Pacific Raptor Report 36

FALL MIGRATION 2014

GOLDEN GATE RAPTOR OBSERVATORY

PACIFIC RAPTOR REPORT

THE NEWSLETTER OF THE GOLDEN GATE RAPTOR OBSERVATORY

Telemetrist Ron Parker listens for a signal from Frosty at an East Bay high point. See pg. 11 for a full account of Frosty's movements. [Photo by Mike Hall]

Contents

COVER IMAGE: THIS ADULT FERRUGINOUS HAWK WAS CREATED BY BIRDER AND ARTIST MATTHEW DODDER IN HONOR OF THE HAWK HIS BIRDING CLASS OBSERVED ON VALENTINE'S DAY 2015. SEE PG. 4 FOR THE FULL DRAMATIC STORY. MATTHEW'S ARTWORK OFTEN CAPTURES THE ESSENCE OF THE BIRD OR BUG LIKE FEW OTHERS. FOR MORE OF HIS WORK ONLINE, SEE WWW.BIRDGUY.NET AND "ARTISTIC NATURE" ON FACEBOOK. [DRAWING BY MATTHEW DODDER]

THE GOLDEN GATE RAPTOR OBSERVATORY IS A PROGRAM OF THE GOLDEN GATE NATIONAL PARKS CONSERVANCY IN COOPERATION WITH THE NATIONAL PARK SERVICE

DIRECTOR'S NOTE *Allen Fish*

The Made, the Born, and the Biological Century

It is Valentine's Day 2015; I sit on the shady side of the house because at 4 pm in the San Francisco Bay Area, it is too bright and too hot to settle on the south side. As the wind chimes murmur, my wife puts her head out the door and says, "The wind feels good, but it's going to dry out everything faster." I think of this morning's weatherwoman showing North America's dividing line of weather systems like two clashing blankets laid diagonally across the same bed. It is 89 degrees in Palm Springs today; it's -30 degrees in Buffalo. Boston cannot find enough places to dump the street-scraped snow. There's almost complete containment on a forest fire north of Reno.

Years ago, somebody introduced me to the concept of the "made" versus the "born" world. It's an easy concept: that which is made could—in theory—be made again. That which is born, once the genetic lineage is snuffed out, as an extinct species, is forever gone. The earth that evolved the Roadrunner is long gone. The forces of time and place, of habitat, water, sand, desert vegetation, insects, and lizard—that all pummeled this new bird to evolve from the clay of some tree-dwelling cuckoo—those forces are gone.

I married an art librarian who happens to love birds of prey, and so we met under the Golden Gate migration some years ago. The art librarian and I have had many talks about the born world and the made world. Once destroyed, could you recreate a painting by Vermeer? In theory. Could you recreate a Jeweled Damselfly? Never. Not ever. Many of us have an emotional response to losing art, and why shouldn't we? Art is the storyline of our species. These artists are us. But to lose to extinction a Jeweled Damselfly? Is that also an emotional event? Perhaps. Perhaps it is bigger—it is an emotional event plus an ecological event.

Not only can the bug never be replaced, it will never again evolve. Not only was it pleasing to the eye, but it had a job. It had a place in the mechanics of the planet. What was its job? Perhaps prey for this. Predator of that. I don't actually know for the Jeweled Damselfly. And often we—the biologists—don't know. And that is not because what it does is insignificant, but more because we don't have many biologists paying attention to damselflies. We're kind of naïve about the damselfly world.

We are naïve about many worlds not our own, such as the world of slime molds, mites, fungi, and…well, the list is huge, isn't it? Many assume that we know mostly all about our vertebrates in the United States, but even about them, we possess big blocks of stupid. I met a professor last week who watches Red-shouldered Hawks forage in his compost pile. "For worms?" I said, certain I was right. "Red cabbage," he said. "You're kidding me." "Red cabbage," he repeated sternly. Who knew that?

Years ago, somebody introduced me to the concept of the "made" versus the "born" world. It's an easy concept: that which is made could—in theory—be made again. That which is born, once the genetic lineage is snuffed out… is forever gone.

Among my many inner voices, I possess one voice of confusion with a sidecar of despair: where are all the naturalists? Where are the people like me? People who as kids discovered the unlimited mysteries of their backyards. I'm not talking about goody-two-shoes martyrdom for protecting the environment here; I'm talking being selfish for time outside, a lust for life in leaf duff, a greed for unravelling the mysteries of mud. Watching birds is a blast, right?

OK, I'm not totally stupid; I have two teenagers, actual progeny who share my house. It's

a recurring joke here to say "Hey Dad, let's go birding!" and then laugh at my ever-gullible, bright-eyed. puppy-dog response. And as brilliant as I know my kids are, I wonder why the nature toggle switch didn't quite flip to "on" in either of them. But, to recall my own teen years honestly, I remember being fairly closeted on the bird-watching front between ages 13 and 17. Is that the power of teen hormones or of peer pressure? Maybe. Of course, biology does bat last.

Still, living so close to two teenage primates has me thinking often about where love of nature comes from. Why does any kid get bitten by the nature bug at all? It's easy to imagine some scenarios: (1) Kid spends time with some beloved relative or friend who knows the joys of being outside and looks deeply into trees; (2) Kid repeatedly escapes to a wild setting to leave behind sadness, anger, or abuse at home; and (3) Kid has the intense focus of a true nerd, and happens to trip over, say, frogs before the computer gaming world hits her.

These remind me of a Barry Lopez quote in *Writing Natural History*: "The natural world is a place where you can explore the nature of your prejudice without fear of reprisal." I love that idea, that wild landscapes absorb us and all of our weird ideas. And that pulls me toward one more thought: do we need nature? Not just food and water, but psychologically. I suspect we do. Most obviously because we evolved here. We are genetically the same as we were millennia ago. Then why don't we act that way?

Maybe this is an old thought, but perhaps it is what defines us as a species, our pig-headed denial of the fact that we need nature. Isn't it interesting—we are smart

GGRO ANNOUNCEMENTS *Allen Fish*

HONORING A BANDER'S LEGACY

On Mothers Day 2014, longtime GGRO bander Jennie Rhine died after a long battle with Alzheimer's. Jennie came to GGRO in 1992 to learn to band hawks and to look for nests, and it was at least two years into our working friendship that I asked her, "So, what do you do?" Without looking up she said "I'm a superior court judge." I about fell out of my banding stool. Really? Really! "Yep, banding is such a great break from work." Not only was Jennie an expert in social justice for Native Americans, and people of urban and rural communities, but in the words of fellow judge Peggy Hora, "She was the perfect Berkeley judge, progressive, connected to the community, and passionate about justice." In summer 2014, Jennie's widower, Tom Meyer, called key park staff together to explore some ways to remember Jennie and her love of hawks. We quickly settled onto a theme of bringing more city kids up to Hawk Hill. And starting this summer we will be working with Crissy Field Center staff to turn such themes into realities. Thank you Tom, and thank you, Judge Jennie.

[Photo: Marion Weeks]

A GIFT FROM ACROSS THE CONTINENT

We were happily surprised in the fall of 2014, as hawks migrated overhead, to get word that Steve and Joan Marlin from North Carolina had made a generous donation to the GGRO's Gregory Hind Endowment. (The Hind Endowment was established in 2013 by Leslie and Troy Daniels to memorialize Leslie's brother Gregory, himself a life-long lover of California's raptors, as well as an inventor and philanthropist.) We hunted down the Marlins by phone and to get the full story on how the GGRO had so affected them.

Steve had been stationed at Beale Air Force Base in the 1970s, but he loved visiting San Francisco and walking around the city meeting people every chance he got. After his military stint ended, he returned to North Carolina to care for his mother Joan, but over the past four decades, Steve made many return trips to San Francisco to enjoy the people and the landscape. Last summer he dropped in at Fort Mason, and was so impressed by the NPS and Conservancy staff that he made the donation to the Golden Gate Raptor Observatory soon after. Great thanks from all of us, Steve.

enough to have figured out some of the greatest puzzles of the planet, including what made us: evolution by natural selection, and the structure of DNA. And yet, we refuse to use that same intelligence to protect the planet that made us and that allows us to live on.

Given the pressures facing this lovely and broken planet, I suspect we have about one more century to face and resolve what Gary Snyder asked 25 years ago, "Do you really believe you are an animal?" That is the crux, the root in the trail, that keeps tripping us up. For only in that belief might we put aside our swing-set arguments about economy, politics, religion, skin color, and even science, long enough to protect what really matters: the whole planet, as we are merely a subset of that.

Writer David Quammen snuck this paragraph into his introduction to *The Best American Science and Nature Writing of 2000*. I think it's the most clarifying statement of our times:

"Science, like democracy and tai chi and golf, is a human activity. It's not a body of Truth, inherent to the universe and revealed by priests and priestesses in white lab coats. It's not irrefragable, nor even so purely objective as it sometimes pretends. Science is a subset of human culture, which is a subset of primate behavior, which is in turn a subset of nature. That's partly why, beyond merely being important, it's so damned interesting. People do science just as people do marriage or baseball, sometimes successfully, sometimes gracefully, sometimes badly."

Welcome to the Biological Century.

Allen starts his 31st year as director of the GGRO this summer, and still offers his kids bribes to keep bird lists.

SCIENTIFIC CONTRIBUTIONS IN 2014

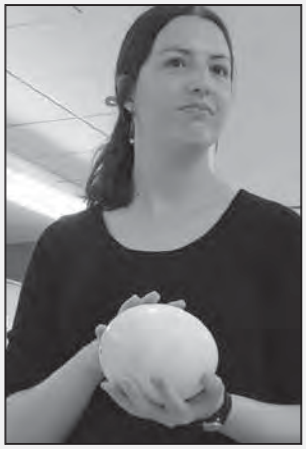
GGRO staff and volunteers work hard to collect consistent data in the field, but we also work hard to get those data into publishable form. In 2014, we published two scientific papers and contributed three scientific presentations, ranging on topics from patterns of Osprey nesting to blood parasites in Red-tailed Hawks. This raises our list of scientific contributions since 1984 to 104. Great thanks to the lead-authors and co-authors of the following:

Jasper, M.A., J.M. Hull, A.C. Hull, and R.N.M. Sehgal. 2014. Widespread lineage diversity of *Leucocytozoon* blood parasites in distinct populations of western Red-tailed Hawks. Journal of Ornithology 155 (3): 767-775.

Brake, A.J., H.A. Wilson, R. Leong, and A.M. Fish. 2014. Status of Ospreys nesting on San Francisco Bay. Western Birds 45 (3): 190-198.

Briggs, C.W., and A.M. Fish. 2014. Anticoagulant rodenticide occurrence in Red-tailed Hawks in coastal California. Poster. Raptor Research Foundation Conference, Corpus Christi, Texas.

Fish, A.M. 2014. Three decades of citizen science and raptor monitoring at the Golden Gate: when to set sail, and when to jump ship. Invited presentation. Plenary Panel on Citizen Science. The Wildlife Society Western Section Conference, Reno, NV.



[Photo: Allen Fish]

Fish, A.M., J.M. Hull, J.J. Keane, S.R. Mori, C.W. Briggs, and B.C. Hull. 2014. Linear trends and accipiter misidentification rates in raptor migration counts —a citizen science approach. Presentation. Citizen Science Symposium. The Wildlife Society Western Section Conference, Reno, NV.

GGRO FLEDGES A PHD!

There are many routes to making a scientific contribution, but one of the most exciting and gratifying for me is when a GGRO alum completes a graduate degree, and while studying raptors no less! In late April 2014, I had the pleasure of sitting in the library of the Museum of Vertebrate Zoology at the University of California, Berkeley, with several dozen others while Elizabeth Wommack delivered her PhD dissertation lecture entitled: "The range and use of plumage variation in the American Kestrel (*Falco sparverius*)." Dr. Wommack, who had been a Research Intern with GGRO in 2006, and has volunteered as a banding leader ever since, started a new job as the Director of the Vertebrate Museum at the University of Wyoming last summer. Congratulations, Beth!

Ferruginous Hawk Collides with Model Airplane

EDITOR'S NOTE: The saga below was penned by GGRO hawkwatcher Tate Snyder and GGRO bander Traci Tsukida, who happened to be on either side of this strange event. The story takes place in two parts: (1) the collision of an adult Ferruginous Hawk with a radio-controlled model airplane; and (2) the successful rehabilitation and release of the hawk—in just two months—still in time to migrate north to its breeding grounds. I want to clarify that GGRO did not take any part in the hawk's rescue or rehabilitation. While participating in Matthew Dodder's birding class, Tate witnessed and documented the accident and got the bird to the Wildlife Center of Silicon Valley, where the competent staff and volunteers, including Traci, took over care. Bravo to the whole staff of the WCSV for their careful and speedy treatment of this awesome winter California raptor species. To support the great work of the WCSV, go to *www.wcsv.org*. Kudos also to biologist Ryan Phillips and Shani Kleinhaus of Santa Clara Valley Audubon Society for working with the Santa Clara Model Aircraft Skypark to install signage to better protect the local hawks. *—Allen Fish*

We were horrified to witness a violent collision between the Ferrug and a large model plane.

PART ONE: THE COLLISION
TATE SNYDER

I was at Ogier Ponds along Coyote Creek in Morgan Hill, California, with Matthew Dodder's birding class on February 14, 2015. The ponds are adjacent to SCCMAS, where there were many pilots flying model airplanes that day.

Around 10:30 AM, the class spotted an adult Ferruginous Hawk actively foraging in the area, apparently very interested in the abundant ground squirrels. The hawk made repeat passes and kited near the model aircraft field. We were horrified to witness a violent collision between the Ferrug and a large model plane near the north end of the runway at an altitude of approximately 50 to 60 feet. The bird immediately dropped to the ground, as did one of the plane's wings.

After some minutes, the bird stood up obviously dazed. It walked a few steps, some say unsteadily, and later unfolded its wings several times, but did not attempt to fly. We made phone calls to every agency and raptor person we could think of and had numbers for, but without much success. Eventually I made contact with the Wildlife Center of Silicon Valley, where the bird was taken for treatment.

A short time later, I received a call from the Wildlife Center, reporting that the bird was in the exam room with a veterinarian and a wildlife technician.

PART TWO: THE REHABILITATION
TRACI TSUKIDA

We did an initial exam, palpated the left ulnar, put on a figure-eight wrap to stabilize the fracture, and treated the bird for ectoparasites. We started pain medications and antibiotics right away and set him up in low stimuli housing. He was placed on a "donut"—a circular

wrapped towel for keel support—and we continued supportive care. Time would tell if he would recover fully.

We took radiographs when he was stable, to confirm and check the displacement. Since the ulna fracture was mid-shaft and had minimal displacement, we only had to keep the wing stabilized to heal and form a callus, which generally takes 7-14 days. A few days after intake, the Ferruginous Hawk successfully stood up, regaining his mobility. We did physical therapy on the wing to make sure that it would maintain mobility and range of motion and then eventually moved him to one of our smaller outdoor raptor enclosures.

As his strength improved, on March 2, we moved the hawk to our largest 50-foot enclosure to ensure that he could fly short distances and hunt live prey. He was most definitely one of the most alert, active, and aggressive birds I've worked with. He even lunged and flew at me a few times.

On April 13, two months after the accident, we released the Ferrug back into the wild. Tate Snyder pulled the curtain aside to allow the hawk to make its first flight.

Rehabilitating this Ferruginous Hawk, the first in 20 years for WCSV staff, was a full team effort. Our veterinarian Dr. Chad Alves did the radiographs, gut parasite sampling, and diagnosing; our wildlife rehabilitation supervisor, Ashley Kinney, oversaw treatment; and Rachel Atkins helped with bloodwork diagnostics.

On April 13, two months after the accident, we released the Ferrug back into the wild.

[Photos by Traci Tsukida]

RESEARCH NOTE *Chris Briggs*

The Stochastic Redtail

Band recoveries have become a large part of the data collected by the GGRO. Through over 1,300 recoveries, we have discovered a great deal about the movements, migrations, and mortality of birds trapped in the Marin Headlands. The volunteer recovery team has done an outstanding job getting the most out of those individual data points, and now we are starting to collect enough data that we can take a step back and look at larger patterns.

Juvenile Red-tailed Hawk banded by Siobhan Ruck in 2013, sighted "alive and healthy in the wild" in Coyote Valley (recovery #1302 on pg. 32 of this issue). [Photo by John Fox]

There are many questions we can begin to answer with the data at hand. For simplicity, however, we will just start with Red-tailed Hawks (*Buteo jamaicensis*). Red-tailed Hawks make an ideal test to look at these relationships for a couple of reasons. 1) We trap a lot of Red-tailed Hawks every year, giving us a great sample size, and 2) Red-tailed Hawks have a relatively high recovery rate after banding. Those factors combine to give us significant statistical power to see beyond the stochastic processes (e.g., an individual that happened to get hit by a car, get poisoned, strike a window, etc.) that may lead to the unfortunate and untimely death of any single individual, to larger patterns in movement and survival. In other words, we can look past the noise to try to discern patterns.

We have trapped 9,303 Red-tailed Hawks over the course of 30 years and have encountered (e.g., an individual is found dead, picked up after a storm, a color band reported, etc.) 681 Red-tailed Hawks. There are innumerable interesting and memorable recoveries for just this species. The furthest-travelling bird was a 5-year-old Red-tailed Hawk banded as a juvenile in 2002 and recovered over 1,400 kilometers away in British Columbia. The oldest bird was at least 25 years old, found near Lake Merced. Causes of death have included starvation, poisoning, shooting, getting hit by cars or planes, and hitting windows.

