



TORREYANA

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The Sea Turtles Among Us

by Joan R. Simon

Five of the seven species of sea turtles in the world live in the eastern Pacific, which includes the California coast, and three of these live in our waters: leatherbacks, loggerheads and green turtles. Of these, the green turtle lives in our immediate neighborhood, at La Jolla Cove and in San Diego Bay; it is the favorite turtle of Dr. Jeffrey Seminoff, Leader of the Marine Turtle Ecology & Assessment Program at NOAA, who spoke at the Docent Society meeting on May 13.

Sea turtles were once the most abundant larger vertebrates in the world's oceans, but today many populations are a fraction of their former size due to decades of unsustainable fishing. They are important regulators and engineers of marine ecosystems. With a nutrient-rich environment in the eastern Pacific, the California coast is one of the best places for a turtle to be. It is also one of the safest. We have two closure areas along the eastern Pacific coast. The first is the Pacific Leatherback

Conservation Area from Oregon to central California, which has one of the most productive swordfish fisheries in the entire eastern Pacific. This area is closed to commercial fishing every year from August 15 to November 15, regardless of circumstances, to protect the leatherback turtles.

The other closed area extends from Los Angeles to northern Baja, protecting the loggerhead turtle from commercial fishing of swordfish. The Pacific



Docent General Meeting

Date: Saturday, June 10, 9:00 am

Location: St. Peter's Episcopal Church Rec Hall, Del Mar

Speaker: Bill Howell

Topic: San Diego Butterflies

San Diego has possibly the most varied ecology of any county in the U.S., resulting in a diverse local butterfly population. In his presentation, Bill Howell will illustrate the diversity of local butterfly species and their life cycles.

Bill's love of butterflies and other small invertebrates has been enjoyed by many from his decades of teaching students of biology and natural history. He is currently training nature interpreters for the Canyoneers of the San Diego Natural History Museum and the Trail Guides of Mission Trails Regional Park. Bill was past president of the Monarch Program in Encinitas, a research and educational organization involved with tagging and counting overwintering monarchs along the California coast. As an award-winning photographer, his images capture the essence of these enchanting creatures.

Refreshments: Docents with last names beginning with **A, B, C** will be responsible for providing snacks for this meeting.

Loggerhead Conservation Area, 25,000 square miles of southern California ocean waters is a dynamic closure, changing each year depending on the circumstances, and has been in effect since 1995. Keeping nets out of areas where turtles live is one of the best strategies we have to protect turtles. Both of these species are protected under the Endangered Species Act (ESA), which provides that all species listed as "threatened" or "endangered" have a "critical habitat" determination to help recovery efforts.

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Zuzana Volny

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Museum Shop.**

Green Turtles

Green turtles live in the southern California waters, including in the local waters of La Jolla and San Diego.

However, their presence in La Jolla Cove is unusual, as these turtles "love warm water, and they shouldn't be here," Dr. Seminoff said, but there's abundant food available and they've somehow adapted to the chilly local water temperature of 13° C (55° F). Their lack of fright of humans is nearly identical to the green turtles in Hawaii, but coastal areas of Hawaii are a much warmer marine environment.

Green turtles are primarily herbivores, but they'll eat pretty much anything – seagrass, algae, sea hares, sponges – which speaks to their adaptability. They have scissor-like mouths that are perfectly suited to clipping seagrass, their main food in San Diego Bay. They go through seagrass beds like lawn mowers, and the abundant food keeps the turtles "fat and happy" so they can go back to their nesting grounds along the central Mexican coast to breed. Like cattle, they have hind-gut microbial fermentation, which helps to degrade plant cell walls. This lets them short-circuit the detritus cycle of seagrass beds and reduce to one day a process that would otherwise take months. "It keeps the nutrient cycle cranking along," Dr. Seminoff said.

At the time of Dr. Seminoff's talk, NOAA was in the midst of a green turtle survey, which involves going out into San Diego Bay twice a week for eight weeks. They have re-caught turtles first caught during surveys in 1997 and 2002, as well as a giant 350-pound female, first caught in 1990. Four years ago, a similar survey found 70 turtles, but since then the population has skyrocketed and Dr. Seminoff estimates it has doubled in size. In 2007, a 540-pound turtle, first seen in 1976, was caught, indicating how long these turtles live and how big they can get. Green turtles can also be recognized by photographs. The sides of their faces do not change, and A.I. can identify individual turtles. Over 700 photos have been collected.

Green turtles come in different shapes, sizes, and colors. They are also called black turtles, which some consider to be a subspecies. They are a true conservation success story. From the 1940s to the 1970s, turtles were harvested in northwestern Mexico and shipped to canneries in south San Diego and elsewhere for distribution throughout the U.S. In 1990, when the population had almost totally collapsed, Mexico outlawed the selling of turtle products, and since then green turtles have rebounded. "We are now approaching historic levels of green turtles," Dr. Seminoff said, but they are still designated "threatened" on the ESA list.



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Leatherback Turtles

Leatherbacks live offshore and eat jellies. They have hook-shaped mouths that facilitate catching their prey and a unique structure of spines in their throats so that food goes down easily but can't come out.



