THE ACORN

American River Natural History Association Quarterly Magazine – Spring 2023

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President's Message, Spring 2023


Laurie Weir

I have always appreciated a good read – and friends that share a great new book become very good friends indeed.

I want to share a really exciting new book with you. It is *The Coasts of California: A California Field Atlas* by obi kaufmann, (Heyday Berkeley, CA 2022). You might have heard of him – or already have some of his earlier works such as *The California Field Atlas, The State of Water*, and *The Forests of California*. *The Coasts of California* is obi's latest work and it is so good, it is a kind of a gift.

Obi is an artist, adventurer, scientist, and nature lover. He writes, draws, and paints passionately about California. He is serious in his work. While the book is beautiful, it is also clearly focused on how to preserve that which we love about our state. Here are obi's "Ethical Presumptions" from *The Coasts of California*:

A. *Preserving humanity means preserving biodiversity; the best strategy against societal and ecological collapse is keeping intact the ecosystem functions and services that are universally strengthened by biological variety, complexity, and connectivity.*

B. *The world does not end; that is not the way nature works. The study of the natural world is the study of cycles within cycles – complex systems of stress and release that unfailingly transform but never wholly obliterate the underlying capacity of life to rebound anew.*

C. *Beauty can be a survival tool; our capacity to adapt and to respond to crisis, indeed our health, is bolstered by aesthetic appreciation, as is our capacity for empathy and reasonable thinking.*

D. *Art and science form a unity of knowledge that maximizes understanding; the humanities represent the values and aspirations of our society and the meaning we give them; the scientific method is the key to unlocking universal truths, but those truths remain valueless without applied meaning.*

E. *For every point of despair, there is a point of hope. As the cascading feedback loops of the climate and extinction crises mount across the globe, so too do moments of insight and knowledge regarding responsibility, justice, and love; far from catastrophic failure as being already determined, the balance of the equation is just as likely to tip toward catastrophic success.*

I hope you will enjoy this book as much as I have. We sell obi's work in the Discovery Store at the Nature Center. Obi is a supporter of the Nature Center, and he has been a guest speaker with us in the past. We hope to have him with us again soon.

Laurie Weir

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Cover: Bumble bee (*Bombus vosnesenskii)* on foxglove.
Photo by Kathy Keatley Garvey

Love the Bees

By Mary Lou Flint

Spring is just about here, flowers are beginning to bloom, and the bees are not far behind. Spend a few minutes surveying the flowers in the Effie Yeaw Nature Center (EYNC) gardens, and you will almost certainly spot a bee.

But what kind of a bee will it be? Honey bees are the most commonly observed, but there are at least 1600 different species of bees in California. There are likely dozens of species in our Nature Study Area (NSA) alone. Here is a rundown of some of the most common types you are likely to encounter.

Most bees in California are natives. The European honey bee, *Apis mellifera*, is an exception (Figure 1). European settlers brought honey bees to America in the early 1600s, and they have become an important resource for agricultural systems as pollinators. Honey bees live in large colonies and have a highly evolved social system that involves a division of labor and cooperative care of young. A colony consists of a single reproductive queen, fertile male drones, tens of thousands of sterile female workers, and immature larvae in the hive. Although honey bees are commonly cultivated by beekeepers in box-like hives, queens often escape into the wild to form colonies in cavities in hollow trees or other structures. We often see wild honey bees nesting in our NSA.

Bumble bees are probably the next most recognizable bees in our area. They are native bees with at least 26 species occurring in California. Medium-sized to large bees, they have stout bodies that are commonly black with yellow bands and quite hairy. The most common species in gardens in our area are the California bumble bee, *Bombus californicus*, and the yellow-faced bumble bee, *Bombus vosnesenskii* (Figures 2 and 3). Like honey bees, bumble bees are social with a queen and sterile female workers living in a single colony. However, colonies are not nearly as large or complex as honey bee colonies and bumble bees do not make or store honey. Colonies die out in the winter with only the fertilized queens surviving. Queens usually build their nests in rodent holes or other underground cavities.

Figure 1. A European honey bee. Photo by Kathy Keatley Garvey.

