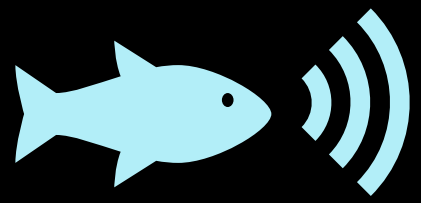
The Ecological Importance and Management Applications of Underwater Sounds

Audrey Looby

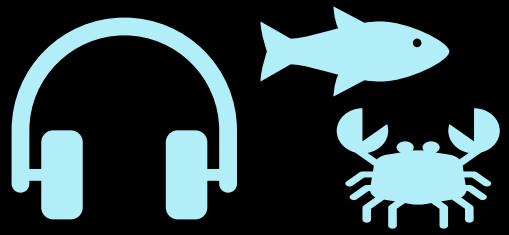
The Ecological Importance and Management Applications of Underwater Sounds



Background

Underwater Soundscapes

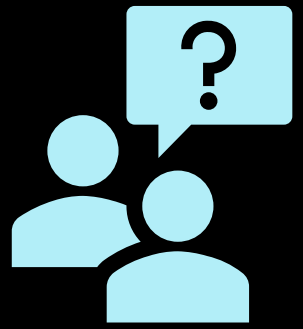
Passive Acoustics



Local Examples

Fish Monitoring

Ecological Monitoring

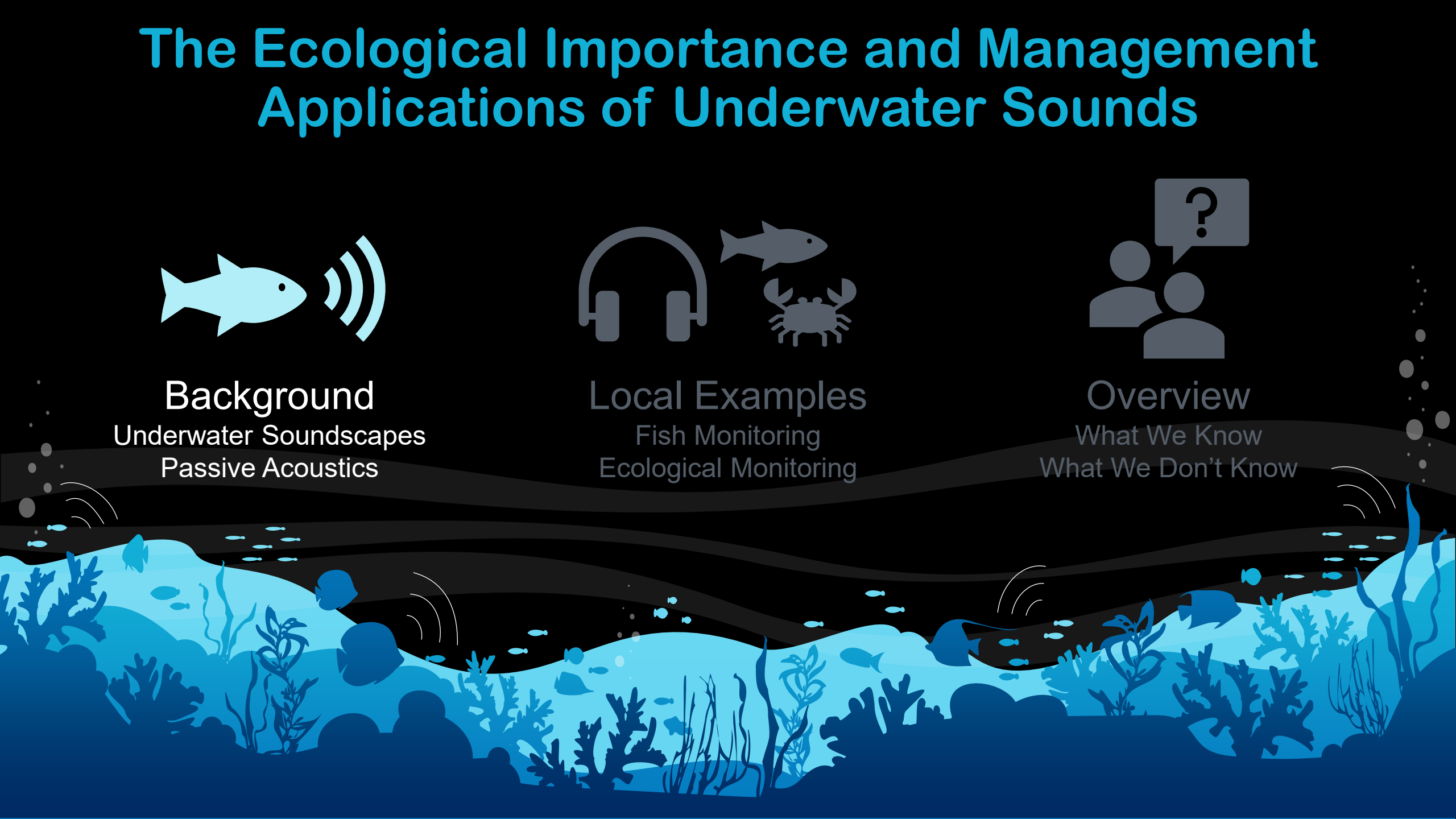


Overview

What We Know

What We Don't Know

The Ecological Importance and Management Applications of Underwater Sounds



Background
Underwater Soundscapes
Passive Acoustics

Local Examples
Fish Monitoring
Ecological Monitoring

Overview
What We Know
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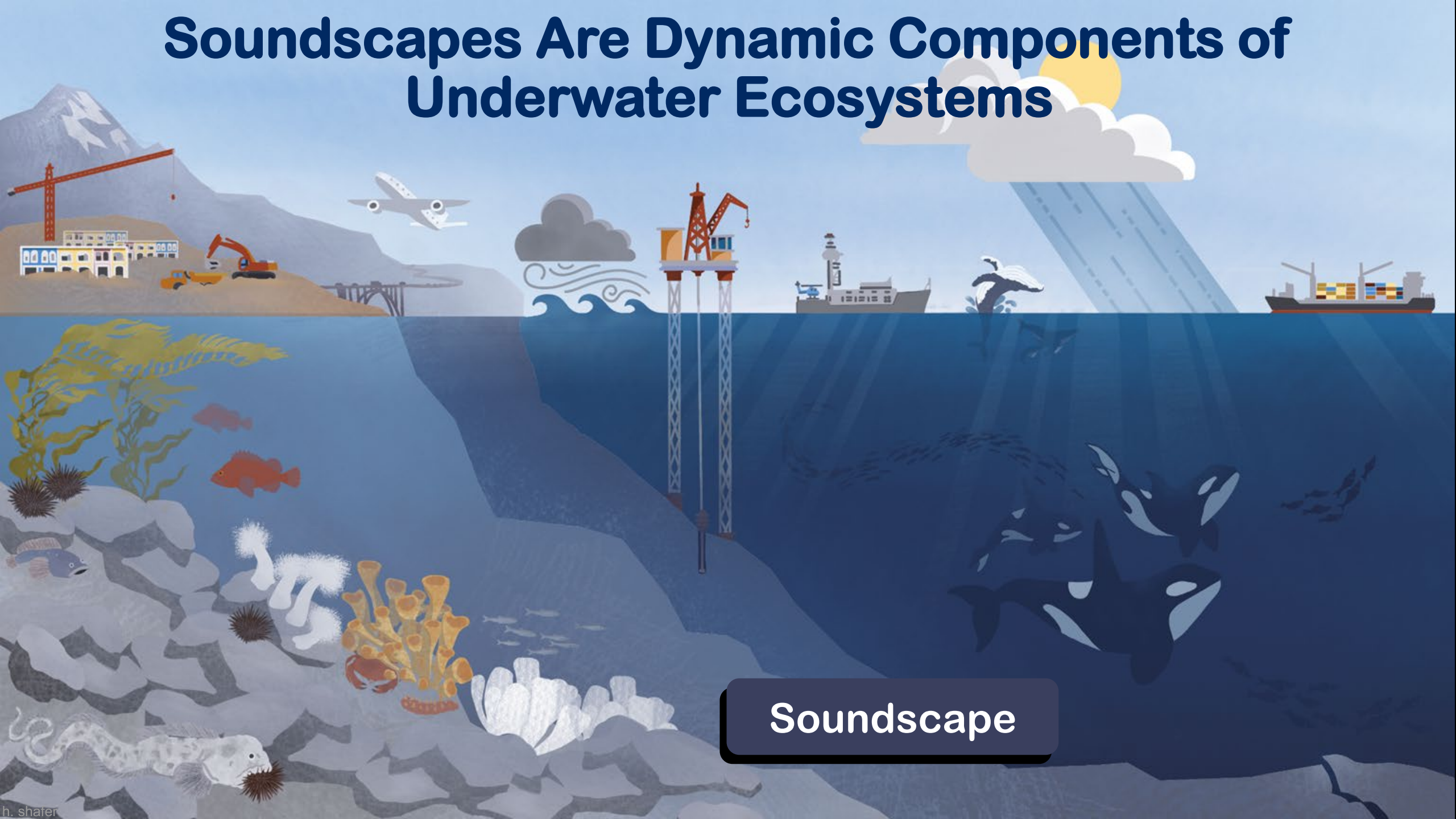
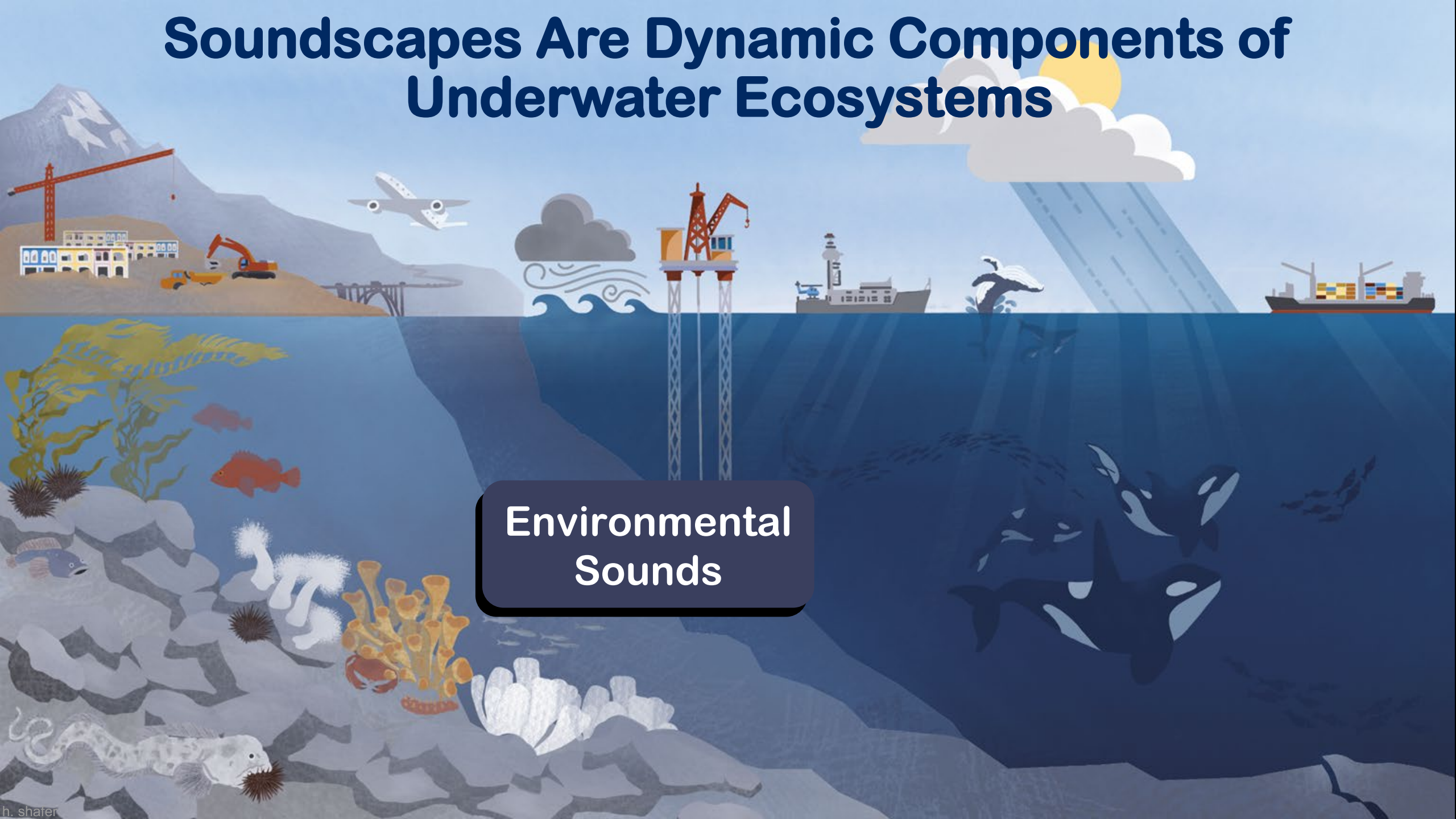
Soundscapes Are Dynamic Components of Underwater Ecosystems