They grow as large as 2000 pounds, but their hatchlings weigh only 6 ounces. "Outside of the marsupial world, I challenge anyone to come up with an animal that has such a size disparity between the hatchling/baby stage and adulthood," Dr. Seminoff said. Leatherbacks occur in the waters off the central California coast, but because their size allows them to maintain internal heat, they can roam as far north as the arctic waters of Canada and Alaska.

Tracking leatherbacks is done by flying small planes "low and slow" over the turtle population and quantifying how many there are. From the planes, boats are guided to the right areas to capture the turtles with nets, take their measurements, and put tracking devices on them before setting them free. Researchers sometimes attach video devices to get a "turtle's eye view" of their foraging. Leatherbacks have a red spot on top of their head called a pineal or pink spot. Like a fingerprint, it can be used to identify individual turtles through photographs. The leatherbacks nest in Indonesia, the Solomon Islands, and Papua New Guinea, and some of them make the trans-Pacific migration to the California side of the ocean every two to three years.

Leatherbacks are by far the most endangered turtle species, not just in the Pacific but around the world. The swordfish fisheries in central California up through Oregon, as mentioned above, are closed for three months every year to protect them. In addition, the leatherbacks, along with humpback whales, can get caught in the Dungeness crab pot lines. NOAA flies over the eastern Pacific, and if they find humpback whales and turtles in the late fall, the California Ocean Protection Council will delay the opening of the Dungeness crab fishing season (early November to mid-March). Last year it was delayed five weeks (hence the rise in the price of Dungeness crabs).

Loggerheads

Loggerheads are largely pelagic and have powerful jaws that make it easy for them to eat mollusks, their preferred prey. They can be found in southern California and Baja California, but nest only in Japan; some make it to our area in the Eastern Pacific, but many spend their entire life in the

Central North Pacific. They have a very specific (and narrow) temperature preference: 63° – 65°F. The TurtleWatch tool gives fisherman the water temperature range in a given area so they can avoid going where the turtles are. As Dr. Seminoff informed us, "No fisherman wants to get his nets tangled up with a turtle."

Since the El Niño starting in 2014, NOAA has been surveying loggerhead turtles from Point Conception down to the Mexico border from a twin-engine turbo plane just 500 feet above the water. It is easy to pick out the "plate-to-platter-size" orange animals as they drift in the blue ocean. Some years there are none; other years they are seen in great abundance. It all depends on the water temperature. For example, in 2011, none were seen; in 2015 the number arrived at through aerial sighting data analyses was 50,000. The results of these surveys help inform strategies for determining when the Pacific Loggerhead Conservation Area in the southern California waters will be closed or remain open.



Dr. Seminoff hailed the increase in community-based science, where citizens use their eyes and ears to contribute information to ongoing research projects. At Torrey Pines, the CoastSnap project at the North Overlook of the Guy Fleming Trail is a good example. He encouraged us all to go out and find our local green turtles and to use the Green Turtle Community Science Hotline for any sightings of turtles in distress: 562-506-4315

SEE A TURTLE?

Please report it to the NOAA West Coast Sea Turtle Sightings Survey

Scan the QR code below or go to [this link](#).



NOAA
FISHERIES

COMMUNITY SCIENCE INITIATIVE

General Meeting Minutes, May 13, 2023

The meeting was called to order by President Matt Xavier at 9:11 am. He introduced our featured speaker, Jeff Seminoff of NOAA, who spoke about sea turtles (see pg. 1). There were quite a few technical glitches with the Zoom program, making the business portion of the meeting spotty, but fortunately most of speaker's talk was recorded and is available for viewing online. Approximately 50 docents attended in person.

New Senior Interpretive Park Aides

Two new Senior Interpretive Park Aides were hired in May: Vanessa Brock and former docent Lila Beth Scott (see profiles on pg. 4). Everyone is encouraged to get to know them.

Docent of the Month

Connie Jaffe is our Docent of the Month. Connie has volunteered for a wide variety of activities, including Lodge hosting, public walks, special walks, CARE Team, and TIK. Winners from the Greater San Diego Science and Engineering Fair 2023

Wayne Kornreich introduced two of the winners from the GSDSEF, Kyle Tianshi and Tejas Ravi, who presented their projects (see their abstracts on pp. 8-9). The two other winners will present their projects at the July 8 meeting.

Lodge Centennial

The Lodge Centennial was a great success. The committee, chaired by **Donna Close** and **Lynne Truong**, also included **Gabriele Wienhausen** and **Matt Xavier**. They worked diligently for a year to make the centennial event happen. Many dignitaries attended, including San Diego Mayor Todd Gloria, Councilman Joe LaCava, state representatives and state park officials. See front page article and photos on pp. 8-9 in the *May Torreyana* [click here](#). The park was full of visitors, and many took part in the guided walks and other activities. Matt praised all the volunteers for their participation.

Museum of Us CEED Tour

Thirty docents, 15 for each tour scheduled May 5 and May 31, got places for the Museum of Us tours. The May 31 tour has been postponed. The board has voted to fund a third tour for the 20 docents who had signed up but did not get places. Watch for the dates for the postponed second tour and the newly approved third tour.

Lodge Hosting

There are quite a few vacancies in the Lodge hosting schedule. Please sign up if you can.