Figure 2. A yellow-faced bumble bee covered with pollen. Photo by Kathy Keatley Garvey.

Figure 3. A yellow-faced bumble bee, the red pollen baskets on its legs full, brings pollen back to its underground nest. Photo by Kathy Keatley Garvey.

Carpenter bees can't be missed. They are those very large, noisy bees you see hovering around flowers. They may have some fuzzy hair on their thorax and legs, but their abdomens are shiny, distinguishing them from bumble bees. Females are usually black, but males of some species, such as the valley carpenter bee, *Xylocopa sonorina*, are golden (Figures 4 and 5). They are solitary bees and don't live in colonies. The females create nests by chewing tunnels in wood, laying several eggs that hatch into larvae, and provisioning them with pollen and nectar. Carpenter bees are long-lived and return to the nest to feed their young until they mature in fall.

About 30% of California's native bees are cavity nesters that lay eggs in hollow plant stems or beetle holes in wood. Some people place bee condos in their gardens to encourage these bees, specifically blue orchard mason bees, *Osmia lignaria*, and leafcutter bees, family Megachilidae (Figure 6). If you visit the EYNC garden, you can see some colorful hexagonal bee condos hanging from stakes and some more elaborate bee houses. Most cavity nesters are solitary (rather than social) bees with one female bee building her nest and providing food for her offspring on her own. Common species in our area also include European wool carder bees, *Anthidium manicatum*.

Figure 4. A female carpenter bee collects pollen on a milkweed flower. Photo by Kathy Keatley Garvey.

Figure 5. The male valley carpenter bee is golden brown with greenish eyes. Photo by Kathy Keatley Garvey.

Figure 6. Leafcutting bees nest in tubular cavities such as hollow stems or specially-built bee nest boxes or "bee condos" such as this one. Photo by Kathy Keatley Garvey.

Most of the other 70% of our bees are ground nesters. They construct their nests in soil, digging tunnels and excavating separate chambers at the sides of tunnels for each offspring. The mother bee provides each chamber with enough food--a pollen ball laced with nectar--to support the larval bee through its growth to a pupa and adult. Common soil-nesting bees in our area include mining bees, digger bees (Figure 7), and sweat bees such as the metallic green sweat bees (Figure 8) and Halictids. The orange-legged burrowing bee, a *Halictus* species, is commonly seen burrowing in the spring at the base of the Natoma Trail in our NSA (Figures 9 and 10). If you spot rapidly-moving bees flying in a zigzag fashion just a few inches or a foot above the soil surface, they are likely ground-nesting bees. Follow one of these bees for a few minutes, and you may see it go into its nest hole.

There are thieves among the bees. Cuckoo bees sneak into the carefully provisioned nests of other bees to lay their eggs. When the eggs hatch, the larvae eat the pollen ball that the other bee's mother left as food. Cuckoo bees do visit flowers for nectar, but they don't collect pollen for their larvae because they don't build nests and rely on other bees to provide food for their young. There are several different families of cuckoo bees. They are often wasp-like in appearance.

Bees are often confused with wasps, which are also insects in the order Hymenoptera. What distinguishes bees from wasps? Although they may feed on nectar, wasps are primarily carnivores and hunt other insects as a source of protein. To feed their offspring, they bring prey back to their nests or lay their eggs in, or on, other insects. In contrast, bees are "vegetarians" that visit flowers to collect pollen as well as nectar. Pollen is the main source of protein for bees, especially for their larval stages. To enhance pollen collection, adults have specialized pollen-collecting hairs and/or pollen baskets to transport pollen back to their nests. Although they look superficially similar, wasps--unlike bees--are rarely hairy, are more slender-bodied, and have no pollen-collecting hairs on their legs.

Figure 7. This digger bee, a bumble bee mimic (*Anthophora bomboides stanfordiana*), is emerging from its nest. Photo by Kathy Keatley Garvey.

Figure 8. Metallic green sweat bees have a striking green color and nest in the ground. Photo by Kathy Keatley Garvey.

Figure 9. These holes on EYNC's Natoma Trail mark the nests of the orange-legged burrowing bee.
Photo by Mary Lou Flint.

