Soundings

American Cetacean Society- Monterey Bay Chapter JANUARY 2013

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, January 31, 2013 Time: 7:30 PM.

PLEASE JOIN US AT 7:00 FOR REFRESHMENTS

Speaker: Casey T. Clark
Subject: Do all humpback whales migrate?

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Each year, humpback whales undertake the longest migration of any marine mammal, moving between productive high-latitude feeding areas and low-latitude breeding areas where they undergo lengthy fasts. It has long been assumed that all humpback whales within a population migrate annually. There is, however, a growing body of evidence that this may not be true. Many researchers have reported seeing humpbacks in feeding areas during the breeding season, when they are expected to be elsewhere. Additionally, there is a consistent overabundance of males in the breeding areas, despite a 50:50 overall sex ratio in the feeding areas. This has led researchers to suggest that some females might not undertake the yearly migration, and might instead choose to stay in the feeding area through the winter. My research looks at seasonal use of Monterey Bay by humpback whales, in an effort to understand how and when these whales use this habitat.

CALENDAR

Jan 17-18: ACS National Board meeting, San Pedro

Jan 20, 1– 2pm: Seymour Center at Long Marine Lab Lecture. "Seeing Below the Surface: Using new technology to study the underwater lives of humpback whales." Ari Freelander, Marine Ecologist

Jan 26 & 27: Whalefest 2013. Celebrate the gray whale migration at Fisherman's Wharf and Cusstom House Plaza in Monterey, 9am– 5pm. Volunteers needed! 214-1016

Jan 27, 8-10am: Annual ACS/MB Gray Whale Fundraising Trip with Monterey Whale Watching at #1 Fisherman's Wharf. Meet at 7:30am on the dock to accompany American Cetacean Society experts to view gray whales during the height of their migration. $25 adults/$15 under 12. All proceeds benefit chapter research, education and conservation efforts. 419-1051

Jan 29, 12pm-1pm: Hopkins Marine Station Seminars. "The biomechanics and physiological ecology of ram-feeding marine vertebrates." Jeremy Goldbogen, Cascadia Research Collective

Feb 14-18: American Association for the Advancement of Science 2013 Annual Meeting in Boston

March 8, 12pm-1pm: Hopkins Marine Station Seminars**.** "Animal phylogenies and what they can tell us about evolution." Max Telford, University College London

BOOK RECOMMENDATIONS

Planet Without Apes
Craig B. Stafford
2013 Harvard University Press

Great White Shark: Myth and Reality
Photography by Patrice Heraud
Text by Alexandrine Civard Racinais

Mediterranean Great White Sharks: A Comprehensive Study Including All Recorded Sightings
Alessandro De Maddalena

Deep Things out of Darkness: A History of Natural History
John G. T. Anderson
2012 UC Press

The Environmental Legacy of the UC Natural Reserve System
Peggy Fielder, Kathleen Wong, Susan Gee Ramsey
2013 UC Press

GREAT WHITE SHARK ANCESTRY SWIMS INTO FOCUS

By Brian Switek (Published: 11/15/12)

Few predators terrorize our imaginations as fiercely as the great white shark. The immense fish is sublimely attuned to an environment that is alien to us, and, despite the rarity of accidents, the nightmare of slipping down the shark's throat has obscured the fact that we have done far worse things to these apex predators. And, in a culture where bigger is frequently confused with better, the great white's prehistoric cousin *Carcharocles megalodon* has gained almost as much fame. A 15-foot-long white shark is imposing enough, but the 50-foot-long version has inspired even more awful novels and blood-soaked B-movies than its living relative.

Today's *Carcharodon carcharias* and the extinct *Carcharocles megalodon* have often been linked together on account of their teeth. With the exception of

rare vertebrae, that's really all we know of the "megashark." The rest of the shark's cartilaginous frame has never been found, and may forever remain that way. Still, since the triangular, finely serrated teeth of *Carcharocles megalodon* thoroughly resembled the more coarsely serrated teeth of today's great white sharks, some ichthyologists and paleontologists connected the two together as close relatives – if not actually ancestor and descendant. The great white shark could be a dwarfed version of its massive, whale-crunching forerunner, or a very close cousin.

Not everyone has agreed that the two sharks were close kin, though. In fact, recent analyses have underscored a different scenario that drives a wider gap between the two sharks.

The teeth of modern great white sharks are broadly similar to those of *Carcharocles megalodon*, but they differ in the specifics. In detail, great white teeth more closely resemble those of broad-toothed mako sharks, of the sort seen in the fossil species *Carcharodon* (formerly "*Cosmopolitodus*") *hastalis*. Today's great white sharks are more likely modified broad-tooth makos, with *Carcharocles megalodon* falling within a separate subgroup in the same shark family (called Lamniformes) that branched from the great white lineage sometime during the Cretaceous.

A paper just published by Monmouth University paleontologist Dana Ehret and colleagues in Palaeontology supports the growing consensus behind the broad-tooth mako link, and does so through the description of a new shark species. Discovered in 1988 within southwestern Peru's Pisco Formation, the previously unrecognized shark species is represented by an absolutely gorgeous specimen – a beautifully preserved set of fossilized jaws, with teeth still in their original positions, and a short string of articulated vertebrae. Following a previous 2009 study of the fossil, Ehret and colleagues have now named the shark *Carcharodon hubbelli* in honor of fossil shark expert Gordon Hubbell. The species appears to be an intermediate form between today's great white sharks and their broad-tooth mako ancestors.

Teeth are the key to the connection. The triangular teeth in *Carcharodon hubbelli* are not quite as serrated as those of the great white shark, for example, but more so than *Carcharodon hastalis*. The newly-named species may have also been intermediate between the two in its natural history. Based on aspects of the shark's teeth and vertebrae, Ehret and coauthors estimate that the shark was about 16 feet long, and annual growth rings on the vertebrae indicate that the animal was about 20 years old when it perished. In comparison with details of modern white sharks, these details indicate that *Carcharodon hubbelli* grew at a relatively slower pace than its living relative.

While identifying direct ancestors and descendants is extremely difficult, and often impossible, in paleontology, Ehret and collaborators make the case that the three sharks represent a chronospecies – or a single lineage – evolving over time. In this scenario, the smooth-toothed *Carcharodon hastalis* was the ancestor of *Carcharodon hubbelli*, which was the progenitor of the great white shark.

The age of *Carcharodon hubbelli* plays a critical role in this hypothesis. In addition to a detailed review of fossil Carcharodon identifications and relationships, the researchers behind the new study also reexamined the geological age of the marine sediments the newly-named species was found in. Previous studies hypothesized that the jaws were those of a modern great white shark that swam Peru's prehistoric coast around four million years ago, but the new analysis suggests an older age – about six to eight million years old.

Based on the age and relationships of *Carcharodon hubbelli*, Ehret and collaborators propose that modern great white sharks evolved in the Pacific Basin. Exactly where the sharks first originated, however, is unclear. The researchers point out that teeth similar to those of *Carcharodon hubbelli* – and, in fact, now assigned to that species by the authors of the new study – have been found in Asia, Australia, and North and South America in deposits of similar age. Now that the species has a name, paleontologists can examine these fossil clues for greater resolution on great white origins. The study is absolutely clear about one thing, though. The great white shark is not simply a pygmy megatooth, and this makes the appearance and biology of our favorite prehistoric leviathan more enigmatic than ever.

References:

Ehret, D., Hubbell, G., Macfadden, B. 2009. Exceptional preservation of the white shark Carcharodon (Lamniformes, Lamnidae) from the early Pliocene of Peru. Journal of Vertebrate Paleontology. 29, 1: 1-13

Ehret, D., Macfadden, B., Jones, D., Devries, T., Foster, D., Salas-

Gismondi, R. 2012. Origin of the white shark Carcharodon (Lamniformes: Lamnidae) based on recalibration of the Upper Neogene Pisco Formation of Peru. Palaeontology 55, 6: 1139-1153

Acrobatic Blue Whales Can Sneak Up on Krill

By Sindya N. Bhanoo

To capture enough food for their enormous bodies, blue whales use an extreme technique called lunge feeding: they take enormous gulps of water, then let it pass through comb-like mouth filters called baleen, keeping krill behind for consumption.

And sometimes, a new study reports, they also do an acrobatic roll to help them capture krill more effectively. Writing in *Biology Letters*, researchers explain that the whales sometimes roll 180 degrees, so their backs face the seafloor as they accelerate and move forward to open their mouths for a lunge.

"They engulf from right beneath the krill patch so they are less likely to be seen," said the study's first author, Jeremy Goldbogen, a comparative physiologist at the Cascadia Research Collective in Olympia, Wash. "This minimizes the escape of the krill."

The whales complete their roll, flipping over another 180 degrees, while filtering water through their mouths.

"The whole process can be finished in about 20 to 30 seconds," Dr. Goldbogen said. That is pretty fast, considering that blue whales are the world's largest animals.

Dr. Goldbogen and his colleagues studied 22 whales living off the coast of Southern California. Only about half used the technique while they were being monitored, and those whales did it only about 10 percent of the time.

"They may be using it in very small krill patches as a way to minimize the krill escape response," Dr. Goldbogen said; when there are dense patches of krill, the acrobatic maneuver may not be necessary.

Dr. Goldbogen believes that other lunge feeders may use the technique as well.

"We haven't observed it yet," he said, "but with more research and more tags we're likely to find it in other closely related whales, like fin whales."

FEDS SCRAP 'DUMB IDEA' OF RELOCATING OTTERS

By Peter Fimrite (Published: 12/18/12)

A federal program that attempted to restrict sea otters to a remote island off Santa Barbara while banning them from most of the rest of Southern California was officially scrapped Tuesday after a 25-year run of failure.

The U.S. Fish and Wildlife Service published its final ruling to end the so-called southern sea otter translocation program and the accompanying "no-otter zone."

Federal officials admitted as far back as 2005 that their efforts to restore California's ravaged sea otter population by relocating the furry creatures to San Nicolas Island had not worked.

"Trying to tell a marine mammal to stay on one side of an imaginary line across the water was a dumb idea," said Steve Shimek, executive director of the Otter Project, which has been fighting against the program for years. "This rule will not only protect sea otters from harm, but because of the otters' critical role in the environment, it will also help restore our local ocean ecosystem."

Between 1987 and 1991, 140 otters were captured and placed on San Nicolas, the southernmost of the Channel Islands, but most of them immediately left the island and returned to their original homes along the central coast. Around 40 otters remain there today.

The southern sea otter, or Enhydra lutris nereis, is the smallest marine mammal in U.S. waters. The otters have voracious appetites and love to gobble sea urchins.

As many as 16,000 otters once roamed California

Two sea otters float near Moss Landing (Monterey County) - far away from the relocation area off the coast of Santa Barbara. Photo: Nicole Laroche, UC Santa Cruz / SF

waters, but they were killed by the thousands for their soft, thick fur, which was considered a luxury starting in the late 1700s. They were believed extinct until the 1930s, when about 50 were discovered near Big Sur. The animals, which now number about 2,800, have been listed since 1977 as threatened under the Endangered Species Act.

The San Nicolas plan was proposed in a 1982 Fish and Wildlife Service report called the Southern Sea Otter Recovery Plan. It said a large oil spill could kill all the remaining sea otters and proposed creating a reserve population that could ensure survival of the species in the event of a catastrophe.

Lobbying by sea urchin harvesters and offshore oil interests, however, resulted in a compromise requiring relocation of any otters found between Point Conception, 40 miles north of Santa Barbara, and the Mexican border, including all of the Channel Islands except San Nicolas. The otters ignored the edict, and only a small portion of them were ever captured.

In Loving Memory of Judson Eells Vandevere

September 15, 1924 ~ December 25, 2012

Naturalist and teacher, Jud Vandevere, died Christmas morning, surrounded by his family, in the home where he had resided since 1956. During those years he taught at Washington Union School, worked as a summer Naturalist at Pt. Lobos, and studied sea otters as a researcher in residence at Hopkins Marine Station.

Throughout his life he remained an avid student of the natural sciences. Always eager to share his passion for the natural world, he mentored dozens of students, many of whom went on to distinguished careers in the sciences; introduced generations of local children and their parents to botany and biology through his popular Lyceum classes; and taught courses on everything from whales, birds and otters to the history of biological exploration in North America for numerous institutions and organizations.

While he will be best remembered for his love of the natural world, he was also a dedicated pacifist and a strong supporter of civil liberties and human rights. A staunch supporter of labor, he was proud to have never crossed a picket line or purchased a boycotted product in his life. As a member of numerous conservation organizations, he worked hard for many decades to convince his environmental allies that the preservation of the planet would ultimately depend on social justice and the end of militarism.

Organizations in which he was actively involved, often as a board member or chair, included the Ventana Chapter of the Sierra Club, the Pt. Lobos League, the United Nations Association, Monterey Pine Forest Watch, the American Cetacean Society, the Audubon Society, the Friends of the Sea Otter, and the California Native Plant Society. He also served as a trustee for the Northern California Nature Conservancy and was a member of the Monterey County Fish & Game Fines Commission for more than 35 years.

He is survived by his wife, Joyce Ryder Vandevere of Monterey; his son, Keith Vandevere of Carmel; his daughter, Gwyn Vandevere of Starnberg, Germany; his sister, Marion Norberg of Seattle; along with grandchildren, great-grandchildren, nieces and nephews.

Donations in memory of Jud Vandevere may be made to Monterey Pine Forest Watch, P.O. Box 505, Carmel, CA 93921 or Friends of the Sea Otter, seaotters.org.

A memorial will be held in July.

In Memory of Rich Stallcup Legendary Bird Lover

December 17, 2012

Earlier today, Audubon California, Bay Nature, Point Reyes Bird Observatory (PRBO) and other organizations/publications reported the recent passing of PRBO Conservation ornithologist and renowned California birder Rich Stallcup. International Bird Rescue director Jay Holcomb has this remembrance:

In order to protect wildlife and nature, you have to love them. Then, through enthusiastic sharing and teaching about what you love, you can't help but inspire change, both in people's lives and in the policies that protect what you are devoted to.

That is exactly what Rich Stallcup did in his life. His absolute devotion and love for nature, and birds in particular, evoked many changes and taught us about the im-

portant things in life: being in harmony with nature, protecting it and seeing its value and beauty.

Rich passed away last week, and International Bird Rescue would like to recognize his vision, leadership and contribution to nature conservation. Rich was a founder of Point Reyes Bird Observatory (PRBO) and served on its board of directors. He was also president of Western Field Ornithologists, regional editor for American Birds and a member of the California Bird Records Committee.
Rich published many scientific papers, four books about birds and 60 “Focus” articles in PRBO’s newsletter, the Observer. From 1976 to 1988, Rich was an owner and tour leader for WINGS birding tours and led many PRBO tours prior to that. In 2002, the American Birding Association presented Rich with the Ludlow Griscom Award for outstanding contributions to American ornithology. In his later years, he served as PRBO’s naturalist and worked with the Gulf of the Farallones National Marine Sanctuary Beach Watch Program (in 1998 he was even designated “Star of the Sanctuary” for Cordell Bank).

What a legacy — for the birds in our world and the people who love them. We’ll miss you, Rich.

Found: Whale Thought Extinct For 2 Million Years

By Tia Ghose

The pygmy right whale, a mysterious and elusive creature that rarely comes to shore, is the last living relative of an ancient group of whales long believed to be extinct, a new study suggests.

The findings, published Dec. 18 in the Proceedings of the Royal Society B, may help to explain why the enigmatic marine mammals look so different from any other living whale.

"The living pygmy right whale is, if you like, a remnant, almost like a living fossil," said Felix Marx, a paleontologist at the University of Otago in New Zealand. "It's the last survivor of quite an ancient lineage that until now no one thought was around."

Living Fossil

The relatively diminutive pygmy right whale, which grows to just 21 feet (6.5 meters) long, lives out in the open ocean. The elusive marine mammals inhabit the Southern Hemisphere and have only been spotted at sea a few dozen times. As a result, scientists know almost nothing about the species' habits or social structure.

The strange creature's arched, frownlike snout makes it look oddly different from other living whales. DNA analysis suggested pygmy right whales diverged from modern baleen whales such as the blue whale and the humpback whale between 17 million and 25 million years ago. However, the pygmy whales' snouts suggested they were more closely related to the family of whales that includes the bowhead whale. Yet there were no studies of fossils showing how the pygmy whale had evolved, Marx said.

To understand how the pygmy whale fit into the lineage of whales, Marx and his colleagues carefully analyzed the skull bones and other fossil fragments from pygmy right whales and several other ancient cetaceans.

The pygmy whale's skull most closely resembled that of an ancient family of whales called cetotheres that were thought to have gone extinct around 2 million years ago, the researchers found. Cetotheres emerged about 15 million years ago and once occupied oceans across the globe.

The findings help explain how pygmy whales evolved and may also help shed light on how these ancient "lost" whales lived. The new information is also a first step in reconstructing the ancient lineage all the way back to the point when all members of this group first diverged, he said.

The pygmy whale, a mysterious cetacean that looks radically different from all living whales, is actually the last living member of a group thought to have gone extinct 2 million years ago. Credit: Darryl Wilson, University of Otago

SIGHTINGS Compiled by Monterey Bay Whale Watch.
For Complete listing and updates see gowhales.com/sighting

Date	#	Type of Animal(s)
1/8 a.m.	15	Gray Whales
	20	Risso's Dolphins
1/7 p.m.	16	Gray Whales
	20	Risso's Dolphins
1/7 a.m.	20	Gray Whales
	20	Pacific White-sided Dolphins
	300	Risso's Dolphins (including calves)
1/6 a.m.	5	Gray Whales
	25	Pacific White-sided Dolphins
	300	Risso's Dolphins
1/5 p.m.	20	Gray Whales (1 breaching)
1/5 a.m.	23	Gray Whales
	100	Pacific White-sided Dolphins
	5	Northern Right Whale Dolp hins
1/4 p.m.	9	Gray Whales
	50	Risso's Dolphins
1/4 a.m.	12	Gray Whales
1/3 p.m.	10	Gray Whales
	50	Pacific White-sided Dolphins
	200	Risso's Dolphins
1/3 a.m.	22	Gray Whales
	50	Pacific White-sided Dolphins
	200	Risso's Dolphins
1/2 p.m.	9	Gray Whales
	20	Risso's Dolphins
1/1 p.m.	22	Gray Whales
1/1 a.m.	13	Gray Whales
12/31 p.m.	15	Gray Whales
12/31 a.m.	15	Gray Whales
	20	Pacific White-sided Dolphins
	100	Risso's Dolphins
12/30 p.m.	8	Gray Whales
	50	Risso's Dolphins
12/30 a.m.	5	Gray Whales
	100	Risso's Dolphins
12/29 p.m.	11	Gray Whales
12/29 a.m.	9	Gray Whales
	100	Risso's Dolphins
12/28 p.m.	13	Gray Whales
12/28 a.m.	14	Gray Whales
	200	Risso's Dolphins
12/27 p.m.	6	Gray Whales
12/27 a.m.	15	Gray Whales
	20	Risso's Dolphins
12/24 p.m.	5	Gray Whales
	20	Pacific White-sided Dolphins
	50	Risso's Dolphins
12/24 a.m.	15	Gray Whales
	10	Pacific White-sided Dolphins
12/20 a.m.	3	Gray Whales
12/19 p.m.	8	Gray Whales
	70	Risso's Dolphins
12/19 a.m.	7	Gray Whales
	70	Risso's Dolphins
12/16 p.m.	2	Gray Whales
12/16 a.m.	5	Gray Whales
12/15 a.m.	4	Gray Whales
12/14 a.m.	200	Risso's Dolphins
12/11 a.m.	1	Male Killer Whale
12/10 a.m.	1	Humpback Whale
12/9 p.m.	3	Gray Whales
	25	Risso's Dolphins
12/9 a.m.	3	Gray Whales
12/8 p.m.	40	Risso's Dolphins (nursery group)
12/8 a.m.	85	Risso's Dolphins
12/7 a.m.	4	Gray Whales
12/6 a.m.	70	Risso's Dolphins
12/5 a.m.	7	Bottlenose Dolphins
	50	Risso's Dolphins
12/4 a.m.	1	Humpback Whale
	10	Risso's Dolphins
12/3 a.m.	1	Killer Whale
	150	Risso's Dolphins
	30	Harbor Porpoise
11/27 a.m.	2	Humpback Whales
	30	Harbor Porpoise
11/26 a.m.	2	Humpback Whales
11/25 p.m.	2	Humpback Whales ("friendly")
11/25 a.m.	2	Humpback Whales
	1000	Risso's Dolphins
11/24 p.m.	2	Humpback Whales
11/24 a.m.	2	Humpback Whales
	20	Risso's Dolphins
11/23 p.m.	1	Tufted Puffin
11/23 a.m.	30	Risso's Dolphins
11/21 a.m.	5	Killer Whales
11/20 a.m.	1	Humpback Whale
11/19 a.m.	4	Killer Whales (predation be havior)
11/18 p.m.	2	Humpback Whales
11/18 a.m.	2	Humpback Whales
	10	Pacific White-sided Dolphins
	1000	Risso's Dolphins
	10	Harbor Porpoise
11/17 a.m.	2	Humpback Whales
	2	Harbor Porpoise
11/15 a.m.	2	Humpback Whales
11/14 a.m.	2	Humpback Whales
	800-1000	Risso's Dolphins
	1	Mola Mola
11/13 a.m.	2	Humpback Whales
11/12 a.m.	2	Humpback Whales
	1000	Risso's Dolphins
11/11 p.m.	1	Humpback Whale
	500	Risso's Dolphins
11/11 a.m.	1	Humpback Whale
	800	Risso's Dolphins
11/10 p.m.	1	Humpback Whale
	500	Risso's Dolphins
11/10 a.m.	2	Humpback Whales
	8	Killer Whales
	1000	Risso's Dolphins
	10	Harbor Porpoise

American Cetacean Society
Monterey Bay Chapter
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Email: tonylorenz@bigbluebay.com
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Soundings

American Cetacean Society- Monterey Bay Chapter
PO Box H E, Pacific Grove, CA 93950

February 2013

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, February 28, 2013 Time: 7:30 PM.
PLEASE JOIN US AT 7:00 FOR REFRESHMENTS

Speaker: William F Gilly
Subject: The Mysterious Humboldt Squid in our Bay

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There has been a lot of talk lately regarding those jumbo squid who keep washing up on our beaches. These creatures are normally found in ocean water up to a 1000 feet deep so what's happening? Dr. Bill Gilly- "Mr. Humboldt Squid" will be telling us at our monthly meeting so please come and find out.

Dr. Gilly has been studying Humboldt squid in the Gulf of California and the Pacific Ocean for the last 10 years. His group at Hopkins Marine Station uses of a variety of electronic tagging methods, an animal-borne video package (CritterCam), and hydro-acoustics to reveal natural behaviors of this adaptable predator in relation to physical and biological features of their environment. This squid supports the largest invertebrate fishery in the world and is a major prey item for sperm whales, Risso's dolphins and other marine mammals in the eastern Pacific.

CALENDAR

March 6, 3pm: Monterey Bay Aquarium Research Institute Lecture. "The Golden Shore." David Helvarg, Blue Frontiers Campaign

March 8, 12pm: Hopkins Marine Station Seminars. "Animal Phylogenies and What They Can Tell Us." Max Telford, University College London

March 7-10: 10th Annual San Francisco Ocean Film Festival. Pier 39, San Francisco

March 23, 8am-5pm: American Cetacean Society Los Angeles Chapter's Ultimate Whale Watch. Look for north bound gray whales, humpback whales, minke whales, dolphins, pinnipeds, and sea birds while traveling toward Catalina Island. For more info contact ACS/LA

April 27: Monterey Bay National Sanctuary 2013. Sanctuary Currents Symposium. "Change: Observations on the Shifting Ecology of the Sanctuary." California State University Monterey Bay

BOOK RECOMMENDATIONS

The Swordfish Hunters: The History and Ecology of an Ancient American Sea People
Bruce Bourque

Swordfish: A Biography of the Ocean Gladiator
Richard Ellis

Birthright: People and Nature in the Modern World
Stephen R. Kellert

The Universe Within: Discovering the Common History of Rocks, Planets, and People
Niel Shubbin

The Golden Shore: California's Love Affair with the Sea
David Helvarg

SCIENTISTS USE MARINE ROBOTS TO DETECT ENDANGERED WHALES

From Science Daily
Published: 1/9/13

Two robots equipped with instruments designed to "listen" for the calls of baleen whales detected nine endangered North Atlantic right whales in the Gulf of Maine last month. The robots reported the detections to shore-based researchers within hours of hearing the whales (i.e., in real time), demonstrating a new and powerful tool for managing interactions between whales and human activities.

The team of researchers, led by Woods Hole Oceanographic Institution (WHOI) scientists Mark Baumgartner and Dave Fratantoni, reported their sightings to NOAA, the federal agency responsible for enforcing the Marine Mammal Protection Act. NOAA Fisheries Service, in turn, put in place on Dec. 5 a "dynamic management area," asking mariners to voluntarily slow their vessel speed to avoid striking the animals.

The project employed ocean-going robots called gliders equipped with a digital acoustic monitoring (DMON) instrument and specialized software allowing the vehicle to detect and classify calls from four species of baleen whales -- sei, fin, humpback, and right whales. The gliders's real-time communication capabilities alerted scientists to the presence of whales in the research area, in the first successful use of technology to report detections of several species of baleen whales from autonomous vehicles.

The oceanographic research project was underway from Nov. 12 through Dec. 5, operating in an area called the Outer Fall, about sixty miles south of Bar Harbor, Me., and 90 miles northeast of Portsmouth, NH. Right whales are thought to use this area every year between November and January as a mating ground.

Two gliders were deployed by Ben Hodges and Nick Woods, also of WHOI, on Nov. 12 from the University of New Hampshire's 50-ft research vessel, the *Gulf Chal-*

lenger. The vehicles surveyed the area for two weeks, sending data to the researchers every two hours via satellite, prior to the scientific team's arrival Nov. 28 on the University of Rhode Island's research vessel *Endeavor*. The gliders continued to survey for another week before being recovered by the *Endeavor* on Dec. 4."We put two gliders out in the central Gulf of Maine to find whales for us," says Baumgartner, who specializes in baleen whale and zooplankton ecology. "They reported hearing whales within hours of hitting the water. They did their job perfectly."

Using the gliders's reconnaissance data and continued real-time updates, the science team was able to locate whales in just a few hours of searching. "We found our first right whale on the first day that we were surveying in decent weather conditions because the gliders were up there doing the leg work for us, to tell us where the animals were in real time," says Baumgartner.

The innovative whale detection system provides conservation managers with a cost-effective alternative to ship- or plane-based means of identifying the presence of whales, and gives whale ecologists new tools for understanding large animals that spend most of their lives out of human eyesight below the sea surface.

Whale researchers want to learn what draws whales to this part of the ocean during the late fall and winter. However, high winds and rough seas typical of that time of year make studying the animals very difficult.

"This presents a huge knowledge gap," says Baumgartner.

The labor-intensive work of surveying for whales, overseen by NOAA, is usually done by human observers on ships or airplanes, and is limited by the conditions at sea.

"We've been doing visual based surveys for a long time -- either from a plane or a boat. They have a lot of value, but they are limited, especially at certain times of the year," says Sofie Van Parijs, leader of the Passive Acoustic Research Group at NOAA's Northeast Fisheries Science Center (NEFSC). "These gliders provide a great complement to this system. Knowing where right whales are helps you manage interactions between an endangered species and the human activities that impact those species."

The success of the project is a result of years of productive collaboration among engineers, biologists and physical oceanographers at WHOI, scientists at the NEFSC Protected Species Branch in Woods Hole, and federal funders like the Office of Naval Research and NOAA's Applied Science and Technology Working Group Program. The gliders are operated by Fratantoni, a physical oceanographer; the DMON acoustic monitoring instrument was developed by WHOI engineers Mark Johnson and Tom Hurst; and Baumgartner, who has nearly a decade of experience identifying whale calls, wrote software for the DMON to enable it to recognize unique calls of sei, fin, humpback, and right whales, and to keep a tally of when and where it heard each call. By integrating the DMON into Fratantoni's gliders, the team had the ability to search large areas of the ocean and to receive data in real time.

"No one of us could've done this project alone. But by teaming up, we created a really nice group of people with expertise that was tailor made for this problem," says Baumgartner. "Now, we can know that there's an animal in a particular part of the ocean within hours of a call being made, as opposed to months later," when the instruments have finally been retrieved and the data has been reviewed.

Gliders -- approx. six-foot-long, torpedo-shaped autonomous vehicles with short wings -- have been in use by oceanographers for about a decade. They move up, down, and laterally in a sawtooth pattern through the water by changing their buoyancy and using their wings to provide lift. Battery powered and exceptionally quiet in the water, the gliders are equipped with an underwater microphone on the underside of the vehicle near its wings, and an iridium satellite antenna on the tail section. The vehicle surfaces every few hours to get a GPS position and transmit data to shore-side computers.

The DMON -- a circuit board and battery about the size of an iPhone -- sits inside the glider recording audio and generating spectrograms, a form of the audio that facilitates complex sound analysis. From the spectrogram, Baumgartner's software generates a "pitch track," a visual representation of a whale call, and estimates which species

of whale made the call based on characteristics of the pitch track. Tallies of each species' detected calls and even a small subset of detected pitch tracks can be transmitted to shore by the vehicle. "Each pitch track takes less than 100 bytes, whereas transmitting just one of those calls as an audio clip would take about 8000 bytes of data," says Baumgartner. This makes the system efficient and economical. And, adds Baumgartner, it's also really flexible. It is easy to update the software to include a larger repertoire of whale calls into the software's "call library."

In addition to demonstrating the utility of the robots for the management and conservation of baleen whales, the project also has ongoing scientific objectives. One goal of the shipboard research team, in addition to spotting the whales, was to take measurements and collect biological samples of the tiny crustaceans or zooplankton upon which the whales feed, in an effort to characterize the oceanic conditions and to understand how those conditions impact the whale's food and ultimately attracts whales to the study area. "Untangling how that happens is a big deal," says Fratantoni.

"We wanted to figure out what right whales were feeding on in this area," says Baumgartner. "We took profiles of the temperature and the salinity of the water and sampled zooplankton throughout the water column to understand what might make this area attractive to right whales." Analysis of these data is in progress now.

Additional team members included representatives from the New England Aquarium who maintain a catalog of right whales and are experts in identifying individual right whales from patches of thickened skin on their heads, called callosities. Through their efforts, the team recognized four of the individual whales sighted during their week on the research ship -- two males born in 2006, one male born in 2004, and one female born in 2008.

Paleontologists who examined a new fossil found in southern California have thrown doubt on earlier claims that a "killer walrus" once existed. (Credit: Copyright Robert W. Boessenecker)

New Research Throws Doubt On Earlier 'Killer Walrus' Claims

From Science Daily
Published: 1/16/13

Paleontologists who examined a new fossil found in southern California have thrown doubt on earlier claims that a "killer walrus" once existed.

A University of Otago geology PhD student Robert Boessenecker and co-author Morgan Churchill from the University of Wyoming have just published their paper about the fossil in the online scientific journal PLOS One.

The paper reports that the new fossil-find, of the extinct walrus Pelagiarctos from southern California, prompts a different hypothesis to an earlier one that a "killer walrus" existed, preying on other marine mammals and/or birds.

Fossils of the walrus were originally found in the 1980s. The large, robust size of the jaw bone, along with the sharp pointed cusps of the teeth similar to modern bone-cracking carnivores like hyenas, suggested that Pelagiarctos fed upon other marine mammals rather than the typical diet of fish as in modern walruses.

However the new fossil, a lower jaw with teeth, and more complete than the original fossil, suggests to the Otago and Wyoming paleontologists that the Pelagiarctos was more of a fish eater as it lacked adaptations for being a "killer walrus."

The evidence pointed to the tooth shape being unlikely to have been adapted for feeding upon large prey; instead it was an example of primitively retained tooth shape.

"This new find indicates that this enigmatic walrus would have appeared similar in life to modern sea lions, with a deep snout and large canines," says Mr Boessenecker. The researchers estimated Pelagiarctos to be similar in size to some modern male sea lions (about 350 kg or 770 lbs).

"However, modern pinnipeds (seals, sea lions, and walruses) of small and large body sizes are dietary generalists, and tend to have diets rich in fish -- including sea lions similar in body size to Pelagiarctos, which means that its large body size alone doesn't make Pelagiarctos an apex predator."

The new study also analysed the evolutionary relationships of Pelagiarctos for the first time, and found it to be an early sea lion-like walrus that was most closely related to another sea lion-like walrus, Imagotaria downsi, also from California.

The study was supported by a University of Otago Doctoral Scholarship, and grants from the Geological Society of America, The Paleontological Society, and a National Science Foundation EAPSI Fellowship.

PACIFIC BLUEFIN TUNA POPULATION IS 'FRACTION OF ITS 1950S SIZE'

By Bernadette Carreon
Published: 1/31/13

[PALAU] The population of the highly-prized Pacific bluefin tuna has dropped by more than 96 per cent from its estimated level in the 1950s before large scale commercial fishing began and it is unlikely to recover if fishing continues at its current intensity, according to a stock assessment.

The summary of the latest stock assessment report of the fish was released by the International Scientific Community (ISC) for Tuna and Tuna-like Species in the North Pacific Ocean on early this month (8 January).

The study analyzed catch data from 1952 to 2011, using these to model the size of the current population and how it has changed over time.

Based on the estimates, the Pacific bluefin tuna population is in serious decline because of overfishing and its population is just a fraction of what it used to be. The assessment warns that the population could crash if commercial fishing is not drastically reduced and points out that fishers are now catching mostly juvenile fish.

Gabriel Vianna, a marine researcher at the Australian Institute of Marine Science, says that the practice of excessive fishing and catching juveniles is unsustainable and that there is in an urgent need for better management.

But Sarah Shoffler, a fishery biologist from the National Oceanic and Atmospheric Administration (NOAA), United States, says that there is no solid evidence that there has been a sharp recent fall in the number of Pacific blue fin tuna that survive to maturity.

"While we are very concerned about the population, the NOAA fisheries scientists who worked on the assessment did not determine if the population is near extinction," Shoffler tells SciDev.Net.

But she says it is clear that the total weight of fish that are at a reproductive age is at or near its lowest level.

US-based campaign organization the Pew Environment Group says that measures to ensure this happens must include science-based catch limits and major cuts in juvenile bluefin catches by implementing minimum size limits across the Pacific Ocean and banning fishing in the spawning grounds. Robust monitoring and enforcement measures must also be implemented, it says.

At the last meeting of the Western and Central Pacific Fisheries Commission in December, member countries were unable to reach a consensus to limit overall catches of tuna species, particularly the big eye, and failed to ensure the long-term sustainability of the fishery.

Meanwhile, at its June meeting, sister organization the Inter-American Tropical Tuna Commission adopted the first catch limits for Pacific bluefin tuna in the eastern Pacific. This conservation measure led to the fishery's early shutdown when the limit was exceeded in August.

The full assessment report will be released in late February.

INTO THE BLUE SERENGETI

By Cheryl Lyn Dybas

"The dugout canoe does not know the depth of the water" (*Umubindi ushira uvimye*). So say the Hangaza, a group of more than 150,000 people who live along Lake Victoria, west of Tanzania's Serengeti National Park. The proverb rings true: floating on the water won't tell you what is going on below. Half a world away from Tanzania, along the United States West Coast, oceanographers are finding new ways of looking beneath research vessels that ply the Pacific. They're getting a fish's eye view of the deep by placing electronic tags on predators such as blue whales and California sea lions, yellowfin tuna and white sharks. As the data come in, their thoughts turn to the Serengeti.

