

# Soundings



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

**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, June 30, 2016**

**Time: 7:30 PM**

**PLEASE JOIN US AT 7:00 FOR REFRESHMENTS**

**Speaker: David Cade**

Title: Insights into Cetacean Feeding Behavior Gleaned from  
New Video and Accelerometry Tags



For nearly all of human existence on the sea, our understanding of whales has been limited to what we can observe at the surface. For fully aquatic animals such as these, however, time spent on the surface is really a tiny fraction of the life cycle of these largest predators on the planet. Basic questions about feeding behavior and ecology have only begun to be answered in the last fifteen years with the advent of animal-borne sensors capable of logging cetacean behavior underwater. Only in the last two years have sensors that measure orientation and motion been combined with high-quality video cameras to provide us with a whale's eye view of the feeding events that are so critical to overall population recovery from 20<sup>th</sup> century lows. David Cade will present to us on new

insights into the feeding behavior of humpback whales from five oceans, fin whales from the Atlantic and blue whales from right here in California.

David spent 12 years as an educator (6 in the great outdoors and 6 in a math classroom) before returning to science to pursue his passions. After earning a master's degree in education at Stanford University in 2005 and a master's in oceanography at Oregon State University in 2014, Cade is now in the midst of his Ph.D. work in Jeremy Goldbogen's lab at Stanford University's Hopkins Marine Station.

**Please join** us for refreshments before the program begins. More information is available on our website, [www.acsmb.org](http://www.acsmb.org).

**Next month:** Instead of our regular program in July, we'll have our annual BBQ and raffle on Saturday, July 23. Details are on page 5 of this *Soundings*. Our programs at Hopkins Marine Station will resume on Thursday, August 25 (the last Thursday of the month), when Sarah Hardee Peterson will give a presentation on elephant seals.

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*Humpback Whale breaching on May 29, 2016. (Credit: Daniel Bianchetta).*

American Cetacean Society  
Monterey Bay Chapter

## Annual Summer Whale Watching Fundraiser

**Saturday, June 25, 2016**  
10:00 am – 3:00 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: \$60**

**Boat: 70' Sea Wolf 2**

**For reservations please call 831-375-4658**

## CALENDAR

**Jul. 11-17:** Summer Course at Moss Landing Marine Labs: "BIO 347, Working with Marine Mammals." 9:30 AM to 5:30 PM each day. This class will be taught by Dr. Jenifer Zelligs. For more information please email the instructor at [τζelligs@csumb.edu](mailto:τζelligs@csumb.edu).

**Jul. 23:** ACSMB Annual Chapter BBQ at Whispering Pines Park in Monterey. 12 to 3 PM. For more information see box on page 5.

**Oct. 3-7:** 9<sup>th</sup> Annual California Islands Symposium at the Marriot Beach Hotel in Ventura, CA. This symposium will present the most recent scientific findings on the Channel Islands and islands off the west coast of Baja California. All day field trips will be scheduled to the Channel Islands with Island Packers in Ventura, CA. For more information go to [www.mednsience.org/CaliforniaIslandsSymposia](http://www.mednsience.org/CaliforniaIslandsSymposia)

**Nov. 11-13:** American Cetacean Society's Biennial Meeting at the Embassy Suites in Monterey, CA. This conference will bring together some of the world's pre-eminent marine mammal scientists for a three day symposium in one of the world's most bio-diverse cetacean hotspots. This conference will also

offer an all day whale watching trip on Friday, November 11 with Monterey Bay Whale Watch.

## BOOK RECOMMENDATIONS

*With so many blue whales having arrived in Monterey Bay over the last three weeks, here are some editor recommendations that cover basic blue whale natural history and biology:*

Blue Whales, by John Calambokidis and Gretchen Steiger. 1997 Voyageur Press.

The Grandest of Lives: Eye to Eye with Whales, by Douglas H. Chadwick. 2008 Counterpoint.

Wild Blue: A Natural History of the World's Largest Animal, by Dan Bortolotti. 2008 St. Martin's Press.

Encyclopedia of Marine Mammals, by William F. Perrin, J. G. M. 'Hans' Thewissen, Bernd Wursig (Eds.). Page 120. 2009 Academic Press.