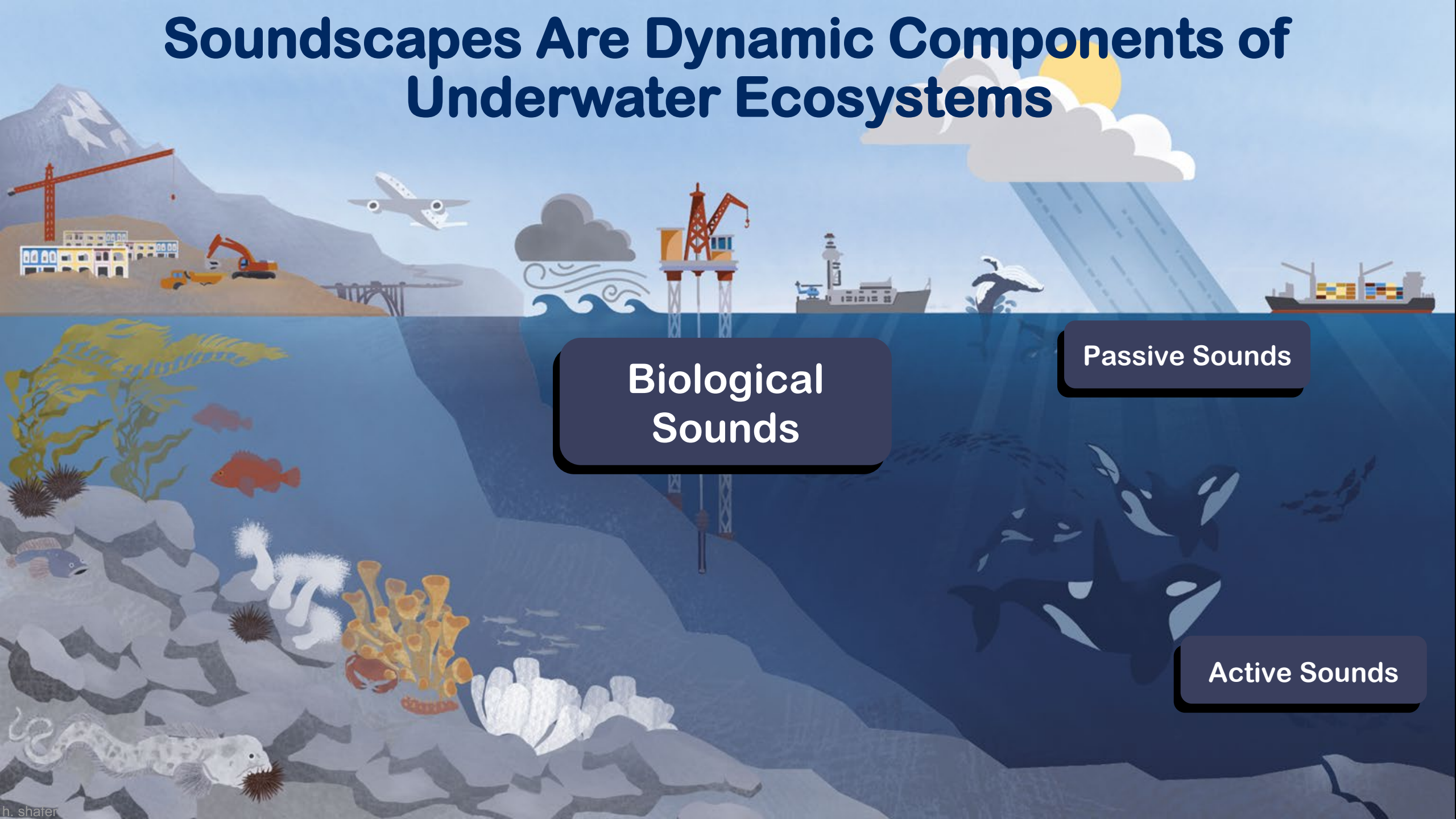


h. shafer

Soundscapes Are Dynamic Components of Underwater Ecosystems

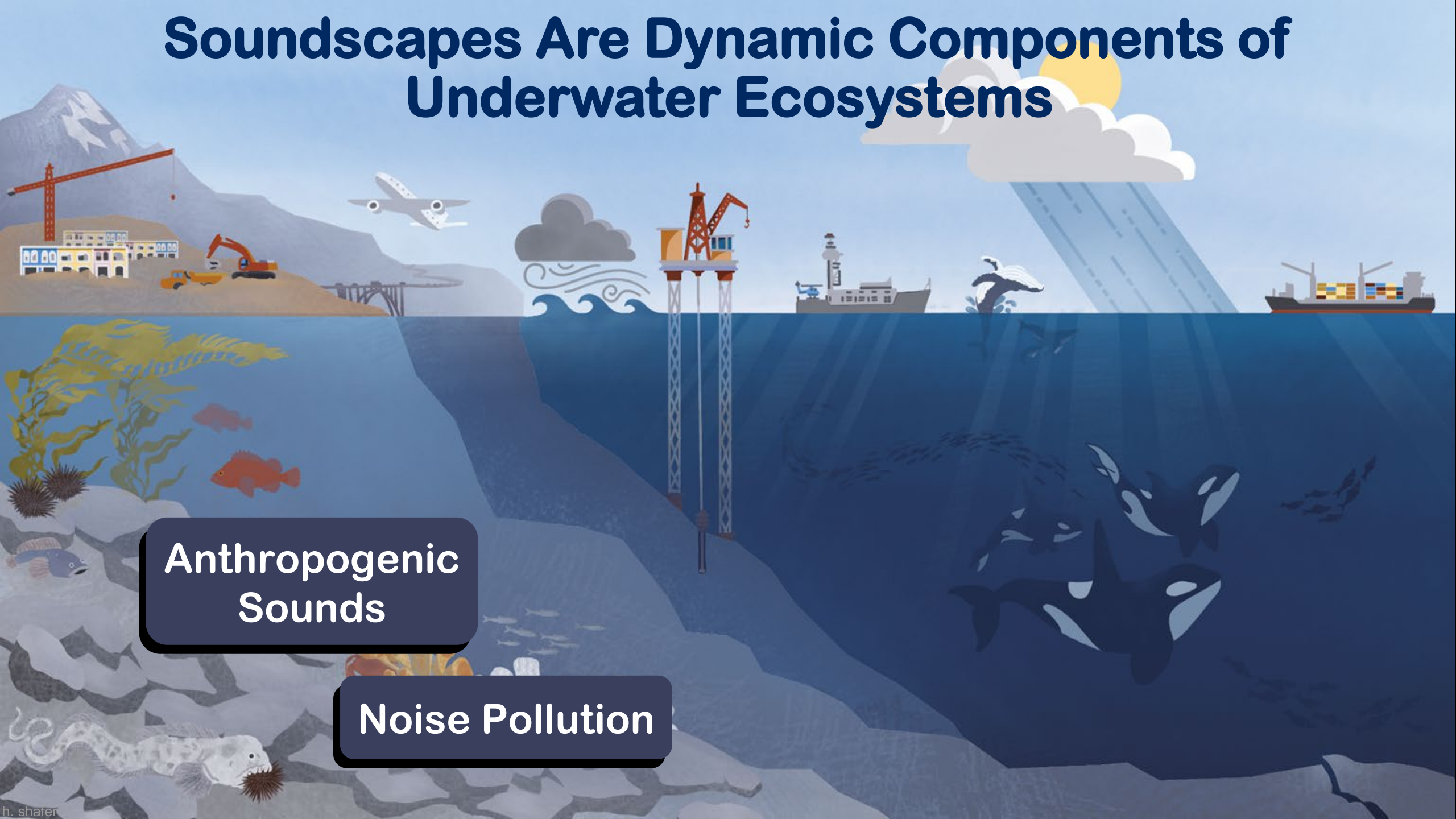


Soundscapes Are Dynamic Components of Underwater Ecosystems



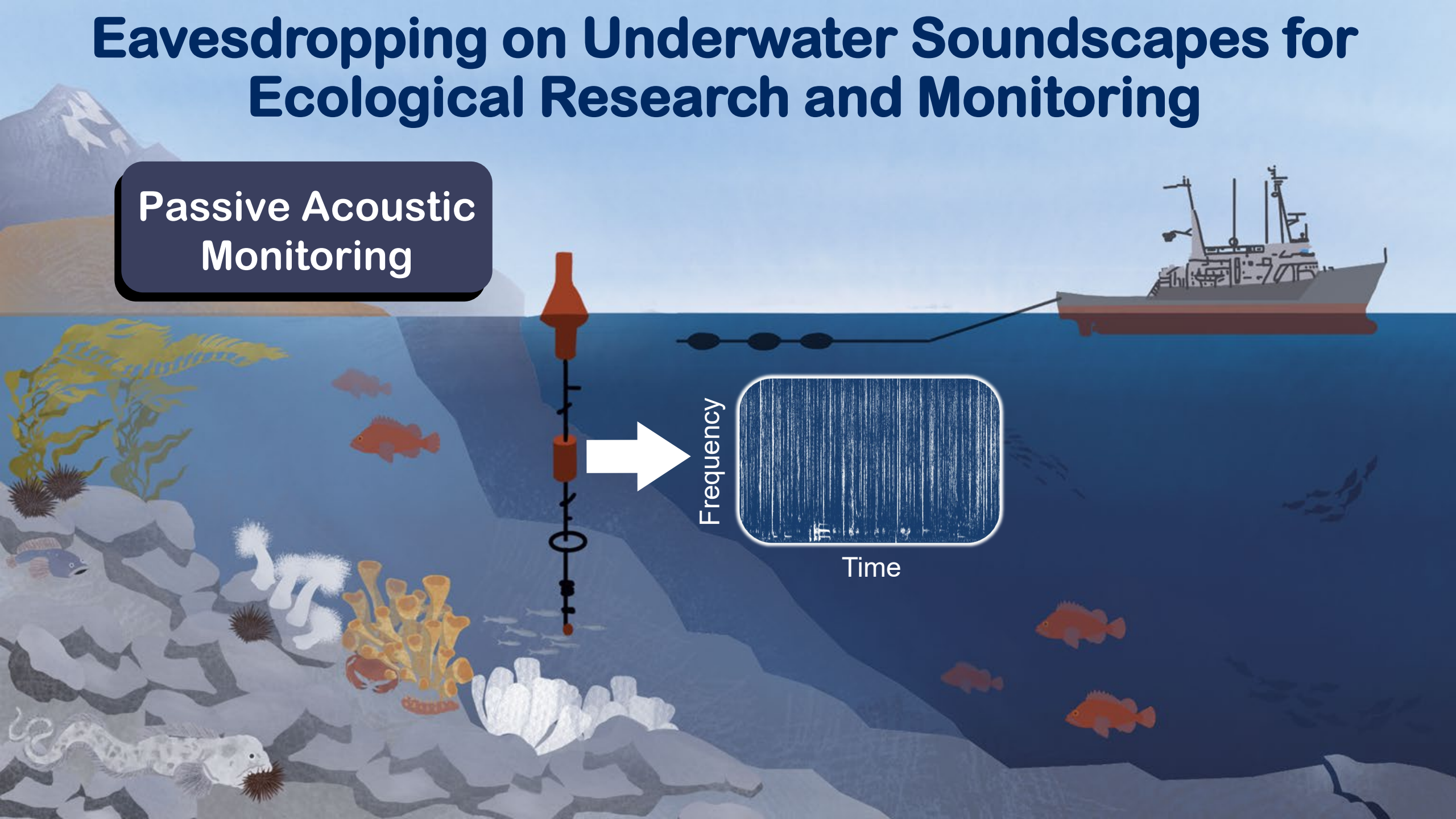
h. shafer

Soundscapes Are Dynamic Components of Underwater Ecosystems

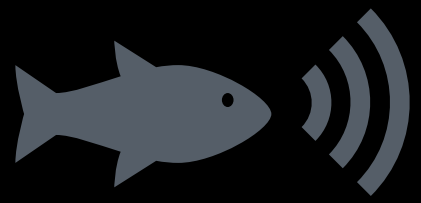


h. shafer

Eavesdropping on Underwater Soundscapes for Ecological Research and Monitoring



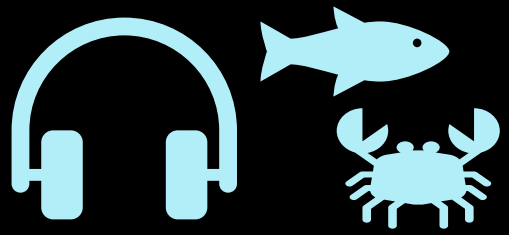
The Ecological Importance and Management Applications of Underwater Sounds



Overview

Underwater Soundscapes

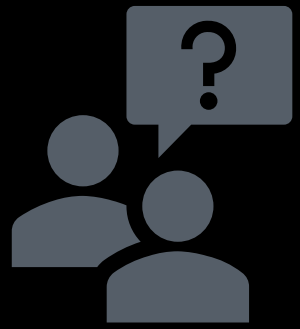
Passive Acoustics



Local Examples

Fish Monitoring

Ecological Monitoring



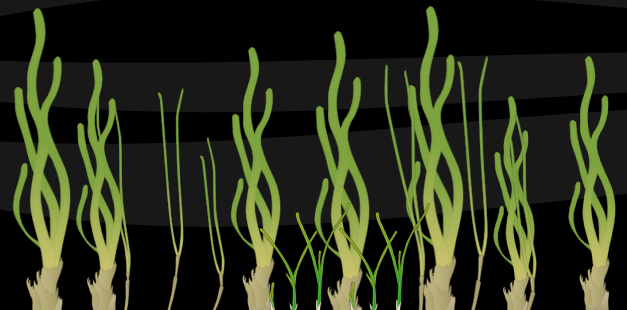
Takeaways

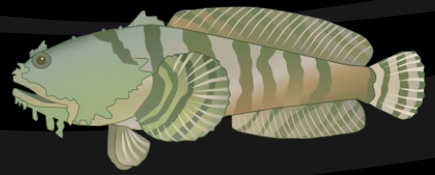
What We Know

What We Don't Know

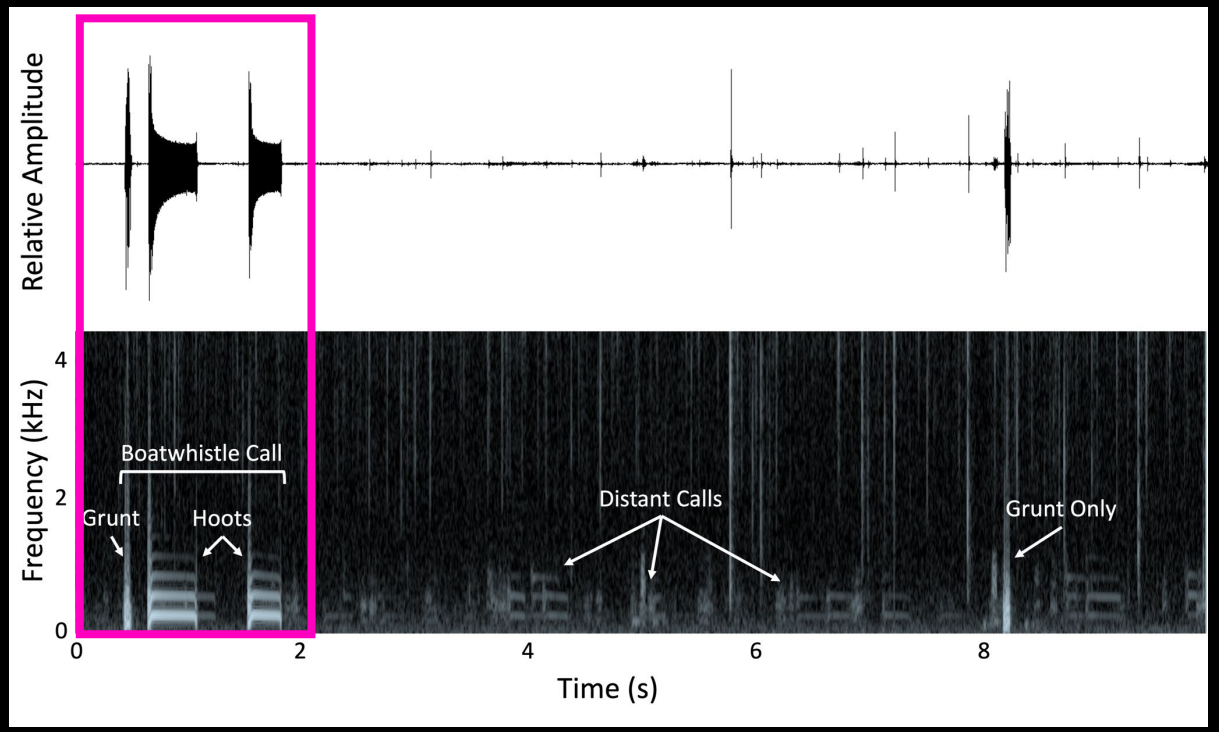
Meet the Gulf Toadfish!

