PACIFIC RAPTOR

GOLDEN GATE RAPTOR OBSERVATORY

ISSUE
39

FALL
MIGRATION
2017

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GOLDEN GATE
NATIONAL
PARKS
CONSERVANCY

Veteran GGRO hawk counter and team leader JJ Harris preps the data sheets in the relaxed minutes before the 9:30 am start of a Saturday Hawkwatch. Photo: Alison Taggart-Barone

PACIFIC RAPTOR 39

FEATURE CONTENTS

Cover photo: Northern Harriers are one of the few North American raptors that can be readily identified to gender by plumage. The pewter gray dorsal colors and bright yellow eyes show this individual to be an adult male. Female adults and all juvenile Northern Harriers have a more camouflaged brown back. Great thanks to harrier-watcher, conservationist, and photographer, Pamela Rose Hawken, for letting us share her beautiful work. By Pamela Rose Hawken, view more of her photos at *www.pamelarosehawkenphotography.com*

ANNOUNCEMENTS

2017

WELCOME

Photo: Hilary Beardsley

KELSIE MCINNIS, GGRO's new Operations Manager, joined us in mid-August 2018 just in time to see the early Ospreys start south. Kelsie earned her bachelor's degree in Geography and Environmental Studies from San Francisco State University. She brings a rich background working with local environmental groups including: California Academy of Sciences, Salmon Protection and Watershed Network, Marin Municipal Water District, Richardson Bay Audubon Center, Marine Mammal Center, and—our mothership—the Golden Gate National Parks Conservancy.

RESEARCH PRESENTATIONS

GGRO presenters were invited keynoters at two conferences in 2017. Dr. Josh Hull gave an overview of thirty years of GGRO banding results at the annual meeting of the *Western Bird-Banding Association* at Point Reyes Station, CA. Allen Fish explored the relationship between Arctic sea ice, jet stream dynamics, and the Broad-winged Hawk migration in western North America for the second *International Bird Observatory Conference* at Cape May, NJ.

GGRO was well represented at the annual *Raptor Research Foundation* meeting at Salt Lake City, UT, in November 2017. Step Wilson spoke about the Parks Conservancy's innovative Migratory Story program in a session on Raptors in Education. USFS ecologist and GGRO volunteer Dr. John Keane presented data on raptor species trends at GGRO, which will be the subject of a forthcoming article. Two members of Josh Hull's lab at UC Davis, Breanna Martinico and Ryan Bourbour, gave talks on their master's degree research; both joint projects with GGRO.

The GGRO has a long connection to the *Raptor Research Foundation*, having presented talks at more than eighteen annual meetings going back to 1985. RRF 2017 was still particularly significant as GGRO's banding manager Teresa Ely used the conference to launch a new international alliance, *Women in Raptor Research and Conservation*.

JOHN KEANE

BREANNA MARTINICO

RYAN BOURBOUR

2017 PRESENTATIONS AND PUBLICATIONS

Bourbour, RP, and JM Hull. 2017. Feeding en route: is raptor migration fueled by migrating songbirds? Raptor Research Foundation conference. Salt Lake City, UT.

Bourbour, RP, BL Martinico, AC Hull, MP Herzog, JT Ackerman, and JM Hull. 2017. Utilizing migrating raptors to assess environmental mercury trends in raptors. Raptor Research Foundation conference. Salt Lake City, UT.

Ely, T, CW Briggs, SE Hawks, GS Kaltenecker, DL Evans, FJ Nicholetti, J-F Therrien, PA Napier, and JP Delong. 2017. Using fall migration banding data from multiple locations to examine causes for the American Kestrel decline. GGNRA/NPS Science Symposium. San Francisco, CA.

Fish, AM. 2017. Broad-winged Hawks and arctic sea ice: did climate change change the Pacific hawk migration in September 2012? GGNRA/NPS Science Symposium.

Fish, AM. 2017. Wielding the unique power of long-term bird observatory data: did Arctic sea ice change the Pacific Coast hawk migration in September 2012? International Bird Observatory Conference. Cape May, NJ.

Hannibal, ME, J. Parrish, and AM Fish. 2017. The emerging whole: putting citizen science in its place. Citizen Science Association. St Paul, MN.

Keane, JJ, AC Hull, JM Hull, SR Mori, and AM Fish. 2017. Raptor population trends for Pacific Coast bioregion of North America. Raptor Research Foundation conference. Salt Lake City, UT.

Martinico, BL, GK Sage, MC Gravley, SL Talbot, AC Hull, BA Haak, and JM Hull. 2017. Post-DDT historical demography and population structure of the Merlin (*Falco columbarius*) in North America. Raptor Research Foundation conference. Salt Lake City, UT.

Wilson, SB. 2017. The Pacific Flyway: Golden Gate Raptor Observatory. Hawk Migration Studies 43 (1): 46-47.

Wilson, SB, K Ju, F Taroc, C Maybury, A Yee, L Fonfa, and AM Fish. 2017. Migratory Story: building a raptor educational program in the Golden Gate National Recreation Area where kids can also be the authorities. Raptor Research Foundation conference. Salt Lake City, UT.

Young, LG, CW Briggs, AM Fish, and AC Hull. 2017. GPS-GSM telemetry of Red-tailed Hawks (*Buteo jamaicensis*) on fall migration at San Francisco, CA. Poster. Raptor Research Foundation conference. Salt Lake City, UT. ●

RAPTORS & FIRE

Allen Fish

On October 9, 2017, I had pre-arranged to meet a group of friends and birders from the Mendocino Audubon Society for a day of raptoring on Hawk Hill at the peak of the season. I was up at 5:30 AM but was quickly sidelined to the television: 20,000 acres burning in the North Bay, evacuations in force, responders already maxed out. The fire had jumped across the six-lane interstate 101, the main artery for driving up and down the Pacific Coast. Heat and east wind—a terrible combination for California in autumn. The Mendocino Audubon leader, former GGRO Intern Hayley Ross, texted that their bus-load of birders, bent on Broad-winged Hawks, would stop and bird the Ukiah Treatment Plant instead. "Waxwings!" she added optimistically.

It was an expensive bus rental and thus a hard decision, but as it turned out, it was the right one. The North Bay fires would burn for another month. There were many fires but they eventually classified as six that burned through October 2017, stretching from Mendocino in the north to Sonoma right at the edge of San Francisco Bay.

Although the hawks were peaking in the migration, for the next week we were unable to count and band hawks. The winds were from the northeast—often called Diablo Winds—and on many days the San Francisco Bay Area was a holding basin for the smoke from the North Bay due to the inversion layer.

As we all worked through the strangeness of the experience—the displacements, and the eerie sky colors—I heard the same questions over and over: "What happens to birds of prey when there is a big fire? Do they escape it? Can they escape it? Sure, hawks are mobile, but how could they not be impacted by a high-impact fire?"

RAPTORS AND AGRICULTURAL BURNS

When I first arrived at UC Davis in 1979, I was bored by the monotonous flatness of the Sacramento Valley. I soon discovered that flat lands let you see far. Raptors were often visible somewhere in the sky. Toss a tractor into the mix, dragging a plume of dust behind, and the hawk ante went up. Or better yet, find the smoky column of a late autumn agricultural burn, and there would be a hawk or two or more. Of course, these were usually Redtails, but sometimes Ferruginous, and occasionally a kite, harrier, or Rough-legged Hawk found their way into the mix. All of them, like me, saw the plume, whether dust or smoke, from a distance away and had come closer to investigate the disruption of these agricultural fields as a splendid source of agitated prey.

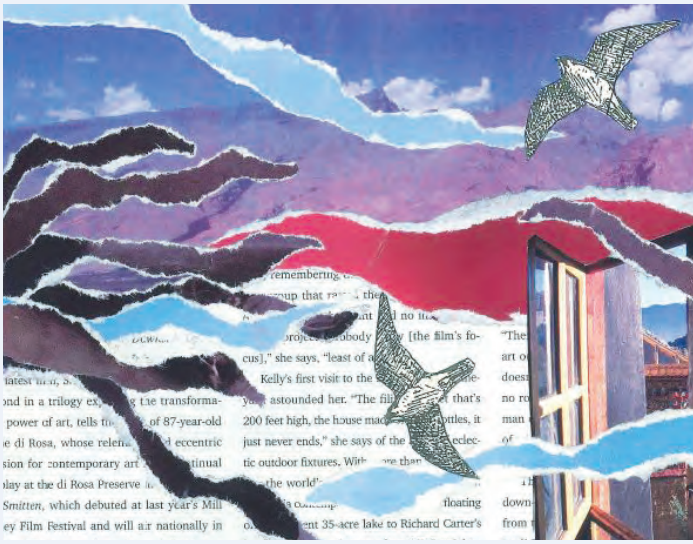
In the late 1980s, the National Wildlife Federation held a series of raptor management symposiums across the United States, focusing on the needs of each region. Not surprising, the western conference, held in Boise, featured a talk on the effects of fire and fire exclusion on raptors, co-authored by biologists Bob Lehman and John

Allendorf. Lehman and Allendorf (1989) state up front that "direct mortality of raptors during wildfires is rare; fire impacts usually result from habitat destruction." And they continue, the worst habitat destruction is usually a result of heavy fuel accumulation after decades of fire suppression.

The rare direct impacts mentioned are usually "the loss of nestlings that cannot flee an approaching fire." Lehman and Allendorff note four such cases for Bald Eagles, and one each for Northern Harriers and Ferruginous Hawks. But fire has beneficial effects as well, citing the work of Swenson (1975) showing that Yellowstone Osprey nested in dead trees in burned areas, though live trees were used also. The late Tom Balgooyen found that American Kestrels in the Sierra Nevada had higher nesting densities in burned forests two to three times greater than in unburned (Balgooyen 1975). Many other biologists have documented greater feeding in recently burned areas, presumably due to loss of ground cover or "displaced prey."

The greatest effects of fire on raptors may be the longer-term impact on habitats, impacts that may even favor one raptor species over another. A fire in a mixed conifer forest may open the stand to sunlight and favor larger older trees. That could promote Northern Goshawks and Cooper's Hawks while deterring nesting by Sharp-shinned Hawks, which favor thick stands of small firs. Along with changing tree stand structure and density, intense fires in the Pacific states might promote the development of grasslands in a shrub-dominated region. This is of course the opposite impact from fire control, which, over the last century, likely created the shrub-lands in the first place.

Many of the most important raptor-fire insights come from anecdotes of one-time events. This reinforces the idea that we still have a lot to learn about the burn response. In January 1981, Smallwood et al (1982) studied the bird response to a hectare of burning shrubland in southwestern Florida. They noted Cattle Egrets working both windward and leeward sides of the burn, while as many as 15 American Kestrels hunted just the windy side, along a 150-m strip. This constituted a hundred-fold increase in kestrels. They noted the falcons were hawking insects that were evading the flames by flying 2 to 4 meters above the ground.



Raptors and fire illustration by Ruthie Parsley with falcons by Siobhan Ruck.

IMPACT AND RECOVERY

We name fires just as we name streets, hurricanes, and earthquakes. The names connect to a place usually but ultimately, they become something much more varied: a feeling on your skin, a smell, a lot of insurance papers. In October, from north to south, they were Redwood, Pocket, Tubbs, Nuns, Thirty-Seven, and Atlas. They together burned 205,867 acres. Imagine this as a square with 18 miles to each side. 6,823 structures burned. 1,869 responders on duty. Tens of thousands of people displaced. Forty-three people dead. (yubanet.com)

Smokey skies followed northeast winds from the North Bay fires, filling the San Francisco Bay basin and shutting down GGRO field research during the week of October 9th, 2017. Photo: Danielle Husband

The GGRO and Park communities were hit hard by the North Bay fires. Three GGRO volunteers lost homes, so did a Parks Conservancy colleague. Many near misses. Perhaps most shocking was the death of one of California's great raptor experts—field biologist, falconer, Peregrine biologist, and professor, Dr. Monte Kirven.

Monte was famous for his work on the Peregrine recovery effort in California when I first met him on Hawk Hill in 1985. He brought his class from Santa Rosa Junior College up annually for a rousing day of hawkwatching. Some of those students later became GGRO volunteers. Monte embodied pure joy on Hawk Hill's North Platform; Sharp-shinned Hawks and Golden Eagles brought forward equal shouts of bird names and "Did you see that?!" He loved it that we had this place and this show, where people could step out of their digital lives and be nearer to hawks.