## WORLD'S SMALLEST PORPOISE NEARS EXTINCTION

May 16, 2016 — Mexican authorities must immediately and indefinitely close all fisheries within the habitat of Mexico's critically endangered vaquita porpoise -- or we will lose the species forever.

The Ministry of Environment and Natural Resources of Mexico, referring to data from the International Committee for the Recovery of the Vaquita (CIRVA), said on Friday that only around 60 vaquitas remained in the upper Gulf of California -- the only place the species exists -- as of December 2015. This is a nearly 40 per cent decline from the 97 vaquitas that remained in 2014.

"We can still save the vaquita, but this is our last chance," said Omar Vidal, CEO of WWF-Mexico. "The Mexican government must ban all fishing within the vaquita's habitat now and until the species shows signs of recovery. Anything else is just wishful thinking."

The vaquita is the world's smallest cetacean -- the group of mammals that includes porpoises, dolphins and whales. It is also the world's most endangered marine mammal species.

The biggest threat to the vaquita is the use of fishing nets that inadvertently catch and drown them, most notably gillnets used to illegally catch the critically endangered totoaba fish. The totoaba's swim bladder is a highly-prized delicacy in Asia that

follows an illegal trade route from Mexico, through the United States, to China.

"Despite all the best efforts, we are losing the battle to stop totoaba fishing and save the vaquita," said Vidal. "In addition to a fishing ban, Mexico, the United States, and China need to take urgent and coordinated action to stop the illegal fishing, trafficking and consumption of totoaba."

Having declined over 90 per cent in just 20 years, the vaquita continues to plummet toward extinction despite a two-year ban on gillnet fishing that began in May 2015, as well as surveillance efforts by Mexico's government, environmental authorities and military.

Millions of dollars have been spent compensating local fishermen for not fishing and to increase efforts to implement vaquita-safe fishing gear. Such equipment is critical to protecting the species and bringing sustainable livelihoods to impoverished fishing communities.

A surge in illegal totoaba fishing, undermining of compensation schemes and resistance to the use of the smart fishing gear are all contributing to the vaquita's demise and create the need for a fisheries closure with stringent, year-round enforcement.

"We are on the brink of driving the fifth marine mammal species to extinction in modern times," said Vidal. "For years, WWF has supported efforts to save the vaquita by working with the Mexican and US governments, local fishing communities, and other partners to implement sustainable fishing options. We will continue to do all we can to save this unique porpoise."

Fishermen affected by any closure must be compensated accordingly and efforts must continue to develop fishing gear to ensure that fishermen and their families can have a more sustainable way of life. Once the vaquita is shown to be on a path to recovery, and sustainable vaquita-safe fishing methods can be fully adopted and enforced, fisheries should be reopened only to vaquita-safe gear.



Vaquita swimming in the Northern Gulf of California in Baja, Mexico. (Credit: NOAA Fisheries).

<https://www.sciencedaily.com/releases/2016/05/160516100914.htm>

## SECRETS OF KILLER WHALE EVOLUTION REVEALED BY GENETIC STUDY

By Tim Radford

May 31, 2016 — Geneticists have deciphered the brief history of the killer whale: the predator that exists in every ocean but has evolved over the generations to hunt in disciplined packs, and specialise in a range of diets.

The lesson is that genetic mutations that may have favoured survival in changing circumstances were then enhanced by natural selection – and by social learning within killer whale family groups.

Researchers report in Nature Communications that they sequenced the entire genomes of 50 killer whales from a range of population groups. They used the differences between each individual to track back to the most recent common ancestor of them all, perhaps less than 250,000 years ago.

They then used the same genetic data to pinpoint mutations that might be linked to behaviour that would be reinforced by social learning.

"What is remarkable is that it is incredibly close to what we see in humans," said Andrew Foote, a geneticist and ecologist at the University of Bern in Switzerland, who with colleagues from Uppsala in Sweden led the study. "Generation time – the time of becoming an adult and having offspring – is also quite similar, roughly 25 years, and they live to roughly the same age."

Some groups of *Orcinus orca* live on a diet of fish, others on mammals, some on birds and reptiles. Some live in Arctic waters, some in the Antarctic. Some groups tend to stay in one place, others are travellers. Although males may occasionally hunt on their own, killer whales tend to stick together and work in tight groups led by the matriarch, and mother killer whales have even been seen pushing their young ashore to hunt for seals.

