

FALL 2017 RAPTOR MIGRATION ANNUAL REPORT: GOSHUTE MTS HAWKWATCH, NEVADA



HawkWatch International, Inc.
Salt Lake City, Utah



**FALL 2017 RAPTOR MIGRATION ANNUAL REPORT:
GOSHUTES HAWKWATCH- GOSHUTE MOUNTAINS, NEVADA**

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INTRODUCTION

The Goshute Mountains HawkWatch in northeastern Nevada is an ongoing, long-term effort to monitor long-term population trends of raptors using the Intermountain Flyway (Hoffman et al. 2002, Hoffman and Smith 2003, Smith et al. 2008a). HWI and its organizational precursors have studied raptor migration in the Goshute Mountains each fall since 1980, when HWI founder Steve Hoffman and colleagues started banding at the site. The first standardized count occurred in 1983 and counts have continued each year since. This is one of the longest running standardized, raptor-migration monitoring efforts in western North America, with the 2017 season marking the 38th consecutive season of banding and the 35th consecutive fall count at the site. Annual counts range between ~12,000–25,000 migrants of up to 19 species, making this one of the largest known concentrations of migrating raptors in the western U.S. and Canada (Bildstein 2006). This report summarizes the 2017 fall migration at the Goshute Mountains HawkWatch.

The Goshute Mountains HawkWatch was 1 of 8 long-term, annual migration counts, and 1 of 4 migration banding studies conducted or co-sponsored by HWI in 2017 (Fig. 1). The primary objective of these efforts is to track long-term regional population trends of diurnal raptors in western North America and around the Texas Gulf Coast (Hoffman and Smith 2003; Smith et al. 2001, 2008 a, b). The Goshute Mountains HawkWatch falls within the Great Basin bird conservation region, the Intermountain West Joint Venture, and the Basin and Range Partners in Flight region. Raptors can serve as important biological indicators of ecosystem health (Bildstein 2001) and long-term migration counts can be a cost effective and efficient method for monitoring regional status and trends of multiple raptor species (Zalles and Bildstein 2000).

In addition to long-term counting and banding efforts, HWI conducts and supports other studies to further our knowledge about the biology of migrating raptors. Some of these efforts include: telemetry work to identify species' ranges, migratory routes and connectivity; and collection of blood and feather samples to study various genetic aspects of raptor populations in the west (e.g., Hoffman et al. 2002, Lott and Smith 2006, Goodrich and Smith 2008, DeLong and Hoffman 2004, McBride et al. 2004).

Beyond having scientific and conservation value, each site in HWI's migration network offers unique opportunities for the public to learn about raptors and the natural environment. Providing such opportunities is another important component of the Goshute Mountains HawkWatch and outreach efforts here reach hundreds of people from Nevada, Utah, and beyond each season.

STUDY SITE

The Goshute Mountains form a 100-km ridge that runs north–south along the Utah–Nevada border. The study site is located in the Goshute Wilderness Study Area approximately 40 km southwest of Wendover, Nevada, on land administered by the Elko Field Office of the Bureau of Land Management (40° 25.417' N, 114° 16.276' W; Fig. 1). The HawkWatch site is located near the south end of the Goshute range and accessed via a primitive road that begins near Ferguson Springs, and then a primitive trail that ascends Christmas Tree Canyon from the east.

Prior to 2001, the main count site was located atop the highest point of ridge in the project area at an elevation of 2,743 m (OP1 in Fig. 2). This location provided an expansive 360° view of the surrounding landscape, but poor visibility at or below eye level hindered the view covering the east side. To compensate when winds blew from the east, during the first couple decades' observers commonly moved about 250 m north to a second observation post (OP2 in Figure 2), which provided an unobstructed view along the lower eastern flanks of the ridge. In 2001 this second location became the permanent observation site with standardized counts occurring there every year since (cf. Vekasy and Smith 2002).

Over the years, HWI has run as many as six trapping stations at the Goshutes in a single year. In recent years, we trap at two stations: North and West (Fig. 2a).

METHODS

STANDARDIZED COUNTS

Two designated observers occasionally relieved or supplemented by other staff and volunteers conduct standardized daily counts throughout the season. Weather permitting, daily counts usually begin between 0800 and 0900 H Mountain Standard Time (MST) and end near sunset, usually between 1700 and 1900 H. Data collection follows standardized protocols used at all HWI migration sites (Hoffman and Smith 2003). Observers routinely record the following data:

1. Species, age, sex, and color morph of each migrant raptor, whenever possible and applicable (Appendix B lists common and scientific names for all species, information about the applicability of age, sex, and color morph distinctions, and two-letter codes used to identify species in some tables and figures).
2. Hour of passage for each migrant; e.g., the 1000–1059 H MST.
3. Wind speed and direction, air temperature, percent cloud cover, predominant cloud type(s), presence or of precipitation, visibility, and an assessment of thermal-lift conditions, recorded for each hour of observation on the half hour.
4. Predominant direction, altitude, and distance from the lookout of the flight during each hour.
5. Total minutes observed and the mean number of observers present during each hour (included designated observers plus volunteers/visitors who actively contributed to the count [active scanning, pointing out birds, recording data, etc.] for more than 10 minutes in a given hour), recorded on the hour.
6. A subjective visitor-disturbance rating for each hour, recorded on the hour.
7. Daily start and end times for each observer.

In comparing 2017 counts against means and 95% confidence intervals for previous seasons, we consider a count value falling outside the 95% confidence interval of the historic site means as significantly different. We use linear and quadratic regression on effort-adjusted annual passage rates (raptors/100hrs) to identify long-term trends in migrating raptors.

TRAPPING AND BANDING

Crewmembers operated 1-2 trapping stations daily (weather permitting) from mid-August through early November, generally between 0900 and 1700 H MST. Capture devices included mist nets, dho-gaza nets, and remotely triggered bow nets. Trappers lured migrating raptors into the capture stations from camouflaged blinds using live, non-native avian lures attached to lines manipulated from the blinds. Unless already banded, we fit all birds with a uniquely numbered USGS Biological Resources Division aluminum leg band. Data collection followed standardized protocols used at all HWI migration-banding sites (Hoffman et al. 2002). We released all birds within 45 minutes of capture.

2017 RESULTS AND DISCUSSION

OBSERVATION EFFORT AND WEATHER SUMMARY

The Goshute Mountains HawkWatch standard season runs 15 August – 5 November; in 2017 observers counted on 79 of 83 possible days during this period for a total of 697.7 hours, statistically no different from site averages of 80 days and 694.6 hours (Appendix C).

2017 FLIGHT SUMMARY

Overall Flight:

We counted 10,806 migrants of 17 raptor species in 2017, 26% lower than the site average (Table 1).

The composition of the 2017 flight broke down as follows: 42% accipiters, 44% buteos, 7% falcons, 2% vultures, 1.5% harriers, 2.5% eagles, and 0.8% Ospreys. The proportions of buteos, eagles, Osprey, and Harriers in the flight were above historic averages; accipiters, vultures, and falcons made up a significantly smaller proportion of the flight compared to site historic averages (Fig. 3). The most commonly observed species in 2017 in descending order: Red-tailed Hawks (36% of the total), Sharp-shinned Hawks (23%), Cooper's Hawks (14%), American Kestrels (6%), Swainson's Hawks (5%), Turkey Vultures (2%), Golden Eagles (2%), and all the other species made up $\leq 1\%$ of the total flight (Table 1).

The following sections summarize the 2017 count relative to historic means at the site, and any statistically significant ($\alpha < 0.05$) population trends are based on first and second order regression analysis. HWI only depicts significant trends for species with a historic average count rate greater than or equal to 10 individuals per 100 hours. The rationale is that trends for counts below this point likely do not contain biologically meaningful information on regional populations—species with counts this low likely have a dispersed migration, another primary migration route, or large portions of the population that are resident. We do include count information in the reports, as occurrences of rarer species are of interest to both managers and the public, and could represent the beginning of meaningful long-term changes.

Total Flight (Fig.4):

The 1,548 raptors counted per 100 hours of observation at the Goshutes HawkWatch in 2017 was significantly low compared to average site passage rate of 2153 raptors per 100 hours. Over the duration of the site, counts have varied but no long-term statistical trend exists.