Figure 10. A burrowing bee enters its nest, its rear legs loaded with pollen. Photo by Mary Lou Flint.

Bees serve an extremely important role in our ecosytems as pollinators. Many plants would not be able to reproduce without the service of insect pollinators, which transfer pollen (the male part) of one flower to the stigma (female part) of another flower to fertilize it. The USDA estimates that over 75% of the food we eat in the United States comes from crops that benefit from insect pollination. Bees are the most important pollinators, although other insects such as flies, butterflies, moths and beetles also play a role. While honey bees are well known as crop pollinators, native bees also play an important role, and native bees are very important in pollinating wildflowers and other plants in our natural habitats.

Growing evidence indicates that bee and other pollinator populations are declining around the world. Many factors contribute to these losses. These include removal of the habitats and the diversity of plants required for survival as a result of large-scale urban and agricultural development. Wide use of pesticides, which kill pollinators or their host plants, is also associated with pollinator decline. Climate change, loss of nesting habitat for soil-nesting bees, and bee pathogens are also likely factors.

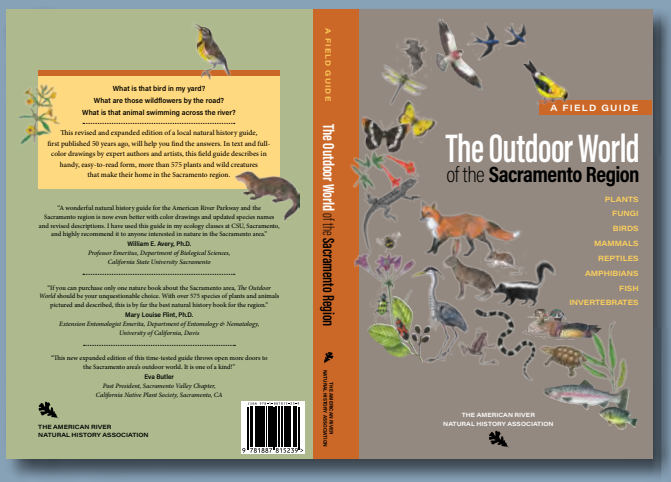
What can you do to encourage bees of all kinds? The best thing you can do is plant a garden with a diversity of plants that provide nectar and pollen. Native plants such as California poppies, coyote mint, penstemon, yarrow, goldenrod, ceanothus, and buckwheat help support native pollinators; but other common garden flowers such as coneflowers, cosmos, coreopsis, sage, zinnias, and lavender are also attractive. One good resource for choosing plants for your garden is The Xerces Society of Invertebrate Conservation website. When planning your garden, be sure to include a water source such as a fountain or bird bath, some bare soil for ground-nesting bees, and perhaps a bee condo or a small stack of dead wood for cavity nesters. And never use pesticides of any kind.

Mary Louise Flint, Ph.D., is a docent at EYNC and Extension Entomologist Emerita at the Department of Entomology and Nematology, UC Davis. Special thanks to Kathy Keatley Garvey from the Department of Entomology and Nematology at UC Davis for providing most of the photos. For more information on California native bees go to www.helpabee.org/common-bee-groups-of-ca.html.

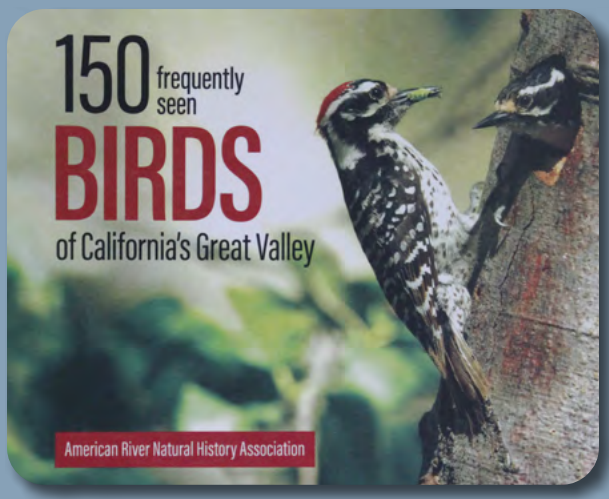
Back in Print!

