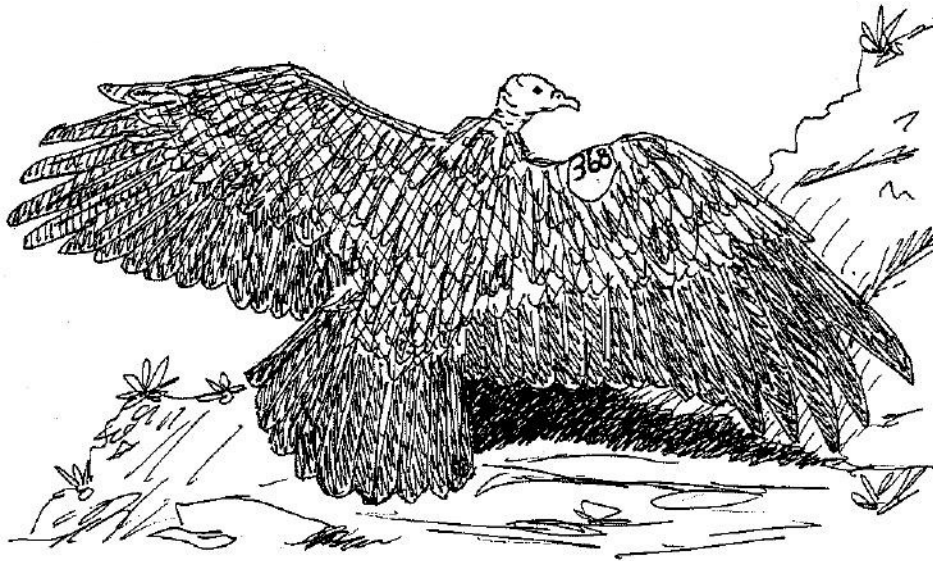


Golden Gate Raptor Observatory
Season Summary 2018



VOLUNTEERS • HAWKWATCH • OUTREACH
BANDING • RESEARCH • DONORS





Turkey Vulture #368 sunning on Fish Rock.

(Illustration by Olivia Wang)

G O L D E N G A T E R A P T O R O B S E R V A T O R Y

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 275 community volunteers and a small staff.

Our deep gratitude to the Gregory Hind Endowment for critical support of the GGRO.

GGRO Season Summary 2018

Compiled and edited by Kelsie McInnis.

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Requests for or questions about GGRO data should be addressed to ggro@parksconservancy.org.

Cover: Ferruginous Hawk. *(Illustration by Siobhan Ruck)*

G G R O S T A F F

ALLEN FISH, GGRO DIRECTOR • KELSIE MCINNIS, OPERATIONS MANAGER

TERESA ELY, BANDING MANAGER • STEP WILSON, HAWKWATCH & OUTREACH MANAGER

BUZZ HULL, RESEARCH DIRECTOR EMERITUS

2018 INTERNS: ERIN BARRY, KIRSTI CARR, LAURA KWASNOSKI, BRIAN TSURU, OLIVIA WANG

SHARON FARRELL, EXECUTIVE VICE PRESIDENT, PROJECTS, STEWARDSHIP AND SCIENCE, GGNPC

BILL MERKLE, WILDLIFE ECOLOGIST, GGNRA

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

Innovating for Birds of Prey, Deepening Park Volunteerism

2019 is the year we celebrate GGRO's 35th anniversary. And although the wheels of planning for celebration are still turning, I am thinking today of the innovations that have happened here since the early 1980s. Think about the 1980s—no internet, few home computers, phones had cords, cameras had film. The terms “citizen science” or “community science” hadn't been coined yet, but amateurs had long blazed pathways throughout ornithology.

In the 1980s, we were fortunate to have rough models for the research we wanted to do at GGRO. The Hawk Migration Association provided sample data sheets for counting hawks. Migration stations like Cedar Grove Ornithological Station, Cape May Bird Observatory, and Hawk Mountain Sanctuary all pioneered methods of trapping, banding, and quantifying migrating hawks—methods we were happy to modify for our needs. And modify we did.

