Soundings

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

JUNE 2017

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

Thursday, June 29, 2017
Time: 7:30 PM

PLEASE JOIN US AT 7:00 FOR REFRESHMENTS

Speaker: **Megan Jensen**

The Biomechanics of Breaching and Filter-Feeding:
Using New Tools to Answer Old Questions

Megan Jensen's research questions apply engineering principles and techniques to biological questions: what can we learn from data from tagged whales about how they breach? What can the structure of baleen plates teach us about filtration? This talk will focus on how modern technology -- whale bio-logging devices, CT scanning, and 3D printing -- is enabling us to answer old questions about breaching and baleen filtration in new ways.

Megan is an interdisciplinary scientist / engineer. Her undergraduate degree is in naval architecture and marine engineering from the University of Michigan, and she worked designing ships for a US Navy contractor prior to her graduate school program in marine biology. She earned a PhD from Hopkins Marine Station, where she worked in Mark Denny's lab and analyzed the effects of hydrodynamic forces from breaking waves on intertidal organisms. Megan is now a postdoc in Jeremy Goldbogen's lab studying the biomechanics of breaching and filter-feeding.

Please join us for refreshments before the program begins. More information is available on our website, www.acsmb.org.

Next month: Instead of our regular program in July, we'll have our annual BBQ and raffle on Saturday, July 29. Details are on page 5 of this *Soundings*. Our programs at Hopkins Marine Station will resume on Thursday, August 31 (the last Thursday of the month). Please save the date and join us!

INSIDE THIS ISSUE

Your local ACS chapter needs you!

Consider serving on the Board of Directors as Membership Chair, Publicity Chair or Education Chair.

Please talk to any board member for more information.

CALENDAR

Jul. 13: Presentation by John Calambokidis McCauley at the Channel Islands National Park Robert J. Lagomarsino Visitor Center in Ventura, CA: "Whale Protection and Vessel Speed Reduction in the Santa Barbara Channel." 7:00 PM.

Jul. 29: ACSMB Summer BBQ at Indian Village in Del Monte Forest (off 17 Mile Drive near the Bird Rock Vista Point). 2pm - 5pm. Tickets are $25, BYOB & Table Setting. There will also be a silent auction and Raffle. To RSVP contact Katlyn Taylor at katlyn.taylor.oc@gmail.com or mail check to ACSMB, P.O. Box H.E., Pacific Grove, CA 93950.

Jul. 29: 2017 ACS / Summertime Blues (and Humpbacks) Whale Watching Fundraiser in Santa Barbara, CA. For information and reservations go to www.eventbrite.com.

Aug. 26: ACSMB Summer Whale Watching Fundraiser with Discovery Whale Watch. This annual fundraiser will explore the marine mammal rich waters of Monterey Bay in search of Blue and Humpback Whales. 9 am – 2 pm. $45. For reservations contact Katlyn Taylor at katlyn.taylor.oc@gmail.com or mail check to ACSMB, P.O. Box H.E., Pacific Grove, CA 93950.

Oct. 23-27: 22nd Biennial Marine Mammal Conference in Halifax, Nova Scotia, Canada. For more information please go to www.marinemammalscience.org.

BOOK RECOMMENDATIONS

Encyclopedia of Marine Mammals 3rd Edition, by Bernd Wursig, J.G.M. Thewissen, and Kit Kovacs. 2017 Academic Press (available September 2017).

The Evolution of Beauty: How Darwin's Forgotten Theory of Mate Choice Shapes the Animal World-and Us, by Richard O. Prum. 2017 Doubleday.

Nature's Machines: An Introduction to Organismal Biomechanics, by David E. Alexander. 2017 Academic Press.

Why Penguins Communicate: The Evolution of Visual and Vocal Signals, by F. Stephen Dobson and Pierre Jouventin. 2017 Academic Press.

MARINE MAMMAL COMMISSION PROPOSED FOR ELIMINATION

President Trump released the Administration's budget proposal to Congress on May 23, 2017, requesting the elimination of the Marine Mammal Commission in fiscal year 2018, which begins on October 1, 2017. I deeply regret having to share this news with you and express my concern about the impact this proposal would have on the American public, marine mammals, and our marine and coastal communities.