Vultures, Osprey, Northern Harriers (Fig. 5a):

We counted average numbers of Northern Harriers and Osprey, and a below average number of Turkey Vultures in 2017 (Table 1). Regression results on fall passage rates suggest that regional populations of Turkey Vultures are growing (slope = 2.13, $r^2 = 0.40$, $p < 0.001$) and recent declines in the number of Osprey counted on migration beginning around 2007 ($F_{2,32} = 7.8$, $r^2 = 0.33$, $p = 0.009$). Northern Harrier populations are stable over the long-term (no significant trend) based on fall migration counts.

Accipiters (Fig. 5b):

Counts and passage rates for Sharp-shinned Hawks and Cooper's Hawks were below average at the Goshutes HawkWatch in 2017 while those for Northern Goshawks were above average (Table 1). Regression analysis results indicate that that Northern Goshawk passage rates are declining (slope = -0.30, $r^2 = 0.14$, $p = 0.024$); that Cooper's Hawk regional populations have been declining since around 2001 ($F_{2,32} = 4.22$, $r^2 = 0.21$, $p = 0.04$), and that Sharp-shinned Hawk passages rates are stable over the long-term (no significant trend).

Buteoine Hawks (Fig 5c):

The 4,735 buteos counted at the Goshutes is significantly higher than the site average of 3,876 (Table 1). Counts and passage rates for Broad-winged Hawks and Swainson's Hawks did not differ from site averages in 2017. Ferruginous Hawk and Red-tailed Hawk, and Rough-legged Hawk counts and passage rates were all significantly high compared to site averages. Regression analyses of passage rates indicate long-term increases in the number of Broad-winged Hawks (slope = .74, $r^2 = 0.46$, $p < 0.001$), Swainson's

Hawks (slope = 2.89, $r^2 = 0.17$, $p = 0.013$), and Red-tailed Hawks (slope = 8.2, $r^2 = 0.32$, $p < 0.001$) counted at the Goshutes HawkWatch during fall migration counts.

Eagles (Fig. 5d):

We counted an average number of Golden Eagles (252 total, 36.1 birds/100hrs) and Bald Eagles (14, 2 birds/100hrs) in 2017 at the Goshute Mountains HawkWatch. Regression results indicate a long-term decline in regional Golden Eagle populations (slope = -0.39, $r^2 = 0.19$, $p = 0.008$) based on migration counts, Bald Eagle passage rates are stable (no trend).

Falcons (Fig 5e):

Crews counted a record low 616 migrating American Kestrels (also a record low 88.3 birds/100hrs) in 2017, the 10th season below in the last 12 years. Regression analysis shows Kestrel passage rates dropping since the turn of the century ($F_{2,32} = 11.31$, $r^2 = 0.41$, $p = 0.002$). Other counts sites (in the HWI network and elsewhere) report similar declines. In response, HWI, along with many other North American researchers and Citizen Scientists are working to understand American Kestrel declines both locally (www.hawkwatch.org/our-work/kestrels) and at the continental scale and have partnered under the umbrella of the American Kestrel Partnership (<http://kestrel.peregrinefund.org/>).

We counted above average numbers (counts and passage rates) of all other falcons (Merlin, Prairie Falcon, and Peregrine Falcon) in 2017. None of these species meets the 10 birds/100hrs average threshold for trend analysis.

BANDING EFFORTS

Crews trapped on 69 of 78 possible days (totaling 608.9 hours, low compared to site average) between 15 August and 31 October, and captured 677 raptors of eleven different species (Table 2 and Appendix D). Record low captures for Sharp-shinned Hawks (313) and Cooper's Hawks (200), the most frequently banded species resulted in an all-time site low of 677 raptors trapped and banded in 2017. We also captured below average numbers of Northern Goshawk, American Kestrel, and Merlin. We captured above average numbers of Red-tailed Hawk (101), Prairie Falcon (7), and a site record 7 Peregrine Falcons.

SITE VISITATION

Approximately 285 visitors made the arduous 2+ mile trek up the mountain to visit one of the most unique natural settings and one of the busiest HawkWatches in the west. Visitors get to see raptors in flight and in hand prior to release post- banding, learn to identify raptors in flight and also about raptor migration ecology and what banding and counting efforts can tell us about regional raptor populations and the health of the landscapes they use. They also learn about the ecosystems found around the Goshutes HawkWatch, wilderness areas, and leave no trace outdoor ethics.

Most visitors to the site came from Nevada and Utah, but we also had guests from California, Idaho, Ohio, Texas, and Canada. Two school groups also visited the site to learn about not only raptor migration ecology, but also banding, counting and using data from HWI's sites to learn about science and statistics. We also hosted a 'locals' day, inviting community members from nearby areas to come and celebrate raptor migration.

2017 FALL MIGRATION ACROSS HWI'S NETWORK

HawkWatch International and partners operated 8 fall count sites in 2017 (Fig. 1). During the 4,486 hours of standardized observation, we counted 305,550 migrating birds of prey. The power and utility of HWI's network of fall count sites, and long-term monitoring in general, lies in that it allows identification

of patterns in regional raptor populations, both over time at a single site and also network-wide. Declines in counts or passage rates for a species or group of species at the regional level can highlight the need for more focused research or management attention at local scales, while increases may indicate the success of management and conservation efforts. While each site in HWI's network varied in terms of individual species or group counts, notable network-wide patterns in 2017 included (Table 4):

- No sites with above average overall counts in 2017
- Below average Sharp-shinned Hawk numbers at 5 of 8 sites (including 2 sites w/ record low counts).
- Below average count of American Kestrels at 6 of 8 sites (3 with record lows) and no sites with above average counts
- Below average counts for Prairie Falcons at 4 of 8 sites (2 with record lows).
- Below average counts for Red-tailed Hawks at 4 of 8 sites, including a record low at Corpus Christi; above average counts at 3 sites.
- Record highs for:
 - Broad-winged Hawks at Chelan Ridge and Manzano Mountains
 - Sharp-shinned Hawks and Peregrine Falcons at Corpus Christi
 - Zone-tailed Hawks (6) at Manzano Mountains

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Table 1. Historic fall raptor migration counts (mean $\pm$ 95% CI), counts from fall 2017, and site records at the Goshutes HawkWatch in eastern Nevada.

Species	1983-2016		All-time Historic Records		
	Mean Count $\pm$ 95 % CI	2017	% Change	Season	Daily
Turkey Vulture	433.5 $\pm$ 80.4	264	-39	1102 (2015)	315 (2013)
Osprey	96.0 $\pm$ 13.8	88	-8	187 (1997)	38 (2013)
Northern Harrier	171.3 $\pm$ 21.7	157	-8	356 (1999)	26 (1995)
Accipiters					
Sharp-shinned Hawk	4528.2 $\pm$ 604.8	2519	-44	9598 (1998)	1001 (2001)
Cooper's Hawk	2995.5 $\pm$ 442.8	1528	-49	6736 (1998)	913 (2001)
Northern Goshawk	91.8 $\pm$ 18.6	125	36	259 (1992)	19 (1996)
Unidentified accipiter	315.8 $\pm$ 67.2	324	3	710 (1987)	
TOTAL ACCIPITERS	7931.3 $\pm$ 1007.7	4496	-43	16508 (1998)	
Buteos					
Red-shouldered Hawk	0.3 $\pm$ 0.2	0		3 (2017)	1 (6 times)
Broad-winged Hawk	79.7 $\pm$ 26.3	95	19	336 (2015)	76 (2010)
Swainson's Hawk	351.4 $\pm$ 166.3	499	42	2856 (2015)	378 (2015)
Red-tailed Hawk	3348.4 $\pm$ 371.2	3884	16	6988 (2015)	915 (2001)
Ferruginous Hawk	15.6 $\pm$ 2.4	26	67	32 (2014)	6 (1995)
Rough-legged Hawk	14.8 $\pm$ 3.2	19	29	50 (1999)	6 (3 times)
Unidentified buteo	66.7 $\pm$ 15.4	212	218	185 (1983)	
TOTAL BUTEOS	3876.8 $\pm$ 519.5	4735	22	10227 (2015)	
Eagles					
Golden Eagle	239.9 $\pm$ 21.4	252	5	344 (1996)	24 (1992/1997)
Bald Eagle	12.3 $\pm$ 2.0	14	14	31 (1999)	6 (1994)
Unknown eagles	0.7 $\pm$ 0.4	3	308	5 (1991)	
TOTAL EAGLES	252.9 $\pm$ 22.3	269	6	372 (1999)	
Falcons					
American Kestrel	1689.9 $\pm$ 286.3	616	-64	3394 (1997)	586 (2000)
Merlin	44.4 $\pm$ 8.6	60	35	110 (2014)	20 (1998)
Prairie Falcon	24.9 $\pm$ 4.7	31	24	58 (1995)	7 (1998)
Peregrine Falcon	16.6 $\pm$ 4.3	25	51	46 (2011)	7 (2001)
Unidentified falcon	6.9 $\pm$ 1.7	17	146	21 (1996)	
TOTAL FALCONS	1782.7 $\pm$ 295.0	749	-58	3556 (1997)	
Unidentified Raptor	96.9 $\pm$ 29.6	48	-50	446 (1983)	
GRAND TOTAL	14641.6 $\pm$ 1635.8	10806	-26	25290 (1998)	2202 (2014)

Table 2. Mean and 2017 capture totals by species for migrating raptors banded at Goshute Mountains HawkWatch 1980-2017.

