

Soundings



American Cetacean Society – Monterey Bay Chapter
PO Box 51691, Pacific Grove, CA 93950

MAY 2018

**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, May 31, 2018

Time: 7:30 PM

PLEASE JOIN US AT 7:00 PM FOR REFRESHMENTS

Speaker: Dr. Elliott Hazen

**Title: Managing Across Multiple Scales:
A Case Study Using Blue Whales in the Northeast Pacific**



Dr. Hazen's research interests span oceanography and fisheries ecology to ecosystem modeling, with a focus on predator-prey dynamics and climate ready management approaches for marine ecosystems. Elliott's publications address a range of topics from fine-scale foraging ecology of marine mammals to modeling the effects of climate change on top predator habitat and biodiversity. His research has been

conducted around the world, from humpback foraging in the Gulf of Maine and the Western Antarctic Peninsula to blue and fin whale habitat and movement in the California Current, and has combined novel technologies including fisheries acoustics to measure prey, bio-logging tags, and oceanographic data with spatial statistics. He is currently working as part of an interdisciplinary team to use species-habitat relationships to create novel management strategies for the California Current Large Marine Ecosystem, a key component of NOAA's Integrated Ecosystem Assessments. Elliott received his master's in fisheries science from the University of Washington and his doctorate in ecology from Duke University in North Carolina, followed by a National Research Council fellowship with NOAA's Environmental Research Division in Pacific Grove, California. Elliott is currently a Research Ecologist with NOAA with an adjunct appointment in the Department of Ecology and Evolutionary Biology and Institute of Marine Sciences at the University of California, Santa Cruz.

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

Next event: We will not be having a June meeting, and our next event will be the annual ACS BBQ on July 7 at Indian Village in Pebble Beach. Please save the date and join us!

INSIDE THIS ISSUE

CALENDAR2

**DIVING DEEP INTO THE BLUE
WHALE GENOME REVEALS
THE ANIMALS'
EXTRAORDINARY
EVOLUTIONARY HISTORY.....2**

**NEW GENUS AND SPECIES OF
EXTINCT BALEEN WHALE
IDENTIFIED.....3**

**BABY HUMPBACK WHALES
MAY SOON FILL ANTARCTIC
SEAS.....4**

**BOTTLENOSE DOLPHINS
RECORDED FOR THE FIRST
TIME IN CANADIAN PACIFIC
WATERS.....5**

**VOYAGE TO THE WHITE
SHARK CAFÉ.....6**

SIGHTINGS.....7

MEMBERSHIP.....8

**ACS Monterey Bay chapter
needs you!**

**Please consider volunteering to
serve on the ACS Board of
Directors. Current openings
include Membership Chair
and Publicity Chair.**

**If you enjoy learning about
whales and sharing your
passion with others, we'd like
to speak with you. Please
contact any board member for
more information.**

CALENDAR

May 14: *Condor Express* begins summer whale watching trips into the Santa Barbara Channel looking for Blue and Humpback Whales. Trips run seven days a week from 10 AM – 2:30 PM.

May 25: Seminar at Hopkins Marine Station: “Coral Reefs and Climate Change: Transformation, Surprises, and Resilience from the Epicenter of the 2015-2016 El Niño.” Presented by Julie Baum of the University of Victoria. 12 PM.

Jun. 15: Exhibit opening at the CA Academy of Sciences in San Francisco: “Giants of Land and Sea.” This exhibit celebrates the extraordinary biodiversity in our own backyard. From whales to giant sequoias, California is home to an extraordinary assemblage of life.

Jun. 16: Celebration of Art Haseltine’s life at Asilomar at 1 PM. If you have not yet RSVP’d your attendance, please call Diane at 831-214-1016.

Jul. 7: ACSMB Annual BBQ at Indian Village in Pebble Beach. More info to come in the June newsletter. \$25/person cost can be sent to ACSMB, P.O. Box HE, Pacific Grove, CA, 93950.

Jul. 16-20: Superpod 6 in Friday Harbor San Juan Island, Washington. This five-day symposium on Southern Resident Killer Whales will include international killer whale scientists, filmmakers, authors, journalists, and naturalists! Whale watching opportunities will be ubiquitous.