Some of the different orca behaviours can be linked to genetic variations that might favour survival in polar seas, the appetite for oil-rich diets, or the capacity to store vital nutrients between infrequent meals.

One of these is a variant in the metabolic cycle that turns the essential amino acid methionine into protein-building cysteine. The variant found in those orcas that eat dolphins or seals helps turn surplus cysteine back into methionine for later use.



Mammal-hunting orcas have a genetic variation that helps them store vital nutrients between meals. (Credit: John Durban, NOAA Southwest Fisheries Science Center).

“We saw it almost in parallel in two different places,” Dr Foote said. “Up in the North Pacific we have a mammal-eating killer whale in the same waters as a fish-eating killer whale and we have another that evolved independently in Antarctic waters. We found that the genes under selection in both of these mammal-eating killer whale types were in the methionine cycle. It wasn’t the same gene in each case, but both were linked to this cycle.”

Mammals cannot generate their own methionine; it comes with a diet of protein. So some killer whales had evolved a safety valve that meant that a sudden surplus of cysteine could be saved for later use. Fish-eating orcas can feed on salmon or herring throughout the day. Mammal-hunters live more precariously on a diet of a dolphin a day.

“They are getting their protein in one big meal in one sitting,” he said. It could be that the methionine variant gave the mammal hunters to make the most of each mouthful and save their surplus cysteine for later need. Killer whales may be the only large carnivore with such variation in preferred habitats and diets.

“The only other one I can think of is ourselves, really. I think it is linked to the geographic spread: killer whales are found from the Arctic to the Antarctic and all the waters in between,” Dr Foote said.

“Humans and also brown rats are the only other mammals that spread across such a wide geographic range. I think it is all the different prey items that make it possible. As a species they feed on almost everything, from turtles to seabirds to mammals.”

<http://www.theguardian.com/environment/2016/may/31/secrets-of-killer-whale-evolution-revealed-by-genetic-study-orcas>

## NO-SHOW PACIFIC OCEAN HUMPBCKS STUMP SCIENTISTS

By Ilima Loomis

May 25, 2016 — Each fall, Pacific Ocean humpback whales migrate from their summer feeding grounds near Alaska and Russia to the warm waters further south. In these places, the whales spend their winters finding mates, breeding, and giving birth to and rearing calves conceived the previous winter. Or, they normally do. This past winter, the whales, by and large, failed to show up.

Whale researchers from around the Pacific are reporting that far fewer whales showed up in their usual wintering grounds than normal. Those that did make it arrived later, departed earlier, and appeared to be far less active than usual, spending less time at the surface and making longer dives.

Ed Lyman, a researcher with the Hawaiian Islands Humpback Whale National Marine Sanctuary on the island of Maui, says he started noticing changes in December 2015. “It did seem that the whales were arriving later, and what tipped us off more than anything was the tourism industry,” he says. Lyman, who works closely with the industry to spot entangled and distressed whales, was getting calls from tour boat operators asking where the whales were.

“Something happened this year,” agrees Jim Darling, a researcher with the nonprofit Whale Trust Maui. “It almost seemed as if the females didn’t bother to show up, which left the males without much to do.” Darling says the overall density of whales off Maui appeared to be down, but the density of cows and calves was especially low, and there was much less surface activity than usual. Darling also reported hearing from colleagues in the Philippines and Japan of similarly low whale numbers in those places.

Although comprehensive surveys of whale populations in Hawai‘i are limited, the data that are available indicate numbers were indeed down. A six-week survey off the Island of Hawai‘i in peak season this year counted 225 humpbacks. That compares to about 700 whales in the same survey done in 2010. Also striking was the low number of calves. Only eight percent of whale groups included a calf this year, compared to 33 percent in a normal year, says Chris Gabriele, a researcher with the nonprofit Hawaii Marine Mammal Consortium.

