Soundings

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

NOVEMBER / DECEMBER 2016

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 1, 2016
Time: 7:30 PM
PLEASE JOIN US AT 7:00 FOR REFRESHMENTS

Speakers: **Chris and Ame Hartzell**
Title: Travel and Photography

Chris Hartzell is a fire captain, naturalist, and environmental conservationist with over 30 years of experience as a wildlife photographer. His work can be found internationally in calendars, advertisements, magazines, books, and educational exhibits. His wife Ame is a nurse and SCUBA enthusiast and is also an international wildlife photographer, and together Ame and Chris have traveled to more than 25 countries to work on field workshops, wildlife tours, educational presentations, photo contest judging, and to teach photography classes.

From the Greater Roadrunner to the Great White Shark, this slide show combined with information and travel techniques is sure to get your travel and photography juices flowing! Chris and Ame will share tips and tricks for choosing, planning traveling, and photographing some of the best places on Earth. You can learn more about Chris and Ame and their work at their webite, PhotoStrokes.net.

P**lease join** us for refreshments before the program begins. More information is available on the ACSMB website, www.acsmb.org.

Next month: We will return to our regular monthly meeting schedule in January, meeting at Hopkins Marine Station on the last Thursday of the month, January 26

INSIDE THIS ISSUE

CALENDAR

Dec. 1: Moss Landing Marine Labs Seminar from 4 PM to 5 PM in the Moss Landing Seminar Room. Seminar led by Charles Boch of Moss Landing Marine Labs: Climate Change and Abalone Life History.

Dec. 2: Hopkins Marine Station Marine Science Lecture from noon to 1 PM. Lecture by Brigitte McDonald of Moss Landing Marine Labs: Pushing the Limits: Diving Physiology and Energetics of Marine Mammals.

Dec. 8: Moss Landing Marine Labs Seminar at 4 PM in the Moss Landing Seminar Room. Seminar led by Mark Carr of UC Santa Cruz: Causes and consequences of geographic patterns of kelp forest community structure.

Dec. 16-18: ACSMB will be participating in Christmas on the Wharf, at Old Fisherman's Wharf in Monterey. We'll be distributing Christmas treats between the hours of 5pm-9pm on 12/16, 11am to 9pm on 12/17, and 11am to 5pm on 12/18.

Jan. 27-28, 2017: Southern California Marine Mammal Workshop in Newport Beach, CA. Speakers will include Dr. Sam Ridgeway, John Calambokidis, and Dr. John Hildebrand.

Jan. 28-29, 2017: Whalefest in Monterey. ACSMB will have a booth on Sunday, January 29. More information to come in the January newsletter.

Jan. 29, 2017: ACSMB's Gray Whale Fundraiser will take place from 8am-10am, with Princess Monterey Whalewatching.

Feb. 22-25, 2017: Pacific Seabird Group 44th Annual Meeting in Tacoma, Washington: "Sound to Sea: Marine Birds Across the Seascape."

BOOK RECOMMENDATIONS

Anatomy of Dolphins: Insights into Body Structure and Function, by Bruno Cozzi and Stefan Huggenberger. 2016 Elsevier Science & Technology Books.

The Lives of Hawai'i's Dolphins and Whales: Natural History and Conservation, by Robin W. Baird. 2016 University of HAWAII Press.

CONSERVATION GROUPS PETITION FEDS TO CREATE SAFE ZONE FOR ORCAS NEAR SAN JUAN ISLAND

by Kyle Mittan

Nov. 5, 2016 — A pair of conservation groups asked the Obama administration Friday to approve what they called a "whale-protection zone" for endangered orcas living near San Juan Island.

Orca Relief Citizens' Alliance and the Center for Biological Diversity said their plan for a 10-square-mile zone along the western coast of the island would mitigate vessel noise that keeps Southern Resident orcas from feeding and communicating.

Southern Resident killer whales stay in Puget Sound but migrate along the West Coast, according to the National Oceanic and Atmospheric Administration. Officials counted only 78 in 2014.

The proposal includes restricting vessels in the zone to a no-wake speed limit from April through September. If the proposal is approved, it could mean big changes for the whale-watching industry.

Advocates say a protection zone along the island is the quickest and easiest way to slow the whales' population decline, the two groups said in a statement.

But not everyone agrees. Scott West of the Orca Relief Citizens' Alliance and Michael Harris of Orca Conservancy tackled the issue of a protection zone in a discussion with KIRO 7 News. Harris said the proposed zone is a "distraction" from more immediate concerns, like the lack of salmon for the whales to eat.

West said he agreed that food is the No. 1 priority for restoring the orcas' population, but added that the protection zone could help address that indirectly.

Southern Resident orcas, including a calf, in December 2015. Two conservancy groups have asked the Obama administration to create a "whale-protection zone" along the western coast of San Juan Island, which would restrict boat traffic in that area. (Credit: Dave Ellifrit | Center for Whale Research).

"They use sound the way we use sight, and it'd be the same if I put a hood over your head and told you to go feed yourself," West told KIRO 7. "You might be able to fumble through but you're going to be very much inhibited. Same thing is true with these masking sort of sounds – it limits their abilities."

