Pacific Raptor Report

FALL MIGRATION 2015

GOLDEN GATE RAPTOR OBSERVATORY

Thirty-Seven

GOLDEN GATE NATIONAL PARKS CONSERVANCY

PACIFIC RAPTOR REPORT

THE NEWSLETTER OF THE GOLDEN GATE RAPTOR OBSERVATORY

We banded 650 Cooper's Hawks—like this adult—in fall 2015. For 2015 and for all 33 years of banding, Cooper's Hawks are our most trapped species—more than 14,000 since 1983. [Photo by George Eade]

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COVER IMAGE: THIS JUVENILE WHITE-TAILED KITE WILL LOSE ITS RUST-BROWN COLLAR SOMETIME NEXT SPRING. [PHOTO BY DAVE HARPER]

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*

Golden Gate and the Next Surge of Citizen Science

There is a great confluence happening in the environmental world. It is the melding of the time and talents of non-professional people with the needs of long-term, scientific data collection. It is happening in part because of access to the internet. But it is also rooted in the opportunity to participate in scientific investigation of the planet.

Some call it citizen science, insofar as we are all citizens of a mysterious planet with much to investigate. Others call it community science or public participation in science. It is easy to see that it has been around for as long as there have been humans. We are, according to UC Berkeley psychologist Alison Gopnik, testing the world and processing our results like scientists—from the time we are in the crib. Only in the last few hundred years did science become professionalized, decreed and degreed, and even then, some of the world's great scientists have been amateurs.

Why is this recognition of volunteers in science happening now? What brought about this coalescing, this new wave of weekend research by non-doctored, non-lab-coated people? I think it comes from many directions. Some of the most critical: 1) Never have so many people had so much access to great libraries of information through the internet; 2) Many people have the ability to record reliable data; for example, to photograph animals, plants, stars, and events with digital cameras and upload their records to databases with thousands of other like-minded nerds; 3) Science journalism—the translator of jargon, mathematical models, and statistical equations from Ph.D. to layperson—has never been better; and finally, 4) There is profound meaning in this work—personal and global. It touches the infinite.

As we get older, many of us yearn to know that we have contributed to this planet; per Mary Oliver's phrase, what will you do with your one and precious life? Contribution to science, to the planet, is in fact a spiritual journey.

In many national parks like the Golden Gate National Recreation Area, the National Park Service (NPS) staff hold up a standard for non-professionals (volunteers-in-parks) to participate in significant scientific work in the park: wildlife tracking, studying geological processes, intertidal monitoring, restoring native plant communities, and removing invasive species—to name a few.

Will Rose measures the curved length of a Redtail's wing with a wing ruler. [Photo by Jen Gale]

It is one thing for park founders to have waved a flag to show that Bay Area people deserve to have close access to an urban national park. It is a far deeper act to say that people deserve to have meaningful, long-term, valued work in their national park. It is deep in its bravery and its expense. Volunteers are expensive. But it is the natural tendency for all humans to deepen their connection to the landscape in which they live, and Golden Gate will always need to respond to such push and pull with the Bay Area community.

How do we create opportunities for increased community science and fully embraced volunteer work, without losing sight of the management goals that protect the park and its flora and fauna? How do we keep the local communities so connected to the goals for the NPS that our neighbors become our best supporters, our most responsible constituency, even our most invested colleagues? How do we create systems

for capturing the scientific services and results provided to us by skilled community scientists, from birders to botanists, geologists to sociologists? How do we better organize ourselves to anticipate and manage interest in community-driven science in the parklands?

A local urban national park is a particularly perfect vehicle for engaging citizen scientists. The motivation to volunteer one's time—the fire that lights the interest—is often not global, nor even regional; it is local. People volunteer because they form a connection with something in their backyard, even their watershed.

This is the scale of the Golden Gate National Parks. It is the neighborhood. Ours is the perfect landscape for seeing broad-scale community science as a critical strategy toward future park management. And this is the perfect time.

I do not say that last part lightly. If there is not a critical scientific mission to be served, there should not be a community science approach. There must be a long list of considerations before starting a community science project: what is the value of the data, urgency of the data, connection to other projects, suitability to volunteer skills and style, funding and fundability, availability of volunteers, staff capacity to monitor and train and evaluate volunteers and their data. The list goes on and on.

The staff of many of our parklands and public lands must decide soon how they might receive, or not receive, more community volunteers working at a much greater level of involvement than we have seen in past decades.

I believe we are about to see an explosion of interest in the national parks, a tidal force of community volunteerism that will greatly challenge our budgets. Perhaps we can create systems now that might allow us to be organized and ready. The great thing here is that these community scientists are the same people who will most fervently visit, and vote for the preservation of national parks. Their passion for service, and our ability to incorporate that passion, will keep the national parks relevant into the future.

Though recently obsessed with dragonflies, GGRO Director Allen Fish starts his 32nd migration season in the Marin Headlands in 2016.

GGRO ANNOUNCEMENTS *Allen Fish*

THE RAPTOR RESEARCH FOUNDATION CONFERENCE

Thirty-three years ago last November, I was tossed in the back of a van with duffels and a handful of other UC Davis undergrads. Terry Schulz and John Aikin, co-instigators, delivered us to Salt Lake City for the 1982 Raptor Research Foundation (RRF) conference.

I'd never been to a scientific conference but the next few days were nothing less than exciting, as I heard talks from leaders in raptor biology: Clayton White, Tom Cade, Joe Hickey, Noel and Helen Snyder, Steve Herman, Fran Hamerstrom. Like the bibliography from a great raptor book.

It'd always been in my head to gather a RRF conference in the San Francisco Bay Area, but I waited too long, and prices skyrocketed in the past decade. But what about Sacramento?

Last November's RRF meeting in Sacramento was a tremendous success with some 450 raptor biologists, naturalists, and aficionados gathered to hear about the biology of Golden Eagles, raptors and climate change, the impacts of wind turbines on birds of prey, the ecology of island raptors, and dozens of other topics—rat poison impacts, the use of drones to study nests, and the use of satellites and cell phones to study migrations.

Success of the five-day program rested squarely on the shoulders of more than three dozen GGRO volunteers and staff that moved mountains, particularly the executive team of Laura Young, Kris Vanesky, Chris Briggs, Christine Cariño, and Candace Renger. We were bolstered by the Parks Conservancy staff who taught us tons about accounting and by the RRF board and leaders who organized the scientific programs.

Thanks to all who stepped forward to help, and to our great donors, particularly the volunteers and donors of GGRO, and the Greg Hind Endowment. You made this event possible, and I got to fulfill a dream. Together we celebrated a half-century of research on, and conservation of, wild birds of prey.

For information on joining the Raptor Research Foundation yourself, check out the RRF website at *raptorresearchfoundation.org*. It costs about 80 cents a week.

[Logo illustration by Lynn Bantley, design by Bill Prochnow]

A panoramic view of the Madison Peregrine Symposium Reunion at the RRF Conference in Sacramento. [Photo by Allen Fish]

STAFF CHANGES

Dr. Christopher Briggs announced his departure from GGRO after four years as our Research Director. It is all for good, however; Chris followed his wife Dr. Cynthia Downs to a terrific professorship at Hamilton College in New York State, where Chris will also be a lecturer while he makes his next plans.

Chris joined GGRO as research director in 2012, just as our founding banding and research director Buzz Hull was retiring after nearly three decades. The transition was smooth, as it should have been, since Buzz had hired Chris once before to be our 2000 GGRO RoboLure Intern. Chris was 20 then, taking a break from his undergrad career at Virginia Tech, and we took a risk on a youngish intern, enthusiastic and ready to learn about birds of prey.

Chris brought GSM tracking technology to GGRO. He prepared the GGRO's first IACUC, and compiled a new research prospectus for our coming decade. Chris reminded me what statistics were (no small feat), and started a tradition of inviting GGRO interns to his home once a month to review the statistics in scientific articles. Chris's commitment to the GGRO has never wavered, and as a source of professionalism, scientific rigor, and deep commitment to citizen science, we are sorry to lose him.

But in May 2016, we welcomed two new staff in two new positions. Teresa Ely will be our Banding Manager, and Step Wilson will be our Hawkwatch Manager, while also overseeing our outreach work and Telemetry studies.

Teresa Ely and Step Wilson

Teresa Ely herself was one of GGRO's interns back in 2008, and has since carved out a career as a travelling raptor biologist with great experiences in migration studies, Veracruz among them. She earned her Master's degree at the University of Nebraska this year.

Step Wilson previously served GGRO as a volunteer bander back in the 1990s, then took a break to do raptor field studies across the U.S.—with international stops in Israel and Mexico, as well. Please introduce yourself to Teresa and Step when you cross paths, and from all of us, a hearty welcome to our new staff members.

SCIENTIFIC CONTRIBUTIONS

As might be expected, hosting the Raptor Research Foundation's 49th conference in November 2015 took much of our time last year, but we also kept up on scientific presentations at some key conferences. Great thanks to our authors, especially Teresa, Tony, and Kris.

FISH, AM. February 2015. *Does citizen science conceal an important dichotomy between crowd-sourced and place-based science? Preliminary results from the citizen point-of-view*. Poster. Inaugural Conference of the Citizen Science Association, San Jose, CA.

VANESKY, K, P PARKER-SHAMES, & CW BRIGGS. April 2015. *Hematology and body condition in migrating Red-tailed Hawks.* Poster. Research in the National Parks Symposium, NPS. San Francisco, CA.

FISH, AM. April 2015. *Beyond apples and oranges—shining light on the rift between crowd-sourced community science and place-based community science.* Presentation. Research in the National Parks Symposium, NPS. San Francisco, CA.

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FISH, AM, CW BRIGGS, LF JESUS, JM HULL, & AC HULL. June 2015. *Three decades of scientific results from the citizen scientists at California's largest raptor migration site.* Presentation. American Association for the Advancement of Science. San Francisco, CA.

BRAKE, AJ, HC WILSON, RV PERICOLI, & AM FISH. November 2015. *A recently expanding Osprey nesting population in industrialized locations of San Francisco Bay.* Poster. Raptor Research Foundation. Sacramento, CA.

ELY, TE, CW BRIGGS, SE HAWKS, GS KALTENECKER, AND JP DELONG. November 2015. *Assessing body condition from migrating American Kestrels as a potential cause of a long-term decline.* Presentation. Raptor Research Foundation. Sacramento, CA.

Doing field research is a lot like planting very small fruit trees for eventual harvest. Lots of things need to go right—water, temps, soil, sun, bugs—and, years later, you eat plums! Conducting wild bird research has some similar aspects, and we have been fortunate to work with Dr. Joshua Hull, adjunct professor at UC Davis, as he guides students through their graduate research in raptor biology.

Kat Tomalty has just completed her Ph.D. work including chapters on the differential timing of Red-tailed Hawk migration at the Golden Gate, and a "10 years later" update of the initial West Nile virus impact on various raptors.

Three other graduate students are in the early stages of their research. Emily Abernathy, former GGRO intern, will be working with Josh and GGRO on rodenticide impacts on raptors. Breanna Martinico will focus on population-level differences between rural and urban Cooper's Hawks, while Ryan Bourbour is attempting to detect prey species for Merlins and Sharp-shinned Hawks, conducting DNA analysis of the debris swabbed from the beaks of these largely bird-eating raptors. Both Breanna and Ryan are veterans of the GGRO's sister program, the Belize Raptor Research Institute.

RESEARCH NOTE *Chris Briggs*

Where Have Golden Gate Raptors Nested?

For several decades, wildlife biologist Pete Bloom has been tracking—via banding and telemetry—Red-tailed Hawks breeding in southern California. He's found that in the summer after nestlings fledge, many birds move north, returning south again in late winter. For years, we've been waiting to see some evidence of one of these north-bound migrants at GGRO—or at least evidence of one moving back south again.

How would we even tell a southern California bird from a more northerly bird that happens to better follow our "traditional" view of migration? This, of course, leads to perhaps one of the most-often asked questions from members of the public, our volunteers, and anyone curious about bird migration at the Golden Gate: where do "our" birds come from?

Thanks to band recoveries, we have an idea of where a very small proportion—around 0.3%—of our migrants end up. For a miniscule percentage we even know how they got there using telemetry technologies. But this still doesn't help us answer the question, "Where do they come from?"

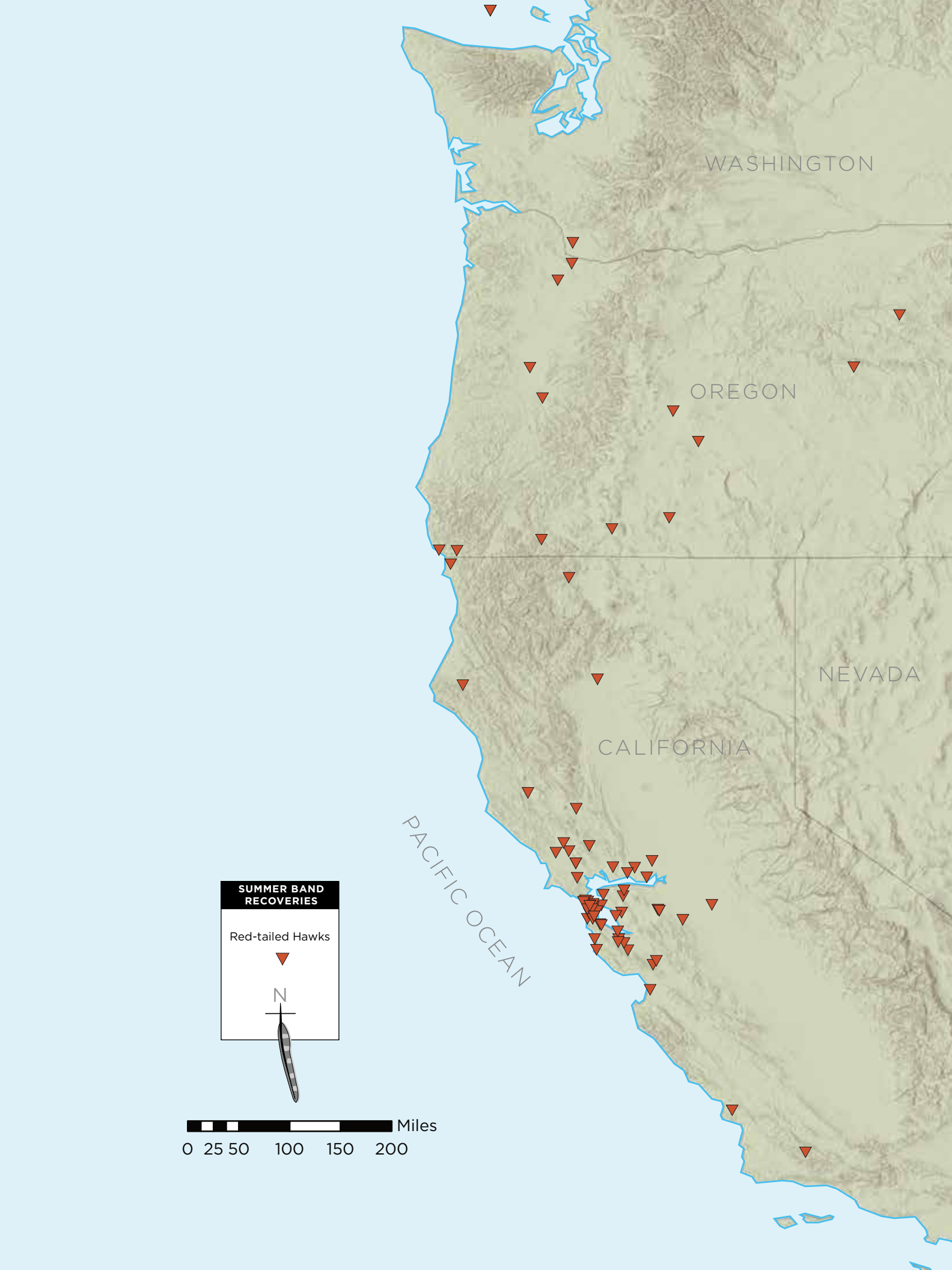
WAITING FOR BANDED HAWKS

The most definitive way to know would be by banding and telemetry of breeding and nestling birds from across western North America, to see which ones come through the Marin Headlands. And indeed, we do on rare occasion get recaptures of birds first banded elsewhere.

