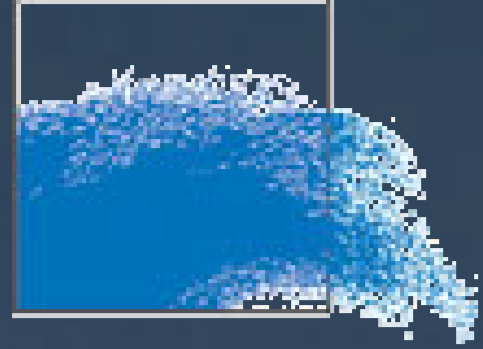


The impact of pile-driving on seabass eggs and larvae

Elisabeth Debusschere^{1,3}, Hans Hillewaert¹, Sofie Vandendriessche¹, Kris Hostens¹, Magda Vincx³, Dick Botteldooren⁴ and Steven Degraer^{2,3}



Management Unit of the North Sea Mathematical Models, Belgium

¹ Institute for Agricultural and Fisheries Research (ILVO), Animal Sciences, Biological Environmental Research

² Royal Belgian Institute of Natural Sciences, Management Unit of North Sea Mathematical Models (MUMM)

³ University of Ghent, Biology Department, Marine Biology Section

⁴ University of Ghent, Department of Information Technologie, Research Group Acoustics



Offshore wind farm

Reference noise ~90-100 decibels (re 1 μ Pa)

low frequency underwater noise

Construction phase ~186 decibels (re 1 μ Pa @ 750 m zero to peak sound pressure level)