The following people are doing a great hosting job. Those with the most hours from 1/1/2023-4/30/2023 include:

Jeannie Smith: >40 hours

Thomas Holland: > 50 hours

Selma Torres: > 70 hours

Medi Denker: 107 hours

Summer BBQ with Matt

President **Matt Xavier** plans to host a potluck BBQ at his house for those logging more than a specified number of hours (TBD) for Lodge hosting. **Tuesday Morning Coffee with President Matt Xavier**

Matt meets with any interested docents for coffee and an open discussion on the first Tuesday of the month at 8 am at Bird Rock Coffee Roasters on Carmel Valley Road. All docents are welcome.

Invitation to Attend Monthly TPDS Board Meetings

The board meets the second Wednesday of the month from 1-3, either in the library or at the Children's Pavilion (see box below).

CARE Team

Nancy Richardson reported on the CARE Team. The team helps show members that we are concerned and care about them. They often send cards or flowers when docents or docent family members become ill or have passed away or have personal issues. The team also monitors docent hours. If members fall behind on their required hours, the CARE team works with them to obtain more hours or put their membership on pause. There are many opportunities for docents to gain hours from home or in modified duties. Nancy encouraged docents to join the CARE team, which needs a few more members. Contact **Medi Denker** for more information. The meeting was adjourned at 11:05am.

Next Monthly Board Meeting

Date: Wednesday, June 7

Time: 1 – 3 pm

Place: Children's Pavilion (or docent library, depending on weather or number attending)

Everyone is welcome, but please let a board member know if you're coming.

See pg. 2 for list of board members.

Docent of the Month: Connie Jaffe

Photo by Herb Knufken

It is no surprise to those who know me that I have always loved being active and spending all the time I can, in the outdoors. After graduate school, I taught classes in kinesiology at a local community college. At least once a month I would take my students to the college track and participate in fitness activities.

Over the years, I've taken some truly memorable hikes with my younger brother. To my delight, we hiked Mt. Whitney in a day, climbed Half Dome in Yosemite, and hiked South Rim to North Rim in the Grand Canyon in less than a day, despite a long break at some waterfalls off the trail. Although I have had a fear of heights, those outings were very special.



For me, running has always been a passion, and I was competitive in dozens of races. One of my favorite training runs was up the Torrey Pines grade, with a quick stretch on the West Overlook while catching my breath. I was one of those La Jolla Half Marathon runners who would grab a cup of water in the Reserve and "miss" the trashcan. So, a belated thank you to all the docents who picked up the strewn cups - and more. I now run much less often and hike and bike more often. Even though I'm slowing down, this gives me the opportunity to observe all the beauty surrounding me that was once a blur.

I loved the docent training classes that the more experienced docents, rangers, park aides, and guest speakers enriched with their expertise and passion. My mentor, **Cres Torres**, is a wealth of information and, though he may try to hide it, very funny! **Coach Vance** also willingly shares her time and knowledge with me and always makes me laugh. Becoming a docent at TPSNR has been one of the most rewarding and memorable things I have done. Being paid with a smile makes my day, and I feel like part of a special family. Thank you, everyone!

Children's Program

by Janet Ugalde, Program Director

On May 19, Children's Program docents celebrated the completion of our 2022-23 school year with a hike in the Extension, led by **Barbara Wallach**. We then enjoyed lunch together at the south lot picnic tables.

Thanks to all who helped make our program a huge success this school year, including program coordinator Louis Sands, Lodge hosts, TIK talkers, park aides, and Dr. Norrie Robbins (geologist).

A ginormous thank you to faithful team members for your contributions to our beloved Children's Program!

Enjoy your well-earned summer break. See you in September.



From left: Dr. Norrie Robbins, Patty Montgomery, Bruce Montgomery, Rosemary Wareham, Pao Chau, Annette Ring, Paul Dunphy, Barbara Wallach, Susan Elliott, Janet Ugalde, Steve Neal
Photo by Craig Carlisle

New Park Aides

Photos by Joan Simon

Two new park aides started work at TPSNR in May: Vanessa Brock and Lila Beth Scott. They were interviewed by Joan R. Simon, and their profiles are on this and the following page. With Ingo Renner and Zuzana Volny, we now have four Senior Interpretive Park Aides at Torrey Pines.

Vanessa Brock

Vanessa grew up in Colorado and Arizona and graduated from North Arizona State University in Flagstaff, majoring in fine and studio art. She also took some environmental courses and “loved them.” In 2012, she did a nine-month program sponsored by AmeriCorps at the American Conservation Experience (ACE) in Flagstaff, which exposed her to all aspects of conservation work, from trail maintenance to experiences at the national parks in Utah, Arizona, Colorado, and New Mexico.



Vanessa moved to San Diego nine years ago, and she and her husband have often hiked at Torrey Pines. After working mostly in customer service, she was ready to move away from a desk position, and said she loves the educational aspect of the park aide job. In her free time, Vanessa has continued her art work, focusing on ceramics.

Vanessa will be working on Tuesday, Thursday, and Sunday from 9 to 5:30.

Lila Beth Scott

Lila Scott is from a military family and grew up in a lot of places, including San Diego, where she came to Torrey Pines with her 4th grade class as part of the TPDS Children’s Program.

Before moving away at 13 she told her family, “I’ll be moving back to San Diego,” and indeed 15 years later she came back with her husband and three children from their home in Virginia Beach.