Harris added that the implications the restrictions could have for the whale-watching industry could end up sending more people to see the whales in captivity.

"If we do something that really, seriously, negatively impacts the whale-watch industry, then that's going to negatively impact the alternative to SeaWorld – the alternative to going to see whales in captivity, which is awful, we both agree," Harris said.

http://www.bellinghamherald.com/news/local/article112854463.html

The Bonney Upwelling and Blue Whales: Annual Visitors from the Deep

Nov. 4, 2016 — Last week, strolling among the stalls at a beachside festival, I passed an old man patting the shoulder of a harried-looking woman.

"The sun," he said. "Will still rise tomorrow."

It's no blinding flash of insight, but it remains a reassuring message to those whose anxiety about the future is a-jangle, which seems to include a fair slice of the world's population in this era of Brexit, Trump and Hanson.

The festival I was attending, it happens, was dedicated to a phenomenon at least as profound as the sun's comforting rhythm, though a lot slower and less familiar.

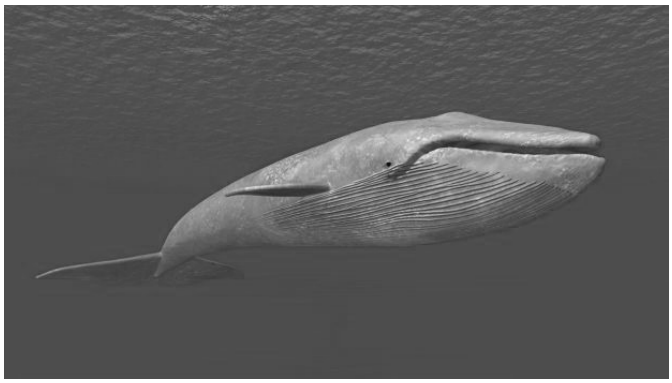
It was in celebration of an ocean tide that occurs but once a year along a small stretch of Australia's coast.

The Bonney Upwelling, it's called. It's a sort of miracle beyond the end of the Great Ocean Road.

Each year around the end of October and the beginning of November, cold water from great depths funnels through underwater canyons, welling up and spilling across the continental shelf clear to the shores of what is known as the Bonney coast between the towns of Portland in south-west Victoria and Robe in the south-east of South Australia.

The upwelling of Antarctic water drops the surface temperature by several degrees and turns those waters frantic with life.

The chill tide, packed with nutrients, hits the surface in a wild flourish of photosynthesis, microscopic phytoplankton exploding and feeding great clouds of krill.



The blue whale is the largest animal to ever live on the planet. (Credit: MR1805).

It is so important to a fishing town like Portland that its biggest annual event is called the Upwelling Festival.

Fish swarm, seabirds wheel and dive, penguins and dolphins fly beneath the waves, crayfish scuttle and seals frolic.

And all those billions of krill, tiny crustaceans, prove irresistible to the greatest creatures that have ever lived upon the the Earth: blue whales.

A single adult blue whale, so big its tongue can weigh as much as an elephant, its heart the size of a Volkswagen, eats three or four tonnes of krill every day off the Bonney coast during the upwelling.

Here is a rhythm that renders the restless doings of humans insignificant.

If you were of a romantic mind – and who isn't from time to time? – you might imagine the upwelling as a surging attempt by the separated continents of Antarctica and Australia to reach out and rejoin.

Indeed, the upwelling occurs between Portland and Robe because this stretch of coast is closer to the continental slope – about 20 kilometres – than any other in mainland Australia. The continental slope, falling away to the depths, is where the Australian continent finally tore itself free of Antarctica 30 million years ago.

Whatever the romance of it, science began working out what has been happening along the Bonney Coast only during the 1960s.

Come late October/early November, the wind shifts to blow along the shore from the south-east. The wind is strong enough to skim the warm surface of the ocean westwards and, through a process known as Ekman Transport, 90 degrees out to sea.

This is the moment the Antarctic waters, deep down, have been waiting for.

They begin rushing up through the canyons of the continental slope to fill the space left vacant by the force of the south-easterlies.

And the blue whales know.

They surf the upwelling in quest of a feast.

Since almost 400,000 blue whales were slaughtered between 1900 and the 1960s, they have remained endangered, perhaps only 10,000 or so left, their lives something of a mystery.

No more than 20 feeding grounds for these huge creatures have been identified worldwide.

The area of the Bonney Upwelling is one of only two feeding grounds known in Australia – the other is the Perth Canyon off the West Australian coast.

Dr. Peter Gill awaits the upwelling at his home in the bush not far from the coast near Portland. He is the chief executive and chief research scientist of the Blue Whale Study, an organisation dedicated to unravelling the mysteries of the greatest cetaceans.

Gill discovered the Bonney coast feeding ground in 1998, and has never lost his fascination.

About four years ago, his research paid off in a way that still enthralls him: spotting from a small plane, he counted an astonishing 70 blue whales off the Great Ocean Road in a single day. The upwelling had called them to their annual banquet.

