

GOLDEN GATE  
NATIONAL  
**PARKS**  
CONSERVANCY



GOLDEN GATE RAPTOR OBSERVATORY  
**Season Summary 2021**

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HAWKWATCH • BANDING • COMMUNITY SCIENCE • RESEARCH

# Golden Gate Raptor Observatory

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## ABOUT GGRO

The Golden Gate Raptor Observatory is a program of the Golden Gate National Parks Conservancy in cooperation with the National Park Service, and is made up of 240 community volunteers and a small staff. GGRO's mission is the preservation of California raptors through scientific research, outreach, and community involvement. Each year, we monitor and study the bird of prey migration on 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.

Our deep gratitude to the Gregory Hind Endowment Fund for critical support of the GGRO, also to the more than 700 people who donated to the GGRO in 2020-21.

*GGRO Season Summary 2021*

Compiled and edited by Mellice Hackett

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If you would like to use GGRO data, please contact us: [ggro@parksconservancy.org](mailto:ggro@parksconservancy.org)

Cover Illustration: Cooper's Hawk by Siobhan Ruck

Back Illustration: Rough-legged Hawks by Lora Roame

Below Illustration: Rough-legged Hawk by Emma Regnier

## GGRO SUPPORT

### **Golden Gate National Parks Conservancy**

Allen Fish, GGRO Director / Associate Director of Conservation & Community Science

Teresa Ely, GGRO Banding Manager

Ashley Santiago, GGRO Migration Biotechnician

Mellice Hackett, Operations Manager

Lizzy Edson, Data Manager

Michela Gentile, Science Engagement & Communication Specialist

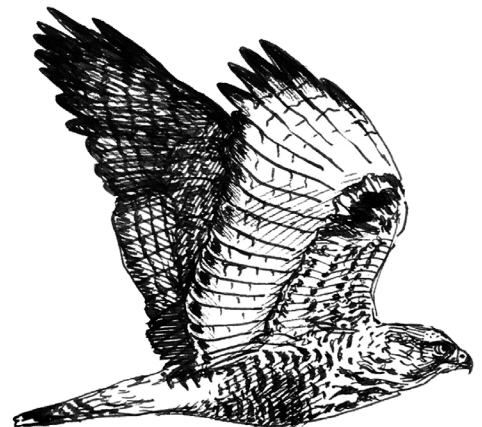
Yolanda Molette, Director of Conservation & Community Science

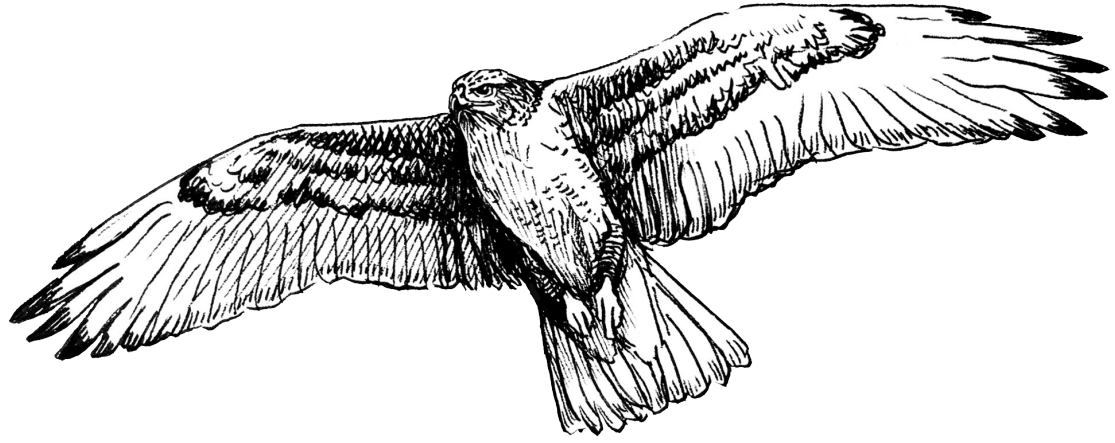
Janet Klein, Vice President of Community Connections

### **National Park Service, Golden Gate National Recreation Area**

Bill Merkle, Wildlife Ecologist / GGRO Advisor

Alison Forrestel, Natural Resources & Science Lead





Ferruginous Hawk Illustration by: Emma Regnier

# Introduction

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*GGRO Season Summary 2021 is dedicated to our Banding Manager, raptor biologist Teresa Ely. Teresa worked with ingenuity, creativity, and perseverance to make sure that our banding program would not be sidelined in 2021. Additionally, she took the lead in keeping all of our staff and volunteers COVID-safe during their raptor work. Thank you, Teresa.*

November 16th was the final Tuesday of the 2021 raptor migration season. I was desk-bound for the better part of the day at my office in Fort Cronkhite in the Marin Headlands, typing to meet a deadline and listening to the GGRO walkie-talkies crackle with occasionally decipherable words from the volunteer banders and counters.