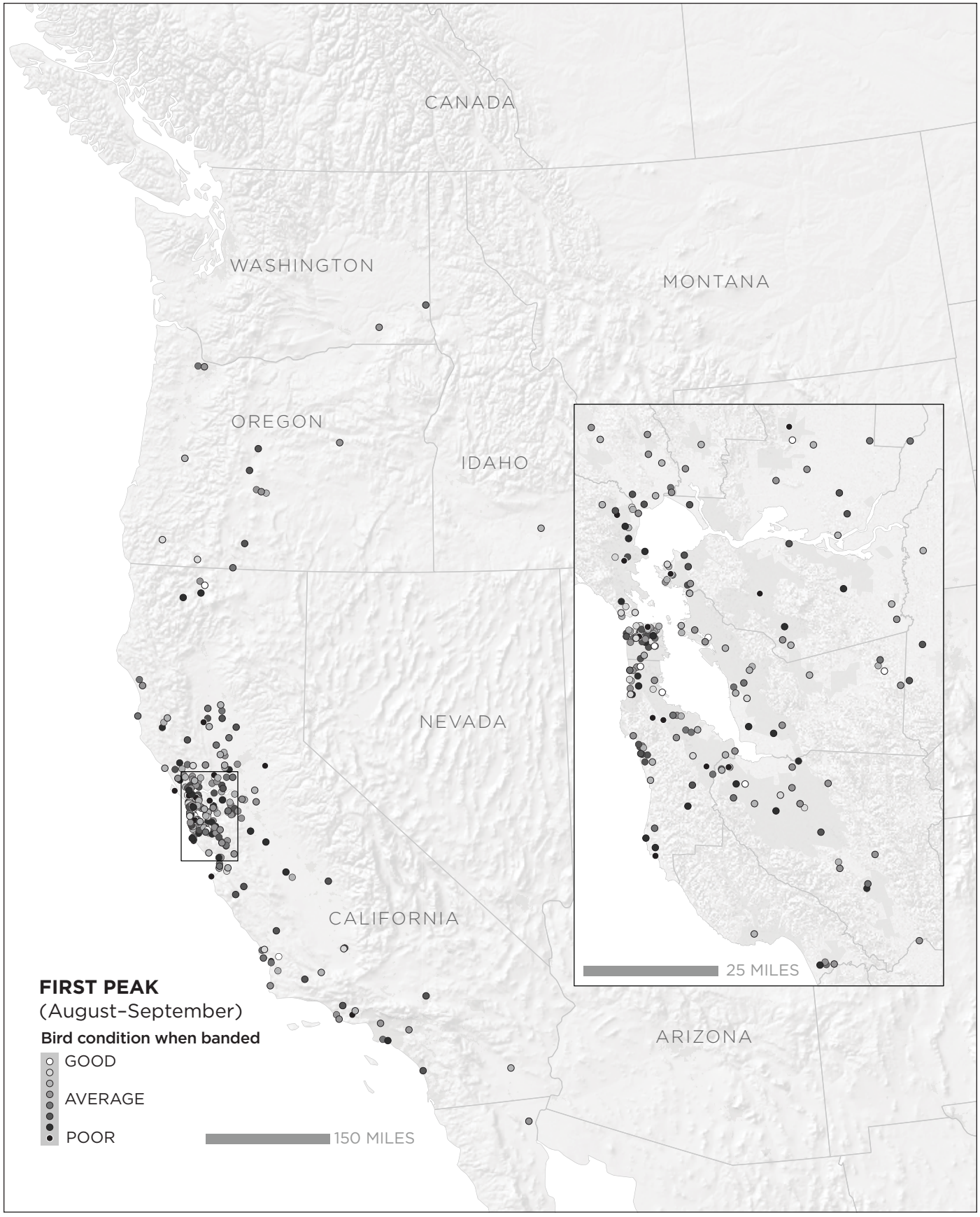
We also know that we have two Red-tailed Hawk peaks during the migration season; from August through September we generally see birds that are genetically from Central California. From October through January, birds tend to be from the Great Basin. We might expect these populations to move and behave differently. With this in mind, we can look at short-term survival, longevity of birds, and the distance a bird travels from the Headlands. By looking at variables (age, sex, presence of ectoparasites, etc.) we can try to predict a bird's future based on the measurements we took at capture.

SHORT-TERM SURVIVAL

We can use recovery first as a surrogate of overall survival for all Red-tailed Hawks trapped; in other words, we will assume that there is a direct relationship between the probability that a bird is recovered and probability that it dies. By assuming that any bird that dies is equally likely to be recovered we can see if any factors around trapping are related to recovery rates. For example, we often suspect that thin birds are malnourished and therefore may not survive much longer. But how do we measure that sort of condition?

Traditionally, we look at how heavy a bird is for its size; for example, we would expect a large female to be much heavier than a small male. There are other metrics of condition, but this one makes some ecological sense, with the idea that the heavier you are for your size the more reserves you have and the better you may be able to withstand energetic hardship. Similarly, ectoparasites—those little feather mites, lice, and flies that sometimes accompany raptors—may indicate a bird is not doing well.

For the near-term, we would like to know if metrics we see at capture relate meaningfully to a bird's ability to live


CANADA
WASHINGTON
MONTANA
OREGON
IDAHO
NEVADA
CALIFORNIA
ARIZONA
25 MILES
FIRST PEAK
(August–September)
Bird condition when banded
GOOD
AVERAGE
POOR
150 MILES

through the next two months. Two months is a somewhat arbitrary cutoff to ensure we have enough recoveries to do an analysis, but still a short enough time that we can imagine that their condition might reasonably influence their movements and survival over that period. When we limit that to birds we know were found dead, we are left with 138 recoveries.

So when we examine[1] the measurements and condition of a bird at capture, what do we find? Several factors come out as significantly related to the probability of being recovered dead within two months. The first was condition. Not surprisingly, thin hawks were more likely to die during the couple of months following capture. This highlights the precarious nature of the first year of a hawk and the downward spiral it may face if it is an already hungry bird.

In addition to condition, birds trapped later in the season were more likely to be recovered shortly after capture. However, individuals that are trapped later in the season also tend to be in poorer condition. So those second-peak/Great Basin birds seem to be thinner, which may be due to their longer journey to get to the Bay Area.

Related to both condition and season was also ectoparasite presence. These later, thinner birds were also more likely to have ectoparasites. This may highlight how a bird can spiral downward if it doesn't have time to preen effectively and remove ectoparasites. Which comes first—declining condition or bugs? We don't know and we won't be able to figure that out without an experiment or two.

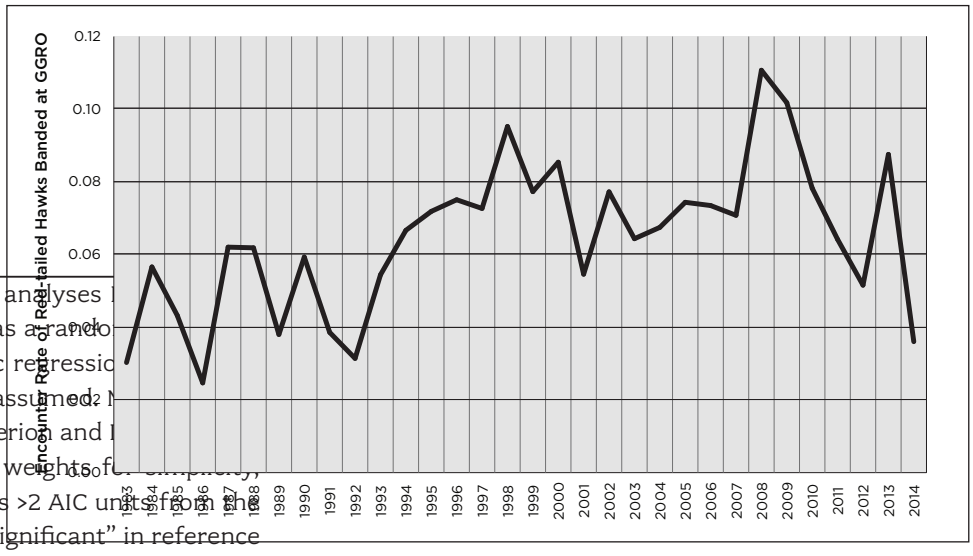
Finally, recovery rates increased over time, with a small jump in recovery rates in the late 1990s, likely as a result of the Bird Banding Lab implementing a 1-800 number, making it easier for the public to report a found bird. In addition, an increasing human population with a larger footprint on the landscape boosts the likelihood of someone finding a dead bird. So, I suspect this upward trend is simply a function of the growth in and around the Bay Area rather than cause for alarm about increasing mortality rates of Red-tailed Hawks.

LONGEVITY

What about after two months? Are there any factors related to a bird being able to live 5, 10, or even 20 years? I did the same analysis as above but left out those unlucky individuals that didn't make it to the 60-day mark. We had 449 individuals that we knew survived past two months, with an average longevity of about 2.5 years.

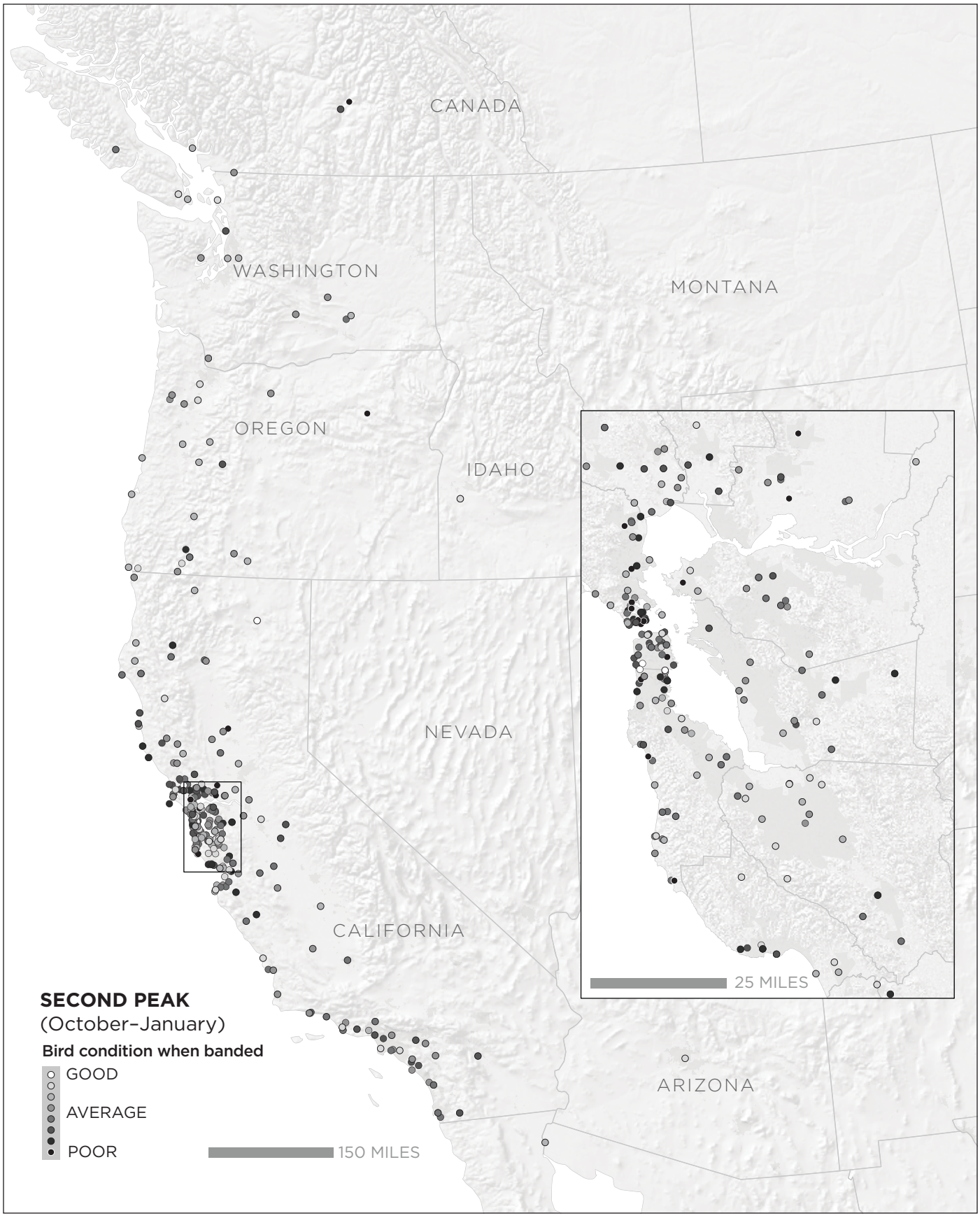
Condition again seemed to be a driver of survival, even ignoring the birds that died within the first two months of capture, with birds in better condition living longer. So the effects of good condition as a juvenile may extend throughout the life of an individual. It brings up the hypothesis that perhaps there is a silver-spoon effect in Red-tailed Hawks. Birds that are given an advantage in the nest (be it increased food, less stress, or better genetics) may just be more competitive in the world, better at catching prey, and can live longer. This effect has been observed in a number of species, so perhaps isn't surprising, but is certainly noteworthy even with all the stochasticity involved in band recoveries from a migration site.

In addition to condition, larger birds (i.e., those with a larger wing chord) are more likely to survive longer. Perhaps there is evolutionary pressure for larger birds, as the longer you live the more offspring you can produce and the more genes you can pass along. This pressure for larger individuals may be balanced by prey availability during the nestling period. In lean years fledglings will be smaller due to pressure to get out of the nest, and we know individuals will sacrifice the ability to be big for the ability to escape potential nest predators.



Encounter rates for Red-tailed Hawks from 1983 to present.

[1] For the statistically inclined, for all analyses I
eral linear mixed model, using Year as a rando
the survival analysis I used a logistic regressio
a standard normal distribution was assumed. M
done using Akaike's Information Criterion and I
top model rather than using model weights fo
though in all cases the top model was >2 AIC units from the
next best model. Throughout I use "significant" in reference
to factors that appeared in the top model.


CANADA
WASHINGTON
MONTANA
OREGON
IDAHO
NEVADA
CALIFORNIA
ARIZONA
25 MILES
SECOND PEAK
(October–January)
Bird condition when banded
GOOD
AVERAGE
POOR
150 MILES

DISTANCES MOVED

How far birds travel is always interesting and we all love to hear about birds that go hundreds of miles. We can make a few predictions here as well. It's reasonable to think that Great Basin birds would be more likely to go back to the Great Basin, and therefore they would travel further from the Bay Area. Again, sticking to birds encountered at least 60 days post-capture and where we had some reasonable approximation of where the bird was found, we looked at a pool of 576 birds. Sixty seemed like a reasonable number here because, as our work with satellite transmitters indicates, these birds are highly mobile and after 60 days have the potential to be almost anywhere in the Western flyway. I would also guess that condition should no longer matter after a couple of months thanks to the vicissitudes of fortune and the death of the relatively weak and poor individuals.

An "exceedingly picky eater," this Red-tailed Hawk came to rehab in February 2014 after a suspected car strike. She was returned to the wild eight months later (see recovery #1269 on pg. 29 of this issue). [Photo by Colleen Grzan]

The first correlation we found was associated with which peak an individual came from; on average, birds from the first peak were encountered 59 miles closer to the Marin Headlands. So, yes, it seems that Great Basin birds are travelling farther from the Headlands.

Interestingly, when the individual was captured also had an impact on distance travelled up to the point of encounter. Birds captured in later years tended to be encountered closer to the Marin Headlands. Perhaps this is due to the disproportionate increase in human population in the Bay Area and a result of proportionally more dead/injured birds being found closer to GGRO.

Finally, condition again played a role in our recoveries, with birds in better condition being found farther than birds in poor condition; the birds in the best condition would be expected, on average, to be found almost 200 miles further than the birds in the poorest condition.

SUMMARY

It's good to be healthy. Birds heavy for their size can survive the short term, are more likely to live long lives, and end up being found farther away on average. It's unclear whether that extra weight is fat, muscle, or (more likely) some combination—but the extra energy and ability to withstand lean periods may be critical for Red-tailed Hawks of all ages and sexes to survive. Ectoparasite presence showed similar patterns, but is obscured because the data hasn't been collected for as long and is highly correlated with condition.

That age was not related to survival or movement surprised me. Often we think of the older birds as healthier and more world-wise. Intuitively, adult Red-tailed Hawk survival rates are going to be higher than that of juveniles, but on average, that was not evident in our analyses. Perhaps our sample is biased due to trapping methods, the fact we are just less likely to encounter adults after banding, or the limitation that our sample sizes for adults are too small to escape the problem of stochasticity.

Whatever the case, it seems this could be investigated further with the aid of telemetry data and perhaps even color banding to increase our ability to track these birds and understand their movements in greater detail. The booming human population of California as a whole seems to help our data collection and may further our understanding of raptor movement ecology as more people have easier ways to report banded birds. Skewed growth (e.g., population is increasing faster in the Bay than other areas of California) may also bias our results toward finding a greater proportion of recoveries closer to home.

Keep in mind, though, that I have done a lot of arm-waving throughout and correlation does not even imply causation. I have presented hypotheses that seem reasonable given the data and known ecology of raptors, but we would need experimental tests to investigate why these relationships exist. Despite that, it is interesting that simple analyses of survival and dispersal bring up questions of ecology, population dynamics, and evolutionary processes in a species few people bother to study due to its ubiquity.

After four productive years as Research Director, Chris Briggs will be leaving the GGRO next January to move to upstate New York with his wife, who will be a professor at Hamilton College.

RADIOTELEMETRY 2014 *Barb Westree*

Frosty the Redtail Goes to Santa Rosa

The 2014 GGRO radiotelemetry tracking season consisted of two events: the chase that happened and the chase that didn't. In spite of major planning and scheduling, we were unable to track a Broad-winged Hawk, although we did successfully follow another Red-tailed Hawk.

In principle, the telemetry program will track any species of raptor. In reality, for various technical reasons mostly involving the weight of the transmitter, the vast majority of the birds we've tracked in 25 years of program operation have been Red-tailed Hawks. Only rarely does another suitable species show up in the banders' nets that is a candidate for tracking.

Broadwings are rare in California, but east of the Rockies they migrate in large flocks from Canada to Mexico and Central America. When Broadwings are observed at Hawk Hill, the migration is brief and intense: no birds, then large numbers for a few days, then no birds the rest of the season. The peak period has consistently been late September to early October, roughly three weeks long.

In 2012, Broad-winged Hawks flew over Hawk Hill in unprecedentedly high numbers. That year, the banders caught nine Broadwings, and telemetrists successfully tracked one of them, suitably named Marathon, for five days all the way to the Mexican border. This was only the second Broadwing ever followed by the GGRO, yet its migration route was amazingly similar to the path taken 18 years previously by the first, Zoe.

Frosty, held by David Jesus prior to release, had a transmitter attached to a central tail feather. The unit will fall off in the spring when molt begins. [Photo by Fred Kral]

We also observed more than average Broadwing numbers in 2013 but, due to the federal government shutdown that fall, we were officially unable to track. As the 2014 season began, we hatched a plan: if Broadwings showed up, we were committed to following at least one, and possibly three, to Mexico.

Each tracking exercise involves at least six people (three teams of two) every day that tracking is in progress. Since many of our telemetry volunteers have jobs and commitments, people are scheduled on and off throughout the tracking period so that as many as 10 volunteers may be involved in the chase from Day One until completion. So we painstakingly scheduled three tracking teams, lining up six people per day for three weeks, with complicated logistical planning for transporting people between San Francisco and San Diego. For the Broadwing period, everyone was on standby—suitcases packed, cat-sitting arranged, refrigerators emptied.

When telemetry is recruiting new volunteers every year, we try very hard to emphasize that, of all the skills necessary to be a successful telemetrist, flexibility may be the most important. The 2014 season made this very clear. We waited for three weeks. The Broadwings came over Hawk Hill but they kept flying. No healthy bird consented to be caught, banded, fitted with a transmitter, and tracked.