Just last year we trapped an American Kestrel banded as a nestling outside of Fairbanks, Alaska. In 2012, we trapped a Swainson's Hawk that was originally banded in the nest outside of Tulelake, California. And in 2007 we trapped a Redtail banded earlier that year as a nestling in Riverside County. But a handful of encounters of individuals banded as nestlings don't quite add up to a complete picture of where Golden Gate migrants come from.

Alternatively, Josh Hull used genetics to determine that from August through around October 15 ("first-peak"), most Redtails migrating through the Marin Headlands come from the central California area. After October 15 ("second-peak"), most seem to be from the Great Basin.

But each of those geographic descriptions covers a pretty broad range. The Great Basin encompasses over 200,000 square miles—most of Nevada, large portions of Oregon and Utah, and small portions of California and Idaho. Are our sec-


WASHINGTON
OREGON
NEVADA
CALIFORNIA
PACIFIC OCEAN
SUMMER BAND RECOVERIES
Red-tailed Hawks
N
Miles
0 25 50 100 150 200

ond-peak Redtails really a mix of birds from that entire range? What about central California? This doesn't even begin to get at other species.

To make progress on this question, I'd like to start with the simplest approach, but one that requires an inferential leap of faith (backed with data, of course!). When we look at literature from raptors, we find that they tend to nest near where they fledge, often within five to 30 miles (though there are many exceptions).

For example, Pete Bloom found that Redtails moved on average <13 miles in southern California. Studies on other species largely agree that diurnal raptors end up breeding near where they hatched.

Many of the Golden Gate Red-tailed Hawks seen in November arrive from nests of the Great Basin or parts north. [Photo by Mary Malec]

BACK TO THE BIRD BANDING LAB

Usually these studies are contained—they have a study area and they don't monitor birds that may move outside that range—which means there could be some bias. Can these data be trusted?

To look at this question, I requested data from the Bird Banding Lab for two species: Red-tailed and Cooper's Hawks. I started with birds banded as nestlings so we would know where they hatched. Next I weeded out birds that died before reaching breeding age, birds recovered outside the breeding season, and birds that had been dead for a while (e.g., "skeletal remains only"), since the recovery location may have been an overwintering or migration area.

This should leave only birds that were likely trying to breed when they were recovered. When we look at each of these species the average movements between where an individual fledged and where they breed is fairly small. Taking our inferential leap, we can surmise that individuals that we've banded at GGRO, that meet the same criteria outlined above (of breeding age, recovered during breeding season, seen alive or freshly dead), are likely to be within some relatively small distance of their natal territory.

Banding—or perhaps more precisely, encounters of banded birds—is a numbers game. So let's break down some numbers: of over 39,000 birds banded at GGRO since 1983, we have encounters for almost 1,400 individuals. Among our data, we really only have enough information for Red-tailed Hawks and Cooper's Hawks to make any broad statements, so I will focus on those two species—leaving the others to more complex (and potentially more ambiguous) analyses for another day.

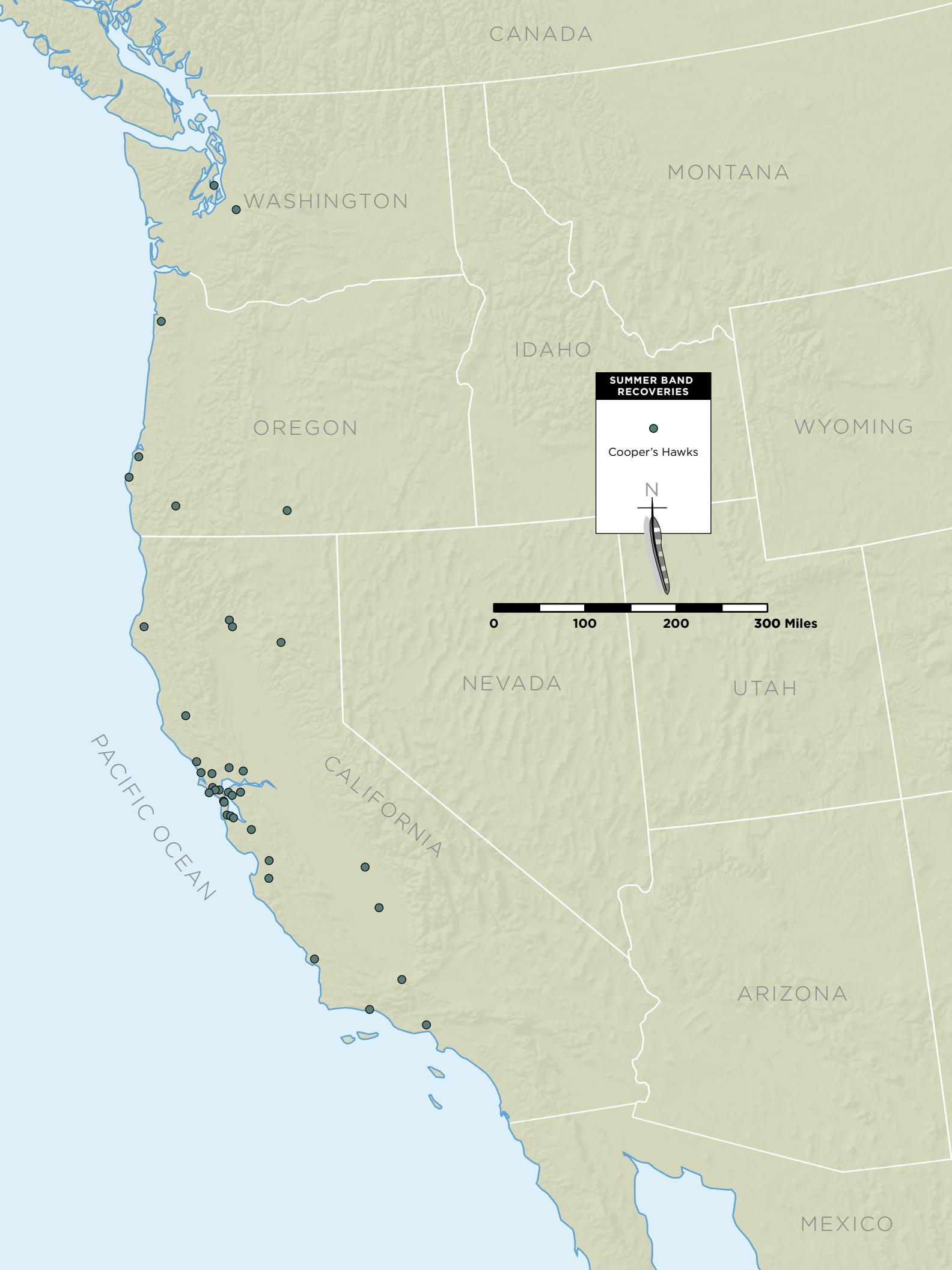
RED-TAILED HAWKS

Of the 77 individuals that met our criteria to be likely breeders, none came from southern California (Map, page 5). Thus, southern Californian post-fledgling birds don't seem to make up a significant portion of our migrants. Instead, our migrants come largely from the greater Bay Area and coastal areas to the north. There is also a smattering of recoveries from the Great Basin in eastern Oregon, but not farther east.

Some of the GSM (satellite telemetry) data demonstrate that the mountain pass northeast of Redding may be a common place for hawks to cross from the Central Valley to the Great Basin, which provides an explanation for why we see Redtails from north of there rather than from central Nevada. Birds farther east or south don't have good opportunities to both cross the Cascades or Sierra Nevada and make it to the Pacific Coast. In contrast, birds from eastern Oregon that use the Cascades to migrate may find the pass and use it to try to find suitable wintering areas.

While the probability of encounters of our Great Basin Redtails is much lower than their Bay Area counterparts, the results shown here are at least suggestive. Golden Gate Red-tailed Hawks caught in November more often come from the Great Basin ($P < 0.05$) and farther north ($P < 0.005$). On average these second-peak Redtails travel over 17 miles (27 kilometers) farther north than first-peak Redtails.

I found only six encounters of Redtails originally banded as adults that met our criteria, with four in the Marin Peninsula and the other two farther north along the coast. So despite more adults showing up in the second peak, it may be that


CANADA
WASHINGTON
MONTANA
IDAHO
OREGON
WYOMING
NEVADA
UTAH
CALIFORNIA
ARIZONA
MEXICO
PACIFIC OCEAN
SUMMER BAND RECOVERIES
Cooper's Hawks
N
0
100
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adults are not necessarily more likely to come from the Great Basin population. However, six recoveries are insufficient data from which to draw sweeping generalizations.

COOPER'S HAWKS

Cooper's Hawks come to GGRO from throughout California and western Oregon and Washington (Map, page 7). However, most individuals seem to come from west of the Sierra or Cascades. There are fewer individuals that would be defined as being from the Bay Area, and proportionally more from areas to the north and the south. Of the 45 individuals that met the criteria, almost half wouldn't be considered "local" (i.e., from the Sacramento Delta south to Half Moon Bay).

There was a single recovery from Baja California. I don't believe this is an accurate location for a breeding Cooper's Hawk (since the species infrequently nests in the region) so I erased that dot. This does stress however that our definition of breeders using band recoveries may not without its flaws or limitations. I could further refine this technique in another analysis, limiting it to older adults, or narrowing the dates of the breeding season. Birds from later in the season tended to come from further north (P = 0.02). Interestingly, this relationship becomes stronger when the Baja outlier is removed, suggesting a fairly robust trend. Perhaps it isn't surprising that birds that show up later likely migrated farther; certainly this is true of our Redtail population.

We can speculate about what we don't know—for example, how many of our Cooper's Hawks come from the Sierra Nevada? They would be unlikely to be located by someone in the densely forested landscapes where they would breed. But the data we have suggest that we are mostly seeing Cooper's Hawks from coastal areas to the north.

A good portion of the Cooper's Hawks seen at the Golden Gate seem to come from nests west of the Sierra Nevada and Cascades. [Photo by Mary Malec]

CONCLUSIONS

Unsurprisingly, there are disparate results between Cooper's and Red-tailed Hawks. Species with such different ecological needs should have different patterns, highlighting that our other migrants will each have their own story to tell—in due time. There seems to be some degree of temporal segregation between more northern populations and southern populations. Does that mean they winter in different areas as well?

Our picture is still incomplete, thanks to limited recoveries in areas where people don't go, and for species too small to find regularly—such as American Kestrels. Does this mean banding as a practice should be tossed aside? Not at all.

Banding for the sole purpose of waiting for recoveries and recaptures is probably not fruitful for many of the species we see. Fortunately, that is not our sole endeavor at GGRO anymore. Band recoveries are interesting in the aggregate; they provide great insight into movements and wintering areas, but are only a part of the whole. Genetics, isotopes, prey analyses, and contaminants are where we need to keep moving to answer big questions about the ecology and conservation needs of these birds.

Author Note: After almost four years as the Research Director at GGRO, I will be leaving to join my wife at Hamilton College in central New York. It has been educational and rewarding to help lead the sterling group of citizen scientists at GGRO. To gain their enthusiasm and energy in the hopes of learning and preserving some part of California's natural heritage has been a privilege. The thoughtfulness, talent, and competence of the volunteers as scientists have been impressive and inspiring. I hope I can take some of the lessons I have learned here to New York. —CB

IDENTIFICATION FOCUS *Allen Fish*

Three Tails for the Juvenile Broadwing

Illustrations by Anna Stunkel

This story starts a few years ago. I was standing on Hawk Hill overlooking the Golden Gate in late September with some GGRO hawk counters. We were having a good Broad-winged Hawk day. (Yes, in California. That means more than 10 in a day.) Lots of Broadwings near each other, some even grouped in twos and threes. "Look at those tails," I said. "A juvenile right next to an adult!"

Indeed, the juvenile had fine, barely visible bands spanning the width of the tail (classic juvenile, Fig. 1), while the adult had one bold band in the center of the tail, dark bands above and below. But then I looked again, and the "adult" had vertical, streaky marks on the breast—in other words, juvenile-type breast marks. An adult Broadwing should have rusty barring (horizontal marks) across the light breast (classic adult, Fig. 2). What gives?

Maybe that bold-banded Broadwing was a partially molted adult? Maybe it was an aberrant juvenile plumage of some kind? I was thinking about this for a few days when George Eade showed me his photos of that same Broadwing day.

George got side-by-side shots of those two birds. *Both* had streaky breasts, but one had about six thin tail bands, the other three adult-looking (thick) tail bands. Looking closer, I could see other juvenile traits on both birds: lightly marked trailing edges on the wings, and squarish windows in the primaries—both marks for juvenile Broadwings, as they are for juvenile Redtails. These were both juvenile Broadwings.

CYBER-BIRDING ON GOOGLE IMAGES

That's when my interest piqued. I went to Google Images and searched on "juvenile Broad-winged Hawk in flight." I lined up about two dozen ventral views, and then it was clear: there are at least two tail types among juvenile Broadwings. One type had five to eight equal, thin bands except for the outer-most (subterminal) dark band (across all tail-feathers), which was about two times larger than the others (see Fig. 1).

The alternate tail type had the same marking as above on the outer two tail feathers (what a bird bander would call the number sixes) but the middle 10 feathers (ones through fives) were fundamentally different. They showed two very bold dark bands above and below a prominent light band. In other words, they were adult-like. But only on the central 10 tail feathers (Fig. 3)!

Part of this outcome is no great surprise for advanced raptor identification readers; in many birds of prey, the outer two tail feathers have a slightly different pattern than the central 10 feathers (the different pattern may give structural support to the outer feathers in the face of the weird wind and airflow at that location).

