



TORREYANA

THE DOCENT NEWSLETTER FOR
TORREY PINES
STATE NATURAL RESERVE

Issue 409

July 2019

The Oceans Are Aglow with Bioluminescence

by Joan R. Simon

Ocean Day (June 8) was the perfect date for Dr. Dimitri Deheyn, a marine biologist at the Scripps Institution of Oceanography (SIO), to speak to the Docent Society about bioluminescence in marine animals. Bioluminescence, he explained, is the production of visible light by living organisms. It should not be confused with fluorescence or phosphorescence, which require an outside source of light that is absorbed by the object and needs a black light to enable visibility (e.g., the scorpions we've seen on summer moonlight walks at the Reserve that absorb their light from the moon). Both living and inanimate objects (such as rocks) can produce these lights.

In contrast, bioluminescence is the ability of animals to produce light on their own, without using an exterior source of light or power. As such, bioluminescence is a highly important adaptation that most sea animals (but just a few land creatures, such as fireflies) possess and is a vital tool employed by sea creatures to blend in or stand out against the surrounding spectral environment.

It is used for

- 1) finding prey (food), as a lure or as a flashlight to see them;
- 2) attracting mates;
- 3) deterring predators, for example by using camouflage to hide, or by flashing their lights to startle an enemy.

Bioluminescence occurs in all parts of the ocean. Where the water is shallow and filled with sunlight, the luminescence can be seen only at night. In midwater "dim twilight" zones, light can be seen looking up toward the sunlight, but not looking down toward the deep ocean. This explains why sharks have white undersides, where they cannot be easily seen from below, but black upper bodies that blend into the dark sea when viewed from above. In the bathypelagic zone

Docent General Meeting

Date: Saturday, July 13, 9:00 am

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

Speaker: Dr. Heather Henter, Executive Director of the UCSD Natural Reserve System

Topic: Mission Bay Kendall-Frost Marsh Reserve: Challenges and Opportunity in a Changing Climate

Dr. Henter will talk about the UCSD Natural Reserve System, including the reserves in San Diego, and will focus on the history and biology of the Kendall-Frost Reserve in NE Mission Bay. She will also cover the city's planning around wetlands restoration in NE Mission Bay in light of future climate change and sea level rise. This is very timely as important decisions about the lands neighboring Kendall-Frost will be made in the next 6 months to a year.

Refreshments: Docents with last names beginning with **T-Z** will be responsible for providing snacks for this meeting.

where sunlight does not reach, the major visible light comes from bioluminescence. Consequently, in the deep sea, bioluminescence is an essential trait. Blue and green spectrum colors are the most common in marine bioluminescence, but in the uppermost layers of water where sunlight is present, reds, yellows and purples can be found.

Dr. Deheyn shed some light (no pun intended) on the

Inside

Oceans Are Aglow (cont.)	2
Meeting Minutes	3
Children's Program	3
Docents of the Month	4
Nature Discovery Series	5
Photo Contest Deadline	5
Ethnobotany-Stonecrop Family	6
CEED trip- SD Arch. Center	7
Poem by Rhea Bridy	7
TP Book Club	7
Better Impact Notes	7
Bird of the Month	8
Bird Survey	8

The Torrey Pines Docent Society publishes the *Torreyana* monthly, edited by Joan Simon and Dan Hammer on alternate months, and is formatted and produced by Roger Isaacson. Submissions are due on or about the 20th day of the preceding month and may be emailed to

Editors@torreypine.org.

