

A Preliminary Report on Transient Orcinus orca Behavior and Acoustics in British Columbia Waters

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INTRODUCTION

The purpose of this study is to provide preliminary information on the behavior, acoustics, travel patterns and foraging techniques of the transient Orcinus orca sighted off the central British Columbia mainland coast. The pods were identified through photo-identification by Dr.M.A.Bigg. This ethogram was assembled from transient whale encounters in waters surrounding and adjoining the Broughton Archipelago during the period from October 1984 through April 1986.

'Transient' is a term coined by Dr. Bigg in 1976 to describe a specific group of Orcinus that range throughout the coastal waters of northeastern Pacific Ocean. Dr. Bigg followed the movements of individual whales using their natural markings for identification. He found three distinct communities along the east coast of Vancouver Island. Two of these communities were consistently resighted within a set of boundaries. A line approximately half-way up Vancouver Island divided the two groups. They were named the northern and southern resident communities. However, other whales were found within the boundaries of both resident communities and they were named transients (See Figure 1 Bigg et al, 1976). Further research revealed distinguishing physical characteristics that were common to just the transient population. The photo-identification images portrayed the transient dorsal fin as being more sharply pointed and slightly bulged at the base of the leading edge.(See Figure 2 photos of O21 and Q9) (Bigg et al, 1985). Autopsies conducted on whales that were found dead evidenced a preference for fish by the

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residents and marine mammals by the transients (Bigg, pers. comm, Balcomb et al, 1980). A study on acoustic variance in Orcinus found that each of the 16 pods within the resident communities could be identified by their unique dialects. However, all the 16 transient pods were found to share one dialect (Ford et al, 1982, 1983a, b, 1985). Their rate and amplitude of sound production were characteristically lower and they were generally silent when encountered. ()

The social dynamics of the transient community were also found to differ from the residents. The number of transients observed swimming together was consistently smaller (Bigg pers. com.) and highly active behaviors such as breaching, spyhopping, porpoising and fluke slapping were rarely documented in the adults or calves.

Research on transients has been opportunistic, during studies focused on the more easily located resident whales. Relatively little information has been collected on any aspect of the natural history of these whales, because they are difficult to find, their swimming patterns are often erratic and they tend to be silent.

Methods

A base of operations was established at Echo Bay on Gilford Island on October 18, 1984. This site is located at the hub of several protected waterways that allow us to access Johnstone Strait and Queen Charlotte Strait during the winter months when S.E. winds prevail. Continuous underwater monitoring from Echo Bay commenced immediately although, eight months passed before any Orcinus calls were detected.

A 6m Zodiac Futura was outfitted with Loran C and a VHF radio. Logging camps, native settlements, floathouse communities, tugboat operators, resident and tourist fishermen, aircraft pilots and patrol vessels were requested to report whale sightings.

When a group of whales were located their left dorsal/sadle region was photographed. These images were sent to Dr. Bigg to be identified. In an effort not to disrupt interaction between transients and prey species we maintained a distance of upto one kilometer. Respiration was timed on the most prominent individual, either a bull or leading cow. Their acoustic activity was monitored at waterway junctions, at the onset of any behavioral transition, and when the water conditions made it possible for us to manoeuver into a position that was ahead of the whales. Recordings were made using a Sony TC-D5M, Helle Engineering directional hydrophone #6505 and a U.S. Naval hydrophone #TR225. Additional information was recorded throughout the encounters on a data sheet that included a chart for noting the approximate location of the whales and any other marine mammals present (See Appendix I).

Results

The Echo Bay hydrophone and VHF radio were monitored for 369 days. Weather permitting the waterways were also scanned visually and acoustically from the boat. Transient whales were encountered on 17 occasions and were tracked for 40 hours. A total of 23 individuals were identified from 9 pods (See Appendix II). We encountered three additional groups we believe were transients due to their conformity to transient physical, acoustic, social and behavioral characteristics. Rough weather did not permit photography and so these

encounters were not included in this report. The number of whales in each documented group ranged from 1 to 11 (See Figure 3), while the number of pods varied from 1 to 4 (See Figure 4).

Foraging

During our 40 hours of transient observation 32 hours were devoted to foraging. Foraging was defined by characteristic swimming formations described below. The rate of travel using Loran coordinates varied from 1.94 kt to 4.85 kt (See Figure 5). Respiration was comprised of one long dive and then five to eight short dives and was synchronized until a prey subject was located. (See Figure 6). The mean long dive duration ranged from 3min 54sec to 6min 44sec (See Figure 7).

Foraging transient whales swim abreast, but spread out over distances upto 1/2nm (.93km). Every transient association we observed approach a waterway as one group fanned out within a kilometer after entry. The cow and calf (if there was one) swam against the shoreline, while the bulls and juveniles took up positions into the middle of the body of water (See Figure 8).