Puerto Vallarta, Mexico, also saw fewer whales than normal says Oscar Frey, an oceanographer and the chief researcher for the nonprofit Deep Blue Conservancy. “Normally, we see more than 1,000 humpbacks in a season, and this year we saw less than

400. The count was 378.” Frey adds that he observed “the least number of mothers with babies that I have ever seen.”

The whales that went to Puerto Vallarta also tended to stay farther offshore, and exhibited some unusual behaviors, such as making much longer dives. Whales that would typically spend a half hour below the surface stayed submerged much longer. “I documented 64-minute dives more than once,” Frey says.

So if the whales weren’t in Hawai‘i, Mexico, and other warm wintering grounds, where were they? It’s possible they simply decided to stay in Alaska. John Moran, a research fisheries biologist with the US National Oceanic and Atmospheric Administration’s Auke Bay Laboratories in Juneau, confirmed that humpbacks seemed to be lingering in Alaska later in the fall than usual, and he observed more in the winter months than he expected. But, he says, data are lacking. While his group has done winter surveys of Prince William Sound humpbacks in previous years, they lacked funding to do so this year. “Of course, that’s when something happens,” he says.

The researchers say it’s too soon to know what’s behind the whale weirdness, though both Darling and Frey pointed to this year’s El Niño—one of the strongest on record—as a probable contributing factor.

Though the whale experts agree that the strange migration may be a one-time anomaly, they suggest it’s definitely something to keep an eye on. Lyman, Gabriele, and Moran all say they plan to step up efforts to gather more and better data in the coming year to better assess what’s going on. “At the very least, we should be attentive,” Darling says. “I don’t think anybody’s suggesting alarm. Anything can happen in one year, especially an El Niño year.”

<http://www.hakaimagazine.com/article-short/no-show-pacific-ocean-humpbacks-stump-scientists>

## WHY ARE GRAY WHALES MOVING TO THE OCEAN NEXT DOOR?

By Richard Schiffman

Feb. 25, 2016 — In 2010, when marine biologist Aviad Scheinin posted a photo online of a gray whale off the coast of Israel, his fellow scientists weren’t buying it. “Nice Photoshopping,” one researcher responded. “Is this April Fools’?” another replied.

Their skepticism was understandable. The species had not been seen outside the Pacific Ocean since the 18th century, when whalers are thought to have harpooned the last Atlantic gray whale. But in 2013, another was spotted even farther afield, off the

*American Cetacean Society – Monterey Bay*

American Cetacean Society  
Monterey Bay Chapter

## Annual Chapter BBQ Saturday, July 23, 2016

Please join us for a fun afternoon with great people, good food and a fabulous raffle & silent auction at Whispering Pines Park.

**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:** Whispering Pines Park, off Pacific Street in Monterey, just up from the Doctors offices

**Time:** 12-3 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

**Questions?** Call the Ternullos at 831-373-4281

Atlantic coast of Namibia in southern Africa, where it lingered for a month before swimming off.

Until recently, the Arctic’s wall of sea ice made such polar ocean-hopping impossible. Whales need to surface every few minutes to breathe and cannot venture under frozen seas. But increasingly warmer summer temperatures are melting the ice of the Bering Strait and Northwest Passage, opening a water highway between the Pacific and the Atlantic.

If gray whales do migrate to the ocean next door, they’ll find that a lot has changed in the Atlantic since the species last plied its waters, including increased ship traffic and higher temperatures. At the same time, says biologist Elizabeth Alter of the City University of New York, these 40-ton bulldozing bottom feeders could have an oversized impact on their new home — for good and for ill.

“Both the physical ocean and the life within it are shifting much more rapidly than our models predicted for the Arctic,” Alter notes, adding that temperatures there are rising twice as fast as everywhere else on the planet.

A full-on return to the Atlantic would be an evolutionary homecoming for the species; gray whales lived in the Atlantic for thousands of years. Alter believes traces of these gray whale ancestors hold hints of the species’s future. In determining how gray

[www.acsmb.org](http://www.acsmb.org)

whales responded to historical shifts in the environment, she may be able to help chart what lies ahead for this sensitive “indicator species” — as well as the larger ecosystem.

### Whales on the Move

Every year, the nomadic grays take two to three months to swim from the lagoons of Baja California, where they breed and nurse their young, to the feeding grounds off the coast of Alaska. It’s one of the longest migrations of any mammal, a round-trip trek of nearly 12,000 miles every year. Once in northern seas, the whales plow the bottom mud and strain it through flexible baleen plates for tiny, shrimplike creatures and tube worms, fattening up each summer for the return journey south.

