

# Soundings



American Cetacean Society- Monterey Bay Chapter

March 2012

PO Box H E, Pacific Grove, CA 93950

## AMERICAN CETACEAN SOCIETY- MONTEREY BAY CHAPTER

Monthly meeting at **Hopkins Marine Station**, Lecture Hall,  
Boat Works Building

(Across from the American Tin Cannery Outlet Stores)

Meeting is open to the Public

**Date: Thursday, March 29, 2012 Time: 7:30 PM.**

**PLEASE JOIN US AT 7:00 FOR REFRESHMENTS**

Speaker: Mark Shelley, Executive Producer,  
Director of Photography & Executive Director of  
Sea Studios Foundation &

Katie Pofahl, the Main “Human” Character in Otter 501

Subject: Otter 501, A Behind the Scenes Look

*When an adventuresome young woman discovers a sea otter pup stranded on the beach and in desperate need of a second chance, an entire species' survival gets personal....*

A visionary, and a passionate advocate for issues affecting our planet's health, Mark Shelley's lifelong ambition has been to harness the power of film-making to spotlight some of the most pressing issues of our times. Otter 501 is a shining example of Mark realizing his vision.

Katie Pofahl came to this area from Wisconsin, where she was given an early start on environmental ethics. She has a strong passion for animals. She can't contain her enthusiasm to know more about the creatures she meets living in Pacific Grove, California. In Otter 501 Mark tells the story of the challenges faced by Southern Sea Otters through the experiences of Katie's character.

Otter 501 was produced by The Sea Studios Foundation, a non-profit team of award-winning filmmakers, respected scientists and communication experts who work together to raise public involvement in solving the major threats to our planets health.

ACS MB is an official sponsor of Otter 501.

Please join us for a special behind the scenes look at the making of Otter 501 during which Mark and Katie will share some of their filmmaking adventures.

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Hope to see you there,

Bob Mannix, Chair, ACS MB Programs Committee

Donna Beckett, ACS MB Programs Committee

## CALENDAR

**Mar. 8-12:** 9th Annual San Francisco Ocean Film Festival. Films will be shown at the Bay Theatre Pier 39 in San Francisco. For more info 415-501-6251

**Mar. 24:** ACS/ LA's Ultimate Whale Watch 8am-5pm San Pedro, CA Cost \$61.00. This trip will head toward Catalina Island in search of Gray Whales, Fin Whales, Humpback Whales, Dolphins, and Marine Birds. For more info go to [ACSLA.ORG](http://ACSLA.ORG)

**April 12-13:** 9am-5pm Moss Landing Marine Laboratory Open House. Itinerary will include lectures, open labs, sea lion presentations, puppet shows, & marine themed art projects. For more info: [openhouse.mlml.calstate.edu](http://openhouse.mlml.calstate.edu)

**April 14:** MBNMS Sanctuary Currents Symposium: From Lions to Luminescence. Linking Land to Sea Conference to be held at CSUMB. For program schedule go to: [montereybay.noaa.gov/currsymp2012](http://montereybay.noaa.gov/currsymp2012)

**May 21-24:** 63rd Tuna Conference Lake Arrowhead, CA. Natural and Anthropogenic Effects on Highly Migratory Fish Populations. For more info go to [tuna.conference.org](http://tuna.conference.org)

**May 22-June 3:** Marine Mammal and Seabird Behavioral Ecology of New Zealand. Class will be taught in Kaikoura, New Zealand with marine mammalogist Bernd Wursig. 13 days immersion in marine mammal and seabird ecology and behavior. For more info go to [wuersig@sbcglobal.net](mailto:wuersig@sbcglobal.net)

**May 26- May 28:** ACS Memorial Day Wildlife Weekend: Spend 3 days aboard the Searcher in search of Blue Whales, Dolphins, Sea Turtles, Pinnipeds, and Marine Birds. This trip will include a cruise past the Los Coronados Islands. Cost is \$450. For more info please call 619-226-2403 or [ASC.org](http://ASC.org)