“High over Slacker Hill. *Bzzzhhh. Crackle.* I think I see carpal patches. *Bzzzhhhh.* That’s not a Redtail. Another Coop going right. *Bzzzhhhhhhhhhhh.* *Schnitzldweep.* Hey, could that be a —?” And then the radio went dead.

A few more desk-hours went by; the sun started to set. I called it quits and walked downstairs when I heard the banders coming in at the end of the day. Long-time GGRO banding leaders Jean Perata (started at GGRO in 1988) and Anne Ardillo (started 1993) were reviewing their banding datasheets at opposite ends of the big table. Both looked up as I walked in, but these weren’t normal “good banding day” smiles – they were face-cracking, cat-ate-the-mouse smiles. Smiles containing secrets. “OK, What?” I took the bait.

Anne slid her phone across the table so I could see the screen – it showed a close-up, side-view of a Ferruginous Hawk face, that magnificent eagle-like head, the wide gape evolved to scarf down Prairie Dogs. “You banded this?!” Anne smiled, “And a Kestrel, a Shoulder, and two Redtails.” Jean added, “And we picked up a Rough-legged Hawk.” “No way!” I blurted, smiling also. “A Roughie!”

Hawks of the high Arctic summers, Roughlegs are among the rarest of raptors at GGRO – rare to observe, even more rare to band. We have banded six Roughlegs in 39 years. Compare that to more than 10,000 Red-tailed Hawks during the same time. And Ferrugs? This was our fourth Ferruginous Hawk ever banded. Both are rare species but to band both in one day? – nearly impossible. And glorious. *(continued on next page)*

Looking back, what I loved about this moment was not just about the birds – it was about the people, and the collective years of work that brought us here. Together, Jean and Anne have more than 60 years of experience banding raptors for GGRO. And here on the same day, during a migration season that has been both a scientific and emotional recovery from not banding in 2020, Jean and Anne got to band two of our rarest on the same day.

GGRO is a story told by data. We track raptor species over time and space, we consider trends, and we contribute to national databases and scientific publications. But we are also this container for amazing stories, for celebrating connections between people and wild birds, for learning to see the world through raptor eyes. And the things that a Ferruginous Hawk and a Rough-legged Hawk have seen? We can scarcely imagine. But when they are close, when they are in your care, however briefly, you cannot help but wonder.

The GGRO is a dedicated and generous community that loves raptors, migration, and science. We are volunteers; we are donors, biologists, and teachers; we are Parks Conservancy staff and National Park Service staff; and we are here for the long haul. Thank you for being a part of the GGRO, especially in these rocky times.

Wishing you good health and abundant raptors,



Allen Fish  
GGRO Director



Ferruginous Hawk Illustration by: Siobhan Ruck

# Volunteers

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More than 240 volunteers make up the GGRO volunteer base in a normal year. During 2021, we were able to bring aboard about 60% of the whole group due to COVID prevention measures. The volunteers listed below were active as 2021 banders, hawkwatchers, Think Tank members, or in some other capacity. To our non-active volunteers in 2021, thank you for your patience, and for your commitment to raptor science and conservation. We look forward to reconnecting with you all when conditions permit.

Jon Altemus  
Jan Ambrosini  
Anne Ardillo  
Jennifer Armer  
Michael Armer  
Stefanie Arthur  
Patricia Bacchetti  
Lynn Bantley  
Eddie Bartley  
Don Bartling  
Marc Blumberg  
Robert Blumberg  
Jeff Boissier  
Bob Boles  
Robyn Boothby  
Ryan Bourbour  
Andy Bradshaw  
Nancy Brink  
Jennifer Brown  
Arden Bucklin-Sporer  
Courtney Buechert  
Christina Cambie  
Christine Cariño  
Linda Chambers  
Rich Cimino  
Laura Coatney  
Patrick Coughlin  
Deborah Crooks  
Susanna Czuchra  
Candace Davenport  
John Davis  
Dennis Davison  
Carmen DeLeon  
Crystal Dolis  
Ben Dudek  
George Eade  
Wade Eakle  
Rich Eliason

