

# Comparing Habitat Soundscapes in North Miami Beach



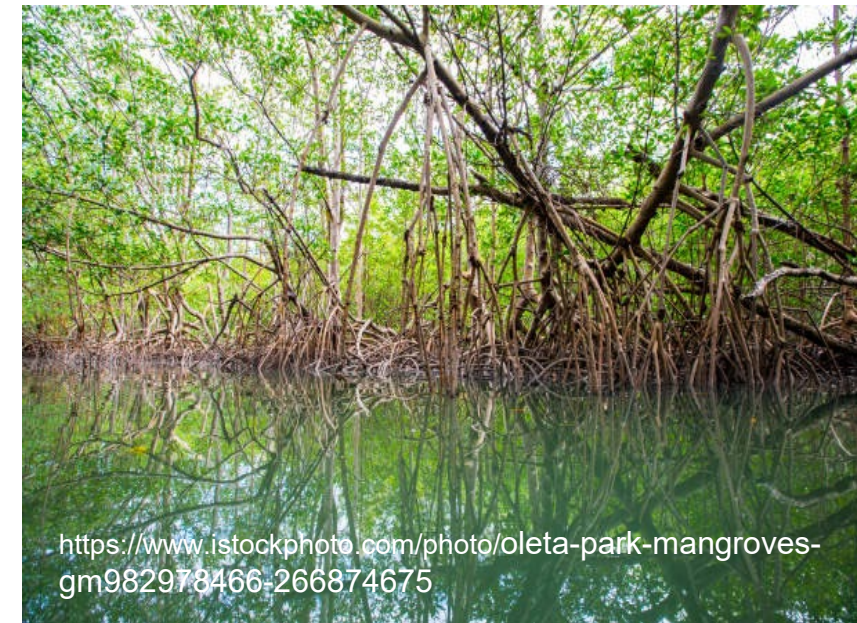
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## BACKGROUND

- Too much background noise can obstruct fish communication and ability to distinguish between sounds over long distances (Lindseth & Lobel 2018).
- Prominent anthropogenic noise from boat noise in shallow waters obstructs 500 Hz to 25 kHz (Hildebrand 2009).
- Invertebrates, esp. shrimp calls: 2.5-15 kHz (Lindseth & Lobel 2018)

## METHODS

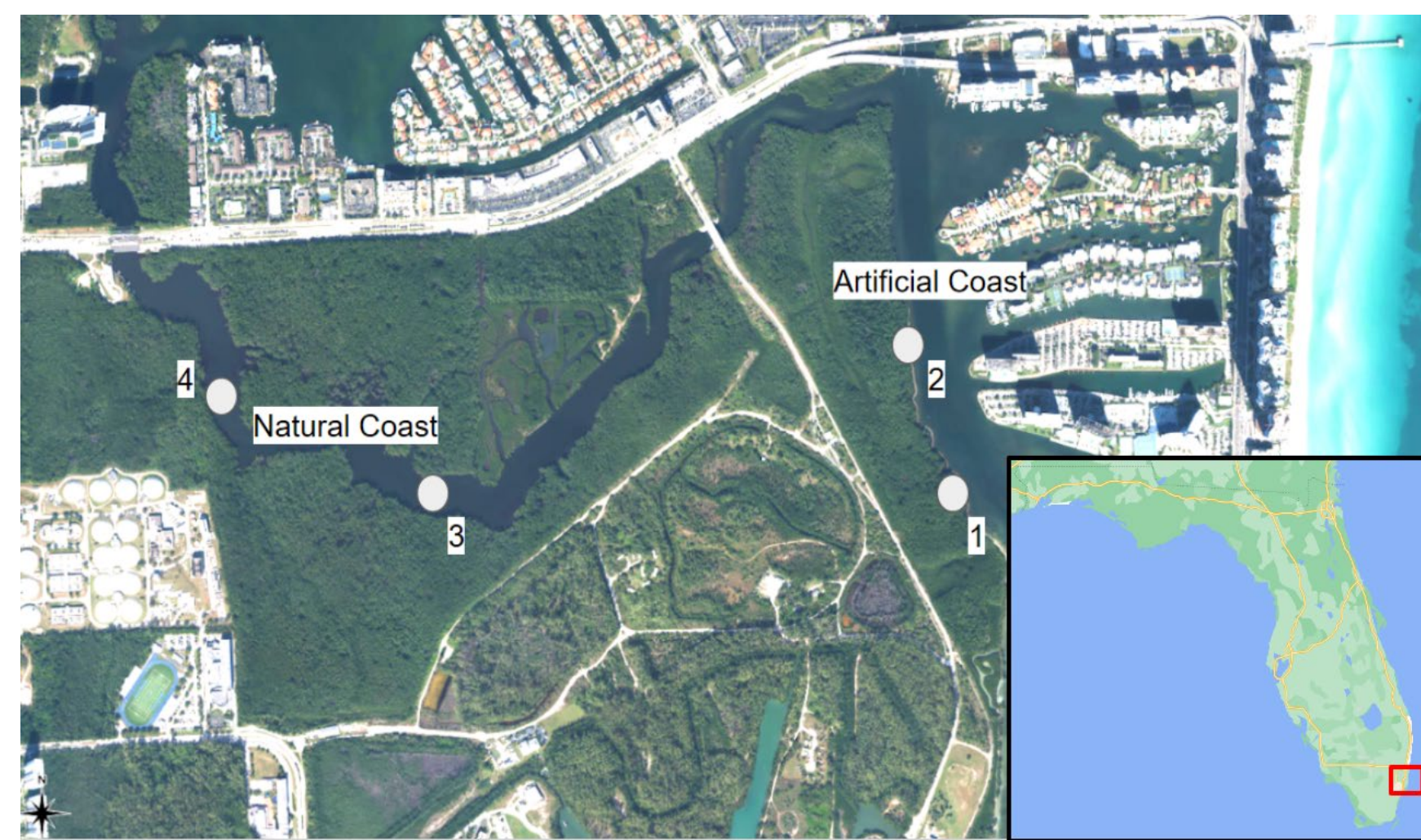
1. Deployed SoundTrap hydrophones in 2 locations—natural and artificial—to compare habitats (see Figures 1-3).