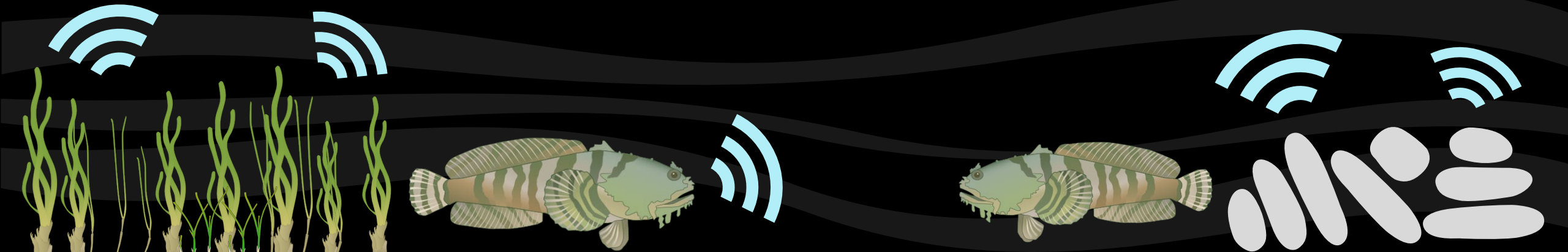
(*Opsanus beta*)





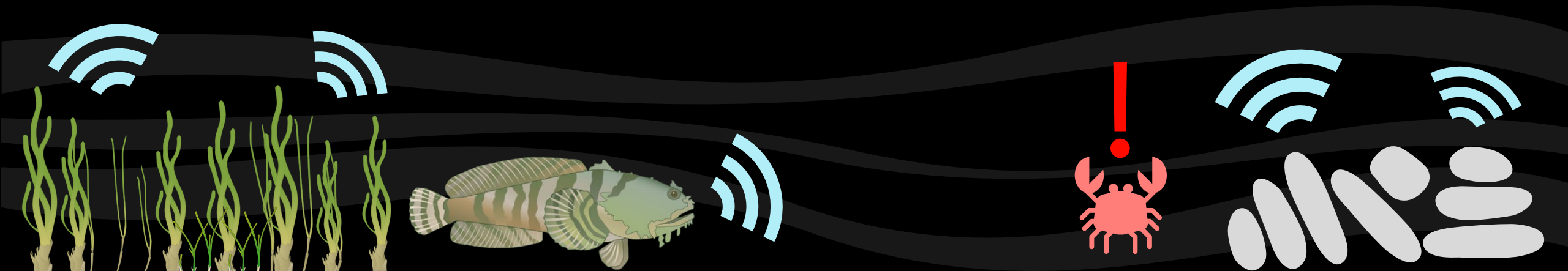
Gulf Toadfish Produce Complex Calls



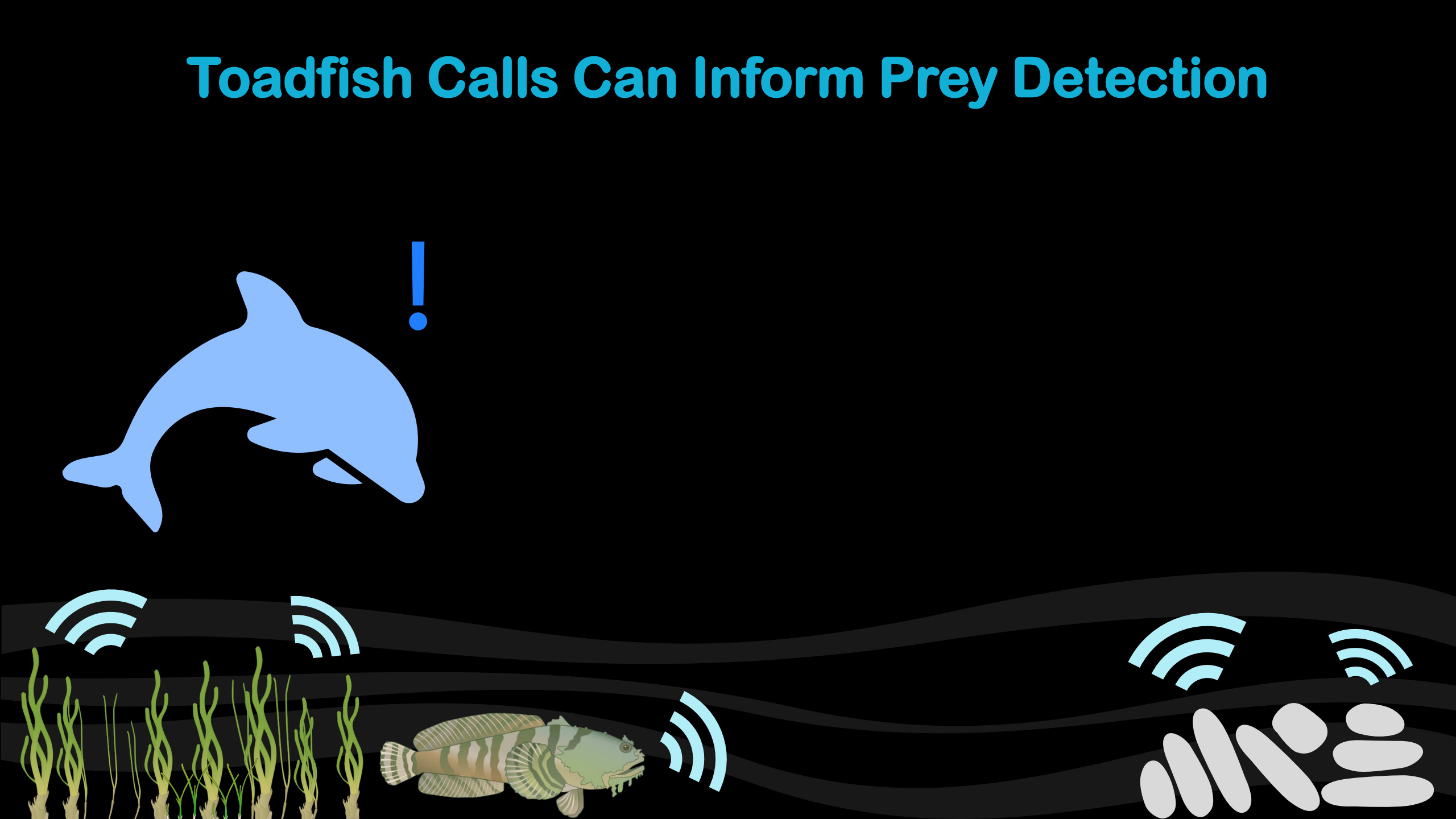


Toadfish Calls Can Inform Reproduction

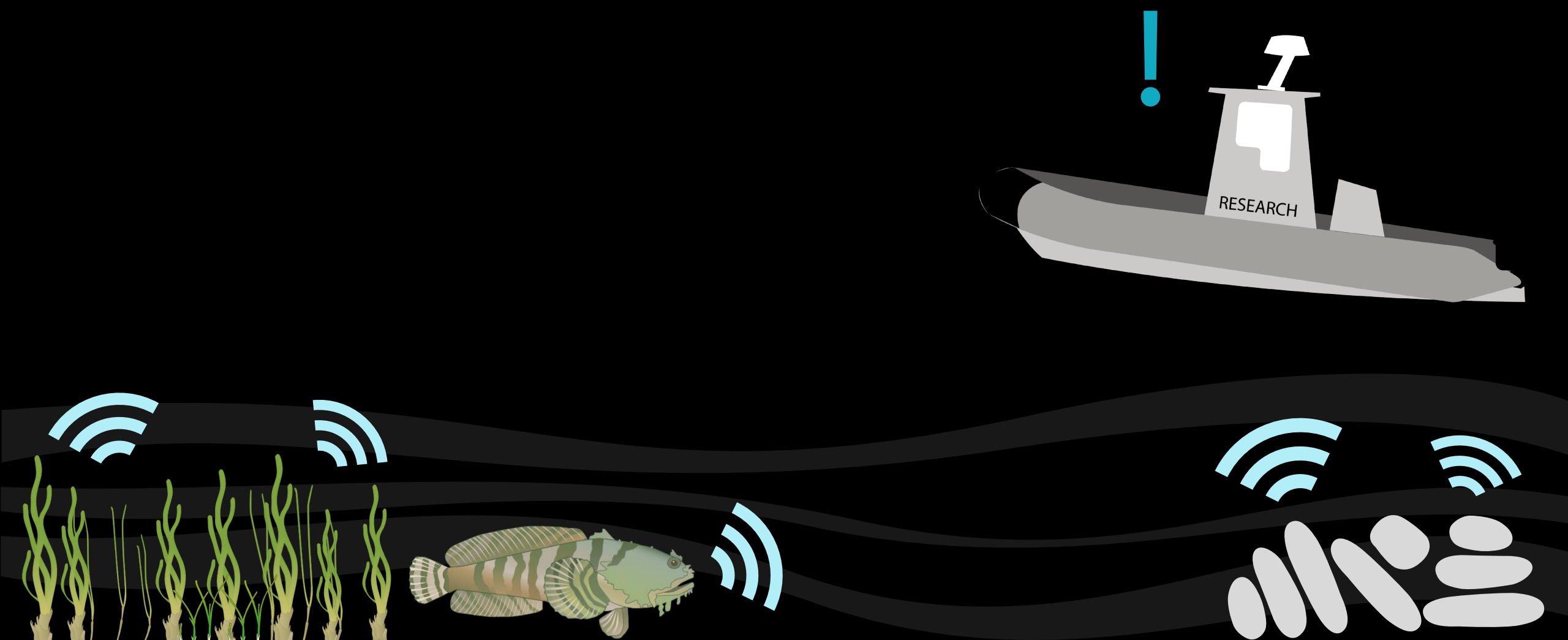
Toadfish Calls Can Inform Predator Avoidance



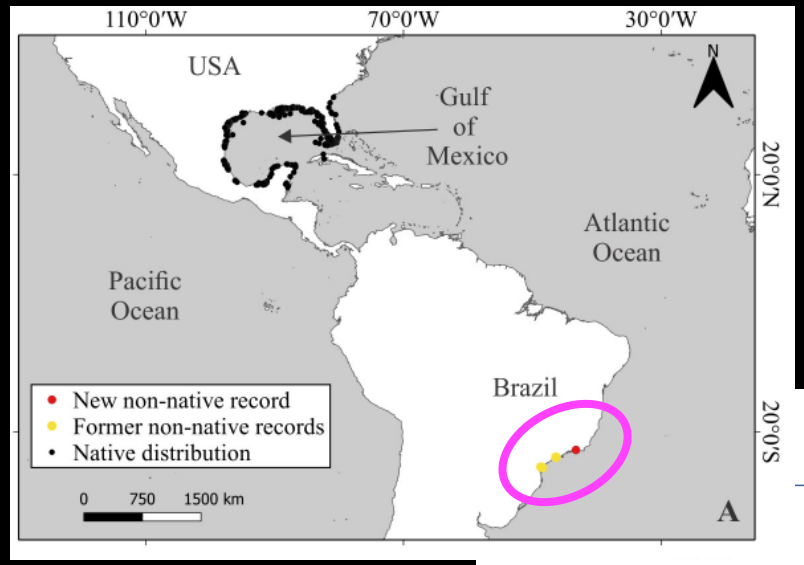
Toadfish Calls Can Inform Prey Detection



Toadfish Calls Can Inform Ecological Monitoring



Toadfish Calls Can Inform Invasive Species Monitoring

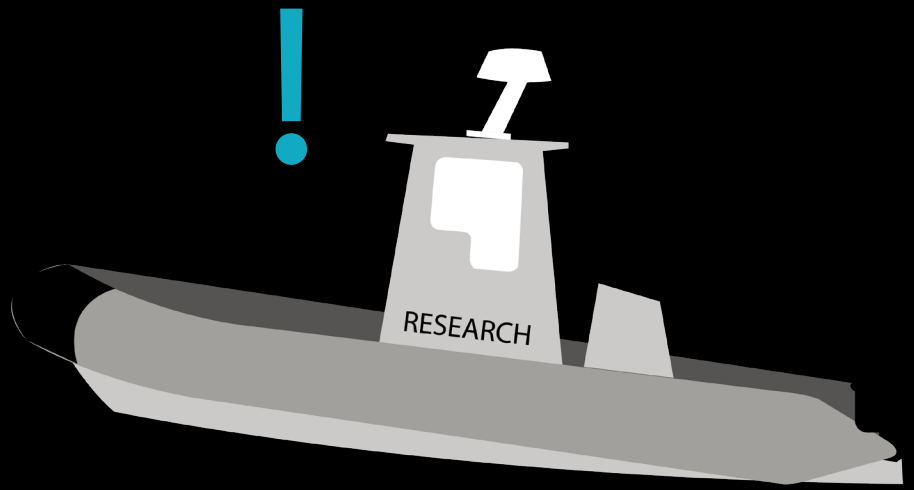


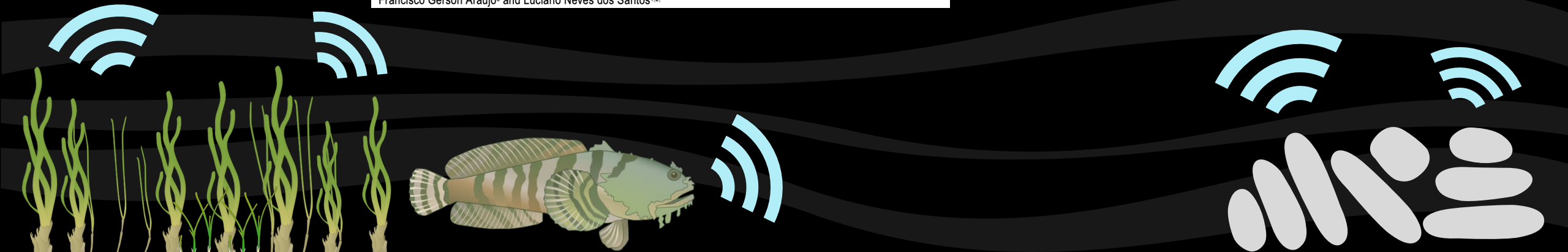
BioInvasions Records (2020) Volume 9, Issue 2: 279–286