Please send postal/
email address changes to:

Torrey Pines Docent Society
P.O. Box 2414, Del Mar, CA 92014
Attn: Membership or email to

Membership@torreypine.org

Web sites:

TP Docent Society: torreypine.org

TP Association: torreypines.org

Visitor Center phone: **858.755.2063**

TPDS Executive Board Members:

President: Janet Ugalde

Vice-president: Roger Isaacson

Treasurer: Gerry Lawrence

Secretary: Steve Neal

Directors-at-large:

Pao Chau

Mark Embree

Annette Ring

Stu Rosenwasser

Lynne Truong

TPSNR Staff:

Supervising Ranger: Dylan Hardenbrook

Rangers: Kyle Knox, Dave Richards, Jesus "Chuy" Salinas Rodriguez

Sr. Park Aides: Louis Sands, Jake Mumma

Park Aides: Tyler Best, Cheryl Biernacki, Krista DeBusschere, Joy Inton, Shawn Jacobs, Johnson Jou (Interpreter), Ingo Renner

© **Torrey Pines Docent Society**
Since 1975
All rights reserved

FLASH From Joy Inton: Don't forget to donate your ZooNoz magazines to the Museum Shop.

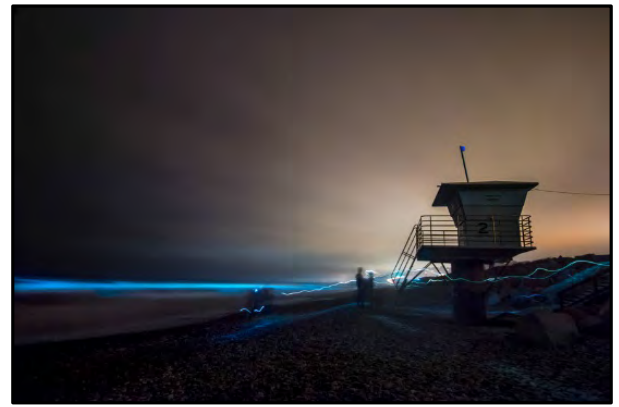
phenomenon of red tides in San Diego. The sea critters that create the red tide are dinoflagellates. They "bloom" in such large numbers that the ocean turns red. At night the movement of waves (or sometimes a pod of dolphins) triggers a spectacular blue bioluminescence, which many of us have seen off the beach at Torrey Pines. What is the purpose of all that flashing? The dinoflagellates are a great meal for shrimps that like to graze on them. The grazing and mechanical handling by the shrimp makes the dinoflagellate produce intense flashes of light... literally as they are being eaten! This flashing however also attracts bigger fish who know that the prey they want to eat, the shrimp, are there for the taking. The result is that most of the dinoflagellates are spared because the shrimp can eat only a few of them before being snapped up by bigger fish who were attracted by the flashing produced by the dinoflagellates -- putting the spot light on the shrimp. This is often referred to as the "Burglar Alarm" process.

Dr. Deheyn explained that unlike red tides in other places, such as Florida and Oregon, ours are usually non-toxic because they are made up of more tropical species. SIO tests the water regularly and makes available the status of the red tide, so we were advised to check periodically during a red tide occurrence.

On the sea floor, luminous brittlestar (*Ophiopsila californica*) use their light to stun predator crabs. Then the brittlestar will cut off its own arm to save the rest of the body. The arm will regenerate later, and in the meantime the crab will swim away with its partial meal, sparing the rest of the organism and its vital organs.

A very special jellyfish, *Aequorea victoria*, was responsible for the Nobel Prize in Chemistry in 2008. The Prize was awarded for the discovery and development of the jellyfish's very special protein, GFP (green fluorescent protein), which produces light by transforming the color of bioluminescence from blue to green. Researchers now use this protein to tag biological systems with glowing markers that can show how brain cells are developing or how cancer cells spread throughout the body. GFPs have even been incorporated into bacteria where these biosensors can detect when food has gone bad. There is now a multi-billion-dollar industry that is studying further applications of GFP.

In summing up, Dr. Deheyn stressed the ubiquity of bioluminescence in the oceans and the many biotechnical applications of this natural ability to create light which are being explored today. [Link to Dr. Deheyn's work here.](#)



Red Tide at Torrey Pines Beach



General Meeting Minutes: June 8, 2019

Meeting called to order at 9:00 am by President **Janet Ugalde**.