Recovering from the disappointment of not driving to the Mexican border and back, the telemetry team still had work to do—namely, train a batch of apprentices. In November, we began our standard vigil of waiting for a suitable Red-tailed Hawk to be caught. On November 8, a young healthy male

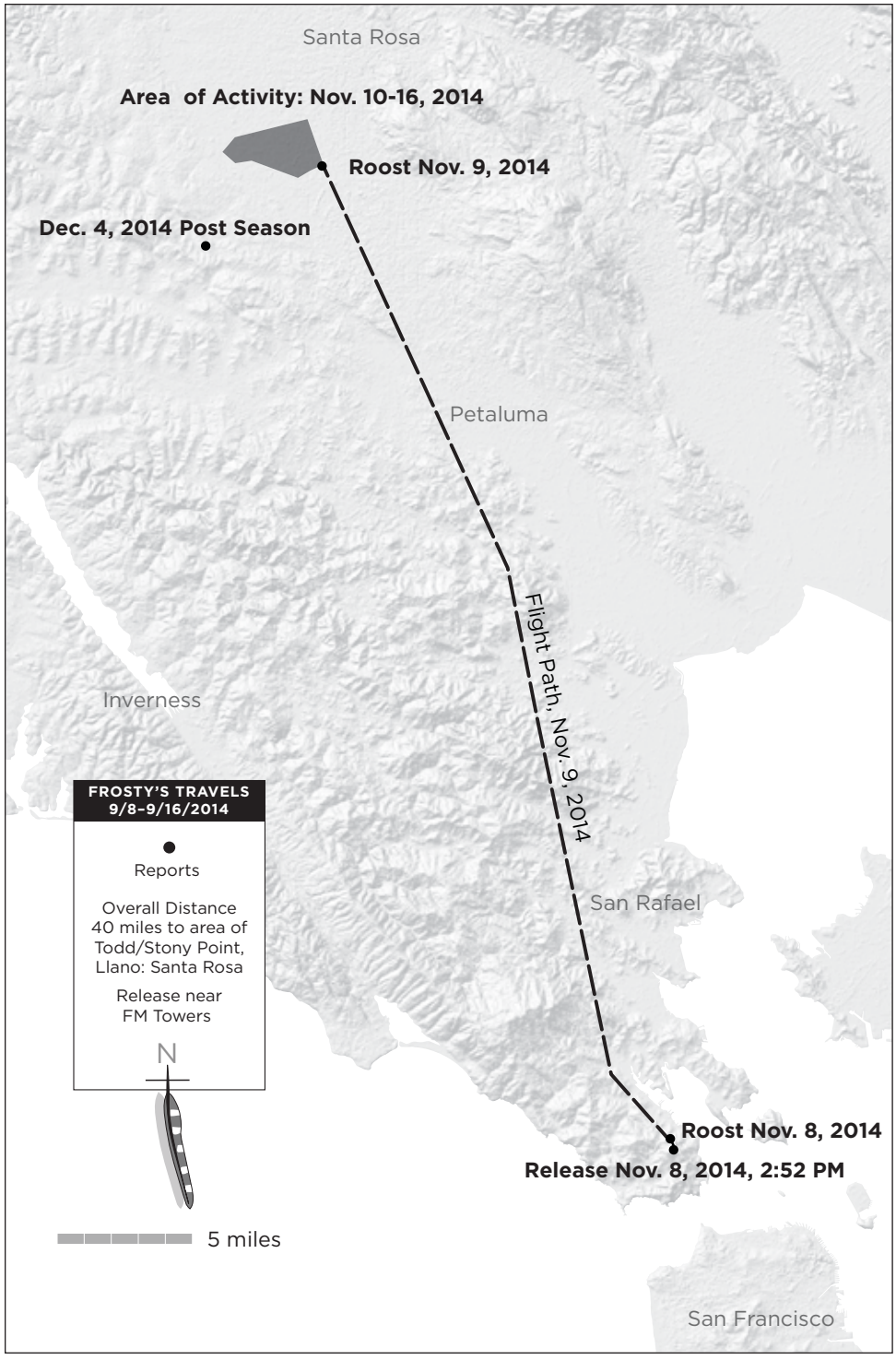
was caught and received his transmitter. This bird, dubbed "Frosty," was released from the top of Spencer Avenue, on the east side of the Marin Headlands at 2:52 PM. He flew immediately into a grove of eucalyptus adjoining the release point. All three tracking teams stationed on hilltops received his signal. It was an early night for all as he settled down in this location.

On the morning of November 9, the trackers found that Frosty had been up early and moved less than a half-mile north of his overnight roost. He continued to move north and ended the day south of Santa Rosa. The next day he was found in the same neighborhood near Laguna de Santa Rosa.

For the rest of the chase, Frosty moved around in a rural area on a flat valley bottom south of Santa Rosa extending about 1.5 square miles, vegetated with grass and shrubs, and sprinkled with groves of trees. Frosty's chosen hangout is occupied by dairy farms and light industrial uses such as contractors' storage yards. There is good hunting and plenty of roost sites. Every day around mid-morning, Frosty would go flying within this area for an hour or two, presumably hunting. By mid-day, he would perch. For the rest of the chase, until November 16, he stayed here. A check on December 4 found he had moved about four miles south into an area of steep rolling hills.

While telemetry would not typically spend a week tracking a "stationary" bird, Frosty's close proximity to the Bay Area allowed us to put in a lot of time training apprentices in understanding the intricacies of our equipment and mapping procedures. The telemetry recruits could spend a day listening to and mapping Frosty's movements, then go home at night.

Some birds lead us on exciting cross-country adventures but some don't. Those Broadwings that flew over in October ended up in Mexico or further south while Frosty spent the winter in northern California, about 40 miles from Hawk Hill.



Telemetry leader Barb Westree had a long carreer as an environmental consultant and planner, specializing in aquatic systems.

GGRO RADIOTELEMETRY 25TH ANNIVERSARY

2014 WAS THE 25TH SEASON of radiotelemetry research at the GGRO. Since 1990, GGRO volunteers have been putting radiotransmitters on a few raptors each year; species caught frequently and large enough to carry the 6 to 9 gram transmitter include: Red-tailed, Red-shouldered, Broad-winged and Cooper's hawks, and Northern Harriers. Our radiotracking seasons generally run about 2 to 5 weeks, long enough to study a handful of birds in their first weeks of movement away (or not) from the Marin Headlands.

The volunteers who step forward to train as radiotrackers are an unusual lot—they are explorers, willing to put their comfort far behind the chance to follow the sometimes seemingly whimsical flight of a hawk. They go to bed late after re-grouping over maps on the day's results; they get up several hours pre-dawn so they can capture a "beep" before a hawk leaves its night roost. One famous Redtail, Francesca, tried to thwart its trackers back in 1992 by moving in the middle of the night. They found her 10 miles away.

Over the following pages, a handful of GGRO radiotrackers have offered up their memories of tracking, some on foot, many by car, a few by plane. You will see that the stories are linked by a depth of feeling and experience, between the people and the hawks, and between people and people. Thanks to these writers, and great thanks to the hundreds of volunteers who have carried the GGRO's telemetry research for the past quarter century. You have taught us many things about the movements of Golden Gate raptors, things that would not have been learned by any other means. Hawks go north in the fall, often. Hawks fly in fog. Hawks fly at night. Hawks cross bay waters with ease. The list is long.

Particularly deserving of appreciation are the telemetry chase-leaders who guided the less experienced of us through the valleys and mountain passes of California. Thank you Henry Altorfer, Caryn Ansel, Carol Baird, Larry Beard, Cathy Bell, Maxine Berg, Jeff Boissier, Mark Bremer, Bill Callaway, Phil Capitolo, Tom Conneely, Laura Creighton, Maura Eagan, Amy Fesnock, Dave Fichtner, Robert Fivis, Lorri Gong, Karen Gonzalez, Quentin Goodrich, Ann Greiner, Mike Hall, Alan Harper, Dick Horn, Karen Hoyt, Bill James, David Jesus, Lynn Jesus, Anita Joplin, Cheryl Kraywinkel, Suzanne Langridge, Julie Lanser, John Longstreth, Cecily Majerus, Kerry Mehl, Jim Mills, Sally Mills, John Moody, Chad Moore, Eon Parker, Jean Perata, Warren Plumb, James Raives, Theresa Rettinghouse, Steve Rock, Libby Rouan, Karen Scheuermann, James Shea, Linda Vallee, Doug Vaughan, Erika Walther, Marion Weeks, Barb Westree, and David Wimpheimer.

These pages are dedicated to the leader of the Radiotelemetry Program for the past two decades, Lynn Jesus. Thank you from all of us.

— Allen Fish

THE FIRST DAYS OF RADIOTELEMETRY RESEARCH AT GGRO

Allen Fish

I WANT TO TELL YOU HOW RADIOTELEMETRY GOT STARTED at the GGRO. As we were getting better at banding in the late 1980s, our banding co-founder Will Shor distributed to many of us a new article from the newsletter of the North American Falconry Association, *The Hawk Chalk*. It was a piece by pilot and biologist William Cochran, about radiotracking a Sharp-shinned Hawk from Wisconsin to Mexico. The account was stunning. That small a bird? That far?

I resisted telemetry at first. I did not want to thoughtlessly attach machines to birds. I wanted our need to be clearly justified and clearly stated—we put a transmitter on this species, or on 20 of this species, to learn that. Looking back now from 25 years, I would have to say that the best reason to start radiotracking Golden Gate hawks was quite basic: to learn what the questions are.

We needed to see enough of the flight patterns to begin creating good questions about where hawks were moving and why. Our band recoveries were being reported at a rate of about 4%. Imagine hearing of four recoveries a few years after banding 100 raptors. This is a good rate for bird banding, but not great for learning details about how raptors move through California.

After Will baited our curiosity with Cochran's research, volunteer bander and ecologist Alan Harper stepped in and grabbed the ball. Alan wrote a proposal for the National Park Service and the U.S. Fish and Wildlife Service justifying the need to study the Golden Gate raptor flight with radiotelemetry methods.

Alan's argument was simple and utterly compelling. Our migration site was uniquely surrounded by some of the densest urban landscapes in the country. This was a chance to understand how hawks strategized migration through cities. It would not help to do an urban raptor study at Hawk Mountain, PA, or Goshutes Mountains, NV. We had to do this at the GGRO. Especially with urban landscapes expanding worldwide, shouldn't we understand something about how raptors fly, negotiate, and survive their first year through a region like the San Francisco Bay Area?

Alan's thoughtful proposal, combined with Sally Mills' legendary curiosity, caused GGRO's radiotelemetry program to become a reality. Four or five months later, we released our first Red-tailed Hawk with a transmitter, Adam.

Would we ever get a Redtail to move us as quickly south as Adam did? The illusion of a southbound autumn migration! Dozens of Redtails later, we seem to have tracked many birds that were perfectly happy suffering winter right in the middle of the Bay Area. But Adam went south at least for a while.

RADIOTELEMETRY SCORECARD, 1990-2014

Number of raptors tracked 60	Total days tracked 503
Number of species tracked 5	Total miles tracked 5700

Hawk miles flown per day (minimum)
0.19 miles/day for Northern Harrier

Hawk miles flown per day (maximum)
110.0 miles/day for Broad-winged Hawk

Hawk miles flown per day (average)
16.5 miles/day for all species tracked

GGRO RADIOTELEMETRY 25TH ANNIVERSARY *Libby Rouan*

OF BEARINGS AND PAGERS

My apprentice year in radiotelemetry was 1993. The day after we released Kismet, a juvenile Red-tailed Hawk, Karen Scheuermann and I were tracking from the parking lot of Mt. Madonna Inn, a high point about 20 minutes east of Watsonville on Hecker Pass on Highway 152.

It was clear and warm as we unloaded our gear and equipment. We set up our lawn chairs as a Stationary High Point Team, so I knew we would be there a while. Karen explained that the westerly views were ideal across the valley from north to south, making this a perfect spot to track. As I was still simply trying to recognize a circling signal pattern, I didn't understand that fact. Until.... "It moved. It's over here now," I said.

Whatever it takes: Libby Rouan made her own highpoint atop a Jeep. [Photo by Libby Rouan]

"What?" asked Karen, sitting up in her chair.

"Well, the signal was stronger toward the north when I took that last bearing, but now it's stronger over here, a little further to the west," I replied.

Karen stood beside me and listened while I showed her what I meant, pointing the Yagi antenna in the two different directions. "Take another bearing!" she said as she flew into action, grabbing the clipboard, checking the time, scribbling the data, plotting the new reading on the map, and then coding a pager message to send to the other two teams. She ran to the nearby telephone booth, punched in a long string of numbers, and then ran back to me, as I kept listening.

"It moved again," I said, "further west, the same direction."

"Take another bearing! Just keep taking bearings!" She continued in her frenzy, noting the data, checking the times, plotting each reading, coding new messages, running to and from the pay phone. I did my best to keep up with the bird, listening to the circling signal as it got stronger each time it moved. I scanned the sky for the hawk, but never put my binoculars up for fear of missing a critical data point. Kismet continued soaring, fast, from north to south and Karen kept sprinting to and from the phone. We were indeed in the perfect spot!

Finally, the signal steadied in a southerly direction but continued to circle while fading in strength. When we lost the signal, Karen sent one last pager code, and left a voicemail for the teams. She showed me the plotted bearings on the map so I could understand what everything meant, what we needed to do next, and why.

We jumped into the Trooper and tore down the road to

our next destination, hoping to stay ahead of the hawk. Kismet had literally soared right past us but we never once saw the bird with our bare eyes. That was so exciting! I was hooked!

The next night, Karen and I were south of Big Sur on the coast, having tracked Kismet deep into the Santa Lucia Mountains. Calling by payphone, Karen learned that the other two teams were inland, rendezvousing in King City. It would take us at least an hour and a half to get there, but, since we needed a team on the coast in the morning, the dayleader suggested we just find lodging. "But Libby is supposed to go home tonight."

Lynn Jesus, David Jesus, and Barb Westree attach a transmitter to Coco the Redtail in 2011. [GGRO photo]

Two fresh trackers had driven in; the tracker who was to drive me home was in King City. It was already well past 8PM. There were four more days of tracking until the season ended with no other volunteer changes planned. Listening to Karen's end of the conversation to work out logistics to get me home, I overheard everything from driving to King City anyway to dropping me off at a bus station—I was stuck!

I finally said to Karen: "Let me call my boss tomorrow. If I can't get back to work, then I can't get back to work. He's pretty flexible. Hopefully, he'll be okay with this." We camped at nearby Kirk Creek Campground in Los Padres National Forest. In the morning, I called my boss. He was shocked, a little confused, but thankfully, he understood.

That night, when all the teams met up again, the dayleader put me on the only team that could fit a third person, in the largest vehicle available, the government Bronco. The intern on the team had found a highly aromatic dead snake along the way, bagged it, and stored it in her cooler. Lovely!

And, no, I don't recall how I managed without enough clean clothes for a grand total of nine days out in the field, but I earned the program's "Apprentice of the Year" award for doing it!

Telemetry leader Libby Rouan moonlights as a Hazard Waste specialist for San Mateo County.

GGRO RADIOTELEMETRY 25TH ANNIVERSARY *John Beckman*

TRACKING ON THE WING

There was a UC Berkeley student-turned-hawkwatcher named Chad Moore who was, and still is, interested in all things that fly. He was a member of the Cal Bears Flying Club, and had a plane that he leased to the club. The plane was a polished aluminum, red-striped, single-engine, tail-dragging, two-seated Cessna 140 built in 1949. Someone, I'd guess it was Chad, had the brilliant idea of using the stunning little plane as a telemetry chase vehicle. Brackets were fabricated and a Yagi antenna was attached to each of the two landing struts.

In the fall of 1992, a sizeable Redtail was captured, a transmitter was attached to its tail by Lynn, and the chase was on. Chad and I drove to Oakland, loaded our sleeping bags, mats, and a few changes of clothing into the plane's tiny cargo hold which was directly behind the two seats. Our light cargo just barely fit into the space. We jumped into the plane, were cleared to take off, and slowly accelerated down the runway. The tail came up, and we were away laughing mischievously as if we had gotten away with something we shouldn't have.

As soon as we got over the Bay we turned on the receiver and heard strong beeps. We flew north to Novato and could easily tell our bird was south of us by listening to the beeps increase and decrease in volume as Chad flew the plane in big circles. We were moving so quickly that we could use the plane's compass readings to triangulate and calculate the location of our bird. That day's weather was ideal for southward bird migration as there was a strong wind from the northwest. As soon as our bird got into the East Bay hills it was obvious to us that it was using the lift, generated by the wind moving up the hills, to quickly soar south. That first day our bird travelled over 100 miles.

We were young. I was 21 and Chad was 19. Our plan was to follow our bird until it settled in the evening and then land at the nearest airport where we would unroll our sleeping bags and camp on the tarmac under the wing. As the first evening unfurled we landed, parked the plane, and started walking to the pilot's clubhouse. Before we got there we were surrounded by people asking us questions about the plane, the antennas, Chad's excellent flying skills, birds, and the GGRO.

Eventually, as people realized we had no means of ground transportation and no food, the conversation turned to eat-

ing and sleeping. Then an amazing thing happened. These new friends, whom we had met just minutes earlier, offered to take us to restaurants, or to their home for home-cooked meals. They offered us rooms to stay in and beds to sleep in. As this conversation was happening, one of our new friends left and returned with take-out from his favorite restaurant for us to eat. We ate and continued talking about any topic that came up. The food and conversation were wonderful.

As it got dark, we thanked them for offering their rooms, and said we preferred to sleep under the wing. They told us that it was probably illegal to sleep under the wing, but understood and appreciated the adventure Chad and I had embarked on. They promised to "keep a lid" on our plan to sleep on the tarmac.

Over the next couple weeks, the same scenario played out again and again at every airport where we landed. We thought our luck had run out when the Sheriff of Los Banos found us sleeping under the wing and asked us to roll our bags up and bring them with us into his cruiser. Without saying anything more, he drove us across the strip to a large hangar. We honestly thought we were going to be arrested. When he opened the door to the hangar he loudly and proudly announced "Here is my Cessna 140A!" He had a plane that looked exactly like ours, but where ours had red stripes, his had green. We all laughed and the conversation was off and running. He also had a Piper Cub and a perfect P51 in the hangar. We didn't turn down his offer to stay in the hangar that night.

This trip repaired and amplified my faith in human nature, which had recently been vigorously shaken. Although I learned a lot about tracking raptors, I also learned some even more valuable lessons. It was here that I learned how important a smile, a handshake or hug, and a laugh are when meeting someone for the first time.

I was reminded how important an open mind is, and that there are generally several workable solutions for most problems. The idea that people's intentions are nearly always good was reinforced. These are concepts that I find myself utilizing constantly and they are absolutely the most important things I took away from the internship. If it weren't for this telemetry chase, I'm not sure I'd be the person I am today.

GGRO's 1992 intern John Beckman has gone on to a lucrative career as a scientist at California's Department of Public Health.

GGRO RADIOTELEMETRY
25TH ANNIVERSARY *Elizabeth Wommack*

TELEMETRY MEMORIES

I spent my first day of telemetry with Steve Rock, hunting a juvenile Red-tailed Hawk that had gotten away from the team the day before. We were on the north edge of the California Central Valley, and had picked up a faint signal. Tracking the bird north, the Sutter Buttes rose in the distance and we passed green fields and orchards. While trying to keep track of us on the map, I glanced up to read the next cross-road and saw us passing a leather emporium and club.