Jul. 24: ACS SF Bay presents a talk by Dr. Shawn Johnson, Director of Veterinarian Science at the Marine Mammal Center: “Not Just Seizing Sea Lions: How Domoic Acid is Impacting Southern Sea Otters.”

Aug. 25: ACS-LA Blue Whale Fundraiser on the *Condor Express* in Santa Barbara, CA. This all-day fundraiser will search the waters of the Santa Barbara Channel for the great Blue Whale. The SBC is one of the best locations in the world to observe the biggest animal to ever live. 8 AM – 4 PM.

Nov. 2-4: American Cetacean Society 16th International Conference at the Hyatt Regency in Newport Beach, CA. Conference Theme: Whales & Us: The Next Generation.

BOOK RECOMMENDATIONS

Darwin's Fossils – The Collection that Shaped the Theory of Evolution, by Adrian Lister. 2018 Smithsonian.

The Rise and Fall of the Dinosaurs: A New History of a Lost World, by Steve Brusatte. 2018 William Morrow.

Guide to Manta and Devil Rays of the World, by Guy Stevens, Daniel Fernando, Marc Dando and Giuseppe Di Sciara. 2018 Princeton University Press.

DIVING DEEP INTO THE BLUE WHALE GENOME REVEALS THE ANIMALS’ EXTRAORDINARY EVOLUTIONARY HISTORY

Apr. 5, 2018 — For the first time, scientists of the German Senckenberg Biodiversity and Climate Research Center, Goethe University and the University of Lund in Sweden have deciphered the complete genome of the blue whale and three other rorquals. These insights now allow tracking the evolutionary history of the worlds’ largest animal and its relatives in unprecedented detail. Surprisingly, the genomes show that rorquals have been hybridizing during their evolutionary history. In addition, rorquals seem to have separated into different species in the absence of geographical barriers. This phenomenon, called sympatric speciation, is very rare in animals. The study has just been published in *Science Advances*.

Blue whales are the giants of the sea. With up to 30 meters (100 feet) long and weighing up to 175 tons, they are the largest animals that ever evolved on earth; larger even than dinosaurs. Short of becoming extinct due to whaling by the end of the 80s, currently the populations of the gentle giants are slowly recovering. Now new research highlights that the evolution of these extraordinary animals and other rorquals was also anything but ordinary.

A research team led by Professor Axel Janke, evolutionary geneticist at the Senckenberg Biodiversity and Climate Research Center and Goethe University, has found that the rorquals, including the blue whale, mated across emerging species boundaries. “Speciation under gene flow is rare. Usually, species are assumed to be reproductively

isolated because geographical or genetic barriers inhibit genetic exchange. Apparently however, this does not apply to whales", explains Fritjof Lammers, co-lead-author of the study, Senckenberg Biodiversity and Climate Research Centre.

Teaming up with cetacean specialist Professor Ulfur Arnason at University of Lund, Sweden, Lammers and his colleagues are the first to have sequenced the complete genome of the blue whale and other rorquals, including the humpback and the gray whale. For these migratory whales, geographical barriers do not exist in the vastness of the ocean, instead some rorquals differentiated by inhabiting different ecological niches. Cross-genome analyses now indicate that there are apparently no genetic barriers between species and that there has been gene flow among different rorqual species in the past.

This is confirmed by spotting hybrids between fin and blue whales still to date, which have been witnessed and genetically studied by Professor Arnason. However, the researchers could not detect traces of recent liaisons between the two species in their genomes. This is probably because whale genomes are currently known only from one or two individuals.

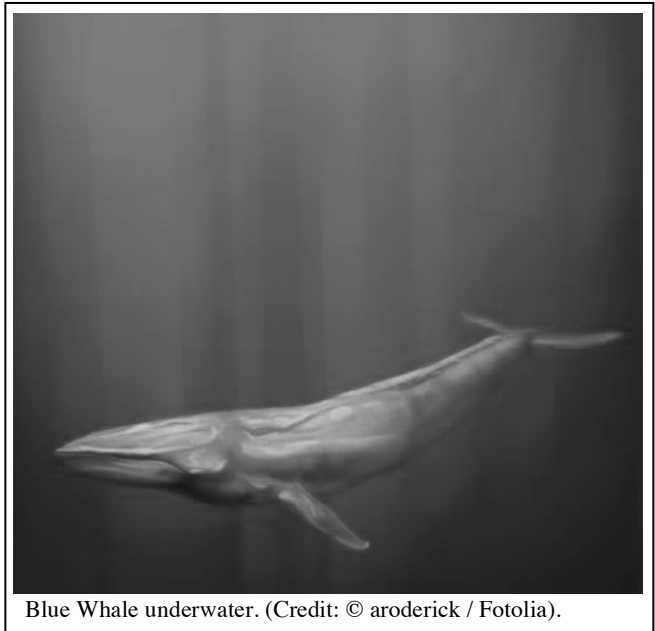
To track down the rorquals' evolution, the scientists have applied so-called evolutionary network analyses. "In these analyses, speciation is not considered as a bifurcating phylogenetic tree as Darwin has envisioned it, but as an interwoven network. This allows us to discover hidden genetic signals, that otherwise would have stayed undetected", says Janke.

