

A NORTHEAST PACIFIC OFFSHORE KILLER WHALE
(*ORCINUS ORCA*) FEEDING ON A PACIFIC HALIBUT
(*HIPPOGLOSSUS STENOLEPIS*)

IAIN M. JONES

Centre for Wildlife Ecology,
Department of Biological Sciences,
Simon Fraser University, 8888 University Drive,
Burnaby, British Columbia V5A 1S6, Canada
E-mail: imjones@sfu.ca

Three ecotypes of killer whale (*Orcinus orca*) have been described in the waters of the northeast Pacific Ocean; these are referred to as “resident,” “transient,” and “offshore” whales (Bigg *et al.* 1990, Ford *et al.* 1992, Ford and Ellis 1999, Ford *et al.* 2000, Baird 2001, Hoelzel 2002). These ecotypes differ in diet, morphology, genetics, social organization, behavior, vocal habits, and geographic range (Baird and Stacey 1988, Stevens *et al.* 1989, Barrett-Lennard *et al.* 1996, Ford *et al.* 1998, Hoelzel *et al.* 1998, Ford *et al.* 2000, Baird 2001, Hoelzel 2002). The least well known of these are the offshore whales with little information available on their behavioral or ecological characteristics (Baird 2001).

While it has been shown that transient whales likely feed exclusively on marine mammals and resident whales likely feed exclusively on fish, very little is known about the diet of offshore whales (Ford *et al.* 1998, Baird 2001, Barrett-Lennard and Ellis 2001, Heise *et al.* 2003). The only account of the diet of offshore killer whales in the literature to date comes from an analysis of the stomach contents of two dead whales that contained salmonid bones (*Oncorhynchus sp.*) and sculpin (*Cottus sp.*) remains, indicating that these fish may make up a portion of their diet (Heise *et al.* 2003).

On 22 and 23 June 2000, 30–50 offshore killer whales were observed and photographed off Juan Perez Sound, Queen Charlotte Islands, British Columbia (52°30'N, 131°22'W). These whales were thought to be offshore killer whales based on their geographic location, large group size, high rate of vocalization, predation on fish, consistent travel pattern, and an absence of individuals that matched published resident identification catalogs. Transient whales are seen frequently in the area but seldom travel in groups larger than five, often have erratic travel and diving patterns, vocalize infrequently, and feed on marine mammals (Bigg *et al.* 1990, Baird and Dill 1996, Barrett-Lennard *et al.* 1996, Ford *et al.* 1998, Ford and Ellis 1999). Resident whales vocalize often and feed on fish but infrequently form groups of this size and are not seen with regularity in the Queen Charlotte Islands (Bigg *et al.* 1990, Ford *et al.* 1998, Baird 2001). Subsequent photographic comparison with cataloged offshore whales indicated that offshore whales O9, O105, O251, and

O252 were present on 23 June 2000 and, therefore, confirmed the offshore ecotype designation.¹

On 23 June 2000 I observed and obtained photographic evidence of O251 feeding on a large flat fish at the water surface. A photographic approximation of the length of this flat fish (0.95 m) was made in the interest of identifying it to species. This was accomplished by first scaling the photograph at the depth of field at which the fish was located. This scale factor was based on comparing the height of the killer whale's dorsal fin in the photo to that of the average reported for female killer whales from the literature (Clark and Odell 1999). The caudal fin of the flatfish was clearly visible at this depth of field and therefore was utilized to approximate the length of the fish. A ratio of caudal fin width to body length, based on measurements taken from 50 Pacific halibut (*Hippoglossus stenolepis*) within unpublished data, was supplied for this purpose by the International Pacific Halibut Commission.²

Based on the observed coloration and the large photographic size approximation of this flatfish (0.95 m) it was likely a Pacific halibut. The Pacific halibut can attain a length of 2.67 m while the starry flounder (*Platichthys stellatus*), the next largest flatfish in the waters of coastal British Columbia, only attains a maximum recorded length of 0.91 m (Lamb and Edgell 1986). In addition, the starry flounder has prominent dark bands visible on the caudal fin (Grant *et al.* 1996) which are not present on the photographed specimen in question. This sighting provides the first evidence that the Pacific halibut makes up at least a portion of the diet of offshore killer whales in the region. To my knowledge this is the first direct observation in the primary literature describing a diet component of the offshore killer whale ecotype.

ACKNOWLEDGMENTS

I thank the following people without whom this publication could not have been possible: my co-observer Randy Burke of Bluewater Adventures; Chris Tulloch and Neil Shearar of Bluewater Adventures; Lance Barrett-Lennard, Doug Sandilands, and Nadine Pinnell of the Vancouver Aquarium; Lauri Sadorus, Levy Boitor, and Bruce Leaman of the International Pacific Halibut Commission; Graeme Ellis and John Ford of the Pacific Biological Station; Rob Butler of the Canadian Wildlife Service; and Ron Ydenberg of Simon Fraser University.

