WILDLIFE

Botta's Pocket Gopher – Carolyn Strange

Watch Out for Rattlesnakes – City of Palo Alto, Nature Notes

Columbian Black-tailed Deer – City of Palo Alto, Nature Notes

Coyote – City of Palo Alto, Nature Notes

Bobcats – City of Palo Alto, Nature Notes

Mountain Lions – CA Department of Fish & Wildlife

Edgewood's Mammals and Herps – compiled by Ken Hickman

***Edgewood Explorer* Archive (1994-2016): Wildlife**

More Resources – Check out these portals for more information and inspiration

Friends of Edgewood – http://www.friendsofedgewood.org/

Bill and Jean Lane Education Center – at the main preserve entrance, off Edgewood Rd. The Ed Center library has circulating and reference materials.

All about Birds (**Cornell Lab of Ornithology)** – http://www.birds.cornell.edu/

Bug Guide – http://bugguide.net/node/view/15740

California Herps – http://www.californiaherps.com/

Natural Resources DataBase – http://www.nrdb.org/simplesearch.asp

Nature of a Man (Ken Hickman's Blog) – http://natureofaman.blogspot.com/

Bay Checkerspot Butterfly – *Euphydryas editha bayensis*

by Kathy Korbholz

Adult Nectar Plants
Lomatium, *Lomatium ssp*.
California goldfields, *Lasthenia californica*
Tidy-tips, *Layia platyglossa*

Larval Food Plants
California plantain, *Plantago erecta*
Owl's-clover, *Castilleja* ssp.

Life Stages
Egg – 7-10 days
Pre-diapause larva – 2 weeks+
Diapause – months, rain-dependent
Post-diapause larva – until 300-500 mg
Pupa – 10-20 days
Adult – 10 days

The Bay checkerspot butterfly (*Euphydryas editha bayensis*), a federally listed endangered species, is endemic (native and confined) to serpentine soil. Edgewood Natural Preserve has the only known colony in San Mateo County. There is also a larger population in Santa Clara County centered on Coyote Ridge.

The adult butterflies emerge from their chrysalises in early spring and feed on a number of nectar plants associated with serpentine soil including lomatium, California goldfields, tidy tips, linanthus (leptosiphon), and muilla. They mate and lay eggs during a flight season that typically lasts 4 to 6 weeks, starting as early as February and ending as late as early May. Males emerge 4 to 8 days before females and mate with females soon after they emerge. Males can mate multiple times, whereas most females are believed to mate only once. The average adult butterfly, male or female, lives about 10 days.

Eggs area typically laid in up to 5 masses of 5 to 250 eggs each during March and April. The eggs are deposited at the base of California plantain (also known as dwarf plantain), or if not available, on owl's clover. In laboratory conditions females can lay up to 1000 eggs.

Larvae hatch in about 10 days and grow to the fourth instar (molt) in 2 weeks or more. California plantain is the primary food and most larvae feed on it initially. Larvae that successfully reach the fourth instar enter a period of dormancy (diapause) that lasts through the summer. They pass the summer months under rocks or in cracks in the soil (one of the reasons visitors are asked to stay on trails).

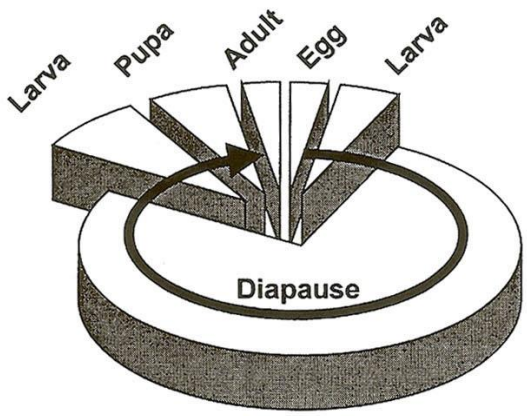
Larvae that have not reached the fourth instar before their host plantain dies must find another plant (usually longer-lasting owl's clover) or die of starvation. The larvae are not very mobile, so the owl's clover must be nearby. The mortality rate for pre-diapausal larvae is very high, usually in excess of 90%, and can reach 99%! High fertility, reliable food sources, and undisturbed habitat are required to maintain the precariously balanced Bay checkerspot population.

The summer diapause ends with the first rain and the germination of the California plantain. The larvae then resume activity, feed, and complete their development. The post-diapausal larvae are much more mobile and can crawl many yards in search of food plants and warm microclimates. They transform into pupae (the inactive state between larvae and adults) after reaching 300 to 500 mg (0.01 to 0.02 oz.). In order to gain the thermal benefit of the warm ground surface, the pupae are suspended a few millimeters above the earth in their chrysalises. The time from pupation to emergence varies from 10-20 days and is strongly affected by thermal conditions. In very dry years, some larvae can enter a second diapause and complete their development the second spring after hatching!

Editor's note: In 1997, just two years before this article was written, around 4,500 Bay checkerspots were counted at Edgewood Natural Preserve; in 2000, only one caterpillar was found. Thanks to intensive restoration efforts, the Bay checkerspot is back, with around 4000 caterpillars counted in Edgewood's serpentine grasslands in spring 2015.

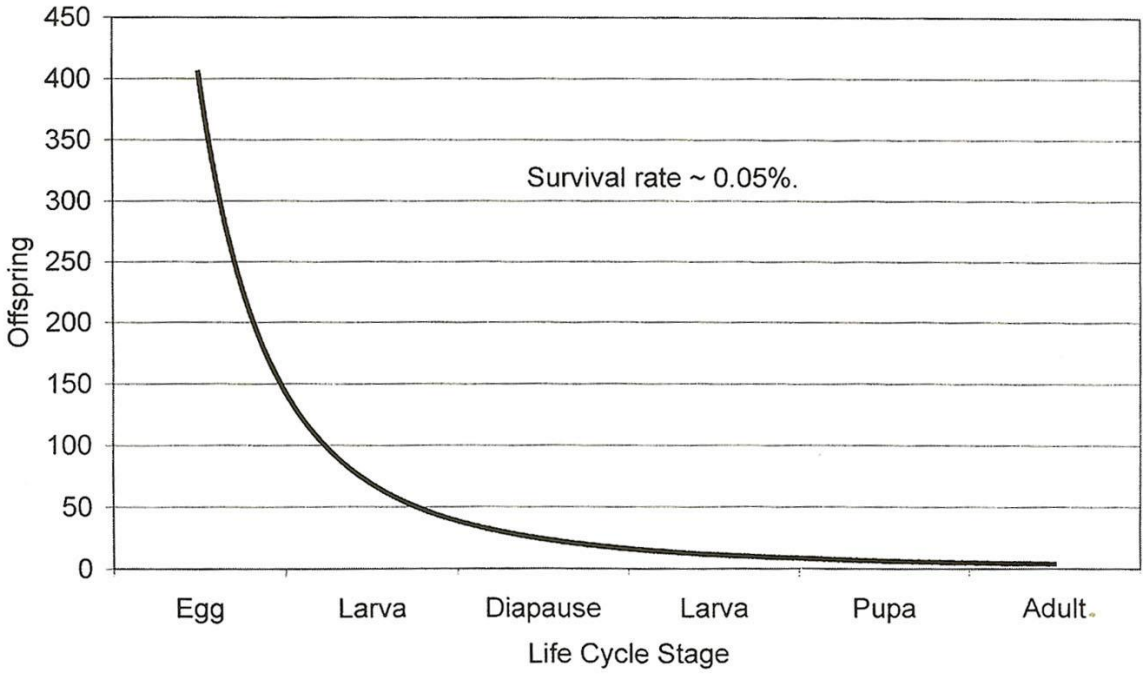
You can find the on-going story of the extinction and restoration of Edgewood's Bay checkerspot at the Friends of Edgewood website (www.friendsofedgewood.org – DISCOVER). See also Christal Niederer's June 2015 article on Bay checkerspot restoration efforts in this binder and in the *Edgewood Explorer* archives (also on the FOE website, under DISCOVER).

Life Cycle of the Bay Checkerspot Butterfly



- **Egg** - 10 days, March and April
- **Larva** - 2 weeks or more, spring before food plants die
- **Summer Diapause** - many months, until food plants germinate
- **Larva** - eats until it reaches 300 to 500 mg
- **Pupa** - 10 - 20 days, early winter
- **Adult** - 10 days, February to early May

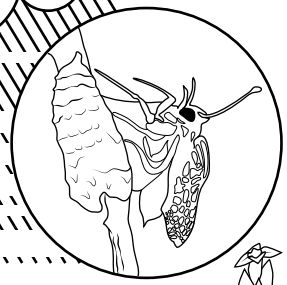
Morbidity Rate of Bay Checkerspot Butterfly



Source: U.S. Fish & Wildlife Service. 1998. *Recovery Plan for Serpentine Soil Species of the San Francisco Bay*. Portland, Oregon.

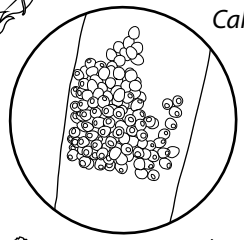
Rainy Season

Adult emergence



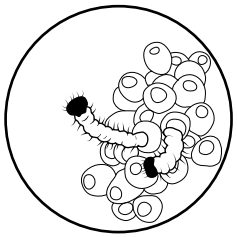
Adults feed on nectar of Tidy Tips, Goldfields, Lomatium and other plants for about 10 days, within which they mate.

Females lay eggs on stem of California Plantain or Owls' Clover.

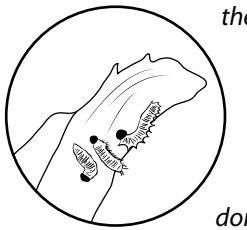


Dry Season

Eggs hatch in 7-10 days. Adults die off.



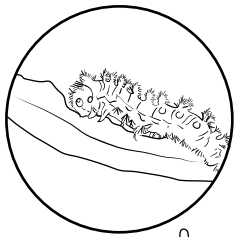
Pre-diapause larvae feed on California Plantain or longer-lasting Owl's Clover if available. They grow and molt repeatedly, reaching the 4th instar in 2 weeks or more.



Most pre-diapause larvae starve, but those that survive to the 4th instar enter diapause, a period of dormancy that lasts through the summer when there is nothing to eat. They emerge when winter rains return.

7th instar larvae pupate (10-20 days).

Post-diapause larvae feed only on California Plantain, and molt repeatedly.



California Plantain germinates, triggering larvae to emerge from diapause.

N D J F M A M J J A S O

Bay Checkerspot, *Euphydryas editha bayensis*

Serpentine grassland endemic

Reestablishing the Bay Checkerspot at Edgewood

by Christal Niederer

Did you know that the Bay checkerspot butterfly was instrumental in saving Edgewood? Back in the 1980s, plans were underway to create a golf course at Edgewood, but the presence of this federally-listed animal was a key argument in turning Edgewood into a natural preserve instead. With this critical role, the butterfly has become an unofficial mascot of this place we all love.

Adult Bay checkerspot butterflies feed on the nectar of wildflowers like this Tidy-tip (Layia platyglossa).

Drive by Extinction

There were about 4500 butterflies at Edgewood in 1997, but the butterflies suffered a local extinction in 2002 due to a decrease in their larval host plant, dwarf plantain *(Plantago erecta)*. Ecologist Dr. Stuart B. Weiss dubbed what happened to the Bay checkerspot butterfly as a "drive by extinction" when his research showed how exhaust fumes (nitrogen oxides and ammonia) from cars driving by on Hwy 280 actually act as a fertilizer on the grasslands. The fertilizer boost given to the non-native grasses, which do not normally grow well in the nutrient-poor serpentine soils, allows them to outcompete the native wildflowers. In time, the wildflowers were reduced to such small numbers they no longer supported the butterfly.

Restoring Habitat

Habitat restoration experiments showed that a rotational mowing program could be used to restore abundant host plant and nectar sources, even though the highway is still a source of pollution. With adequate habitat in place, the U.S. Fish and Wildlife Service granted a permit to transfer butterflies, in both the caterpillar and adult form, from a robust population at Coyote Ridge in south San Jose to 30 acres of prime habitat at Edgewood. The reintroductions began in 2007, and supplemental animals were translocated in 2011–2014. In 2014 we estimated about 4000 larvae in the serpentine grasslands.

Checking Results via Citizen Science

During flight season, designated checkerspot monitors are allowed to walk a course through the butterfly habitat, recording the adults they see. Other monitors record data on amount of host and nectar sources. The height of the flight season is compared with the timing of host plant dry out to determine whether numbers are likely to boom or bust the next year. Survival is tied very closely to phenology, or the effects of weather on the timing of animal and plant life cycles.

Bay checkerspots spend about 11 of 12 months in the larval, or caterpillar, stage.

Life and Behavior

The butterflies live for about a year, but each individual exists in the stage we know as an adult butterfly for about a week, although it is unlikely they even make it that stage. The majority of the year they are larvae (caterpillars). They do not migrate, but spend their entire life cycle usually within a few hundred meters. Adults fly in spring, usually in March or April. Although individual adults have very short lives, the flight season can last four to six weeks or more as individuals emerge at different times. These adults mate, and females lay 20–150 eggs on dwarf plantain or owl's clover (*Castilleja* spp.). The eggs hatch in about 7–10 days. Tiny prediapause larvae emerge, and begin the race to become large enough to reach diapause (a dormant state) before their host plants dry out. They enter diapause in the fourth instar (molting stage). It is common for even 99% of larvae to starve to death because their host plants have dried out before they can reach this stage. A good owl's clover year can be a boon to checkerspots, because this plant doesn't dry out as quickly as dwarf plantain.
During the long, hot, and dry summer, larvae that have made it to diapause exist in soil cracks and under rocks. This is one reason it is so important to stay on trails at Edgewood. When the rainy season begins (usually November or December), dwarf plantain germinates. This triggers the larvae to emerge from diapause. Dwarf plantain is the only thing the postdiapause larvae will eat. When they reach their seventh instar, they become large enough to form a chrysalis on low vegetation or rocks. After 10–20 days, they will emerge as an adult butterfly, and the cycle continues.

Keys to Success

Bay checkerspots can do well in both wet and dry years. More important than total rainfall is timing and March–April temperatures. Usually early rain is best because it allows diapausing larvae to emerge and begin their race against the clock. Cool temperatures in early spring are more important than precipitation in maintaining fresh host plants. Heavy rains during pupation can damage the chrysalis, and can limit adult flight time and therefore mating. Larvae are pretty durable, but all stages need sunlight to develop quickly.

The restored Bay checkerspot population at Edgewood has been increasing slowly, and we hope to reach a stage soon where introductions are no longer regularly needed. This project has taken place thanks to many partners, including San Mateo County Parks, Creekside Center for Earth Observation, San Mateo County Parks Foundation, U.S. Fish and Wildlife Service, Pacific Gas & Electric Company, the JiJi Foundation, Microsoft, REI, the California Native Plant Society, and of course, the Friends of Edgewood Natural Preserve.

Christal Niederer is a biologist for Creekside Center for Earth Observation, where she has worked with Dr. Stuart Weiss since 2005. This article was sparked by the vision and generosity of Norma Jean Bodey, Friends of Edgewood Docent Class of 1996.

Butterflies and Moths of Edgewood by Deanna Schiel

With its great variety of plant communities and plant species, topography, and soils, Edgewood Park and Natural Preserve invites a variety of butterfly and moth species. Here are some of the butterflies frequently seen at Edgewood.

BUTTERFLIES

Bramble Hairstreak

Anise Swallowtail

Acmon Blue

Common Wood Nymph

Lorquin's Admiral

Buckeye

Red Admiral

CA Ringlet

Tailed Copper

Skipper

Bay Checkerspot

Painted Lady

Grey Hairstreak

Monarch

Host Plants: Flowers provide nectar for adult butterflies, and foliage provides food for the larvae that hatch from eggs. Nectar-providing plant species may be different than the plant required for the growing larvae. Here are some examples of the plants frequented by butterflies at Edgewood:

Painted Ladies	**Blues**	**Hairstreaks**	**Swallowtails**	**Coppers**
mule ears	*buckeye*	*willows*	*carrot family*	*buckwheats*
everlastings	*shooting stars*	*oaks*	*coyote mint*	*gooseberries*
thistle	*buckwheats*	*lupines*	*coffeeberry*	*currants*
lupines	*lupines*	*deerweed*	*yampah*	*willow dock*
mallows	*oaks*	*coyote brush*	*willows*	*gum plant*
yerba santa	*vetches*	*ceanothus*		

Wood Nymph/Ringlet	**Buckeyes**	**Admirals/CA Sisters**	**Skippers**	**Monarchs**
grasses	*plantains*	*oaks*	*grasses*	*milkweed*
fiddleneck	*coyote brush*	*yerba santa*	*thistles*	*yerba santa*
yerba santa	*clovers*	*thistles*	*coyote brush*	*coyote mint*
legumes	*monkeyflowers*	*asters*	*mallows*	*thistles*

Butterfly or Moth? So what's the difference between a butterfly and a moth? Although there are exceptions to every rule, this chart gives some general distinctions.