Along with the profound losses brought by the North Bay fires of 2017, there will be great ecological lessons as well. We are fortunate to have the Pepperwood Preserve in the middle of the North Bay fires' range, with a staff and mission poised to study local ecological impacts over the long haul. Regarding the impact of fire on raptor populations, the research will need to be much more focused to make sense of it all. Raptors are highly mobile and—in some cases—able to change prey or habitat types. But with each new California fire, and the closer we monitor them, the more we can learn how birds of prey, how all of our wildlife species, respond to these intense ecological events. ●

American Kestrels have been observed hunting insects at the edge of grassland fires. Photo: Pamela Rose Hawken

Balgooyen, TG. 1976. Behavior and ecology of the American Kestrel in the Sierra Nevada of California. UC Publications in Zoology 103: 1-74.

Lehman, RN, and JW Allendorff. 1989. The effects of fire, fire exclusion and fire management on raptor habitats in the western United States. Pp 236-244 In Proceedings of the Western Raptor Management Symposium. National Wildlife Federation Scientific and Technical Series 12. 317 pp.

Smallwood, JA, M Woodrey, NJ Smallwood, and MA Kettler. 1982. Foraging by Cattle Egrets and American Kestrels at a fire's edge. Journal of Field Ornithology 53(2): 171-172.

Swenson, JE. 1975. Ecology of the Bald Eagle and Osprey in Yellowstone National Park. MS Thesis. Montana State University, Bozeman. 146 pp.

ALLEN FISH the GGRO Director, starts his 34th year at the Golden Gate National Parks Conservancy, still convinced that the first job is the best job.

VULTURE RESEARCH AT GGRO

Teresa Ely

I have always loved Turkey Vultures. It all started when I met Toulouse, the Turkey Vulture, when I was a volunteer at the Animal Resource Center at the San Francisco Zoo. As a GGRO Intern in 2008, I watched the Turkey Vultures do their wobbly, effortless soaring around Hawk Hill. One day on the Hill, someone said to me, "You will get tired of watching Turkey Vultures when you go to Veracruz." Well, that person was wrong. My experience in Mexico, watching thousands of vultures on migration, only increased my love for vultures. Incidentally, in Mexico, Turkey Vultures are called "Zopilotes."

When I heard Chris Briggs, former GGRO Research Director, was starting a Turkey Vulture research project at GGRO, I was ecstatic. This project was one of the (many) reasons why I applied for the GGRO banding manager job and wanted to come back. Chris did the hard part; he set up the initial proposals, permits, and the first International Animal Care and Use Committee (IACUC) approvals, so I was able to walk into a project that was nearly good to go.

However, vultures are surprisingly tricky to catch and a lot of patience is needed. After a bit of a learning curve and still no vultures caught, I decided to change the method we were using. We built a walk-in trap. I spent a few days in southern California with raptor biologist and trapping expert Pete Bloom to learn about his walk-in trap and how to wing-tag vultures. The walk-in trap is essentially a modified dog-run where the entry door has been altered so that a vulture can walk in, but it won't be able to walk out. And of course, the trap is baited with carcasses.

Teresa Ely prepares to release a Turkey Vulture after tagging. Photo: GGRO

TERESA ELY was a GGRO Intern in 2008 and completed her Master's degree in Biology at the University of Nebraska before returning to GGRO as Banding Manager in 2016.

WHY STUDY VULTURES IN THE FIRST PLACE?

Turkey Vultures are the best avian decomposers we have in North America. Vultures can eat an animal that has died from anthrax or cholera. They will not contract botulism, rabies, or salmonella from carcasses because they have excellent immune systems. Their gastric juices are highly acidic and strong enough to kill most bacteria (with a pH of almost 0). And vultures poop on their feet. Why?

Vulture feces are also highly acidic and can kill bacteria that have made their way onto their legs, but they also sterilize the area around the rotting carcass to help stop diseases from spreading. We do not band vultures like we band raptors because if a band were placed on a vulture, the excrement would build up and possibly impede the blood supply. So instead we place a patagial marker, also called a wing-tag, similar to that on California Condors. This tag can be read while the vulture is flying or perched.

Turkey Vultures are pretty common in North America and some populations are known to migrate. The North American Breeding Bird Survey shows that their summer populations have increased in number from 1966 to 2014 and the global breeding population is estimated by *Partners in Flight* to be about 18 million. This makes them a great study organism because we can pretty much study them anywhere, like the Marin Headlands. Turkey Vultures are considered partial migrants, so the northern populations tend to be highly migratory whereas the southern populations are less migratory, and western populations are more migratory than in the east. The long-distance migrants tend to spend winters in Central and South America.

Turkey Vultures scavenge on rotting meat, so they are likely to be exposed to whatever toxins are in our environment such as lead, other metals, and rodenticides. Unfortunately, rodenticides are used throughout California. One of our research goals is to find out if these birds are being exposed to rat poisons and what the level of exposure is.

Turkey Vulture #372 tugs at seal remains on Rodeo Beach in the Marin Headlands. Photo: William Legge

One of the most common questions on Hawk Hill is, "How do you know you aren't counting the same bird twice?" Our second research goal is to help answer this question by tagging the vultures and to learn more about movement ecology. Do these birds hang around the Marin Headlands throughout the year or just part of the year? Are they migrating to Veracruz, Mexico? We hope to answer some of these questions by placing patagial tags on the vultures, by using GSM transmitters, and by collecting blood samples for later analysis.

WHAT WE HAVE SO FAR:

As of fall 2018 we have tagged ten vultures with patagial tags, and one of these also with a GSM (global system for mobile communications) transmitter.

The very first bird we wing-tagged was back in July 2017 in collaboration with *WildCare*, the wildlife rehabilitation facility in San Rafael. With WildCare we have twice tagged rehabilitated vultures that are ready for release. This is a good opportunity to not only provide information on the survival of rehabbed birds but also to increase our knowledge about their basic movements.

With the help of the 2017 GGRO Interns and GGRO Hawkwatch Manager Step Wilson, we opened the trap in October 2017. During that time, we saw many vultures in the Marin Headlands, but it was a slow beginning for the trap. We did not manage to lure a vulture for the first few months, despite the tasty rotting meat offered inside.

Vultures are skeptical of humans; a key part of successfully trapping a vulture is the use of a live "decoy" vulture placed in the trap. Because a live decoy is not easy to acquire, we settled on using a fake, but because vultures are wary, they were not so easily fooled by the taxidermied decoy. After some trial and error with meat placement, and lots of patience, we lured our first vulture into the trap in early December 2017. Once this bird was trapped, the number of vultures attracted to the area increased exponentially. We soon had attracted another five vultures into the trap with at least five more nearby, all trying very hard to figure out how to get to the meat.

Two out of the six trapped vultures started showing signs of potential poisoning: they were unable to stand or perch properly. As soon as we noticed this behavior, we quickly took them to *WildCare* for medical analysis. We closed the trap for the winter while we waited for the results of the sick vultures. One of the vultures, #3348 (*WildCare* patient number), had severe visceral gout and trace amounts of the anticoagulant rodenticide (AR) Difethialone were detected in the liver. Unfortunately, this vulture was unable to recover from the severe effects of visceral grout and eventually succumbed to the disease. The other vulture was also treated for lead poisoning, but the lead levels were not significantly elevated, and the bird was able to recover. This bird became GGRO's wing-tag #368 and we placed a satellite transmitter on it in late January 2018. We cannot say for sure, but the symptoms these vultures were exhibiting were most likely from exposure to AR's or lead.

In the months after tagging the vultures in January, we received a number of re-sightings. These will be reported in full in our next *Pacific Raptor*. For the most part, the vultures have remained in the North Bay and a few have been seen in the Marin Headlands. All of these birds were tagged after the peak vulture migration last fall.

ACKNOWLEDGEMENTS

A number of people helped *Project Zopilote* get off the ground. First, thank you to Chris Briggs for bringing this research into fruition. Thank you to Keith Bildstein and *Hawk Mountain Sanctuary* for providing us with patagial tags. GGRO's intern cohort of 2017 continued to provide support of the walk-in trao with early morning visits before banding and late afternoons after hawkwatching to open and close the trap and move carcasses. Thank you to the interns for keeping me from giving up when vultures were lacking. Thank you to *WildCare* for providing the taxidermied vulture, aka Beatrice Bones, and for collaborating to tag rehab vultures. Thank you to Step Wilson, Lee Morse, and Paul Romanek for setting up the walk-in trap. To Kris Vanesky and Eric Chow for providing the meat. To Step for getting our GSM transmitters up and ready, placing the backpack, and for extensive moral support. To *Cellular Tracking Technologies* for the GSM transmitters. Pete Bloom taught me how to properly tag a vulture. To Bill Merkle, Daphne Hatch, and other NPS staff for guiding us through the permit process to allow us to trap vultures in the Marin Headlands. To Sharon Farrell for her continued support and enthusiasm. And of course, to Allen Fish and Laura Young for loving vultures as much as I do and providing the support needed to continue *Project Zopilote*. Critical financial support for vulture satellite transmitters came from the *Paul Armer Memorial Fund* and the amazing Armer family, longtime supporters of GGRO. ●

Previous page, Vulture motif Image: Encisco, J. 1971. *Designs from Pre-Columbian Mexico. Dover Pictorial Archives.*

Left: Turkey Vulture heads are thought to be especially adapted for tearing apart and snuffling inside of vertebrate carcasses. They are also unique among raptors in that they have a perforated (see-through) nostril. Photo: Ashley Santiago

Below: Learning to read the wing-tag on a gliding, stooping Turkey Vulture requires perseverance and visual agility. Photo: George Eade

FINDING THE PIZZA BIRD

Michaela Figari

I never thought I'd be the bird girl. My mom was the one who initially had me looking to the sky. Driving by the beach she would point out the pelicans. Going through the park we would stop to watch the herons, and of course the hawks. She didn't always know which species we were seeing, but she always had me interested, engaged, and wanting to learn more about them. Eventually I got a few bird books and became a casual birder.

GGRO hawkwatchers scan the North Quadrant. Photo: Jessica Weinber

By my early twenties I moved from North Carolina back to San Francisco. I had spent almost two years working with birds of prey professionally at a rehab and education center. I now work at the San Francisco Zoo as a bird keeper, a job I love. The one problem? We have very few raptors. I had often heard of the Golden Gate Raptor Observatory but had never been in one place long enough to be a useful long-term volunteer. I now had my chance! I was so nervous and excited to apply, I didn't know what to expect or what was expected of me.

The new volunteer orientation was my first time ever on Hawk Hill, and I didn't know anyone else there, but after just a few minutes of talking to my fellow new volunteers, I felt like I was surrounded by people who understood me. We talked about our lives, but more importantly about our favorite birds and which birds we hoped to see this coming season. I was finally with people who understood how badly I wanted to see a Ferruginous Hawk in the wild!

As many can guess, or may know, identifying raptors in flight is not easy. GGRO made it less scary and a bit simpler to understand. My new teammates were excited and ready to help teach those of us who were new. Many of our first birds were Red-tailed Hawks, Cooper's Hawks, and Turkey Vultures, and although they're common, it was still so exciting to see these birds passing over our heads. The only pair of binoculars I had ever owned were from my grandpa, and they were not going to be helpful for identifying birds at a distance. GGRO had that problem solved: not only did they let us borrow binoculars, but my fellow hawkwatchers were also excited to share theirs and what they liked about them.

MICHAELA FIGARI started the 2018 migration season as a hawkwatcher and an apprentice bander at GGRO.

Rough-legged Hawks are tundra nesters, found throughout the Arctic region in the summer, and so are the latest species to appear at the Marin Headlands each autumn. In most years the first Roughleg arrives in late October. In other years, we see no Roughlegs at all. Photo: Pamela Rose Hawken.

Throughout my first season hawk-counting with GGRO, a mysterious bird referred to as the pizza bird was mentioned. It turned out to be one of my personal favorite species, one I had not yet seen in the wild. The Rough-legged Hawk is called the pizza bird because of its rarity—the first team to see it each autumn gets pizza delivered! People jokingly mentioned the pizza bird, though the chance of our team seeing it first was slim. We went through each of our days identifying and counting birds, talking about what we saw, and practicing on slower days.

By late November, we were all mostly sad to see the migration end, and although the pizza bird was still mentioned, the likelihood of it coming by was probably less than before. But, on our final day, a bird was spotted at a far distance and the group started discussing it. It made its way toward Hawk Hill, and more identifications were being thrown out. This bird was different! It was the first and only Rough-legged Hawk of the season.