Rapid Communication

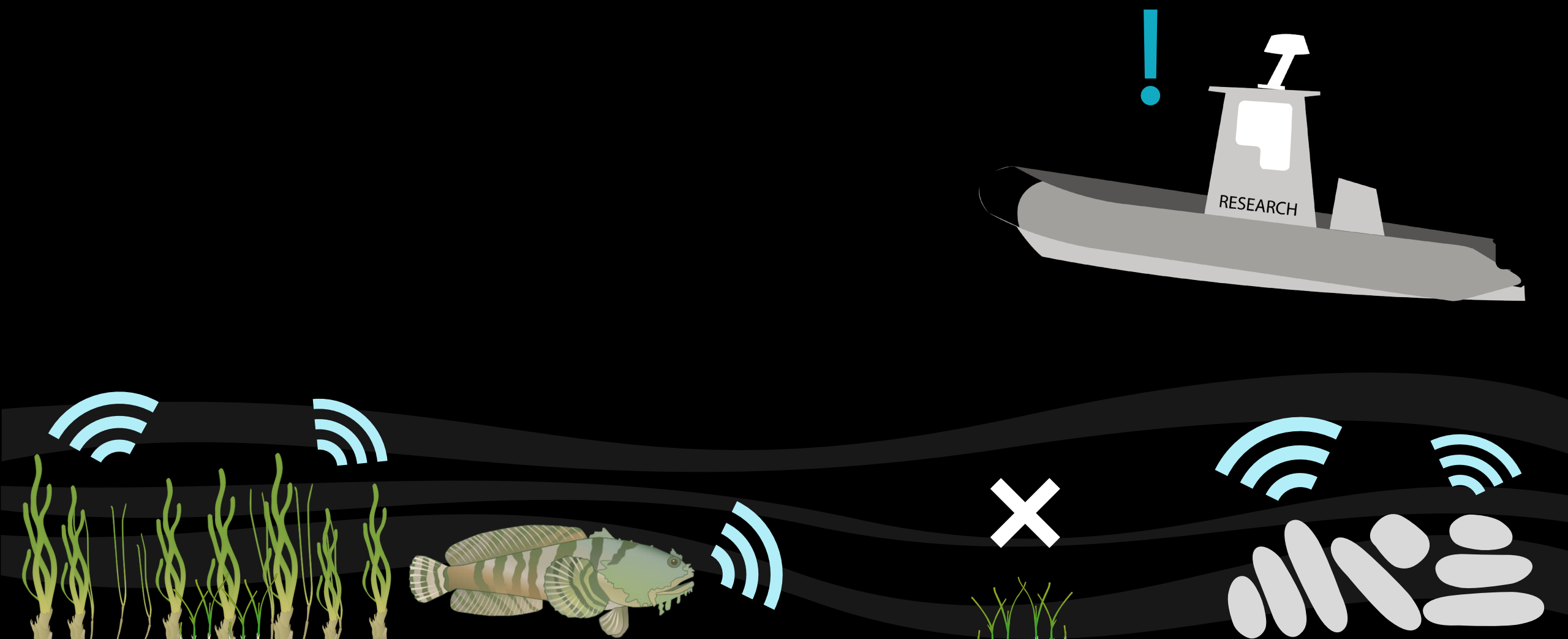
First report of the non-native gulf toadfish *Opsanus beta* (Goode & Bean, 1880) on the coast of Rio de Janeiro – Brazil

Bruno Damasceno Cordeiro[1,2], Athila Andrade Bertoncini[1,2], Felipe Eloy Abrunhosa[2], Luana Santos Corona[2], Francisco Gerson Araújo[3] and Luciano Neves dos Santos[1,2,*]





Toadfish Calls Can Inform Environmental Monitoring

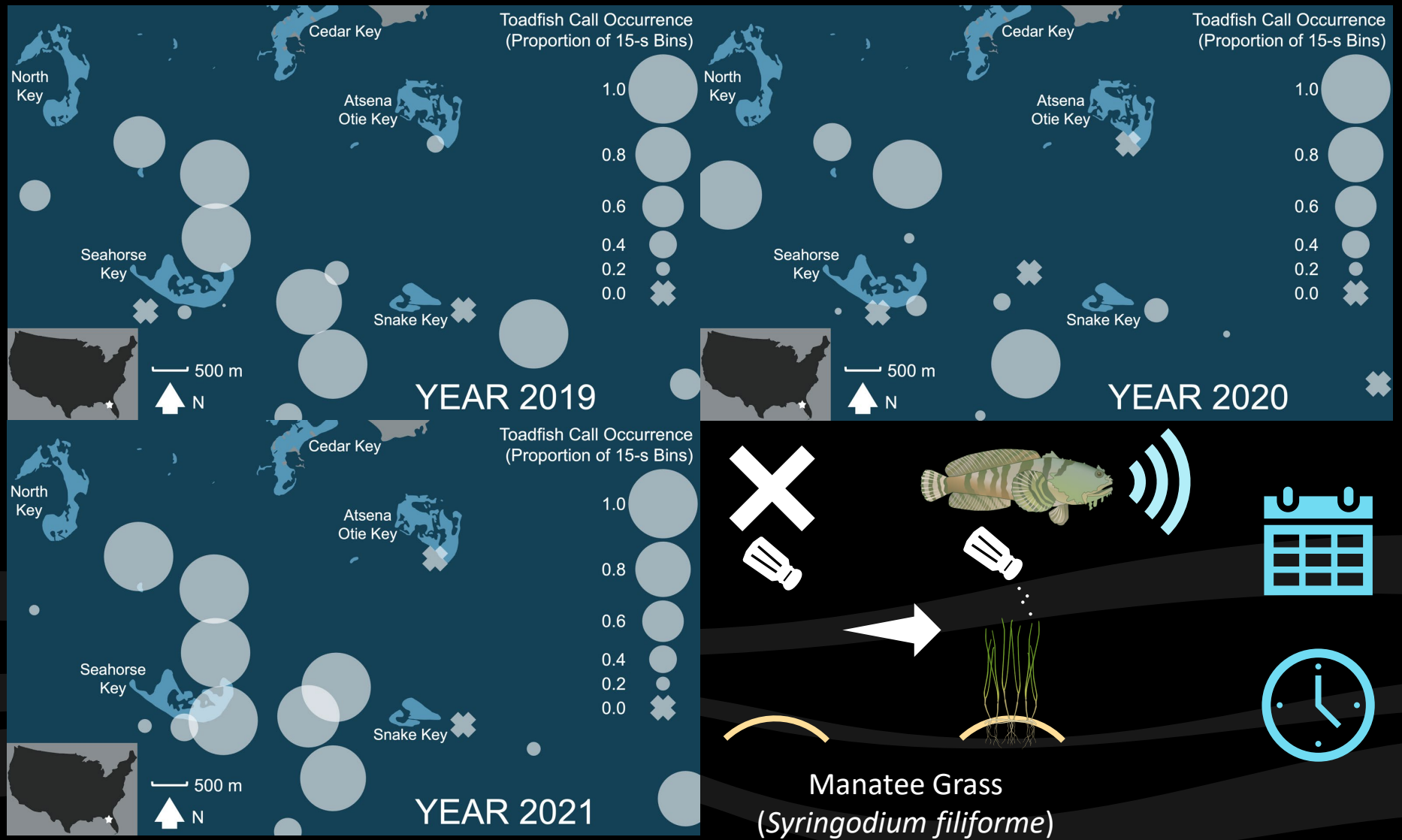


How Prevalent Are Gulf Toadfish Calls?

How Effective Are They For Monitoring?

Looby et al. 2024. Estuaries Coast

Gulf Toadfish Calls Were Heterogeneously Distributed Across Seagrass Meadows



Passive Acoustics Was More Effective Than Trawling at Detecting Gulf Toadfish

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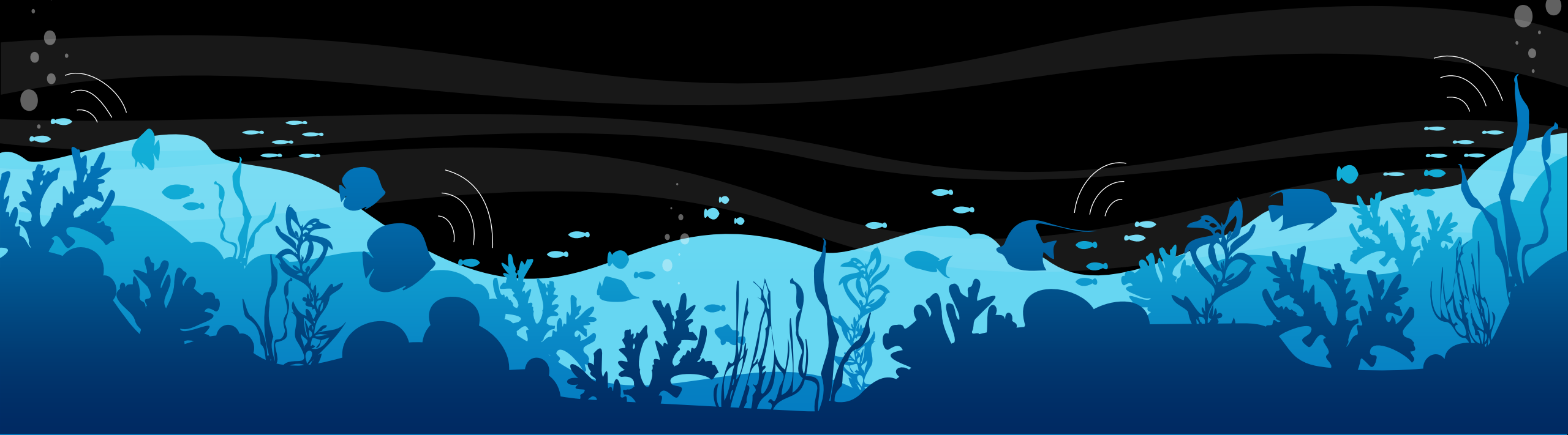
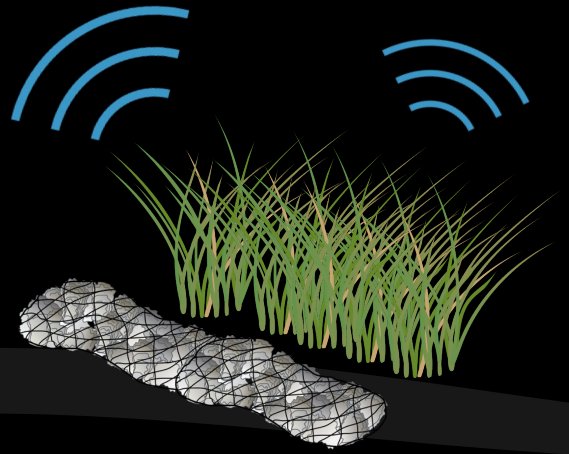
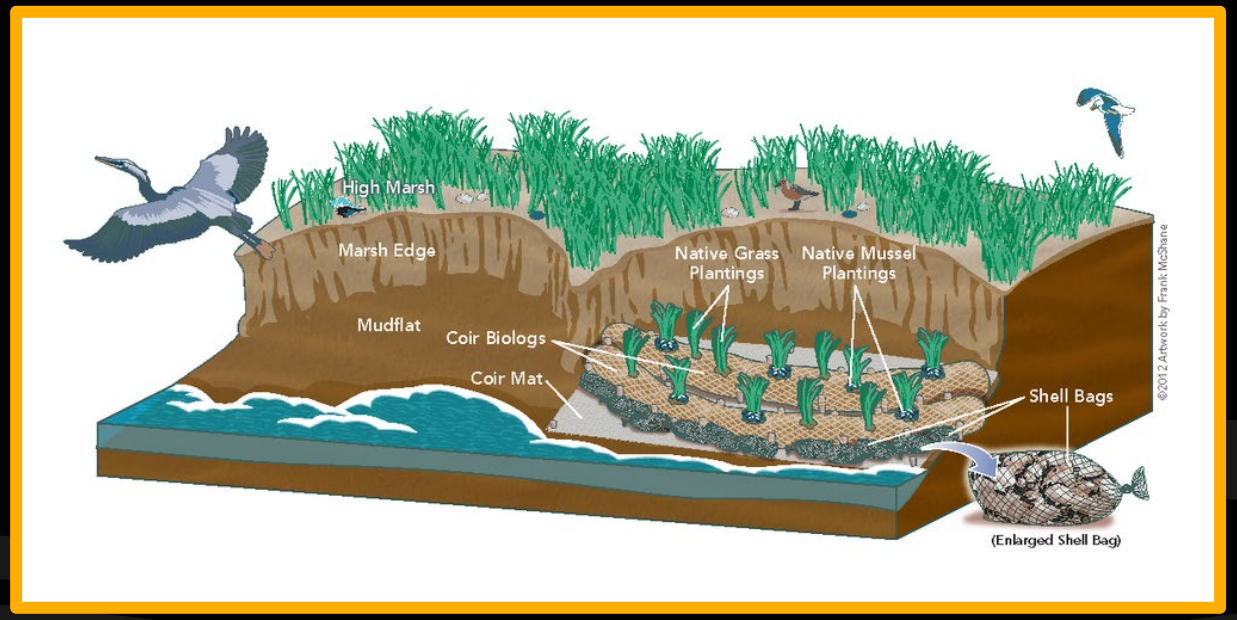
5 / 45

Gulf toadfish calls can reflect habitats and passive acoustics performed better than a traditional sampling method



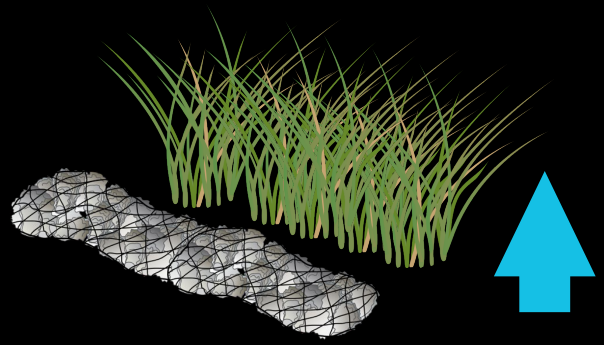
What Impact Does a Living Shoreline Have on Its Underwater Soundscape?





