

May 14, Cebu, Philippine






General underwater bioacoustics

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

1. Communication



Baby's vocalizations

6 days (January 17, 1999)	broadband	
43 days (February 23, 1999)	narrowband	
74 days (March 26, 1999)	frequency modulation	
149 days (June 10, 1999)	clear FM	
394 days (February 9, 2000)	same as parents	

Parents' vocalizations

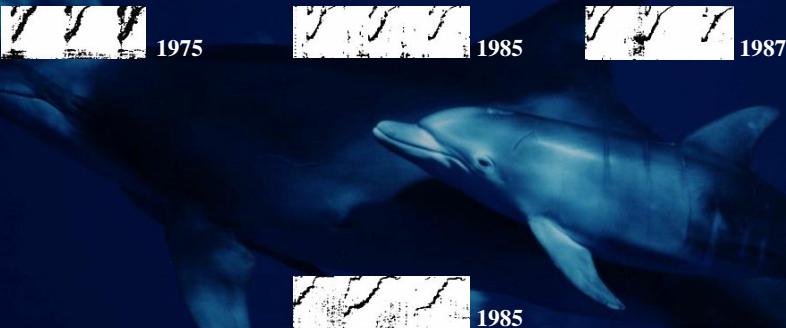
Stella (mother)	
Bingo (father)	
Oscar (adult male)	

killer whales

Kamogawa Sea World

'98 2 12

Signature whistle



1975 1985 1987

1985

Sayigh et al. 1990

撮影:河 濱

This slide features a dark blue background with an illustration of two dolphins. The title 'Signature whistle' is centered at the top. Below the title, three spectrograms are shown, each labeled with a year: 1975, 1985, and 1987. A fourth spectrogram is positioned below the 1985 label. The citation 'Sayigh et al. 1990' and the photographer's name '撮影:河 濱' are located at the bottom of the slide.



humpback whales

Registered from
12 August 1991, Volume 173, pp. 587-592

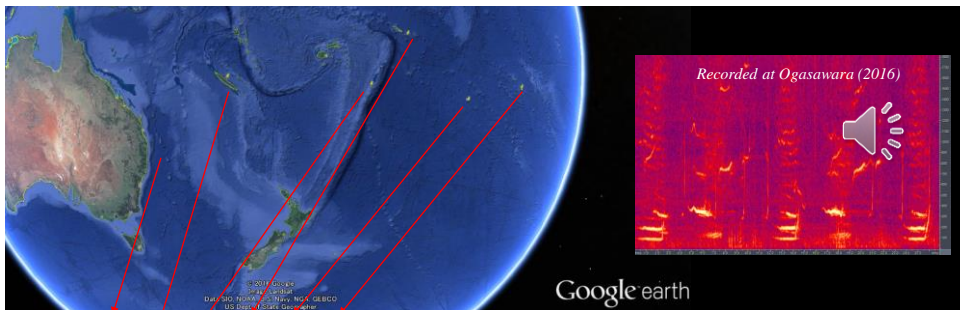
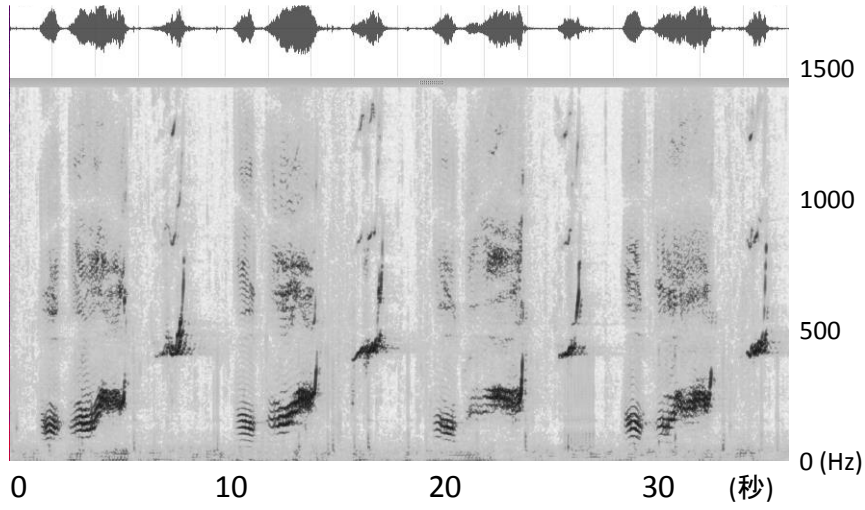
SCIENCE

