

Golden Gate Raptor Observatory
Season Summary 2015



HAWKWATCH • BANDING • VOLUNTEERS • RADIOTELEMETRY
OUTREACH • RESEARCH • DONORS



Intern Nicole Beadle releases a Cooper's Hawk after banding. (Illustration by Laura Young)

GOLDEN GATE RAPTOR OBSERVATORY

The Golden Gate Raptor Observatory's mission is to inspire the preservation of birds of prey. Our business is to monitor and study the bird of prey migration along the central California coast, particularly at the Marin Headlands, part of the Golden Gate National Recreation Area. We are dedicated to the conservation of raptors both through careful data collection *and* through involving the public in every aspect of our research. The GGRO is a program of the Golden Gate National Parks Conservancy and the National Park Service, and is made up of 297 community volunteers and a small staff.

GGRO Season Summary 2015 written by Allen Fish, Chris Briggs, Elan Carnahan,
Mike Hall, Natasha Lekach, and Laura Young.

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Cover Illustration: Sharp-shinned Hawk (*Pen and ink by Siobhan Ruck*)

G G R O S T A F F

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2015 INTERNS: NICOLE BEADLE, LAURA BOOTH, ELAN CARNAHAN,
ANNA FRYJOFF-HUNG, NATASHA LEKACH, STEPHANIE SZARMACH

I N T R O D U C T I O N

The Golden Gate Raptor Observatory staff and volunteers were honored to host the annual conference of the Raptor Research Foundation in Sacramento last November. The RRF is a 1,000-member international group, now in its fiftieth year, committed to the scientific study and conservation of the world's birds of prey. My introduction to the RRF took place in 1982, when I was hauled to the RRF conference in Salt Lake City while still an undergrad, riding in the way-back of a Ford van out Highway 80, wedged between backpacks and duffel bags. It was a magnificent trip, accented by light November snows on the sage steppe in Nevada and Utah. The conference speakers were the authors of all the scientific papers I'd been reading for four years.

The 2015 RRF conference was a long-time dream for me, and it was made possible by some very hard work and lots of extra hours from the GGRO staff and volunteers at every level, as well as great help from our Parks Conservancy and NPS colleagues. My great thanks to each of you, and especially to Laura Young, Chris Briggs, and Kris Vanesky—who managed the lion's share of what I committed to do—and to our program book designer Lynn Bantley who produced the best Conference Program Book in the history of Conference Program Books. The GGRO's hosting of the Raptor Research Foundation conference in 2015 was greatly supported by the Greg Hind Endowment.

On the Marin Headlands front, 2015 was an exciting year for GGRO with strong raptor numbers for banding and hawkwatching. Results from these and our telemetry research appear in the following pages. Perhaps the greatest "new thing" during the 2015 was the creation and start (in just six weeks!) of the "Hawks on the Move" educational program, a cooperative effort between the Crissy Field Center, National Park Service, and GGRO staffs that brought 193 fourth graders from inner San Francisco to Hawk Hill during October 2015. "Hawks on the Move" was generously underwritten by Tom Meyer in memory of his wife, Alameda County Superior Court Judge Jennie Rhine. Jennie had been a devoted GGRO bander in the 1990s.

The success of a community science program such as the GGRO rests greatly on the shoulders of the long-term volunteers. They provide continuity, tradition, consistency, wisdom, practical knowledge, and to put it simply: the GGRO couldn't operate without them. I extend great gratitude and congratulations to our 20+ year volunteers this season. Four volunteers celebrate two decades with GGRO in 2015: hawkwatchers Keith Gress and Jim Hallisey; bander Dian Langlois; and bander, hawkwatcher, nest biologist, and dayleader Kim Meyer. Three have reached their quarter century marks: hawkwatcher Wade Eakle; banding leader Dick Horn; and hawkwatcher/bander Rebecca Olsen. Two have completed their 30th seasons as GGRO hawkwatchers: Terry Coddington and dayleader Dennis Davison. Thanks to each of you for your commitment to raptor research and conservation—deep volunteering at its finest.

Great thanks also to our National Park Service and Parks Conservancy colleagues. We depend on the great talents and good will of many Park co-workers to conduct the annual raptor migration studies in the Marin Headlands. Preparing for the 2015 RRF conference illuminated even stronger Park friendships than we knew before. Thank you for your great support.

- Allen Fish



H A W K W A T C H

RAPTOR-SIGHTINGS IN THE MARIN HEADLANDS DURING AUTUMN

	2015 Season (540 Hours)		Past 10-Year Average (2003-2014)* (489 Hours)	
	Sightings	Raptors/hour	Sightings	Raptors/hour
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*

The 2015 Hawkwatch season started on August 17 and closed 16 weeks later on December 6, as noted by dayleader Horacio Mena in the Hawkwatcher Journal, "A fitting end of season: rain, fog, drizzle, lots of food, no hawks." In between, 188 counters and six interns tallied more than 31,000 raptor-sightings across 540 hours, our highest count in 8 years.

