

Visualizing Marine Soundscapes for Marine Resource Managers and the General Public: Data Visualization Website Developed Using Human-Centered Design Principles and Interdisciplinary Collaboration

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Background

SOUNDSCAPE

combination of sounds that arises from an immersive environment

- **Biophony:**
sounds created by organisms
- **Anthrophony:**
sounds created by humans
- **Geophony:**
nonbiological ambient sounds of wind, rain, thunder, etc

GOALS

- Establish Baseline Conditions
- Understand Impact on Animals & Their Behavior
- Quantify How Sounds are Changing Over Time

Drifting Buoy

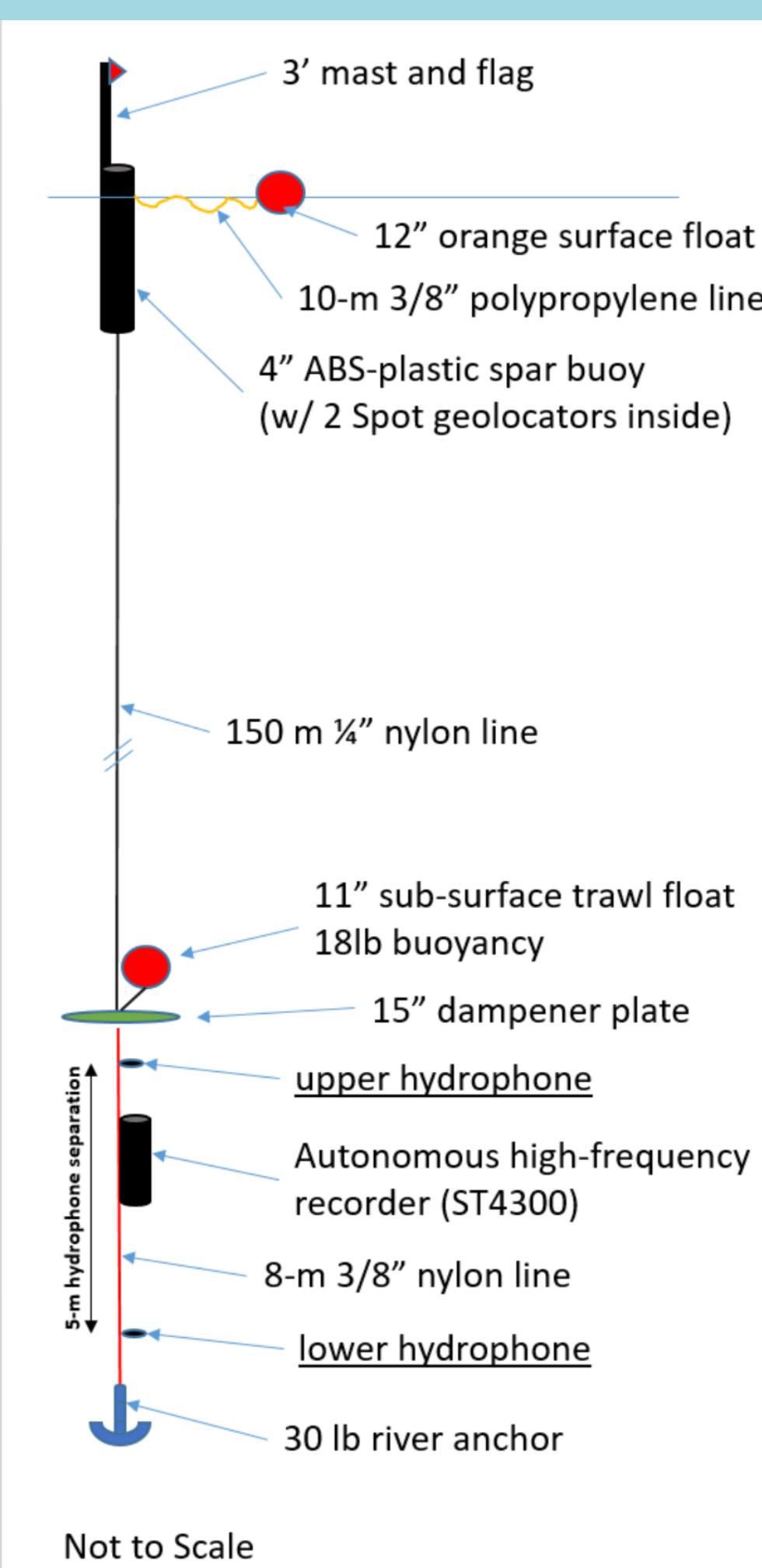


Figure Above: Pilot whale swimming near drifting buoy (with acoustic recorder attached underneath). Photo: NOAA Fisheries/Jay Barlow

Figure Left: Diagram of the Drifting Acoustic Spar Buoy Recorders (DASBRs) used in acoustic data collection. (Credit: NOAA Fisheries/Jay Barlow)