From the beginning, GGRO volunteers were innovators, genius sparking genius. They improved trapping techniques, refining equipment and methods. They created better bird care techniques. They invented entirely new systems—Quadrant Counting, RoboLuring; Urban Raptor Nest Monitoring; Three-team Radiotracking with high-point maps and beeper codes; Field Mentoring; Leadership Training and Evaluations; Rodenticide research; Beak and Talon Swabbing; the San Francisco Bay Osprey Coalition; the Accipiter Identification Study; and Migratory Story. Some of these innovations have already resulted in scientific papers or presentations, sealed and delivered. Others are in production. All are valuable contributions to raptor science and conservation.

Today I salute the innovators and leaders of the GGRO's first 35 years. You are an impressive group in your commitment to raptor biology. Thank you for what you have done to shape the GGRO, and to deepen the meaning of volunteering in national parks. To tweak Margaret Mead's famous adage—never underestimate the power of community, especially in their commitment to wildlife and wildlands.

Although many Conservancy and NPS staff contribute their time and attention to make GGRO's migration monitoring possible, I am especially grateful this year for the timely aid of Alisa Shor, Alison Forrestel, Audrey Yee, Bill Merkle, Brian Teng, Carol Klammer, Derek Mann, Denise McKinney, Garrett Lee, Hayden Murray, J Mark Jenkins, Katherine Toy, Kelsi Ju, Kendall Brown, Kyle Mackiewicz, Laurel Mackay, Maggie McKinlay, Maggie Perry, Mia Monroe, Mike Moser, Mike Rafferty, Rodney Anderson, Roxi Farwell, Sharon Farrell, Simon Chow, Sue Gardner, Sue Woo, Todd Blatt, Zac Stanley, and the entire magnificent Crissy Field Center staff. Great thanks also to Terry Kreidler who retired this fall after decades of guiding our brilliant Golden Gate National Recreation Area volunteer programs.

Yours in bird conservation,



— Allen Fish, GGRO Director

V O L U N T E E R S

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 Jeff Acuff
 Cat Acuff
 Sylvia Algire
 Jon Altemus
 Jan Ambrosini
 Anne Ardillo
 Michael Armer
 Jennifer Armer
 Cynthia Armour
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 Sam Hontalas
 Kimberly Horrell
 Heather Hoyles
 Serena Hubert
 Buzz Hull
 Josh Hull
 Julian Hyde



Bander Anne Ardillo shows off a juvenile dark-morph Red-tailed Hawk. (Illustration by Olivia Wang)

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 Phil Capitolo
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 Sally Cedarblade
 Daniel Chelsky
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Steve Miller	Bob Power	Holly Thomas	



Red-shouldered Hawk.
(Illustration by Brian Tsuru)

H A W K W A T C H

RAPTOR-SIGHTINGS IN THE MARIN HEADLANDS DURING AUTUMN

	2018 Season* Excludes Smoke Days (408 hours)		Past 10-Year Average (2006-2017)** Excludes Smoke Days (430 hours)		Past 10-Year Average (2006-2017)** (488 hours)	
	sightings	raptors/hr	sightings	raptors/hr	sightings	raptors/hr
Turkey Vulture	6694	16.42	6989	16.25	7828	16.05
Osprey	67	0.16	76	0.18	78	0.16
White-tailed Kite	52	0.13	66	0.15	76	0.16
Bald Eagle	14	0.03	6	0.01	8	0.02
Northern Harrier	600	1.47	500	1.16	611	1.25
Sharp-shinned Hawk	3389	8.31	3653	8.49	3851	7.90
Cooper's Hawk	1914	4.70	2386	5.55	2475	5.08
Northern Goshawk	3	0.01	1	0.00	1	0.00
Red-shouldered Hawk	362	0.89	440	1.02	470	0.96
Broad-winged Hawk	295	0.72	275	0.64	275	0.56
Swainson's Hawk	5	0.01	7	0.02	8	0.02
Red-tailed Hawk	9230	22.64	7552	17.56	8693	17.83
Ferruginous Hawk	29	0.07	25	0.06	27	0.06
Rough-legged Hawk	8	0.02	3	0.01	6	0.01
Golden Eagle	14	0.03	18	0.04	19	0.04
American Kestrel	349	0.86	333	0.78	375	0.77
Merlin	182	0.45	171	0.40	192	0.39
Peregrine Falcon	205	0.50	201	0.47	237	0.49
Prairie Falcon	2	0.00	5	0.01	6	0.01
Unidentified	909	2.23	1039	2.42	1112	2.28
Total	24,323	59.67	23,747	55.22	26,349	54.04

*2018 hawk count lost twelve days (November 9-20) due to hazardous fire smoke.

