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 150 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 600 people who donated to the GGRO in 2022.

GGRO Season Summary 2022
Compiled and edited by Mellice Hackett. Text by Allen Fish, Teresa Ely, and Laura Echávez.

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If you would like to use GGRO data, please contact us: ggro@parksconservancy.org

Cover Illustration: Red-shouldered Hawk Illustration by Siobhan Ruck
Back Illustration: Sharp-shinned Hawk Illustration by Lora Roame
Below Illustration: Prairie Falcon Illustration by Emma Regnier

GGRO SUPPORT

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Laura Echávez, GGRO Senior Biotechnician
Krista Fanucchi, GGRO Assistant Biotechnician
Yolanda Molette, Director of Conservation & Community Science (CCS)
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Michela Gentile, CCS Science Engagement & Communication Specialist
Lizzy Edson, Data Manager
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

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Introduction

THE 2022 SHARP-SHINNED HAWK DELAY

An average Marin Headlands fall migration starts in mid-August. At the beginning of the season, our Hawkwatch counters are mostly seeing young Red-tailed Hawks, some Cooper’s Hawks, some Osprey, an occasional Harrier and Redshoulder, and a Peregrine cruising past Hawk Hill. By the first week in September, the Sharp-shinned Hawks start to appear in singles, then more, then around September 10th the floodgates open, and Sharpshins seem to be everywhere. Sharpshins drive the migration numbers up and up to a spike in late September and early October – a spike that often peaks around 25-30 raptors per hour (RpH).

But 2022 was different. We started counting on August 15th. On September 3rd, the first 2022 Sharpshin was counted on Hawk Hill. On September 10th, aka, Floodgate Day: no Sharpshins. Finally, on September 13th, we had two more sightings on the count. Then 25 sightings by the end of week four. Still under quota but some relief.

By the fifth week of the migration, September 26th to October 2nd, Sharpshins peaked, totaling 504 sightings for the week, or 19 RpH – about two-thirds of a normal spike, which isn’t a great concern. It was the lateness of it all. Someone forgot to turn the Sharp-shinned Hawk migration spigot on until mid-September. Cooper’s were also slow to arrive but the numbers were less dramatic.

Our Banding teams also experienced this Sharpshin delay. The first Sharp-shinned Hawk of the season wasn’t banded until September 16th and just two more on September 20th. Then the Sharpshin numbers did rise, peaking at 24 hawks banded on September 26th. The rest of the banding season was light for Sharp-shinned and Cooper’s Hawks, but never have we seen a lapse in Sharpshins like the first half of September 2022. What caused this weird and striking delay?
Talk ran rampant through the GGRO community – we blamed all the regular culprits: big spring rains squashed the nesting season; the last half-decade of mega-fires in the Pacific states ravaged nesting habitats; migration was delayed by climate change; migratory short-stopping kept songbirds and thus Sharpshins farther north. All are worthy hypotheses, and all will take years to dissect, but the bottom line was this: This event, this in-your-face, clearly-not-normal Sharpshin delay said something else to us. It said, *this is exactly why we do this work*: to detect change.

This is why we have been banding and counting Pacific Flyway hawks in the Golden Gate National Recreation Area for forty years. This is why we keep a community of more than 150 volunteer biologists focused on this annual flight, and why we will continue to do so.

Just as people keep seismographic sensors attached to the ground all over California, just as people measure river flow, air temperature, or ambient noise, we are doing the work necessary so that we can detect it when something extraordinary happens – like a delay in the Sharp-shinned Hawk migration at the Golden Gate. Capturing extraordinary events is especially critical in this time of massive anthropogenic impacts. We have so much to learn about how other species respond to human-caused changes. We have many extraordinary events yet to capture.

The 2022 GGRO was made possible by 150 volunteer banders and counters, by our hard-working field staff Laura Echávez, Krista Fanucchi, and Carmen DeLeon, by our awesome park support staff and colleagues from both the Parks Conservancy and the National Park Service, by our scientific partners for their critical and inspiring research, and by the hundreds of people who donate selflessly and annually to the Golden Gate National Parks Conservancy to keep the GGRO alive and thriving. Thanks to all of you for your dedication to the conservation of the Pacific Raptor Flyway. We raise our binoculars to you.

