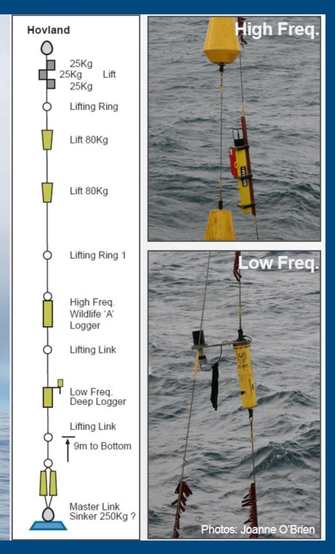
IRISH SEA NOISE, MARCH TO SEPTEMBER 2014
AMBIENT NOISE, SEISMIC SIGNALS, AND FIN, BLUE, SPERM AND TOOTHED WHALE PRESENCE



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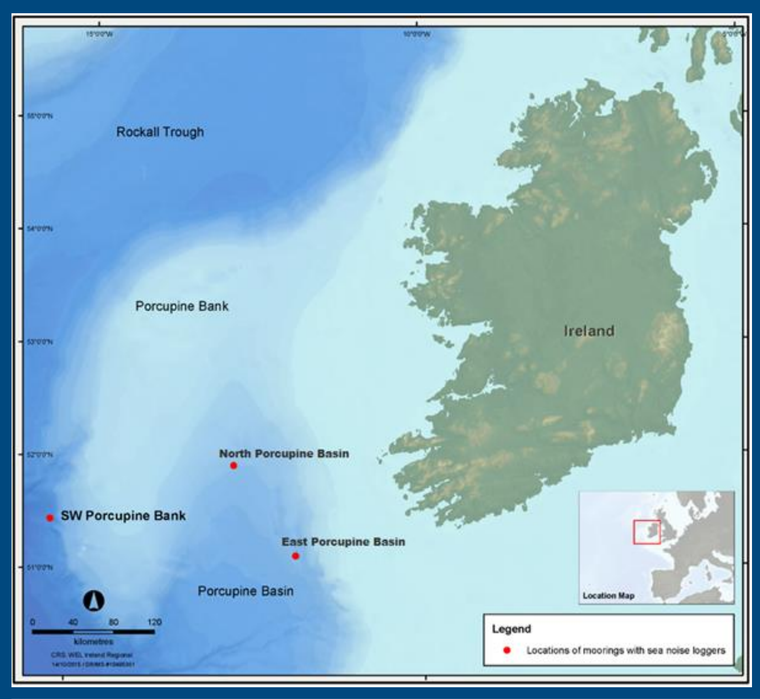
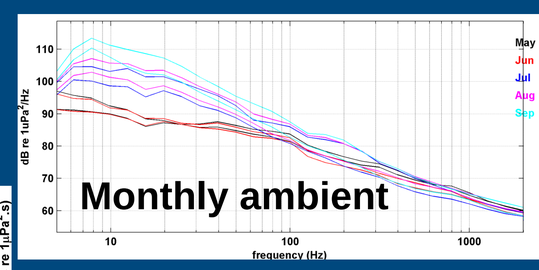


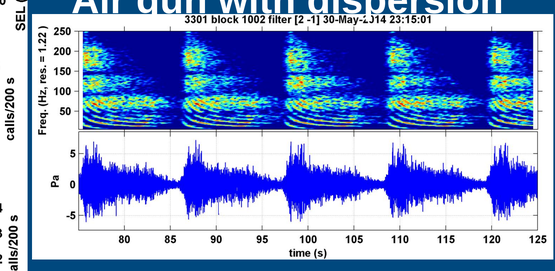
Site	Water Depth	Location	
East Porcupine Basin	538m	51° 22.904' N	11° 37.446' W
North Porcupine Basin	596m	52° 22.775' N	52° 22.775' N
SW Porcupine Bank	767m	51° 52.660' N	15° 01.344' W

WHERE, HOW & WHAT

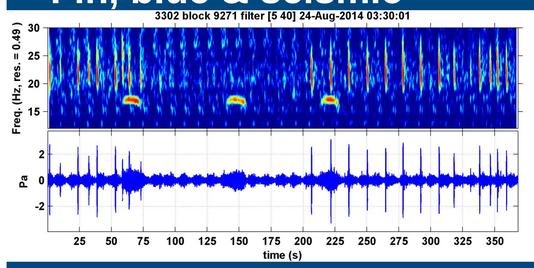
- Three moorings deployed Irish waters, Mar-Sep 2015
- Six sea noise loggers, 3 x 2 Hz to 3 kHz, 3 x 1 to 96 kHz
- Analysed for ambient, man made & biological sources