He got a call this week from an acquaintance informing him that a mother and her calf had been spotted off Cape Bridgewater, a few kilometres west of Portland.

The annual rhythm of the upwelling, in short, was under way.

Right on time.

Much of the world awaits, its heart in its throat, for the outcome of an election next week that will decide whether a dangerous bozo will lead the most powerful nation on Earth, with consequent knock-on effects to nations including our own.

In times like this it is worth reminding ourselves that though the likes of Donald Trump might come and go, the sun will always come up tomorrow, which means vastly more.

And yes.

Every year the cold deep waters of Antarctica will erupt just down our coast, and the greatest creatures ever to exist on Earth will return to feast on clouds of the tiniest crustaceans.

Call it a miracle if you wish. It's near unbelievable. But it's true.

http://www.theage.com.au/comment/the-bonney-upwelling-and-blue-whales-annual-visitors-from-the-deep-20161103-gsh7if.html

Whales Can Really Rock With Their Mellow Songs

by Nicholas St. Fleur

Nov. 4, 2016 — When a whale sings, it fills the sea with more than just serene sounds. It also sends vibrations coursing through the water like a speaker with the bass turned way up.

Though scientists have long listened to the marine mammals' melodies, they haven't really been feeling the music. Now, a new study highlights this overlooked and poorly understood component to the whale's song.

In a paper published Wednesday in the journal Biology Letters, a team of researchers reported detecting humpback whale vibrations from more than 650 feet away. The researchers said that the rattles traveled farther than expected, suggesting that they may play a role in whale-to-whale communication.

"They are these noisy animals in the ocean — noise is central to their biology," said T. Aran Mooney, a biologist at the Woods Hole Oceanographic Institution in Massachusetts and the lead author on the study. "We have not really been measuring half of the whale sounds out there."

Dr. Mooney and his colleagues first recorded the vibrations while conducting research into the acoustics of coral reefs in Hawaii. They were out on a small research boat when they picked up the vibrations using a tool known as an accelerometer.

That tool and a hydrophone for listening to sounds underwater allowed the team to collect data about two components of the whale's song: the sound pressure and the particle motion. Sound pressure is what you hear, like the music from a radio.

"Particle motion is like being next to a speaker at

A humpback whale near Tonga. A research team has found that the mammals' song vibrations travel farther than expected, and may play a role in their ability to communicate. (Credit: Vanessa Mignon/Barcroft Media, via Getty Images).

a rock concert," he said. "You can feel it."

But sound travels much farther in water, and subsequent research has shown that whale song vibrations can go as far as 3,000 feet.

Researchers still don't know everything about how whales hear the sounds. Dr. Mooney said they might feel the vibrations in their bones. He suggested that further research could reveal whether whales respond to these vibrations and use them to communicate.

http://www.nytimes.com/2016/11/05/science/whale-songs-vibration.html

Local Fidelity Key to Ocean-wide Recovery of Humpback Whales

Oct. 17, 2016 — Humpback whales can migrate thousands of miles to reach feeding grounds each year, but a new study concludes that their fidelity to certain local habitats -- as passed on through the generations -- and the protection of these habitats are key to understanding the ultimate recovery of this endangered species.

The study documents the local recruitment of whales in Glacier Bay and Icy Strait in Alaska over a 30-year period. The researchers found that contemporary whales that utilize these rich feeding grounds overwhelmingly are descendants of whales that previously used the area.

In other words, the population recovery of humpback whales in the region depends on cultural knowledge of migratory routes passed on from mothers to their calves; it is not a product of whales from outside the area suddenly "discovering" a rich feeding ground.

Results of the study are being published this week in the journal *Endangered Species Research*.

A humpback whale mother and calf are in Glacier Bay National Park, Alaska, with the Fairweather Mountains in the background. (Credit: National Park Service photo under NMFS Scientific Research permit #945-1776-01).

"Humpback whales are recovering from exploitation on an ocean-wide basis, but ultimately their individual success is on a much more local scale," said Scott Baker, associate director of the Marine Mammal Institute at Oregon State University and a co-author on the study.

"Humpback whales travel globally, but thrive locally."

The study compares records of individual whales returning to Glacier Bay. The first, referred to as the "founder's population," included whales documented by a local high school teacher, Charles Jurasz, beginning in the 1970s. Jurasz was one of the first researchers to realize that individual whales could be identified by photographs of natural markings -- a technique now widely used to study living whales.

Over the years, other researchers -- including the authors of this study -- continued to record the return of these whales by photo identification and they later collected small genetic samples to confirm the relatedness between individual whales.

Using a large database maintained by Glacier Bay National Park and the University of Alaska Southeast, the records of the founding population were then compared to records of the "contemporary population" returning to Glacier Bay, more than 30 years after Jurasz's initial studies. The results were striking.

Of the 25 "founding females" that were also sampled for genetic analysis, all but one was represented in the contemporary group -- either as still living, or by a direct descendant, or in many cases, both. Several of the founding females were even grandmothers of individuals in the contemporary population.

