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Posted by [Maddalena Bearzi](#) of [Ocean Conservation Society](#) in [Ocean Views](#) on December 30, 2014 [Edit](#)

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Bottlenose dolphins socializing near the shore. Photograph courtesy of Maddalena Bearzi.

A Glance Into the Lives of our Ocean Friends

All around me I see dolphins. I feel as though I could be part of a family, somehow different from my terrestrial one. At the bow of my boat, there's a group of exuberant bottlenose teenagers playing amongst themselves. Some bear strings of kelp on the end of their snouts while others frolic with small pieces of plastic or jellyfish. We are all following one of those "freeways" called fronts,

which form when water masses of different temperature meet in the ocean.

Most dolphins are social animals and, like great apes and humans, derive more advantages than disadvantages from living in a group. In schools, a dolphin can attain protection from predators, ease of finding food and a convenient place to meet fertile sexual partners.

Bottlenose dolphins are the most well-known and studied cetaceans. They spend their lives in what are known as fission-fusion societies. “Fission” means that the members of the local breeding population are continually splitting up and going their separate ways. And “fusion” means they always come back. A fission-fusion society may consist of several to many schools, the composition of which may be constantly changing on a daily or even hourly basis. The complexity of these societies, coupled with the difficulties of studying animals at sea, present quite a challenge for scientists bent on understanding these cosmopolitan animals.

Who is with whom? Who is not with whom?

Who is with whom? Who is *not* with whom? These are important questions for dolphin researchers. Figuring out who, but also why, when, and how long different individuals stay together is very demanding due to the wide array of social strategies found in these animal populations.

To illustrate how confusing this can be it's enough to look at three populations of bottlenose dolphins, one swimming in Shark Bay, Australia, another in Sarasota Bay, Florida, and the third in waters of Moray Firth, Scotland. In Sarasota and Shark Bay, females in a school may be either relatively social or completely solitary, avoiding the presence of other individuals in their group. Males may travel alone or form strong relationships with other males, bonding in alliances comparable to those of their primate cousins. However, when we travel half the world away to Scotland, the females behave similarly but the males act quite differently by not forming any alliances at all; so any hope of finding a single, general set of rules to evaluate social relationships in dolphin populations goes out the window.

Herding Fish

The unpredictable composition of a dolphin school becomes even messier when we look into the high variability in foraging strategies used by bottlenose dolphins at different locations. In some populations, they feed using a complex group strategy that involves ingeniously circling and herding fish schools while a few individuals at a time dive to catch prey and several other animals stand guard nearby, occasionally switching jobs such that all members of the group may feed.

In the Bahamas, things are different. Dolphins work alone by diving nose first into the sandy sea bottom to seek a yet unidentified solitary prey, leaving the seafloor riddled by face prints that

resemble small “volcanoes”. In Shark Bay, dolphins chase fish schools by swimming belly up near the surface. Prey are then either taken underwater or tossed into the air and snatched.



Acrobatic bottlenose dolphin in the waters of Santa Monica Bay, California.
Photograph courtesy of Maddalena Bearzi.

In yet another technique prevalent on the coastlines of Georgia and South Carolina, bottlenose dolphins search out a fish school and once located, cooperatively herd it to the muddy shoreline of tidal creeks forcing the prey to jump out of the water onto the beach. When the fish are helplessly stranded, the dolphins charge the muddy beach, sometimes throwing their entire bodies out of the water to grab a fish at which time they leap back to the safety of the water.

This diverse repertoire of foraging behaviors emphasizes the ability of these animals to capitalize on their own aptitudes and adopt either solitary or group strategies for hunting, depending on a variety of factors including the availability and type of food sources and the surrounding environment. If we think for a moment about accomplishing any of these tasks and the diverse levels of communication, organization, innovation and learning capacity that these strategies

require, we begin to gain an appreciation for the level of intelligence inherent in a dolphin society.

Interspecific differences in foraging techniques are plentiful in cetacean field research observations. At one end of the spectrum there are some species of river dolphins like the near completely blind susu, a species on the brink of extinction living in South Asia, somewhat reminiscent of a pink aquatic anteaters. The susu generally behaves as a solitary hunter, side-swimming along the bottom, endlessly nodding its head to scan for fish and obstacles with its sophisticated biosonar — a system used by dolphins to see and detect objects with sound. At the other end, we find huge schools of common dolphins — sometimes containing thousands of individuals — that can fan out to cover a vast amount of water in their search for patchily distributed fish schools in the open ocean. These cooperative groups may, later on, separate into smaller social units that disperse in different directions.