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

D A Y L E A D E R S

JON ALTEMUS • TIM BEHR • CHRISTINE CARIÑO • DENNIS DAVISON • NANCY ELLIOT • KEITH GRESS
 MARY KENNEY • CHERYL LENTINI • HORACIO MENA • KIM MEYER • BRIAN O'LAUGHLIN • BOB POWER
 JAMES RAIVES • LAURY ROSENTHAL • STEP WILSON

H A W K W A T C H

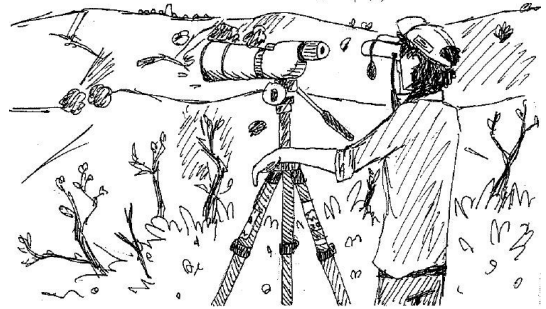
The 2018 GGRO Hawkwatch season was scheduled for August 13 through December 2 for its usual 16-week count. The season began with 23 outstanding apprentices fresh from GGRO's raptor ID training, two amazing Alcatraz waterbird interns freed from their breeding-colony count, and five incredible interns immersed in a six-week GGRO ramp up. They rounded out the 201 volunteer hawkwatchers who kept counts under the daily assistance of 15 dayleaders responsible for the collection and accuracy of all data.

The season was again interrupted with hazardous air conditions, this time due to the Camp Fire in Butte County. Our sincere sympathy goes out to everyone impacted by this catastrophe and its aftermath.

The effect on this year's hawk count was highly unusual and extremely different from last year as teams were prohibited from counting for 12 consecutive days after exiting Hawk Hill early on November 9 due to the worsening air quality. Not only was the air quality too poor for volunteers and staff to work outdoors, but also the visibility was significantly diminished for count purposes. What effect it had on the raptor movement and the data at our count site is largely speculative. Historically we have compared our current year's data with our previous 10-year average. Since the data we could not collect is about ten percent of our total numbers, we have decided to compare this year's count to the historical average and also to the 10-year average excluding November 9-20.

— Step Wilson, Hawkwatch Manager

*GGRO intern Brian Tsuru scans the skies.
(Illustration Olivia Wang)*



O U T R E A C H

Outreach at GGRO is a many-feathered thing. At its core is this simple message: come to Hawk Hill and look up. There is no substitute for seeing a hawk in the wild, gliding over the Marin Headlands, leaning into the south, disappearing into the cityscape of San Francisco. In 2018, GGRO Outreach Interns Olivia Wang and Brian Tsuru were the backbone of our weekend docent programs, hosting HawkTalks and Raptor Releases every clear weekend day in September and October, averaging 40 audience members per talk.

For the fourth year, GGRO's sister program, the Crissy Field Center, co-hosted *Migratory Story* programs with us in the classrooms of seven San Francisco Title-1 middle schools where English is the second language for most students. The *Migratory Story* innovation connects the study of bird migration on Hawk Hill with the necessity for human migration around the planet. It allows the kids to participate, when comfortable, in sharing their own family stories of movement from place to place.

Many other classrooms, community groups, birders, and even Golden Gate Bridge photographers joined the GGRO last fall to watch the migration. Among the groups that heard GGRO talks on or off Hawk Hill in 2018 were Balboa High School Wilderness Art and Literary Collective, Children's Day School, Century Club, Friends of China Camp State Park, Head Royce School, Hillside Club, Marin Art and Garden Center, Marin County Parks, Marin Horizon School, Mendocino Coast Audubon Society, National Trust for Historical Preservation, Naturebridge, Oakland Zoo Docents, Oakland Zoo Teen Club, Saint Vincent De Paul High School, San Francisco Bay Bird Observatory, Society for Conservation Biology, Sonoma State University, Tamalpais High School, UC Berkeley Alumni, Veteran Administration – Ft. Miley, and YMCA Point Bonita.