Allen Fish, GGRO Director
Teresa Ely, GGRO Senior Biologist and Banding Manager

Conservation and Community Science Department
Golden Gate National Parks Conservancy
Volunteers

After a couple of years of pent-up pandemic demand, we were finally able to grow our volunteer family again and bring on a couple dozen new Hawkwatch and Banding volunteers. New volunteer training for our programs is a big undertaking, but we are thankful to our 2022 apprentice volunteers for the fresh enthusiasm they brought to our Hawkwatch and Banding teams this season. As for our many returning volunteers – their increasing knowledge and skills are truly fundamental to our success year after year. Our sincerest gratitude to:

Ryan Abusaa  
Jon Altemus  
Jan Ambrosini  
Anne Ardillo  
Jennifer Armer  
Michael Armer  
Stefanie Arthur  
Patricia Baccetti  
Mary Badger  
Lynn Bantley  
Eddie Bartley  
Don Bartling  
Margot Bezrutczyk  
Marc Blumberg  
Robert Blumberg  
Jeff Boissier  
Robyn Boothby  
Ryan Bourbour  
Andy Bradshaw  
Nancy Brink  
Jennifer Brown  
Arden Bucklin-Sporer  
Courtney Buechert  
Ryan Byrnes  
Christine Cariño  
Linda Chambers  
Oliver Chesley  
Conner Cimmiyotti  
Laura Coatney  
Patricia Contaxis  
Patrick Coughlin  
Alexandra Cox  
Deborah Crooks  
Candace Davenport  
John Davis  
Dennis Davison  
Crystal Dolis  
Ben Dudek  
Joan Duffield  
George Eade  
Wade Eakle  
Rich Eliason  
Catherine Elliott  
Anastasia Ennis  
Michaela Figari  
Erin Fisher-Colton  
Dan Foldes  
Lief Gallagher  
Alison Gee  
Zeka Glucs  
Maureen Grabowski  
Susan Greef  
Mitchell Green  
Keith Gress  
Jessica Grubaugh  
Erica Harris  
JJ Harris  
Melissa Hero  
Tori Herzog  
Kimberly Hettler-Coleman  
Rasia Holzman Smith  
Calvin Hom  
Sam Hontalas  
Diane Horn  
Josh Hull  
Buzz Hull  
Eric Jepsen  
Chelsea Johnson  
John Keane  
Brian Klemper  
Mary Kenney  
Melissa Kohner  
Maryrose Kulick  
Rachel Lawrence  
Cheryl Lentini  
Patricia Lessard  
William Ludan  
Tom Luster  
Eric Lynch  
Yvette MacDonald  
Mary Malec  
Robert Martin  
Breanna Martinico  
Cindy McCauley  
Mark McCaustland  
James McDermott  
Tomas McKay  
Paul Meadow  
Horacio Mena  
Rachel Miller  
Jennifer Miller  
Margarita Montenegro  
Sue Morgan  
Nancy Mori  
Kimberlie Moutoux  
Jody Newman  
Tistine Newsham  
Craig Nikitas  
Brian O’Laughlin  
Ana Olivar  
Rebecca Olsen  
Kristin Olson  
Claire O’Neil  
Ryan Overhiser  
Sarah Parnell  
Sean Parnell  
Denise Peck  
Jean Perata  
Roy Pisetsky  
Bill Prochnow  
James Raives  
Cricket Raspet  
Sonja Raub  
Kinley Renger  
Lora Roame  
Jeff Robinson  
Steve Rock  
Paul Romanak  
Anne Ross  
Elizabeth Rouan  
Siobhan Ruck  
Jane Rudebusch  
Rod Santos  
Peter Sapienza  
Sarah Sawtelle  
Linda Schneider  
Kaela Schnitzler  
Jack Schofield  
Lynn Schofield  
Paulette Sherry  
Tim Stroshane  
Linda Sudduth  
Natalie Tan-Torres  
Christina Tarr  
Craig Tewell  
Holly Thomas  
Laura Thomas  
Traci Tsukida  
Michael Voeltz  
Kristin Vorhies  
Noreen Weeden  
Marion Weeks  
Emily Weil  
Carol Weinstein  
Jeff Wilcox  
Ken Wilson  
Woody Woodbury  
Jim Yampolsky  
Pauline Yeckley  
Gretchen Zantzinger
The 2022 fall migration was a season of almost-recovery from Covid-19, but someone forgot to tip off the hawks, as we had one of our lowest overall counts in many years. Though we brought our Hawkwatch season back up from 12 to 16 weeks, we kept some safety procedures from the Covid years: social distancing, fencing to keep volunteer counters separated from the public, and no volunteer office visits. We increased the count team size from 5 to 8 people, which included: two Co-Dayleaders, four journey-level counters, one apprentice, and one staff person. On weekends, we added a second staff person to stay near the fence and greet the many visitors.

