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A PUBLICATION FOR FRIENDS OF CABRILLO MARINE AQUARIUM



**Cabrillo
Marine
Aquarium**

A facility of the City of Los
 Angeles Department of
 Recreation and Parks with
 support from Friends of CMA



BEACH ECOLOGY COALITION

Balancing Human Recreation with Wildlife Conservation

Few realize that their favorite sandy beach is a complex coastal ecosystem, as well as a beloved playground. Sandy beaches are home to unique plants and animals, intricate food webs and vital ecological functions.

People appreciate the restorative power of beaches, as do seabirds, sea turtles and marine mammals. Human children love beaches and so do animal babies. Beaches are nursery areas for seals and sea lion pups, and for shorebird nests. One marine fish, our famous California Grunion, relies on beaches for spectacular midnight spawning runs, burying eggs on sandy shores.

Protecting natural resources on the coast of urban areas is challenging. Beaches are at the interface between water and land, affected by impacts from both sides. Structures such as houses and seawalls prevent natural replenishment from the back of beaches, while sea level rise and erosion from waves narrow beaches further. This coastal squeeze reduces the amount of beach available for people and living natural resources.

In southern California, sandy beaches along 70% of our coastline attract millions of visitors every year. Surprisingly, even though beaches are the most extensive coastal feature, their management is not consistent. There is no certification program or set curriculum to prepare managers and maintenance workers to care for ecosystem features and protect natural resources in sandy beach ecosystems, as there is, for example, for lifeguard training and protection of human recreation.

Fortunately, a unique organization has come together to improve management practices

for sandy beaches, based on shared experience and scientific expertise. Formed in 2004 with 14 members, the Beach Ecology Coalition now has hundreds of participants and global recognition. To share information and best practices, the Beach Ecology Coalition holds two meetings each year.

The Beach Ecology Coalition uses its meetings to share specific examples of management actions that support wildlife on our urban beaches. These include presentations, demonstrations of equipment or natural features and roundtable discussions. In addition, Best Management Practices are developed as templates for organizations seeking to benefit from the



Meeting at Cabrillo Marine Aquarium

experiences of others facing similar situations. The charismatic California grunion played a key role in the formation of the Beach Ecology Coalition. Fifteen years ago, a San Diego citizen sounded an alarm about the potential harmful effects of beach raking. She observed a tractor raking up kelp from a beach. Looking

closer, she saw that the tracks behind the vehicle glistened with California grunion eggs, brought to the
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From the Director

Shifting Sands

People come from near and far to enjoy the beaches of Southern California. Our culture is characterized by people frolicking on the beach. Few people pay much attention to the sand itself or the many animals and plants that call this habitat home. A healthy beach is part of a healthy ocean. Grunion run on our beach. Sand crabs scurry up with the waves and burrow in. Human actions have dramatically changed beaches whether it's damming rivers that results in reduced beach sand replenishment, armoring beaches to protect homes and businesses or raking beaches to provide a good spot for people to lay down beach towels. Along with the shifting sands we need to shift our ideas of what makes for a healthy beach. You will learn more in this issue about the Beach Coalition and efforts to maintain healthy sandy beach habitats.



MIKE SCHAADT, CMA DIRECTOR

Aquarium Notes

A Place to Grow - CMA is hosting seven marine research internships for local high school and college students. For over 20 years, young scientists have been launching their careers from our Young Scientists Program. Summer is also the season to grow young fish for research, sharing and education. Garibaldi, grunion, giant sea bass and more will spend their summer indoors in the safe haven of our Aquatic Nursery. **It's a matter of Safety** - Library staff are busy setting up hard copies as well as digital access to Safety Data Sheets for all CMA employees. The sheets outline proper storage and handling of all chemicals at CMA as well as first aid in the event of any accidents. **Only sushi grade will do for these discerning palettes** - Only the finest for CMA's animals who dine on delicacies such as squid, mackerel, clams, smelt, silver fish, shrimp and krill. Meals are lovingly prepared and delivered by Aquatic staff and volunteers.



MARGO KENNEDY, MANAGEMENT ANALYST

BEACH ECOLOGY COALITION



continued from page 1

surface by the action of the tides. She alerted the media, and the community passionately supported protecting grunion nests from this disturbance.

The City of San Diego called for scientific study of beach grooming practices and a look at the status of the grunion on city beaches. This led to the formation of the Grunion Greeters, a group of citizen scientists that observes and reports the strength of local grunion runs. One outcome of that study was to recommend changes to beach raking protocols. San Diego's City Council accepted the recommendation, and the beach maintenance team adjusted their efforts during grunion season.