**Figure 1.** Natural mangrove coastline site along Oleta River



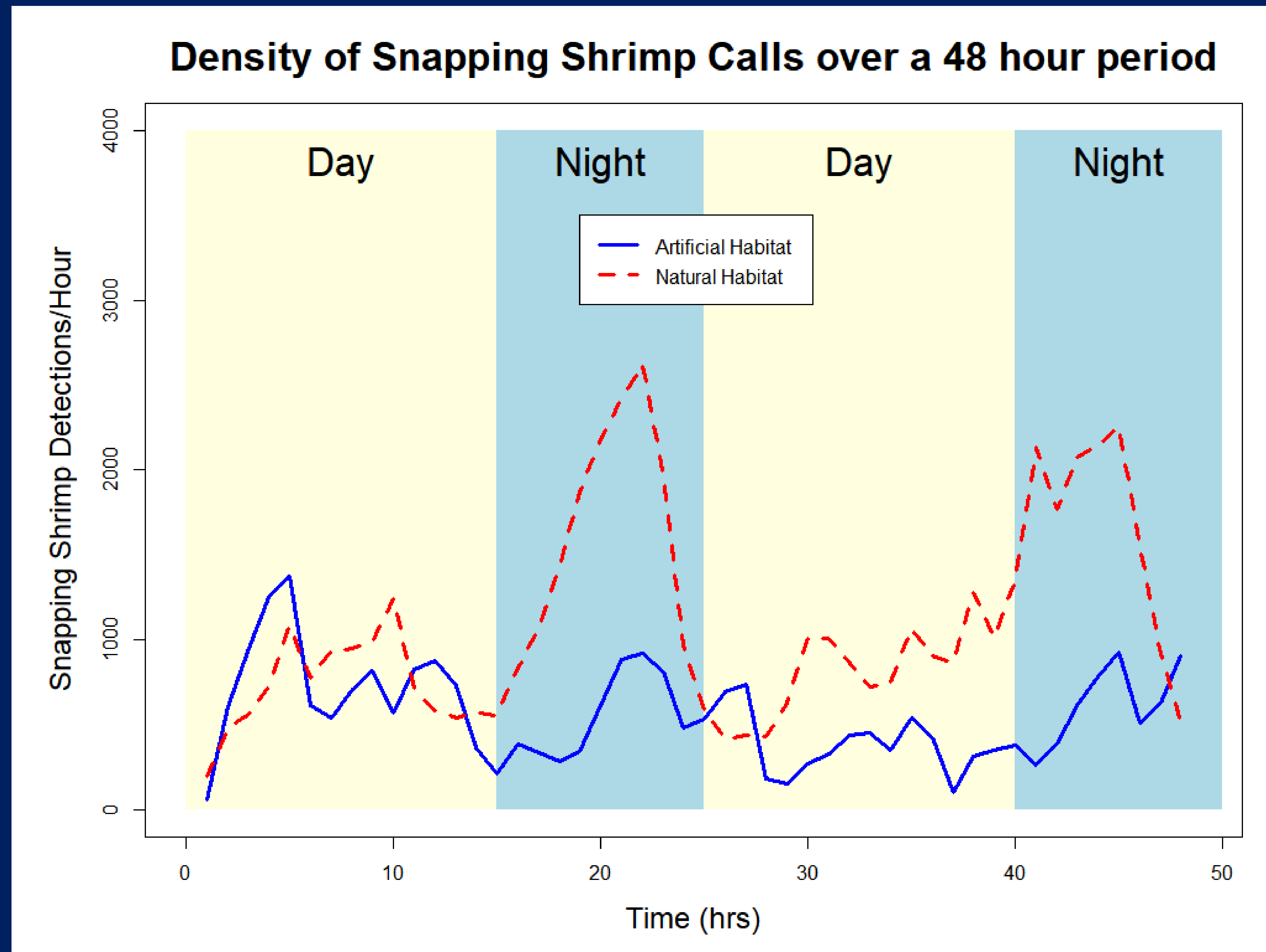
**Figure 2.** Artificial mangrove coastline site in North Biscayne Bay with rock barrier separating bay from mangroves