As cliché as it sounds, GGRO left me inspired. I knew I wanted to continue working with birds professionally, but now I want to pursue field work, and on raptors specifically. I'm now hoping to get into a graduate program—possibly studying the decline of the American Kestrel or the Diclofenac crisis affecting Old World Vultures, or maybe something else entirely. Whatever it may be, I plan to spend a lot of my free time with GGRO and my fellow hawkwatchers, learning as much as possible, and hopefully seeing more pizza birds. ●

A TRIFECTA OF HEAT, SMOKE, AND FOG

Step Wilson

The GGRO's hawkwatch is different from many other counts across the United States. At other sites, hawks move continuously along ridges and pass through the count area. I suspect that raptors use and remain in the Marin Headlands longer than at other hawk count sites, in that they tend to move through the landscape for days or weeks even, increasing the possibility of double-counting. This is one of the main reasons the unique quadrant system was developed here and has been in continuous use since 1989.

Dayleader Horacio Mena manages data on Hawk Hill. Photo: Lara Elmquist

Yet there are many similarities and other raptor counts that are incorporating some of our long-gained strategies. Working within the National Park Service system is one of them. The implementation of long-term community scientist volunteers is another. I think this aspect of our work is one of the greatest gifts given and received by the GGRO. The number of volunteers and the community reached in our autumn endeavors is exceptional. And it all comes from caring for our wonderful park scenery, relieving our city life stresses, and enjoying the migrations incredible majesty that passes right through our neighborhoods.

In the fall of 2017, 175 volunteers dedicated a consistent day every other week for 16 weeks to collect data on not just the raptors but also the passerines, dragonflies, and butterflies using the Marin Headlands. For most, this is their first journey from the nest. This year, the teams were fogged out only 18 days but we had the new situations of excessive heat for two days and five occupational health days due to the Northern California firestorm. With this perfect trifecta, we missed 25 days of counting during our regular season, but were still able to count for 468 hours —not far off from our ten-year season average of 488 hours. Enduring all this, our teams trained

STEP WILSON came to GGRO as a bander in 1995 and caught the raptor bug, committing the next 15 years to raptor studies in Mexico, Israel, and across the American West. Step returned to GGRO in 2016 to be GGRO's first Hawkwatch Manager.

30 new hawkwatchers. Nine mentors volunteered 72 hours to apprentice and less experienced volunteers wanting to improve their sighting and identifying skills.

The hawkwatch teams tallied almost 25,000 raptor-sightings in 2017. Within this total, Red-tailed Hawk numbers, our highest-sighted species, increased by almost 3500 (or 61%) over 2016's count. The 2017 Red-tailed Hawk count was remarkably close to the previous ten-year average of 9250 sightings. It's a real joy for us to see these large visually-varying buteos, and to work on our identification skills of this species so we are ready when other buteos appear on the Headland's horizon. See full 2017 count on p.15.

Turkey Vultures, our other most-sighted species, also showed an increase of over 1000 sightings from last year, but were still 15% below their previous ten-year average. With the smaller accipiters being our other two most - sighted raptors, we had contrasting results in 2017. Sharp-shinned Hawk sightings declined over 1000 from 2016 and were below their average by 20%. Cooper's Hawk increased in 2017 by 10% over 2016 numbers, but were still below their previous 10-year average by 14%. These four species made up 87% of the GGRO's 2017 count.

The other 14 species we saw this year didn't follow any consistent pattern other than they were all down from their ten-year averages except for Merlin, Northern Harrier, Broad-winged Hawk, and Bald Eagle. Merlins were sighted 42% more than last year and 35% more than their average. Northern Harrier's 905 sightings were 44% higher than their previous ten-year average. This species can be more difficult to keep an accurate count given its hunting style, but the increase is still impressive. Broad-winged Hawks showed less than 1% decline from 2016 yet were up 21% from their ten-year average.

Bald Eagles nearly tripled their prior ten-year average and they had 17 sightings compared to 16

Raptor spotter Sam Hontalas gets the team's attention on a high-flying harrier, a few hundred feet above Hawk Hill's summit. Photo: Phoebe Parker-Shames

Golden Eagles. Now I know that's only one more, but it was the first time in GGRO's 35 years that Bald Eagle exceeded Golden Eagle sightings. This is a marker of what is being seen throughout the West: Bald Eagle populations are increasing, and Golden Eagle populations are showing a slight decline (Millsap et al. 2016. Bald and Golden Eagles. Population demographics and estimation of sustainable take in the US, 2016 update. USFWS Division of Migratory Bird Management. Wash, DC. 115 pp. Appendix A4.).

The remaining ten species mostly showed an increase from 2016 sightings with their 10-year averages still on the decline: Red-shouldered Hawk, Swainson's Hawk, Ferruginous Hawk, Rough-legged Hawk, Peregrine Falcon, Prairie Falcon, American Kestrel, White-tailed Kite, Osprey, and Golden Eagle. ●

RAPTORS SIGHTINGS - MARIN HEADLANDS

	AUTUMN 2017 (468 HRS)		PAST 10 YEARS* (488 HRS)	
	SIGHTINGS	RAPTORS/HR	SIGHTINGS	RAPTORS/HR
Turkey Vulture	7063	14.53	7910	16.26
Osprey	63	0.13	83	0.17
White-tailed Kite	61	0.13	77	0.16
Bald Eagle	17	0.03	7	0.01
Northern Harrier	905	1.86	567	1.16
Sharp-shinned Hawk	3107	6.39	3981	8.20
Cooper's Hawk	2198	4.52	2498	5.14
Northern Goshawk	0	<0.01	1	0
Red-shouldered Hawk	220	0.45	463	0.95
Broad-winged Hawk	286	0.59	261	0.55
Swainson's Hawk	13	0.03	7	0.01
Red-tailed Hawk	9132	18.79	8508	17.5
Ferruginous Hawk	20	0.04	29	0.06
Rough-legged Hawk	1	<0.01	7	0.01
Golden Eagle	16	0.03	19	0.04
American Kestrel	268	0.55	411	0.85
Merlin	252	0.52	187	0.39
Peregrine Falcon	252	0.52	233	0.49
Prairie Falcon	5	0.01	6	0.01
Unidentified	906	1.86	1165	2.41
Total	**24,785**	**51**	**26,417**	**54.4**

** 2010 and 2013 seasons not included because they were partial seasons*

FROM APPRENTICE TO JOURNEY-LEVEL BANDER

Robert Martin

An unusually calm Merlin allows Robert Martin to check his health and plumage. Photo: GGRO

We all learn about the Golden Gate Raptor Observatory (GGRO) in different ways. For me, it was a relationship developed slowly over time and a series of logical short steps of deepening commitments. Shortly after moving to San Francisco in 2008, I spotted a Red-tailed Hawk in my local city park. It stared at me, as I intently stared at it. The hawk had a silver band around its left leg, which piqued my curiosity. After performing some internet research and speaking to several ornithology friends, I learned about the GGRO.

In the fall of 2015 I informally joined a hawkwatch team at the top of Hawk Hill. When I say "joined in" I mean I just showed up after proudly cycling to the top of Hawk Hill. The counters seemed friendly enough, and were happy to give this cycling gear-clad visitor some hawkwatching tips. Further interested in getting involved, I attended a GGRO volunteer information session. Hawkwatching sounded great, but the opportunity to band live raptors, to examine them in the hand, well that is not something you get a chance to do very often. I applied and after a friendly interview was advised that I had been accepted into the bander program.

And so began my path as an apprentice raptor bander. The work is hard, the learning curve steep, and the hours long, but the rewards are exceptional. At the heart of my desire to join was to try my hand at something different while also contributing to important environmental research. Like many people in the Bay Area, I work in the technology sector and spend most of my time sitting bound to a desk. Volunteering with the GGRO was a chance to spend time outdoors, to challenge my comfort zone, and to become a complete beginner attempting to learn a new skill in a very different field than I was familiar with.

Every apprentice's journey begins with the classroom training, learning the key markings of the different hawk species in the field. It is a key skill to be able to identify the correct species of hawk in flight and to communicate its presence to your teammates. A new vocabulary

ROBERT MARTIN joined the GGRO banding team in 2016 and is a journey-level bander. A vagrant from Ireland, he spends his non-banding hours working as a technology consultant and relaxing as a hobby ornithologist.

is also introduced. Red-tailed Hawks become "RT's." Cooper's Hawks evolve in to "Coops." And the most challenging for me to remember was the vertical net that is called the dho-ghaza, abbreviated to the succinct "DG." The next stage is the practical, hands-on training—learning how to erect nets, carefully handle the birds, band legs, and, most importantly, take accurate measurements. The highlight for me was learning how to extract birds from a dho-ghaza net by practicing the protocol of logical and methodical extraction on a patient chicken. All the while, you must learn how to gently but securely handle the bird to avoid being footed, a polite word for being cut by incisor-like talons. It is during the training that you start to learn some things you did not expect to learn, like the fact that you need three hands when disentangling a bird from a net: one to secure the bird, one to gently loosen the netting, and a third to hold the guy-line to open the net. This third hand is initially your training partner, but as you gain confidence, you learn that everyone develops a third hand (by holding the guy-line in their mouth).

2017 intern Lara Elmquist positions a Redtail for a morph photo before release. Photo: Teresa Ely

Part of the joy of being an apprentice bander is the thrill of discovery—doing something that you have never done before and learning a ton along the way. Here are a few things I did not expect and was surprised to discover:

1 Birds are completely different from mammals! No, it's true. I was surprised the first time I held a Cooper's Hawk. Its body was noticeably warm to touch. Birds have a higher body temperature than humans (105°F vs. 98°F). They also have a distinct, yet not unpleasant, smell. It could be described as a sweet earthy smell (one colleague described it as a second-hand bookstore smell). To be clear, I was not sniffing them as you don't want to get too close for another discovery that surprised me—hawks can have their own party of ectoparasites hitching a ride, insects that spend part of their life-cycle hiding in the feathers of the hawk. We record the presence of ectoparasites as part of the banding data collection. Sometimes ectos can be hard to detect. Often a bird has none. But there are times when a hawk has many and the mere recall of them can you leave you itching for the rest of the day.

2 The presence of birds, or the general migratory flow of birds, can at times seem totally random. You learn that there are peak periods—weeks when the hawk counts are higher—but how they are distributed across the Marin Headlands, or throughout the day, varies considerably. One banding blind (the wooden shacks that banders hide in) may be busy while another, at the same time, might struggle to even see a bird. One day the sky might be full of birds, the next day quiet. Other times, during the same day, the birds seem to hide for long periods of time, only to come all at once, in pulses. Sometimes these pulses seem to coincide with our volunteer leader being outside the blind, trying to make repairs. The cry of "Freeze!" comes from the blind. If someone is outside and a bird appears, banders in the blind call out for them to become motionless, invisible, drop their gaze and resist any temptation to see what hawk has come

visiting. One memorable event happened on one of these busy/empty days. After a particularly quiet period, a Red-shouldered Hawk, an uncommon visitor, came into the trapping arena and perched on a nearby rock to figure out what was going on. It was quickly chased by a Merlin, but then returned only to be chased off by two Red-tailed Hawks. After that flurry of birds, normal action resumed and we returned to our quiet reflection of empty skies without trapping anything. Banding, as one blind-mate observed, is good meditation training.

3 The last fact I was not expecting is that you can quickly become obsessed with thinking about raptors. Banding days are on a two-week cycle, that is to say that apprentices normally join a banding day once every two weeks. During the week prior to your banding day you call the GGRO banding phone recording to hear what the conditions were like and what other banders caught, and you read the daily GGRO hawkwatch count, all to forecast how your upcoming day might be. Then every time you see a raptor in your civilian life, you have to stop whatever you are doing and check it for a band. If it has a band you really have to stop what you are doing to try to discern some sort of writing on the band. This can get distracting when I work from home where my office overlooks a park. But there is a certain pride when you see a bird in the wild and it has a small metal band on it. Knowing that you might, just might, have handled that bird.

Then finally, there comes the birds that you have the privilege to spend time with. My first year I helped band the usual three species—Sharp-shinned, Cooper's, and Red-tailed hawks—all juvenile. The majority of birds banded by GGRO are termed "hatch-year," birds that were born earlier that spring and are making their inaugural migration. Among the Redtails we banded I was lucky enough to handle both a dark-morph and a Harlan's. The Harlan's Hawk is a confusing subspecies that tends to breed further north. It was great to see these two up-close on the same day and be able to compare the subtly different feather patterns and coloration that point to potentially different subspecies.