— Allen Fish, GGRO Director

D O C E N T S

EDDIE BARTLEY • KIRSTI CARR • CARMEN DELEON • TERESA ELY • ALLEN FISH • CRAIG NIKITAS
LYNN SCHOFIELD • SIOBHAN RUCK • BRIAN TSURU • OLIVIA WANG • STEP WILSON

B A N D I N G

RAPTORS BANDED IN THE MARIN HEADLANDS DURING AUTUMN

	2018* (8/13/2018 - 12/20/2018)	Annual Average** 1993-2017***	Totals 1983-2018
Northern Harrier	6	10.48	323
Sharp-shinned Hawk	413	472.44	13,074
Cooper's Hawk	468	560.24	16,192
Northern Goshawk	1	0.20	7
Red-shouldered Hawk	12	16.32	465
Broad-winged Hawk	5	1.44	46
Swainson's Hawk	0	0.40	11
Red-tailed Hawk	342	305.52	10,324
Ferruginous Hawk	0	0.04	3
Rough-legged Hawk	0	0.16	6
Golden Eagle	0	0.04	2
American Kestrel	26	53.28	1483
Merlin	21	31.40	817
Peregrine Falcon	5	4.24	117
Prairie Falcon	1	1.80	50
Eurasian Kestrel	0	<0.10	1
Total	1300	1458	42,921

*Missed November 9-20 due to hazardous fire smoke. Missed December 21 - January 3 due to government shutdown.

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

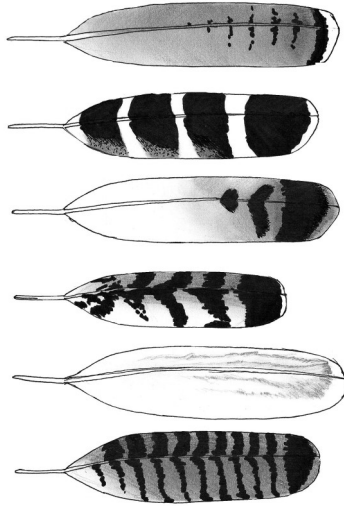
***1993-2017 are used for this comparison due to similarity of methods and effort between those years and 2018.

D A Y L E A D E R S

ANNE ARDILLO • MICHAEL ARMER • EDDIE BARTLEY • ROBYN BOOTHBY • NANCY BRINK • CARMEN DeLEON
TERESA ELY • ANASTASIA ENNIS • LIEF GALLAGHER • BUZZ HULL • JOSH HULL • DAVID JESUS
MAMIKO KAWAGUCHI • JOHN KEANE • CRAIG NIKITAS • CLAIRE O'NEIL • JEFF ROBINSON • LYNN SCHOFIELD

B A N D I N G

Buteo tail feathers; one from each California species. (Illustration by Siobhan Ruck)



The 2018 season started with a strong presence of Red-tailed Hawks. We banded 342 Redtails this season, and 185 also received a color-band. We also placed color-bands on 11 Cooper's Hawks, wrapping up that project. Heavy smoke from the Camp Fire shut us down for 13.5 days, followed by several rain days, then a government shutdown, but we still ended up with a decent banding season—a total of 1304 birds trapped and banded.

Highlights included the seventh Northern Goshawk banded ever at GGRO, five Broad-winged Hawks banded, and five Turkey Vultures tagged. We made three foreign (not banded by GGRO) recaptures—two Cooper's Hawks and a Peregrine Falcon. Both Cooper's Hawks were captured in late September and previously banded in mid-September at Bonney Butte, OR (HawkWatch International). The Cooper's Hawks were banded in Oregon one day apart and showed up in the Marin Headlands eight days apart. We also recaptured one of the UC Berkeley Peregrine Falcons on August 29. The juvenile Peregrine was originally banded as a nestling on the Campanile Tower by the Santa Cruz Predatory Bird Research Group in May 2018 by raptor biologist (and GGRO volunteer) Dr. Zeka Glucs.