Songs of Humpback Whales
Roger S. Payne and Scott McVey

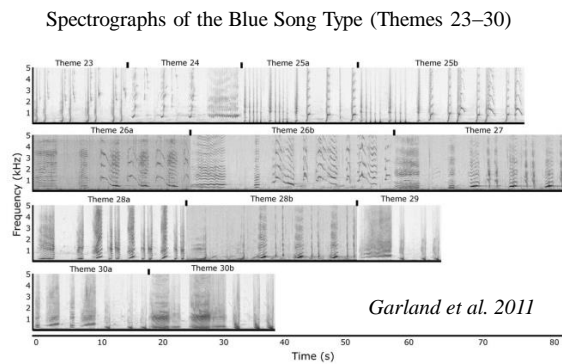
Ship noise

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This slide features a blue-tinted underwater photograph of a humpback whale. The title 'humpback whales' is centered at the bottom. In the top right corner, there is a reference to a Science journal article: 'Songs of Humpback Whales' by Roger S. Payne and Scott McVey, registered from 12 August 1991, Volume 173, pp. 587-592. The journal cover shows three spectrograms. On the left, there is a speaker icon and the text 'Ship noise'. At the bottom left, there is a green audio waveform. The copyright notice '© 小笠原ホエルウォッチング協会' is at the bottom right.



Year	East Australia	New Caledonia	Tonga	American Samoa	Cook Islands	French Polynesia
1998						
1999						
2000						
2001						
2002						
2003						
2004						
2005						
2006						
2007						
2008						



2. Species identification

Species



YAMAHA C7X

Species



YAMAHA C7X



Species



YAMAHA C7X



<http://gitakencan.exblog.jp/18432085>

Noise isolation

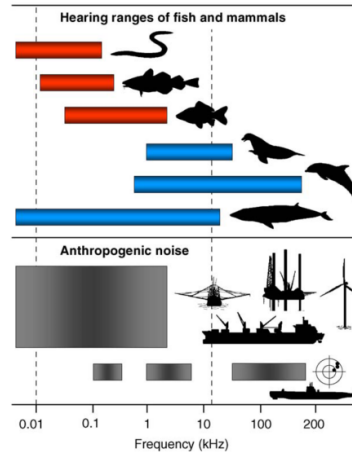
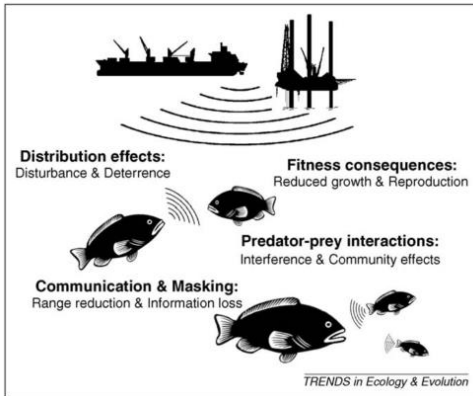


Review

Cell
PRESS

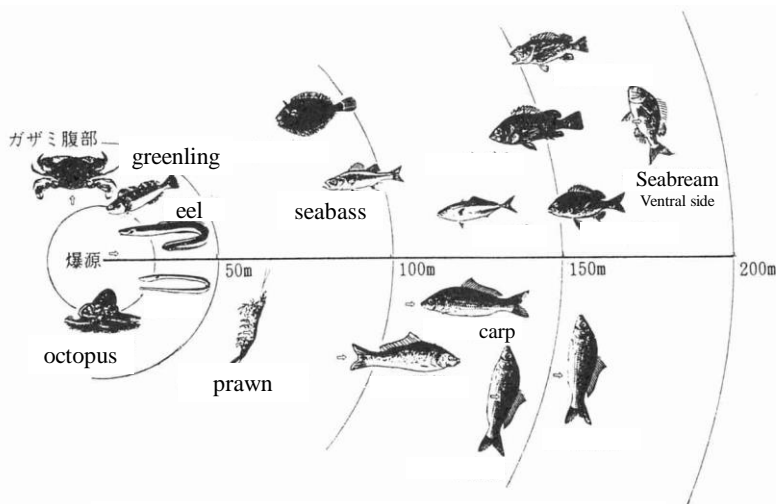
A noisy spring: the impact of globally rising underwater sound levels on fish

Hans Slabbekoorn¹, Niels Bouton², Ilse van Opzeeland³, Aukje Coers⁴, Carel ten Cate¹ and Arthur N. Popper⁵



Trends in Ecology and Evolution, 25(7), 419–427.