Two of the most popular books from the American River Natural History Association are back in print and available at the Discovery Shop at the Effie Yeaw Nature Center and online at sacnaturecenter.net/shop-books/.

The Outdoor World of the Sacramento Region has been completely revised and expanded in this 2022 Edition. It features images and descriptions of over 575 plants, animals, and other organisms common in our area.



150 Frequently Seen Birds of California's Great Valley has been out-of-print for many months and is now back in stock. The book includes a two-page entry for each bird species featuring two beautiful color photos along with a brief description, size specifications, and seasonal occurrence in our area.



Western Black-legged Tick

By Melanie Loo

As you walk through the Effie Yeaw Nature Center Nature Study Area (NSA) in winter and spring you may encounter Tyvek-clad people maneuvering meter-square flags of white flannel off the trail. These are not practitioners of a new sport; they are tick surveyors from the Sacramento-Yolo Mosquito and Vector Control office (Figure 1).

Figure 1. Tick surveyors from Sacramento-Yolo Mosquito and Vector Control sampling ticks with white flannel flags in NSA. Photo by Melanie Loo.

They conduct regular tick surveys in the NSA as part of a public health service. The texture of the flannel mimics the skin of a vertebrate, and the white color provides a contrasting background for easy detection of ticks that crawl onto the flag. Ticks are ectoparasites that pierce and insert their mouth parts into the skin of vertebrates to get blood meals as nutrition. In this way they are potential vectors of disease. If the blood they take from one host contains disease-causing microbes, some of those pathogens can be passed on to a later host. After mosquitoes, ticks are the next leading vectors of diseases in humans.

Several species of ticks are found in oak-woodland habitats of northern California. Of particular interest is the western black-legged tick (*Ixodes pacificus*) because it can carry several different pathogenic microorganisms (Figure 2). One of those pathogens is the bacterium *Borrelia burgdorferi*, which causes Lyme disease. If left untreated, Lyme disease brings on symptoms of fever, chills, fatigue, and rash around the bite, followed much later by swollen joints and nerve damage. If identified early, the disease can be treated with antibiotics.

Figure 2. Adult Western black-legged tick (*Ixodes pacificus*). Photo by Ria Jarquin.

The life cycle of the tick takes about three years with a blood meal from a vertebrate required to progress from one stage to the next (Figure 3). Adult females can lay more than a thousand eggs in winter or early spring, which hatch into larvae in summer. The following year, after a blood meal, larvae molt into nymphs. During the third year and weeks to months after a blood meal, nymphs molt into adults. A final blood meal is required before the female can lay eggs.

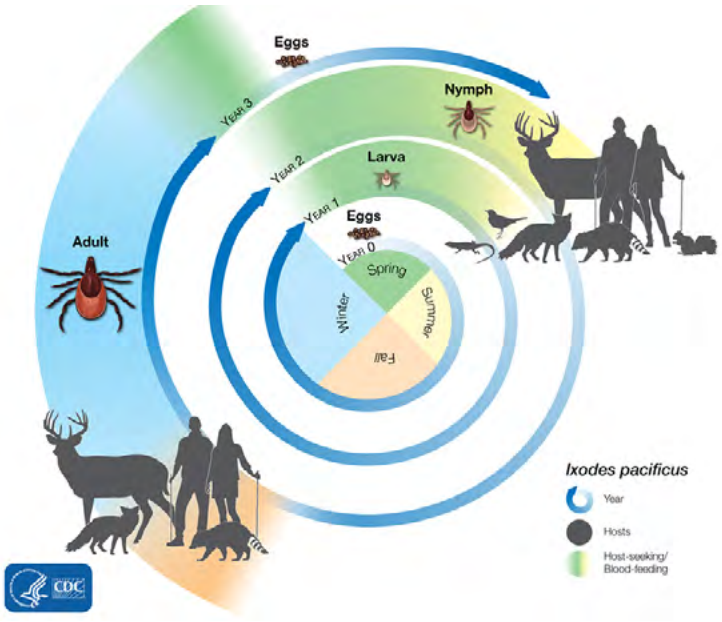


Figure 3. Western black-legged tick life cycle, showing seasonal activity and hosts. Diagram courtesy of CDC.