I still remember the building sitting there in the middle of the flat rolling country as we zoomed by, and wondering how in the world the store had landed out in the northern fringes of the Central Valley. There were no neighboring houses or close towns, only these two connected buildings, standing alone in their bright colors, alongside the backroads highway.

One of GGRO's 2006 interns, Beth Wommack recently started a new job as Curator of the University of Wyoming's Vertebrate Museum.

GGRO RADIOTELEMETRY 25TH ANNIVERSARY *Maxine Berg*

THE "JUST ONE PING" YEARS

My first experience in radiotelemetry began with a bird that apparently had been lost. As a novice, I was paired with an experienced tracker, and we wound our way to the top of Mt. Diablo (my first time there despite living in the Bay Area for over 25 years; amazing views!). I got lots of practice with the Yagi antenna and logging our results. But—no signal.

An early telemetry celebration at Fort Cronkhite. [Photo by David Jesus]

The discussion over dinner was whether to remain on this bird, or see if the banders could find another suitable Redtail. We eventually decided to stay with this bird one more day.

The next day I was paired with a long-time tracker, Cheryl Kraywinkel, who drove us up the long and winding road to the top of Mt. Hamilton, yet another first for me.

Again, I practiced with the Yagi and the logging sheets. Again, no signal. (At least I was getting to see parts of the Bay Area I'd never been to.) Surely, we'd be moving onto a new bird the next day. Phone calls were made. At 4 PM, Cheryl made the final pass of the Yagi before we would call it quits.

But then she heard a faint ping to the east! I couldn't believe it. Suddenly we were winding down that mountain and across the Central Valley. Because of a single ping! I was in awe. For the next couple of days, we chased that bird along the western foothills of the Sierra and over to Marysville, until I had to leave and go back to my 9-to-5 job and the mundane. By then I was hooked.

A couple of years ago, I offered to drive my Prius as we chased a Broadwing toward Mexico. I picked up three others in the East Bay and we headed south. By the end of the day, we had caught up to the first teams of trackers in Santa Clarita.

My vehicle limited me to paved roads, so I was assigned to Mt. Wilson overlooking the L.A. Basin; we would hopefully pick up the signal when the bird passed the San Gabriel Mountains and headed for Mexico. Another long winding road to the top.

My partner heard a faint signal to the northeast. I wasn't able to catch it, so left him with the equipment as I drove down to a payphone to report to the other teams, as we had no cell reception. That was our one ping. We returned the next day, but by 2 PM, our day was done; the bird had moved beyond the basin. I never heard another signal.

Maxine Berg fell in love with raptors after visiting Hawk Hill in 2005, and has been a GGRO volunteer ever since.

Zach Smith and Bill James track "Traveler" through Daly City in 2000. [Photo by Karen Scheuermann]

GGRO RADIOTELEMETRY 25TH ANNIVERSARY *Phil Capitolo*

A TELEMETRY STREAM OF CONSCIOUSNESS

The hawks are fantastic. It's a privilege to track them, gaining insight into their behaviors and habitat selections, and aiding in their conservation. But tracking is also just a great excuse to get off the beaten path with friends.

As I reflected on my tracking experiences, no one story jumped out that I needed to tell, but rather a series of memories of people and places came to mind, like these: Karen Scheuermann first talked me into trying telemetry while sitting in a banding blind back in 1992; Mrs. Sutro on Atlas Peak made breakfast for Kerry Mehl and me in 1996; I ignored no-trespassing signs with Quentin Goodrich; we got a telescope tour at Mt. Hamilton's Lick Observatory; I tracked from Mt. Hamilton in the snow with Ann Greiner; ate baked beans in Leggett; and wished the Mt. Aukum winery was open with Larry Beard.

There's more: I saw the Pinnacles National Monument with Ruthie Parsley; drove the Parkfield Grade with Mike Hall; scrambled up the Shasta scree looking for a Cooper's Hawk transmitter; tracked Huxley the Redtail with Suzi Langridge from Don Edwards National Wildlife Refuge, where I've since spent countless hours as a seabird biologist; travelled deep into the Mendocino National Forest with Carol Baird; re-found Yosemite the Redtail with Bill James; and Lorri Gong encouraged us to drive up to Figueroa Mountain after a hopeless morning with no signals from Marathon the Broad-winged Hawk—where we then got some all-important beeps.

Later, I stared into Mexico from Laguna Mountain with Linda Vallee as Marathon flew south; Diana the Redtail flew right overhead of Megan Mayo and me in the midst of the Laguna de Santa Rosa, and all those Lincoln's Sparrows. I ate Bodega Bay clam chowder with Ken Weidner and Bridget Bridshaw in 2014. And I enjoyed so many more people and places.

Biologist Phil Capitolo has taken time from studying seabirds on California's rugged coast to track hawks with GGRO for over two decades.

GSM TRANSMITTERS *Laura Young*

Rethinking the Meaning of Migration

Do hawks migrate? It's a question I hear a lot when I tell people I work with an organization that studies raptor migration. A seemingly easy question that evades a simple answer. To most of us, "migration" brings to mind restless movements of epic proportions—elephants crossing the Serengeti, or Canada Geese flying the North American continent in the dead of night. There are certainly hawks that fit the bill. Each spring and fall, Swainson's Hawks and Broad-winged Hawks travel thousands of miles to chase richer hunting grounds or more forgiving climes. They are the marathoners of the hawk world and leave no one in doubt of their migratory status.

Other species are less cut-and-dry. What about the ubiquitous Red-tailed Hawk? If you've driven down a highway in northern California for long enough, chances are you've seen a Redtail. You may not have even known it, since juvenile birds lack the eponymous rusty-colored retrices. If you've travelled the same section of road often enough, perhaps you've even seen the "same" hawk on the "same" power pole nearly every morning at 7:40 am. There are pigeons and gophers enough to satisfy even the hungriest hawk in the mild northern California winter. Surely, these sedentary, predictable creatures have no need for energy-sapping transcontinental journeys. Indeed, this has long been the ruling assumption—but the work of the GGRO has raised tantalizing questions about where hawks are going when they pass through the Marin Headlands.

Lupine the Red-tailed Hawk gets a vanity shot just before her release last September. [Photo by Jeff Robinson]

Answering these questions requires us to be able to follow a bird consistently through space and time, no small feat considering that a hawk is not bound to such pedestrian things as roads. Global System for Mobile Communications (GSM) technology as a means for studying bird movements is still somewhat new, and it comes with its own set of limitations. Because the units transmit data via cellular networks, even the best performing device is only as good to us as the nearest cell tower. The power of the technology lies in its ability to operate continuously for long periods of time—months to years—tirelessly waiting for the opportunity to download, independent of the need for human manipulation. As we learned last year, therein lies the beauty as well.

Fall 2014 will not be remembered for the quantity of data collected at GGRO. Following on the heels of an anemic trapping season, we deployed just three new GSM units, barely adding to our sample size. One transmitter (named "Northern") gave only three days of data before going offline. The two other units, however, did not disappoint.

The first GSM bird of the season, "Lupine", has achieved legendary status at GGRO. In her initial two weeks of post-GGRO life, this Redtail saw more of the West Coast than I've seen in nearly a decade as a California resident. Here was a bird that defied expectation. After 25 years of telemetry studies, we expected a Redtail to move a few hundred miles at most, if any distance at all; Lupine has travelled over 2,000 linear miles to date.

When she seemed to follow the classic "Broadwing" path southward, we expected her to disappear into Mexico; from GGRO band recoveries we know this is possible. Instead, Lupine veered east into the Mojave desert before boomeranging back north and west to roost finally in southern Oregon (at least for a time). To put it mildly, her movements were unpredictable. This was not the steady, southerly translocation we recognize under the umbrella of "fall migration."

Yet, there was sense in Lupine's path as well. Red-tailed Hawks generally don't nest in the first two years of life. For any predator, the first year is the hardest as they hone their hunting skills and avoid territorial breeders. In short, the mission is to fatten up and stay alive. There's evidence, though, that young birds will scout out potential nesting sites long before they're ready to breed.

Although Lupine took an unconventional route at first—likely aided by a powerful southward tailwind—her movements seemed to support that hypothesis. She would stay in one place (almost always an ag field, likely teeming with rodents!) for a few days or weeks and then continue on. When spring arrived, Lupine found her way back to the East Bay, flew a long loop through Napa, El Sobrante, Pleasanton, and Livermore before returning to where she'd made her winter

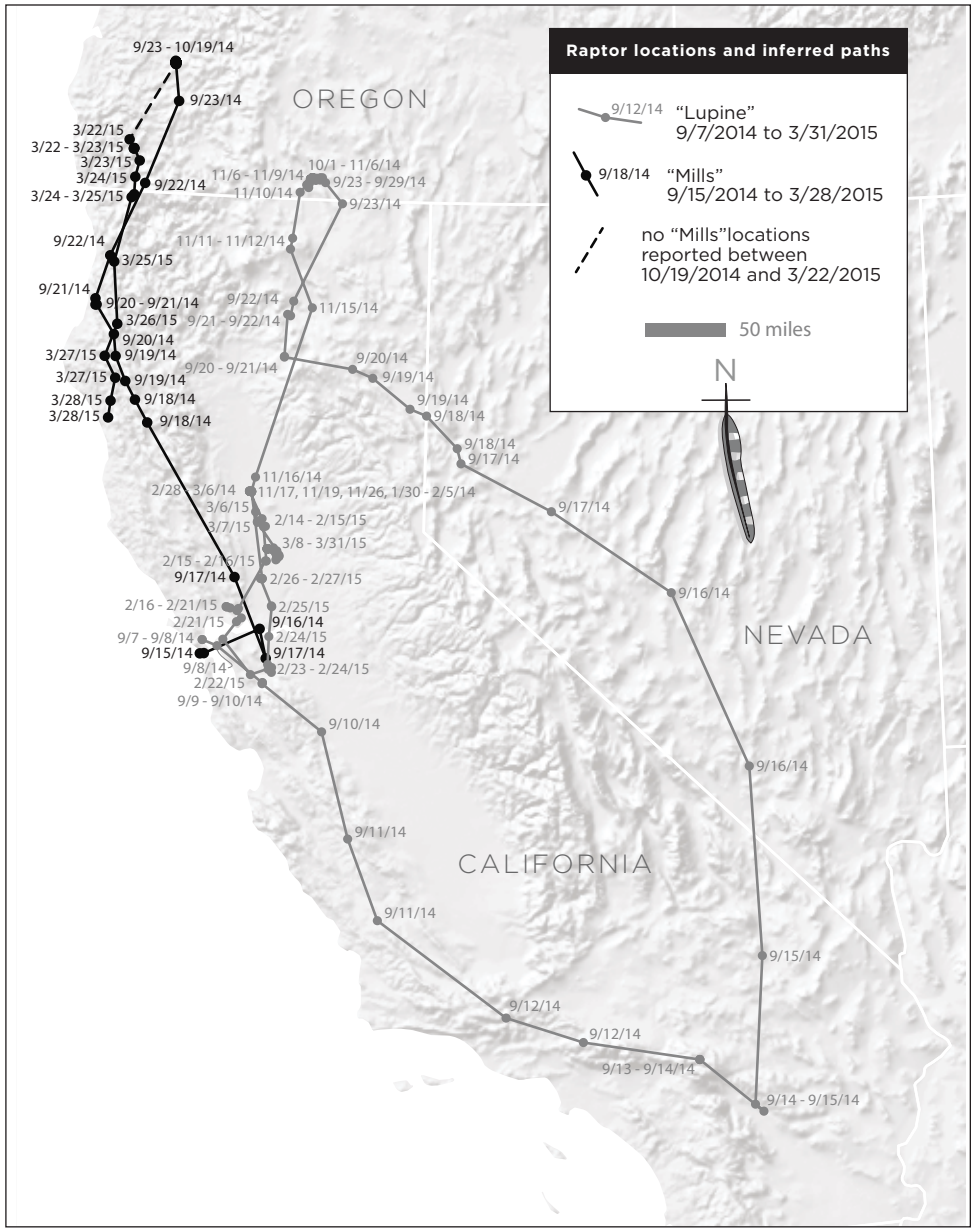
home in California's Central Valley. Perhaps, if we're lucky, Lupine's unit will last long enough to tell us where she decides to lay her first eggs.

After Lupine came a juvenile Red-tail named "Mills", for a co-founder of the GGRO radiotelemetry program, Sally Mills. Mills left my own hands 20 grams heavier on a warm and sunny afternoon not far from where banders removed her from a net. The vast majority of the time (96%, based on band recoveries), that's the end of the story for us, which is what makes GSM so alluring. When Mills did not report that week, or the next, or the week after that, we chalked it up to equipment failure and moved on with our work.

Seven months later, with Mills long gone and mostly forgotten, GGRO intern Kris Vanesky discovered some "extra" data on the daily Lupine report. (This is the part of science that I enjoy the most—not the observations that conform to prevailing hypotheses, but those moments just after you utter the words "that can't be right...")

The dawning comprehension that a second unit had begun reporting morphed quickly into dumbstruck amazement that Mills was finally online, and that she'd just dumped over 60 data points dating all the way back to the day of her release. We learned that in scarcely eight days, she'd flown due north to an area just east of Roseburg, OR, somehow evading every serviceable cell tower in between. Had she remained—or died—there, we would have been none the wiser.

The magic happened when Mills began moving with springtime—ironically, southward! We picked her up again just 12 miles west of Grants Pass in southern Oregon. She proceeded to retrace nearly the exact same route she'd taken six months earlier, sometimes reporting less than 6 miles from a corresponding fall location. This was migration in the most understandable sense—even if it was in the "wrong" direction!



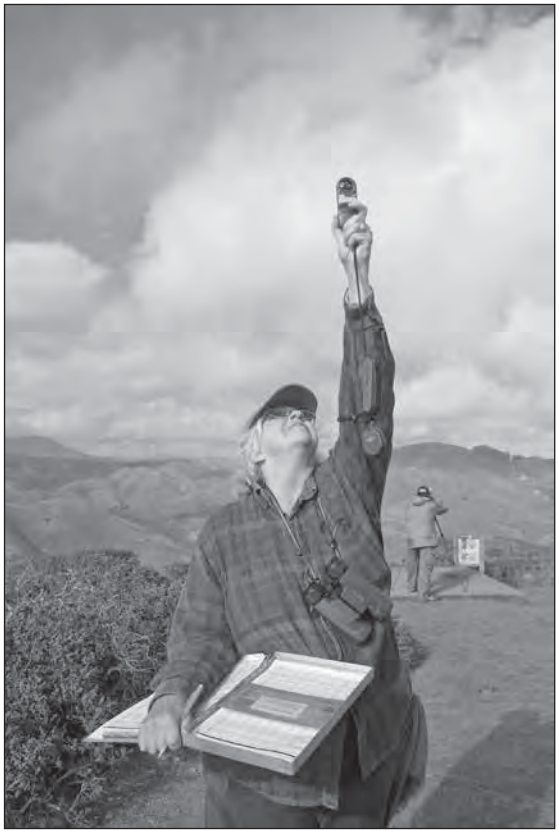
As of this writing, Lupine has finally "settled" onto a parcel of land north of Woodland where she continues to report almost daily. In late March, Mills disappeared, moving south into the cell tower-poor Mendocino coastal region of California. We're hopeful she'll check in again and continue to provide us with valuable data as we pursue GSM and other new technologies in the name of science. In the meantime, I like to imagine she's winging her way back to the Headlands for the next fall migration.

GGRO bander for five years and counting, Laura Young gleefully joined the staff full time in July 2014 as Operations Manager, knowing full well what she was getting into.

HAWKWATCH 2014 *Paul Meadow*

Friends and Raptors:
An Apprentice's Experience

"Here, you really should try a piece of this dark chocolate with one of these smoked almonds. They are fantastic together!" Jim Davis has his arms outstretched, offering a bar and a bag. Jim is an integral part of the food culture of the team I joined this year as an apprentice hawkwatcher. He has been coming to Hawk Hill since 2012 in support of his daughter Belle, who wanted to join the program at age 11 after seeing a Hawk Talk the previous year. She is a bright, sharp, and colorful young lady, a talented artist, and one of the best hawkwatchers on the team. Jim is just as enthusiastic as she is, and an enjoyable partner to watch raptors with and learn identification from. Jim and Belle are two of the many reasons that I look forward to going to the hill every other week for my Hawkwatch rotation—Saturday II.



Hawkwatcher J.J. Harris measures wind speed and direction atop Hawk Hill. [Photo by Phoebe Parker-Shames]

The Hawkwatch program of the GGRO is one of the longest continuously running biological surveys and one of the largest volunteer science projects in the world. The program is very lean and effective, having made over 600,000 observations of raptor activity since 1986 with just three paid staff who recruit, organize, and train roughly 300 volunteers every season.

The program is successful because it invests so much energy into its volunteers, seeing to it that they feel welcomed, needed, and well-trained. Many hours of raptor identification training are spent on each new volunteer before the season begins, with additional training throughout the season. The importance of continuing skills development is part of the culture here, but it is woven into the fabric of the program in such a way as to be supportive and non-intimidating. Everyone is always learning and improving; and everyone, even those with 30 years of experience, gets fooled.

"Ok, Paul, try this one—what do you see?" Sam Hontalas and I are working together in North quadrant. The study area on Hawk Hill is divided into four quadrants by compass direction and the team for the day is distributed into each quadrant as evenly as possible, by number and experience. This helps to ensure that Hawkwatch results are repeatable over time and across teams of various sizes and composition, a necessity to make the results statistically and scientifically useful.

I have just spotted a raptor rising from the valley below and tentatively called out an accipiter. Sam concurs and is urging me to try to identify it.

Sam is a natural teacher. He is extremely knowledgeable but gracious, and so can be encouraging and informative without intimidation. It is very comfortable to stand next to him and learn, particularly because he embraces the fact that he is still learning, and so it is a partnership even though he is way ahead of me.

Accipiters tend to be fast, so I did not have much time to observe. "I see the tail looks pretty long, with rounded corners...the leading edges of the wings are fairly

straight ... I am going to say this is a Cooper's Hawk."

"Very good, you got it! Can you age it?" Sam presses. I take another look.

"I ... have no idea," I admit.

"Remember, the belly of a juvenile will look dirty and streaked, while an adult will be cleaner and barred, with rufous coloring. That was a juvenile by the streaking in the belly," Sam explains. "Why don't you call it in, and we better hand it off to East quadrant." I call in a juvenile Cooper's Hawk to J.J. Harris, our data recorder for the day, and Sam hands the bird off to the East quadrant team so they know it has been counted.

J.J. Harris is a veteran hawkwatcher of 16 years who frequently does the job of data recorder: marking down all of the raptor activity sightings as they are called out, clarifying data when necessary, and helping to make sure that sightings represent new activity. I can only imagine that this must be a tough job, especially on high activity days, when you have to handle multiple pieces of information being shouted at you simultaneously from different directions. Her experience allows her to do this fluidly and know when to ask questions to determine if a sighting is new or was already called in from another quadrant. Along with the day leader, the data recorder is the nerve center of the team.