	BUTTERFLY	MOTH
Antennae	Slender, end in thickened knobs	Taper to a point, feather-like
Wings	Hold vertically	Hold in "tent," hiding abdomen
Flight Activity	Mostly diurnal (fly during day)	Mostly nocturnal (fly during night)
Coloration	Generally bright colors, boldly patterned	Generally quiet colors
Body	Slender body	Stout, fuzzy body
Scales	Smaller scales on wings	Larger scales on wings
Pupa	Chrysalis, usually exposed and attached to leaf or twig	Cocoon of silk, usually in soil, under bark or other protected place

MOTHS

Here are three moth species frequently seen in Edgewood. These moths, photographed during the day, show that not all moths are dully colored, hold their wings in a "tent," or fly only at night!

Long-horned Moth

Owlet Moth

Oak Moth

References:

Las Pilitas Nursery. 2014. "Plants for a California or Western Butterfly Garden." http://www.laspilitas.com/butterfl.htm

Shapiro, Arthur, and Timothy Manolis. 2007. *Field Guide to Butterflies of the San Francisco Bay and Sacramento Valley Regions*. University of California Press.

Banana Slug (*Ariolimax* spp.) by Carolyn J. Strange

Names, Classification, Range and Habitat

The common name, "banana slug," describes eight species of terrestrial slugs found in damp, temperate, coniferous forests along the west coast, from California to Alaska. Isolated populations occur along the coast as far south as San Diego County, and also on some moist western slopes of the Sierras. California, especially the Santa Cruz Mountains, is a species hot spot.

Retractable sensory tentacles adorn the head. The upper two detect light. The lower pair are touch and smell/taste sensors.

Often bright yellow, banana slugs can resemble their namesake fruit in various stages of ripeness or decay, shading from white to greenish browns and almost black. The Pacific banana slug (*A. columbianus*), which is sometimes spotty, is the most widespread, and is found outside California. Edgewood's denizens could be one of two other species, *A. californicus*, or *A. dolichophallus*. Externally they all appear very similar, and experts use internal differences, mainly in the genital structures, to distinguish the species. Modern molecular biology suggests new classifications.

Slugs and snails are gastropods ("stomach-foot"), probably the largest class within the very large and diverse phylum of Mollusca. Technically, "slug" refers only to a body type, not to a closely related animal grouping, because slugs evolved from snails multiple times, in different lineages. That means a sluggy body must offer advantages. A shell certainly affords protection, but it's also bulky, and requires a higher calcium diet. Streamlined slugs gained access to microenvironments where snails would never fit, but lost protection against dehydration. Slugs require reliable moisture. When it's too hot or dry to come out, they hunker down in a damp, shady shelter. Save your banana slug searches for cool, moist days, and shady locations that tend to stay damp and cool even on sunny days.

What to Notice

Banana slugs are the largest land slug in North America and second largest in world. They can reach 10 inches and 4 ounces—quarter-pounders!—but are more typically about 6–8 inches long. (One European slug reaches 12 inches.)

Four **tentacles** extend from the head. Sticking up like periscopes, the larger, upper two are optical tentacles; the small black dots at the ends detect light intensity. The lower sensory pair feel and smell. All tentacles move independently and can quickly retract to protect the valuable sensors. If a tentacle is lost, it regenerates. Below the tentacles, the mouth contains the **radula** (L. scraper) a

vaguely tongue-like ribbon covered with rows of tiny, replaceable backward-pointing teeth, which scrape food into the esophagus. (It's also used in slug fights.)

What appears to be draped over the back and head is a leathery covering called the **mantle**. It's what secretes the shell in snails, but provides some protection for slugs too. An opening on the right side (pneumostome), which the animal can open or close, leads to an inner cavity like a lung. The mantle conceals two more nearby openings: the genital opening is forward of, and the anus is to the rear of the pneumostome. A keel-like ridge, or **carina** runs down the back to the tail. The appearance and color of an individual can vary with its circumstances, such as level of hydration, diet, health, age or injury.

Slime and Locomotion

Serving many vital purposes, slime (or mucus) is essential and slugs secrete it from pretty much everywhere, using different "recipes" in different body parts and circumstances. Slime helps prevent dehydration, and allows gas exchange for respiration. (As in amphibians, the "lung" doesn't do all the work; wet skin helps.) When temperatures rise and humidity drops, slugs coat themselves in thick slime and duff, roll up in a safe place and go dormant (estivate) until conditions improve.

Slime also facilitates movement and protects against sharp edges. Gastropods move by contracting muscles in the foot, in multiple places at the same time, resulting in a series of waves that look like small arcs rippling along the body's length. (You can see this if you watch through a glass pane.) Each arc is a muscular contraction lifting up and lunging forward, and they collectively propel the slug. Slime helps slugs adhere to surfaces, and also increases suction, so they can glide along vertical surfaces, or even upside down. If they trek up a tree too far, they can shorten the return trip by exuding a slime cord and lowering themselves back down. Slime can't be reeled back in, but is often eaten, so is not wasted. Estimates vary, but banana slugs typically sail along at about 3–4 inches/minute, with a maximum speed of over 6 inches/minute reported. Although their slime helps them move, they're also constantly working against it because it adheres to surfaces.

Laying down a blanket of slime is part of foreplay (and another use of slime).

Slime also carries chemical messages, important to homing behavior and mating, and helps repel predators—more on these topics below. Finally, although you hear about folks who handle and even kiss banana slugs, it's best not to touch banana slugs—for *their* sake. They're used to what they encounter on the forest floor, but not to the sweat, soap and oils that might be on our hands.

Life and Behavior

Banana slugs lead solitary lives, cruising the forest by night for food, and by day too when humidity allows. They find shelter sites to wait out drier times, and can return to them, apparently "homing" to preferred shelter sites by scent, which may include their own slime trail.

In their temperate range, mating occurs any time of year, and often several times. Pheromones in their slime advertise readiness and help attract mates. Banana slugs are simultaneous hermaphrodites, meaning they have both female and male organs, and although they can self-fertilize, they usually cross-mate, with both slugs accepting and delivering sperm during an encounter. Being hermaphroditic doubles the chances of reproducing, which is helpful when population density is low. They can also store sperm for many weeks, to fertilize eggs that mature after mating. Both slugs lay clutches of 20–30 translucent eggs (~1/4 inch), protected under logs or leaves. Eggs hatch a month or so later. Baby slugs, an inch at most, are on their own once they emerge from the eggs. They can live up to seven years.

Banana slugs can get almost anywhere, and eat almost anything.

Banana slug mating behavior is … remarkable. Foreplay begins with laying down a copious slime blanket, but can be quite violent and takes hours. Once they maneuver themselves into a curved yin-yang position with right sides together, they remain pressed together for several more hours. And when they're ready to separate, troubles often arise because huge male organs have evolved … and they get stuck. So, yes, they chew them off. This is probably not great material to share on walks! But it's good for docents to know about in case you get a smarty-pants visitor who asks you about apophallation. It's not clear whether they can regenerate the lost organ, but they can apparently carry on as females. This state of affairs may best be framed in evolutionary terms, probably as a result of sexual conflict and partner manipulation tactics.

What They Eat and Who Eats Them

Banana slugs eat pretty much anything, but do avoid some potential foods, while preferring others. They eat many types of living, dead or decaying plant matter and lichens, as well as animal droppings and carrion. They seem to be fond of mushrooms, which are abundant in their damp domain.

They don't make an easy meal themselves, but do show up on a variety of predators' menus. One defensive action is to change body shape by contracting into more of a ball, becoming too big a mouthful, while upping slime production. A shrew or mole snatching an inviting baby banana slug can end up wrestling more of an unmanageable melon instead. For predators who don't mind a

balled-up slug, slime provides another two-pronged defense. The sticky consistency alone repels some predators, and those who get a slug to the moist skin of their mouths discover the tingling, anesthetic properties of slime. Some raccoons roll slugs in dirt or duff prior to dining. Salamanders, newts, garter snakes, foxes, porcupines, crows, ducks, beetles and millipedes have all been observed eating banana slugs.

A further note on the bright yellow color—is it camouflage/mimicry, or a warning? Both or neither? Sometimes a bright color warns predators, "Beware of inedible yuckiness!" and that's somewhat true with banana slugs. Then again they might be harder to see than we think, for instance when gliding (slowly!) past bay trees, willows, or coffee berries, which drop bright yellow, slug-shaped leaves. Also, consider that the slugs are most active at night, and nocturnal predators don't see the same as we do.

Roles in Ecosystem

Banana slugs have been called the clean-up crew for the forest floor. These detritovores speed decomposition, thus helping recycle nutrients and enriching soil. As they drift from one meal to the next, they help spread seeds and spores. A study to determine what was damaging coast redwood seedlings found that confined banana slugs would eat their cardboard enclosure or starve rather than nibble *Sequoia sempervirons* seedlings. They exhibited no such restraint for other seedlings that sprouted, however, thus eliminating competition and turning it into fertilizer for redwoods. The great trees, in turn, provide deep shade, and comb foggy skies for moisture so critical to the slugs.

Banana Slug Fun Facts

In 1986, amid controversy, the banana slug became the official mascot of the University of California, Santa Cruz campus. Two years later, with prompting from local Peninsula children, the State Legislature voted to elevate the creature to State Mollusk, but then-Gov. Deukmejian vetoed the bill. California still has no official state mollusk. Late in 2014, UCSC alumni received email from "Sammy the Banana Slug," part of a successful crowd-sourced campaign to fund the sequencing of the banana slug genome. Students will undertake the project in 2015, UCSC's 50th anniversary. *Ariolimax dolichophallus* could become the first terrestrial slug to have its genome mapped, and scientists can use the information to reveal more about banana slug evolution and biology.

Science writer Carolyn J. Strange has written hundreds of articles. She became an Edgewood neighbor in 1998, a docent in 2003, and has served the Friends of Edgewood in various ways ever since. She earned her writing credentials much longer ago, in the Graduate Science Communication Program at UC Santa Cruz—which makes her a Banana Slug too!

This article was sparked by the vision and generosity of Norma Jean Bodey, Friends of Edgewood Docent Class of 1996.

California Turret Spider (*Antrodiaetus riversi*)

by Carolyn J. Strange

Name, Classification, Range and Habitat

Turret spiders are named for the structures they build. These spiders are found only in California, in the Coast Range and Sierra foothills. Within their range, they are limited to moist woodlands, often on north-facing slopes, and near shady streams and thickets.

Turrets are built with silk and available materials. Outward radiating "spokes" may help the spider sense prey nearby.

Their susceptibility to dehydration limits their ability to disperse, so populations become isolated, and diverge over time. Although distant populations may look the same to human eyes, modern molecular biological identification methods indicate that there are at least eight species of turret spiders. They belong to an ancient lineage of spiders, the mygalomorphs, which includes some of the world's largest and longest-lived spiders. Tarantulas and trapdoor spiders are also part of this group, sometimes called "primitive spiders" (as opposed to true or modern spiders). Perhaps the most obvious difference is that mygalomorph fangs swing straight down, instead of towards each other from the sides like pincers. In general mygalomorphs have heavy builds, and don't hang in silk webs; they spend the bulk of their time in burrows.

Poised just inside its burrow, the ambush predator awaits passing prey.

What to Look for and Notice

Full-grown, turret spiders are only about ¾-inch long, and they generally hide in the ground in daytime. You may never see the spiders, but you can look for their tiny turrets! They're usually camouflaged by bits of plant debris, so the first thing your eyes might pick out are holes in the ground (up to half-inch or so in diameter). Keep looking to notice a collar or tube, made of soil and plant bits, that extends roughly perpendicularly above the soil surface, sometimes by an inch or two. Other creatures, such as tiger beetle larvae, also live in burrows, but their entrances are flush with the soil surface and unadorned. The spider's silk-lined burrow can be up to 8-inch deep. The silk lining

is thicker nearer the top, and gradually thins to the bottom. This thicker silk provides support where soil is less compacted, and also helps incorporate debris for building the turret. The spiders build with whatever materials are handy. Where available, tiny twigs and pine needles might radiate outward, spoke-like, from the turret, which increases the spider's ability to sense prey. Turrets also help keep rain out of the burrow. Turrets have also proved flexible and fragile to scientists trying to measure them, so they are best left alone.

Life and Behavior

Turret spiders are homebodies, who rarely leave their burrows, and for most of the year each burrow houses just one of the dark brown spiders—except when young spiderlings remain in their mother's burrow during their first winter. Mating occurs in August or September, and it's the only time adults —males only— leave their burrows. When a male reaches sexual maturity (at 8 or 9 years!), he sets out at night to find a female and mate, or die trying. He dies afterwards, anyway. Females continue to mate yearly, and can reach at least 16 years of age.

Silk-wrapped egg sacs, attached half way down the burrow, contain 20–70 eggs. Spiderlings hatch in early fall, and usually wait to disperse until spring. They can't go very far, because they're small and dehydrate easily, so they dig in nearby, building their burrows close to their mother's. That's why spider turrets occur in clusters of smaller burrows around a larger burrow of an adult female. It's a family thing.

What They Eat and Who Eats Them

Like many of their mygalomorph relatives, turret spiders are ambush predators that lurk in burrows. Turret spiders wait deep in their burrows during the day, and come up for food at night, poised just inside the turret. They capture millipedes, ants, termites, beetles, and other arthropods. They sense prey through vibrations, quickly lunging part-way out of the turret to seize whatever stumbles past. The last pair of legs grips the turret lip, and the first two pairs of legs help the mouthparts grab and position the prey for piercing with the fangs. Once injected with venom, the meal is pulled down into the burrow. If prey gets away, turret spiders don't give chase. One researcher who wanted to study turret spiders more closely in the lab tried to entice them from their burrows with tethered prey. It didn't work, and he had to dig out the spiders.

Any creature that would eat a spider that size is a potential turret spider predator, but the protective burrow makes it a harder meal to find. As is often the case, the dispersing young are most vulnerable. The burrow provides little protection from a parasitoid fly that uses turret spiders as a host.

Roles in Ecosystem

These tiny predators help control populations of other arthropods, and no doubt end up feeding some of them too. Although the spiders are seldom seen, the homes they build delight nature-loving humans.

Science writer Carolyn J. Strange has written hundreds of articles. She became an Edgewood neighbor in 1998, a docent in 2003, and has served the Friends of Edgewood in various ways ever since. This article was sparked by the vision and generosity of Norma Jean Bodey, Friends of Edgewood Docent Class of 1996.

Spider Webs and Burrows by Deanna Schiel

Many spiders make their home at Edgewood Natural Preserve. Even if we don't see the spiders, we can often see their webs and burrows—made in an astonishing variety of architectural styles. Why are there so many different types of spider webs?

Orb Weaver Spider Web

Different species of spiders use webs for different purposes. Poor vision but sensitive to vibration?—orb weavers. These spiders use a web to trap a meal. Good vision and fast mover?—jumping spiders and wolf spiders. These spiders don't need a web to be successful at capturing a meal, but use silk for different purposes.

Arachnids have a cephalothorax with eyes, fangs, mouth parts and 4 pair of legs, and an abdomen where **spinnerets** are located. Depending on species, spiders will have 2 to 8 of these silk spinning organs (usually paired), producing different types of silk for distinct uses. Drag, safety, and signal lines are different from sticky entrapment, orb radial, and spiral lines. In addition, a different kind of silk is used to wrap prey, protect egg sacs, and can even provide transport for young spiders (called "ballooning"). Silk also plays a part in spider sex: males typically wrap their sperm in silk before transferring it to the female.

Silk is produced as a liquid but becomes a solid fiber of 0.001 – 0.004mm thick as the spider moves away from the attachment point. The tensile strength of spider silk is greater than the same weight of steel and, unlike steel, it has elasticity.

Dome Spider Web

Bowl and Doily Spider Web

Sheet Spider Web

Funnel Spider Burrow

Researchers have duplicated this extraordinary material. A man-made silk protein called BioSteel is 7-10 times stronger than steel of equivalent weight, can be stretched to 20x's its unaltered size without losing strength, and is resistant to high temperatures. Scientists make BioSteel by incorporating spider silk spinning genes of a golden orb weaver (*Nephila clavipes*) into transgenic goats and then extract it from the goat's milk. Once purified and dried, it could be transformed into microfibers. So far, this process has been unsuccessful in producing commercial quantities, but this material is being considered for a wide variety of uses, from artificial tendons and ligaments to bullet proof vests, car airbags and parachutes!