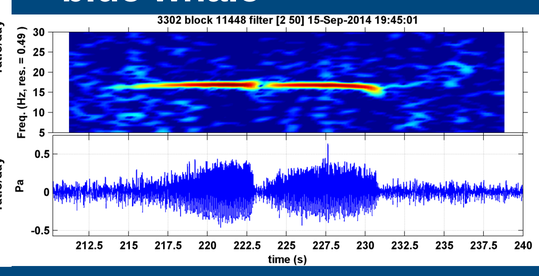
Air gun with dispersion



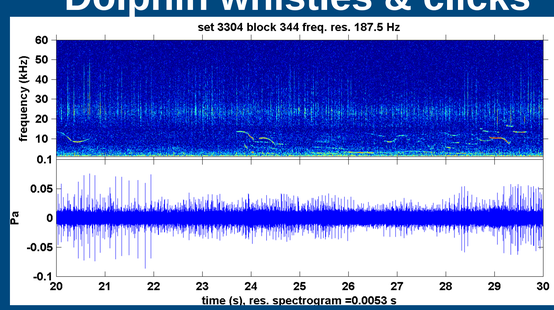
Fin, blue & seismic



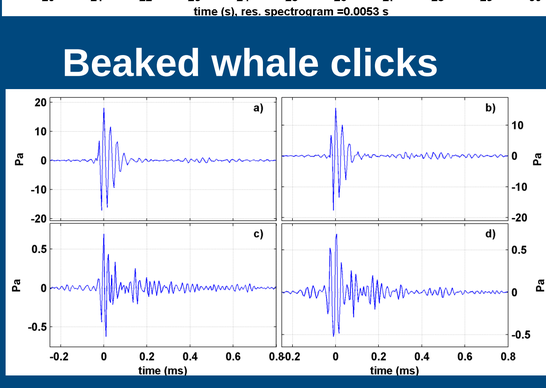
blue whale



Dolphin whistles & clicks



Beaked whale clicks



SUMMARY

- Ambient noise – wind, ships, seismic, biological
- Seismic surveys (3 of), transmission varied
- Fin whales – common offshore, increased Aug-Sep
- Blue whales – offshore only, rare, increased Aug-Sep
- Humpback, minke – not detected
- Sperm whales – common, most offshore, least East Porcupine
- Dolphins – often with sperm whales, common offshore & SW Porcupine Bank
- Probable beaked whales – common offshore & SW Porcupine Bank
- Smaller odontocete echolocation clicks common
- Enormous amount of information

Fin whale

- Spectral peak 21.5 Hz, 19-40 Hz range (3 dB down)
- 1-9 pulses spaced 14.7 s apart
- High SNR calls always single pulse, always down sweep
- Low SNR variable, always multiple pulses (multipath) sometimes upsweep (dispersion)
- Max # callers 3, median 1-2
- Present during seismic
- Listening range variable 53-186 km in normal conditions, pending SL, ambient noise & path

Blue whale A-B types

- Spectral peak 16.9 Hz
- Repetition interval ~ 72 s
- All at SW Porcupine Bank
- Listening range variable, similar fin whales

Sperm whales

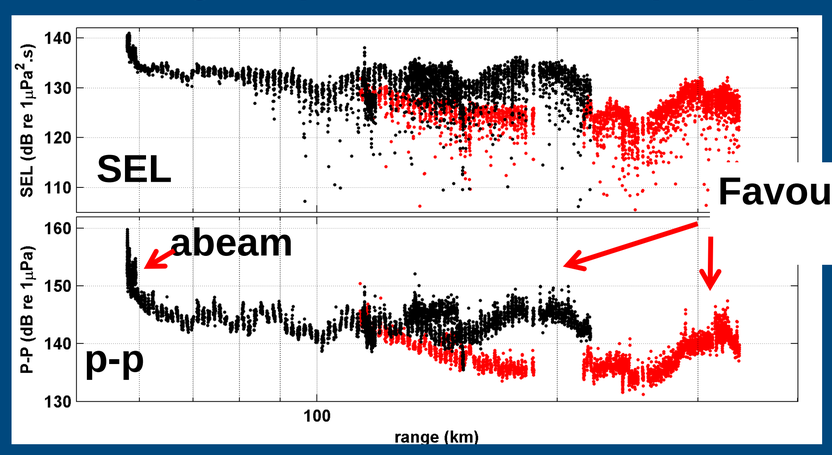
- Bouts around 1.7 hours length separated by ~ 12 hours
- Often in common with dolphin whistles (40-60% co-occurrence, late July East Porcupine)
- 3-15 day periodicity