As great as my first year was, seeing all those hawks, I did ungratefully bemoan the fact that I never handled any falcons that year. My second year was different, and I was lucky enough to spend time with all three of the most commonly banded falcons. On my first day of my second season we only banded one bird, but what a bird—my first falcon, an adult female American Kestrel. What a joy to see it up close and examine the eye spots on the back of its head. This, I learned from Banding Manager Teresa Ely, is called deflective or aposematic coloration, and tries to trick would be predators into believing that the kestrel has eyes on the back of its head.

The Merlin was the next falcon that we caught, and it truly lived up to its reputation, flying into the net like a bullet. The sage advice I received that day was that if it comes from nowhere and is flying so fast you cannot confidently tell what it is, it's a fairly safe bet it is a Merlin. The irony of that identification method was not lost on me.

As I mentioned earlier, the majority of birds banded by the GGRO are juvenile birds, so catching my first adult raptor was very memorable. The first adult I caught was an adult female Cooper's hawk. The juvenile plumage is a soft white and muted brown, but this is transformed in the adult birds to a strong russet breast and a striped gray and black tail. But most striking of all in the adults is the ruby red eye that deepens with age and can fix you with a murderous, unafraid stare. I learned that the depth of color in the eye is also recorded and can be used to estimate the age of the bird.

The most exciting bird of the season for me was a sub-adult male Peregrine Falcon. The plumage on this bird was truly breathtaking—its bright yellow cere and talons contrasting sharply with the steely-blue feathers and coal-black eyes. Amongst its adult feathers were many juvenile brown feathers which we catalogued in a molt chart—another new skill for the apprentice to learn. We gather detailed data of how birds molt their feathers to be able to determine their age and possible health condition. Seeing the falcon up close, I discovered that all falcons have a tiny cone in their nares (nostrils) to allow them to continue to breathe when they are in a deep dive. This adaptation helped inspire jet engine designers that faced similar problems of maintaining airflow at high speed.

From raptor identification to aircraft engine design, I learned a lot during my GGRO apprenticeship. I now move forward to become a journey-level bander. During this period, we continue to hone our skills and build on our experience. I am already looking forward to spending fall days in the Marin Headlands with a great group of fellow raptor enthusiasts. I thank the team at the GGRO who make this opportunity possible and to the fellow experienced volunteers who enthusiastically welcomed this new apprentice into their ranks. ●

One of the most unusual and stunning species of the 2017 banding season was this adult Ferruginous Hawk. Its rust-colored (ie, ferruginous) markings accent an otherwise white tail. Photo: Jeff Robinson

Laura Echávez bids farewell to a freshly banded Sharp-shinned Hawk. Photo: Jeff Robinson

THE POWER OF BANDING

Teresa Ely

As long-time GGRO bander David Jesus said it, "We have been canceled due to rain, fog, earthquakes, heat, and a government shutdown over the last 30 years and there is still something new that can cancel banding...smoke!" The banding program was canceled for about 4.5 days in October 2017 due to the heavy smoke from the devastating fires in the north. This was a tragic point in the migration season that no one could have predicted. The fires, combined with some record-breaking hot days up to 106-degrees, definitely had an effect our banding season total.

Steve O'Neill lifts a juvenile Red-tailed Hawk back into the migration after banding. Photo: Jeff Robinson

While this was neither the biggest banding season nor the lowest at GGRO, we cannot deny the diversity that 2017 brought—thirteen species, including Turkey Vultures, a Black Merlin, a Peale's Peregrine Falcon, a Broad-winged Hawk, a late-season Swainson's Hawk, and an adult Ferruginous Hawk.

It's easy to feel discouraged when banding numbers are low because we put so much of our time, sweat, and energy into constructing traps and blinds and maintaining equipment, and then we sit in a blind for long hours in the fog. The reason we are here is because we are dedicated to raptors, to migration monitoring, and to community science. We all "want more birds" but a friendly reminder—we are not lacking in birds when you look at the ten-year averages. Of course, there are a couple of exceptions, like American Kestrels, Red-shouldered, and Sharp-shinned Hawks (the latter I think was a result of blinds being shut due to smoke when the Sharpshins were migrating). I believe we are seeing the down-swing portion of a population cycle for these three species, something we have evidence for in our long-term migration monitoring.

The fact is, the information that we collect from banding raptors is still critical no matter the season total. Raptor monitoring is a useful tool, essential in raptor conservation. When migration stations started 30 to 50 years ago, researchers and community scientists could not have known all that the data would be used for in the future. And now, because of these long-term data sets, our statistical analyses have that much more power, especially when looking at trends.

GGRO banding data have contributed to many long-term and short-term studies. We have feather samples from wild raptors that date back to 2002. That's sixteen years of DNA! This ongoing feather collection has provided the GGRO with the opportunity to examine levels in mercury exposure in our population of migrant raptors. Working with UC Davis and US Geological Survey (USGS), we have been able to: (1) compare mercury exposure among ten species of raptors; (2) examine the trend through time of mercury exposure in Sharp-shinned Hawks, Red-tailed Hawks, and Northern Harriers; and (3) compare levels of mercury exposure across the continent for Merlins trapped at GGRO and at twelve other North American migration sites.

Tani Myers does a perfect wing-photo hold on an adult plumage female Cooper's Hawk. Notice the Cooper's Hawk's high neck and deeply curved tail tip. Photo: Jeff Robinson

GGRO has collected well over a hundred thousand data points of raptor measurements (called "morphometrics") since 1983. These data are immensely valuable, especially when combined with other migration sites like the *Cape May Raptor Banding Project* (over 50 years), and the *HawkWatch International* sites (over 30 years). In my master's thesis, I examined the wing chords and weights of American Kestrels banded across the North American continent, and found that the juvenile female kestrels we are trapping in the Marin Headlands are smaller in size than they were in 1985. My research also indicated that kestrels of all ages and sexes are getting smaller in Cape May, NJ, and that the wing chords of kestrels of the intermountain west sites are getting shorter. These trends have the power they do because of the long-term data collection by raptor banders across the continent.

We all want more raptors to grace our presence every time we are out in a banding blind, but we should not lose focus on the importance of all of the data being collected. And who knows, maybe the next season will bring the first adult Northern Goshawk. ●

RAPTORS BANDED - MARIN HEADLANDS

	AUTUMN 2017	Annual Average* 1993-2016**	Totals 1983-2017
Northern Harrier	3	10.8	317
Sharp-shinned Hawk	330	478.4	12,661
Cooper's Hawk	496	562.9	15,724
Northern Goshawk	0	0.2	6
Red-shouldered Hawk	3	16.9	453
Broad-winged Hawk	1	1.5	41
Swainson's Hawk	1	0.4	11
Red-tailed Hawk	212	309.4	9982
Ferruginous Hawk	1	0	3
Rough-legged Hawk	0	0.2	6
Golden Eagle	0	<0.1	2
American Kestrel	21	54.6	1457
Merlin	37	31.2	796
Peregrine Falcon	11	4	112
Prairie Falcon	1	1.8	49
Eurasian Kestrel	0	<0.1	1
Total	**1121**	**1472**	**41,625**

** 2013 data are not a complete season; missed October 1-16 due to government shutdown*

***1993-2016 are used for this comparison due to similarity of methods and effort between those years and 2017*

HUMAN IMPACTS ON RAPTORS

Nancy Brink

One beautiful autumn evening, I drove east on Route 120 through Yosemite National Park. As I approached Crane Flat, an enormous form swooped up the road, straight at me, at drivers-eye level. I braked, and a Great Gray Owl eased up and over the car. Shaken, I stopped to look for the bird. It sat on a branch, about 10 feet up. We watched each other for a minute, and the Great Gray pushed off and continued its crepuscular flight west on 120.

I had longed to see a Great Gray Owl. That evening, I felt very lucky to have gotten such a good look—and equally lucky to avoid a disastrous collision. I suspect most of us have similar stories of Red-tailed Hawks that swoop down in front of our cars in pursuit of roadside prey. Or a thump on a window by a Cooper's Hawk chasing a sparrow at a feeder in a backyard.

Band recovery reports tell many stories about banded raptors—where they go and how long they live—but perhaps one of the most important stories is that of the impact of human activities and environments on raptors.

As GGRO rolls toward its 35th year, our total band recovery reports are creating a significant data set. We receive almost weekly reports from the *Bird Banding Laboratory* (BBL), the federal agency in Patuxent, MD, responsible for issuing bands and maintaining a database of encounter reports for all bird species banded in North America. Each report receives follow-up by the band recovery team, led for more than 20 years by intrepid volunteer Marion Weeks. Marion calls finders to confirm report basics and to transform codes and abbreviations into stories that allow us to refine data and better understand that one raptor's journey.

One of the codes sent to us in the BBL report is *How Obtained*, which describes "the circumstances surrounding the encounter of a bird or band." This might indicate the recapture of a banded bird, or the sighting by color band or scope. Knowing a raptor is still out and flying always gives us a lift, but unfortunately, we more often receive a code that indicates one of the mostly-young birds we band has died. And many of those reports show a circumstance that is the result of human activity and proximity.

How Obtained codes have evolved over time to reflect changes in environment, awareness, and human behavior. It's notable that the first code after the generic, code 00 (found dead), is code 01 (shot). Think back to the origins of *Hawk Mountain Sanctuary*, when hunters would line the ridge to shoot Northern Goshawks for the $5 bounty.

NANCY BRINK is a videographer who started her banding career at GGRO in 2000.

GGRO also receives occasional reports of raptor shootings, but consistent with the broader trend, this has been replaced as a leading cause of raptor death by more indirect causes of human interference. Top among them collisions with cars (code 14, caught due to striking or being struck by motor vehicle), particularly for species of diurnal and nocturnal raptors that hunt near roads.

GGRO volunteer Nancy Brink captures a photo of a newly banded bird before release. Photo: Nancy Brink

While there is no current overview for the number of raptors of all species killed by vehicle collisions, a 2014 analysis of avian mortality across all species in the U.S. suggests that "between 89 and 340 million birds die annually from vehicle collisions on US roads" (Loss, et al. 2014. Estimation of bird-vehicle collision mortality on US roads. *Journal of Wildlife Management* 78: 763-771.). Our records document at least 85 recoveries due to vehicle impact and another 72 found dead or injured near or on a highway.

Running into windows and other manmade objects (code 13, caught due to striking stationary object other than wires or towers) is also significant for raptors living in proximity to human structures in both urban and less settled areas, in particular for Cooper's and Sharp-shinned Hawks. We've confirmed 187 such collisions in our 35 years of data. At the police station in Hollister, CA, a Cooper's Hawk hit the picture window so hard that those inside jumped. Unfortunately, the hawk died on impact (Recovery #1461).

Another concern is rodenticides (code 62, found dead or caught due to poisoning). In our 35 years, we have only 15 recoveries confirmed in this category. Unfortunately, it is difficult to confirm whether a bird has succumbed to poisoning unless there is a blood test while it is in rehab, or a necropsy after it has died. Two of our recoveries this year were suspicious for rodenticides. An 11-year-old Red-tailed Hawk (#1435) was found emaciated and grounded in a storm, and died in care. We are awaiting results of a necropsy.

A Peregrine Falcon (#1472) banded this year by intern Laura Echávez in the Marin Headlands, was found just 18 days later in Sonora, Mexico. Finder Alan Mendoza noticed that the bird appeared to be dehydrated and was not aggressive. It was given water, but a few hours later convulsed and died. We can't know for sure why the falcon died, but it is notable that thirst is often associated with rodenticide exposure.

BBL has created *How Obtained* codes for more natural injuries or deaths, such as predation by an owl, but they favor anthropogenic causes. In part, this reflects an inevitable bias in our recovery data: the hawk must be seen or found by a human, so is more likely to be in an urban or frequently-traveled area. Vehicle collisions and impacts with manmade objects are perhaps most prevalent, but there are many other ways that humans impact raptors on migration.

As you read through the 44-band encounter reports we received in the last year, notice the information about what led the finder to the 24 Red-tailed Hawks, 13 Cooper's Hawks, five Sharp-shinned Hawks, one Peregrine Falcon, and one Red-shouldered Hawk.

