Soundings

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

AUGUST 2011

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, AUGUST 25, 2011

TIME: 7:30 PM.
PLEASE JOIN US AT 7:00 FOR REFRESHMENTS

Speaker: John Calambokidis, Research Biologist and Co-Founder, Cascadia Research

Title: An Overview of some of the Current Issues affecting several Great Whale Species.

INSIDE THIS ISSUE

Whale Conservation is frequently in the news and can be a hot political topic in many different arenas. Those supporting Whale Conservation have to confront different opposing interests including those in favor of oil drilling in marine environments, those looking to maintain existing shipping lanes and those in support of hunting threatened whales as a food source. The best defense in all these cases for the whales and those speaking on their behalf is good science based on accurate data.

Our speaker this evening is one of the founders of Cascadia Research, a non-profit corporation founded in 1979 to conduct research needed to manage and protect threatened marine mammals.

John will give us a special overview of some of the most important and interesting issues facing cetaceans in the wild including long term trends in humpback and blue whales, new findings on gray whale population structure, and some of Cascadia's studies on human impacts including ship strikes and response to sonar.

Please join us for what promises to be an informative presentation from this globally recognized cetacean research scientist.

See you there,
Bob Mannix, ACS MB, Co-Chair Programs

CALENDAR

Aug. 30th 8am-4: ACS National Fundraiser: Blue Whales: Behemoths Of The Deep. Boat-Condor Express. Santa Barbara, CA. For Info and Reservations Please Call Kaye Reznck at ACS National 310-548-6279

Sept. 10th: Channel Islands Adventure: Cabrillo's Landing. Retrace Cabrillo's landing on San Miguel on this all day natural history adventure. Activities include landing and hiking on San Miguel Island and searching for marine mammals in the Santa Barbara Channel. Past trips have encountered large aggregations of Blue Whales. For more info contact George Fukahara at the Cabrillo Marine Aquarium at 31-548-7502

Sept 17th: 26th Annual CA Coastal Cleanup Day

Sept 18: Science Sunday at Long Marine Lab Santa Cruz, CA. Hawaiian Monk Seals: Lessons from a guest at Long Marine Lab.
Dr. Terrie Williams will discuss Hawaiian Monk Seal Physiology

Register now for Whales and Dolphins of Monterey Bay: Marine Life Studies Adventure! A Marine Life Studies Junior Research Scientist Program for children ages 8-13. Program offered through the Monterey Peninsula Regional Park District "Let's Go Outdoors!" Classes start in September. Go to www.marinelifestudies.org or www.mprpd.org for details. Call 831.372.3196 to register by phone.

Sept. 22-25: 7th Annual Monterey Bay Birding Festival. Field trips, lectures, and photo workshops will be held all weekend.
www.montereybirdingfestival.org

Nov 27-Dec 2: 19th Biennial Conference on the Biology of Marine Mammals. Tampa, FL
Conference Theme: Cumulative effects of threats to marine mammals: Challenges to animals, scientists, and managers. On Saturday and Sunday prior to the conference there will be 29 workshops running all day covering many diverse conservation topics.
For more info visit The Society for Marine Mammalogy website.

BOOK RECOMMENDATIONS

Whales and Dolphins: Cognition, Culture, Conservation and Human Perceptions. By Rob Lott (Whale and Dolphin Conservation Society)

The Age of Mammals: Continents Move Climates Change, Mammals Evolve
By John M. Harris

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Gray Whales Likely Survived the Ice Ages by Changing Their Diets

ScienceDaily (July 7, 2011) —

If ancient gray whale populations migrated and fed the same as today's whales, what happened during the Ice Ages, when their major feeding grounds disappeared? UC Berkeley and Smithsonian paleontologists argue that gray whales utilized a range of food sources in the past, including herring and krill, in addition to the benthic organisms they consume today. As a result, pre-whaling populations were two to four times greater than today's population of around 22,000.

Gray whales survived many cycles of global cooling and warming over the past few million years, likely by exploiting a more varied diet than they do today, according to a new study by University of California, Berkeley, and Smithsonian Institution paleontologists.