Because spider webs consist of protein and need to be replaced to remain effective in capturing prey as well as for the spider's safety, a spider will consume its own web to recycle the valuable resource. Some spiders do this daily.

You can read about the burrow of the turret spider in a separate article in your binder. All these photos of spider webs and burrows were taken at Edgewood Natural Preserve. Next time you're on the trail, look more closely to see how many different kinds you can find!

Turret Spider Burrow

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Edgewood's Harvestmen by Kathy Korbholz

Edgewood Natural Preserve is home to two of the Bay Area's seven harvestmen that are federally listed as species of concern. They are the Edgewood blind harvestman, *Calicina minor,* and the Edgewood microblind harvestman, *Microcina edgewoodensis*. Harvestmen, commonly known as "daddy-longlegs," are not spiders, despite their superficial resemblance. While both harvestmen and spiders are arachnids, harvestmen belong to the order Opiliones, while spiders are in the order Araneae.

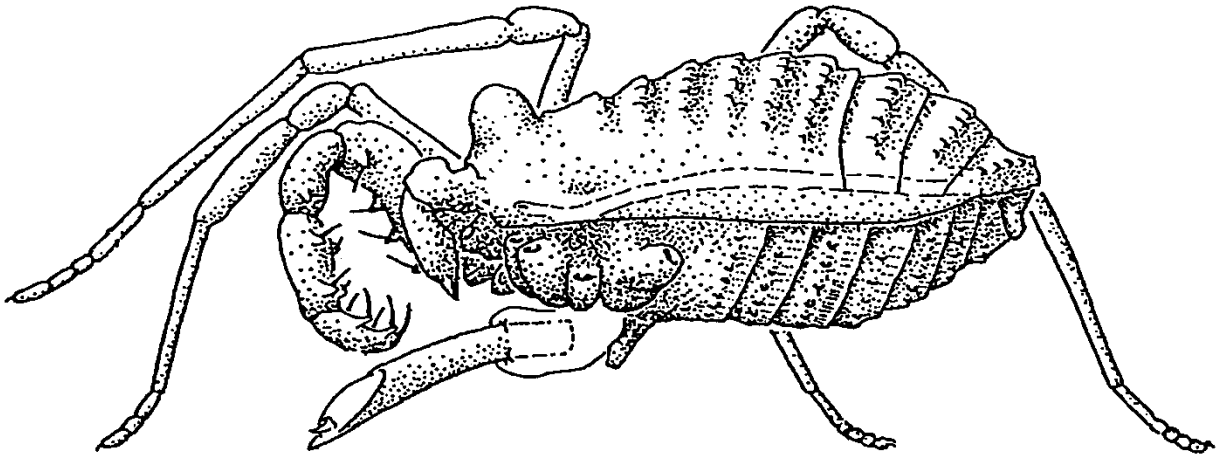


Illustration of *Microcina* sp. magnified approximately 100x. (Legs on near side of body are not shown.)

The harvestman order contains 3,200 species worldwide, with the majority of species occurring in tropical regions. Harvestmen typically have unusually long and thin legs in relation to their small, oval-shaped body. But, harvestmen found at Edgewood are tiny, mite-sized animals, roughly 1 millimeter long (1/16 inch).

Members of the genera *Calicina* and *Microcina* belong to the family Phalangodidae, arachnids which are characterized by simple paired claws on the posterior tarsi (the terminal segments on insect and spider legs). Very similar in appearance, the most evident distinguishing characteristic between the two genera is the presence of an eyespot in the genus *Calicina,* which is absent in *Microcina*. Despite their nearly microscopic size, these animals are easily detected when their yellow, orange or reddish-brown body coloration contrasts with the undersides of displaced wet stones. They can also be identified by their motionless stance or slow movements. Blind and microblind harvestmen are endemic (prevalent in or peculiar to a particular locality) to California. Both of the Edgewood species are found only on serpentine soil.

At Edgewood both of these harvestmen species co-occur with two other federally listed species: the

threatened Bay checkerspot butterfly (*Euphydryas editha bayensis*) and the endangered San Mateo thornmint (*Acanthomintha obovata* ssp. *Duttonii)*.

The Edgewood blind harvestman is found only at Edgewood, while populations of the Edgewood microblind harvestman occur both in Edgewood and in the "Triangle" west of Interstate 280, but nowhere else. The known populations of these two species were bisected by the construction of the freeway in the 1960's. Historically, the Edgewood blind harvestman was also found just north of the Crystal Springs Dam, but it is believed to be extirpated (locally extinct) from this location.

Almost all of the individuals encountered in the field are adults. The appearance of these adults coincides with the onset of the winter rainy season in California. The absence of young suggests that development takes place beneath the soil. Harvestmen typically oviposit directly into the soil, where the eggs are presumed to develop. Normally, only one or a few adults are present under each rock, where they feed on springtails (very small, primitive insects in the order Collembola). The drying of the ground beneath rocks seems to result in their disappearance until the next year's first major rain.

These two Edgewood harvestmen species are always found in serpentine soil, primarily beneath medium to large rocks (4 by 4 inches to 18 by 18 inches), which have been in undisturbed contact with the soil for a prolonged period. It is presumed that rocks of these dimensions act most effectively to retain ideal humidity and thermal conditions. Individuals are not found on rocks in standing or running water, and are seldom found on hilltops or in windswept areas.

While little is known of the ecology and life history of these species, it is certain that their survival will depend upon the continued existence of favorable conditions. Disturbance of the soil, introduction of predatory species, or other environmental changes could spell disaster for these two species of concern at Edgewood.

Key facts about Edgewood's harvestmen:

- Taxonomy

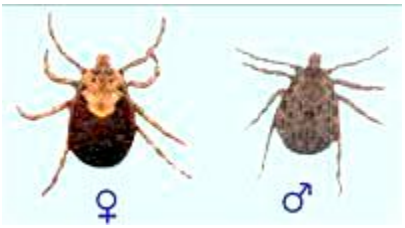
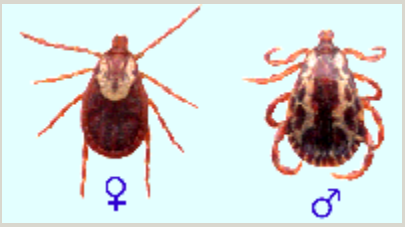
Kingdom	Animalia
Phylum	Arthropoda
Class	Arachnida
Order	Opiliones
Family	Phalangodidae
Genus species	*Calicina minor / Microcina edgewoodensis*

- Federally listed as species of concern
- Found only at Edgewood (microblind harvestman also found in Triangle)
- Endemic to serpentine soil
- Near microscopic size
- Not spiders

Source: U.S. Fish & Wildlife Service. 1998. *Recovery Plan for Serpentine Soil Species of the San Francisco Bay*. Portland, Oregon.

Common Ticks of San Mateo County

Although there are 21 species of hard ticks in San Mateo County, the list below shows the most common ticks that people and pets contact in the environment.

Ticks	Characteristics
 Ixodes pacificus **In general, adult ticks are the size of a sesame seed; nymphs the size of a poppy seed.**	**"Western Black-Legged Tick"** Adults quest along trails November to May Adults feed readily on humans, horses, dogs, and other large mammals Larvae and nymphs are active March to early August, peaking in April to June Larvae and nymphs feed primarily on lizards but may also attach to rodents and people Importance: Primary vector of Lyme disease to humans in California
 Dermacentor occidentalis	**"Pacific Coast Tick"** Adults feed on cattle, horses, deer, dogs, and humans Adults reach peak activity from April through May but are present along trails from November through August Larvae and nymphs feed on small rodents and other small mammals in spring and summer Vector of Tularemia and Rocky Mountain Spotted Fever, and both have been detected in ticks in San Mateo County
 Dermacentor variablis	**"American Dog Tick"** Adults feed on dogs and large mammals, including humans Adults along trails primarily from March through July Larvae and nymphs feed on rodents and other small mammals, they are active from late winter to summer Vector of Tularemia and Rocky Mountain Spotted Fever, and both have been detected in this tick in San Mateo County

Source: This information is taken from the website of the San Mateo County Mosquito and Vector Control District: www.smcmvcd.org/ticks.

Common Questions about Lyme Disease

What is Lyme disease?

Lyme disease is caused by a bacterium (*Borrelia burgdorferi*) which is transmitted by ticks. It may be cured by early diagnosis and appropriate antibiotic treatment, but it may persist in the human body for years if not properly treated. Lyme disease was named for Old Lyme, Connecticut, where the first cases of Lyme disease were reported. The first case in California was reported in 1978. It is currently the most commonly reported tick-borne disease in California, as well as in the United States.

Is the tick that transmits Lyme disease in San Mateo County?

Yes, the most commonly encountered tick in San Mateo County during winter and spring is the western black-legged tick (*Ixodes pacificus*), a known vector of Lyme disease. Lyme disease bacteria have been detected in approximately 3% of western black-legged ticks in San Mateo County. Infected ticks have been found along recreational trails throughout the county.

How do people get Lyme disease?

People become infected when they are fed on by infected ticks. Adult ticks are commonly encountered when people's clothing brushes over grass or bushes along the edges of hiking trails. Nymphal ticks occur on fallen logs and leaf litter in wooded areas. People can pick them up on their clothes or skin when leaning against trees, sitting on logs, or playing in fallen leaves. Nymphs are particularly dangerous because their small size allows them to go undetected and they may feed on a person for several days without being found.

If I am bitten by a tick, will I get Lyme disease?

Not necessarily. First, not every tick carries the infection. Second, laboratory evidence indicates that the bacterium is usually not transmitted to humans until the tick has fed for at least 48 hours. The best defense against Lyme disease is to check for ticks after hiking and to remove ticks as soon as possible after they attach.

What are the symptoms and signs of Lyme disease?

An early sign of Lyme disease infection often includes a spreading "bulls-eye" rash which may be accompanied by fever, aches, and/or fatigue. Symptoms that occur during the later stages of the disease can include complications of the heart and/or nervous system as well as severe arthritis. Lyme disease presents itself with a variety of symptoms and signs in different people. If infected, you may experience one, both, or none of these symptoms/stages and they could overlap.

Source: This information is taken from the website of the San Mateo County Mosquito and Vector Control District: www.smcmvcd.org/ticks.

An Edgewood Bird Sampler by Carol Belew

Here are a few interpretive notes on birds you might see at Edgewood Natural Preserve. Look at these birds in a field guide—like the one on the Friends of Edgewood website—to match picture with description, and you'll be able to share some information with visitors.

These notes were originally written in 1999 and were revised in 2015, with the help of Susie Hons of the Sequoia chapter of the Audubon Society. The Sequoia chapter conducts monthly Sunday morning walks at Edgewood Natural Preserve. Whether you are a "birder" or a "birdwatcher," a beginner or an expert, Audubon walks provide an excellent opportunity to learn about the more than 100 bird species seen at Edgewood.

Raptors—Hawks, Falcons, Kites

Raptors seize and capture their prey. From Latin *rapere*, to seize.

Red-tailed Hawk. A large hawk, often seen soaring overhead or perched conspicuously on poles or towers. Our most common hawk, known by its red tail (adult only) Dark head, pale chest often showing streaked "belly band." Always identifiable in flight by dark patagial bars under forward edge of wing (the leading edge of the wing is called the patagium). Look at this in your field guide as it is an important ID factor and separates "red-tails" from other hawks. Eats small mammals, birds, reptiles.

Red-shouldered Hawk. Smaller, slimmer cousin of the red-tail; flaps more in flight and is recognized by its reddish breast and shoulders. In flight, look for its heavily banded tail and translucent crescent-shaped "wing-windows" next to dark wingtips. A fairly easy bird to see at Edgewood as it nests locally and is often heard calling.

American Kestrel, *Falco sparverius*, once called sparrow hawk. Our most common falcon, an exquisite, colorful little raptor which hovers gracefully over open areas in search of small rodents and large insects (check power poles along 280 where it often perches). Male easily identified by two dark "sideburns" on each side of face, russet-brown back and tail, and blue-gray pointed, sickle-shaped falcon wings. Translucent spots along trailing edge of wing resemble "string of pearls" in flight. A cavity nester.

Turkey Vulture, *Cathartes aura,* a flying scavenger, whose name means "cleaner" in Greek. Provides a valuable service to nature by recycling carrion, which makes up most of its diet. It has keen eyesight and an incredible sense of smell. Its naked red head reduces feather-fouling when it thrusts its heavy bill into a carcass to rip flesh. Body all black with silver linings along trailing half of wings (looks like a "wing-within-a-wing"). Floats in sky in a dihedral shallow **V**; often rocking from side-to-side, rarely flapping.

The Corvids—Ravens, Crows, Jays

The Corvids are considered the most intelligent of all birds

Common Raven: *Corvus corax* ("croaking raven") has more fun than any bird. Larger than crows, all black with diamond- or wedge-shaped tail, ravens are quite acrobatic, sometimes tumbling through the sky; also seen soaring like hawks on long, stiff wings. Emits a hoarse *croak-croak-croak*. Its size, blackness and intelligence have made it an almost universal object of superstition and embodiment of deity as a powerful hero, shape-shifter, creator and helper.

American Crow: *Corvus brachyrhynchos* ("short beak") is smaller in size than its cousin the raven. It has a shorter, fan-shaped tail with a straight edge. Wing beats are smooth and faster than the raven's. While raven wings make a "swishing" sound during flight, crows are usually silent. Their usual call is *caw-caw-caw,* though they can produce a wide variety of sounds and sometimes mimic the noises of other birds and even animals. They are highly social and are often seen in groups working together in a behavior known as "mobbing" to drive off predators.

Our Two Jays *Please do not call these "blue jays." The blue jay is an Eastern bird. Not all jays are blue ~ some tropical jays are green, some brown.*

Western Scrub Jay. Aggressive blue-and-gray bird with round head, no crest, long tail; often heard screaming *What!What!What!* its noisy, loud call repeated several times. Common in oaks and chaparral. Bounces, hops around on ground. Flight short, ending in a sweeping glide.

Steller's Jay. Bold, raucous bird of pine-oak woodland and conifer forests, easily identified by its black crest, dark blue body. Named for a German naturalist who accompanied Vitus Bering, a Danish navigator employed by Russia to determine if the coasts of Siberia and Alaska were contiguous. Steller wrote an account of his travels describing birds and mammals, among them Steller's sea lion and Steller's eider, a duck of northern waters noted for its "eiderdown."

Two Towhees

California Towhee. (formerly Brown Towhee). Common year-round resident, often seen in pairs (when you see one, look for another ~ one feeding while the other stands guard); all brown with cinnamon patch under a long tail. Common in dense underbrush where it scratches on the ground to uncover food; nearby shrubbery provides escape. Listen for its characteristic metallic "*chink-chink-chink*" notes.

Spotted Towhee. (formerly Rufous-sided Towhee). More of a skulker than the California Towhee. A fairly large ground feeder who likes scrubby underbrush and leaf litter where it scratches noisily among dead leaves, kicking backwards. Black hood and back contrast sharply with reddish-brown flanks and white belly; tail black with large white spots; white outer tail feathers; red eye (good for seeing in dark understory). Emits a catcall and another spluttering, downward raspberry sound like a Bronx cheer.

Two Thrushes

American Robin. Hops with erect stance on lawns; look for it in grass near Day Camp picnic tables. Adult male has dark back, brick-red breast; female paler; young speckle-breasted with rusty wash on breast (you can see the young in early summer). Often heard singing, an up its bright up-and-down song, *Cheery-cheery, Cheery-cheery*.

Western Bluebird. Another must-know for docents; visitors love this bird! Look for it along low fence lines in grassland, in the Bay checkerspot butterfly habitat, and in the area of *Fritillaria liliacea*. You can't miss the male's brilliant blue body and reddish wash on breast (female paler). Often hovers and flies out to capture insects, its favorite food; also feeds on the ground in grasslands. Always check low fence lines. Another cavity nester, its declining population has been the impetus for bluebird recovery programs throughout the country (including at Edgewood) to provide and monitor nest boxes for this beautiful bird and its eastern counterpart, the Eastern Bluebird.

Other Medium-sized Birds

Dark-eyed Junco. Sparrow size, solid black head appears "hooded," pale flesh-colored bill. White-edged tail feathers flick and flash in flight. Nests at Edgewood. Name from *Juncus*, Latin name for members of the rush family (Juncaceae). Junco was an Old World name for a bird of reedy habitats; compare the plant family represented at Edgewood by *Juncus xiphioides, J. effusus pacificus, J. patens, J. bufonius*, and *J. occidentalis*.