LITERATURE CITED

- BAIRD, R. W. 2001. Status of killer whales, *Orcinus orca*, in Canada. *Canadian Field-Naturalist* 115:676–701.
- BAIRD, R. W., AND L. M. DILL. 1996. Ecological and social determinants of group size in transient killer whales. *Behavioral Ecology* 7:408–416.
- BAIRD, R. W., AND P. J. STACEY. 1988. Variation in saddle patch pigmentation in populations of killer whales (*Orcinus orca*) from British Columbia, Alaska and Washington State. *Canadian Journal of Zoology* 66:2582–2585.

¹ Personal communication from Graeme Ellis, Fisheries and Oceans Canada, Science Branch, Conservation Biology Section, Pacific Biological Station, Nanaimo, BC V9T 6N7, Canada, January 2005.

² Personal communication from Lauri Sadorus, International Pacific Halibut Commission, P. O. Box 95009, Seattle, WA 98145-2009, May 2005. Data collected by Levy Boitor and Bruce Leaman.

- BARRETT-LENNARD, L. G., AND G. M. ELLIS. 2001. Population structure and genetic variability in Northeastern Pacific killer whales: Towards an assessment of population viability. Canadian Scientific Advisory Secretariat, Department of Fisheries and Oceans Research Document 2001/065. Available at http://www.dfo-mpo.gc.ca/csas/Csas/publications/ResDocs-DocRech/2001/2001_065_e.htm.
- BARRETT-LENNARD, L. G., J. K. B. FORD AND K. A. HEISE. 1996. The mixed blessing of echolocation: Differences in sonar use by fish-eating and mammal-eating killer whales. *Animal Behaviour* 51:553–565.
- BIGG, M. A., P. F. OLESIUK, G. M. ELLIS, J. K. B. FORD AND K. C. BALCOMB. 1990. Social organization and genealogy of resident killer whales (*Orcinus orca*) in the coastal waters of British Columbia and Washington State. Report of the International Whaling Commission (Special Issue 12):383–405.
- CLARK, S. T., AND D. K. ODELL. 1999. Allometric relationships and sexual dimorphism in captive killer whales (*Orcinus orca*). *Journal of Mammalogy* 80:777–785.
- FORD, J. K. B., AND G. M. ELLIS. 1999. Transients. Mammal-hunting killer whales. UBC Press, Vancouver, BC.
- FORD, J. K. B., G. M. ELLIS AND L. M. NICHOL. 1992. Killer whales of the Queen Charlotte Islands: A preliminary study of the abundance, distribution and population identity of *Orcinus orca* in the waters of Haida Gwaii. Prepared for South Moresby/Gwaii Haanas National Park Reserve, Canadian Parks Service, by the Vancouver Aquarium. 69 pp.
- FORD, J. K. B., G. M. ELLIS, L. G. BARRETT-LENNARD, A. B. MORTON, R. S. PALM AND K. C. BALCOMB. 1998. Dietary specialization in two sympatric populations of killer whales (*Orcinus orca*) in coastal British Columbia and adjacent waters. *Canadian Journal of Zoology* 76:1456–1471.
- FORD, J. K. B., G. M. ELLIS AND K. C. BALCOMB. 2000. Killer whales: The natural history and genealogy of *Orcinus orca* in British Columbia and Washington State. UBC Press, Vancouver, BC.
- GRANT, D., M. GJERNES AND N. VENABLES. 1996. A practical guide to the identification of commercial groundfish species of British Columbia. Archipelago Marine Research Ltd., Victoria, BC.
- HEISE, K., L. G. BARRETT-LENNARD, E. SAULITIS, C. MATKIN AND D. BAIN. 2003. Examining the evidence for killer whale predation on Stellar sea lions in British Columbia and Alaska. *Aquatic Mammals* 29:325–334.
- HOELZEL, A. R., M. DAHLHEIM AND S. J. STERN. 1998. Low genetic variation among killer whales (*Orcinus orca*) in the Eastern North Pacific and genetic differentiation between foraging specialists. *Journal of Heredity* 89:121–128.
- HOELZEL, A. R., A. NATOLI, M. E. DAHLHEIM, C. OLAVARRIA, R. W. BAIRD AND N. A. BLACK. 2002. Low worldwide genetic diversity in the killer whale (*Orcinus orca*): Implications for demographic history. *Proceedings of the Royal Society of London* 269:1467–1473.
- LAMB, A., AND P. EDGELL. 1986. Coastal fishes of the Pacific Northwest. Harbour Publishing, Madera Park, BC.
- STEVENS, T. A., D. A. DUFFIELD, E. D. ASPER, K. G. HEWLETT, A. BOLZ, L. J. GAGE AND G. D. BOSSART. 1989. Preliminary findings of restriction fragment differences in mitochondrial DNA among killer whales (*Orcinus orca*). *Canadian Journal of Zoology* 67:2592–2595.

Received: 17 March 2005

Accepted: 23 May 2005