This shows up on accipiters, which often have an extra dark band on juvenile outer tail feathers, plus the bands are out of alignment with those on the inner 10 feathers.

But something else is going on in juvenile Broadwings. I started looking online for pictures of juvenile Broad-winged Hawks in flight. Some had 10 thick-banded tail feathers in the center. Others had only six thick-banded tail feathers (Fig. 4). Some had eight. I also found dark morph juvenile photos with the full range of juvenile tail types.

Of 50 juvenile Broad-winged Hawk photos I analyzed, 40 had narrow tail bands (Fig. 1), seven had bold bands (Fig. 3), and three had bold bands in the center tail feathers with at least two pairs of narrows on the outers (Fig. 4).

CHECKING BROADWINGS IN THE FIELD

A few years ago, I asked GGRO hawkwatchers to help me count the number of narrow-band vs. bold-band juvenile Broadwings from Hawk Hill. The survey mostly bombed. Most of

the hawks were just too high up to detect the difference.

WHAT DO THE FIELD GUIDES SAY?

What do Sibley, Clark, Wheeler, Dunne, and Liguori say about juvenile Broadwing tails? Do they talk about these broad-band adult-like tails on juveniles? How had I missed this problem of two juvenile Broadwing tail types? I started flipping pages, focusing on the ventral views of juvenile tails.

Many guides make reference to juvenile Broadwings' "indistinct" and "variable" bands, often combined with a dark subterminal band. And this is the true hawk-watchers' view at many of the eastern and Texas migration sites. But bring the birds closer to earth and you get some better looks and better descriptions.

Turns out there are a lot of great descriptions, if one reads carefully. The earliest I could find was in Clark and Wheeler (2000) on page 190: "The tail below is creamy with dark brown bands, sub-terminal band widest; some individuals show an accipiter-like pattern of equal-width dark and light bands."

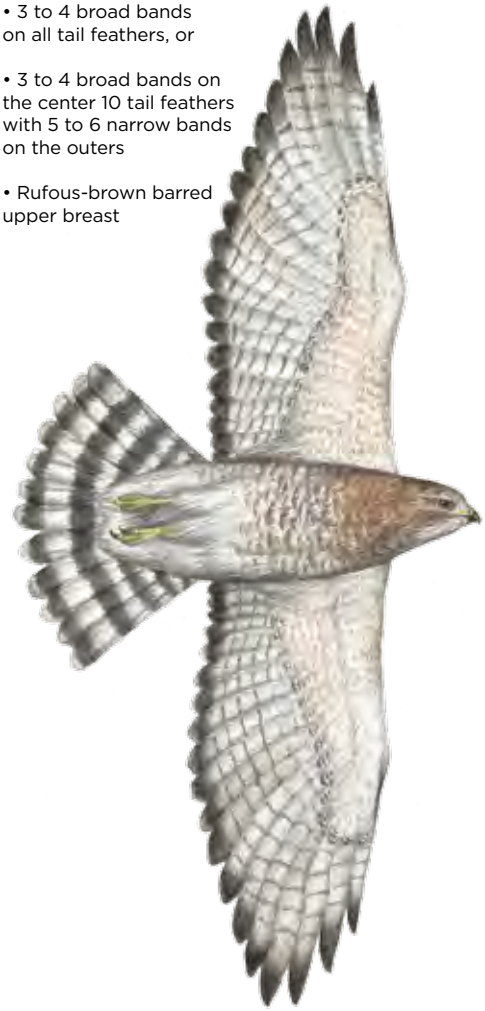
Brian Wheeler paints one of each type juvenile tail on Plate 18. [M] is narrow; [N] is broad. Wheeler's *Western Guide* (2003) is even more to the point, referencing "two major types of tail banding" and specifying a narrow-banding type (page 258; plate 261) versus a bold-banding type (plate 262), each with a prominent sub-terminal band.

FIGURE 1: TYPICAL JUVENILE

- 6 to 8 fine bands on all tail feathers
- One thick subterminal band
- Streaky or spotty upper breast

FIGURE 2: TYPICAL ADULT

- 3 to 4 broad bands on all tail feathers, or
- 3 to 4 broad bands on the center 10 tail feathers with 5 to 6 narrow bands on the outers
- Rufous-brown barred upper breast



But then I looked again, and the "adult" had vertical, streaky marks on the breast—in other words, juvenile-type breast marks. An adult Broadwing should have rusty barring (horizontal marks) across the light breast (classic adult, Fig. 2)**. What gives?**

Jerry Liguori summarizes the reality of Broad-winged Hawk tail marks in *Hawks at a Distance* (2011; page 51): "The underside of the tail is pale with a dark sub-terminal band which is the only band visible in the field. A few juveniles show a boldly-banded tail that appears identical to those of adults, but they lack other adult traits, like a dark trailing edge to the wings or rufous underbody."

If I had read Jerry's perfectly scripted line when I first came across this problem of juvenile Broad-winged Hawk tail types, I might not have tried to "CSI" this situation. And in doing so, I just learned one more thing—that sometimes (4% according to my cyber-sampling above) the bold-banded juvenile tail only extends across six or eight tail-feathers in the center of the tail, and the remaining outers are narrow-banded.

I started to work on other questions as well: 1) Is tail boldness tied to dark morphism? Likely not, at least not the dark morphs we checked at Golden Gate; 2) Could boldness be found in certain nesting ranges? Perhaps, but no data exists for this; and, 3) Would tail type proportions on Google Images hold true at a big Broadwing site like Cape May New Jersey, Hazel Bazemore down in Texas, or Veracruz? Maybe; there's always more work to be done.

My thanks to my predecessors and colleagues, and remember: Read your bird books!

FIGURE 3: "BOLD BAND" JUVENILE

- 3 to 4 broad bands on the center 10 tail feathers with 5 to 8 narrow bands on the outers
- Subterminal band often broadest in center tail feathers
- Streaky or spotty upper breast

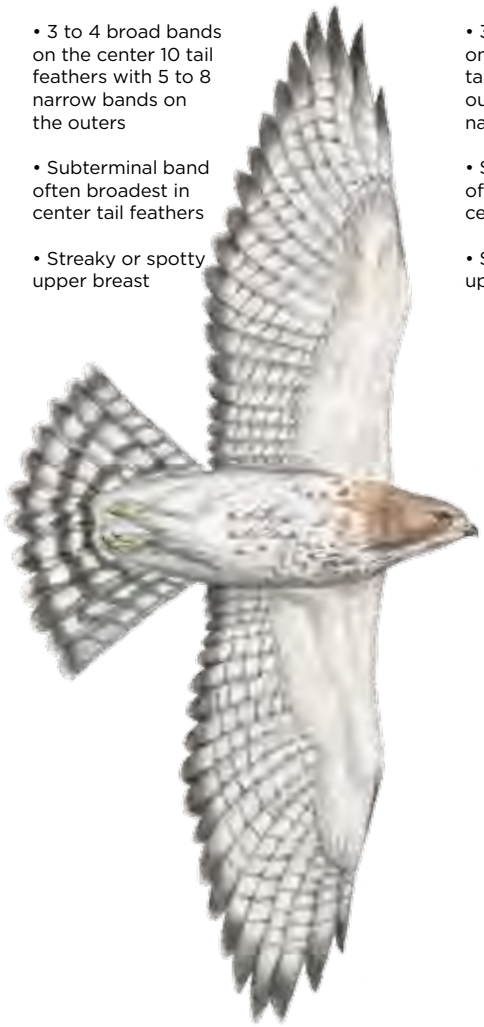
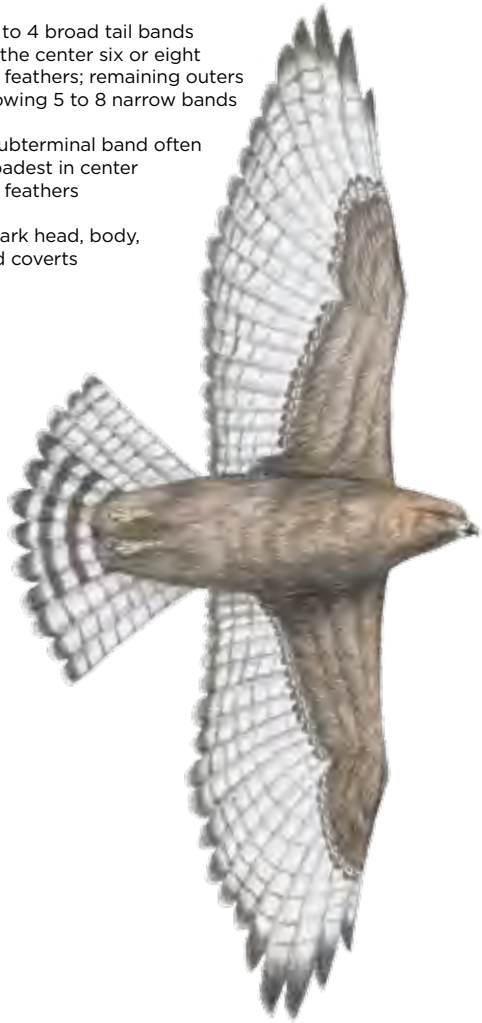


FIGURE 4: "CENTER BOLD" JUVENILE

- 3 to 4 broad bands on the center six or eight tail feathers; remaining outers showing 5 to 8 narrow bands
- Subterminal band often broadest in center tail feathers
- Streaky or spotty upper breast

FIGURE 5: "CENTER BOLD" DARK MORPH JUVENILE

- 3 to 4 broad tail bands on the center six or eight tail feathers; remaining outers showing 5 to 8 narrow bands
- Subterminal band often broadest in center tail feathers
- Dark head, body, and coverts



HAWKWATCH 2015 *Holly Thomas*

Why We Watch

There were nearly 200 of us on the 2015 Hawkwatch roster, plus a number of irregular counters. Each of us brought unique experiences, skills, motivations, and interpretations to our common task. Each of the 14 rotating teams encountered different weathers, events, and birds. And—if we were doing our jobs—each of us was looking, at any given moment, in a different direction from the rest of our team.

The 2015 season was my fifth as a volunteer, so I am more than an apprentice but less than an expert. I believe that I work harder than the average volunteer at acquiring the skills and experiences that allow me to appreciate the pageant of migration.

Also, I confess that one of my pastimes has been to observe my fellow hawkwatchers, both individually and as a community. Although we are a diverse lot, it is clear that we share many reasons for our participation in this program.

Naturally, we share support for the missions of GGRO, one of which is to promote the conservation of raptors by collecting data of their movements around Hawk Hill. But I don't believe that this explains why most of us hawkwatchers are *really* there.

Considered only as data, numbers of Ferruginous Hawks or American Kestrels are simply interesting or alarming statistics. In fact, the data that we collect is a lot like a message that we stuff into a bottle and throw into the ocean. We hope that *someone* will retrieve it, and that *someone* will then *do* something—what?—to fix the things that we fear are wrong with the world as a habitat for raptors. That hope, though fervent, strikes me as too tenuous, and too detached from our passions and experiences, to explain the work and time that we devote to the practice of watching hawks.

What's more, I find that I have *no* passion for collecting data as such. Do any of us? I found no entries in this year's hawkwatch journal or blog expressing warm satisfaction with the quadrant system, or enthusiasm for the accuracy of the data collected. No one wrote of the rewards of keeping the datasheet.

For most of us, the rewards of hawkwatching are very different from whatever satisfactions may be derived from the dispassionate collection of data. In fact, what is most obvious to anyone who observes us is that we share a relish for the practice of watching raptors—as a game or competitive sport.

The South Quadrant spotter pulls a high Peregrine from the western sky, while West Quadrant scopes the Tamalpais ridgeline. [Photo by Nelia White]

The expressions of this competition range from the subtle to the blatant. We keep score of numbers of birds and species; the teams with the highest daily scores are recognized at our annual banquet. Any team member who is first to make challenging calls of distant or difficult birds gains status among us—and perhaps resentment from would-be competitors. When Hawk Hill's North Quadrant is crowded with experts (real or pretend), and the sky is full of interesting birds, one

can almost smell the testosterone in the air.

In short, hawkwatching is addictive because "winning" requires a combination of dedication, intelligence, good luck, and hard-earned skill. In this, it resembles poker, or football, or any number of other games. What's more, the strategies for winning—whether this means improving the day's "score," or impressing one's fellow hawkwatchers—can include bluffing.

I recall remarking to Tim Behr that a hawkwatcher can make *any* call, as long as he or she makes it with unshakeable confidence, and the sighting is so distant or so brief that others cannot contradict it. Tim's response was to chuckle, and note that the ploy works best when the person making the ID has an expensive spotting-scope.

I am not immune to the charms of competition. Any day when my team spots a rarity is rewarding for the whole team. Any day when I first spot and then identify a rarity is doubly rewarding for me personally.

Yet what mainly brought me to Hawk Hill during the 2015 season was the sheer spectacle: the wonder of our Redtails as they rode the air with ease, the thrill of our Sharpies as they shot by like windblown leaves, the drama of our Merlins as they casually harassed their fellow migrants.

For many of us, Ferruginous Hawks held center stage during the past season. For a while, the sight of one or more of these majestic birds—*Buteo regalis* indeed—was a daily occurrence. A journal entry from September 23 says it well:

"…[N]othing quite beats the luxurious flight of a Ferrug. in perfect light who, having captured the rapt attention of all on the Hill, conjured up a partner for everyone's enjoyment."

This season also had its disappointments. Most of us (all but those present on November 17) deplored the absence of Rough-legged Hawks, birds that we cherish on account of the beauty of their markings and the graceful buoyancy of their flight.

For me, however, this was a season of Northern Goshawks. I was absent on November 25, when banders caught and released a juvenile male. Nonetheless, I believe (with reasonable but not absolute certainty) that I saw two of these birds this season.

The first time was after counting hours, on October 12. It had been a very slow day, with a hot and windless afternoon. Since it was not one of my regular days, I stayed after the team left. I felt lazy; I didn't wish to brave the freeway until traffic might be lighter. Any hope that I might see something remarkable was slim.

Although the wind soon freshened, there were few birds to be seen. So I was pleased to spot what I took to be a distant Cooper's Hawk flying straight toward Hawk Hill from the direction of Mt. Tam. I thought to myself how nice it was to see accipiter wing beats that could not *possibly* be mistaken for those of a Sharpie. Still in a daze from the day's heat, I watched idly as the bird approached. It was, after all, the only show around.

And then, it flew overhead and wheeled east and then north. It was like having a bucket of cold water splashed over me. During those few crucial seconds, it just looked too big, and heavy, and bulky to be a Cooper's Hawk. My internal pattern-matching software turned on the flashing amber light that said "Northern Goshawk!" with a conviction that was both unexpected and entirely involuntary.