Western Meadowlark. Cheerful, bubbly flute-like song often heard before seen in Edgewood's grasslands. A popular bird to listen and watch for on your spring walks! Mottled brown back, striped head, bright yellow breast with black **V** (football sweater?). Large feet adapted to walking on ground. White outer tail feathers prominent in flight; stiff wings, nose pointed up in flight.

California Thrasher. Basic-brown, robin-size, strongly down-curved sickle bill unmistakable. A skulking resident of chaparral and brushy areas, best seen singing from atop *Baccharis pilularis* in upper Clarkia Trail in spring, a raspy, guttural repeated song sounding like a cross between a robin and a mockingbird. Visitors often ask if it "thrashes" (no, its name is a variant of thrush).

California Quail. Our state bird, strikingly patterned and decorated with an improbable black forehead plume used by some Native Americans to decorate baskets. Quails belong to a group called gallinaceous birds (chicken-like ground feeders), feeding on the ground and flying only in short bursts to escape danger. Strong bill for seed-cracking, strong legs for running; plump body, wings short and broad, wing beat rapid, noisy. Listen for its distinctive 3-syllable call *Chi-ca-go* + clucking notes often heard in brush.

Three Woodpeckers

Woodpeckers have singular adaptations for their lifestyle: hard, straight chisel-like bills in skulls specially reinforced to withstand shocks; long, mobile barbed tongues that wrap around inside their heads; stiff tail feathers that act as a prop and stabilizer in climbing trees. Truly a remarkable bird!

Acorn Woodpecker. Called *el carpintero* by the Spanish, it hammers holes in poles or tree trunks, then jams acorns in the holes pointed end first so they are flush with the surface and unobtainable to squirrels (only the woodpecker can get them out). Red head, black and white body, white wing patches prominent in flight.

Nuttall's Woodpecker. For Thomas Nuttall, a naturalist whose first interest was botany and curator of Harvard's Botanical Gardens in 1800s, later devoting himself to ornithology. Some plant species bear his name. One of his namesakes is this black-and-white woodpecker with barred (laddered) back; male has red cap, female no red in head. This bird likes wooded canyons where its distinctive long, trilly rolling call is hard to mistake. Look for it clinging to an oak as it grubs for wood-boring insects.

Northern Flicker. A brown, ground-foraging woodpecker with black "bib," speckled belly; white rump-patch and gorgeous red wing linings seen in flight (hence, red-"shafted," one of its names). Male has black line off bill (mustache). Probes on ground for ants, catches insects in air. Voice a loud *kekekekekekekeke* heard throughout Edgewood, check treetops in direction of sound.

Two Flycatchers

Black Phoebe. One of the sassy flycatchers, frequently seen near the 280 Overpass on a favorite perch from which it makes forays out to snap up aerial insects. Its distinctive tuxedo-like appearance, black head and back, white underbody and flycatcher crest make it easy to identify. Pumps its tail.

Ash-throated Flycatcher. Look for this bird in late spring and summer; mostly brown with pale gray (ashy) throat and breast, reddish-brown on tail, prominent brown crest. Its distinctive burry *BRTTT* or *Ka-brik* call often heard in Edgewood's grassland oaks where it darts out to snatch an insect on the wing, then returns to its low perch.

Other Small Birds

House Finch. Most people are familiar with this regular neighborhood bird common near houses and in many habitats. Red head and breast in male; female brown, streaked.

Purple Finch. Prefers woodlands, especially conifers. Male's head and upper body a deep wine-red (like he's been dipped in raspberry juice). Often sings from tree top during nesting season ~ a long, loud rich warble that some birders liken to a sloppy bugler playing reveille.

Lesser Goldfinch. Sometimes referred to as a *wild canary*. Male bright yellow with black wings and tail; female head and back greenish yellow. Loves thistles, sunflowers, dandelion seeds; prevalent late summer and fall to coincide with thistle crop. Look for flocks at that time in the Triangle and grasslands near 280. Roller-coaster flight (typical of finches), undulates up and down in flight.

Oak Titmouse (formerly Plain Titmouse). Perky little gray bird with gray crest, black beady eyes. Favors oak woodlands. In spring says *peter-peter-peter* or *su-weet, su-weet, su-weet*; has several songs, all lively and cute; call raspy, like a hoarse *Chick-a-dee* with bronchitis.

Bewick's Wren. Brown back, white undersides, long barred tail held up. Bold white eyestripe distinguishes it from most other wrens. Song distinctive, a whirring wind-up, followed by *beep-beep-beep* (like phone dialing-?), heard throughout Edgewood pretty much all year. Named for English author/wood engraver Thomas Bewick (1754-1828); pronounced *Bu-ick*, like the car: the song has been likened to the noise of trying to start a cold car in winter (the whirring wind-up); second part of song sounds like the car horn (the *beep-beep-beep-beep*).

Wrentit. Brown body, salmon-colored breast; long unbarred tail held up and out; short hopping flight, bush-to-bush. Lives in the brush of chaparral. Called "The Voice of the Chaparral," its song is several short notes followed by a series of staccato ringing notes on one pitch, like a ping-pong ball. More often heard than seen, it is curious and responds well to "pishing." Try standing near its bush; say *pshh-pshh-pshh* (or kiss the back of your hand with a squeak) ~ you may observe it working its way in toward you, and it may even pop up in view!

Northern Rough-winged Swallow. A special bird at Edgewood, look for it late spring and summer under the 280 freeway (the southern overpass) where it nests in small holes. Our only brown (and white) swallow, it often perches on fences near. An insectivore, very fast in the air with lovely, swept-back wings. Its name comes from small hooks on outer edge of wings, function unknown.

Anna's Hummingbird. Hummingbirds are only found in the Western Hemisphere and are the only birds that are capable of flying backwards. This highly energetic "jewel" is found year round at Edgewood. Body about 4" long; the long, straight, slender bill is ideally suited for obtaining nectar from tubular-shaped flowers. Insects are also on the menu. Sunlight turns the head and throat feathers of the male a bright red, its back an iridescent green. Perched on shrubs and trees, the male will emit a scratchy metallic sound. During courtship, he will fly to a height of 130ft. then dive at approx. 60mph. Pulling up at the bottom of the dive, he'll use his tail feathers to create a loud chirp.

Some Colorful Summer Visitors – Neotropical Migrants

Wilson's Warbler. Male bright yellow, black cap; female duller. Named for Wilson, an ornithologist/artist.

Orange-crowned Warbler. Most characteristic feature is its lack of any strong field mark. A dull yellow bird of the canopy, orange crown rarely seen, song heard throughout Edgewood's riparian, oak woodland and scrub communities in spring (and most places locally), a rapid, descending trill. I've seen a male feeding his chick in early June on the Sylvan.

Black-headed Grosbeak. Large finch with a HUGE conical beak (hence gros-beak). Male showy black-and-orange, black head, song similar to a Robin, but more sloppy, bubbly.

Blue-gray Gnatcatcher. A special bird; pair has been observed building a nest along Ridgeview trail; also nests across from Edgewood at Pulgas Ridge OSP. A lovely little blue-gray bird with a white eye ring and white outer tail feathers; in contrast, its call is a querulous nasal whine.

Reference: www.allaboutbirds.org/guide

Birds of Edgewood Park and Natural Preserve

by Lee R. Franks

During the early 2000s, Lee Franks, a good Friend of Edgewood, wrote a series of 25 articles for the *Edgewood Explorer* describing some of the more than 100 species of birds that have been identified in the park. As *Edgewood Explorer* editor Anne Koletzke noted in June 2008, "Lee's knowledge of all things feathered is extraordinary, and in sharing it with us, he has made an inestimable contribution to the newsletter and to the Edgewood community."

A long-time member of the Sequoia Audubon Society, Lee conducted bird surveys at the chapter's Murray Ranch site off Skyline Blvd. Lee also volunteered with the Bluebird Recovery Program, which installs and monitors nest boxes throughout the United States. Lee installed boxes in grasslands across San Mateo County—at Runnymead and Filoli and, beginning in 1997, here at Edgewood. You can read more about this program and Lee Franks' work in Frances Morse's article "Bluebird Monitoring Program at Edgewood Natural Preserve" (in the binder). In addition to his many birding activities, Lee also volunteered in the 1990's as a member of the Trail Patrol at Edgewood.

At the Friends of Edgewood website, you can search for the archived copies of Lee Franks' original articles (see the list at the bottom of the page). Here we offer just a few of our favorites, slightly edited for length.

- **Red-shouldered Hawk** – originally published in the June 2004 *Edgewood Explorer*
- **Our Woodpeckers** – originally published in the December 2002 and March 2004 *Edgewood Explorer*
- **Western Bluebird** – originally published in the March 2008 *Edgewood Explorer*

Below is the complete list of articles that Lee Franks wrote on birds at Edgewood. Find them all at the Friends of Edgewood website: http://www.friendsofedgewood.org/newsletters (or choose "Newsletters" in the DISCOVER menu on the home page).

American Kestrel	June 2005	Lesser Goldfinch	Dec. 2006
Bewick's Wren	Sept. 2006	Northern Flicker	Mar. 2004
Bird Monitors	Dec. 2005	Northern Harrier	Mar. 2007
Bird Song	Mar. 2006 & June 2006	Oak Titmouse	Sept. 2007
		Our Woodpeckers	Dec. 2002 & March 2004
Birds That Nest in Cavities	Sept. 2001		
California Quail	Sept. 2002	Red-shouldered Hawk	June 2004
California Thrasher	Mar. 2005	Steller's Jay	Sept. 2004
Chestnut-backed Chickadee	June 2007	Swallows	June 2003
Cooper's Hawk	Dec. 2001	Western Bluebird	Mar. 2008
Flycatchers	Sept. 2003	Western Meadow Lark	Mar. 2002
Golden Pheasant	Dec. 2003	Yellow-rumped Warbler	Dec. 2004
Kinglets and Vireos	Mar. 2003		

Red-shouldered Hawk by Lee R. Franks

Birds and people are "sight animals." For both, the eyes are the dominant sense organs, vastly more important than their inferior sense of smell. The reasons for our sensory similarity to birds can be found in human evolutionary history. At one point the ancestors of *Homo sapiens* were small, tree-dwelling primates. When leaping from limb to limb and snatching insect prey with the hands, sharp, binocular vision was very handy; those of our forebears that tried to smell the location of a branch on which to land were unlikely to survive to reproduce. And since in the breezy treetops odors quickly dissipate, they do not provide good clues for detecting food, enemies, or mates. Birds, flying higher and faster than primates leap, naturally also evolved sight as their major device for orienting to the world.

The term "hawk-eyed" accurately describes raptors like the Red-shouldered Hawk, *Buteo lineatus*. They have eyes designed for high "visual acuity." There is, in fact, evidence that hawks can distinguish their prey at something like two or three times the distance that a human being can detect the same creature. One way they have attained such a high degree of acuity is by having relatively large eyes. But more than size alone appears to account for the astonishing performance of the eyes of hawks. Evolution has arranged the structure of their eyes so that each eye functions very much like a telescope. The eye has a somewhat flattened lens placed rather far from the retina, giving it a long focal length, which produces a large image. A large pupil and a highly curved cornea admit plenty of light to keep the image on the retina bright.

The Red-shouldered, a mid-sized hawk (19 in.), does most of its hunting from a perch. Sitting atop a fencepost, utility pole or tree, it waits patiently to detect snakes, mice, and frogs. It prefers riparian and oak woodlands, but also occupies eucalyptus groves and residential areas. The pair that breeds at Edgewood nest in a large eucalyptus tree near the parking lot. The breeding season is about 150 days, beginning in February. They usually lay 3 eggs.

Appearance

The Red-shouldered Hawk is distinguished by its "red" shoulder patches, black and white checkered flight feathers, heavily banded tail, and dark rufous chest with white, horizontal streaks. The sexes look alike, but the female is larger in size. Their tails, which are relatively long for a mid-sized hawk, are marked by several wide dark bars with intervening narrow white bars and a white tip. Wings appear 2-toned when viewed from below, with rufous inner feathers contrasting with black and white wing linings.

Behavior

The Red-shouldered Hawk flies with wings and tail outspread when circling above territory. When hunting in open, it flies low and directly toward prey. It will fly 6-15 meters high through trees, below the canopy, often gliding or swooping up to nests. It leaves its nest by dropping off to pick up speed and clear branches before flapping. The female roosts on nest until young are 3-4 weeks old. The male generally roosts several hundred meters away from nest. These birds are solitary or in pairs year-round. They are rarely found in flocks, even during migration.

Sounds

The Red-shouldered Hawk is the most vocal raptor in our area. Adults and juveniles call at any time of year, but calling becomes more regular and frequent between November and May, peaking in the January to April period. Female vocalizations are noticeably lower-pitched than those of the male. While their vocal array consists of seven calls, the most common is the **kee-aah**, which has accent on the first syllable and a drawn-out second syllable with a downward inflection. This call is usually performed 5-10 times, followed by a 10-20 minute interval of silence. The call is used when announcing territory in early spring, up to start of incubation, after which adults become much quieter. The call is also used as an alarm.

Breeding

Red-shouldered Hawks maintain their territories and home ranges throughout the year and begin to pair in February. Courtship lasts about 3 weeks, with nest building/refurbishing starting before courtship ends. Egg-laying takes place in March, with hatching occurring about 5 weeks later. The nesting period averages about 6-7 weeks with nest departure generally taking place in June. Their nests are composed mostly of live or dead sticks, dried leaves, strips of bark and lichens. The inner cavity is lined with finer shreds of inner bark, mosses and lichens. Pairs, not necessarily the same birds, may reuse the same nest for many years. The nest in the Park has been used for the past 4 years.

Photo Credits

The photo for this article depicts an actual Red-shouldered Hawks that lived at Edgewood. It was photographed by George Raiche and appears on his website, www.digibird.com. There you will find a fascinating photo-history of their nesting activities for the past four years. *Lee Franks' original article, which includes additional photos, was published in the June 2004 Edgewood* Explorer. *George Raiche wrote and photo-illustrated an article about the nesting Red-shouldered hawks at Edgewood that was published in the June 2002* Explorer.*-ed.*

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Our Woodpeckers by Lee R. Franks

When we think of bird sounds, singing is the first thing that comes to mind. But many birds have found other ways of generating acoustical signals to serve functions usually accomplished by songs. Some bird sounds are produced with their bills, feet, wings, or tails. The best known use of bills to produce auditory displays among North American birds is the drumming of several woodpecker species. They do this by striking their bills against a hollow or dried tree branch, or, to the annoyance of many homeowners, metal gutters, drainpipes or even trashcans.

Why do woodpeckers peck wood? They want to get the insects hiding underneath the bark. Woodpeckers have extremely acute hearing and are capable of hearing bugs crawling under bark. If they don't hear them, they surely can feel the vibrations the insects create as they move about. Powerful muscles and a tough bill are necessary to produce the tremendous force needed to break through the bark. But while the woodpecker is pounding away at the bark, its brain is being subjected to hundreds of pounds of force. Any other bird's brain would be turned to mush, but the woodpecker's brain has a cushion that absorbs this pounding. The apparatus that supports the use of the bill is impressive: strong, grasping feet (2 toes pointed forward and 2 backward) that work in concert with stiff tail feathers to form a triangular brace, allowing the bird to position itself for its strenuous pecking.

After the hole is drilled into the tree, how does the woodpecker get the bug out? It can't grab it with its bill, because the bill is the same size as the hole. What it does is insert its long, sticky tongue, which is 3 times longer than its bill, into the hole, catch the insect, pull it out and eat it. But where does it put this long tongue when it's not using it? It's too long to keep in its bill, but it can't be left hanging out. What the woodpecker does is stick its tongue into a nostril up inside its skull and wrap the tongue around its skull, under its skin.

We're most aware of woodpeckers in the early winter months when the woods are pretty much silent except for a solitary tap, tap, tap. It's not a loud tap, but it is distinct. Often it will be the **Downy Woodpecker (*Picoides pubescens*)**, the smallest woodpecker in North America (7"), and one of 5 woodpecker species present in the Park. It is usually alone, as they don't associate with their own kind until spring.

As spring approaches, the Downies—with their black- and white-striped head, black upperparts, white in center of the back, and white spots on their wings—change their behavior. For one thing, their tapping becomes a quite different unbroken trrrrrrrrr lasting several seconds. This tapping, known as drumming, is no longer simply an effort to get food, but a means of communication to other Downies that this is "my" territory. It is also the first attempt to attract a mate.

Both sexes drum. After the drumming unites the pair, courtship begins, resulting in a bonding of the pair and excavation of a cavity in a living or dead tree as high as 50 feet above the ground. It requires quite a bit of work for both birds, over a week or more, to carve a gourd-shaped cavity, into which the female lays 4-5 pure white eggs, which both parents incubate for 12 days until they hatch.

