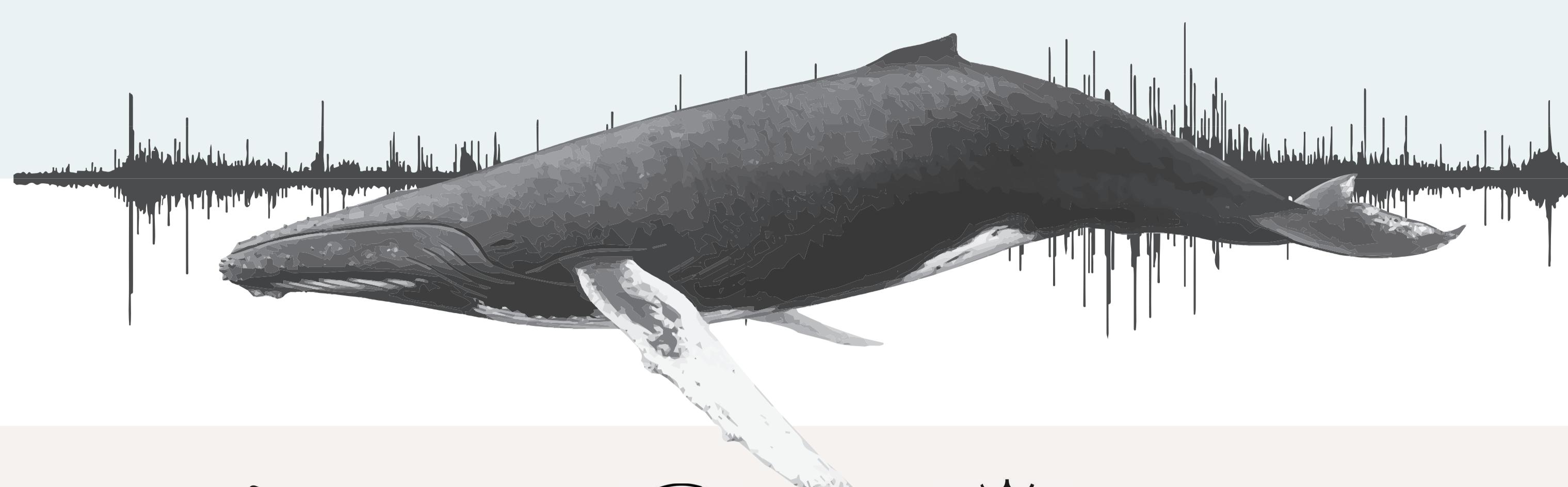


# Say what?! Linking acoustic signaling with tag-derived behavioral states in Antarctic humpback whales (*Megaptera novaeangliae*)

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**This project aims to characterize humpback whale vocalizations relative to behavior using data from non-invasive, animal-borne tags deployed along the Western Antarctic Peninsula (WAP).**

Defining the relationships between vocal signaling and behavior will critically expand the acoustic library and overall capabilities of passive acoustic monitoring of humpback whales in this region. When paired with data from our passive listening network, this project will enable us to assess changes in the behavioral ecology and phenology of an otherwise cryptic indicator species relative to this rapidly changing polar environment.

## WHY ACOUSTICS?

### MARINE MAMMALS USE SOUND FOR...

- communication
- navigation
- prey detection
- environmental sensing
- predator avoidance

Using bioacoustic techniques, otherwise CRYPTIC SPECIES can be studied where humans and light cannot travel.

## WHY THE WAP?

RAPIDLY CHANGING ENVIRONMENTAL CONDITIONS along the WAP are altering the distribution and phenology of species.

Shifts in the timing and extent of annual sea ice coverage are projected to influence the seasonal presence of phytoplankton, creating potential PHENOLOGICAL MIS-MATCHES that may affect the foraging and behavioral ecology of humpback whales.

## METHODOLOGY

### DATA COLLECTION.

CATS suction-cup tags were deployed on adult humpback whales along the WAP between Nov and Apr from 2015 to 2023.

### Sensors include...

- Accelerometers
- Magnetometers
- Gyroscopes
- Temperature
- Pressure
- Light
- Audio
- Video

**DATA ANALYSIS.** Spectrograms of audio data are generated for aural-visual identification and annotation of ACoustic SIGNALS.

Video data are audited to evaluate fine-scale behaviors and the presence of conspecific associates.

Plots of motion data, including tri-axial orientation, depth, speed (m/s), and jerk (m/s<sup>3</sup>), are plotted to evaluate for overall BEHAVIORAL STATE.

## NEXT STEPS

Out of 74 total, 29 TAG DEPLOYMENTS (>100 HRS) have simultaneous audio, video, and motion data streams, making them usable for our analysis

Acoustic signals will be manually sorted into distinct call types based on acoustic parameters (e.g., call duration, frequency bandwidth, slope) and cross-validated using linear discriminant analysis (LDA)

**OUR HYPOTHESIS.** Prevalence of certain call types/signal characteristics will be associated with different behavioral states, diel periods, and social contexts

## MORE INFO

### QR CODE

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