The researchers, who analyzed California gray whale (*Eschrichtius robustus*) responses to climate change over the past 120,000 years, also found evidence to support the idea that the population of gray whales along the Pacific Coast before the arrival of humans was two to four times today's

population, which stands at about 22,000. The whale is considered a conservation success story because protections instituted as early as the 1930s have allowed populations to rebound from fewer than 1,000 individuals in the early 20th century, after less than 75 years of systematic whaling.

"There almost certainly were higher gray whale populations in the past," said evolutionary biologist David Lindberg, a UC Berkeley professor of integrative biology who coauthored the paper with his former student, Nicholas D. Pyenson, now curator of fossil marine mammals at the Smithsonian in Washington, D.C. The paper appears on July 6 in the online, open-access journal *PLoS ONE*.

Lindberg and Pyenson suggest that higher populations in the past were possible because gray whales utilized a greater variety of food resources -- resources that today's whales are only now beginning to exploit. According to Lindberg, gray whales were once thought to feed only by suctioning seafloor sediment and filtering out worms and amphipods -- so-called benthic organisms. But some whales are now eating herring and krill as well, just like their baleen whale relatives, which include the humpback and the blue.

Credit: Photo by Geoff Shester)

Some whales are even dropping out of the migratory rat race. One group hangs out year-round off Vancouver Island in Canada, where they chase herring and krill.

"We propose that gray whales survived the disappearance of their primary feeding ground by employing generalist filter-feeding modes, similar to the resident gray whales found between northern Washington State and Vancouver Island," the scientists wrote in their paper.

"A combination of low population numbers and a species migrating between places where humans didn't bother them gave us the impression that gray whales have a stereotypical migratory and feeding behavior that may not be historically correct," Lindberg said.

The new population numbers accord with a 2007 estimate that the California gray whale population was likely 76,000 to 120,000 before humans began hunting them. That estimate, by Stephen Palumbi of Stanford University and his collaborators, was based on an analysis of gray whale genetic diversity.

The numbers clash, however, with claims by some ecologists that populations of between 15,000 and 20,000 are likely the most that the Pacific Coast -- specifically along the whales' 11,000 kilometer (6,900 mile) migratory route from Baja California to the Bering Sea -- could support, today or in the past.

"Our data say that, if the higher estimates are right, gray whales would have made it through the Ice Ages in numbers sufficiently large to avoid bottlenecking," Pyenson said. "If gray whale populations were at the lower levels, they would only have squeaked through the ice ages with populations of hundreds or a few thousand. That would have left bottlenecking evidence in their DNA."

Bottlenecking is when populations drop so low that inbreeding becomes common, decreasing the genetic diversity in the species and making them less able to adapt to environmental change.

The new assessment is good news for gray whales, which appear to have "a lot more evolutionary plasticity than anyone imagined," Lindberg said. This could help them survive the climate change predicted within the next few centuries that is characterized by an expected sea level rise of several meters.

"I suspect the gray whales will be among the winners in the great climate change experiment," Pyenson said.

Lindberg and Pyenson initiated the study several years ago in the face of conflicting and contentious estimates for past gray whale populations. They thought that an understanding of how gray whales adapted to climate change over the past 3 million years, the period called the Pleistocene, might

provide insight into how they will adapt to climate change today.

Since gray whales arose -- the oldest fossils date from 2.5 million years ago -- Earth has gone through more than 40 major cycles of warming and cooling, each of which significantly affected the world's flora and fauna. During the last glacial cold spell, between 50,000 and 10,000 years ago, most of the large terrestrial mammals disappeared through a combination of climate change and human depredation, Lindberg noted. The marine realm, however, experienced almost no extinctions and very few new originations during that same period.

The California, or eastern, gray whale, one of two surviving populations of gray whale, can be traced back about 150,000-200,000 years. Pyenson and Lindberg looked closely at only the past 120,000 years, during which Earth transitioned from a warm period to a glacial period and then to today's warmer climate.

During the glaciated period, ocean water became locked up in land-based glaciers, drawing down the sea level by about 120 meters, or nearly 400 feet. That drop eliminated nearly 60 percent of the Bering Sea Platform, a shallow area that is part of the continental shelf and the major summer feeding area for today's gray whales. Gray whales can engage in benthic feeding no deeper than about 75 meters (250 feet), Pyenson said, and during the glacial period, waters offshore of the Bering platform would have been much deeper than that.