"We looked at three possibilities for population increase over a 33-year period including local recruitment from Glacier Bay/Icy Strait, recruitment from elsewhere in southeastern Alaska, and immigration from outside the region," said Sophie P. Pierszalowski, a master's student in OSU's Department of Fisheries and Wildlife and lead author on the study.

"It is clear that the contemporary generation of whales is based on local recruitment, highlighting the importance of protecting local habitat for recovering species, especially those with culturally inherited migratory destinations."

Humpback whales in the North Pacific were once estimated to number more than 15,000 individuals based on catch data before commercial whaling took a toll, reducing the population to less than a thousand by 1966. Humpback whales were first protected by the

International Whaling Commission in 1965, then listed under the U.S. Endangered Species Act in 1973.

Since the protection, the oceanic population has increased to an estimated 21,000 individuals based on photo-identification studies and other evidence. The recovery has been slow, in part because humpback whales can live to be 70 years of age and their recovery is driven primarily by local fidelity and recruitment.

"Limiting vessel traffic in important habitats is one way to help protect humpback whales," Pierszalowski said, "along with maintaining legal distances by vessels, reducing the risk of entanglement with fishing gear, and maintaining stranding networks that have the capacity to quickly disentangle whales."

OSU's Marine Mammal Institute is based at the university's Hatfield Marine Science Center in Newport, Ore.

https://www.sciencedaily.com/releases/2016/10/161017151315.htm

Declines in Whales, Fish, Seabirds and Large Animals Disrupt Earth's Nutrient Cycle

Oct. 26, 2015 — Giants once roamed the earth. Oceans teemed with ninety-foot-long whales. Huge land animals--like truck-sized sloths and ten-ton mammoths--ate vast quantities of food, and, yes, deposited vast quantities of poop.

A new study shows that these whales and outsized land mammals--as well as seabirds and migrating fish--played a vital role in keeping the planet fertile by transporting nutrients from ocean depths and spreading them across seas, up rivers, and deep inland, even to mountaintops.

However, massive declines and extinctions of many of these animals has deeply damaged this planetary nutrient recycling system, a team of scientists reported October 26 in the *Proceedings of the National Academy of Sciences*.

"This broken global cycle may weaken ecosystem health, fisheries, and agriculture," says Joe Roman, a biologist at the University of Vermont and co-author on the new study.

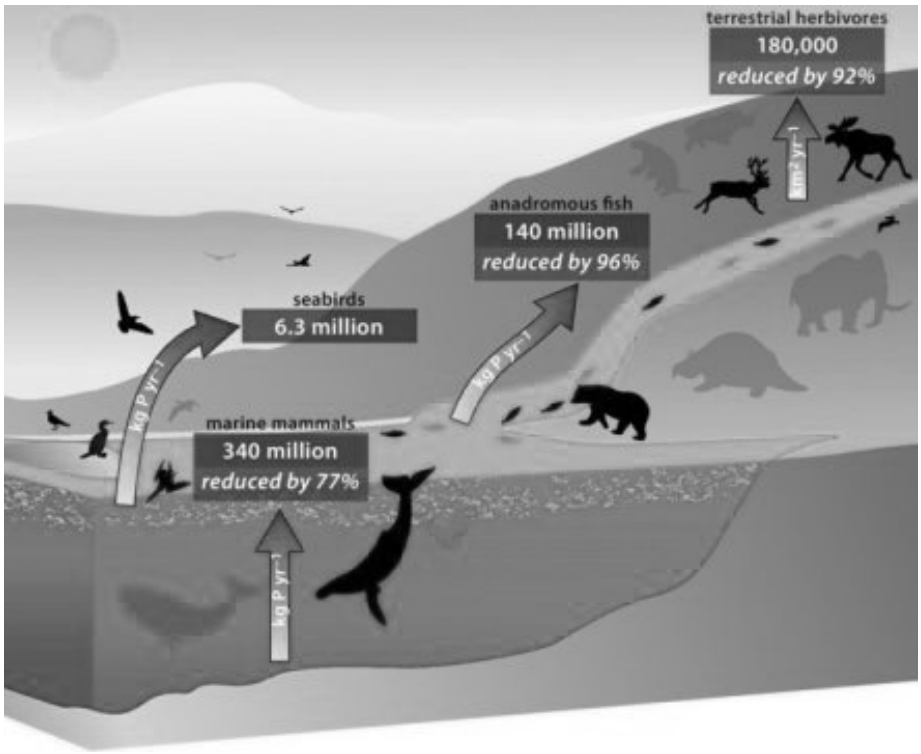
On land, the capacity of animals to carry nutrients away from concentrated "hotspots," the team writes, has plummeted to eight percent of what it was in the past--before the extinction of some 150 species of mammal "megafauna" at the end of the last ice age.

And, largely because of human hunting over the last few centuries, the capacity of whales, and other marine mammals, to move one vital nutrient--phosphorus--from deep ocean waters to the surface has been reduced by more than seventy-five percent, the new study shows.

Ignoring Animals

"Previously, animals were not thought to play an important role in nutrient movement," said lead author Christopher Doughty, an ecologist at the University of Oxford.