Overall, the research also shows that the relationships among the rorqual species are more complicated than hitherto thought. So far, the humpback whale has been seen as an outsider among the rorquals because of its enormous fins. The genome reveals that this classification does match the evolutionary signals. The same is true for the gray whale, which was believed to be evolutionarily distinct from rorquals due to its appearance. Genomic analyses show however that gray whales are nested within rorquals. Gray whales just happened to occupy a new ecological niche by feeding on crustaceans in coastal oceanic waters.

"Our research highlights the enormous potential of genome sequencing to better understand biological processes and the fundamentals of biodiversity. It even reveals how population sizes of whales have changed during the last million years", summarizes Janke. Janke is one of the leading researchers at the Hessian LOEWE Research Centre for Translational

Biodiversity Genomics (LOEWE-TBG). Launched in January 2018, LOEWE-TBG is set to systematically analyze complete genomes or all active genes. The research center is envisaged to do basic research with a strong emphasis on transferring knowledge to benefit the study of natural products and protect biodiversity.

<https://www.sciencedaily.com/releases/2018/04/180405095358.htm>



Blue Whale underwater. (Credit: © aroderick / Fotolia).

NEW GENUS AND SPECIES OF EXTINCT BALEEN WHALE IDENTIFIED

Apr. 18, 2018 — University of Otago palaeontologists are rewriting the history of New Zealand's ancient whales by describing a previously unknown genus of baleen whale, alive more than 27.5 million years ago and found in the Hakataramea Valley.

The new genus and species of extinct baleen whale is based on a skull and associated bones unearthed from the Kokoamu Greensand, a noted fossil-bearing rock unit in the South Canterbury and Waitaki district from the Oligocene period, which extends from about 33.9 million to 23 million years ago. At this time, New Zealand was an archipelago surrounded by shallow, richly productive seas.

Former PhD student in the University of Otago's Department of Geology, Cheng-Hsiu Tsai and his supervisor, Professor Ewan Fordyce, have named the new genus *Toipahautea waitaki*, which translates in Māori as a baleen-origin whale from the Waitaki region.

Professor Fordyce says the discovery is significant in New Zealand's fossil history.

"This is a pretty old whale that goes almost half-way back to the age of the dinosaurs. We are tracking whale history back through time," Professor Fordyce explains.

"This newly-named whale lived about 27.5 million years ago. It's about as old a common ancestor as we have for the living baleen whales like the minke whales and the right whales."

Baleen whales are a group of Mysticeti, large whales usually from colder waters that lack teeth but have baleen plates in the upper jaw which are used to filter food such as krill out of large quantities of seawater.

The fossil was actually recovered from the Hakataramea Valley in South Canterbury 30 years ago in January 1988. However, it was only worked up in recent years with Dr Tsai – who is now currently working at the National Taiwan University – beginning his thesis only a few years ago. The thesis provided the analytical framework to identify and name the new whale.

The research paper announcing the new archaic baleen whale was published today in the scientific journal *Royal Society Open Science*.

While the skeleton of the whale was disarticulated when it was excavated, the bones were closely associated, which gave the palaeontologists plenty of

material to work with. In particular, the highly diagnostic earbones were preserved, helping with identification.

The skull was about one metre long and the body about five metres, which means it was a reasonably small species, Professor Fordyce says. "That's about half the size of an adult minke whale."

It was previously known that the baleen whales can take on board thousands of litres of water in the lower jaws which they scoop open to get great mouthfuls of water and food. *Toipahautea waitaki*'s jaws were toothless, long and narrow, Professor Fordyce says, suggesting that it fed in a similar way to the modern-day minke whales.