### Summer Classes at Moss Landing Marine Lab

1. Techniques and Theories of Animal Training:  
Bio 348 (July 9-15) Tuition \$585
2. Working with Marine Mammals:  
Bio 347 (July 23-29) Tuition \$585

Completion of both courses will earn the student a Certificate of Completion in Beginning Marine Mammalogy. Class instructor will be Dr. Jenifer Zeligs. For more info and class registration call 831-582-4500

**Aug. 4:** Monterey Bay Chapter ACS Summer Whale Watch "Search For The Great Blue Whale". Join us aboard the Sea Wolf 2 in search of the largest animal the world has ever known. Monterey Bay is one of the foremost locations in the world to observe blue whales. For more info please call Tony Lorenz at 831-901-7259 (more info to follow).

## Media Recommendations

Petrels, Albatross, and Storm Petrels of North America. A Photographic Guide. By Steve N.G. Howell. 2012 Princeton University Press

Shifting Baselines: The Past and Future of Ocean Fisheries. By Jeremy B.c. Jackson, Karen Alexander, and Enric Sala. 2011 Island Press

Beaches and Parks from San Francisco to Monterey 2012 U.C. Press Author (California Coastal Commission)

The Magic of Reality: How We Know Whats Really True. By Richard Dawkins. Illustrated by Dave McKean. 2011 Bantam Press

Hello American Cetacean Society friends!

I want to let you know of the exciting formation of the San Francisco Bay branch of the American Cetacean Society Student Coalition by Cara Gallagher.

With the support of the main San Francisco chapter and the National Student Coalition based out of Indiana, we are well on our way to creating a fully functioning group of students working towards the betterment of our oceanic world! Cara, as a young scientific researcher, understands the importance of mixing science and activism to produce effective education. She plans on following the lead of the National Student Coalition and starting out with focus directed on educating the public on how to eat sustainable and healthy seafood through the Monterey Bay Aquarium's Seafood Watch program. Once the Coalition is fully established, she plans on working on other issues such as education on the whaling of the Faroe Islands in Denmark and possibly even the debris that has been coming our way from Japan's tsunami in March of 2011. There will be many trips and activities such as group beach/river cleanups, documentary/movie nights, and special activities for Earth Day and California Coastal Cleanup Day!

The majority of meetings are going to take place on the CSU East Bay campus in Hayward, California and she plans on having meetings every other week with events and activities happening usually between meetings. If you or anyone you know is interested in joining the SF branch of the ACS Student Coalition they can contact Cara at [cgallagher3@horizon.csueastbay.edu](mailto:cgallagher3@horizon.csueastbay.edu). She is very excited to be able to assemble a group of young, ambitious people to help pave the way to a better future for the world's cetaceans!

On behalf of SF Bay ACS chapter a big welcome and congratulations to Cara!

For students and teachers in the bay area, but not the CSU area, it is not a problem to join the coalition and work together from your area. If you need further information re: San Francisco Bay American Cetacean Society chapter, becoming involved, or developing the student coalition branch in your area please contact:

Lynette R. Koftinow  
President San Francisco Bay American Cetacean Society  
[lklifeart@sbcglobal.net](mailto:lklifeart@sbcglobal.net)  
[www.acs-sfbay.org](http://www.acs-sfbay.org)

## WHALES AND DOLPHINS 'SHOULD HAVE LEGAL RIGHTS'

*Campaign for intelligent marine mammals to have right to life, which would protect them from hunters and captivity*

Campaigners who believe that dolphins and whales should be granted rights on account of their intelligence are to push for the animals to be protected under international law.

A group of scientists and ethicists argues there is sufficient evidence of the marine mammals' intelligence, self-awareness and complex behaviour to enshrine their rights in legislation.