The city's beach manager at the time, Dennis Simmons, saw both the importance and the simplicity of this protocol to conserve this endemic species of fish. He believed other coastal managers could benefit from sharing this kind of information. He reached out to beach managers in neighboring areas to form a new organization, one that would encourage ecologically sensitive beach maintenance based on sound science and practical experience. The first meeting was held at Pepperdine University in Malibu.

Over the years participation increased, and the organization was incorporated as an educational non-profit in 2007. Currently hundreds of people are involved in the Beach Ecology Coalition: beach managers, lifeguards, scientists, equipment operators, coastal engineers, surfers and staffers from environmental organizations and resource management agencies such as Surfrider Foundation, Heal The Bay, the California Coastal Commission, California State Parks, California Department of Fish and Wildlife and public aquariums. There is no other organization like it in the world. This is the only opportunity that professionals with such diverse beach experience can come together from across California in a collaborative setting.

It turns out that altering beach raking practice by leaving kelp wrack on shore has many additional benefits besides protecting vulnerable grunion eggs. Wrack supports a food web of invertebrates that are in turn consumed by shore-birds. It traps sand, helping to retain the natural slope of the beach. Over time, nutrients return to the ocean and recycle into new kelp plants. Now, some beach managers have altered their raking practices to leave the wrack line year-round.

In the past, caring for the beach amounted only to picking up trash and promoting human safety. Now and in the future, caring for the beach involves protecting much-needed habitat for native plants and animals that have nowhere else to go. The Beach Ecology Coalition works with beach managers and others to conserve our beautiful sandy beaches so that they can be enjoyed for their ecological treasures and recreational pleasures for generations to come.

KAREN MARTIN, PHD, PROFESSOR OF BIOLOGY PEPPERDINE UNIVERSITY
CO-FOUNDER, THE BEACH ECOLOGY COALITION • EXECUTIVE DIRECTOR GRUNION GREETERS

Creature Feature

Spiny Sand Crab

Blepharipoda occidentalis

Everyone loves a sand crab. You know the kind you feel wriggling in the sand under your feet and when you pick them up, they tickle your palm...

Spiny sand crabs, *Blepharipoda occidentalis*, are just like these only they reach three times the size, have sharp spines jutting out along the sides of their carapace and two sizable spiny claws in front...not to mention they may eat their smaller sand crab cousins for dinner!

At a whopping 3" long and 1.75" wide, the spiny sand crabs can be found burrowing off the wave swept beaches of California and Baja. While you may expect to find them between the tides with the others, they prefer to live in the fine grained sand of the deeper sub-tidal zone. They can even be found 98 feet down. It is common for them to burrow so deep that only their eyes and antennae extend past the sand. In this position they can easily hide at the first sign of trouble.



Juveniles keep these feathery antennae fanned out to filter food passing by. It is not until adulthood that they expand their palate of plankton and detritus to include the remains of smaller dead sand crabs. This feeding strategy is why scientists look to sand crabs as an indicator species. The more plankton they consume, the more domoic acid can accumulate in their bodies. While this is not good for the sand crabs, it does provide us with important information on the level of natural toxins in the water.

Even worse for the spiny sand crabs, their heavily armored bodies are no match for fish like the queen croaker and the barred surf perch. Luckily, for the fish at least, most of the spiny sand crabs they eat also come with a side of clams. It turns out *Mysella pedroana*, a commensal mollusk, can be found living inside the bronchial chamber of 2/3rds of the population. Some individuals have been found with 22 mollusks inside!

It is not too common to find a live spiny sand crab (and their tiny clams) on the beach but you may be lucky enough to find a molt. If you do, pick it up, take a good look, but always remember to watch out for the spines.

ALIX LOMAS, AQUARIUM EDUCATOR

Profile

Diane Alps

"Let not distance, nor time, stand in one's way for whales." That is a mantra that I have penned for Diane Alps who is a self-proclaimed, "whale nerd."



Ever since she was a youngster and, even though she grew up in Indio, she has had that inner passion for whales and dolphins.

Back in 1998 she had an opportunity to scratch that "whale itch" by joining that Cabrillo Whalewatch Program by becoming a Whalewatch Naturalist. Wow, talk about dedication, for three months Diane would drive from Indio to the Aquarium and back each Tuesday, a 240 mile commute before she moved closer to the sea in beautiful San Pedro. In 2000 she became a part-time staff member in the programs department assisting with the various programs. Then in 2005 she became a full-time staff member in the programs department as a clerk typist to assist me. Through the years Diane took that clerk typist position and expanded the breadth and scope of its duties to the next level. Instead of just assisting and taking a supporting role she has taken the lead in organizing and implementing major CMA programs, such as the Whale Fiesta and Autumn Sea Fair. During her time here she also became quite active in the American Cetacean Society, one of the oldest whale conservation organizations, which she eventually became the president of the local chapter. She is now the current national president of the American Cetacean Society.