For many years she has worked in insurance and estate planning for various small businesses, but she’s always had “a heart for nature.” During Covid, while walking at Torrey Pines State Beach,



she saw the sign for a new docent class starting in the fall of 2022 – and, yes, she saw it as a “sign.” This spring, she saw several notices that the Reserve was hiring new park aides, and she knew that was another “sign” that this was the time “to open myself up to a new path.”

Since becoming a docent at the beginning of 2023, Lila has been busy working with the CEED program and has already organized several successful trips. As a senior interpretive park aide, she will continue this work, collaborating with the Docent Society to plan more CEED adventures.

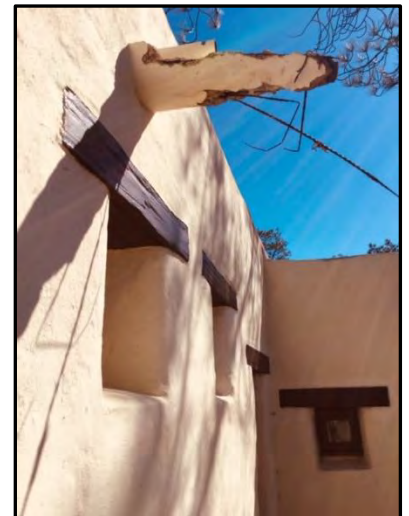
Lila will be working on Thursday, Friday, and Saturday from 9:00 to 5:30.

Don’t Forget to Gargoyle and Rinse

by Judy Schulman, TPDS Historian

This is the sixth in a series of articles by Judy Schulman about Torrey Pines Lodge, whose 100th anniversary we celebrated on April 8, 2023.

Be careful the next time you walk around the Lodge. You don’t want to get scared by the gargoyles. Yes, you read me correctly ... Torrey Pines has gargoyles! According to Richard Requa’s architectural plan, we should have eight of them. There are two in the front of the Lodge, three on the west side, and three on the east side. There are none in the back. You don’t need to be alarmed. What Requa referred to as a gargoyle is more commonly referred to in southwestern architecture as a canale. The purpose of the canale is to channel the flow of rainwater from the flat roof to the ground and away from the building. The flat roof is slightly tilted to aid in the runoff. In his building plans, Requa specified that they be made from hollowed-out logs with two coats of Cabot’s creosote stain #249. But if you look at them closely, they look more like they were made from cement or plaster. So why did Requa refer to them in his design as gargoyles? I think this is a result of his interest in Mediterranean architecture, where canales are called gargoyles. The function remains the same. In some cases, the scary-looking creatures at the end of the canales were added to ward off evil spirits. See if you can find the remaining gargoyles that we have!



Gonzales Canyon CEED Walk

by Mukesh Mehta

What does Socrates have to do with a plant in Gonzales Canyon? Common hemlock, the plant used to poison Socrates in ancient Greece, grows in Gonzales Canyon. Gonzales Canyon is named after the landowner, Levi Gonzales, who, after emigrating from Portugal, constructed an adobe and planted a variety of crops in the late 1800s. Some of the trees he planted – such as walnut, pecan and eucalyptus – are still thriving.



Gonzales Canyon, located east of El Camino Real and north of Del Mar Heights Road, is part of the San Dieguito watershed. We started our CEED hike at the Sword Way Trailhead located off Lansdale Drive. In the late 1970s, Gonzales Canyon was slated for development, but thankfully it was preserved for its rich biodiversity of coastal sage scrub, southern maritime chaparral, and riparian habitats.

On May 3, 19 Torrey Pines docents braved the early-morning drizzle and rain to come out for a wonderful CEED hike led by Park Aide Ingo Renner. Thanks to the abundant rain this winter and spring, we were hosted by a huge variety of beautiful wildflowers: twining snapdragon, California rose, checkerbloom, fiesta flower and miniature lupine. Crossing a stream, we were greeted by baby frogs swimming in the water, surrounded by a rich blend of lady fingers (*dudleya edulis*), miner's lettuce (also called rooreh), chia sage, and cream cups. A pleasant two-horse equestrian traffic jam was encountered on the trail, which was navigated with great care.

Further along the trail we saw a pecan or walnut tree near a mature eucalyptus tree and a hybrid prickly pear that was possibly brought to this ranch location by Gonzales. Along the winding trails we witnessed three types of *Artemisia* plants: mugwort, sagewort or wild tarragon, and California sagebrush. The sounds of quail and wrentits and the aroma of fennel in the morning sunlight made this second CEED hike a delightful event.

Museum of Us CEED Visit

by Mukesh Mehta

The first visit to the Museum of Us on May 10 was completed

successfully. All 15 docents were on time for a fantastic museum experience. We were welcomed graciously by Dr. Micah Parzen, COO of the Museum of Us. Our first exhibit was actually outside the museum, at the



“Land Acknowledgement” monument across the road from the main museum entrance. Dr. Parzen explained that the Museum of Us recognizes that it sits on the stolen ancestral homeland of the Kumeyaay Nation. The Museum extends its respect and gratitude to the Kumeyaay people who have lived here for millennia. An official land acknowledgment is one of many steps the museum is taking to build a more equitable, inclusive, anti-colonial, and racially just space. Dr. Parzen continued to explain that between 1912-13 the Kumeyaay living in Balboa Park, near the museum, were rounded up and evicted so that the Panama-California Exposition in 1915 could be built.