Alas, I did not see any of the details that could have ruled out the possibility of a short-circuit in my own neurons. I saw no spotted under-tail coverts, or white eyebrow; the bird was not quite close enough, or the angle was wrong, for those field marks. After the epiphany,

RAPTOR-SIGHTINGS IN THE MARIN HEADLANDS DURING 2015

	2015 Season (540 Hours)		Past 10-Year Average 2003-2014** (489 Hours)	
	Sightings	RpH	Sightings	RpH
Turkey Vulture	9,692	17.95	8,434	17.25
Osprey	83	0.15	93	0.19
White-tailed Kite	36	0.07	97	0.20
Bald Eagle	8	0.01	6	0.01
Northern Harrier	442	0.82	618	1.26
Sharp-shinned Hawk	4,652	8.61	3,945	8.07
Cooper's Hawk	3,106	5.75	2,435	4.98
Northern Goshawk	2	<0.01	1	<0.01
Red-shouldered Hawk	574	1.06	463	0.95
Broad-winged Hawk	344	0.64	215	0.44
Swainson's Hawk	6	0.01	7	0.01
Red-tailed Hawk	10,017	18.55	8,947	18.30
Ferruginous Hawk	73	0.14	21	0.04
Rough-legged Hawk	1	<0.01	6	0.01
Golden Eagle	18	0.03	19	0.04
American Kestrel	297	0.55	482	0.99
Merlin	257	0.48	178	0.36
Peregrine Falcon	225	0.42	237	0.48
Prairie Falcon	6	0.01	6	0.01
Unidentified	1,381	2.56	1,211	2.48
Total	**31,220**	**57.81**	**27,423**	**56.08**

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

RpH = Raptors Per Hour

the increasingly distant bird was either going-away or wing-on. All I could confirm was that it was big, and had more pointed wings than I would expect on a Cooper's Hawk.

In short, my conviction that I had seen a Northern Goshawk was completely based on its "Giz" during a few seconds' view. E-bird would have laughed at me. But, looking back, I still remain (mostly) convinced that I saw a Goshawk.

The second sighting was on November 27, the season's last day for the Friday 1 team. Unlike my first sighting, this one was not unexpected. It was only two days after the capture of the juvenile Gos, so we had hopes that this bird might still be around.

My first sight of the bird that we identified as a Goshawk was in the south quadrant. I screamed something like, "Take a look at this accipiter!"—deliberately resisting the temptation to yell "Goshawk!" because I wanted the whole team to see the bird and exercise its collective judgment. Not that it mattered. The team knew exactly what I was thinking.

The team judged that it was indeed a juvenile Northern Goshawk. In the discussion that followed, it became clear that each of us had focused on, and been persuaded by, different characteristics. What I took to be especially telling was the fact that, on a blustery morning when the Sharpies had been blowing about, seemingly quite out of their own control, this large accipiter, with pointed wings and a slow wing-beat, had been as stable in the air as any Redtail.

My pleasure in the spectacle of migration becomes greater every year. Three years ago, I could not have seen these two special birds as anything but large Cooper's Hawks. The fact that we learn to be cultivated spectators is, I suspect, what brings us the deepest satisfaction.

Recognizing a bird—not just seeing it—is, for me, the expression of a relationship between me and the bird, just as recognizing a friend on the street expresses a relationship between me and the friend. The hawk, of course, is aware of no such relationship.

Paradoxically, the very independence and separateness of the hawk from me—the fact that it does not share my point of view—is what makes the connection profound. The hawk has its own point of view, which I cannot pretend to imagine. I have no idea of what it's like to be a hawk.

As a consequence, whenever I perceive, identify, recognize a hawk, I touch something that transcends my own existence.

Professor, attorney, and investigator by profession, Holly Thomas jumped into the GGRO Hawkwatch with both talons in 2011. Her enthusiasm for learning new birds has resulted in her writing a summary of her raptor ID learning tricks, called Holly's Tips.

BUG COUNT 2015 *Natasha Lekach*

Odes and Lepidopts, Year 2

In 2015, we conducted our second season of bug counting during the Hawkwatch. Bug counts were done on 56 days, for a total of about 304 hours, throughout the fall season.

We noted 186 dragonfly sightings during the season; 65% of the sightings consisted of Variegated Meadowhawks, Black Saddlebags, and Green Darners. We also spotted Cardinal Meadowhawks, Red Saddlebags, Spot-winged Gliders, 12-spotted Skimmers, Flame Skimmers, and members of the Blue Darner group. The largest flurries of dragonflies occurred in early September, one month earlier than in 2014, with 62 sightings on the busiest day.

Bug-watchers also tallied 851 butterfly sightings during the same 56 days on Hawk Hill. Pipevine and Anise Swallowtail sightings comprised 44% of the count, while in 2014 they made up about 10%. Both of these species dwindled toward the end of the season.

Though counters consistently spotted many Monarchs during the season, the rate of Monarch sightings dropped from last year's count. Paralleling the dragonflies, the butterfly peak occurred in early September (a month earlier than the 2014 butterfly peak), with 56 on the busiest day.

Hawk Hill's most common dragonfly in the autumn is the Variegated Meadowhawk, a friendly odonatan that often perches on the coyote brush. [Photo by Mike Hall]

HAWKS ON THE MOVE *Natasha Lekach and Elan Carnahan*

Bringing City Kids to Hawk Hill

This year, hawkwatchers weren't the only ones screaming, "Accipiter!," "Buteo!," or "Falcon!," when a raptor flew overhead. These exclamations also burst from the mouths of 181 fourth-grade students who visited Hawk Hill during the inaugural *Hawks on the Move* program. Bringing eight classrooms of San Francisco Unified School District students to Hawk Hill was no small feat; it took over a year of collaboration, hard work, and wonderful generosity to make this new program possible.

In February 2014, long-time GGRO bander Jennie Rhine passed away after a long fight with Alzheimer's disease. Outside of the blind, Jennie spent her career as Judge Rhine in U.S. Superior Court, fighting for social justice for Native Americans, and people of urban and rural communities. After her passing, her husband, Tom Meyer, met with park staff members to create a way to honor Jennie's work and her love of hawks. These early discussions created the idea for *Hawks on the Move*.

Starting in July 2015, we began meeting with seven staff members from the Crissy Field Center (CFC) and the National Park Service (NPS) Interpretation Team to collaborate on developing a program to bring students from San Francisco Title I schools to Hawk Hill. Title I schools have at least 40% of their students from low-income households.

After multiple brainstorming and curriculum-writing meetings, many emails back and forth, and several training days, the six CFC educators, two NPS interpreters, and two GGRO interns were ready to bring the *Hawks on the Move* curriculum to life. We invited the students to start thinking about our essential question: "Why do things move?" We strove not to just spark an interest in raptors, but to stimulate discussions and a personal connection with the phenomenon of migration.

For each class, we visited the schools a few days before the students took their field trip to Hawk Hill. In their classroom, students participated in hands-on exploration of raptor parts and Bay Area topography in order to explore the natural world's complexities and to formulate their own questions. These ranged from: "Why are the wings different shapes and colors?" to "What is the largest animal a raptor can carry?"

When on Hawk Hill, students engaged in a series of activities that highlighted the benefits and challenges of migration. GGRO hawkwatchers got to observe the students and educators wobbling around as Turkey Vultures, or "flap, flap, gliding" as accipiters. Powered and empowered by their new ID skills, students also had the chance to be scientists and collect data on passing raptors. Through play and action on Hawk Hill, we hope the students gained the knowledge that these national parklands are for them; they own the Golden Gate National Parks and they can be a part of the science conducted here.

For many of the students who participated in *Hawks on the Move*, their journey across the Golden Gate was their first expedition across the bridge and out of San Francisco. We worked with a diverse group: two programs were taught in Spanish, and one in Cantonese and Mandarin; all schools had English Language Learner students and varying levels of literacy. The opportunity to reach a diverse population and seeing the students' enthusiasm for learning about raptors made the challenges of starting a new program well worth it.

We especially want to thank Tom Meyer for his immense generosity. We also thank all of the NPS and CFC staff for their support in developing and teaching the curriculum. We are grateful to the teachers from Longfellow Elementary, Chinese Education Center, Glen Park Elementary, and Mission Education Center for participating in this pilot program.

Intern Natasha Lekach brought a ton of experience to the Hawks on the Move program in 2015, including a year at the Seattle Science Center. So did Elan Carnahan, with several years of scout counseling in the Sierra Nevada while completing her degree at San Luis Obispo.

IN CONVERSATION *Laura Booth*

Thirty Years of 'Following the Child' to Hawk Hill

Kathleen Hazelton-Leech has been bringing kindergarteners up to Hawk Hill since the late 1970s, shortly after helping start the Marin Horizon School in '77, where she continues to work as Primary Head Teacher. Over the years, her students—"Hawks"—have seen the content in the Golden Gate Raptor Observatory lessons evolve. But Hazelton-Leech insists one thing stays the same: the wonder of children and their parents when they witness the migration of raptors over the Golden Gate.

Marin Horizon teacher Kathleen Hazelton-Leech and her stuffed Rough-legged Hawk mascot have been teaching kindergartners about Hawk Hill since the late 1970s [Photo courtesy of Kathleen Hazelton-Leech].

PACIFIC RAPTOR REPORT: Kindergarteners at the Marin Horizon School are called the Hawks. Why?

KATHLEEN HAZELTON-LEECH: A traditional Montessori classroom is a mixed-age range of 3- to 6-year olds, but parents and teachers saw a need for the kindergarteners to have a bigger peer group. So we started this program, and we thought, "What would we call it?" We decided to call it the Hawk program because they're at the top of the food chain; they're majestic and powerful.

As part of that, we thought, "Well, we're right here, near Hawk Hill." So we will include that as an opening field trip to teach them about hawks and to come up to this beautiful, majestic site of the migration.

PRR: Did you always know about Hawk Hill? How did you first hear about it and the GGRO?

KHL: One of the [founding] teachers, John Littleton, who I started the school with, was a nature aficionado, and knew about Hawk Hill.

PRR: What do you think is the kids' favorite part about coming up to the Hill?

KHL: It's such a majestic site—there are so many favorite things. They're just bubbling up with their impressions and excitement about being there.

Their imagination is so lucid at this age that the hands-on experience is an incredible life impression for them. The frosting on the cake is to go and see men and women scientists at work. It's a window into the life of a raptor and into the lives of the humans that love and appreciate and care for raptors. It's a microcosm of nature appreciation, and what people are doing to help raptors and save the environment. That spurs them on to be caretakers of nature, too.

It's a gateway, a catalyst for them to ask more questions about everything. What is their part in the ecosystem? We call it becoming on fire with their learning.

PRR: I feel like our connection to nature has shifted dramatically in 30 years. Is there an influence of technology? Can kids sit up on Hawk Hill and enjoy it in the same way that they always have?

KHL: I'd say that it has been just as magnificent, if not more, because we've learned to go into even more depth. We've had a lot of our students for three years by the time they come up to the Hill, so they are already into that inquisitive mode about science. It's even more exciting because they're actually realizing that they're going to where the hawks are, where they migrate. I think it just turns them on to nature.

And many families have not been up to Hawk Hill, even though we're right here in the midst of Marin. This is a real breakthrough for the children and for the families, too. They'll say, "Wow, we're here in Marin and I didn't know about this? This is so incredible." Most of them are

talking about and planning to bring their families back.

PRR: Do the parents get into the lesson about birds of prey?

KHL: To see their child so engaged draws them in as well and gives them something more in common with their children to explore.

PRR: Why do you think environmental education, in particular, is important? How does that relate to the Montessori mission?

KHL: Whatever their interests are, Maria Montessori's basic advice is to "follow the child." And John Littleton, who was also a founding teacher, connected that to nature, saying, "I'm always amazed at how readily young people connect with the natural world, as dear Maria Montessori learned early on and incorporated into her curriculum and philosophy. Encouraging and developing an appreciation for nature sits right at the heart of the Montessori classroom."

They're so tuned in now to looking for hawks, to looking at birds, to asking questions, to being on fire with learning—this year [after doing their field trip to the Hill], I came back to the classroom with our new dean and the kids are shouting at me from outside—"Red-tailed Hawk! Red-tailed Hawk! Red-tailed Hawk!" Our dean is new from Miami, so I said, "You better come," and there was a majestic Red-tailed Hawk right above them.

PRR: Do you have any stories that jump out at you from the 30 years of bringing your classes up to Hawk Hill?

KHL: Well, I think it was really great that Milo [a current kindergartener] wanted to be a hawk for Halloween, because there's every kind of Star Wars character, there's every kind of prototype in the genre of superheroes. I was impressed that out of all of that, he wanted to be a hawk. He was in his glory being a hawk for Halloween.

Pennsylvania native and science journalist Laura Booth interned for GGRO during 2015-2016. Catch up with Laura's blogging at thenatureofcities.org.