In the early 1970s, in response to concern expressed by the American public, Congress passed the Marine Mammal Protection Act (MMPA), firmly placing the United States at the forefront of marine mammal and marine ecosystem conservation. As mandated by the MMPA, the Commission has for nearly half a century provided independent, science based oversight of federal activities and programs affecting marine mammals—a function performed by no other agency.

Marine mammals inspire children and adults alike. They draw us to the sea and remind us of the amazing beauty and power of nature. We have proudly served you to ensure that whales, manatees, dolphins, seals, sea otters, and other marine mammals survive for generations of Americans to come. In addition to being part of our natural resource heritage and serving as ocean ambassadors, marine mammals play a critical role in the health and productivity of the world's oceans and contribute significant revenues and countless jobs to our coastal economies.

The Commission sits at the juncture where science, policy, and economic factors are reconciled to meet the mandates of the MMPA, which balances the demands of human activities with the protection of marine mammals and the environment that sustains them. This role of the Commission helps ensure an effective and efficient regulatory process that abides by Congressional directives, takes into account all stakeholder views, and is based on the best available science. We excel at bringing people together to find solutions to problems before they become crises. We fund cutting edge research that targets novel, low-cost projects that achieve a large impact. We work to ensure healthy populations of marine mammals in our oceans and we protect the subsistence hunting rights of Alaska Natives. We proudly perform these and other duties with a modest annual operating budget of $3.431 million, which comes to just over 1 penny per American per year.

A dedicated team of Commission staff has tirelessly and proudly served our country. In the most recent Federal Employee Survey, the Commission

ranked number one in the U.S. government for overall employee engagement and satisfaction, showcasing the level of commitment and motivation of its staff. Despite facing possible elimination of the agency and loss of employment, employees of the Commission remain committed to you and the marine life that has kept us in collective awe for centuries.

The proposed elimination of the Commission comes at a time when decades of marine stewardship are achieving success because of a strong American environmental ethic that balances economic needs with the conservation of our natural resources. We are loyal to our Congressional mandate to responsibly manage and protect marine mammals and their ecosystems, which are vital to our economy, prosperity, and future.

Sincerely,
Daryl J. Boness, Ph.D.
Chairman, Marine Mammal Commission

http://myemail.constantcontact.com/MMC-Proposed-for-Elimination.html?soid=1119223236081&aid=uqW9kO2nj KI

Great White Sharks Are Being Killed and Eaten by Killer Whales

By Kimon de Greef

May 11, 2017 — She was nearly five meters long, weighed more than a tonne, and could fit an entire human torso between her jaws. But the great white shark that washed up on a beach outside Cape Town, South Africa, last Wednesday had met a powerful adversary. A large wound gaped midway down her belly, where her liver had been removed with exacting precision. Residents from the nearby fishing town of Gansbaai, home to a lucrative shark cage diving industry, immediately began speculating that a killer whale was responsible for the attack.

The next morning, marine scientists gathered to examine the carcass, the largest great white shark ever dissected in South Africa. By noon, they considered it very likely that the rumors in town had been correct.

Great whites are apex predators, embodying a sense of oceanic terror for millions of people around the world. The thought of another creature preying on them is difficult to comprehend. The scientists at the dissection were careful about drawing conclusions, agreeing to wait until completing a full report. But that evening, another great white washed up with very similar injuries, and it was clear that something extremely unusual was taking place.

The second shark, a male measuring 3.4 meters, had large chunks bitten from each flank. It took more than 10 people to lift its body onto the back of a truck. Its liver and heart were gone. Three days later, a third carcass—a 4.2-meter male—rolled ashore in Struisbaai, 70 kilometers to the east of Gansbaai. Its liver was also missing.

"We've never seen anything like this," says Alison Towner, a shark biologist at the Dyer Island Conservation Trust.