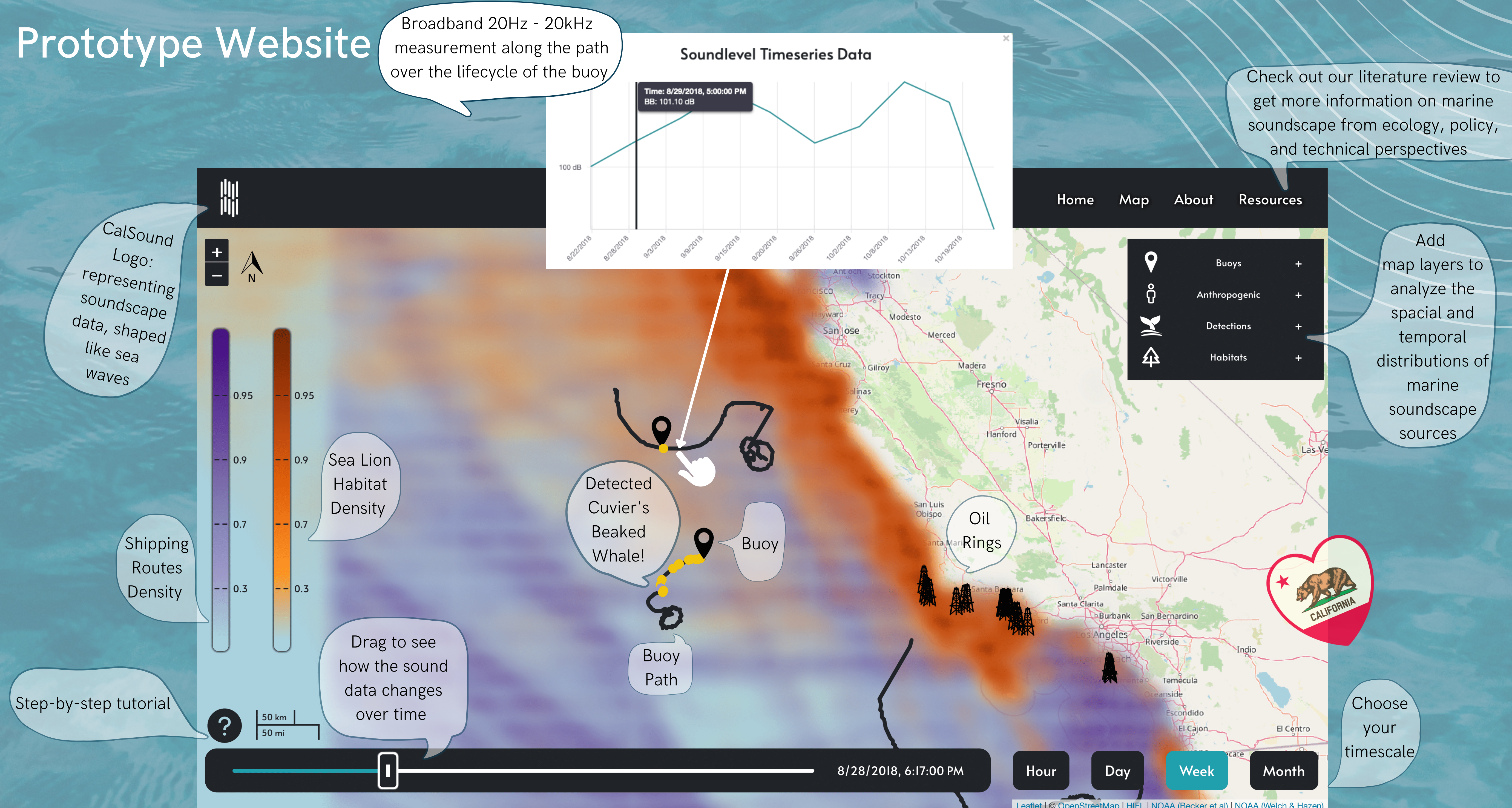
QUICK FACTS

- 12 drifting buoys
- Date range from July 24th to Dec 2nd, 2018
- Data collected as a part of the NOAA 2018 California Current Ecosystem Survey

How Might We...

...help marine resource managers, researchers, policymakers and the general public see the impacts of noise pollution in the ocean and provide a clear, holistic way of synthesizing information and visualizing ocean soundscapes?

Prototype Website



calsound.herokuapp.com



Hi! I am Jenny Chen, a California resident. I am curious about the newly planned coastal wind farm's noise pollution impact on marine animals near beaches in my county. I went to CalSound's website and studied the overlap between existing sound sources and animal habitats, as well as how loud the background sound is in the ocean. Looks like the new wind farm will be on a quiet coast with a lot of mammals. I'll write letters to my governor and coastal managers to nudge them to move the plan to a more eco-friendly location.



Interview Takeaways

CENTRALIZE RESEARCH

1

- Policies are currently geared towards individual species, and we need a platform to showcase the sound impact on the ecosystem as a whole.
- Bridge the divide between ecology and acoustics physics.