Some headlines of the 2015 season: (1) we had the highest Ferruginous Hawk count (73) by two-times in the 32 years of season-long counting; (2) we had the lowest number of fogged-out days (four) in August-

D A Y L E A D E R S

TIM BEHR • CHRISTINE CARIÑO • LEWIS COOPER • DENNIS DAVISON • ALLEN FISH
 JOSHUA HAIMAN • ERIC JEPSEN • MARY KENNEY • HORACIO MENA • KIM MEYER
 BRIAN O'LAUGHLIN • BOB POWER • JAMES RAIVES • LAURY ROSENTHAL

H A W K W A T C H

September in GGRO history (recent average is 12.4); (3) we had low season counts for White-tailed Kites, Northern Harriers, and American Kestrels ; and (4) we had a peak day count of just over 1,000 sightings (1,093 to be exact) on September 23—15 species, 182 rph. This was only the fourth time we've cleared 1,000-sightings per day since 1983.

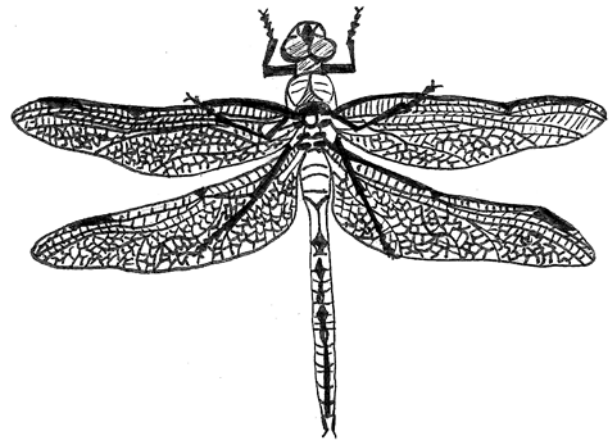
How to explain the Ferruginous high? Hard to say. Most local Ferrug nesting happens north and northeast of California, and breeding territories are often connected to colonies of gophers, jackrabbits, prairie dogs, or ground squirrels. Perhaps mild winters (i.e., drought) in the Intermountain West allowed for an increase in winter survival of these magnificent buteos. Reasonable speculation, but speculation nonetheless. We also had high (though not record) counts for Broad-winged Hawks and Merlins.

And the trend toward less summer fog? After two years of drought, we were prepared for another year of heat in the Great Central Valley of California, which in turn usually builds up the “marine layer” at the coast due to the cool water temperatures. But offshore Pacific Ocean temps were weirdly warm this past year (remember the blob?), creating all sorts of havoc for pelagic species. Higher water temps means less moisture in the above-ocean air to condense when it drifts eastward over the Marin Headlands, equals less fog.

Drones are on an upward population trend from the Hawk Hill perspective. The graph is pretty simple. We saw zero drones from 1983 to 2013, one in 2014, and 12 in 2015. Drones are illegal to operate within National Parks, and the US Park Police made every effort to find the pilots of each drone we called in. Although there are records for drone-raptor collisions in other places, we have not yet seen any collisions or evasive flights by raptors from drones in the Marin Headlands.

In 2015, we conducted our second year of bug counting concurrent with the hawk count. Across 56 days (304 hours) throughout the fall, we noted 186 dragonfly-sightings; 65% consisted of Variegated Meadowhawks, Black Saddlebags, and Green Darners. We also spotted Cardinal Meadowhawks, Red Saddlebags, Spot-winged Gliders, 12-spotted and Flame Skimmers. The largest flurries of dragonflies occurred in early September, one month earlier than in 2014, with 62 sightings on the busiest day.

We tallied 851 butterfly-sightings during the same 56 days on Hawk Hill in 2015. Pipevine and Anise Swallowtail sightings comprised 44% of the count, while in 2014 they made up about 10%. Counters spotted many Monarchs during the 2015 season (325), up from 141 sightings in 2014. Parallel to dragonflies, the butterfly peak occurred in early September, a month earlier than the 2014 butterfly peak, with 56 on the busiest day. Other butterflies included American, Painted, and West Coast Ladies as well as Red Admirals.



Blue Darner.
(Illustration by Natasha Lekach)

- Allen Fish, Natasha Lekach, and Elan Carnahan

B A N D I N G

RAPTORS BANDED IN THE MARIN HEADLANDS DURING AUTUMN

	2015 (Aug 16, 2015 - Dec 31, 2015)	Annual Average* 1993-2014**	Totals 1983-2015
Northern Harrier	8	11	311
Sharp-shinned Hawk	481	479	11,867
Cooper's Hawk	649	562	14,723
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	1,522	1,478	39,218

**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 2014.*

In contrast to low numbers in 2013 and 2014, we had a slightly above average season totaling 1,520 raptors banded for the year. This year again started with relatively few foggy days, which lead to a reasonable number of Red-tailed Hawks, Kestrels, and a few Cooper's Hawks.

Peak migration built "normally" with bird numbers steadily increasing into late September. We had a very nice peak day on September 23 with 97 raptors banded of seven species—included in the mix were Red-tailed, Red-shouldered, Broad-winged (two of them, even), Cooper's, and Sharp-shinned Hawks, also Merlins, and American Kestrels. Both quality and quantity.

October sputtered at times and days could be hit or miss, but we continued on our trend of hovering around the average. Unfortunately, November storms slowed us down with a lackluster second Red-tailed Hawk peak. We banded only 116 Redtails in the second peak (i.e., post-October 15) compared to an average of 182 for the last

D A Y L E A D E R S

ANNE ARDILLO • MIKE ARMER • EDDIE BARTLEY • MARC BLUMBERG

RANDY BREAUX • CHRIS BRIGGS • NANCY BRINK • RUSS DELONG • CLAIRE GALLAGHER

BUZZ HULL • JOSH HULL • DAVID JESUS • MAMIKO KAWAGUCHI • JOHN KEANE • CRAIG NIKITAS

B A N D I N G

ten years; while not as anemic as some years it does suggest a decline in Redtail reproduction in the Great Basin relative to recent years.