Volunteer Maxine Berg narrows the field for a Broad-winged Hawk^ somewhere above San Francisco. [Photo by Eileen Richey]

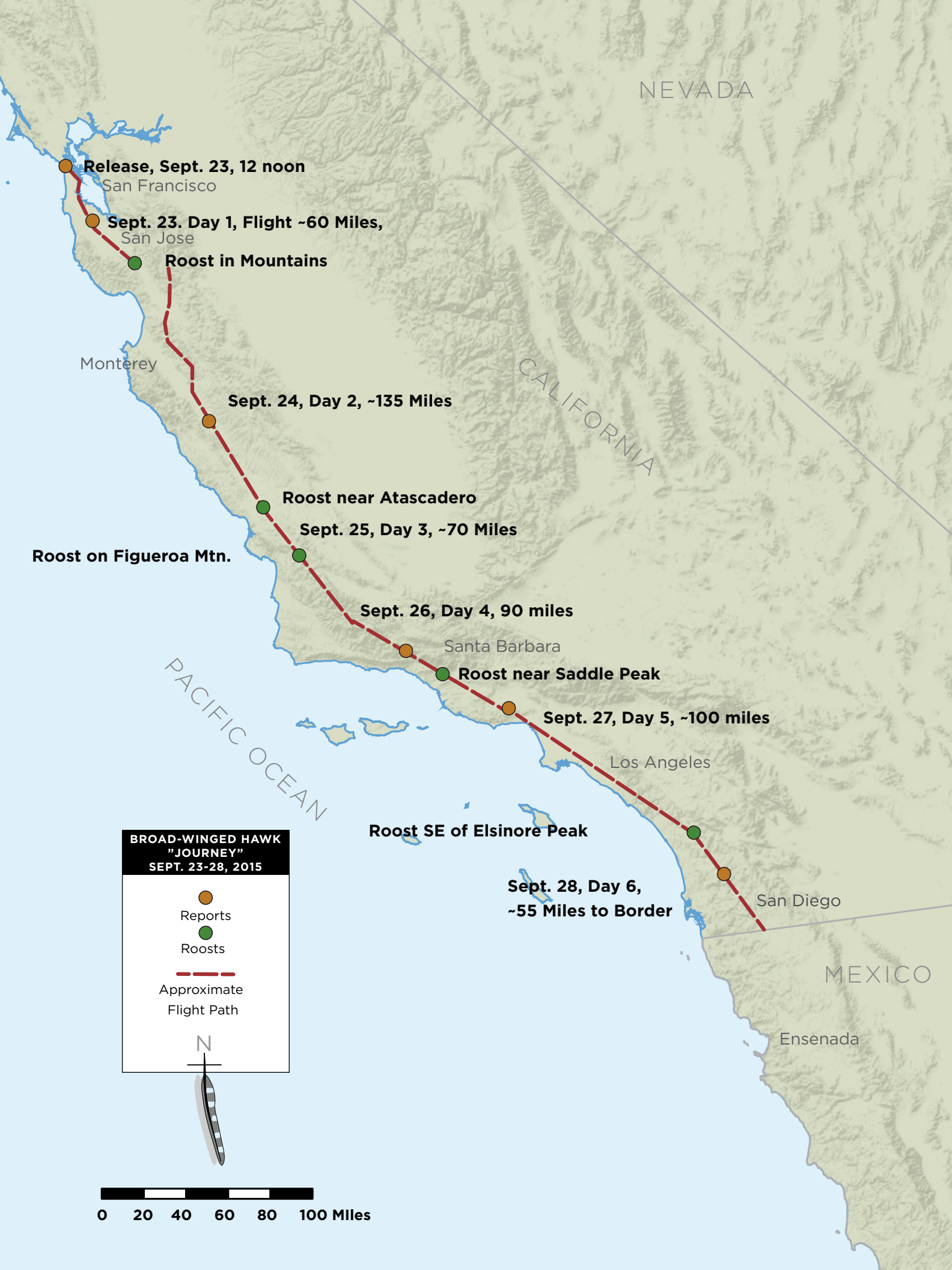
RADIOTELEMETRY 2015 *Mike Hall*

Up and Away

"We keep an eye out for them. They help us find the lift." The retired hang-glider pilot is telling me of his kinship with raptors. "I remember one time, there were two hawks and two gliders sharing the same thermal. Another time, I had this Redtail stilling right in front of me when it suddenly raised its wings 'til the tips touched..." He demonstrates the motion. "...and then it shot upwards on an updraft that could have broken me up. Probably saved my life."

We are standing together on top of a picnic table at Double Peak Park in San Marcos, California, as the sinking sun is preparing a spectacular Pacific panorama. My Yagi antenna is leaning against the table, and my receiver is turned off. "Journey" the Broad-winged Hawk is at roost for the night, and other things are about to transpire. It is the most natural thing in the world for each of us to be as close to the sky as we can get.

I'm here because our GGRO Telemetry Coordinator Lynn Jesus located enough San Diego County high points via Google Earth so that we could track a "coastal bird." It's September 27, 2015. The park is slowly filling with people but there's not much babble—just scopes, kids, students. Palomar Community College and CSU San Marcos have reserved the site to observe the super moon eclipse. A full moon at perigee


NEVADA
CALIFORNIA
PACIFIC OCEAN
MEXICO
Release, Sept. 23, 12 noon
San Francisco
Sept. 23. Day 1, Flight ~60 Miles,
San Jose
Roost in Mountains
Monterey
Sept. 24, Day 2, ~135 Miles
Roost near Atascadero
Sept. 25, Day 3, ~70 Miles
Roost on Figueroa Mtn.
Sept. 26, Day 4, 90 miles
Santa Barbara
Roost near Saddle Peak
Sept. 27, Day 5, ~100 miles
Los Angeles
Roost SE of Elsinore Peak
Sept. 28, Day 6,
~55 Miles to Border
San Diego
Ensenada
BROAD-WINGED HAWK
"JOURNEY"
SEPT. 23-28, 2015
Reports
Roosts
Approximate
Flight Path
N
0 20 40 60 80 100 Miles

combined with a total eclipse, this "blood moon" won't happen again until 2033.

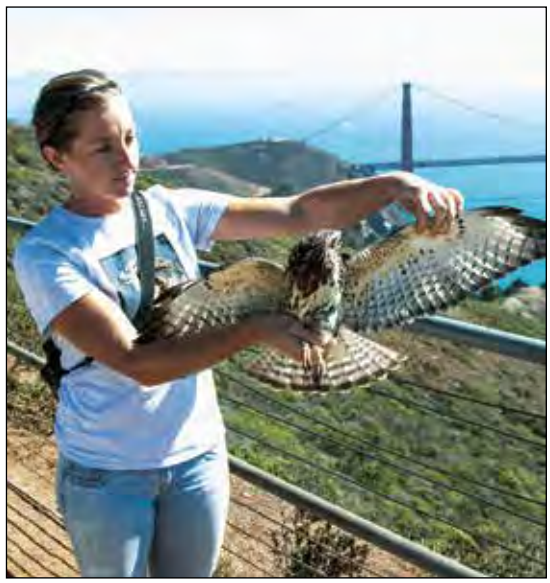
I'm recalling this special evening as a way of suggesting the power and poetry layered just beneath our dutiful adherence to training and protocol. After all, we raptorphiles are always seeking that connection, and our citizen-science roles help us focus the quest. Strategizing a chase and then hitting the road as a radiotelemetrist is one way an earthbound amateur scientist can sort of emulate a soaring, migrating hawk. At the least, time and terrain can bring us unexpected moments of discovery.

Back in August, we planned for a split season: a two-week window during the height of the Broad-winged Hawk migration in September, and then another stretch in October. While we jump at a chance to track one of our special Pacific Flyway Broadwings, we're also curious and eager to learn the migration habits of even rarer Marin Headlands visitors, such as a Ferruginous, Rough-legged, or Swainson's Hawk, or Prairie Falcon. But the banders have to snag one first!

It turns out that 2015 was a better-than-average year for Broad-winged Hawks over Hawk Hill, about 50% better. Banders caught three Broadwings, two of them on September 23. Choices, choices! Chris Briggs decided to apply the transmitter to a juvenile male, and Kris Vanesky released Journey from the Hawk Hill ridge.

After five days with bags packed and schedules shifting, we had three teams ready to roll in the Marin Headlands, where they enjoyed watching a remarkable 1,000-raptor day over Hawk Hill as Journey rested up. But after a mere half-hour, Journey launched himself across the Golden Gate.

From Twin Peaks, trackers Libby Rouan and Maxine Berg noted Journey's shift to the east and south. Tracker Bill James, who followed the two previous Broadwings to the Mexican border, was "on the bird" solo—functioning simultaneously as driver, navigator, tracker, recorder, and communicator. Journey ended his first broadcast day south of San Jose near Mount Madonna, as determined by Bill (now accompanied by Maxine) the next morning from Fremont Peak. I followed them down Highway 101 and caught a couple of good bearings south of Salinas, the last we heard from Journey on Day 2.



GGRO Research Assistant Kris Vanesky practices her Spanish with the bilingual "Journey"—a juvenile Broad-winged Hawk—heading to Mexico in just five days [Photo by David Jesus].

Our ideal is to have three teams in the field—one staying close to the bird, the others stationed on surrounding high points to provide locational fixes via triangulation of compass readings based on the bird's radio beeps.

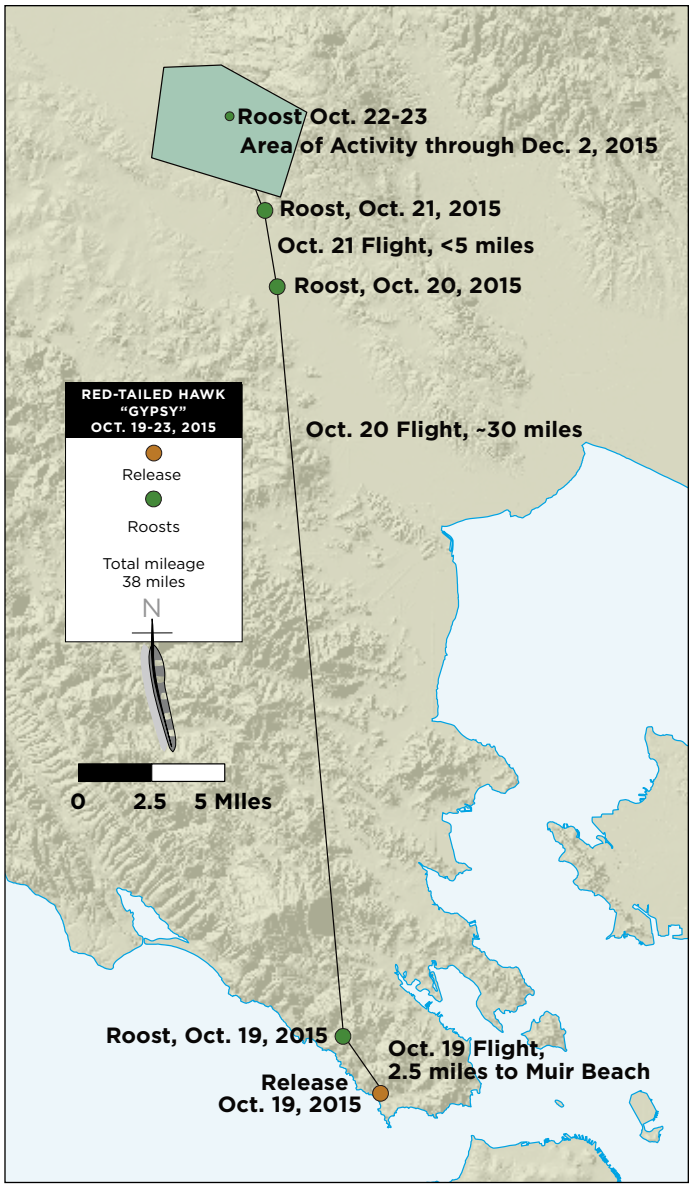
For Day 3, Bill was once again solo; Libby drove down with Ken Weidner and took up a promising position on Mt. Pinos. Maxine joined me and we lucked out with early signals as Journey got underway north of Atascadero, and again at the end of the day as he came to roost near our high point on Figueroa Mountain.

Both previous Broadwings we tracked had crossed the California-Mexico border by the end of their fourth day. But here was Journey at the start of Day 4, still west of Santa Barbara! Libby and Ken were on Mt. Pinos; Bill, now again teamed with Maxine, was way northeast on Mt. Wilson. I headed to Saddle Peak, in the Santa Monica Mountains above Malibu and not far from downtown L.A.

As it happened, Journey flew all of 60 miles and roosted right near Saddle Peak. But that night, while Journey slumbered, four-fifths of his entourage was driving north. Bill wisely chose not to keep pushing, and both Libby and Ken had to meet Bay Area obligations the next day.

Guess who's left? Journey and me.

The weather throughout this expedition has been phenomenal. In the clear morning light of Day 5, I look south from Saddle Peak and make out Mt. Orizaba above the cloud layer on Santa Catalina Island, 35 miles away. I look east and



down at the high-rises of downtown Los Angeles, backlit against the rising sun.

It enters my mind, as it will again this evening at Double Peak Park in San Marcos, to consider what Journey sees ahead of him. We often, I think, conceive raptor vision in terms of predator and prey, above and beneath. But what do those keen eyes pick out up ahead? Perhaps, as I focus on beetling my way through SoCal freeway traffic, Journey is already contemplating the Mexican mountainsides.

Journey signals me at 10:15 AM, so closely that I hear his beeps with the receiver's attenuator switched on, and it jogs me to get a move on, get to the next high point, Elsinore Peak, where I listen as Journey moves steadily south along the coast, angular increment by increment on the compass dial, in textbook fashion.

When he's due south—right in line with Double Peak, in fact—I can't stand it and jump back in the car to catch up with him. Of course, I'm too late, and now they want me out of the parking lot for their eclipse party. I leave, because I've got paperwork to complete at my Motel 6 before I can grab a couple hours' sleep. Big Final Day tomorrow, September 28.

Lynn informs me that Libby has actually volunteered to drive back down, to provide cross-bearings. But Journey's last leg should be pretty straightforward, so it's on me. Uh, not that simple after all—he's not checking in to Double Peak for Day 6.

Now it's after 11:00 AM and Chase Syndrome kicks in—that anxiety that something up ahead is getting away from you. I head inland to Laguna Mountain, on the assumption that Journey is angling away from the coast. But we'll never know for sure, because at 40 minutes past noon, Laguna Mountain provides me one passage of beeps with just one Yagi bearing before all signals cease for the day.

The signals prove that Journey is aloft and close to the border, and since the bearing intersects the coast exactly one mile north of the border, he will have crossed into Mexico within 10 to 60 minutes after the reading, depending on how far inland he is.

As for that second season; we tracked a juvenile male Red-tailed Hawk, "Gypsy," all of 38 miles north to an area partway up Sonoma Mountain, over three calendar days. There he appears to have settled in with others of his kind, as confirmed by follow-up checks into December.

Libby applied the transmitter with help from Kris, and over the five-day period October 19-23, some 14 volunteers—leaders, trainers, interns, and apprentices—participated in the travelling, positioning, calibrating, listening, interpreting, reading, plotting, triangulating, locating, recording, and communicating that are involved in a typical chase, albeit in this case a nicely genteel North Bay one.

Telemetry in 2015 was embodied in its avatars: one chase led by a spirit of long and far, tenuous and extended and challenging—a spirit both alien and brotherly. The other chase by a spirit of comprehensible, communal, common-sense—but of course still alien, as in hawk, as in raptor.

Mike Hall joined Hawkwatch and added Telemetry after retirement from a desk job. He also monitors raptor nests in Sonoma.

Intern Nicole Beadle casts a banded Cooper's Hawk back to the migration. [Photo by Anna Fryjoff-Hung]

BANDING 2015 *Jeff Robinson*

Just Like Fly Fishing?

"Hawk banding is just like fly fishing." I don't remember when I first heard this statement. I do remember my reaction: "A bird is different from a fish, water is different from land, a hook is different from a net." The speaker was a professional biologist with a Ph.D. and an impressive resume, so I kept my skepticism to myself.

Now, years later, having experience in both activities, I thought it was time to re-examine this statement. What are the similarities between hawk banding and fly fishing? The results surprised me.

Fly fishing targets fish, a carnivore that hunts by vision. The fish are in water so you have much better results if you fish near water. A light flexible pole is used to transmit energy to a line and the line carries the lure to the fish. If successful, the fish will bite the fly, you set the hook and reel it in. Generally no biometric data are collected about the fish.

The hawk banding target is not a fish. It is a hawk, a carnivore that hunts by vision. During migration, hawks concentrate over certain areas of land. If you band near these concentrations, you will be more successful. A rigid stationary pole and a line are used to attract a hawk. When you are successful, the hawk is captured in a net and carefully extracted. Data on the hawk are meticulously recorded, and a band is attached to the hawk's leg. The purpose of the band is to record even more data when the band is recovered.