A close relative of the Downy is the rather shy **Hairy Woodpecker (*Picoides villosus*)**. White backs generally identify both a Downy and a Hairy, but the Hairy is much larger (9-12"), and forages on taller trees. Hairy Wood-peckers have bills that are equal to or longer than the length of their head, whereas the Downy bill length is shorter than its head.

The **Nuttall's Woodpecker (*Picoides nuttallii*)** is generally similar to and only slightly larger than the Downy, but is readily distinguished by the presence of white/black barring on the back (mid-back pure white on the Downy).

Nuttall's have similar forage preferences as Downies and will defend their territories just as aggressively as the Downies. While they are often seen foraging in the oaks, acorns make up only a small part of their diet. Insects such as beetles, caterpillars, ants and bugs are sought among the oaks with the most abundant foliage. They creep diagonally as they forage in crevices and underneath bark, often hanging upside down as they probe. While probing, an individual often turns its head from side to side and peers into crevices.

Walkers may be surprised by a woodpecker flushing from the ground before them. As the jay-sized **Northern Flicker (*Colaptes auratus*)** beats a hasty retreat, it reveals an unmistakable white rump and red wing linings, contrasting strikingly with its rich brown/black-barred back. The center of their chest sports a black crescent and the face and upper breast is gray with a prominent red moustache stripe.

The Northern Flicker is the least arboreal of our woodpeckers, as it spends more time feeding on the ground than in the trees. They are the "anteaters" of the bird world. Since ants contain formic acid, which is believed to kill small parasites living on the flickers' skin and feathers, flickers will not only eat ants but squash them and then preen themselves with the remains.

Since Northern Flickers do not have the super-hammering apparatus of most woodpeckers, they can't drill into hard wood, and need rotten or soft trees for nest cavities.

Last, but not least, is the highly social **Acorn Woodpecker (*Melanerpes formicivorus*)** a cooperative breeder that lives in family groups of up to a dozen. Only a pair or two may actually breed, so the remainder of the group helps the parents raise the young. Acorns are probably best known for their unique method of storing acorns in specialized trees called granaries, which are available to all family members. Group living and acorn storage are not however characteristics of the population in Edgewood, which appear to be a splinter group from a family group located somewhere outside the Park boundaries. Insects are their preferred food and are eaten at any time of the year when weather permits. Acorns are supplemental and are eaten, rather than stored.

This woodpecker is medium sized (9"), clown-faced, black and white with a distinctive red crown, glossy black and white head, white eyes, and a yellow throat. They have a limited presence (winter only) in the Park, but when you hear waka, waka, waka, their most common vocalization, you can be sure they are not very far away.

Downey Woodpecker

Hairy Woodpecker

Nuttall's Woodpecker

Northern Flicker

Acorn Woodpecker

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Western Bluebird by Lee R. Franks

Western Bluebirds (*Sialia mexicana*) are small thrushes that live and breed in Edgewood Natural Preserve.

Appearance

Males are easily identified by the brilliant blue plumage of their heads, wings, and tails, and by their rust-colored breasts. Females are duller and have more brown and gray in their feathers. The superficially similar, but smaller, Lazuli Bunting also has blue upperparts and chestnut on the breast but have conical bills and prominent white wing bars.

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Diet

Western Bluebirds are predominately insectivores (92% animal, and 8% vegetable). They typically consume grasshoppers, beetles, ants, flies, and caterpillars. They also consume small fruits like currants, grapes, elderberries, mistletoe, and poison oak berries.

Breeding

These birds are socially monogamous. Both partners usually care for their young, but they also seek to mate outside the pair bond, with the result that offspring are not always related to their attendant male. Western Bluebirds are also cooperative breeders, which is only true of about 3%, or approximately 300 species, of bird species worldwide.

Cooperative breeders, as the name implies, help other breeders (usually parents or stepparents) to raise their young while waiting for an opportunity to breed themselves. These helpers are young from the breeding pair's previous broods, and their helping tasks include defending territories and bringing food to nestlings. Scientific studies show that breeding pairs with helpers fledge more young than those without helpers, primarily because they suffer less stress, and hence survive longer and are more likely to re-nest.

How do helpers finally achieve breeding status? Waiting for an opening is the first step. Females monitor nearby groups and move quickly to replace females that disappear. Males, on the other hand, inherit breeding positions on their natal territories in relation to their age and status. The dominant (usually oldest) son replaces his (deceased) father, stepfather, or brother. Helpers may also take over a separate portion of the family territory for their own breeding purposes.

Although the helpers may appear to act altruistically (i.e. one bird seems to put itself at risk to help another, like a bird in a flock that spots a predator and gives an alarm call, alerting the rest of the group), they actually act in their own best interest. Achieving status on an exclusive territory is difficult when occupied territories saturate the habitat. By helping to raise another's brood, the helpers enhance their own chances for breeding through inheritance of a territory or through other forms of territory acquisition.

Why has evolution produced cooperative breeding? Current thinking of the scientific community is that cooperative breeding arises when environmental constraints severely limit the opportunities for younger birds to breed independently. These limitations may include a shortage of territory openings because higher quality habitats are saturated with established breeders, or an unpredictable availability of resources that could make it too risky for individual pairs to commit themselves to reproduce in any given year.

Western Bluebirds reside in stable environments that have specialized habitats (low-growing grasslands sprinkled with oak trees), so there is little marginal or secondary habitat for young individuals to occupy. Consequently dispersal of young is limited and cooperative breeding becomes a way, perhaps the only way, for individuals and the species to survive.

We know, for example, that development along California's Central Coast—from Santa Barbara County to Monterey County—is leading to the clear-cutting of oaks, upon which Western Bluebirds depend, changing the oak woodlands into treeless acreage for agricultural use, particularly vineyards. Hopefully, because they are cooperative breeders, the Western Bluebirds will successfully survive this challenge as they have so many others.

See also Frances Morse's article on Edgewood's Bluebird Box Monitoring Program in this binder. –ed.

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Bluebird Monitoring Program at Edgewood Natural Preserve by Frances Morse

History

Twenty years ago a Western Bluebird (WEBL) was a rare sight at Edgewood Natural Preserve. Indeed, the WEBL population was in decline all over California due to habit loss in rural areas. (Bluebirds need holes/cavities found in decaying trees or wooden fence posts for nest building). The California Bluebird Recovery Program (CBRP) was started in 1996 to bring back these beautiful creatures. Volunteers built nest boxes and created bluebird trails (groups of nest boxes in one location) all over California. Lee Franks, a member of the Sequoia Audubon Society (SAS), volunteered with CBRP in San Mateo County. In 1997 he established a bluebird trail in Edgewood Park. He started with 10 nest boxes, and bluebirds returned to our park! Over the years, he added more boxes, getting up to around 30. The boxes were scattered around the park, primarily in the grasslands, but there were a few in the woodlands off the Sylvan and Ridgeview Trails.

Frances Morse inspects Western bluebird nest boxes at Edgewood Natural Preserve

Up until 2010, Lee Franks, through the SAS, did all of the bluebird monitoring, analysis and reporting. He worked closely with Edgewood ranger John Trewin when installing boxes, adding snake guards, and deciding what grassy areas to string cut (to improve bluebird access to insects and to discourage snakes). From 2010 – 2013, Lee and his wife, Marilyn Travis, monitored the boxes on their own. In 2013, they officially retired, and Frances Morse and Mary Wilson took over responsibility for the monitoring. Frances is now in charge. She has worked with several volunteers, most recently Whitney Mortimer and Chris O'Connell. The Friends of Edgewood have a Scientific Permit from the San Mateo County Parks Department that allows us to go off trail to monitor the boxes.

Activities

We currently have 24 boxes that are actively monitored. You will see them in 3 forms: attached to park boundary fences, mounted on metal poles, or hanging in trees. Four boxes are actually outside the park boundaries, but we include them our data. A few boxes are no longer monitored.

Bluebirds build nests out of dried grass and lay 4 – 6 beautiful blue eggs. The female incubates the eggs for 12 – 15 days. After the cute little birds hatch, the nestlings grow quickly and fledge (leave the nest) in 17 – 21 days.

In late winter, we clean out and disinfect each box. (They get pretty yucky and poopy!) Starting in early March, we monitor the boxes weekly until mid-July. Armed with notebooks, inspection mirrors, flashlights, binoculars, and paint scrapers for cleaning out old nests and poop, we walk the bluebird trail, open each box, and count nests, eggs, and hatchlings. When things go right, we eventually open the box to find an empty, but very poopy nest. Then we know how many fledglings have made it to our park from that nest box. We record our observations in a little field notebook, and then enter the data into a spreadsheet for analysis.

Although we have mainly WEBLs, other birds of similar size use our nest boxes. Most recently, we have seen Tree Swallows (TRSW), Violet Green Swallows (VGSW), and Ash-throated Flycatchers (ATFL). We have also encountered Gopher snakes, field mice, and even a sleeping Brown Bat as we opened a box. Bluebird monitoring is not for the faint of heart!

Results

Success can be measured in several ways -- Number of nests, Number of fledglings entering our park, or Survival rate (# fledglings / # eggs). Here are the results from the 2015 season:

Bird	Total Nests	Total Eggs	Total Hatched	Total Fledged
WEBL	17	74	59 (80%)	54 (73%)
TRSW	6	27	16 (59%)	11 (41%)
ATFL	1	5	5 (100%)	5 (100%)
Total	24	106	80 (75%)	70 (66%)

2015 was a fairly good year despite the prolonged drought. We counted 24 nests and 106 eggs, of which 80 eggs hatched (75%) and 70 birds fledged (66%). These 70 little avian additions to Edgewood included 54 Western Bluebirds, 11 Tree Swallows, and 5 Ash-throated Flycatchers. Despite the prolonged drought, our total fledging rate (66%) was the same as 2014. However, there were some effects that may be related to the drought. For example, we observed fewer second nests, and none of the eggs in those nests hatched. We also observed more snake activity compared to prior years. (Food is scarcer for snakes, too.)

As we do each year, we reported our results to the California Bluebird Recovery Project (http://www.CBRP.org) that tracks data from all over California.

Future Steps

Moving forward, we will be coordinating with the San Mateo County Parks Department to improve our program. We plan to relocate some of the boxes that have had little or no activity over the last 3 years, and we are considering adding new boxes. We are hoping to install more snake guard on the nest boxes, too. Monitoring nest boxes is intense work for 4 months each season, but it is highly rewarding and fun! If you have ideas for the Bluebird Monitoring Program or are interested in helping, please contact Frances Morse at info@friendsofedgewood.org.

Natural Resources DataBase (NRDB) Checklist of Birds in Edgewood Natural Preserve

	Most Common Name	Scientific Name
	Mallard	*Anas platyrhynchos*
	California Quail	*Callipepla californica*
	Wild Turkey	*Meleagris gallopavo*
	Double-crested Cormorant	*Phalacrocorax auritus*
	Great Blue Heron	*Ardea herodias*
	Great Egret	*Ardea alba*
	Green Heron	*Butorides virescens*
	Turkey Vulture	*Cathartes aura*
	White-tailed Kite	*Elanus leucurus*
	Northern Harrier	*Circus cyaneus*
	Sharp-shinned Hawk	*Accipiter striatus*
	Cooper's Hawk	*Accipiter cooperii*
	Red-shouldered Hawk	*Buteo lineatus*
	Red-tailed Hawk	*Buteo jamaicensis*
	Golden Eagle	*Aquila chrysaetos*
	American Kestrel	*Falco sparverius*
	Merlin	*Falco columbarius*
	Peregrine Falcon	*Falco peregrinus*
	Ring-billed Gull	*Larus delawarensis*
	Western Gull	*Larus occidentalis*
	California Gull	*Larus californicus*
	Glaucous-winged Gull	*Larus glaucescens*
	Caspian Tern	*Hydroprogne caspia*
	Rock Pigeon	*Columba livia*
	Band-tailed Pigeon	*Patagioenas fasciata*
	Mourning Dove	*Zenaida macroura*
	Barn Owl	*Tyto alba*
	Western Screech-Owl	*Megascops kennicottii*
	Great Horned Owl	*Bubo virginianus*
	Northern Pygmy-owl	*Glaucidium gnoma*
	Vaux's Swift	*Chaetura vauxi*
	White-throated Swift	*Aeronautes saxatalis*
	Anna's Hummingbird	*Calypte anna*
	Allen's Hummingbird	*Selasphorus sasin*
	Acorn Woodpecker	*Melanerpes formicivorus*
	Red-breasted Sapsucker	*Sphyrapicus ruber*
	Nuttall's Woodpecker	*Picoides nuttallii*
	Downy Woodpecker	*Picoides pubescens*
	Hairy Woodpecker	*Picoides villosus*
	Northern Flicker	*Colaptes auratus*
	Olive-sided Flycatcher	*Contopus cooperi*
	Western Wood-Pewee	*Contopus sordidulus*
	Pacific-slope Flycatcher	*Empidonax difficilis*

	Most Common Name	Scientific Name
	Black Phoebe	*Sayornis nigricans*
	Say's Phoebe	*Sayornis saya*
	Ash-throated Flycatcher	*Myiarchus cinerascens*
	Western Kingbird	*Tyrannus verticalis*
	Cassin's Vireo	*Vireo cassinii*
	Hutton's Vireo	*Vireo huttoni*
	Warbling Vireo	*Vireo gilvus*
	Steller's Jay	*Cyanocitta stelleri*
	Western Scrub-jay	*Aphelocoma californica*
	American Crow	*Corvus brachyrhynchos*
	Common Raven	*Corvus corax*
	Tree Swallow	*Tachycineta bicolor*
	Violet-green Swallow	*Tachycineta thalassina*
	Northern Rough-winged Swallow	*Stelgidopteryx serripennis*
	Cliff Swallow	*Petrochelidon pyrrhonota*
	Barn Swallow	*Hirundo rustica*
	Chestnut-backed Chickadee	*Poecile rufescens*
	Oak Titmouse	*Baeolophus inornatus*
	Bushtit	*Psaltriparus minimus*
	Red-breasted Nuthatch	*Sitta canadensis*
	White-breasted Nuthatch	*Sitta carolinensis*
	Pygmy Nuthatch	*Sitta pygmaea*
	Brown Creeper	*Certhia americana*
	Bewick's Wren	*Thryomanes bewickii*
	House Wren	*Troglodytes aedon*
	Pacific Wren	*Troglodytes pacificus*
	Blue-gray Gnatcatcher	*Polioptila caerulea*
	Golden-crowned Kinglet	*Regulus satrapa*
	Ruby-crowned Kinglet	*Regulus calendula*
	Wrentit	*Chamaea fasciata*
	Western Bluebird	*Sialia mexicana*
	Swainson's Thrush	*Catharus ustulatus*
	Hermit Thrush	*Catharus guttatus*
	American Robin	*Turdus migratorius*
	Varied Thrush	*Ixoreus naevius*
	Northern Mockingbird	*Mimus polyglottos*
	California Thrasher	*Toxostoma redivivum*
	European Starling	*Sturnus vulgaris*
	Cedar Waxwing	*Bombycilla cedrorum*

	Most Common Name	Scientific Name
	Orange-crowned Warbler	*Oreothlypis celata*
	Yellow Warbler	*Setophaga petechia*
	Yellow-rumped Warbler	*Setophaga coronata*
	Townsend's Warbler	*Setophaga townsendi*
	Hermit Warbler	*Setophaga occidentalis*
	Wilson's Warbler	*Cardellina pusilla*
	Spotted Towhee	*Pipilo maculatus*
	California Towhee	*Melozone crissalis*
	Chipping Sparrow	*Spizella passerina*
	Clay-colored Sparrow	*Spizella pallida*
	Vesper Sparrow	*Pooecetes gramineus*
	Lark Sparrow	*Chondestes grammacus*
	Savannah Sparrow	*Passerculus sandwichensis*
	Grasshopper Sparrow	*Ammodramus savannarum*
	Fox Sparrow	*Passerella iliaca*
	Song Sparrow	*Melospiza melodia*
	Lincoln's Sparrow	*Melospiza lincolnii*
	White-crowned Sparrow	*Zonotrichia leucophrys*
	Golden-crowned Sparrow	*Zonotrichia atricapilla*
	Dark-eyed Junco	*Junco hyemalis*
	Western Tanager	*Piranga ludoviciana*
	Black-headed Grosbeak	*Pheucticus melanocephalus*
	Lazuli Bunting	*Passerina amoena*
	Red-winged Blackbird	*Agelaius phoeniceus*
	Western Meadowlark	Sturnella neglecta
	Brewer's Blackbird	Euphagus cyanocephalus
	Brown-headed Cowbird	Molothrus ater
	Hooded Oriole	Icterus cucullatus
	Bullock's Oriole	Icterus bullockii
	Purple Finch	Carpodacus purpureus
	Cassin's Finch	Carpodacus cassinii
	House Finch	Carpodacus mexicanus
	Pine Siskin	Spinus pinus
	Lesser Goldfinch	Spinus psaltria
	American Goldfinch	Spinus tristis

Edgewood Explorer Archive (1994-2016): Birds

Find them at www.friendsofedgewood.org - DISCOVER - Newsletters

American Kestrel	June	2005	Lee Franks
Anna's Hummingbird—World's Fastest Flyer	Sept	2009	Carolyn Strange
Bewick's Wren	Sept	2006	Lee Franks
Bird Brains—part 1	Sept	2010	Carolyn Strange
Bird Brains—part 2	Dec	2010	Carolyn Strange
Bird Monitors	Dec	2005	Lee Franks
Bird Song—part 1	Mar	2006	Lee Franks
Bird Song—part 1	Jun	2006	Lee Franks
Birds that Nest in Cavities	Sept	2001	Lee Franks
CA Quail	Sept	2002	Lee Franks
CA Thrasher	Mar	2005	Lee Franks
Chestnut-backed Chickadee	Jun	2007	Lee Franks
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Migration: New Flap in Bird Migration	Sept	2014	Carolyn Strange
Northern Flicker	Mar	2004	Lee Franks
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[Owl] Oweluliah, interview w/Barn Owl	Dec	2010	Anne Koletzke
[Owl] The Simple Truth, interview w/Barn Owl	Sept	2010	Anne Koletzke
Red-shouldered Hawk	Jun	2002	George Raiche
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Swallow: Survival of the Fleetest	Mar	2014	Carolyn Strange
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[Western] Bluebird Monitoring Returns…	Sept	2013	Frances Morse
[Western] Bluebird Monitoring Program, 2015	Dec	2015	Frances Morse
[Western Bluebird] 2014 Nest Box Report	Sept	2014	Frances Morse
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Western Bluebirds of Crabbiness ….	Jun	2015	Carolyn Strange
Western Meadow Lark	Mar	2002	Lee Franks
Yellow-rumped Warbler	Dec	2004	Lee Franks

SF Dusky-footed Woodrat *(Neotoma fuscipes annectens)*

by Ken Hickman

Classification, Range, and Habitat

Dusky-footed woodrat at entrance of stick house.