The 2022 Hawkwatch program was staffed by 75 volunteers and 4 staff members. We brought on apprentices for the first time since 2019 and conducted field classes each morning using foam-core boards invented in 2021 by the late, great George Eade. These “George-Boards” covered a range of raptor identification lessons, for example, Eagle Ages, Accipiter Tails, Brown-backed Harriers, and Buteo Salad.

The season ran from August 15th to December 4th. Except for inclement weather, we counted daily from 10 am to 3 pm. Amidst rain and fog, high heat, and crazy wind, we counted for 410 of the possible 560 hours for the whole season, a bit lower than the average 470 hours/year for the ten years pre-Covid.

Our Parks Conservancy Data Manager Lizzy Edson set up the Hawkwatch 2022 comparison charts to show the raw count data for 2022 and the ten-year average count data. We use the term “sightings” since there is no way to be certain that a bird has been counted previously or not. The rates show sightings per hour; this is better for year-to-year comparisons since the number of count-hours fluctuates annually depending on how many fog days, rainouts, hot days, etc., have happened that year. Of the 18 raptor species counted in 2022, 13 showed declines in migration rates this year, and nine of those were near or over a 50% decline from the ten-year average.

Our four most prolific species – Turkey Vulture, Sharp-shinned, Cooper’s, and Red-tailed Hawk – declined in 2022, most extremely, Cooper’s, with 2022 rates just 44% of the past average. Two species increased in 2022, Bald Eagle and Broad-winged Hawk. Balds have been growing steadily and slowly in number in the fall migration as well as around the SF Bay Area since the 1990s. The Broad-winged Hawk increase mostly took place during four days in late September when 157 Broadwing sightings were recorded.

DAY LEADERS

Jon Altemus, Don Bartling, Andy Bradshaw, Christine Cariño, Deborah Crooks, Dennis Davison, Catherine Elliott, Erica Harris, Sam Hontalas, Mary Kenney, Mary Malec, James McDermott, Horacio Mena, Brian O’Laughlin, Becky Olsen, Libby Rouan, Jane Rudebusch, Linda Schneider, Holly Thomas, Ken Wilson, and Gretchen Zantzinger.
### Hawkwatch

Raptor sightings in the Marin Headlands, California, during autumn.

