Percussive Behavior in the Southern Resident Killer Whale (Orcinus orca) Population at Lime Kiln Point State Park

Rylee Jensen, Dr. Julie K. Young, & Dr. Robert E. Otis
Utah State University Department of Wildland Resources

Introduction

- The Southern Resident killer whales (SRKWs, Orcinus orca) are an iconic species in the Pacific Northwest. As of April 2018, there are currently 76 whales in 3 pods (J, K, L).
- SRKWs were listed as endangered in 2005 due to:
  1. environmental contaminants;
  2. lack of prey (Chinook salmon); and
  3. vessel traffic creating noise pollution.
- SRKWs frequently display a variety of above-surface behaviors (e.g. breaching, tail lobbing, pec slapping) called “percussives” because they create a splash and elicit a sound on the water’s surface. ¹
- The study objective was to evaluate the frequency of percussives across age and sex classes.

Study Area

San Juan Island is situated in the northwest corner of Washington State. On the west side of the island is Lime Kiln Point State Park, which is famous for its frequent sightings of the resident killer whales. We used the Lime Kiln lighthouse as our observation point for collecting data. Our rectangular study area overlooks Haro Strait, extending 0.5 miles out from the point of the lighthouse and approximately 1-mile long from the south (Deadman’s Bay) to the north end (Lime Kiln Cove).¹

Results

Over the course of the 83-day study period, there were 34 total passbys, 24 of which contained percussive behavior. We collected 221 behavioral observations and were able to record the age and/or sex of the whale 87.3% of the time behaviors were performed. Adult females performed percussive behavior most frequently (Fig. 1) and tail slaps and breaches were the most frequent behavioral types (Fig. 2).

Methods

SRKWs were classified into 5 age classes:
- calves (0-1 yr.) – typical weaning age⁴;
- juveniles (2-10 yrs.);
- subadult males (11-19 yrs.) – sexual maturity⁳;
- adult females (>11 yrs.) – age at first reproduction⁵; and
- adult males (>20 yrs.) – physical maturity⁵.

Between 20 May and 10 August 2016, daily data collection took place opportunistically from 0900 to 1700. From the shore, we recorded onset/exit time into and out of the study area, duration of the encounter (passby), surface behaviors, total whales seen, spread out time (SOT, time between the first and last whale), and any directional change.¹

Study Limitations

Scope of inference limited due to several factors:
- Spatially – small study area compared to whales’ 100+ mile/day summer range
- Temporally – small timespan (8 hrs/day) allotted for data collection; and
- Limited ability to identify individuals within and across years.

Discussion

We believe that percussive behavior serves several functions during daily activities:
- Communication mechanism toward conspecifics → especially when the group is spread out over a large area;
- Hunting techniques → younger whales may learn from their mothers or older pod members;
- Social bonding → juveniles often form temporary coalitions during large gatherings, where many percussives are performed.

We also noticed that some individuals (e.g. adult female L82, juvenile male J47) may be driving trends for their respective age classes. This illustrates the importance of taking individual variation into account in animal behavior studies, especially if those behaviors play a role in survival and are subject to changing with environmental conditions over time. For example, a lack of salmon throughout the years may mean that experienced individuals conserve more energy by performing fewer percussive behaviors and spending more time searching for prey.

Implications

This population is endangered, thus any data about their behavior may contribute to knowledge about overall population dynamics (e.g. reproduction, disturbance, hunting success, etc.) and facilitate conservation efforts. Studying SRKW percussive behavior may reveal more insight into their daily patterns since these types of behaviors are so variable in function among cetaceans. Along with this, it is important to document the behavioral variations of individuals so management strategies can respond accordingly (i.e. slowing vessel speed near adult males or mothers with calves).

References


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