Many raptors have adapted well to urban environments and some human presence. While this adaptability is exciting for those of us who like to have our daily dose of raptor sightings, it also intensifies exposure to man-made threats. Our band recovery database is one tool for analyzing impacts and hopefully, finding ways to better coexist with our raptorial neighbors.

Figure 1. Circumstances of GGRO Band Recoveries

As of this writing (July 2018), GGRO has received encounter reports for 1475 of the 41,625 raptors we have banded since 1983. In addition, we have received reports of 28 second or third sightings of a particular raptor, bringing our current total number of encounters to 1503.

HOW OBTAINED CODE	DESCRIPTION	NUMBER OF RECOVERIES
00	Found dead	552
01	Shot	34
02	Caught or found dead due to starvation	22
03	Caught due to injury	157
04	Caught by traps or snares, not intended for birds	11
09	Caught by hawks, owls, or other raptors	10
11	Caught by dog	1
13	Caught due to striking object, not wires nor tower	179
14	Caught due to striking motor vehicle	80
20	Caught due to disease	8
21	Found dead in building or enclosure	15
28	Caught by hand	48
29	Sight record made by color band or marked plumage	18
32	Caught due to parasite infection	1
39	Caught due to strike with moving aircraft	2
44	Caught due to animal control operations	9
45	Found dead or injured on highway	69
50	Found dead, band with skeleton or bone only	93
52	Sight record, band read by scope while bird was free	23
54	Caught due to striking radio, TV wires or towers	29
57	Caught due to tangling in other than fishing gear	8
62	Caught due to poisoning	5
63	Struck wind turbine	3
64	Caught by predator other than cat	4
89	Trapped & released by bander different location	60
97	Miscellaneous	13
98	Band or band number obtained, nothing else	30
99	Trapped & released by bander same location	19
	TOTAL	1503

RECENT RECORDS

Marion Weeks

1272-B 1067-B Juvenile female Red-shouldered Hawk banded on 8/17/07 by Mike Armer; first trapped and released by a bander 10/14/10 at Deer Island Open Space at Novato, Marin Co., CA; found 10/4/17 at the same preserve by a hiker who led *Marin Humane Society* Officer Kenan Boyle to its body. The hawk had a wound 2-3 inches wide, "could see the bones inside," just under the left wing down to the mid-section of her body. The Redshoulder was not able to use the left wing or foot and thus was euthanized on arrival at *Marin Humane Society*.

1394-B Juvenile male Red-tailed Hawk banded with both metal and color bands on 9/10/15 by Kris Vanesky; originally sighted and photographed at Mussel Rock Beach Park at Daly City on 1/22/16 found dead 5/20/17 on stairs of a home also at Daly City, San Mateo Co., CA; reported by Edgar Corona, the animal control contractor for San Mateo Co. The resident believed the bird hit a window the evening before;

1429-B Juvenile female Red-tailed Hawk banded on 9/21/16 by Katie Herrmann; first sighted at the East Shore State Park, Berkeley, Alameda Co., CA on 10/15/16; observed on "multiple occasions posing a threat to aviation safety throughout the beginning of June [2017]" at Travis Air Force Base, Solano Co., CA. Swedish goshawk traps were set to try to catch the bird for relocation but it was not interested. Noise deterrents were performed on numerous occasions...to no avail." On 6/13/17 the bird was again observed flying dangerously close to departing aircraft, so the bird was lethally removed under (their) *US Fish and Wildlife* depredation permit; reported by biologist Matt Thomas. Matt also noted they were certain it was the same bird from its distinctive tail pattern.

1435 Juvenile female Red-tailed Hawk banded on 11/12/06 by Eric Jepsen; found "wet and thin, feathers saturated," in a backyard at Sonoma, Sonoma Co., CA on 2/7/17 possibly grounded due to a severe rain storm. The bird was taken to *Sonoma Co. Wildlife Rescue* where it "passed in care on 2/20/17." Katie Woolery and Danielle Mattos provided the information about this Redtail.

1436 Juvenile male Cooper's Hawk banded on 10/12/09 by Galen Leeds; found dead on 2/13/17 10 miles south from Bellevue, King Co., WA; reported by Kyle Cooper. Numerous attempts to reach Mr. Cooper were unsuccessful.

1437 Juvenile female Cooper's Hawk banded on 9/30/12 by Diane Horn; found dead, still warm, no marks, no holes in body, in area with poles and lines above on 2/11/17 at Salinas, Monterey Co., CA;

MARION WEEKS GGRO bander since 1992, Marion has taken the initiative to dig deeper into band recoveries through the ancient art of correspondence.

reported by John Arthur who found no evidence of a window strike and thought it may have struck the lines above.

Band recovery 1438. Photo: Siobhan Ruck

1438 Juvenile Red-tailed Hawk banded on 8/29/03 by Theresa Rettinghouse; digiscoped on 1/4/17 by Siobhan Ruck and Nancy Mori (both long time GGRO banders) at Half Moon Bay, San Mateo Co., CA; while they were looking for a rare Ross's Gull.

1439 Juvenile male Sharp-shinned Hawk banded on 10/9/12 by Catherine Elliot; found 2/15/17 in driveway or roadway "quite torn up, decomposing body, mostly feathers" and reported to NPS ranger Mia Monroe by a neighbor in Mill Valley, Marin Co., CA.

1440 Juvenile female Sharp-shinned Hawk banded on 9/21/14 by Lynn Bantley; remains found by Jeff Woods on 1/29/17 on a neighbor's lawn at Lakewood, Los Angeles Co., CA. Jeff used a jeweler's loupe to read the band and stated the bird had been there for a while, ants on it, eyes gone, but not eaten or preyed upon. Jeff also noted that it was three feet from a curb to a parkway.

1441 Juvenile male Cooper's Hawk banded on 10/2/16 by Sean Peterson; reported by Kevin Scott on 12/16/16 who found it in grass near a cypress tree in a park at Stinson Beach, Marin Co., CA. The *Bird Banding Laboratory* (BBL) reported the bird had been killed by a motor vehicle. Kevin gave the bird to birder and artist Keith Hansen who planned to donate the bird to the *California Academy of Sciences*. Both Kevin and Keith agreed that the bird did not appear to have been hit by a vehicle and added "vehicles in that area only go about two miles per hour."

1442 Juvenile male Sharp-shinned Hawk banded on 10/8/16 by Lynn Bantley; reported by Chelsea Smith of *Monterey Co. SPCA*, found on 3/3/17 in a yard at Salinas, Monterey Co., CA. "It was sitting there, eyes closed, not flying." On exam it had "blood in its mouth, crackling lung sounds, and standing with difficulty...internal bleeding." Chelsea has seen several birds that have internal injuries after hitting a window. The bird was euthanized that same day.

1443 Juvenile male Red-tailed Hawk banded on 8/15/16 by Allison Levin; reported by Stephanie Pone from *SF Animal Care and Control* as flying into a building and falling to the ground on 1/5/17; reported by several witnesses at San Francisco, San Francisco Co., CA. The bird was dead by the time she got there.

Band recovery 1444. Photo: Robert Gallucci

1444 Juvenile male Red-tailed Hawk banded with both metal and color bands on 11/29/16 by Isabel Lawrence; reported and photographed on 2/15/17 by Robert Gallucci while he visited the Marin Headlands near the Visitor Center, Marin Co., CA. Being from New Jersey he was thrilled to see our western Redtails and how different their plumage is from those on the East Coast.

1445 Juvenile female Red-tailed Hawk banded on 8/25/07 by Jeff Acuff; reported by Eric Chow, Wildlife Biologist, USDA APHIS Wildlife Services, at Moffitt Field, Santa Clara Co., CA. On 4/11/17 he trapped this bird on the airfield and stated it "looked very healthy, the band was definitely worn as expected for a 10-year old band, released the same day north of Point Reyes."

1446 Juvenile male Red-tailed Hawk banded on 12/2/15 by Jeff Robinson; "a perfect little skeleton...no flesh or feathers" was found on 5/6/17 at Stanford's Jasper Ridge Biological Preserve in a tree covered area near the Stanford Linear Accelerator, San Mateo Co., CA; reported by Janet Creech, a citizen scientist, conducting an ant survey when she encountered the remains.

1447 Juvenile female Cooper's Hawk banded on 9/15/06 by Marty Wilson; leg only found about 10 miles SSW of Bend, Deschutes Co., OR on 4/24/17 as reported by the BBL, but may have been found as early as 2009. The finder, Steve Grimm "had it for years...he was hunting on his 90 acres of property and...was near the fire station that is just across the street from his acreage." The BBL date was most likely the date it was reported to the BBL.

1448 Juvenile female Cooper's Hawk banded on 9/11/11 by Eric Jepsen; "claw with the band" found on a railroad track on 4/25/17 at Millbrae, San Mateo Co., CA; reported by Jose Mendoza, a railroad mechanic, who sees "possums and skunks on the right of way scavenging on dead animals at night."

1449 Juvenile Red-tailed Hawk banded on 12/14/98 by Shawna Abafo; found dead on 4/5/17 by Lina Aglialoro while walking her dog in an old mining area 7 miles SE from Cave Junction, Josephine Co., OR. Initially Lina thought she saw some flowers which turned out to be the belly feathers of the desiccated remains.

1450 Juvenile female Sharp-shinned Hawk banded on 10/10/16 by Brian Smucker; feathers and skeleton with band found on 3/13/17 in gutter at edge of Natural Bridges State Park, Santa Cruz, Santa Cruz Co., CA; reported by Joyce Wente.

Northern Goshawk. Photo: Jeff Robinson

1451 Juvenile female Cooper's Hawk banded on 9/21/10 by John Ungar; reported by Susan Barnes, OR Dept. of Fish and Wildlife, as found on evening of 7/18/17, The bird's remains were next to a big picture window at a Tualatin, Clackamas Co., OR medical center. Susan suspected the bird died after flying into the window.

1452 Juvenile male Red-tailed Hawk banded on 10/11/16 by Cindy McCauley; found at Daly City, San Mateo Co., CA; brought to *Peninsula Humane Society* (PHS) by their animal control officer on 7/13/17 with severe injuries and was euthanized; reported by Tani Myers of PHS. The injuries resemble those occurring in birds that have been hit by fast moving vehicles.

1453 Juvenile female Red-tailed Hawk banded on 9/8/13 by Tara McIntire; found at Barbara Morton's backyard in San Francisco, San Francisco Co., CA on 9/18/16 and unable to fly. The "huge bird was up against the house. It scared the crap out of me, but moved up against the fence, one of its legs seemed messed up." Officer Peter Flores,

SF Animal Control, who reported the bird, picked up the bird and took it to PHS on 9/19/16 where it was euthanized due to a large area of infected and necrotic tissue, lacking skin on the leg and an abraded and necrotic area on the top of its head.

1454 Juvenile male Red-tailed Hawk banded on 10/19/16 by Steve O'Neill; reported as shot with a pellet gun on 8/3/17 at San Francisco International Airport (SFO) at Millbrae, San Mateo Co., CA, reported by Natalie Reeder, a biologist for SFO, who stated: "this bird along with another banded Red-tailed Hawk were consistently hunting voles in the grassy area near the approach runways...Redtails seem to be the most

Raptor band after removal. Photo: GGRO

problematic" and these two perched on an antenna to watch for the voles. Netting was put up to prevent the antenna's use, but it failed to do the job. Note, she has worked with raptor biologist Bud Anderson and airport personnel from Seattle, Portland and Vancouver on preventing the need for lethal controls at airfields.

1455 Juvenile Red-tailed Hawk banded on 12/11/91 by Jim Mills; intact band only, still crimped and not very scratched up was found almost 26 years later on 8/5/17 about 60 miles south of Boise, in the Owyhee foothills, Owyhee Co., ID. No bones or feathers were at the site which is a mile from the nearest road. Sylvia Copeland, with the *Bureau of Land Management* (BLM), reported the find of one of her technicians who was assigned to look for any raptor nests as they were setting out various sized buffer zones to be protected from the BLM plan to bulldoze and remove the young junipers to enlarge areas for Sage Grouse habitat. Sylvia's goal was to protect the raptor young with these buffers so they could successfully fledge next spring.

1456 Juvenile male Red-tailed Hawk banded on 9/15/10 by Lindsay Addison; reported by Bill Schoeppach's guest who found the banded leg on 8/13/17 in his yard at Cedarville, Modoc Co., CA. They noticed the raptor's "talons and noted that there were some feathers and skin and flesh on the leg...still kind of fresh."