The researchers were not able to determine how this whale died. Professor Fordyce says it could have been attacked by a shark, stranded on a beach or died of disease. When it died, it sank to the bottom of the sea floor with its skeleton falling apart and becoming a hub for coral and other organisms to grow on.

Professor Fordyce expects the ancient whales' history books may keep being rewritten in years to come.

"We are pretty sure there are some species [of baleen whale] that will be older than these. But right now it anchors the modern baleen whale lineage to at least 27.5 million years."

The *Toipahautea waitaki* fossil was collected during fieldwork funded by a grant from the National Geographic Society with further lab work also funded by the Society.

<https://www.sciencedaily.com/releases/2018/04/180418100507.htm>

BABY HUMPBACK WHALES MAY SOON FILL ANTARCTIC SEAS

By Yasemin Saplakoglu

May 2, 2018 — Lots of baby humpback whales may be on their way, if recent years are any indication.

An unusually high number of female humpbacks living in the Southern Ocean around the Western Antarctic Peninsula have gotten pregnant in recent years, according to a study published today (May 2) in the journal *Royal Society Open Science*. Researchers are hopeful that the population is recovering from years of commercial whaling that nearly wiped them out in the area in the 20th century.

Humpback whales usually give birth every couple of years and have pregnancies that last for around 11 months, according to the National Oceanic and Atmospheric Administration. Once the baby is born,



Burial in the ancient sea of Zealandia: a *Toipahautea* whale skeleton is slowly covered by sand 27-28 million years ago, on its path to become a fossil. (Credit: Reconstruction by Chris Gaskin, ©Geology Museum, University of Otago).



A humpback whale and her calf. (Credit: Shutterstock).

the mother is very "protective" and "affectionate" toward its young, according to NOAA.

Pregnant or not, humpback whales were easy targets for whalers because of their abundance in bays and their tendency to float when killed, according to the study. With treaties put in place in the late 20th century, whaling stopped, and populations slowly began to recover. Now, humpback whales in the Southern Ocean around Antarctica are not considered endangered, according to *The New York Times*.

The researchers collected skin and blubber samples between 2010 and 2016 from 268 unsuspecting females. They tested the samples for progesterone — a hormone that regulates the reproductive system and pregnancy in most mammals, including humans. If the progesterone levels matched those found previously in pregnant female humpbacks, the researchers could indicate if these giants were "expecting."

They found that pregnancy rates varied greatly from year to year, from 36 percent in 2010 to 86 percent in 2014. But across all the tissue samples, on average, 63.5 percent of the females were pregnant. This is up from 48 percent of pregnant females identified between 1950 and 1956 in Antarctic whaling areas, according to the study.

But this good news could be short-lived, according to *The New York Times*.

The Western Antarctic Peninsula has increased in air temperature by nearly 12.6 degrees Fahrenheit (nearly 7 degrees Celsius) since the 1950s, according to the paper. Warmer air means more melting of the sea ice covering the Southern Ocean. This region has seen one of the greatest effects of climate change regarding warming. And while at first this might be helping the whales, providing them with 80 more days of hunting before the sea ice begins to cover their habitat, the

good times most likely won't last, according to the researchers.

The whales may expand into more areas that were previously covered with ice, and "prey availability will likely increase," the researchers wrote, referring to the little crustaceans called krill that make up the bulk of humpbacks' diet. "Long-term trends, however, may be more problematic." According to *The New York Times* article, a reduction in sea ice can endanger the krill.

<https://www.livescience.com/62456-antarctica-humpback-whale-baby-numbers.html>

BOTTLENOSE DOLPHINS RECORDED FOR THE FIRST TIME IN CANADIAN PACIFIC WATERS

Apr. 19, 2018 — A large group of common bottlenose dolphins (*Tursiops truncatus*) have been spotted in Canadian Pacific waters — the first confirmed occurrence of the species in this area. The sighting is reported in a study published in the open access journal *Marine Biodiversity Records*.

On 29 July 2017, researchers from Halpin Wildlife Research, in collaboration with the Department of Fisheries and Oceans, Canada and the Department of Environment and Climate Change, Canada, observed a group of approximately 200 common bottlenose dolphins and roughly 70 false killer whales (*Pseudorca crassidens*). The sighting occurred off the west coast of northern Vancouver Island, British Columbia, Canada and may be the northern most recording for this species in the eastern North Pacific.

