 kHz)



The seal touching the response target, marking a Go response

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SDU DEPARTMENT OF BIOLOGY