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## Characterization of Northern Resident killer whale (*Orcinus orca*) call types and source levels during beach rubbing

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# Playgrounds by a highway: Understanding the effects of increased ambient noise levels on Northern Resident killer whale (*Orcinus orca*) vocalizations during beach rubbing

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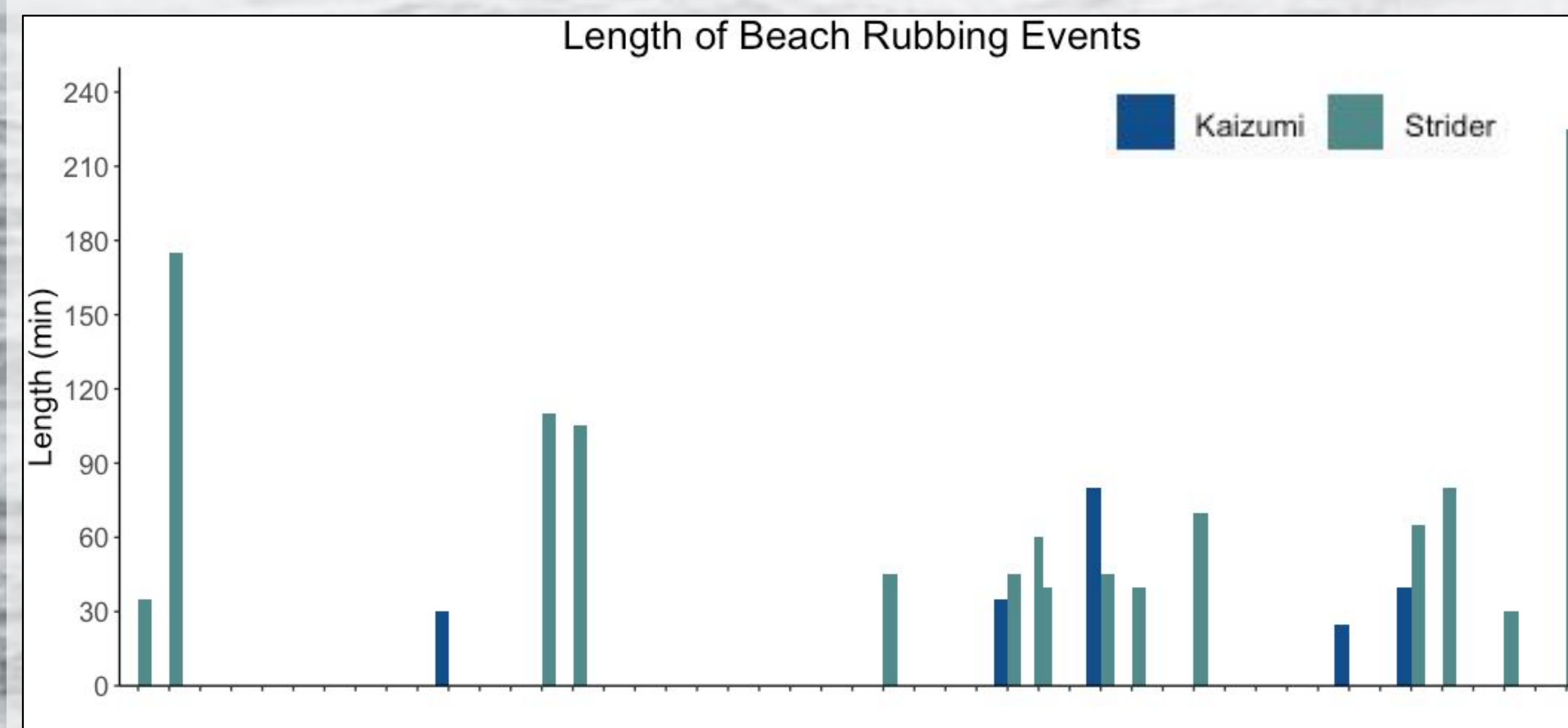