Luke Halpin, lead author of the paper, said: "It is surprising to find a warm-water dolphin in British Columbian waters, and especially to find such a large number of common bottlenose dolphins within the group."

Halpin added: "The sighting is also the first offshore report of false killer whales in British Columbia. To see the two species traveling together and interacting was quite special and rare. It is known that common bottlenose dolphins and false killer whales seek each other out and interact, but the purpose of the interactions is unclear."

Both common bottlenose dolphins and false killer whales typically live in warm temperate waters further south in the eastern North Pacific, but this sighting suggests that they will naturally range into British Columbia, Canada when conditions are suitable. There has been a warming trend in eastern North Pacific waters from 2013-2016 and the authors

hypothesize that the trend may be the reason behind this unusual sighting.

Halpin adds: "Since 2014 I have documented several warm-water species: common bottlenose dolphins, a swordfish and a loggerhead turtle in British Columbian waters. With marine waters increasingly warming up we can expect to see more typically warm-water species in the northeastern Pacific."

<https://www.sciencedaily.com/releases/2018/04/180419233828.htm>

VOYAGE TO THE WHITE SHARK CAFÉ

By Ken Peterson

Apr. 20, 2018 — For nearly 20 years, researchers from Monterey Bay Aquarium and Stanford University have fitted electronic tracking tags on adult white sharks each fall and winter along the California coast around San Francisco Bay. Each year, the tags documented a consistent migration by the sharks to a region more than 1,200 miles offshore—halfway to Hawaii—that's been considered an oceanic desert. They dubbed it the White Shark Café, guessing that opportunities to feed and to mate might be the draw.

Now a team of scientists will spend a month at the Café in a month-long expedition to learn why the sharks make an epic annual migration to such a distant and seemingly uninviting location. The multi-disciplinary team is bringing an impressive complement of sophisticated oceanographic equipment, from undersea robots and submersibles to windsurfing drones that will search signs of sharks and their possible prey.

Funded by the Schmidt Ocean institute (SOI), the team is led by Stanford University Professor Barbara Block and includes marine biologists and oceanographers from Stanford University, Monterey Bay Aquarium, Monterey Bay Aquarium Research Institute (MBARI), the University of Delaware, and NOAA's Office of Ocean Exploration and Research. They are traveling aboard the SOI research vessel *Falkor* and set sail from Honolulu on April 20. They will return to port in San Diego on May 19.

Unraveling a mystery

"We've studied these sharks for nearly 20 years, and they've told us consistently that the White Shark Café is a really important place in the ocean—but we've never known why," said Dr. Salvador Jorgensen, a senior research scientist and shark research lead at Monterey Bay Aquarium.

By documenting the biology, chemistry and physical conditions in the region—a swath of the Pacific Ocean the size of Colorado—the researchers

hope to understand what makes the Café an annual offshore hot spot for one of the ocean's most charismatic predators.

"I think of it like Burning Man," Sal says. "You have all these Bay Area white sharks, and every year they head out into this White Shark Café, out into the desert of the ocean—and we're not exactly sure what they're doing out there."

That's where the multi-disciplinary team and the ocean sampling equipment come into play.

High-tech research tools

The researchers are bringing a remotely operated vehicle, the ROV SuBastian, which can dive to depths of 4,500 m and record high-resolution video; a Slocum Glider—a free-swimming, torpedo-shaped robot carrying instruments to measure temperature, oxygen and salinity, through the water column; and two Saildrones. These newly developed robotic platforms, which are steered remotely and powered by the wind, can scan below the surface with sonar, picking up schools of fish, shrimp and other marine prey.

They will also use environmental DNA technology to help identify the community of animals using these waters.

To find the exact location of individual sharks present at the Café during the expedition, researchers hope to collect data from satellite and acoustic tags they put on the sharks during the fall and winter of 2017 off the California coast. The pop-up satellite archival tags (PSATs) are programmed to release from the sharks and report their locations beginning April 23—at the start of the *Falkor's* journey. The Saildrones and Slocum Glider carry acoustic listening devices, specially designed to hear the coded "pings" emitted by acoustic tags placed on white sharks.