RAPTOR-SIGHTINGS IN THE MARIN HEADLANDS DURING 2014

	2014 Season (487 Hours)		Past 10-Year Average 2002-2012** (497 Hours)	
	Sightings	RpH	Sightings	RpH
Turkey Vulture	8,433	17.32	8,703	17.51
Osprey	79	0.16	96	0.19
White-tailed Kite	73	0.15	98	0.2
Bald Eagle	9	0.02	5	0.01
Northern Harrier	394	0.81	711	1.43
Sharp-shinned Hawk	3,539	7.27	4,180	8.41
Cooper's Hawk	2,169	4.45	2,495	5.02
Northern Goshawk	0	0	1	<0.01
Red-shouldered Hawk	578	1.19	473	0.95
Broad-winged Hawk	310	0.64	201	0.4
Swainson's Hawk	10	0.02	7	0.01
Red-tailed Hawk	7,559	15.52	9,430	18.97
Ferruginous Hawk	19	0.04	23	0.05
Rough-legged Hawk	1	<0.01	7	0.01
Golden Eagle	32	0.07	18	0.04
American Kestrel	380	0.78	512	1.03
Merlin	183	0.38	180	0.36
Peregrine Falcon	279	0.57	220	0.44
Prairie Falcon	7	0.01	7	0.01
Unidentified	1,159	2.38	1,231	2.48
Total	**25,213**	**51.77**	**28,596**	**57.54**

**2010 and 2013 data not included due to partial seasons

RpH = Raptors Per Hour

"Paul, why don't you come over to North for a raptor ID study?" Brian O'Laughlin is our day leader, and he is inviting me to participate in a training exercise. The banding team in the blind just below Hawk Hill has notified him that they are preparing to release a raptor they have just finished banding. They coordinate with the Hawkwatch team so that less experienced members have the opportunity to try to identify a raptor of known species.

I watch the release spot intently as they count down. The bird appears, wings spread, and I zero in on what looks like a clearly defined trailing edge wing band, and shout out "Is that a Broad-winged Hawk?"—while simultaneously forgetting two important things.

First, in a raptor ID study, you are supposed to decide your ID silently, and then discuss it with the team afterward, so everyone can come to his or her own conclusion without being influenced. Brian gently reminds me of this.

Second, it is best practice to start by determining the type of raptor—buteo, accipiter, falcon, etc.—by its shape and size before going to field marks for a species ID. A Broad-winged Hawk is almost twice the size of the little Sharp-shinned Hawk they have just released. This is why they train us.

"White! I see white!" I am working in the West quadrant, scanning one of my favorite areas for raptors. I have found that the ridge and hillside that rises opposite and below us is a great place to find raptors that are flying low over the scrub or rising from the valley. The aspect of the hillside means that in good sun, moving birds often cast sharp shadows that are easy to detect.

I have spotted some motion at ground level just below the ridgeline. A large bird has started to rise from the slope. As it spreads its wings, I see a large patch of bright white at the base of the tail, and one on each wing at the primaries. The bird angles up and toward us, and the leading edges of its wings are bright white.

"Lots of white!" I call out.

"Ferrug! Ferrug!" shouts Phoebe Park-

er-Shames, confirming what I was starting to suspect—that this was something special. Ferruginous Hawks are the largest buteo in North America, and they are magnificent creatures. They are also infrequently seen at Hawk Hill, and always generate a lot of excitement.

Phoebe is one of a handful of seasonal interns who join the GGRO each migration season, gaining valuable field experience for themselves and making much of the organization's work possible in the bargain. Phoebe and Bridget Bradshaw are part of our team every other Saturday. They are expert raptor identifiers, and bring a lot of energy and enthusiasm to the group. Together, they deliver the weekly in-depth raptor ID training to the team before we go out to Hawk Hill. In exchange, we do our best to keep them well-fed.

Phoebe is frequently busy with photo documentation, and Bridget handles public outreach, answering questions and delivering the weekend Hawk Talk to the many visitors who come to the hill to witness the raptor migration. Bridget is also passionate about insects and, when things are slow, she can be found with any variety of creatures on her fingertips, carefully observing their details. She initiated the first-ever butterfly and dragonfly migration count this year on Hawk Hill. I call her the "Bug Whisperer."

By most measures, the 2014 Hawkwatch season was average, maybe a little below average. There were a total of 25,213 sightings at a rate of 51.77 raptors per hour (RpH) observed, both at the lower end of normal. A concerning downward trend of American Kestrel sightings continued, while we had one of the highest years for Golden Eagles. Red-shouldered Hawks and Peregrine Falcons continued their significant annual uptrend, with the best year on record for Peregrine Falcons; and Broad-winged Hawks posted another strong year against 10-year averages.

My year, however, was anything but average, because it was my first, and my 13-year-old son, Jack, who is becoming an avid hawkwatcher in his own right, joined me frequently. Not only did I learn volumes over what I knew previously, but I also had the privilege of spotting one of the few Ferruginous Hawks of the season.

I pursued this volunteer opportunity because I am captivated by raptors and wanted to learn more about them and become part of a scientific survey such as this. What I have found is all of that—plus a committed community of people with a culture of continuous learning and shared purpose. This is more than I had hoped for and so I look forward to many seasons to come.

Previously a database architect at Oracle, apprentice hawkwatcher Paul Meadow has reinvented himself as a conservation student and photographer.

BUGGING ON HAWK HILL

Bridget Bradshaw

For the insect fanatics of Hawk Hill, you'll be excited to know that there were dragonflies and butterflies in abundance this past season! Perhaps you remember watching the Red Admirals duking it out with a Painted Lady in front of the Golden Gate Bridge, or the copper-winged Variegated Meadowhawks perching delicately atop the coyote brush.

I imagine most hawkwatchers have, at one time, put their binoculars on a bird crossing the bay to San Francisco only to discover that it was a hardy Monarch, somehow prevailing in the face of violent wind.

The insect count for this year—the first-ever on Hawk Hill—was very informal and either I or a few other hawkwatchers would call in passing insects when we saw them. Much like the situation with our Hawkwatch, it is likely that some individuals of a species were counted multiple times, and thus we have adopted a similar "sightings" method.

We tallied 111 dragonfly sightings spread across 19 days of counting, consisting primarily of Variegated Meadowhawks and Green Darners. There was also a smattering of Blue-eyed Darners, Flame Skimmers, Cardinal Meadowhawks, and Black Saddlebags, averaging about 6 dragonflies per day.

Butterflies were more abundant, though I imagine we saw the same Pipevine Swallowtail every day for a few weeks. We totaled 255 butterfly sightings, around half of which were Monarchs. Anise Swallowtails dwindled as the season wore on, whereas the *Vanessa* species (i.e., Red Admirals, Painted Ladies, and West Coast Ladies) became more abundant.

A Variegated Meadowhawk perches on a branch. [Photo by Phoebe Parker-Shames]

A wholehearted thank you to all who helped count and point out passing insects! We reached a total of 14 different species of dragonflies and butterflies, excluding some mystery species that are comfortably situated in our "unidentified" categories. Herb Brandt, Tim Behr, George Eade, Sam Hontalas, Mike Hall, and Christine Lamphear were especially helpful and I hope that this is the beginning of a long tradition of entomological enthusiasm on Hawk Hill!

2014 GGRO intern Bridget Bradshaw shifted her entomological attentions to the Southeastern states in 2015.

BANDING 2014 *Siobhan Ruck*

The Making of a Volunteer Scientist

You don't often get a chance for a do-over in life. It's kind of nuts that we expect people in their early 20s to know what they want to do for the next 50 years of life and lock into the college courses that will set them on their career path.

That's the beauty of citizen science. For those who didn't discover their interest in science until after their college years or who needed a job with more financial security than a wildlife biologist position could afford them, it's an opportunity to get involved in—and make genuine contributions to—their area of interest. It's a chance to move from "that must be so cool" to "that's what I do on Saturdays."

I admit that my initial attraction to banding hawks was simple. I'd gone to a recruitment meeting more than 20 years ago to learn about Hawkwatch. But then I looked at one volunteer's photos and said, "You mean you get to *hold* them?"

As thrilling as that experience is, it's not what has kept me coming back for all these years. Banding takes me to the grassy hills of the Marin Headlands; it lets me step from the world of an office worker to that of a field biologist.

Siobhan holds a Redtail aloft during a banding demonstration. [GGRO photo]

The term "citizen science" wasn't in use when the GGRO started. The first cited use was by the Audubon Society in 1989—but the tradition goes back much further. Early scientists were all citizen scientists in the sense that science wasn't the only thing they did; Leonardo da Vinci, Benjamin Franklin, and Charles Darwin all had day jobs. Even in the modern sense of "citizens helping scientists gather data," examples go back more than a century to studies like Christmas Bird Counts.

The GGRO's three main research programs study raptors at macro and individual levels. Hawkwatch takes broad surveys of the populations, banding gets more details about a cross-section of the birds, and telemetry tracks individuals as they continue their journeys beyond the Headlands. My favorite analogy is with the Golden Gate Bridge; hawkwatchers count the cars that drive over each day; banders note the license number, make, model, and year of every 10th car; and telemetrists ride along for a few weeks with a handful of drivers.

Each part is useful in understanding the bigger picture, and it takes a lot of work to gather all that information. It simply wouldn't be practical to undertake such a comprehensive study without citizen science. During 2014 alone, volunteers put in roughly 40,000 person-hours.

Banding gets us two important data sets: bird morphology and health (from data taken during the banding process), and information on ranges, longevity, and causes of death (from band recoveries).

The core measurements we take help us determine the sex of several species and allow us to compare our populations with those of other banding stations and with museum specimens. Using data collected by volunteers, the GGRO created flow charts to determine the sex of juvenile Redtails and Red-shoulders in our populations with 95% accuracy. Before the flow charts, the sex of these birds had to be recorded as "unknown" due to overlapping ranges for weight and wing length.

There have been other changes to the data collected, for both long-term and short-term studies. In the past, we've collected blood samples to monitor for West Nile Virus and Avian Flu, and looked at parasite loads as a way of getting a better picture of a bird's health. For adult birds, which represent about 5% of our captures, we've been recording molt patterns for decades, as well as plumage details on Redtails. In 2014, we also began recording color morphs of all ages of Redtails, grading them on a scale of 1-5, lightest to darkest. (As a plumage/molt geek, I can't wait to see where that study goes!)

Some of these additional studies originated with the program's leadership, but others started with volunteers. Both banders and hawkwatchers have created and participated in breeding raptor surveys over the past two decades, including studies focused on urban Cooper's Hawks and Ospreys.

It's that last part that keeps so many of us coming back

year after year. The GGRO doesn't just awaken a dormant love of science; it encourages us to take that interest further. Sometimes that means becoming more observant as we go about our days and answering our own "why" questions with our sightings. Every now and then, the GGRO says, "That's an interesting question" and gets behind studying it formally.

And it's a good thing that the science is such a big part of the appeal of banding, because if it were just the experience of being with the hawks, the past few years would have decimated our ranks. In 2014, we banded just 1,252 hawks—well below our long-term average and only slightly better than 2013's total, which was lowered by the government shutdown. Our Big Three species were all down from their averages, with Sharpies down moderately (414 vs. 490 avg.) and bigger drops in the numbers of Redtails (222 vs. 317) and Cooper's Hawks (390 vs. 569). Kestrels were also down slightly, with Harriers and Red-shoulders up slightly.

In 2013, the hawks were there but we weren't able to band them. In 2014, we were there but the hawks were not. As a birder, the lack of hawks could be described in many ways—frustrating, depressing, puzzling, even annoying (*I got up at 5:30 AM to sit in the blind all day and see nothing?!).*

What do those lower numbers mean? Are they a statistical blip or part of a long-term decline? Maybe this is the shape of things to come, as habitat loss, climate change, and other factors have ever-stronger effects on bird populations. Rather than stand by and fret about the birds' fates, citizen science gives us a chance to take an active role by gathering solid, useful data to share with others who are working on these same issues.

In February 2015, I was able to attend the first-ever Citizen Science Association conference. As one of the few citizens in a sea of scientists, it was interesting to hear things from their view. A few things came up regularly, like concerns over the quality of data gathered by volunteers, recruitment and retention of volunteers, and barriers to participation.

On the matter of data quality, I think GGRO does a great job. We invest a great deal of time in training to make sure the volunteers have the skills to gather data well. It doesn't just benefit the program—it also makes things more fun for the volunteers (it's pretty great to be able to take hawk ID beyond "well, it's brown and streaky…"). The skills we learn translate to better observation abilities overall, and provide a richer experience every time we step out into the world.

Banders perform ongoing quality control by re-measuring recaptured hawks as long as they're in good shape. (A surprising number of them fall for our tricks a second time and end up back in our nets within days or hours of their original capture.) Though weight will fluctuate based on how recently they've eaten, most of the other measurements won't change much under normal circumstances so we can get an idea of how much variability there is in our data set. If any measurement shows really wide variations, we can focus training to improve precision.

It's true that GGRO has a bit of a built-in advantage in recruiting because we are offering people the essential coolness of hawks as an incentive to join, though we ask for a much larger time commitment than most of the programs discussed at the conference. That commitment can create a barrier to participation for many people, but it also gives the volunteers a much greater sense of investment in the work being done. This inspires some to take the studies even further. The conference really brought home to me how uncommon this last aspect is; I heard almost nothing about citizen science projects starting and supporting new studies originating with their volunteers.

Even the time commitment doesn't need to be a barrier to participating. The banding program would be lost without the people who find our birds and take a few minutes to report them. Some of our most important "volunteers" are people we've never met.

This winter, I joined their ranks. Nancy Mori (a fellow bander) and I were birding in Half Moon Bay and saw an

RAPTORS BANDED IN THE MARIN HEADLANDS DURING AUTUMN

	2014 (8/17/14-1/3/15)	Annual Average* 1992-2013**	Totals 1983-2014
Northern Harrier	18	11	303
Sharp-shinned Hawk	414	475	11,396
Cooper's Hawk	485	561	14,087
Northern Goshawk	0	0	5
Red-shouldered Hawk	25	16	408
Broad-winged Hawk	1	1	34
Swainson's Hawk	0	0	10
Red-tailed Hawk	222	322	9,303
Ferruginous Hawk	0	0	2
Rough-legged Hawk	0	0	6
Golden Eagle	0	0	2
American Kestrel	50	56	1,382
Merlin	33	29	675
Peregrine Falcon	2	4	91
Prairie Falcon	2	2	44
Eurasian Kestrel	0	0	1
Total	**1,252**	**1,477**	**37,749**

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

**1992-2013 are used for this comparison due to similarity of methods and effort between those years and 2014.

adult Redtail perched on a power pole. Looking through a scope, I noticed it was banded; Nancy looked more carefully and pointed out that it was wearing a GGRO color band as well. We were confident that we read the number correctly, but maneuvered closer and confirmed—E64 on a lavender band. I also managed to photograph the band for further documentation.

We reported the sighting to the Patuxent Bird Banding Lab, but also checked with the office (of course, hoping that it was one we'd personally banded). GGRO had banded the bird as an adult about three months earlier; the bander noted that it was a bit on the skinny side (sharp keel bone). Since then, the bird appeared to have found a food bonanza because it looked to be in great shape.

To me, E64 was a chance to see what happened to one of our birds after it left our hands. To another, it could be opening a door to a whole new world.

Office manager, raptor trapper, and scientific illustrator Siobhan Ruck is the artist behind the feather drawings in Peter Pyle's second Bander's Ageing/Sexing Guide.

BAND RECOVERIES 2014 *Nancy Sue Brink*

A Headlands Homecoming

Research Director Chris Briggs slipped into the GGRO headquarters one fine March morning in 2014, binoculars in hand, and announced to all who would listen: "There's a Redtail out there with a band on its leg. I've got all but the first two numbers—it's ours, one of two birds we've banded."

He turned to Marion Weeks, long-time band recovery maven, who was organizing new reports sent to us by the Bird Banding Lab (BBL) in Patuxent, MD. "And *you*," said Chris to Marion, "banded one of them."

"Marion's bird" perches outside the GGRO office devouring her favored prey item, a garter snake. [Photo by Chris Briggs]

Marion was beside herself. Each year, the BBL sends us dozens of reports from people who encounter one of "our" banded hawks and take time to get on the phone or go online to add their discovery to BBL's massive database. Over the past year, BBL sent us 102 reports, one of our busiest years yet: 68 Red-tailed Hawks, 23 Cooper's Hawks, nine Sharp-shinned Hawks, one Red-shouldered Hawk, and one American Kestrel.

Sadly, most reports are of birds that have died—and a large proportion of those die because of something we humans do to make life hard for migrating and moving raptors. Hit by cars, electrocuted by high-tension power lines, smashed by plate-glass windows, poisoned by rodenticides—these are the just some of the causes of death identified in BBL encounter reports. So when we get news of a "sight record"—from a live bird whose band is read while it's perched in the wild—there is palpable joy among folks at GGRO.

And here was a banded bird right outside our window. Literally. That very afternoon, a big adult Red-tailed Hawk landed on a phone pole outside the upstairs windows of the intern office, where we were tracking down people who originally reported the hawks to the BBL. Such follow-up adds great stories to our records—but even more important, it refines and adds data that increases our understanding of the hawk's journey.

Absorbed in phone calls and letter writing, it took a while for us to notice her sitting and preening. Her belly had a beautiful light rufous wash. She looked strong and healthy. The band glinted on her leg. Chris snuck out with a scope. She promptly flew away.

Getting a band number from a perched hawk sounds like a simple task—put your scope on the bird's leg, zoom in, focus, and read the number! Alas, it is not so. Shirley Doell, a Bay Area birder, has reported two sight records for our Redtails (#1336 this year). She shared what she had to do to get the number right: "I was on a Christmas Bird Count near Clifton Court Forebay less than 1 mile from Discovery Bay. I used my

60-power scope, and left the Count people for about 10 minutes while I followed the hunting Redtail from perch to perch and wrote the numbers on a pad... You see about four numbers at a time, but when you get different views you can get the number." She's reported banded birds of many species, including albatross on Midway Island, where she was counting nests. (It's much easier to spot the bands on these birds, she reports, as the albatross stands up when you approach its nest and shows you its legs.)

"*I think that was a hawk.*" The phrase heard often in a banding blind when a Merlin like this one zooms past. [Photo by Walter Kitundu]

This past year, we had eight sight records. Four were reports of color bands (1281, 1291, 1302, 1314)—lavender (Redtails) or green (Coops) plastic bands inscribed with a combination of one white letter and two numbers, which are much easier to read with binoculars than traditional metal bands. The rest were "scoped" (1252, 1272, 1315, 1336)—including our Headlands visitor.