	Capture Totals		Seasonal Record
	1991-2016 ²	2017	
Northern Harrier	4.8 ± 1.4	2	18
Sharp-shinned Hawk	1004 ± 203	313	2692
Cooper's Hawk	513.8 ± 101	200	1478
Northern Goshawk	22.8 ± 6.2	12	105
Broad-winged Hawk	1.2 ± 0.4	0	7
Swainson's Hawk	0.2 ± 0.2	0	2
Red-tailed Hawk	66.5 ± 10.5	101	158
Rough-legged Hawk	0.1 ± 0.1	0	2
Red-shouldered Hawk	0.1 ± 0.1	0	2
Golden Eagle	3.8 ± 0.9	3	11
Bald Eagle	0.0 ± 0.1	0	1
American Kestrel	104.3 ± 33.6	24	368
Merlin	8.3 ± 2.0	8	26
Prairie Falcon	4.6 ± 1.1	7	17
Peregrine Falcon	1.1 ± 0.4	7	7
All Species	1735.7 ± 342	677	4697

¹ Captures / 100 station hours. 17.6± 2.2 11.1

² Mean of annual values ± 95% confidence interval.

Table 3 Summary of the 2017 fall flight of migrating raptors across HWI's monitoring network. Values are counts ; green indicates a count significantly higher (outside the 95% confidence interval) than the historic site average, red indicates a count significantly lower than average, and black indicates a count that does not differ from the site average. Asterisks denote a record high or low count. In 2017 HWI monitored fall migration for 4,486 hrs and counted 305,550 birds.

	Bonney Butte, OR	Chelan Ridge, WA	Bridger Mtn, MT	Commissary Ridge, WY	Goshute Mts, NV	Yaki Pt, AZ	Manzano Mts, NM	Corpus Christi, TX
	Hours Counted in 2017							
Species	430.1	409.1	424.3	530.5	697.75	595.4	570.8	828.3
Black Vulture								409
Turkey Vulture	474	29	*29*	94	264	na	480	87934
Osprey	78	*11*	7	49	88	48	52	138
Northern Harrier	22	74	50	27	157	55	54	351
Crested Caracara								4
Common Black Hawk								0
Harris' Hawk								10
Accipiters								
Sharp-shinned Hawk	*525*	*245*	321	695	2519	1234	1658	*2681*
Cooper's Hawk	347	*110*	191	414	1528	761	1244	1358
Northern Goshawk	26	19	39	36	125	5	21	0
Unidentified accipiter	33	49	45	44	324	133	169	100
TOTAL ACCIPITERS	931	*423*	596	1189	4496	2133	3092	4139
Buteos								
Red-shouldered Hawk	0	0	0	0	0	*1*	0	*15*
Broad-winged Hawk	7	*21*	11	34	95	31	*23*	*160916*
Short-tailed Hawk								1
Swainson's Hawk	2	17	5	112	499	68	496	8891
White-tailed Hawk								16
Zone-tailed Hawk							*6*	16
Red-tailed Hawk	371	*107*	208	846	3884	1291	930	139
Ferruginous Hawk	1	0	5	2	26	4	11	1
Rough-legged Hawk	6	17	64	10	19	0	0	0
Unidentified buteo	18	29	19	31	212	21	53	42
TOTAL BUTEOS	405	*191*	312	1035	4735	1416	1519	*170037*
Eagles								
Golden Eagle	*27*	*11*	1476	289	252	3	117	0
Bald Eagle	86	5	69	155	14	12	1	13
Unknown eagles	2	2	1	1	3	0	1	0
TOTAL EAGLES	115	*18*	1549	445	269	15	119	13
Falcons								
American Kestrel	*7*	11	74	87	*616*	*332*	388	960
Merlin	74	*18*	22	17	60	13	32	113
Prairie Falcon	5	6	13	*2*	31	*2*	13	5
Peregrine Falcon	11	8	13	9	25	10	79	*343*
Aplomado Falcon								1
Unidentified falcon	9	14	6	11	17	7	14	14
TOTAL FALCONS	106	57	128	126	749	*364*	526	1436
Kites								
Hook-billed Kite								0
Swallow-tailed Kite								109
White-tailed Kite								7
Mississippi Kite								11362
Unidentified Kites								0
TOTAL KITES								11478
Unidentified Raptor	10	50	25	15	48	7	34	205
GRAND TOTAL	2141	*853*	2696	2980	10806	4041	5877	*276156*



Figure 1. Locations of fall HawkWatch sites operated by HWI and partners (symbols with borders represent sites that conducted banding in 2017).

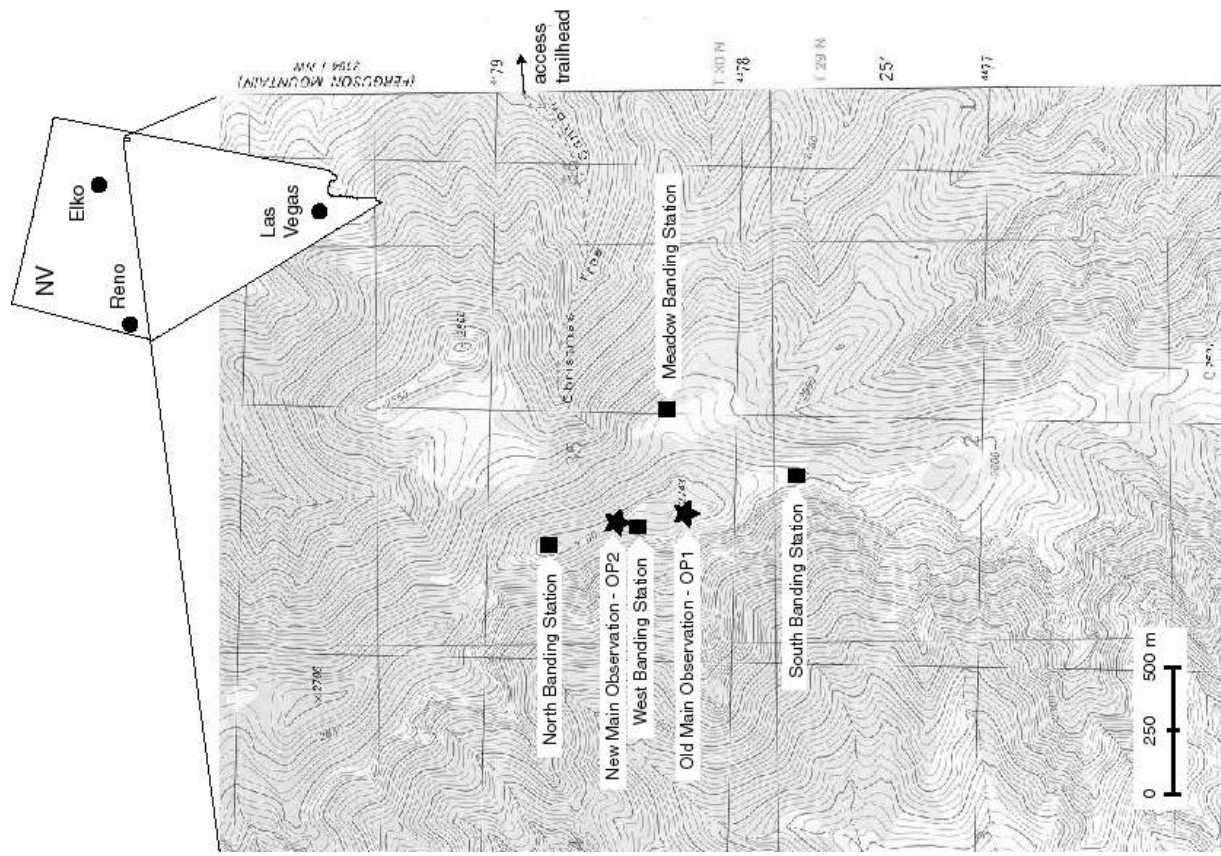


Figure 2. Location of the Goshutes HawkWatch in eastern Nevada.