But the new study shows that animals are a crucial "distribution pump," the scientists write, transporting masses of fecal matter to fertilize many places that would otherwise be less productive, including ocean surface waters and the interior of continents.



This diagram shows an interlinked system of animals that carry nutrients from ocean depths to deep inland -- through their poop, urine, and, upon death, decomposing bodies. A new study in the Proceedings of the National Academy of Sciences reports that -- in the past--this chain of whales, seabirds, migratory fish and large land mammals transported far greater amounts of nutrients than they do today. Here, the red arrows show the estimated amounts of phosphorus and other nutrients that were moved or diffused historically -- and how much these flows have been reduced today. Grey animals represent extinct or reduced densities of animal populations. (Credit: Diagram from PNAS; designed by Renate Helmiss).

These fertilized ecosystems, in turn, maintain natural functions vital to people. For example, the new study notes that restoring whale populations could help increase the ocean's capacity to absorb climate-warming carbon dioxide.

Traditionally, scientists studying nutrient cycling have focused on weathering of rocks and nitrogen collection by bacteria--largely ignoring animals. This view assumed that the role of animals was minor, and mostly that of a passive consumer of nutrients. "However, this notion may be a peculiar world view that comes from living in an age where the number and size of animals have been drastically reduced from their former bounty," the team of nine scientists write.

"This study challenges the bottom-up bias that some scientists have--that microbes are running the show, and phytoplankton and plants are all that matter," says Joe Roman, a whale expert in UVM's Rubenstein School of Environment and Natural Resources and the Gund Institute for Ecological Economics.

"This once was a world that had ten times more whales; twenty times more anadromous fish, like salmon; double the number of seabirds; and ten times more large herbivores--giant sloths and mastodons and mammoths," says Roman.

On land, before the rise of modern humans, there were elephant-like gomphotheres the size of a backhoe, deer with twelve-foot wide antlers, and bison herds to the horizon. These were just a few of the huge animals that could eat huge amounts of plant matter, accelerating the release of nutrients through digestion and carrying these nutrients away from feeding areas to higher ground through their deposit of feces, urine and, upon death, decomposing bodies.

Overall, the scientists calculate that this animal-powered, planetary pump may have dropped to just six percent of its former capacity to spread nutrients away from concentrated sources on both land and sea.

Whale Work

A series of recent studies show that large animals appear to disproportionately drive nutrient movements. To make their new study, the team--including scientists from University of Oxford, University of Vermont, Harvard University, Aarhus University in Denmark, Princeton University, Netherlands Institute of Ecology, and Purdue University--used these findings and other existing data about historic and current animal populations. Then they applied a set of mathematical models to estimate the movement of nutrients vertically in the oceans and across the land--and how this movement changed with extinctions and declining animal populations.

For example, whale densities are estimated to have declined by between 66% and 90% over the last three centuries due to commercial hunting, the study notes. Most grievously, 350,000 blue whales, many over one hundred tons, used to inhabit oceans around the globe. Only a few thousand now remain. These and other great whales feed in the depths--and then defecate at the sun-lit surface "in a flocculent, liquidy cloud," says Roman.

Limited Phosphorus

In particular, the new study examined phosphorus, a nutrient critical for plant growth. Prior to the era of commercial hunting, the scientists estimate that whales and other marine mammals annually moved around 750 million pounds of phosphorus from the depths to the surface. Now that figure is about 165 million pounds--some 23% of former capacity.

The team also gathered data on seabird and fish populations that feed in the sea and then come onto land--like ocean-going salmon that move up rivers to defecate, spawn, and die. Movements by these birds and fish once carried more than 300 million pounds of phosphorus onto land each year, but that number has declined to less than four percent of past values as a result of destroyed seabird colonies, habitat loss, and overfishing.

"Phosphorus is a key element in fertilizers and easily accessible phosphate supplies may run out in as little as fifty years," says Oxford's Chris Doughty. "Restoring populations of animals to their former bounty could help to recycle phosphorus from the sea to land, increasing global stocks of available phosphorus in the future."

Recovery

The world of giants came to an end on land after the megafauna extinctions that began some 12,000 years ago--driven by a complex array of forces including climate change and Neolithic hunters. And it ended in the oceans in the wake of whale and other mammal hunting in the industrial era of humans.

"But recovery is possible and important," says UVM's Roman. He points to bison as an example. "That's achievable. It might be a challenge policy-wise, but it's certainly within our power to bring back herds of bison to North America. That's one way we could restore an essential nutrient pathway."

And many whale and marine mammal populations are also recovering, Roman notes. "We can imagine a world with relatively abundant whale populations again," he says.

But have domestic animals, like cows, taken over the nutrient distribution role of now-extinct large land animals? No, the new study shows. Though there are many cows, fences constrain the movement of domestic animals and their nutrients. "Future pastures could be set up with fewer fences and with a wider range of species," the team writes.