Their project is called Tagging of Pacific Ocean Predators (TOPP). It focuses on certain areas of the Pacific, among them the California Current, an undersea river of water that flows south along the western coast of North America, beginning off British Columbia and ending near Baja California. The current supports large populations of whales and seabirds, and fuels important fisheries. Its productivity comes from an upwelling of cold subsurface waters, caused by prevailing northeasterly winds. The chilly waters ferry a steady supply of nutrients to the surface. The scientists are also studying an area called the North Pacific Transition Zone, the boundary between cold subarctic water and warm subtropical water, about halfway between Hawaii and Alaska. It's a major trans-Pacific corridor for the movements of predators and prey.

"These are the oceanic areas where food is most abundant," says marine scientist Barbara A. Block of Stanford University's Hopkins Marine Station in Pacific Grove, California. "They're the savanna grasslands of the sea." Knowing where and when species migrate is critical information for managing and protecting ecosystems, says biologist Daniel P. Costa of the University of California, Santa Cruz. TOPP was launched in 2000 by Block and Costa along with Steven J. Bograd of the National Oceanic and Atmospheric Administration's Southwest Fisheries Science Center in La Jolla, Randall E. Kochevar of Stanford, and others. The project was part of the Census of Marine Life, a ten-year-long investigation of the diversity, distribution, and abundance of ocean species. TOPP became the world's largest "biologging" (electronic tagging) study, involving more than seventy-five biologists, oceanographers, engineers, and computer scientists in eight countries. A decade of findings were reported in the journal *Nature* in June 2011. They reveal that the migrations of twenty-two marine species overlap.

"It's been like looking across the entire African savanna," says Block, "and trying to figure out: Where are the watering holes a zebra or a cheetah might frequent? Where are the fertile valleys? Where are the deserts that animals might avoid, and the migratory corridors species such as wildebeest use to travel from place to place?"

Block, Costa, and their colleagues use an array of technologies to track species and to record such environmental variables as water temperature, salinity, and depth. The TOPP project alone deployed 4,306 satellite-monitored tags, yielding a massive amount of data. Scientists spent two years synthesizing data sets. They discovered intersecting ocean hotspots and highways of life—and learned much about how marine conditions influence where animals hang out.

The results show that many migratory marine species, like animals on the Serengeti grasslands, return to the same regions each year, homing in with astonishing fidelity to the places where they were first tagged. "It's akin to a student from London studying in far-off Rome and coming home each summer at the same moment—but doing it all in the dark without a map or compass, using only his or her internal sense of position and direction," says Costa.

Leatherback sea turtles, for example, travel huge distances between their nesting and feeding sites. In the Pacific Ocean, contingents from two populations of leatherbacks make their way each year to beaches along the eastern and western Pacific, respectively, to lay eggs. (An individual female will nest once every two or three years.) Helen Bailey of the University of Maryland Center for Environmental Science placed tracking devices on 135 leatherbacks' shells. Leatherback turtles in the eastern Pacific were tagged at their nesting sites in Costa Rica and Mexico; western Pacific turtles were tagged at nesting sites in Indonesia and on their foraging grounds off the coast of California. The instruments transmitted satellite signals each time the turtles surfaced.

The results of Bailey's study were published in the April 2012 issue of *Ecological Applications*. The western Pacific turtles traveled to feeding sites in the South China Sea, Indonesian seas, southeastern Australia, and the U.S. West Coast. "This wide dispersal," says Bailey, "allows for a greater likelihood of finding food. It also means that the turtles are more vulnerable to being snagged unintentionally in fishing gear."

The eastern Pacific leatherbacks have a different migration pattern, traveling south from nesting sites in Mexico and Costa Rica to the southeast Pacific. The turtles feed in offshore upwelling areas where their meals, almost exclusively jellyfish, are easy catches. "The limited feeding grounds of the east Pacific turtles make them vulnerable to changes that might occur in the abundance of jellyfish," says Bailey. "Being caught in fishing gear also poses a greater risk to this population because it has a smaller range than western Pacific leatherbacks." Entanglement in fishing gear is believed to be a major cause of death in leatherback sea turtles. James R. Spotila of Drexel University, a co-author of the paper, notes that leatherback turtles are long-lived animals that take a long time to reach maturity. Because the species' numbers are declining very fast, he considers it critical to take measures so they don't go extinct. In the past thirty years, leatherback numbers in the eastern Pacific have dropped by 90 percent. Information on the turtles' movements will help scientists determine where fishing should be limited at certain times of the year, says Bailey. A good precedent is a decision made in 2010 to close a swordfish and thresher shark fishery off California from mid-August to mid-November. That may have dramatically reduced incidental leatherback catches.

To read more, visit: http://www.naturalhistorymag.com/features/242338/into-the-blue-serengeti

Photo by Mike Johnson

SIGHTINGS Compiled by Monterey Bay Whale Watch.
For Complete listing and updates see gowhales.com/sighting

Date	#	Type of Animal(s)
2/5 a.m.	4	Gray Whales
	1	Blue Whale
	400	Long-beaked Common Dol phins
2/4 p.m.	15	Gray Whales
	400	Long-beaked Common Dol phins
2/4 a.m.	13	Gray Whales
	400	Long-beaked Common Dol phins
2/2 p.m.	6	Gray Whales
	600	Long-beaked Common Dol phins
2/2 a.m.	7	Gray Whales
2/2 early a.m.	3	Gray Whales
	60	Risso's Dolphins
2/1 a.m.	14	Gray Whales
1/31 p.m.	9	Gray Whales
	400	Pacific White-sided Dolphins
1/31 a.m.	6	Gray Whales
	75	Long-beaked Common Dol phins
1/30 a.m.	6	Gray Whales
	300	Long-beaked Common Dol phins
	45	Risso's Dolphins
1/26 a.m.	2	Gray Whales
1/25 a.m.	6	Gray Whales
	50	Risso's Dolphins
1/24 a.m.	11	Gray Whales
	6	Pacific White-sided Dolphins
	12	Risso's Dolphins
1/23 p.m.	28	Gray Whales
	100	Long-beaked Common Dol phins
	50	Risso's Dolphins
1/23 a.m.	13	Gray Whales
	200	Long-beaked Common Dol phins
	60	Risso's Dolphins
1/22 p.m.	20	Gray Whales
	60	Long-beaked Common Dol phins
1/22 a.m.	19	Gray Whales
	60	Long-beaked Common Dol phins
1/21 p.m.	2	Gray Whales
	2	Killer Whales (transient type - Stubby & Fat Fin)
	1	Blue Whale
	150	Risso's Dolphins
1/21 a.m.	22	Gray Whales
	1	Killer Whale (transient type - George=CA65)
	220	Risso's Dolphins
1/20 p.m.	27	Gray Whales
1/20 a.m.	26	Gray Whales
1/20 early a.m.	20	Gray Whales
1/19 p.m.	32	Gray Whales
	2	Killer Whales (Stubby & Fat Fin)
	35	Risso's Dolphins
1/19 a.m.	27	Gray Whales
	250	Risso's Dolphins
1/19 early a.m.	21	Gray Whales
	200	Risso's Dolphins
1/18 p.m.	35	Gray Whales
1/18 a.m.	20	Gray Whales
1/17 p.m.	40	Gray Whales
	30	Risso's Dolphins
1/17 a.m.	38	Gray Whales
1/16 a.m.	15	Gray Whales
	12	Long-beaked & Short-beaked Common Dolphins
1/15 p.m.	2	Killer Whales
	100	Long-beaked Common Dol phins
1/15 a.m.	19	Gray Whales
	20	Risso's Dolphins
1/13 p.m.	10	Gray Whales
	15	Risso's Dolphins
1/13 a.m.	31	Gray Whales
	10	Risso's Dolphins
1/12 p.m.	5	Killer Whales (same whales, still very active)
1/12 a.m.	5	Gray Whales
	5	Killer Whales (very active, breaching & hunting, with juveniles learning to hunt prey)
1/12 early a.m.	2	Gray Whales
1/8 a.m.	15	Gray Whales
	20	Risso's Dolphins
1/7 p.m.	16	Gray Whales
	20	Risso's Dolphins
1/7 a.m.	20	Gray Whales
	20	Pacific White-sided Dolphins
	300	Risso's Dolphins (including calves)
1/6 a.m.	5	Gray Whales
	25	Pacific White-sided Dolphins
	300	Risso's Dolphins
1/5 p.m.	20	Gray Whales (1 breaching)
1/5 a.m.	23	Gray Whales
	100	Pacific White-sided Dolphins
	5	Northern Right Whale Dolp hins
1/4 p.m.	9	Gray Whales
	50	Risso's Dolphins
1/4 a.m.	12	Gray Whales
1/3 p.m.	10	Gray Whales
	50	Pacific White-sided Dolphins
	200	Risso's Dolphins

American Cetacean Society
Monterey Bay Chapter
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Soundings

American Cetacean Society- Monterey Bay Chapter
PO Box H E, Pacific Grove, CA 93950

March 2013

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 28, 2013 Time: 7:30 PM.
PLEASE JOIN US AT 7:00 FOR REFRESHMENTS

Speaker: Virginia Bria and Art Haseltine
Subject: Diving with Beluga Whales

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In July 2011, Virginia Bria, Art Haseltine, and three other intrepid divers ventured to the town of Churchill, Canada – on the shores of Hudson Bay. Their primary goal was to take underwater photographs of the white beluga whales (ghosts of the sea). Their presentation will show the results of this underwater photographic challenge. Additionally, they will share an overview of Churchill, Hudson Bay, polar bears, dog sledding, and an excursion onto the subarctic tundra.

Virginia Bria has studied art and photography at Pratt Institute, NY. A lifelong passion for photography and the marine environment lead naturally to diving and underwater photography. Viginia's photos are used by several environmental NGOs, and she is past president of the Northern California Underwater Photographic Society. Virginia travels extensively, and resides in Marin County, California. (www.bellasirenaimages.com)

Art Haseltine is a marine biologist and underwater photographer. He is retired from the California Department of Fish and Game, where he worked with shellfish aquaculture on the Big Sur coast. Art makes black-and-white prints of underwater marine life while remaining loyal to the west coast tradition of fine-art photography. The white beluga whales have been high on his bucket list. Art has lived in Carmel since 1969. (www.fotosea.com)

CALENDAR

Every Monday in April: Viva Vaquita benefit at Hula's Island Grill, 622 Lighthouse Ave, Monterey. 10% of all purchases benefits the most endangered vaquita porpoise. Open at 4 on April 1,8,15, 22 & 29.vivavaquita.org

April 20-21: Moss Landing Marine Lab Open House 2013. Activities will include lectures, demonstrations, open labs, arts and crafts, puppet shows, SLEWTHS sea lion demo, and much more. For a complete schedule of activities go to www.mlml.calstate.edu/

April 27: Monterey Bay National Sanctuary 2013. Sanctuary Currents Symposium. "Change: Observations on the Shifting Ecology of the Sanctuary." California State University Monterey Bay

June 24-30: Marine Mammal Courses at Moss Landing Marine Laboratory. Techniques and Theories of Animal Training. Bio 348 . For a complete class description and further info please contact Dr. Jenifer A. Zeligs at: slewths.mlml.calstate.edu/

June 29, 9am-1:30pm: ACS Monterey Bay Chapter Summer Whale Watch Fundraiser. "Searching For Natures Giants." We will be searching the biggest animal to have ever lived, the Great Blue Whale. We will also be searching for humpback, fin, minke, and killer whales. Albatross and numerous seabirds are also likely to be encountered.
For reservations and Info call: 831-901-7259

July 18-24: Marine Mammal Courses at Moss Landing Marine Laboratory. Working With Marine Mammals: Bio 347. For a complete class description and further info please contact Dr. Jenifer A. Zeligs at: slewths.mlml.calstate.edu/**G**

GENETIC STUDY PURSUES ELUSIVE GOAL: HOW MANY HUMPBACKS EXISTED BEFORE WHALING?
From Science Daily
Published: 2/13/13

Scientists from Stanford University, the Wildlife Conservation Society, the American Museum of Natural History, and other organizations are closing in on the answer to an important conservation question: how many humpback whales once existed in the North Atlantic?

Building on previous genetic analyses to estimate the pre-whaling population of North Atlantic humpback whales, the research team has found that humpbacks used to exist in numbers of more than 100,000 individuals. The new, more accurate estimate is lower than previously calculated but still two to three times higher than pre-whaling estimates based on catch data from whaling records.

Known for its distinctively long pectoral fins, acrobatics, and haunting songs, the humpback whale occurs in all the world's oceans. Current estimates for humpback whale numbers are widely debated, but some have called for the level of their international protection to be dropped.

The study appears in the recently published edition of Conservation Genetics. The authors include: Kristen Ruegg and Stephen Palumbi of Stanford University; Howard C. Rosenbaum of the Wildlife Conservation Society and the American Museum of Natural History; Eric C. Anderson of the National Marine Fisheries Service and University of California-Santa Cruz; Marcia Engel of the Instituto Baleia Jubarte/ Humpback Whale Institute, Brazil; Anna Rothschild of AMNH's Sackler Institute for Comparative Genomics; and C. Scott Baker of Oregon State University.

"We're certain that humpback whales in the North Atlantic have significantly recovered from commercial whaling over the past several decades of protection, but without an accurate size estimate of the pre-whaling population, the threshold of recovery remains unknown," said Dr. Kristen Ruegg of Stanford University and the lead author of the study. "We now have a solid, genetically generated estimate upon which future work on this important issue can be based."

"Our current challenge is to explain the remaining discrepancy between the historical catch data and the population estimate generated by genetic analyses," said Dr. Howard Rosenbaum, study co-author and Director of the Wildlife Conservation Society's Ocean Giants Program. "The gap highlights the need for continued evaluations of

whale populations, and presents new information informing the debate and challenges associated with recovery goals."

"We have spent a great deal of effort refining the techniques and approaches that give us this pre-whaling number," said Dr. Steve Palumbi of Stanford. "It's worth the trouble because genetic tools give one of the only glimpses into the past we have for whales."

Reaching some 50 feet in length, the humpback whale was hunted for centuries by commercial whaling fleets in all the world's oceans. Humpbacks had predictable migration routes and were reduced to several hundred whales in the North Atlantic. The global population was reduced by possibly 90 percent of its original size. The species received protection from the International Whaling Commission in North Atlantic waters in 1955 due to the severity of its decline.

Since that time, the humpback whales of the North Atlantic have made a remarkable comeback; experts estimate the current size of the North Atlantic's humpback whale population to be more than 17,000 animals. North Atlantic humpback whales are now one of the best-studied populations of great whales in the world and the mainstay of a multi-million dollar whale-watching industry.

But estimating the number of whales that existed prior to commercial whaling is a far more difficult problem, critical in determining when the total population has recovered. Historical catch data from the logs of whaling vessels suggest a population size between 20,000-46,000 whales, but the current genetic analysis indicates a much larger pre-whaling population. The results of the genetic analysis indicate that the North Atlantic once held between 45,000 -- 235,000 humpback whales (with an average estimate of 112,000 animals).

A previous study using the mitochondrial DNA of humpbacks in the North Atlantic suggested a higher pre-whaling population size; an average of 240,000 individuals. To increase the accuracy of the current analysis, the team measured nine segments in the DNA sequences throughout the genome (as opposed to just one DNA segment used in the previous study).

Palumbi, who participated in the first humpback genetic analysis, added: "The International Whaling Commission reviewed the results of the first study and recommended we improve the method in six specific ways. We've done that now and have the best-ever estimate of ancient humpback populations."

Scott Baker, Associate Director of Oregon State University's Marine Mammal Institute and a co-author said: "These genetic estimates greatly improve our understanding of the genetic diversity of humpback whales, something we need to understand the impact of past hunting and to manage whales in the uncertain future."

The research team analyzed genetic samples from whales in the North Atlantic as well as the Southern Hemisphere. Southern Atlantic whales were used to answer one of the six IWC questions: was there intermixing of whale populations across the equator? The samples were analyzed by sequencing specific regions of DNA in known genes. By comparing the genetic diversity of today's population to the genetic mutation rate, Ruegg and colleagues could estimate the long-term population size of humpbacks. They also showed no substantial migration of humpbacks whales across the Equator between the Southern and Northern Atlantic, and no movement from the Pacific to the Atlantic. The team recently used the same techniques to estimate pre-whaling numbers for the Pacific gray whale and the Antarctic minke whale. A difference of two to three times also was recorded between the genetic and catch estimates for the grey whale population, but were exactly on target for the Antarctic minke whale, which has not been extensively hunted.

This work was supported by a grant from the Lenfest Ocean Program.

FOSSILS REVEAL FOUR NEW SPECIES OF ANCIENT WHALES

By Breanna Draxler
Published: 2/19/13

Paleontologists in California announced this week that fossils excavated in the early 2000s represent four new species of ancient whales. The toothed baleen whales apparently

stuck around longer than scientists once thought, and they may hold clues about how and when whales evolved from toothy giants to the baleen-equipped beasts we see today.

It all began with a road-widening project that was slowly making its way through a rock outcrop in California's Laguna Canyon in 2000. During such construction work the state requires paleontologists to be on site just in case they stumble upon something interesting. In this case they found something interesting indeed: hundreds of exciting fossilized sea creatures, 30 whale skulls among them.

Four new species of whale were among the findings that paleontologist Meredith Rivin presented at the AAAS annual meeting on Sunday, as reported by ScienceNow. The whale bones date back 17 to 19 million years, upending scientists' previously held theory that these species were extinct five million years prior.

Rivin said these fossils represent the most recent known whales that still had teeth, as opposed to the baleen we see in whales' mouths today. These newfound species are not a direct ancestor of modern whales, but they are part of the same suborder and were probably contemporaries of baleen whales' predecessors.

The California find wasn't the first time scientists happened upon fossilized whale skeletons during road construction, either. In a similarly fortuitous find along Chile's Pan-America highway in 2001, crews were excavating an ancient shallow Chilean tidal flat when they came across 45 whale skeletons.

Since the highway crew was anxious to move forward with construction, the scientists digitized the fossils in place to create 3-D models of the skeletons before they were paved over.

"This is one of those examples of a technological answer to a scientific question," said Nick Pyenson, one of the researchers with the Smithsonian National Museum of Natural History, in a AAAS press conference on Sunday. "This is, I think, in many ways, the next big thing for being able to document the natural world."

CALIFORNIA'S LEATHERBACKS DECLINING BY 6 PERCENT PER YEAR

By Teri Shore
Published: 2/26/13

Western Pacific leatherback sea turtles that feed on jellyfish along the U.S. West Coast are part of a population that continues to slide toward extinction. New science published today chronicles a massive 78 percent decline in the number of leatherback nests between 1984 and 2011 at a key nesting beach in Indonesia.

Researchers from the University of Alabama working with Indonesian researchers predicted that the leatherbacks could go extinct in 20 years if new conservation measures are not immediately implemented. About 75 percent of Western Pacific leatherbacks nest on the Bird's Head Peninsula in Papua, Indonesia. Anywhere from 100 to 300 swim the California coast every year,
about 16 percent of the population, according to recent estimates.
The sea turtles need full protection of nesting beaches as well as protection from longline, drift gillnet and other commercial fisheries that snag and kill them in the Pacific Ocean.

The new science provides additional evidence for not allowing swordfish gillnetters along the California coast to fish in the Pacific Leatherback Conservation Area, which would increase captures of these disappearing turtles. The Pacific Fishery Management Council will vote on whether to allow drift gillnetters to capture leatherbacks as bycatch when fishing for swordfish along the California coast at its March 10 meeting in Tacoma, Washington.

GREAT WHITE SHARKS OFF CALIFORNIA GAIN MORE PROTECTION

By Steve Gorman
Published: 3/1/13

Great white sharks off the coast of California gained new protection on Friday as regulations took effect designating them candidates for listing under the state's Endangered Species Act.

The world's largest predatory fish, whose fossil record by some estimates dates back some 16 million years, has been off-limits to commercial and sport fishing under California law since 1994.

But great whites, particularly as juveniles, are still snared as unintentional "bycatch" in gill-net fishing for halibut, swordfish and white sea bass off California and Mexico's Baja Peninsula. Such bycatch, or also known as incidental taking, has been unrestricted.

Under the sharks' new status, gill-net fishermen will be required to obtain special state permits to allow bycatch of great whites but on a restricted basis.

The permits are likely to entail limits on the amount of time gill-nets can be in the water, where they can be placed and how many sharks can be caught before fishing is ordered halted, state Fish and Wildlife Department biologist Traci Larinto said.

Violations would be treated as criminal misdemeanors, but it was not yet clear what penalties such an offense would carry.

Before Wednesday, there were no limits on bycatch and no penalties for incidental killing of great whites, though fishermen were supposed to throw surviving sharks back or turn them over to scientists studying the species.

The five-member California Fish and Game Commission voted unanimously on February 6 to name the great white shark as the first marine animal granted candidate designation under the state Endangered Species Act.

If formally listed, fishery management bodies would be required to develop measures to minimize bycatch. In the meantime, candidate status carries the same legal force as an actual listing.

The panel acted after environmental groups presented data collected in 2011 and 2012 showing adults and sub-adults of the species numbering fewer than 340 in two principal feeding grounds off central California and Baja.

The survey, the first tally of great whites along the U.S. Pacific Coast, provided no comparison numbers.
Commercial fishing industry groups have questioned whether the tally, which may seem small, might actually reflect a healthy number for an apex marine predator, and whether it represents a growing or shrinking population.

Larinto cited recent data suggesting that more than half of young great whites snared in gill-nets survive. Of 94 caught inadvertently and turned over to scientists between 2006 and 2011, 55 were later released alive, most with research tags.

She said those figures probably represent the majority of great white bycatch off California south of Santa Barbara.

Zeke Grader, a spokesman for the Pacific Coast Federation of Fishermen's Associations, said fishermen and environmentalists share an interest in keeping great white populations healthy since they are vital to maintaining a balanced marine environment.

For instance, great whites are important in controlling the population of sea lions and other marine mammals that prey on salmon and other commercially valuable fish, Grader said.

Scientists consider the West Coast population of the shark to be genetically distinct and isolated from other great whites worldwide, thought to number several thousand off Australia, South Africa, New Zealand and in the Atlantic Ocean. Australia and South Africa have listed their great whites as endangered.

The Fish and Wildlife Department will recommend by next February whether great whites warrant formal listing, with the Fish and Game Commission making the final decision. Environmental groups also seek to list California's great whites under the U.S. Endangered Species Act.

While the great white is among three shark species most associated with attacks on humans - along with bull sharks and tiger sharks - such encounters are exceedingly rare. But great whites hold a special place in the popular imagination due mainly to their size, with some specimens known to have reached 20 feet in length and 5,000 pounds (2,268 kilograms).

FRED BENKO: 1939-2013

GREAT CAPTAIN OF THE *CONDOR EXPRESS*, FOUNDER OF SEA LANDING

By Hillary Hauser
Published: 3/8/13

Fred Benko — who built the Sea Landing center on the waterfront and captained the Condor and Condor Express to fame as the best whale-watching boats in the world — died Thursday morning, and it is impossible to think of the Santa Barbara Harbor without him. He was 73 years old.

It's also hard to think that Captain Fred won't be around all the numerous nonprofit events he attended and supported with his longtime wife, Hiroko. "Hello, you beautiful woman!" he'd say — to every woman — and, to his friends and acquaintances and fishermen and philanthropists alike, he'd give a strong handshake, a grin, and unique pleasantness.

Though a salty character most known for his association with the sea and the harbor, Fred was also a serious singer who toured Europe and helped form the Santa Barbara Civic Light Opera. He got his start at the age of 8 as a soprano in a boys' choir, performing at St. Paul's Episcopal Church in Akron, Ohio. He was paid a quarter for each rehearsal. He sang in Handel's Messiah, and did a lot of Bach — "Remember," he once said, "this was an Episcopalian church."

By the time he wrapped it up with the boys' choir at the age of 14, Benko had gone from soprano to bass, but he quit singing to play football. He once said his real singing got its start in the Marine Corps, but then he "got into the wrong crowd" and spent a couple of years on the beaches of North and South Carolina, Georgia, and elsewhere, "running around with a guitar and singing for beer."

He eventually landed in Washington, D.C., performing at the Cellar Door in Georgetown and, after that, the Bitter End in New York City. In 1963, he toured Europe as a solo act in a U.S. Food and Agriculture exhibition of American music. He was about to perform in Amsterdam when John F. Kennedy was assassinated. "They loaded us on a plane the next morning and brought us home," Benko recalled.

He met his first wife on that plane and ditched singing to become a corporate salesman as well as a father to a son, Matt, and daughter, Dody. During one of his West Coast trips, he discovered Santa Barbara and gave up sales for fishing. The Santa Barbara Harbor became his home.

In 1973, Captain Fred founded a charter service on the breakwater side of the harbor, where he moored the Hornet and other boats that took people sport fishing, out to the Channel Islands, and on evening coastal cruises. (From the beach, you could hear his party cruises from very far away!)

When Fred's business was moved to the other side of the harbor, he wasn't so happy about it and worried that he'd lose business because all the tourists were on the breakwater, not "way over there." But away he went, to the other side, where he established Sea Landing with its own building and series of docks for his sport fishing boats Hornet, Island Fox, and Sea Hawk, which were moored next to an impressive fleet of dive boats and the original Condor, built in 1979. Many a boat captain today will say they got their training, sea legs, and love of the sea from Fred Benko.

In 1985, Captain Fred sold his boats and the Sea Landing itself to Glen Fritzler so that he could go into whale watching full-time. When submarine blasting was halted in the Santa Barbara Channel, the whales — grays, humpbacks, finbacks, and even the majestic blues — began to come back. Fred took the greatest pride in saying that anyone who wanted a near-guarantee to see a blue whale came to Santa Barbara for that purpose — and they did come from all over, including Japan, Germany, and Australia.

In 2002, Fred launched the new, modern Condor Express, and his business became even more renowned. Mat Curto, who came to work for Benko in 1995, became operations manager for the Condor Expresscruise business, giving Fred more time to talk to people about marine life.

A few of us remembering Captain Fred now will see him in our minds' eye as Dick Deadeye in the Civic Light Opera performance of Gilbert and Sullivan's H.M.S. Pinafore at the Lobero Theatre. At the time, we all thought he'd been typecast: the villainous pirate with the black eyepatch. "He's an ugly son-of-a-gun, and he has bad habits," said Benko of the role, with a big laugh. "He has a pessimistic attitude, so the crew hates him. At one point, they throw him overboard, but he crawls back on board again."

Ah, Fred! You have gone to the Great Overboard in the Sky, and you're not going to crawl back on board again. What can we do but wish you a bon voyage and hopes that your sailing is peaceful. We give our love to Matt and Dody, your sisters Kathy and Diane, your mother Dorothy (oh, those bridge games we played!), and of course Hiroko, who voyaged by your side as your wife for 29 years.

Hillary Hauser, a pianist as well as executive director of Heal the Ocean, once provided piano accompaniment for Fred's private solo performance of Schubert's "Ave Maria."

SIGHTINGS Compiled by Monterey Bay Whale Watch.
For Complete listing and updates see gowhales.com/sighting

Date	#	Type of Animal(s)
3/5 a.m.	11	Gray Whales
	300	Long-beaked Common Dolphins
	15	Risso's Dolphins
3/4 p.m.	6	Gray Whales
3/4 a.m.	8	Gray Whales
	1	Humpback Whale (breaching)
	200	Pacific White-sided Dolphins
3/3 p.m.	1	Gray Whale
	2	Humpback Whales
3/3 a.m.	4	Gray Whales
	2	Humpback Whales
	5	Pacific White-sided Dolphins
	150	Risso's Dolphins
3/2 p.m.	2	Humpback Whales
3/2 a.m.	2	Gray Whales
	2	Humpback Whales
	200	Pacific White-sided Dolphins
	100	Risso's Dolphins
3/2 early a.m.	20	Gray Whales
	2	Humpback Whales
	200	Pacific White-sided Dolphins
3/1 p.m.	3	Gray Whales
	2	Humpback Whales
	5	Risso's Dolphins
3/1 a.m.	2	Humpback Whales
2/27 p.m.	1	Gray Whale
	100	Pacific White-sided Dolphins
	15	Long-beaked Common Dolphins
	3	Risso's Dolphins
2/27 a.m.	14	Gray Whales
2/25 p.m.	6	Gray Whales
2/25 a.m.	9	Gray Whales
2/24 p.m.	2	Gray Whales
2/24 a.m.	4	Gray Whales
	2	Killer Whales
	100	Common Dolphins
2/23 a.m.	2	Killer Whales (Stubby & Fat Fin)
	200	Long-beaked Common Dolphins
2/22 a.m.	2	Gray Whales
2/21 p.m.	3	Gray Whales
2/21 a.m.	3	Gray Whales
	100	Long-beaked Common
2/19 a.m.	1	Humpback Whale
2/18 p.m.	12	Gray Whales (9 Southbound, 3 Northbound)
2/18 a.m.	3	Gray Whales (Northbound!)
	20	Pacific White-sided Dolphin
2/17 p.m.	4	Gray Whales
2/17 a.m.	2000	Long-beaked Common Dolphins
	50	Risso's Dolphins
2/17 early a.m.	1200	Long-beaked Common Dolphins
2/16 p.m.	15	Gray Whales
	45	Long-beaked Common Dolphins
	70	Risso's Dolphins
2/16 a.m.	2	Gray Whales
	2	Humpback Whales
	75	Long-beaked Common Dolphins
	60	Risso's Dolphins
2/16 early a.m.	2	Humpback Whales
	500	Pacific White-sided Dolphins
2/15 p.m.	12	Gray Whales
	40	Long-beaked Common Dolphins
2/15 a.m.	9	Gray Whales
	400	Long-beaked Common Dolphins
	25	Risso's Dolphins
2/14 p.m.	14	Gray Whales
	300	Long-beaked Common Dolphins
	40	Risso's Dolphins
2/14 a.m.	30	Gray Whales
	4	Blue Whales
	2	Killer Whales
	1	Fin Whale
	200	Risso's Dolphins
2/13 a.m.	7	Gray Whales
	1	Humpback Whale
	1	Blue Whale
	150	Risso's Dolphins
2/12 p.m.	3	Blue Whales
	1	Fin Whale
2/12 a.m.	15	Gray Whales
	3	Blue Whales
2/11 p.m.	3	Gray Whales
	3	Blue Whales
2/11 a.m.	2	Gray Whales

American Cetacean Society
Monterey Bay Chapter
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kmarypaul@gmail.com

Soundings

American Cetacean Society- Monterey Bay Chapter
PO Box H E, Pacific Grove, CA 93950

April 2013

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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, April 25, 2013 Time: 7:30 PM.

PLEASE JOIN US AT 7:00 FOR REFRESHMENTS

Speaker: Bryant Austin
Subject: Connecting Humanity with the Greatest Minds in the Water

Bryant Austin is an experimental multi-media artist whose life-long passion has been exploring the depths of possibility in connecting humanity with the greatest minds in the water. His journey and challenge to recreate the transcendent sensation one experiences floating an arm's length away from the eye of an inquisitive whale, has compelled him to create breath-taking photo mosaics at "whale scale"- both in terms of size and in the level of detail witnessed in 'real life'.

Austin's body of work represents the largest and most detailed photographs of whales in the world. His photographs have been met with international acclaim, and has been received enthusiastically during exhibits worldwide, including shows in Norway and Japan – countries that continue to hunt whales.

Austin's talk will begin with the journey to follow the inspiration given to him by two whales, and the external and personal challenges he had to overcome to document and share these creatures on their scale. He will share stories about his incredible experiences photographing whales and about his extensive work in Norway and Japan. He offers insights to the overwhelmingly positive responses both from the public and from the media in these countries and how it has provided him with a glimpse into the potential for positive change with the simple act of making a whale truly visible. He concludes with a message of hope; knowing that with sufficient time and care, it is possible to connect humanity with the greatest minds in the water.

CALENDAR

Every Monday in April: Viva Vaquita benefit at Hula's Island Grill, 622 Lighthouse Ave, Monterey. 10% of all purchases benefits the most endangered vaquita porpoise. Open at 4 on April 1,8,15, 22 & 29.vivavaquita.org

April 19, 12-1pm: Hopkins Marine Station Seminars. "The Singing Planet: Chronic Noise Impacts on the Acoustic Ecology of Great Whales." Chris Clark, Cornell University

April 26, 12-1pm: Hopkins Marine Station Seminars. "Leveraging Leopold: An Evaluation of the Global Opportunity to Expand Terrestrial into Marine Protection." Caleb McClennen, Wildlife Conservation Society

April 20-21: Moss Landing Marine Lab Open House 2013. Activities will include lectures, demonstrations, open labs, arts and crafts, puppet shows, SLEWTHS sea lion demo, and much more. For a complete schedule of activities go to www.mlml.calstate.edu/

April 27: Monterey Bay National Sanctuary 2013. Sanctuary Currents Symposium. "Change: Observations on the Shifting Ecology of the Sanctuary." California State University Monterey Bay

May 3, 12-1pm: Hopkins Marine Station Seminars. "Underwater Eden: Saving the Last Coral Wilderness on Earth." Greg Stone, Conservation International

May 20-23: 64th Tuna Conference. "Back to Biology: the Role of Life History Characteristics in Tuna Stock Assessments." Lake Arrowhead, CA

June 1, 9am-12pm: Saturday Workshop for Beginners. "Drawing the Sea." Local naturalist and artist Kate Spencer will assist in teaching with drawing and watercolor to illustrate the sea and its life forms. Register at: hopkins.stanford.edu/workshops

June 24-30: Marine Mammal Courses at Moss Landing Marine Laboratory. Techniques and Theories of Animal Training. Bio 348 . For a complete class description and further info please contact Dr. Jenifer A. Zeligs at: slewths.mlml.calstate.edu/

June 29, 9am-1:30pm: ACS Monterey Bay Chapter Summer Whale Watch Fundraiser. "Searching For Natures Giants." We will be searching the biggest animal to have ever lived, the Great Blue Whale. We will also be searching for humpback, fin, minke, and killer whales. Albatross and numerous seabirds are also likely to be encountered. For reservations and Info call: 831-901-7259

July 18-24: Marine Mammal Courses at Moss Landing Marine Laboratory. Working With Marine Mammals: Bio 347. For a complete class description and further info please contact Dr. Jenifer A. Zeligs at: slewths.mlml.calstate.edu/

BOOK RECOMMENDATIONS

The Bonobo and the Atheist: In Search of Humanism Among the Primates
Frans De Waal

Beautiful Whale: Text and Photography
Bryant Austin

Letters To A Young Scientist
Edward O. Wilson

Last Ape Standing: The seven Million Year Story of How and Why We Survived
Chip Walter

After the Grizzly: Endangered Species and the Politics of Place in California
Peter S. Alagona

BLUE WHALE NAMED IN HONOR OF FRED BENKO

From Cascadia Research
Published: 3/14/13

This distinctive blue whale was named "Fred Benko" by Cascadia Research in honor of Fred's passion, devotion, and contribution to the appreciation of blue whales. This whale was chosen for Fred because of its frequent sightings in the Santa Barbara Channel going back many years and also sightings off Baja California, another area Fred like to go to fish.