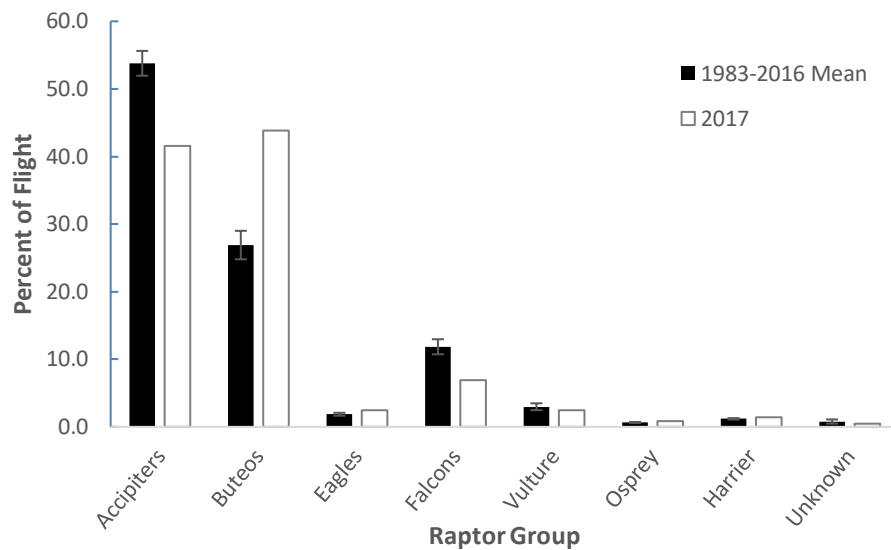


Figure 3. Fall migration flight composition by major species groups at the Goshutes HawkWatch in eastern Nevada: 1983–2016 versus 2017.

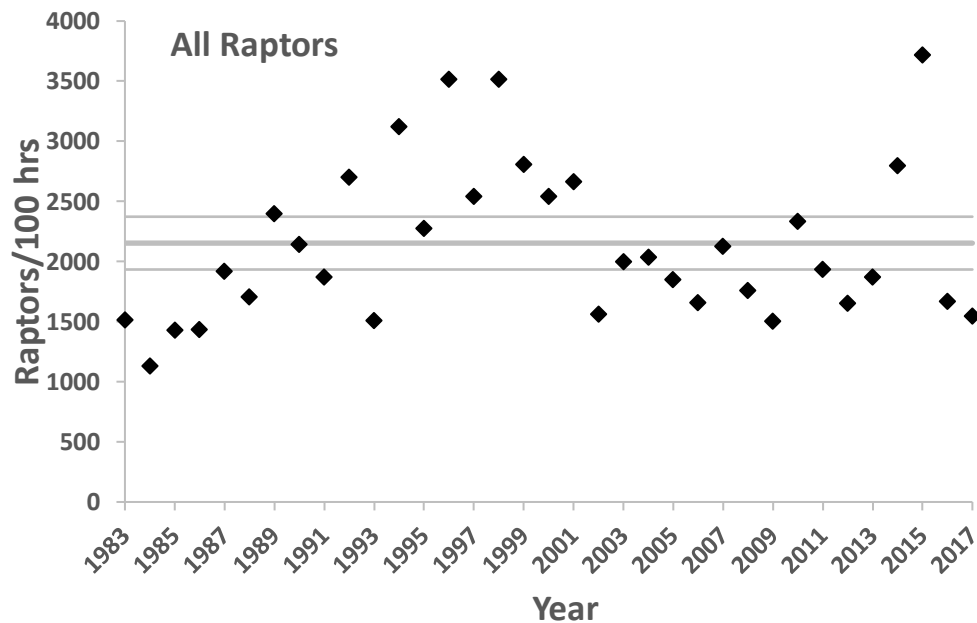


Figure 4. Fall migration passage rates at the Goshutes HawkWatch in eastern NV for all migrating raptors: 1983-2017. Solid grey lines represent mean (thick) and upper and lower 95% confidence intervals (thin) of historic counts (1983-2016) at the Goshutes. Dashed line (if present) represents trend for significant ($p < 0.05$) quadratic regression.

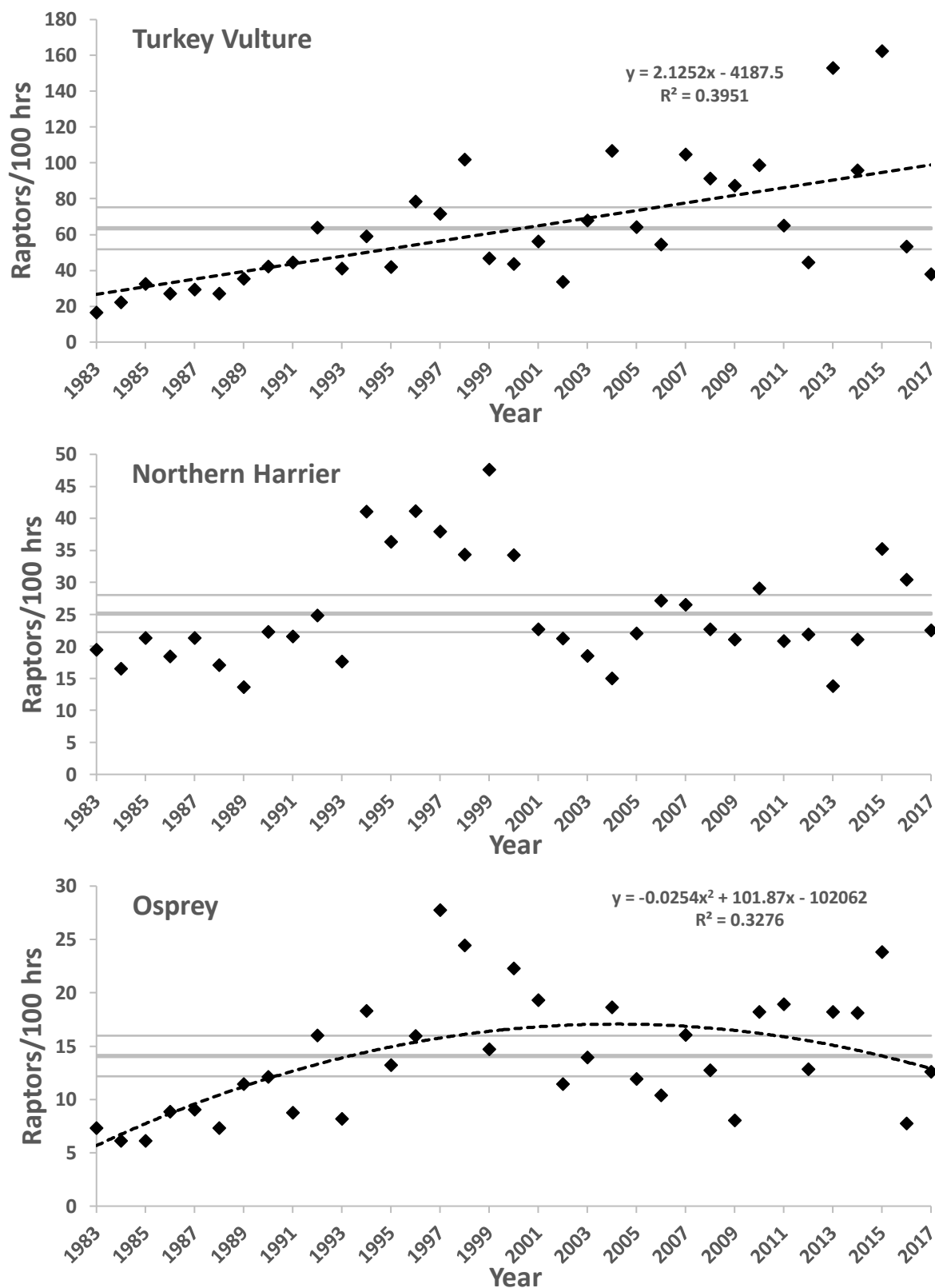


Figure 5a. Fall-migration passage rates at the Goshutes HawkWatch in eastern NV for Turkey Vultures, Ospreys, and Northern Harriers: 1983–2017. Dashed lines indicate trends for significant ($p < 0.05$) linear or quadratic regressions. Solid grey lines represent mean (thick) and upper and lower 95% confidence intervals (thin) of historic counts (1983-2016).