After the March sightings, our pole-sitting Redtail disappeared, perhaps tending a nest. As summer approached, she was back, sitting on her phone pole and devouring what appeared to be a favorite food: snakes. Still, those final two numbers eluded our Research Director. Chris did what any determined (or desperate) Research Director would do—he assigned the job to the new crop of amazing interns who arrive at the GGRO each summer. This would be their first raptorial challenge: to complete the band number, and finally determine exactly which hawk had returned to the Headlands.

Just one week after their arrival, the interns had it: a complete band number. Our skillful hunter was once again sitting on top of that pole eating a Common Garter Snake. The light was good and she was cooperative, calmly devouring her prey. Chris joined the interns, circling the bird and scoping her from different angles, each person confirming the nine numbers.

Over the next few weeks the Redtail gave the interns multiple opportunities to double-check their work. On one occasion, Chris and intern Kris Vanesky had a scope on her while she was sitting on the pole eating yet another garter snake. Kris had almost confirmed the number, but our bird, done with the snake, swooped down into a patch of sage, grabbed a vole, and devoured it in two bites.

"What a pig!" They shook their heads at the hawk with the very large crop. Eleven days later, intern Bridget Bradshaw reported a second confirmed sighting to the BBL. She was—you guessed it—eating a snake.

"Identifying the band number and the hawk was really exciting," said Kris. "The first month of the internship, you spend a lot of time sitting in the office, so it was great to get out in the field. And later, as we were out there in the blinds, it was really nice to think about the banded bird still out flying, since we were also hearing so much about how hard it is for the juveniles to survive."

And yes—it was Marion's bird, banded on September 22, 2008 at Hill 88, now GGRO Recovery #1315 (A & B). According to the Bander Journal, the repository of the daily musings of ecstatic or frustrated banders, it was a "Glorious day ... For the most part there was a steady flow of birds. Very best was the juvenile RT that when scared off the rock behind the blind flew to the RBN ["rubber band net," a trap controlled by a bungee] ... sat on a rock and attacked the bungee cord, lifting it, bending over to bite it, back to the rock to watch it ... to the ground nearby to contemplate it—really wanted that 'snake.'"

At 6 PM sharp, the Red-tailed Hawk was trapped and banded. She weighed 1,130 grams, and had a wing cord (the measure of one arced wing) of 412 mm. She was a big healthy girl that, as a juvenile, had already developed the interest in snakes she would display when identified six years later in the Headlands.

Since last summer, Marion's Bird, as she has come to be known, continues to fly through the Headlands, returning now and again to her perch on the phone pole, entertaining visitors with closeup looks and sharing bits of her meals with those standing below. In the off-season, as we're mired in data and reports from the BBL, we watch her through the office windows, a reminder of the beautiful raptors that we work to study and protect, and that grace us now and again with delightful and intimate knowledge.

And a reminder to keep our eyes open, and be sure to look at the legs of every perched hawk.

Band recoveries maven Nancy Brink celebrated 15 years as a GGRO bander in 2014. Here's hoping for another 15!

BAND RECOVERY LISTINGS

Marion Weeks

270-B Juvenile Red-tailed Hawk banded on 9/14/92 by Will Shor. First encountered on 1/7/97 near the National Cemetery in the Presidio at San Francisco, San Francisco Co., CA. Second encounter occurred 21 years after banding on 2/11/14. Reported by Kara Mirmelstein via email with subject "Found: dead hawk in valley of serpents." She was alerted to the hawk by Benjamin Mertz at Presidio Coastal Bluffs, San Francisco, San Francisco Co., CA.

1235 Juvenile Red-tailed Hawk banded on 9/24/03 by Marc Blumberg. "Claw with band on it" spotted by 10-year old Nicholas Ball on 8/3/13 as he was walking with parents at a vineyard located 25 miles NE of Napa, near Lake Berryessa, Napa Co., CA. The hawk's leg was caught in netting used to protect the grapes from birds.

1236 After second-year female Sharp-shinned Hawk banded on 10/3/07 by Allison Levin; caught and released on 7/25/13 in mist netting operations at Point Blue's Palomarin Station at Bolinas, Marin Co., CA; reported by Renee Cormier who noted hawk was caught and released again on 8/7/13 at the same net.

1237 Juvenile male Red-tailed Hawk banded on 10/12/12 by Angela Newsham; found dead on 10/22/12, 2.2 miles north of Pacifica, San Mateo Co., CA; reported by Julia Sabory.

1238 Juvenile male Red-shouldered Hawk banded on 10/20/09 by Emily Weil; found dead on 10/3/13. Sylvia Goodman, who reported the bird, speculated that it might have hit one of the large windows in the home at San Rafael, Marin Co., CA.

1239 Juvenile male Red-tailed Hawk banded with both a metal and color band on 8/27/13 by Peter McGuire; found dead on 9/22/13 in water of fountain near Hagiwara Tea Garden Drive at Golden Gate Park, San Francisco, San Francisco Co., CA. SF Animal Control Officer Ellie Sadler suspects rodenticide poisoning, which causes its victim to seek water due to thirst.

2014 intern Kate Owens and bander Steve O'Neill glow over a double Northern Harrier capture. [Photo by Mary Malec]

1240 Juvenile female Red-tailed Hawk banded on 9/26/11 by Robyn Smith; found dead of unknown cause on 10/20/13 at San Anselmo, Marin Co., CA; reported by Brian Crawford. The bird was found under a bush with no wounds or signs of predation, described as "mummified."

1241 Juvenile male Cooper's Hawk banded on 9/19/13 by Claire O'Neil; found dead on 9/26/13 at a home near Annadel State Park, Santa Rosa, Sonoma Co., CA; reported by Dan Stamps who said it looked emaciated, relatively freshly dead, and had "lost an eye, looked like an injury."

1242 Juvenile male Red-tailed Hawk banded on 11/17/06 by Craig Jones; found dead on 10/30/13 three miles northwest from Willamina, Yamhill Co., OR; reported by Shawna Newton.

1243 Juvenile male Red-tailed Hawk banded on 9/26/13 by Steve Rock; found dead on 10/20/13 eight miles south of Napa, Napa Co., CA; reported by Noah Drever.

1244 Juvenile male Cooper's Hawk banded on 9/19/13 by Marc Blumberg; found dead on 10/3/13 at Pasadena, Los Angeles Co., CA; reported by Jacqueline Samos.

1245 Juvenile female Cooper's Hawk banded on 11/2/13 by Steve O'Neill; found freshly dead at Tiburon, Marin Co., CA on 11/16/13 about "one foot from wall of back corner of house...no windows at all on that side of the house." Reported by Peter Thorner.

1246 Juvenile female Sharp-shinned Hawk banded on 9/26/13 by Daniel Pirtle; found dead on 10/3/13 at Watsonville, Santa Cruz Co., CA; reported by Barbara Hamrick.

1247 Juvenile male Cooper's Hawk banded on 8/28/12 by Regan Dohm; found dead at Redwood City, San Mateo Co., CA on 10/28/13. Taken to the Peninsula Humane Society (PHS); reported by Dylan Skiles of PHS; no information on file as to cause of death.

1248 Second-year Red-tailed Hawk banded on 9/17/13 by Sarah Sawtelle; found dead 7.9 miles southwest of Durham, Butte Co., CA on 11/28/13 "near a spit of water where Wood Ducks hang out;" reported by Clay Pelfrey.

1249 Juvenile Red-tailed Hawk banded on 9/20/96 by Lynn Bantley; found dead 17 years later on 10/3/13 at Thousand Oaks, Ventura Co., CA; reported by Jo Joseph of California Wildlife Center.

1250 Juvenile male Red-tailed Hawk banded on 10/31/13 by Calvin Hom; found fairly freshly dead on 11/26/13 in a backyard pool at La Quinta, Riverside Co., CA. Reported by Clint Korte; no wounds or injuries seen. Suspected rodenticide poisoning.

1251 Juvenile male Red-tailed Hawk banded on 11/2/13 by Nancy Mori; found dead on 11/29/13 at Lake Forest, Orange Co., CA; "method of recovery not covered by other codes" per Bird Banding Laboratory; reported by Kristi Krause of Serrino Animal Hospital; no further information at this time.

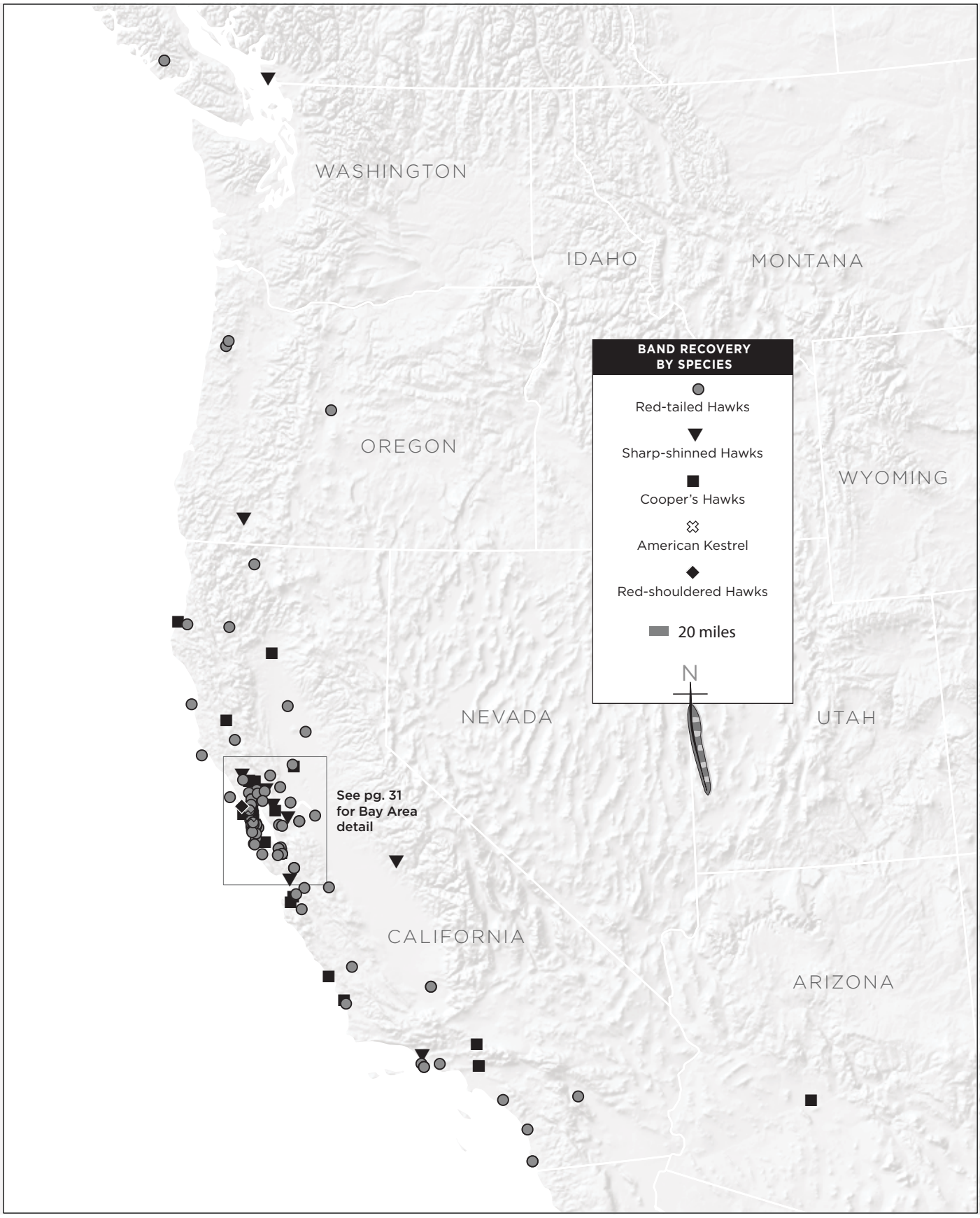
1252 After second-year female Cooper's Hawk banded on 9/26/10 by Genevieve Rozhon; sighted on 12/19/13, 0.3 miles SSW of Pismo State Beach, Pismo Beach, San Luis Obispo Co., CA; reported by Ryan Slack.

1253 Juvenile female Sharp-shinned Hawk banded on 9/22/13 by Emma Cox; found dead on 11/22/13, three miles east of Forestville, Sonoma Co., CA; reported by Steve Maass.

1254 Juvenile female Cooper's banded on 9/26/13 by Terri Mead; found dead on 10/24/13 in front yard at Woodland, Yolo Co., CA. Trinidad Perez has an aviary; scattered food attracts doves and other small birds, which, in turn, attracts birds of prey; reported by her husband Jose Perez.

1255 Juvenile female Cooper's Hawk banded on 11/1/13 by Ryan Bantley; found dead on unknown day of 11/13 by Arroyo Corte Madera del Presidio stream in Mill Valley, Marin Co., CA; reported by Brady Kallas.

1256 Juvenile female Red-tailed Hawk banded 8/26/13 by Brian Smucker; found on 10/26/13 on street intersection at Golden Gate Park, San Francisco, San Francisco Co., CA. The hawk was alive, but injured. SF Animal Control Officer Ellie Sadler found it standing; when she attempted to net it, it flew into pathway of car, was hit, but bounced off, and then she was able to capture it. "It had a weird thing on its back," she observed; the object turned out to be a GGRO tracking unit placed on "Fargo." Ellie transported Fargo to the Peninsula Humane Society, where she was dead on arrival. Mike Armer, GGRO banding volunteer and UC


WASHINGTON
IDAHO
MONTANA
OREGON
WYOMING
NEVADA
UTAH
CALIFORNIA
ARIZONA
BAND RECOVERY BY SPECIES
Red-tailed Hawks
Sharp-shinned Hawks
Cooper's Hawks
American Kestrel
Red-shouldered Hawks
20 miles
N
See pg. 31 for Bay Area detail

Davis veterinary student, took the hawk to Davis for a necropsy, which revealed it died of "exsanguination due to the presence of a second generation rodenticide;" reported by Gregg Hassett of PHS. Fargo was known to frequent Candlestick Park and Mount Sutro in San Francisco.

1257 Juvenile female Cooper's Hawk banded on 9/6/13 by Josh Hull; caught due to injury on 9/26/13 at San Francisco, San Francisco Co., CA; arrived at the Peninsula Humane Society emaciated, lethargic, with a dislocated right shoulder. The hawk was euthanized on arrival; reported by Patrick Hogan of PHS.

1258 Juvenile female Cooper's Hawk banded with both metal and color bands on 9/17/13 by Dick Horn; band(s) found with skeleton or bone only on 12/6/13 at oak grassland six miles NNE from Penngrove, Sonoma Co., CA; reported by Nick Moss.

1259 Juvenile female Sharp-shinned Hawk banded on 9/6/05 by Nick Villa; found dead on 1/1/14 at Napa, Napa Co., CA; reported by Cynthia Krantz.

1260 Juvenile female Red-tailed Hawk banded on 9/27/11 by Elin Gunnerson; found dead on 11/7/13 at Salinas, Monterey Co., CA; reported by Gabriel Mendoza.

1261 Juvenile female Red-tailed Hawk banded on 9/14/13 by Laura Young; caught 11/2/13 after being hit by a car 0.7 miles north of Cupertino, Santa Clara Co., CA; taken to Wildlife Center of Silicon Valley, where it was found to be thin, dehydrated, to have a dislocated shoulder, and with possible head trauma; euthanized 11/15/13; reported by Traci Tsukida of the Wildlife Center.

1262 Juvenile male Red-tailed Hawk banded on 11/21/13 by Emma Cox; found grounded under an oak tree on 12/17/13 at Santa Rosa, Sonoma Co., CA; reported by Brad Marsh of Santa Rosa Bird Rescue Center, where it was treated for a broken wing bone. Bird was sent to WildCare of San Rafael to prepare for eventual release, but died suddenly; the necropsy diagnosed cause of death as an Aspergillosis infection.

1263 Juvenile male Red-tailed Hawk banded on 11/26/10 by Randy Breaux; found dead 1/18/14, five miles southwest of Willamina, Yamhill Co., OR, reported by Don Cranfill. Found lying dead under a fir tree, he did not see any wounds and it looked "fine. It was just a miracle that it had not been taken away or eaten by coyotes...it was dead, stiff, but intact, no maggots."

1264 Juvenile male Red-tailed Hawk banded with both metal and color bands on 11/30/13 by Dana Owens; found dead on 1/22/14, 3.7 miles east of Port Hueneme, Ventura Co., CA; reported by Eric Seward.

1265 Juvenile female Red-tailed Hawk banded on 11/15/13 by Chris Briggs; found dead with blood on it on 12/26/13, on private land outside an apartment complex at San Jose, Santa Clara Co., CA; reported by David Royal.

1266 Juvenile male Red-tailed Hawk banded on 11/21/13 by Emma Cox; found dead on 1/26/14, under a cork oak tree on Napa Sanitation District property one mile south of Napa, Napa Co., CA; reported by Chris Francis. He noted there were "no obvious wounds, no blood, the bird was stiff, feathers intact, eyes still there and dried, but insects had not yet started eating the body."

Bander beware: the quizzical look on this diminutive Merlin's face belies its fiercely sharp bill and talons. [Photo by Kris Vanesky]

1267 Juvenile male Red-tailed Hawk banded on 12/14/13 by Steve O'Neill; found dead on 1/17/14 at Half Moon Bay, San Mateo Co., CA; reported by Lou Weinert.

1268 Juvenile Red-tailed Hawk banded on 8/24/92 by Karen Scheuermann; was trapped and released 21 years later on 1/20/14, during banding operations conducted by Stan Moore, 0.4 miles southeast of Ignacio, near Novato, Marin Co., CA.

1269 Juvenile female Red-tailed Hawk banded on 10/17/09 by Nathan Elliot; found alive on 2/5/14 at San Jose, Santa Clara Co., CA. She was taken to Wildlife Education and Rehabilitation Center (WERC). Suspected car strike but with no injuries on examination; infested with feather lice and most of the tail feathers were broken. Described as an "exceedingly picky eater, refusing the rats and mice that we have a good supply of, instead preferring the much-harder-to-get gophers, ground squirrels, and road-killed jackrabbits." Reported by Sue Howell; additional information from Colleen Grzan, Director of Animal Care at WERC; the Redtail was released on 9/2/14, near where she was picked up in February.

1270 Juvenile female Red-tailed Hawk banded on 8/21/13 by David Jesus; caught due to injury on 12/1/13 at Sonoma, Sonoma Co., CA. BBL notes state that "they found it starving; bird taken to a rehabber;" last known outcome is "alive and in captivity" per BBL; reported by Jim Dunford.

1271 Juvenile male Red-tailed Hawk banded on 11/21/13 by Russ Delong; found dead with "chest clawed up" on 12/26/13 in a residential acre lot at Vista, San Diego Co., CA; reported by Michael Jacobs.

1272 Juvenile male Red-tailed Hawk banded on 8/19/13 by Daniel Pirtle; sighted by spotting scope at the Great Highway on 11/27/13; the hawk often hunts from light poles at the western end of Golden Gate Park, San Francisco, San Francisco Co., CA; reported by Peter Cole.