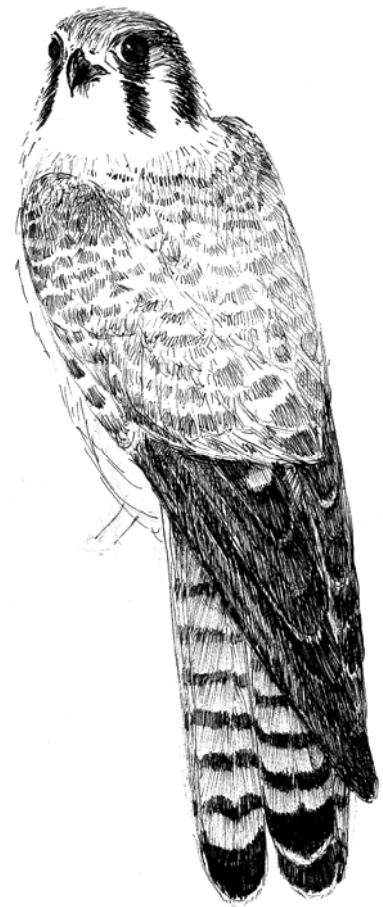
We trapped some notable individuals this year despite average numbers. The first was our sixth Northern Goshawk in 33 years of banding: a large male was caught on November 25. Interestingly, this individual was subsequently found on December 10 outside of Petaluma, CA, with a crop so full that he couldn't fly away. He was released after a check-up ensured there were no other issues. Petaluma was an interesting data point given how far we are outside the species typical range in the Sierra Nevada and Pacific Northwest.

We also had several foreign-banded (not banded at GGRO) recaptures. The first was a juvenile American Kestrel trapped on October 1. Banders noticed the band seemed dirty and worn, and wondered if it might have been banded somewhere else—as opposed to being trapped in the Headlands and recaptured within a few days, which would be more typical. They documented the individual well and ensured the band number was correct. Upon reporting to the Bird Banding Lab, we learned it was originally banded outside of Anchorage, AK, as a nestling at a nest box. That little bird had migrated over 3,300 km (2,000 miles)!

Finally, we also picked up a banded juvenile Peregrine Falcon last fall. This individual had fledged from San Jose City Hall and was featured on a web-based nest cam viewed by thousands of people. Dubbed “Hunter” by students from Holy Oak Elementary, she somehow managed to get a prey item in her eye for several days before finally dislodging it in a fight with her nest-mates. The experience seemed to leave her no worse for the wear, as she was feisty and had no indications of problems with her vision.

With so many birds naturally comes a huge output of work from our banders. Equipment maintenance, training, construction, and trapping produced over 12,000 hours of volunteer time this year. A fantastic effort from a dedicated group. We only took on a couple of brand new apprentices this year to give last year's 19 apprentices a change to build their skillsets. Also, our Siteleaders were challenged with keeping their own skills up to date with a refresher course to ensure data integrity.

- Chris Briggs



American Kestrel.
(Illustration by Siobhan Ruck)

V O L U N T E E R S

Sam Abercrombie
Emily Abernathy
Sylvia Algire
Jon Altemus
Anne Ardillo
Michael Armer
Kendra Armer
Jennifer Armer
Ray Arpon
Stefanie Arthur
Lynn Bantley
Ryan Bantley
Shahram Baradaran
Kathleen Barker
Bill Barnaby
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Caryl Carr
Sally Cedarblade
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Michael Clark
Jim Clausen
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Tom Conneely
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Jason Cooper
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Emma Cox
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Ross Forman
Laura Fujii
Kathleen Gadway
Jen Gale
Jim Garlock
Jack Gedney
Angelo Gilbert



Acorn Woodpecker.
(Illustration by Siobhan Ruck)