Nancy Elliot  
Catherine Elliott  
Anastasia Ennis  
Michaela Figari  
Erin Fisher-Colton  
Dan Foldes  
Lief Gallagher  
Alison Gee  
Zeka Glucs  
Maureen Grabowski  
Susan Greef  
Keith Gress  
Erica Harris  
JJ Harris  
Melissa Hero  
Kimberly Hettler-Colman  
Calvin Hom  
Sam Hontalas  
Diane Horn  
Josh Hull  
Buzz Hull  
Eric Jepsen  
John Keane  
Mary Kenney  
Melissa Kohner  
Cheryl Lentini  
Patricia Lessard  
Allison Levin  
Cathy Loewen  
William Ludan  
Tom Luster  
Eric Lynch  
Mary Malec  
Robert Martin  
Breanna Martinico  
Cindy McCauley  
Mark McCaustland  
James McDermott

Tomas McKay  
Paul Meadow  
Horacio Mena  
Danny Mestizo  
Lisa Michl  
Rachel Miller  
Jennifer Miller  
Margarita Montenegro  
Sue Morgan  
Nancy Mori  
Craig Nikitas  
Maureen Noon  
Brian O'Laughlin  
Ana Olivar  
Becky Olsen  
Sarah Parnell  
Sean Parnell  
Jean Perata  
Sean Peterson  
Roy Pisetsky  
Bob Power  
Bill Prochnow  
James Raives  
Cricket Raspet  
Lora Roame  
Jeff Robinson  
Steven Rock  
Paul Romanak  
Will Rose  
Libby Rouan  
Siobhan Ruck  
Jane Rudebusch  
Rod Santos  
Sarah Sawtelle  
Linda Schneider  
Kaela Schnitzler  
Jack Schofield  
Lynn Schofield

Paulette Sherry  
Shannon Skalos  
Tim Stroshane  
Linda Sudduth  
Natalie Tan-Torres  
Christina Tarr  
Craig Tewell  
Holly Thomas  
Laura Thomas  
Traci Tsukida  
John Ungar  
Michelle Unger  
Michael Voeltz  
Kristin Vorhies  
Noreen Weeden  
Marion Weeks  
Emily Weil  
Carol Weinstein  
Ken Wilson  
Elizabeth Wommack  
Pat Wong  
Woody Woodbury  
Jim Yampolsky  
Pauline Yeckley  
Gretchen Zantzinger



White-tailed Kite  
Illustration by: Emma Regnier



# Hawkwatch

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GGRO's 36th season of hawk counting was marked by reducing both our group size and the number of days of raptor monitoring. We organized a pool of 70 total hawkwatchers into 6-person pods – one pod for each of the 14-day cycle. The pod-strategy allowed us to minimize contact between people in case of a COVID outbreak, and to make contact-tracing easier after the fact. Fortunately, no one contracted or transmitted COVID during our field season – a great success in itself.

The 2021 season was August 31st through November 21st. The season length was reduced by 25% from our usual 16-week season to 12 weeks to maximize safety across the field programs. Volunteers spent 301 hours counting hawks during the 2021 season, just under two-thirds of an average pre-2020 count season (470 hours). Of the 84 possible count days, 18 days were missed due to rain (9) or fog (9).

Looking at the Hawkwatch chart, to account for reduced number of count-hours in 2021, we “matched” the hours counted in 2021 with the same hours from the previous decade. This gave us a better baseline to judge the species changes in 2021. The overall rate of raptor migration in 2021 (55 raptors per hour) was a bit less than the previous 10-year average (61 raptors per hour), although some species stood out from the pack. Increases were mainly in low-number species like the Swainson's and Rough-legged hawk. However, Redtails and Osprey had strong showings in 2021 as well. Small falcon declines were still evident in 2021, for both Kestrels and Merlins. White-tailed Kites continued a decreasing trajectory that started back in 2013.

## DAY LEADERS

Thank you to this season's Hawkwatch Day Leaders: Deborah Crooks, Christina Tarr, Dennis Davison, Mary Kenney, Christine Cariño, Horacio Mena, Cheryl Lentini, Don Bartling, Libby Rouan, Linda Schneider, Jane Rudebusch, Sam Hontalas, Becky Olsen, Ken Wilson, James McDermott, Jon Altemus, Bob Power, Holly Thomas, and Brian O'Laughlin.