We also welcomed two new dayleaders and five new siteleaders to our team of 105 banders. Thank you to all banders for taking the time and energy to properly train our 26 apprentices this season.

— Teresa Ely, Banding Manager

R E S E A R C H

One of the side benefits of being a 35-year community science program is having many cooperators out in the scientific community. The GGRO has benefitted hugely from the volunteers and interns who have moved on into professional biology as academics, as contract biologists, as museum curators, and as educators. We have also cultivated long relationships with bird-related labs at colleges local and distant including UC Davis, UC Berkeley, San Francisco State University, Sonoma State University, University of Wyoming, and Hamilton College.

In 2018, we added three scientific articles and a scientific poster to our catalog of 40 published articles and more than 100 presentations and publications. Working in Joshua Hull's lab at UC Davis, former GGRO Intern Emily Abernathy published her Master's research, scanning Red-tailed Hawk blood for rodenticides.

Abernathy, EV, JM Hull, AM Fish, and CW Briggs. 2018. Secondary anticoagulant rodenticide exposure in migrating juvenile Red-tailed Hawks (*Buteo jamaicensis*) in relationship to body condition. *Journal of Raptor Research* 52 (2): 225-230.

Also working at UC Davis, Charlene Lujan-Vega published her review of a specific family of micro-organisms in the soaring hawks, using samples from a range of sites in California. This study was conducted in Michelle Hawkins' lab at the UCD School of Veterinary Medicine.

Lujan-Vega, C, MG Hawkins, CK Johnson, CW Briggs, C Vennum, PH Bloom, JM Hull, C Cray, D Pesti, L Johnson, P Ciembor, and BR Ritchie. 2018. Atypical Chlamydiaceae in wild populations of hawks (*Buteo* spp.) in California. *Journal of Zoo and Wildlife Medicine* 49 (1): 108-115.

(continued...)

R E S E A R C H

GGRO's Banding Manager Teresa Ely also published her Master's research in 2018, based out the University of Nebraska and under the supervision of John DeLong. Ely combined the work of seven migration sites across North America to get a continental picture of American Kestrel trends.

Ely, TE, CW Briggs, SE Hawks, GS Kaltenecker, DL Evans, FJ Nicoletti, J-F Therrien, O Allen, and JP DeLong. 2018. Morphological changes in American Kestrels (*Falco sparverius*) at continental migration sites. *Global Ecology and Conservation*. doi: 10.1016/j.gecco.2018.e00400.

Last winter and spring, working in the Hull Lab, UCD undergraduate Olivia Wang analyzed 30 years of GGRO hawk counts for Cooper's and Sharp-shinned Hawks to see if either showed phenological trends (changes in migration timing). Wang found a fascinating discrepancy between these lookalike accipiters—the Cooper's Hawk migration timing stayed static over time while Sharp-shinned Hawk timing showed a delay in migration. Wang presented her results as a poster:

Wang, O, S. Skalos, C Tyson, AM Fish, and JM Hull. 2018. Changes in the autumn migration timing of two North American raptor species. Poster presented at the *UC Davis Undergraduate Research Symposium*. Davis, CA.

Great thanks to all the researchers and students who have advanced the analysis of GGRO-generated data, and the GGRO volunteers for providing consistent and precise data.

— Allen Fish, GGRO Director



GGRO banders caught and banded our seventh Northern Goshawk ever in 2018.

(Illustration by Brian Tsuru)

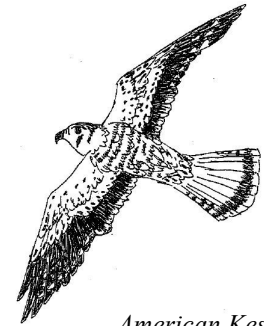
D O N O R S

**Indicates donors who contributed to the Data Analysis and Publishing (DAP) fund*

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	Louis Morton *		Anita Scuri



American Kestrel.
(Illustration by Olivia Wang)

D O N O R S

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 Jay Sheets *
 Carrie Sherriff *
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**THE GREGORY HIND
 ENDOWMENT**
 Leslie & Troy Daniels