Physical effect of noise



Calculated no damage distance of marine organisms from the 1 ton explosive (Hatakeyama et al. 1997)

lethal effect of noise

ARTICLES

NATURE ECOLOGY & EVOLUTION

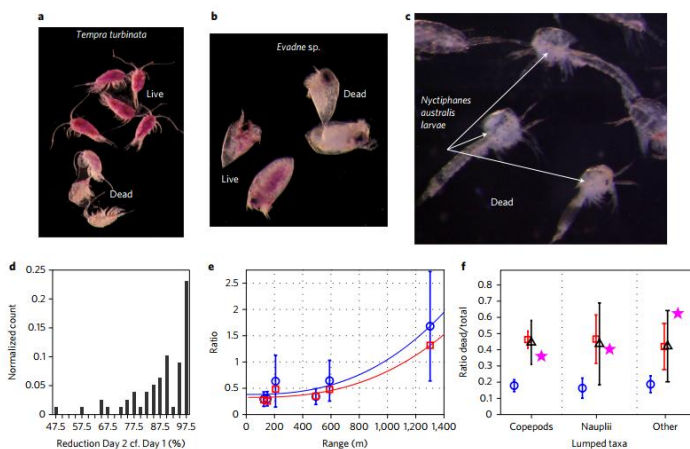


Figure 3 | Zooplankton vital staining images, and ratios of zooplankton abundance and dead to total plankton counted. **a-c**, Image of copepod (*Temora turbinata*, Temoridae; **a**), cladoceran (*Evadne* sp., Podanidae; **b**) and krill larvae (*Nyctiphanes australis*, Euphausiidae; **c**). **d**, Distribution for control samples of the percentage reduction in abundance of all net tows on Day 2 compared with Day 1. **e**, Ratio of exposed/control abundance for copepods and cladocerans with range from DTASL showing mean (circles), median (squares), and power fit to mean (blue) and median (red) values ($r^2 = 0.92$ and 0.96 , respectively). **f**, Ratio of dead/total animals counted for copepods, nauplii and other zooplankton, with means of controls (blue circles), and 71–150 m (red squares), 451–547 m (black triangles) and 1,248 m (magenta stars) from DTASL. Error bars are 95% confidence limits. Live and dead animals are shown in the vital staining images.

McCauley, Robert D., et al. "Nature Ecology & Evolution 1 (2017): s41559-017.



Very basics of environmental impact assessment

Scenario 1
No comparison

Survey 1	Before	During	After
impact		few	
control			

Scenario 2
Change only in impact zone

Survey 2	Before	During	After
impact	many	few	many
control			

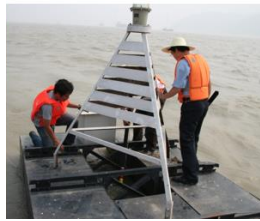
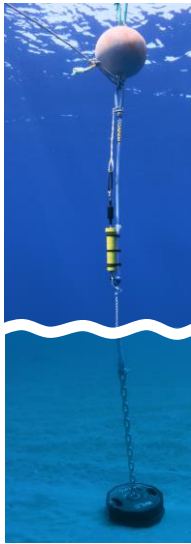
Scenario 3A
Natural change

Survey 3A	Before	During	After
impact	many	few	many
control	many	few	many

Scenario 3B
Effect of impact

Survey 3B	Before	During	After
impact	many	few	many
control	many	many	many

Fixed acoustic monitoring platforms



Advantages

- simple deployment
- available anywhere
- silent

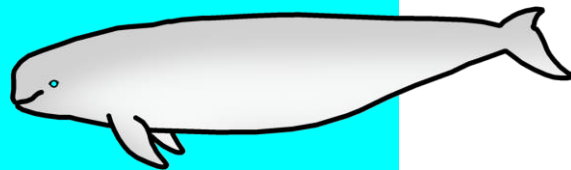
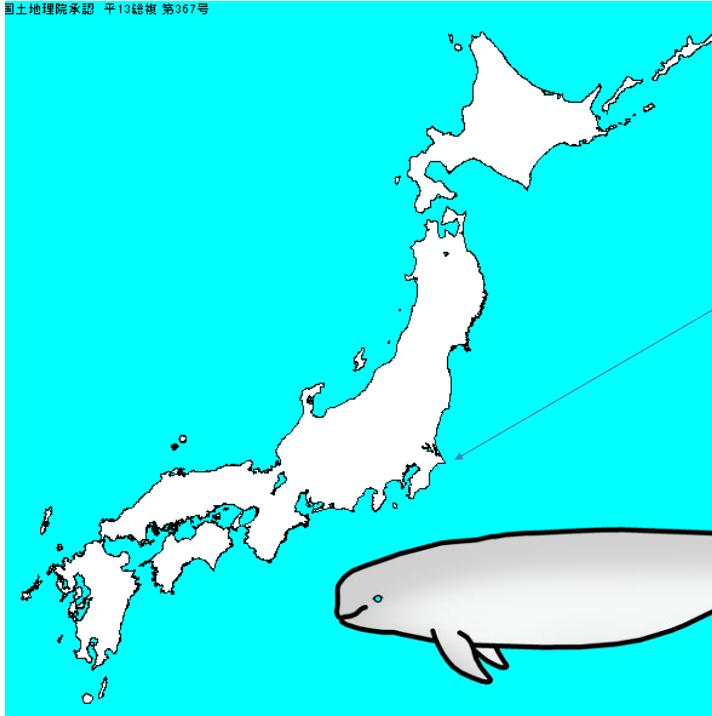
Disadvantages