"If gray whales were primarily feeding on the Bering Platform, it's hard to see how they could have avoided a population crash," Lindberg said.

By calculating the amount of food lost because of dropping sea levels, and combining this with estimates of the food needed to keep a whale alive, the two researchers calculated the impact of global cooling on gray whale populations and the populations that would have had to exist in order for the whales to survive.

They concluded that populations would have had to have alternative feeding modes sufficient to support a population of around 70,000 during warm periods so that population drops during glacial periods wouldn't be below 5,000-10,000 whales. Much lower numbers would have produced a genetic bottleneck obvious in the DNA of the whales, and such a signature has not yet been seen.

"We don't yet have the ability to look deep enough into the whale genome to see this type of bottleneck," Pyenson added, though genetic analysis that has been done shows no evidence of a bottleneck much shallower in time, just before humans targeted the mammals for whaling.

The carrying capacity of the North Pacific could have been as high as 170,000, "assuming modern day values for benthic productivity, food density, and gray whale energetics," the authors concluded. If gray whales also exploited non-benthic organisms, such as krill, the populations could have been even higher.

If gray whales do respond well to the rising temperatures and sea levels predicted for the future, that may not be true for the birds and other marine mammals that feed in the Bering Sea, one of the most productive marine ecosystems during the summer.

"If this environment disappears in glacial maxima, we really need to rethink what we know about the ecological history of all the other organisms that make a living in the Bering Sea," Pyenson said. He and Lindberg urge other scientists to focus on the historical ecology of species to fully understand their complex interactions with a changing environment.

"We really make a lot of conservation decisions without a lot of data," Lindberg said. "Integrating paleontological and geological data in the context of known ecological traits can help us address impending biological changes in marine ecosystems."

The work was supported by the National Science Foundation, the Natural Sciences and Engineering Research Council of Canada and the Smithsonian Institution.

Pyenson performed part of this research while a post-doctoral fellow at the University of British Columbia. Lindberg is also a member of the Center for Computational Biology and the Museum of Paleontology at UC Berkeley.

Fighting Back from Extinction, New Zealand Right Whale Is Returning Home ScienceDaily (June 27, 2011) — After being hunted to local extinction more than a century ago and unable to remember their ancestral calving grounds, the southern right whales of mainland New Zealand are coming home..

A new study published June 27 has shown for the first time that whales from a small surviving population around remote, sub-Antarctic islands have found their way back to the New Zealand mainland.

Before the onslaught of 19th century whaling, historical records suggest that up to 30,000 of these impressive whales once migrated each winter to New Zealand's many sandy, well-protected bays to give

birth and raise their calves. As a particularly social and acrobatic species, they could be seen from shore as they frolicked, slapped their tails and breached almost entirely out of the water.

And now they're coming back, according to researchers from Oregon State University, the University of Auckland and other institutions. The findings were just published in *Marine Ecology Progress Series*.

"We used DNA profiling to confirm that seven whales are now migrating between the sub-Antarctic islands and mainland New Zealand," said Scott Baker, associate director of the Marine Mammal Institute at OSU who initiated a study of these whales in 1995.

"These are probably just the first pioneers," Baker said. "The protected bays of New Zealand are excellent breeding grounds, and I suspect that we may soon see a pulse of new whales following the pioneers, to colonize their former habitat."

Credit: Photo by Auckland Islands Team 2009, courtesy of Oregon State University)

Because of their playful behavior and inclination to swim close to shore, Baker said, southern right whales have become a major tourist attraction in Argentina and South Africa, where their population has increased more rapidly.

The right whales -- three species are now recognized- earned their names from the dubious distinction of being the "right" species to kill. They could be hunted from small boats launched from shore, they couldn't flee rapidly from approaching boats, and they floated when killed because of their large stores of blubber. The same characteristics that made them an ecological marvel also caused them to be sought by hunters.

A large baleen whale, adult right whales can reach up to 60 feet in length and weigh up to 100 tons. Even calves weigh a ton, and right whales are thought to live for 70 years or more.

Hunting of right whales peaked in New Zealand and Australia in the 1830s and 1840s, the researchers noted in their report, and small remaining populations were further depleted by illegal harvest by the Soviet Union in the early 1960s. None were seen around mainland New Zealand for decades of the 20th century.