According to Towner, this sort of predation has never before been recorded in South Africa, although records exist of killer whales attacking great whites off California and Australia. Shark livers are high in squalene, an oily, nutrient-rich compound that Towner believes is attractive to the whales.

"It seems that certain [killer whale] groups specialize in hunting sharks and fish, with a preference for the liver," Towner says.

Killer whales around the world have distinct cultures, with different social structures and hunting techniques. There are growing signs that killer whales in South Africa have acquired a preference for hunting sharks.

Last March, researchers learned that killer whales had begun attacking sevengill sharks—a large but

American Cetacean Society
Monterey Bay Chapter

Annual Summer Whale Watching Fundraiser

Saturday, August 26, 2017
9:00 am – 2:00 pm

This annual fundraiser will explore the marine mammal rich waters of Monterey Bay in search of Blue and Humpback Whales.

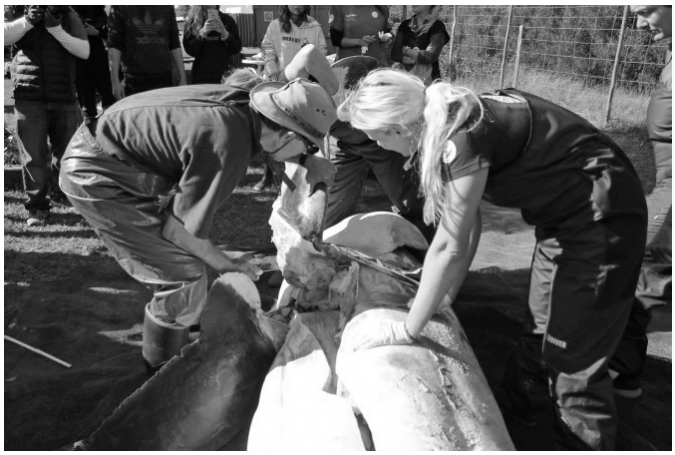
Humpback Whales have been seen daily for weeks and Blue Whales have already been observed on several occasions in both March and April of this young feeding season.

We will also be on the lookout for Fin Whales, Killer Whales, and various species of dolphin.

Cost: $45

Hosted by Discovery Whale Watch

For reservations contact Katlyn Taylor at katylyn.taylor.oc@gmail.com or mail check to ACSMB, P.O. Box H.E., Pacific Grove, CA 94950.



Similar to the modus operandi of South Africa's shark-eating seals, killer whales in the area seem to be targeting great white sharks' nutrient-rich internal organs. (Credit: Marine Dynamics/Dyer Island Conservation Trust).

docile resident in Cape Town's False Bay. As with the recently found great whites, the six carcasses recovered had no livers.

"We suspect the same killer whales might be involved in these more recent great white attacks," says Alison Kock, a marine biologist at South African National Parks. "Two of the individuals are highly recognizable, with bent over dorsal fins, and were seen near Gansbaai shortly before last week's predation events."

In Gansbaai, which is usually home to one of the highest concentrations of great whites in the world, the sharks seem to be acting cautiously following the attacks. Cage diving operators have not encountered a single living individual since last week.

"We don't know how long they'll be gone," says Towner, "but they've certainly noted the trauma and moved rapidly away."

https://www.hakaimagazine.com/article-short/great-white-sharks-are-being-killed-and-eaten-killer-whales

How Whales Became the Biggest Animals on the Planet

By Nicholas St. Fleur

May 24, 2017 — Whales are big. Really big. Enormously big. Tremendously big.

Fin whales can be 140,000 pounds. Bowhead whales tip the scales at 200,000 pounds. And the big mama of them all, the blue whale, can reach a whopping 380,000 pounds — making it the largest animal to have ever lived.

But for as long as whales have awed us with their great size, people have wondered how they became so colossal.

In a study published Tuesday in the journal Proceedings of the Royal Society B, a team of researchers investigated gigantism in baleen whales, the filter-feeding leviathans that include blue whales, bowhead whales and fin whales. The marine mammals became jumbo-size relatively recently, they found, only within the past 4.5 million years. The cause? A climatic change that allowed the behemoths to binge-eat.