**Figure 3.** Designated sample sites.

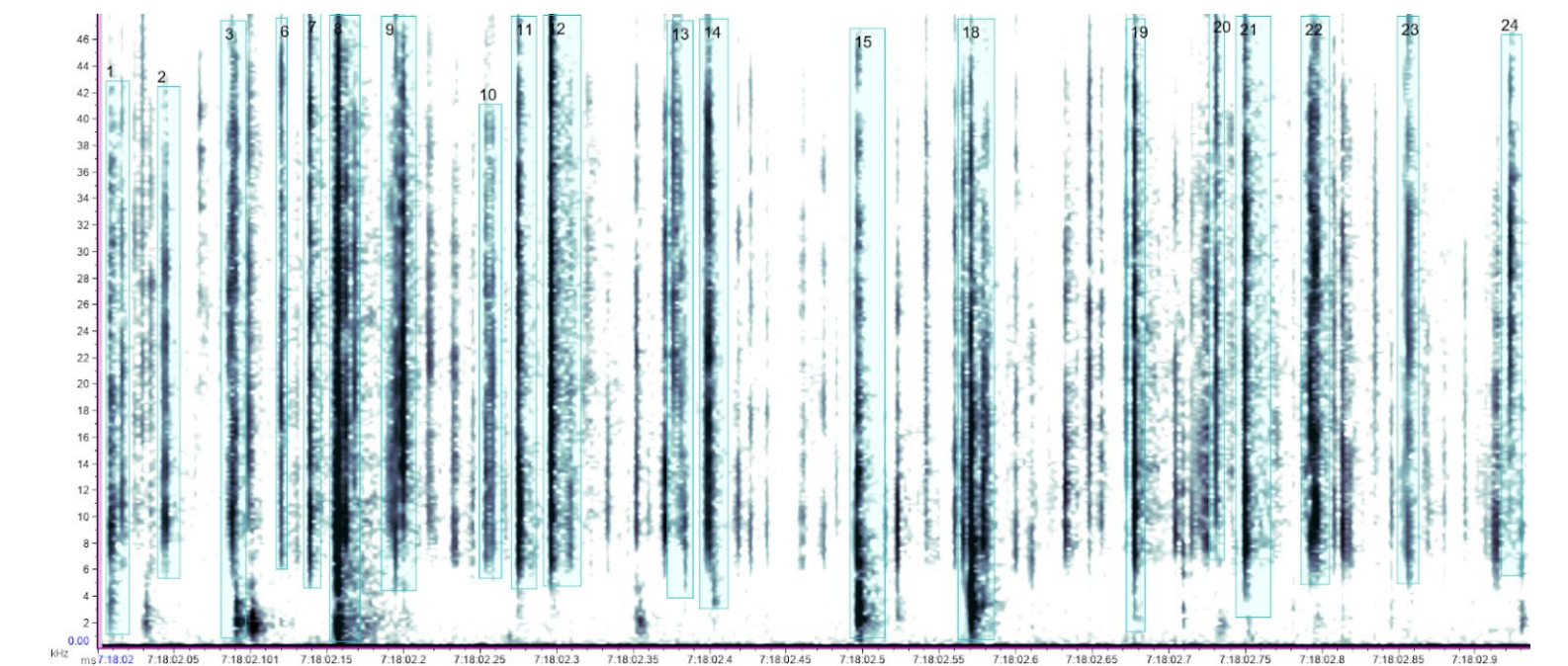
1. Recorded data for 48-hour collection periods over 2 weeks.
2. Imported acoustic data to Raven Pro 2.0 (Cornell Lab of Ornithology) to generate spectrograms.
3. Trained template detector using in situ data to scan remaining dataset and recognize snapping shrimp acoustic signatures.

