

Orca Research Collective of Antarctica



A multi-disciplinary investigation
of killer whales in waters off the
Western Antarctic Peninsula

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“In order to identify, manage and mitigate key areas of habitat for killer whales, *Orcinus orca*, in the Southern Ocean, we require an understanding on the status of this species in Antarctic waters (population structure, distribution, and abundance), the role this animal plays in the Antarctic food web, and the level to which this animal is affected by human activities”

ORCA Mission Statement

Background and Rationale

2007-08 marks the International Polar Year (IPY) with worldwide efforts underway to increase our understanding, appreciation, and conservation of our planet’s northernmost and southernmost latitudes as well as the animals that live there. Implemented by CWRP, the Orcinus Research Collective of Antarctica (ORCA) is a multi-national assemblage of scientists working together to further our knowledge of killer whales (orcas) in the waters surrounding the Antarctic Peninsula. This knowledge is crucial in order to develop effective conservation strategies for these animals and their fragile Antarctic environment. While we know that killer whales are common in Antarctic waters, information on their movement patterns, behaviour, and food requirements is still extremely limited. We will use research techniques and skills we have developed studying killer whales in other parts of the world to fill in important gaps in our understanding of the lives of killer whales along the Antarctic Peninsula.

Why study killer whales in Antarctica?

Determining the status of this top-level marine predator in Antarctica is vital to the ecological understanding of the delicate marine food web dominant in this region. Killer whales are an ideal indicator species for identifying human-induced changes in marine biological systems, mainly because their position at the top of marine food webs makes them extremely vulnerable to even the smallest of changes in their environment. Ultimately, they are capable of providing us with initial warning signs of major environmental threats such as pollution, habitat loss, over fishing and climate change. The former being a real concern at the present time because the Antarctic Peninsula and its inhabitants are now experiencing the fastest rate of climate warming ever recorded on the planet (2 to 3 times faster than the global average). The ecological repercussions stemming from this trend are presently uncertain, although a major reduction in seasonal sea-ice cover is already being observed. This, in itself, has the potential to destabilize the marine food web on all levels through its unfavorable effect on the survival of krill (the engine powering the entire Antarctic ecosystem).

Identifying individuals from natural markings

Killer whales can be individually identified from photographs of cuts and nicks along the dorsal fin, as well as from rake marks on the grey patch located immediately behind the dorsal fin, known as the “saddle patch”. This technique, widely known as photo-identification, allows us to study several aspects of killer whale’s life history, including group

composition, associations between individuals and, on the longer term, population parameters such as abundance, birth, and death rates. By comparing photographs taken in different encounters, it also allows us to identify short to long-range movements of individuals among areas, their fidelity to specific regions, and their home ranges. We will use digital SLR cameras to photo-identify killer whales in the study area primarily to study group composition and behavioural preferences, distribution, movement patterns and site fidelity. Photographs of individuals will be compared to killer whale catalogues from other research groups working in the Antarctic for the same purposes.

Studying the underwater sounds of killer whales

Killer whales live in a world of sound: since vision is extremely limited under water, killer whales rely primarily on sound for navigation and communication. For this reason, acoustic research provides a powerful tool to learn about these animals, particularly about their behaviour when they are under water and out of view. Research has shown that killer whales communicate with highly stereotyped underwater calls, and that the structure of these calls differs between populations or even between family groups within the same population. We will therefore use acoustic recordings to learn about the population- and social structure of the groups we encounter. We will monitor the vocal behaviour of focal groups to learn how often the animals call. In the North Pacific, killer whales that hunt seals and other marine mammals are known to travel silently to avoid detection by their acoustically sensitive prey. Conversely, killer whales that feed on fish, a prey with poor underwater hearing, call and echolocate frequently in order to locate and ultimately capture their prey. For this reason, the amount of vocal behaviour can tell us a lot about the food preference and hunting tactics of a particular group.

Learning about the food preferences of Antarctic killer whales

Previous research suggests that south polar waters are home to at least three distinct types of killer whales that differ in their morphology and behaviour and might be genetically isolated. However, we currently have little information on what the different populations eat. Killer whales hunting seals and penguins must use very different hunting tactics from those feeding on fish. We will follow groups of killer whales in small boats looking for evidence of feeding events. Even with seals and penguins as prey items, feeding behaviour can be extremely subtle and difficult to confirm from surface observations alone. We will rely on acoustic cues, such as bouts of calling behaviour or sounds generated as the whales interact with the prey animal, to detect feeding events. Once such an event has been confirmed, we will use a dip net to collect prey remains (fish scales, feathers, or bits of skin and blubber). In cases where the prey cannot be identified visually, we will use genetic techniques to determine prey identity. This study will provide the first comprehensive documentation of the feeding habits of the different killer whale populations that frequent the waters around the Antarctic Peninsula.

How you can help

This study offers a unique opportunity to acquire a glimpse of an animal that has managed to elude scientists for years. CWRF has assembled a team of scientists who possess the necessary expertise to accomplish the proposed objectives and who have designed an appropriate research protocol that should finally solve the long-standing questions associated with *Orcinus orca* in its Antarctic environment. However, studying killer whales in a remote place like Antarctica can be very expensive. To make this research expedition a reality, we need your help. Join our effort to increase awareness, knowledge, and appreciation for remote Polar Regions by providing financial or logistic support to our expedition. Together we can collect very important information for this IPY 2007-08 and increase global knowledge, awareness and understanding of this magnificent species, the killer whale.

For further information, or if you are interested in supporting this research by making a contribution either by mail or on-line, please visit our website at www.coastalwildlife.com

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