V O L U N T E E R S

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Alane Gray

David Gregoire

Keith Gress

Edith Grosbellet

Eli Gross

Joshua Haiman

Mike Hall

Joey Hall

Jim Hallisey

Mike Hammer

Mary Ellen Hannibal

Michael Harkins

Katie Harrington

JJ Harris

Melissa Hero

David Herrema

Cheri Hinkley

Jennifer Ho

Lynn Hoerle

Krista Hoff

Ruth Holbrook

Ryan Holmes

Nora Holmes

Tom Holmes

John Holson

Calvin Hom

Sam Hontalas

Ashley Hoover

Diane Horn

Dick Horn

Kimberly Horrell

Heather Hoyles

Buzz Hull

Josh Hull

Sara Hurley

Angie Ippolito

Bill James

Eric Jepsen

David Jesus

Lynn Jesus

Debbie Kahn

Kanani Kauka

Mamiko Kawaguchi

Beth Kean

John Keane

Mary Kenney

Rina Kor

Ann Kositsky

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Meagan Kubojiri

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Emma Lord

William Ludan

Tom Luster

Eric Lynch

Karen Madsen

Mary Malec

Audrey Martin

Breanna Martinico

Megan Mayo

Zoe McCormick

Yvonne McHugh

Tara McIntire

Ewen McKechnie

Raleigh McLemore

Paul Meadow

Patricia Meadows

Horacio Mena

Kim Meyer

Rachel Miller

Jennifer Miller

Steve Miller

Sarah Millus

Nick Moore

Sue Morgan

Nancy Mori

Tom Moutoux

Daniel Murnane

Jennifer Nazzal

Elizabeth Ng

Jeanette Nichols

Craig Nikitas

Chris Nikitas

Megan Noel

Maureen Noon

John Odell

Christine Okon

Brian O'Laughlin

Ana Olivar

Rebecca Olsen

Michelle Oltman

Claire O'Neil

Steve O'Neill

Kenn Osborne

Pat Overshiner

Dana Owens

Ron Parker

Vick Parks

Laura Peña

Jean Perata

Ralph Pericoli

Sean Peterson

Ryan Phillips

Roy Pisetsky

V O L U N T E E R S

Ruth Poliakon	Peter Sapienza	Craig Tewell	Emily Weil
Logan Porrazzo	Juta Savage	Holly Thomas	JoAnne Weston
Bob Power	Sarah Sawtelle	Laura Thomas	Alana Weston Cruz
Ann Prentiss	Linda Schneider	Jasper Toscani	Barbara Westree
Dave Presotto	Lynn Schofield	Leslie Tribe	Nick Whelan
Bill Prochnow	Emily Schultz	Traci Tsukida	Nelia White
James Raives	Terrie Schweitzer	Mikhail Twarogowski	Jeff Wilcox
Katherine Raspet	David Sexton	John Ungar	Jeffrey Wilkinson
Chris Read	Amanda Shafer	Linda Vallee	Harv Wilson
Tyson Read	Paulette Sherry	Karen Vandergrift	Step Wilson
Don Reinberg	Molly Simonson	Kris Vanesky	Ken Wilson
Theresa Rettinghouse	Kate Skelly	Kim Varney	Bright Winn
Eileen Richey	Brian Smucker	Doug Vaughan	Beth Wommack
Jeff Robinson	Curtis Snyder	Nick Villa	Pat Wong
Steve Rock	Tate Snyder	Denise Villa	Claire Woolf
Diane Rooney	KC Sorgen	Kristin Vorhies	Jim Yampolsky
Will Rose	Christine Steck	Jacqueline Wall	Pauline Yeckley
Laury Rosenthal	Tim Stoddard	Noreen Weeden	Laura Young
Libby Rouan	Linda Sudduth	Marion Weeks	
Siobhan Ruck	Michelle Tattersall	Kenneth Weidner	



Maxine Berg listens for Journey atop Black Mountain. (Illustration by Laura Young)

R A D I O T E L E M E T R Y

RAPTORS RADIOTRACKED IN 2015

Bird Name	Species/Age/Sex	Tracking Season	Net Direction	Last Known Location	Net Distance from Headlands
Journey	Broad-winged Hawk, juvenile male	9/23-9/28	Southeast	Mexican border SW of Mt. Laguna, CA	515 miles
Gypsy	Red-tailed Hawk, juvenile male	10/19-10/23	North	6 mi. NE of Petaluma, CA	34 miles

An enthusiastic August planning meeting was graced with five raptor species seen from the deck—including a Golden Eagle and a male Northern Harrier. In this auspicious setting the Telemetry volunteers committed to another season of standing by, ready to follow a “Broadwing or better” wherever he or she took them. As things turned out, the spirit was willing but the flesh and the daily grind’s schedule conflicts led to a thinly-staffed chase in SoCal.

The good news is, there was indeed a chase. After last year’s dearth of Broadwings, and the previous year’s—officially—aborted pursuit, truncated by the government shutdown, Hawk Hill this year counted over 350 Broad-winged Hawks. On Day 5 of their wait, banders presented telemetrists with not one but two Broadies! We selected a juvenile male and named it Journey, Chris Briggs applied the transmitter, and we released him from Hawk Hill. After only a half-hour in Kirby Cove, he took off and didn’t stop until he roosted south of San Jose near Mt. Madonna.



*The view west from Hawk Hill.
(Illustration by Natasha Lekach)*

Unlike 2012’s Marathon, who got to the Mexican border in four days, Journey took six, with additional roosts near Atascadero, the slopes of Figuera Mountain and Saddle Peak, and near Escondido. For an entertaining full account, see the Telemetry blog at ggrotelemetry.blogspot.com.

As usual there was also a later-season schedule featuring a Red-tailed Hawk. Gypsy was easy for this year’s group of Apprentices to train on, but he called it quits once he reached the slopes of Sonoma Mountain. Post-season check-ups as late as early December found him still near the upper reaches of Adobe Creek. Two juvenile Red-tails were seen soaring together, and five were perched in a field, all within a mile of Gypsy’s roost.

The Radiotelemetry program this year adopted smartphone texting protocols that greatly improved communication over the old pager system. Google Earth and other mapping technologies show promise for refining the chase in future years.