“What’s in a name?” Dr. Parzen asked. “Why was Museum of Man renamed Museum of Us?” Dr. Parzen explained that the previous name, San Diego Museum of Man, was changed on August 2, 2020 to the Museum of Us, to represent a new era. The new name is aspirational: it is a museum for all and not for only some of us. The change reflects the museum’s commitment to equity, anti-racism, and decolonization. To dignify indigenous peoples around the world, some additional words have been changed, for example, “artifacts” to “belongings,” “collections” to “cultural resources,” and “mummies” to “ancestors.”

As we entered the museum we came to a Mayan Peoples Temple, with three giant vertical sculpted columns called *stelai*, which are over fifteen feet high. Dr. Parzen explained that they were cast from the originals and are in a better shape than the originals, which have been eroded over time by natural elements.

On the second floor is the Kumeyaay Exhibit, and the traditional Kumeyaay Cosmology (sky knowledge) is one of the outstanding features. The Kumeyaay have different names and forms for constellations than those used by Europeans. Kumeyaay Cosmology was intertwined with the traditional religious beliefs and was suppressed by the Spanish invaders in San Diego in 1769. For Orion’s belt, the Kumeyaay see *Emuu* (mountain sheep) and for the Big Dipper, they see the constellation *Selq Hatun* (arm).

The Kumeyaay exhibit continues to be a work in progress as the museum and the Kumeyaay elders work together, and the individual exhibits are evolving with the changing awareness. Docents had many interesting questions and comments during the presentation. Two additional CEED visits are being scheduled for docents who have already signed up for the museum tour.

La Jolla Half Marathon

by Ann Smith Mercandetti

A small but dedicated group of seven TPSNR docents arrived by 6:30 am on Saturday morning, May 20, to monitor the La Jolla Half Marathon runners as they ran into the Reserve, up our mighty hill, and back out of the Reserve near the golf course. With Covid behind us, the number of runners was higher again this year, which is helpful for the goals of the La Jolla Kiwanis Club. Profits from this event support their many different projects in our local community. Some runners remarked about the beauty around them, having arrived from elsewhere in the country and had no idea about our rare Torrey pines. What an introduction to our very own State Natural Reserve!

Docent Lore Heath and her husband



Rosemary Wareham, Marian Edelbrock, Myrna Trust, Lore Heath, Joan Simon, Gale Darling, and Ann Smith Mercandetti were the early rising docents, holding up posters with photos by Herb Knufken as the runners came through the Reserve. The monitors all received lots of compliments as the runners expressed their thanks and appreciation for the docents cheering them forward.



Photo by Gale Darling

The Greater Science and Engineering Fair 2023

by Wayne Kornreich

The Greater San Diego Science and Engineering Fair was held in person this year for the first time since the start of the Covid pandemic. It is always much more enjoyable and rewarding when you are able to interact with the students in person. This year there were many outstanding science fair projects, and our judging team (**Robert James, Karen Lisi, Leigh Fenly, Kathy Dickey, Kimberley Gambling, and Wayne Kornreich**) selected four projects as winners. Two of the students presented at our May 13 docent meeting, and two will present at our July 8 meeting. Below are the two May presentation abstracts.

Prevalence of Microplastics in Local Waters: A Quantitative Study

Tejas Ravi, 10th grade, Canyon Crest Academy

Microplastics pollution has become a topic of major concern when discussing the current state of our marine environments. However, not much is known about the actual concentration of microplastics in our waters or the extent of their effects. Because of this, I chose to study the prevalence of microplastics in our coastal waters.

I tested the overarching hypothesis that the amount and types of microplastics will vary between geographic locations along the coastline, due to varying demographics and industrial practices. I tested samples from three locations: Oceanside, Encinitas, and Mission Beach.

For each of the sites, I collected three samples of coastal water and a field blank. To take the field blank, I exposed a jar of deionized water to the air. The purpose of the field blank is to understand what contaminants are in the air, not just in the water. I also took one sample of deionized water to serve as my control.

I used vacuum filtration to separate particulate matter from each sample. I used a 5-micron stainless-steel filter and filtered 500 ml of water per sample. I used a compound light microscope to take scans of my filter. The microscope took an 11 x 12 grid of the filter and stitched those images together to form a scan.

In order to obtain quantitative and accurate data, I used FTIR spectroscopy. FTIR stands for Fourier Transform Infrared spectroscopy and uses infrared light to determine the spectrum of a particle. Using the spectrum, we can accurately determine the composition of the particle.

Across all samples, polymers occupied the highest area fraction of the filters. Polymers occupied an average area fraction of 58.2% in the Oceanside samples, 68.5% in the Mission Beach samples, and 56.2% in the Encinitas samples.

Plasticizers and synthetic fibers were the dominant groups of polymers. The Mission Beach samples showed a significantly greater number of fibers, compared to the Oceanside and Encinitas samples which demonstrated a higher area fraction of plasticizers.

Microplastics are prevalent in our coastal waters as shown by my results. There is also variance between the number and type of plastic particles between each sample site, supporting my hypothesis. In the future, I hope to take more replicates and test more locations to solidify and expand on my results. I also want to map watersheds that empty into these water bodies to understand my results and work on mitigating plastic contamination.