# Hawkwatch

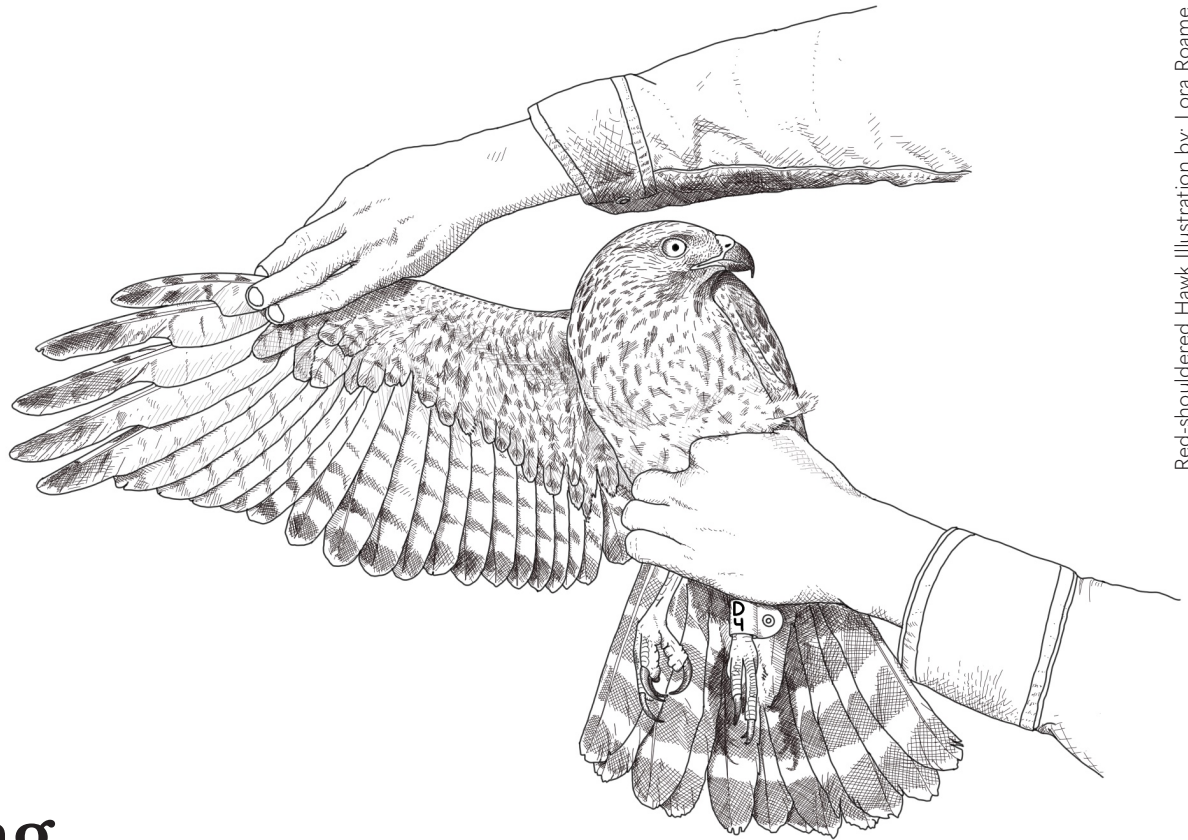
Raptor sightings in the Marin Headlands, California during autumn.

	Count 2021 (sightings)	Rate 2021 (sightings/hour)	Average Rate 2008-2019*	% Change in Rate**
Turkey Vulture	3414	11.39	17.70	-36%
Osprey	58	0.19	0.15	27%
White-tailed Kite	16	0.05	0.16	-69%
Bald Eagle	9	0.03	0.04	-25%
Northern Harrier	426	1.42	1.36	4%
Sharp-shinned Hawk	2740	9.14	9.17	0%
Cooper's Hawk	1407	4.70	6.21	-24%
Northern Goshawk	1	trace	trace	0%
Red-shouldered Hawk	330	1.10	1.20	-8%
Broad-winged Hawk	194	0.65	0.88	-26%
Swainson's Hawk	9	0.03	0.02	50%
Red-tailed Hawk	6830	22.79	19.53	17%
Ferruginous Hawk	18	0.06	0.08	-25%
Rough-legged Hawk	9	0.03	0.01	200%
Golden Eagle	6	0.02	0.04	-50%
American Kestrel	126	0.42	0.70	-40%
Merlin	91	0.30	0.50	-40%
Peregrine Falcon	156	0.52	0.55	-5%
Prairie Falcon	5	0.02	0.01	100%
Unidentified Raptor	728	2.43	2.53	-4%
<b>Total Sightings</b>	<b>16,573</b>	<b>55.29</b>	<b>60.84</b>	<b>-9%</b>
Hours Counted	301			