Originally given the much less colorful identification of 1139 by Cascadia and BB#229 and CICI#590 by Mexican researchers, this whale has been positively identified over 30 times going back to the earliest identification in 1991. Sightings have been in the winter-spring in the southern Sea of Cortez and in the summers off California primarily in the Santa Barbara Channel, but as far south as San Diego and north to the Gulf of the Farallones. With the frequent sightings in the Santa Barbara Channel starting in 1992 and through the 1990s and the early 2000s when Fred was frequently the captain of the Condor and then the Condor Express, there is no doubt that the two of them came across each other many times. Fred supported blue whale photo-identification research by inviting researchers on board the Condor and Condor Express to take photographs. John Calambokidis fondly recalls Fred's help in his early research in the Santa Barbara Channel in the early 1990s when he would invite John to stop by the Condor so he could talk to the passengers (Fred would have the galley prepare food for him since he knew John tended to forget to bring food). Fred always wanted to learn the latest research on blue whales both to satisfy his own curiosity as well as to share with his passengers. He would never miss a chance to host a gathering at his house to hear about the latest information. This whale will be particularly easy to follow because like Fred, this whale has a distinctive look. It has an almost white dorsal fin and some small dark scars indicative of a killer whale attack at an early age (apparent in the photograph taken 26 June 2005 in the Santa Barbara Channel).

RISK TO ENDANGERED WHALES FROM SHIPS IN SOUTHERN CALIFORNIA ANALYZED IN NEW STUDY

From Science Daily

Published: 3/25/13

Researchers have identified areas off southern California with high numbers of whales and assessed their risk from potentially deadly collisions with commercial ship traffic in a study released today in the scientific journal Conservation Biology.

Scientists from NOAA Fisheries, the Marine Mammal Commission and Cascadia Research Collective analyzed data collected over seven years by NOAA on marine mammal and ecosystem research surveys in the Southern California Bight. Maps predicting the density of endangered humpback, fin and blue whales were developed by merging the observed whale sightings with oceanographic conditions to identify the habitat preferred by the different whale species.

"We know several endangered species of whales occur in the waters off southern California," said Jessica Redfern, a NOAA Fisheries marine mammal biologist and lead author of the paper. "What we didn't know, and what this study helps provide, is an understanding of the areas with the highest numbers of whales."

Knowing where whales are more likely to be found in the ocean environment is vitally important to reduce human impacts. Although this information could be used to assess any number of human impacts, the study specifically looked at current and alternative shipping routes to and from the Ports of Los Angeles and Long Beach and the risk to humpback, fin and blue whales from ship strikes. Researchers selected four routes to study; the shipping route in the Santa Barbara Channel, which is the current shipping route; a Central route south of the northern Channel Islands; a Central Fan route, or just the eastern part of the Central route; and a Southern route, a course south of the Central route and constrained by the protected areas around Santa Barbara, Santa Catalina, and San Nicolas Islands.

Researchers have identified areas off southern California with high numbers of whales and assessed their risk from potentially deadly collisions with commercial ship traffic in a new study. (Credit: John Calambokidis of Cascadia Research)

By overlaying the routes with the predicted whale densities, researchers found the route with the lowest risk for humpback whales (Southern route) had the highest risk for fin whales and vice versa. However, risk may be ameliorated for both species in one of the Central routes. Blue whales, however, were at approximately equal risk in all routes considered because of their more even distribution throughout the study area. The authors' estimate of the number of blue whales likely killed by ships exceeds levels established by the Marine Mammal Protection Act to ensure sustainable populations. This result suggests that it is important to find ways to reduce the risk of ships striking blue whales.

"The Southern California Bight is an incredibly complex system with a diverse set of users, including the military, shipping industry and fishing industry. All users have specific needs and their input is necessary to plan the best and safest uses of these waters," said Redfern, "This paper helps to incorporate whale habitat use in the planning process so that their needs can be considered as well."

SATELLITE TAGGING MAPS THE SECRET MIGRATION OF WHITE SHARKS

From Science Daily

Published: 4/4/13

Long-life batteries and satellite tagging have been used to fill in the blanks of female white sharks' (Carcharodon carcharias) lifestyles. Research published in the launch edition of BioMed Central's open access journal Animal Biotelemetrydefines a two year migratory pattern in the Pacific Ocean. Pregnant females travel between the mating area at Guadalupe Island and nursery in Baja California, putting them and their young at risk from commercial fishing.

White sharks are pelagic much of their time, living in the open ocean. However they are also philopatric, in that they return to the same place to find a mate. This commute can be far-ranging, including the Hawaiian Islands, California, and Mexico but while males have been reported returning yearly to mating sites, the behavior of females has before now been more secretive.

Dr Michael Domeier and Nicole Nasby-Lucas from the California based Marine Conservation Science Institute mapped the migration patterns of female white sharks using satellite-linked radio-telemetry tags.

Female white sharks were found to follow a two-year migration pattern with four distinct phases. Firstly the pregnant females left Guadalupe Island, Mexico and remained offshore for most of their 18 month gestation (on average 465 days). This pelagic area was much larger than the foraging area used by males and in fact the females tended to avoid the male's foraging area while the males were present.

The second phase was a two month sojourn in the coastal waters of Baja California where the sharks gave birth. After leaving the nurseries the female sharks began a migratory path back to Guadalupe Island in such a way as to avoid males until ready to reproduce. Finally the mating n phase at Guadalupe Island lasted up to four and a half months before the two year cycle began again.

Females that skipped a year of reproduction returned to the breeding site after only a single year migration.

Dr Domeier commented, "During the mating phase both males and female sharks are seen with injuries. It's unclear whether males are fighting over food or females or both, but this aggression may be why the females avoid males at other times. Our tracking has also highlighted a previously unknown period of vulnerability when the females are exposed to commercial fishing off the coast of North America."

Open access publisher BioMed Central is proud to announce the launch of Animal Biotelemetry. This journal joins our growing portfolio in ecology and conservation and marks a significant development in the area of Animal Biotelemetry research.

AN ANCIENT BIOSONAR SHEDS NEW LIGHT ON THE EVOLUTION OF ECHOLOCATION IN TOOTHED WHALES

By Steve Gorman

Published: 4/4/13

Some 30 million years ago, Ganges river dolphins diverged from other toothed whales, making them one of the oldest species of aquatic mammals that use echolocation, or biosonar, to navigate and find food. This also makes them ideal subjects for scientists working to understand the evolution of echolocation among toothed whales.

New research, led by Frants Havmand Jensen, a Danish Council for Independent Research / Natural Sciences postdoctoral fellow at Woods Hole Oceanographic Institution, shows that freshwater dolphins produce echolocation sig-

nals at very low sound intensities compared to marine dolphins, and that Ganges river dolphins echolocate at surprisingly low sound frequencies. The study, "Clicking in shallow rivers," was published in the journal PLOS ONE.

"Ganges River dolphins are one of the most ancient evolutionary branches of toothed whales," says Jensen. "We believe our findings help explain the differences in echolocation between freshwater and marine dolphins. Our findings imply that the sound intensity and frequency of Ganges river dolphin may have been closer to the 'starting point' from which marine dolphins gradually evolved their high-frequent, powerful biosonar."

The scientists believe these differences evolved due to differences in freshwater and marine environments and the location and distribution of prey in those environments.

A complex, underwater environment

To sustain themselves, river dolphins must find their food, often small fish or crustaceans, in highly turbid water where visibility seldom exceeds a few inches. Like their marine relatives, they manage this using echolocation: They continuously emit sound pulses into the environment and listen for the faint echoes reflected off obstacles while paying special attention to the small details in the echoes that might signify a possible meal.

The environment that freshwater dolphins operate in poses very different challenges to a biosonar than the vast expanses of the sea where most dolphins later evolved.

"Dolphins that range through the open ocean often feed on patchily distributed prey, such as schools of fish," Jensen says. "They have had a large advantage from evolving an intense biosonar that would help them detect prey over long distances, but we have little idea of how the complex river habitats of freshwater dolphins shape their biosonar signals."

A rare sight of the fast and shy Ganges river dolphin. (Credit: Photo by Rubaiyat Mansur, Whale and Dolphin Conservation Society)

Shy study animals with a surprisingly deep voice

To answer that question, the researchers recorded the echolocation signals of two species of toothed whales inhabiting the same mangrove forest in the southern part of Bangladesh: The Ganges river dolphin, an exclusively riverine species that is actually not part of the dolphin family but rather the Platanistidae family, and the Irrawaddy, a freshwater toothed whale from the dolphin family that lives in both coastal and riverine habitats.

Surprisingly, the echolocation signals turned out to be much less intense than those employed by marine dolphins of similar size and it seemed that the freshwater dolphins were looking for prey at much shorter distances. From this, the researchers surmise that both the dolphin species and the river dolphin were echolocating at short range due to the complex and circuitous river system that they were foraging in.

While both Irawaddy and Ganges river dolphin produced lower intensity biosonar, the Ganges river dolphin had an unexpectedly low frequency biosonar, nearly half as high as expected if this species had been a marine dolphin.

"It is very surprising to see these animals produce such low-frequent biosonar sounds. We are talking about a small toothed whale the size of a porpoise producing sounds that would be more typical for a killer whale or a large pilot whale," says Professor Peter Teglberg Madsen from Aarhus University in Denmark, an expert on toothed whale biosonar and co-author of the study.

A new perspective on the evolution of biosonar

The study suggests that echolocation in toothed whales initially evolved as a short, broadband and low-frequent click. As dolphins and other toothed whales evolved in the open ocean, the need to detect schools of fish or other prey items quickly favored a long-distance biosonar system. As animals gradually evolved to produce and to hear higher sound frequencies, the biosonar beam became more focused and the toothed whales were able to detect prey further away. However, the Ganges river dolphin separated from other toothed whales early throughout this evolutionary process, adapting to a life in shallow, winding river systems where a high-frequency, long-distance sonar system may have been less important than other factors such as high maneuverability or the flexible neck that helps these animals capture prey at close range or hiding within mangrove roots or similar obstructions.

Improved tools for counting animals

Freshwater dolphins are among the most endangered animal species. Only around a thousand Ganges river dolphins are thought to remain, and they inhabit some of the most

polluted and overfished river systems on Earth. The results of this study will help provide local collaborators with a new tool in their struggle to conserve these highly threatened freshwater cetaceans. Using acoustic monitoring devices to identify the local species may help researchers estimate how many animals remain, and to identify what areas are most important to them.

DWARF WHALE SURVIVED WELL INTO ICE AGE

From Science Daily

Published: 4/4/13

Research from New Zealand's University of Otago detailing the fossil of a dwarf baleen whale from Northern California reveals that it avoided extinction far longer than previously thought.

Otago Department of Geology PhD student Robert Boessenecker has found that the fossil of the 4-5 meter long Herpetocetus, thought to be the last survivor of the primitive baleen whale family called cetotheres, may be as young as 700,000 years old.

Mr Boessenecker says the previously youngest-known fossils of this whale were from the pre-Ice Age Pliocene epoch; approximately 3 million years ago, a time before many modern marine mammals appeared. Baleen whales of this type were most common much earlier, about 10-15 million years ago.

"That this whale survived the great climatic and ecological upheavals of the Ice Age and almost into the modern era is very surprising as nearly all fossil marine mammals found after the end of the Pliocene appear identical to modern species.

"Other baleen whales underwent extreme body size increases in response to the new environment, but this dwarf whale must have still had a niche to inhabit which has only recently disappeared," he says.

The find indicates that the emergence of the modern marine mammals during the Ice Age may have happened more gradually than currently thought, he says.

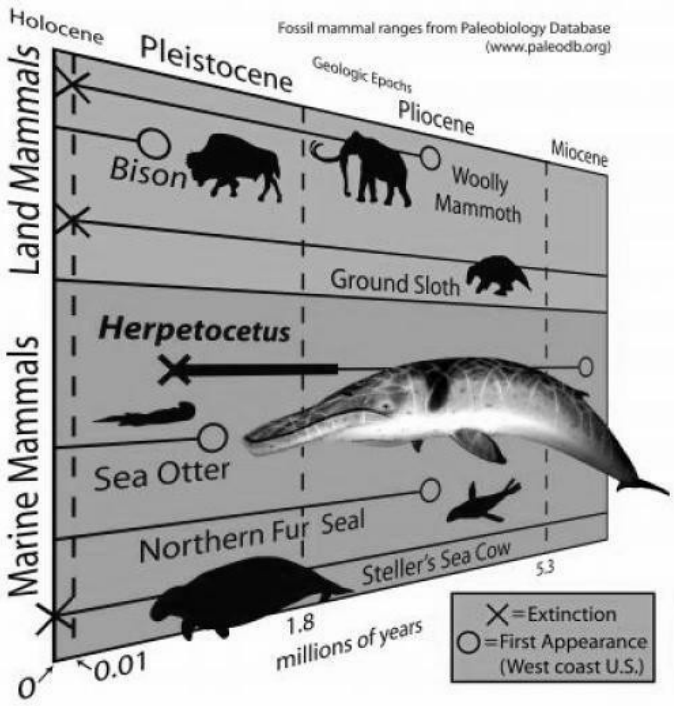
The discovery also lends indirect support to a hypothesis about the modern pygmy right whale (Caperea marginata) recently published by Mr Boessenecker's colleagues Professor Ewan Fordyce and Dr Felix Marx. The pair posited that this enigmatic Southern Ocean whale is not a true right whale but actually a member of the cetothere family and one of the closest relatives of Herpetocetus.

"If their hypothesis is correct, this latest discovery indicates that other close relatives of the pygmy right whale nearly survived to modern times within the Northern Hemisphere.

"In this light, Herpetocetus can be viewed as a Northern Hemisphere equivalent of the pygmy right whale: both are small-bodied with peculiar anatomy, possibly closely related, with feeding habits that are seemingly divergent from other baleen whales."

All baleen whales lack teeth and instead use baleen to strain small prey like krill and fish from seawater. Many whales, such as humpback and blue whales, gulp enormous amounts of water during lunges, while others such as gray whales filter prey from mud on the seafloor.

Owing to a strange jaw joint, Herpetocetus could not open its mouth more than 35 degrees, unlike any modern baleen whale.



Research detailing the fossil of a dwarf baleen whale, Herpetocetus, from Northern California reveals that it avoided extinction far longer than previously thought. The 4-5 metre long whale, thought to be the last survivor of the primitive baleen whale family called cetotheres, may be as young as 700,000 years old. The previously youngest-known fossils of this whale were from the pre-Ice Age Pliocene epoch; approximately 3 million years ago, a time before many modern marine mammals appeared. Baleen whales of this type were most common much earlier, about 10-15 million years ago. This graphic shows the geologic ages of Herpetocetus and various well known marine and land mammals from California, with a life restoration of Herpetocetus. (Credit: R.W. Boessenecker)

SIGHTINGS Compiled by Monterey Bay Whale Watch.
For Complete listing and updates see gowhales.com/sighting

Date	#	Type of Animal(s)
4/7 p.m.	4	Humpback Whales (2 very active)
	4	Gray Whales
	35	Risso's Dolphins
4/7 a.m.	6	Humpback Whales (2 lunge feeding)
	5	Gray Whales
	75	Risso's Dolphins
4/6 p.m.	3	Humpback Whales
	7	Gray Whales
	20	Pacific White-sided Dolphins
	450	Risso's Dolphins
4/6 a.m.	5	Humpback Whales
	20	Gray Whales
	15	Pacific White-sided Dolphins
	230	Risso's Dolphins
4/5 p.m.	7	Gray Whales
	4	Humpback Whales
	25	Risso's Dolphins
4/5 a.m.	7	Gray Whales
	3	Humpback Whales
	50	Risso's Dolphins
4/4 p.m.	4	Gray Whales
	9	Humpback Whales
	80	Pacific White-sided Dolphins
	600	Risso's Dolphins
4/4 a.m.	5	Humpback Whales
	80	Pacific White-sided Dolphins
	600	Risso's Dolphins
4/3 p.m.	2	Gray Whales
	2	Humpback Whales
	10	Risso's Dolphins
4/3 a.m.	4	Humpback Whales
	20	Risso's Dolphins
4/2 p.m.	2	Killer Whales
4/2 a.m.	7	Gray Whales
	10	Humpback Whales
4/1 p.m.	4	Gray Whales
	2	Humpback Whales
	20	Risso's Dolphins
4/1 a.m.	10	Gray Whales
	4	Humpback Whales
	30	Risso's Dolphins
3/31 a.m.	1	Gray Whale (juvenile)
	4	Humpback Whales (lungefeeding)
	2	Killer Whales (Stubby & Fat Fin)
	300	Pacific White-sided Dolphins
	200	Risso's Dolphins
3/30 p.m.	7	Gray Whales
	1	Humpback Whales
	10	Risso's Dolphins
3/30 a.m.	1	Gray Whale
	4	Humpback Whales
	15	Pacific White-sided Dolphins
	100	Risso's Dolphins
3/30 early a.m.	2	Gray Whales
	2	Humpback Whales
	200	Risso's Dolphins
	1	Laysan Albatross
3/29 p.m.	8	Gray Whales
	3	Humpback Whales
	10	Risso's Dolphins
3/29 a.m.	3	Gray Whales
	3	Humpback Whales
3/28 p.m.	3	Gray Whales
	5	Killer Whales (transient type)
	2	Humpback Whales ("friendlies")
3/28 a.m.	13	Gray Whales
	8	Humpback Whales
3/27 p.m.	8	Gray Whales
	4	Humpback Whales
3/27 a.m.	3	Gray Whales
	7	Humpback Whales
	300	Long-beaked Common Dolphins
3/26 p.m.	1	Gray Whale
	2	Humpback Whales
3/26 a.m.	14	Gray Whales
	5	Humpback Whales
3/25 p.m.	5	Gray Whales
3/25 a.m.	5	Gray Whales
	4	Humpback Whales
	15	Risso's Dolphins
3/24 p.m.	22	Gray Whales
	60	Pacific White-sided Dolphins
	200	Risso's Dolphins
3/24 a.m.	26	Gray Whales
	50	Pacific White-sided Dolphins
	600	Risso's Dolphins
3/23 p.m.	3	Gray Whales
	2	Humpback Whales
3/23 a.m.	35	Gray Whales
	40	Risso's Dolphins
3/23 early a.m.	16	Gray Whales
	250	Long-beaked Common Dolphins
3/22 a.m.	7	Gray Whales
	30	Risso's Dolphins
3/20 p.m.	26	Gray Whales
	200	Pacific White-sided Dolphins
	25	Risso's Dolphins
3/20 a.m.	21	Gray Whales
	50	Risso's Dolphins
3/19 p.m.	11	Gray Whales
	50	Long-beaked Common Dolphins
3/19 a.m.	5	Gray Whales
	200	Long-beaked Common Dol phins
	100	Risso's Dolphins

American Cetacean Society
Monterey Bay Chapter
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Soundings

American Cetacean Society- Monterey Bay Chapter

PO Box H E, Pacific Grove, CA 93950

May 2013

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, May 30, 2013 Time: 7:30 PM.

PLEASE JOIN US AT 7:00 FOR REFRESHMENTS

Speaker: Doug Cheeseman
Subject: Hippo and Whale Evolution

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Doug Cheeseman will compare hippos and whales in an energetic program with 100 images focusing on wildlife behavior that he has observed, including mating and feeding strategies. Doug has been leading African wildlife safaris since 1978 and Cheesemans' Ecology Safaris charter to Antarctica since 1994. He was a lecturer on the Lindblad Explorer back in 1984 for Salen Lindblad on an Antarctic circumnavigation. In 1998 Doug retired from many years of teaching zoology and ecology at De Anza College to photograph wildlife and to lead safaris around the world full time. He is an enthusiastic speaker and has many great photos to choose from taken on safari of hippos and other African wildlife and on pelagic trips of several different species of cetaceans from many areas, including Antarctica. He will discuss social and survival behavior in Orcas, Humpbacks, other cetaceans, and their relatives, the Hippopotamus, plus a few other fascinating wildlife species. He will have many action photos. Join Doug as he compares characteristics of cetaceans in the Southern Ocean to their close relatives, the Hippos of Africa.

CALENDAR

May 20-23: 64th Tuna Conference. "Back to Biology: the Role of Life History Characteristics in Tuna Stock Assessments." Lake Arrowhead, CA

June 1, 9am-12pm: Saturday Workshop for Beginners. "Drawing the Sea." Local naturalist and artist Kate Spencer will assist in teaching with drawing and watercolor to illustrate the sea and its life forms. Register at:
hopkins.stanford.edu/workshops

June 24-30: Marine Mammal Courses at Moss Landing Marine Laboratory. Techniques and Theories of Animal Training. Bio 348 . For a complete class description and further info please contact Dr. Jenifer A. Zeligs at: slewths.mlml.calstate.edu/

June 29, 9am-1:30pm: ACS Monterey Bay Chapter Summer Whale Watch Fundraiser. "Searching For Nature's Giants." We will be searching the biggest animal to have ever lived, the Great Blue Whale. We will also be searching for humpback, fin, minke, and killer whales. Albatross and numerous seabirds are also likely to be encountered. For reservations and Info

July 13, 8am-4pm: ACS/LA Summertime Blues and Humpbacks Whale Watch Adventure. Whale Watcher's will spend the day searching for blue and humpback whales
aboard the newly renovated 75ft Condor Express.
For more info and reservations call 424-266-0516

July 18-24: Marine Mammal Courses at Moss Landing Marine Laboratory. Working With Marine Mammals: Bio 347. For a complete class description and further info please contact Dr. Jenifer A. Zeligs at: slewths.mlml.calstate.edu/

July 27: ACS Monterey Bay Chapter BBQ. Honoring Katy Castagna. Veterans Memorial Park, Monterey, CA.

August 10: ACS National Annual Fundraiser. Blue Whales: Behemoths Of The Deep. Condor Express, Santa Barbara, CA. For info and reservations, call 310-548-6279 or acsonline.org

BOOK RECOMMENDATIONS

My Beloved Brontosaurus: On the Road with Old Bones, New Science, and Our Favorite Dinosaurs
Brian Switek

Plant and Animal Endemism in California
Susan P. Harrison

Down by the Bay: San Francisco's History between the Tides
Matthew Morse Booker

Odd Couples: Extraordinary Differences between the Sexes in the Animal Kingdom
Daphne J. Fairbairn

Surviving the Shark: How a Brutal Great White Shark Attack Turned a Surfer into a Dedicated Defender of Sharks
Jonathan and Margaret Kathrein

SINGING HUMPBACK WHALES TRACKED ON NORTHWEST ATLANTIC FEEDING GROUND

From Science Daily
Published: 4/29/13

Male humpback whales sing complex songs in tropical waters during the winter breeding season, but they also sing at higher latitudes at other times of the year. NOAA researchers have provided the first detailed description linking humpback whale movements to acoustic behavior on a feeding ground in the Northwest Atlantic.

Findings from the study, published April 10 in the journal PLOS ONE, demonstrate the potential applications of passive acoustic tracking and monitoring for marine mammal conservation and management.

Co-author Sofie Van Parijs, who heads the passive acoustics group at the Woods Hole Laboratory of NOAA's Northeast Fisheries Science Center (NEFSC), says this study is not so much about biology, but about acoustic methods.

"We have monitored and acoustically recorded whale sounds for years, and are now able to 'mine' these data using new computer software applications and methods, " said Van Parijs. "Passive acoustic tracking has enabled us to localize humpback whale song to study the movements of individual whales, and to relate the singing to specific behaviors. This has never before been accomplished for singing humpbacks on a northwest Atlantic feeding ground."

"Passive acoustic tracking of humpback whales and other cetacean species provides an opportunity to collect data on movement patterns that are difficult—or impossible—to obtain using other techniques," said lead author Joy Stanistreet, who worked with Van Parjis and co-author Denise Risch at the NEFSC's Woods Hole Laboratory at the time of the study. Stanistreet is currently a graduate student at the Duke University Marine Laboratory in Beaufort, N.C.

Since 2007, NEFSC researchers have used year-round passive acoustic monitoring to study ocean noise in the Stellwagen Bank National Marine Sanctuary, a feeding ground for humpback whales and other marine mammal species in the southern Gulf of Maine. Humpback whales typically frequent the sanctuary between April and December and feed on sand lance and other small schooling fish. Humpback whale singing in the sanctuary usually occurs from April through May, following the spring migration from southern waters, and from August to December before the return fall migration. During the summer, humpbacks remain in the sanctuary but generally do not sing while they feed.

The researchers used data from acoustic recordings collected from an array of 10 bottom-mounted marine autonomous recording units (MARUs). Continuous 24-hour recordings units were deployed in the sanctuary for four consecutive three-month periods during 2009. The MARUs were placed three to six miles apart, and the arrays shifted seasonally to areas within the sanctuary having high whale concentrations.

Humpback whale songs were recorded in distinct time periods during spring and fall. No songs were recorded during summer and winter, although humpback whales remained in the area. Songs were most common in the spring, and occurrences of singing increased significantly before and after migration periods.

Forty-three song sessions, each lasting from 30 minutes to eight hours, were used to track individual singing whales. Most of the singers were actively swimming; the patterns and rates of their movement ranged from slow meandering to a faster directional movement. In one case, two singers were tracked at the same time, suggesting a potential reaction by one singer to the presence of the other.

Marine mammal researchers could also use passive acoustic localization and tracking methods to better understand the geographic distribution, abundance, and densities of cetacean species, many of which are threatened by human activities. These applications may help inform and enhance marine mammal conservation and management efforts
The study was funded by the National Oceanographic Partnership Program, a collaboration of federal agencies that provides leadership and coordination of national oceanographic research and education initiatives.

GREAT WHITE SHARKS SCAVENGING ON DEAD WHALES

From Science Daily
Published: 4/10/13

Many terrestrial animals are frequently observed scavenging on other animals- whether it is a hyena stealing a lion kill in the Serengeti or a buzzard swooping down on a dead animal. However, documenting this

sort of activity in the oceans is especially difficult, and often overlooked in marine food web studies.

In a new study published in PLOS ONE titled, "White sharks (*Carcharodon carcharias*) scavenging on whales and its potential role in further shaping the ecology of an apex predator," Captain Chris Fallows from Apex Expeditions collaborated with University of Miami (UM) scientists Dr. Neil Hammerschlag and Austin Gallagher, to explore the behaviors of great white sharks scavenging on dead whales in South Africa. The team documented as many as 40 different sharks scavenging on a carcass over the course of a single day, revealing unique social interactions among sharks.

The study summarized observations based on four scavenging events opportunistically observed over a 10 year period. In each multi-day observation, the team recorded daily evidence of social, aggregative and feeding behaviors observed in the waters off South Africa. They suggest that although the occurrence of coming upon a whale carcass may be sporadic, the shark populations are likely prepared to scavenge on them, and may even rely on their scavenging activities to supplement their regular feeding activities.

"Although rarely seen, we suspect that as white sharks mature, scavenging on whales becomes more prevalent and significant to these species than previously thought," said Hammerschlag, who is director of the R.J. Dunlap Marine Conservation Program at UM.

The team found that sharks showed a clear preference for scavenging on the blubber, probably because these high calorie meals can sustain the sharks for longer periods of time. Interestingly, though, the study also found that sharks showed an initial preference for feeding on the whale's fluke before moving on to feed on the rest of the carcass. The team also found that while scavenging on whales, they ceased hunting and feeding on seals, one of their primary natural prey.

"While scavenging on the whale, the sharks clearly showed a size-based pecking order," said Fallows. "The biggest sharks came right in, targeting areas of highest blubber content, while smaller sharks fed on areas with less blubber or kept their distance from the whale, mostly scavenging on pieces of blubber that drifted away from the carcass."

The paper reveals how the social and size structure of sharks at the carcass appeared to be influenced by environmental patterns. "The cues, such as the oils, emanating from this pulse of food are likely attracting much larger sharks over 4.5 meters from long distances to scavenge," said Gallagher. "These data provide some credence to the hypothesis that large white sharks may be swimming known ocean corridors looking for dead, dying, or vulnerable whales."

"By attracting many large white sharks together to scavenge, we suspect that the appearance of a whale carcass can play a role in shaping the behaviors, movements, and the ecosystem impacts of white sharks" said Hammerschlag. "These patterns may shed some light into the ecology of this often studied -- yet still highly enigmatic -- marine predator."

SWORDFISH CAUGHT IN DRIFTNETS IS CALIFORNIA'S DEADLIEST CATCH

From Sea Turtle Restoration Project
Published: 4/22/13

The California drift gillnet fishery for swordfish and shark is the most dangerous fishery for whales and other marine mammals along the U.S. West Coast from California to Alaska. A new federal review of marine mammal bycatch in commercial fisheries found that the drift gillnet fleet is causing more harm to whales than ever.

The 25 vessels operating in the drift gillnet fishery now

accidentally capture and kill more whales and marine mammals than any other fishery along the U.S. West Coast.

"The capture and death of whales and dolphins in the deadly California drift gillnet fishery is far too high, and this has been going on far too long" said Teri Shore, Program Director at SeaTurtles.org. "It's time to phase out drift gillnets along the California coast as soon as possible."

Due to the capture and drowning of an estimated 16 endangered sperm whales two years ago, the California drift gillnet fishery for swordfish and shark will now be designated as a harmful Category 1 fishery under the Marine Mammal Protection Act. Recently it was ranked in the less serious Category 2.

The only other U.S. Pacific commercial fishery ranked at that serious Category 1 level of marine mammal harm is the much larger Hawaii longline tuna fleet with 125 vessels.

National Marine Fisheries Service made the determination in its newly published 2013 annual review of marine mammal bycatch in commercial fisheries. Download the proposed new regulation below.

The new ranking for the drift gillnet fishery could trigger new protections for sperm whales and other marine mammals. The fishery accidentally captures and kills about 3 sperm whales per year, a rate that is more than double the number that federal biologists say the West Coast population can sustain without risk of extinction.

Shore will be arguing for the phase out of the California drift gillnet fishery at the 40th Annual Fisheries Forum hosted by the California Assembly Joint Committee on Fisheries and Aquaculture on Thursday, April 25, in Sacramento.

Over the past decade, more than 1,000 sea lions, dolphins, whales and turtles drowned after getting tangled in the large-mesh drift gillnets targeting swordfish and shark.

Recently, SeaTurtles.org helped defeat federal fishery manager's proposals to expand the drift gillnet fishery at the of risk capturing more whales, dolphins and other marine mammals as well as endangered leatherback sea turtles.

While most gillnets have been banned in California because of their deadly toll on endangered wildlife, the state's drift gillnet fishery targeting swordfish and thresher shark continues to operate. Nets that stretch a mile are set to "soak" overnight, and catch and drown marine animals indiscriminately.

HAWAII'S TUNA FISHERY TAKING DEADLY TOLL ON WHALES, SEA TURTLES AND SEABIRDS

From Sea Turtle Restoration Project
Published: 5/7/13

An estimated 20 endangered sea turtles, 35 protected whales and dolphins, and 165 Black-footed and Laysan albatross were injured or killed by Hawaii-based tuna fishing boats in just the first three months of 2013. This is according to recently published federal fishery observer reports from the Pacific Islands Region of National Marine Fisheries Service.

"The high numbers of dolphins, whales and turtles killed or injured so early in the year is a clear sign that these longline fisheries are still a big problem for endangered species," said Teri Shore, Program Director, Turtle Island Restoration Network (SeaTurtles.org). "We need to roll back accidental capture of disappearing marine animals, not allow it to escalate."

This year new measures were imposed on the tuna fishery beginning in February to halt the hooking of false killer whales, whose numbers have declined to about 2,000 individuals in the Hawaiian Islands. Despite these efforts, numbers are on a frightening upwards trend.

First quarter observer reports revealed that between January and March the Hawaii deepset longline tuna fishery hooked the highest number of protected marine animals compared to any of the last first-quarter periods in 10 years including:

- 20 critically endangered leatheback, loggerhead, and olive ridley sea turtles
- 15 false killer whales (a dolphin species) - one more

could trigger a closure.
- 5 short-finned pilot whales
- 5 rare pygmy killer whales (a dolphin species) - at limit of acceptable harm under MMPA (5.2 Potential Biological Removal Level).
- 165 Black-footed and Laysan albatross - accounting for 99 percent of seabird hooking

If these high levels of incidental capture continue, the longline fishery could exceed allowable incidental take levels under the Marine Mammal Protection Act and Endangered Species Act. This could mean mandatory fishery closures and additional federal protections or actions. The hooking and serious injury or death of even a single additional false killer whale from the endangered Hawaiian "insular" population would trigger a closure of fishing areas south of the Hawaiian Islands.

"Every bite of tuna sushi comes with a side of dead dolphins and sea turtles, and the true cost of Hawaii longline tuna is the cruel deaths of hundreds of dolphins, whales, sea turtles and seabirds," said Todd Steiner, biologist and executive director of Turtle Island Restoration Network (SeaTurtles.org). "The government's attempt to reduce the carnage through various restrictions on fishers is obviously not working and needs to be tightened up, not weakened."

ANTARTIC BLUE WHALES PINPOINTED WITH SONAR

By Becky Oskin
Published: 5/8/13

Whales may be the biggest animals on Earth, but finding them in the vast open ocean isn't easy.

Now, an Australia-led research team has demonstrated a novel idea for chasing down the massive marine mammals. To search for Antarctic blue whales, the group dropped sonar buoys in the Ross Sea west of Antarctica, and listened for whale calls. They triangulated the whale's location from their calls, and then sailed to the right spot.

During the research cruise, the scientists photographed 57 blue whales, collected 23 skin biopsy samples and stuck on two satellite-tracking tags. They also spotted 11 pygmy blue whales and eight humpback whales, among a total 720 cetacean species (the group that includes whales, dolphins and porpoises).

"In many respects our expectations of what we could achieve have been exceeded," the scientists wrote on the expedition's blog.

The deep, resonating song of Antarctic blue whales travels hundreds of kilometers across the Southern Ocean, Brian Miller, of the Australian Antarctic Division and the lead marine mammal acoustician of the mission, said in a statement. The team returned with 626 hours of recordings, with 26,545 blue whale calls analyzed in real time.

The whale's satellite tags will transmit never-before obtained data on how the whales feed near the edge of the Antarctic ice, marine biologist Virginia Andrews-Goff of the Australian Marine Mammals Center said in a statement.

The International Whaling Commission estimates the population of Antarctic blue whales is between 400 and 1,400 individuals. The leviathans were slaughtered to near extinction in the early 1900s by whalers, who took some 340,000 whales, according to a statement from the Australian government.

Researchers worldwide have used acoustic technology to track whale species for decades, including blue whales, humpback whales and right whales. This is the first time that scientists have located whales for tagging and identification by identifying their positions with sonar, the statement said.