Under the declaration of rights for cetaceans, a term that includes dolphins, whales and porpoises, the animals would be protected as "non-human persons" and have a legally enforceable right to life.

If incorporated into law, the declaration would bring legal force to bear on whale hunters, and marine parks, aquariums and other entertainment venues would be barred from keeping dolphins, whales or porpoises in captivity.

"We're saying the science has shown that individuality, consciousness and self-awareness are no longer unique human properties. That poses all kinds of challenges," said Tom White, director of the Centre for Ethics and Business at Loyola Marymount University in Los Angeles.

"Dolphins are non-human persons. A person needs to be an individual. And if individuals count, then the deliberate killing of individuals of this sort is ethically the equivalent of deliberately killing a human being. The captivity of beings of this sort, particularly in conditions that would not allow for a decent life, is ethically unacceptable, and commercial whaling is ethically unacceptable," White said.

The group spoke at the annual meeting in Vancouver of the American Association for the Advancement of Science, to raise support for the declaration among scientists and the visiting public. The 10-point declaration sets out a framework to protect cetaceans' "life, liberty and wellbeing", including rights to freedom of movement and residence in their natural environment, and protection against "disruption of their cultures".

"The next step is taking the science and advocating for law in different places, from a regional point of view, from a national point of view, and eventually from a multi-national and international view," said Chris Butler-Stroud of the Whale and Dolphin Conservation Society.

Decades of research on cetaceans, and dolphins in particular, has revealed that their brains, while markedly different from humans, are large, complex and capable of sophisticated behaviour. Observations of dolphins have shown that they can recognise themselves, use tools and understand symbols and abstract concepts.

In 2001, Lori Marino of Emory University in Atlanta, who is promoting the declaration, tested whether dol-

phins recognised themselves by drawing temporary marks on different parts of their bodies and watching them check the mark by swimming up to an immersed mirror. "When we did that with two dolphins they passed with flying colours," she said.

Orcas off Patagonia displayed a seemingly extraordinary act when an aged member of the group suffered jaw damage and could no longer eat properly. The whale's companions kept the animal alive by feeding it. "The animal, we would say, was past its sell-by date, an older creature. They must have conceptualised that if it wasn't fed, something would have happened to it, and they were able to work out what was needed to keep it alive," said Butler-Stroud.

At the Institute for Marine Mammal Studies in Mississippi, a dolphin named Kelly outwitted its human keepers and passed on some of its tricks to its offspring. Dolphins at the centre were rewarded with fish if they collected litter from their tanks and carried it in their mouths to the staff but Kelly found a weakness in the scheme. When people dropped paper into her tank, she hid it under a rock on the bottom. When a keeper next approached, she swam down and tore a small piece off, and returned to the surface to claim her reward. She worked out that a small piece of paper earned the same reward as a big piece, and so maximised her meals.

Then one day, Kelly managed to grab a gull that flew into the tank. When she delivered it to her keepers, she got an especially large fish reward. The next time Kelly was fed she hid the fish at the bottom of the pool, and later brought it to the surface to lure more gulls into the pool. The strategy proved so successful that she taught her offspring, who went on to teach others.

Though much of the declaration is intended to bring pressure on whaling nations and venues that keep cetaceans in captivity, the document has major implications for conservation programmes and environmental assessments that impinge on communities of dolphins, whales and other cetaceans.

As an early step, the special rights for cetaceans are being considered by the UN as part of its convention on migratory species, which aims to protect migrating species over their entire ranges.

Enshrining the rights in law could be some time, though. "If we are lucky it could take 10 years," said White. "We are at the stage of climate scientists 20 years ago. This is the first step."

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## Endangered Turtles and Sharks Sacrificed for Swordfish Eco-labeling

*The End of Sustainable Seafood and the Marine Stewardship Council's Credibility*

Two back-to-back eco-certifications of Atlantic longline fisheries for swordfish that capture and kill thousands of sharks and endangered sea turtles by the Marine

Stewardship Council (MSC) is a death knell for the credibility for the industry-funded sustainable seafood eco-labeling scheme. Ocean conservation groups are now calling on seafood retailers and restaurateurs to stop offering unsustainable longline-caught swordfish.