Data compiled by Lizzy Edson and Allen Fish. If you would like to use these data, please contact us: [ggro@parksconservancy.org](mailto:ggro@parksconservancy.org)

\* Hours matched - meaning that 2008-19 count hours were matched to those hours counted in 2021, as closely as possible. Counts from 2010, 2013, and 2020 were not used as the data collection methods were not comparable to most years.

\*\* Change in migration rate from the 2008-2019 average to 2021.



Red-shouldered Hawk Illustration by: Lora Roame

# Banding

2021 was a banding season like no other: fewer staff, no interns, reduced volunteers, one less blind, volunteer pods, reduced field days, and a shorter field season. This season, sixty volunteer banders were divided into 3-person pods. These pods banded once every week or once every other week and rotated between 3 blinds. Some days all three blinds were in operation, on other days only one blind was banding.

Even though we had a lot less to work with, we banded 12 different species and over 700 raptors this season. Highlights included: 1 Rough-legged Hawk, 1 Ferruginous Hawk, 1 Broad-winged Hawk, 5 Peregrine Falcons, and 22 Red-shouldered Hawks. We placed color bands on 152 Redtails, 19 Redshoulders, and 4 Peregrines. We cannot make an extensive comparison of this season versus previous years without diving into the data and site efficiency, and even then – 2021 is a different season. We can say that Kestrel numbers were low, Redtail numbers were about average, and Redshoulder numbers were up. We hope to have more on that in the 2022 *Pacific Raptor*.

This year we did not tag any Turkey Vultures, but 9 out of the 17 tagged were re-sighted. Vultures were re-sighted in Sausalito, Tiburon, Concord, El Sobrante, Benicia, Novato, South San Francisco, and Point Arena. We continue to receive regular color band re-sightings on Redtails we have banded. 2021 is the first year we started color-banding Redshoulders and we were excited to receive our first Redshoulder re-sighting this November from Arizona!

The main priority this season was safety; safety for our volunteers and for the raptors we study. People were skeptical that it could be done, but 2021 proved to be one of the safest seasons in the history of our banding program.



# Banding

Raptors banded in the Marin Headlands, California during autumn.

	2021 Total*	1983-2021 Total
Turkey Vulture	0	17
Northern Harrier	6	339
Sharp-shinned Hawk	184	13,430
Cooper's Hawk	283	17,071
Northern Goshawk	0	7
Red-shouldered Hawk	22	502
Broad-winged Hawk	1	47
Swainson's Hawk	0	11
Red-tailed Hawk	195	10,745
Ferruginous Hawk	1	4
Rough-legged Hawk	1	7
American Kestrel	7	1500
Merlin	16	856
Peregrine Falcon	5	129
Prairie Falcon	1	51
<b>Total Banded</b>	<b>772</b>	<b>44,725</b>