Rapid Detection of Microplastics in Water: A Novel Light Scattering Method Using Fluorescence Emissions

Kyle Tianshi, 11th grade, The Cambridge School

Microplastics have been identified as a rapidly emerging contaminant due to their increasingly widespread presence in ecological and environmental sources. Commonly used visual industry analysis methods requiring the physical filtration and manual examination of particles are error-prone and labor-intensive. Other chemical composition analysis methods (Raman, IR, FTIR spectroscopy) are expensive, multi-step procedures that also involve the filtration of particles.

A novel device NEREID (Nanoparticle Examining Raspberry Pi Empowered Image Processing Detector) that uses laser light scattering microscopy to detect particles in water samples was developed. NEREID can accurately report the counts and size of solid particles greater than 10 μm in water. The instrument was coupled with a selective staining method that enables microplastics to produce a unique fluorescence peak. This method can detect microplastics in liquid samples without requiring a physical filtration process.

A fluorometer was used to measure the fluorescence emission spectra of common contaminants in liquid samples, including different types of microplastics, bacteria, and sand. Distinguishing unstained contaminants through laser-excited emissions was not feasible. A commercially stained Nile Red microplastic sample showed a prominent fluorescence peak between 580 nm and 630 nm when excited with a 538 nm light. Adding an optical filter with a bandpass between 600 nm to 650 nm onto the NEREID microscope allowed the commercially stained microplastics to be successfully distinguished from other contaminants in water samples. A Nile Red staining procedure was developed using a 2 $\mu\text{m}/\text{mL}$ solution and was confirmed to effectively dye non-polar PS, HDPE, and PVC microplastics. Polar contaminants such as sand particles, *E.*

coli, and *S. aureus* remained unstained in liquid because Nile Red generally adheres to non-polar substances.

This method has many benefits over current industry solutions. It can quantitatively detect plastics as small as 10 μm (100 times smaller than the capabilities of existing processes) without the use of physical filtration. NEREID can measure particles in very low concentrations due to its ability to continuously record water samples and costs under \$60 when purchasing individual components. This solution has a wide range of applications, including water treatment monitoring, home water quality monitoring, portable in-field testing, and laboratory research.

Soft Purple Nightshade

by Rhea Bridy

You are so lovely,
Backlit in early bluish light.
May I take your picture?

Before the bumblebees
Awaken. Before discovery
Of your fresh yellow prize
Before the fun gymnastics,
Hanging upside down,
Vibrating coordinated wings
And shaking your bountiful
Pollen, all over their very
Fuzzy-Wuzzy selves.



What's Blooming? Uncommon Plants along the Trails

Article and most photos by Donna Close

As spring fades into summer, our cooler temperatures and residual moisture in the soil have extended the bloom on many of our spring favorites. Yellow is still the predominate color, with yellow pincushions adding to the mix of sea dahlias, golden yarrow, and bush sunflowers (*Encelia californica*). The white-lined sphinx moth caterpillars were out in force munching their way through the sand verbena, attracting the attention of visitors and docents alike. As we make our way into June, here are the latest plants to look for while on the trails.

Three-Spot, False Rosinweed (*Osmadenia tenella*)

This small, aromatic annual herb is a member of the sunflower family. It is native to southern California and Baja. The flower heads are in clusters of three to five on a branching stem, with three florets in white or fringed in light pink, with a pink dot. They prefer sandy soil, and you will find them all along the Guy Fleming Trail. Be sure to get close and check out their scent. These plants usually arrive when other spring plants are fading. With the abundance of rain, we may be in for a carpet of three-spot this year. Flowering time is May to October.



Dark Tip Bird's Beak, Stiff Branched Bird's Beak (*Cordylanthus rigidus* ssp. *settigerus*)

This annual plant is a member of the broom-rape family. Its lacy, bristle-covered leaves are up to 1 ½ inches long, and the plant can grow up to three feet in height. It is easy to miss this plant as it sprouts along the trails. The foliage may be green or burgundy colored. The unusual flowers are white and flattened between two burgundy straps, which viewed from just the right angle looks like a bird's beak. Like the wooly paint brush, this plant is hemi-parasitic, penetrating the roots of neighboring plants for nutrients. You will find dark-tip bird's beak growing along most trails in the Reserve. Flowering time is typically May to August.



Prickly Skunkweed, Hooked Skunkweed (*Navarretia hamata*) Photo by Ingo Renner

Ever encountered the slight scent of skunk while hiking the trails? Most likely, you have come across the skunkweed. This member of the phlox family grows along the edges of the trails in clusters of light pink to purple flowers. It is native to the coastal mountains and valleys of California, from the San Francisco Bay Area south to Baja California. Flowering time is after the end of the rainy season and lasts about a month (April to June).



Cleveland Sage, Fragrant Sage (*Salvia clevelandii*)

This salvia is the most aromatic of sage varieties in the Reserve. Hiking along the park road past the west parking lot, you will encounter its sweet scent, especially on foggy mornings. This sage has small, grayish green leaves and is covered in light blue-purple flowers. It was named after Daniel Cleveland, who started the herbarium at the San Diego Natural History Museum. The two most visible plants are adjacent to the exit of the west parking lot on the right. Make sure to stop and rub a leaf to appreciate its wonderful aroma. Blooming is June to August.