1273 Juvenile female Red-tailed Hawk banded on 11/2/13 by Steve O'Neill; found dead on 1/7/14 in pear orchard at Lakeport, Lake Co., CA; reported by Gretchen Morgane who noted one wing hanging down as if it was broken.

1274 Juvenile male Red-tailed Hawk banded on 11/6/13 by Molly Peppel; found dead on 1/31/14, six miles south of Dillon Beach, Point Reyes National Seashore, Marin Co., CA on beach near cliff base. No obvious injuries, wing and leg bones were intact, but had been dead for some time; reported by Galen Plotkin.

1275 Juvenile female Cooper's Hawk banded with both metal and color bands on 10/29/13 by Brian Smucker; brought into Humboldt Wildlife Care Center/Bird Ally X on 11/11/13, after twice colliding with a window at the Bayshore Mall in Eureka, Humboldt Co., CA; reported by Lucinda Adamson. No injuries were found and the bird was released after 24 hours observation.

1276 Juvenile female Cooper's Hawk banded on 9/23/13 by Diane Horn; found dead on 2/10/14 at Potter Valley, Mendocino Co., CA; reported by Justin Woolley. He found bird freshly dead when he was returning his chickens to their pen. Justin stated: "the hawk looked healthy, in fairly good condition."

1277 Juvenile Red-tailed Hawk banded on 9/24/00 by Ron DeLeon; found dead or injured

on 1/11/14, on highway north of San Bruno, San Mateo Co., CA, by Christoph Monecke; no additional information but bird believed to be dead.

1278 Juvenile female Red-tailed Hawk banded on 11/22/13 by Erika Walther; caught on 2/8/14, due to striking or being struck by a motor vehicle on a public road two miles west from Gonzales, Monterey Co., CA ; reported by Orval Burke. The BBL report showed the hawk's condition as "alive-in captivity"; no further information at this time.

1279 Juvenile female Red-tailed Hawk banded on 11/15/13 by Jennifer Gale; found dead on 2/15/14 by Kevin Condon, as he was walking his dog about eight miles southeast from Petaluma, Sonoma Co., CA.

1280 Juvenile female Cooper's Hawk banded on 9/10/12 by Candace Davenport; on 2/21/14, per report by Pacific Wildlife Care (PWC) to the BBL, the hawk "fell to ground and then died." Found 15 miles west of Atascadero, San Luis Obispo Co., CA; reported by Jennifer Campbell of PWC.

1281 Juvenile male Red-tailed Hawk banded with both metal and color bands on 9/17/13 by Sarah Sawtelle; Nathan Holcombe read the hawk's color band on 12/20/13 as the hawk sat on a fence outside a Best Buy at San Francisco, San Francisco Co., CA. Nathan said the bird held a rat in its talons for two hours before starting to eat it!

1282 Juvenile female Cooper's Hawk banded on 9/22/08 by Marion Weeks; found dead on 1/8/14, "in the gutter at the side of a road near the entrance to a business, basically smashed, probably run over by a vehicle" at San Jose, Santa Clara Co., CA; reported by Officer Jeff Lum of San Jose Animal Care and Services.

1283 Juvenile female Sharp-shinned Hawk banded on 9/20/11 by Emily Weil: found "dead in backyard behind fence" on 1/2/14 at Ventura, Ventura Co., CA; reported by Richard Renshaw.

1284 Juvenile male Red-tailed Hawk banded on 9/6/12 by Calvin Hom; band with skeleton or bone only found 3/18/14, on private land two miles south of Arroyo Grande, San Luis Obispo Co., CA; reported by Pete Gagliardini.

1285 Juvenile Red-tailed Hawk banded on 9/14/95 by Carole Hyden; found dead 18½ years later on 3/2/14, half a mile from Hwy 97 and close to two ranches 3.6 miles ESE from Tumalo, Deschutes Co., OR; "probably placed where it was, near a tree on crummy BLM land, almost like an artifact on a rock, in a very obvious place;" reported by Wendy and Scott Silver.

1286 Juvenile male Red-tailed Hawk banded on 12/23/13 by Jeff Robinson; found on 1/5/14 at San Jose, Santa Clara Co., CA. Reporting party found him standing in the same location for six hours. The Wildlife Center of Silicon Valley (WCSV) found him to be extremely emaciated and anemic, prognosis guarded, weight 650 grams (weight at banding was 1014 grams), no external bleeding, wings drooped due to weakness, dull mentation, and left foot had two wounds. The Redtail was given pain meds but expired within 24 hours; reported by Ashley Kinney of the WCSV with additional information given by Traci Tsukida.

1287 Juvenile female Red-tailed Hawk banded with both a metal and color band on 11/2/13 by Dana Owens; caught 3/9/14 due to striking or being struck by a motor vehicle at San Diego, San Diego Co., CA; recorded as dead by the BBL; reported by Sean Hammer.

1288 Juvenile Red-tailed Hawk banded on 9/19/02 by Kari Rodenkirchen; caught by hand at South San Francisco, San Mateo Co., CA on 3/23/14; reported by Shannon McClain. The BBL listed the bird as dead.

1289 Juvenile male Red-tailed Hawk banded on 12/11/13 by Jeff Robinson; found freshly dead on 3/25/14 lying in the bushes on an undesignated trail at Anderson Lake County Park, Morgan Hill, Santa Clara Co., CA; reported by Rebecca Kay, a seasonal ranger, while looking for illegal fishermen.

1290 Juvenile male Red-tailed Hawk banded on 12/7/13 by Laura Young; found on 12/23/13 at San Ramon, Contra Costa Co., CA, by Casey and Annette Wolff, who stated, "We heard the bird slam into the window!" Taken to Lindsay Wildlife Museum (LWM), the Redtail was euthanized due to injuries on 12/27/13; reported by Marianne Dominguez of LWM.

1291 Juvenile female Red-tailed Hawk banded with both a metal and color band on 10/25/13 by Noreen Weeden; Tom Eckles reported first seeing this bird on 1/21/14 at his home in Gualala, Mendocino Co., CA in tall pine trees. He took numerous photos and discovered the metal and color bands when the pictures were on his computer. He was able to read the color band when the bird landed on his deck railing; "she came in from the trees—to land atop a bird feeder in a rain storm—looked like a baby. Last time I saw A-63 was 2/17/14." He named the bird Ruby, as "she is going to have a red tail sooner or later."

1292 Juvenile male American Kestrel banded on 9/30/11 by Craig Tewell; "ran into a window" and died on 2/1/14 two miles north of Sausalito, Marin Co., CA; reported by Leo Gilberti.

1293 Juvenile female Sharp-shinned Hawk banded on 9/24/12 by Jeremy Thweatt; banded leg of the hawk found on 1/21/14 at a home at Cottonwood, Tehama Co., CA; reported by Rick Kincannon.

1294 Second year Red-tailed Hawk banded on 12/17/13 by Ariana LaPorte; found dead on 1/11/14 at Ocean Beach, San Francisco, San Francisco Co., CA. "Had been in the water and may have been eaten by crabs a little;" reported by Chase Borchers.

1295 Juvenile male Red-tailed Hawk banded on 12/25/13 by Steve O'Neill; found on 4/4/14; the hawk was "emaciated, full of feather lice, grounded from weakness, filthy feathers and encrusted talons" at Hollister, San Benito Co., CA; reported by Rebecca Dmytryk. The bird was taken to WERC, where it received fluids, but without success; the Redtail died on 4/8/14.

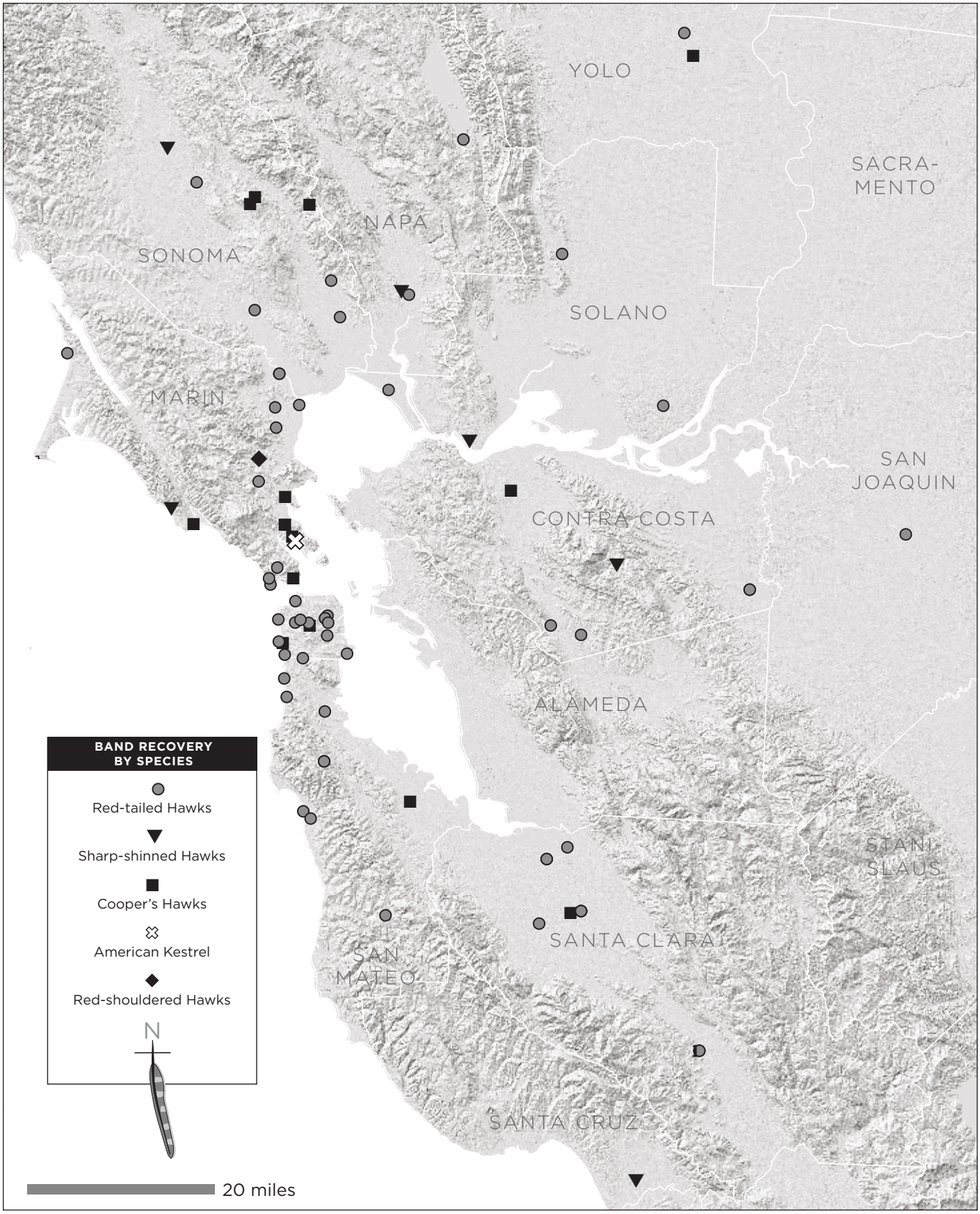
1296 Juvenile male Red-tailed Hawk banded on 8/26/06 by Michael Armer; found on 2/3/14 at Novato, Marin Co., CA; the hawk was dead, intact, with no eyes, in "perfect condition, and looked like he had choked on a gopher snake—it was partially digested—in his stomach, head first." Reported by Mike and Lorena Martin.

1297 Juvenile male Red-tailed Hawk banded on 10/31/12 by Mamiko Kawaguchi; found grounded on 3/2/14 at Vacaville, Solano Co., CA and taken to Suisun Wildlife Center; reported by Jamie Paradis of SWC. Their staff noted that both the beak and talons were blue and that the bird was infested with feather mites and flat flies and had been on the ground for a time. It died shortly after arrival. Information provided by Chris Reider.

1298 Juvenile male Red-tailed Hawk banded on 11/16/13 by Tara McIntire; caught due to injury at San Francisco, San Francisco Co., CA on 4/12/14; diagnosed with a broken humerus by the staff of Peninsula Humane Society; the bird was euthanized upon diagnosis; reported by Greg Hassett of PHS.

1299 Juvenile male Red-tailed Hawk banded with both metal and color bands on 9/2/13 by Ralph Pericoli; found next to a road on 4/18/14 at a rural area at Creston, San Luis Obispo Co., CA; "had been there for three days" before being picked up and taken to Pacific Wildlife Care (PWC). The bird weighed 660 grams, was emaciated, and had a big wound on the right leg. At the center for three weeks, the hawk was gaining weight, but died on 5/7/14; reported by Jennifer Campbell and information provided by Shannon Riggs, both of PWC.

1300 After second-year female Cooper's


YOLO
SACRA-
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SONOMA
SOLANO
MARIN
SAN
JOAQUIN
CONTRA COSTA
ALAMEDA
STANI-
SLAUS
SANTA CLARA
SAN
MATEO
SANTA CRUZ
BAND RECOVERY
BY SPECIES
Red-tailed Hawks
Sharp-shinned Hawks
Cooper's Hawks
American Kestrel
Red-shouldered Hawks
N
20 miles

Hawk banded on 12/12/13 by Calvin Hom; trapped and released on 2/25/14 by Chris Briggs at a business at San Rafael, Marin Co., CA. Chris listed employee Brandon Case as the finder.

1301 Juvenile female Red-tailed Hawk banded on 9/7/13 by Nathanael Hoffman; found dead on 4/27/14, on Hwy 65, four to five miles north of where Poso Creek crosses in Kern Co., CA. The bird was "still warm, but it was a warm day...seemed a recent event, no rigor mortis." Reported by Sylvia Crissman: "We found a nice spot and with great care spread its wings and put its head in a good position and left it there."

1302 Juvenile female Red-tailed Hawk banded with both metal and color bands on 8/31/13 by Siobhan Ruck; the color band was sighted by John Fox on 10/14/13 at an agricultural area of Coyote Valley between Morgan Hill and San Jose, Santa Clara Co., CA. John reported the bird as "alive and healthy in the wild."

1303 Juvenile male Red-tailed Hawk banded on 12/18/13 by Steve O'Neill; the pelvis, spine, and leg bone were found on 2/23/14 in a "bit of a wilderness of trees" that are between the tennis courts for an apartment complex and the Olympic Golf Course at San Francisco, San Francisco Co., CA; reported by Andree Venturella. She found feather clumps in the area and a wing hanging from a tree branch; the skeleton was picked clean.

1304 Juvenile female Red-tailed Hawk banded on 11/5/13 by Chris Briggs; found dead on 4/26/14, at a remote area in the Trinity National Forest, Trinity Co., CA. Finder Terri Reymann reported that the bird was found "still warm 3.5 miles east of Big Flat, CA on Hwy 299 around 11:00 AM...in good condition."

1305 Juvenile female Red-tailed Hawk banded on 11/7/13 by Anna Stunkel; reported as "found dead" on 12/13/13 by the BBL, but also reported as received 12/15/13 by Peninsula Humane Society (PHS) from San Francisco Animal Control, found at San Francisco. San Francisco Co., CA. Brought into PHS with a left foot injury. Upon exam on 1/22/14 by the PHS veterinarian the bird was euthanized; reported by Patrick Hogan of PHS; with information provided by Ashley Damm of PHS.

1306 Juvenile female Cooper's Hawk banded on 10/9/10 by Robert Sexton; found dead on 1/3/14 at Cottonwood, Tehama Co., CA next to an electrified wire fence in a dense oak woodland; reported by Gerald Markel, who suspects the bird hit the fence when chasing prey.

1307 Juvenile female Sharp-shinned Hawk banded on 9/22/12 by John Perry; on 3/9/14,

A GGRO tradition: apprentice banders Kristin Vorhies and Eric Lynch admire a dark-morph Red-tailed Hawk during 2014 Thanksgiving Day trapping. Who needs turkey after that? [Photo by Nancy Brink]

"the bird slammed into a window at a Starbucks in Benicia," Solano Co., CA. Brought to Lindsay Wildlife Museum (LWM); "it had extensive bruising on right side, but apparently no broken bones or other complications." She weighed 142 grams when banded; during her rehabilitation she weighed as much as 198 grams and was described as "stuffing herself on quail." Reported by Michelle Setter of LWM, with additional information from Terri Mead (a volunteer at both LWM and the GGRO) and Marianne Dominguez, Wildlife Rehabilitation Technician at LWM. This lucky Sharp-shinned Hawk was released 5/1/14.

1308 Juvenile female Cooper's Hawk banded on 9/16/13 by Stephen Wilson; found dead on 10/25/13 next to a trashcan at Soledad Canyon RV and Camping Resort, two miles NE from Acton, Los Angeles Co., CA; reported by Sergio Riquelme.

1309 Juvenile female Red-tailed Hawk banded on 12/9/12 by Kat Tomalty; found dead on 6/1/14, 3.2 miles NNE from Brisbane, San Mateo Co., CA; reported by Kelly Tankersley.

1310 Juvenile female Red-tailed Hawk banded with both a metal and a color band on 9/4/13 by Mamiko Kawaguchi; captured on 3/29/14 at the Coyote Creek Field Station of the San Francisco Bay Bird Observatory at Milpitas, Santa Clara Co., CA; reported by Josh Scullen, Landbird Program Director. "It seems that her bands got tangled in the net when she flew into it, which is the only reason we were able to extract her. I'm impressed that she didn't tear the net to pieces! The bird seems to be in good condition, and was released."

1311 Juvenile male Red-tailed Hawk banded on 11/5/13 by Chris Briggs; found dead near a stand of eucalyptus trees in a tall grass area at Adobe Creek golf course on 5/8/14 at Petaluma, Sonoma Co., CA; reported by Dave Sheldon. The hawk "was extremely dry, obviously...dead for a while...completely intact and did not seem to have been attacked prior to dying."

1312 Juvenile male Red-tailed Hawk banded on 9/12/11 by Dick Horn; caught due to injury on 3/2/14 near Lake Berryessa on Knoxville Road, 40 miles NE of Napa, Napa Co., CA; reported by Chad Zierenberg, owner of Wildlife Out. Chad stated the bird was brought to him; he assessed it as "too far gone" and took it to Wildlife Rescue Center of Napa County to be euthanized.

1313 Juvenile Red-tailed Hawk banded on 11/20/89 by Val Fairman; reported as being "found dead or caught due to disease" on 6/27/04, four miles west of Yreka, Siskiyou Co., CA at Greenhorn Mountain; reported by Ronnie Dickison. The BBL report to the GGRO was generated on 7/5/14 and our major question is the recovery date: was it found in 2004 or 2014? Thus, was the bird found 14 years post banding or 24 years? Current status of the bird is dead per the BBL report. We have not succeeded in contacting the finder to date.