-Mike Hall

C H A S E L E A D E R S

MIKE HALL • BILL JAMES • LYNN JESUS • LIBBY ROUAN • BARB WESTREE

O U T R E A C H



*Docent Siobhan Ruck releases a Kestrel.
(Illustration by Kris Vanesky)*

front of the audience, we present a wild, living hawk close-up, one of many individuals at a brief stop in a journey of hundreds, or even thousands of miles. Curious visitors will often ask about fate of these birds on their migrations, and we hope that they continue to wonder even after they leave the Hill. GGRO's docents deserve many thanks for their boundless enthusiasm and expertise, as well as for introducing audiences to the world of hawks.

School groups also joined us learning about raptor migration. Through inquiry-based and hands-on experiences, we urged students to see, think, and wonder. We challenged the children to recognize the dark silhouette of a hawk wheeling above, to think about the different types of feathers and their uses, and wonder about the lives of these marvelous creatures and their connections to the world, and to themselves. Thank you to the teachers and students of Longfellow Elementary, Chinese Education Center, Glen Park Elementary, Mission Education Center, Eagle Peak Montessori, Head-Royce School, Marin Horizon, Montessori de Terra Linda, Prospect Sierra School, and San Francisco Waldorf School for coming out to Hawk Hill, enjoying the marvel of raptors, and allowing us the chance to inspire the next Allen Fish.

This season, we were able to reach out to additional San Francisco classrooms through our new cooperative outreach program, Hawks on the Move, as noted on the Introduction page. Our thanks to our great colleagues at the Crissy Field Center and the National Park Service—particularly Charity Maybury and Francis Taroc—for guiding the creation of this brand new raptor reach into fourth grade classes of San Francisco.

-Elan Carnahan and Natasha Lekach

D O C E N T S

EDDIE BARTLEY • LAURA BOOTH • RANDY BREAUX • ELAN CARNAHAN
ALLEN FISH • NATASHA LEKACH • CRAIG NIKITAS • BILL PROCHNOW
SIOBHAN RUCK • NICK VILLA • DENISE VILLA • STEP WILSON

R E S E A R C H

GGRO research continued its upward trend in 2015. We hosted the Raptor Research Foundation in Sacramento last November, including the 50th anniversary of the Madison Peregrine Conference (see Allen's introduction for more information). The focus on getting more students to the conference (roughly 130 of the 440 attendees were students) paralleled our own efforts at GGRO to increase student involvement in our research program.

ONGOING PROJECTS. We color banded 103 Red-tailed Hawks in 2015 and have already heard back from four individuals. Color band encounter rates are comparable to that of birds with only a USGS band, effectively doubling our encounter rate, allowing us to make more inferences about survival and where birds go.

Kris Vanesky continues to study blood parasites and hematology of samples collected over the last decade, to assess if there are correlations between survival and parasite load, or their physiological state as measured through blood. This study aims to determine if there are deleterious effects of blood parasites, and if blood is a better indicator of an individual's condition than just body weight.

Also in 2014, we sampled Red-tailed Hawks during migration to determine prevalence of *Chlamydia psittaci*, a bacterial parasite that often infects the respiratory tract, for Charlene Luján-Vega's MS thesis. Charlene found only one (<2%) of the individuals tested from GGRO had *Chlamydia*. Interestingly she found an atypical chlamydial organism most similar to a mammalian strain in that individual. Future research will have to investigate this, but it was possibly from a mammalian prey item that was passing through the GI tract of that individual.

COLLABORATIONS. In 2015 we have started several projects in conjunction with Dr. Joshua Hull and three graduate students at UC Davis. They have selected projects based on gaps in GGRO data and their own interests. After learning that 10% of GGRO hawks tested in 2013 were positive for anticoagulant rodenticides we have started a more in-depth study with former intern-turned graduate student Emily Abernathy. We collected over 100 blood samples in 2015 for her to measure anticoagulant rodenticide levels in Redtails, in addition to swabbing beaks and talons to try to identify recent prey. Using both measures we may be able to determine if specific prey items are correlated with presence of these pesticides.

Breanna Martinico will examine Cooper's Hawk genetics. If we can find regional population structure in their genetics, we may be able to disentangle differences in origin of migrating Cooper's hawks. In other words, if certain populations have unique genetic fingerprints we can look for those fingerprints in our migrants and better assess where they came from. This, in turn, can tell us if there are differences in where different populations go.

Ryan Bourbour is investigating the prey species of Merlins and Sharp-shinned Hawks migrating through the Marin Headlands. Similar to the Redtail analysis, GGRO banders swab beaks and feet, and Ryan will use DNA barcoding to determine what species these raptors were eating just prior to being caught here. This data has the potential to inform us if either species is specializing on specific prey, or merely eating what seems to be commonly available.