Before becoming engorged with blood, larvae are the size of a pinpoint and nymphs the size of a poppy seed. Both immature stages feed primarily on small animals like lizards, birds, and rodents (Figure 4) and live on leaf litter. Nymphs may also reside on mossy rocks, logs, and low on tree trunks. Adults are about an eighth of an inch long; live on low-lying vegetation, grasses and brush; and feed on small and large vertebrates. While tick larvae have just six legs, nymphs and adults have eight legs, like their spider relatives.

All three feeding stages have organs to sense humidity, temperature, and odors, which help them avoid dehydration and find suitable hosts. When a host is found, the tick crawls to a region of bare skin, pierces the skin, inserts its mouth part, and has its blood meal. It may also secrete a glue-like substance to help it remain attached and a numbing substance to keep its host from feeling its bite. After 1-2 days of feeding the tick may triple in size. Both nymphs and adults will bite humans.

Past surveys indicate that in northern California, nymphs are most abundant and active in spring, while adults actively seek food from late fall through spring. Roughly 4% of black-legged ticks sampled in California carry the *B. burgdorferi* bacteria causing Lyme disease, whereas around 50% of deer ticks sampled on the East Coast carry them. Thus, the risk of contracting Lyme disease is much lower in California. One factor contributing to the lower level of Lyme disease in California is the western black-legged tick's preference for feeding on western fence lizards in its larval and nymphal stages. These lizards contain a blood protein that kills Lyme disease-causing bacteria, thus reducing the transmission of Lyme disease. For more information about the fascinating relationships among the Lyme disease-causing bacteria, the western black-legged tick, and the western fence lizard, refer to the article in the Winter 2020 edition of The Acorn: sacnaturecenter.net/wp-content/uploads/2020AcornWinter_final.pdf

One simple way to reduce the risk of getting attacked by a tick is to walk on groomed trails, away from grass, shrubs, and other vegetation. Other ways are to apply tick repellent, minimize exposed bare skin, and check for attached ticks right after being in tick-friendly habitat. It is estimated to take 1-2 days for a tick carrying *B. burgdorferi* to transmit the bacteria to a host while feeding from that host. So prompt removal prevents bacterial transmission.

To effectively remove a tick, you should use a pair of tweezers to firmly grasp the head of the tick as close to your skin as possible and pull steadily away from the skin. Twisting, burning, or trying to smother the tick just increases the likelihood of the tick regurgitating blood that it consumed from a previous host. The removed tick may be put in a plastic bag for later examination; its abdominal distension will give you an idea of how long it has been feeding on you. If you experience fever, chills, fatigue, and a rash around the bite several days after being bitten, you should consult your physician about suitable treatment. The preserved tick can be examined by a local vector-control agency to identify the species of tick and presence of microbial pathogens. More information about local vectors and the pathogens they carry can be obtained from Sacramento-Yolo Mosquito and Vector Control.

Figure 4. Tick after blood meal near ear of squirrel. Photo by Robin Holm on iNaturalist, photo 128048654. (c) Robin Holm – some rights reserved (CC BY-SA)

Melanie Loo, Ph.D. is a retired Professor of Biological Sciences at CSU Sacramento. She volunteers at EYNC as a docent, trail steward, and member of the Habitat Restoration Team.

Wildlife Rehabilitation

By Joey Johnson

Everyone who has visited the Effie Yeaw Nature Center (EYNC) has encountered at least one of our Animal Ambassadors. Most understand that the animals at EYNC live here because they have been orphaned or injured and cannot be returned to the wild. As a result, people frequently call us when they find an injured animal and ask if we can take it. The answer is "no" because we are not licensed as a rehabilitation facility. But we always provide callers with information they can use to find help for the animal they have found.

So, what is the difference between animals that are in a rehabilitation program and our Animal Ambassadors? The short explanation is that the goal of rehabilitation programs is to give rescued animals the treatment they need to return to the wild, whereas EYNC is a permanent home for animals that cannot, for various reasons, return to the wild, often after having received treatment at a rehabilitation center. EYNC is not staffed, equipped, or licensed to rehabilitate wild animals.