Whales have an interesting evolutionary history. They began as land-dwelling, hoofed mammals some 50 million years ago. Over several millions of years they developed fins and became marine creatures. Between about 20 million and 30 million years ago, some of these ancient whales developed the ability to filter-feed, which meant they could swallow swarms of tiny prey in a single gargantuan gulp. But even with this feeding ability, whales remained only moderately large for millions of years.

"But then all of a sudden — 'boom' — we see them get very big, like blue whales," said Nick Pyenson, the curator of fossil marine mammals at the Smithsonian Institution's National Museum of Natural History and an author of the paper. "It's like going from whales the size of minivans to longer than two school buses."

Dr. Pyenson and his colleagues measured more than 140 museum specimens of fossilized whales, and then plugged that data into a statistical model. It showed that several distinct lineages of baleen whales became giants around the same time, independently of one another. Starting around 4.5 million years ago, giant blue whales were popping up in oceans across the world alongside giant bowhead whales and giant fin whales.

The researchers suspected that an environmental change happened during that time that essentially caused the baleen whales to bulk up. After some investigation, they found that this time period coincided with the early beginnings of when ice sheets increasingly covered the Northern Hemisphere.

Runoff from the glaciers would have washed nutrients like iron into coastal waters and intense seasonal upwelling cycles would have caused cold water from deep below to rise, bringing organic material toward the surface. Together these ecological effects brought large amounts of nutrients into the water at specific times and places, which had a cascading effect on the ocean's food web.

Throngs of zooplankton and krill would gather to feast on the nutrients. They would form dense patches that could stretch many miles long and wide and be

more than 65 feet thick. The oceans became the whales' giant all-you-can-eat buffets.

"Even though they had the anatomical machinery to filter-feed for a long, long time," said Jeremy Goldbogen, a comparative physiologist from Stanford University and author of the paper, "it wasn't until the ocean provided these patchy resources that it made bulk filter-feeding so efficient."

The baleen whales could now gulp down much larger amounts of prey, which allowed them to get bigger. But that was only part of the equation.

"Plentiful food everywhere isn't going to get you giant whales," said Graham Slater, an evolutionary biologist at the University of Chicago and the study's lead author. "They have to be separated by big distances."

Because the ecological cycles that fuel the explosions of krill and zooplankton occur seasonally, Dr. Slater said the whales must migrate thousands of miles from food patch to food patch. Bigger whale ancestors that had bigger fuel tanks had a better chance of surviving the long seasonal migrations to feed, while smaller baleen whales became extinct.

If the food patches were not far apart, Dr. Slater said, the whales would have grown to a certain body size that was comfortable for that environment, but they would not be the giants we see today.

"A blue whale is able to move so much further using so much less energy than a small-bodied whale," Dr. Slater said. "It became really advantageous if you're going to move long distances if you're big."

Ari S. Friedlaender, a behavioral ecologist at Oregon State University who was not involved in the study, said the research improved our understanding of how baleen whales became giants.

"What this does is it allows us to be able to say that there are crucial processes in the ocean that allowed these animals to get this big," he said.

Baleen whales started evolving to gigantic sizes around 4.5 million years ago. (Credit: SILVERBACKFILMS / BBC).

American Cetacean Society
Monterey Bay Chapter

Annual Chapter BBQ

Saturday, July 29, 2017

Please join us for a fun afternoon with great people, good food and a fabulous raffle & silent auction!

What: BBQ and Raffle
Menu includes grilled tri-tip, chicken, sausage, salads, beans, rolls and cake.
Water, soft drinks and coffee
BYOB and table setting

Where: Indian Village in Del Monte Forest (off 17 Mile Drive near the Bird Rock Vista Point)

Time: 2-5 pm

Cost: $25 per person. Please pay at the June meeting, at the BBQ, or send payment to ACSMB, P.O. Box HE, Pacific Grove, CA 93950

To RSVP or with Questions: Contact Katlyn Taylor at katlyn.taylor.oc@gmail.com

Richard Norris, a paleobiologist at the Scripps Institution of Oceanography, called the study a "nice piece of work," and said that it confirmed scientists' current understanding of changes to the oceans over time.