Shark tags reporting in

The pop-up tags detach from the sharks and feed their stored data to researchers via satellite, providing rich data sets on white shark locations and documenting their preferred water temperatures and swimming depths. Acoustic tags, which remain on the sharks, report the animals' locations when they pass by a listening station—like a Saildrone or a Slocum glider.

Over 35 sharks are carrying tags. If all works as planned, some will release their pop-up tags in Café while the expedition is underway.

The researchers will compile all the data they collect—from tags, from shipboard instrumentation and from the robots—to generate a detailed 3-D view of the Café environment. This would tell scientists where the white sharks are, and document the

oceanographic conditions and the prey surrounding them.

Stanford's Barbara Block believes that understanding what makes the Café so attractive to white sharks will also reinforce its importance in the global ocean.

A 2016 report from the United Nations Educational, Scientific and Cultural Organization (UNESCO) and IUCN identified the White Shark Café as a potential World Heritage site, recognizing the unique importance of the region for white shark biology, she notes.

Dr. Block explains that, "By using the tools of modern oceanographic science we hope to better understand what makes this high seas place so attractive to one of the most iconic shark species on our planet."

<https://futureoftheocean.wordpress.com/2018/04/20/voyage-to-the-white-shark-cafe/>

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)
4/29 9 am	27 2	Humpback Whales Harbor Porpoise
4/28 8 am All Day	5 7 9 2 2,500 300 250	Humpback Whales Killer Whales Fin Whale (friendlies!) Gray Whales (cow/calf pair) Pacific White-sided Dolphins Northern Right-whale Dolphins Risso's Dolphins
4/27 8 am All Day	9 11 1 5 1 300 20	Humpback Whales Killer Whales Blue Whale Fin Whales Minke Whale Risso's Dolphins Pacific White-sided Dolphins
4/26 8 am All Day	10 5 700 5 150	Humpback Whales Killer Whales Pacific White-sided Dolphins Northern Right Whale Dolphins Risso's Dolphins
4/25 9 am	1 14 2 150 5	Humpback Whale Killer Whales (predation event on a Gray Whale calf) Gray Whales (cow/calf pair) Risso's Dolphins Black-footed Albatross
4/24 9 am	20 250 6	Humpback Whales Risso's Dolphins Black-footed Albatross
4/23 8 am	30	Humpback Whales (50+ breaches)

All Day	20 150	from 1 Humpback!) Pacific White-sided Dolphins Risso's Dolphins
4/22 8 am	10 5 12	Humpback Whales Killer Whales Black-footed Albatross
4/21 8 am	16 13 20	Humpback Whales Killer Whales Black-footed Albatross
4/20 9 am	7 255 8	Humpback Whales Risso's Dolphins Harbor Porpoise Black-footed Albatross
4/19 8 am All Day	12 3	Humpback Whales (several breaching) Laysan Albatross
4/18 9 am	15 2 40 4	Killer Whales, 2 nd predation on Gray Whale calf Gray Whales Risso's Dolphins Harbor Porpoise
4/17 9 am	6 7 1	Humpback Whales Killer Whales, predation on the Gray Whale calf from start to finish (2 hour event) Gray Whale calf
4/16 9 am	14 40 10	Humpback Whales Risso's Dolphins Harbor Porpoise
4/15 8 am All Day	5 7 2,000 20 8	Humpback Whales Killer Whales Pacific White-sided Dolphins Northern Right Whale Dolphins Harbor Porpoise
4/14 8 am	12 7 30 2 10	Humpback Whales Killer Whales Pacific White-sided Dolphins Harbor Porpoise Black-footed Albatross
4/13 8 am	11 20 15 3	Humpback Whales Risso's Dolphins Harbor Porpoise Black-footed Albatross
4/12 8 am All Day	10 120 5	Humpback Whales Risso's Dolphins Harbor Porpoise
4/11 9 am	12 16 1	Humpback Whales Harbor Porpoise Mola Mola (Ocean Sunfish)
4/10 8 am	11 5 1	Humpback Whales Harbor Porpoise Black-footed Albatross
4/9 9 am	13 3 10	Humpback Whales Gray Whales Harbor Porpoise
4/8 8 am	14 1 40 30 7	Humpback Whales Gray Whale Pacific White-sided Dolphins Risso's Dolphins Black-footed Albatross

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