*The diminutive but fierce Merlin.
(Illustration by Kris Vanesky)*

R E S E A R C H

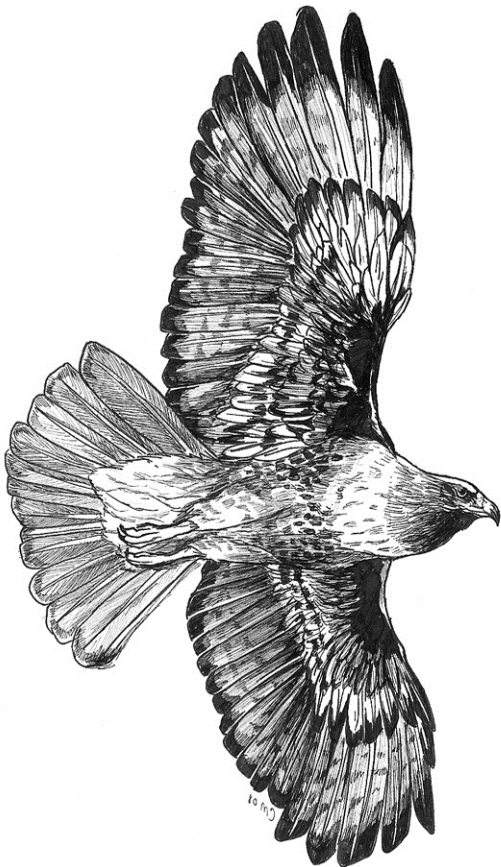
2015 was also the first year GGRO had a tool to sex adult Red-tailed Hawks. Using our data, former volunteer Kat Tomalty was able to develop a key to tell male from female adult Redtails with almost 95% accuracy, getting a paper accepted for publication in the *Journal of Raptor Research* entitled “Differential Migration and Phenology of Adult Red-tailed Hawks in California.” Kat continues working to increase our knowledge about Redtail migration by analyzing the genetic origins of individuals trapped over the past 10 years at GGRO.

SCIENTIFIC PRESENTATIONS. With planning for the November RRF conference looming overhead, we didn’t have any new research published in 2015; however, we did create or co-author two scientific posters and one conference presentation during the year. Allen Fish served on the scientific review committee for the Inaugural Meeting of the Citizen Science Association which was held in February 2015 in San Jose, CA. The Parks Conservancy also served as a major contributor for the event, being well-steeped in community-based science programs. Allen’s poster was a scientific investigation into the impacts of citizen science on the participants, “Does Citizen Science Conceal an Important Dichotomy between Crowd-sourced and Place-based Science? – Results from the Citizen Point-of-View.”

At the Raptor Research Foundation conference in November, former GGRO Intern Teresa Ely spoke on “Assessing Body Condition from Migrating American Kestrels as a Potential Cause of a Long-term Decline.” Teresa incorporated data from multiple migration sites, GGRO among them, and included migration researchers Chris Briggs, Shawn Hawks, Greg Kaltenecker, and John DeLong as co-authors. GGRO volunteer biologist

Tony Brake presented a poster on “A Recently Expanding Osprey Nesting Population in Industrialized Locations of San Francisco Bay” based on four years of work under the GGRO umbrella, and conducted with help from co-authors Harve Wilson, Ralph Pericoli, and Allen Fish. Tony and team discovered a burgeoning urban Osprey colony four years ago that has since doubled in size from 12 to 32 active nests. The colony didn’t exist before 1990, and now nearly every nest has been built on manmade structures, mostly between Mare Island in the North and ranging south to Oakland.

- Chris Briggs



Red-tailed Hawk in flight.
(Illustration by Caitlin Morrow)