SIGHTINGS Compiled by Monterey Bay Whale Watch.
For Complete listing and updates see gowhales.com/sighting

Date	#	Type of Animal(s)
5/7 p.m	2	Humpback Whales
	50	Pacific White-sided Dolphins
	200	Risso's Dolphins
5/7 a.m	15	Humpback Whales
	2	Gray Whales (mom and calf snorkeling)
	20	Pacific White-sided Dolphins
	150	Risso's Dolphins
5/6 a.m.	4	Humpback Whales (2 "friendlies")
	100	Pacific White-sided Dolphins
5/5 a.m.	4	Killer Whales
	200	Risso's Dolphins
5/4 a.m	19	Humpback Whales
	50	Pacific White-sided Dolphins
	700	Risso's Dolphins
5/3 p.m.	8	Humpback Whales
	100	Risso's Dolphins
5/3 a.m	11	Humpback Whales
	4	Killer Whales
	100	Risso's Dolphins
5/2 p.m.	10	Humpback Whales
	60	Risso's Dolphins
5/2 a.m.	16	Humpback Whales
	1000	Risso's Dolphins
5/1 p.m	14	Humpback Whales
	1	Gray Whale
	20	Risso's Dolphins
5/1 a.m	20	Humpback Whales
	4	Killer Whales
	30	Pacific White-sided Dolphins
	100	Risso's Dolphins
4/30 a.m.	1	Humpback Whale
	50	Risso's Dolphins
4/29 a.m.	28	Humpback Whales
	14	Killer Whales
	200	Pacific White-sided Dolphins
	100	Risso's Dolphins
	1	Northern Sea Lion eating a skate
4/28 p.m.	5	Humpback Whales
	2	Gray Whales
4/28 a.m.	9	Humpback Whales
4/27 a.m.	1	Humpback Whale
	8	Killer Whales
4/26 a.m.	5	Humpback Whales
	30	Pacific White-sided Dolphins
	500	Risso's Dolphins
	5	Northern Right Whale Dolphins
4/25 p.m.	7	Humpback Whales
	20	Risso's Dolphins
4/25 a.m.	5	Humpback Whales
	2	Gray Whales
	15	Risso's Dolphins
4/24 a.m.	3	Humpback Whales (1 friendly)
	1	Blue Whale
	2	Gray Whales
	15	Baird's Beaked Whales
	30	Risso's Dolphins
4/23 a.m.	4	Humpback Whales
	1	Blue Whale
	80	Risso's Dolphins
	2	Harbor Porpoise
4/21 p.m.	275	Risso's Dolphins
4/21 a.m.	2	Humpback Whales
	3	Killer Whales (transient type)
	300	Pacific White-sided Dolphins
4/20 a.m.	3	Blue Whales
	5	Killer Whales (transient type)
	40	Risso's Dolphins
	5	Harbor Porpoise
4/19 p.m.	2	Humpback Whales
4/19 a.m.	6	Humpback Whales
	8	Killer Whales (including a calf)
	2	Gray Whales (cow/calf pair)
	120	Risso's Dolphins
4/18 p.m.	1	Gray Whale
	50	Risso's Dolphins
4/18 a.m.	5	Humpback Whales
	hundreds	Risso's Dolphins
4/17 a.m.	2	Humpback Whales
4/16 a.m.	5	Pacific White-sided Dolphins
	1000	Risso's Dolphins
4/14 a.m.	100	Risso's Dolphins
4/13 a.m.	1	Humpback Whale
	2	Gray Whales
	100	Risso's Dolphins
4/12 a.m.	2	Humpback Whales
	75	Risso's Dolphins
4/10 a.m.	2	Humpback Whales
	3	Gray Whales 4/7 p.m.
	4	Humpback Whales (2 very active)
	4	Gray Whales
	35	Risso's Dolphins
4/7 a.m.	6	Humpback Whales (2 lunge feeding)
	5	Gray Whales
	75	Risso's Dolphins
4/6 p.m.	3	Humpback Whales
	7	Gray Whales
	20	Pacific White-sided Dolphins
	450	Risso's Dolphins
4/6 a.m.	5	Humpback Whales
	20	Gray Whales
	15	Pacific White-sided Dolphins
	230	Risso's Dolphins
4/5 p.m.	7	Gray Whales
	4	Humpback Whales
	25	Risso's Dolphins
4/5 a.m.	7	Gray Whales
	3	Humpback Whales

American Cetacean Society
Monterey Bay Chapter
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Soundings

American Cetacean Society- Monterey Bay Chapter JUNE 2013

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, June 27, 2013 Time: 7:30 PM.

PLEASE JOIN US AT 7:00 FOR REFRESHMENTS

Speaker: Tim Thomas
Subject: Dancing on the belly of the shark:
Whale tales from long ago on Monterey Bay

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Tim Thomas, well-known fisheries historian and Monterey Bay waterfront tour guide, will talk about one of Monterey's more unique and least understood fisheries – whaling -- when he talks to the Monterey Bay Chapter of the American Cetacean Society on Thursday, June 27. He will use historic photos, film and oral histories to discuss the local industry that helped decimate whale populations in the 19th and 20th centuries.

Tim has been researching Monterey Bay fisheries for 25 years and has written two books on the subject and is now working on a third about "Pop" Ernest Doelter, the "abalone king" who found cooking methods that turned the bait-fish mollusks into dining delicacies. He'll talk about "Pop" and other little known history, including a basking shark fishery and how a wealthy sport fisherman introduced catch ideas that revolutionized the fishing industry and made Monterey world famous.

Tim was the historian/curator at the Monterey Maritime Museum for 16 years and is known for his lectures, programs and tours on the Monterey waterfront. He has also lectured extensively on the Monterey Japanese community both here and in Japan and is on the board of the Monterey Japanese American Citizens League. For more information, see www.acsmb.org, or www.montereywaterfrontcanneryrowtours.com.

Also in June: *Saturday the 29th, 8:45 a.m. to 1 p.m., annual blue whale fundraising trip from Monterey Bay Whale Watch, $49; reservations 419-1051.*

Next month: *Saturday, July 27, 3 to 7 p.m., annual BBQ in Veterans Memorial Park in Monterey, $20, honoring Katy Castagna for years of dedication to cetaceans and ACS. Reservations by checks to Box HE, Pacific Grove, CA 93950.*

CALENDAR

PLEASE JOIN US FOR THE

AMERICAN CETACEAN SOCIETY

MONTEREY BAY CHAPTER

ANNUAL BLUE WHALE WATCHING TRIP

And dolphins, seabirds, sea lions, seals and who knows?

WHEN: JUNE 29, 2013

WHERE: Monterey Bay Whale Watch Center

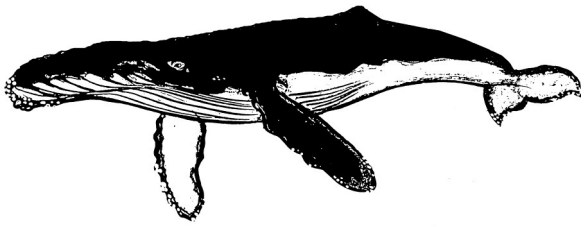
84 FISHERMAN'S WHARF #1

MONTEREY, CA 93940 TEL 831-372-0599

COST: $49.00 4-5 hours

SEND PAYMENT TO: ACS, P.O. BOX HE, PACIFIC GROVE, CA93950 (CHECKS ONLY)

QUESTIONS? CALL JERRY LOOMIS AT 831-419-1051 OR 831-372-0599



AMERICAN CETACEAN SOCIETY

MONTEREY BAY CHAPTER

ANNUAL BARBEQUE!

*****HONORING KATY CASTAGNA*****

When: July 27, 2013

Where: Veteran's Memorial Park, Monterey

Drive due west on Jefferson St. (up the hill) from the heart of Monterey, our area is on the left. Or take Highway 68 west from Highway 1 to Skyline **Forest.** Turn right there, go to Skyline **Drive** and turn left. Skyline Drive will lead you right into the Park. Our area is on the right if coming on Skyline.

What: Tri-tip, chicken, veggie burgers, salad, beans, soft drinks, water. Good friends. Fun raffle, so bring some bills.

Cost: $20, under 12= ½ price.

Please bring your own table service and byob.

Send payment to reserve your dinners to: ACS, P.O. Box HE, Pacific Grove, CA 93950(checks to ACS)

Questions: call Sally Eastman 372-6919 or

Jerry Loomis 419-1051

UCSC Summer Ocean Sciences Classes
At Long Marine Lab
July 29 to August 30 Summer Session 2
Biology of Marine Mammals; Bio 129-01
5 units Maresh
Biology of Marine Mammals: Laboratory
2 Units Maresh

June 22: Catalina Above and Below with the Cabrillo Marine Aquarium. Observe Marine Mammals, Bait for Sharks and learn techniques to capture marine animals. For info call Larry Fukuhara at 310-548-7562

BOOK RECOMMENDATIONS

Primates of the World: An Illustrated Guide by Jean-Jacques Petter and Francois Desbordes Princeton University Press

After the Grizzly: Endangered Species and the Politics of Place in California by Peter S. Alagona 2013 UC Press

Amphibians and Reptiles of Baja California, Including Its Pacific Islands and the Islands in the Sea of Cortes by L. Lee Grismer UC Press

American Cetacean Society
Monterey Bay Chapter

Chapter awards 3 student grants for whale research

The Monterey Bay Chapter of the American Cetacean Society has awarded its 2013 research grants to two graduate students at Moss Landing Marine Laboratories in Moss Landing, and one student at at the National Polytechnic Institute in La Paz, Mexico.

The grants, for $1,500 each, were awarded to:

Moss Landing graduate student Angela Szesciorka to study the behavior of humpback whales when they encounter ships between San Francisco and Los Angeles.

Jacqueline Schwartzstein, also a graduate student at Moss Landing, to study the group of gray whales that spends summers feeding off Washington state rather than continuing on to the Arctic with the rest of the migrating population.

Jorge Alberto Mares Mayagoitia, a student in the Marine Mammals Ecology Laboratory in La Paz, to study the feeding habits of male sperm whales that visit the Gulf of California during the summer breeding seasons.

First grey whale spotted south of the equator

Namibia sighting suggests much-hunted whales are regaining ancient migratory routes, or may be down to climate disruption

Astonishing news from Walvis Bay, Namibia, where scientists from the Namibian Dolphin project on Tuesday confirmed the sighting of a grey whale. Not only has this north Pacific species been extinct in the Atlantic since the 18th century, it has never been seen south of the equator.

The significance of this sighting is creating excitement among marine biologists. It may suggest good news – that the great whales are recovering from the disastrous hunts of the 20th century. Or it may indicate that the changing climate is disrupting their feeding habits – with unknown consequences.

A unique sighting of a grey whale in the Mediterranean in May 2010 – the animal got as far as Israel – has overturned many preconceptions, with some scientists speculating that this much-hunted great whale – reduced to near extinction in the 20th century – is regaining ancient migratory routes.

John Paterson, of the Walvis Bay Strandings Network, says the whale was first sighted by tour boats on dolphin watch on 4 May. The "strange whale" was confirmed as a grey, and photographed, by a member of his team on 12 May.

"The question is now, what is origin of this whale?" says Paterson. The photographs prove this is not the same individual that turned up in the Mediterranean, he says. "Is it another individual that has traverse the Northwest Passage, or perhaps travelled around the southern tip of South America and across the Atlantic? Unfortunately, we'll never know the route it followed to get here."

Known as "devil fish" for the ferocity with which they fought the whalers (usually because the hunters targeted the calves, which the mothers fiercely defended), grey whales now permit themselves to be petted by tourists from whalewatch boats off Baja California. Their historic range included the Atlantic, with convincing historical evidence that Icelandic people hunted them. The whales may have migrated south to the Mediterranean to calve in the warmer waters of the Mediterranean, where they would also be relatively free from attack by orca, their only natural predators.

As shore-hugging, bottom-feeders, grey whales may have also been once common off British shores. A vertebra in the collection of the Royal Cornwall Museum, Truro, found in Cornwall, has been identified as belonging to a grey whale. The last records of grey whales in the Atlantic appear to coincide with the start of modern whaling off the coast of New England in the early 18th century, with the appearance of "scrag whales" off the island of Nantucket.

The southern African grey whale joins other whales where they should not be. In Cape Cod Bay off New England last year, an aerial reconnaissance team from the Provincetown Centre for Coastal Studies surveying the north Atlantic right whales feeding in the bay were amazed to find a bowhead whale – a strictly Arctic cetacean – among their number. Climate change and shifting ice have been attributed to its surprise appearance – with the same conditions possibly accounting for the Mediterranean grey whale, which may have crossed from the north Pacific to the Atlantic via the opened-up North-west Passage.

In his forthcoming book, Feral, George Monbiot cites a contemporary proposal to reintroduce grey whales to the Irish Sea by airlifting 50 animals there from California. Today's news from southern Africa (Walvis Bay translates as Whale Bay) indicates that the whales may be about to achieve their own reintroduction without the need of airpower.

Worst-Ever Right Whale Die-Off Continues to Puzzle

By Megan Gannon, News Editor, LiveScience. Com, May 10

Scientists still don't know why hundreds of baby southern right whales are turning up dead around Patagonia, a decade after observers first saw signs of the worst die-off on record for the species, according to the Wildlife Conservation Society (WCS).

With no evidence of infectious diseases or deadly toxins in whale tissue samples, scientists are scrambling to determine a cause of death. Some are even pointing a finger at blubber-eating birds.

The whales come to the peaceful Atlantic bays around Peninsula Valdes along Argentina's Patagonian Coast to give birth and raise their young. At least 605 dead right whales have been counted in the region since 2003, WCS officials say. Of those, 538 were newborn calves. Last year, the mortality event was especially severe, with a record-breaking 116 whale deaths, 113 of them calves.

"In 2012 we lost nearly one-third of all calves born at the Peninsula," said Mariano Sironi, Scientific Director of the Instituto de Conservacion de Ballenas in Argentina. "Southern right whales have their first calf when they are nine years old on average. This means that it won't be until a decade from now that we will see a significant reduction in the number of calves born, as all of the female calves that died will not be contributing any new offspring to the population," Sironi, who is also an advisor to the Southern Right Whale Health Monitoring Program, added in a statement.

Sironi and colleague Vicky Rowntree, who is co-director of the monitoring program, have studied a strange phenomena that could be stressing southern right whales. They say kelp gulls at Peninsula Valdes land on the backs of the cetaceans to eat their skin and blubber.

"The attacks are very painful and cause large, deep

lesions, particularly on the backs of young 2-6 week-old calves," the researchers said in a statement from WCS. "This harassment can last for hours at a time. As a result, right whale mothers and their calves are expending much precious energy during a time of year when mothers are fasting and at a site where little to no food is available to replenish fat reserves."

The situation is discouraging for a species that had made a significant comeback since its population was depleted by the whaling industry.

"The southern right whale population is still only a small fraction of its original size, and now we have reason to worry about its recovery," Rowntree said.

Though the southern right whale is not listed as endangered, conservationists warn that the species' sister populations could go extinct if hit with a mysterious die-off on this scale. For instance, there are thought to be just about 500 North Atlantic right whales remaining.

The world's largest 'waste dump' is found in the Pacific Ocean

By: Darren Lloyd, May 06, 2013

If you were to travel from the United States of America to Japan, you would most likely encounter what could be described as the world's largest waste dump: a 100,000 tonne expanse of debris floating around a large region of the Pacific Ocean. The total area of this phenomenon has been said to equal the size of continental U.S., but the truth about its true size remains unknown.

Captain Charles Moore first discovered the 'Pacific garbage patch' in 1997. The area in which rubbish gets caught up is known as a gyre, which can be described as a large-scale circular feature made up of ocean currents that ultimately traps waste and moves it around the region.

Plastics constitute 90 percent of all trash in the world's oceans with 20 percent of this waste being dumped from ships and oil platforms. The rest comes from land.

Plastic is of course, a very useful product; durable and stable, yet it is these very properties that deem it troublesome in marine environments.

"The polypropylene and the polyethylene that make up the majority of floater plastics and consumer plastics are just a little bit lighter than water. So if it's rough they get pushed down under. When it's really calm, all these bits and pieces can float to the surface," Charles Moore told the Earth Island Journal.

To Moore, it is clearly a land-based problem and he believes that what drives the market and what subsequently runs off the streets into our oceans is all part of the same problem.

A one-liter plastic bottle, when in seawater, can reduce to so many small pieces that it is possible a single fragment could be found on every beach in the world. The entire marine food-web is suffering as a result. The breakdown of plastics into small pieces allows them to mimic the prey of all marine animals, from zooplankton to whales. When plastic is so prevalent that it fills up a creature's stomach, it turns off the desire to feed. If an organism doesn't put on fat stores for reproduction and migration, its population will crash. Floating plastic will even act as transport for some organisms, introducing them to areas where they could be problematic to resident species.

Seventy percent of the plastic waste sinks to the ocean floor and this mass of waste causes considerable damage to bed-dwelling organisms. In the worst case scenario—suffocation.

Plastics are also very good sponges, as such they are often used in oil clean-ups. But Moore explains that "petroleum-derivative toxins are sticking to these plastics, delivering these toxicants to marine creatures from the very base of the food-web to the top, in addition to killing millions by entanglement".

According to the UN Environment Program (UNEP), over one million seabirds and one hundred thousand marine mammals and turtles are killed as a result of plastic ingestion or entanglement.

Marcus Eriksen, a research director at the US-based Algalita Marine Research Foundation, also highlighted the threat plastic waste poses to human life. He told the Telegraph in 2008 that "such pollutants can attract man-made chemicals such as hydrocarbons and the pesticide DDT," adding that "what goes into the ocean goes into these animals and onto your dinner plate. It's that simple".

Solutions to this problem are not immediately clear. A cleaning strategy would cost vast amounts of money due to the immense area in question and the unpredictability of the highest concentrations of waste. Of course, the reduction of waste on land is really where strides can be made and recycling will go a long way to suppress the situation.

Iceland to kill more than 180 endangered Fin whales this year

280 Fin whales have been killed since 2006.
7 Fin whales were killed in Iceland's waters in 2006,
125 in 2009 and 148 in 2010.
Call for U.S. action as Iceland violates
international whaling law

May 2013. A coalition of international animal welfare and conservation groups is calling on the Obama Administration to impose economic sanctions against Iceland after Icelandic whaling company Hvalur hf announced it will hunt and sell the meat of up to 184 endangered Fin whales this summer after a two year hiatus. Iceland is one of three countries that refuse to abide by international whaling laws banning the killing and trading of whales for commercial gain. The groups have sent a letter to the US Secretaries of State, Commerce and Interior calling for stronger measures by the Obama Administration.

"President Obama has said that the US opposes

resumed commercial whaling by Iceland" said Susan Millward, Executive Director of the Animal Welfare Institute (AWI). "It is now time to act. Certification by the Secretary of Interior is long overdue and should be concluded urgently. There is no obstacle preventing President Obama from imposing trade sanctions against Iceland now under the Pelly Amendment."

Iceland has flouted international laws since 2003; killing 496 Minke whales and 280 endangered Fin whales and exporting over 2,800 metric tons of whale products to Japan. Despite international pressure to discontinue this barbaric practice, Iceland recently announced plans to resume Fin whaling this season after a two year pause, beginning in June.

"Endangered whales do not belong on a chopping block or dinner table," said Taryn Kiekow, staff attorney with the Natural Resources Defense Council. "The United States can play a pivotal role in ending the slaughter of whales by imposing economic sanctions that send a clear message-whaling is no longer tolerated."

On September 15, 2011, President Obama adopted the Secretary of Commerce's July 2011 "certification" under the Pelly Amendment that Iceland's commercial whaling is undermining the effectiveness of the International Convention for the Regulation of Whaling (ICRW) which has prohibited commercial whaling since 1986. "Iceland's actions threaten the conservation status of an endangered species and undermine multilateral efforts to ensure greater worldwide protection for whales," said President Obama. He directed Cabinet Secretaries to use diplomatic efforts to dissuade Iceland from continuing whaling.

"In the 21st century, for a government to support an industry built from the trade in flesh and other products from slow-to-reproduce marine mammals who can live up to 90 years of age, is reckless and irresponsible," said Kitty Block, vice president of Humane Society International.

'Pelly Sanctions'

"Iceland's actions meet the conditions for Pelly sanctions, and we've provided the U.S. government with the information necessary to target those sanctions at the Hvalur Group, which owns Iceland's Fin whaling industry, and its associated companies, including HB Grandi, Iceland's biggest fishing company," said Millward.

"Iceland has crossed a line by exporting more than 2,800 tons of Fin whale meat and blubber to Japan since 2008, repeatedly defying the international protection for this endangered species afforded by its listing on Appendix I of CITES," said Allan Thornton, president of the Environmental Investigation Agency.

"President Obama, the time for talking about saving whales is past; it's now time for action," said Phil Kline, Oceans Campaigner at Greenpeace, adding "as you said 'commercial whaling has to end'; imposing economic sanctions now will help that happen."

"Iceland's decision to resume international trade in the meat of endangered Fin whales presents the perfect opportunity for the U.S. to put real teeth behind its commitment to treat illegal wildlife trade as a foreign policy priority," said Leigh Henry, Senior Policy Advisor at the World Wildlife Fund. "If the U.S. government is willing to ask others to take action - then they should do the same."

In December 2010, 19 global conservation and animal welfare groups filed a petition to the U.S. Commerce and Interior Secretaries calling for action against Iceland under the Pelly Amendment. The filing identified specific Icelandic companies as potential targets for economic sanctions; including major seafood industry players tied to Iceland's whaling industry. At the centre is the Icelandic Fin whaling company Hvalur hf.

A Leading Marine Biologist Works to Create a 'Wired Ocean'

Stanford University scientist Barbara Block heads a program that has placed satellite tags on thousands of sharks, bluefin tuna, and other marine predators to better understand their life cycles. Now, using data available on mobile devices, she hopes to enlist public support for protecting these threatened creatures.

by Ben Goldfarb

Even as populations of sharks, bluefin tuna, and other large fish are being severely over-exploited, scientists still know surprisingly little about when and where the ocean's biggest predators congregate to feed and spawn, making it difficult to protect biological hot spots. Stanford University marine biologist Barbara Block is seeking to narrow that knowledge gap by deploying an armada of satellite tags on the backs of ocean creatures. Block envisions a wired ocean, a blue fount of data in which tags, smart buoys, and mobile robots reveal the secrets of marine life. She and her colleagues have been involved in the Tagging of Pacific Predators project, a long-running study that has affixed more than 4,000 tags to 23 different species and revealed that the eastern Pacific is a veritable "blue Serengeti," rich with life and traversed by regular migration routes.

In an interview with *Yale Environment 360* contributor Ben Goldfarb, Block — the architect of Shark Net, an app for iPads and iPhones that allows subscribers to track great white sharks off the coast of California — discusses the wealth of data gathered by the latest electronic tags and explains why it's important to put the fruits of this research into the public's hands. "What we need is environmental interest and awareness that connects humans to the world," says Block, "or else we're going to end up with the same problem that we had on the continents, where the large mammals are gone."

Yale Environment 360: I gather you've done a lot of the tag design yourself? How do you create a tag that then stays in these creatures for five years?

Barbara Block: Well, you first have to dream big. And you have to say, "What is it I want to know?" Back in the

mid-90s, we were at the table at big fisheries commission meetings, where we really didn't know where big fish went. And so we asked the question, "How could we study something underneath the sea, that breathes through the gill?" You can't use radio waves because sound has to travel through air primarily to get anywhere... So we used a technique that was first talked about many years ago, in which we took light from the sun and measure photons, so we can actually put together sunrise and sunset data. We have an accurate clock on the tags. It's what mariners have done for all of time — we're using light and time to calculate our position from Greenwich... We try to use the same chips that are in your computer, the same devices that allow you to talk to satellites and cell phones, and we package them in small devices, put them on big animals like white sharks and tunas, and we follow them across the globe. What we're trying to do is figure out how do big animals live in the ocean ecosystem, and where they are. And we've done this through huge tagging campaigns. One was in the Atlantic called "Tag a Giant" that focused on giant bluefin tuna, fish that are up to 1,500 pounds that carry these computer tags, sometimes up to four or five years. And we have a campaign in the Pacific we call "Tagging of Pacific Predators." Over 5,000 animals have been tagged, 80 scientists working together, five nations, trying to figure out how the largest ocean on Earth works.

e360: I imagine that it's incredibly hard to tag something like a blue whale or a white shark.

Block: For every animal it's a different problem. For us, when we come face-to-face with a large shark, the goal is basically to get the tag on the animal with the least amount of challenges for the animal — great white sharks are sometimes as large as 5,000 to 7,000 pounds.

e360: How many of these tags do you have deployed at any given time?

Block: We have a data logger, or an archival tag. But with that archival tag, you have to get it back when humans intercept the fish. You can only put that into an animal that has a huge fishery, like a bluefin tuna. And we've put over 1,500 of those tags in tunas in the Atlantic and the Pacific Ocean. We get about 22 percent back in the Atlantic, 50 percent back in the Pacific, and when they come back, we download the information and find out where the animal's been. But we got tired of waiting for people to turn tags back in. So we worked with engineers and packaged [the tags] into a tube. It's got a little float on the top, and it rides on the tuna, takes the data, rides on the shark, takes the data, pops off a small piece of steel that corrodes away, comes to the surface, and then sends the data back to Earth-orbiting satellites. And then we get data back without any human interception. Then finally, there are tags you can put on the dorsal fin of sharks, and they use radio waves and talk to Earth-orbiting satellites every day. I looked up this morning the location of a salmon shark that came from Alaska to Monterey Bay in the last six months.

e360: One of the cool things that you've done is you've put a lot of this data in the hands of the public. Can you talk a little bit about your efforts to make this stuff publicly available?

Block: We want to engage the public because we've got some of Earth's greatest critters out there, the big sharks and the tunas, and most people look at the ocean and can't even see anything. So it's hard to imagine how we're going to save animals, or build conservation strategies, when you can't even see the animals. So lately what we're trying to do is transmit the data in ways that become browser-friendly on your internet site or iPhone. "Shark Net" is our app. It's free, and it allows you to keep track of great white sharks on the west coast of North America, and hopefully soon we'll bring some other sharks into that.

e360: You've also pioneered a lot of robotic technology, including something called a "wave glider."

Block: The wave glider is built by Liquid Robotics. It's a brand new technology, a green robot, and it's a surfboard that is attached with a unique tether to a sub, or a glider. And it captures the motion of waves, and it is completely powered by the kinetic energy of waves. It then uses solar power to power the instruments on board. And right now we're gliding off the coast of North Carolina and we're seeing things like sand bar sharks, sturgeon, animals that are freely swimming in the sea that use acoustic tags that send sound waves to the underwater glider, which then is transmitted to us in real time through iridium uplinks from the glider.

e360: How many of these gliders do you have out there right now?

Block: Well, the company, Liquid Robotics, might have as many as 150 gliders that are plowing through the ocean looking for everything from natural gas, or oil, to helping us do our biological oceanography. We envision a day when our coastlines can be protected by devices that are telling us what ships are there, telling us in real time how the ocean is today. And then also finding out where these congregations of animals are — the hot spots — so that we might then put a marine protected area around them.

e360: Your Pacific Predator tagging study suggested that marine animals tend to use the same migratory corridors over and over. How do you go about protecting corridors once you've identified them?

Block: Well, we are still just identifying them, but we're dreaming now of how to protect them. Think of a continent as large as Africa, and then imagine that we're working in a geography that's at least ten-fold larger. If you looked at Africa, you might say, where's the Serengeti? Where's the watering hole where you'd see zebras, gazelles, elephants? Well, we're looking for that watering hole in the ocean.

For the complete interview go to : http://e360.yale.edu/feature/a_leading_marine_biologist_works_to_create_a_wired_ocean/2630/

SIGHTINGS Compiled by Monterey Bay Whale Watch.
For Complete listing and updates see
http://gowhales.com/sighting.htm

Date	#	Type of Animal(s)
6/1 a.m.	2	Humpback Whales
	60	Risso's Dolphins
5/31 a.m.	150	Risso's Dolphins
5/29 a.m	17	Humpback Whales
	15	White-sided Dolphins
	100	Risso's Dolphins
	100	Northern Right-whale Dolphins
5/28 a.m	18	Humpback Whales
	40	Pacific White-sided Dolphins
	30	Risso's Dolphins
	10	Dall's Porpoise
5/27 p.m.	2	Humpback Whales
	75	Risso's Dolphins
5/27 a.m	4	Humpback Whales (including mom & calf)
	1	Killer Whale (Stubby)
	85	Risso's Dolphins
5/26 p.m.	4	Killer Whales
5/26 a.m	4	Humpback Whales
	80	Pacific White-sided Dolphins
	400	Risso's Dolphins
5/25 p.m.	2	Humpback Whales
5/25 a.m	4	Humpback Whales (2 double-breaching)
	400	Pacific White-sided Dolphins
	50	Risso's Dolphins
5/19 a.m	11	Humpback Whales
	600	Pacific White-sided Dolphins
	300	Risso's Dolphins
5/18 a.m	7	Humpback Whales
	1200	Pacific White-sided Dolphins
	150	Risso's Dolphins
5/17 p.m.	6	Humpback Whales (3 "friendlies" breaching)
5/17 a.m.	10	Humpback Whales
	80	Risso's Dolphins
5/16 p.m.	1	Blue Whale
	160	Risso's Dolphins
5/16 a.m.	32	Humpback Whales
5/15 a.m	8	Humpback Whales
	1	Blue Whale
	75	Risso's Dolphins
5/14 a.m	3	Humpback Whales
	1	Blue Whale
5/13 a.m	2	Humpback Whales
	1	Blue Whale
	9	Killer Whales
5/12 p.m.	2	Humpback Whales (mother & calf breaching)
5/12 a.m.	5	Humpback Whales
	80	Risso's Dolphins
5/11 p.m	9	Humpback Whales
	50	Pacific White-sided Dolphins
5/11 a.m.	80	Risso's Dolphins
5/10 a.m.	8	Humpback Whales
	60	Risso's Dolphins
5/9 a.m	1	Humpback Whale
	1	Blue Whale
	50	Pacific White-sided Dolphins
	50	Risso's Dolphins
5/8 p.m.	2	Humpback Whales
	10	Harbor Porpoise
5/8 a.m	7	Humpback Whales
	1	Blue Whale
	3	Risso's Dolphins
	10	Harbor Porpoise
5/7 p.m	2	Humpback Whales
	50	Pacific White-sided Dolphins
	200	Risso's Dolphins
5/7 a.m	15	Humpback Whales
	2	Gray Whales (mom and calf snorkeling)
	20	Pacific White-sided Dolphins
	150	Risso's Dolphins
5/6 a.m.	4	Humpback Whales (2 "friendlies")
	100	Pacific White-sided Dolphins
5/5 a.m.	4	Killer Whales
	200	Risso's Dolphins
5/4 a.m	19	Humpback Whales
	50	Pacific White-sided Dolphins
	700	Risso's Dolphins
5/3 p.m.	8	Humpback Whales
	100	Risso's Dolphins
5/3 a.m	11	Humpback Whales
	4	Killer Whales
	100	Risso's Dolphins
5/2 p.m.	10	Humpback Whales
	60	Risso's Dolphins
5/2 a.m.	16	Humpback Whales
	1000	Risso's Dolphins
5/1 p.m	14	Humpback Whales
	1	Gray Whale
	20	Risso's Dolphins
5/1 a.m	20	Humpback Whales
	4	Killer Whales
	30	Pacific White-sided Dolphins
	100	Risso's Dolphins
	10	Harbor Porpoise
4/30 a.m.	1	Humpback Whale
	50	Risso's Dolphins
4/29 a.m.	28	Humpback Whales
	14	Killer Whales
	200	Pacific White-sided Dolphins
	100	Risso's Dolphins
	1	Northern Sea Lion eating a skate
4/28 p.m.	5	Humpback Whales
	2	Gray Whales
4/28 a.m.	9	Humpback Whales
4/27 a.m.	1	Humpback Whale
	8	Killer Whales
4/26 a.m.	5	Humpback Whales
	30	Pacific White-sided Dolphins
	500	Risso's Dolphins
	5	Northern Right Whale Dolphins
4/25 p.m.	7	Humpback Whales
	20	Risso's Dolphins
4/25 a.m.	5	Humpback Whales

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AMERICAN CETACEAN SOCIETY

MONTEREY BAY CHAPTER

ANNUAL BARBEQUE!

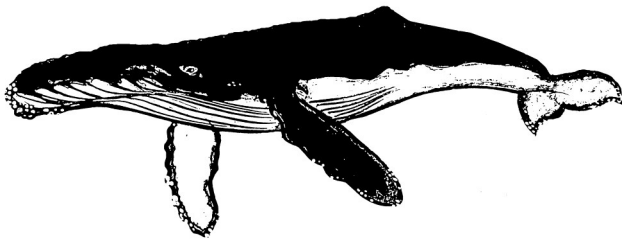
******HONORING KATY CASTAGNA******

FOR DECADES OF SERVICE AS A PREVIOUS NATIONAL CHAPTER PRESIDENT AND OUR TREASURER

When: July 27, 2013 from 3 pm until dusk

Where: Veteran's Memorial Park, Monterey

Drive due west on Jefferson St. (up the hill) from the heart of Monterey, our area is on the left. Or take Highway 68 west from Highway 1 to Skyline **Forest.** Turn right there, go to Skyline **Drive** and turn left. Skyline Drive will lead you right into the Park. Our area is on the right if coming on Skyline.



What: Tri-tip, chicken, veggie burgers, salad, beans, soft drinks, water. Good friends. Fun raffle, so bring some bills.

Cost: $20, under 12= ½ price.

Please bring your own table service and byob.

Send payment to reserve your dinners to: ACS, P.O. Box HE, Pacific Grove, CA 93950(checks to ACS)

Questions: call Sally Eastman 372-6919 or

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CALENDAR

July 20: 12 noon-5pm: 2013 MBARI's Open House Moss Landing, CA. For a full description of the day's events and lectures go to www.mbari.org/openhouse

UCSC Summer Ocean Sciences Classes
At Long Marine Lab
July 29 to August 30 Summer Session 2
Biology of Marine Mammals; Bio 129-01
Biology of Marine Mammals: Laboratory

August 10: ACS National Fundraiser: Blue Whale Watch: Behemoths of the Deep. Santa Barbara, CA 8am-4 pm Vessel-Condor Express. For inquiries contact Diane Alps at (424) 888-4346

Moss Landing Marine Lab
Fall Course Offerings

MLML Classes: Graduate and undergraduate students, as well as community members, can take classes at MLML. Most MLML classes are day-long, usually have a lecture component in the morning and lab in the afternoon, and meet once per week at the main MLML facility in Moss Landing, CA. Most classes are offered for 4 units, so visiting students are encouraged to take no more than one class per semester. Go to *http://gradprog.mlml.calstate.edu/taking-courses* for more information

Monday
MS 135 Physiology of Marine Algae
MS 285 Graduate Seminar in Marine Science-Topics in Marine Conservation Biology: Large Marine Ecosystems

Tuesday
MS 104 Quantitative Marine Science
MS 202 Oceanographic Instrumentation

Wednesday
MS 141 Geological Oceanography

Thursday
MS 103 Marine Ecology
MS 142 Physical Oceanography
MS 274 Advanced Topics in Oceanography-Marine Sedimentation

Friday
MS 105 Marine Science Diving

BOOK RECOMMENDATIONS

About Monterey Humpbacks: Tales of Whales by Esta Lee Albright.

A wonderful introduction to the California/ Mexico population of Humpbacks that spend their feeding season foraging in the prolific waters of Monterey Bay. This book is written by Esta Lee Albright who spent 20 years as a naturalist with Monterey Bay Whale Watch. She observed and studied Monterey Humpbacks while a naturalist in Monterey Bay. This book offers some of her astute observations about a population of whales that is often overlooked when compared with other populations of humpback whales found around the world. This book will be available at Monterey Bay Whale at the beginning of August.

A Field Guide to the Wildlife of South Georgia

(Wild Guides) by Robert Burton and John Croxall. Princeton University Press

Reptiles and Amphibians of the Pacific Islands: A Comprehensive Guide.

Written by George R. Zug. 2013 UC Press

Pterosaurs: Natural History, Evolution, Anatomy
Mark P. Witton. 2013 Princeton University Press

NOAA DECIDES AGAINST LISTING GREAT WHITE SHARKS AS ENDANGERED

Great white sharks in the northeastern Pacific, including California, are not in danger of becoming extinct, according to NOAA Fisheries, and will not be listed under the Endangered Species Act.