"The eco-labeling of longlined swordfish dupes well-intentioned seafood lovers into unknowingly consuming fish caught in ways that sacrifice sea turtles and sharks," said Teri Shore, Program Director at Sea-Turtles.org. "It spells the end of sustainable seafood schemes since none can be fully trusted."

Last week the MSC dismissed an objection to the sustainable certification of the Canadian Atlantic longline fishery for swordfish filed by three major marine conservation organizations, allowing the eco-labeling to go ahead with only minor technical changes in the assessment document. Read more here.

This followed in the wake of the eco-certification of the Florida longline swordfish fleet, which targets swordfish and accidentally captures sea turtles from the same populations as the Canadian fishery, without any consideration of cumulative impacts. The Florida swordfish fishery captured an estimated 147 endangered leatherbacks and loggerheads from 2005 to 2009.

At the same time, the MSC's credibility has been undermined by several major Alaskan fisheries vacating the program in favor of self-certification, which will further undermine the credibility of eco-labeling and sustainable seafood marketing.

The MSC assessment of the Canadian longline fishery recognized that two sharks die for every swordfish caught and that the fishery captures 1,200 endangered sea turtles every year and operates without measures that protect sea turtles. Neither fact will prevent the newly-certified fishery from selling swordfish marked with MSC's 'blue check mark' as of March 2012.

Longline-caught swordfish is listed on Canada's SeaChoice Red 'Avoid' list, the Monterey Bay Aquarium Seafood Watch Red 'Avoid' list, and Greenpeace International's Seafood Red List. These assessments are based on the best science available, include strict conservation criteria, and are not paid for by industry clients, unlike the Marine Stewardship Council.

Giant retailers that want to profit from rising demand for sustainable seafood are triggering the false eco-labeling of fish caught with destructive gear such as the two longline swordfish fisheries.

Even worse, the U.S. government warns women of child-bearing age (18 to 45) never to eat swordfish due to high mercury levels (as well as shark, mackerel and tilefish). No certification scheme considers mercury or other toxins in fish. Read more about mercury at [www.GotMercury.org](http://www.GotMercury.org)

## ICONIC MARINE MAMMALS ARE 'SWIMMING IN SICK SEAS' OF TERRESTRIAL PATHOGENS

ScienceDaily (Feb. 21, 2012) — Parasites and pathogens infecting humans, pets and farm animals are increasingly being detected in marine mammals such as sea otters, porpoises, harbour seals and killer whales along the Pacific coast of the U.S. and Canada, and better surveillance is required to monitor public health implications, according to a panel of scientific experts from Canada and the United States.

UBC scientists Stephen Raverty, Michael Grigg and Andrew Trites and Melissa Miller from the California Department of Fish and Game, presented their research Feb 21 at the Annual Meeting of the American Association for the Advancement of Science (AAAS) in Vancouver, Canada.

They called for stronger collaboration among public health, coastal water policy and marine mammal health research sectors to reduce land-sea transfer of pathogens and toxins. These terrestrial sourced pollutants are killing coastal marine mammals and likely pose risks to human health.

Between 1998 and 2010, nearly 5,000 marine mammal carcasses were recovered and necropsied along the British Columbia and Pacific Northwest region of the U.S., including whales, dolphins and porpoises, sea lions and otters.

"Infectious diseases accounted for up to 40 per cent of mortalities of these marine animals," says Stephen Raverty, a veterinary pathologist with the Animal Health Centre in the British Columbia Ministry of Agriculture and Lands, and an adjunct professor in UBC's Marine Mammal Research Unit.