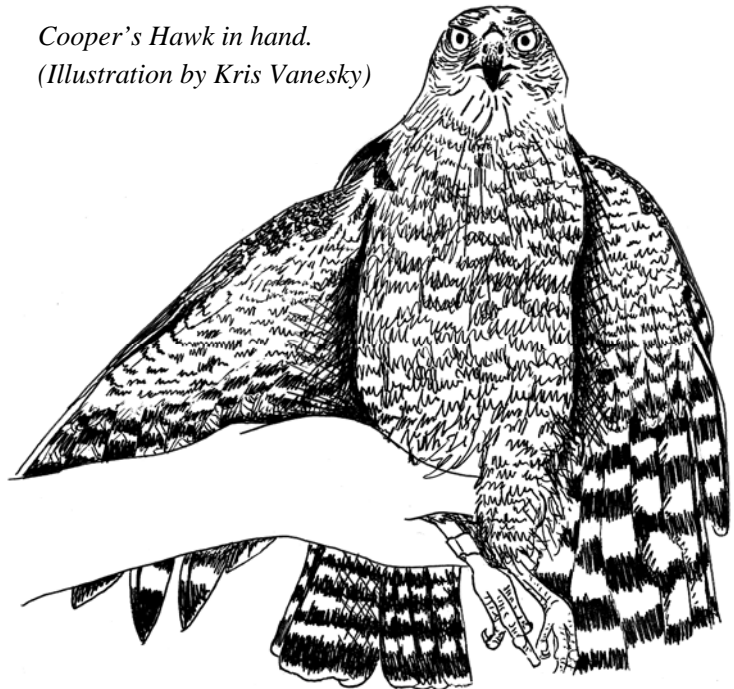
D O N O R S

Cheryl Abel	Heather Borman	Ludek Dadok	Morey Goldstein
George Almeida	Tony Brake & Yvonne McHugh	James Davis	Patricia Gotchall
Leslie Andrews	Randy Breaux	Pamela Dayton	David Gregoire
Anonymous	James Britain	Tom Delebo	Dorothy Gregor
Caryn Ansel	Johnny Brown	Janine DeMartini	Earl Gress
Marilyn Armbruster	Phyllis Browning	Licia DeMeo	Keith Gress
Kendra Armer	Lorraine Bruno	Charles & Leslie Dicke	Mary Haack
Mike & Jenn Armer	Shannon Burke	Robert Downs	Mike Hall
Loretta Armstrong	Richard & Sandra Camp	Barbara Duncan	Lora Haller
Ray Arpon	Hugh Champion	Steve Dykes	John Harris
Lee Aurich	Ruth Cantwell	Peter Ehrlich	Judith Harris
Marylou Avanzino	Caryl Carr & David Presotto	Nancy Elliot	George Hartzell
Paul Babwin	John Caulfield	Catherine Elliott	Hugh Harvey
Chloe Banks	Sally Cedarblade	Anastasia Ennis	Jennifer Haynes
Kathleen Barker	Corry Chen	Janeann & Laura Erickson	Pete Heller
William Barnaby	Rich Cimino	Natalee Ernstrom	Cheri Hinkley & Jim Broadstreet
Juliana Barr	Marshall Clark	Norval Fairman	Jan Hintermeister
Reginald Barrett	Terry & Zeo Coddington	John Farnsworth	Jennifer Ho
Don & Mai-Liis Bartling	Ron Colwell	Tom Felts	Lynn Hoerle
Guy Baty	Huguette Combs	Ron Felzer	Ruth Holbrook
Linda Becker	Kay & Tom Conneely	Richard Ferris	Sam Hontalas
Ron & Maxine Berg	Jason Cooper	Virginia Fifield	Ashley Hoover
Sandra Berggren	Lewis Cooper	Roberta Fischer	Dick & Diane Horn
Anne Bernstein	Chris Cottrell	George & Patsy Fish	Penn Hughes
Ardith Betts	Deborah Crooks	Joseph Frank	Sara Hurley
Linda Biscoe	J.R. Crumpler	Gayle Fuetsch	John Irwin
Carl Blom	Reese Cutler	Laura Fujii	Kathy Jarrett
Robert & Marion Blumberg	Charles Cutting	Inman Gallogly	David & Lynn Jesus
Roxanne Borcich	Ludek Dadok	Derek Girman	Marcine Johnson
Dix Boring		Ben Gleason	Peter & Lindsay Joost

D O N O R S

Debbie Kahn	Peter McGuire	Rebecca Olsen	Eileen Richey
Mary Kenney	Tara McIntire	Claire O'Neil	Marci Riseman
John Knox	Ewen McKechnie	Patricia Overshiner	Duane Robinson
Ann Kositsky	M. McKisson	Elizabeth Palmer	Jeff Robinson
Allison Kozak	Tonya Mcquade	Diane Parish & Paul Gelburd	Steve Rock & Nancy Brink
Cheryl Kraywinkel	John McQuown	Ron & Ruth Parker	Diane Rooney
Lori Lambertson	Terry Mead	Katherine Pattison	Elizabeth Rouan
Barbara Lancaster	Paul Meadow	Gene Pedrotti	Ruth Royter
Jasmine Leek	Andrew Melomet	Molly Peppel	Steve Rudolph
Owen Leibman	Horacio & Mona Mena	Allan Plumb	Ann Ruffer
Elizabeth Leite	Amy Meyer	Carol Poole	Leonard Rush
Winifred Lennihan	Ivan & Maris Meyerson	Bob Power	Serena Salomon
Peter Leveque	Steven Miller	Carol Prince	Ivan Samuels
Allison Levin	Nancy Mori	Bill Prochnow	Peter Sapienza
Ann Linder	Alida Morzenti	William & Karin Rabin	Ananda Satara
H.J. Lindqvist	Tom Moutoux	John Rathkey	Charles Savage
Marie & Barry Lipman	Kathleen Mugele	Gail Richardson	Michael Savino
David Loeb	Heidi Munzinger		
Carolyn Longstreth	Dan Murnane		
Lianna Lopez	Suzanne Murphy		
Tina Lopez	Mark Mushkat		
Eric Lynch	Mikiye Nakanishi		
Chris Macintosh	Soo-Hi Nayer		
Karen Madsen	Jennifer Nazzal		
Ron Mallory	Gregg Niceley		
Nancy Martin	Jeanette Nichols		
Charles Massen	Maureen Noon		
Ronald Maykel	Ed Nute		
JoAnn McAllister	John Odell & Gloria Kemp		
Maureen McCormick	Brian O'Laughlin		
Frances McDermott			