A small population of this species survived, however, near the Auckland and Campbell Islands south of New Zealand in sub-Antarctic waters. But right whales have a strong "maternal fidelity" in which migration and calving grounds are passed along from mother to calf. Mainland New Zealand had once been a favored breeding ground, but once the last individuals there were killed, they didn't come back.

"This maternal fidelity contributed to the vulnerability of these local populations, which were quickly hunted to extinction using only open boats and hand-held harpoons," said Emma Carroll, lead author on the study and a doctoral student working with Baker, who has an adjunct appointment at the University of Auckland.

The researchers wrote in their report that "fidelity to calving grounds can be viewed as a type of cultural memory, and it seems the memory of the suitable calving ground can be lost along with the whales that formerly inhabited such areas."

Just lately, however, a few right whales started finding their way back home. By 2005, there were estimates of fewer than a dozen reproductive females sited near the mainland, and there are still only a few dozen. But the new study showed that some of them definitely are coming from the sub-Antarctic islands -- and more may follow.

These studies have been supported by the U.S. Department of State, National Geographic, the University of Auckland, Marine Conservation Action Fund, and other environmental groups and agencies. Other collaborators are from the New Zealand Department of Conservation, Australian Antarctic Division, Macquarie University, and the Museum of Western Australia.

"The right whale is remarkably graceful, very spectacular to watch," Baker said. "There used to be thousands of them in New Zealand and they are now re-discovering their ancestral home. It will be interesting to see what develops."

Embargoed By Science

Loss of Large Predators Has Caused Widespread Disruption of Ecosystems
Scripps scientists part of research team studying cascading effects on ecosystems
Scripps Institution of Oceanography / University of California, San Diego

(Thursday, July 14, 2011) The decline of large predators and other "apex consumers" at the top of the food chain has disrupted eco-systems all over the planet, according to a review of recent findings conducted by an international team of scientists and published in the July 15 issue of *Science*.

The study, which included Jeremy Jackson and Stuart Sandin of Scripps Institution of Oceanography at UC San Diego, looked at research on a wide range of terrestrial, freshwater and marine ecosystems and concluded that "the loss of apex consumers is arguably humankind's most pervasive influence on the natural world."

According to first author James Estes, a professor of ecology and evolutionary biology at UC Santa Cruz, large animals were once ubiquitous across the globe, and they shaped the structure and dynamics of ecosystems. Their decline, largely caused by humans through hunting and habitat fragmentation, has had far-reaching and often surprising consequences, including changes in vegetation, wildfire frequency, infectious diseases, invasive species, water quality and nutrient cycles.

The decline of apex consumers has been most pronounced among the big predators, such as wolves and lions on land, whales and sharks in the oceans and large fish in freshwater ecosystems. But there have also been dramatic declines in populations of many large herbivores, such as elephants and bison. The loss of apex consumers from an ecosystem triggers an ecological phenomenon known as a "trophic cascade," a chain of effects moving down through lower levels of the food web.

Sandin's contribution to the study focused on the importance of sharks in coral reef ecosystems. For the past several years, Sandin and his colleagues have explored a chain of islands in the Central Pacific Ocean that feature virtually pristine, undisturbed reefs but also reefs adjacent to populated islands and subject to the effects of pollution and fishing. As documented in the *Science* study, uninhabited Jarvis Island features a healthy, thriving reef ecosystem with a robust shark population. Neighboring Kiritimati, or Christmas Island, however, with a population of 5,000 people and an active fishery, is absent of sharks and now features an ecosystem dominated by small fishes and overrun by algae.

"Practically and ethically, we cannot conduct large experiments to investigate the effects of predator removal," said Sandin. "But in the Line Islands we can rely on a natural experiment to follow what happens when sharks are removed. The abundance of prey changes, the way the energy flows through the ecosystem changes and even the way nutrients are cycled is altered. The importance of this paper is its recognition that predator removal is a global phenomenon, affecting reefs and almost every other ecosystem."

In a separate study recently published in the *Public Library of Science (PLoS) ONE* journal, Sandin and his colleagues began probing the details and mechanisms of how coral reef ecosystems change without the presence of sharks. Comparing unfished Palmyra to heavily fished Christmas Island, Sandin and his coauthors found that the ecology of prey fish changed dramatically in the relative absence of predators. On the reefs of Christmas, the removal of sharks and other large predators leads to an increase in the longevity of prey fish, an alteration in their patterns of growth and ultimately the creation of a wholly new structure for the "predator-lite" coral reef food web, the study showed.