1314 Juvenile male Red-tailed Hawk banded with both metal and color bands on 9/14/13 by Steve Rock; the color band was sighted on 1/17/14 by Robert Mathews a little north of Marysville, Yuba Co., CA, in the trees on his property. When contacted a year after his initial sighting, he stated that he believes the bird is still hanging around.

1315-A Juvenile female Red-tailed Hawk banded on 9/22/08 by Marion Weeks; sighted 7/11/14 by Chris Briggs and the 2014 GGRO interns; the hawk was perched atop a pole eating a garter snake outside GGRO office at the Marin Headlands, Sausalito, Marin Co., CA; reported by Kris Vanesky.

1315-B Juvenile female Red-tailed Hawk banded on 9/22/08 by Marion Weeks; sighted again on 7/22/14 on a pole at Bldg. 1064 Fort Cronkhite (GGRO office), Sausalito, Marin Co., CA, by Bridget Bradshaw, again eating a common garter snake followed shortly by a vole. (Note: Read the accompanying article for more about "Marion's bird." Since the article was written, hawkwatcher and bander Mary Malec has also photographed this bird fending off an unbanded juvenile Red-tailed Hawk at Fort Cronkhite on 12/29/14.)

1316 Juvenile male Red-tailed Hawk banded on 9/12/10 by Siobhan Ruck; reported on 4/2/14 at San Francisco, San Francisco Co., CA, by Erin Fisher and Patrick Hogan of PHS. Greg Hassett of PHS confirmed the band number of a Redtail that was found in San Francisco on 3/31/14 that was released on 4/2/14. Unable to locate this bird's medical record, Greg recalled that "it wasn't flying" when it was brought to them.

1317 Juvenile female Red-tailed Hawk banded with both metal and color bands on 10/29/13 by Chris Briggs; "leg and color band only, partially decomposed" per BBL; found at Kneeland, Humboldt Co., CA. The hawk went through a number of people before it was brought to and reported by Dave Lancaster of California Fish and Game on 8/1/14.

1318 Juvenile female Cooper's Hawk banded on 9/3/13 by Emily Abernathy; found dead on 9/14/14 three miles east of Kenwood, Sonoma Co., CA; reported by John Meserve.

1319 Juvenile female Cooper's Hawk banded on 10/2/14 by Kristin Vorhies; found dead or caught due to disease on 10/18/14 at Salinas, Monterey Co., CA; reported by Ashley Clemen.

1320 Juvenile female Cooper's Hawk banded on 9/17/13 by Brian Smucker; caught on 10/24/14 due to injury; found on the ground with broken right leg at the Encanto Golf Course, San Tan Valley, Maricopa Co., AZ, south of Phoenix; reported by Amy Burnett of AZ Department of Game and Fish. Taken to Liberty Wildlife at Scottsdale, where Sheila Coden stated, "the leg was so badly broken that they had to tape it to the body of the bird to hold it in place." It may also have had internal injuries from a collision with something hard. The bird died on 10/31/14.

1321 Juvenile female Red-tailed Hawk banded on 9/2/10 by Allison Levin; found dead or caught due to disease on 10/27/14 at San Ramon, Contra Costa Co., CA; reported by Robert Rodriguez. The BBL lists the bird as dead.

1322 Juvenile female Cooper's Hawk banded on 10/29/14 by Kate Owens; found dead on 11/5/14 at Paradise Valley Farms, Bolinas, Marin Co., CA, in an agricultural area that backs onto the Point Reyes National Seashore. The bird was decapitated and the head was found; both body parts were "in perfect condition, still soft, floppy, no blood anywhere." Reported by Dana O'Conner. She gave the bird to Keith Hansen, wildlife artist, who gave the bird to the California Academy of Sciences at San Francisco.

1323 Juvenile female Cooper's Hawk banded on 9/17/14 by James Lawson; found dead on 10/27/14 at an unused exhibit at the San Francisco Zoo, San Francisco, San Francisco Co., CA; reported by Helen Horblit. The zoo veterinarian thought it had been predated and had been there for a while.

1324 Second-year female Sharp-shinned Hawk banded on 10/9/09 by Judd Howell; found dead on 10/10/14 after being hit by a car at Coquitlam, British Columbia, Canada; reported by Orphaned Wildlife (OWL). Mindy Dick of OWL stated that the bird will be sent to the Provincial Government for testing and/or given to a native Indian group for use in ceremonies.

1325 Juvenile Red-tailed Hawk banded on 11/27/02 by David Jesus; found freshly dead on 10/8/14 at the side of Highway 4 at Taylor Flats, in the southwestern area of British Columbia, Canada; reported by Peter Clarkson of Resource Conservation of Pacific Rim National Park Reserve. Peter, a shorebird bander, describes the area as an extremely rich year-round bird area.

1326 Juvenile female Red-tailed Hawk banded on 9/25/14 by Kate Owens; found dead 11/5/14 at San Francisco International Airport in San Mateo Co., CA; reported by Chris Borchard, Airport Operations, who responded to a report by a pilot of debris on the runway and found the dead hawk. Chris suspected it was struck by the side of an aircraft, though no crew member or pilot reported a bird strike.

1327 Juvenile female Red-tailed Hawk banded on 10/26/14 by Emily Weil; caught during a storm on 12/3/14 at a private residence in Sonoma, Sonoma Co., CA. The hawk was unable to fly, and was brought to Wildlife Rescue Sonoma County (WRSC) where it was warmed, given food and quiet for several days, and released where found on 12/14/14; information given by Danielle Mattos of WRSC.

1328 Juvenile male Red-tailed Hawk banded on 9/9/14 by Kate Owens; found on 12/8/14 on side of onramp to Highway 85 at the Santa Teresa intersection in San Jose, Santa Clara Co., CA; reported by Charles Irwin; thinking it was an eagle, he pulled over and ran back to retrieve it.

1329 Juvenile male Red-tailed Hawk banded with both a metal and a color band on 11/18/14 by Buzz Hull; reported on 11/30/14 by Chad Crivelli, while driving to check on his cattle, 15.7 miles SSW from Los Banos, Merced Co., CA. Chad observed a "Golden Eagle hit the hawk, went to ground and then carried it to a tree and began to eat the hawk."

1330 Juvenile female Cooper's Hawk banded on 9/30/14 by Candace Davenport; caught due to injury on 10/8/14 at Salinas, Monterey Co., CA and taken to Monterey County's SPCA for care. The hawk had popping at the elbow joints, scabs on both legs and feet; x-rays were planned for the next morning after the bird was stabilized, but it died overnight; reported by Jamie Doglione.

1331 Juvenile Red-tailed Hawk banded on 8/19/92 by Amy Fesnok; found dead 4/20/11 five miles WSW from Rio Vista, Solano Co., CA at the Shiloh II Wind Farm; reported by Aaron Hasch. We have not been able to confirm the recovery date as this report was sent to us by the BBL on 12/20/14.

1332 Juvenile female Red-tailed Hawk banded on 11/26/14 by Matt Delgado; found dead on 1/2/15 seven miles north from Fort Bragg, Mendocino Co., CA; reported by Ami Puri.

1333 Juvenile male Red-tailed Hawk banded on 9/26/14 by Noreen Weeden; found dead on 1/3/15 at La Honda, San Mateo Co., CA next to an open space preserve; reported by Jennifer Heit, who vacuum-sealed and froze the bird to give to us for testing and promised to give us more information upon her return from Burma.

1334 Juvenile female Cooper's Hawk banded on 9/10/14 by Julie Baughman; found freshly dead with no apparent wounds or injuries on 11/14/14 on the ground at the Discovery Museum's landscaped outdoor learning lab at Fort Baker, Sausalito, Marin Co., CA; reported by Kinsey Brock.

1335 Juvenile male Red-tailed Hawk banded on 9/23/14 by Matt Delgado; found dead on 12/1/14 at Fire Station 2, Oxnard, Ventura Co., CA; reported by Brandon Taylor as he was doing weekly yard maintenance and saw the hawk "sleeping on the ground." He found no evidence of any gunshots or injuries.

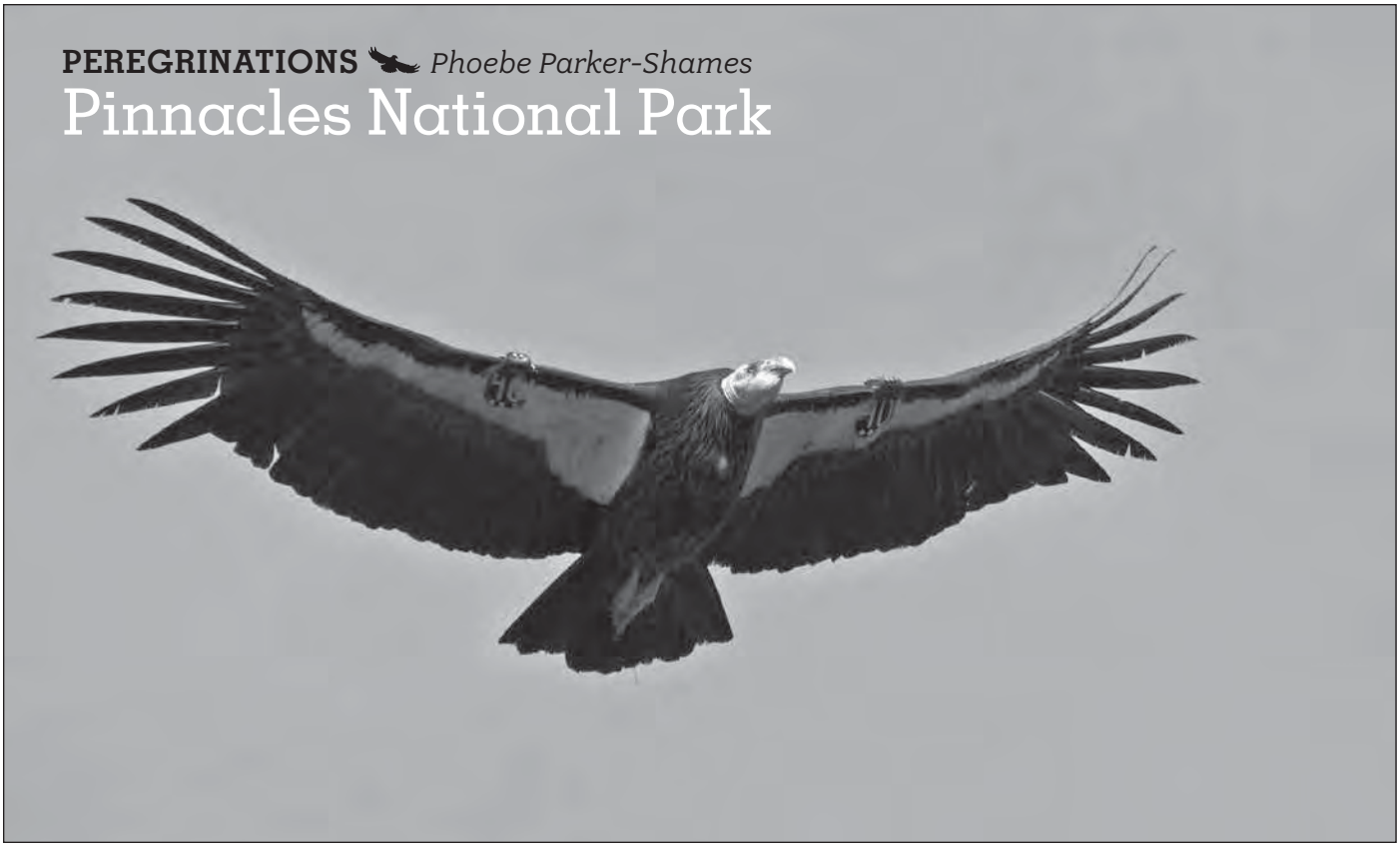
1336 Juvenile male Red-tailed Hawk banded on 10/11/14 by Jennifer Armer; sighted on 12/17/14, 4.2 miles south of Discovery Bay, Contra Costa Co., CA by Shirley Doell, who was on a Christmas Bird Count near Clifton Court Forebay.

1337 Juvenile male Sharp-shinned Hawk banded on 10/29/14 by James Lawson; found dead on 1/8/15, most likely after hitting garage window in pursuit of birds at a feeder in backyard of home on wooded hillside, three miles east of Mount Diablo Summit at Clayton, Contra Costa Co., CA; reported by Jerald Britten.

Heart and soul of GGRO band recoveries, Marion Weeks spends countless hours tracking down and transcribing the stories

PEREGRINATIONS *Phoebe Parker-Shames*

Pinnacles National Park



Captive-reared "Kun-wak-shun", California Condor male #340, soars over Pinnacles National Park to the delight of GGRO's 2014 interns. [Photo by Matthew Delgado]

When we think of critically endangered species, we often think of animals like tigers, rhinos, pandas, or elephants. However, one of the rarest, most endangered birds in the world can be found not in some far away country but just 130 miles south of the Marin Headlands at Pinnacles National Park.

The California Condor (*Gymnogyps californianus*) is the largest North American vulture and is one of the most well-known examples of captive-breeding reintroduction bringing an animal back from the brink of extinction. By 1982, habitat destruction, poaching, and lead poisoning reduced the population to just 22 birds. Many naturalists presumed their inevitable doom because California Condors only lay one egg at a time and take six years to reach sexual maturity.

In 1987, the San Diego Zoo Global program, U.S. Fish and Wildlife Service, California Department of Fish and Game, National Audubon Society, and Los Angeles Zoo began a captive breeding and reintroduction program that has increased the population to 425 birds as of January 2015 (219 of which are living in the wild). The program is ongoing as wild condor populations have yet to reach self-sustaining numbers (due to continuing threats such as lead poisoning), but these birds would certainly be extinct by now if it hadn't been for those efforts.

I remember as a kid watching a nature program about the condors and how researchers donned vulture-headed puppets on their hands in order to feed and interact with the chicks. It was one of the first stories I can remember hearing about conservation and extinction. At that time, it wasn't clear whether the program would work at all. They seemed as removed from me as tigers in Siberian Russia. Until I got to the GGRO, I had no idea it was possible for me to see a California Condor outside of a photograph. So when it came time to plan an intern road trip, finally laying eyes on these mythic birds was priority #1 on my list.

Pinnacles is one of five release sites for the California Condor breeding program, and the place closest to the Headlands to find these winged conservation icons. So, on a sunny morning in early January, all five interns crammed into Bridget's blue Subaru and headed south. We made a few stops along the way to learn about incredibly powerful (and expensive) microscopes at SF State University, poke sea anemones along the coast, and spend a day at the Monterey Bay

Aquarium. Finally, just after dark, we made our way to the east entrance of Pinnacles National Park and found ourselves a camping spot at the Pinnacles Campground.

We awoke to dewdrops and quail calls and headed out. At the ranger station we planned our hiking route to one of the best condor-watching spots: High Peaks overlook. We took the Bear Gulch Loop up to this highest point in the park. It started down in the valley floor, following Bear Creek and winding between buckeye trees. Then it headed up. And up. And up. We climbed up the ridge past rolling meadows and oaks, and into the rocky peaks made of consolidated volcanic ash and landslide breccia. We hiked through all the major habitat types found in the park: riparian, woodlands, chaparral, grasslands, and rock and scree.

Finally, we reached the High Peaks overlook and immediately knew we were in the right place. There was a volunteer researcher with a Yagi antenna scanning for condors. We spent a few hours eating lunch, resting, and staring at some distant dark specs that we were fairly certain were condors, but weren't close enough to tell for sure. Finally, feeling slightly dejected, we packed up and started to head back down. As soon as all cameras were safely zipped up in our packs, we heard a gasp and a yell and a giant dark shape soared over the rocky spire behind us. Suddenly an entire group of condors was directly overhead. They floated silently between the peaks and pine trees, their contrasted black and white wings spread wide while their bulbous, naked heads scanned the ground below. They were fantastically huge, and just for comparison, a Turkey Vulture flew along beside them, suddenly miniscule. We cried out and jumped for joy.

As we hiked down, we kept coming across the same group around bends in the path, slowly circling in the sky. We saw at least eight birds, and it struck us how lucky we were to see a group of animals that actually makes up nearly 4% of the overall wild population. We could also see the big numbers painted on their patagial tags that researchers use to keep track of each individual. From these tags we were able to identify some of the birds we saw using the Pinnacles web site and the online Condor Spotter:

FEMALE #550: This bird was one of the few wild-born chicks and hatched in Pinnacles in 2010. However, she suffered from lead poisoning and was evacuated to the L.A. Zoo until 2011.

MALE #606: This juvenile bird seemed to follow us around and is in almost every single one of my photos. His parents laid his egg in the wild in Big Sur, but concerns about situations like the one that #550 faced (above) led researchers to swap it out and hatch him at the L.A. Zoo in 2011. He had a stress-free release in January 2013 and seems to be doing well in Pinnacles.

MALE #340, "KUN-WAK-SHUN": This bird was the first chick successfully raised in the Oregon Zoo in 2004. He is described as an active and aggressive bird that quickly rose in the condor hierarchy. He is a very exploratory vulture and often leads feeding expeditions. Sadly, his mate died of lead poisoning in 2014.

MALE #602: Hatched in 2011 at the L.A. Zoo and released in 2013, #602 is the most dominant of his cohort and is frequently seen in Pinnacles.

MALE #251, "CRUSH": Hatched in 2001 at the L.A. Zoo. Crush's original mate #306 and their chick died in 2013, probably from lead poisoning. However, Crush has been courting #222 (Cosmo) for years and researchers are hopeful that the two will help form the breeding base of the Pinnacles population.

FEMALE #222, "COSMO": Hatched in 2000 in San Diego, she is Crush's current mate. When Cosmo's old mate was injured and returned to captivity, she finally became receptive to Crush's advances and although the two have struggled with raising offspring, they may do better this year.

FEMALE #236, "TINY": Hatched in 2001 in San Diego, she is one of the puppet-raised chicks I'd heard about as a kid. Smaller than the average female, she has nevertheless successfully raised and fledged two chicks in the wild and is described as having "spectacular parenting skills."

MALE #219, "PUFF DADDY": We aren't 100% sure on this identification, but if we're right, we got to see one of the largest wild California Condors. Hatched in 2000 in San Diego, Puff Daddy got his name because he makes himself even larger by inflating air sacs in his neck. However, he's also been through some tough scrapes. Once, while he was eating trash along Highway 1, a can got stuck on his lower mandible and had to be removed. Despite this, he also helped successfully fledge his first wild-born chick in 2010.

It was incredible to see these birds in the wild, but reading their biographies makes me even more concerned for their survival. The future of wild condors is uncertain. In 2000, the mortality rate for the wild populations was 25% and lead poisoning continues to be the biggest cause—despite bans on lead ammunition within the condor's range. Managers at Pinnacles are trying to reduce lead exposure, and they claim that those efforts are starting to have a measurable effect.

Hopefully California Condors like the ones we saw will continue to grace the skies over Pinnacles so that visitors like us have the opportunity to see these legends of the raptor world in person.

After spending the 2014 season as a GGRO intern, Phoebe Parker-Shames is now assisting research on Trinidadian guppies.

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