Future directions of acoustics research with large megafauna



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(Some) New Research Directions

- 1. Integrated behavioral and physiological response studies
- 2. New directions in laboratory hearing studies

3. Cross-disciplinary partnerships in acoustics and ecology to monitor marine mammal populations

- 4. Coordinating response studies with full-scale industrial operations
- 5. Integrating response studies and population consequences of disturbance models



1. Integrated behavioral and physiological response studies



SOCAL "Tagless" Behavioral and Physiological Response Study (BPRS)



2. New directions in 'laboratory' hearing studies

What can we learn from laboratory studies?

UNDERSTANDING HEARING

How different marine mammals receive and perceive sound – new species and new focus on very low and very high frequencies

Behavioral methods



https://pinnipedlab.ucsc.edu/

stitute of Marine Sciences Organized Research Unit

UNDERSTANDING BIOSONAR

How odontocete cetaceans use echolocation - new focus on beam control, conditioned hearing attenuation

EFFECTS OF NOISE

How noise interferes with hearing or causes residual effects - new focus on masking, cognitive effects

Neurophysiological methods



3. Cross-disciplinary partnerships in acoustics and ecology to monitor marine mammal populations

22-Oct to 06-Nov

Oceanic giants dance to atmospheric rhythms: Ephemeral wind-driven resource tracking by blue whales John P. Ryan¹ | Kelly J. Benoit-Bird¹ | William K. Oestreich^{1,2} | Paul Leary³ 37°N Kevin B. Smith³ | Chad M. Waluk¹ | David E. Cade² | James A. Fahlbusch^{2,4} Brandon L. Southall^{5.6} | John E. Joseph³ | Tetvana Margolina³ | John Calambokidis⁴

LETTER WILEY





U1: upwelling 06-Nov to 13-Nov

R2: relaxation 13-Nov to 25-Nov

U2: upwelling 25-Nov to 15-Dec

4. Coordinating response studies with full-scale industrial operations



5. Integrating response studies and population consequences of disturbance models

Conservation Physiology

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Research Article

Context-dependent variability in the predicted daily energetic costs of disturbance for blue whales

Enrico Pirotta^{1,2,*}, Cormac G. Booth³, David E. Cade^{4,10}, John Calambokidis⁵, Daniel P. Costa^{6,10}, James A. Fahlbusch^{4,5}, Ari S. Friedlaender^{7,10}, Jeremy A. Goldbogen⁴, John Harwood^{3,8}, Elliott L. Hazen⁹, Leslie New¹ and Brandon L. Southall^{7,10}





A common obligation: INSPIRING THE NEXT GENERATION



INTEGRATING RESEARCH, CONSERVATION, AND EDUCATION FOR THE OCEAN

www.caoceanalliance.org/education



Future directions of acoustics research with large megafauna: SYNTHESIS

- Integrated methods and multi-disciplinary approaches
- Increased realism of noise source operations in both dedicated experimental studies and coordinated monitoring
- Multi-sectoral partnerships on projects with practical applications
- Sustained, sincere, and inclusive dedication to training, empowering, and inspiring the next generation