strong impulse low frequency underwater noise

Potential impact on marine wild life

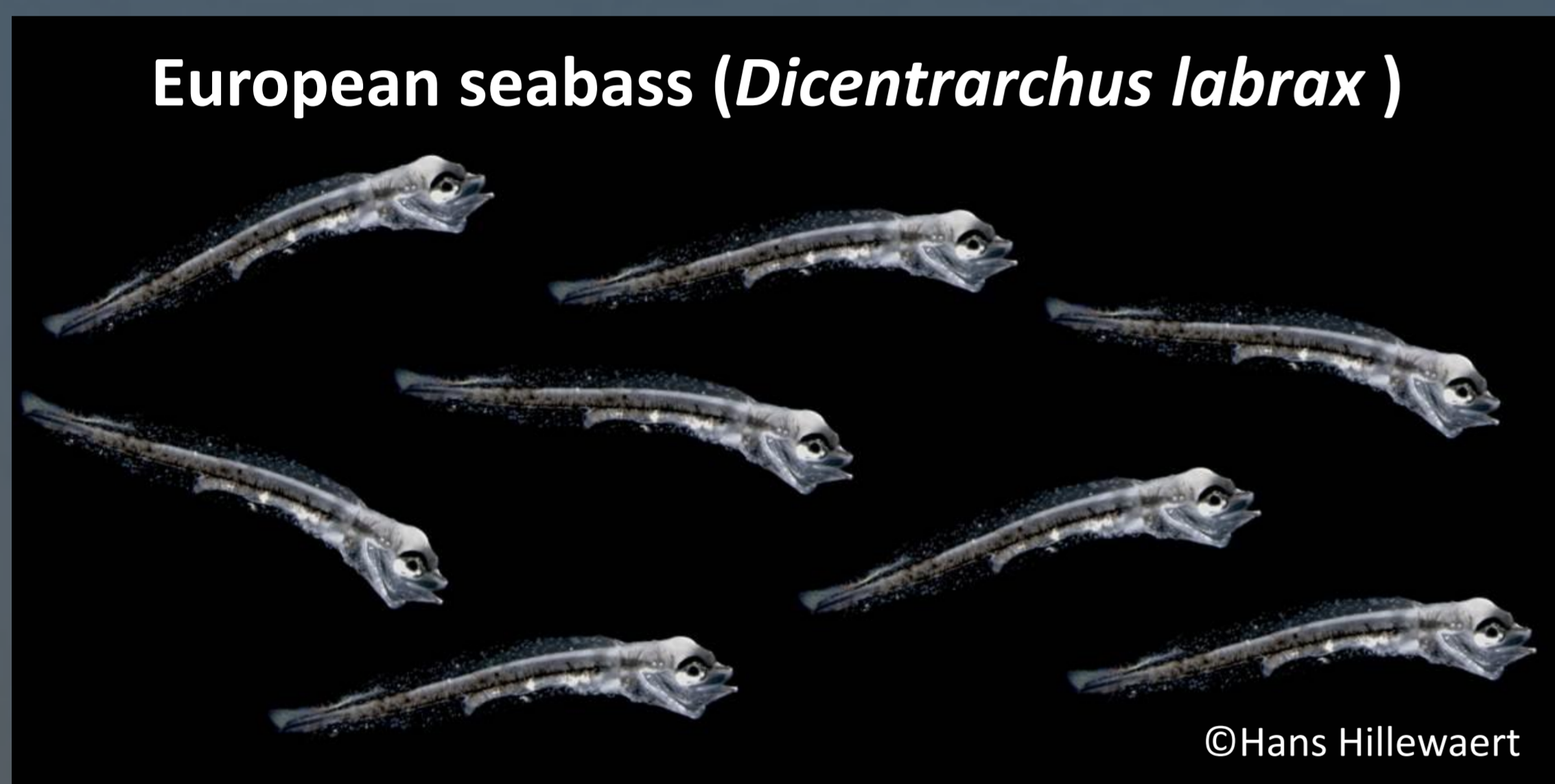
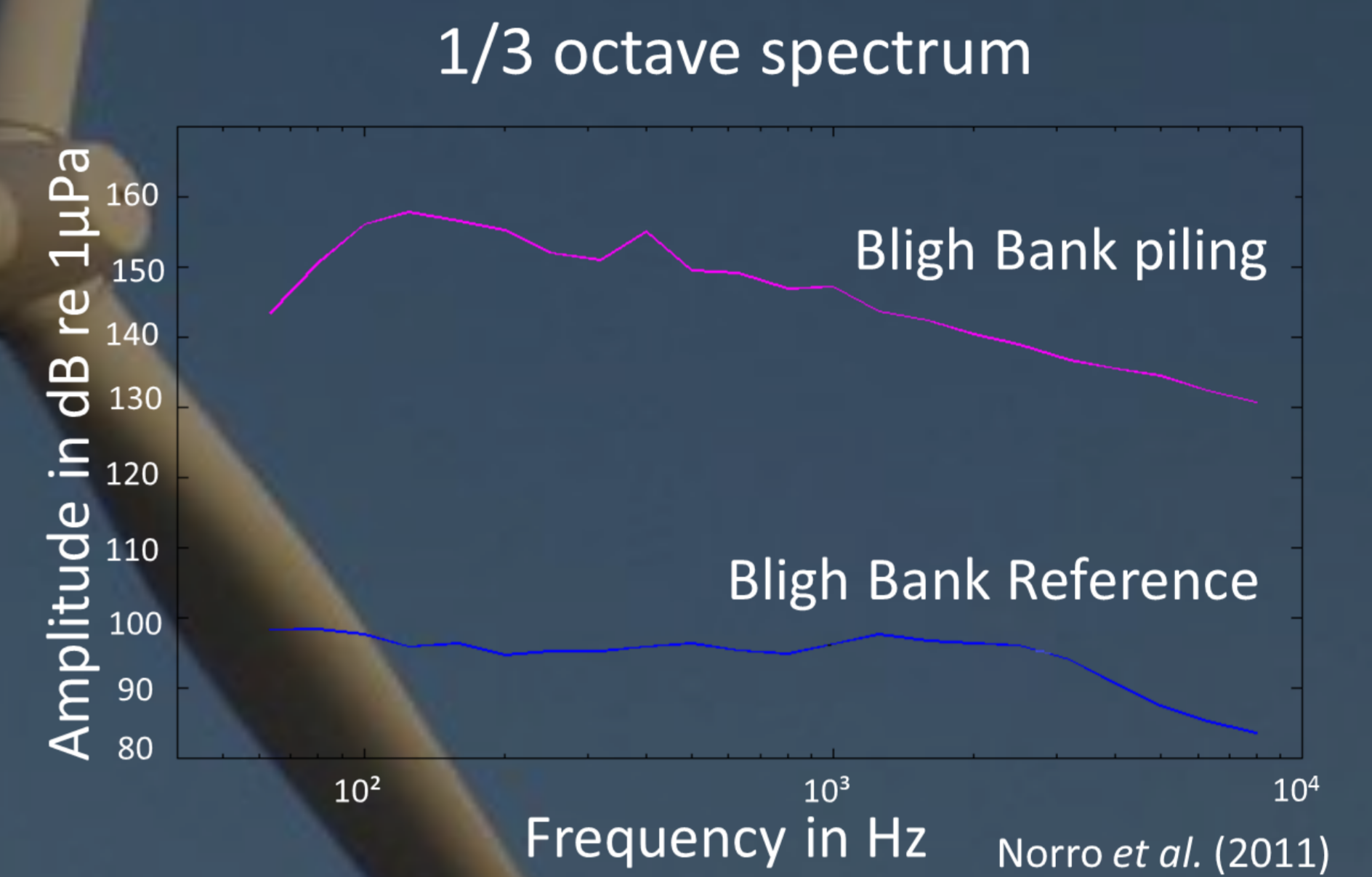
Barotrauma, auditory injury, mortality, disturbance of natural behaviour, stress

Great gaps + extrapolation is difficult

➔ **Need to examine fish eggs and larvae**

MSFD 11th Descriptor to achieve a Good Environmental Status (GES)

In Belgium the interim criterion based on the precautionary principle states that “the level of anthropogenic impulsive sound sources is less than 185 dB (re 1 μ Pa @750 m zero to peak sound pressure level)” ➔ **More research is needed**