I reached out to Gold Country Wildlife Rescue (GCWR) and connected with Sydney Cayler, Wildlife Care Coordinator, to find out more about the rehabilitation process at their center. She gave me a basic description of how they handle rescued animals, which I summarize here. GCWR's mission is to rescue, rehabilitate, and release injured and orphaned wildlife. The process starts at intake. The basic intake protocol consists of the finder bringing the patient (the injured animal) to GCWR's front door, where the intake admin takes all their information, including finder's name, address, phone number and email; where the animal was found (exact location/address if possible); what happened to the animal (fell from tree, hit by car, caught by a cat, etc.); and if any care was given by the finder (such as food, water, heat). (Although GCWR always advises finders to keep patients warm, dark and quiet, they advise them not to offer food or water.)

While GCWR admin is getting all this information from the person who found the animal, the patient is brought back to triage. GCWR technicians then do a full examination on the patient; create treatment plans based on the story and the injuries; and provide any upfront supportive care including giving medications, giving fluids and tube feeding. Each species has different protocols depending on age, story and condition. While triaging, the technician also is logging all this information into the GCWR database.

The next step is to put the patient out on the floor and set it up for a successful rehabilitation with the hopes of release. Each patient is also given a unique number, which is how GCWR keeps records of everything happening with that patient. The finder is also given this patient number so they can reach out by email, including that number, and request a status update on the animal they brought in. In reality there is a lot more that goes on during triage depending on species, story, and so forth but that is a basic summary of GCWR's triage protocol.

Once triaged, the animal is cared for medically and physically with as little contact with humans as possible so it doesn't become so dependent on humans that they cannot be released. Ms. Cayler told me that they usually have a veterinarian on staff or on constant call but that their carefully trained staff provides the majority of medical treatment. Continuing education is a requirement for rehabilitation facility staff.

The licensing requirements for a wildlife rehabilitation facility are rigorous and clearly described in detail in California Law Governing Wildlife Rehabilitation (Title 14

Ke-lik-a-lik is an American kestrel who came to live permanently at EYNC in 2019 after rehabilitation at the UC Davis Raptor Center. He was injured by a dog.

Cal. Regs Sect. 679). The California Department of Fish and Wildlife (CDFW) issues permits as Memorandums of Understanding to facilities that meet the standards set forth in the manual "Minimum Standards for Wildlife Rehabilitation, 2000 Third Edition" published jointly by the International Wildlife Rehabilitation Council and the National Wildlife Rehabilitation Association. The record keeping requirements of a rehabilitation facility are very detailed and involved. Rehabilitation facilities cannot release an animal back into the wild without permission from CDFW, and if it is determined that the animal cannot be released into the wild, the rehabilitation facility must find an appropriate permanent placement such as Effie Yeaw Nature Center.

The rehabilitation facility may then contact EYNC to see if we can take the animal as an ambassador. The Animal Ambassadors at EYNC will live here for the rest of their lives. Most of our animals have received rehabilitation services, but in the course of the rehabilitation, it was determined that they would never be able to survive in the wild. Whether or not we can bring the animal into the EYNC facility depends on the size, needs and behavior of the animal, in addition to available space. All of our ambassadors go through a process of getting acclimated to their new living quarters and to being around people, both staff and the public, which is very different from the people/animal relationship at a rehabilitation facility. The process can be slow, but it is important not to put animals in a situation that causes them stress.

Our American kestrel, Ke-lik-a-lik, is a recent example of an Animal Ambassador who spent time in a rehabilitation program before coming to EYNC. He was found in Esparto and was rescued from inside a dog's mouth and taken to the California Raptor Facility in Davis, CA. He had a fractured vertebra and humerus. In spite of surgery and daily physical therapy, he was unable to regain full range of motion and flight. He stayed at the raptor facility for an extensive amount of time because of his health needs. In December of 2019 we obtained our permit to keep him, and he moved to EYNC.