A special treat for a hawk bander is to have a band recovered so the bander and scientists can learn where the hawk went and what happened to it. This is referred to as a "recovery." For example, we banded a Northern Goshawk in 2015, which showed up at a wildlife rehab center in Petaluma a short time later. The goshawk was diagnosed and treated for an eating disorder—eating so much food that his crop was too full to be able to fly. At least we know he's a good hunter.

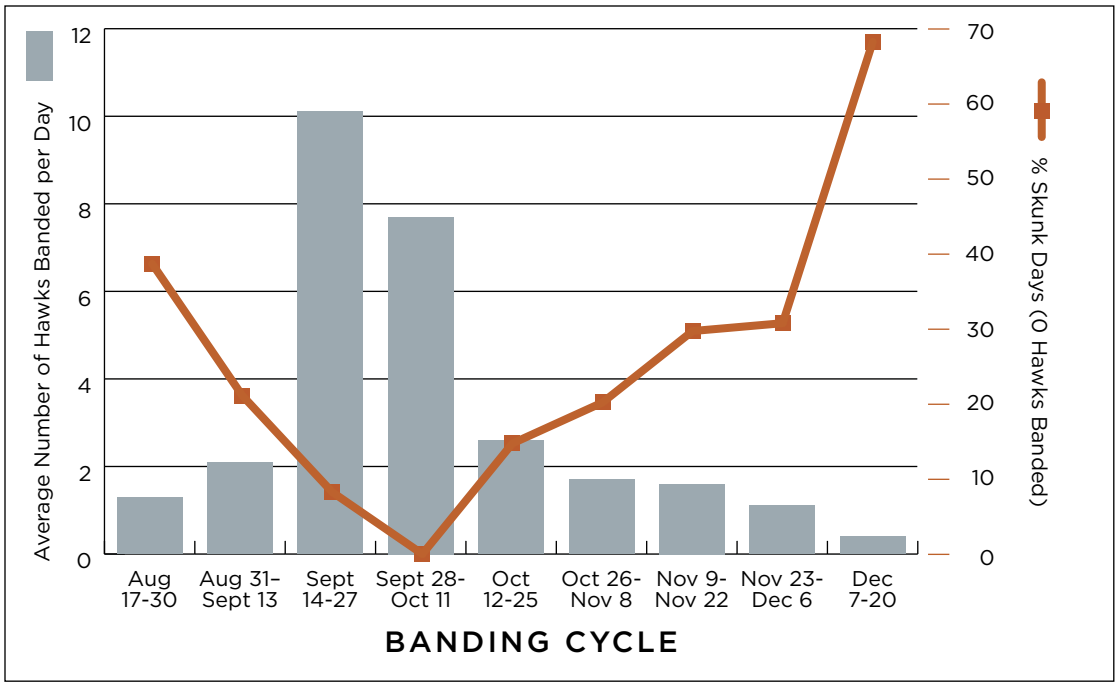
After you catch and release a

RAPTORS BANDED IN THE MARIN HEADLANDS DURING AUTUMN

	2015 (8/12/15-1/2/16)	Annual Average* 1993-2014**	Totals 1983-2015
Northern Harrier	8	11	311
Sharp-shinned Hawk	481	479	11,867
Cooper's Hawk	650	562	14,724
Northern Goshawk	1	0	6
Red-shouldered Hawk	33	16	438
Broad-winged Hawk	3	1	38
Swainson's Hawk	0	0	10
Red-tailed Hawk	251	316	9,541
Ferruginous Hawk	0	0	2
Rough-legged Hawk	0	0	6
Golden Eagle	0	0	2
American Kestrel	41	57	1,410
Merlin	50	30	725
Peregrine Falcon	2	4	92
Prairie Falcon	3	2	46
Eurasian Kestrel	0	0	1
^Total	**1,523**	**1,478**	**39,219**

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

**1993-2014 are used for this comparison due to similarity of methods and effort between those years and 2015.



fish you generally do not see it again, but it can happen. I hooked a fish one day and it snapped my line. I was fishing the next day at the same spot and the same phase of the tide. I caught a fish and found that the fish had my fly from the day before. The fish was a very rare recovery. And not very smart.

In fly fishing there is a phenomenon I call, "You should have been here yesterday!" Early in the day, more times than I would like, I encounter a fly fisherman who tells me at tremendous length and in excruciating detail how fabulous the fishing was yesterday. The quantity and quality of the fish were astounding, and the weather was perfect—certainly better than today. Fishing yesterday was a once-in-a-lifetime experience.

Similarly, in hawk banding we diligently strive never to miss the opportunity to declare, "You should have been here yesterday!" The day leader leaves a phone message and the banding journal records the day's achievements. Even when the hawks were limited, there is the irresistible opportunity to describe the details of yesterday's hawk behavior. At the morning meeting, we share the great experiences that most of us missed just a few days ago. You should have been banding yesterday!

Some hawk banders take this information as a personal challenge and resolve to band a wider variety and greater number of hawks. They will not be happy unless their banding experience today is included in the headlines of yesterday to be broadcast tomorrow.

By contrast, other hawk banders are all about lowering and managing expectations. What can I expect today? How about a nice day in the natural setting of the Marin Headlands? Unless visibility is limited, I can expect a beautiful view of the Headlands with at least some birds and clouds above. I will gain experience identifying birds and I will learn more about their behavior. This is what I hope for and anything else is icing on the cake.

Over a season, both fly fishers and hawk banders keep score. For fly fishing it is often just a subjective impression of great fishing. Exceptional fish are recorded only in one's gray matter, and this frees the fisherman to indulge in unlimited descriptive hyperbole. Not so for hawk banding. Exact results are recorded on paper and transferred to computer files.

The 2015 season ran from August 12, 2015 to Jan 2, 2016, and was divided into nine 14-day cycles followed by a period of 18 days until all the blinds were taken down. (Hill 88 Blind is closed in late fall before the end of the field season to mitigate erosion at the trapping site.)

We banded 1523 hawks, which is close to an average year, but there is seasonality in the hawk migration numbers. The banding peak came this year on September 23, 2015, with a total of 98 hawks banded. But it's possible to spend a day in a blind and not band any hawks. We refer to this as "getting skunked." Skunk rate is highly seasonal as well (see Fig. above).

I can personally attest that fly fishermen also can be skunked.

Fly fishing and hawk banding are both opportunities to escape from routine activities, demands, and responsibilities, offering time to concentrate only on the task at hand. This can be mentally and spiritually therapeutic. Being alert and quick to react are critical for

both activities; if you are not focused, you will miss the quarry. You use skills and senses that you may not have used since the last time you fished or banded.

There is skill involved in fly fishing. It takes practice to be able to cast a line and have the fly presented realistically to the fish. It's easy to frighten a fish and miss your chance to catch it. You catch more fish if you have a higher level of skill and are able to adjust your fishing to each situation; however, it is also possible to catch fish with just luck and no skill. I have caught many fish serendipitously, wading up a stream with my fly trailing in the water behind me. This still counts and prevents you from being skunked. You can also make a perfect presentation of the right fly to a fish and have the darn fish show no interest.

As hawk banders we constantly experience disinterest from a hawk. The right motion at just the right time does not always result in a banded hawk. The most memorable captures involve luck, as well as some of the following: the bird surprising everyone in the blind; banders misidentifying the bird, pulling the wrong line, tripping over lines, or falling into bushes; or the hawk sinking its talons into at least one bander.

If you do catch a fish, a trophy photo is needed so that social media friends can marvel at your accomplishment. When your fish is not very large, you just have to hold it closer to the camera to turn Nemo into Moby Dick. After a quick picture the fly-caught fish is often released. Many fly fishers use barbless hooks to facilitate releasing the fish.

Pictures are also standard practice for hawk banders, especially to document unusual species, adult birds, and unusual plumage. The hawk bander releases the bird in hopes that it will have a long life and that the band will be recovered many years later.

Is hawk banding just like fly fishing? It was not difficult for me to find similarities between the two. Could that professional biologist with the Ph.D. be right? I will leave that for you, the reader, to decide.

Bander and wildlife photographer Jeff Robinson roams the globe for opportunities to document the Earth's stunning birds of prey and owls.

BAND RECOVERIES 2015 *Nancy Sue Brink*

Longevity of Redtails, and of the People who Band Them

In September 1983, Judd Howell, National Park Service resource ecologist, wrote the first entry in a new "GGNRA Banding Journal":

The banding program at Pt. Diablo (Battery 129) appears as though it will work. Laurie Binford's (1979) paper about the hawk migration here and the Audubon Society's interest indicate it is a prime spot. Raptors always are present.

Will Shor and I set up a Dho-Gazza trap on Saturday, 24 Sept. We caught two (2) immature Cooper's Hawks before we could sit down. The birds were banded; wing and tail measured. Two (2) more Cooper's Hawks were captured but the mesh size was too large. They escaped. Three (3) Red-tailed Hawks approached, but shied away from the nets. Two birding groups were present and several individuals wanted to volunteer. Given this early success, I hope it can be maintained.

A classic adult western Red-tailed Hawk shows just a hint of incomplete dark bands across the brick-red tail feathers. [Photo by Jeff Robinson]

Thirty-two seasons and many journal entries later, the banding program does indeed seem to be working. Information provided by measurements, feathers, and other data collected when a hawk is banded continually expands our understanding of West Coast raptor migrations—as do the growing number of band recoveries.

Our banding and recovery data are part of an extensive database maintained by the Bird Banding Lab (BBL) in Patuxent, Maryland, which receives reports from people who encounter birds with numbered aluminum bands or other

identification, like wing tags or color bands. The BBL then notifies us of these encounters.

Marion Weeks then tracks down the person who reported the band, helping us build a picture of one particular hawk's story. This year, we received 43 "encounter reports"

Well-lit photos help us keep a record of wing molt in adult hawks. Notice the darker shades in some of these primaries and secondaries. [Photo by Jeff Robinson]

from the BBL: two Sharp-shinned Hawks, 17 Cooper's Hawks, and 24 Red-tailed Hawks.

As our program ages (along with many of our dedicated banders), one trend we're seeing in the band recovery department is an increase in encounters with older hawks, especially Redtails that have survived 10 years or more since banding. This is heart-warming, since we're constantly reminded of low survival rates for young hawks, often due to human activity.

So this year, we were most excited to receive news of a 28-year-old Red-tailed Hawk (Recovery #1365), brought to WildCare, in San Rafael, on October 15, 2015, most likely hit by a car near Marshall, CA. Our WildCare contact, Nat Smith, described its injuries as "catastrophic." He went on to say that "we tried hard to help the bird survive, given its age, we really hoped to help it. In the end, it was suffering and not making progress." WildCare noted that the hawk was blind in one eye; a necropsy showed trace amounts of rodenticides.

Recovery #1365 was banded on September 22, 1987—the peak of our fifth banding season—at Slacker Blind, by Wayne Swaney. At 28 years, it is the longest time between banding and encounter in our records. It is close to the Redtail record in the entire BBL database, a bird which was banded and recovered in Michigan after 30 years and eight months.

This inspired us to dig into our records to find reports of hawks that came to us at least 10 years after banding. We found 53 reports, 50 of them Redtails. A few details about those 50 birds:

- 32 were recovered 10 to 14 years after banding
- 11 were recovered 15 to 19 years after banding
- Seven, including #1365, were recovered 20 to 28 years after banding
- Six were banded as adults of an uncertain age, so could be even older

The BBL notes that the age reported is the "time to encounter" and represents the minimum possible age of that hawk. When we band a hawk, we estimate the age of the hawk to the best of our ability, based on plumage characteristics. Juvenile hawks, those kids making their first migratory flight, are labeled "HY" (Hatch Year) and we know the hawk was born in the spring of the same year.

Sometimes we can safely identify a hawk as SY (Second Year) or TY (Third Year), but we identify most adult hawks as "AHY" (After Hatch Year). This means only that the hawk fledged in a previous year; it is thus older than the number of years between the banding date and the recovery date.

These age records provide a sense of longevity of the populations we band, and a little hope and perspective for those of us out on the hill. Looking at our list of long-lived hawks is a reminder of the amazing collection of people who have contributed to this work over the years. Some of these birds were banded by folks who have passed on, like Will Shor and Jim Mills, but many are still with us and still out there banding hawks.

One of our long-lived Redtails (#964), at 20 years, was banded by Bill Prochnow, who began his banding career in 1984, the GGRO's second year, and the first in which large numbers of volunteers were recruited and trained.

Bill banded #964—an "AHY" hawk—on December 8, 1988, at Hawk Blind. His bander journal entry for that day was short and to the point: "Windy from east, caught 1 AHY RTHA, 9 HY RTHA. Otherwise, very slow." (Slow?! Ten Redtails sounds pretty good to us!)

Bill's Redtail was reported to the BBL by Lisa Konie of Wildlife Center Silicon Valley (WCSV). Lisa wrote to us:

"The Red-tailed Hawk is a female. She was [brought to WCSV] on January 23, 2009. She was found in Milpitas, California—underweight and with a cracked beak. She has completed her rehabilitation and reconditioning, and on Sunday, May 10th I released her

back into the wild. I can't thank you enough for maintaining this information. It was a true delight to realize that we had a 22+ year old redtail."

(Note the discrepancy between our BBL age report and Lisa's estimate; she has added on the additional time represented by the Redtail's "AHY" banding age.)

We can imagine #964 still out there, hunting, sitting on poles, and delighting watchers. Encounters of older hawks also delight banders. Bill reflected in poetic form on his more than 30 years of banding and Redtails:

Old friends, that RT and I
Can't sit and reminisce as geezers are wont to do.
And what would we say, if we could?
Keep it up, amigo, and tell songs of the ages.

As GGRO continues its research, we expect to get more reports of Red-tailed Hawks living a good long life, one that represents the natural lifespan of these ubiquitous, resilient birds. Over time, as both banders and birds age, our data set grows, and we learn a little bit more. As you peruse the band recovery listings this year, you might want to consider how each individual hawk expands our knowledge and understanding of the birds of prey we admire.

Back to that first day of banding at Pt. Diablo (now called Hawk Hill), and those first Cooper's Hawks. While not long-lived, one was a very long-flying hawk. Banded by Will Shor on Hill 129, on September 24, 1983, the hawk was reported dead (shot) to the BBL on January 15, 1984 in Mexicali, Baja California Norte, Mexico. It reminds us of the incredible flow of raptors, this natural phenomenon, that we document and witness each year.

And two of those "several individuals" that Judd Howell mentioned in the journal, who wanted to volunteer? Buzz Hull, GGRO Research Director Emeritus, visiting the Headlands with his 11-year old son, Josh Hull, who is now a raptor geneticist deeply involved in guiding and developing GGRO's research.

You just never know the impact of each banded hawk on our efforts to understand and conserve West Coast raptors.