Fisheries and Oceans Canada

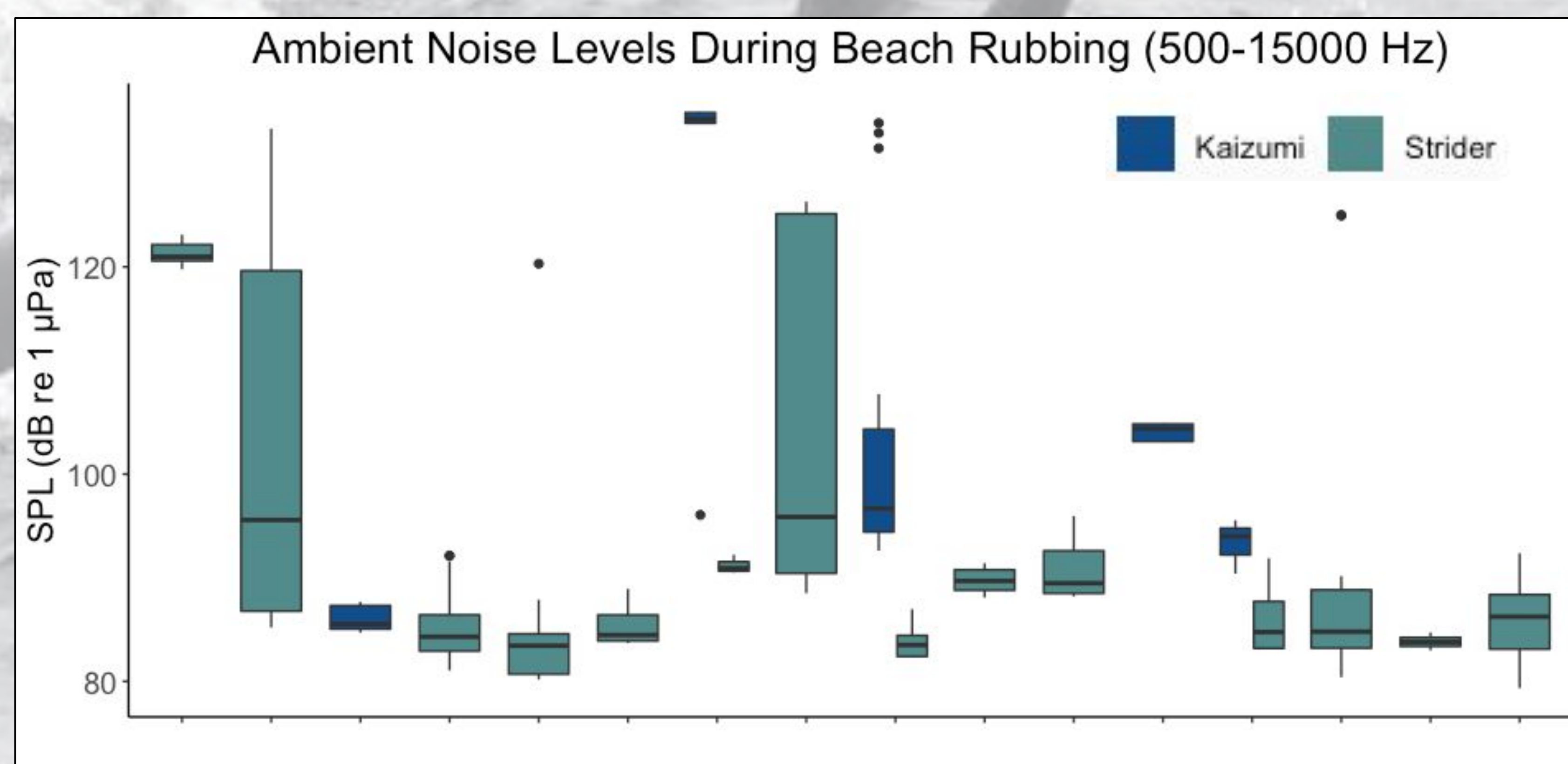


## Introduction

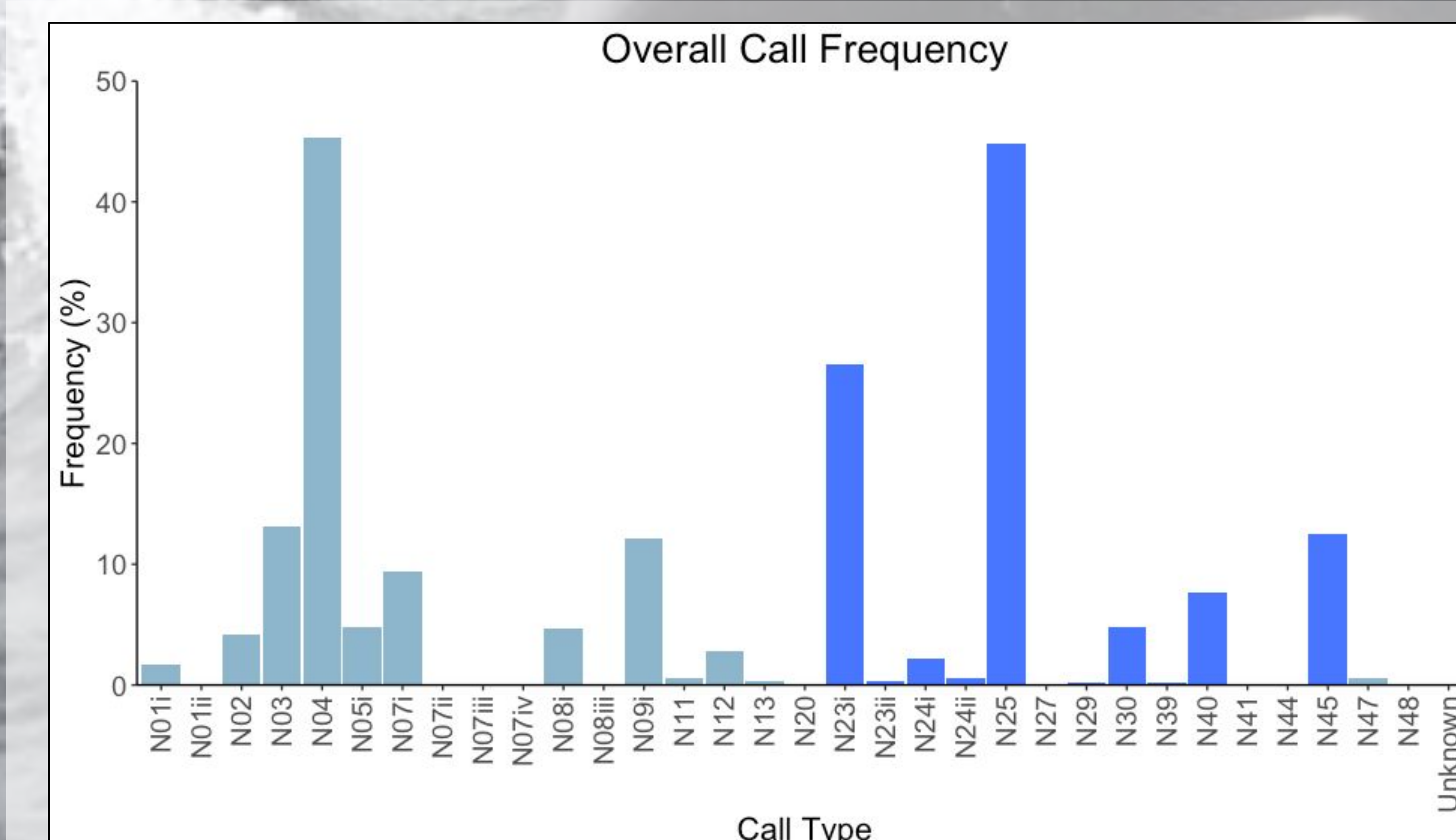
- The marine soundscape is an essential component of Northern resident killer whale (NRKW) critical habitat.
- Increased ambient noise levels (ANLs) from small vessels negatively interfere with aspects of NRKW behaviours.
- NRKW perform a unique rubbing behaviour on beaches within and outside the Robson Bight Michael Bigg Ecological Reserve (RBMBER).
- Little is understood about beach rubbing or how vessel noise impacts this behaviour.



**Figure 2.** Total number of confirmed beach rubbing events occurring at each beach during the study period, including the length of each event in minutes.



**Figure 3.** Sound pressure levels (in dB re 1 µPa) in the 500-15000 Hz range during each recorded beach rubbing event.



**Figure 4.** Call occurrence frequencies of A and G clan call types that were isolated and identified during all recorded beach rubbing events.

## Results

- 20 beach rubbing events were recorded, with a clear preference to rub at the beach within RBMBER (15 vs. 5 events).
- ANLs at the beach outside RBMBER are significantly higher than the ANLs at the beach within RBMBER (average 10.64 dB difference).
- No significant difference in call variation between beaches was detected.