Neotoma fuscipes is native to oak woodlands and chaparral throughout the Coast Ranges, from Central California into Oregon.

Neotoma fuscipes annectens is the regional subspecies of San Francisco and the Santa Cruz Mountains and foothills. Because of this limited range it is a California Subspecies of Special Concern with local protections.

Dusky-footed woodrats have brown-gray fur, a white chest, and sooty-gray tops on their feet and sometimes face. The tail is about equal to their 8–10-inch body length and lightly haired—not as naked, long and tapered as *Rattus* sp., such as the black rat. While similar superficially, they're not closely related to European *Rattus* rats, but are genetically closer to deer mice (*Peromyscus* spp.).

Woodrat collecting coffeeberry leaves to store in her larder.

Nocturnal, Caching Herbivores

Woodrats eat leaves, flowers, buds, berries, seeds, nuts, acorns and fungi that they forage and collect at night, and store in larders in their houses for future meals. Some plants are “aged” to reduce toxins and bitter flavors. Other collected plants, such as bay laurel leaves, help reduce fleas, mites and other parasites in the larders, house, and on the woodrat itself.

Favorite foods include poison oak, toyon, coffeeberry, coast live oak, and bay laurel.

Their instinct to gather food and sticks also sometimes drives them to pick-up shiny objects too, which is why they’re also called packrats and trade rats.

What to Look for and Notice

The most obvious signs of woodrats are their stick houses, easily visible from the trail. Also watch for fresh twigs on the ground, nipped off with a pruning shears-like cut. They snip and store seasonally, heaviest in fall before winter, and often climb trees and bushes and snip a bunch to then collect off the ground over multiple nights.

Woodrat-nipped twig.

Keystone Builders with Live-in Buddies

Woodrats build fortress-style "stick houses" around hollow trees, logs, rock piles, and the like. The structures have a central nest chamber, larders for vegetation and nut storage, and multiple tunnels, entrances, exits and latrines. Houses protect them from weather and predators, and maintain a consistent habitat for living and long-term food storage. Woodrats are a keystone species for these houses, which are relied upon by numerous live-in species, including mice, lizards, snakes, salamanders, frogs, crickets, beetles, and millipedes. Woodrats sometimes maintain multiple houses, and move among them to forage more broadly. Great climbers, they also occasionally build houses up in trees.

Stickhouse of a female dusky-footed woodrat.

Solo and Social

Adults generally live solo in houses, but are social and live in neighborhoods. Loosely matriarchal—females choose mates, sometimes the same male year to year. Males will cede houses to females, and senior females generally occupy the best houses. Typically they just have one litter per year of 2–3 pups, which often ride around on Mom's belly. Kids stay with Mom for as much as a year, and woodrats can live 6 to 8 years (if not caught by a predator, such as an owl, snake or coyote!). Males disperse furthest, usually less than 500 feet, and daughters tend to stay nearer to Mom, and may even inherit the house from her. Both often look for abandoned "starter houses" when they disperse.

Fun Woodrat Factoids

California mice *(Peromyscus californicus)* are deeply connected to woodrats and almost exclusively live in their stick houses with them.

California mouse

If woodrats hear a threatening noise outside their house, they'll sometimes thump their feet, or rattle their tail in dry leaves to mimic a rattlesnake, to both scare the predator and alert their neighbors.

Woodrats are cleaner than European rats, partly because they're herbivores, partly because they live solo, but also because they live more cleanly, and have outside latrines where they "poop on the stoop," instead of inside the house. Woodrat urine and poop can sometimes contain Hantavirus, so leave their houses alone.

Ensatina salamander going into woodrat stick house entrance next to a male suitor of the house owner.

Ken Hickman is a wildlife researcher and Friend of Edgewood. Follow his adventures at NatureofaMan.blogspot.com.

This article was sparked by the vision and generosity of Norma Jean Bodey, Friends of Edgewood Docent Class of 1996.

Botta's Pocket Gopher *(Thomomys bottae)*

by Carolyn J. Strange

Names and Classification

Stuffed pockets! Note the sprig of greenery sticking out of right pocket!

French settlers may have named gophers, applying a word for honeycomb or waffle (gaufre), perhaps because the unfamiliar New World creatures honeycomb the ground with their burrows, leaving surface mounds and indentations resembling a waffle. The pocket in their name refers to two fur-lined cheek pouches used for carrying food and nest materials. Other rodent families use their cheeks for shopping bags, but gopher pockets open outside the mouth, can extend back to the shoulders, and can be turned inside out for emptying!

Endemic to North and Central America, pocket gophers are burrowing rodents in the family Geomyidae. Taxonomy is in flux, but there is a handful of genera (five or six) within the family, and about three dozen species. The *Thomomys* genus is also known as western pocket gophers. The species name honors Paul-Emile Botta, a naturalist and archeologist who collected mammals in California in 1820s–1830s.

Range and Habitat

Botta's pocket gophers live almost everywhere in California, and much of the West, limited only by major rivers, barren deserts or rocky terrain. They're at home in a variety of soil types and habitats, including grasslands, chaparral, scrubland, and woodlands, as well as agricultural lands and suburbs. This wide range is possible partly because western pocket gophers rely more on their teeth for digging. Most gophers dig primarily with their claws, which are softer and wear down faster, limiting them to softer soils. Look for gophers in Edgewood's grasslands.

What to Look for and Notice

It's easy to see the work gophers do, but it usually takes patience to see a gopher. Keep your eyes open for **asymmetric mounds** of fresh soil! A gopher can make several mounds a day. As it digs tunnels searching for food, it periodically pushes loosened dirt up to the surface with its head and front legs. The debris is pushed ahead, right and left, creating mounds shaped like fans, or hearts. Digging can continue year-round, but in drier areas like Edgewood, you may notice more mounds in spring or fall, when moister soil makes digging easier, and mounds more obvious.

Tunnels (up to 200 yards-worth per burrow system) are generally one-way (~3-inch diameter) so gophers somersault to turn around. A burrow system typically includes long, shallow (~4–12-inch

deep) tunnels for foraging, and deeper (up to 6 feet!) tunnels and chambers used for larders, latrines or nesting. Burrow systems are closely regulated microenvironments, and any opening gets plugged within a day. Thus, an open hole with fresh dirt might mean the occupant is still digging. Hang around quietly and you might see a gopher.

Built like blunt torpedoes with short, strong legs, gophers are adapted for digging and tunneling. Roughly 7 to 10 inches long, including about 2 inches of tail, they have large claws on their front paws, and small eyes and ears. Large, ever-growing front teeth loosen soils and rocks, and also chomp roots. Their lips close *behind* those incisors, preventing mouthfuls of soil. Sensitive whiskers help find the way forward, and gophers run backward almost as fast as forward, probably aided by their sparsely-haired tails. Short, rich brown fur can trend reddish or yellowish, often closely resembling local soil color.

Stretching out of the burrow in broad daylight is risky. Pineapple Weed (Matricaria discoidea) must be worth it!

Life and Behavior

Pocket gophers are territorial and solitary, except during breeding season when young live with their mother. Males are larger, nearly double the weight of females. Their territories are larger too. Gophers aggressively defend areas bigger than their own burrow systems, maintaining unoccupied "demilitarized zones" between neighboring burrow systems. Where food is abundant they can breed year-round, but in general, they breed early spring to early summer, producing one litter of 3 to 5 pups. (Gestation ~18 days.) Born hairless and blind, pups remain in the nest for 5–6 weeks before wandering off (above ground) to establish their own territories. They live one to two years. Gophers spend nearly all their time underground, but may emerge at night to forage. They're active year-round, about 9 hours a day, at any hour. They're quiet creatures, but communicate with clicking noises, soft hisses and squeaks.

What They Eat, and Who Eats Them

Gophers eat vegetation only—a LOT of it— including plant parts encountered underground, as well as leaves and stems of plants around tunnel entrances. They find food by sense of smell, and get enough moisture from their diet, so don't need a water source. They eat a lot for their body size, possibly because they use so much energy digging. They're choosy about the plant parts and species they eat, possibly for the same energetic reasons.

Birds of prey catch gophers above ground — hawks by day, owls at night. Coyotes, foxes, bobcats, domestic dogs and cats catch gophers at burrow entrances, and by digging. Other predators hunt

them down in their burrows, including skunks, rattlesnakes, and gopher snakes, as well as badgers and some weasels. (The last two are not found at Edgewood.)

Roles in Ecosystem

Sometimes nicknamed "Nature's rototillers", their constant burrowing helps keep soil loosened and aerated, while burying vegetation that enriches the soil. Depending on circumstances (soil, climate, etc.), a single gopher may rearrange more than two tons of soil in a year, mostly below ground. The flora of gopher mounds often differs from surrounding areas, and their presence can increase plant diversity. Gopher holes/burrows can capture runoff, allowing it to sink in, which can conserve both water and soil. But, extensive burrowing sometimes increases erosion on slopes. Gophers can kill trees and sometimes become pests in agricultural areas. A variety of other animals use their burrows, and as herbivores gophers turn plants into meat.

Not to Be Confused with…!

The word "gopher" sometimes gets used loosely to refer to any burrowing animal, but nothing else is like a true pocket gopher. **Ground squirrels** are rodents, but they're not closely related to gophers, and none live at Edgewood. (Think chipmunks or prairie dogs, which are easy to spot running around in daytime.)

Like gophers, **moles** live alone underground, rarely leaving their tunnels. Moles create somewhat similar earthworks, and are generally beneficial for similar "rototilling" reasons. But moles are smaller, and their mounds tend to be **symmetrically conical**. Moles are insectivores, not rodents. They prefer moist areas where they eat earthworms, snails, grubs, and insects.

Science writer Carolyn J. Strange has written hundreds of articles. She became an Edgewood neighbor in 1998, a docent in 2003, and has served the Friends of Edgewood in various ways ever since.

This article was sparked by the vision and generosity of Norma Jean Bodey, Friends of Edgewood Docent Class of 1996.

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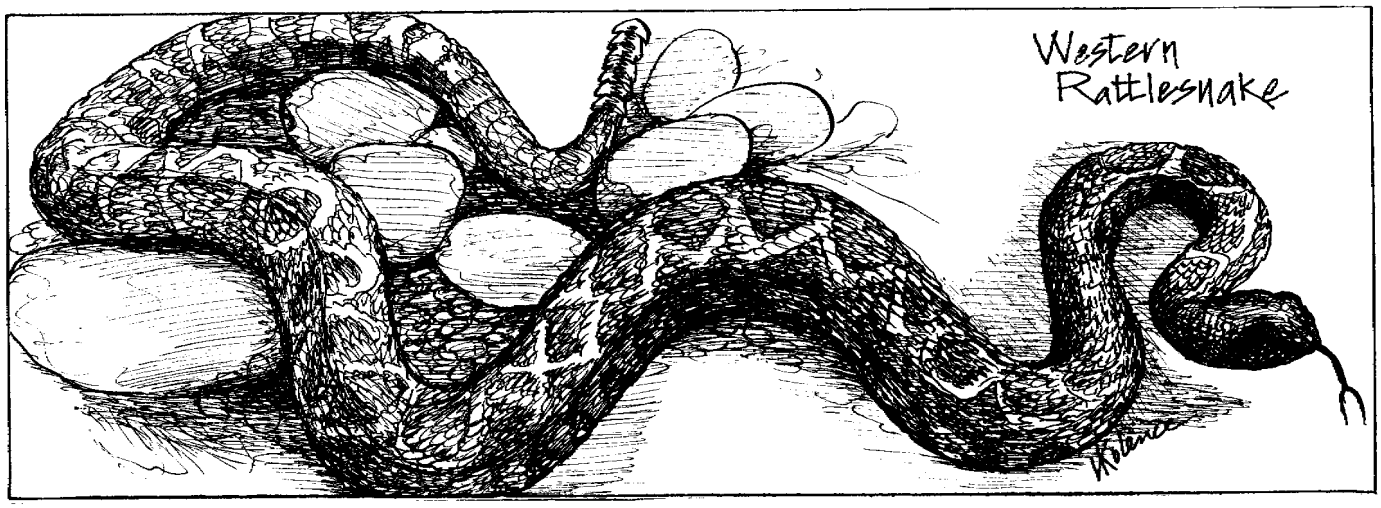
Watch Out for Rattlesnakes

Description: Rattlesnakes are pit vipers characterized by the presence of a rattle on the tail. They also possess stout bodies, heart-shaped heads and the most elaborate and efficient venom-injection system among the snakes. The term "pit" refers to the presence of heat-sensitive depressions on each side of the head. These pits function to detect warm animals and to guide the direction of the strike, especially at night. After striking a victim a rattlesnake can trail its prey by moving its tongue in and out, picking up odorous particles from the air then transferring them to a chemo-receptive organ in the mouth. This organ is also used in locating the opposite sex during the mating season and other rattlesnakes when hibernation groups are formed.



Distribution, Habitat and Season: Related to the Fer de Lance and the Bushmaster, rattlesnakes are widely distributed throughout most of the United States. The Western Rattlesnake (*Crotalus viridis*), common in chaparral woodland, is the only poisonous snake in the Bay Area. In September a female may bear 7-12 live young, each of which has a single button at the tip of its tail. A new rattle is formed each time the skin is shed, which may occur two to three times a year. Rattlesnakes are active from April to October, but are the most active in the warmest months.

Diet: Ground squirrels, rabbits, birds, rodents, lizards, and frogs are the main courses on this pit viper's menu.

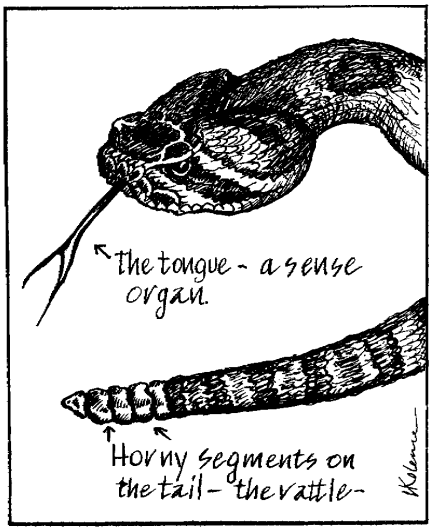
Enemies: As part of the web of life, deer, hawks, owls, coyotes, foxes, and kingsnakes will attack and kill rattlesnakes. However, humans are perhaps its greatest enemy even though rattlesnakes may benefit humans in controlling rodent populations.

Venom: The poison injected through the rattlesnake's fangs is modified saliva consisting of both proteins and enzymes. This hemotoxin attacks blood cells and capillary walls.