# Natural habitats have a higher prevalence of snapping shrimp (*Alpheus spp.*) sound production than artificial habitats.

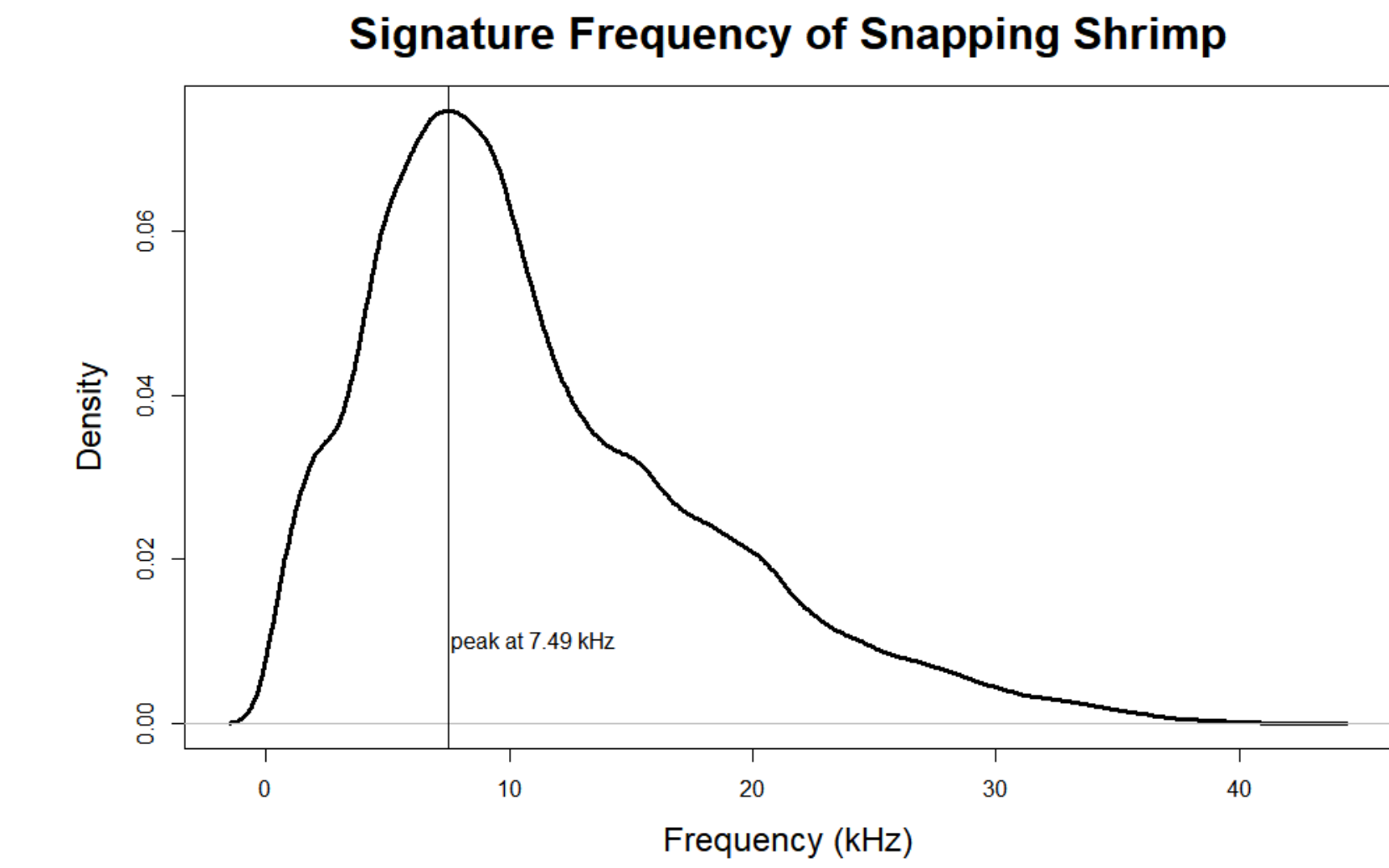


**Figure 4.** After conducting a T-test, we calculated a significant difference in detections per hour between natural and artificial habitats ( $p\text{-value} < 5.003 \times 10^{-7}$ ,  $df = 66.536$ ).