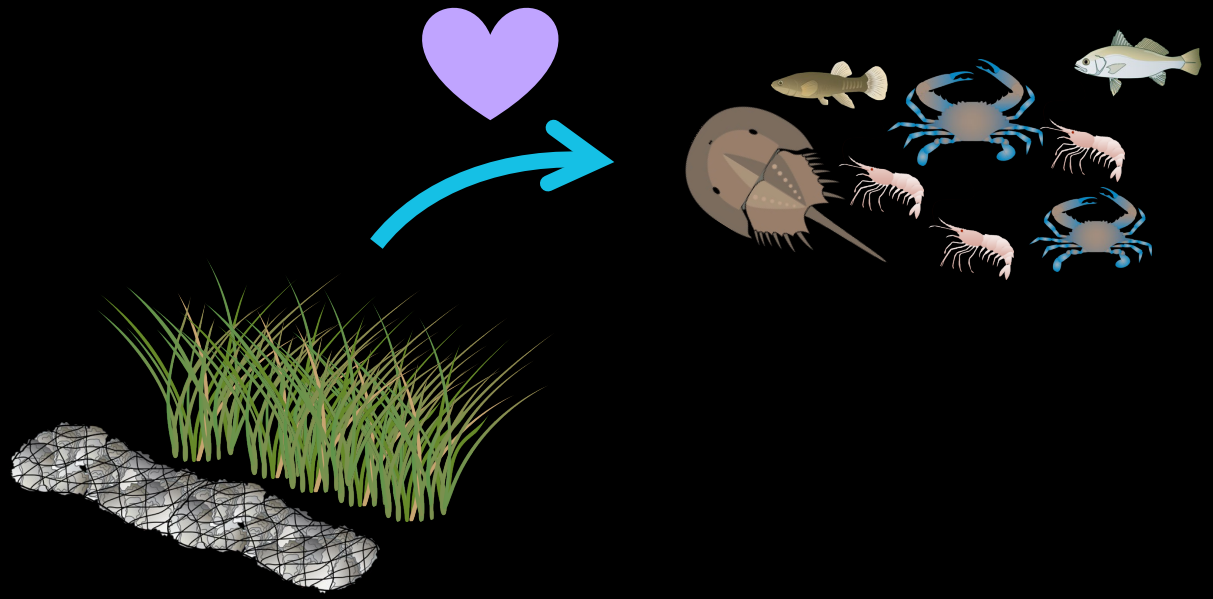
Looby et al. 2024. Aquat Conserv: Mar Freshw Ecosyst

With an Increase in Habitat Structure…



Arrow Key
Beneficial
Detrimental

…Intertidal Organisms Would Increase, Which Would…

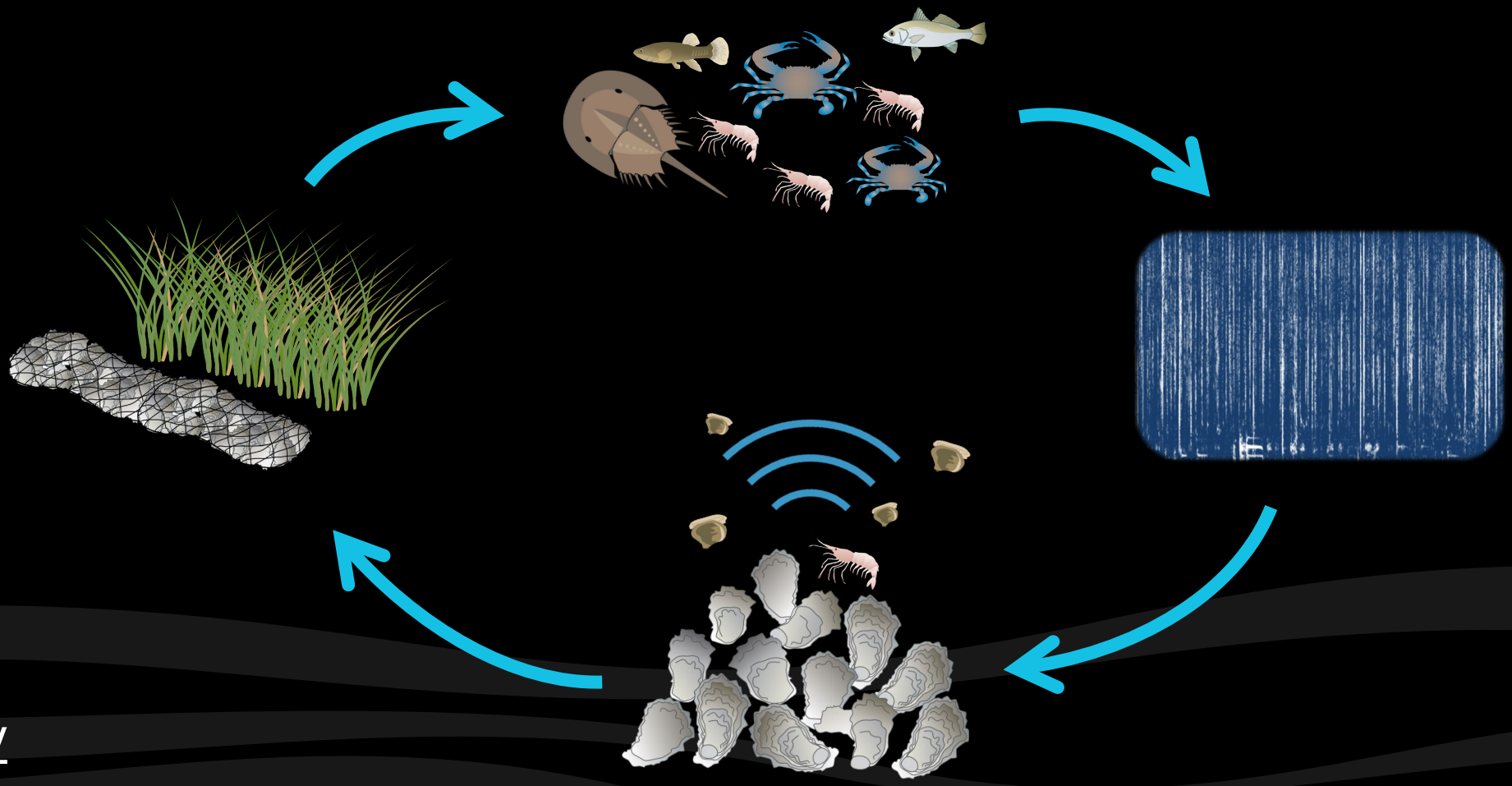


Arrow Key
Beneficial
Detrimental

…Lead to More Sounds, Which Would…

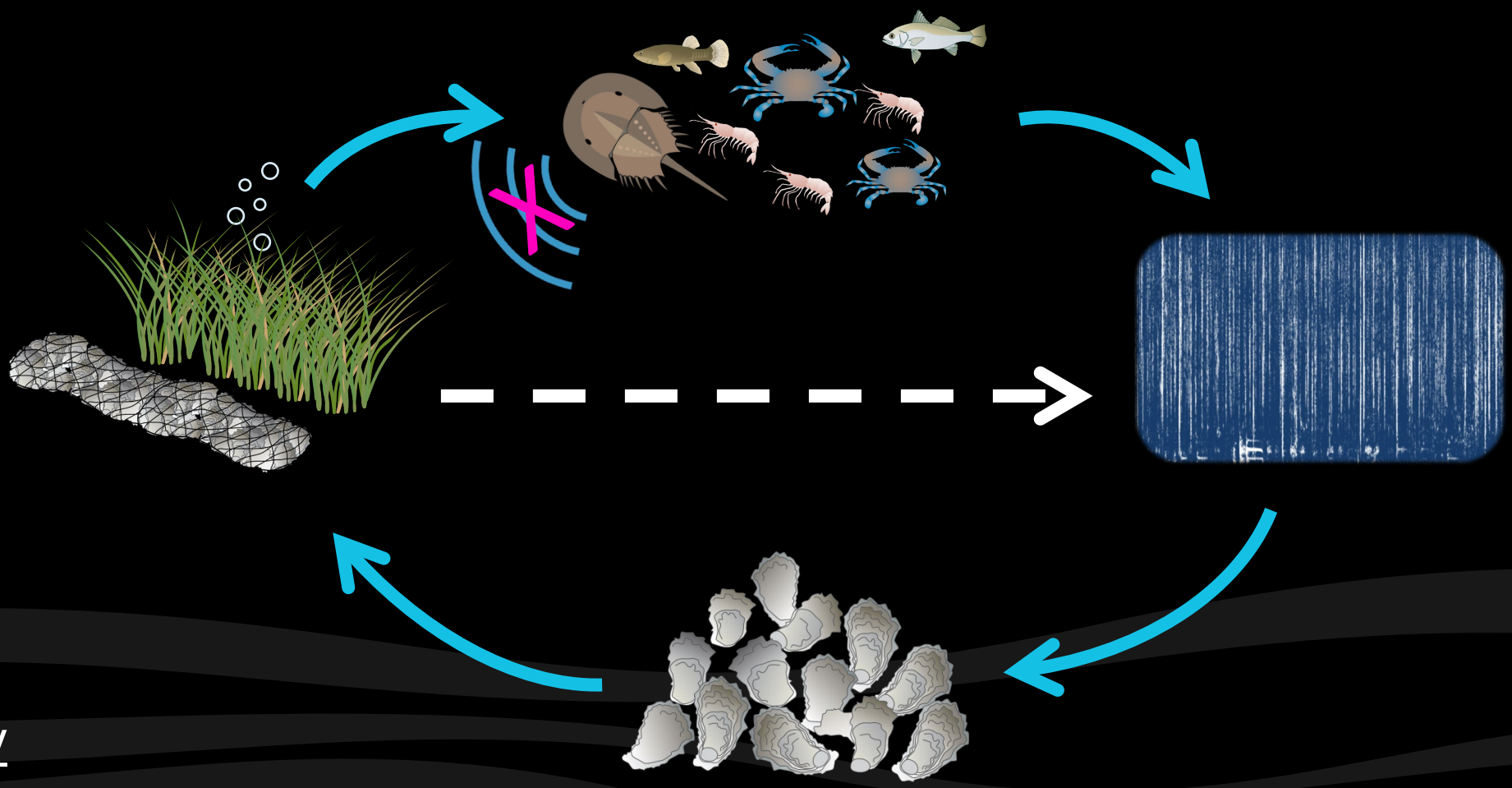
Arrow Key
Beneficial
Detrimental

…Lead to More Oyster Settlement and Habitat Structure



Arrow Key
Beneficial
Detrimental

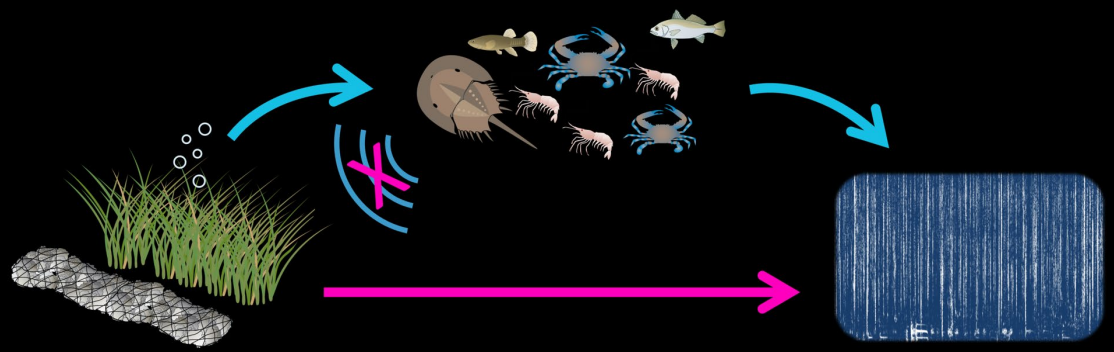
Salt Marsh Plants Would Increase Attenuation