"When we think about what the planet has been like in its long history, a whale of 10 million years ago was a very different type of critter than we have now," Dr. Norris said. "So in a sense we live in a special time where we get to enjoy the majesty of really big animals out there in the ocean."

https://mobile.nytimes.com/2017/05/24/science/whales-evolution-oceans.html

36M-YEAR-OLD FOSSIL DISCOVERY IS MISSING LINK IN WHALE EVOLUTION, SAY RESEARCHERS

By Nicola Davis

May 11, 2017 — Fossil hunters say they have unearthed a missing link in the evolution of baleen whales after digging up the remains of a creature thought to have lived more than 36 million years ago.

The whales, known as mysticeti, sport a bristling collection of sieve-like plates known as baleen that they use to filter water for food. Species include the

enormous blue whale, the gray whale and the humpback whale.

But while baleen whales are known to have shared a common ancestor with toothed whales, which are the other major group of modern whales, the path by which the creatures emerged has been somewhat hazily understood. Now researchers say they have discovered the oldest known cousin of modern baleen whales, offering unprecedented insights into their evolution.

"This [split in the family tree] has been dated to about 38 or 39m years ago," said Olivier Lambert, co-author of the research from the Royal Belgian Institute of Natural Sciences. "The whale we discovered here has been dated to 36.4 [million years ago], so it is only two to three million years younger than this presumed origin."

Unearthed at a site known as Playa Media Luna on the southern coast of Peru, the newly discovered creature has been named *Mystacodon selenensis* – a portmanteau of the Greek for "moustache" and "tooth", together with a nod to the Greek goddess of the moon.

The animal would have been just under four metres in length but, rather than boasting baleen, it had a mouthful of teeth and apparently vestigial hind limbs.

From an analysis of the skull, jaw and teeth, Lambert says that the newly unearthed animal likely hoovered up other marine creatures by suction feeding, moving its tongue to lower the pressure inside its mouth and draw its prey in, before expelling the water.

Two *Mystacodon selenensis* individuals diving down to catch eagle rays along the seafloor of a shallow cove off the coast of present-day Peru. (Illustration Credit: Alberto Gennari).

"If it was indeed using suction to catch its prey, it means that the prey items could not be too large, because the whole animal was swallowed in a single gulp – so medium sized fish, maybe small squid, could have been a good type of prey for such an animal," he said.

By contrast, the ancestors of both baleen and toothed whales are thought to have captured prey by grabbing it with their teeth, a method also used by many modern toothed whales.

The feeding method and body form of the new creature, added Lambert, backs up previous predictions of the features expected for an animal near the bottom of the baleen branch of the whale family tree.

"Sometimes it is good to see that predictions were precise enough, and well documented, in a way that new fossils really fit the story," he said.

What's more, said Lambert, the find ties in well with the recent discovery of "Alfred", a much younger, toothed fossil whale dating from 25m years ago that is also thought to have been a suction feeder and falls on the baleen branch of the whale family tree.

But the new find has also thrown up surprises, not least that the creature was found to have tiny, probably useless, hind limbs sticking out from its body. That, says Lambert, was a shock.

The absence of hind limbs in all modern whales, together with evidence of apparently vestigial limbs in fossils dating to before the split in the whale family tree, had previously led scientists to believe the appendages had been lost in a common ancestor of toothed and baleen whales.

But the new finding, published in the journal Current Biology, suggests that both branches of the whale family tree lost the hind limbs independently.

Emily Rayfield, professor of palaeobiology at the University of Bristol who was not involved in the research, welcomed the findings, adding that the suggestion that the creature was a suction feeder ties into recent theories about how terrestrial animals returned to the water and evolved into the whales we see today.