"The typical flow of nutrients is down mountains to the oceans," says Joe Roman. "We are looking at ways that nutrients can go in the other direction--and that's largely through foraging animals. They're bringing nutrients from the deep sea that could eventually reach a mountain in British Columbia."

https://www.sciencedaily.com/releases/2015/10/151026172050.htm

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Orcas Are First Non-Humans Whose Evolution Is Driven by Culture

by Colin Barras

May 31, 2016 — You could call it a culture shock. Many researchers accept that cultural experiences have helped shape human evolution – and evidence has now emerged that the same may be true of killer whales.

Human genomes have evolved in response to our cultural behaviours: a classic example is the way that some human populations gained genes for lactose tolerance following the onset of dairy farming.

But whether genomes and culture co-evolve in other animal species has been unclear.

Andrew Foote at the University of Bern, Switzerland, and his colleagues suspected that killer whales might follow a similar pattern to humans.

Cosmopolitan whales

Killer whales, like people, are widely dispersed from the tropics to the poles. But many populations seem to remain in a single area where they have carved out a specialised niche, hunting a particular target through a sophisticated hunting strategy.

Ready to pounce? (Credit: John Durban, NOAA Southwest Fisheries Science Center; research authorised by NMFS (US)).

Some eat fish by herding them into bait balls, for instance, whereas others target mammals such as seals by deliberately stranding themselves on beaches where the seals live.

Individuals live in stable groups for several decades, so juveniles have plenty of opportunity to learn these specialisms from the adults – biologists use the term “culture” to describe the learning of such striking behaviours.

But are these cultural groups of killer whales genetically distinct from one another? To find out, Foote and his colleagues looked at the genomes of 50 killer whales from five niches – two in the Pacific Ocean and three in the Antarctic Ocean.

The genomes fell into five distinct groups that exactly mirrored the five cultural niches. Some genes that may have specific functions in diet, for example, seemed to have diverged between the different cultural groups.

In other words, even though killer whales shared a common ancestor as recently as 200,000 years ago, individual cultural groups have become genetically distinct – so killer whale genomes and culture have co-evolved.

Founding fathers

The evidence even helps to explain how killer whales have gained their genetic diversity.

The genomes indicate that all five groups began when a small founding population – numbering perhaps a few tens or hundreds of individuals – invaded each new niche and then expanded. Whenever a species passes through this sort of population bottleneck, it can rapidly gain a unique genetic identity.

“We suspect that the [invasion] event and subsequent bottleneck occur first and then the behavioural flexibility allows the founder group to adapt to local conditions,” says Foote.

When juveniles learn social behaviours from adults, it helps solidify the group identity and gradually reinforce its distinct genetic signature.

Essentially, a few individuals can colonise new habitats and ecological niches thanks to their behavioural flexibility. Group culture then transmits the know-how of surviving on new resources and sets the group on a separate evolutionary track.

“This is an extremely important piece of research,” says Hal Whitehead at Dalhousie University in Halifax, Canada. “The results are fascinating. We now see how in killer whales, as in humans, culture is not only an important factor in the

lives of the whales, but also [helps drive] genetic evolution."

"One of the main conclusions is that variation within killer whales, humans and likely many other species arises from multiple interacting processes rather than being attributed to just culture, ecology or genetics," says Foote.

But Whitehead is not sure that the co-evolution of genomes and culture will turn out to be a common feature throughout the animal kingdom.

After all, killer whales and humans share a number of unusual features, including their intelligence, longevity and social natures – which work together to create an ideal environment for social learning that can strengthen group identity and reinforce genetic distinction. "In both," says Whitehead, "culture is in the driving seat."

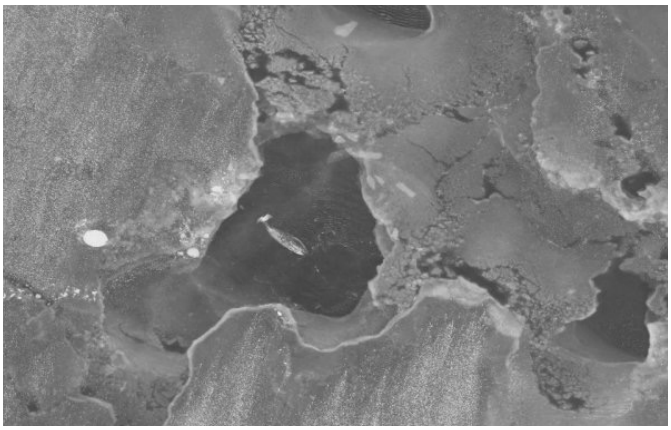
https://www.newscientist.com/article/2091134-orcas-are-first-non-humans-whose-evolution-is-driven-by-culture/

Narwhal Echolocation Beams May Be the Most Directional of any Species

Nov. 10, 2016 — Analysis of some of the first recordings of wintering narwhals showed that they may have the most directional sonar of any species, according to a study published November 9, 2016 in the open-access journal *PLOS ONE* by Jens Koblitz from Bioacoustics Network, Germany, and colleagues.

The narwhal is considered one of the Arctic's most sensitive marine mammals: more than 80 percent winter in one place -- Baffin Bay -- and their summering refuges include Lancaster Sound, which is expected to become a year-round shipping route as the ice retreats with climate change. To get a baseline of narwhal sonar and its use, the researchers recorded the species' echolocation beams at 11 pack ice sites in Baffin Bay, West Greenland, in 2013. Hydrophones were placed at depths between 3 and 18 meters.

