Apr 26th, 4:30 PM - 5:00 PM

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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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 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.

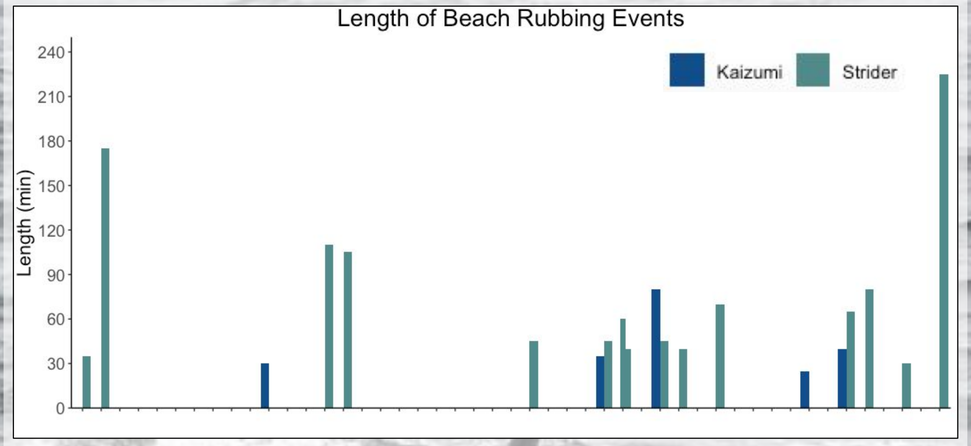

Figure 2. Total number of confirmed beach rubbing events occurring at each beach during the study period, including the length of each event in minutes.

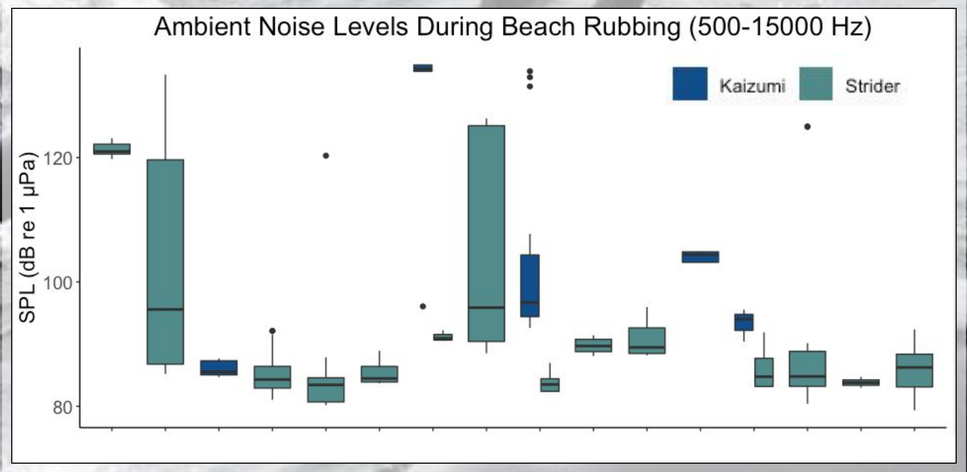

Figure 3. Sound pressure levels (in dB re 1 uPa) in the 500-15000 Hz range during each recorded beach rubbing event.

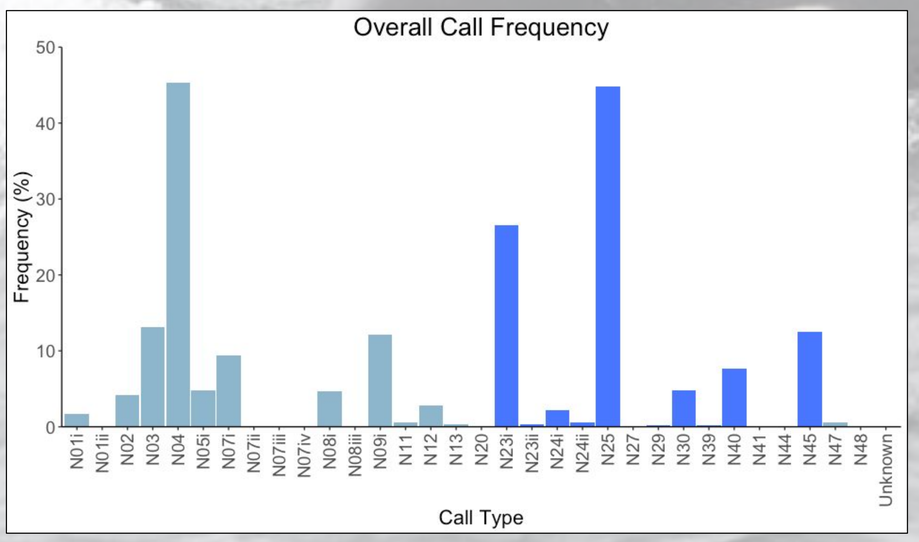

Figure 4. Call occurrence frequencies of A and G clan call types that were isolated and identified during all recorded beach rubbing events.

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.