Amole, Small-Flowered Soap Plant (*Chlorogalum parviflorum*)

This perennial herb grows from a bulb in the coastal sage scrub. You will find it growing in the Linda Vista formation on Broken Hill and Red Butte down to the soft sand areas of the Guy Fleming Trail. The basal leaves have wavy edges and have been visible along the trails for months. It is native to coastal southern California and Baja California. The cluster of flowers are white or pinkish in color and darkly veined and develop along a single stalk. Each flower has six petals and is open for only one day! You will have to zoom in with your camera or look closely with a magnifying glass to really appreciate these beautiful tiny flowers. Blooming is from May to August.



Prostrate Spineflower (*Chorizanthe procumbens*)

This annual member of the buckwheat family is native to California and Baja California, growing in the coastal sage scrub and chaparral habitats. As it flowers, the leaves disappear along the reddish stems; the flowers are small cream or yellow and surrounded by yellow spine-tipped bracts. Look for it growing along the Razor Point Trail and the Beach Trail just before heading down the steps past the Yucca Overlook trail (right hand side). It usually flowers from March to June.



Bookies Visit “A Tree Like No Other” Exhibit at LJHS

by Annette Ring

Rain made the outing of the Bookies, the Torrey Pines Book club, to the La Jolla Historical Society’s Torrey Pines exhibit a multi-phased field trip. The first date we planned to meet was March 23 and it was raining, but a few braved the weather: **Gabrielle Ivany**, her daughter, and **Ken King**. Our second attempt, on March 29, was also rainy, but we had a pretty good turnout: **Debi and David Buffington, Kathy Glasebrook, Annette Ring, Marty Jacobson and Mona Kuczenski**. On our third and final visit, the skies were finally clear, and more Bookies got a chance to see the exhibit: **Darlene Farnes, Karen Lay, Judy McNeely, Ken King, Cindy Tozer, Ann Gaarder, and Annette Ring**. The displays were very well done. It was a well-balanced combination of art and history with a tribute to the Kumeyaay.



Roving Interpreter Training: June 2023

by Cresencio Torres

The 2023 Roving Interpreter training program is scheduled for Thursday, June 29, at the Pavilion from 9:30 am to 12. If you plan on attending the training, please email your intention to Cresencio Torres (see membership list). Current Roving Interpreters may attend the training as a refresher.

The requirements for new docents to receive the Roving Interpreter vest patch are:

1. Read and be familiar with the Roving Interpreter Handbook.
2. Complete two quizzes, one on the Handbook content and one identifying all trails in the Reserve and the Extension.
3. Attend the Roving Interpreter training session on June 29, which Ranger Stephanie Adams and Park Aide Ingo Renner will lead.
4. Hike with an experienced Roving Interpreter docent from 11:00 am to 12 noon on the training day.
5. Celebrate the experience with a group photo at noon and receive the Roving Interpreter vest patch.

I will send a link to the RI Handbook along with the handbook quiz on June 1 to all docent candidates. All quizzes must be returned to me by June 15.

If you cannot attend the June 29 session, you can view the Roving Interpreter training video at torreypine.org/Volunteering/Docent Login/Current Docents, Training Video/Reopening Oct 9, 2021.

Volunteers are needed to lead small groups of candidates on June 29. If you are an experienced Roving Interpreter and would be interested in leading a group, please email Cresencio Torres.

JUNE 2023 CEED EVENT

Date: Wednesday, June 14

Time: 10 am – 2 pm

Place: Volcan Mountain hike and tour of the Nature Center

[Click here](#) for the Nature Center website.

Leader: Janice Smith, Volcan Mountain Foundation

RSVP: Lila Beth Scott

Museum Shop Spotlight

by Nancy Walters

The shop team would like to give recognition this month to all the wonderful docents who create items for our shop! These docents give of their time and talents to the shop on a regular basis, thereby ensuring we always have one-of-a-kind items to sell. Our gratitude goes out to: **Eva Armi** for her beautiful photo cards; **Connie Beardsley** for her lovely mugs; **Rhea Bridy** for those wonderfully creative notecards; **Judy Schulman** for her treasured pine needle baskets; and **Jeannie Smith** for all the perfectly rendered mini paintings. These are all favored shop items, and we salute you ladies with a big thank you for all your efforts!

PHOTO NEWS

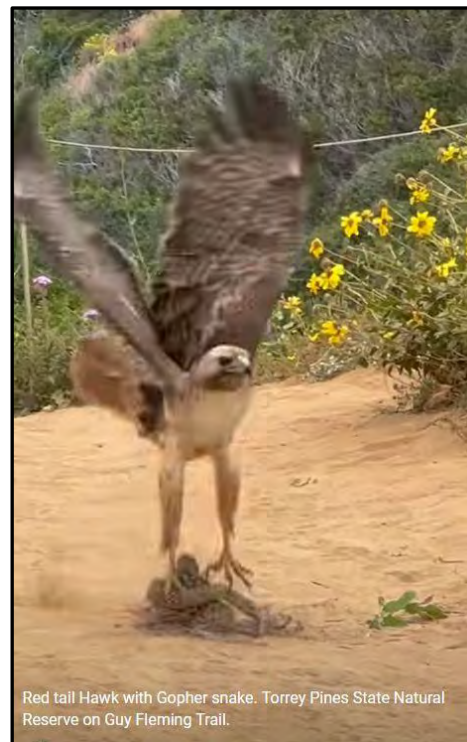
Photos below by Ingo Renner



Park Aide Lila Beth Scott with a fallen concretion on the beach just south of Flatrock. After several days, it is eroding and sinking with the tides (photo right).