Killer Whales

Somewhere in the middle of the spectrum are killer whales, cosmopolitan marine mammals living from the polar latitudes to the equatorial regions and among the most distinctive members of the dolphin family. They too, live in highly coordinated and complex societies based on communication and group cooperation. Studies in the northeastern Pacific show astonishing differences in dietary specializations between sympatric populations of killer whales.



A killer whale male traveling. Photograph courtesy of Maddalena Bearzi.

Two of these populations, referred to as resident and transient, live in the same coastal waters but are socially isolated from each other. They differ in morphology, genetic structure, distribution and behavioral patterns. Resident groups feed on fish only while transients feed mainly on marine mammals. Residents also live in long-term, large and stable pods formed by several maternal lineages whereas in transient populations all of the offspring – except for one male – disperse from their maternal pod. The offspring of transient whales, however, continue to live in their natal range displaying what is called locational philopatry. Transient whale pods of up to four individuals are much smaller than residents whose numbers can reach two hundred in a pod.

Group Foraging Tactics

No record of diet specialization like the one found in the sympatric populations of killer whales has ever been observed elsewhere in the mammal world. These dietary strategies seem to have been refined over a long period of time spanning multiple generations. In a clever and mutually exclusive way, resident and transient whales have developed their group foraging tactics to increase both rate of prey encounter and prey capture success. Depending on the type of prey, resident and transient whales have skillfully learned how to adopt different detection strategies, using

echolocation when looking for fish or passive listening during a hunt for marine mammals.

Living in a school of common dolphins or killer whales clearly requires much contact and strong communication between individuals. In highly multimodal animals like dolphins, this can be attained through visual, tactile and acoustic means. As in human societies, this voluminous exchange of information, transferred from one individual to another, forms the foundation for these coordinated social organizations.

In large or small schools, in fission-fusion societies or not, in coordinated foraging groups or as solitary hunters, dolphins live in all oceans of the world. Diverse as their respective environments, they can be as different from each other as are the frozen seas of the arctic from the clear warm waters of the tropics. Different species may resemble each other physically or their diversity may be obvious, as illustrated by the tremendous size difference between sperm whales, the largest of the dolphins at over eighteen meters in length, and the diminutive vaquita, an endangered species indigenous to Mexico's Sea of Cortez, measuring in at just under a meter.

In their everyday life, all of these dolphin species must use context-dependent complex social signals and draw from an extensive variety of strategies to resolve any given task, including not only foraging but also engaging in courtships, maintaining relationships and hierarchies, or warning other individuals of peril.

Like food, sex plays an all-important role in dolphin societies.

Like food, sex plays an all-important role in dolphin societies. Sex is not only essential for reproduction, but also in a "social" context. Sexual "non-reproductive" behavior in marine mammal species like bottlenose dolphins and spinner dolphins is important in mediating social relationships or when individuals attempt to communicate. So-called "goosing" or rostro-genital contact is widespread in dolphin societies. This genital check up where an individual rubs its beak into the genital area of another of the same or different sex may tell a dolphin the reproductive state of the inspected animal. In the underwater world, it is neither unusual nor outrageous to find infant males trying to mount their mothers, young males sexually harassing older males, older males mounting calves, or an adult male mounting other males to express dominance.

Bottlenose dolphin males reach their sexual maturity at about ten, twelve years of age; females about five to ten. As in many dolphin species, bottlenose males and females do not display sexual dimorphism, meaning that they look pretty much the same to a human observer.

After a pregnancy of twelve months or so, a single calf is born. The dolphin females invest a great deal in their offspring, as in humans, great apes and other mammals. The birth of a dolphin calf marks the beginning of the strongest bond found within a school, that of a mother and her calf.

Their two existences will be united for several years to come. At its mother's side, under her guidance and devotion, the calf will gradually be taught how to survive in the challenging ocean world. Understanding parental "love" in species others than ours is not easy, mostly because this kind of emotion is thought to be for humans only. But those of us who have observed the meticulous care of a mother for a calf, who have heard the pleading and calling of a dolphin mother suddenly separated from her offspring or have witnessed a mother lingering for hours near a lifeless calf, can't help thinking that this feeling of "love" may not belong to solely to us.

This article has been adapted from the book [Beautiful Minds: The Parallel Lives of Great Apes and Dolphins](#) (M. Bearzi and C. Stanford, Harvard University Press, 2008).

Maddalena Bearzi has studied the ecology and conservation of marine mammals for over twenty-five years. She is President and Co-founder of the [Ocean Conservation Society](#), and Co-author of [Beautiful Minds: The Parallel Lives of Great Apes and Dolphins](#) (Harvard University Press, 2008; paperback 2010). She also works as a photo-journalist and blogger for several publications. Her most recent book is [Dolphin Confidential: Confessions of a Field Biologist](#) (Chicago University Press, 2012).

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