"In many cases, the diseases found in these marine mammals have similar or genetically identical agents as those infecting pets and livestock. We don't yet know how these diseases are affecting the health of marine mammals" says Raverty.

For example, researchers recently identified the first case of *Neospora caninum* in sea otters. The parasite is known to cause infectious abortions in dairy cattle and muscular and bone diseases in dogs. *Cryptococcus gatti*, a fungus typically associated with dead and decomposing eucalyptus trees in tropical regions, has been found in some harbour and Dall's porpoises.

"The marine mammals that died of severe brain disease were infected with two common parasites, Toxoplasma and Sarcocystis, which are shed in the feces of feline and opossum hosts," says Michael Grigg, a researcher with the U.S. National Institutes of Health's Laboratory of Parasitic Diseases and adjunct professor in UBC's Marine Mammal Research Unit.

"Expansion of host range for the opossum and climate change may be important factors contributing to the increased incidence of infection from these land-based

pathogens."

"We can expect increased health risks for humans, pets and marine mammals sharing the same polluted marine habitat -- including along the shorelines right here in downtown Vancouver," says Andrew Trites, director of UBC's Marine Mammal Research Unit. "In a way, marine mammals are the canary in the coal mine -- we must consider ourselves warned and take appropriate action.

The team recommends better management of urban pest populations, maintaining wetland marshes, reducing run-off from urban areas near the coast, and monitoring water quality to prevent pathogens and toxins from entering the marine food chain. Collaboration amongst coastal regions and countries is also crucial.

"Marine mammals recognize no borders, and neither do pathogens and parasites," says Raverty.

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## **RESEARCHERS: SHARKS BLAMED AS NUMBER OF DEAD SEA OTTERS RECOVERED HITS HIGH; 'TASTE-TESTS' TAKE TOLL**

Underwatertimes.com News Service

SANTA CRUZ, California -- The California or southern sea otter (*Enhydra lutris nereis*) appears to be experiencing an unprecedented increase in mortality from attacks by sharks, according to federal and state scientists.

Since 1968, biologists and veterinarians at the U.S. Geological Survey and California Department of Fish and Game have documented and examined all reported sea otter "strandings" — counting the number of dead, sick or injured sea otters recovered along California's coast each year.

"The southern sea otter, once hunted to the brink of extinction, is staging a comeback but still faces multiple challenges on its road to recovery," explained USGS director Marcia McNutt. "Careful scientific detective work can help us understand which threats are in our power to mitigate and which are inevitable risks of living in the wild for this beautiful animal, often considered a bellwether for ocean health."

Shark bites have always ranked among the causes of mortality, accounting for approximately 8% of recovered carcasses in the 1980's and early 1990's.

"But we're starting to see a perplexing trend suggesting increased shark attacks on sea otters," says Tim Tinker of the USGS Western Ecological Research Center, who co-leads the California Sea Otter Stranding Network with colleague Brian Hatfield. "Shark bite deaths accounted for 15% of recovered carcasses by the late 1990's, and this has risen to approximately 30% of recovered carcasses in 2010 and 2011."

Tooth fragments and other distinguishing characteristics of the wounds suggest that most of these bites are from white sharks (*Carcharodon carcharias*). But, strangely there is no evidence that white sharks are actually consuming the otters.

"The nature of the bite wounds we see on sea otters suggest these events are investigative bites, or 'taste-tests' so to speak. We don't see any indication of tissue removed from these bitten otters," says Michael Harris, a sea otter biologist with CDFG. "Our guess is that otters are being mistaken for the sharks' preferred prey of seals and sea lions, but otters are not consumed because they lack the high-calorie, thick blubber layer found in seals and sea lions. Unfortunately, even a taste test by a white shark usually proves fatal for a sea otter."

There are other reasons for concern beyond the increase in numbers.

"The most disturbing part of this trend is the growing proportion of female otters killed by shark bites, since female deaths will have much greater impacts on population growth," says Tinker.