Red-tailed hawk with a gopher snake, entertaining visitors on the Guy Fleming Trail on May 20. Images taken from video by Lila Beth Scott.



Red tail Hawk with Gopher snake. Torrey Pines State Natural Reserve on Guy Fleming Trail.

Red-tailed hawk is about to fly away with gopher snake.

Torrey Pines Book Club

We will continue to meet via Zoom at our regularly scheduled time. Please notify **Annette Ring** if you plan to participate or if you need any extra help getting connected.

When: Tuesday, June 13, 1:00 pm

What: *Awe: The New Science of Everyday Wonder and How It Can Transform Your Life* by Dacher Keltner

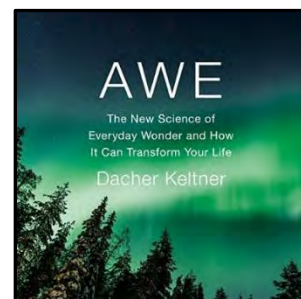
Amazon says:

Awe is mysterious. How do we begin to quantify the goose bumps we feel when we see the Grand Canyon, or the utter amazement when we watch a child walk for the first time? How do you put into words the collective effervescence of standing in a crowd and singing in unison, or the wonder you feel while gazing at centuries-old works of art? Up until fifteen years ago, there was no science of awe, the feeling we experience when we encounter vast mysteries that transcend our understanding of the world. Scientists were studying emotions like fear and disgust, emotions that seemed essential to human survival. Revolutionary thinking, though, has brought into focus how, through the span of evolution, we've met our most basic needs socially. We've survived thanks to our capacities to cooperate, form communities, and create culture that strengthens our sense of shared identity—actions that are sparked and spurred by awe.

In *Awe*, Dacher Keltner presents a radical investigation and deeply personal inquiry into this elusive emotion. Revealing new research into how awe transforms our brains and bodies, alongside an examination of awe across history, culture, and within his own life during a period of grief, Keltner shows us how cultivating awe in our everyday life leads us to appreciate what is most humane in our human nature.

All TPDS docents are welcome. Meetings usually last one hour and a half.

July 11: *Bicycling with Butterflies: My 10,201-Mile Journey Following the Monarch Migration* by Sara Dykman



Torrey Pines Docent Society Bird Survey: May 2023

Number of species: 77
(+2 other taxa)

Canada Goose 4
Cinnamon Teal 1
Gadwall 9
Mallard 21
Surf Scoter 1
California Quail 8
Western Grebe 13
Eurasian Collared-Dove 1
Mourning Dove 69
Vaux's Swift 113
White-throated Swift 26
Black-chinned Hummingbird 1
Anna's Hummingbird 48
Rufous Hummingbird 2 Birds
all rufous, no green on back.
Allen's Hummingbird 25
hummingbird sp. 2
Ridgway's Rail 1
Virginia Rail 1
Long-billed Curlew 4
Western Gull 29
California Gull 16
Caspian Tern 6

Royal Tern 44
tern sp. 12
Brandt's Cormorant 20
Double-crested Cormorant 6
Brown Pelican 118
Great Blue Heron 3
Great Egret 9
Snowy Egret 8
Cooper's Hawk 1
Red-shouldered Hawk 2
Red-tailed Hawk 7
Downy Woodpecker 1
Nuttall's Woodpecker 13
Peregrine Falcon 3
Pacific-slope Flycatcher 10
Black Phoebe 6
Say's Phoebe 1
Ash-throated Flycatcher 15
Cassin's Kingbird 17
Hutton's Vireo 2
Warbling Vireo 13
California Scrub-Jay 9
American Crow 29
Common Raven 46
Northern Rough-winged
Swallow 15
Cliff Swallow 7

Bushtit 78
Wrentit 64
California Gnatcatcher 7
House Wren 18
Bewick's Wren 33
California Thrasher 22
Northern Mockingbird 10
Western Bluebird 2
American Robin 1
Cedar Waxwing 20
Scaly-breasted Munia 3
House Sparrow 2
House Finch 82
Lesser Goldfinch 41
Dark-eyed Junco 8
Song Sparrow 71
California Towhee 82
Rufous-crowned Sparrow 1
Spotted Towhee 46
Yellow-breasted Chat 16
*Most of these birds were found
along Flintkote Dr where
habitat is good for the birds.*
Hooded Oriole 8
Red-winged Blackbird 21
Great-tailed Grackle 1
Orange-crowned Warbler 32

Common Yellowthroat 33
Yellow Warbler 2
Townsend's Warbler 3
Hermit Warbler 3
Wilson's Warbler 3
Black-headed Grosbeak 17
Lazuli Bunting 8

Observers: Tsaiwei Olee,
Andy Rathbone, Marty
Hales, Steve Neal,
Gabriele Wienhausen,
Darlene Martineau, Phyllis
Kusznier, Margaret Fillius,
Barbara Wallach, Mark
Embree, Ingo Renner, Bob
Glasser, Valerie Thomas,
Colleen Huang, Bob
Turner, Karen Turner,
Manolo Turner, Kathy
Estey, Kathy Dickey,
Nancy Richardson, Karen
Lisi, David Walke



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