The recordings revealed that narwhal clicks are the most directional sonar signal of any species, which may help to reduce echoes from the water or sea ice surface. The researchers also determined click intensities, and found that narwhals scan vertically with sonar during ascents and descents. Besides characterizing narwhal sonar to provide a reference for future acoustic monitoring in the region, the data gathered in this study might be used to distinguish narwhal sonar from that of belugas, the Arctic's other toothed whale. Knowing how narwhals use sound



Narwhal photographed in the Arctic, from above. (Credit: J Kristin Laidre).

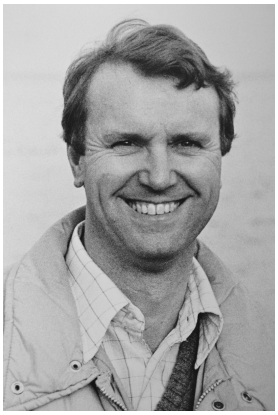
could inform future work on how they might be affected by a changing Arctic environment.

"The data collected in a most challenging environment show that the narwhal emits echolocation clicks with the most directional beam of all echolocators," says Jens Koblitz.

https://www.sciencedaily.com/releases/2016/11/161110154942.htm

BC's Pioneer Of Killer Whale Research

by Michaela Ludwig



Michael Bigg, The Marine Detective

Nov. 4, 2016 — Killer whales, or orcas, are an iconic part of the British Columbia coast. Dr. Michael Bigg, a marine biologist from Duncan, is known as the founder of modern research on killer whales.

Bigg was born in London, England, in 1939, and moved with his family to BC when he was just eight years old. His love of nature was well matched in BC. After graduating high school in Duncan, he went on to get his PhD from the University of British Columbia. Despite later being well known for his research on killer whales, Bigg studied falcons, water shrews and harbor seals in university, and his PhD was based on the reproductive ecology of harbor seals. He earned his PhD in 1972.

Today, there are whale-watching companies that, for a fee, will take you out on a boat for the purpose of seeing whales in the wild. The public has a great love

Killer whales. (Credit: istockphoto.com).

for the instantly recognizable black-and-white whale. But this wasn't always the case. Prior to the mid-1960s, the public, and even governments, knew next to nothing about killer whales and assumed they were dangerous predators. In the ocean, shooting killer whales was acceptable, and even encouraged.

In the mid-1960s and early 1970s, scientists and the public at large became more interested in the species and developed a desire to learn more about them. The first live capture and display of a killer whale was done in 1964 – a whale named Moby Doll was harpooned off the coast of Saturna Island, one of the Southern Gulf Islands of BC. But Moby Doll wasn't the only killer whale to be caught – between 1962 and 1973, about 47 killer whales from the BC and Washington coastal areas were captured and kept in captivity. At least 12 killer whales died while trying to be captured. Governments and scientists assumed killer whale populations were plentiful, but if killer whales were going to be considered a harvestable animal, the Canadian government wanted a census completed.

In 1970, Bigg was hired as the head of marine mammal research at the Canadian Department of Fisheries and Oceans, Pacific Biological Station in Nanaimo, BC, and the task fell to him to implement the census.

Bigg started the census by sending out 15,000 questionnaires to boaters, lighthouse keepers, fishermen and any others that frequented the BC coast, and asked them to record all killer whale sightings on one specific day. The results of the questionnaire, which was taken on July 27, 1971, showed the population of killer whales on the BC coast was, at most, 350 – a drastic difference from the thousands of killer whales that were assumed to be in the waters. Similar questionnaires done in the following two years, as well as photo identification, proved the original results were accurate.

In 1976, Bigg sent in his report and indicated that the rate of captures from this small population was unsustainable. He recommended restrictions on capturing killer whales from Canadian waters. Also in 1976, the US National Marine Fisheries Service conducted its own killer whale survey on the Washington coast, and found similar low numbers. With these results on both sides of the border, the public opinion began to turn against capture and captivity. Since 1976, no other killer whales have been captured from the waters off BC or Washington, with the exception of Miracle, a young killer whale that was found starving and had been inflicted with several bullet wounds.

Organizations still wanting killer whales for public display continued to capture them off the coast of Iceland until 1989, when that country outlawed any further captures. Over time, the number of killer whales in marine parks has begun to decline and only a few small-scale captures have been done off the coasts of Argentina, Japan and Russia.

During their research in the early 1970s, Bigg and his colleagues discovered photo-identification techniques. They figured out that killer whales could be identified in a decent photograph of the animal's dorsal fin and saddle patch when it comes to the surface. Variations like nicks, scratches and tears on the dorsal fin, as well as the pattern of the white or grey saddle patch, are enough to be able to identify one killer whale from another. This discovery meant killer whales could be counted each and every year, rather than simply estimating the numbers. This also meant researchers could conduct a longitudal study of these individual whales and identify their travel patterns and social relationships in the wild. This revolutionized the way killer whales could be studied. Just a few years previous, any research on killer whales had to be done on captured or dead animals, and the study of living, wild killer whales didn't exist.