Echolocation clicks & whistling

- 1-17 animals whistling simultaneously
- ~ 1.4 million clicks
- Not ascribed to species
- Tentative beaked whale clicks pulled out based on: HF spectral peak, FM modulated
- Common at SW & East Porcupine, less common at north

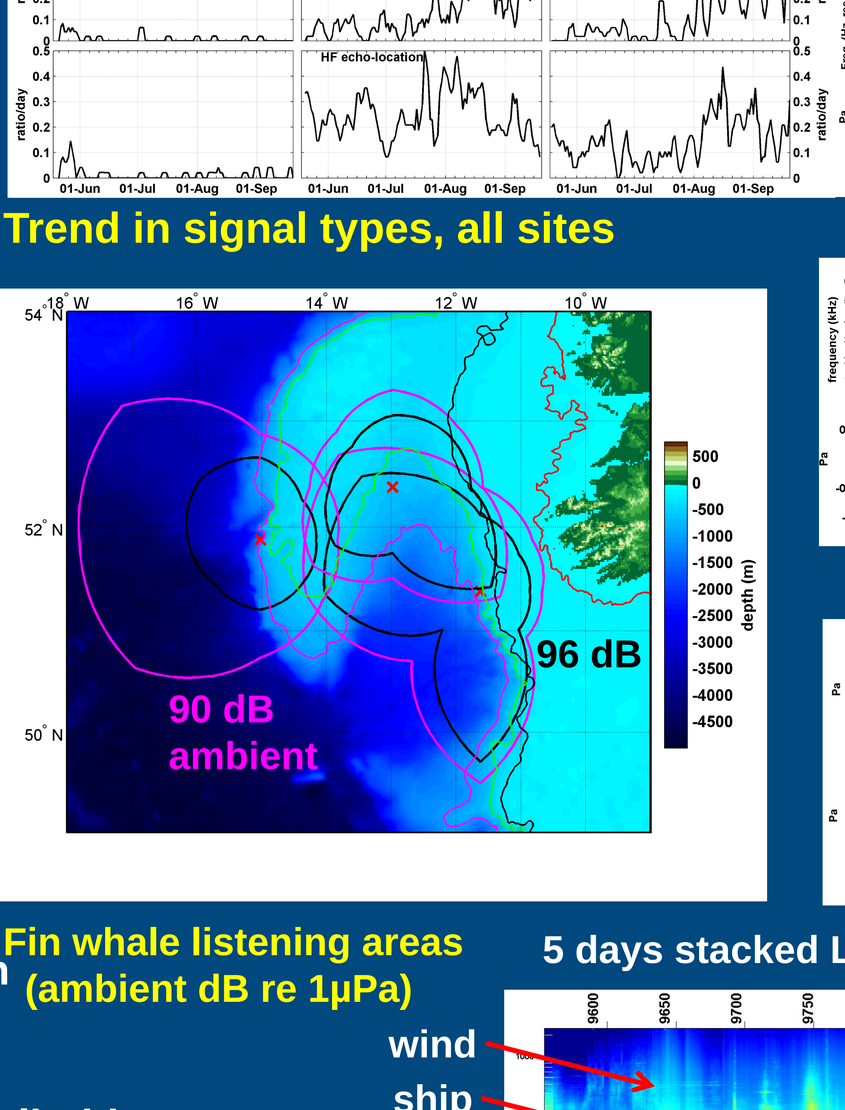
Seismic

- Max range detectable - 300-400 km
- Ducting deep sound channel (DSC) ⇒ transmission peculiarities



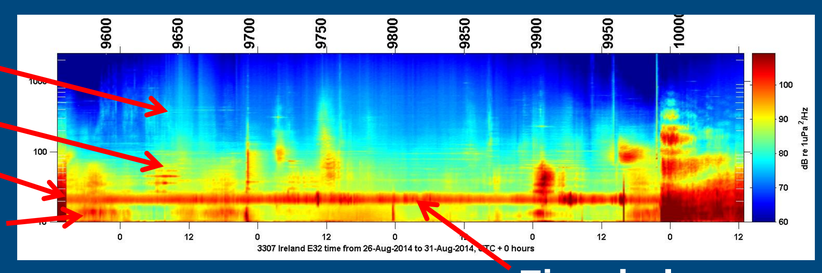
Favourable bathymetry for coupling into DSC

Trend in signal types, all sites



Fin whale listening areas (ambient dB re 1μPa)

5 days stacked LF sea noise, log freq.



Acknowledgments:

Research Partners: Marine Institute Foras na Mara; GMIT; Curtin University of Technology Perth Western Australia; Curtin University; IWDG The Irish Whale and Dolphin Group; RPS Australia & Asia Pacific; BirdWatchIreland

Funding Partners: woodside; AZEIRE PETROLEUM; Petrel Resources PLC