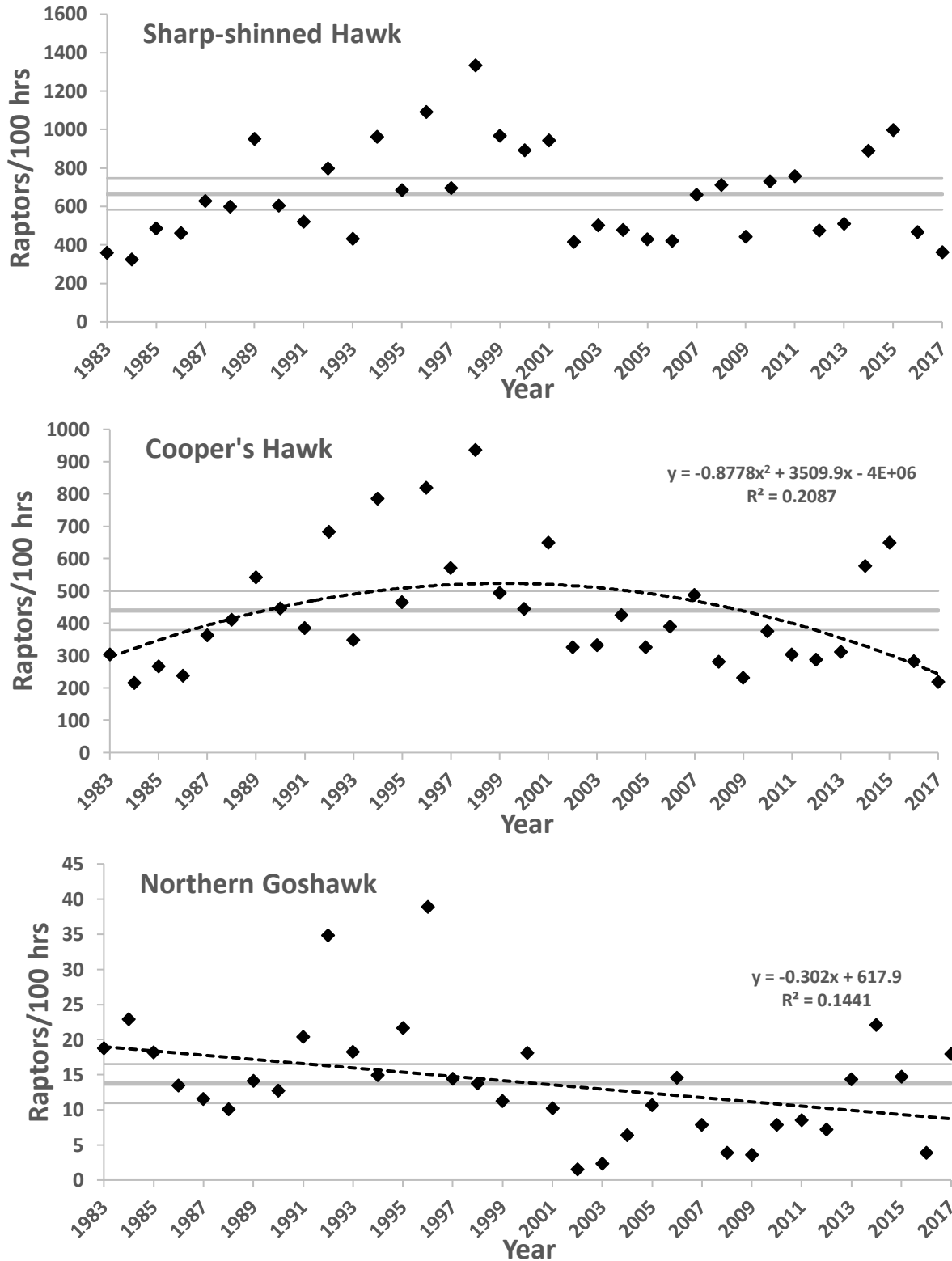


Figure 5b. Fall-migration Accipiter passage rates at the Goshutes HawkWatch in eastern NV: 1983–2017. Dashed lines indicate trends for significant ($p < 0.05$) linear or quadratic regressions. Solid grey lines represent mean (thick) and upper and lower 95% confidence intervals (thin) of historic counts (1983-2016).

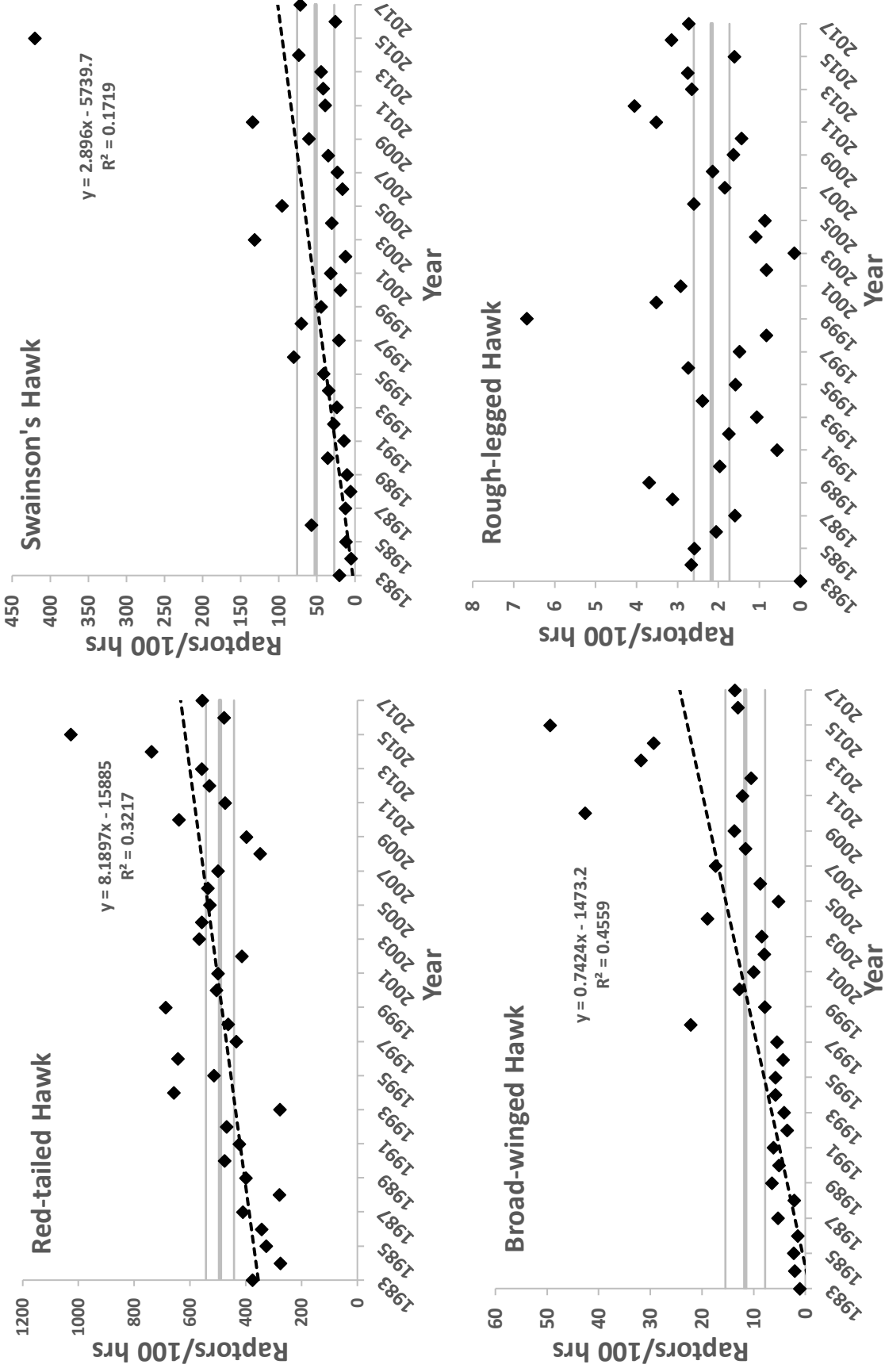


Figure 5c. Fall-migration buteo passage rates at the Goshutes HawkWatch in eastern NV: 1983–2017. Dashed lines indicate significant ($p < 0.05$) population trends based on linear regression. Solid grey lines represent mean (thick) and upper and lower 95% confidence intervals (thin) of historic counts (1983–2016).

