



Killer Whales

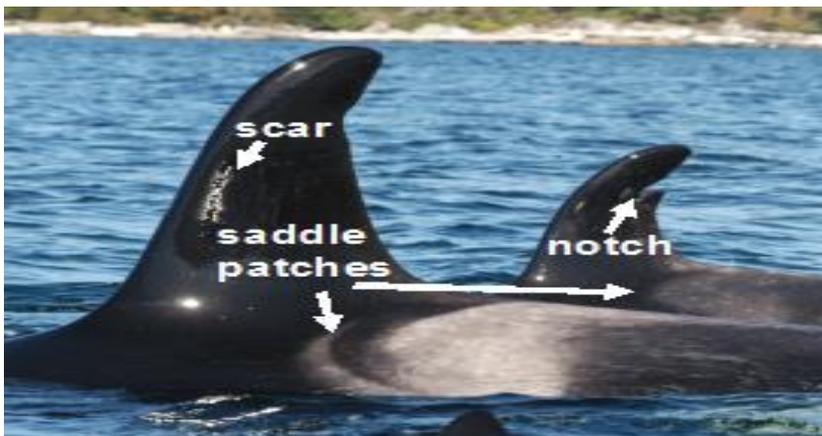
in the Georgia Basin

- What are killer whales?
- Are local killer whales all the same?
- What is the status of local killer whales?
- What pollutants are found in killer whales and where are they from?

What are killer whales?

Killer whales (*Orcinus orca*) belong to a group of marine mammals known as cetaceans. Cetaceans include whales, dolphins and porpoises. Killer whales are actually the largest member of the dolphin family although most people think of them as small whales. Killer whales are the most widely distributed of all marine mammals. They can be found in all of the world's oceans, in such places as Antarctica, Iceland, Norway, and the Pacific Coast of North America. They are in fact found in all three of Canada's oceans!

Male killer whales can reach lengths of 8 or 9 metres and weigh up to 6 tonnes (6,000 kg) while females tend to be less than 7 meters and 4 tonnes. Killer whales have a very distinct black and white skin pattern (mostly black on top and white beneath). They also have a large dorsal fin, and snub nosed appearance. Just behind the dorsal fin they have a mottled grey area called a saddle patch. Differences in the shape and colour of the saddle patch, along with dorsal fin size and nicks and scratches, have allowed researchers to identify individual killer whales using photographs of the dorsal fin area (see picture at right). This photo-ID technique has been used extensively in BC and has allowed researchers to learn a lot about local killer whales (see below).



The distinctive saddle patches, scars and notches in the dorsal fin area are used to identify individual killer whales.

Photo courtesy of John Ford

Are local killer whales all the same?

There are three main groups or 'ecotypes' of killer whales in British Columbia (BC), which look much the same but behave very differently and do not interbreed. The least is known about a group called offshore killer whales because they tend to remain in deeper waters away from the coast travelling in groups of 30 to 60. More is known about transient killer whales as they frequently range into coastal waters. They get their name from the fact that they range widely along the Pacific coast with little regularity and travel in small groups of two to five animals. Transients eat marine mammals, such as seals, sea lions, porpoises and have even been known to attack and kill small whales. The most is known about resident killer whales because they are consistently found in coastal waters from spring through the fall with a relatively predictable pattern. Residents eat mainly salmon (dominantly Chinook) and have a complex social structure. They are divided into a northern and southern community and although their preferred ranges overlap (link to map?), they do not interbreed. Resident killer whales stay with their mother for their entire lives which results in groups of whales (called Matriline) that are the direct descendants of the eldest female. Pods are made up of one or more of these Matriline that commonly travel together and are thought to be related. Clans are likewise groups of pods that have a similar vocal dialect and thus likely share common ancestors. This behaviour is so consistent that it is possible to place an identified individual resident within its social structure (eg. killer whale K11 is the daughter of the head of K7 Matriline, which is part of K1 pod which is part of J clan which is a member of the southern resident community).

What is the status of local killer whales?