- mooring noise
- orientation
- permissions

Tips

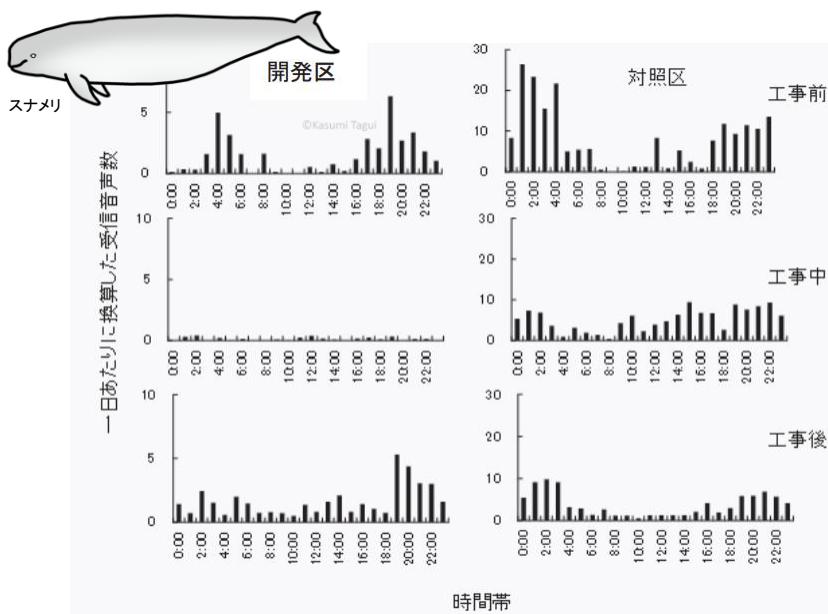
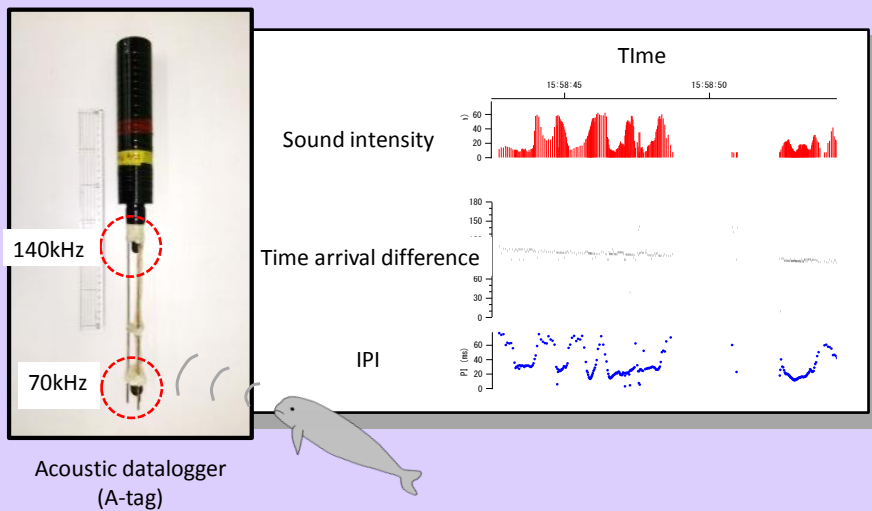
- submerge all
- use existing buoys

国土地理院承認 平13総検 第367号



©Kasumi Tagui

Acoustic datalogger (A-tag)



「着床式洋上風力発電導入ガイドブック」の別冊である「着床式洋上風力発電の環境影響評価手法に関する基礎資料」365ページ