But as temperatures rise, these age-old patterns are changing fast. The timing of the migration has shifted: The whales are leaving their calving grounds earlier and coming back later. Their feeding grounds move steadily north, and evidence suggests some even spend the winter there. And the whales are beginning to feed at various depths as well as along the sea floor, a shift that may have to do with changes in the population densities of their prey.

Even against the backdrop of these changes, the 2010 and 2013 sightings in the Atlantic took biologists by surprise. Those first two gray whale pioneers, which threaded their way through the icy labyrinth of the Northwest Passage into the North Atlantic, accomplished this feat by dumb luck, according to Alter. But now, with the ice receding farther every summer, she says, “the current trickle of strays may turn into a steady stream,” though that could take decades or even centuries.

How will these colonizers fare in the Atlantic after all this time? The best guess comes from past population patterns. For years, Alter and her colleagues have meticulously reconstructed the history of the species using subfossils — ancient bones that, unlike true fossils, are not yet fully mineralized and still contain minute traces of DNA.

Extracting genetic material from these ancient bones is a meticulous practice. At the American Museum of Natural History in New York, where Alter is a research associate, she pauses by a wall of steel shelving in the museum’s cavernous basement. It holds ribs the size of small logs and 6-foot-long mandibles — modern bones similar to the subfossils Alter has studied. She points to a black smudge discoloring the surface of a flanged whale vertebra. “We scrape off this dark material, which contains traces of bacterial DNA,” she explains. “Then we drill out a tiny wedge of spongy bone matrix and grind it

into a fine powder that we use to extract the DNA in the lab.”

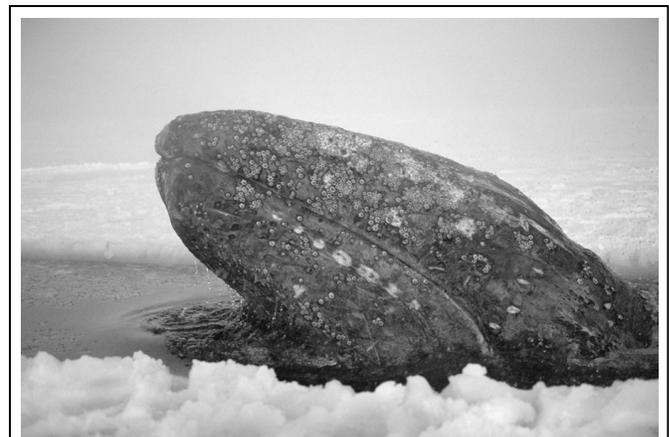
That DNA was hard-won. When Alter first had the idea to trace the history of gray whales from subfossils in the early 2000s, she quickly hit a major snag; gray whale subfossils are hard to come by. Most lay widely scattered on the bottom of the sea. With little material to work with, the project languished for a year.

Then in 2005, she met evolutionary biologist Michael Hofreiter, then at the Max Planck Institute for Evolutionary Anthropology, who shared some extraordinary news: Dutch trawlers raking the mud of the North Sea dredged up a cache of gray whale subfossils, the largest ever discovered. “I almost fell out of my chair,” Alter recalls. She and Hofreiter teamed up to tease out the story hidden within their new trove.

“Now, for the first time, there was enough material to conduct a really thorough study,” Alter says.

Analyzing this Atlantic material and comparing it with DNA from the Pacific from the same time period, Alter and Hofreiter discovered that grays moved freely between the Pacific and the Atlantic on at least three separate occasions during the late Pleistocene and the Holocene, periods when temperatures were warmer and sea ice was light. (The most recent migratory “pulse” ended about 5,000 years ago.) And based on the genetic diversity in the samples, Alter’s team estimated in 2007 that the archaic population was three to five times larger than it is today.

Nicholas Pyenson, curator of fossil marine mammals at the Smithsonian Institution, reached a similar conclusion after analyzing earlier gray whale fossils from the Pleistocene. Not only are gray whales



A gray whale finds its way amid the ice off the Alaskan coast  
(Credit: Michio Hoshino/Minden Pictures).

no strangers to the Atlantic, it seems they've thrived there under warmer conditions.