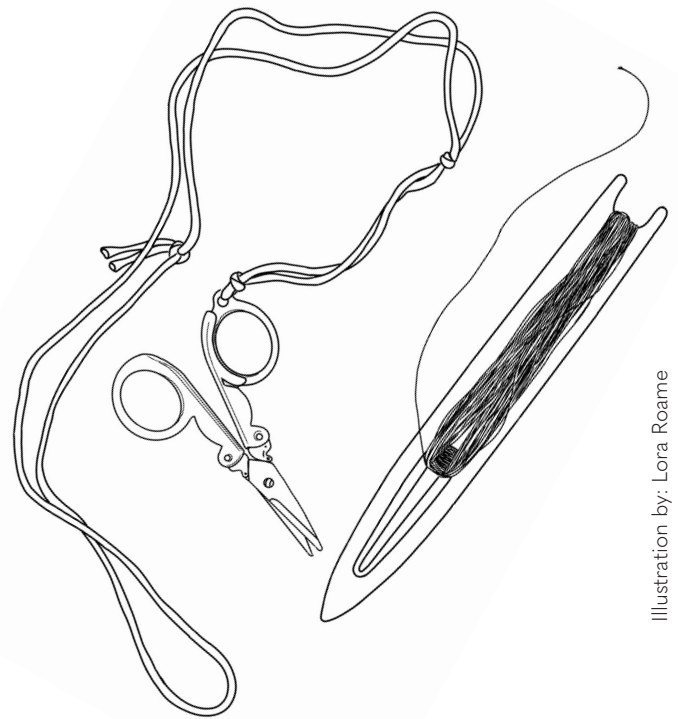


Illustration by: Lora Roame

Data compiled by Teresa Ely. If you would like to use these data, please contact us: [ggro@parksconservancy.org](mailto:ggro@parksconservancy.org)

\*2021 season was shortened due to the COVID-19 pandemic.



Merlin Illustration by: Emma Regnier

# Research

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We are delighted that GGRO's work appeared in two scientific journals in 2021. One was a critical review of an excellent new bander's ageing-sexing guide from Hawkwatch International, and the other, a summary of results from the DNA metabarcoding analysis of Merlin beak and foot swabs – part of the going PhD work of Ryan Bourbour in Dr. Joshua Hull's lab at UC Davis. Thanks to Teresa, Ryan, Josh, and all the collaborators for their hard work.

- Bourbour, RP, CM Aylward, CW Tyson, BL Martinico, AM Goodbla, TE Ely, AM Fish, AC Hull, and JM Hull. 2021. Falcon fuel: metabarcoding songbird prey species in the diet of juvenile Merlins (*Falco columbarius*) migrating along the Pacific Coast of western North America. Ibis doi: 10.1111/ibi.12963
- Ely, TE, and CE Hallett. 2021. Book Review – In-hand Guide to Diurnal North American Raptors. *Journal of Raptor Research* 55 (3): 468-469.

Ryan Bourbour also made four scientific presentations on the Sharp-shinned and Merlin prey DNA research in 2021 with co-authors CM Aylward, CW Tyson, BL Martinico, AM Goodbla, TE Ely, AM Fish, AC Hull, and JM Hull:

- Prey DNA on talons and beaks reveals what a migrating raptor eats. *American Ornithological Society*. August 2021. Also: *The Wildlife Society*. October 2021.
- Foraging ecology of Sharp-shinned Hawks and Merlins migrating along the Pacific Coast of North America. *Raptor Research Foundation*. October 2021.
- Feeding en route: Studying the diet of migrant raptors. *Wildlife Society, Central Coast Chapter*. November 2021.

# Think Tanks

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This year could not have been possible without the hard work, motivation, determination, and energy of the GGRO Volunteer Think Tanks. The Think Tanks are a virtual volunteering opportunity created as a result of the 2020-21 GGRO programmatic shutdowns, staff reductions, and a genuine desire by volunteers to want to help the GGRO through these challenging times.

These Volunteer Think Tank groups developed original virtual programs to keep our raptor community engaged: to help volunteers practice identification skills, to discuss GGRO-published research papers, to discover what former GGRO interns are doing out in the bigger world of raptor research, and to learn about raptor molt.

Bander and Hawkwatch Think Tanks worked together to provide weekly Zoom programs called “Molt Academy” from mid-August to the first week of November. Each of these evening programs drew more than 60 volunteers and involved everyone in discussions and exercises. The Diversity, Equity and Inclusion (DEI) Think Tank has been working hard to create thoughtful articles for our volunteer newsletter, *Raptor Passage*, a survey for volunteers, and other projects. We look forward to sharing more of these results in 2022. The GGRO Internship Think Tank helped us design the summer Academic Internship position and created a “Where Are They Now?” survey for previous GGRO interns, which has given us invaluable content and stories about the impact of this internship.

We would like to extend a huge thank you to everyone who took part in the Think Tanks: Internships, DEI, Fundraising, Research, Education/Outreach, Social Media, Band Recovery, Safety, Training, Volunteer Engagement, the Coordination Team, and to everyone who attended GGRO’s 2021 virtual programs – these were immensely effective at keeping our community together during a time when we were forced to be apart.