NOAA had consented to consider listing white sharks as endangered in response to two petitions submitted last year. In a news release issued Friday, the federal agency explained that a team of eight scientists determined, based on review of the best available science, that white sharks in the northeast Pacific--from the Bering Sea to Mexico, and westward to Hawaii--have "a low to very low risk of extinction now and in the foreseeable future."

While conservation groups and some in research circles will argue that white shark numbers are low enough to warrant listing--one recent study placed the California population at only 219 adult sharks--others believe that long-standing conservation efforts are working and that the population might actually be increasing.

"I keep saying that the recovery of the white shark population is probably one of California's greatest success stories," said Christopher Lowe, director of the Shark Lab at Cal State Long Beach. "And it's based on the fact that it takes more than just protection of white sharks from fishing mortality back in the mid 1990s to accomplish this.

"It has required improving water quality, restoring prey for juveniles and adults through better fisheries management and protection. Just look at the amazing recovery seal and sea lions have made off California alone!"

The Monterey Bay Aquarium, which has temporarily displayed live white sharks in the past and has participated in research projects with Stanford University and other institutions, issued a statement in which Margaret Spring, vice president of conservation of science, stated:

"The aquarium appreciates NOAA's thorough review and synthesis of the best available information on great white shark status and threats. We are fully committed to supporting rigorous science, public education efforts and ocean policy reform to ensure that great white sharks do not become more vulnerable in the future.

"For more than a decade, the Monterey Bay Aquarium and our research colleagues from Stanford, UC Davis, CSU Long Beach and other institutions have generated most of the data about adult and juvenile great white sharks in the northeastern Pacific. We will continue this work so we can gain a better understanding of population trends and the overall health of sharks that play a vital role in ocean health."

In California, the Farallon Islands and other Bay Area waters are primary seasonal aggregation spots for adult white sharks. They arrive each late-summer and fall to feed at elephant seal rookeries.

In Mexico, Guadalupe Island west of Baja California is the primary gathering place for white sharks during the same feeding season.

While these are primary aggregation sites, some scientists believe that because of the burgeoning sea lion population off the West Coast, particularly off Southern California, not all adult white sharks need to visit elephant seal rookeries each fall. Thus, it's impossible to formulate an accurate population estimate.

Lowe, who has worked extensively with juvenile sharks off Southern California, cites as contributing factors for what he believes is a growing population: The Marine Mammal Protection Act of 1972; the removal of coastal gill-nets under Prop. 132 in 1990, and a long-standing California ban on fishing for white sharks.

"It's always a good sign when the big predators start to return to coastal ecosystems," Lowe said. "It means we're doing some right to correct for our past abuses of the ocean. Of course, we're not out of the woods yet, as there will always be new emerging problems as a result of an ever-growing human population. But this shows we have the ability to fix things when we put money and political will toward it."

Some of those problems exist in Mexico, and particularly off Baja California, where there is no ban on near-shore netting, and where juvenile white sharks are often caught and killed by fishermen.

--Pete Thomas

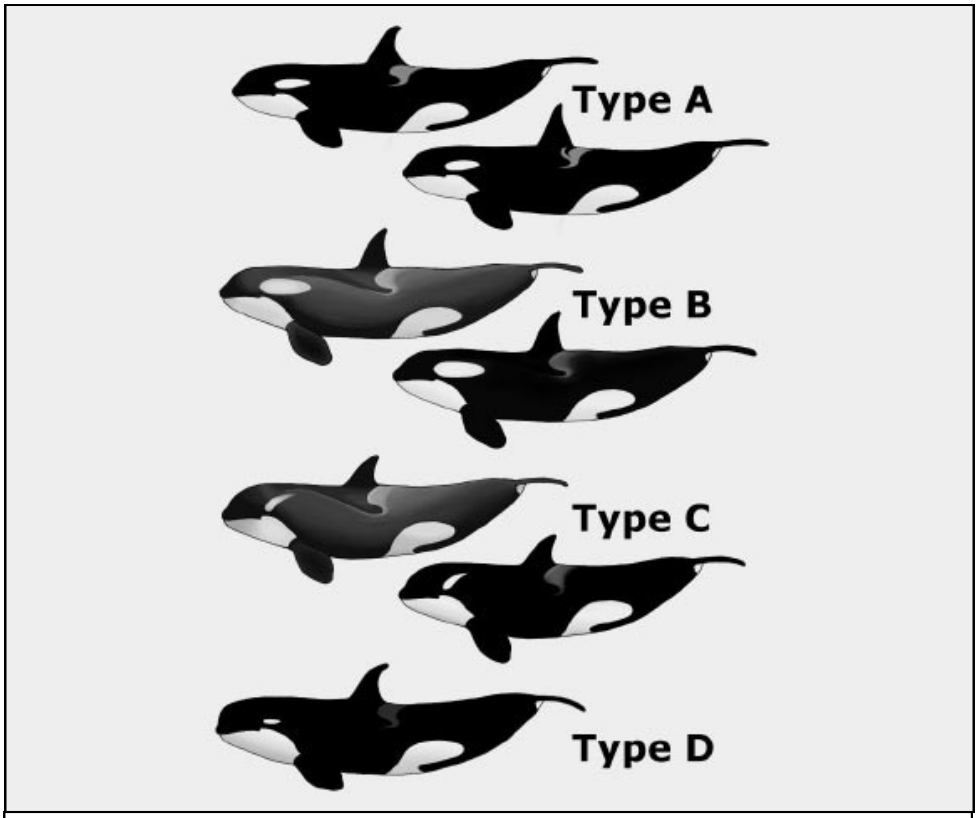
http://www.petethomasoutdoors.com/2013/06/noaa-decides-against-listing-great-white-sharks-as-endangered.html

DNA Study Suggests Extremely Rare Type D Killer Whale May Be New Species

Jun 24, 2013 by Natali Anderson

Scientists led by Dr Thomas Gilbert from the University of Copenhagen have used DNA from a museum specimen collected in 1955 to study what may be a distinct subspecies or species of killer whale (Orcinus orca).

In 1955, a pod of unusual-looking killer whales stranded on a New Zealand beach and a skeleton was saved in a museum in Wellington. Photographs were also taken but it was almost 50 years before this unique form of killer whale, characterized by a very small white eye-patch and bulbous forehead, was documented alive in the wild.



Types of killer whale. The type D killer whale is immediately recognizable by its extremely small white eye patch, shorter than usual dorsal fin, and bulbous head (Albino Orca / CC BY-SA 3.0)

Marine scientists have suspected for some time that there might be more than one type of killer whale, a theory supported by recent genetic studies. The so-called 'type D' killer whale from New Zealand, however, was not included in previous genetic studies because no tissue samples were available.

For the current study reported in the journal *Polar Biology*, the scientists extracted DNA from dried tissue and tooth fragments from the New Zealand skeleton, the only known specimen of type D killer whale.

A complete mitochondrial DNA sequence of the type D specimen was compared to samples of 139 killer whales from around the world. From that, the researchers estimated that type D separated from other killer whales approximately 390,000 years ago, making it the second oldest branch in the killer whale family tree and possibly a separate subspecies or species. "Dramatic changes in global sea level and ice sheet coverage during the Pleistocene may have contributed to the diversification of killer whales."

Bibliographic information: Andrew D. Foote et al. Mitogenomic insights into a recently described and rarely observed killer whale morphotype. *Polar Biology*, published online June, 2013; doi: 10.1007/s00300-013-1354-0

How Diving Mammals Evolved Underwater Endurance

June 13, 2013 — Scientists at the University of Liverpool have shed new light on how diving mammals, such as the sperm whale, have evolved to survive for long periods underwater without breathing.

The team identified a distinctive molecular signature of the oxygen-binding protein myoglobin in the sperm whale and other diving mammals, which allowed them to trace the evolution of the muscle oxygen stores in more than 100 mammalian species, including their fossil ancestors.

Myoglobin, which gives meat its red colour, is present in high concentrations in elite mammalian divers, so high that the muscle is almost black in colour. Until now, however, very little was known about how this molecule is adapted in champion divers.

Proteins tend to stick together at high concentrations, impairing their function, so it was unclear how myoglobin was able to help the body store enough oxygen to allow mammals, such as whales and seals, to endure underwater for long periods of time

without breathing. Elite mammalian divers can hold their breath for over an hour while they hunt in the depths of the oceans, while land mammals, such as humans, can hold their breath for only a few minutes. Dr Michael Berenbrink, from the University's Institute of Integrative Biology, who led the international team, explains: "We studied the electrical charge on the surface of myoglobin and found that it increased in mammals that can dive underwater for long periods of time. We were surprised when we saw the same molecular signature in whales and seals, but also in semi-aquatic beavers, muskrats and even water shrews.

"By mapping this molecular signature onto the family tree of mammals, we were able to reconstruct the muscle oxygen stores in extinct ancestors of today's diving mammals. We were even able to report the first evidence of a common amphibious ancestor of modern sea cows, hyraxes and elephants that lived in shallow African waters some 65 million years ago."

Dr. Scott Mirceta, PhD student on the project, added: "Our study suggests that the increased electrical charge of myoglobin in mammals that have high concentrations of this protein causes electro-repulsion, like similar poles of two magnets. This should prevent the proteins from sticking together and allow much higher concentrations of the oxygen-storing myoglobin in the muscles of these divers."

"We are really excited by this new find, because it allows us to align the anatomical changes that occurred during the land-to-water transitions of mammals with their actual physiological diving capacity. This is important for understanding the prey items that were available to these extinct animals and their overall importance for past aquatic ecosystems."

The research, funded by the Biotechnology and Biological Sciences Research Council (BBSRC), could also help improve understanding of a number of human diseases where protein aggregation is a problem, such as Alzheimer's and diabetes, and could inform the development of artificial blood substitutes. Dr Berenbrink added: "This finding illustrates the strength of combining molecular, physiological and evolutionary approaches to biological problems and, for the first time, allows us to put 'flesh' onto the bones of these long extinct divers."

University of Liverpool (2013, June 13). How diving mammals evolved underwater endurance. ScienceDaily. Retrieved July 6, 2013, from http://www.sciencedaily.com- / releases/2013/06/130613142812.htm#

Harbor Porpoises Can Thank Their Worst Enemy, the Killer Whale, for Their Success

June 12, 2013 — The harbor porpoise (*Phocoena phocoena*) is a whale species that is doing quite well in coastal and busy waters. They are found in large numbers throughout the Northern Hemisphere from Mauritania to Alaska, and now researchers from the University of Southern Denmark explain why these small toothed whales are doing so well: The harbor porpoise can thank their worst enemy, the killer whale, for their success. Coastal areas are more challenging and potentially dangerous for a small whale. There is a risk of beaching and being caught in a fisherman's net, but there are also benefits. Fish are plentiful and easier to find in coastal waters than in the open sea.

Therefore, coastal waters are attractive for porpoises, and they are extremely skilled at navigating, locating prey and avoiding hazards near the coast. Like other toothed whales porpoises use echolocation for orientation and to detect prey. They emit a constant stream of sonar clicks, which, when these hit a rock, a fish or a ship nearby an echo is sent back to the porpoise. From the echo, the porpoise can distinguish the location of the object and often also can identify the object.

Porpoises can locate even small fish and small objects such as net floats and fine fishing nets. This ability sets them apart from many other toothed whales, which do not have such sophisticated echolocation abilities. The secret of this ability is that the porpoise uses very short clicks and these are higher in frequency than those of many other toothed whales, explains Lee Miller from the Institute of Biology, University of Southern Denmark (SDU).

Porpoise clicks last just a hundred-millionth of a second, and are about 130 kHz. For comparison, a human can hear up to 20 kHz and a dog up to about 60 kHz.

Lee Miller and his colleague Magnus Wahlberg, also from the Institute of Biology, SDU, now believe that they have found an explanation why porpoise clicks are so high in frequency. They point at the porpoise's greatest enemy: the killer whale. This is one of their conclusions in a research article in the journal Frontiers in Physiology.

"Over millions of years the porpoise has

evolved its ability to emit very high frequency click sounds that killer whales have difficulty hearing since they cannot hear sounds that are much higher than about 100 kHz. Killer whale hearing is best at around 20 kHz, so it is hard for them to detect a porpoise," explains Lee Miller.

The ancestor of whales emerged about 50 million years ago, and the first toothed whales began to use echolocation about 30 million years ago.

"5-10 million years ago the killer whale emerged and then evolution began to favor the toothed whales that could avoid being captured by killer whales. One way to avoid being eaten was to emit echolocation sounds that were difficult for killer whales to detect -- thus an ability favored by evolution, "concludes Lee Miller and Magnus Wahlberg in their research article.

Strange as it may sound, porpoises can thank their worst enemy, the killer whale, that they are doing so well in coastal and busy waters.

But why do many species of porpoises and other small toothed whales emit echolocation sounds at about 130 kHz? Why not click at even higher frequencies?

"These frequencies are the most effective for porpoises. Besides avoiding killer whales, there is another advantage: It is also at these frequencies that natural noise in the ocean is the lowest. Thus porpoises can better hear the echoes from objects and prey when using these clicking sounds, "explains Lee Miller.

University of Southern Denmark (2013, June 12). Harbor porpoises can thank their worst enemy, the killer whale, for their success. ScienceDaily. Retrieved July 6, 2013, from http://www.sciencedaily.com- /releases/2013/06/130612101901.htm#

RIGHT ON! FIRST BC RIGHT WHALE SIGHTING IN 62 YEARS

JUNE 20, 2013 By Scott Wallace, Senior Research Scientist

After 62 years, there's new hope for one of the rarest animals on earth. A lone Pacific right whale has been sighted off the BC coast near Haida Gwaii. This news is about as exciting as it gets for this once abundant giant whale and for all those who care deeply about the survival of critically endangered species.

I studied right whales on the Atlantic side of Canada during my graduate studies at Dalhousie University so I've always been keenly interested in right whale stories. But they were stories, not sightings. I never imagined that a right whale would be seen again in this area of the Pacific.

The entire population of North Pacific right whales was reduced dramatically by hunting, with only a few tens of animals thought to be alive in the eastern North Pacific, and possibly a few hundred in the entire North Pacific. At one time, right whales were abundant throughout the North Pacific, including British Columbia. It is estimated that 26,500-37,000 animals were killed during intensive whaling in the 1800s, mostly by American whalers but also those in British Columbia. Hunting has been banned since 1935.

The fact that this lone whale was observed during one of the Department of Fisheries and Oceans research surveys highlights the importance of continued scientific monitoring of our marine ecosystems. And it speaks to the short sightedness of recent cuts to research programs. Over the last few years several marine research initiatives — from contaminant monitoring to commercial fisheries — have received deep budget cuts or have been abolished altogether.

While it's hard to say why the right whale has come back to our coast now, one thing is certain: our actions are key to the survival of endangered species. And this rare sighting brings us hope that with careful conservation measures, resilient ecosystems can, indeed rebound.

http://www.davidsuzuki.org/blogs/healthy-oceans-blog/2013/06/right-on-first-bc-right-whale-sighting-in-62-years/#

SIGHTINGS Compiled by Monterey Bay Whale Watch.
For Complete listing and updates see
http://gowhales.com/sighting.htm

Date	#	Type of Animal(s)
7/5 a.m.	1	Humpback Whale
	9	Blue Whales
	1	Killer Whale (Fat Fin)
7/4 late p.m.	1	Humpback Whale
	1	Blue Whale
7/4 p.m.	15	Humpback Whales
	8	Blue Whales
	1	Killer Whale (Fat Fin)
	35	Risso's Dolphins
7/4 a.m.	6	Humpback Whales
	32	Blue Whales
	1	Killer Whale (Fat Fin)
	10	Risso's Dolphins
	7	Dall's Porpoise
7/3 late p.m.	1	Humpback Whale
	1	Blue Whale
	10	Dall's Porpoise
7/3 p.m.	9	Humpback Whales
	14	Blue Whales
	3	Risso's Dolphins
7/3 a.m.	1	Humpback Whale
	20	Blue Whales
7/2 late p.m.	15	Risso's Dolphins
7/2 p.m.	2	Humpback Whales
7/2 a.m.	3	Humpback Whales
	4	Blue Whales
	40	Risso's Dolphins
	3	Dall's Porpoise
7/1 late p.m.	1	Humpback Whale
	20	Risso's Dolphins
7/1 p.m.	10	Harbor Porpoise
7/1 a.m.	1	Humpback Whale
	10	Risso's Dolphins
	5	Dall's Porpoise
	5	Harbor Porpoise
6/30 a.m.	3	Humpback Whales
6/29 a.m.	6+	Humpback Whales
	18+	Blue Whales
	2	Fin Whales
	40	Risso's Dolphins
6/27 a.m.	1	Humpback Whale
	30	Pacific White-sided Dolphins
6/26 p.m.	1	Humpback Whale
	2	Blue Whales
	5	Risso's Dolphins
6/26 a.m.	2	Blue Whales
	200	Risso's Dolphins
	10	Northern Right-whale Dolphins
6/25 p.m.	1	Humpback Whale
	15	Risso's Dolphins
6/25 a.m.	2	Humpback Whales
	7	Killer Whales
6/24 p.m.	300	Risso's Dolphins
6/24 a.m.	2	Killer Whales
6/23 p.m.	2	Killer Whales
	25	Harbor Porpoise
6/23 a.m.	2	Killer Whales
	50	Risso's Dolphins
6/22 a.m.	4	Humpback Whales
	1	Blue Whale
	75	Pacific White-sided Dolphins
	120	Risso's Dolphins
	1	Northern right-whale dolphin
6/21 p.m.	8	Humpback Whales
	50	Risso's Dolphins
6/21 a.m.	13	Humpback Whales
	200	Pacific White-sided Dolphins
	50	Risso's Dolphins
6/20 a.m.	7	Humpback Whales
	150	Pacific White-sided Dolphins
	20	Risso's Dolphins
6/19 a.m.	2	Humpback Whales
6/18 a.m.	1	Humpback Whale
	2	Blue Whales
	10	Pacific White-sided Dolphins
	20	Risso's Dolphins
	10	Bottlenose Dolphins
6/17 a.m.	1	Humpback Whale
	1	Blue Whale
	20	Risso's Dolphins
	10	Dall's Porpoise
6/16 p.m.	2	Blue Whales
	3	Bottlenose Dolphins
6/16 a.m.	4	Humpback Whales
	3	Blue Whales
	2	Killer Whales (Fat Fin & Stubby)
	50	Pacific White-sided Dolphins
	260	Risso's Dolphins
6/15 p.m.	10	Humpback Whales
	4	Blue Whales
	200	Pacific White-sided Dolphins
	100	Risso's Dolphins
6/15 a.m.	15	Humpback Whales
	4	Blue Whales
	2	Killer Whales (Fat Fin & Stubby)
	300	Pacific White-sided Dolphins
	500	Risso's Dolphins
6/14 a.m.	5	Humpback Whales
	1	Blue Whale
	30	Risso's Dolphins
	6	Dall's Porpoise
6/13 a.m.	2	Humpback Whales
	1	Blue Whale
	20	Pacific White-sided Dolphins
	30	Risso's Dolphins
6/12 a.m.	6	Humpback Whales
6/11 p.m.	2	Humpback Whales
	50	Risso's Dolphins

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AUGUST 2013

**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**

AUGUST MEETING DATE:

Thursday, August 29, 2013
Time: 7:30 PM. PLEASE JOIN US AT 7:00 FOR REFRESHMENTS

Speaker: Bob Wilson
Title: Polar Bears In A Changing World

Bob Wilson, a founder of Polar Bears International and a board member of the Farallones Marine Sanctuary Foundation, will talk about polar bears and the threats they face in a warming world when the Monterey Bay Chapter of the American Cetacean Society meets on Thursday, August 29.

The polar bears are as dependent on oceans as whales and dolphins, they just like it frozen. Bob will discuss the biology of the bears and the challenges they face as polar ice melts. He will share his appreciation of these great creatures.

Bob Wilson is a Director Emeritus for The Marine Mammal Center and is currently on the Position and Policy Committee and liason with other environmental groups. He has been a volunteer crew member and member of the rescue team for over 30 years. He is currently the CFO of the Farallones Marine Sanctuary Association and has served as past chair and interim Executive Director. He is also a long time member of the Beach Watch program.

He has been actively involved in the Marine Life Protection Act process and served as a stakeholder for the North Central Coast process establishing a series of marine reserves and special closure areas including those in the GFNMS, especially the Farallon Islands.

He was a member of the team that established the USCG procedures for use of volunteers in oil spills. He was a founder and long term board member of Polar Bears International and served as board chair and CFO. He is currently on the audit committee of the Desert Tortoise Preservation committee. He is also a member of the advisory committee of the Snow leopard Trust.

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CALENDAR

Next month: Thursday, Sept. 26**,** 7 p.m. , in the Monterey Boat Works building at Hopkins Marine Station -- Harbor porpoises and bottlenose dolphins return to San Francisco Bay , a program presented by biologists from Golden Gate Cetacean Research.

Mark your calendars: The October meeting will be on Oct. 24 instead of the usual last Thursday of the month in order to avoid any conflict with Halloween activities.

SIGHTINGS compiled by Monterey Bay Whale Watch. For complete listing and updates see *www.gowhales.com/sighting.htm*

Date	#	Type of Animal(s)
8/2 p.m.	5	Humpback Whales
	25	Harbor Porpoise
8/2 a.m.	9	Humpback Whales
	3	Harbor Porpoise
8/1 a.m.	6	Humpback Whales
7/31 p.m.	6	Humpback Whales
7/31 a.m.	15	Humpback Whales
	2	Blue Whales
	20	Risso's Dolphins
7/30 p.m.	12	Humpback Whales
	10	Dall's Porpoise
7/30 a.m.	12	Humpback Whales
	2	Blue Whales
	100	Risso's Dolphins
7/29 p.m.	6	Humpback Whales (w/very active calf)
	1	Blue Whale
	5	Dall's Porpoise
7/29 a.m.	4	Humpback Whales
	1	Blue Whale
	250	Risso's Dolphins
7/28 late p.m.	1	Humpback Whale (breaching repeatedly)
	1	Blue Whale
	40	Risso's Dolphins
7/28 p.m.	3	Humpback Whales
	2	Blue Whales
	25	Risso's Dolphins
	3	Dall's Porpoise
7/28 a.m.	4	Humpback Whales
	3	Blue Whales
	225	Risso's Dolphins
7/27 late p.m.	5	Humpback Whales
	1	Blue Whale
	255	Risso's Dolphins
7/27 p.m.	3	Humpback Whales
	3	Blue Whales
	20	Risso's Dolphins
	10	Dall's Porpoise
7/27 a.m.	14	Humpback Whales
	7	Blue Whales
	1	Killer Whale (Stumpy)
	200	Risso's Dolphins
7/26 late p.m.	8	Humpback Whales
	5	Blue Whales
	42	Risso's Dolphins
7/26 p.m.	5	Humpback Whales
	7	Blue Whales
	30	Risso's Dolphins
	3	Dall's Porpoise
7/26 a.m.	5	Humpback Whales
	6	Blue Whales
7/25 late p.m.	2	Humpback Whales
	5	Blue Whales
	12	Risso's Dolphins
7/25 p.m.	4	Humpback Whales
	8	Blue Whales
	1	Minke Whale
	30	Risso's Dolphins
7/25 a.m.	5	Humpback Whales
	4	Blue Whales
	200	Risso's Dolphins
	6	Bottlenose Dolphins
7/24 late p.m.	5	Humpback Whales
	6-10	Blue Whales
	100	Risso's Dolphins
7/24 p.m.	11	Humpback Whales
	4	Blue Whales
	10	Risso's Dolphins
7/24 a.m.	3	Humpback Whales
	4	Blue Whales
	7	Risso's Dolphins
7/23 p.m.	2	Humpback Whales
	3	Blue Whales

California's Drift Gillnet Fishery Too Deadly for Endangered Sperm Whales

Feds Refuse to Issue Marine Mammal Permit

SAN FRANCISCO— The National Marine Fisheries Service this week declined to issue a required marine mammal take permit for California's swordfish drift gillnet fishery in light of the recent entanglement of two sperm whales, but agreed to call a special meeting next week to discuss possible emergency measures to allow the fishery to continue operating legally while reducing interactions with these endangered whales

The government on Monday reversed course after issuing a draft permit last month for the fishery to kill and seriously injure endangered sperm, fin and humpback whales. More than 13,000 comments were submitted in opposition to the permit.

"This is a huge victory for sperm whales and other marine mammals. Nobody wants this many whales to die in California gillnets for a swordfish steak," said Catherine Kilduff with the Center for Biological Diversity. "These incredible whales are already struggling under the stress of climate change, loud noises from military exercises and other threats. At the very least we can ensure they don't get snared in indiscriminate fishing nets."

Drift gillnet fishing involves setting out mile-long nets at dusk that drift freely where fish, sharks, turtles and marine mammals feed during the night. The boats retrieve the nets the next day and haul in whatever catch has been ensnared in the nets. On average this California fishery — which primarily operates between Aug. 15 and Jan. 31 — catches and discards more than 100 protected whales, dolphins, seals and sea lions each year, as well as thousands of sharks and other non-target fish. The vast majority are dumped back into the ocean, many dead or injured.

"Whales, dolphins, sea lions and thousands of non-target fish are killed in drift gillnets off California each year, said Ben Enticknap Pacific Campaign Manager and Senior Scientist at Oceana. "It's time to stop the use of deadly drift gillnets and transition to clean, selective gear types like the existing harpoon fishery for swordfish."

In April 2013 a federal report ranked California's drift gillnet fishery one of the nation's deadliest fisheries for marine mammals. The National Marine Fisheries Service says that, on average, more than 3 endangered sperm whales are killed every year by the fishery — more than twice the number federal scientists say the population can sustain and still recover. The agency is proposing to make the California gillnet fishery one of two U.S. commercial fisheries in the Pacific classified as a "Category 1" fishery, a designation for those with "frequent" incidents of death and injuries to marine mammals. The other is the Hawaii tuna longline fishery. Oregon and Washington have already banned their fishing vessels from landing swordfish caught by drift gillnets, leaving California as the last remaining state on the west coast allowing this destructive fishing gear.

Sperm whales have been protected under the Endangered Species Act since 1970. The California-Oregon-Washington stock of sperm whales are found year-round in California waters and reach peak abundance between April and mid-June and from the end of August through mid-November. In Washington and Oregon they have been seen in every season except winter. Deep divers known to prey on the elusive giant squid, females grow to 36 feet and 15 tons and males reach 52 feet and weight as much as 45 tons. Newborn calves are about 13 feet long.

"This swordfish driftnet fishery indiscriminately kills whales, dolphin and sharks and should be shut down forever. Why should we allow this fishery to kill endangered species to deliver seafood known to be so high in mercury that the FDA has issued an advisory warning women and children not to consume swordfish, the target species?" said Todd Steiner, biologist and executive director of SeaTurtles.org.

The Center for Biological Diversity, Oceana and Turtle Island Restoration Network requested emergency regulations and filed a notice of intent to sue the federal government under the Endangered Species Act in September 2012 because of the alarming killing and injury of

sperm whales, and other new information, suggested the government was overlooking the fishery's impact on endangered species. Conservation groups' efforts in prior years have forced the fishery to implement closed areas to protect loggerhead and leatherback sea turtles.

Military Sonar Can Alter Blue Whale Behavior: Human-Made Noises Cause Ocean Giants to Move Away from Feeding Spots

July 3, 2013 — Some blue whales off the coast of California change their behavior when exposed to the sort of underwater sounds used during U.S. military exercises. The whales may alter diving behavior or temporarily avoid important feeding areas, according to new research.

The Southern California Behavioral Response Study exposed tagged blue whales in the California Bight to simulated mid-frequency (3.5-4 kHz) sonar sounds significantly less intense than the military uses.

"Whales clearly respond in some conditions by modifying diving behavior and temporarily avoiding areas where sounds were produced, said lead author Jeremy Goldbogen of Cascadia Research. "But overall the responses are complex and depend on a number of interacting factors," including whether the whales were feeding deep, shallow or not at all.

The study, funded by the U.S. Navy Chief of Naval Operations Environmental Readiness Division and the U.S. Office of Naval Research, appears July 3 in the Proceedings of the Royal Society B.

The scientists tagged the whales with non-invasive suction cups, which recorded acoustic data and high-resolution movements as the animals were exposed to the controlled sounds.

"The tag technology we use offers a unique glimpse into the underwater behavior of whales that otherwise would not be possible," said Ari Friedlaender, a research scientist at the Duke Marine Laboratory.

The scientists found that some of the whales engaged in deep feeding stopped eating and either sped up or moved away from the source of the noise. Not all of the whales responded to the noise, and not all in the same way.

"Blue whales are the largest animals that have ever lived. Populations globally remain at a fraction of their former numbers prior to whaling, and they appear regularly off the southern California coast, where they feed," said John Calambokidis, one of the project's lead investigators of Cascadia Research.

That area of the ocean is also the site of military training and testing exercises that involve loud mid-frequency sonar signals. Such sonar exercises have been associated with several unusual strandings of other marine mammal species (typically beaked whales) in the past. Until this study, almost no information was available about whether and how blue whales respond to sonar.

"These are the first direct measurements of individual responses for any baleen whale species to these kinds of mid-frequency sonar signals," said Brandon Southall, SOCAL-BRS chief scientist from SEA, Inc., and an adjunct researcher at both Duke and the University of California Santa Cruz. "These findings help us understand risks to these animals from human sound and inform timely conservation and management decisions."

A related paper published July 3 by the same research team in Biology Letters has shown clear and even stronger responses of Cuvier's beaked whales to simulated mid-frequency sonar exposures. Beaked whales showed a variety of responses to both real, military sonar in the distance and nearby simulated sonar. What the beaked whales were doing at the time appeared to be a key factor affecting their reactions.

Are North Atlantic Right Whales Mating in the Gulf of Maine?

July 24, 2013 — Using data obtained during six years of regular aerial surveys and genetics data collected by a consortium of research groups, scientists have strengthened evidence pointing to the central Gulf of Maine as a mating ground for North Atlantic right whales, according to a study recently published online in

the journal *Endangered Species Research*.

The North Atlantic right whale (*Eubalaena glacialis)* is one of the most endangered marine mammal species in the world and has been intensively studied for decades. Much has been learned about its habitat, behavior, and population demographics. But until now, there was little to indicate where these whales mated, a big missing piece in the puzzle of their life history.

"A high proportion of potential mates aggregated in the central Gulf of Maine between November and January, and these same individuals produced a calf a year later. We concluded that this is a pretty strong indication of a mating ground if the gestation period is 12 months," said Tim Cole, lead author and a biologist at the Woods Hole Laboratory of NOAA's Northeast Fisheries Science Center (NEFSC).

Through aerial surveys, the researchers documented not only how many but also which right whales were present in the study area during 2002-2008. Individual animals were identified using a photo identification catalog maintained at the New England Aquarium that includes most of the adults in the population. Using genetic data gathered in other field work, known fathers seen in the surveys were identified, as were known mothers, who were identified by association with a calf.

The resulting analyses showed that the animals seen included a higher proportion of reproductively successful animals than were present in other areas that these whales used seasonally. The researchers further assumed a 12-month gestation period for North Atlantic right whales, similar to that estimated for the closely related southern right whale (*Eubalaena australis*) by the South African whale biologist Dr. Peter Best.

How definitive is the study? Cole says that while it's a strong indicator, there could well be other mating areas, and its not clear how fixed the areas might be. In fact, since the study ended, fewer right whales have been observed in the area during what would be the mating period. The study also found a similar, if less dramatic, indication that Roseway Basin -- an area south of Nova Scotia -- may also serve as a mating ground.

"We are still seeing right whales in the central Gulf of Maine, just not in the same numbers. They are still out there, but *where* they all are is the big question. The decline is significant, so something appears to have changed," Cole said. "The good news is that calf production has been fairly good, with 22 calves born in 2011, 7 in 2012, and 20 this past winter. It will be interesting to see how many calves are born next year."

Most of the North Atlantic right whale population spends the spring and summer on feeding grounds off the northeastern U.S. and the Canadian Maritimes. In late fall and early winter, pregnant females migrate to waters off the southeastern U.S. to give birth. Mothers and calves are detected during intensive aerial surveys conducted from December through March off the coasts of Florida, Georgia, South Carolina, and North Carolina. Mothers and calves return to the northeast feeding grounds in the early spring, and the calves stay with their mothers for a year following birth.

Recovery of this endangered species depends on successful reproduction, but current reproductive rates for North Atlantic right whales are much lower than those for the recovering populations of southern right whales. The reasons for this are unknown, but may include a low level of genetic variability and /or inbreeding, disease, biotoxins, pollutants, food supply limitations, and habitat loss. Increased ocean noise from coastal development could also impact the species by triggering behavioral changes that negatively impact reproduction. Determining the right whale's conception period and mating grounds are important steps in learning about the factors that may be impairing reproduction.

In addition to Cole, study authors included Allison Glass Henry, Peter Duley and Richard Pace from NOAA's Northeast Fisheries Science Center; Philip Hamilton from the New England Aquarium; Bradley White from Trent University in Ontario, Canada; and Tim Frasier from St. Mary's University in Halifax, Nova Scotia,Canada.

KILLER WHALE GENETICS: REDEFINING STOCK STRUCTURE IN A MARINE TOP PREDATOR

July 11, 2013 — Found in every ocean around the world, killer whales are a force to be reckoned with globally. Their remarkable social bonds and sophisticated hunting techniques make them top predators in their salty domain. For many years, it was assumed that these clever, highly mobile whales bred with each other freely in the seemingly homogeneous ocean. As our understanding of the oceans' complexity has grown, and dedicated researchers have peered ever deeper into the world of killer whales, it has become clear that the truth is far more nuanced.

As the agency responsible for conserving and managing killer whales in U.S. waters, the National Oceanic and Atmospheric Administration (NOAA) faces a major challenge -- it must identify orca subpopulations, understand their needs, and develop effective and sometimes unique ways to manage them. Figuring out the patterns of similarity and relatedness coded in the whales' DNA also gives managers important insights into how these subpopulations arose, what factors shaped them, and what drove divergence in the species complex. This work has implications beyond identifying the boundaries of whale stocks. It is fundamental for evaluating the status of killer whale populations.

Recent studies have shown that distinct groups of killer whales gather in the same place seasonally. Previously, scientists didn't know whether this was attributable to feeding or mating patterns. Now, genetic evidence and observations of individual whales have shown that these whales exhibit low levels of "gene flow" -- breeding among subpopulations. A new paper by NOAA scientists available via Open Access in the *Journal of Heredity* sheds light on these principles at work among killer whales in Alaska and the northern North Pacific Ocean.

Uncertainty about the population structure and a lack of data for the far western reaches of the North Pacific have led to very broad stock designations for killer whales in the waters of the western Gulf of Alaska, Aleutian Islands, Bering Sea, and Russia. Currently, fish-eating "resident" killer whales in the far North Pacific are considered a single stock that ranges from southeast Alaska through the Aleutian Islands and Bering Sea. Bigg's killer whales (formerly known as "transients") are currently managed as two stocks with overlapping ranges -- the "Aleutian and western" stock (Gulf of Alaska, Aleutian Islands, and Bering Sea) and the much smaller "AT1" stock which appears to range primarily throughout Prince William Sound and the Kenai Fjords.