Speaker: Dr Dimitri Deheyn of Scripps Institute of Oceanography presented an amazing lecture titled *Light Production and Light Manipulation in Living Organisms* (see the article on the front page).

Science Fair Winner Presentation: Emily Tianshi (two-time previous winner) summarized her project titled *Biomimicking Torrey Pines Needles: Atmospheric Moisture Harvesting Through Alternating Hydrophilic and Hydrophobic Micro-Patterns*. (See her paper in the June *Torreyana*, page 6.) The other winning project was a team of Eric Yang and Jack Chine, who will present their project at the July general meeting.

President's Report: **Janet Ugalde** announced that **Nancy Walters** and **Selma Torres** have volunteered to be co-managers of the Museum Shop. She thanked **Lynne Truong** and **Annette Ring** for conducting the search for the new management team. Janet next announced that the board has approved **Janice Barnard** as Annette Ring's replacement on the Nominating Committee. Next Janet announced that the Children's Program educated 4362 students this school year, and Senior Park Aide **Louis Sands** did a superb job dealing with 15 rescheduled events due to rain. At the June board meeting, **Dylan Hardenbrook** reiterated that the Broken Hill Trail should be open by the end of the summer. Dylan also requested that docents continue asking visitors to take a smartphone photo of the trail map instead of a paper copy.

Vice President's Report: **Roger Isaacson** reminded docents that the photo contest for our 2020 TPDS tide calendar has a cutoff date for submission of photos by the end of the day on July 13, and the contest needs more docent participation. See pg. 5 to download the instructions.. He also announced walk leaders can sign up on Better Impact for summer walks at 10 am on Fridays through August.

Park Aide Ingo Renner reported that there will be an extra Reserve vehicle available this summer to drive docents working in the Reserve to and from National University. Docents who might need a ride (to staff their weekend or holiday assignments at prime time) will be called by a park aide the morning of their assignment to determine if they require a ride. Next, Ingo announced he will lead a docent educational walk on Flintkote Trail in the Peñasquitos Lagoon at 9 am on June 23. Lastly, Ingo plans a walk on the Red Ridge Trail in the Extension later in June to view the Scarlet Larkspur in bloom. The date will be determined as soon as the plants start flowering and will be announced via Google Groups.

Annette Ring announced that 20 new docents attended the annual Roving Interpreter training last month, where the

emphasis was on education, not enforcement. **Kathy Dickey** has set up the next CEED event at the San Diego Archaeological Center in Escondido on June 12 from 10 am to noon. The next pavilion *Nature Discovery Series* will be Saturday June 15 at 9:30 am, *Insects and Spiders of TPSNR* by **Johnson Jou** and **Joy Inton**, followed by a hike. The September 14 docent meeting will be an evening potluck at the Reserve, with the presentation of winning photos for the 2020 tide calendar and a moonlight hike.

Docents of the Month: **Dan Hammer** and **Joan Simon** for their outstanding editing of the TPDS monthly *Torreyana* newsletter. Joan is also an avid Whacky Weeder and frequent Lodge host. Dan also hosts at the Lodge and does Roving Interpretation.

Refreshments: At July's General Meeting, docents with last names starting with letters **T-Z** are responsible for snacks.

Meeting ended at 11:05 am.

Children's Program

by *Louis Sands, Children's Program Coordinator*

OK, everyone, guess the significance of these numbers: 15, 67, 4362, 42, and 43. And, no, these are not Powerball/MegaMillions suggestions!

Give up? These numbers tell the story of another remarkable year with our Children's Program. So let's start with the number 15, which represents this year's **challenge**: RAIN, RAIN, and more RAIN! That's right, folks, a whopping 15 program days had to be rescheduled thanks to Mother Nature. The rescheduling began in November and did not end until mid-May. WOW!