<table>
<thead>
<tr>
<th>Species</th>
<th>Count 2022 (sightings)</th>
<th>Average Count 2008-2019* (sightings)</th>
<th>Rate 2022 (sightings/hour)</th>
<th>Average Rate 2008-2019* (sightings/hour)</th>
<th>% Change in Rate**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turkey Vulture</td>
<td>5974</td>
<td>6571</td>
<td>14.54</td>
<td>16.41</td>
<td>-11%</td>
</tr>
<tr>
<td>Osprey</td>
<td>41</td>
<td>63</td>
<td>0.10</td>
<td>0.16</td>
<td>-37%</td>
</tr>
<tr>
<td>White-tailed Kite</td>
<td>14</td>
<td>58</td>
<td>0.03</td>
<td>0.15</td>
<td>-80%</td>
</tr>
<tr>
<td>Bald Eagle</td>
<td>20</td>
<td>10</td>
<td>0.05</td>
<td>0.02</td>
<td>150%</td>
</tr>
<tr>
<td>Northern Harrier</td>
<td>191</td>
<td>478</td>
<td>0.47</td>
<td>1.19</td>
<td>-60%</td>
</tr>
<tr>
<td>Sharp-shinned Hawk</td>
<td>1905</td>
<td>3049</td>
<td>4.64</td>
<td>7.61</td>
<td>-39%</td>
</tr>
<tr>
<td>Cooper’s Hawk</td>
<td>891</td>
<td>2001</td>
<td>2.17</td>
<td>5.00</td>
<td>-57%</td>
</tr>
<tr>
<td>Northern Goshawk</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Red-shouldered Hawk</td>
<td>189</td>
<td>399</td>
<td>0.46</td>
<td>1.00</td>
<td>-54%</td>
</tr>
<tr>
<td>Broad-winged Hawk</td>
<td>558</td>
<td>270</td>
<td>1.36</td>
<td>0.68</td>
<td>100%</td>
</tr>
<tr>
<td>Swainson’s Hawk</td>
<td>8</td>
<td>6</td>
<td>0.02</td>
<td>0.02</td>
<td>0</td>
</tr>
<tr>
<td>Red-tailed Hawk</td>
<td>6195</td>
<td>7250</td>
<td>15.08</td>
<td>18.11</td>
<td>-17%</td>
</tr>
<tr>
<td>Ferruginous Hawk</td>
<td>11</td>
<td>26</td>
<td>0.03</td>
<td>0.07</td>
<td>-57%</td>
</tr>
<tr>
<td>Rough-legged Hawk</td>
<td>1</td>
<td>4</td>
<td>0</td>
<td>0.01</td>
<td>-100%</td>
</tr>
<tr>
<td>Golden Eagle</td>
<td>8</td>
<td>14</td>
<td>0.02</td>
<td>0.04</td>
<td>-50%</td>
</tr>
<tr>
<td>American Kestrel</td>
<td>115</td>
<td>287</td>
<td>0.28</td>
<td>0.72</td>
<td>-61%</td>
</tr>
<tr>
<td>Merlin</td>
<td>87</td>
<td>166</td>
<td>0.21</td>
<td>0.41</td>
<td>-49%</td>
</tr>
<tr>
<td>Peregrine Falcon</td>
<td>209</td>
<td>201</td>
<td>0.51</td>
<td>0.50</td>
<td>2%</td>
</tr>
<tr>
<td>Prairie Falcon</td>
<td>4</td>
<td>4</td>
<td>0.01</td>
<td>0.01</td>
<td>0</td>
</tr>
<tr>
<td>Unidentified</td>
<td>424</td>
<td>869</td>
<td>1.03</td>
<td>2.17</td>
<td>-52%</td>
</tr>
<tr>
<td><strong>Total Sightings</strong></td>
<td><strong>16,845</strong></td>
<td><strong>21,727</strong></td>
<td><strong>41.01</strong></td>
<td><strong>54.28</strong></td>
<td><strong>-24%</strong></td>
</tr>
<tr>
<td><strong>Hours Counted</strong></td>
<td><strong>411</strong></td>
<td><strong>400</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

* The ten-year average used survey hours 10am to 3pm only for the years 2008-2019, removing 2010 and 2013.

** Change in migration rate from 2008-2019 average to 2022
**Banding**

In 2022, the GGRO Banding Program had huge accomplishments before the field season even started. This was the first season since 2018 that we were able to invite new volunteer apprentices (12) into the Banding Program. During the spring, we lost access to the NPS warehouse (due to heavy metal contamination) where our blinds were stored, but volunteer banders Craig Nikitas, Paul Romanak, and Lynn Bantley stepped in and took on the monumental task of rebuilding three banding blinds, ensuring that we would have a fall field season.

This migration season we banded 601 raptors of nine different species. Cooper’s Hawk (197) and Sharp-shinned Hawk (238) numbers were considerably lower than average and only one Northern Harrier was banded. The second wave of Red-tailed Hawks did not happen, but we banded 127 by the end of the season. We also banded low numbers of American Kestrels (10) and Merlins (8).

Despite the lower numbers, we continued to collect invaluable data. We placed color bands on 101 Redtails, 7 Redshoulders, 5 Peregrine Falcons, and we collected over 600 feather samples. We recaptured one Cooper’s Hawk that was banded in 2021. No Turkey Vultures were wing-tagged this season, but we had over 160 sightings of tagged vultures. We also had band encounters or resightings 27 Red-tailed and 4 Cooper’s Hawks.