"I think it is an interesting new fossil from an exciting part of the world that shows how new information can enrich and development our understanding of the evolution of groups, including their feeding strategies," she said.

https://www.theguardian.com/science/2017/may/11/36m-year-old-fossil-discovery-is-missing-link-in-whale-evolution-say-researchers-mystacodon-selenensis

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)
5/31 2 pm	9 1	Humpback Whales Harbor Porpoise
5/31 1 pm	7 1 1	Humpback Whales Harbor Porpoise Black-footed Albatross
5/31 9 am	11 800 55 200 1	Humpback Whales Pacific White-sided Dolphins Risso's Dolphins Northern Right-whale Dolphins Black-footed Albatross
5/31 8 am	17 460 100 50 1	Humpback Whales Pacific White-sided Dolphins Risso's Dolphins Northern Right-whale Dolphins Black-footed Albatross
5/30 9 am	32 50 10	Humpback Whales Pacific White-sided Dolphins Risso's Dolphins
5/30 8 am	6 180 50	Humpback Whales Pacific White-sided Dolphins Dall's Porpoise
5/29 9 am	18 600 40 100 4	Humpback Whales Pacific White-sided Dolphins Risso's Dolphins Northern Right-whale Dolphins Harbor Porpoise
5/29 8 am	30 1000 100 2	Humpback Whales Pacific White-sided Dolphins Northern Right-whale Dolphins Black-footed Albatross
5/29 8 am All Day	35 2000 1000	Humpback Whales Pacific White-sided Dolphins Northern Right-whale Dolphins
5/28 2 pm	14	Humpback Whales
5/28 1 pm	4	Humpback Whales
5/28 9 am	26 80 6	Humpback Whales Pacific White-sided Dolphins Harbor Porpoise
5/28 8 am	35 120 10	Humpback Whales Risso's Dolphins Harbor Porpoise
5/28 8 am All Day	40 3 500 20	Humpback Whales Killer Whales Pacific White-sided Dolphins Risso's Dolphins
5/27 4:30 pm	24	Humpback Whales
5/27 2 pm	22	Humpback Whales
5/27 1 pm	15	Humpback Whales
5/27 9 am	14	Humpback Whales
	12 1	(2 lateral-lunge feeding) Killer Whales Black-footed Albatross
5/27 8 am	20 9	Humpback Whales Harbor Porpoise
5/27 8 am All Day	12 25 3 11	Humpback Whales Killer Whales Fin Whales Baird's Beaked Whales
5/26 2 pm	36 3	Humpback Whales Harbor Porpoise
5/26 1 pm	14	Humpback Whales
5/26 9 am	30 6 4	Humpback Whales Killer Whales Black-footed Albatross
5/26 8 am	18 6 1	Humpback Whales Killer Whales Black-footed Albatross
5/26 8 am All Day	16 11	Humpback Whales Killer Whales
5/25 9 am	20 6	Humpback Whales (breach) Killer Whales
5/25 8 am	21 6 90	Humpback Whales Killer Whales Risso's Dolphins
5/24 2 pm	29	Humpback Whales
5/24 9 am	52 1 155 2 1 13	Humpback Whales Blue Whale Risso's Dolphins Harbor Porpoise Elephant Seal Black-footed Albatross
5/23 2 pm	15	Humpback Whales
5/23 9 am	14 1 7	Humpback Whales Blue Whale Harbor Porpoise
5/22 2 pm	20	Humpback Whales
5/22 9 am	19 85	Humpback Whales Risso's Dolphins
5/22 8 am	20	Humpback Whales
5/22 8 am All Day	32 250 10	Humpback Whales Risso's Dolphins Harbor Porpoise
5/21 4:30 pm	20 1 1	Humpback Whales Risso's Dolphin Black-footed Albatross
5/21 2 pm	17	Humpback Whales
5/21 1 pm	15 8	Humpback Whales Risso's Dolphins
5/21 9 am	15 8 4	Humpback Whales Risso's Dolphins Harbor Porpoise
5/21 8 am	8	Humpback Whales
5/21 8 am All Day	27 50 5	Humpback Whales Risso's Dolphins Harbor Porpoise
5/20 4:30 pm	7	Humpback Whales
5/20 2 pm	19	Humpback Whales
5/20 1 pm	25 10	Humpback Whales Harbor Porpoise

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Monterey Bay Chapter
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