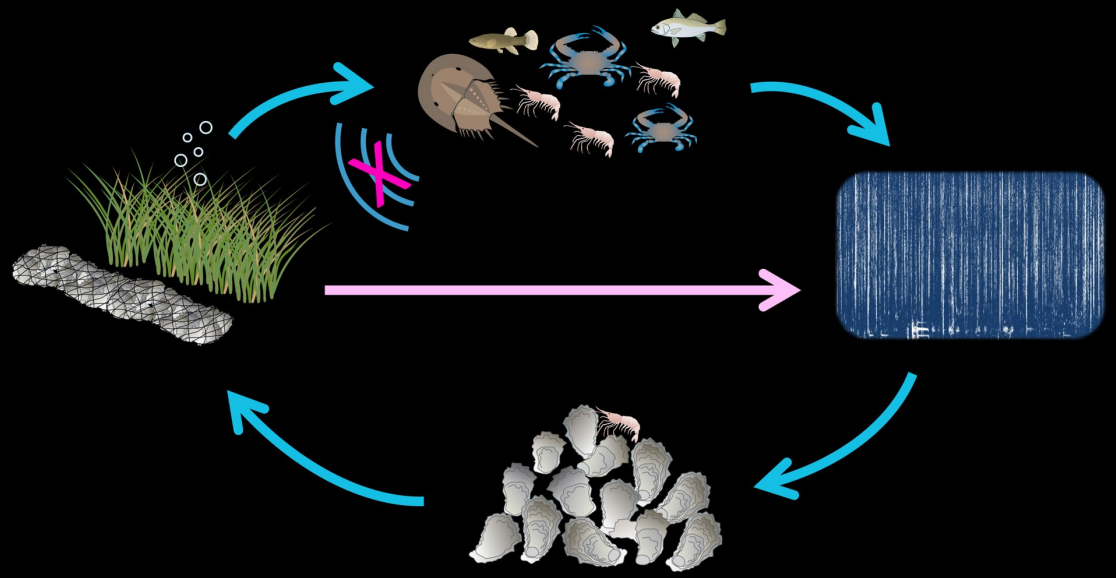
Arrow Key
Beneficial
Detrimental

Salt Marsh Plants Would Increase Attenuation

Salt Marsh Plants Lead to the Same or Less Sound



Salt Marsh Plants Have Limited Effects on Sound



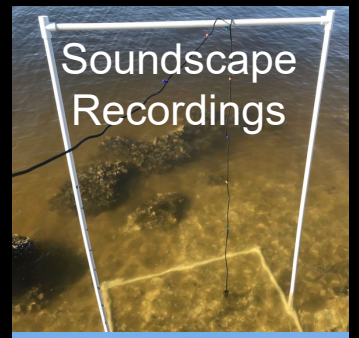
Arrow Key
Beneficial
Detrimental

Field Sampling at Hardened and Living Shorelines in Cedar Key, FL

Field Data Supported the Existence of Soundscape-Habitat Interactions

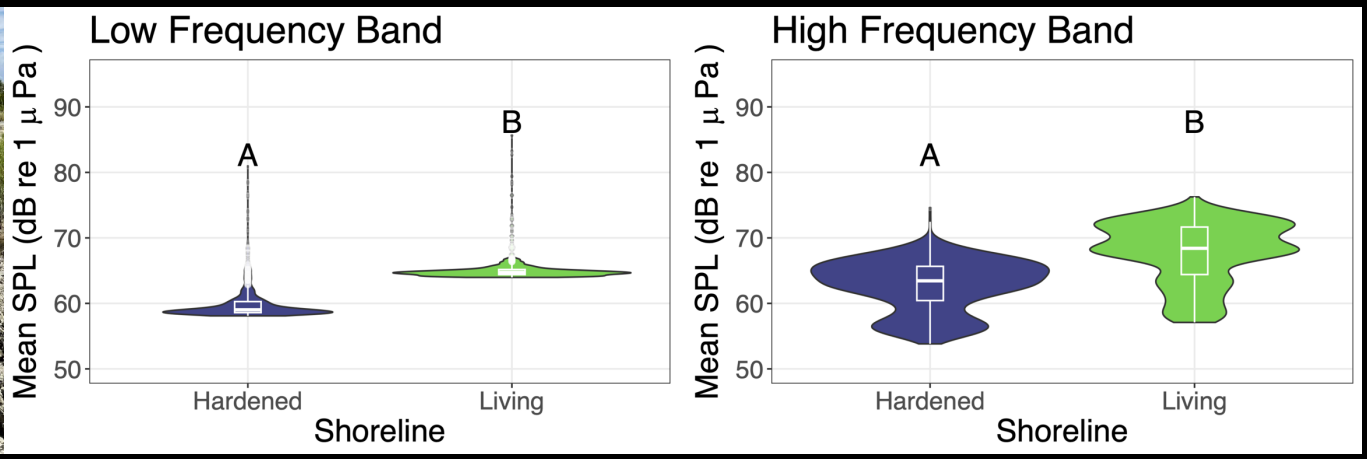
Before-After-Control-Impact

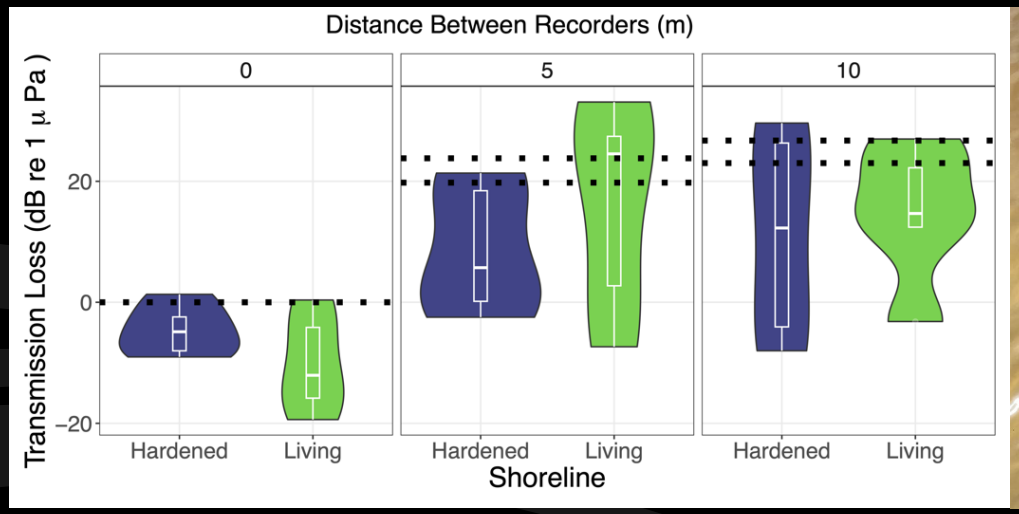
Seasonal

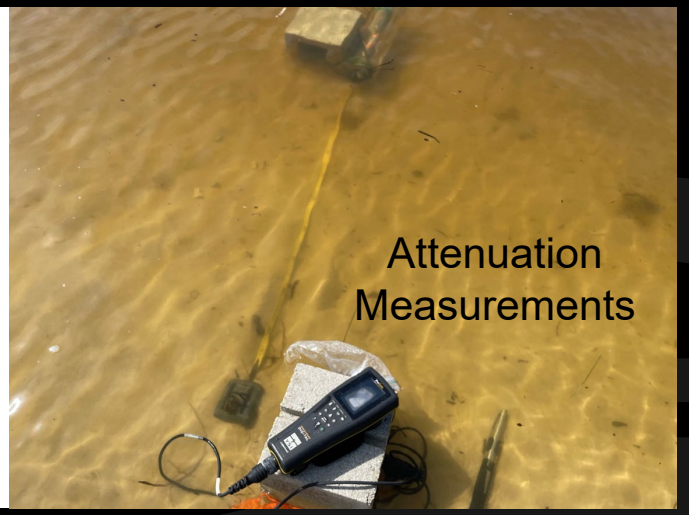


Inconclusive

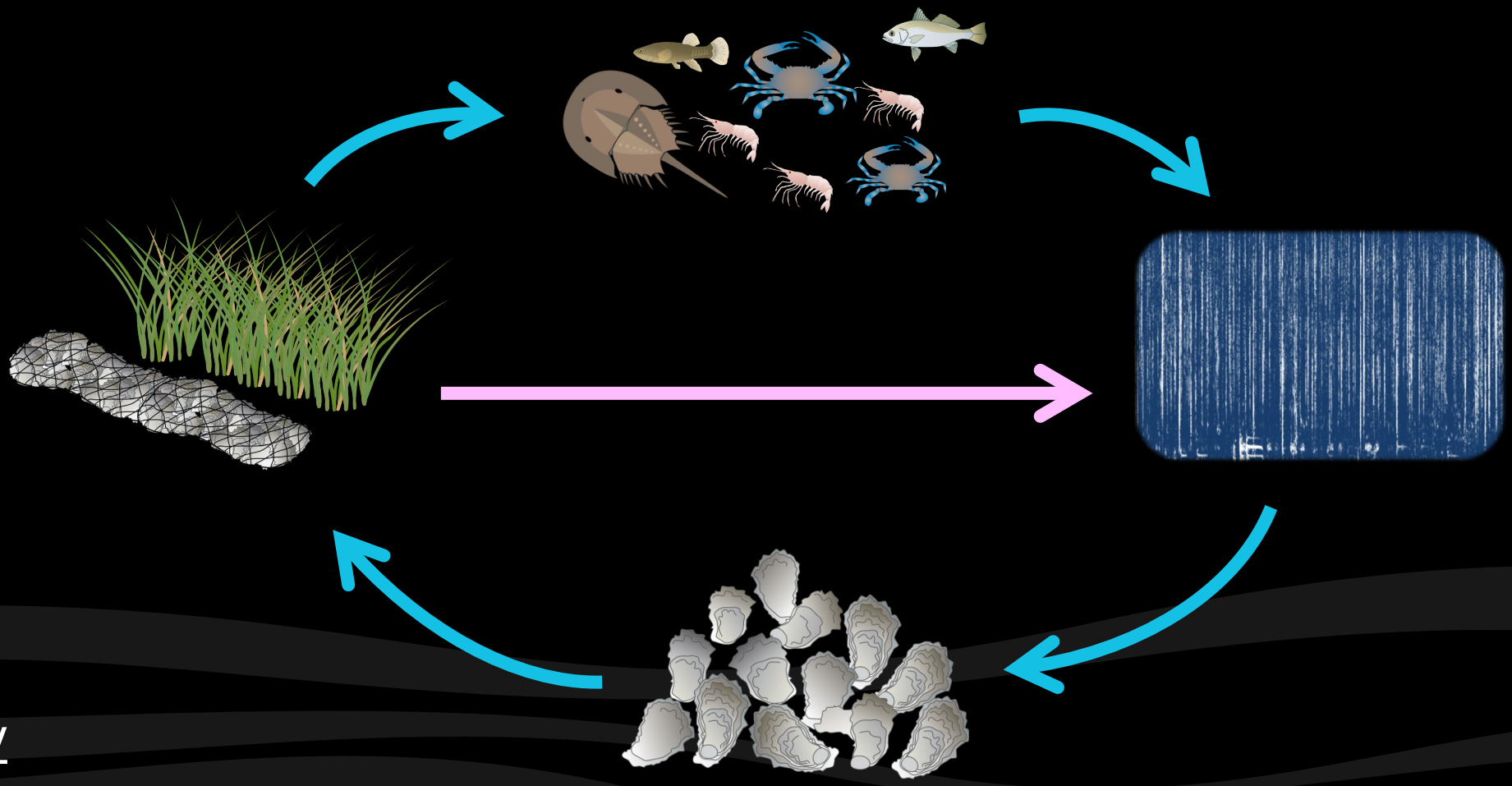
A Year Following Construction





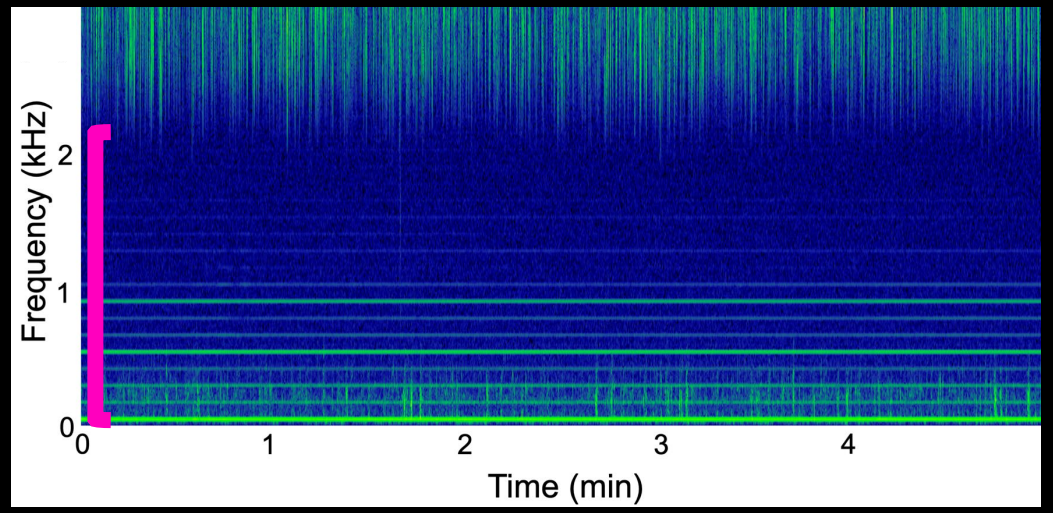


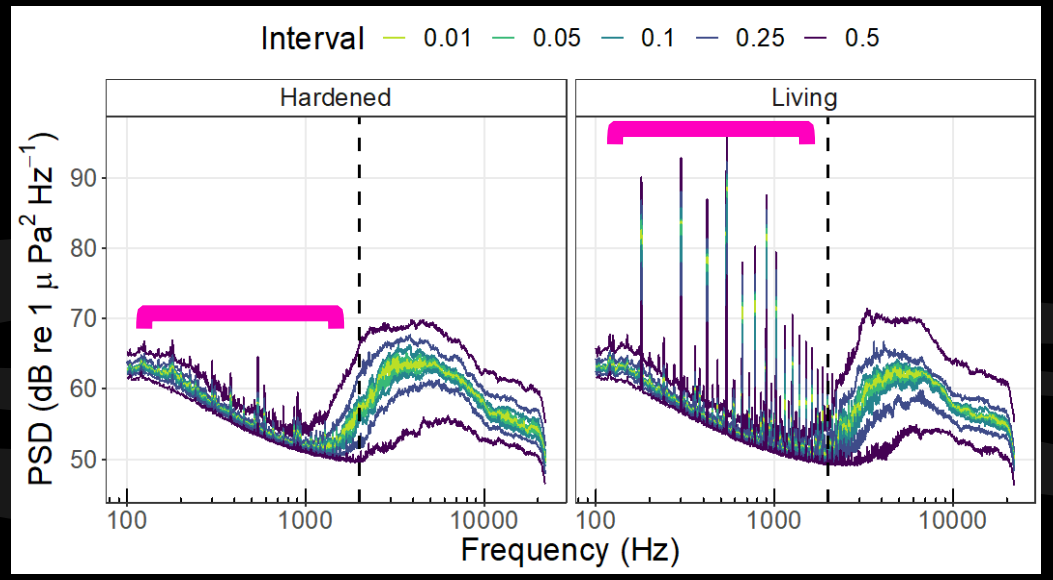
Soundscape Changes Support Living Shoreline Enhancement



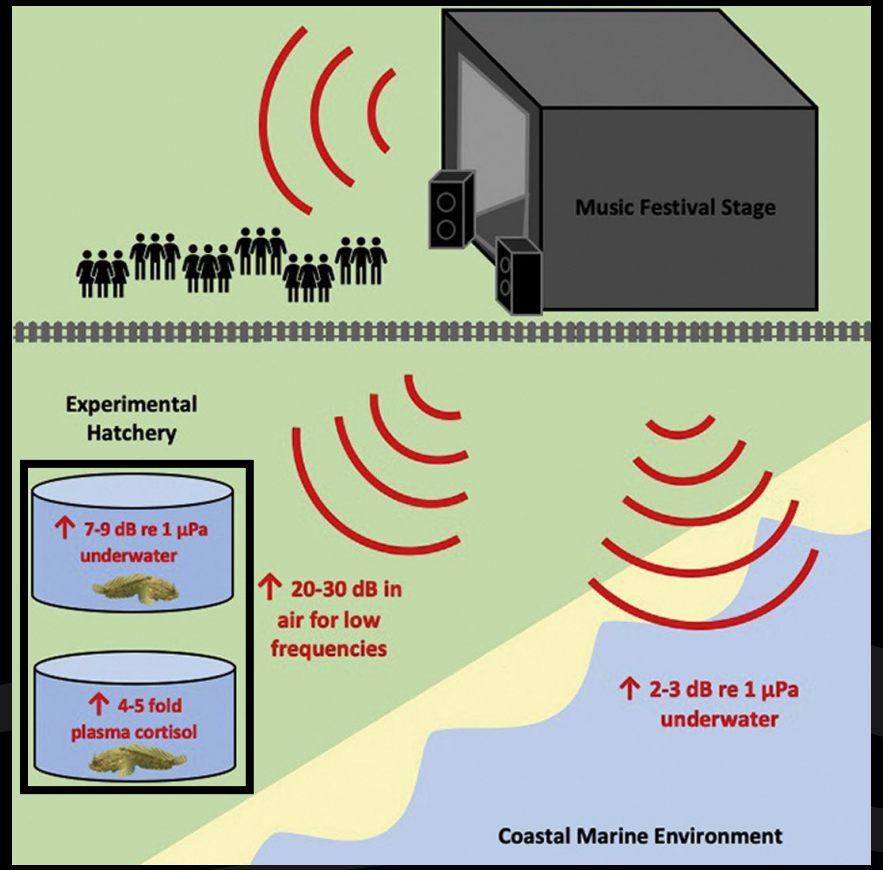
Arrow Key
Beneficial
Detrimental

The Low Frequency Band Was Often Dominated by a Loud, Chronic, Human-Made Sound

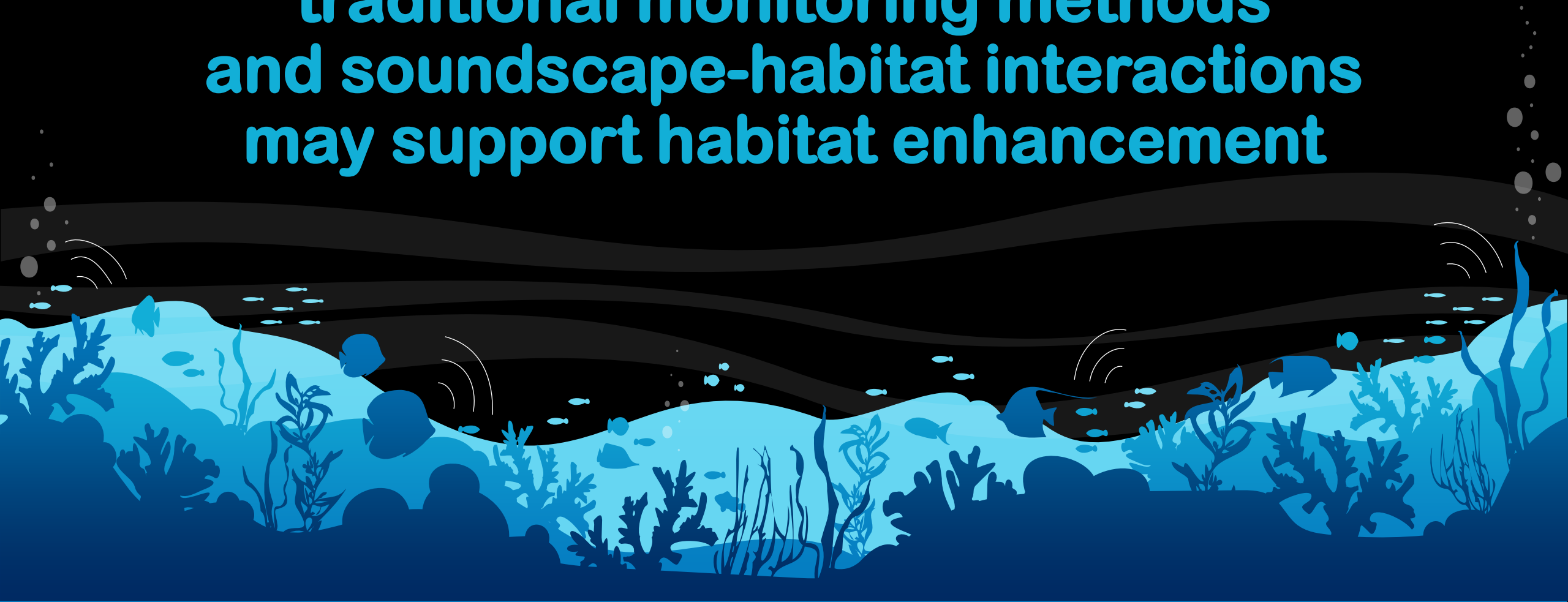




Cartolano et al. 2020. Environ Pollut



Passive acoustics can supplement traditional monitoring methods and soundscape-habitat interactions may support habitat enhancement