The numbers 67 and 4362 represent **commitment**. Even though the rainy days threatened to curtail our ability to honor all confirmed field trips, we stayed the course and still managed to provide 67 program days of fun and education. And thanks to ever-increasing class sizes, the total number of students served this year jumped 5% to 4362. Yes, this group of docents is a committed one!

The number 42 represents **mission**. Of the 67 program days previously mentioned, 62% of them or 42 were confirmed for Title I schools. Providing access for students from these schools has been our mission for some time; we are so grateful to all financial donors, whose generosity funds the bus grants necessary to make these field trips possible.

And, lastly, 43 represents **love**. The 43 docents, who made this program a success this year, absolutely love what they do! As always, **Janet Ugalde** and I thank you for your humble service, and 4362 schoolchildren thank you as well! Have a wonderful summer, everyone, and we'll be back in touch in August. Take care.

Docents of the Month: Dan Hammer and Joan Simon

Photos by Herb Knüfken

Dan:

It is an honor to be named co-Docent of the Month with **Joan Simon**, and it is a pleasure to be teamed with her as co-editor of the *Torreyana*.

Here's how it works. If I am to edit (say) the August issue, my job begins at the July TPDS meeting, where I take notes on the speaker's presentation. Within two days, I draft an article (sometimes including further research through the speaker's writings) and send it to him or her for review.



Over the next week, other articles pour in from our brilliant contributors: our fellow docents and Park Aide Louis Sands. To meet our monthly deadline, I edit these as they come in. On the 20th, I prod any regular contributors who are tardy. By the 24th, I send the edited articles to Joan for review and **Roger Isaacson** for layout. As with so many activities at Torrey Pines, Roger is the hardworking genius behind the scenes. Each month, he turns our loose collection of articles into the beautiful production we know and love.

Once Roger has a tentative layout, Joan catches most of the typos and grammatical errors that I've missed. (I do the same for her when I'm "off duty.") Then Roger sends a link to our contributors and a regular group of watchdogs for further additions and corrections. After we get their input, along with monthly encouragement from **Rhea Bridy**, the issue goes up on the website (with an email notice from Roger alerting all docents) and then to the printer for the few readers who still get their *Torreyana* by snail mail.

Joan:

When my husband and I moved to San Diego from a suburb outside of New York City ten years ago, I already knew about Torrey Pines. I had family in the area and over the years had spent many days at Torrey Pines, mostly at the beach. My first goal after I settled in was to sign up for docent training (which I knew all about since my sister was already a docent). Right away I fell in love with the trails and vistas, and especially the plants. One of my first activities after becoming a docent was to join the Whacky Weeders, a group that has become more vibrant with every year, thanks to our leader **Lynne Small**.



Having worked in book publishing in Boston and New York, and written for a suburban New York online newspaper, I was thrilled when an opening soon came up on the *Torreyana* (thanks, **Lillian**). It has been a genuine pleasure to work with **Roger Isaacson**, who is the indispensable glue that keeps the *Torreyana* together, and with **Dan Hammer**, who is a true comrade-in-arms.

I have enjoyed many years working as a Lodge host and have intermittently participated at the TIK, both of which are wonderful ways to meet visitors and learn their stories, and to share all that is special about the Reserve. I have also been a member of the Garden Committee, under the inspired leadership of **Pete diGirolamo**. Over the past few years, we have tended, and I hope improved, Whitaker Garden and the garden in front of the Lodge, with identifying signs and some (not always successful) new plantings. More recently we have extended our efforts to the new Pavilion area.

Two years ago I became a docent at the San Diego Botanic Garden, where (surprise!) I work in garden beautification, which is a classier way of saying more weeding.

Thank you for naming Dan and me Docents of the Month and for honoring the *Torreyana*.