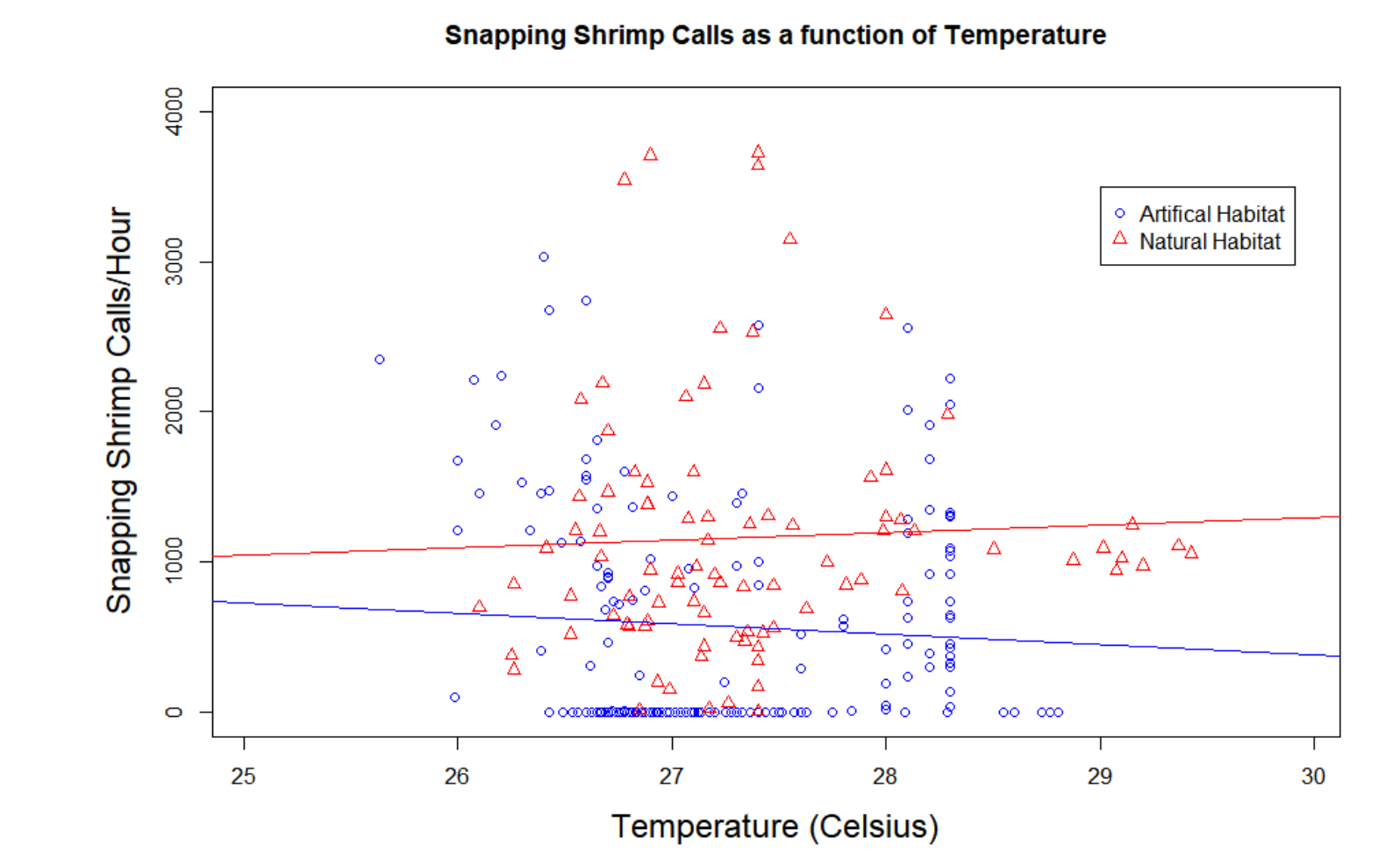
## RESULTS/DISCUSSION



**Figure 5.** Spectrogram generated by Raven Pro 2.0. This is the visual representation of sound, created by plotting time against frequency (kHz). Selected areas are manually identified snapping shrimp vocalizations.