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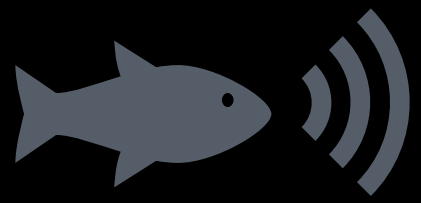

Background

Underwater Soundscapes

Passive Acoustics

Local Examples

Fish Monitoring

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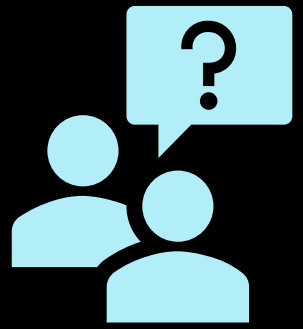


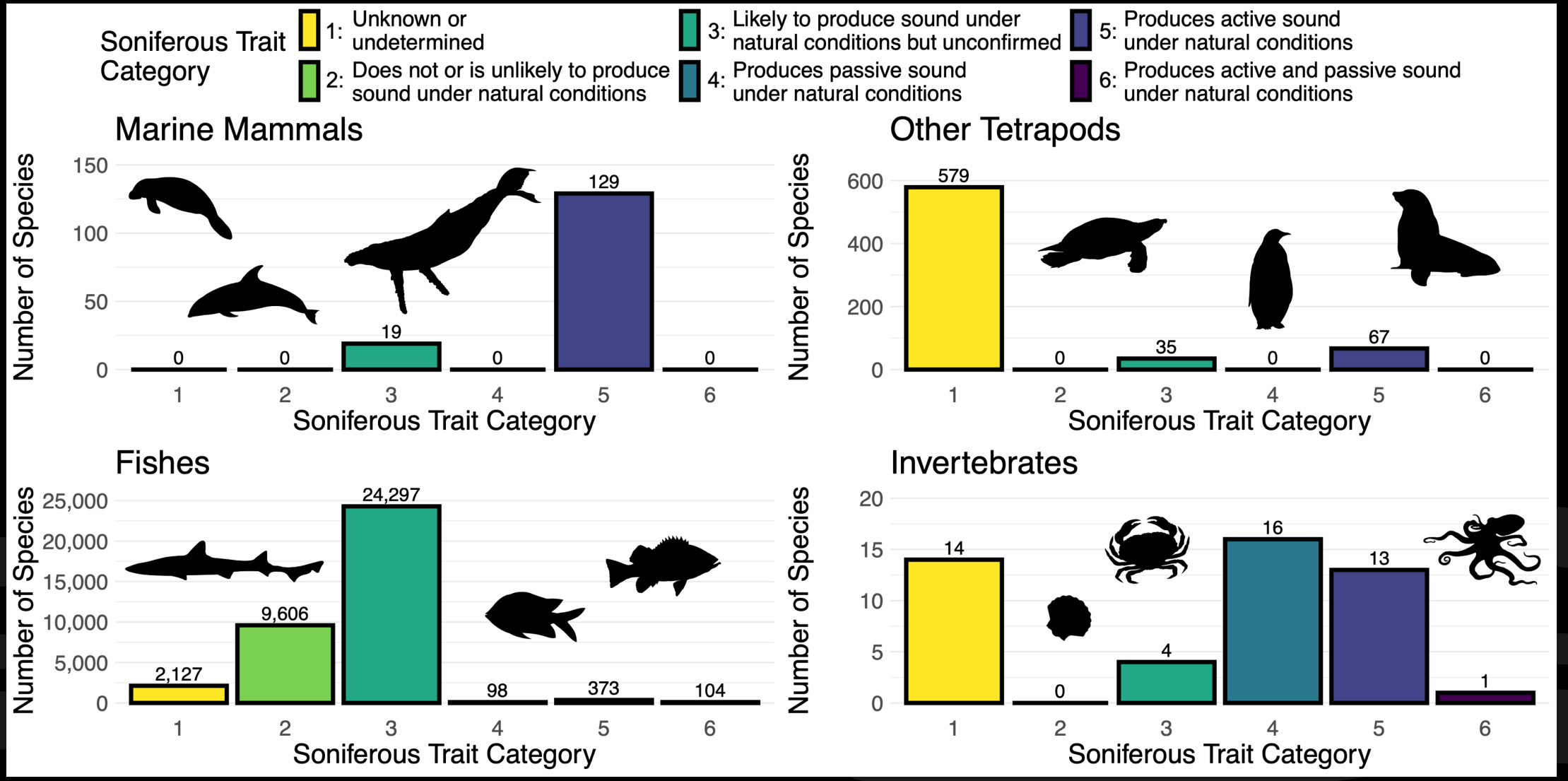
Overview

What We Know

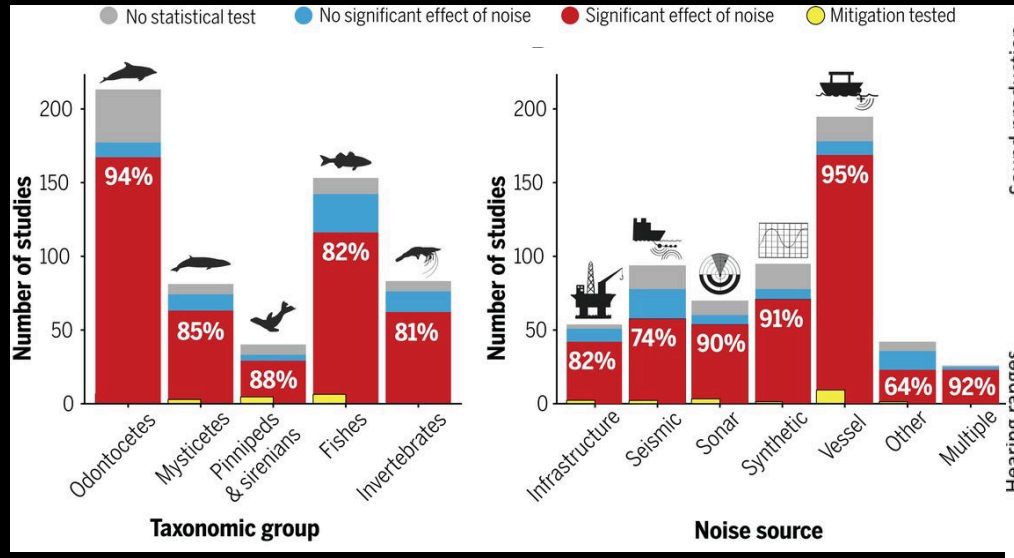
What We Don't Know

Underwater Sound Production is Widespread Among Species

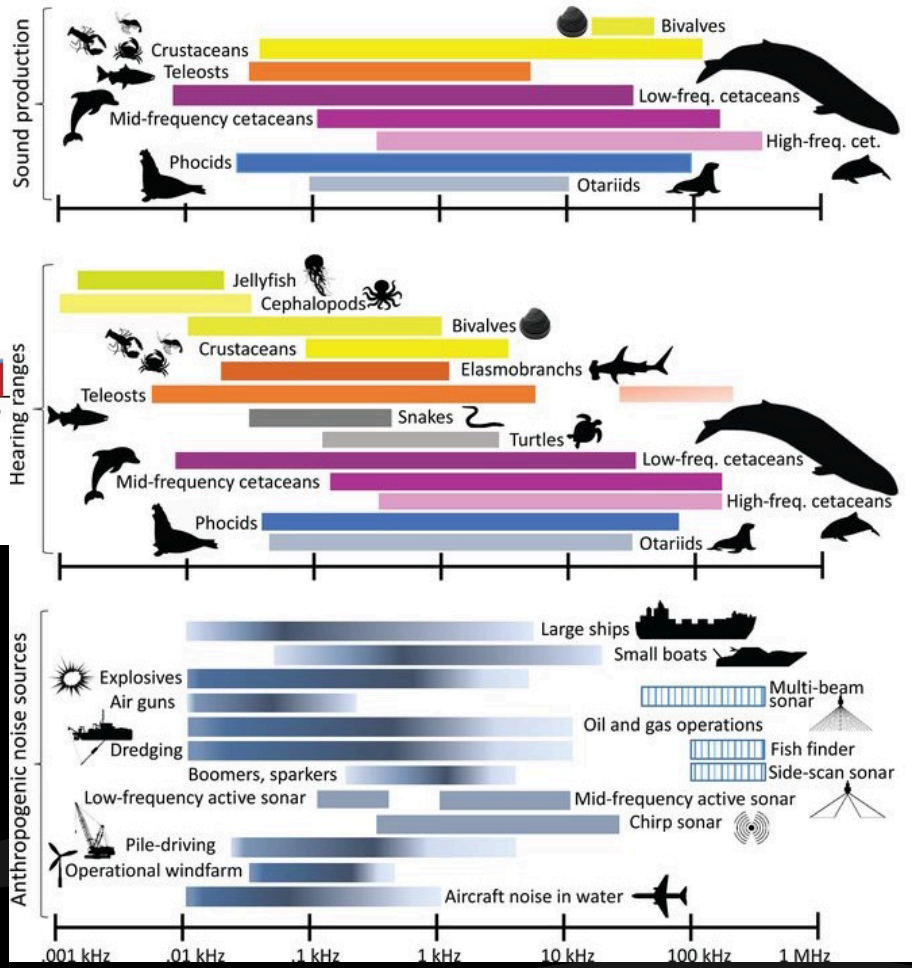
Looby et al. 2023. Sci Data



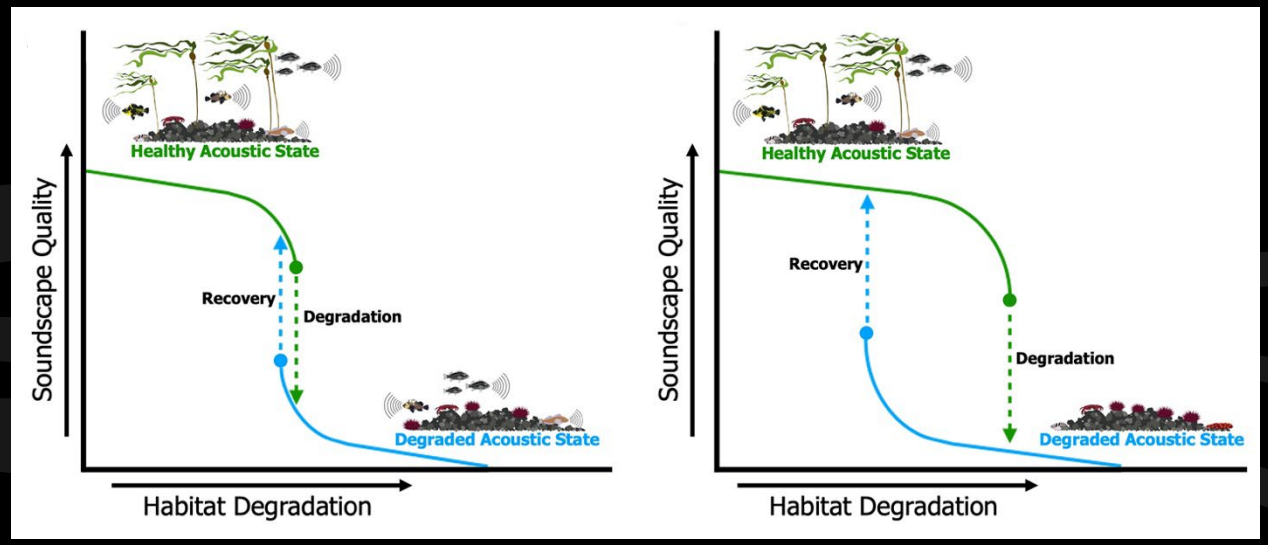
Noise Pollution Has Broad and Varied Impacts



Duarte et al. 2021. Science



Cox et al. In press. Front Ecol Environ



Passive Acoustic Monitoring is Becoming Operationalizable

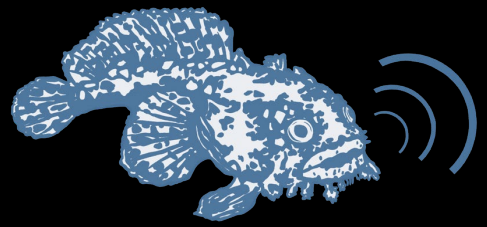
ELSEVIER

Ecological Informatics

Volume 74, May 2023, 101953

FishSounds Version 1.0: A website for the compilation of fish sound production information and recordings

Audrey Looby [a b], Sarah Vela [c d], Kieran Cox [e], Amalis Riera [f], Santiago Bravo [g], Hailey L. Davies [f], Rodney Rountree [f h], Laura K. Reynolds [i], Charles W. Martin [a], Stan Matwin [c j k], Francis Juanes [f]



Remote Sensing in Ecology and Conservation

Open Access

ZSL LET'S WORK FOR WILDLIFE

ORIGINAL RESEARCH

HydroMoth: Testing a prototype low-cost acoustic recorder for aquatic environments

Timothy A. C. Lamont[1,2*], Lucille Chapuis[1*], Ben Williams[1], Sasha Dines[3,4], Tess Gridley[3,4], Guilherme Frainer[4,5], Jack Fearey[4,5], Permas B. Maulana[6], Mochyudho E. Prasetya[6], Jamaluddin Jompa[7,8], David J. Smith[2,9] & Stephen D. Simpson[1,10]