Females used to represent just 17% of shark-bites, but they comprise 35% of all shark-bitten carcasses in 2011. The increase in shark bites has been especially notable in the southern third of the sea otter's range, from Cayucos and southward, where females are more common. Tinker cautions despite these dramatic increases, it is difficult to put these shark bite mortalities in perspective, let alone speculate on the reasons behind the increase in bites. "Stranding numbers only account for sea otter carcasses that people find," says Tinker. "Past research indicates that only about 50% of sea otters that die in the wild end up on the beach, so our stranding data at best provide only an index of trends in population mortality."

In 2011, a total of 335 sea otters stranded — a record high. Causes of death besides white shark bites included mating trauma, emaciation, parasites and infectious diseases, bacterial infections, heart disease, harmful algal toxins, boat strikes, and gun-shot wounds.

The stranding tallies offer helpful reference points in the overall population recovery of southern sea otters, a federally listed threatened species. USGS monitors the southern sea otter population annually and provides these data to the U.S. Fish and Wildlife Service, which determines the sea otter's progress toward population recovery and whether the species is ready for delisting under the Endangered Species Act. The last official population index reported for the species was 2,711 — still short of the 3,090 threshold that would begin federal consideration for delisting.

"We are interested in understanding all factors influencing the recovery of southern sea otters," says Lilian Carswell, Southern Sea Otter Recovery Coordinator for the U.S. Fish and Wildlife Service. "We will continue to work with our research partners to understand the implications of this apparent trend in shark-related mortality."

About the California Sea Otter Stranding Network: Since 1968, there has been an effort to document all sea otter strandings in California. USGS, CDFG, Monterey Bay Aquarium, USFWS, The Marine Mammal Center, California Academy of Sciences, Santa Barbara Museum of

Natural History, various city beach clean-up crews and others contribute to the survey by reporting carcasses that wash ashore. The CDFG-Marine Wildlife Veterinary Care and Research Center conducts the detailed necropsies on a subsample of the fresh dead sea otter cases, and a team of biologists examines most of the cases in the field. Live sea otters that strand ashore in California are reported to and retrieved by the Monterey Bay Aquarium or The Marine Mammal Center.

## MYSTERIES OF KILLER WHALES UNCOVERED IN THE ANTARCTIC

*Two of the world's leading experts on the world's top marine predator are now in Antarctica, tagging and photographing a creature whose remarkably cooperative hunting behavior and transmission of knowledge across generations may be rivaled only by humans.*

By Fen Montaigne

On the afternoon of January 10, at the tip of the Antarctic Peninsula, whale researchers Robert L. Pitman and John W. Durban stood on the bridge of a cruise ship, peering through binoculars for signs of killer whales. The Weddell Sea, where English explorer Ernest Shackleton and his men were locked in the sea ice nearly a century ago, was calm and studded with icebergs. It was raining, an increasingly common occurrence in summer in this rapidly warming part of Antarctica.

Around 3 p.m., Pitman spotted several of the distinctive triangular dorsal fins of killer whales two miles ahead. Soon, roughly 40 killer whales appeared on all sides of the cruise ship, the National Geographic Explorer, delighting the nearly 150 passengers on board.

Pitman and Durban stepped into a rubber Zodiac driven by a ship's naturalist and cruised slowly toward the whales. Two large female killer whales approached, rolled on their sides, and "took a long look at us with wide open eyes as they passed a few feet under the Zodiac," Pitman later recalled. One of the females surfaced next to the boat, and Durban, cradling a black crossbow, fired a satellite tag onto the middle of the whale's dorsal fin. When the second female rolled on the surface, Durban fired a dart that would provide a tissue sample for scientific analysis. "Our skin donor," Pitman said later.

Thus began more than a month of killer whale research in the Antarctic, conducted by two of the world's leading experts on these top predators, whose killing power, Pitman says, "probably hasn't been rivaled since dinosaurs quit the earth 65 million years ago." I was a lecturer aboard the *Explorer*, and was able to watch the pair work for more than a week in the Antarctic.

