Soundscapes of Seagrass Beds in Pamlico Sound, North Carolina

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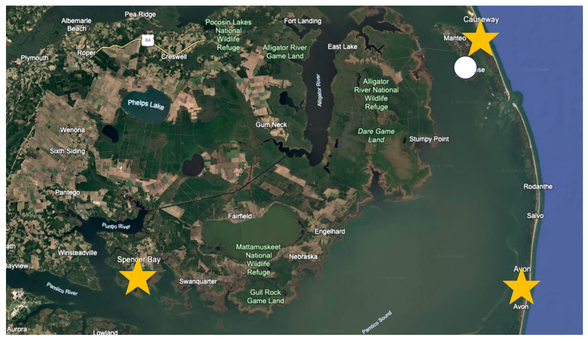
Introduction

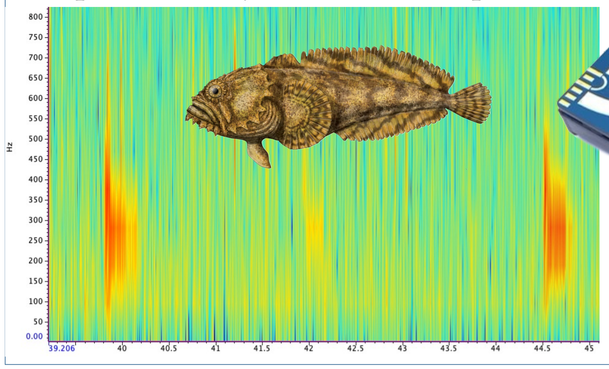
- Soundscapes can be used to estimate biodiversity.
- Sound production by fish is associated with activities like spawning, feeding, and courtship.
- The use of Passive Acoustic Monitoring (PAM) has been increasing as a tool for biodiversity assessments as it allows researchers to collect data for all times of day and limits disturbance.
- **Research Questions:**
  1. **Does the presence of seagrass beds at a given site impact the biodiversity?**
  2. **Does time of day impact organismal activity?**



Sample locations (stars) where 1 control site and 1 SAV site were selected. At Spencer Bay (bottom left) 2 control and 2 SAV sites were selected. The Coastal Studies Institute is represented by a white circle.

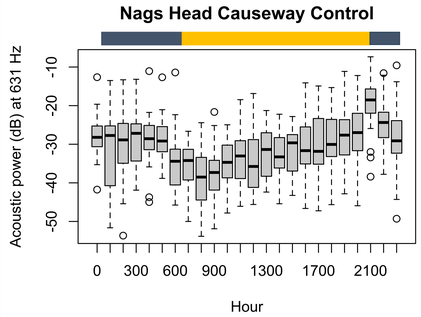
Methods

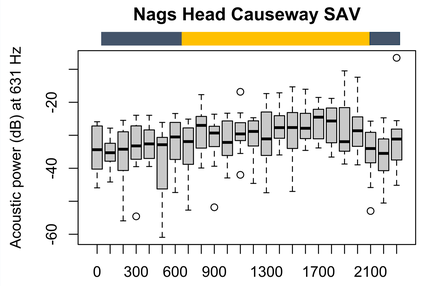
- HydroMoth acoustic recorders placed at 4 SAV (submerged aquatic vegetation) and 4 control sites.
- Recorded first 5 minutes of every hour (13-29 days).
- 20% of files for each site selected for manual listens of first minute in Raven Lite software.
- Listened for fish and snapping shrimp.
- Spectral analysis for all files performed in R.



Left: Oyster toadfish call in Raven Lite. Above: HydroMoth acoustic recorder

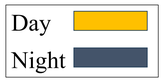
Results

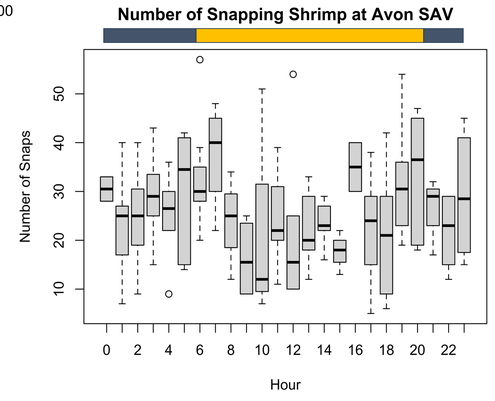


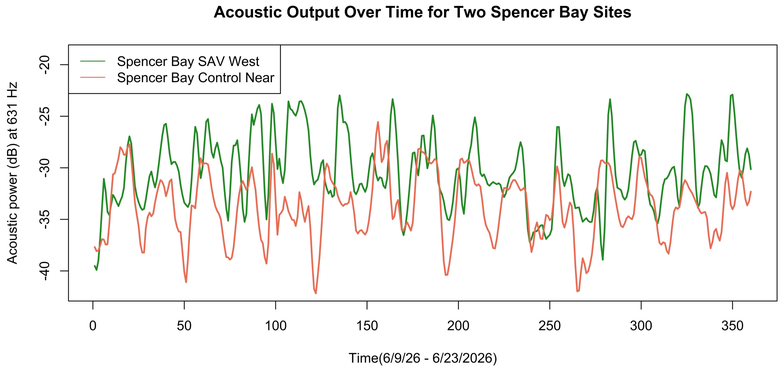


- Snapping shrimp follow a diurnal pattern.
- For Avon SAV, 4 instances of silver perch chorusing, mostly around dusk.

- Diurnal patterns differed between control and SAV sites.
- At the control site, acoustic power highest at night and at the SAV site acoustic power highest during the day.
- Significant anthropogenic noise evident at some sites.



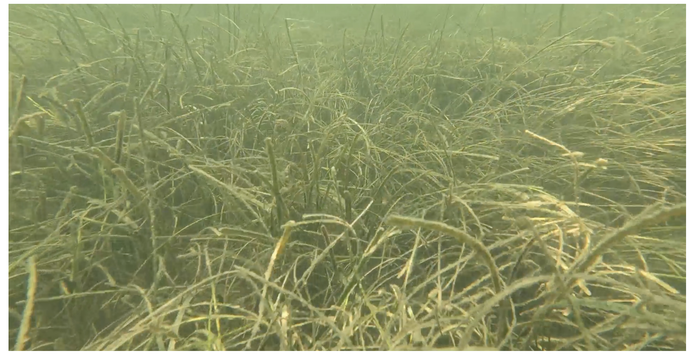




- SAV site has overall higher acoustic power, indicating more biological activity.
- Diurnal pattern present over entire deployment time.

Conclusion

- Diurnal patterns indicate that time of day might have an impact on organismal activity.
- There might be a difference in biodiversity between control and SAV sites, but more analysis is needed.
- More files need to be manually reviewed to understand how anthropogenic noise and other interference might have impacted spectral analysis.
- **Future Work**
  - Continue manual listens across sites.
  - Complete spectral analysis across sites.
  - Look into comparing organismal activity to temperature readings collected using a HOBO temperature logger.



Seagrass bed at Avon

References

- Kimura, L., Gomez, R., & Nakamura, T. (2024). Typhoon impacts on coral and fish communities revealed by reef soundscape assessment using a low-cost acoustic recording device. *Galaxea, Journal of Coral Reef Studies*, *26*, 9–17. https://doi.org/10.3755/galaxea.G26N-3
- Radford, C. A., Jeffs, A. G., Tindle, C. T., & Montgomery, J. C. (2008). Temporal patterns in ambient noise of biological origin from a shallow water temperate reef. *Oecologia*, *156*(4), 921–929. https://doi.org/10.1007/s00442-008-1041-y

Acknowledgements

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