By collecting 462 skin samples from both resident and transient wild killer whales and characterizing individual genetic variability using two different genetic markers (mitochondrial DNA and nuclear microsatellites), NOAA scientist Kim Parsons and her research partners discovered further subdivision within the whale stocks. In fact, the evidence is so strong that Parsons and her colleagues believe it's time to revise the killer whale stocks in the region. Genetic tests also indicated a lack of breeding between the two killer whale types highlighting the distinctness of the sympatric Bigg's and resident killer whales on a local scale. This finding corroborates a 2010 global genetic study of killer whales1 and what many marine scientists suspected, based on years of studying wild orcas by tracking their movements and comparing their vocalizations, preferred prey, and social structure. Though much work remains to be done, powerful genetic tools have given us another vital piece of the puzzle.

Recent research sheds light on stock structure of these apex predators in the northern North Pacific Ocean, with important implications for management. (Credit: Km M. Parsons, National Marine Mammal Laboratory, NOAA Fisheries)

A National Park for Blue Whales?

In one day, a baby boy gained 200 pounds (90 kilograms) just from his mother's milk. At this rate, it seems like he'll be fully grown in no time. But this little guy has a long way to go. He's a blue whale calf, and in five to 10 years, he'll be the largest animal ever known to exist on Earth.

For now, he'll continue to gain weight at this staggering rate and swim alongside his mother for another two years.

A new collaborative study suggests that characteristics like the slow maturation rates of blue whales may doom them to extinction. Already the International Union of Conservation of Nature (IUCN) deems them endangered. One of the lead researchers of this study, Alison Boyer, an ecologist at the University of Tennessee, explains how she helped to create a statistical model to understand what factors make a species more likely to be "at risk."

External pressures such as human impacts, together with intrinsic biological characteristics – like the number of births per year and body size at weaning – were used to try to predict the threat rankings across 125 species of marine mammals. One-quarter of these animals currently are listed as endangered.

The study showed that factors like a small geographic range or a slow reproductive rate are the best predictors of which species are struggling to survive. On the opposite end, species with large social groups, like bottlenose dolphins, tallied up as less at risk.

Developing a tool to help predict which species may be endangered is vital because 40 percent of all marine mammals are classified as data deficient by the IUCN, meaning that scientists just don't know enough about the numbers of these elusive animals to predict their survival.

"The most exciting outcome of this study is that we were able to predict that 13 of the data-deficient mammals are likely to be endangered," says Boyer." This list includes Amazon River dolphins, which have found their way into local legends as spiritual enchanters. But with a slow reproductive rate, very small geographic distribution, and small social groups, they have many of the characteristics that predict them to be at a higher risk of becoming endangered.

After predicting which species are most likely to be at high risk, Boyer and her colleagues determined marine mammal hotspots – or danger zones – by identifying overlapping geographic ranges of the threatened species. Each hotspot contains six or more threatened marine mammals. Unfortunately, these regions often coincide with areas of high human impact (such as commercial fishing zones or shipping lanes). Blue whales often are killed when struck by large ships, and the Amazon River dolphin can drown from entanglement in fishermen's nets.

So how can we help preserve these species?

One solution, says Boyer, is to create Marine Protected Areas (MPAs) at these crossroads of human and marine mammal activities. Similar to a national or state park, human activities would be limited within the boundaries of MPAs. In setting aside watery areas for the preservation of species, it's important to note that the hotspots identified in this study span a mere 1.7 percent of all oceans. Currently, the international community is looking at initiatives to designate 10 percent of the world's oceans as MPAs by the year 2020. Boyer hopes her and her collaborators' study can guide the placement of a portion of these new protected areas.

Even if enough ocean areas are set aside for these species to thrive, can they come back from their threatened status?

Very possibly. Boyer explains that marine scientists saw thrilling increases in numbers of humpback and gray whales after an international ban on commercial whaling. Sea otters and elephant seal populations also rebounded after certain protections were enacted. Marine Protected Areas have real potential to protect and preserve the watery habitats of marine mammals, Boyer says. They may be necessary to ensure the survival of these graceful giants of the open oceans and the enchanting mystics of the Amazon.

Rachel Fovargue is a Ph.D. candidate at the University of Tennessee in the Dept of Ecology & Evolutionary Biology

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Email: tonylorenz@bigbluebay.com
soundingsnewsletter@gmail.com

Soundings

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SEPTEMBER 2013

**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**

MEETING DATE:

Thursday, September 26, 2013
Time: 7:30 PM. PLEASE JOIN US AT 7:00 FOR REFRESHMENTS

Speaker: Founders of Golden Gate Cetacean Research
Title: Porpoises and dolphins return to San Francisco Bay

Bill Keener, Jon Stern, Izzy Szczepaniak and Marc Webber, founders of Golden Gate Cetacean Research, will talk about the unexpected discovery of harbor porpoises in San Francisco Bay after an absence of 65 years. They will also talk about bottlenose dolphins that traveled there from Monterey Bay when they meet with the Monterey Bay Chapter of the American Cetacean Society on Thursday, September 26.

The researchers have been able to photo-identify and track individual harbor porpoises, a scientific first for this hard-to-see species. They watch from shore and boat, and will share photographs of the social and mating behavior of the harbor porpoises.

The speakers founded the nonprofit Golden Gate Cetacean Research in 2010 to focus scientific study on the porpoises, dolphins and whales of San Francisco Bay.

Bill Keener is a former executive director of The Marine Mammal Center. Dr. Jon Stern is a biology professor at San Francisco State University. Izzy Szczepaniak is a local expert on harbor porpoises who has been studying them for 35 years. Marc Webber was formerly Director of Animal Care at the Marine Mammal Center and currently works for the U.S. Fish & Wildlife Service in Alaska.

Next month: Thursday, Oct. 24**,** 7 p.m., in the Monterey Boat Works building at Hopkins Marine Station, Dr. Terrie Williams, UC Santa Cruz professor of ecology and evolutionary biology, will discuss physiological "tipping points" in marine mammals, from the effects of noise on cetaceans to dwindling ice on polar bears and narwhals. (**Please note** this special meeting date, NOT the usual last Thursday of the month, in order to avoid any conflicts with Halloween.)

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CALENDAR

Sept. 12-15: Monterey Bay Birding Festival. Activities will include workshops and numerous field trips around Monterey Bay. For more info go to montereybaybirding.org

Sept 22: Monterey Bay Whale Watch Fundraiser Cruise for the Cheetah Conservation Fund. Special All-day Cruise with Dr. Laurie Marker. Trip leader will be marine biologist Nancy Black. The Sea Wolf will depart at 9 am from Monterey Bay Whale Watch. Return time will be based on cetacean sightings and the weather. Expect at least 6 hour on Monterey Bay to optimize search time and for maximum amount of time to spend with the wildlife being observed. (Sept. can be a great time to spot baleen whales and killer whales). Price is $130 per person. For reservations please call 831-375-4658

Sept. 22-28th:Sea Otter Awareness Week: Immerse yourself in a week of sea otter biology, ecology, and conservation. Fun and educational events will be taking place around Monterey Bay & beyond. For info please go to www.seaotterweek.org

Oct. 12:Wildlife Conservation Expo. San Francisco, CA. For info go to www.wildnet.org

Oct 30- Nov 2: Society Of Vertebrate Paleontology Annual Meeting: Westin Bonaventure Hotel and Suite Los Angeles, CA. This meeting will include world experts on the science of vertebrate paleontology and field trips to some of the best paleontological fossil sites in the world. (Sharktooth Hill, Ca. La Brea Tar Pits. Ca). For more info please go to www.vertpaleo.org

Dec 9-13: 20th Biennial Conference on the Biology of Marine Mammals: Dunedin, New Zealand,. Workshops will be held on Dec. 7-8, prior to the conference. For a full list of programs,workshops,and field trips go to marinemammalscience.org

Jan 26th 2014, 8-10 am: ACS Monterey Bay Gray Whale Fundraiser. Cost-$40. Boat-Princess Monterey. For reservations and more info please call Jerry Loomis at 831-419-1051

BOOK RECOMMENDATIONS

Sharks of the World: A Fully Illustrated Guide. Written by David A. Ebert, Sarah Fowler, and Leonard Campagno. Illustrated by Marc Dando

Penguins: Their World Their Ways. Written by Tui De Roy, Mark Jones and Julie Curthwaite

American Tuna: The Rise and Fall of an Improbable Food. Written by Andrew F. Smith

Ignoring Nature No More: The Case for Compassionate Conservation. Written by Marc Bekoff

The World in the Curl: An Unconventional History of Surfing. Written by Peter Westwick and Peter Neushal

CLOSE ENCOUNTERS OF THE WHALE KIND

by Esta Lee Albright

The evening before this August arrived with a wild ocean and rough waters, I was out in my sailboat on the bay with two of my usual crew. We sailed over toward the hotel on the beach and hung a left to head west. Soon we began to feel the ocean swell somewhat more than a couple of miles from shore, then we saw spouts. Evidently we had passed two humpbacks inside the bay, swimming in circles, diving and surfacing fast: feeding!

We altered course and headed to one side of their position. All boats need to follow whale - watching guidelines, not just those on whale watch cruises. Predicting where feeding humpbacks will surface after a dive and maintaining exactly the prescribed 100 yards away is not easy, but we were determined to watch without interfering.

One whale breached. Later I wondered if it was attempting a look at us. Surely they were aware of our boat. Whales' vision is said to be good above and below water, and we know they have keen hearing underwater. I assumed right away they could hear the waves slapping on the boat's hull and probably the gurgle of water passing the heavy keel underneath. Just how familiar were these whales

with sailboat noise, as opposed to engine noise? We couldn't guess.

The whales sounded. We kept our course and looked in all directions. Feeding whales change location and direction of travel quite often. It was only several minutes later that the loud wwhhoooossshhh of whale spouts sounded behind us. Two large humpback backs and the tops of their heads, with blowholes open, were at the surface only about 30 feet away. These whales were maybe 45- 50 feet long; my sailboat is 26 feet long. My crew had never seen humpbacks and their size compared to familiar gray whales made quite an impression – they screamed and I laughed. Thus there perhaps were new watery noises, odd shapes, and screeching vocalizations for the whales' curiosity. Suddenly I pictured in my mind the times I had sailed out of Moss Landing, where two adult humpbacks had provided similar close encounters. Then and now the two whales stayed motionless side by side, as if pausing to collect data on this strange thing in the water.

We maintained our course away at about 5 knots. They remained motionless for a minute or two then turned to follow us. I had seen this behavior before, too. Once on a small, slow whale watch boat off Monterey we had the thrill of three humpbacks diving and swimming around our stationary boat for almost an hour. When they finally moved away enough that we could avoid them, we made our getaway. Within a short time we could see them swimming after us, frolicking with each other, rolling, turning, and easily keeping up with our boat. It was awhile before we were near another whale watch boat and could transfer them to those delighted passengers.

In my sailboat this time we kept moving and soon our two companions found more food, made a sharp turn and resumed their diving and feeding. We saw them two more times in the distance. Later I learned the bay water had plentiful anchovies and our opportunistic feeders were only two of a total of five whales close inside the bay the next day. Humpbacks and blue whales were feeding several miles northwest of Point Pinos in July; given a day of rough water and white caps present even inside the bay, anchovies and whales were very welcome.

Note: Esta Lee's new book, About Monterey Humpbacks, is for sale at Monterey Bay Whale Watch on the wharf. Questions and mail orders can be sent to Esta Lee through the web site www.whalesail.com.

LIFE IN ANTARCTICA RELIES ON SHRINKING SUPPLY OF KRILL

These tiny crustaceans are a bellwether of climate change.

By Kenneth Brower for National Geographic
Published August 17, 2013

On the Antarctic island of South Georgia, in February, toward the middle of what passes for summer at the bottom of the world, I hurried through the ruined whaling station of Grytviken.

I had an appointment at the British Antarctic Survey station on the opposite side of King Edward Cove. I was to interview a marine ecologist working on krill. I did not want to be late.

The keystone of the South Georgia ecosystem, the secret to the miraculous abundance of wildlife on this stark, cold, windswept island—the foundation, indeed, for almost all vertebrate life in the Antarctic—is krill.

South Georgia and the South Sandwich Islands are administered from the Falkland Islands as a British Overseas Territory, in which the little outpost of Grytviken is the only inhabited spot. The inhabitation is very marginal. In southern winter there are just eight staff members of the British Antarctic Survey, including a doctor, a government officer, and a postal clerk. A handful of visiting scientists augment this skeleton crew in southern summer.

Grytviken is gritty and grim. The name means "Pot Bay," a reference to the cauldrons in which the Norwegian whalers here rendered oil from blubber. It is apt. The rusting vats, boilers, ramps, chimneys, and ramshackle buildings of the long-abandoned whaling station; the wrecks of the catcher boats stranded on the waterfront; and the rows of giant whale-oil tanks upslope are all the apparatus of a genocide, in the literal, Latin sense of the word. The genus was Balaenoptera, the baleen whale.

From the whale's upper jaw, in place of teeth, hang long, fringed curtains of keratin—baleen—used to seine krill. The largest member of the genus and the biggest creature ever to live, the blue whale gets that way from its ability to process eight tons of krill a day.

The Antarctic, in its remoteness, girded by pack ice, abloom in summer with phytoplankton and coursing with torrents of krill, was the stronghold of the blue whale. The invention of the steam-powered catcher boat and the explosive harpoon ended all that. Today in the Southern Ocean, where a century ago 200,000 blue whales fed on the krill swarms of austral summer, only a few hundred are left.

A Game of Chinese Boxes

If William Blake thought he had seen "dark satanic mills" in England, then he should have taken a stroll through Grytviken. After the darkness of the whaling station, and the black, snow-seamed rock of the encircling mountains, and the somber sky, the white interior of the British Antarctic Survey laboratory was dazzling.

For a moment I lost my bearings. Bright fluorescent light glinted from microscopes. Martin Collins turned away on a swivel stool from his laboratory workbench and stood to greet me. In his immaculate white lab coat he was incandescent, an angelic figure of medium height, pale-skinned, with semi-curly hair of indeterminate color. This might have been the start of the Rapture, with Collins as my heavenly guide—until I chanced to glance down. Beneath his white lab coat the ecologist was wearing muddy trousers and gumboots streaked with penguin guano.

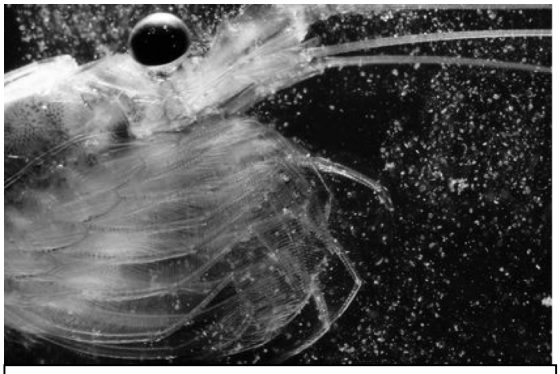

Photo (r): A krill shrimp traps tiny plants with its thoracic legs off Antarctica.
Photograph by Flip Nicklin, National Geographic

He mimed an apology for not shaking hands, holding up both of his own to show blue rubber gloves. Just now he had been rooting around in fish stomachs. Pulling over a bucket of offal, he groped about inside and extracted a half-digested mackerel icefish. "That's come out of a skate's stomach," he said. "A little worse for wear," I suggested.

Collins agreed and he dug again in the offal, searching for a more intact specimen. His bucket of guts was bloody, but not in the normal, crimson sense, for icefish have no hemoglobin. Their plasma is full of antifreeze but no red cells, so their blood runs clear.

"This one's probably slightly better," he said, holding up a less eroded fish. "There's a fishery for these mackerel icefish. We've done a trawl survey for icefish all around South Georgia to estimate the stocks. Icefish are krill feeders—80 percent of their diet is normally krill—so their stomachs can tell us what's happening with krill. I've done something like 650 icefish in the last couple of weeks. It's been a slightly strange year for the krill around South Georgia."

"Strange," I said. "In what way?"

"You get odd years, and 2004 was one of those, when there's a little bit less krill. This year seems to be fairly extreme. There's very little krill and scarcely any icefish at all. We're seeing the gentoo penguins struggling a little bit this season, as well. Not enough krill. The gentoos don't seem to be giving the food to their chicks that they normally do."

From his workbench Collins retrieved a glass dish of krill. He had extracted this handful—eight or nine little shrimplike crustaceans—from the stomach of an icefish, which he had previously extracted from the stomach of a skate, and had counted, weighed, and measured each one.

In death the krill were bright red. They were big *Euphausia superba*, the king of krill, probably the most successful species on Earth by measure of sheer biomass: roughly twice the weight of humanity, thronging in "swarms" as dense as 10,000 individuals per cubic meter.

In Norwegian, kril means "small fry." The noun is almost always a collective plural in that language, as it is in English. And as it is in the grammar of Nature herself, where krill are collective like no other organism. The name has an onomatopoeic rightness; "krill" seems to boil, seethe, swarm.

Collins's game of Chinese boxes—his opening of stomachs to investigate the stomachs within—had ended with this dish of krill. No further dissection was necessary, for krill are translucent, and the green contents of the gastric mill and the hepatopancreas were visible through the exoskeleton. In the middle of krill mating season, the last meal—interrupted by a hungry icefish—for these krill had been phytoplankton.

The Thrill for Krill

Euphausia superba breeds in Antarctic summer, January through March, in dense spawning aggregations near the ocean surface. On the abdominal segment of the males, the first pair of "swimming legs" (technically called pleopods or swimmerets) are modified into sex organs with handlike appendages, the gonopods. For krill, ejaculation is replaced by gesticulation. Working deftly with his gonopods, the male attaches a kind of limpet mine—the spermatophore, or sperm package—to the female. The thrill for krill must be something like the clandestine excitement a Navy frogman feels in setting up a demolition.

The female's eggs, between 5,000 and 10,000 per session, are fertilized by sperm from the

spermatophore as they exit her genital opening. The fertilized eggs sink slowly, sometimes as deep as two miles, and during the descent they develop into embryos. At depth, each egg hatches into a larva—the nauplius—which begins to make its way back up.

The nauplius is a little cyclops, just a head with three pairs of sculling appendages where ears might go and a single compound eye. In a "developmental ascent," the nauplii, transmogrifying as they rise, spend three weeks or so reaching the top, where they appear in vast numbers just under the surface.

There is something almost Hindu in the ontogeny of krill: Each little crustacean, in growing up, shape-shifts through a progression of avatars. After the nauplius comes the metanauplius, then the three stages of the calyptopis, then the six stages of the furcilia—a succession of incarnations in which the thorax and abdomen separate and differentiate, the legs multiply and develop. The single eye divides in two (depth perception, suddenly!), and this new pair of compound eyes, fixed at first, becomes moveable and erupts from the carapace, rising on short stalks above. At a little more than a half-inch in length, the juvenile becomes a miniature of the adult. At two inches in length and three years of age, it reaches maturity.

In a species whose strategy is to overwhelm with sheer numbers, it is surprising, perhaps, that each individual *Euphausia superba* should be such a careful, exquisite piece of work. Each one looks to have been delicately carved from translucent, rose-tinted crystal. Each one is cunningly organized on the Swiss Army knife principle, with an ingenious set of glassy tools folding out from its underside: the squad of swimming and breeding legs on the abdomen (pleopods and gonopods), the squad of feeding and grooming legs on the thorax (the thoracopods), an assortment of sensory and feeding appendages on the head (antennae, antennules, stalked eyes, and mandibles), and a tail-fan (telson) at the stern.

Survival Strategies

In a species so small and expendable—just fodder for a whole ecosystem of sea mammals, seabirds, cephalopods, and fish—it is remarkable that the individuals should live as long as they do, from five to ten years. To escape all the hungry mouths in the sea and live out that full span, krill resort to a bagful of survival tricks, detailed below.

Lobstering. As a rule, euphausiid krill proceed headfirst, rowing forward with coordinated strokes of their swimming legs, like little oars in Roman galleys, but in emergencies the tail-fan of the telson provides a powerful reverse gear. In a fright response that short-circuits the brain (such as it is) and is mediated entirely by giant neurons in the tail, the krill snaps its telson violently to send itself "lobstering" backward at two feet per second, in a nearly instantaneous escape reaction.

Luminescence. Euphausiid krill are sometimes called "light shrimp" for their bioluminescence. From photophores at the base of their legs and eye-stalks, they emit pulses of yellow-green light. The krill do not themselves manufacture the luciferin that fuels this luminescence; they sequester it instead from the phosphorescent dinoflagellates they eat. This pirated luciferin migrates to the nearly heatless lamps of the krill's photophores, each of which has a concave reflector at the back, a lens in front to focus the beam, and muscles to swivel the spotlight this way and that.

We know *how* krill illuminate themselves—it's just the glow of a good meal—but we are uncertain as to why. The lights may help in orienting the swarm in darkness, or they may be used for signaling during spawning aggregations, or both. For the most part the photophores are on the underside. This has led some scientists to hypothesize that the lights are counter-illumination, a means of softening the silhouettes of the krill against daylight or moonlight above. From the vantage of predators below, according to this hypothesis, the krill's suit of lights works like an invisibility cloak.

Juvenescence. In hard winters when food is scarce, krill shed their sex organs and regress to a kind of juvenile form (the Peter Pan or Michael Jackson strategy). Everything shrinks but the protuberant compound eyes. We know this big-eyed hunger syndrome from images of human famine, but in krill the effect is even more pronounced. The ratio between eye size and body length has proved a reliable indicator of starvation in krill. The little crustaceans can survive 200 days without food. When summer arrives finally and the phytoplankton bloom, the krill regrow their sex organs and take up adult life again.

Countermeasures. When pursued, krill will sometimes spontaneously molt, leaving behind their exuvia—their shed exoskeletons—as decoys. The exuvium is a perfect facsimile of the little animal, down even to the fine, comblike "teeth" on the feeding legs, except that there is nothing inside. The ghost krill drift and spin behind the real ones like "chaff," those aluminum strips jettisoned as radar countermeasures by warplanes.

Filter-feeding. The prime adaptation of *Euphausia superba*, the explanation for its extraordinary biomassiveness, lies in its ability to feed directly on

phytoplankton, particularly on the tiny single-celled plants called diatoms. Krill economic policy is to cut out the middleman and eat at the very bottom of the food pyramid.

The krill's foremost rank of legs, the thoracopods, are modified into feathery combs that it clasps together prayerfully to form a "feeding basket," which it pushes ahead through the sea. At intervals it unclasps the basket to comb the netted diatoms toward its mouth with bristles on the inner edges of its thoracopods.

Filter-feeding in this manner is more familiar to us on a much larger scale: This is how manta rays, basking sharks, whale sharks, and baleen whales feed. If the archetype for the factory ship is the blue whale, then the archetype for the blue whale is *Euphausia superba*, its principal prey. Any given blue whale is built by eating vast multitudes of these tiny crustacean approximations of itself.

Trouble in the Nursery

When I had finished studying Collins's glass dish of krill, I returned it to him. He peered at it for a moment, tilting the dish at a steeper angle to the light, as if some new question about these specimens had just occurred to him. Then he dumped it unceremoniously into the bucket of fish offal. All the data he needed had been gleaned from this batch, and the contents of the bucket would now feed the skuas.

Science, Collins told me, was not yet able to say whether global warming had figured in this year's krill shortage.

"According to oceanographers back at Cambridge, about every fifth year you get a bad krill year," he said. He explained that South Georgia lies north of the zone of winter sea ice that serves krill as nursery. Krill swarms are brought up to South Georgia on a "conveyor belt" of cold current from the Antarctic Peninsula, and every five years or so the belt seems to go off track.

Early this year, the plume of krill appeared to swing too far west, then curl around north of South Georgia to join the eastward-flowing mainstream of the Antarctic Circumpolar Current. Large specimens, like the ones he had consigned to the bucket, are characteristic of poor krill years, Collins said. Because the younger krill normally borne up on the plume had missed the island, the few krill showing up now in the stomachs of icefish were bigger, older holdovers from previous years.

"There is some evidence for a global-warming effect," he added. "In 2004 a colleague of mine—name is Angus Atkinson—published research based on a long series of standardized net-hauls for krill. He did show that there's evidence of a decline in the amount of krill in the last 40 years around here in the Scotia Sea. I think the jury is still out a little bit on that."

Having read this paper, published in *Nature*, myself, I was puzzled by Collins's last comment. His scientific caution was admirable, but it crossed my mind that there might be some wishfulness there, and some denial. As I understood it, the jury had, at very least, filed back into the courtroom and was studiously avoiding the eyes of the defendant.

Less Ice Means Fewer Krill

Atkinson and his three co-authors had conducted the most comprehensive study yet of krill abundance and distribution in the Southern Ocean, gathering data from all the net samples they could find over the previous 80 years, a total of 12,000 summer net-hauls. This database showed that the southwest Atlantic sector of the Southern Ocean—the narrow, productive stretch between the Antarctic Peninsula and South Africa—contained more than half the krill in the Southern Ocean. It also indicated that krill stocks in this crucial sector had declined by 80 percent in the previous 30 years.

The study did not directly identify the cause of the decline, but it provided a hint: Summer krill densities in the southwest Atlantic correlate positively with sea-ice extent the previous winter.

Antarctic sea ice typically expands fivefold in the course of a year. At its winter maximum, it often covers eight million square miles, nearly twice the area of the Antarctic continent and eight percent of the entire Southern Hemisphere. This vast substrate of ice—or superstrate, actually, as it forms the frozen *ceiling* of the ocean—is colonized by ice algae, which green the brine channels in the ice and the undersides of drifting floes.

Krill, with rows of rakelike bristles at the tips of their thoracopods, scrape the algae from the ice and pass it on to their mandibles. The vast extent of these filmy krill pastures, their bioenergetic potential, and their crucial role in sustaining the Antarctic ecosystem through the winter months have only recently been incorporated in scientific models. This adjustment comes even as science has begun to quantify how rapidly, in response to climate change, the sea ice is diminishing at both poles, not only in extent but in duration.

"Krill are dependent on the sea ice in winter," Collins said. "The juvenile krill in particular feed under the sea ice, and some of the adult krill as well. Declines in sea ice associated with warming means less habitat for krill and, therefore, in the longer term,

certainly less krill. I do think we're looking at that sort of thing potentially, in the middle to long term. I think Atkinson's work suggests that decline is already beginning to happen."

Penguin distribution on the Antarctic Peninsula is shifting with this new reality. The Adélie penguin, a true Antarctic penguin, is sea-ice obligate, which is to say that it requires sea ice to survive. The chinstrap penguin, a more northerly species, is sea-ice intolerant. As the western Antarctic Peninsula warms, Adélie penguin populations there are declining sharply and chinstrap populations are growing. (There are similar perturbations among penguin species farther south in Antarctica. The new "march of the Penguins" is a kind of route step, disorderly and in several directions.)

Juvenile krill, like Adélie penguins, are sea-ice obligate. The nursery ice for the South Georgian krill plume is disappearing at the source.

Heart of the Antarctic

If krill is the staff of life for the baleen whales of the Southern Ocean—if these great animals are just so much recycled krill—then so it is for most Antarctic creatures. The crabeater seal has leaflike, multi-lobed teeth that intermesh to form a sieve for krill (the "crabs" of its name), and it eats almost nothing else. The Antarctic fur seal has cheek teeth with a similar shape and function, and it feeds primarily on krill.

The leopard seal, behind the great fangs of its canine teeth, has molars that fit together as krill sieves. (The sea leopard has a reputation for killing penguins and lesser seals with those canines, but in truth its great bulk—ten times that of the terrestrial leopard—is owed mostly to the sieves of its molars and the krill that make up a large part of its diet.)

Gentoo, Adélie, and emperor penguins are obligate feeders on krill. The Procellariiformes, the "tube-nose" birds that dominate the Antarctic avifauna—the albatrosses, petrels, prions, shearwaters, and fulmars—feed directly on krill or on things that eat krill.

The extirpation of baleen whales in the first half of the last century opened up the krill resource to these smaller krill-eaters. Penguins and petrels prospered. The crabeater seal multiplied prodigiously and now numbers from 15 to 30 million, the most abundant seal in the world. The Antarctic fur seal has made a sensational recovery: from putative extinction a little more than a century ago to about four million today, 90 percent of which breed on South Georgia. A rebound on this scale seems miraculous, mathematically impossible, until one factors in the infinitude of krill that fed the resurrection.

No natural system exists in a steady state. Polar ecosystems, which are characterized by large numbers of individuals and relatively few species, are particularly unstable, prone to cycles of boom and bust. In the past two centuries in the Antarctic, these steep swings in fortune have been sharply amplified by a new agency: us.

First the depredations of the Antarctic sealing fleets, then the depredations of the whalers, then the anti-depredation effects of the Antarctic Conservation Act, then heavy fishing pressure, and now climate change have intensified the booming and busting. *Homo sapiens* came very late to Antarctica—an American sealer named John Davis was the first human to set foot on the continent in 1821—but since then that foot has been on the scales, first nudging the bust side of the balance, then the boom side.

If the Antarctic ecosystem is seen as a heart, pumping its red streams of krill, then for the last century it has been a heart in fibrillation.

Taking the Helm

Martin Collins pulled the blue rubber glove off his left hand and held it for a moment in his right, thinking of something. Then he took off the right glove. He surfaced from his thoughts and gave me a look.

"I'm changing jobs in a couple of weeks' time," he said. "I'm taking over as senior executive for South Georgia. I'll have overall responsibility for fisheries and tourism and everything else in the island."

In this new capacity, Collins would be reporting to the governor of the Falklands, up a chain of command ending with the Queen of England, but here within the Antarctic Convergence the buck—or the pound sterling—would stop with him.

"So this is going to be your domain!" I said.

"Yes." He laughed lightly, dismissively, but clearly he was pleased.

South Georgia is now well into its Collins administration. The senior executive and fisheries director is enjoying himself, according to his emails, but his responsibilities are legion and he finds himself very busy.

Just three months into his new job, Collins had to deal with an episode of counterfeiting. Someone in the Northern Hemisphere was turning out commemorative coins purporting to be licensed by the Government of South Georgia and the South Sandwich Islands (GSGSSI)—which is a long and fancy way of saying that they were supposedly

licensed by Collins himself. Heads on these dubious coins showed an effigy of Queen Elizabeth II. Tails showed either images of the Horse Guards of London, the Tower of London, Westminster Abbey, or Windsor Castle. "The Government of South Georgia and the South Sandwich Islands wishes to state categorically that these Bi-Metallic pieces should be treated as fakes," Collins informed the world, from his office way down under.

Some months later, Collins, in his secondary role as fisheries director, issued an Administrative Penalty Notice to a longline vessel fishing under GSGSSI license in GSGSSI waters. The fishermen had failed to report the killing of two albatrosses. They had been caught discarding baited hooks, as well—a hazard to albatrosses and other seabirds. For the two dead albatrosses, Collins fined the mariners £25,000. It was the sort of stiff punishment for albatross abuse that you might find in a long narrative poem by Coleridge.

The sheer sweep of Collins's responsibility is daunting. He manages the whole northern rim of the Scotia Sea, the 1,500-mile stretch from Shag Rocks eastward to Bristol, the final and southernmost of the South Sandwich Islands.

Rolling in from all sides is the Southern Ocean, the wildest, windiest, most prolific seas on Earth. The South Georgia Maritime Zone extends 200 nautical miles outward from the island in all directions and is patrolled by Collins's navy, his jet boats *Prion* and *Pipit* and his flagship *Pharos*, an old Scottish lighthouse tender converted to Coast Guard cutter.

Kingdom of Krill

The main island, South Georgia, is one hundred miles long, steeply mountainous and glacier-carved into an endless coastline of deep bays and fiords. Four million Antarctic fur seals and 400,000 Southern elephant seals breed on the shores there. Smaller delegations of Weddell and crabeater seals haul out on the rocky South Georgian beaches, and leopard seals loll offshore in the kelp.

Thirty million pairs of burrowing petrels nest beneath the soil. More than 450,000 pairs of king penguins stand at attention in the bays and coves, shoulder to shoulder in endless black-and-white formations.

In the breeding season, the main island hosts nesting gentoo, macaroni, chinstrap, and rockhopper penguins. Wandering, black-browed, gray-headed, and light-mantled sooty albatrosses nest here, along with Southern giant petrels, Northern giant petrels, snowy sheathbills, and skuas.

If natural history is treasure—and zoologists always see it that way—Collins is now an Antarctic Croesus.

Out there in the screaming sixties, winging underwater, are all the penguin species that pass the island without nesting here—the emperor, royal, and Magellanic penguins. Winging above are all the airborne flocks that do the same: Southern royal, sooty, and Salvin's albatrosses; little, great, and sooty shearwaters; Antarctic, Atlantic, Kerguelen, white-headed, great-winged, and soft-plumaged petrels.

The maritime zone is Collins's specialty, home to the icefish, skates, squid, and Patagonian toothfish he knows so well, but home also to six species of baleen whale, all now designated "rare" or "scarce," and five species of beaked whale, not to mention sperm whales, killer whales, hourglass dolphins, and spectacled porpoises.

It is, all of it, an ecosystem fabricated out of krill.

These days I find myself thinking a good deal about Martin Collins, down there in the furious fifties, in the Antarctic Convergence. I have come to see him as symbolic. He is master now of his favorite place in the universe, a miraculously abundant island in cold seas. He is in mild denial, perhaps, about his island's prospects in the era of climate change. Or maybe he is just serene in acceptance of the things he cannot change. He is managing what is manageable within his 200-mile limit-keeping his eye on the Patagonian toothfish, chasing pirate fishing boats, addressing the outrage of counterfeit coins—even as the planet warms and the krill begin to fail ... which is to say he is every one of us.

NORTH ATLANTIC KILLER WHALES MAY BE BRANCHING INTO TWO SPECIES

VIRGINIA MORELL, AUGUST 16, 2013-Killer whales (*Orcinus orca*) can be surprisingly finicky eaters. In the North Pacific and Antarctic, some feed only on fish; others, only on mammals—dietary preferences that seem to have led to new species of orcas. Some researchers think that a similar process is occurring in the killer whale populations of the Northeast Atlantic. But speciation there may be a long time in coming. A new paper examining these orcas' diets over the last 10,000 years reveals that most are not as picky as their relatives; those eating herring today may be feasting on baby seals tomorrow. The study shows that the Northeast Atlantic whales may only be at the beginning of the speciation process.

Evolutionary biologists have long argued about whether it's possible for a new species to arise

in a population that isn't separated by geographic barriers, such as an ocean or a mountain range—a process called sympatric speciation. "Killer whales have been thought of by some as something like the poster child" for the process, "because there are multiple genetically distinct populations [which have not yet been formally described as separate species] with different prey preferences in the North Pacific and Antarctic," says Phillip Morin, a cetacean biologist at the Southwest Fisheries Science Center in San Diego, California, who was not involved in the new study. Scientists have suggested that the orcas separated into distinct species because of what they chose to eat. In this scenario, fish-eaters would mate only with other fish-eaters, and mammal-eaters only with other mammal-eaters. Given enough time, the two populations would become genetically distinct and unable to reproduce.

Some killer whale observers have proposed that the orcas in the Northeast Atlantic also likely comprise two species, because some pods appear to be fish specialists, while others prefer marine mammals. They point out that the orcas' hunting tactics for the two types of prey differ dramatically and are learned behaviors—cultural differences that may also help drive populations apart.

"When hunting herring, the whales travel in large groups and vocalize a lot," says Andrew Foote, an evolutionary biologist at the University of Copenhagen, and lead author of the new study. "But they travel in small groups, three to five animals, and hunt in complete silence when going after seals," because of the seals' acute hearing.