As many as 50,000 killer whales roam the world's oceans today, and roughly half of them are believed to live in Antarctic waters. Yet though killer whales may be the most recognizable creatures in the marine world, a great deal about them remains a mystery, especially in the Antarctic, and Pitman and Durban are now gathering basic

information about their behavior and feeding habits. This baseline data is particularly important since climate change and other human impacts, such as overfishing and the accumulation of toxic chemicals, are rapidly altering the whales' habitats and their prey.

Scientists worldwide are still sorting out how many species and sub-species of killer whales — also known as orcas — exist in places like Alaska, the Pacific Northwest of the U.S. and Canada, and the North Atlantic. In Antarctica, Pitman and Durban — who work for the U.S. National Marine Fisheries Service in La Jolla, Calif. — have played a role in identifying three main types of killer whales in Antarctic waters and a fourth in the sub-Antarctic. The populations — likely separate species — differ in their distinctive black, white, and gray patterning; in the shapes of their dorsal fins and heads; in their geographic range; and in their food and foraging habits. Each individual has unique markings on the saddle behind the dorsal fin, and Pitman and Durban — who have amassed a collection of 40,000 photos of killer whales from Antarctic waters — have gotten to the point where they can recognize individuals and extended families.

But what has driven the men to pursue killer whale research is not the minutiae of markings or migration routes, but rather the extraordinary culture and habits of these cetaceans, whose cooperative hunting behavior and intergenerational transmission of knowledge is rivaled only by humans, Durban and Pitman contend.

Killer whales — *Orcinus orca* — are long-lived, with females surviving for up to 90 years or more. The whales travel in extended family groups, with offspring generally remaining with their mothers their entire lives. Stable groups of whales join together in pods composed of different matriline (a dominant female and her offspring), and these related whales all communicate in a distinct dialect using an array of clicks, whistles, and pulsed calls. Killer whales — which gestate for 17 months — are believed to recognize their mother's calls *in utero* and are born with the ability to immediately communicate.

As many as four generations of killer whales will travel together, passing on astonishingly sophisticated group hunting behavior from one generation to the next.

"You've got individuals that are spending 50, 60, 80 years together, and you can do a lot of things when you're spending a lot of time with your family and related individuals," Pitman told me in an interview. "You can hunt cooperatively. You can make sacrifices that other animals wouldn't make. If you kill 50,000 seals in your lifetime, you get pretty good at it. And if you learn a few things you pass them on to your offspring. It makes them quite remarkable and very human-like in the things they do."

"We have grandmothers, great-grandmothers, and great-great-grandmothers traveling in groups together with younger whales, imparting cultural knowledge," added Durban.

Three years ago, farther south along the western Antarctic Peninsula, Pitman and Durban spent three weeks observing such behavior among a group of pack ice killer whales, also known as large type-B Antarctic killer whales. The men studied a hunting technique known as “wave-washing,” in which a pod of whales moves through ice floes, its members lifting their heads out of the water — a behavior known as “spy-hopping” — looking for their preferred meal: fat, fish-eating Weddell seals. Once they spotted a seal on an ice floe, the whales called in reinforcements and, two to seven abreast, swam toward the floe and washed the seal off the ice by creating a large wave with powerful strokes of their tails. Pitman and Durban then observed what they call the “butchering” of seals, with the whales first drowning the seals and then meticulously stripping off their skin to get at the choice flesh.

“It was shocking to see,” said Pitman. “You’re not used to animals doing things that are so canny.”