There have been changes to the GGRO Banding Program in the past few years that impact our banding totals. Field hours during the general season and daily schedule were adjusted to ensure that staff can always be on-hand to provide support for the volunteers. In 2021 and 2022, we operated three blinds instead of four. During the years 2013, 2018, and 2019, we had low banding season totals, and in 2020 banding operations were completely shut down due to Covid-19. While these physical changes have reduced the number of banding hours for recent seasons, they do not impact the program’s goals and purpose.

The GGRO Banding Program is here to collect accurate data, samples, etc. on each individual raptor that we band, and we accomplished this goal in 2022, despite the below-average season.

**DAY LEADERS**

Anne Ardillo, Mike Armer, Eddie Bartley, Marc Blumberg, Robyn Boothby, Nancy Brink, Candace Davenport, Laura Echávez, Teresa Ely, Anastasia Ennis, Krista Fanucchi, Lief Gallagher, Josh Hull, Eric Jepsen, John Keane, Eric Lynch, Craig Nikitas, and Jeff Robinson.
## Banding

Raptors banded in the Marin Headlands, California, during autumn.

<table>
<thead>
<tr>
<th>Species</th>
<th>Average 2010-2019*</th>
<th>2021</th>
<th>2022</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northern Harrier</td>
<td>5.2</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>Sharp-shinned Hawk</td>
<td>314.2</td>
<td>184</td>
<td>238</td>
</tr>
<tr>
<td>Cooper's Hawk</td>
<td>423.9</td>
<td>283</td>
<td>197</td>
</tr>
<tr>
<td>Northern Goshawk</td>
<td>0.2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Red-shouldered Hawk</td>
<td>15.2</td>
<td>22</td>
<td>12</td>
</tr>
<tr>
<td>Broad-winged Hawk</td>
<td>2.1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Swainson's Hawk</td>
<td>0.3</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Red-tailed Hawk</td>
<td>219.6</td>
<td>195</td>
<td>127</td>
</tr>
<tr>
<td>Ferruginous Hawk</td>
<td>0.1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Rough-legged Hawk</td>
<td>0.1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>American Kestrel</td>
<td>28.1</td>
<td>7</td>
<td>10</td>
</tr>
<tr>
<td>Merlin</td>
<td>27.7</td>
<td>16</td>
<td>8</td>
</tr>
<tr>
<td>Peregrine Falcon</td>
<td>3.5</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>Prairie Falcon</td>
<td>1.0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total Banded</strong></td>
<td><strong>1041.2</strong></td>
<td><strong>722</strong></td>
<td><strong>601</strong></td>
</tr>
</tbody>
</table>

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

* From the early 1990s through 2019, on most days, we used four banding blinds in the GGRO Banding Program. In 2021 and 2022, we only used three blinds, therefore this chart shows the ten-year banding average for only the three blinds, making comparisons more valid. Numbers have not been adjusted for changes in banding season start and end dates in recent years, nor for changes in daily start and end times.
Vulture Ecology Study

Beyond being widely misunderstood by the general public, Turkey Vultures are often misunderstood from an ecological perspective as well. Where do they nest? How widely do they migrate, if at all? And how are they impacted by toxics, especially rodenticides, heavy metals, and even microplastics?

From 2017 to 2020, GGRO wing-tagged 17 Turkey Vultures to study these and other aspects of vulture behavior and conservation, particularly in this urban region. Nine of the tagged vultures were resighted (multiple times) throughout the Bay Area in 2022. The sightings were in Marin, Contra Costa, San Francisco, San Mateo, and Alameda counties.

From day one (August 15th) of the 2022 migration season, GGRO hawkwatch volunteers observed one of our most frequently seen tagged individuals, Turkey Vulture #368 over Hawk Hill. Over the course of the fall season, the volunteers recorded 168 sightings of tagged vultures from the hill, which means during the 411 hours on hawkwatch, we counted a tagged vulture, on average, every 2.5 hours. Following the same trend of the last few years, Turkey Vulture #368 was the most frequently sighted vulture by a considerable margin, with 27 confirmed records from Hawk Hill in 2022. Sightings of other tagged vultures ranged from 1 to 4 sightings throughout the entire season.