Bites: The chances of meeting a rattlesnake are slim and the chances of being bitten are even more remote. While caution is always in order, remember that these snakes are just as afraid of you as you are of them.

Helpful Hints:

- When hiking, walk in the center of the trail, frequently scanning the ground ahead.
- When a sudden buzzing sound is heard, stop and locate the source.
- Do not reach into bushes or behind logs and rocks.
- Wear jeans and boots when hiking in rattlesnake country.
- Be familiar with rattlesnake first aid treatment.



By Robert Badaracco, First Park Ranger
Edited by Kathleen Jones
Illustrated by Virginia Kolence

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Columbian Black-Tailed Deer

The Columbian Black-tailed Deer (*Odocoileus hemionus columbianus*) is common in the foothills. It is mainly characterized by its tail, which is almost entirely black. The tails of other sub-species or races of mule deer all have areas of white in them. The toes of each hoof of the black-tailed deer are close together, a trait which distinguishes their tracks from those of sheep and antelope.

Black-tailed bucks and other male members of the deer family grow and shed a set of antlers each year. During the early summer, a buck is said to be in velvet when its antlers are covered with hairy skin. While in velvet, the antlers grow externally through a build-up of calcium at the tip of each point. In this way, antlers differ from horns which grow internally and are permanent. When the antlers stop growing, bucks rub them against rocks, fence posts, and young trees to remove the velvet. Here in the foothills, the bark of some young trees has been worn away as a result of this activity.

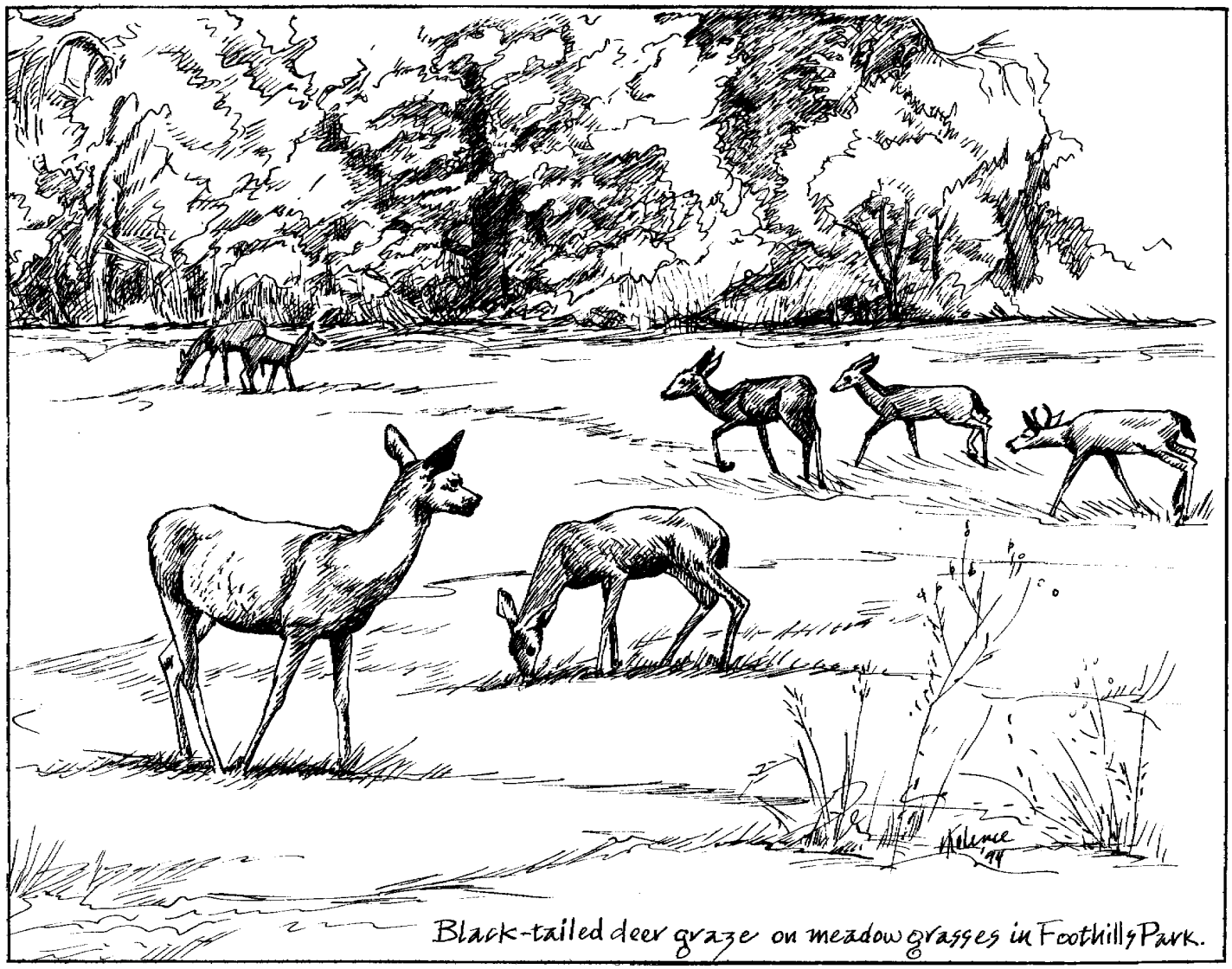
Mating generally occurs during the month of November. Seven months later females give birth to one to two spotted fawns. Immediately after birth, mothers hide their fawns in thickets, tall grass, or behind fallen logs. The fawns remain in these hiding places until they are able to run well. During this period of hiding, fawns depend on their motionless bodies and their spotted coloration to escape their enemies. Fawns apparently have no odor, since predatory animals have been observed to pass by them without noticing them.

Black-tailed deer prefer to feed in open areas or along the edges of chaparral and woodland. Their feeding habits generally follow seasonal patterns according to the type and quantity of food available. During the winter and spring, deer feed in fields and chaparral where they find grasses and wildflowers. They feed in orchards and on cooler northern exposures during the hot, dry summer. In the fall they eat the acorns found in woodland areas. Black-tailed deer favor the tender shoots of chamise, mountain mahogany, ceanothus and California bay laurel, while they occasionally feed on the leaves of poison oak and toyon.

Next to humans, the mountain lion is the most important enemy of deer. A mature lion will kill about 50 deer each year. However, many of these deer are old, sick, or injured and would not have had long lives. Disease and death may result when deer are heavily infested with parasites. Common deer parasites include eye worms, tapeworms, stomach worms, lung worms, fleas, and ticks.

Each year, many people enjoy feeding deer. This is not healthy for them. Artificial feeding can not only cause stomach disorders, but may encourages deer to remain in small areas where they contract parasites and disease. Perhaps of greatest importance is the fact that these deer soon learn to depend on handouts rather than foraging for themselves on natural plant foods. These deer as well as all wild creatures are far more appreciated when observed in a natural undisturbed state.

By Ron Russo
Edited by Kathleen Jones
Illustrated by Virginia Kolence



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The Coyote

The coyote (*Canis latrans*) is a widespread resident of North America. Much of its territory has been rapidly altered by man. Coyotes have survived and even flourished despite decades of hunting and poisoning. Versatility is the key to the coyote's success. A true opportunist, they eat a wide variety of small birds and mammals. They may be active during day or night, but do the majority of their hunting between dusk and dawn.

Coyotes are very interesting animals to observe because of their physical prowess. They are the best runners of the Canidae family, usually cruising at 25 miles per hour. In short spurts, they can reach speeds in excess of 40 miles per hour. They stalk their prey, then pounce upon the victim. These pounces can be up to 14 feet long. They are also great swimmers, and often enter rivers after water-borne prey.

As a member of the family Canidae, coyotes are dog-like in appearance. In fact, they have been known to mate with domestic dogs. The resulting hybrid, called a "coydog," is occasionally found in the wild. Coyotes have a sandy brown colored coat, a bushy tail with a black tip, and ears with yellowish points. Males are usually larger than females, and weigh up to 40 pounds. As with all other canines their claws are non-retractable. Coyote footprints are therefore easily distinguishable from those of a bobcat.

The basic social unit of the coyotes is the mated pair. Like other wild dogs, they usually live in packs. These packs include three to seven individuals, typically consisting of the mated pair along with their offspring. The family will travel, eat and sleep together. The pack has a well-defined territory of about eight square miles, commonly marked by urine. These scent marks establish boundaries which are seldom encroached upon by other coyotes.

Coyotes utilize rocky outcrops, caves, hollow logs, and loose soil for den sites. They tend to mate from February to May. One litter of pups is bom to a female each year, after a 63 day gestation period. A litter usually consists of six or seven. They are cared for by both the male and the female. The male is very loyal to his mate, and will stay with the same female for several years.

Perhaps the most well-known fact about the coyote is their wide range of vocal talent. In fact, the scientific name *Canis latrans* means "barking dog." They have about ten gradations of sounds, including woofs, barks, howls,

yips, yaps, and yelps. Their howls allow other coyotes to know their location, and serve to reunite them if they are separated. Their familiar prolonged howls on a moonlit night can evoke an eerie feeling.

The coyote feeds on a wide variety of animals. Usually they prefer small mammals, such as mice, ground squirrels, gophers, and rabbits. Other prey includes insects, carrion, fruit, and the occasional bird or deer fawn.

Coyotes are intelligent and will often team up with each other while hunting. They will either chase the prey in relays or ambush it. All individuals involved share in the kill. Sometimes a single coyote will go hunting with a badger (*Taxidea taxis*). In these instances, the team will use the coyote's sense of smell to sniff out a burrowing creature, while the badger's incredible digging power is utilized to extract the prey. Again, the victim is shared.

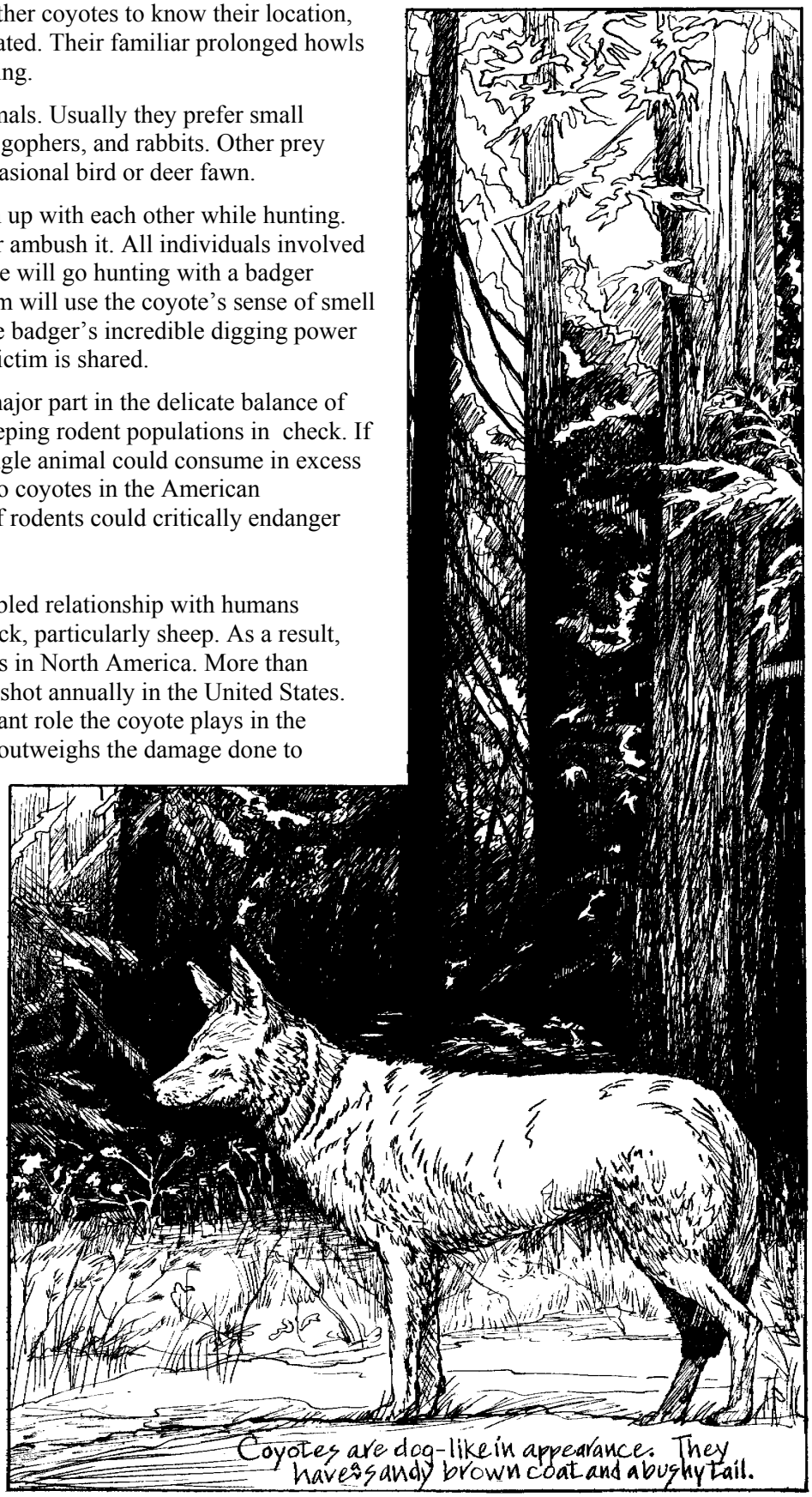
The coyote's role as a scavenger plays a major part in the delicate balance of nature. They are especially effective in keeping rodent populations in check. If a coyote were to feed solely on mice, a single animal could consume in excess of 10,000 mice every year. If there were no coyotes in the American wilderness, the resulting overpopulation of rodents could critically endanger the ecosystems of the country.

Despite their benefits, coyotes have a troubled relationship with humans because they will kill and eat domestic stock, particularly sheep. As a result, coyotes are one of the most hunted animals in North America. More than 100,000 of them are trapped, poisoned, or shot annually in the United States. Many people fail to understand the important role the coyote plays in the environment. Its rodent control ability far outweighs the damage done to livestock. As a matter of fact, much of the domestic stock killing attributed to coyotes is actually done by feral dogs.

The good news is that the coyotes, because of their ability and cunning, have thus far been able to sustain human-inflicted losses. Hopefully, the value of the coyote will become better known and its persecution will end.

This nature note is dedicated to the memory of Michael Powell.

By Zach Perron & Michael Powell
Edited by Kathleen Jones
Illustrated by Virginia Kolence



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Bobcats

Foothills Park is home to many different species of animals. Of the various larger mammals, the bobcat is the one most frequently sighted by visitors. Normally the bobcat is a very shy animal, yet several animals have made Foothills Park their home over the years.

Bobcats arc solitary animals except during the breeding season. A female bobcat can breed any time of the year, but usually mates in the early Spring. She looks for a den site under a rock ledge or in a hollow log. After a gestation period of 63 to 70 days, usually two to four kittens are born. The kittens are born with their eyes closed, which open after nine to ten days. They are weaned after three to four months, and begin to eat some meat during their second month. Female kittens become sexually mature within their first year, whereas male kittens aren't sexually mature until their second year. The young bobcats stay with their mother until the next breeding season, at which time they go their separate ways.

The young bobcat males seek out new territories. The young females stay in the vicinity of their birth place, sometimes even settling within their mothers' home range. Size of the home ranges varies (depending on food availability) from 0.4 to 16.2 square miles (0.9 to 42 square kilometers). Males generally have a larger home range. Female ranges sometimes overlap.

Bobcats generally eat small rodents and mammals, in some areas they have been known to bring down a weak or sick deer during the winter or spring. In Foothills Park, they most likely feed upon small rodents such as gophers, and any other "bite-size" animal that can be caught.