## Discussion

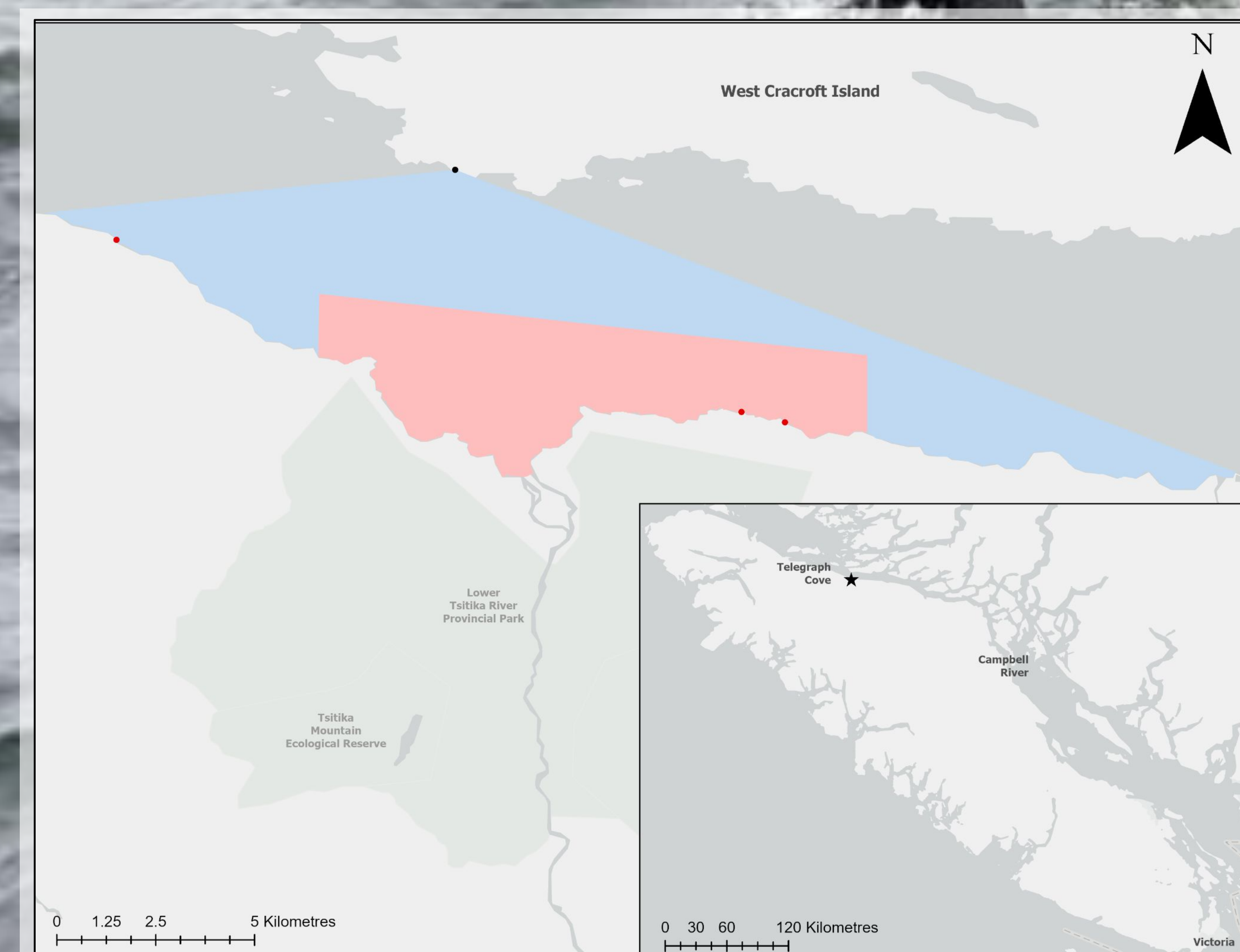
- Lack of call variation between beaches supports previous studies showing that they vary more based on matrilineal unit presence.
- Continued ANLs of 100+ dB at the rubbing beach outside RBMBER could result in complete eventual disuse.
- Further studies on other environmental factors should be performed to determine if correlation between ANLs and beach preference equals causation.

## How to be a Safe Boater



## Acknowledgements

Thank you to the CETUS Research & Conservation Society, OrcaLab, and my supervisors, Dr. Ruth Joy, Dr. Sheila Thornton, and Dr. Harald Yurk for the support.



**Figure 1.** Map of the study site within the Johnstone Strait, BC, Canada, including the Robson Bight Michael Bigg Ecological Reserve.

## Project Goals

1. Develop a call list of NRKW beach rubbing vocalizations between beaches within and outside of RBMBER.
2. Determine if higher ANLs play a role in the decision to rub at the beach outside RBMBER.
3. Determine whether NRKW alter aspects of beach rubbing in the presence of increased ANLs.