"Predators have a huge structuring influence," said Sandin. "When you remove them you change the biology, which is typically profound and complex. And in many cases it's not necessarily predictable."

"The top-down effects of apex consumers in an ecosystem are fundamentally important, but it is a complicated phenomenon," Estes said. "They have diverse and powerful effects on the ways ecosystems work, and the loss of these large animals has widespread implications."

Estes and his coauthors cite a wide range of examples in their review, including the following:

• The decimation of wolves in Yellowstone National Park led to over-browsing of aspen and willows by elk, and restoration of wolves has allowed the vegetation to recover.

• The reduction of lions and leopards in parts of Africa has led to population outbreaks and changes in behavior of olive baboons, increasing their contact with people and causing higher rates of intestinal parasites in both people and baboons.

• A rinderpest epidemic decimated the populations of wildebeest and other ungulates in the Serengeti, resulting in more woody vegetation and increased extent and frequency of wildfires prior to rinderpest eradication in the 1960s.

• Dramatic changes in coastal ecosystems have followed the collapse and recovery of sea otter populations; sea otters maintain coastal kelp forests by controlling populations of kelp-grazing sea urchins.

• The decimation of sharks in an estuarine ecosystem caused an outbreak of cow-nosed rays and the collapse of shellfish populations.

Despite these and other well-known examples, the extent to which ecosystems are shaped by such interactions has not been widely appreciated. "There's been a tendency to see it as idiosyncratic and specific to particular species and ecosystems," Estes said.

One reason for this is that the top-down effects of apex predators are difficult to observe and study. "These interactions are invisible unless there is some perturbation that reveals them," Estes said. "With these large animals, it's impossible to do the kinds of experiments that would be needed to show their effects, so the evidence has been acquired as a result of natural changes and long-term records."

Estes has been studying coastal ecosystems in the North Pacific for several decades, doing pioneering work on the ecological roles of sea otters and killer whales. In 2008, he and coauthor John Terborgh of Duke University organized a conference on trophic cascades, which brought together scientists studying a wide range of ecosystems. The recognition that similar top-down effects have been observed in many different systems was a catalyst for the new paper.

The *Science* study's findings have profound implications for conservation. "To the extent that conservation aims toward restoring functional ecosystems, the reestablishment of large animals and their ecological effects is fundamental," Estes said. "This has huge implications for the scale at which conservation can be done. You can't restore large apex consumers on an acre of land. These animals roam over large areas, so it's going to require large-scale approaches."

The *Science* paper's coauthors include 24 scientists from various institutions in six countries. Support for the study was provided by the Institute for Ocean Conservation Science, Defenders of Wildlife, White Oak Plantation, U.S. National Science Foundation, Natural Sciences and Engineering Research Council of Canada and NordForsk

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

Date	#	Type of Animal(s)
8/9 p.m.	4	Humpback Whales
	1	Mola Mola
8/9 a.m.	4	Humpback Whales
	5	Killer Whales
	2	Mola Molas
8/8 p.m.	5	Killer Whales
8/8 a.m.	1	Humpback Whale
	5	Killer Whales
	1	Minke Whale
	2	Dall's Porpoise
	2	Mola Molas
	1	Leatherback Sea Turtle
8/7 p.m.	1	Humpback Whale
	5	Killer Whales
8/7 a.m.	3	Humpback Whales
	2	Bottlenose Dolphins
8/6 p.m.	1	Humpback Whale
	1	Minke Whale
	10	Harbor Porpoise
8/6 a.m.	10	Humpback Whales
	1	Minke Whale
	2	Risso's Dolphins
8/5 p.m.	1	Humpback Whale
8/5 a.m.	7	Humpback Whales
	4	Harbor Porpoise
8/4 p.m.	1	Humpback Whale
	1	Mola Mola
8/4 a.m.	7	Humpback Whales
	1	Blue Whales
	3	Bottlenose Dolphins
	8	Harbor Porpoise
8/3 p.m.	15	Humpback Whale
	2	Blue Whales

Skipped dates indicate no trips

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