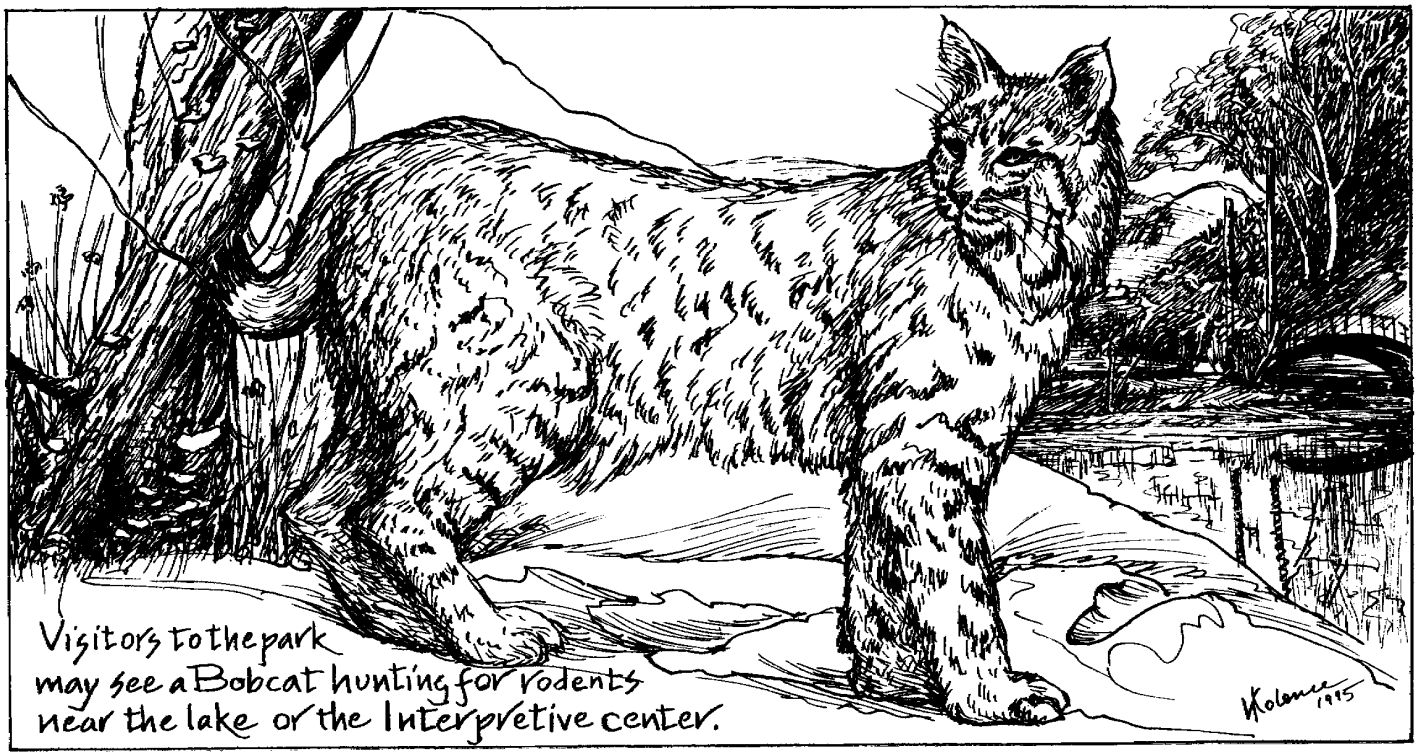
Historically, and at present, bobcats are found in the lower 48 states and northern Mexico. Bobcats vary in color from a rusty red to a yellowish brown to gray. They have a prominent facial ruff and their ears are tipped with tufts of black hair. The tail is relatively short,

black tipped, and white on the underside. The belly of the bobcat is sometimes heavily spotted. The average weight for bobcats ranges from 17.5 to 38 pounds (8 to 14 kilograms). The total body length (including tail) ranges from 25.5 to 51.25 inches (65 to 130 centimeters) and the height at the shoulder ranges from 17.5 to 29.5 inches (45 to 75 centimeters). The females are generally smaller than the males. Bobcats can live up to 15 years in the wild and usually longer in captivity.

In 1975, the Convention of International Trade in Endangered Species (CITES), placed the ocelot, the tiger and the cheetah on its Appendix I list. An Appendix I listing bans all commercial trade in those species or the products made from them. The spotted "belly" fur of the bobcat became the substitute for the large cats on Appendix I. Despite the introduction of bobcat pelts to the fur market, the North American bobcat populations are stable or increasing.

Since bobcats are solitary hunters that prefer to hunt at dawn or dusk, this is the best time to catch a glimpse of one. Perhaps the next time you are hiking through the Park, you'll be lucky enough to see a bobcat.

Written by Susah Kocher Massey
Edited by Kathleen Jones
Illustrated by Virginia Kolence



Mountain Lions

Adapted from materials by the CA Department of Fish and Wildlife

Smaller only than the jaguar among North American cats, the mountain lion is a beautiful and powerful predator. Its scientific name is *Puma concolor*; other common names for this big cat include cougar, puma, and panther. The mountain lion is a solitary and elusive animal—its nature is to avoid humans.

More than half of California is mountain lion habitat, and mountain lions generally exist wherever deer are found. Mountain lions prefer to eat deer, but if allowed, they will also eat pets and livestock. In *extremely rare cases*, people have fallen prey to mountain lions.

The status of the mountain lion in California has evolved from that of "bountied predator" between 1907 and 1963 (meaning that monetary incentives were offered for every mountain lion killed) to "game mammal" in 1969 to "special protected mammal" in 1990. Estimates of the current mountain lion population in California range from 4,000 to 6,000 individuals.

Appearance

- Mountain lions are tawny-colored with black-tipped ears and tail.
- Adult males may be more than 8 feet long from nose to end of tail, generally weigh between 130 - 150 lbs.
- Adult females may be up to 7 feet long and weigh 65 - 90 lbs.
- Mountain lion kittens, or cubs, are covered with blackish-brown spots and have dark rings around their tails. The markings fade as they mature.

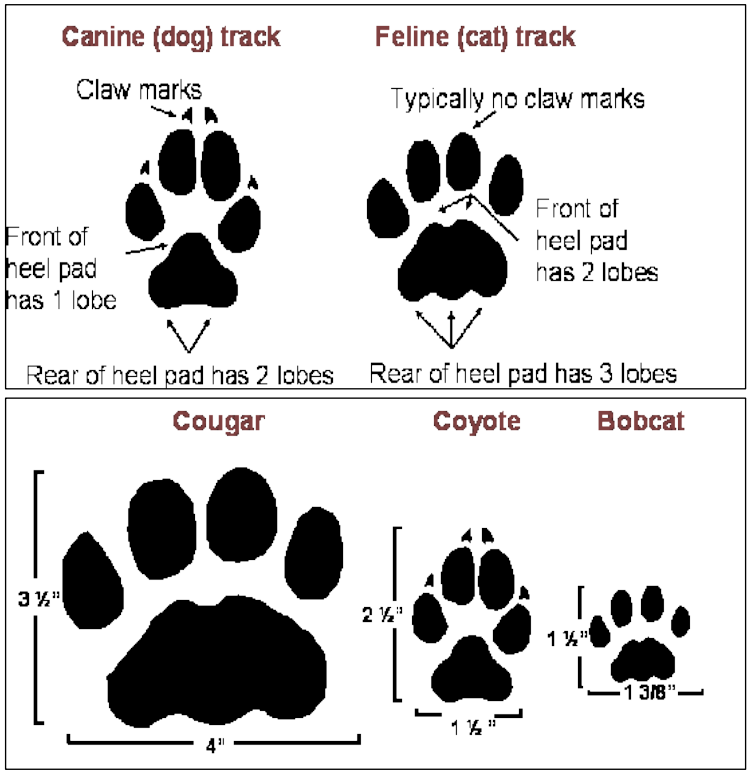
Habitat

Mountain lions live in many different types of habitat in California, from deserts to humid coast-range forests, from sea level to 10,000 ft. elevations. An adult female's range is generally 20-60 sq. miles, but an adult male's range may span over 100 sq. miles. Mountain lions are most commonly found in areas with adequate cover and plentiful prey.

Behavior

Mountain lions normally prey upon large animals, such as deer. They most often hunt alone, at night, and typically kill with a powerful bite below the base of the skull, breaking the prey's neck. Mountain lions will often cover a carcass with dirt, leaves, or snow and may come back to feed over several days.

The life span of a mountain lion is about 12 years in the wild and up to 25 years in captivity.



Living with Mountain Lions

People who live in or visit mountain lion habitat have a responsibility to the wildlife whose habitat they share. It is important for people to understand mountain lions so that we can coexist with these magnificent animals. *Evidence suggests that mountain lions regularly hunt at Edgewood Natural Preserve.—ed.*

Precautions

Do not hike, bike, or jog alone.

Avoid hiking or jogging when mountain lions are most active – dawn, dusk, and night.

Keep a close watch on small children.

Talk with children about mountain lions; and teach them what to do if they encounter one.

If You Encounter a Mountain Lion

- Do not approach a mountain lion. Give it a way to escape.
- Do not run from a mountain lion. Running may stimulate the instinct to chase.
- Stand and face the animal. Make eye contact.
- Pick up small children, but try not to crouch down or bend over.
- Do all you can to appear larger. Raise your arms and wave them slowly while speaking firmly in a loud voice. Open your jacket if you are wearing one.
- Throw stones, branches, or whatever you can reach without crouching or turning your back.
- If attacked, fight back. Since a mountain lion usually tries to bite the head or neck, try to remain standing and face the attacking animal.
- Immediately report all encounters or attacks by calling 911. Also report any sightings of dead or injured mountain lions.

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California Department of Fish and Game "Living with California Mountain Lions." Brochure. sagehen.ucnrs.org/Documents/visitors/wildlife/lion.pdf

California Department of Fish and Wildlife. 2015. "Keep Me Wild: Mountain Lion." https://www.wildlife.ca.gov/Keep-Me-Wild/Lion

Edgewood Mammals and Herps, compiled by Ken Hickman

- Adapted from the Natural Resources DataBase (NRDB)
- *Herps*, from the word *herpetology*, refers to reptiles and amphibians
- See separate NRDB list in this manual for birds of Edgewood Natural Preserve
- An asterisk (*) indicates a non-native species

Mammals documented at Edgewood

Common name	**Scientific name**
Coast Black-tailed Deer	*Odocoileus hemionus columbianus*
Mountain Lion	*Puma concolor*
Bobcat	*Lynx rufus*
Coyote	*Canis latrans*
Gray Fox	*Urocyon cinereoargenteus*
Striped Skunk	*Mephitis mephitis*
Virginia Opossum *	*Didelphis virginiana*
Raccoon	*Procyon lotor*
Black-tailed Jackrabbit	*Lepus californicus*
Brush Rabbit	*Sylvilagus bachmani*
Western Gray Squirrel	*Sciurus griseus*
Eastern Gray Squirrel *	*Sciurus carolinensis*
Fox Squirrel *	*Sciurus niger*
Botta's Pocket Gopher	*Thomomys bottae*
SF Dusky-footed Woodrat	*Neotoma fuscipes annectens*
Brush Mouse	*Peromyscus boylii*
California Mouse	*Peromyscus californicus*
Deer Mouse	*Peromyscus maniculatus*
California Vole	*Microtus californicus*
Broad-footed Mole	*Scapanus latimanus*
Vagrant Shrew	*Sorex vagrans*

Mammals not documented at Edgewood, but nearby and possible

Common name	Scientific name
American Badger	*Taxidea taxus*
Long-tailed Weasel	*Mustela frenata*
California Ground Squirrel	*Spermophilus beecheyi*
Merriam's Chipmunk	*Tamias merriami*
Harvest Mouse	*Reithrodontomys megalotis*

Amphibians & Reptiles documented at Edgewood

Common name	Scientific name
Yellow-eyed Ensatina Salamander	*Ensatina eschscholtzii xanthoptica*
Arboreal Salamander	*Aneides lugubris*
California Slender Salamander	*Batrachoseps attenuatus*
Pacific Treefrog (formerly Pacific chorus frog)	*Pseudacris sierra*
Coast Range Fence Lizard	*Sceloporus occidentalis bocourtii*
Western Skink	*Plestiodon skiltonianus skiltonianus*
California Alligator Lizard (ssp. of Southern Alligator Lizard)	*Elgaria multicarinata multicarinata*
Yellow-bellied Racer	*Coluber constrictor mormon*
California Kingsnake	*Lampropeltis californiae*
Pacific Gopher Snake	*Pituophis catenifer catenifer*
Pacific Ring-necked Snake	*Diadophis punctatus amabilis*
Sharp-tailed Snake	*Contia tenuis*
Northern Pacific Rattlesnake	*Crotalus oreganus oreganus*

Amphibians & Reptiles not documented at Edgewood, but nearby and possible

Common name	Scientific name
California Newt	*Taricha torosa*
California Toad	*Anaxyrus boreas halophilus*
SF Alligator Lizard (ssp. of Northern Alligator Lizard)	*Elgaria coerulea coerulea*
Santa Cruz Gartersnake	*Thamnophis atratus atratus*
Coast Gartersnake	*Thamnophis elegans terrestris*

Edgewood *Explorer* Archive (1994-2016): Wildlife

Find them at www.friendsofedgewood.org - DISCOVER - Newsletters

Mammals

Why We're Warm	2011	Mar	Carolyn Strange
Botta's Pocket Gopher *	2015	Mar	Carolyn Strange
Brush Rabbit, Interview with the	2008	Dec	Anne Koletzke
Coyote-*Canis latrans*	1994	July	Kathy Korbholz
Dusky-footed Woodrat	2000	Dec	Elly and Bob Hess
Dusky-footed Woodrat *	2014	Dec	Ken Hickman
[Hare] Mad as a March Hare	2008	Sept	Anne Koletzke
Herbivores vs. Plants vs….. *	2015	Mar	Carolyn Strange
[Jackrabbit] What's in a Name?	2008	Jun	Anne Koletzke
[Kangaroo rat] Relationships Matter	2012	Mar	Carolyn Strange
[Meadow mice] Dear Editor	2009	Jun	Anne Koletzke
[Meadow mice] Dear Editor	2009	Sept	Anne Koletzke
Mole Matters	2010	Mar	Anne Koletzke
[Mountain Lion] It's Not Just Who's Snared…..	2009	Dec	Carolyn Strange
Sniffo-Location – The Nose Knows	2013	Sept	Carolyn Strange
Skunks, *Mephitis mephitis*	2009	Mar	Anne Koletzke

Herps (Reptiles and Amphibians)

Edgewoodiana - Tick Talk and Lizard Lore	2008	Dec	Carolyn Strange
Herps of Edgewood: Overview	2004	Mar	Roger Myers
Lizards, Tale of Two…	2010	Mar	Roger Myers
Lyme Disease, Avoiding…	1997	Jun	Kathy Korbholz
Nature at Night and Summer Stargazing [night hike]	2013	Dec	Debbi Brusco
Rattlesnakes: Myths and Misconception….	2011	Dec	Roger Myers
The Rattlesnake's Rattle	2016	Sep	Paul Heiple

Arthropods and Other Creatures

Ants, Argentine	2008	Dec	Paul Heiple
Arthropods at Edgewood	2006	Dec	Paul Heiple
Arthropods of Edgewood [contd.]	2007	Mar	Paul Heiple
Arthropods of Edgewood [contd.]	2008	Mar	Paul Heiple
Arthropods, Edgewood - *Argiope sp*	2006	Sept	Paul Heiple
Banana Slug, Who am I?	1996	Feb	---
Bay Checkerspot (*Euphydryas editha bayensis*)	2011	Jun	Christal Niederer
Bay Checkerspot (*Euphydryas editha bayensis*) *	2015	Jun	Christal Niederer
Bay Checkerspot: Life Cycle of an Island Nymph…	1995	May	Susan Sommers
[Bay Checkerspot] Rare Butterfly….	2007	Mar	Carolyn Strange

Bay Checkerspot Update	2008	Mar	Stuart Weiss
[Bay Checkerspot Update] Butterfly Reintroductions…	2012	Jun	Christal Niederer
[Bay Checkerspot Update] Another Excellent Year…	2013	Jun	Christal Niederer
[Bay Checkerspot Update] How Many Checkerspots…	2014	Jun	Christal Niederer
Bumble Bee ESP	2013	Jun	Carolyn Strange
Butterflies, Four-legged	2008	Jun	Paul Heiple
Butterflies, Frass Flinging Foils Foes…	2013	Sept	Carolyn Strange
Butterflies, Return of the	2006	Jun	Kathy Korbholz
Butterfly Restoration, Mowing for	2005	Jun	Stuart Weiss
[Butterfly Restoration] Edgewood Mowing Program	2010	Jun	Christal Niederer
[Butterfly Restoration] Serpentine Grassland Restoration	2002	Sept	Stuart Weiss
Edgewoodiana - Tick Talk and Lizard Lore	2008	Dec	Carolyn Strange
[Flies] Edgewood Flies That You Might Like	2008	Sept	Paul Heiple
Grasshoppers, Edgewood	2007	Sept	Paul Heiple
Nature at Night and Summer Stargazing [night hike]	2013	Dec	Debbi Brusco
[Night-crickets] Songs of a Summer Night	2009	Sept	Paul Heiple
Paper Wasps at a Glance	2011	Sept	---
Turret Spider, California (*Antrodieatus riversi*)*	2015	Sept	Carolyn Strange
Wasps Know Who Is Who	2011	Sept	Carolyn Strange
Yellowjackets, About	1997	Aug	San Mateo Parks & Rec

* in this binder