**Figure 6.** Signature frequency of snapping shrimp (*Alpheus spp.*) generated through analysis of frequency contour percentile 95% of a systematic sample of 96 minutes of acoustic data.

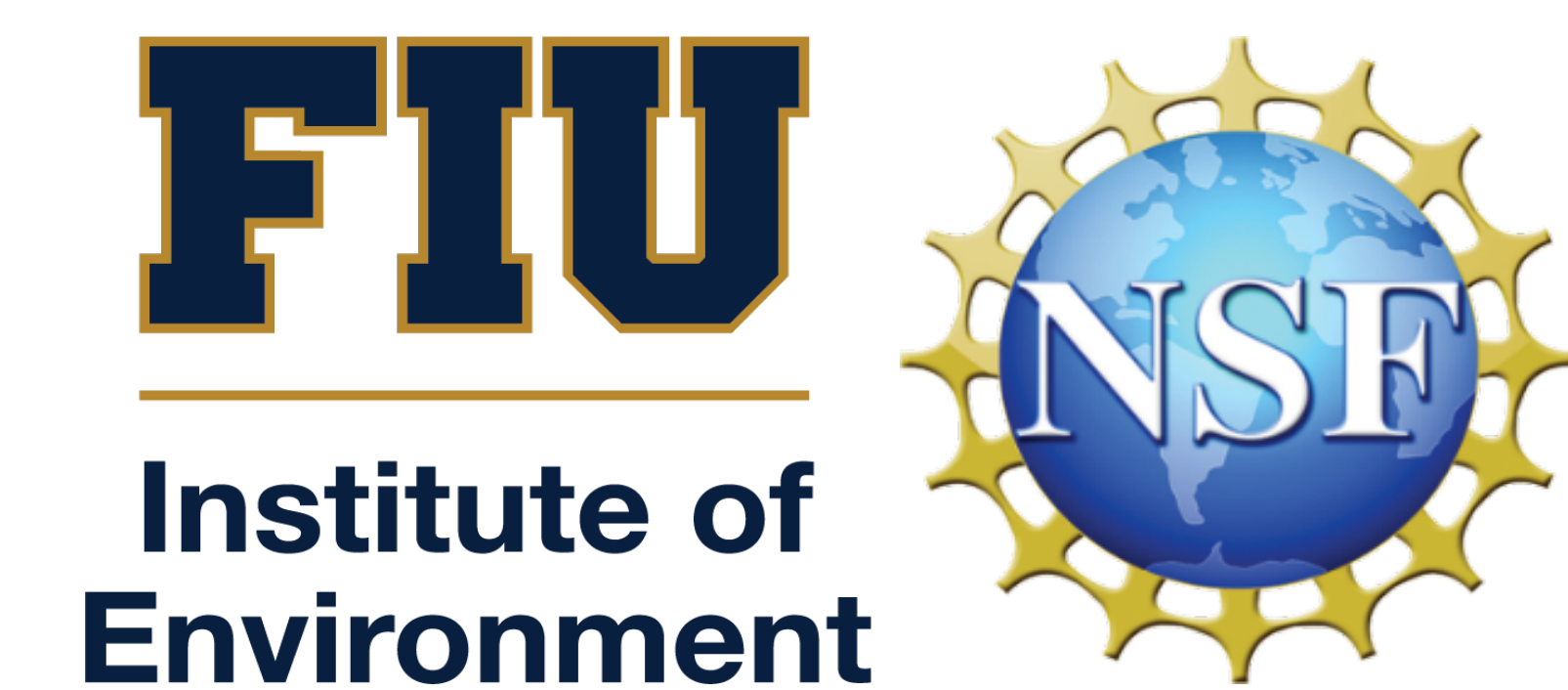


**Figure 7.** Results are inconclusive, as there appears to be very little difference between in detections between the habitats.

- Artificial habitats appear to show reduced numbers of snapping shrimp calls

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# FIU Coastal Ecosystems REU Site