*Cooper's Hawk in hand.
(Illustration by Kris Vanesky)*



D O N O R S

Rolf Scherman	Janet & John Upton, Jr.	Marin Horizon School	Jay Sheets
Birgit Schilling	Linda Vallee	Big Brothers Big Sisters of the North Bay	John Ungar
Linda Schneider	Richard Vanderlugt		Nature Trip
Leslie Schroeder	Nick & Denise Villa		March Conservation Fund
Terry Schweitzer	Karyn Vogel	DAP FUND:	
Anita Scuri	Mary Watt	Jeff Acuff	
David Sexton	Noreen Weeden & Eddie Bartley	Caryn Ansel	THE GREGORY HIND ENDOWMENT:
James Shea	Marion Weeks & Stephen Blossom	Kendra Armer	Leslie & Troy Daniels
Jay Sheets	Emily Weil	Mike & Jenn Armer	
Carrie Sherriff	David Wells	Mark Blumberg	IN MEMORY OF DOROTHY FILE:
W. David Shuford	Richard & Virginia Welsh	Gleneda Borton	Jean Perata & Dennis Davison
Martin Sidor	Nick Whelan	Randy Breaux	
Janice Sinclair	Gretchen Whisenand	Dennis Davison	IN MEMORY OF WILLY FIVIS:
Kate Skelly & Tim Stoddard	Peter White	Pamela Dayton	Robert & Donna Fivis
Sandra Slichter	M.K. Whyte	Janeann & Laura Erickson	
Mary Smith	David Wiechers	Norval Fairman	IN MEMORY OF JENNIE RHINE:
Ronald Smith	Vicki Wilhite	George & Patsy Fish	Tom Meyer
Sharon Solomon	Edwin Williams	Alane Gray	
Sheila Sousa	Katie Winslow	Sam Hontalas	
Philip Steiner	Elizabeth Wommack	J. Pearce & Lynda Hurley	
Joan Stewart	Pat Wong	Mamiko Kawaguchi	
Byron Stone	Bob Zeiss	Cheryl Kraywinkel	
Polly Strahan		Penelope Lewis	
Deborah Stratmann	ORGANIZATIONS:	Charles Massen	
Linda Sudduth	Audubon Canyon Ranch	Frances McDermott	
Meryl Sundove	Genentech	John & Leslie McQuown	
Mark Sutherland	Prospect Sierra School	Steve Rock & Nancy Brink	
Craig & Elise Tewell	Petit Teton Foundation	Ann Ruffer	
Susan Thomas	Mitchell Family Trust	James Shea	
John Ungar			

NUMBER OF RAPTORS BANDED 1983-2015, MARIN HEADLANDS*

	1983-2008	2009	2010	2011	2012	2013**	2014	2015	Total
Northern Harrier	248	8	1	2	16	10	18	8	311
Sharp-shinned Hawk	8,657	556	362	494	730	173	414	481	11,867
Cooper's Hawk	11,019	450	524	444	762	390	485	649	14,723
Northern Goshawk	5	0	0	0	0	0	0	1	6
Red-shouldered Hawk	287	13	2	15	42	21	25	33	438
Broad-winged Hawk	20	2	0	0	9	3	1	3	38
Swainson's Hawk	8	0	1	0	1	0	0	0	10
Red-tailed Hawk	7,759	225	115	188	348	433	222	251	9,541
Ferruginous Hawk	2	0	0	0	0	0	0	0	2
Rough-legged Hawk	5	0	0	0	0	1	0	0	6
Golden Eagle	2	0	0	0	0	0	0	0	2
American Kestrel	991	73	82	56	81	37	49	41	1,410
Merlin	408	62	52	60	36	24	33	50	725
Peregrine Falcon	71	3	2	3	7	2	2	2	92
Prairie Falcon	31	3	1	2	2	2	2	3	46
Eurasian Kestrel	1	0	0	0	0	0	0	0	1
Total	29,514	1,395	1,142	1,264	2,034	1,096	1,251	1,522	39,218

*Data compiled by Chris Briggs. 2015 data are through December 31, 2015.

**Not a complete season; missed October 1-16 due to government shutdown

NUMBER OF RAPTOR-SIGHTINGS 2004-2015, MARIN HEADLANDS*

	2004	2005	2006	2007	2008	2009	2011	2012	2014	2015
Hours	530	456	492	524	525	497	439	442	488	540
Turkey Vulture	10,133	7,877	9,211	9,228	7,529	8,060	6,447	6,622	8,433	9,692
Osprey	124	110	108	90	88	81	57	62	79	83
White-tailed Kite	201	66	130	71	74	93	74	129	73	36
Bald Eagle	3	6	2	2	6	10	9	8	9	8
Northern Harrier	957	460	1,090	1,002	454	614	335	523	394	442
Sharp-shinned Hawk	3,257	4,407	5,244	4,636	4,091	3,332	2,622	3,149	3,539	4,652
Cooper's Hawk	2,454	2,427	3,367	3,717	1,956	1,738	1,805	2,695	2,169	3,106
Northern Goshawk	0	1	0	4	2	1	0	0	0	2
Red-shouldered Hawk	548	149	612	512	559	529	248	604	578	574
Broad-winged Hawk	42	146	184	70	131	180	203	756	310	344
Swainson's Hawk	5	4	7	12	1	1	13	11	10	6
Red-tailed Hawk	13,094	7,278	11,390	11,869	6,862	8,297	7,530	8,601	7,559	10,017
Ferruginous Hawk	31	33	25	13	15	11	18	32	19	73
Rough-legged Hawk	0	4	21	10	4	2	0	19	1	1
Golden Eagle	21	13	24	38	18	11	9	13	32	18
American Kestrel	547	627	611	378	377	458	358	396	380	297
Merlin	173	198	230	140	184	149	166	180	183	257
Peregrine Falcon	229	219	237	181	224	259	264	246	279	225
Prairie Falcon	9	5	8	4	7	9	2	8	7	6
Unidentified	1,474	1,441	1,436	1,382	904	991	1,011	1,084	1,159	1,381
Total	33,302	25,471	33,937	33,359	23,486**	24,826	21,171	25,138	25,213	31,220
Raptor Activity (raptors per hour)	62.8	55.9	69.0	63.7	44.7	50.0	48.2	56.9	51.7	57.8

* 2010 data are not included here because two count sites were used and data are not directly comparable; 2013 data not included due to incomplete season caused by government shutdown

** Total includes 1 Mississippi Kite.

Golden Gate Raptor Observatory

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GGRO Season Summary 2015



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*The Golden Gate Raptor Observatory is
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