2

REPORT METRICS

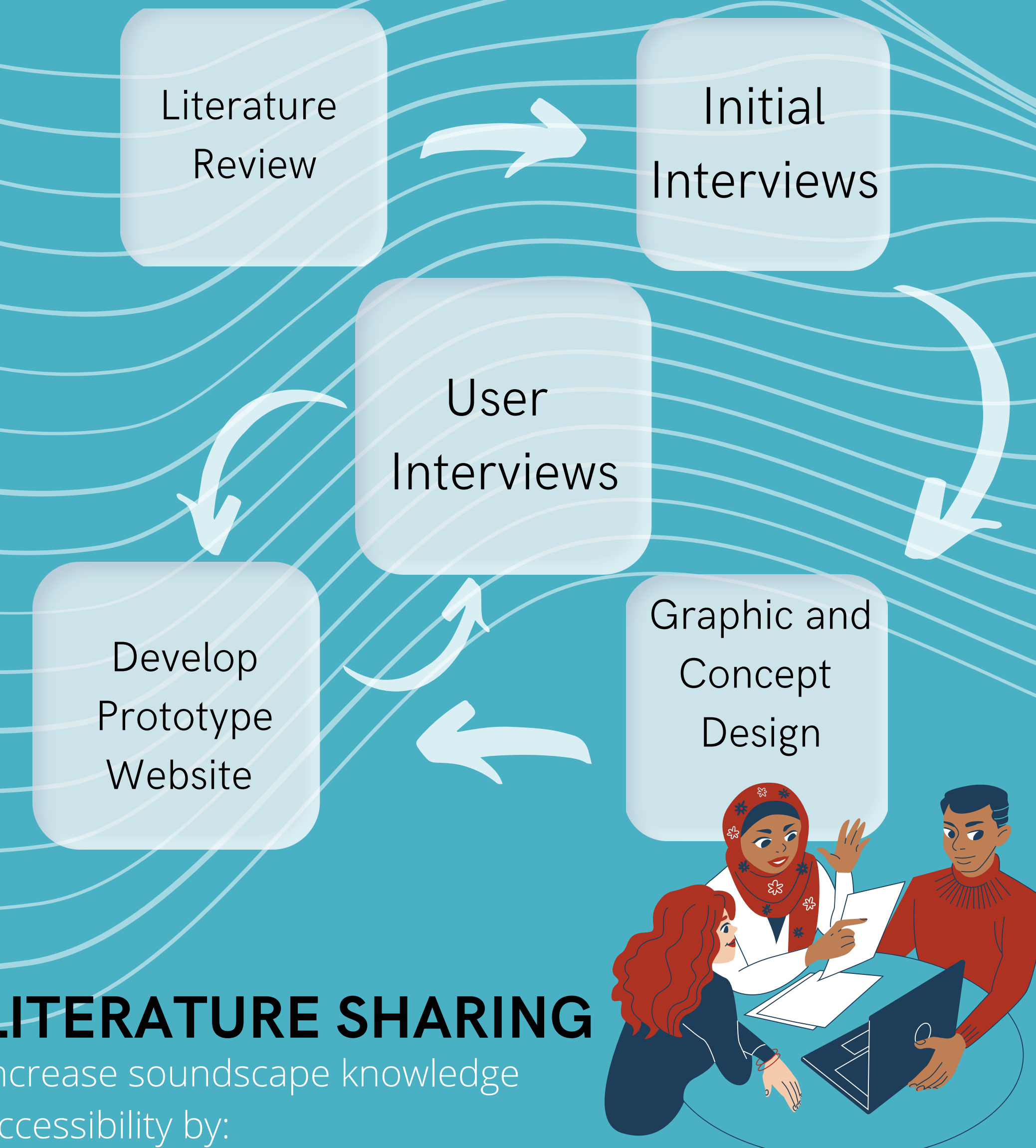
- The impact of a sound is judged by its frequency, intensity, temporal frequency, and accumulation in a 24 hour period.
- The contrast of before and after a sound source is introduced is important.
- Soundscape data needs to reflect the current marine environment

3

SHOW LAYERS

- Provide the sound source components and their proportions to the sound data
- Show the intersection of animal and human activities.
- Within anthropogenic sounds, include sources from multiple industries.

Design Process



LITERATURE SHARING

Increase soundscape knowledge accessibility by:

- Using non-technological terms
- Easy access to sections targeted towards different public interests
- Linking map data sources and featuring marine soundscape projects for further information

INTERVIEWEE PROFILE

12 researchers and marine resource managers from 7 different marine management and research organizations revealed what features they need to improve their fields.

Future Work

INCREASE PUBLIC ACCESSIBILITY

- Build a glossary for soundscape jargon.
- Develop virtual oceanography field trips on the website for K-12 students

RESEARCHER INTERFACE

- Allow researchers to upload and share data themselves so that they can adjust it for their functionality

INCORPORATE FEEDBACK

- Reach out back to interviewees for user feedback to better the website
- Incorporate feedback from conferences

Acknowledgement

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