Rough-legged Hawk Illustration by: Siobhan Ruck

## NUMBER OF RAPTOR SIGHTINGS 2009–2021\*

Marin Headlands, California

	2009	2011	2012	2014	2015	2016	2017	2018	2019	2021
Turkey Vulture	8060	6447	6622	8433	9692	5998	7063	6694	7340	3414
Osprey	81	57	62	79	83	67	63	67	58	58
White-tailed Kite	93	74	129	73	36	20	61	42	31	16
Bald Eagle	10	9	8	9	8	8	17	14	19	9
Northern Harrier	614	335	523	394	442	354	905	600	807	426
Sharp-shinned Hawk	3332	2622	3149	3539	4652	4138	3107	3389	2021	2740
Cooper's Hawk	1738	1805	2695	2169	3106	1998	2198	1914	2629	1407
Northern Goshawk	1	0	0	0	2	0	0	3	0	1
Red-shouldered Hawk	529	248	604	578	574	265	220	362	280	330
Broad-winged Hawk	180	180	756	310	344	289	286	295	110	194
Swainson's Hawk	1	13	11	10	6	5	13	5	4	9
Red-tailed Hawk	8297	7530	8601	7559	10,017	5676	9132	9230	8248	6830
Ferruginous Hawk	11	18	32	19	73	48	20	29	17	18
Rough-legged Hawk	2	0	19	1	1	4	1	8	8	9
Golden Eagle	11	9	13	32	18	13	16	14	13	6
American Kestrel	458	358	396	380	297	229	268	349	286	126
Merlin	149	166	180	183	257	178	252	182	156	91
Peregrine Falcon	259	264	246	279	225	199	252	205	196	156
Prairie Falcon	9	2	8	7	6	2	5	2	0	5
Unidentified	991	1011	1084	1159	1381	862	906	909	784	728
<b>Total Sightings</b>	<b>24,826</b>	<b>21,171</b>	<b>25,138</b>	<b>25,213</b>	<b>31,220</b>	<b>20,353</b>	<b>24,785</b>	<b>24,323</b>	<b>23,007</b>	<b>16,573</b>
Hours	497	439	442	488	540	443	474	408	443	301
Raptors Per Hour	50.0	48.2	56.9	51.7	57.8	41.2	52.3	59.7	51.9	55.3

Data compiled by Lizzy Edson and Allen Fish. If you would like to use these data, please contact us: [ggro@parksconservancy.org](mailto:ggro@parksconservancy.org)

\* Due to the impacts of regional and world events, GGRO annual data trends should not be assessed without specific knowledge and consultation with GGRO staff.

## NUMBER OF RAPTORS BANDED 1983–2021\*

Marin Headlands, California

	1983-2012	2013	2014	2015	2016	2017	2018	2019	2021	Total
Turkey Vulture	n/a	n/a	n/a	n/a	n/a	5	5	2	0	17
Northern Harrier	275	10	18	8	3	3	6	10	6	339
Sharp-shinned Hawk	10,799	173	414	481	463	330	413	181	184	13,438
Cooper's Hawk	13,199	390	485	649	503	496	468	596	283	17,069
Northern Goshawk	5	0	0	1	0	0	1	0	0	7
Red-shouldered Hawk	359	21	25	33	12	3	12	15	22	502
Broad-winged Hawk	31	3	1	3	2	1	5	0	1	47
Swainson's Hawk	10	0	0	0	0	1	0	0	0	11
Red-tailed Hawk	8635	433	222	251	229	212	342	227	195	10,746
Ferruginous Hawk	2	0	0	0	0	1	0	0	1	4
Rough-legged Hawk	5	1	0	0	0	0	0	0	1	7
American Kestrel	1284	37	49	41	24	21	26	10	7	1499
Merlin	618	24	33	50	34	37	21	23	16	856
Peregrine Falcon	86	2	2	2	9	11	5	7	5	129
Prairie Falcon	39	2	2	3	2	1	1	0	1	51
<b>Total Banded</b>		<b>1096</b>	<b>1251</b>	<b>1522</b>	<b>1281</b>	<b>1122</b>	<b>1305</b>	<b>1071</b>	<b>772</b>	<b>44,725</b>

Data compiled by Teresa Ely. If you would like to use these data, please contact us: [ggro@parksconservancy.org](mailto:ggro@parksconservancy.org)

\*Due to the impacts of regional and world events, GGRO annual data trends should not be assessed without specific knowledge and consultation with GGRO staff. 2020 banding season was suspended due to the COVID-19 pandemic. However, 5 Turkey Vultures were tagged.



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