1457 Juvenile male Red-tailed Hawk banded on 9/5/16 by Robert Heim; shot under depredation permit (see #1454) on 9/4/17 as this is the second of two Redtails that were persistent in hunting the grassy area between or next to the approach runways at SFO at Millbrae, San Mateo Co., CA. Barry Davis reported this bird and noted that "Redtails and Great Blue Herons are the worst." Pesticide use is very limited and the area is mowed very close, as managers hope to discourage the voles. They also use a huge asphalt roller with projections on it hoping to collapse the vole tunnels, and use loud sounds to haze the birds and raptors. But this pair was persistent, and they had a couple close calls with aircraft.

1458 Juvenile Red-tailed Hawk banded on 11/5/93 by Laura Rainero; band only found on 10/4/17 in their driveway at Two Rock, Sonoma Co., CA; reported by Theresa Petersen. Theresa's husband thought it was a chicken band, but she recognized that it was too big. She described it as shiny, not very worn, and mailed it to us for our files.

1459 Juvenile Red-tailed Hawk banded on 10/10/90 by Jim Mills; found almost 27 years later on 9/27/17 by Shawn Hamill, a general contractor, who was informed that a bird was floating in a deep pond at the house he was working on at Sebastopol, Sonoma Co., CA. The Redtail had been there "for a while, was smelly, but still intact." Shawn buried the bird.

1460 Juvenile female Red-tailed Hawk banded on 8/17/16 by Mary Malec; sighted by Laura Young on 10/16/17 at Fort Cronkhite, Marin Co., CA. Laura enlisted GGRO interns Ashley Santiago and Lara Elmquist, and using a spotting scope and iPhone for about an hour they were able to read the entire band number. The hawk was focused on catching pocket gophers and devoured two while they watched.

1461 Juvenile female Cooper's Hawk banded on 9/30/17 by Nancy Mori; died on impact with a police station's large window on 10/13/17 at Hollister, San Benito Co., CA. The impact was so loud it caused the occupants to jump. Deanna Barth, a volunteer for *Wildlife Emergency Services*, was called to pick up the bird, which she reported.

Adult Sharp-shinned Hawk. Photo: Jeff Robinson

1462 Adult female Cooper's Hawk banded on 8/21/15 by Jeff Robinson; found dead in Pamela Mullen's driveway when she took her dogs out for a morning walk on 10/24/17 at San Francisco, San Francisco Co., CA. She noted that it was not there at 8:30 the evening before. She was clear that its body was not near any windows but she did discover a wound on the left lower abdomen.

1463 Juvenile male Sharp-shinned Hawk banded on 9/14/17 by Nancy Brink; trapped in a mistnet and released 9/19/17 in banding operations conducted at the *Point Blue Conservation Science* Palomarin Field Station, at Point Reyes National Seashore, Bolinas, Marin Co., CA; reported by Renee Cormier.

1464 Juvenile male Red-tailed Hawk banded on 9/30/17 by Sean Peterson; found on 10/14/17 with severe injuries of unknown source and was euthanized at *Lindsay Wildlife Museum* (LWM). Max Lipman, a Certified Wildlife Rehabilitator at LWM, reported the bird and stated it was found near the water-pool at the Oakland Raider training facility in Alameda, Alameda Co., CA.

1465-A Juvenile female Red-tailed Hawk banded with both metal and color bands on 9/5/17 by Ashley Santiago; sighted from an upper story apartment window overlooking the top canopy of trees in Buena Vista Park, San Francisco, San Francisco Co., CA on 9/28/17 by Robert Martin. He watched the bird for 10 minutes to read the color band and noted that the bird remained in the area for 4-5 days. Robert is a GGRO bander.

1465-B Juvenile female Red-tailed Hawk banded with both metal and color bands on 9/5/17 by Ashley Santiago; sighted by biologist Joe Drennan on 11/6/17 atop the Wells Fargo Building at San Francisco, San Francisco Co., CA. Joe used binoculars to read the color band and added afterward "it was serendipitous, she landed almost right in front of my face."

1466 Juvenile female Red-tailed Hawk banded on 11/18/16 by Violet Kimzey; leg found amid oleander bushes that were being removed from a construction site on 10/20/17 at Santa Clara, Santa Clara Co., CA; reported by Jessika Mamea. Jessika described the leg as looking "old and dried out…no other bones or other body parts were found."

1467 Juvenile female Cooper's Hawk banded on 8/23/12 by Bill Prochnow; found on 11/7/17 "running around" in residential area of Morgan Hill, Santa Clara Co., CA; reported to Animal Control by several people, captured and taken to *Wildlife Education and Rehabilitation Center* (WERC). She had a broken keel and was missing all her tail feathers, which the vet believes was caused by a collision with a car. Since she was not eating on her own, they force-fed her. No surgery or bandages can help the keel to heal, so she could not be released until her tail feathers regrew; reported by Anna Pasqual.

1468 Juvenile male Cooper's Hawk banded on 9/26/17 by Eddie Bartley; found by Douglas Adair at his date ranch located in the desert at Thermal, Riverside Co., CA. Darren Rugh, Douglas's son-in-law reported the hawk; he said it may have been found a week earlier than the BBL's date of 11/9/17. Darren estimated the bird to have been dead for as long as a month as "its insides were gone."

1469 Juvenile female Cooper's Hawk banded on 9/22/15 by John Ungar; found on 11/20/17 after hitting window at the Naval Base near the San Diego National Wildlife Refuge, San Diego, San Diego Co., CA, reported by Aireo Shipman of Project Wildlife. The hawk was found to have irreparable spinal and hip injuries and was euthanized 12/1/17 after the spinal injury had progressed to an inflamed state.

Adult Cooper's Hawk. Photo: Jeff Robinson

1470 Juvenile female Red-tailed Hawk banded on 9/21/15 by Brian Smucker; caught due to injury on 11/9/17 at Walnut Grove at Tyler Island in the Sacramento Delta, Sacramento Co., CA. BBL further defined the place found as "Desc: 220 Ryde." Ryde is an unincorporated community on Grand Island, Sacramento Co., CA at the junction of State Routes 220 and 160 also near the Sacramento River and three miles WSW of Walnut Grove, CA. The BBL listed the bird as in captivity; reported by Amando Carillo. No further information available despite several unsuccessful attempts to reach the finder.

1471 Juvenile male Cooper's Hawk banded on 9/20/11 by Lief Gallagher; found 11/18/17 dead with trauma to the spine and back of head on a roadside at Petaluma, Sonoma Co., CA; reported by Mario Balitbit of *Bird Rescue Center of Santa Rosa* who believed it had been hit by a car.

1472 Juvenile female Peregrine Falcon banded on 11/1/17 by Laura Echávez; found 18 days later on 11/19/17 "weak on the ground" with no signs of injury "and did not act aggressively towards the finders but appeared to be dehydrated…some broken feathers noted." When provided with water, the bird drank. It "was calm and quiet for several hours, but suddenly convulsed and died." Though the BBL listed Caborca, Sonora, Mexico as the place found, Alan Mendoza, who reported the Peregrine, corrected the location as 3-4 miles "NE highway off of Altar, Sonora, Mexico."

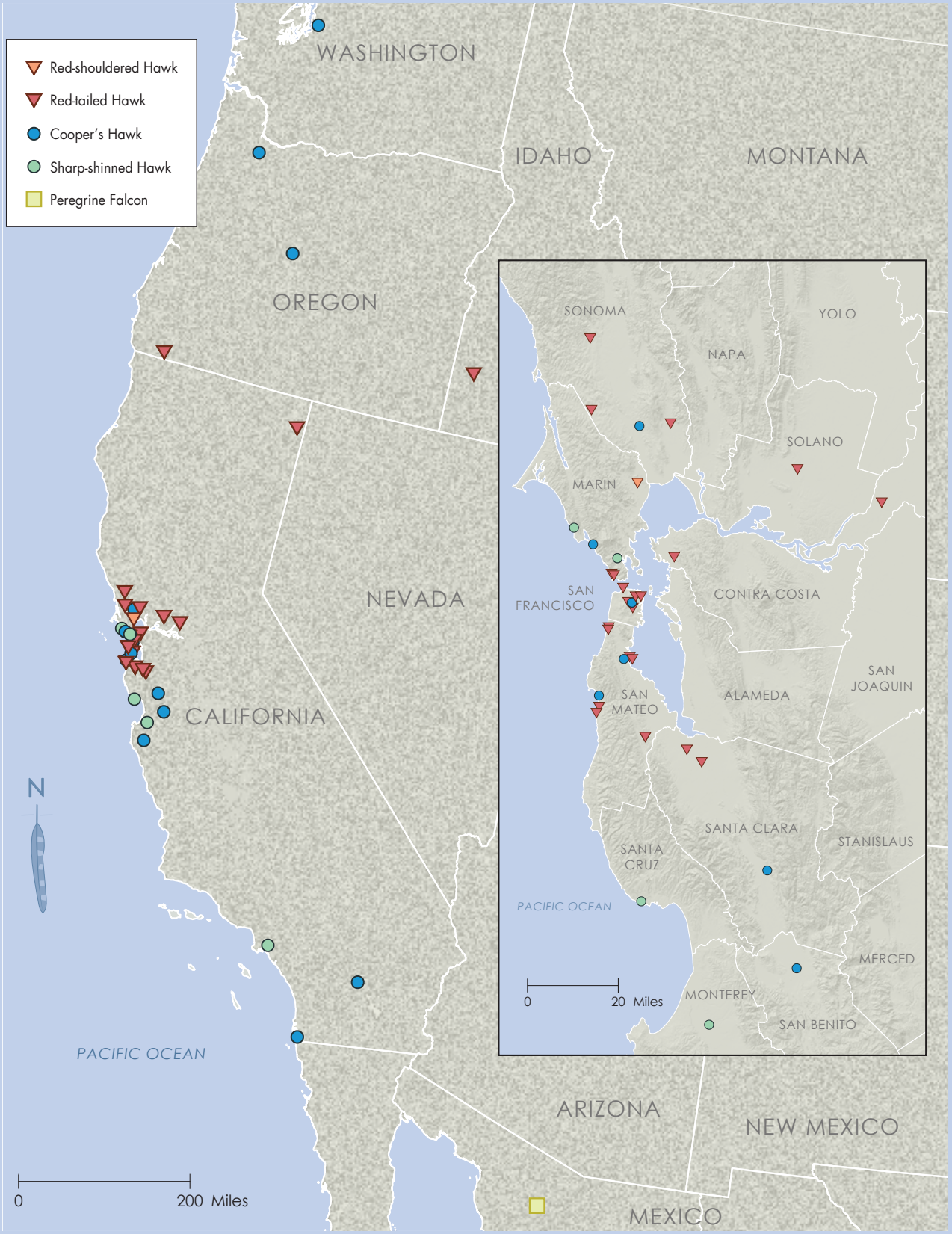
1473 Juvenile female Cooper's Hawk banded on 11/14/17 by Erin Fisher; found 11/20/17 at Half Moon Bay, San Mateo Co., CA; brought to the PHS after hitting a window, unable to stand and with left shoulder problems causing the left wing to droop. Once it was able to sustain flight and the wing no longer drooped, it was released on 12/17/17; reported by Tani Myers, both a vet tech with PHS and a GGRO bander.

1474 Juvenile male Red-tailed Hawk banded with both metal and color bands on 11/12/17 by Tara McIntire; was deceased on intake at the PHS on 11/23/17; there were no notes indicating its physical condition or how it died; reported by PHS staff. "The only information is that it was in a garbage bag in front of the address (at Half Moon Bay, San Mateo Co., CA) of the reporter.

Band recovery 1475, photo: Michael Chasse

1475 Juvenile male Red-tailed Hawk banded on 11/23/16 by Tani Myers; exactly a year later, on 11/23/17, skull, leg bones with band, and left wing were found on the coastal bluffs at the Presidio at San Francisco, San Francisco Co., CA. Crystal Dolis discovered the remains along with some black feathers at the site; reported by Fue Her, a Biological Science Technician with the Presidio Trust. ●

Jeff Robinson releases a Merlin after banding. Photo: Phoebe Parker-Shames



Map by Maryrose Kulick and Zac Stanley

A BIRDLESS AND TRANSITIONAL YEAR

Libby Rouan

GGRO's radiotelemetry program underwent a major change in leadership in 2017. After twenty years as our volunteer Radiotelemetry Coordinator, Lynn Jesus, retired. Lynn left enormous shoes to fill. I was happy for her, and I was also scared, anxious, and worried for the program. At our 2016 Post-Season Debriefing Meeting and Potluck, the remaining telemetrists gathered to address this colossal programmatic change. We decided to sacrifice tracking a bird and instead use 2017 as a transitional year to catch up on projects and address leadership and other needs.