Thanks to our steady-handed hawkwatcher-photographers for capturing numbers on the fast-gliding, tagged TVs: John Davis, Don Bartling, Ken Wilson, Mary Malec, and others.
Turkey Vulture Band Recoveries in 2022

Data Source: Golden Gate Raptor Observatory (GGRO)

Map Author: Erin Fisher-Colton, GGRO Volunteer, 15 Jan 2023
Research

It is no surprise that, as a forty-year-old Community Science program, the GGRO’s scientific publications and presentations should be steeped in collaboration and partnership. It’s not readily apparent from the list below, but the research on this page alone includes collaborators from Colgate University, State University of New York, Syracuse, Hamilton College, Cornell University, University of Florida, University of Georgia, University of California – Davis, National Audubon Society, and the National Park Service. Thanks to all our reasearch partners, and particularly to Dr. Joshua Hull of UC Davis, and Dr. Chris Briggs of SUNY Syracuse, for their leadership.

PUBLICATIONS

Bourbour, RP. 2022. The foraging ecology of raptors migrating along the coast of California revealed with eDNA metabarcoding. PhD dissertation. UC Davis.


PRESENTATIONS

Bourbour, RP. Sept 2022. Beak and talon swabs reveal dietary trends of Sharp-shinned Hawks banded during fall migration. Western Bird-Banding Association Conference. UC Davis, CA.


Outreach

From 1990 to 2019, GGRO staff and interns held weekend “HawkTalks” at high noon on Hawk Hill. These included: a raptor identification mini-class; an overview of GGRO findings; and – if the birds complied – the release of a live, recently-banded hawk. With staff reductions following the outbreak of Covid-19, we had to let go of some GGRO activities, and, sadly, the HawkTalk was among them.

Although full interpretive talks weren’t possible in 2022, we did arrange our weekend schedules so that one GGRO staff person would also be a greeter to informally talk to people about the migration on Hawk Hill, and the results were wonderful. Hawk Hill visitors were enthusiastic and full of questions; they were one of the true highlights of the 2022 season. The Golden Gate Bridge vista is one of the most-visited places in the National Park system, yet many of these travelers have no idea that they are visiting the biggest raptor migration in the Pacific States. Then a Peregrine tears across the sky and someone is hooked for life.

August 15th to December 4th, we tallied 8348 people on the hill, with an average rate of 21.6 visitors per hour (VpH). Interestingly, weekday rates were 16.5 VpH, while weekends and holidays were double that, at 33.4 VpH.

In 2022, school groups continued to use Hawk Hill as a landscape to teach about migration, community science, and raptor ecology: Independence High School, Downtown High School, and USF among them. We are thrilled that our Parks Conservancy colleagues at the Crissy Field Center kept the innovative Migratory Story program moving forward in 2022. Bilingual science instructors met with more than 200 kids from nine San Francisco Unified School District classes to explore the raptor migration and the universality of migratory movements among all living things. In February 2022, Parks Conservancy Associate Director of Youth Education, Francis Taroc, was featured in Audubon magazine back in February 2022 in an article about Migratory Story, and the intersectionality of bird conservation work. The Paths We Take | Audubon Magazine

GGRO had an increasing digital presence in 2022. During the migration season, Teresa Ely, Laura Echávez, and Krista Fanucchi created more than 100 Instagram posts and stories to fan the flames of interest in Hawk Hill and the raptor flight. GGRO director Allen Fish was interviewed by Michael Hawk (no relation) on the top of Hawk Hill for an episode of Nature’s Archive. Raptor Migration from Hawk Hill | Nature’s Archive Podcast

Like so many organizations, our outreach work largely shifted from wild landscapes to online during the pandemic, however, 2022 was a great reminder of the lasting impact that happens when people see wildlife outside in a natural place. We look forward to accelerating our Hawk Hill offerings in 2023 and ahead, to make the best use of this magnificent migration, and location, to impact people.
### NUMBER OF RAPTOR SIGHTINGS 2011–2022*

Marin Headlands, California

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
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Data compiled by Lizzy Edson and Allen Fish. If you would like to use these data, please contact us: 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 1983–2022*

Marin Headlands, California

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| Total Banded             | 1251      | 1522 | 1281 | 1122 | 1305 | 1071 | 772**| 601**| 45,323|

Data compiled by Teresa Ely. If you would like to use these data, please contact us: 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.

** The 2021 and 2022 banding seasons operated with three blinds. All previous seasons operated with four. This is a contributing factor to lower numbers.