Filmmaker Nancy Brink joined up as a bander with GGRO a mere 17 years ago. In 2015 she led the film crew to document the RRF Conference in Sacramento. The full reunion of Peregrine biologists can be found on YouTube at https://youtu.be/YDXxesLfMz0.

BAND RECOVERY LISTINGS *Marion Weeks*

UPDATES ON PAST BAND RECOVERIES

1202-B Juvenile Red-tailed Hawk banded 9/28/02 by Tania Pollack; caught by hand 9/6/15 at Penngrove, Sonoma Co., CA; taken to Sonoma Co. Wildlife Rescue with severe neurological damage, possibly "HBC—hit by car." Possible blindness noted, not taking food on own, and with no improvement, the Redtail was euthanized on 9/24/15; reported by Danielle Mattos.

1229 Juvenile male Red-tailed Hawk banded 8/28/12 by Peter McGuire; caught 5/14/13 due to injury 10 miles south of South San Francisco, San Mateo Co., CA; reported by Patrick Hogan of Peninsula Humane Society (PHS); upon arrival was diagnosed with right wing fractures of the radius and ulna and euthanized same day.

1258 Juvenile female Cooper's Hawk banded with both color and metal bands 9/17/13 by Dick Horn; bands found 12/6/13 by Nic Moss six miles NNE of Penngrove, Sonoma Co., CA; Nic describes "hiking through a hilly oak and Bay forest on a mission to find a sleeping raccoon or its den. I spotted a hole in a large Valley Oak and a Raccoon latrine in the crotch of a branch, and while scanning for other possible sleeping sites, I noticed a large branch about 20 feet up covered in downy feathers. I climbed to investigate. Sure enough the branch was plastered with breast feathers. As I sat there, I noticed a few wing and tail feathers on the ground, so I climbed down and found a few bone fragments and the two legs still attached to each other."

1272 Juvenile male Red-tailed Hawk banded 8/19/13 by Danny Pirtle; sighted, photographed, and reported by Peter Cole 11/27/13 near the Great Highway, from Fulton Street to the Beach Chalet Restaurant, San Francisco, San Francisco Co., CA. Peter "observed the hawk from late October through mid-December, sometimes at mid-morning, sometimes around noon, and occasionally both morning and noon. Eventually I got enough photos to get the whole number."

1288 Juvenile Red-tailed Hawk banded 9/19/02 by Kari Rodenkirchen; found 3/23/14 in the 1700 block of El Camino Real, South San Francisco, San Mateo Co., CA, lying prone, minimally to non-responsive, with a shoulder fracture; it was euthanized on arrival at PHS; reported by Shannon McClain.

1304 Juvenile female Red-tailed Hawk banded 11/5/13 by Chris Briggs; found 4/26/14 on Highway 299, just past the east fork of the Trinity River, Trinity Co., CA. "The hawk looked as if it just got hit by a car while trying to lift with its prey. It was a beautiful raptor. I buried it under some rocks not knowing if the carcass would be needed by anyone," reported Steve Reymann.

1313 Juvenile Red-tailed Hawk banded 11/20/89 by Val Fairman; "found dead or caught due to disease 6/27/04" (on a Bird Banding Laboratory report dated 7/5/14), four miles west from Yreka, Siskiyou Co.,

CA; reported by Ronnie Dickison. The question was whether the BBL report contained a typo of 2004 versus 2014. After multiple emails and phone calls over a 16-month period, we confirmed that the bird was indeed found dead 6/27/14, making it at least 25 years old, 10 years older than originally reported.

1315-C Juvenile female Red-tailed Hawk banded 9/22/08 by Marion Weeks; reported as a sight record 7/17/15 by GGRO Intern Anna Fryjoff-Hung as foraging from electrical poles around the GGRO offices at Fort Cronkhite, Sausalito, Marin Co., CA. Chris Briggs noted "her feathers are pretty worn—so she could use a good molt, otherwise she seems pretty nonplussed by the Ravens and other distractions that Ft. Cronkhite has to offer."

NEW BAND RECOVERY LISTINGS

1338 Juvenile male Red-tailed Hawk banded on 11/29/14 by Katherine Raspet; found grounded in front of United Nations Plaza at San Francisco, San Francisco Co., CA, during a protest on 12/13/14. The hawk was picked up and transported to the Peninsula Humane Society (PHS) and found to be thin, with lesions on its feet. The bird was unsuccessfully treated for avian pox and euthanized on 12/31/14; reported by Greg Anderson with additional information from Ashley Damm, both of PHS.

1339 Juvenile male Red-tailed Hawk banded on 12/12/12 by Steve O'Neill; only the legs were found at Deer Island Open Space Preserve, Novato, Marin Co., CA; reported by JT Walsh. JT reports, "It was half-way hidden/buried in a forest, as if it were a meal. Oddly enough I found the legs six months apart," the banded one on 12/31/14. Since the recovery date is that of the banded second leg, and JT reports that he found the bird about six months earlier, the bird could have been dead by June of 2014.

1340 After-second-year Red-tailed Hawk banded with both color and metal bands on 11/26/14 by Elizabeth Wommack; sighted and photographed at Half Moon Bay, San Mateo Co., CA. The Redtail was first seen in a residential neighborhood, later spotted and photographed at a nearby beach by Siobhan Ruck and Nancy Mori (GGRO banders) on 2/15/15.

1341 Juvenile female Red-tailed Hawk banded on 9/27/14 by Kris Vanesky; reported found on 12/23/14 one mile south of Stockton, San Joaquin Co., CA, and taken to Tri-County Wildcare. Pat Benik recalled, "It was found in Holt, no physical injuries, emaciated, very weak, unable to stand, given fluids; the Redtail died overnight."

1342 Juvenile male Red-tailed Hawk banded on 12/1/13 by Adrian Ye; found emaciated and lethargic by Chris Briggs, GGRO Research Director, at the Marin Headlands YMCA, Marin Co., CA on 12/30/13 and transported to WildCare that same day. "The bird was very unstable, no fractures palpated. Its weight was 540 grams (down from 743 grams at banding). Based on blood work and presenting signs, prognosis was poor." Despite supportive care and basic life-sustaining treatment, the Redtail expired overnight. Anticoagulant and rodenticide testing results were negative, as well as negative for avian influenza and heavy metal toxicology; reported by Kelle Kacmarcik, Director of Wildlife Solutions and Advocacy at WildCare.

Although bands take just a few minutes to put on a raptor (such as this Merlin held by Traci Tsukida), band recoveries may occur decades later. See #1313, a 25-year-old Redtail. [Photo courtesy of Traci Tsukida]

1343 After-hatch-year male Cooper's Hawk banded on 10/3/14 by John Ungar; found on 3/15/15 in bushes at Pacheco, Contra Costa Co., CA and brought to Lindsay Wildlife Rehabilitation Hospital. Staff believe the bird struck a window, as injuries included bleeding and swelling about the head, and neurological signs, especially the eyes and mobility, were affected; after three days without improvement the bird was euthanized; reported by Lindsay staff.

1344 Juvenile male Red-tailed Hawk banded on 8/20/14 by Jeff Robinson; found dead on 1/15/15 at the base of a power pole at Daly City, San Mateo Co., CA; reported by Randy Wells, a retired PG&E employee. Randy added, "My house is along the coastal bluffs overlooking the ocean. There are many hawks and falcons here. It is a prime hunting area for them with the natural uplift (and) northwest prevailing breezes along the cliffs; a lot of prey and easy pickings."

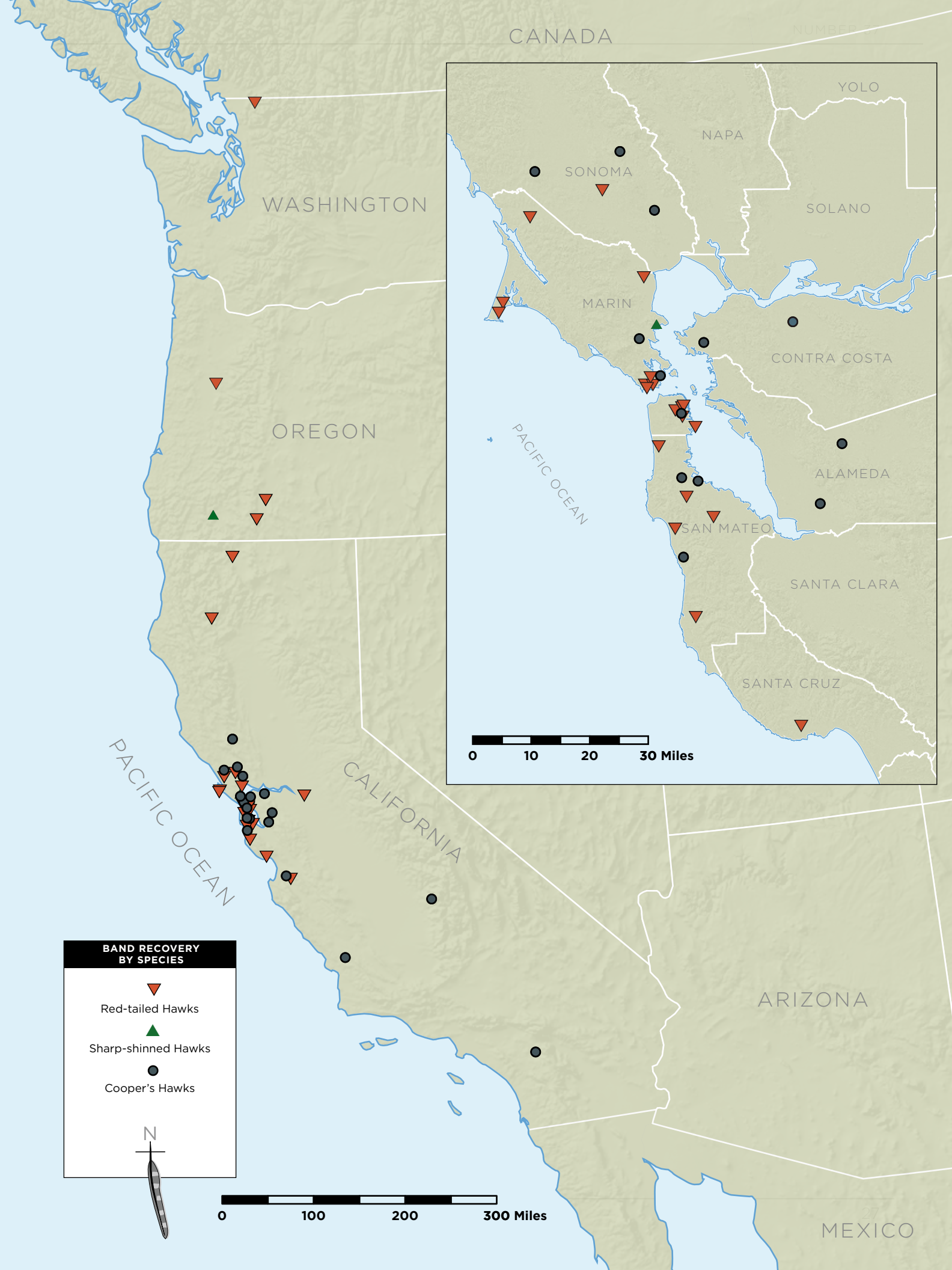
1345 Juvenile male Sharp-shinned Hawk banded on 9/20/09 by Walter Kitundu; found dead on 4/13/15, under a pine, with tail feathers a few feet away, in the front yard at Central Point, Jackson Co., Oregon; reported by Lisa Jeff. Lisa buried him where she found him.

1346 Juvenile female Red-tailed Hawk banded on 9/22/14 by Diane Horn; found dead on 10/4/14 at Alchemy SF, Folsom St., San Francisco, San Francisco Co.; reported by Ketzia Jacoby of San Francisco Animal Control.

1347 Juvenile female Cooper's Hawk banded on 10/8/12 by Ariana La Porte; found on 5/24/15 at cliff bluffs north of eucalyptus/pine grove at San Simeon, San Luis Obispo Co., CA; band with skeletal remains, "bones cleaned and white with no dried muscle or feathers at all," reported by Amy Yetter, whose kids were really excited with this "archeology stuff."

1348 Juvenile Red-tailed Hawk banded on 10/24/01 by Jennifer Zamanian; found dead on 6/22/15, 35 miles east of Medford, Jackson Co., OR; reported by Brandon Jeffers.

1349 Juvenile male Cooper's Hawk banded on 9/10/14 by Mary Ellen Hannibal; found dead in finder Richard Helbig's backyard at Richmond, Contra Costa Co., CA, on 6/28/15, with a tennis ball next to the body. Richard is not sure if the bird was struck and killed by the tennis ball. He contacted the California Academy of Sciences at San Francisco and the bird is now part of their study collection; the preparer noted that its skull was crushed.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1350 Juvenile male Red-tailed Hawk banded on 10/12/09 by Claire Gallagher; found dead on 7/16/15 at the side of Highway 1, just south of Pescadero, San Mateo Co., CA. Injuries indicated the bird was hit by a car; reported by Theresa Binning.

1351 Second-year Red-tailed Hawk banded on 1/1/03 by Steven Rock; mostly white skeletal remains found on 7/6/15 at Kendall, Whatcom Co., WA; reported by Brandy U.

GGRO Intern Steph Szarmach showing deep disappointment at having trapped and banded one of the eight Northern Harriers in 2015. [Photo by Brian Smucker]

1352 Juvenile female Red-tailed Hawk banded on 8/22/15 by Ryan Bantley; found dead on 9/8/15 at the base of a power pole outside a business at San Francisco, San Francisco Co., CA; reported by Chris Pettengill.

1353 Juvenile female Cooper's Hawk banded on 9/5/13 by Marissa Ortega-Welch; found on 9/11/15 grounded at Pleasanton, Alameda Co., CA, and brought to Lindsay Wildlife Rehabilitation Hospital by Animal Control. Because the bird had severe neurological symptoms and a shoulder dislocation, which stretches tendons in such a way that makes rehabilitation impossible, the bird was euthanized the same day; reported by Amber Engle of Lindsay.

1354 Juvenile female Cooper's Hawk banded on 8/30/15 by Craig Nikitas; found "dead a day or so" on 9/9/15 by Isabel Ebert, while on a walk in the hills near her home at South San Francisco, San Mateo Co., CA; cause of death is unknown.

1355 Juvenile male Red-tailed Hawk banded on 9/1/15 by Elan Carnahan; found dead of electrocution under a power pole on 9/22/15, 1,000 feet from the town of Fort Klamath, Klamath Co., OR; reported by Eric Kasprazak, who noted "the power pole has been retrofitted to avian safe standards."

1356 Juvenile male Red-tailed Hawk banded with both color and metal bands on 8/25/15 by Anna Fryjoff-Hung; found dead 10/5/15 on ground, approximately 25 feet from an active power pole. "Bird was likely electrocuted" per BBL information; reported by Alex Pries.