These whales methodically entered almost every convolution of the coastline and responded with a high degree of predictability to water-body junctions. The first group to reach an intersection would await the arrival of all the others, milling and often floating on the surface. Once regrouped all animals took eight to ten short

respirations before making the course change. After the final blow in this sequence exceptionally long dives were performed. When the whales resurfaced they were well into the new body of water and divided into subgroups again. When exiting these branch systems they swam in one group against the shore that would advance their progress along the main inlet or channel.

There were two types of areas that transients consistently avoided. They moved off of shorelines with human developments such as logging camps, booming grounds and floathouse communities. They also avoided estuary and beach tidal flats at high and low tide. Some of these tidal flats were densely populated by harbor seals (*Phoca vitulina*), a known prey species (Osborne et al 1985).

Marine Mammal Predation

Although we observed transients interacting with warm-blooded species during four of our encounters we witnessed only one kill. A large association of eleven transients approached and entered a bay in the manner described above. The whales located the sea lions and initiated the attack while submerged. From my position at the mouth of the bay I was unable to determine when the sea lions died, but they were not consumed immediately. A flock of sea gulls was attracted to the site and was picking up bits from the surface of the water within ten minutes of the attack. However, 20 minutes later the whales were tossing sea lions in the same manner as during the beginning of the attack and in the same location.

We observed the 02Ø pod pursuing river otters (*Lutra Canadenis*) on

two occasions. No sign of a kill ensued and the two otters were seen escaping onto land. In the case of the second otter the whales were porpoising in a tight circle when an otter shot out of their midst and scurried up the embankment. The whales immediately stopped porpoising, but remained milling for 30 minutes in the exact location from which the otter had escaped.

A calf, Q12 was observed breaching onto a common loon (*Gavia immer*) while the rest of the pod foraged nearby. The bird resurfaced after each breach shaking its' head and dipping its' bill. It did not make any attempt to fly. Q12 stopped circling the loon when the pod moved on. The loon emitted a long warbling call as the calf departed.

Orientation to Tidal Flow

Although the transients' response to direction and strength of tidal flow appears to be flexible there is evidence that they prefer to forage against the tide. Foraging transients swam against the tide during 72% of our encounters with them. (The one successful marine mammal kill we observed resulted while foraging against an ebb tide, while both otters escaped when the whales approached with a flood tide.)

During both encounters with vocal, cavorting transients the whales were traveling with the tide. However, when they turned into the flow they fell silent and foraged.

The amount of tidal exchange and resulting current seems to affect the whales' direction of travel as well. Three transients entered a channel while the tide was dropping 4.9m. After 30 minutes the

whales reversed direction and swam out of the channel with the flow. It was our only observation of a 180° turn mid-tide or mid-channel. The largest tidal exchange we observed the whales travel against without interruption was 3.3m (See Figures 7,8)

Vocal Activity

Vocalizations were recorded in transients during two distinctly different activity states. Sound production occurred during marine mammal predation and while two or more pods were travelling together in the presence of a playful association of calves and juveniles. Vocals were never detected during foraging or when a single pod was travelling off the shoreline.

Low amplitude calls were initiated within seconds of the first breaches during the sea lion attack. These low amplitude calls continued for minutes and then became dramatically louder. Sound production continued for an hour and was still underway when the recording was terminated.

Vocalization played an interesting role during the otter pursuit. As the bull and juvenile porpoised back towards the cow, calf and otter our monitoring commenced immediately. The whales porpoised in a tight circle emitting low amplitude calls. As soon as the otter climbed out of the water sound production stopped completely. The whales were silent for the next 30 minutes as they continued to circle the same small area. The bull, 02Ø hit the rock wall producing a resounding cracking noise and the pod quickly moved off together.

Vocalizations were loud and continuous throughout both of our encounters with cavorting transients. These vociferous groups traveled erratic courses well off the shoreline. The calves and juveniles were congregated into a satellite formation. They were engaged in high speed swims along zigzagging courses, breaching, porpoising, spyhopping, sexual behavior, and pulling bull kelp. The adults swam in a single tight group. One of our encounters with this behavior state involved just females and calves and the other bulls as well as females and calves (See Appendix II). The bull group maintained an unusual formation throughout most of the observation. (See Figure 9).

Both of these vocal groups entered kelp beds. We observed floating, milling, deep dives and fast swims towards the rocky shoreline. There was no evidence of any marine mammals in the kelp beds and sound production was continuous.

Response to Human Presence

Although the transients avoided areas of the coastline that had been developed there^{was} response to our waterborne presence. During the encounter with Q3 and Q4 pods on January 1, 1985 we experienced our only whale-to-boat contact to date. The juveniles, Q7, Q8 and Q12 circled around behind the zodiac. For several minutes they swam very close under and beside us. Then while two of the whales surfaced just off our portside, the third whale (Q7 or Q8) surfaced, pushing up under our starboard side. We proceeded for several meters with the whales' portside in contact with the boat as it swam along the surface. We shifted into neutral and contact was terminated. It dove and then surfaced off the bow with the two other juveniles.

The transients that pursued the otters were foraging on a course that followed a prawn trapline. The prawn fishermen have reported finding otters in their traps. Apparently the river otters are attracted to the bait or the trapped prawns and the orcas were taking advantage of this.