Recently, Diane became interested in a particular parasitic copepod, called *Pennella*, which live on certain whales. Last year at the Marine Mammal Conference she co-presented a poster on the *Pennella*, which drew quite a bit of interest from the whale community. Her desire to be out on the water looking for whales has also lead her to be invited to the International Whaling Conference to sit on the whale watch subcommittee.

Back in February Diane decided to step back from her position here to pursue, full time, her degree in Fishery and Wildlife Biology. Yes, we miss her daily "good mornings," her hardy laugh and her participation in the many programs that she was engaged in. However, in the long run, we know that her degree will open more opportunities for her to help the whales she is so passionate about.

LARRY FUKUHARA, PROGRAMS DIRECTOR

HERE TODAY, GONE TOMORROW

Seasonal Beach Changes

Those wide sandy summer beaches look pretty stable and permanent, but the sand rarely sits still for very long. Wind blows the sand around on the back beach, and the waves are constantly at work pushing the sand back and forth, across and along the beach face. Every time the tide goes in and out and each time we have a winter storm, the shape of the shoreline will change. These daily and seasonal processes and a number of other subtle and more obvious features are easily recognized by coastal residents, frequent beach visitors, or a careful observer.



Low energy waves during the summer deposit sand onto Cabrillo Beach.

Perhaps the most striking, noticeable change to the shape of most beaches is that which takes place between winter and summer. The summer beach has a berm, which is the wide, dry, higher part of the beach where we throw our towels, have picnics, and perhaps play Frisbee or volleyball. The berm may be hundreds of feet wide. In winter, all or much of this sand is removed by the steeper and more energetic waves, usually leaving behind a much narrower winter berm. Although the total amount of sand spread between the exposed and submerged part of the beach is about the same in



High energy waves more common during winter storms scour sand from Cabrillo Beach exposing a lower layer of rocks and boulders.

summer and winter, it has been redistributed in response to different wave conditions. The beach responds to the more energetic winter waves by moving sand offshore, where it usually forms a series of longshore bars, or large sand waves on the seafloor that are parallel to the shoreline, separated by longshore troughs. Because the depth where the waves break is determined by the height of the waves, the presence of these sand bars causes the waves to break farther offshore. This dissipates more of the breaking wave’s energy offshore, which reduces the wave energy expended on the beach and acts as a natural shock absorber. In the late spring and summer months, the less energetic and less steep waves will gradually begin to move the sand that accumulated on the longshore bars back onto the beach. These more gentle waves will wash the sand up the beach face, building up the berm over the months ahead. By July or August the exposed beach will usually be at its maximum width again, in time for all of the summer visitors. The balance between a winter and a summer beach, or the wave conditions that move sand offshore and those that move it onshore, is somewhat delicate, and conditions can change



High energy waves move sand offshore.

quickly that will reverse the transport of sand. Years of observations as well as experiments in wave tanks have shown that the wave steepness, which is the ratio between the wave height (h) and the wave length (L), or h/L, exerts the strongest influence on whether the sand is moving onshore to form a berm, or offshore to form sand bars. Winter or storm waves tend to be steeper, and are more effective at moving sand off the beach face or berm and transporting it offshore. The less steep summer swells move sand the other way, back onshore to rebuild the berm, providing us a place to sit. All of this back and forth movement of sand grains is brought about by the movement of water or turbulence near the seafloor produced by the passage or breaking of each wave.

Just as you get thrown around when body surfing or playing in the waves, the sand grains are a lot smaller and lighter and are picked up and carried along much easier. Once a sand grain is picked up off the bottom, it is moved with the nearshore currents or by the breaking wave and can be carried a few inches or many feet each time a wave breaks. During the passage of lower and less steep summer waves, the circular or orbital movement of the water near the seafloor picks up the sand grains and moves them a short distance towards the shoreline with the passage of each wave. Thus there is a net onshore movement of the sand grains, gradually adding sand to the beach face. With steeper winter waves, however, which break more frequently, the entire surf zone is very turbulent, which keeps the sand stirred up. There is no time for the sand to settle out between waves, and the sand stays in suspension longer. The general pattern seems to be that the water at the surface in the surf zone is moving up the beach face, while the water near the bottom, where most of the sand is concentrated, is moving seaward. This leads to an overall transport of sand off of the beach face and offshore where it will settle out onto the bars that form in the winter or stormy months.



Winter storm waves can move massive amounts of sand offshore exposing layers of rocks and sand.