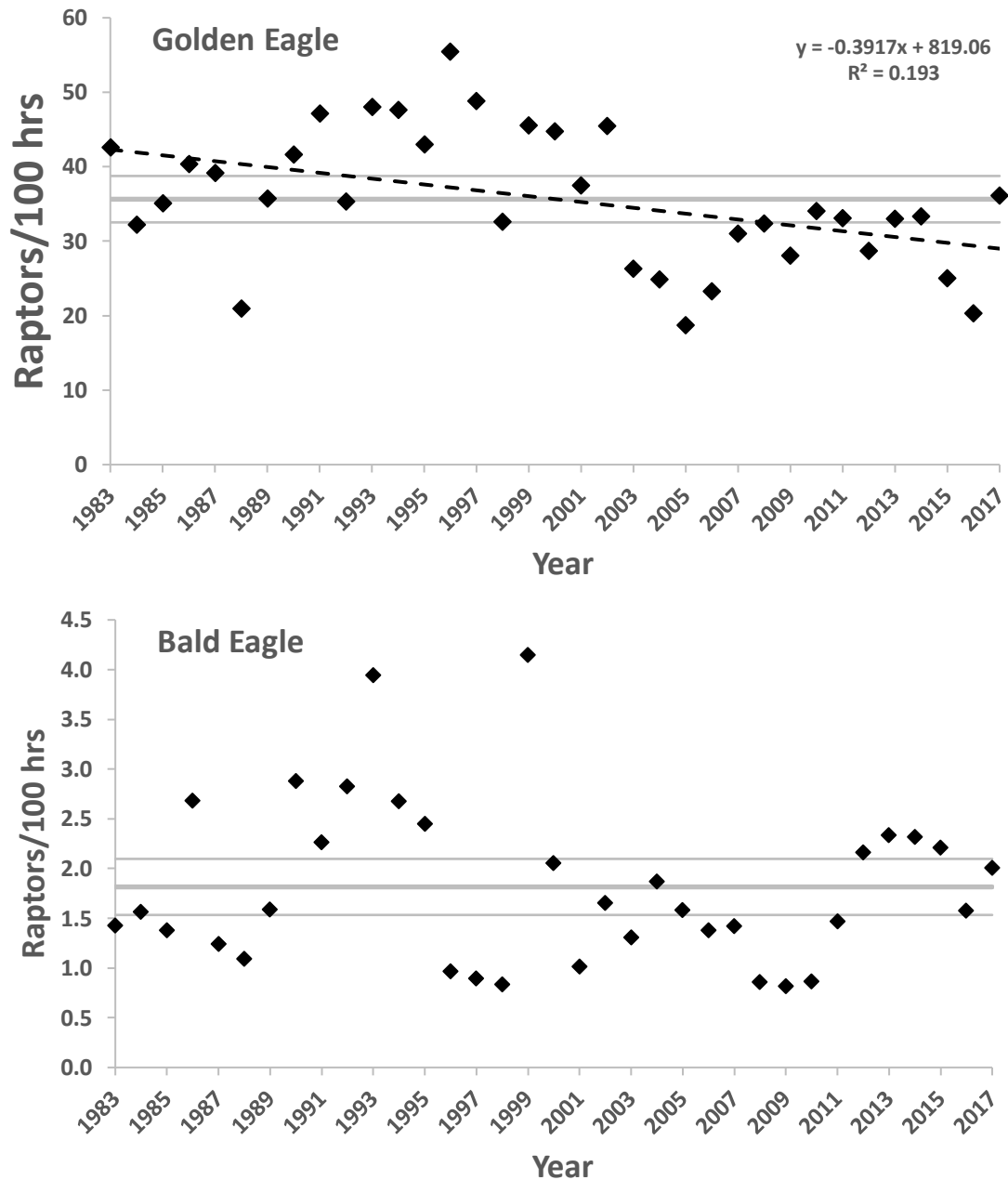


Figure 5d. Eagle passage rates for the fall migration at the Goshutes HawkWatch in eastern NV: 1983–2017. Dashed lines indicate significant ($p < 0.05$) population trends based on linear regressions. Solid grey lines represent mean (thick) and upper and lower 95% confidence intervals (thin) of historic counts (1983-2016).

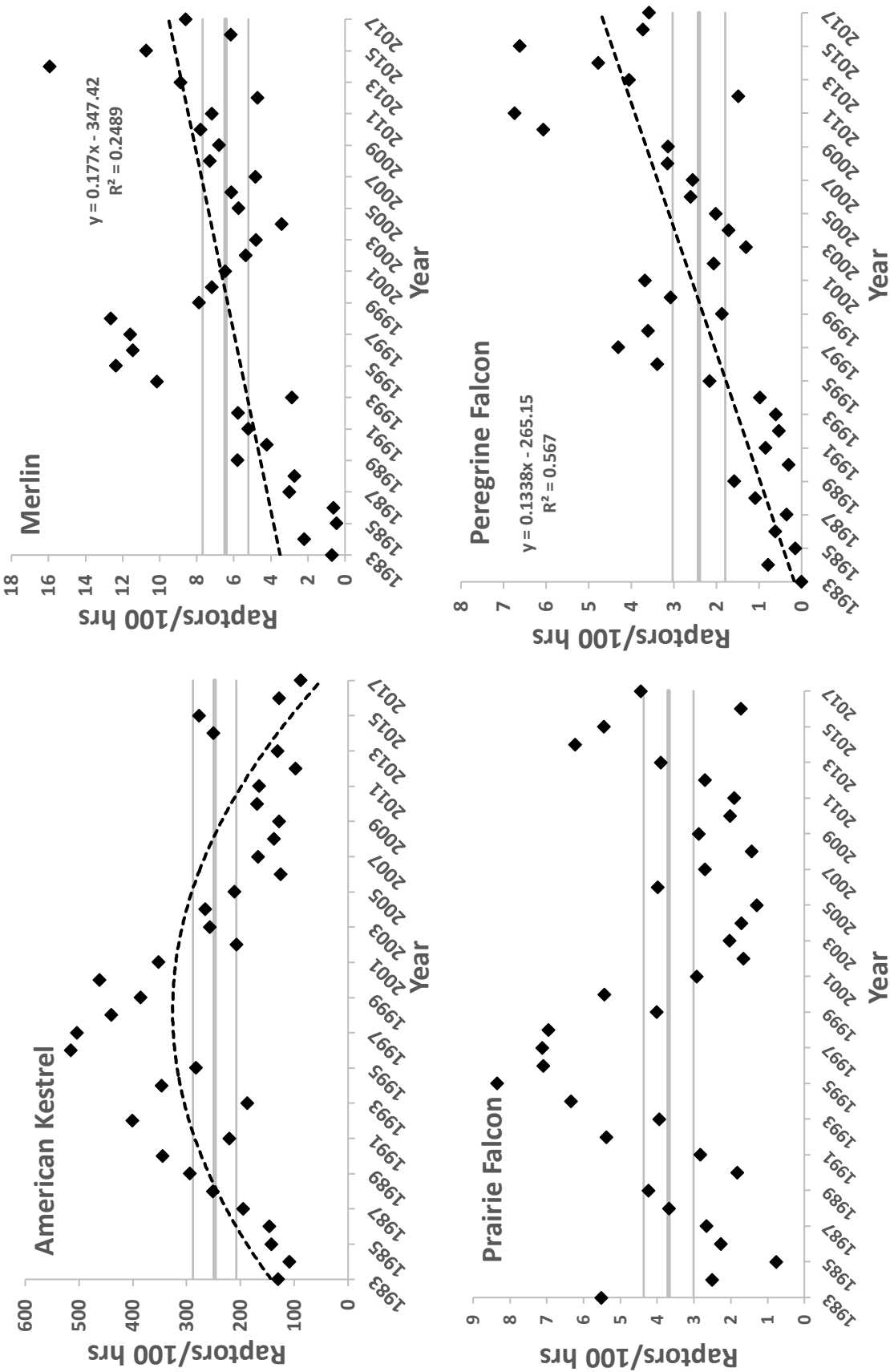


Figure 5e. Fall-migration falcon passage rates at the Goshutes HawkWatch in eastern NV: 1983–2017. Dashed lines indicate significant ($p < 0.05$) population trends based on linear or quadratic regressions. Solid grey lines represent mean (thick) and upper and lower 95% confidence intervals (thin) of historic counts (1983–2016).