Nature Discovery Series: Insects and Arachnids

by Kathy Dickey

About 35 to 40 people, including at least 12 children, enjoyed the latest Nature Discovery Series lecture and demonstration at the TPSNR Pavilion on June 15. **Johnson Jou's** presentation of the "Insects and Arachnids of the Torrey Pines Trails" was fun and engaging for all ages. I know I sure learned a lot!



Did you know that approximately 1 million insects have been discovered on earth, but there might be up to 5 million yet to be discovered? And, we learned that one out of five animals on our planet is a beetle.

Johnson started with our nemesis, the bark beetles, to a chorus of "boos" from the docents in the audience. We have the horror of two types here following a drought: the 5 Spine Engraver Beetle that infects the top part of our trees with its burrowing larvae and Fusarium fungus, along with the Red Turpentine Beetle, which stays at the bottom and secretes red, berry-smelling frass (poop) and carries the Leptographium fungus.

He told us a cute Native American "shame story" about the Darkling Beetle, as it bows down in a pose meant to threaten others.

The anatomical differences between our butterflies and moths were covered, with further descriptions of the Yucca Moth, Dogface Butterfly, Monarch and other butterflies. Did you know the Skipper can fly up to 37 mph, twice the speed of a fast human? Did you know the Mourning Cloak Butterfly can live about 2 years? Most butterflies do not live past a few days. I learned that plant leaves have about 25% protein, very necessary for the metamorphosis of caterpillars into moths and butterflies. Videos added another

dimension to his stories, as we watched an egg become a caterpillar, chrysalis, and then an adult butterfly.

More insect tidbits:

- 1) True bugs have a triangle on their back.
- 2) It takes about 70,000 of the scaly Cochineal insects to dye one red coat (as in the British Redcoats of 1776).
- 3) Antlions can stay in the larval stage up to 3 years.
- 4) When you eat Honey Bee honey, it is twice-barfed vomit (really!).
- 5) We have 26 types of native bees in San Diego, most of them solitary.
- 6) Never, never get stung by a Red-Haired Velvet Ant or even worse, by the excruciatingly painful bite of a Tarantula Hawk (a spider wasp)!
- 7) Cricket zombies exist (ask Johnson).

The Arachnid group had more interesting tidbits:

- 1) Ticks make a breaststroke-like motion to burrow into skin, and it can take days for a full blood meal.
- 2) The Silver Argiope may have 300-1400 eggs in one of their green triangle egg sacs.
- 3) The Black Widow Spider is shy; the Brown Widow is much more aggressive but has a less-potent venom.
- 4) Tarantulas are more prevalent in the fall.
- 5) Go out on a moonless night with a black light to see the greenish yellow glow of scorpions near our trails.

Johnson concluded by showing his collection of live insects, and remarking that he "hoped he showed us all the horror, adventure, and romance of the insect world."

Upcoming Nature Discovery Series Events (note new start time)

July 20: Barbara Wallach *Signs Along the Trails*, 10:30 am

Aug. 17: Ray Barger on *Geology in the Reserve*, 10:30 am

All talks will be followed by a short walk.

Don't miss these new programs – and tell all your non-docent friends, relatives and neighbors to come along with their families!

PHOTO CONTEST deadline is July 13.

Here is a link to the instructions:

[Click here to download PDF instructions.](#)

***Crassulaceae* : Ethnobotany of the Stonecrop Family at TPSNR**

by Jane Barger

Stonecrop flora are small, very succulent plants that are typically found in exposed, grainy soils or rock outcroppings in mountains and deserts. Patterns of the Stonecrop family include:

- Bisexual flowers
- 1-2 times as many stamens as petals
- 4-5 sepals and petals (sometimes 30 of each)
- Ovary of 3 or more simple pistils

The Stonecrop plants found in TPSNR include those below:



Lance-Leaf Dudleya – *Dudleya lanceolata*

Ethnobotany: The Kumeyaay ate the raw, green leaves; the leaves were not cooked.