Over the years, Lynn managed all the fine details of implementing GGRO radiotelemetry because she loved it. She ensured that access permits to state and local parks were in place. She unpacked and repacked our equipment bags and clipboards, replacing odds and ends, like pens or batteries. She sent transmitters and receivers to the manufacturer for refurbishing when needed. She setup a voicemail system for team communications in the field. She updated document binders so we had enough datasheets while tracking. She checked and replaced old field maps with new ones. She determined the season time-frame based on banding data and capture rates. She studied every single bird we ever tracked and could tell you the story of each one. She recruited and trained new volunteers, knowing us well enough to purposefully pair returning trackers with new apprentices on the schedule. She addressed all this and more in the pre-season so the trackers could just show up and track. GGRO and especially the Radiotelemetry volunteers will forever be grateful to Lynn Jesus for her amazing dedication and longevity.

So, rather than attempt to pull off the daunting miracle of completing these tasks on our own, we determined program priorities and opted to conduct more rigorous field-testing of a smaller transmitter to assess its viability for actual tracking. We also surveyed former and current volunteers for their feedback on the program. Further, we prioritized our data management and security, particularly to support research publication. This will enable us to design future tracking studies on the science of what we know and don't know, instead of on what species we'd like to track as volunteers.

ITTY-BITTY TRANSMITTER TEST

We conducted a field test of a little 6-gram transmitter in July 2017. This transmitter is smaller, lighter, but also less powerful, than our standard transmitter. We planned to use it on smaller species, such as Cooper's Hawks, hoping the birds would accept the mount without it interfering with

LIBBY ROUAN is a UC Santa Cruz grad and Hazardous Waste Specialist with San Mateo County. She has kept the GGRO radiotelemetry data moving toward publication for the past few years, and for this we are deeply grateful.

their daily activities. We also hoped that, although the signal was less powerful, it would still transmit a sufficient distance for teams in the field to successfully track and collect data. Unfortunately, the Google Earth Map of the results revealed very short-range transmitter reception, which was not promising for our long-range tracking style. For now, we will continue to use the regular-sized transmitter, which means tracking large hawks due to the necessary transmitter-to-body-weight ratio.

TELEMETRY VOLUNTEER SURVEY

We identified that our dwindling number of active telemetrists was a challenge that needed attention and so conducted a survey of former and current volunteers in May 2017. Our goal was to find out what brought a volunteer to radiotracking hawks, what they liked about the experience, whether they are still volunteering, and if not, why? The results revealed interesting and useful information, such as how to improve training, ideas for future studies, and the impacts of weather. When we plan for future tracking, we can now design it to address these suggestions, as well as acknowledge that Mother Nature could do a better job cooperating!

DATA MANAGEMENT AND SECURITY

Former GGRO intern Lynn Schofield started work on a new and improved radiotelemetry database and sent us a workable version in October 2017. This was another enormous step forward for the program! We will be able to use this system to analyze bird data, to triangulate and map it via animal movement software available online instead of doing this manually. Yes, we are excited to be advancing from rock-and-chisel to the present. This will help us figure out what we know and don't know from the scientific perspective for research publications and planning future studies.

We also identified securely scanning our bird datasheet sets as an urgent issue. Most of the datasheet sets were stored in their original and hardcopy paper form at GGRO, Lynn's or another volunteer's home. This is all perfectly fine...until it's not. Fire, water-damage, misplacement, oh my! This data security effort started as a top priority in April. We have almost 40 bird datasheet sets scanned and only about 20 to go—almost there.

Bill James studies the beep pattern during the field test of an itty-bitty radio-transmitter. Photo: GGRO

FILLING LYNN JESUS'S SHOES

Many volunteers helped design and field-test the itty-bitty transmitter, conduct the volunteer survey, scan the datasheets, etc., to meet the needs for the 2017 season in a massive attempt to fill the leadership void. In all, this effort included myself, Theresa and Nick Rettinghouse, Mike Hall, Sandra Corzantes, Maxine and Ron Berg, Linda Vallee, Ron Parker, Eileen Richey, Ken Weidner, Lynn Schofield, Phil Capitolo, Kaitlin McGee, Danielle Husband, Lara Elmquist, Laura Echávez, and Ashley Santiago, with critical support from Laura Young, and all under the guidance of Step Wilson and Allen Fish, and even Lynn herself, who quietly kept an eye on us.

I hope I didn't forget anyone. See how big Lynn's shoes were? Her feet are huge! That took over twenty people. ●

INTER-INTERN INTERVIEW: MEGAN MAYO '12

Ashley Santiago '17

AS an intern about to face a world outside the GGRO, I get a feeling of comfort and pride hearing about the GGRO Interns that have come before me. Many GGRO volunteers must remember Megan Mayo of the 2012 season who has recently received her PhD from UC Davis. She has graciously taken the time out of her busy life as a new doctorate and new mother to tell us the story of her life post-GGRO.

Megan Mayo processes a Red-tailed Hawk. Photo: GGRO

GGRO banders and hawkwatchers alike spend a lot of the quiet time between hawks telling each other our life stories. We just don't make eye contact! In fact, a big part of what makes the GGRO so special is the support and exchange between volunteers, staff, and interns. In a way, this interview felt like an opportunity to share a banding blind with Megan and to learn from her and laugh with her without the added interruption of "Hawk! Oh, never mind, it was just a Raven."

WHAT WERE YOUR GOALS AND EXPERIENCES BEFORE THE GGRO? WHAT LED YOU TO THE GGRO?

Before the GGRO, I was finishing up my undergrad career at Florida State University. I had completed a couple of internships, including one working with Bobwhites, one with woodrats and cotton mice in the Keys, another with beach mice populations along the coast, and still another doing bear management with the Florida Fish and Wildlife Conservation Commission. I was interested in education and wildlife biology in general and wanted to gain as much experience as possible in the field. Someone posted a flyer at FSU for the GGRO, and I thought it looked like the coolest position ever. Little did I know how right that would be.

DESCRIBE YOUR GGRO EXPERIENCE. WHAT DID YOU LEARN?

So much. Besides the breadth of knowledge in identifying, handling, measuring, and banding raptors, I learned a lot about respecting wild animals—the power that they have, how they are incredible athletes, but at the same time are intensely vulnerable to human threats.

WHAT IS YOUR FAVORITE MEMORY?

There is no way I could name a single favorite memory. Banding with and learning from Buzz. Teasing apart field marks from the accipiter that flew overhead on Hawkwatch with Allen—I still

ASHLEY SANTIAGO made her first post-GGRO move to Point Barrow to study eiders for USGS.

swear it was a Coop, but he's positive it was a Sharpie. The experience of growing and learning with my fellow interns. There are so many excellent memories jam-packed into that one short season. Nothing quite takes your breath away as being up-close to your first raptor, though. For me, it was a Red-tailed Hawk. She was enormous, and I was shaking the whole time that Diane Horn walked me through the banding process. I have a picture somewhere with me grinning like an absolute idiot, the bird staring in horror and indignation.

WHAT WAS THE MOST CHALLENGING PART?

Figuring out what's next. That question starts to come pretty early from everyone, and it is difficult to ignore it and just focus on the present. The thing most interns don't realize is that there are a ton of connections from the GGRO, and just about every GGRO intern has ample opportunity to take advantage of them.

DID YOUR GOALS CHANGE AFTER GGRO?

Yes and no. I am still very interested in teaching and wildlife research, and I will hopefully get back to that one day. I hadn't really considered how meeting the right person and starting a family could change my perspective on things and I am excited about the new path I am forging.

HOW DID YOU DECIDE ON GRAD SCHOOL?

I was interested in pursuing this raptor business that GGRO started in my life, and UC Davis and working with Dr. Josh Hull afforded me the opportunity to do that.

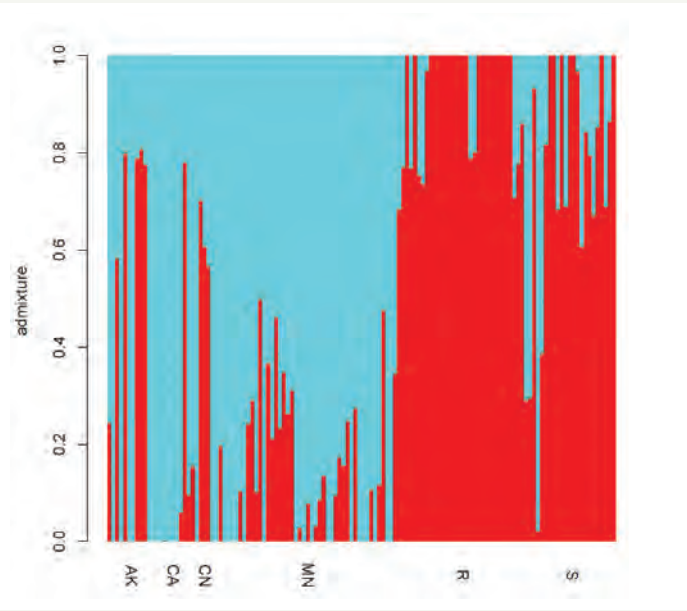
WAS GRAD SCHOOL WHAT YOU EXPECTED?

Not at all. Grad school was one of the most mentally and emotionally challenging experiences of my life. Giving birth was a million times easier! For me, it was 5.5 years of realizing that I knew nothing about anything, banging my head against the wall when analyses wouldn't work and I couldn't figure out the problem, and dragging this monstrosity that was my PhD, kicking and screaming, to the finish line. It was not pretty (or at least it wasn't for me).

I'm still trying to figure out if it was worth it, and I have a slight feeling that it might have been. It taught me a lot about myself and what motivates me, my strengths and weaknesses, and it taught me that the natural world is such an insanely beautiful, complex, and mysterious wonder. Nothing is really as it seems, and the more you learn, the more you realize how little anyone knows about anything.

CAN YOU GIVE US A GENERAL OVERVIEW OF YOUR RESEARCH?

In a few words, I studied the population genetics of Rough-legged Hawks and of Northern Hawk-Owls, and I learned a ton about color variation, without answering any questions about Harlan's Hawks.



Results from a Bayesian clustering analysis for 39,260 Single Nucleotide Polymorphisms for 128 Rough-legged Hawks (*Buteo lagopus*) comparing the proportion of ancestry for each individual for K=2.

AK=Alaska; CA=California; CN=Canada; MN=Minnesota; R=Russia; S=Scandinavia

WHAT ADVICE WOULD YOU GIVE TO INTERNS THINKING ABOUT GRAD SCHOOL?

It is a great experience! You can do it! And it is definitely as hard as they say. That being said, don't rush into grad school. You are presumably at a point in your life where there are so many opportunities to do more amazing things that you will probably not ever have the chance to do again. The pay is terrible, but when else will you have the chance to go live in a hut in Panama and chase birds around? Or move out to the desert for three months to search for scorpions? Or hop on a boat to count sea turtles?

If grad school opens up opportunities like these, even better, but there is no rush to grow up and the sooner you realize that, the better. Also, if you have the opportunity to go abroad for grad school, seriously consider it. From my limited experience, it seemed that European universities were much better at fostering community among researchers and work-life balance.

WHAT WERE THE MOST UNEXPECTED PLACES YOU FOUND YOURSELF IN, THINGS YOU FOUND YOURSELF DOING, CHANGES IN PERSPECTIVE?

Before I went to grad school, I found myself working with what was formerly PRBO and is now *Point Blue Conservation Science*, staring at a Northern Spotted Owl and thinking "Holy heck, they are paying me to do this?!"

During grad school, I found myself on a road trip with Bill Clark (author of the *Peterson Field Guide to Hawks* and other raptor guides) cruising up and down the Alaska Highway searching for and catching Harlan's Hawks.

I also had the opportunity to live in Sweden for three months among some amazing ecologists, geneticists, and bird nuts, and learned a thing or two about a thing or two.

WHAT ARE YOUR FUTURE PLANS?