Appendix A. History of official observer participation at the Goshutes HawkWatch in eastern NV.

- 1983-1986:** Single observer throughout with occasional scribe. Principal observers: 1983, David Sherman (0)¹; 1984, Jim Daly (0), Jeff Smith (0), and Fred Tilly (14); 1985, Jim Daly (1) and Fred Tilly (15); 1986, John Lower (0).
- 1987-1989:** Single observer throughout, two observers during the peak month. Principal observers: 1987, Victor Fazio (2) and Fred Tilly (16); 1988, Brian Mongi (2) and Fred Tilly (17); 1989, Brian Mongi (3) and Fred Tilly (19).
- 1990:** Two observers throughout with two teams of two for a comparison count during the peak month. John Martin (1), LisaBeth Daly (2), Fred Tilly (21), and Cathy Tilly (1).
- 1991:** Two observers throughout except 30 October - 5 November, with a scribe throughout. Principal observers: Steve Engel (1) and Dale Payne (0).
- 1992:** Two observers throughout, three observers during the peak month, with a scribe throughout. Principal observers: Steve Engel (2), Maureen O'Mara (0), and Fred Tilly (24).
- 1993:** Two observers throughout with a scribe throughout. Principal observers: Emily Teachout (1) and Jeff Maurer (0).
- 1994:** Two observers throughout, three observers during the peak month, with a scribe throughout. Principal observers: Steve Engel (3), Jeff Maurer (1), and Fred Tilly (27).
- 1995:** Two observers throughout with a scribe through 17 October. Principal observers: Robert Clemens (3) and Susan Salafsky (2).
- 1996:** Two observers throughout except 27 October - 4 November, three observers for the peak month with a scribe until 27 October. Principal observers: Fred Tilly (29), Cathy Tilly (4), Robert Clemens (4), and Aaron Barna (1).
- 1997:** Two observers throughout with a scribe from 10 September - 15 October. Principal observers: Jessie Jewell (9) and Neils Maumenee (2).
- 1998:** Two observers throughout. Jerry Liguori (15) and Mike Lanzone (0).
- 1999:** Two observers throughout. Jerry Liguori (17) and Aaron Barna (4).
- 2000:** Two observers throughout. Jerry Liguori (19), Jeff Maurer (3), Nathan McNett (4), and Aaron Barna (5).
- 2001:** Two observers throughout. Jerry Liguori (21) and Nathan McNett (5).
- 2002:** Two observers throughout. Nathan McNett (6) and Greg Levandoski (2).
- 2003:** Four observers throughout rotating duties at two sites for comparison count. Nathan McNett (7), Adam Hutchins (4), Allison Cebula (3), Eric Hallingstad (2).
- 2004:** Two observers throughout. Allison Cebula (4), Ricardo Perez (1+), and Nathan McNett (8).
- 2005:** Two observers throughout. Ken McEnaney (1), Chris Jager (+), and Allison Cebula (5).
- 2006:** Two observers throughout. Christian Nunes (+), John Bell (1), and Jeremy Russell (+).
- 2007:** Two observers throughout. Steve Seibel (5+), Greg Levandoski (4), and Adam Hutchins (5).
- 2008:** Two observers throughout. Steve Seibel (6+) and Jeremy Russell (1+).
- 2009:** Two observers throughout. Aaron Viducich (2) and Laurel Ferreira (1).
- 2010:** Two observers throughout. Rachel Smith (1+), Megan Shaub (0), and Kerry Ross (1+).
- 2011:** Two observers throughout. Rachel Smith (2+), and Kerry Ross (2+).
- 2012:** Two observers throughout. Steve Seibel (7+), Bryce Robinson (0), and Caitlin Davis (0).
- 2013:** Two observers throughout. Russell Seeley (3), Rya Rubenthaler (1), and Toby Chipman (0).
- 2014:** Two observers throughout. Russell Seeley (4), Rya Rubenthaler (2), and Cherin Spencer-Bower (2).
- 2015:** Two observers throughout. Russell Seeley (5), Rya Rubenthaler (3), Isabel Brofsky (0), and John Garrett (0).
- 2016:** Two observers throughout. Steve Seibel (11+), Istvan Balazs (1+), Ellen Grimm (1), Lauren diBiccari (0), and Shelly Kremer (0).
- 2017:** Two observers throughout. Scott Shively (2), Frank Simeone (1), Emilee Sparks (2), Casey Weissburg (2), and Allie Pesano (1).

¹ Numbers in parentheses indicate the number of seasons of previous experience conducting migratory raptor counts (+ indicates less concentrated previous exposure).

Appendix B. Common and scientific names, species codes, and regularly applied age, sex, and color-morph classifications for all migrant raptors seen in the Goshute Mountains, Nevada.

COMMON NAME	SCIENTIFIC NAME	SPECIES CODE	AGE ¹	SEX ²	COLOR MORPH ³
Turkey Vulture	<i>Cathartes aura</i>	TV	U	U	NA
Osprey	<i>Pandion haliaetus</i>	OS	U	U	NA
Northern Harrier	<i>Circus cyaneus</i>	NH	A I Br U	M F U	NA
Mississippi Kite	<i>Ictinia mississippiensis</i>	MK	A I U	U	NA
Sharp-shinned Hawk	<i>Accipiter striatus</i>	SS	A I U	U	NA
Cooper's Hawk	<i>Accipiter cooperii</i>	CH	A I U	U	NA
Northern Goshawk	<i>Accipiter gentilis</i>	NG	A I U	U	NA
Unknown accipiter	<i>Accipiter</i> spp.	UA	U	U	NA
Red-shouldered Hawk	<i>Buteo lineatus</i>	RS	A I U	U	NA
Broad-winged Hawk	<i>Buteo platypterus</i>	BW	A I U	U	D L U
Swanson's Hawk	<i>Buteo swainsoni</i>	SW	U	U	D L U
Red-tailed Hawk	<i>Buteo jamaicensis</i>	RT	A I U	U	D L U
Ferruginous Hawk	<i>Buteo regalis</i>	FH	A I U	U	D L U
Rough-legged Hawk	<i>Buteo lagopus</i>	RL	U	U	D L U
Unknown buteo	<i>Buteo</i> spp.	UB	U	U	D L U
Golden Eagle	<i>Aquila chrysaetos</i>	GE	I, S, NA, A, U ⁴	U	NA
Bald Eagle	<i>Haliaeetus leucocephalus</i>	BE	I, S1, S2, NA, A, U ⁵	U	NA
Unknown eagle	<i>Aquila</i> or <i>Haliaeetus</i> spp.	UE	U	U	NA
American Kestrel	<i>Falco sparverius</i>	AK	U	M F U	NA
Merlin	<i>Falco columbarius</i>	ML	AM Br	AM U	NA
Prairie Falcon	<i>Falco mexicanus</i>	PR	U	U	NA
Peregrine Falcon	<i>Falco peregrinus</i>	PG	A I U	U	NA
Unknown falcon	<i>Falco</i> spp.	UF	U	U	NA
Unknown raptor	Falconiformes	UU	U	U	NA

¹ Age codes: A = adult, I = immature (HY), Br = brown (adult female or immature), U = unknown age.

² Sex codes: M = male, F = female, U = unknown.

³ Color morph codes: D = dark or rufous, L = light, U – unknown, NA = not applicable.

⁴ Golden Eagle age codes: I = Immature: juvenile or first-year bird, bold white wing patch visible below, bold white in tail, no molt; S = Subadult: white wing patch variable or absent, obvious white in tail and molt or tawny bar visible on upper wing; NA = Not adult: unknown age immature/subadult; A = Adult: no white in wings or tail; U = Unknown.

⁵ Bald Eagle age codes: I = Immature: juvenile or first-year bird, dark breast and tawny belly; S1 = young Subadult: Basic I and II plumages, light belly, upside-down triangle on back; S2 = older Subadult: Basic III plumage, head mostly white with osprey-like dark eye line and dark band on tail; NA = Not adult: unknown age immature/subadult; A = Adult: includes near adult with dark flecks in head and dark tail tip, and adult with white head and tail; U = Unknown.