Ladies' Fingers (aka Coast Live-Forever) – *Dudleya edulis*

Ethnobotany: The young and fresh leaves were eaten as vegetables by the Kumeyaay.



Chalk Dudleya (aka Chalk Live-Forever) – *Dudleya pulverulenta*

Ethnobotany: The Kumeyaay and Diegueno braised or cooked the leaves over flames of fire. One side was peeled and placed peeled side down to help remove corns or calluses. A tea was made from the roots to treat asthma. Leaves were eaten raw or chewed to alleviate thirst.



Dwarf Live-Forever (aka Short-Leaf Dudleya) – *Dudleya brevifolia*
(No Ethnobotany information found for this plant.)



Pigmy Stonecrop (aka Pigmy Weed) - *Crassula connata*
(No Ethnobotany information found for this plant.)

CEED Event: San Diego Archaeological Center

by Kathy Dickey

Approximately 27 docents gathered at the San Diego Archaeological Center in the beautiful San Pasqual Valley on June 12. SDAC Director Cindy Stankowski gave an introductory lecture about the various hypotheses regarding how people first came to North and South America.



Their newest exhibit, "From Land and Sea," gave further details about the topic. Afterward, we split into two groups. One followed Cindy as she described all the other exhibits at the SDAC museum and the other group went into the laboratory and curation areas to see reports and artifacts from various excavations of the village of Ystagua, a long-term Native American settlement not far from TPSNR in the Sorrento Valley area. The settlement has been dated to at least 2000 (and perhaps 4000) years ago. Then the groups switched, followed by a lunch under the shade of some trees. It made for an interesting and fun outing!

The Dance

by Rhea Bridy

In loose flocks,
foraging Snowy Egret

seek succulent snail

fish, shrimp, crab, clam,
perhaps a juicy frog or worm
or spider

shuffle amid muddy clumps
of eelgrass, pickleweed

dance deceitfully
in yellow slippers
and shake each sushi loose
from its hiding place.

Torrey Pines Book Club

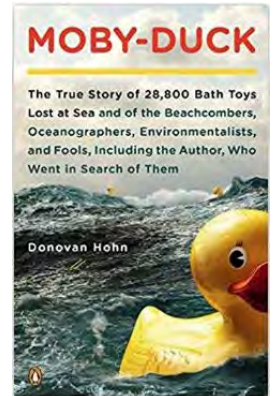
When: Tuesday, July 9, 1:00 pm

Where: Karen Lay's home, east of Del Mar

What: *Moby Duck: The True Story of 28,000 Bath Toys Lost at Sea & of the Beachcombers, Oceanographers, Environmentalists & Fools ...* by Donovan Hohn

Amazon says:

When the writer Donovan Hohn heard of the mysterious loss of thousands of bath toys at sea, he figured he would interview a few oceanographers, talk to a few beachcombers, and read up on Arctic science and geography. But questions can be like ocean currents: wade in too far, and they carry you away. Hohn's accidental odyssey pulls him into the secretive arena of shipping conglomerates, the daring work of Arctic researchers, the lunatic risks of maverick sailors, and the shadowy world of Chinese toy factories. *Moby-Duck* is a journey into the heart of the sea and an adventure through science, myth, the global economy, and some of the worst weather imaginable.



Jennifer Brandon, who spoke at the May docent meeting about *Marine Debris in the Pacific*, recommended this book to our group.

All TPDS docents are welcome. Meetings usually last a couple of hours. RSVP to **Karen Lay** if you plan to attend. (Check Member List for email or phone number.)

August 13: *Where the Crawdad Sings* by Delia Owens

Better Impact Notes

by Roger Isaacson

On August 1, we will be switching to our own private account, instead of sharing with about 10 other San Diego area parks.

To reduce the transition administrative work, we are now only allowing future Lodge hosting signups out to October 31. After August 1, it will be possible to sign up as far as about seven months ahead.