I am embarking on my greatest adventure yet, motherhood. I have the privilege of being a stay-at-home mom, and I am currently working on teaching other new moms how to get outside in nature with their little ones as I figure it out myself. You better believe Eddy will know how to identify raptors in California. ●

Rough-legged Hawk. Photo: Pamela Rose Hawken

Right: GGRO annually brings five interns aboard to create a higher level of consistency in data collection and field support during the busy fall migration season. Our 2017 interns were focused and enthusiastic, and we are immensely grateful for their hard work. Clockwise from top left: Kaitlin McGee (California); Lara Elmquist (Texas); Laura Echávez (Venezuela); Danielle Husband (Florida); and Ashley Santiago (Illinois). Photo: Allen Fish


BUILDING 1301
Marin Headlands
Nursery

NORTH LIVERMORE/ BRUSHY PEAK

Danielle Husband

In February 2018, the GGRO interns were given an assignment to write an article on raptor-seeking in the Bay Area, and we decided that Golden Eagles would be our quarry. During February, adult Goldens are establishing nesting territories. So we consulted GGRO dayleaders and eagle monitors Christine Cariño and Bob Power for help in finding an East Bay raptor hub where we might see Goldens but not disturb nests. In the end, all signs pointed to the beautiful, rolling fields of north Livermore.

Brushy Peak's low hills and wide expanses make for superb big-raptor watching. Patient scanning of distant ridge-lines, fence-lines, poles and towers always pays off. Photo: Kaitlin McGee

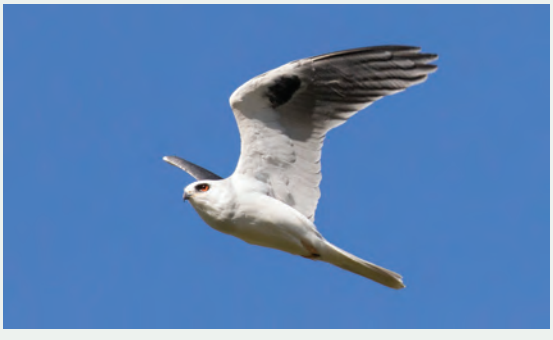
We set our sights on Brushy Peak Regional Preserve, an 1833-acre park featuring a 1702-foot peak amongst low grassy hills. This preserve features former ranching lands, with continued seasonal grazing operations today. It is dominated by seasonal grasses, with spots of oak woodlands and spring-fed ponds. Given this information, we expected to see a range of soaring buteos and perhaps a falcon or two combing the hills for small mammals, namely Beechey Ground Squirrels.

As we drove up to the preserve, we noticed the array of wind turbines on Altamont Hills, spinning wildly. The gusty winds did not deter us as we parked in the main lot and set up our scopes. At first, it was hard not to notice hundreds of gulls forming large kettles in the strong winds overhead. As we looked closer, scanning the hills and skies, we noticed raptors in the distance. Redtails, Turkey Vultures, and American Kestrels were popping up out of the trees and over the fields, giving us good identifying looks. Almost out of thin air, a Prairie Falcon coasted over the group, providing the clearest view of a Prairie for a few of us! This just goes to show that one may not even have to leave the parking lot to see raptors! We took notice of other birds as well, spotting a Northern Flicker and Western Meadowlarks from the lot.

After spending some time counting at the lot, we started down the Brushy Peak Loop trail to see more. We happened upon a pond and spotted some shorebirds and ducks, including Buffleheads, American Wigeons, American Coots, Mallards, and Killdeers. From this location, we saw more

DANIELLE HUSBAND was one of our 2017 GGRO Interns. Interns Lara Elmquist, Kaitlin McGee, Ashley Santiago, and Laura Echávez also contributed to this article.

kestrels kiting around, finding almost no issue with the wind. Even a lone Red Admiral butterfly was coasting along the pond vegetation nearby. As we walked on, yips of ground squirrels followed us, sounding the neighborhood alarm. We kept scanning Brushy Peak for eagles, but none showed. A Northern Harrier popped up over the fields and soared right above the group, the fourth raptor species of the day. After wandering further down the trail, our guides ushered us back to the lot, to start the car tour aspect of our trip.



Top photo: Ferruginous Hawks, named for their rusty color, are synonymous with the wide-open grasslands of the American West. Bottom photo: White-tailed Kites are a year-round resident of California's grasslands, hunting mice from a high perch or hover. Photo credit for both: Don Bartling

Driving down two-lane highways, each of us scanned the skies. Much like any car tour, finding handy pullouts to park and scan were essential. We added a long-distance Ferruginous Hawk to the list and White-tailed Kites were spotted at one location as well. At last, we found a pair of Golden Eagles high above the hills.

The *East Bay Regional Parks District* sponsors an extensive Golden Eagle nest monitoring program. As a cooperative effort between the county and state, the locations of each eagle nest are tracked and watched from inception to chick fledging to flight. Christine Cariño is a long time nest monitor and has spent many daylight hours cataloging behaviors through the spring season. When we took this trip in early February, the eagles were establishing territories and hanging out near nest sites. All Golden nests are kept classified, as human disturbance is known to negatively affect eagle behavior. So, while one can see Golden Eagle nests from roadsides, we kept our distance from them. In the end, we saw seven Golden Eagles driving around north Livermore.

From start to finish, north Livermore delivered raptors. If you have the chance next winter, I encourage you to check out north Livermore, take a walk in the Bushy Peak Preserve, and appreciate the raptors we all know and love.

RAPTORS: Red-tailed Hawk, American Kestrel, Prairie Falcon, Turkey Vulture, Northern Harrier, Ferruginous Hawk, White-tailed Kite, Golden Eagle, Cooper's Hawk, Sharp-shinned Hawk.

OTHER BIRDS: Western Meadowlark, California Gulls, Bufflehead, American Wigeon, American Coot, Mallard, Killdeer, Savannah Sparrow, American Pipit, Greater Yellowlegs, Loggerhead Shrike, Red-winged Blackbird, Rock Dove, European Starling, Black Phoebe, Tree Swallow. ●

Saturday hawkwatch team strikes a pose on Hawk Hill. Photo: Steve Miller

GOLDEN GATE RAPTOR OBSERVATORY GRATEFULLY ACKNOWLEDGES

The success of the Golden Gate Raptor Observatory rests on the shoulders of many people: the staff of the Golden Gate National Parks Conservancy and the National Park Service; the donors who provide a critical budgetary boost for our research and operation; and an exceptional, creative and dedicated volunteer staff. GGRO volunteers give a minimum of 70 hours a year to the National Parks Service, often closer to 100 hours. Double that is not unusual. But whether you give sweat, donations, or moral support, we deeply appreciate your sponsorship, your stepping up for raptor conservation. Great thanks to all of you, our volunteers and donors.

2017 VOLUNTEERS

Emily Abernathy
Rosa Albanese
Jon Altemus*
Anne Ardillo*
Jenn Armer
Kendra Armer
Michael Armer*
Stefanie Arthur
Patricia Bacchetti
Michelle Bain
Jared Baker
Lynn Bantley
Kathleen Barker
Eddie Bartley*
Don Bartling
Carie Battistone
Nicole Beadle
Tim Behr*
Maxine Berg
Ronald Berg
Emily Berk
Chris Bessett
Sam Bessett
Alan Bleiman
Marc Blumberg*
Robert Blumberg
Sara Bohannon
Jeff Boissier
Bob Boles
Laura Booth*
Robyn Boothby*
Carroll Botvinick
Ryan Bourbour
Andy Bradshaw
Herb Brandt
Randy Breaux
Lucy Breslow
Nancy Brink*
Johnny Brown
Arden Bucklin-Sporer
Marcia Budarf
Courtney Buechert
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Allison Levin holds a juvenile Redtail. Photo: Jeff Robinson

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Hawkwatchers strike a pose in front of the Golden Gate. Photo: Lara Elmquist

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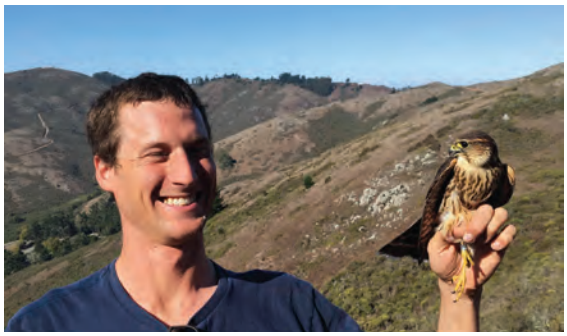

Eric Lynch prepares to release a Merlin. Photo: Teresa Ely

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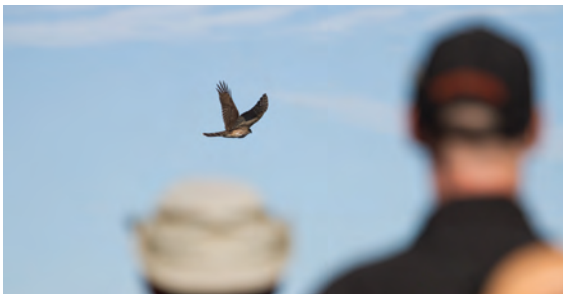

Hawkwatchers set their sights on a bird in the distance. Photo: Phoebe Parker-Shames

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The National Park Service was created in 1916 to preserve America's natural, cultural, and scenic treasures, which today number 418, and to provide for their enjoyment by future generations. For information about the Golden Gate National Parks, phone (415) 561-4700, or visit nps.gov/goga.

COLLAGE OF FEATHERS

PICTURED ON BACK COVER

Megan Gnekow

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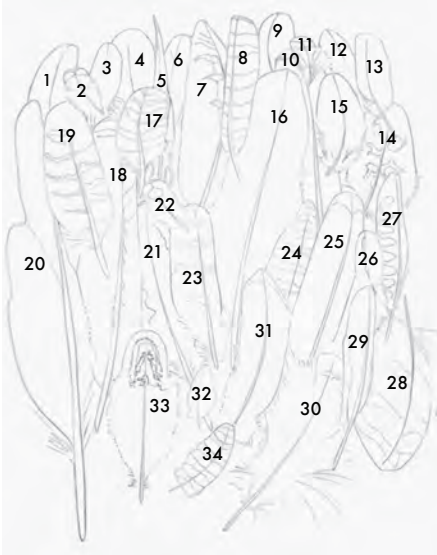

1. Pheasant Pigeon
2. Ring-necked Pheasant
3. Steller's Jay
4. Great horned Owl
5. Northern Pintail
6. Inca Dove
7. Barn Owl
8. Cooper's Hawk
9. Peregrine Falcon
10. Red-tailed Hawk
11. Chukar
12. Swainson's Hawk
13. Screech Owl
14. Golden Eagle
15. Ferruginous Hawk
16. Great Blue Heron
17. Great Horned Owl
18. Red-tailed Hawk
19. Ferruginous Hawk
20. Ferruginous Hawk
21. Belted Kingfisher
22. Northern Flicker
23. Short-eared Owl
24. Peregrine Falcon
25. Great Blue Heron
26. Northern Harrier
27. American Kestrel
28. Barred Owl
29. Northern Flicker
30. Swainson's Hawk
31. Mallard
32. American Kestrel
33. Ring-necked Pheasant
34. American Kestrel

This piece was originally developed for a beer label. The client requested that the piece be a "collage of feathers, beautiful, vivid and pastel colors...some of them could be Red-tailed, White Hawk, Peregrine feathers." They wanted the feathers featured on the label to belong to California birds (though I still don't think we have White Hawks here). So I went about borrowing feathers from rescued birds, drawing from study skins in the collections at California Academy of Sciences, accepting gifted feathers from duck hunters and fly-tiers, and sketching from local birds as much as possible.

I did preliminary sketches and sample drawings of individual feathers for the client. As I developed the piece, I explained that most California birds just don't have vividly colored feathers. That's not a particularly useful characteristic for birds living in our ecosystems. But the client kept approving the sketches and the preliminaries anyway, even as my misgivings about the fate of this project grew.

Ultimately, I presented this finished piece of work featuring the feathers of nearly twenty species of California birds. The client declined to pay for it, saying that it was not "photo realistic and colorful" as they had asked for. So I kept my drawing and now enjoy the feedback of many folks who disagree heartily with that assessment.

Painter and biologist Megan Gnekow earned her scientific illustration certificate from UC Santa Cruz. She hawkwatched for GGRO a few years back and now helps monitor the raptor nests of Pinnacles National Monument. For a glimpse of Megan's stunning illustrations, go to www.megangnekow.com. You can also buy Megan's art at her Etsy.com website, including the original of the feather bouquet printed here.