Since Ke-lik-a-lik had been around people for his care and treatment, he was pretty used to people. He has learned to wear jesses, get on a glove, and respond to verbal commands, which are important skills for being an ambassador with the public and to facilitate health care. This training process can be lengthy because it involves building trust and must proceed at a pace determined by the bird's readiness to learn. After he arrived in late 2019, it was difficult to give him the training time

Wek'-wek is a peregrine falcon who came to EYNC in 2017 after rehabilitation at Lake Tahoe Wildlife Care. She had been shot in both wings.

Orion is a Swainson's hawk who was rehabilitated at the UC Davis Raptor center and came to live at EYNC in 2017. He had a broken wing and also lacked a natural fear of humans.

that our previous birds such as Wek'-wek were given, due to the reduced staff during the Covid 19 shutdown. Because learning is so crucial, Ke-lik-a-lik was sent to a professional trainer to get the one-on-one attention he needed. Training programs use positive reinforcement (operant conditioning) to develop the skills needed to be an ambassador.

Just like the rest of us, the birds can lose what they have learned and develop bad habits if they are not constantly practicing their skills. For instance, EYNC Animal Care Specialist Renée Covey explained that the animal care staff are currently working with Orion, our Swainson's hawk, to regain skills he lost during the time that we weren't running programs due to the pandemic.

There are similarities between a rehabilitation facility and a facility such as EYNC. The volunteer training is very similar and volunteers are a crucial part of both types of facilities. The regulations for care and sanitation are the same and the requirements for housing size and space are the same. The housing requirements have changed since EYNC first took in Ambassador Animals and this is driving the need for a new aviary/animal facility.

If someone calls EYNC about an injured animal they have found, they are referred to the rehabilitation facilities in the area, which are primarily the UC Davis Raptor Facility and Gold Country Wildlife Rescue. We also work with Tahoe Wildlife Care when they have an animal that cannot be released. As Kent Anderson, EYNC Executive Director, told me, "The way I describe our involvement in the rescue process is that 'it is a spectrum' and we are the 'end point' in an animal's journey."

Joey Johnson is a Past President of ARNHA, a photographer and nature lover. Thanks to Sydney Cayler, Gold Country Wildlife Rescue, Margaret Leavitt, Kent Anderson and Renée Covey for their help in putting this article together. You can learn more about some of our Animal Ambassadors by visiting our web page https://www.sacnaturefacility.net/visit-us/resident-animals/.

Bird and Breakfast: Save the Dates!

Effie Yeaw Nature Center (EYNC)'s annual Bird and Breakfast events are set for Saturday, March 18th and Sunday, March 26th. This is an opportunity to take a tour of the EYNC Nature Study Area with an expert birder to observe and identify the many species of birds that inhabit our nature reserve. Prior to the event, birders from EYNC and the Sacramento Audubon Society scout out the site for bird nests and set up scopes so participants can view nests and sometimes even baby birds. After a 45-minute hike, groups return to the Nature Center for a hearty breakfast of home-made goods.

Read about last year's event in the Summer 2020 issue of The *Acorn* at sacnaturecenter.net/wp-content/uploads/2022AcornSummer-1.pdf.

Bird and Breakfast participants viewing a nest through a scope in 2022. Photo by Sam Cohen-Suelter.

Register for the event at sacnaturecenter.net/events/bird-breakfast-weekend/. The March 18 event is the standard program whereas the March 26th event is geared specifically for families with children. Bring your binoculars!

Staff Profile: Renée Covey, Animal Care Lead

By Margaret Leavitt

One of the sights at Effie Yeaw Nature Center guaranteed to elicit "oohs" and "ahhs" and squeals of excitement from visitors is a glimpse of a resident Animal Ambassador–any of the snakes, frogs, owls, falcons, turtles and other animals that call Effie Yeaw home. As described elsewhere in this issue of the *The Acorn*, the Animal Ambassadors have come from a wildlife care or rehabilitation program where they were found to be non-releasable–unable to survive in the wild due to injury or for other reasons. At Effie Yeaw, they have found a permanent home, providing the public with opportunities to observe them close-up and learn about these fascinating creatures. At Effie Yeaw, the Animal Ambassadors thrive under the meticulous, dedicated care of Renée Covey and her corps of helpers.