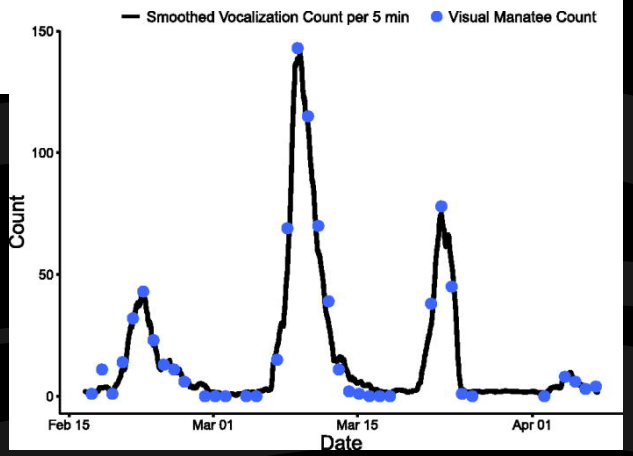
Estimating Florida manatee (*Trichechus manatus latirostris*) abundance using passive acoustic methods

Athena M. Rycyk; Cora Berchem; Tiago A. Marques

Check for updates

+ Author & Article Information

JASA Express Lett. 2, 051202 (2022)

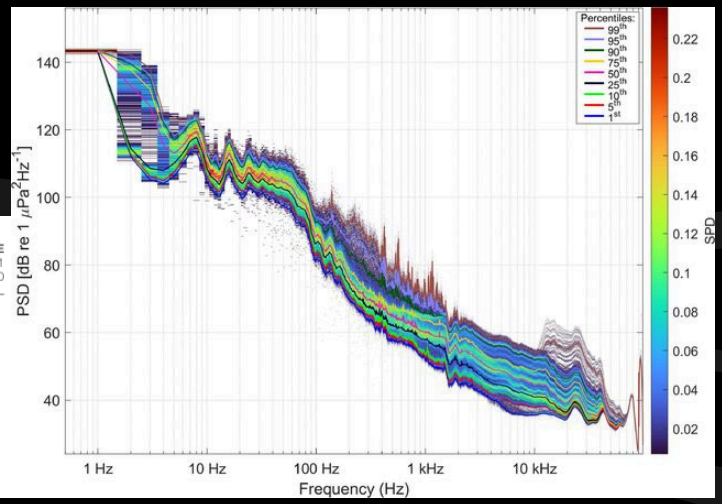


frontiers in Marine Science

TECHNOLOGY AND CODE
published: 19 August 2021
doi: 10.3389/fmars.2021.703650

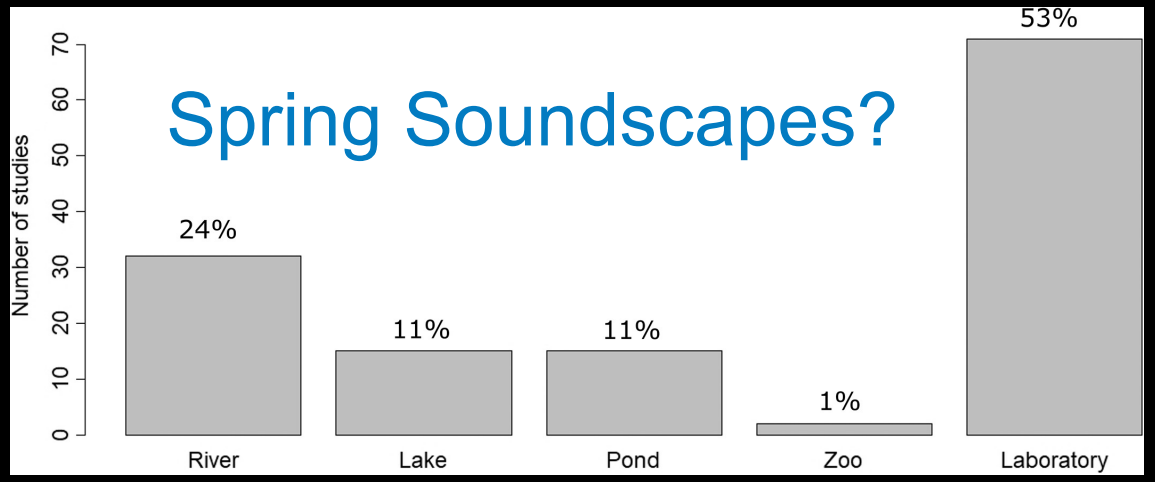
Ocean Sound Analysis Software for Making Ambient Noise Trends Accessible (MANTA)

Jennifer L. Miksis-Olds[1], Peter J. Dugan[2], S. Bruce Martin[3], Holger Klinck[2,4], David K. Mellinger[5], David A. Mann[6], Dimitri W. Ponirakis[2] and Olaf Boebel[7]*

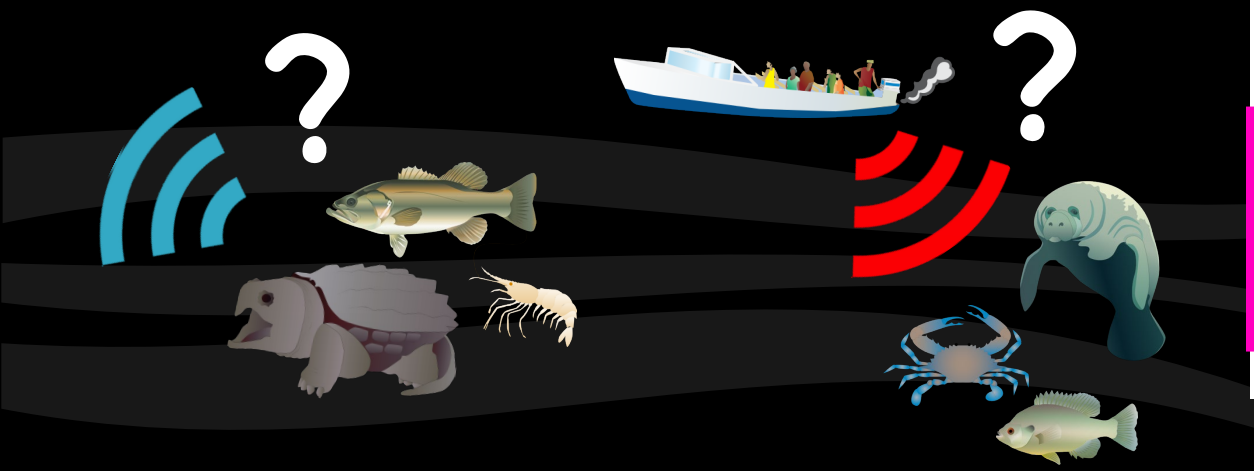


A Lot Remains Unknown or Unstudied

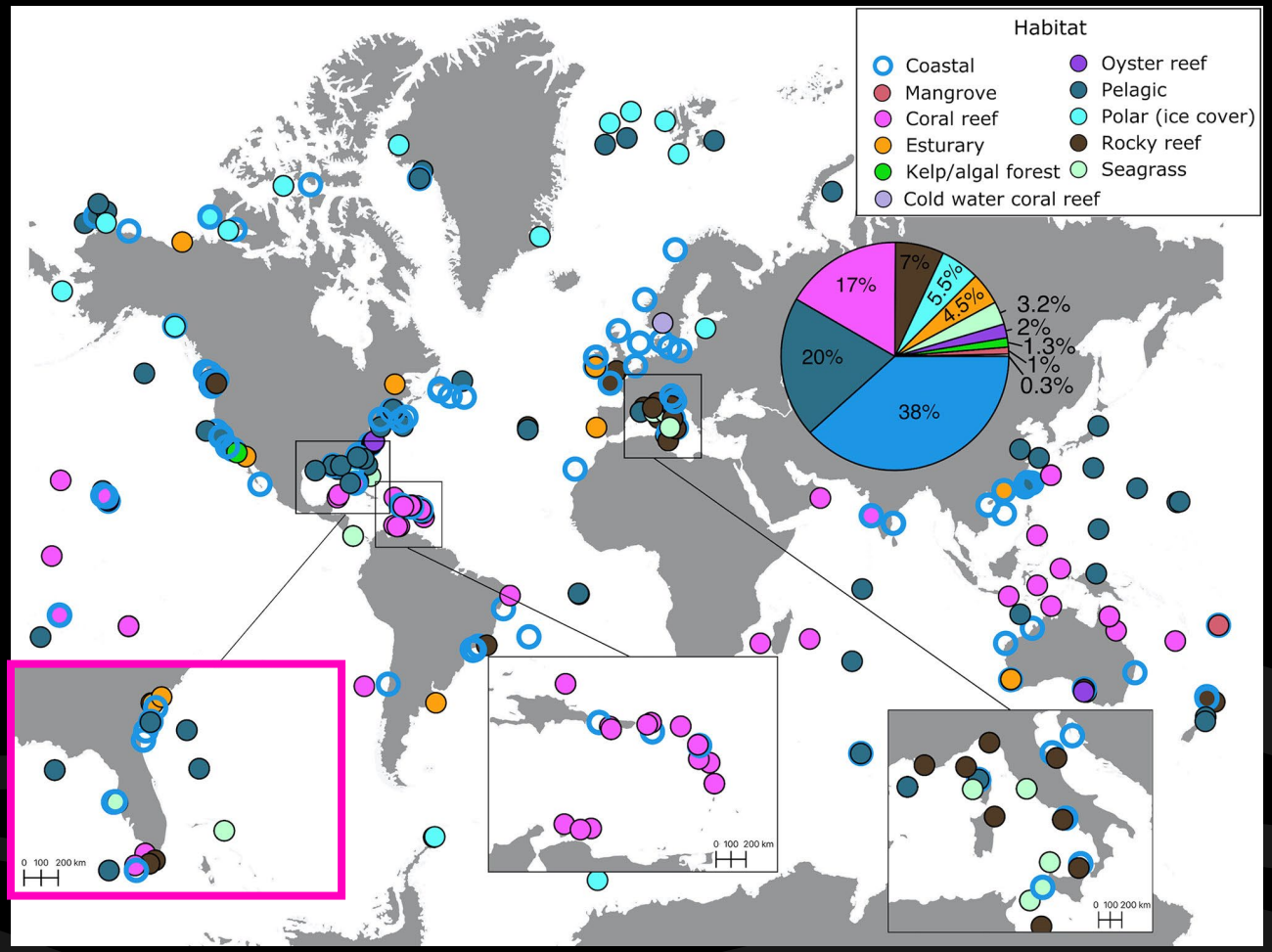
52 Freshwater Passive Acoustics Studies



Greenhalgh et al. 2020. WIREs Water

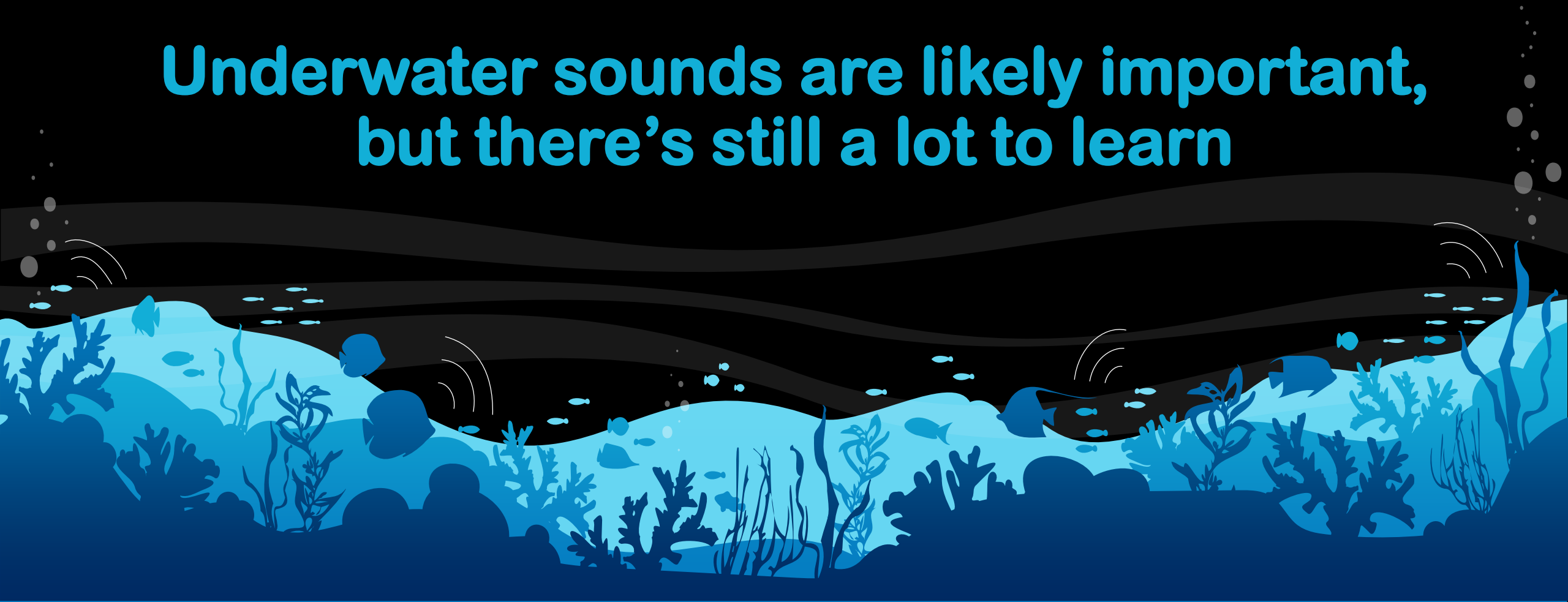


200 Marine Soundscape Studies



Havlik et al. 2022. Front Mar Sci

Underwater sounds are likely important, but there's still a lot to learn



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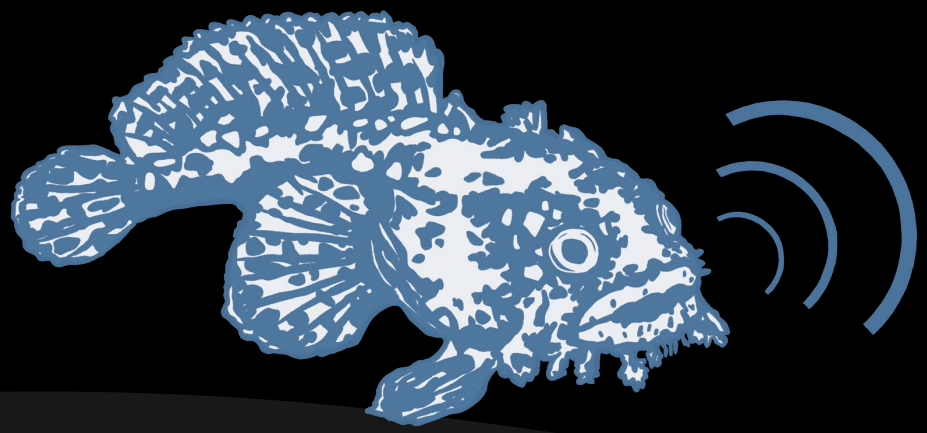
Questions?



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