2018 intern Kirsti Carr releases a Red-tailed Hawk. (Illustration by Olivia Wang)

NUMBER OF RAPTORS BANDED 1983-2018, MARIN HEADLANDS*

	1983-2011	2012	2013**	2014	2015	2016	2017	2018***	Total
Turkey Vulture	n/a	n/a	n/a	n/a	n/a	n/a	5	5	10
Northern Harrier	259	16	10	18	8	3	3	6	323
Sharp-shinned Hawk	10,069	730	173	414	481	463	330	413	13,074
Cooper's Hawk	12,437	762	390	485	649	503	496	468	16,192
Northern Goshawk	5	0	0	0	1	0	0	1	7
Red-shouldered Hawk	317	42	21	25	33	12	3	12	465
Broad-winged Hawk	22	9	3	1	3	2	1	5	46
Swainson's Hawk	9	1	0	0	0	0	1	0	11
Red-tailed Hawk	8287	348	433	222	251	229	212	342	10,324
Ferruginous Hawk	2	0	0	0	0	0	1	0	3
Rough-legged Hawk	5	0	1	0	0	0	0	0	6
Golden Eagle	2	0	0	0	0	0	0	0	2
American Kestrel	1203	81	37	49	41	24	21	26	1483
Merlin	582	36	24	33	50	34	37	21	817
Peregrine Falcon	79	7	2	2	2	9	11	5	117
Prairie Falcon	37	2	2	2	3	2	1	1	50
Eurasian Kestrel	1	0	0	0	0	0	0	0	1
Total	33,316	2034	1096	1251	1522	1281	1122	1305	42,931

*Data compiled by Teresa Ely. 2018 data are through December 20, 2018.

**Not a complete season; missed October 1-16, 2013, due to government shutdown.

***Missed November 9-20 due to hazardous fire smoke. Missed December 21 - January 3 due to government shutdown.

NUMBER OF RAPTOR-SIGHTINGS 2007-2018, MARIN HEADLANDS*

	2007	2008	2009	2011	2012	2014	2015	2016	2017	2018**
Hours	524	525	497	439	442	488	540	443	486	408
Turkey Vulture	9228	7529	8060	6447	6622	8433	9692	5998	7063	6694
Osprey	90	88	81	57	62	79	83	67	63	67
White-tailed Kite	71	74	93	74	129	73	36	20	61	52
Bald Eagle	2	6	10	9	8	9	8	8	17	14
Northern Harrier	1002	454	614	335	523	394	442	354	905	600
Sharp-shinned Hawk	4636	4091	3332	2622	3149	3539	4652	4138	3107	3389
Cooper's Hawk	3717	1956	1738	1805	2695	2169	3106	1998	2198	1914
Northern Goshawk	4	2	1	0	0	0	2	0	0	3
Red-shouldered Hawk	512	559	529	248	604	578	574	265	220	362
Broad-winged Hawk	70	131	180	203	756	310	344	289	286	295
Swainson's Hawk	12	1	1	13	11	10	6	5	13	5
Red-tailed Hawk	11869	6862	8297	7530	8601	7559	10017	5676	9132	9230
Ferruginous Hawk	13	15	11	18	32	19	73	48	20	29
Rough-legged Hawk	10	4	2	0	19	1	1	4	1	8
Golden Eagle	38	18	11	9	13	32	18	13	16	14
American Kestrel	378	377	458	358	396	380	297	229	268	349
Merlin	140	184	149	166	180	183	257	178	252	182
Peregrine Falcon	181	224	259	264	246	279	225	199	252	205
Prairie Falcon	4	7	9	2	8	7	6	2	5	2
Unidentified	1382	904	991	1011	1084	1159	1381	862	906	909
Total	33,359	23,486	24,826	21,171	25,138	25,213	31,220	20,353	24,785	24,323
Raptor Activity (raptors per hour)	63.7	44.7	50.0	48.2	56.9	51.7	57.8	41.2	51.0	59.7

*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

**2018 hawk count lost twelve days (November 9-20) due to hazardous fire smoke.

Golden Gate Raptor Observatory

Golden Gate National Parks Conservancy

Fort Cronkhite, Building 1064

Sausalito, California 94965

GGRO Season Summary 2018

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