Pitman and Durban are now aboard the 331-foot *Explorer*, where they will remain until mid-February, as guests of Lindblad Expeditions and National Geographic Expeditions. As visiting scientists, they use the ship as a research platform, and even rely on passengers to help take close-up photos of the killer whales’ distinctive markings, an example of the “citizen science” that has helped identify hundreds of individual killer whales in hot spots such as Alaska and the Pacific Northwest. Pitman, 62, who has a sweeping mustache, has worked in the Antarctic for more than two decades and has studied killer whales for the past 15 years. Durban, 35, a burly Englishman with a black beard, first worked with killer whales as a 16-year-old assistant to a pioneering whale researcher in Washington state.

The 40 whales the men encountered in the Weddell Sea likely comprised three matriline and belonged to an “ecotype” — or possibly new species — of Antarctic killer whale they refer to as a “small type-B”, related to the larger type-B “wave-wash” hunters. But little is known about the small type-B’s; Pitman and Durban have occasionally seen them feeding on gentoo and chinstrap penguins, but never on seals, and one of the goals of this year’s research is to get a better sense of what the small type-B’s are eating. The small type-B’s are roughly half the mass of a larger Antarctic killer whale, the type-A, which is found in more open water and hunts minke whales. Type-A males can grow to nearly 30 feet in length and weigh up to 10 tons.

In the three weeks since the female killer whale was tagged, she and her pod have traveled many hundreds of miles in the Weddell Sea, sometimes skirting the pack ice. Durban and Pitman have tagged 15 Antarctic killer whales with the 1.4-ounce satellite transmitters over the last three years, and the results have greatly expanded knowledge of their habits, preferred habitats, and migrations. Six of the tagged type-B killer whales made rapid migrations, following a nearly identical northerly trajectory,

past the Falkland Islands and beyond to the Atlantic Ocean off Brazil. One of the whales made a 6,000-mile round-trip journey from the Antarctic Peninsula to Brazilian waters and back again in just 42 days. Durban and Pitman believe the whales make these previously unknown migrations for one main purpose: shedding and renewing their skin, something they would be unable to do in frigid Antarctic waters because they would lose too much heat.

Four days after the scientists tagged the whale in the Weddell Sea, the *Explorer* was off the western Antarctic Peninsula, in the Gerlache Strait, a breathtaking passage flanked on both sides by glaciated mountains. There, the scientists encountered some old friends — an extended family group of roughly 70 small, type-B killer whales that spend much of their time in the strait.

Durban and Pitman photographed nearly all of the whales, and Durban — who possesses a photographic memory for killer whale markings — recognized many of the individuals from earlier encounters. Durban was unable to get positioned for a tagging shot with the crossbow, but 10 days later, on the following cruise, he managed to shoot a \$2,500 satellite tag, as well as a \$4,500 dive-depth tag, onto two killer whales in the Gerlache Strait. The depth tag would reveal some information on feeding habits they had long been looking for.

This is the kind of work that scientists worldwide are doing as they intensify research into a marine mammal long thought of as one species but that likely, in fact, comprises several distinct species. Genetic testing, for example, shows that so-called transient, mammal-eating killer whales in the Pacific Northwest diverged from the resident, fish-eating whales a half-million years ago and should perhaps be recognized as a distinct species, despite being found now in the same waters. This is not a purely academic matter, as distinct species, evolved to live in certain regions and eat certain prey, may be more vulnerable to environmental change.

That change is happening rapidly. Many groups of these apex predators have accumulated extremely high levels of PCBs and other toxic chemicals, with potentially harmful effects on development and reproduction. Global warming is also altering their world and that of their prey. As Arctic summer sea ice melts, for example, what will become of the predator-prey relationship between gray whales and killer whales as they gray whale migration extends deeper into the Arctic Ocean?

Meanwhile, in Antarctica, Pitman and Durban continue to unlock mysteries of killer whales. Last week, the depth tag they affixed to a killer whale in the Gerlache Strait showed that the whales were repeatedly making deep, nighttime dives of up to 1,900 feet off the western Antarctic Peninsula, an indication — for the first time — that these whales were most likely eating fish and squid on or near the sea floor.

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