The table below gives the designation of the killer whale groups by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) as well as what is known for population status and recent trends. The data for offshores and transients is poor due to lack of sightings but the data on residents is quite accurate due to the repeated sightings and identification of individuals within those groups. The Species at Risk Act (SARA) in Canada obligates the Government of Canada to protect and recover threatened and endangered species.

Killer whale group	COSEWIC Listing	Recent Population Estimate
Offshores	Species of special concern	Uncertain, 200 identified by 1999
Transients	Threatened	Uncertain, 220 identified by 1999
Northern Residents	Threatened	216 in 1998
Southern residents	Endangered	78 in 2001

What pollutants are found in killer whales and where are they from?

The transient and resident killer whales are known to have high levels of a variety of Persistent Organic Pollutants or POPs (see references 2-4). This group includes compounds that are now banned or regulated in most of the world (PCBs, PBBs, PCNs, dioxins, furans, DDT) and some of which are relatively new and as yet poorly regulated (PBDEs). The persistence of these chemicals means that they remain in the environment for a very long time and many of them bioaccumulate in organisms and biomagnify up the food chain. These characteristics make killer whales especially susceptible because they are long lived (longer time to accumulate contaminants) and they occupy a high position on the food chain (so biomagnification is more significant). These contaminants are also lipophilic (soluble in fats but not in water) so the killer whales do not get them from the water, but from the food they eat. This has important implications for the interpretation of the levels of contaminants found in the different killer whale groups. All the sampled groups of killer whales were found to have significant levels of POPs whether or not they frequent areas strongly impacted by humans. This is because the pollutants in question have been transported by wind, currents, and even in organisms to all parts of the world. However, areas strongly impacted by humans still have the highest concentrations. The southern residents frequent the highly populated and industrialized Puget Sound and Strait of Georgia and these whales contain much higher POP concentrations than the northern residents that frequent the more remote central and northern coast of BC (See the Chinook fact sheet for more on how Chinook specifically contribute to the POPs in southern resident killer whales). Interestingly, the transients also contain high POP concentrations despite the fact that they tend to remain in more remote areas. This is due to biomagnification, as transients eat marine mammals which puts them higher on the food chain than the fish-eating residents.

Key References

1. Ford, J. K. B., Ellis, G. M., and Balcomb, K. C. 2000. Killer Whales. 2nd edition. UBC Press, Vancouver. 104p.
2. Rayne, S., Ikonomou, M. G., Ellis, G. M., Barrett-Lennard, L. G., and Ross, P. S. 2004. PBDEs, PBBs, and PCNs in three communities of free-ranging killer whales (*Orcinus orca*) from the northeastern Pacific Ocean. *Environmental Science and Technology* 38: 4293-4299.
3. Ross, P. S., Ellis, G. M., Ikonomou, M. G., Barrett-Lennard, L. G., and Addison, R. F. 2000. High PCB concentrations in free-ranging Pacific killer whales, *Orcinus orca*: effects of age, sex and dietary preference. *Marine Pollution Bulletin* 40: 504-515.
4. Ross, P. S. 2006. Fireproof killer whales (*Orcinus orca*): flame retardant chemicals and the conservation imperative in the charismatic icon of British Columbia, Canada. *Canadian Journal of Fisheries and Aquatic Sciences* 63: 224-234.
5. Hickie, B.E., Ross, P.S., Macdonald, R.W., and Ford, J.K.B. 2007. Killer whales (*Orcinus orca*) face protracted health risks associated with lifetime exposure to PCBs. *Environmental Science and Technology* 41: 6613-6619.

Useful Websites

- More detail on marine mammal contaminant research by Fisheries and Oceans Canada http://www.dfo-mpo.gc.ca/science/Story/quebec/killerwhales_e.htm
- Vancouver Aquarium site “BC’s Wild Killer Whale Adoption Program” has further information on killer whale biology <http://www.killerwhale.org/>
- BC Cetacean Sightings Network (joint DFO-Vancouver Aquarium project) collects sightings data on all cetaceans <http://www.wildwhales.org/>
- The Whale Museum is a stewardship group <http://www.whale-museum.org/> whose focus is on southern resident killer whales as is the Centre for Whale Research <http://www.whaleresearch.com/>. Both are located at Friday Harbor in Washington State.