GARY GRIGGS, DISTINGUISHED PROFESSOR OF EARTH & PLANETARY SCIENCES
DIRECTOR INSTITUTE OF MARINE SCIENCES
UNIVERSITY OF CALIFORNIA SANTA CRUZ

DISCOVERY LECTURE SERIES
Presented by AltaSea & Cabrillo Marine Aquarium

DR. JEFF ARMSTRONG
ENVIRONMENTAL SUPERVISOR
ORANGE COUNTY SANITATION DISTRICT-OCEAN
MONITORING PROGRAM
FRIDAY, JUNE 3, 2016 • 7 - 9PM

SEWERS TO SANDDABS: PROFILING
ORANGE COUNTY SANITATION DISTRICT’S
OCEAN MONITORING PROGRAM

Dr. Armstrong will profile OCSD’s monitoring of the treated wastewater released into the ocean offshore of Huntington and Newport Beaches and discuss their water reclamation efforts.



Dr. Jeff Armstrong is the Environmental Supervisor of the Orange County Sanitation District’s Ocean Monitoring Program. He has been with the District for over 20 years, all in Ocean Monitoring. He holds a Bachelor’s degree in Marine Biology and a Master’s degree in Biology from California State University, Long Beach, and a Ph.D. in Biological Oceanography from City University Los Angeles. He is also adjunct faculty at CSU Long Beach working in the Environmental Endocrinology Laboratory researching the effects of contaminants of emerging concern on local marine fish.

Fee: Free, but reservations required (Please RSVP to lecture@cmaqua.org)

Upcoming Lecture Dates:

- August 5, 2016 - John Calambokidis, Cascadia Research
- October 7, 2016 - TBD
- December 2, 2016 - Dr. Dan Pondella

For more information, call 310-548-7562.

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† Through March 20.
Subsequent supporters to be recognized in next edition.



The Grand Grunion Gala is Just Days Away, But it's Not Too Late to Get Tickets
Here's the Top 10 Things You Should Know:

- 10
- Arrive at 5!. We're giving you an extra hour to snap a photo with Mermaid Linden, check out the expanded auction and enjoy creative cocktails featuring Tito's Handmade Vodka. Jelly shots are back and so are the Planktinis!
- 9
- Don't forget to wear white in honor the white abalone. Go all in or throw on a splash of white. Or you can always flash us your pearly whites. The only thing that's mandatory is to be comfortable.
- 8
- After winning rave reviews last year, Chef Paul Buchanan is back to wow us with his amazing appetizer stations, followed by a farm-to-table dinner served family style. Gluten-free and vegetarian options await at every table!
- 7
- At some galas, the band plays politely while everyone remains seated. WE DANCE! With the Funky Hippies in the house, we predict it will be impossible not to shake your booty!
- 6
- Our honorees are amazing! Advanced Environmental Group's new technology removes 98% of emissions when ships call in port. That's equivalent to 12,000 cars! NOAA is helping to bring the white abalone back from the brink of extinction. And teachers Gwen and Chuck Davies

- 5
- have taught thousands of kids about the ocean over the span of their careers.
- 4
- The ever popular WINE WALL is back—for \$40, everyone gets a nice bottle of wine. You might get lucky and snag the 100-point bottle or another premium offering.
- 3
- Get on the Bus, Gus. During the live auction, you can help us buy a new Outreach Van, which brings the Aquarium to schools that can't come to the Aquarium.
- 2
- Take a Trip—Our auction items will include a Holland America cruise, a Spirit Cruise for 40, a Hawaiian getaway or an afternoon on Body Glove's Disappearance.
- 1
- Stay the night—and get a deal at the Doubletree Hotel near the Aquarium. We can even arrange to pick you up and drop you off. Call 800-222-TREE and mention code FCM.
- 1
- We appreciate your amazing support all year long! Still have questions? Call us at (310) 548-7593 or go to www.grandgruniongala.org. Need more info? Call us at (310)548-7593 or go to <http://cabrilloaq.ejoinme.org/gala>

CAROLINE BRADY, EXECUTIVE DIRECTOR, FCMA

Summer in the Gift Shop

The CMA Gift Shop is stocked up and ready for summer with new beach towels, boogie boards and sand toys. Check out our soft grass flip flops, magic boxer shorts, sun visors and CMA hats. Don't forget Sand Castle Day on Saturday, July 23!

Now is the time to fly kites and hang up wind catchers and flags. We've got them! Look for new sea life home décor – frames, votive holders, ceramic figurines, napkin rings, plaques, sand sculptures, and a new line of whale purses! Check out our cold drinks and snacks.

The Annual Red Dot Sale is June 1 to July 31 and selected items are 40-50% off. Members get 20% off all regular-priced items.





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www.cabrillomarineaquarium.org

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