Renée is Animal Care Lead, responsible for providing all aspects of care for the Animal Ambassadors, while ensuring compliance with the permits from the California Department of Fish and Wildlife (CDFW) that allow Effie Yeaw to house the animals. Renée began volunteering at Effie Yeaw after college and found that she loved working with the animals. When a staff position opened up four years ago, she was chosen to fill that job.

One aspect of the job that Renée has found particularly fascinating and rewarding has been animal behavior. The constant challenge of understanding the animals and what they need beyond basic food and shelter has become a passion for Renée. With the raptors, for example, each individual has its own needs. Echo is a great horned owl, a species that is solitary. Echo becomes stressed when she is on display around people unless she has her back to a wall, giving her a feeling of protection. Orion, on the other hand, is a Swainson's hawk, a species that tends to gather in groups. He is less likely to become stressed when he is out in the open among people, and indeed seems to need the stimulation. Ac-

Renee with Orion, the Swainson's Hawk. Photo by Sam Cohen-Suelter.

cording to Renée, not all stress is bad. Awareness of the environment and the challenge of new people or new "toys" can prevent boredom in an animal and the problems that it might bring. The key is knowing your animal and being able to identify the symptoms of stress.

With cold-blooded animals, like the snakes and turtles, most life processes are much slower than in birds and are influenced by outside factors like weather and hormones. It is sometimes, according to Renée, like watching an animal "live in slow motion," requiring close and constant observation to determine when the animal is under stress. If the animal isn't eating, is it because of normal seasonal cycles or a sign of illness? With mother/son gopher snakes Dragonette and Jasper, careful observations Renée and her staff made during Dragonette's life have enabled them to identify emerging similarities in Jasper's condition.

One of the harder parts of the job is dealing with the death of one of the Animal Ambassadors. Although Renée is always aware that the animals are not pets, she and the staff naturally become attached to the animals, who become an important part of their lives. Indeed, Renée says that becoming attached is necessary to the job, ensuring that the staff provides good care, and so it is appropriate to mourn an animal's passing. When that happens, the staff comes together to remember the animal and its special habits or quirks. Renée herself tries to process her grief by learning as much as she can about the causes and circumstances surrounding the animal's passing. This can also help staff provide better care in the future. But since these are wild animals, often with an unknown history, it can be difficult to know exactly what happened. The best situations, says Renée, are those in which the animal lived a good, long life.

Caring for the animals is a constant learning experience. "I've loved all the stuff I've learned since I've been here," says Renée, citing the example of learning how mother rattlesnakes birth and care for their young. Renée has found that oral teaching from prior staff leads and staff, in an apprentice-type model, has been particularly helpful for her. Effie Yeaw's regular vet is also a resource for information and referrals to experts. Increasingly, online resources are becoming valuable places for Renée to turn to.

Inevitably, paperwork is a significant part of the job. Meticulous records must be kept for each animal, both because it ensures good care, and because state law requires it. Renée hopes someday to have a digital record-keeping system for each animal, much like the medical charts trending in human care, to make communication and observations among the staff more effective and accurate.

In addition to record-keeping, the CDFW requires Effie Yeaw to renew its permits annually, through the submission of extensive paperwork, primarily on the raptors. Renée's administrative time is also spent in planning for improvements to facilities, outlining best practices, ensuring uniformity in care, and focusing on the needs of each animal. Emergency planning is also necessary, as Effie Yeaw needs to be able to quickly evacuate the animals to appropriate temporary housing in the event of a natural disaster or something as common as a power outage as happened during the January 2023 storms.

The overseeing of all aspects of an animal's life – food, shelter, environment, health, stimulation, and whatever else is needed to ensure that an animal thrives – is an enormous task. Add in record-keeping and paperwork, compliance with applicable statutes and regulations, taking in new animals, planning for the future, and throw in the unexpected – illness, impacts of a pandemic, staff unavailability, or a power outage,--and you have some idea of the broad scope of Renée's responsibilities. Renée's dedication, willingness to learn and passion for the animals in her care are what makes her an effective Animal Care Lead at Effie Yeaw Nature Center.

Margaret Leavitt is Vice President of the American River Natural History Association and a longtime volunteer at Effie Yeaw Nature Center.

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