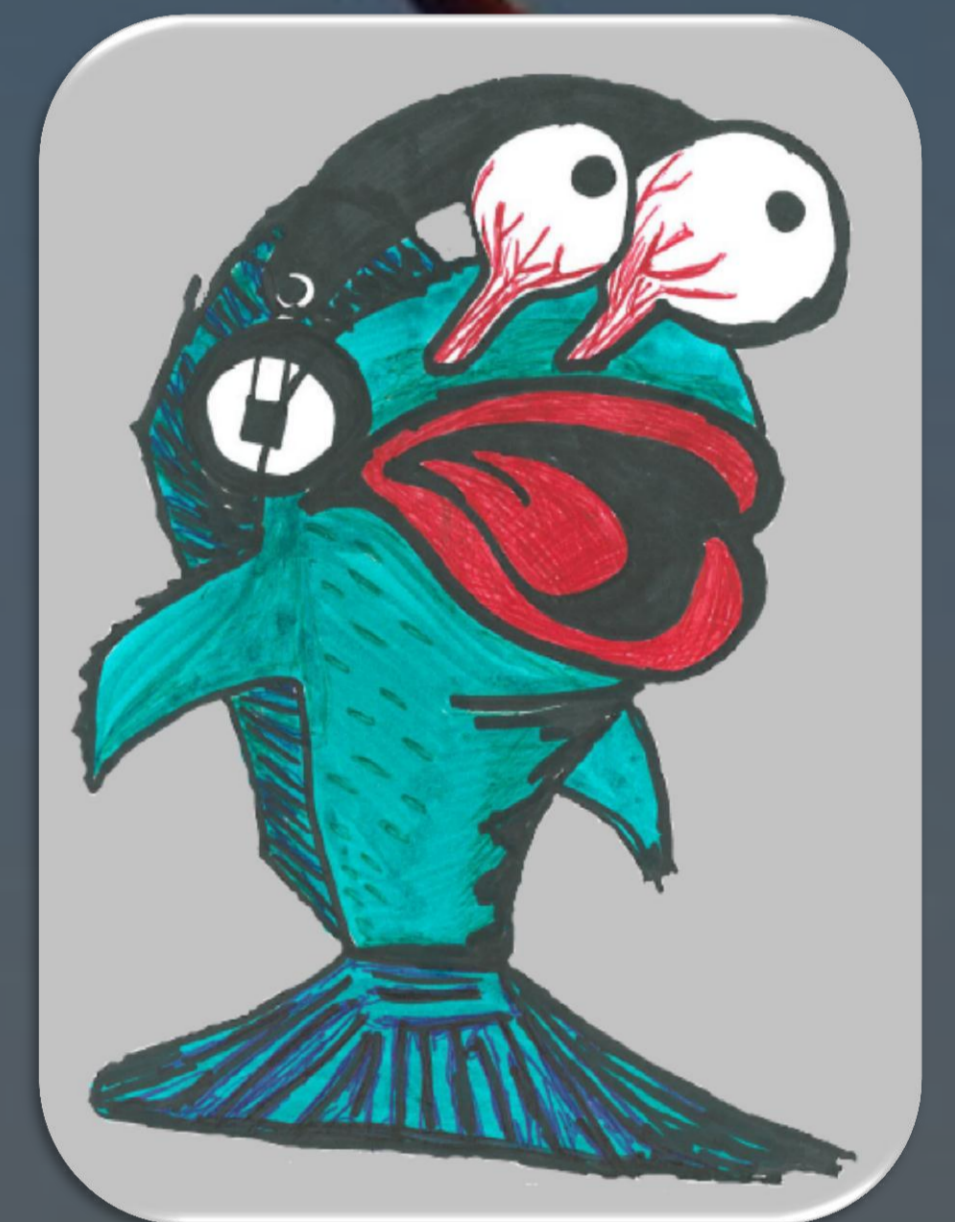


European seabass (*Dicentrarchus labrax*)

©Hans Hillewaert



🔊 Pile-driving of monopiles at Bligh bank @ 500 m



OFFNOISE PROJECT

Aim to assess the **acute** and **chronic** effects of short-term exposure of construction noise on **eggs and larvae of European seabass**

Impact on survival, development, fitness and stress

WORST CASE SCENARIO PILE-DRIVING EXPERIMENTS ON PILE-DRIVING

FIELD EXPERIMENTS

= real situation @40m from piling source

A strike every 1,5 second

Low frequency strong impulse noise

30 larvae/vial

1 complete piling event



©Karl Van Ginderdeuren

Construction of monopiles at Lodewijkbank (07/2013)

LAB EXPERIMENTS

= simulate pile-driving

3000 Volt is discharged every second

Low frequency strong impulse noise

30 larvae/vial

30 min exposure



©Karl Van Ginderdeuren

SIG sparker-electrode