To find out if differences in diet and culture have also led to two species of killer whales in the Northeast Atlantic, Foote and his colleagues studied the dietary choices and genetic relationships of orcas from Greenland to Norway. They compared 20 tissue samples taken from modern (1865 to 1995) whale bones and teeth with 23 more ancient samples, dating from 2800 to 6800 years ago, that were collected from archaeological sites and dredging operations. The scientists analyzed the samples' isotopic ratios—a telltale chemical signature of what the animals ate during their lifetimes. They also extracted DNA from the specimens, and from skin samples of living orcas to reconstruct the whales' genetic lineages. And they examined the wear-patterns on the animals' teeth; killer whales that feed heavily on herring have badly worn teeth.

The scientists' analysis revealed a mixed picture. Although two of the orca populations eat only fish, there was no genetic evidence that they have diverged from those that dine on seals, the team reports online this week in the *Proceedings of the Royal Society B*.

"It might be that the whales are at the beginning of what is a very slow process, since all the ecological ingredients are there for a speciation event," Foote says. He points out that only 10,000 years ago these waters were under ice, and no orcas were to be found, so it may not be a surprise that most of the orcas haven't differentiated as they have in the North Pacific and Antarctic, where they've lived far longer.

Some of the study populations that previously were considered fish-only diners also feast on mammals, the team's research shows. For instance, the scientists collected samples from a family pod of six orcas that aboriginal hunters in East Greenland had killed. "Each whale had a seal pup in its stomach," Foote says, "yet their teeth were worn like those of the herring-hunting whales" seen off Iceland. In fact, the researchers' subsequent analysis showed that these orcas belonged to the population of animals previously considered strictly fish-eaters. Tilikum, SeaWorld's notorious orca that has killed three people, including one of his trainers, was captured as a youngster in these same waters, Foote notes; while he is fed only fish at SeaWorld, in the wild, he may have eaten marine mammals, too.

"Their data indicate that prey preferences are less fixed in North Atlantic killer whales than in those in the North Pacific and Antarctic," Morin says. So, in these waters "prey preferences alone don't appear to be sufficient to cause genetic divergence," leading to distinct species. The populations may need to be physically separated, too. Still, that may be happening, Foote says. "If the strict fish-eaters stick to their diet, and the groups hunting fish and seals become specialized on mammals, in time, they'll have fewer encounters with each other, and that could lead to speciation." And if that's the case, then Foote and his team have documented one of the rarest of biological events: a population at the very beginning of becoming two species.

Dolphins Keep Lifelong Social Memories, Longest in a Non-Human Species

Aug. 6, 2013 — Dolphins can recognize their old tank mates' whistles after being separated for more than 20 years -- the longest social memory ever recorded for a non-human species.

The remarkable memory feat is another

indication that dolphins have a level of cognitive sophistication comparable to only a few other species, including humans, chimpanzees and elephants. Dolphins' talent for social recognition may be even more long-lasting than facial recognition among humans, since human faces change over time but the signature whistle that identifies a dolphin remains stable over many decades.

"This shows us an animal operating cognitively at a level that's very consistent with human social memory," said Jason Bruck, who conducted the study and received his Ph.D. in June 2013 from the University of Chicago's program in Comparative Human Development. His study is published in the current issue of the *Proceedings of the Royal Society of London B.*

To establish how well dolphins could remember their former companions, Bruck collected data from 53 different bottlenose dolphins at six facilities, including Brookfield Zoo near Chicago and Dolphin Quest in Bermuda. The six sites were part of a breeding consortium that has rotated dolphins and kept records on which ones lived together, going back decades.

"This is the kind of study you can only do with captive groups when you know how long the animals have been apart," Bruck said. "To do a similar study in the wild would be almost impossible."

"Signature whistles" offer means to test memory

In recent years, other studies have established that each dolphin develops its own unique signature whistle that appears to function as a name.

Researchers Vincent M. Janik and Stephanie L. King at Scotland's University of St. Andrews reported earlier this year that a wild bottlenose dolphin can learn and repeat signatures belonging to other individuals, and answer when another dolphin mimics its unique call.

Bruck played recordings of signature whistles to dolphins that had once lived with the animals that made the calls. Determining whether the dolphins recognized their old companions required a methodical comparison of how they responded to familiar calls versus calls belonging to dolphins they had never met.

First, Bruck would play recording after recording of signature whistles that the target dolphins had never heard before. His initial studies showed that these "dolphins get bored quickly listening to signature whistles from dolphins they don't know." Once they were habituated to the unfamiliar calls, Bruck would play a recording of an animal that he knew the target dolphin had lived with. The familiar calls often would perk up the dolphins and elicit an immediate response.

"When they hear a dolphin they know, they often quickly approach the speaker playing the recording," Bruck said. "At times they will hover around, whistle at it, try to get it to whistle back."

To check that the response was the result of recognition, Bruck also would play a test recording of an unfamiliar bottlenose that was the same age and sex as the familiar animal. All the behavior was scored according to how quickly and to what degree the animals responded.

A clear pattern emerged in the data: Compared with unfamiliar calls, dolphins responded significantly more to whistles from animals they once knew, even if they had not heard the calls in decades.

An audio reunion of old companions

In one notable example, Bruck played a recording of a female dolphin named Allie, who currently lives at the Brookfield Zoo, for Bailey, a female now in Bermuda. The pair had last lived together at Dolphin Connection in the Florida Keys when Allie was 2 and Bailey was 4. But 20 years and six months after their last contact, Bailey still recognized the recording of Allie's signature whistle.

That kind of performance after decades apart was typical, leading Bruck to conclude that dolphins maintain lifelong memories of each others' whistles. In the wild, bottlenose dolphins have an average life expectancy of around 20 years, though longer-lived individuals can survive up to 45 years or more.

In fact, Bruck's study appears to show the longest pure memory of any kind in a non-human species. Anecdotally, an elephant can remember a mother after 20 years, but testing animals' long-term memories outside of family relationships requires more systematic study of multiple relationships.

Exactly why dolphins' social memories persist so long remains unclear. Dolphins exhibit sophisticated social connections that follow a "fission-fusion" model. In the open ocean, dolphins may break apart from one group and "fuse" with other groups many times over. Such relationships could have required a growth in memory capacity. But it's also possible that memory is just one facet of the advanced mind that evolved in dolphins for other reasons.

"Why do they need this kind of memory? I'm not sure they do," Bruck said. "The cognitive abilities of dolphins are really well developed, and sometimes things like this are carry-along traits. But to test whether this kind of social memory capacity is adaptive, we would need more demographic data from multiple populations in the wild to see if they

experience 20-year separations."

The emergence of advanced memory in marine mammals as well as in humans shows that in evolution, "there are lots of ways to get from point A to point B," Bruck said. "It's nice to see this kind of ability in a non-primate, as this is a great example of convergent evolution."

Probing similarities to human names

Another big question such research raises is how similar dolphins' signature calls are to human words and names. So far no one has been able to test what signature whistles signify in a dolphin's mind.

"We know they use these signatures like names, but we don't know if the name stands for something in their minds the way a person's name does for us," Bruck said. "We don't know yet if the name makes a dolphin picture another dolphin in its head."

For his next round of research, Bruck said, "That's my goal -- show whether the call evokes a representational mental image of that individual."

SIGHTINGS compiled by Monterey Bay Whale Watch. For complete listing and updates see *www.gowhales.com/sighting.htm*

Date	#	Type of Animal(s)
9/4 p.m.	7	Humpback Whales
9/4 a.m.	15	Humpback Whales
	15	Blue Whales
	26	Risso's Dolphins
9/3 p.m.	3	Humpback Whales
	4	Blue Whales
9/3 a.m.	25	Humpback Whales
	10	Blue Whales
	200	Risso's Dolphins
9/2 late p.m.	15	Humpback Whales
	6	Blue Whales
9/2 p.m.	27	Humpback Whales
	5	Blue Whales
	30	Risso's Dolphins
9/2 a.m.	35	Humpback Whales
	15	Blue Whales
	25	Pacific White-sided Dolphins
	350	Risso's Dolphins
9/1 late p.m.	26	Humpback Whales
9/1 p.m.	37	Humpback Whales
9/1 a.m.	42	Humpback Whales
	50	Pacific White-sided Dolphins
	300	Risso's Dolphins
8/31 p.m.	4	Humpback Whales
8/31 a.m.	2	Humpback Whales
	100	Pacific White-sided Dolphins
	700	Risso's Dolphins
8/30 a.m.	5	Humpback Whales
	100	Risso's Dolphins
	5	Northern Right-whale Dolphins
8/29 a.m.	7	Humpback Whales
	3	Bottlenose Dolphins
	1	Big Mola Mola (Ocean Sunfish)
8/28 a.m.	11	Humpback Whales
	20	Risso's Dolphins
8/27 a.m.	12	Humpback Whales
	1	Killer Whale (Lonesome George)
	300	Risso's Dolphins
8/26 p.m.	7	Humpback Whales (including a mom & calf)
8/26 a.m.	14	Humpback Whales
	200	Risso's Dolphins
8/25 late p.m.	5	Humpback Whales
8/25 p.m.	6	Humpback Whales
	200	Risso's Dolphins
8/25 a.m.	16	Humpback Whales
	2	Blue Whales
	500	Risso's Dolphins
	5	Harbor Porpoise
8/24 p.m.	16	Humpback Whales
8/24 a.m.	15	Humpback Whales
	6	Blue Whales
	250	Risso's Dolphins
8/23 p.m.	1	Humpback Whale
	2	Blue Whales
8/23 a.m.	21	Humpback Whales
	5	Blue Whales
	150	Risso's Dolphins
8/22 late p.m.	1	Humpback Whale
	14	Blue Whales
8/22 p.m.	8	Blue Whales
8/22 a.m.	12	Humpback Whales
	3	Blue Whales
	25	Harbor Porpoise
	1	Elephant Seal
	1	Mola Mola (Ocean Sunfish)
8/21 p.m.	4	Humpback Whales
8/21 a.m.	5	Humpback Whales
	10	Harbor Porpoise
8/20 p.m.	10	Humpback Whales
8/20 a.m.	11	Humpback Whales
	50	Risso's Dolphins
8/19 p.m.	6	Humpback Whales
8/19 a.m.	9	Humpback Whales
8/18 late p.m.	3	Humpback Whales

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soundingsnewsletter@gmail.com

Soundings

American Cetacean Society- Monterey Bay Chapter
PO Box H E, Pacific Grove, CA 93950

OCTOBER 2013

**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**

MEETING DATE:

Thursday, October 24, 2013
Time: 7:30 PM. PLEASE JOIN US AT 7:00 FOR REFRESHMENTS

Speaker: **Dr. Terrie Williams, UCSC chief of Mammalian Physiology Lab**

Title: The Sensitive Cetacean: Are dolphins &whales (& other marine mammals) especially vulnerable to human disturbances?

Dr. Terrie Williams, professor of ecology and evolutionary biology at the University of California at Santa Cruz, has traveled around the world for more than 30 years to work with the largest mammals on earth in an effort to understand how they survive in today's rapidly changing world.

Terrie has done extensive research on marine mammals like killer whales, narwhals, endangered Hawaiian monk seals and sea otters, as well as land mammals like elephants, cheetahs and lions. She describes her work as "the Biology of Big." Terrie has been in charge of the Marine Mammal Program at UCSC for 20 years, which includes The Mammalian Physiology Lab. She recently spent two of those years with an orphaned Hawaiian monk seal that stars in a book published last year, "The Odyssey of KP2: An Orphaned Seal, a Marine Biologist and the Fight to Save a Species."

Terrie will talk to us about the unique biology of cetaceans that makes them both sensitive and robust to human and environmental disturbances. Expect a comparative view of the physiological tipping points in marine mammals, from the effects of noise on dolphins and whales, to dwindling ice on polar bears and narwhals. In addition to her extensive research, Terrie directed the Sea Otter Rescue Center during the Exxon Valdez oil spill and is co-founder of the Center for Ocean Health at UCSC.

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Next month: Thursday, Dec. 5, at 7 p.m., Cynthia Fernandez, who helps monitor the notorious dolphin captures and slaughters in Taiji, Japan, will be our speaker.

Please note the schedule change as we combine November and December into a single program for the holiday season.

CALENDAR

Oct. 12:Wildlife Conservation Expo. San Francisco, CA. For info go to www.wildnet.org

Oct 30- Julia Stewart, PhD., National Center for Ecological Analysis and Synthesis: Humboldt Squid in the California Current System. Lecture will be held at 3pm in the Pacific Forum at MBARI

Oct 30- Nov 2: Society Of Vertebrate Paleontology Annual Meeting: Westin Bonaventure Hotel and Suite Los Angeles, CA. This meeting will include world experts on the science of vertebrate paleontology and field trips to some of the best paleontological fossil sites in the world. (Sharktooth Hill, CA. La Brea Tar Pits). For more info please go to www.vertpaleo.org

Science Sundays at the Seymour Center
Oct. 20, 1pm-Sharks in Danger: Impacts of the Global Shark Fin Trade. Michael Sutton, Vice President Pacific Flyway, National Audubon Society

Nov.17, 1pm-"Re-Patriation" of Bald Eagles to the Central Coast. Glenn R. Stewart, Director UC Santa Cruz Predatory Bird Research Group

Oct. 31-Nov 3 2013 Sitka WhaleFest: Sitka Sound Science Center. Arctic Sea Change: What's Ahead?

Nov. 7-10 :Western Society of Naturalist 94th Annual Meeting, Oxnard/Ventura, CA Embassy Suites Mandalay Beach Hotel and Resort

Dec 9-13: 20th Biennial Conference on the Biology of Marine Mammals: Dunedin, New Zealand,. Workshops will be held on Dec. 7-8, prior to the conference. For a full list of programs, workshops, and field trips go to marinemammalscience.org

Pacific Seabird Group 41st Meeting
February 19-22,2014 Juneau, Alaska
Centennial Hall Convention Center

Save The Date:
Jan 26th 2014, 8-10 am: ACS Monterey Bay Gray Whale Fundraiser. Cost $40. Boat-Princess Monterey. For reservations and more info please call Jerry Loomis at 831-419-1051

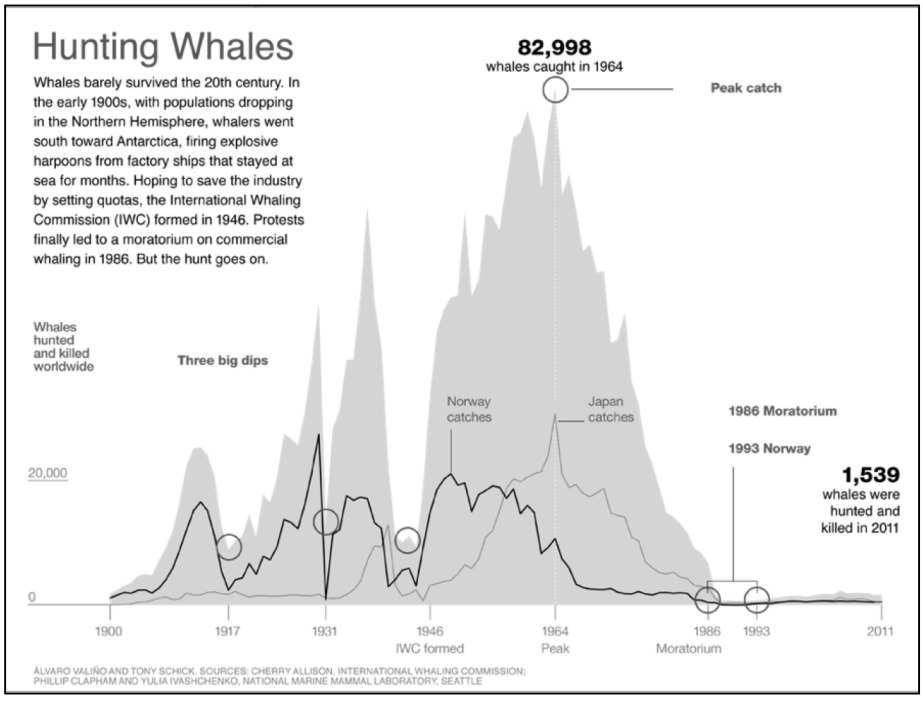
BOOK RECOMMENDATIONS

Tracks and Shadows: Field Biology as Art by Harry W. Greene. 2013 UC Press

How Forest Think: Toward an Anthropology Beyond Human by Eduardo Kohn. 2013 UC Press

A Field Guide to the Wildlife of South Georgia By Robert Burton and John Croxall. Princeton University Press

COUNTDOWN: Our Last Best Hope For A Future on Earth by Alan Weisman



WHALE MASS STRANDING ATTRIBUTED TO SONAR MAPPING FOR FIRST TIME

Sep. 25, 2013 — An independent scientific review panel has concluded that the mass stranding of approximately 100 melon-headed whales in the Loza Lagoon system in northwest Madagascar in 2008 was primarily triggered by acoustic stimuli, more specifically, a multi-beam echosounder system operated by a survey vessel contracted by ExxonMobil Exploration and Production (Northern Madagascar) Limited.

In response to the event and with assistance from IFAW, WCS led an international stranding team to help return live whales from the lagoon system to the open sea, and to conduct necropsies on dead whales to determine the cause of death.

According to the final report issued today, this is the first known marine mammal mass stranding event of this nature to be closely associated with high-frequency mapping sonar systems. Based on these findings, there is cause for concern over the impact of noise on marine mammals as these high-frequency mapping sonar systems are used by various stakeholders including the hydrocarbon industry, military, and research vessels used by other industries.

The report concluded: "The potential for behavioral responses and indirect injury or mortality from the use of similar MBES [multi-beam echosounder systems] should be considered in future environmental assessments, operational planning and regulatory decisions."
The full report can be found at: http://iwc.int/2008-mass-stranding-in-madagascar

The Wildlife Conservation Society (WCS) and the International Fund for Animal Welfare (IFAW) welcomed the report and praised all those involved in the process, including governments, NGOs, and industry.

"WCS and IFAW support these conclusions that add to a mounting body of evidence of the potential impacts of anthropogenic noise on marine mammals," said Dr. Howard Rosenbaum, Director of the Ocean Giants Program for WCS. "Implications go well beyond the hydrocarbon industry, as these sonar systems are widely used aboard military and research vessels for generating more precise bathymetry (underwater mapping). We now hope that these results will be used by industry, regulatory authorities, and others to minimize risks and to better protect marine life, especially marine mammal species that are particularly sensitive to increasing ocean noise from human activities. "

Added Dr. John G. Robinson, Executive Vice President for Conservation and Science for WCS: "We greatly appreciate the efforts of the U.S. government agencies and authorities and the International Whaling Commission for facilitating and overseeing this process, and we are particularly grateful to the Government of Madagascar for authorizing this work and their continued interest in the outcome. Understanding what causes mass strandings of marine mammals is critical to prevent this in the future. In this case, the cooperation by industry, conservation organizations, and government regulatory authorities led to best science being evaluated by an independent panel, which came up with conclusion based on weight of considerable evidence made available."

"Mass stranding response is challenging under the best of circumstances. Together with local individuals and the government of Madagascar, we provided the expertise to rescue as many animals as possible and medical care to those that stranded alive," said Katie Moore, Director of Animal Rescue at IFAW. "Equally important was to gather as much data as possible from the animals to address the root cause of the stranding. We are pleased to see the ISRP report and its conclusions, which will hopefully be used in shaping future conservation policies."

The report was written after a formalized process was established to investigate the mass stranding. The process was undertaken with endorsement of the Government of Madagascar. Several have contributed to this report including organizations involved in the mass stranding response effort, the International Whaling Commission, and several relevant U.S. federal agencies.

A multi-stakeholder steering committee was established to provide guidance in setting up and structuring the review panel and to ensure completion of the process and public release of the report. Those on this steering committee included: Dr. Howard Rosenbaum (WCS); Dr. Rodger Melton and Dr. Linda Zimmerman (ExxonMobil); Dr. Teri Rowles (NOAA Marine Mammal Stranding Network); Dr. Jason Gedamke (NOAA Ocean Acoustics Program); Dr. Peter Thomas (Marine Mammal Commission); Jill Lewandowski (BOEM); Dr. Greg Donovan (IWC); Dr. Brandon Southall (SEA), also head of the independent scientific review panel.

While aspects of the stranding remain unknown, the panel concluded that a multi-beam echosounder system, operated intermittently by a survey vessel moving down the shelf-break the day before the event was the most "plausible and likely

behavioral trigger for the animals initially entering the lagoon system."
http://www.sciencedaily.com-/releases/2013/09/130925132211.htm#

RESEARCH REVEALS BOTTOM FEEDING TECHNIQUES OF TAGGED HUMPBACK WHALES IN STELLWAGEN BANK SANCTUARY

Sep. 26, 2013 — New NOAA-led research on tagged humpback whales in Stellwagen Bank National Marine Sanctuary reveals a variety of previously unknown feeding techniques along the seafloor. Rather than a single bottom feeding behavior, the whales show three distinct feeding approaches: simple side-rolls, side-roll inversions, and repetitive scooping.

A recently published paper, in the journal Marine Mammal Science, indicates that bottom side-roll techniques are common in Stellwagen Bank National Marine Sanctuary and the Great South Channel study area, a deep-water passage between Nantucket, Mass. and Georges Bank-further southeast.

The study further states that the observed feeding behavior also leads to vulnerability to entanglement in bottom set fishing gear, an issue which is a major mortality factor for the species. This finding reaffirms a NOAA Fisheries regulation that mandates the use of sinking line between fishing traps used in the lobster fishery as a way of reducing entanglements.

The new findings follow earlier NOAA-led studies detailing so-called "bubble net" feeding behaviors near and at the surface. Bubble net feeding is a behavior in which humpback whales corral and contain fish into a small area by trapping them in nets of air bubbles so they can more efficiently scoop them up in their large filter-feeding mouths.The behaviors are used by individual animals and as part of coordinated feeding behaviors involving two or more animals.

"Tagging technology is allowing us to observe whales underwater, much as land-based biologists study animal subjects in their specific environments," said David Wiley, sanctuary research coordinator and a co-author on the paper. "The data have allowed us to detect new feeding techniques as well as nuances in those behaviors. We have determined that bottom feeding is a much more commonly used technique than the more well known bubble net behaviors."

Bottom side-rolling feeding was previously hypothesized from observations of scars on the jaws of humpback whales and from earlier tagging projects. In the recent studies, researchers showed that this behavior happens for extensive periods of time at or near the seafloor, that it occurs in the presence of concentrations of sand lance (a preferred prey fish), and that the behavior is accompanied by the expansion of the animal's ventral (throat) pleats.

Information was collected through the use of DTAGs (synchronous motion and acoustic recording tags) and Crittercam™, National Geographic Society's underwater video and audio recording system.

"By visualizing the data with TrackPlot, we can actually see how the whale moves underwater and this enables us to discover different kinds of foraging behaviors," said lead author Colin Ware of the University of New Hampshire's Center for Coastal and Ocean Mapping. TrackPlot is a custom software tool for DTAG data that produces a ribbon-like image in three dimensions. "With these 3-D visualizations, we can follow the path of the whale from surface to seafloor along with all of the pitch, roll and heading changes while underway. By adding Crittercam video, we now get a more complete understanding of these various bottom feeding techniques," Ware said.

A side-roll is defined as a roll of between 45 and 135 degrees from a normal orientation along the seafloor -- the most common version uses a 90 degree roll with a downward head pitch of about 30 degrees, which matches favorably with earlier speculative sketches of bottom feeding. A side-roll inversion involves rolls that continue past the 135 degree orientation position. One humpback used a technique that employed a repetitive sequence of moves approximately every 20 feet during which the animal rolled from a 90 degree position to an inverted position, with some 10 to 17 of these "scoops" per dive.

Sand lance, also known as sand eels, tend to burrow into the sandy sediments at night or form nighttime horizontal schools close to the seafloor. In addition, Crittercam footage indicates that sand lance can form dense mats along the seabed during the day. The side roll feeding technique with extended pleats emphasizes width rather than height, resulting in more efficient feeding when encountering prey at or near the seafloor. Coordinated feeding may also help cluster prey or simply ensure that it does not escape. Crittercam footage also showed for the first time a head-to-head orientation for two animals that were side-rolling at the seafloor.

While this humpback bottom feeding behavior occurs at relatively slow speeds, it does involve the expansion of ventral pleats, which was once thought to require high speeds, as in lunging. The researchers theorize that humpback side rolls may be similar to

the feeding technique of gray whales in the Pacific. The three types of bottom feeding techniques may be due to different prey distributions or may just reflect individual preferences between whales.

http://www.sciencedaily.com/releases/2013/09/130926143238.htm

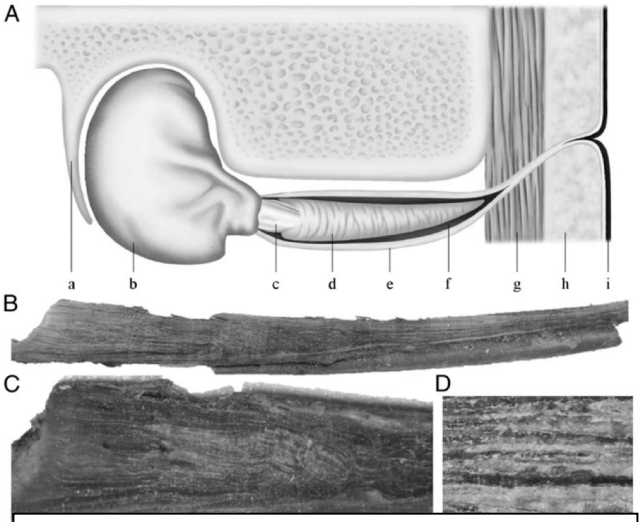
Giant Gob of Earwax Reveals Blue Whale Secrets

Two biologists at Baylor University in Texas, Sascha Usenko and Stephen Trumble, and colleagues have dissected a giant gob of earwax from a blue whale to measure pollutants to which the whale was exposed. The earwax (known as an earplug) can also be used to measure levels of stress and sexual maturity.

It sounds odd to go spelunking for information on chemical contaminants in the inner ear of a dead whale, but Usenko and Trumble say that the method yields more data than previous methods, such as taking samples of whale blubber.

"We could get measurements of what chemicals they were exposed to and the hormones in their body at six-month increments," Usenko said.

Adds Trumble: "We can not only get measurements of different chemical exposures in different time periods, but also from different places around the world."



A diagram shows an earplug in a blue whale skull. The bacon-like image (D) is the earplug. Images courtesy Michelle Berman-Kowalewskic, Santa Barbara Museum of Natural History

Enter the Earwax

Blue whales are the largest living animals today. They weigh up to 190 tons (380,000 pounds) and measure up to 89 feet (27 meters) long. Despite their size, whales, which roam the ocean, are difficult to study. Commercial whaling in the early 19th century caused their numbers to plummet, but they haven't made much of a comeback.

One reason may be organic pollutants that accumulate in the whale's fatty blubber, though the specifics are not understood as yet. Researchers can take a sample of blubber, but that method only reveals the mammal's exposure to contaminants at one point in time. Usenko and Trumble wanted to know how those levels changed over the span of the whale's lifetime. The problem was identifying something fatty like blubber that accumulated over time and allowed scientists to get a historical picture.

Scientists and museums had collected the waxy, fatty deposits of earwax from the ear canals of dead blue whales and other species for hundreds of years. The earplugs were displayed or (more likely) placed into storage for later study. Usenko and Trumble thought this might provide some answers.

"Historically, people had used earplugs from certain baleen whale species to help estimate the age of the whale. You can count the layers [of earwax] like tree rings and basically go back in time. Once we knew this and combined it with the knowledge that contaminants like to accumulate in lipid-rich matrices like the earplug, we could start asking whether earplugs could be used to make these measurements," said Usenko, whose study appears today in the journal *Proceedings of the National Academy of Sciences*.

Harvesting Earwax

When a blue whale was struck and killed by a boat in the waters off Santa Monica, California, researchers harvested a 10-inch (25-centimeter) long piece of earwax. But even the world's largest Q-tip is of no use in removing the earplug.

"You can only get to the earplug after the animal has died," Trumble said, by cutting into the skull with a large, sharp knife.

Analysis of the earplug revealed that the whale deposited one layer roughly every six months. The dead whale had 24 layers of earwax and was estimated to be around 12 years old, which corresponded to other estimates of its age.

In dissecting the layers of earwax, the scientists discovered that during its first year of life the blue whale had a spike in the concentrations of organic pollutants (mainly pesticides like chlordane and PCBs), which they believe occurred during nursing. The high fat content of blue whale milk (scientists estimate that the milk contains between 30 to 50 percent fat) further concentrates these

compounds.

Usenko and Trumble also noticed a spike in mercury in the earplug shortly after the blue whale's fifth birthday, although they don't yet know the significance of the spike.

Lastly, the researchers could track stress levels and reproductive maturity over the course of the whale's life by measuring concentrations of the stress hormone cortisol and testosterone. The whale showed a massive spike in testosterone at ten years of age, corresponding with the animal's sexual maturity. Cortisol levels spiked in the next layer, probably due to breeding and social competition.

The study shows that earplugs can potentially allow researchers to track a whale's exposure to different chemicals over time, as well as some of the physiological changes exposure may have caused, the researchers say.

"We can go back in time and determine when the animal was exposed. If it's undergoing development or sexual maturity or something like that, exposure can be really important," Usenko said.

The hundreds of well-preserved samples in museum collections will enable scientists to gather historical data, as well.

Hopefully, knowledge gained from measuring the effects of contaminants on whale health will lead, in time, to a rebound in population levels.

http://newswatch.nationalgeographic.com/2013/09/16/giant-gob-of-earwax-reveals-blue-whale-secrets/

Feds Clamp Down on Whale Kills in California's Drift Gillnet Fishery

New federal emergency fishing regulations are forcing California's drift gillnet fleet for swordfish and shark to stop fishing for the season if a single endangered sperm whale gets entangled in a net. All vessels that fish offshore will now be required to carry on-board observers at all times.

The emergency measures were finally imposed today after two endangered sperm whales were observed killed in the fishery in 2010. The rules will be enforced by requiring new vessel monitoring systems tracking the locations of all drift gillnet vessels off the U.S. West Coast.

Also today, Turtle Island Restoration Network (SeaTurtles.org) published a new online exposé calling for an end to the gillnet fishery titled, *California's Deadliest Catch*.

"While these emergency measures are supposed to prevent whale deaths in the short term, the real fix is to phase out this obsolete and wasteful fishery once and for all," said Teri Shore, Program Director at Turtle Island Restoration Network, SeaTurtles.org. "The new regulations do nothing to stop the killing of more than 100 dolphins, sea lions, and other marine animals every year. It's time to end this waste of ocean life."

TIRN's new report *California's Deadliest Catch* reveals that the drift gillnet fishery captured and killed 1,300 protected whales, dolphins, and sea turtles animals over 10 years (2001 - 2010) -- and caught and discarded an estimated 100,000 giant ocean sunfish and 10,000 blue sharks, that were dumped overboard dead, dying or injured. "The gillnet fishery is a curtain of death and should be shut down forever," said Todd Steiner, biologist and executive director of SeaTurtles.org. "Why do we allow gillnets to kill endangered marine species to deliver swordfish and shark known to be so high in mercury that the FDA warns women and children never to eat it?"

The emergency regulations on California's swordfish drift gillnet fishery were imposed in response to two endangered sperm whales that were observed killed in the fishery in 2010. Based on low observer coverage in the fleet of 20 percent or less, marine mammal experts estimated that as many as16 individual whales were killed in the CA drift gillnet fishery that year. This number is high above the legal limit allowed under the Marine Mammal Protection Act. Until now, the fishery has been operating for nearly three years without a legal marine mammal take permit. Turtle Island Restoration Network, Center for Biological Diversity, and Oceana requested emergency regulations and filed a notice of intent to sue the federal government under the Endangered Species Act in September 2012 because of the alarming killing and injury of sperm whales — as well as other new information that suggested the government was overlooking the fishery's impact on endangered species. Conservation groups' efforts in prior years have forced the fishery to implement closed areas to protect loggerhead and leatherback sea turtles. Today's regulations will help enforce these closed areas by monitoring all fishing vessel locations.

Federal Emergency Whale Protection for California's Drift Gillnet Fishery — Implements an immediate closure of the California thresher shark/swordfish drift gillnet (mesh size ≥ 14 inches) (DGN) fishery if one sperm whale is observed killed or seriously injured in DGN gear off California — Requires all DGN fishing vessels to carry a NMFS-trained observer from August 15, 2013 to January 31, 2014 in a 100% observer coverage area (Zone). The Zone covers nearly all areas in the U.S. exclusive

economic zone (EEZ) deeper than the 1,100 fathoms (fm) (2,012 meters (m)) depth contour.— Exceptions: an area seaward of the Santa Lucia Escarpment, and any canyons/basins shoreward of the main north-south 1,100 fm (2,012 m) depth contour (regardless of depth) to facilitate monitoring and enforcement— Owners/operators of vessels intending to fish with DGN gear will be required to install, activate, carry and operate a vessel monitoring system (VMS) prior to embarking on a DGN fishing trip after the effective date of this rule.

Top 10 Reasons to End California's Deadliest Catch

1. High bycatch gear
2. Death and injury of whales, dolphins and sea turtles
3. Pacific sea turtles going extinct
4. Waste of blue sharks, sunfish and other fish
5. Swordfish and shark in danger of decline
6. Violates marine conservation laws
7. Drift gillnets banned in Oregon, Washington, on High Seas
8. Only 12 active CA gillnet boats left
9. U.S. swordfish consumption down due to high mercury
10. Fleet observer coverage too low and biased

SIGHTINGS compiled by Monterey Bay Whale Watch. For complete listing and updates see *www.gowhales.com/sighting.htm*

Date	#	Type of Animal(s)
9/30 p.m.	50	Humpback Whales with hundreds of sea lions
9/30 a.m.	75	Humpback Whales
	70	Risso's Dolphins
	4	Harbor Porpoise
9/29 late p.m.	22	Humpback Whales
9/29 p.m.	70	Humpback Whales
9/29 a.m.	150+	Humpback Whales
	25	Bottlenose Dolphins
	30	Harbor Porpoise
9/28 late p.m.	23	Humpback Whales (a full breach next to boat)
9/28 p.m.	65	Humpback Whales
	400	Risso's Dolphins
9/28 a.m.	80+	Humpback Whales
	15	Harbor Porpoise
9/26 a.m.	13	Humpback Whales
	2	Risso's Dolphins
	11	Harbor Porpoise
9/25 a.m.	25	Humpback Whales
9/24 a.m.	50+	Humpback Whales
	20	Risso's Dolphins
9/23 p.m.	40+	Humpback Whales
	2	Harbor Porpoise
9/23 a.m.	80+	Humpback Whales
	10	Risso's Dolphins
	20	Harbor Porpoise
	1000	Sea Lions
9/22 p.m.	25	Humpback Whales surface feeding
9/22 a.m.	45	Humpback Whales surface feeding
9/21 p.m.	50	Humpback Whales
9/21 a.m.	55	Humpback Whales
9/20 p.m.	85	Humpback Whales
9/20 a.m.	85	Humpback Whales
	6	Risso's Dolphins
9/19 p.m.	60	Humpback Whales, one surface feeding with Sea Lions
9/19 a.m.	85	Humpback Whales surface feeding with 1000 Sea Lions
9/18 a.m.	90+	Humpback Whales
	200	Risso's Dolphins
	1	Blue Shark
9/17 a.m.	90+	Humpback Whales
	50	Risso's Dolphins
	2	Bottlenose Dolphins
9/15 a.m.	150	Humpback Whales
	250	Pacific White-sided Dolphins
	12	Harbor Porpoise
9/14 p.m.	6	Humpback Whales
9/14 a.m.	75	Humpback Whales
	3	Blue Whales
	3	Killer Whales
	600	Pacific White-sided Dolphins
	150	Risso's Dolphins
9/13 p.m.	8	Humpback Whales
9/13 a.m.	90	Humpback Whales
	25	Blue Whales
	50	Pacific White-sided Dolphins
	50	Risso's Dolphins
9/12 p.m.	100+	Humpback Whales
	25+	Blue Whales
	20	Risso's Dolphins
9/12 a.m.	50+	Humpback Whales
	10	Blue Whales
	50	Pacific White-sided Dolphins
	350	Risso's Dolphins
	10	Harbor Porpoise

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soundingsnewsletter@gmail.com

Soundings

American Cetacean Society- Monterey Bay Chapter
PO Box H E, Pacific Grove, CA 93950

NOVEMBER/DECEMBER 2013

**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**

MEETING DATE:

Thursday, December 5, 2013
Time: 7:30 PM. PLEASE JOIN US AT 7:00 FOR REFRESHMENTS

Speaker: **Cynthia Fernandez, Cove Monitor with Ric O'Barry's Dolphin Project**

Title: Taiji, after "The Cove"

Cynthia Fernandez is a volunteer Cove Monitor with Ric O'Barry's Dolphin Project. She has also presented outreach programs at many schools for the Dolphin Project, educating others about why dolphins are special animals, dolphin captivity, the dolphin drives in Taiji, Japan, as well as the Grind in the Faroe Islands. Her goal has been to educate children and teenagers about the cruelty of captivity in the hopes of someday seeing all dolphins and orcas wild and free. Cynthia believes that the end of the captive dolphin trade will also bring about the end of the dolphin drives in Taiji.