After determining that the left side of the animal would be used to photographic identification, Bigg and his team of photographers and spotters grew to include hundreds of volunteers. In 1975, researchers combed through thousands of photos of killer whales and assembled a catalogue identifying each individual whale in BC's waters. That catalogue continues to be updated and used today.

Bigg died of leukemia on Oct. 18, 1990, at 51 years old. His ashes were spread in the Johnstone Strait, and more than 30 killer whales appeared to attend the ceremony. The Robson Bight Ecological

Reserve, a killer whale sanctuary in the Johnstone Strait, was renamed the Robson Bight/Michael Bigg Ecological Reserve. The reserve is 1,715 hectares in size – 467 hectares upland and 1,248 hectares of foreshore, and includes one of the few rubbing beaches known in the world, where killer whales gather and rub against the pebbles under the water.

Because of Bigg and his research, BC's killer whales have been studied longer than any other marine mammal species on the planet.

http://www.bcmag.ca/BCs-Pioneer-Of-Killer-Whale-Research

SIGHTINGS

Sightings are compiled by Monterey Bay Whale Watch. For complete listing and updates see *http://www.montereybaywhalewatch.com/slstcurr.htm*

Date	#	Type of Animal(s)
11/15 9 am	10 600	Humpback Whales Long-beaked Common Dolphins
11/14 2 pm	5 Raft of	Humpback Whales Sea Otters and Sea Lions
11/14 9 am	5 675	Humpback Whales Sea Lions
11/13 2 pm	2	Humpback Whales (thick fog)
11/13 12:30 pm	1	Humpback Whale (thick fog)
11/13 9 am	4 350 3	Humpback Whales Long-beaked Common Dolphins Bottlenose Dolphins
11/13 8 am	7 700	Humpback Whales Long-beaked Common Dolphins
11/12 2 pm	6	Humpback Whales
11/12 12:30 pm	7 50	Humpback Whales Long-beaked Common Dolphins
11/12 9 am	8 500 5	Humpback Whales Long-beaked Common Dolphins Harbor Porpoise
11/12 8 am	9 500 2	Humpback Whales Long-beaked Common Dolphins Harbor Porpoise
11/11 ACS Fundraiser	11 1 300 250	Humpback Whales Killer Whale Pacific White-sided Dolphins Risso's Dolphins
11/10 2 pm	2 10-12 500-600	Humpback Whales Killer Whales Long-beaked Common Dolphins
11/10 9 am	20 500-600	Humpback Whales Long-beaked Common Dolphins
11/9 2 pm	6 10	Humpback Whales Long-beaked Common Dolphins
11/9/ 9 am	12 1 1	Humpback Whales Killer Whale Harbor Porpoise
11/8 9 am	12 200	Humpback Whales Risso's Dolphins
11/7 2 pm	5 8 3	Humpback Whales Risso's Dolphins Bottlenose Dolphins
11/7 9 am	8 5	Humpback Whales Bottlenose Dolphins
11/6 2 pm	1 3	Humpback Whale Bottlenose Dolphins
11/6 9 am	10	Humpback Whales
11/6 8 am	5 20	Humpback Whales Risso's Dolphins
11/5 2 pm	3 800	Humpback Whales (2 breaching, lobtailing, and flipper slapping for 25 minutes) Long-beaked Common Dolphins
11/5 9 am	8 800 20 10	Humpback Whales Long-beaked Common Dolphins Risso's Dolphins Bottlenose Dolphins
11/4 2 pm	6	Humpback Whales (including Friendly Fran and one other curious whale for over an hour)
11/4 9 am	3 100 4	Humpback Whales (1 lunge-feeding on anchovies right outside our harbor) Long-beaked Common Dolphins Bottlenose Dolphins
11/2 2 pm	9 350 20 4	Humpback Whales Long-beaked Common Dolphins Risso's Dolphins Harbor Porpoise
11/2 9 am	21 350 30	Humpback Whales Long-beaked Common Dolphins Pacific White-sided Dolphins
11/1 2 pm	21 350 3	Humpback Whales Long-beaked Common Dolphins Harbor Porpoise
11/1 9am	14 350	Humpback Whales Long-beaked Common Dolphins
10/31 2 pm	30	Humpback Whales
10/31 9 am	9 250 5 50	Humpback Whales Long-beaked Common Dolphins Pacific White-sided Dolphins Risso's Dolphins
10/29 2 pm	6 800	Humpback Whales Long-beaked Common Dolphins
10/29 12:30 pm	4 500 35	Humpback Whales Long-beaked Common Dolphins Risso's Dolphins
10/29 9 am	8 800	Humpback Whales Long-beaked Common Dolphins
10/29 8 am	9 1300	Humpback Whales Long-beaked Common Dolphins
10/28 2 pm	11 100	Humpback Whales Risso's Dolphins
10/28 9 am	21 1000 1	Humpback Whales Long-beaked Common Dolphins Harbor Porpoise
10/27 2 pm	4	Humpback Whales

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