1357 Juvenile female Cooper's Hawk banded on 10/19/15 by David Jesus; found dead on 10/21/15 under a window at Sebastopol, Sonoma Co., CA; reported by Sylvia Tether.

1358 Juvenile female Cooper's Hawk banded on 9/28/15 by Melanie Echanique; found 10/21/15 at Hemet, Riverside Co., CA; reported by Chante Retzlaff. Chante exclaimed, "it fell out of the sky and onto the corner of our garage." Her husband saw it when he was leaving for work and gave it to her. Chante's friend examined the bird; found no injuries so cause of death unknown. They cremated the bird.

1359 Juvenile male Cooper's Hawk banded on 10/16/12 by Heather von Bodungen; band found with skeleton or bone only on 10/24/15 at Ettawa Springs, Middletown, Lake Co., CA, up on a ridge burned by wildfire. "Legs only left! My property is next to Boggs Mountain National Forest," reported Sandy Nichelini.

1360 Juvenile female Cooper's Hawk banded on 9/15/15 by Ellen Burroughs; found dead on 9/22/15, at Kindred Transitional Care and Rehabilitation Center, San Rafael, Marin Co., CA; reported by Laura Hessig who saw the hawk while outside with her patients.

1361 Juvenile male Red-tailed Hawk banded with both color and metal bands on 8/27/14 by Kris Vanesky; found injured on 10/13/15 at edge of Park Presidio and Golden Gate National Recreation Area, San Francisco, San Francisco Co., CA; picked up by SF Animal Care and Control (ACC), the Redtail died before staff could deliver it to Peninsula Humane Society. The Reporting Officer, Ellie Sadler, stated that no cause of injury was noted in ACC report.

1362 Juvenile male Red-tailed Hawk banded on 11/24/14 by Kate Owens; "found 10/14/15 dead, killed or caught by a predator other than a cat," per the BBL report, at Golden Gate National Recreation Area, west of Sausalito, Marin Co., CA; reported by Laurie Brown.

1363 Juvenile female Cooper's Hawk banded on 9/24/15 by Laura Booth; found on 11/10/15 at Springville, Tulare Co., CA. When Candace Anderson went out to her front porch to gather some firewood that evening, she found the bird sitting on a table, unable to fly. She put a towel over it and put it in her bathtub for the night, but found it dead about an hour later. Upon examination, no blood or broken bones were noted but a wing was a bit "slobbery" like it had saliva on it. Candace lives in a rural area and used to work for a vet.

1364 Juvenile female Cooper's Hawk banded on 9/28/15 by Dick Horn; found dead on 11/14/15, beneath a window that overlooks SF Bay at San Francisco, San Francisco Co., CA: reported by Eli Wadley, a gardener.

1365 Juvenile Red-tailed Hawk banded 9/22/87 by Wayne Swaney; hit by a car on 10/28/15 on Highway 1 about 6.5 miles north of Marshall, Marin Co., CA; the bird was still alive, but had "catastrophic injuries" and was taken to WildCare. Despite valiant efforts, but not wanting to make the bird suffer, the staff euthanized the Redtail on 11/10/15; reported by Melanie Piazza and Nat Smith of WildCare.

1366 Juvenile female Cooper's Hawk banded on 10/26/13 by Mike Armer; found on 11/15/15 in a building or enclosure at Salinas, Monterey Co., CA; reported by Janet Bravo who told the BBL the bird was "alive but not flying and not doing well." Outcome unknown.

1367 Juvenile female Red-tailed Hawk banded on 11/9/11 by David Jesus; selected to be a radio-transmitter study

bird for GGRO and dubbed "Diana;" found dead 11/16/15 on side of Highway 5 about 2.6 miles NE from Shedd, Linn Co., OR, near exit on Highway 5. Lokni Muniz stopped to pick it up and checked the bird pretty thoroughly: "no damage, no lacerations, no blood, not run over, no bugs or ants, intact, pretty fresh, no smell." For the beginning of Diana's story read *Pacific Raptor Report 33*.

1368 Juvenile female Red-tailed Hawk banded on 9/12/15 by Laura Young; sighted on 11/2/15, by Scott De Young at Point Reyes National Seashore, just short of the Drakes Beach parking lot, Marin Co., CA. Scott reported the bird looked very healthy and was "friendly," allowing him to approach her while perched on a pole. He observed her eating voles, potato bugs, and a gopher snake.

1369 Juvenile female Cooper's Hawk banded on 10/30/15 by Jeff Robinson; found alive on 11/21/15 at Sausalito, Marin Co., CA; reported by Nat Smith of WildCare as very thin, blood in mouth, no obvious injuries, but had respiratory difficulties; the bird died the next day. A post-mortem revealed roundworms in the gut.

1370 Juvenile male Cooper's Hawk banded on 10/1/15 by Steve Rock; found by Andrea Chen on 12/6/15 in a pigeon trap atop a roof at the Tesla plant at Fremont, Alameda Co., CA; released after he had enjoyed a full meal of one pigeon.

1371 Juvenile female Cooper's Hawk banded on 10/30/15 by Laura Booth; found 11/18/15 at Half Moon Bay, San Mateo Co., CA, apparently stunned after flying into a barn window; taken to PHS for care; reported by Ashley Damm as released on 11/19/15.

1372 Juvenile male Cooper's Hawk banded on 9/6/15 by Diane Horn; found on 12/6/15 injured at San Francisco, San Francisco Co., CA; picked up by SF Animal Control and taken to PHS. Diagnosed with a fractured elbow joint deemed unrepairable, the bird was euthanized same day; reported by Greg Hassett of PHS.

1373 Juvenile Red-tailed Hawk banded on 9/2/01 by Josh Hull; partial remains found on 12/16/15 by former GGRO bander Allison Kozak at Buena Vista Park, San Francisco, San Francisco Co., CA. Allison reported head was missing, body eaten, wings partially intact.

1374 Juvenile male Red-tailed Hawk banded with both color and metal bands on 8/23/15 by Stephanie Szarmach; sighted 8/23/15, in garden next to the UC Santa Cruz Arboretum, Santa Cruz, Santa Cruz Co., CA, diving for and eating Jerusalem beetles; reported by Lisa Sheridan.

Sharp-shinned Hawks are rarely found as band recoveries probably owing to their smallness and to their love of deep forests. [Photo by George Eade]

1375 Juvenile male Red-tailed Hawk banded with both color and metal bands on 9/6/15 by Tara McIntire; caught due to injury on 11/13/15; picked up by SF Animal Control near Highway 280 onramp in San Francisco, San Francisco Co., CA, and taken to PHS for evaluation; PHS noted right digit missing a talon; no fractures, feathers in good condition; hawk released on 11/14/15; reported by Greg Hassett.

1376 Juvenile female Red-tailed Hawk banded with both color and metal bands on 9/16/15 by Mary Malec; photographed by Steve Crow on 10/23/15, while the bird stood on his deck railing eating a pigeon at San Francisco, San Francisco Co., CA. "It came back the following day and perched on a telephone pole above my deck after swooping over my head." Steve realized it was banded when he looked at his photos.

1377 Juvenile female Sharp-shinned Hawk banded on 10/5/15 by Beth Wommack; found alive on 12/19/15 at San Rafael, Marin Co., CA; reported by Nat Smith of WildCare as "dead on arrival, healthy body condition, no idea of what happened." BBL code indicates that it might have flown into a window.

1378 Juvenile female Red-tailed Hawk banded on 10/14/15 by Brian Smucker; found dead on 12/17/15 at Salinas, Monterey Co., CA, in a yard where a hawk had previously been found dead; finders gave the bird to a California Fish and Wildlife Warden, due to suspected unusual circumstances; bird was taken to lab for necropsy; the radiograph revealed no pellets. Reported by Jamie Doglione of SPCA Wildlife Center for Monterey County.

1379 Juvenile male Cooper's Hawk banded on 10/4/15 by John Holson; found dead on 12/14/15, at side of house under tree the day after a big storm at Sonoma, Sonoma Co., CA; Mamiko Kawaguchi, a GGRO bander, reported "bird's head was detached, no blood, very emaciated, some dry open superficial lesions on toes, no evidence of trauma because of the lack of blood or injury in spite of the head being completely gone."

1380 Juvenile male Red-tailed Hawk banded on 12/2/15 by Allison Levin; found 1/13/16, stunned, not moving, grounded by side of road after striking or being struck by motor vehicle at Cotati, Sonoma Co., CA. The bird was unstable, unable to stand, kept falling over; thick mucosa in mouth and nares; it died within 30 minutes of intake at Sonoma County Wildlife Rescue; reported by Danielle Mattos.

Marion Weeks has served as Chief Correspondent for our Band Recovery Team for many years. Marion started at GGRO as a volunteer bander 25 years ago.

PEREGRINATIONS *Natasha Lekach, Steph Szarmach, and Laura Booth*

A Winter Raptor Retreat to Rush Ranch

Interns Elan Carnahan, Laura Booth, and Steph Szarmach take a January 2016 respite to ramble across Solano Land Trust's raptor-rich Rush Ranch, just a half hour's drive from the heart of the urban Bay Area. [Photo by Natasha Lekach]

When we got into the car on a cool January morning in the Marin Headlands, our intention was to take a short jaunt northeast to Lynch Canyon, a local raptor hotspot that we had heard good things about for winter birding. But when we arrived at the parking area, our entrance was barred by a locked gate. Somehow, we had missed the memo that this Solano Land Trust tract of open space is only open to the public Fridays through Mondays. On this sunny Wednesday, we were out of luck!

Or so we thought—until Natasha remembered reading about raptor workshops based out of another, nearby Solano Land Trust property called Rush Ranch, less than 15 miles farther northeast, off Route 12. We zipped back out onto I-80 and soon pulled up to the Rush Ranch Open Space, where we were greeted by a Visitor Center, a mare with an adorable foal, and several educational displays featuring the history of Rush Ranch and its ecology and wildlife.

The Solano County Farmlands and Open Space Foundation purchased Rush Ranch, which encompasses more than 2,000 acres, in 1988; it was the first acquisition of the organization that we now know as the Solano Land Trust. Today, it continues to operate as a working cattle ranch, as it did under the Rush family from the late 1850s onward. In our browsing, we also learned that this land was originally stewarded by Patwin Native Americans, who spent summers in the area.

We decided to start our day on the Suisun Hill Trail, a two-mile loop that begins across Grizzly Island Road from the Ranch entrance. Almost immediately, we began spotting raptors soaring in the distance, riding thermals over a series of hills about a five to 10-minute hike in front of us. Elan called for us to check out our first Ferruginous Hawk of the day, a juvenile that swiftly dipped behind the ridge, flashing its three points of light at us. Distracted by some of the larger buteos over this far ridge, it took us a few minutes to notice several American Kestrels hover-hunting close by against the hill nearest to Grizzly Island Road.

We spent at least a half hour at this single spot, perhaps a half mile into the pasture from the entrance on the road. We had the opportunity to spend some quality time studying Kestrels through our scope, and got some excellent looks at Northern Harriers, Red-tailed Hawks, and Ferruginous Hawks that soared closer in to us. Of these, we saw one beautiful, chocolatey dark morph juvenile Redtail, as well as a dark morph adult that was heavily marked in the breast.

We also added an intermediate morph adult Ferruginous Hawk, a bird that spurred some vociferous debate among our teammates about whether its legs really were the "rusty" coloration of an adult's. After the bird turned into the sun, we got our definitive answer: a unanimous yes!

As we scanned the landscape for more birds, Steph was the first to shout, "Look! A Burrowing Owl!" And there, stationed in the midst of scurrying ground squirrels and wearing a classic Burrowing Owl expression (somewhere between

bemused and angry, our team agreed), was a Burrowing Owl. We even spotted a second owl over the course of our watching.

The highlight of this spot on the trail, however, was a Golden Eagle, who appeared as if out of nowhere to replace the Kestrels cresting the nearest hillside. Although it was poorly lit while in close proximity and then rapidly lengthened its distance from us, we came to the conclusion that it was a sub-adult based on several clues: visible molt in the primaries, substantial white coloration in the tail feathers, and a moderately prominent, tawny bar on the back of each wing.

We finally picked up our scope and hiked up Suisun Hill, a steep-ish affair on par with climbing to the top of Hawk Hill from the parking lot. We broke for lunch at the summit, which features a circle of benches for lounging in the sun and snacking. Our meal was made that much more satisfying by the captivating sight of Kestrels hovering at eye level—the air sweeps up the side of Suisun Hill, driving the birds to hang almost close enough to touch!

Revitalized by lunch, we embarked on our way down Suisun Hill and back to the Ranch, where we planned to spend some time on the Marsh Trail. On the way down, Steph and Elan put up their binoculars to look at some distant birds. Natasha asked if they needed the scope, but they replied, "No, we think it's just a Red-tail."

Before we could take another step, though, we did a quick scan of the "fifth quadrant" and found a truly scope-worthy sight: an adult Bald Eagle soaring directly overhead, its pure white tail feathers nearly translucent in the sun. We all managed to get excellent views, both through our scope and through binoculars, before the bird disappeared in the direction of Route 12.

"So much for not needing a scope!" Natasha said.

We were pleased with our raptor sightings for the day, but continued back across Grizzly Island Road to the Marsh Trail, where we rounded out our count with several more Northern Harriers (including the always-stunning adult male "Gray Ghost") and White-tailed Kites. We didn't complete the whole Marsh Trail loop, preferring to pause and set up our scope at the overlook closest to the Suisun Slough, where we soaked in some late afternoon sunshine and watched an Anna's Hummingbird doing the same, its iridescent throat catching the light like a gem.

Although Ferruginous Hawks don't nest in California, they show up in late September to make use of California's winter grasslands, like at Rush Ranch. [Photo by George Eade]

On the way back to the cars, we ran into Jordan Knippenberg, a field steward with the Solano Land Trust. "There's a Barn Owl in the barn right now," he said, pointing to the central barn. We all grinned at each other. Entering the barn quietly, we peered up into the dust mote-filled darkness. Serene eyes in an unmistakable, heart-shaped face met our gazes—a perfect ending to a raptor-filled day.

Natasha Lekach, Steph Szarmach, and Laura Booth were one half of the GGRO's 2015 intern crew, noteworthy for helping us host the Sacramento Raptor Research Foundation conference and for their particular weakness for good chocolate.

The grasslands of Suisun Hill are bustling with California ground squirrels. These medium-sized rodents not only provide a quality food source for some of our favorite raptors, they also act as ecosystem engineers in this habitat. By changing the abiotic and biotic features of habitats, ecosystem engineers create, modify, or maintain ecosystems. In this case, California ground squirrels engineer complex networks of burrowing tunnels. Once the squirrels have abandoned a group of burrows, Burrowing Owls move into the network. An absence of California ground squirrels in this region could cause the disappearance of Burrowing Owls, as well.

Rush Ranch, with soft soils and abundant squirrels, provides excellent habitat for Burrowing Owls like this one, wearing its classic expression. [Photo by Tara McIntire]

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