Cynthia will speak about her fieldwork as a Cove Monitor in Taiji in December 2012 and into January of 2013. She will discuss changes in Taiji since the release of "The Cove." After the popularity of "The Cove," the small fishing village has been inundated with activists, forcing changes. Cynthia will discuss her experiences in Japan and the links between the captive dolphin trade and the dolphin slaughters in Taiji. She will provide the latest information in the struggle to end the dolphin drive fisheries in Japan.

Cynthia will be traveling to Taiji again, from November 16th to December 1st, so she will have the latest information about what is happening in Taiji. She will also present a video she produced about her trip (there are no graphic images of the dolphin slaughter), and will offer suggestions for what individuals can do to help end this slaughter.

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Please note that the November and December programs have been combined into a single program for the holiday season.

Coming in January: Thursday, Jan. 30, at 7 p.m., Dr. James Harvey, director of Moss Landing Marine Laboratories, will be our speaker.

CALENDAR

Dec. 9-13: 20th Biennial Conference on the Biology of Marine Mammals: Dunedin, New Zealand. Workshops will be held on Dec. 7-8, prior to the conference. For a full list of programs, workshops, and field trips go to www.marinemammalscience.org

Jan. 14: Hopkins Marine Station is extending a special invitation to members of the ACS-MB to attend the January Friends of Hopkins lecture. Titled "Natural History of the World's Biggest Mouthful: Lunge-feeding in Baleen Whales," the lecture will be given by Jeremy Goldbogen, HMS' newest faculty. Dr. Goldbogen is a specialist in the feeding biomechanics of *rorquals*, the largest group of baleen whales. **Tuesday, January 14th at 7:30 pm, HMS Boatworks Hall.** ***This meeting will be in addition to the regular January meeting of ACS-MB.***

Jan. 25-26: Whalefest at Custom House Plaza and Fisherman's Wharf #1, Monterey. Fun and family-friendly activities from 10am – 5pm both days. Free.

Jan. 31-Feb. 1: 2014 Southern California Marine Mammal Workshop, Newport Beach, CA. For more info go to SCMMWorkshop@gmail.com

Feb. 19-22: Pacific Seabird Group 41st Meeting. Centennial Hall Convention Center, Juneau, Alaska.

Apr. 10-17: 34th Annual Symposium on Sea Turtle Biology and Conservation, New Orleans, LA. *More information to follow*.

Sep. 22-26: The 5th Bio-logging Science Symposium, Strasbourg (France).

Save The Date:
Jan 26th 2014, 8-10 am: ACS Monterey Bay Gray Whale Fundraiser. Cost $40. Boat-Princess Monterey. For reservations and more info please call Jerry Loomis at 831-419-1051

BOOK RECOMMENDATIONS

Drawn from Paradise: The Natural History, Art and Discovery of the Birds of Paradise with Rare Archival Art by D. Attenborough and E. Fuller. 2012 Harper Design.

Blue Mind: The Surprising Science That Shows How Being Near In, On, or Under Water Can Make You Happier, Healthier, More Concentrated, and Better at What You Do by Wallace J. Nichols. 2014 Little, Brown, and Co.

An Appetite For Wonder: The Making Of A Scientist by Richard Dawkins. 2013 Ecco.

Marine Mammals of the Salish Sea, a poster by Uko Gorter. Natural History Illustration.

HUMAN IMPACTS ON TOP OCEAN PREDATORS ALONG US WEST COAST MAPPED

Oct. 28, 2013 — The California Current System along the U.S. west coast is among the richest ecosystems in the world, driven by nutrient input from coastal upwelling and supporting a great diversity of marine life. Like coastal regions in general, it is also heavily impacted by human activities. A new study led by scientists at the University of California, Santa Cruz, reveals areas along the west coast where human impacts are highest on marine predators such as whales, seals, seabirds, and turtles.

The study, published October 28 in *Nature Communications*, found that many of the high impact areas are within the boundaries of National Marine Sanctuaries. This means there are good opportunities

for improving management strategies, according to first author Sara Maxwell, who led the study as a graduate student in ocean sciences at UC Santa Cruz and is now a postdoctoral scholar at Stanford University's Hopkins Marine Station.

"The sanctuaries are located close to the coast in areas where there are a lot of human activities and a lot of marine life, so it's not surprising that we see a lot of impacts there," Maxwell said, noting that oil spills were a big concern when the sanctuaries were established, and many do not limit activities such as fishing, although they are actively engaged in managing industries such as shipping.

"With the sanctuaries already in place, we have an opportunity to increase protections. The results of this study allow us to be more specific in where we focus management efforts so that we can minimize the economic impact on people," she said.

There are five National Marine Sanctuaries along the west coast, covering nearly 15,000 square miles. A proposed expansion of the Gulf of the Farallones and Cordell Bank National Marine Sanctuaries would extend protections north to Point Arena, a key area identified in the study.

Marine mammals and other predators are critical to the health of marine ecosystems. The study used tracking data for eight species of marine predators: blue whales, humpback whales, northern elephant seals, California sea lions, black-footed and Laysan albatrosses, sooty shearwaters, and leatherback sea turtles. These are among the 23 species whose movements have been tracked since 2000 as part of the Tagging of Pacific Predators (TOPP) program. The eight species included in the new study are ecologically important but are not commercially exploited, Maxwell said.

The TOPP studies showed that many marine predators travel thousands of miles every year, yet often concentrate within small-scale "hotspots" to breed or feed on fish and other prey. Many such hotspots are found within the California Current System.

Maxwell and her coauthors combined the TOPP tracking data with a database of human impacts in the California Current System that was developed by a group led by coauthor Benjamin Halpern at UC Santa Barbara. The relative impact on each species was determined for each of 24 stressors associated with human activities, such as fishing, shipping, climate change, and pollution. The analysis yielded maps showing where the greatest impacts on each species are likely to be.

California sea lions are among 23 species whose movements have been tracked since 2000 as part of the Tagging of Pacific Predators (TOPP) program. (Credit: Dan Costa, UC Santa Cruz)

"Areas where key habitats and human impacts overlap represent important areas for conservation efforts," Maxwell said. "In other cases, areas of high human activities are not key habitats for predators. As a result, we can maximize both conservation of marine predators and human uses that our coastal communities depend on."

The study suggests that protecting key habitat without considering human uses may result in missed opportunities for sustainable resource use. "Having this detailed spatial information will help us move toward a more sustainable management approach," said coauthor Elliott Hazen, a research biologist at UCSC and the NOAA Southwest Fisheries Science Center.

Providing information to support management and policy decisions was one of the goals of the TOPP program, which was conceived by coauthors Dan Costa at UC Santa Cruz, Steven Bograd at NOAA, and Barbara Block at Stanford. TOPP researchers used sophisticated tags with satellite- or light-based geolocation capabilities to track the movements of top predators throughout the Pacific Ocean.

"A major component of the TOPP program was to identify important conservation areas of the North Pacific Ocean. This paper is a significant step forward in increasing our awareness of the 'blue Serengeti' that lies just off the west coast of the U.S.," Costa said.

http://www.sciencedaily.com/releases/2013/10/131028090825.htm

YANGTZE FINLESS PORPOISE: HIGHLY ENDANGERED MAMMAL TRYING TO COPE WITH CONSTANT SHIPPING, DREDGING AND UNDERWATER CONSTRUCTION

Oct. 21, 2013 — The Yangtze finless porpoise, which inhabits the high-traffic waters near the Three Gorges Dam in China, is highly endangered, with only about 1,000 animals alive today. Scientists from Woods Hole Oceanographic Institution (WHOI) and their Chinese colleagues are using medical technology to shed new light on this species' critical sense of hearing in a waterway punctuated by constant shipping, dredging, and underwater construction.

"We want to understand how they may be impacted by noise," said Aran Mooney, a biologist at the Woods Hole Oceanographic Institution (WHOI) and a lead author on the study published online this week in the *Journal of Experimental Biology*.

Marine mammals such as dolphins and porpoises rely on their hearing to navigate, communicate, and find food in the typically deep, dark, and murky waters they inhabit. But what we know about how they hear has been limited to research on just a few species, particularly bottlenose dolphins, because they are relatively common in marine parks and aquaria. This can be a problem when natural resource managers and regulators base aquatic noise pollution policy decisions on data from a limited number of "representative species" when there are over 70 species of toothed whales or odontocetes that live in a variety of aquatic habitats.

A Yangtze finless porpoise at the Institute of Hydrobiology, Chinese Academy of Sciences in Wuhan, China. (Credit: Photo by Aran Mooney, Woods Hole Oceanographic Institution)

This new research shows how variability in the size and shape of toothed whales' heads across species can result in marked differences in how they receive sound and how sensitive they are to a range of frequencies.

"We've learned that there's more variation than we've taken into account on how different species hear," Mooney said.

He and colleagues at WHOI and the Institute of Hydrobiology of the Chinese Academy of Sciences in Wuhan, China applied live acoustic sensitivity examinations and computed tomography (CT) scans on Yangtze finless porpoises to begin to identify the auditory variability among toothed whales.

Porpoise populations are declining rapidly worldwide. The Yangtze finless porpoise shares the same habitat as the Baiji river dolphin, seemingly the first toothed whale that has become extinct by humans. Like all toothed whales, the Yangtze finless porpoise do not have external ears. It hears when sound reverberates through its head, throat, jaw, and acoustic fat within the mandible.

Scientists conducted hearing examinations on two Yangtze finless porpoises that were originally from the wild, but have resided at the Institute of Hydrobiology in Wuhan for six and 14 years. The hearing exams were similar to hearing tests regularly given to infants.

"Porpoises, like babies, can't tell us if they can hear in their left or right ear, so we measure their hearing physiologically from the surface of the skin," Mooney said.

Broadband clicks and low, mid, and high frequency tones within a normal threshold were transmitted through silicon suction cup sensors on nine parts of the animal's head and body. The scientists non-invasively recorded the porpoises' neuron responses.

The exam results showed that the finless porpoises are sensitive to sound nearly equally around their heads while bottlenose dolphins and beluga whales exhibit a substantial 30-40 decibel difference in sound sensitivity from their jaw to other parts of their head.

The researchers then CT scanned two stranded Yangtze finless porpoise specimens at a hospital associated with Wuhan University to gather information on their skeletal and tissue structure.

"We had the opportunity to scan them in Wuhan and work with the Chinese radiologists, which was very interesting to get a chance to see their facility and how they operate in comparison to WHOI," said Darlene Ketten, a biologist and director of the Computerized Scanning and Imaging (CSI) facility at WHOI. "We've done a lot of these here. But, they had never scanned any porpoises."

The CT images revealed that the acoustic fat pads in Yangtze finless porpoises are thicker and more disc-like in shape compared to the elongated shape of these fat deposits found in other toothed whales.

"Now that we have some hearing data, we are working on modeling how the conformation of these pads and their dimensions and shapes relate to the frequencies and sensitivities," Ketten said.

The morphology of the Yangtze finless porpoise implies that it hears omni-directionally, which means it may have difficulty discerning signals among the clutter of constant noise.

"In a noisy environment, they'd have a hard time hearing their prey or their friend. It makes it more difficult for them to conduct basic biological activities such as foraging, communicating, and navigating in the river," Mooney said.

The differences in hearing sensitivities between the finless porpoise and other species such as bottlenose dolphins and belugas indicate further auditory variations among species. Mooney believes that effective management strategies must consider these variations. He would like to broaden this study to include examinations of other toothed whales, such as the Risso's dolphin, harbor porpoise, and white-sided dolphin, and continue to examine noise impacts on the endangered Yangtze finless porpoise.

http://www.sciencedaily.com/releases/2013/10/131021104246.htm

New Species of Dolphin Found in Australia

A NEW SPECIES OF HUMPBACK DOLPHIN IS FOUND CRUISING THE OCEAN.

Oct. 29, 2013 — Hiding in plain sight, researchers have discovered a new species of humpback dolphin living off the northern coast of Australia.

The discovery came when scientists with the Wildlife Conservation Society(WCS) tried to settle a decades-old argument among marine mammal researchers.

"For many years, there's been this debate about the number of species of humpback dolphins," said Howard Rosenbaum, director of the WCS ocean giants program. Scientists have proposed everything from two to four species within the group's genus Sousa.

But there was never enough good evidence supporting claims of more than two species, Rosenbaum said. So about ten years ago, the community decided that until they had more information, they'd recognize only two species—the Atlantic humpback dolphin and the Indo-Pacific humpback dolphin.

New Science

Rosenbaum and colleagues decided to revisit this old argument, and started collecting physical and genetic samples from humpback dolphin populations throughout their range. This included samples from West Africa, the Indian Ocean, the Pacific Ocean, and off the coast of Australia.

"From a management standpoint, the marine mammal community has specified that they need at least two different forms of evidence to justify different species [designations]," said Rosenbaum.

So he and his colleagues tried to collect as comprehensive a data set as possible to get the best chance of putting this argument to rest. Usually, genetic analyses into the question of new species consider only DNA from an organism's mitochondria—the cell's battery pack.

This is because mitochondrial DNA is inherited only through the mother and is easier to work with than DNA from a cell's nucleus, said Martin Mendez, assistant director for the Latin American and Caribbean program at WCS.

Two individual animals from an as-of-yet unnamed species of humpback dolphin jump in the waters off northern Australia.

But Mendez and colleagues looked at DNA from both parts of the cell. That, combined with physical characteristics including the length of the dolphins' beaks and the number and position of their teeth, suggested there were four species of humpback dolphin. Not two.

Three of those species were ones researchers had previously proposed. They encompass a species off of West Africa (*S. teuszii*), one in the central and west Indian Ocean (*S. plumbea*), and one in the eastern

Indian and west Pacific Oceans (*S. chinensis*).

The fourth species, an as-yet unnamed group off the north coast of Australia, was a pleasant surprise, said Rosenbaum.

In some ways, this species is new to science, said Mendez. But in other ways, it isn't because researchers have known about this group down in Australia for a while. They just didn't realize it was a different species.

It's rare to find a new species of mammal, said Mendez. "[But] it's also not crazy to find new species when you're using the kind of [genetic] information we're using.

"One of the reasons we're finding new species is because we're finding new tools," he explained. "Genetics opens a new window into these kinds of questions."

Aiding Conservation

Mendez is hopeful that this discovery—reported this week in the journal Molecular Ecology—will help in the management of this IUCN Red List group. The Atlantic humpback dolphin is considered vulnerable, and the Indo-Pacific group is considered near threatened.

The legal framework used to protect vulnerable species is based on species designations, he explained. "We're proposing that Australia has its own humpback [dolphin] species, which has implications for conservation strategies."

"Countless dolphins die every year as bycatch in fisheries," said Rosenbaum. The humpback dolphin is subject to particularly high rates of bycatch, and in some places is hunted directly.

"By describing these different species, we hope that this sets the stage not only for the appropriate conservation protections to be put in place by different countries, [but that] it also helps reduce threats like bycatch."

http://news.nationalgeographic.com/news/2013/10/131029-new-humpback-dolphin-species-ocean-animals-science/

California and Indonesia Launch Partnership to Save Endangered Sea Turtles

Oct. 18, 2013 — On California's first Pacific Leatherback Conservation Day, California and Indonesia established a conservation partnership between the two regions that the endangered sea turtle calls home. Governments, schools, and ocean protection organizations came together to form the partnership.

The summit was spurred largely by a new California law passed last year, introduced by Assemblymember Paul Fong (D-Cupertino) and signed into law by Governor Jerry Brown, establishing Pacific leatherback sea turtles as the state marine reptile and encouraging international collaboration.

"Like the leatherbacks' migration across the ocean, this trans-Pacific conservation agreement bridges the gap between two distant coasts and cultures that share a common vision of ocean protection," said Teri Shore, Program Director, Turtle Island Restoration Network (SeaTurtles.org).

Signing the Leatherback Summit Declaration

"It is an honor to collaborate with our coalition of partners across the state and important dignitaries from Indonesia in recognizing the importance of Leatherback Sea Turtles, a majestic creature that has swam our ocean's for millions of years and plays a vital part of the biological diversity of our ocean's ecosystem," said Assemblymember Fong. "The first ever Pacific Leatherback Sea Turtle Conservation Day pays homage to this species in the hope, that this inaugural event and future events will raise the awareness of the need to protect this species for generations to come."

"The leatherback sea turtle is an integral part of cultural and natural heritage of Tambrauw, Indonesia, as symbolized by its inclusion in the official Tambrauw logo. It also represents a shared asset of the trans-Pacific nations," said Bupati Tambrauw, a government official from the region of Indonesia where California's leatherbacks nest. "Because of its unique characteristics and biology, the leatherback represents a biological ambassador for unifying conservation efforts throughout the Pacific. This is exemplified by this inaugural leatherback summit

between Tambrauw and California which will serve as a foundation for Pacific-wide leatherback conservation."

At the inaugural Pacific Leatherback Sea Turtle Conservation Summit hosted by California in Monterey, dignitaries from both sides of the Pacific signed a declaration agreeing to work together to ensure that leatherback sea turtle populations survive and thrive both on nesting beaches in Indonesia and in the ocean waters off the California coast where they spend most of their time.

"Just as our two countries are interconnected by the oceans, all of the species living in the oceans are interconnected as well," said Rep. Sam Farr, D-Calif. and co-chair of the House Oceans Caucus. "It is important that we work together to protect the leatherbacks, not just to save this majestic species but to protect the health of our shared ocean."

"Cooperation between California and Indonesia will strengthen the work of both governments by connecting the two regions critical to the leatherback's life cycle," said California Natural Resources Agency Undersecretary Janelle Beland. "We look forward to working with Indonesia to develop innovative conservation approaches to protect the Pacific leatherback sea turtle."

While U.S. federal agencies were unable to attend the summit due to the federal shutdown, NOAA Fisheries and Sanctuaries remain key partners for the agreement and newly established partnership.

The new conservation declaration was the culmination of the historic Pacific Leatherback Sea Turtle Conservation Summit, where scientists and political leaders convened to craft a new international agreement to forward an international conservation plan to speed the recovery and long-term survival of critically endangered Pacific leatherback sea turtles. Participants in the summit also drafted an international Memorandum of Agreement that is expected to be signed by Indonesia, California, and the U.S. federal government in the coming months, which will make the partnership official. One potential outcome of the summit is a Sister Sanctuary arrangement between the Monterey Bay National Marine Sanctuary and protected areas off Indonesia.

Ricardo Tapilatu, a leading leatherback researcher with the State University of Papua, Indonesia, explains, "The nesting population of leatherbacks at the two main nesting beaches in the Tambrauw jurisdiction of Papua Barat, Indonesia has declined 78 percent during the past three decades. We have initiated science-based conservation efforts on the nesting beach in an attempt to reverse this decline and initiate its recovery. However, the recovery of the leatherback is dependent upon a Pacific-wide approach. The current leatherback summit unifies conservation efforts at both ends of the leatherback's trans-Pacific migration, the primary nesting beach and the major foraging ground."

"If we are going to prevent the extinction of species that cross international borders, we need to take action beyond our own borders." said Geoff Shester, California Program Director for Oceana, whose organization served as the lead organizer of the event. "Our leatherbacks are ambassadors that link Californians to our new partners on the other side of the world."

Every summer and fall, Pacific leatherbacks migrate from their nesting beaches in Indonesia to ocean waters off the West Coast of the United States to feed on jellyfish — a 12,000-mile round-trip journey. According to Scott Benson, marine ecologist with the National Marine Fisheries Service, "Leatherback turtles don't recognize international borders, so it is the responsibility of people in all Pacific nations to protect this species wherever it occurs. Improved international coordination that is implemented at the local level is essential for the conservation and recovery of leatherback populations in the Pacific."

http://www.seaturtles.org/article.php?id=2538

Ten Thousand Walruses Gather on Island As Sea Ice Shrinks

THE MARINE MAMMALS, WHICH USUALLY SPEND THEIR TIME RESTING ON SEA ICE, ARE INCREASINGLY FORCED TO HAUL OUT ON LAND.

Oct. 2, 2013 — An estimated ten thousand Pacific walruses have huddled together on a remote island in the Chukchi Sea, an unusual phenomenon that's due to a lack of sea ice, experts say.

The giant marine mammal is known to "haul out"—literally haul its body onto ice or land to rest or warm up—on various places along the Arctic coast.

But with the Arctic warming up and melting much of its floating ice, there are limited areas for the walruses to gather. This forces them to cluster on land in huge aggregations rarely before seen.

In 2011, 30,000 walruses hauled out along a stretch of beach less than a mile long, according to the National Oceanic and Atmospheric Administration, which took aerial pictures of the most recent walrus gathering.

Scientists first noted that such large terrestrial haulouts along Alaska's coast in 2007 and reports

have increased in the past five years, said Pam Tuomi, senior veterinarian at the Alaska SeaLife Center in Seward.

That mirrors the effect of warming temperatures in the Arctic, which is in the throes of a "long-term, downward trend" in sea ice cover, according to the National Snow and Ice Data Center.

In 2013, the Arctic experienced its sixth lowest minimum extent, or the period when sea ice cover is at its smallest.

The walrus haulouts are "another one of the symptoms of the changes that are occurring in the Arctic Ocean," Tuomi said, "and they are causing cascading effects."

On Thin Ice

The Pacific walrus as a species is suffering due to its shrinking habitat—the animal's numbers are declining, and it is currently listed as "threatened" and may soon be upgraded to "endangered" under the U.S. Endangered Species Act, Tuomi said.

Meanwhile, the large haulouts are putting individual animals at risk. For one, if something like an airplane flying overhead spooks one of the mammals, it may spark a stampede into the water. During their panic, the heavy animals—which can weigh up to 1.5 tons (1.4 metric tons)—may trample other walruses to death, especially young ones, she said.

"It's like yelling fire at a movie theater," she said.

In addition, so many animals in such close quarters could increase the likelihood of a disease outbreak. In 2011 a mysterious, fatal disease swept through a population of ringed seals in Alaska and there was concern that some walruses might also have been affected, she noted.

The disease may have spread from one population of marine mammal to another—for instance, ringed seals in Russia—and they weren't mixed together in a dense aggregation. A disease outbreak in a crowded haulout could be even deadlier.

http://news.nationalgeographic.com/news/2013/10/131002-walruses-arctic-haulout-science-animals-alaska-global-warming/

Fossil hunters in Santa Cruz make whale of a find

Sept. 8, 2013 — The fossil hunters of the Purisima Formation are avid collectors of the dead - they probe the beaches and sandy cliffs around Santa Cruz to find the stony bones of birds and whales and sea creatures that lived and died there millions of years ago.

To scientists, those amateur hunters provide an endlessly renewing source of material that bears witness to the ebb and flow of evolution as environments change over the millennia and life adapts to the changes and moves on into ever-new forms.

A fossil of a 5 million-year-old whale skull found near Santa Cruz is now held at the UC Berkeley Museum of Paleontology. Photo: Instytut Paleobiologii PAN

Two of those amateurs recently passed on a few of their trophies to Robert W. Boessenecker - known as Bobby to his surfing friends in Capitola - who is now a 27-year-old paleontology graduate student in New Zealand.

Evolutionary ancestors

He and two colleagues have just published a scientific report on the fossil discoveries: a primitive whale skull and two ear bones from two members of the dolphin family that swam in the sea some 5 million years ago and appear to have shared the features of modern whale species. The ancient animals might well have been the common evolutionary ancestors of their modern descendants, Boessenecker believes.

His detailed description of the primitive bones is published in the international paleontology journal *Acta Paleontologica Polonica*. In the report, Boessenecker credits Stanley Jarocki of Watsonville and Robin Eisenman, a one-time Aptos beachcomber, as the fossils' finders.

Probing the cliffs

Jarocki, now retired from construction engineering and a longtime Santa Cruz surfer, has been probing the nearby cliffs and beaches for more than 30 years - both to add to his own fossil collection and to give away to eager scientists.

"In this fossil-hunting business they say that what you find is yours, but I'm just a hunter and a donator," Jarocki said. "I remember that I once gave Bobby some fossil bird bones I found, and he studied them, and this time I gave him the ear bones I found

embedded in the cliffs that I didn't really need."

Jarocki also donates many of his finds to the Santa Cruz Museum of Natural History, where he is a valued contributor to the museum's fossil collections, said research associate Frank A. Perry, a co-author of Boessenecker's report.

"He donates lots of small stuff he finds and that other fossil hunters overlook," Perry said. "I first met him 20 years ago, when he donated a whole collection of early shark teeth that dated from 10 or 12 million years ago.

"They were the inspiration for an entire report on the sharks of that era that the museum published."

Robin Eisenman, who found the ancient whale skull on a beach north of Aptos, has since reportedly left to live in Idaho, where the ocean is more than 600 miles away.

The beachside fossil hunters working around Santa Cruz are vital to his research, Boessenecker said, and that's how he met Jarocki five years ago.

"You'll see people with their kids, walking their dogs, people surfing, and occasionally someone who's paying a bit too much attention to the rocks, standing out like a sore thumb as a fossil collector," Boessenecker said. "So I went up to introduce myself and we chatted."

Fossil-rich area

The result was Jarocki's gift of the fossil ear bones that, like Eisenman's fossil skull, came from animals long buried in what geologists term the Purisima Formation.

It's a series of fossil-rich sandstone outcrops along the coast, from Point Reyes to the Santa Cruz area, that were thrust upward by earthquakes some 7 million to about 2.6 million years ago, when the Pacific Ocean reached into what is now the Central Valley.

Surfers have long discovered fossils in the cliffs above the beaches in the Santa Cruz area, and Boessenecker is both a surfer and a fossil hunter.

Now a graduate student at the University of Otego in New Zealand, he has teamed with Perry in Santa Cruz and with Jonathan Geisler, a mentor at the New York Institute of Technology's College of Osteopathic Medicine in Old Westbury, N.Y., for his report on the Purisima Formation's ancient whales.

Bones a bit of a mystery

The fossil bones are something of a mystery; there are too few to link them precisely to any modern whale species, Boessenecker said. But they clearly come from a group known as Globicephalines - otherwise known as blackfish - that include pilot whales, false killer whales and some dolphins, he reports.

"The fossil skull shares features with both pilot whales and false killer whales and may be the common ancestor to both," Boessenecker reported. "They probably would have lived in environments like the modern California shelf and Monterey Bay of the Purisima Formation."

Says Perry of the mystery that remains about the fossil whale bones:

"I see the study of fossils akin to assembling a gigantic jigsaw puzzle. Little by little paleontologists collect and put together the pieces, giving us a better picture of the past. We'll never have the entire picture, but every little part helps."

http://www.sfgate.com/science/article/Fossil-hunters-in-Santa-Cruz-make-whale-of-a-find-4797539.php - skip

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JAPAN'S COASTAL SEA HUNTS RISK FOR SPECIES

Oct. 30, 2013 — Japan's hunts of smaller whales, dolphins and porpoises threaten some species with extinction, an environmental group said Thursday.

Catch quotas are based on data collected as much as 20 years ago and some species have been overhunted beyond the point of recovery, the Environmental Investigation Agency said in its report.

The lucrative market in live catches for aquariums, especially in China, poses another risk, the report said. Live animals can sell for between $8,400 and $98,000, sometimes more than the roughly $50,000 from sales of meat for a single bottlenose dolphin.

Japan set its catch limit for small cetaceans at 16,655 in 2013, far below the 30,000 caught annually before limits were set in 1993 but still the largest hunt in the world. It defends its coastal whaling as a longstanding tradition, source of livelihood and as necessary for scientific research.

The London-based independent conservation group said Japan is failing to observe its stated goal of sustainability and urged the country to phase out the hunts over the next decade.

"The government has a responsibility to restore and maintain cetacean species at their former levels," said Jennifer Lonsdale, a founding director of the EIA.

The small cetaceans are among a number of species facing severe declines in Japan. They include Japanese eels, a delicacy usually served roasted with a savory sauce over rice, and torafugu, or puffer fish.

The status of each species varies, depending on its range and hunting practices. Catch limits for Dall's

porpoises are 4.7-4.8 times higher than the safe threshold, the report said.

For the striped dolphin, once the mainstay of the industry but now endangered and disappearing from some areas, catches have dropped from over 1,800 in the 1980s to about 100.

That is still four times the sustainable limit, the report said. It urged that the government update its data on the abundance of it and other species and stop transferring quotas from already overfished areas to areas that exceed their quotas.

Under a 1946 treaty regulating whaling, nations can grant permits to kill whales for scientific research.

In July, Japan defended its annual harpooning of hundreds of whales in the icy seas around Antarctica, insisting the hunt is legal because it gathers valuable scientific data that could pave the way to a resumption of sustainable whaling in the future.

Australia has appealed to the World Court to have the whaling outlawed.

http://www.sfgate.com/news/science/article/Group-Japan-sea-hunts-risk-for-species-consumers-4941302.php

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SIGHTINGS

Sightings are compiled by Monterey Bay Whale Watch. For complete listing and updates see *www.gowhales.com/sighting.htm*

Date	#	Type of Animal(s)
10/31 pm	100 50	Humpback Whales Rissos's Dolphins
10/31 am	50 10 300	Humpback Whales Killer Whales Risso's Dolphins
10/30 pm	30 300	Humpback Whales Risso's Dolphins
10/30 am	60	Humpback Whales Risso's Dolphins
10/29 pm	35 300 5	Humpback Whales Risso's Dolphins Dall's Porpoise
10/29 am	45 300 1	Humpback Whales Risso's Dolphins Olive Ridley Sea Turtle (rare sighting)
10/27 am	85 1 40 20	Humpback Whales Killer Whale (Fat Fin) Risso's Dolphins Harbor Porpoise
10/26 pm	80	Humpback Whales
10/26 am	75 2	Humpback Whales Killer Whales (Fat Fin and Stumpy)
10/25 pm	50	Humpback Whales (some breaching)
10/25 am	100 70	Humpback Whales (some breaching) Risso's Dolphins
10/24 pm	25	Humpback Whales (in foggy conditions)
10/24 am	20 2	Humpback Whales Killer Whales (Fat Fin and Stumpy)
10/23 pm	25 2	Humpback Whales Killer Whales (Fat Fin and Stumpy)
10/23 am	40 2 70	Humpback Whales Killer Whales (Fat Fin and Stumpy) Risso's Dolphins
10/22 pm	28	Humpback Whales
10/22 am	50 3 5	Humpback Whales Dall's Porpoise Harbor Porpoise
10/21 pm	50+ 3	Humpback Whales Killer Whales
10/21 am	38	Humpback Whales (in foggy conditions)
10/20 pm	42 2	Humpback Whales Killer Whales (Fat Fin & Stumpy)
10/20 am	48 2 60 200	Humpback Whales Killer Whales (Fat Fin and Stumpy) Pacific White-sided Dolphins Risso's Dolphins
10/19 pm	60	Humpback Whales (very active)
10/19 am	150 300	Humpback Whales Risso's Dolphins
10/18 pm	150 2	Humpback Whales Killer Whales (Fat Fin and Stumpy)
10/18 am	220 2 150	Humpback Whales Killer Whales (Fat Fin and Stumpy) Risso's Dolphins
10/17 pm	120 2	Humpback Whales Killer Whales (Fat Fin and Stumpy)

10/17 am	90 2 800 15	Humpback Whales Killer Whales Risso's Dolphins Harbor Porpoise
10/16 pm	120 2 700 8	Humpback Whales Killer Whales (Fat Fin and Stumpy) Risso's Dolphins Harbor Porpoise
10/16 am	120 700 10	Humpback Whales Risso's Dolphins Harbor Porpoise
10/15 pm	100+ 2 100	Humpback Whales Killer Whales Risso's Dolphins
10/15 am	60+ 2 600 6	Humpback Whales Killer Whales (Fat Fin and Stumpy) Risso's Dolphins Dall's Porpoise
10/14 pm	35 250	Humpback Whales (including calf breaching & surface feeding) Risso's Dolphins
10/14 am	90 1 5	Humpback Whales Killer Whale (Fat Fin) Dall's Porpoise
10/13 pm	90 1 75	Humpback Whales Killer Whale (Fat Fin) Risso's Dolphins
10/12 pm	90 1	Humpback Whales Killer Whale (Fat Fin, breaching)
10/12 am	34 1 45	Humpback Whales Killer Whale (Fat Fin) Risso's Dolphins
10/11 pm	60 1 700	Humpback Whales Killer Whale (Fat Fin, breaching) Risso's Dolphins (breaching)
10/11 am	60 1 700	Humpback Whales Killer Whale (Fat Fin) Risso's Dolphins
10/10 pm	20	Humpback Whales
10/10 am	24 35	Humpback Whales Risso's Dolphins
10/8 pm	15 30	Humpback Whales Risso's Dolphins
10/8 am	50 10	Humpback Whales Pacific White-sided Dolphins
	700	Risso's Dolphins
10/7 pm	30+ 300	Humpback Whales Risso's Dolphins
10/7 am	30+ 1 300	Humpback Whales Killer Whale (Fat Fin) Risso's Dolphins
10/6 pm	35 1 100 700	Humpback Whales Killer Whale (Fat Fin) Pacific White-sided Dolphins Risso's Dolphins
10/6 am	60 1 700 8	Humpback Whales Killer Whale (Fat Fin) Risso's Dolphins Bottlenose Dolphins
10/5 pm	45 12	Humpback Whales Harbor Porpoise
10/5 am	80 120 15	Humpback Whales Risso's Dolphins Harbor Porpoise
10/4 pm	50 30	Humpback Whales Risso's Dolphins
10/4 am	19 100 30	Humpback Whales Risso's Dolphins Northern Right Whale Dolphins
10/3 am	15	Humpback Whales
10/2 am	25 2	Humpback Whales Harbor Porpoise
10/1 am	45+	Humpback Whales

Breaching Risso's Dolphin on Oct. 11, 2013. (Credit: Daniel Bianchetta, Monterey Bay Whale Watch)

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