**An Uncertain Future**

These insights into the gray whale's past have left researchers guardedly hopeful about their future. Gray whales are accustomed to traveling far and exploring new areas. And throughout their long history, grays have been "generalists," not tied to only one food source or feeding method. While they're sensitive to change, they are also, it turns out, quite resourceful in responding to it. "They're a good example of a species that will likely adapt to global climate change better than other less behaviorally flexible whales," Pyenson says.

But the Atlantic today is different from the ocean the grays once swam in. The whales that return to their ancestral home will have to cope with a greater risk of fatal collisions with ships than in the Pacific. They may have to dodge oil- and gas-drilling operations in the Arctic and the North Atlantic as well as deafening sonar blasts. And as the climate changes, their food sources, from phytoplankton to tiny crustaceans, may shrink.

The whales, in turn, could affect their new neighborhood if they arrive in large numbers. Like beavers, gray whales are ecosystem engineers whose activities transform the places where they live. They stir up enormous plumes of mud while bottom-feeding, for instance. But just what effect they'll have is unknown.

Studying the ancient DNA of gray whales has opened a new door into how ecosystems have changed over time — and underscores the unprecedented pace of change in today's human-altered world, Alter says.

"With human-caused climate change, we're running a vast, unintended ecological experiment," she says. "We simply can't say yet what the results are going to be. But it is clear that the consequences for gray whales — and for the oceans they inhabit — will last well beyond our lifetimes and our children's lifetimes."

<http://discovermagazine.com/2016/april/13-why-are-gray-whales-moving-to-the-ocean-next-door>

**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	22	Humpback Whales
	40	Risso's Dolphins
	1600	Northern Right Whale Dolphins

		and Pacific White-sided Dolphins (mixed mega-pod)
5/31 12:30 pm	15 500 500	Humpback Whales Northern Right Whale Dolphins Pacific White-sided Dolphins
5/31 10 am	35 6 40	Humpback Whales Killer Whales Pacific White-sided Dolphins
5/31 9 am	19 6 1 350 50	Humpback Whales Killer Whales Fin Whale Pacific White-sided Dolphins Northern Right Whale Dolphins
5/31 8 am	12 1 200 50 2 7	Humpback Whale Minke Whale Pacific White-sided Dolphins Risso's Dolphins Harbor Porpoise Mola Mola (Ocean Sunfish)
5/30 5:30 pm	24 25	Humpback Whales Blue Whales
5/30 2 pm	15 30	Humpback Whales Long-beaked Common Dolphins
5/30 12:30 pm	45	Humpback Whales (including surface feeding)
5/30 9 am	16 25 6 4	Humpback Whales Blue Whales Harbor Porpoise Dall's Porpoise
5/30 8 am	25 40	Humpback Whales Blue Whales
5/29 5:30 pm	24 25	Humpback Whales Blue Whales
5/29 4:30 pm	20-25 20-30 2	Humpback Whales Blue Whales Mola Mola (Ocean Sunfish)
5/29 2 pm	18 25 1 1	Humpback Whales Blue Whales Minke Whale Black-footed Albatross
5/29 12:30 pm	20	Humpback Whales
5/29 9 am	16 30 25 1 1	Humpback Whales Blue Whales Risso's Dolphins Elephant Seal Guadalupe Fur Seal
5/29 8 am	12 20-30 6 300	Humpback Whales Blue Whales Killer Whales Long-beaked Common Dolphins
5/27 10 am	4 30-50 100-200	Humpback Whale Blue Whales Long-beaked Common Dolphins
5/27 9 am	6 40+ 150	Humpback Whales Blue Whales Short-beaked Common Dolphins
5/26 2 pm	7 3 1	Humpback Whales Killer Whales Mola Mola (Ocean Sunfish)

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City, State, Zip \_\_\_\_\_

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Individual \$45	Student \$35	Teacher \$35
Senior (62 plus) \$35		

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Signature \_\_\_\_\_

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**Return to: Membership Secretary, ACS Monterey Bay Chapter**  
**P.O. Box H E Pacific Grove, CA 93950**

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