Here are some Better Impact FAQs:

[Click here for FAQ on Lodge hosting.](#)

[Click here for Info-FAQ on Public Walks](#)

[Click here for FAQ on the TIK.](#)

[Click here for FAQ general info.](#)

Bird of the Month: Whimbrel

by Jack Friery; photo by Herb Knüfken

Our featured bird this month is the **Whimbrel**, *Numenius phaeopus*. This lovely large sandpiper is about 18 inches long, with a wingspread of about 32 inches. Its most prominent feature is a long, crescent-shaped bill. (The bird's generic name, *Numenius*, means "new moon" in Greek, a reference to the shape of the bird's bill.) It has prominent dark stripes on its head, a feature that distinguishes it from the similar Long-billed Curlew.

Watch for Whimbrels, often in groups of two or three, walking the water's edge on Torrey Pines Beach in a hunt for their favorite food, crabs. Although most of our shorebirds disappear to their northern breeding grounds as summer approaches, Whimbrels are usually among the first shorebirds to reappear, in midsummer. Respect them when you see them return, for they have traveled from their breeding grounds as far as the north slope of Alaska and the shores of Hudson Bay in north-central Canada.



Sources: allaboutbirds.org/guide/Whimbrel/overview;
audubon.org/field-guide/bird/whimbrel;

Unitt, San Diego County Bird Atlas.

Torrey Pines Docent Society Bird Survey: June 2019

Number of species: 66
(+1 other taxon)

Gadwall 9
Mallard 10
California Quail 15
Western Grebe 61
Mourning Dove 33
Lesser Nighthawk 1
White-throated Swift 15
Anna's Hummingbird 31
Allen's Hummingbird 16
hummingbird sp. 3
Killdeer 1
Heermann's Gull 5
Ring-billed Gull 5
Western Gull 40
California Gull 6
Caspian Tern 3
Royal Tern 8

Common Loon 1
Black-vented Shearwater 6
Brandt's Cormorant 4
Double-crested Cormorant 5
Brown Pelican 46
Great Blue Heron 3
Great Egret 5
Snowy Egret 8
Black-crowned Night-Heron 1
White-tailed Kite 2
Cooper's Hawk 2
Red-tailed Hawk 7
Downy Woodpecker 1
Nuttall's Woodpecker 3
American Kestrel 2
Peregrine Falcon 3
Pacific-slope Flycatcher 9
Black Phoebe 11
Ash-throated Flycatcher 7
Cassin's Kingbird 8
Hutton's Vireo 1

California Scrub-Jay 16
American Crow 29
Common Raven 23
Northern Rough-winged
Swallow 32
Bushtit 108
House Wren 10
Marsh Wren 5
Bewick's Wren 21
California Gnatcatcher 18
Wrentit 57
Western Bluebird 5
California Thrasher 15
Northern Mockingbird 5
House Finch 97
Lesser Goldfinch 49
Savannah Sparrow 4
Song Sparrow 18
California Towhee 55
Rufous-crowned Sparrow 1
Spotted Towhee 25

Yellow-breasted Chat 11
Hooded Oriole 2
Red-winged Blackbird 15
Orange-crowned Warbler 18
Common Yellowthroat 24
Black-headed Grosbeak 8
Blue Grosbeak 1
House Sparrow 15
Scaly-breasted Munia 4

Observers:

Frank Wong, Andy Rathbone, Tina Rathbone, Marty Hales, Steve Neal, Bob Glaser, Herb Knüfken, Kathy Dickey, Jack Friery, Robert Turner, Manolo Turner, Nancy Richardson, and Anonymous

View this checklist online at ebird.org/view/checklist/S57468353

Herb Knüfken's amazing photo gallery, including many birds, may be found here: pbase.com/herb1rm

This page intentionally blank



Torrey Pines Docent Society
PO Box 2414
Del Mar, CA 92014
(858) 755-2063
torreypine.org