Appendix C. Annual summaries of observation effort and unadjusted raptor counts by species at the Goshutes HawkWatch in eastern NV: 1983–2015.

	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
Start Date	15-Aug	16-Aug	20-Aug	16-Aug	17-Aug	17-Aug	18-Aug	15-Aug	16-Aug	16-Aug	16-Aug	16-Aug	15-Aug	15-Aug
End Date	23-Oct	17-Nov	5-Nov	31-Oct	27-Oct	9-Nov	4-Nov	31-Oct	5-Nov	10-Nov	5-Nov	5-Nov	5-Nov	4-Nov
Observation days	68	83	76	67	66	85	76	78	79	85	80	78	83	74
Observation hours	561.08	638.66	654.50	485.00	564.25	734.66	567.50	667.00	707.67	743.42	659.50	709.58	694.92	620.17
Raptors / 100 hours	1,517	1,130	1,427	1435	1,921	1,704	2,397	2,527	1,879	2,703	1,510	3,122	2,276	3,514
SPECIES	RAPTOR COUNTS													
Turkey Vulture	92	141	211	131	165	198	200	278	314	473	270	418	289	486
Osprey	41	39	40	43	51	54	65	80	62	119	54	130	92	99
Northern Harrier	109	105	139	89	120	125	77	147	152	184	116	291	252	255
Mississippi Kite	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sharp-shinned Hawk	2,021	2,067	3,177	2,233	3,537	4,405	5,404	3,994	3,677	5,931	2,838	6,835	4,752	6,773
Cooper's Hawk	1,698	1,378	1,741	1,149	2,042	3,012	3,074	2,945	2,728	5,071	2,298	5,576	3,252	5,075
Northern Goshawk	105	146	119	65	65	74	80	84	144	259	120	106	150	241
Unknown accipiter	562	362	311	251	710	295	204	402	647	639	348	522	416	464
TOTAL ACCIPITERS	4,386	3,953	5,348	3,698	6,354	7,786	8,762	7,425	7,196	11,900	5,604	13,039	8,570	12,553
Red-shouldered Hawk	0	0	0	1	1	0	0	1	0	0	0	0	0	2
Broad-winged Hawk	6	13	15	7	30	16	37	34	44	26	27	41	40	27
Swainson's Hawk	116	34	78	276	69	43	60	238	105	208	159	244	287	498
Red-tailed Hawk	2,105	1,765	2,132	1,663	2,317	2,048	2,263	3,147	2,992	3,489	1,827	4,663	3,572	3,990
Ferruginous Hawk	3	6	17	5	15	9	23	21	27	19	15	20	29	16
Rough-legged Hawk	0	17	17	10	9	23	21	13	4	13	7	17	11	17
Unidentified buteo	185	74	65	42	156	44	47	33	149	70	128	110	69	62
TOTAL BUTEOS	2,415	1,909	2,324	2,004	2,597	2,183	2,451	3,487	3,321	3,825	2,163	5,095	4,008	4,612
Golden Eagle	239	206	230	196	221	154	203	275	334	263	317	338	299	344
Bald Eagle	8	10	9	13	7	8	9	19	16	21	26	19	17	6
Unidentified eagle	2	0	0	1	0	0	0	1	5	1	1	1	1	1
TOTAL EAGLES	249	216	239	210	228	162	212	295	355	285	344	358	317	351
American Kestrel	731	697	934	708	1,099	1,844	1,669	2,279	1,562	2,982	1,234	2,461	1,964	3,199
Merlin	4	14	3	3	17	20	33	28	37	43	19	72	86	71
Prairie Falcon	31	16	5	11	15	27	24	12	20	40	26	45	58	44
Peregrine Falcon	0	5	1	3	2	8	9	2	6	4	4	7	15	21
Unidentified falcon	6	7	2	8	6	7	5	12	14	4	6	9	18	21
TOTAL FALCONS	772	739	945	733	1,139	1,906	1,740	2,333	1,639	3,073	1,289	2,594	2,141	3,356
Unidentified raptor	446	113	94	53	186	107	96	101	192	234	117	229	149	83
GRAND TOTAL	8,510	7,215	9,340	6,961	10,840	12,521	13,603	14,146	13,231	20,093	9,957	22,154	15,818	21,795

Appendix C. continued

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Start Date	15-Aug	15-Aug	15-Aug	15-Aug	15-Aug	15-Aug	15-Aug	15-Aug	15-Aug	15-Aug
End Date	5-Nov	31-Oct	5-Nov	5-Nov	5-Nov	5-Nov	5-Nov	5-Nov	5-Nov	5-Nov
Observation days	79	71	82	78	83	81	79	76	83	82
Observation hours	673.58	719.50	748.08	681.50	787.30	725.67	688.21	642.75	695.30	652.58
Raptors / 100 hours	2,541	3,515	3,003	2,542	2,662	1,564	2,001	2,038	1,849	1,658
SPECIES	RAPTOR COUNTS									
Turkey Vulture	482	732	349	297	441	243	466	685	445	355
Osprey	187	176	110	152	152	83	96	120	83	68
Northern Harrier	255	247	356	233	178	154	127	96	153	177
Mississippi Kite	0	0	0	0	0	0	0	0	0	0
Sharp-shinned Hawk	4,677	9,598	7,236	6,071	7,429	3,009	3,460	3,073	2,973	2,745
Cooper's Hawk	3,848	6,736	3,689	3,022	5,110	2,369	2,281	2,736	2,260	2,541
Northern Goshawk	97	99	84	123	80	11	16	41	74	95
Unknown accipiter	368	75	132	87	56	257	271	318	590	72
TOTAL ACCIPITERS	8,990	16,508	11,141	9,303	12,675	5,646	6,028	6,168	5,897	5,453
Red-shouldered Hawk	0	0	0	1	0	0	0	0	0	0
Broad-winged Hawk	37	160	59	87	79	58	58	122	36	57
Swainson's Hawk	143	507	334	132	251	91	908	197	664	109
Red-tailed Hawk	2,922	3,329	5,137	3,446	3,926	3,008	3,903	3,589	3,678	3,492
Ferruginous Hawk	18	16	25	19	14	20	20	8	12	10
Rough-legged Hawk	10	6	50	24	23	6	1	7	6	17
Unidentified buteo	77	5	24	21	13	42	57	117	97	13
TOTAL BUTEOS	3,207	4,023	5,629	3,730	4,306	3,225	4,947	4,040	4,493	3,698
Golden Eagle	329	235	341	305	295	330	181	160	130	152
Bald Eagle	6	6	31	14	8	12	9	12	11	9
Unidentified eagle	0	0	0	0	0	0	0	4	0	0
TOTAL EAGLES	335	241	372	319	303	342	190	176	141	161
American Kestrel	3,394	3,169	2,887	3,149	2,774	1,503	1,768	1,709	1,468	820
Merlin	78	91	59	49	51	39	33	22	40	40
Prairie Falcon	48	50	30	37	23	12	14	11	9	26
Peregrine Falcon	29	26	14	21	29	15	9	11	14	17
Unidentified falcon	7	2	7	3	2	6	13	12	11	4
TOTAL FALCONS	3,556	3,338	2,997	3,259	2,879	1,575	1,837	1,765	1,542	907
Unidentified raptor	102	25	57	34	26	81	79	51	104	3
GRAND TOTAL	17,114	25,290	21,011	17,327	20,960	11,349	13,770	13,101	12,858	10,822

Appendix C. continued

	2007		2008		2009		2010		2011		2012		2013		2014		2015		2016		2017		Mean
Start Date	15-Aug	15-Aug	15-Aug	15-Aug	15-Aug	15-Aug	15-Aug	15-Aug	15-Aug	15-Aug	15-Aug	15-Aug	15-Aug	15-Aug	15-Aug	15-Aug	15-Aug	15-Aug	15-Aug	15-Aug	15-Aug	15-Aug	15-Aug
End Date	5-Nov	5-Nov	5-Nov	5-Nov	5-Nov	5-Nov	5-Nov	5-Nov	5-Nov	5-Nov	5-Nov	5-Nov	5-Nov	5-Nov	5-Nov	5-Nov	5-Nov	5-Nov	5-Nov	5-Nov	5-Nov	5-Nov	5-Nov
Observation days	82	82	82	82	82	82	82	79	79	83	83	80	80	81	81	81	81	80	80	79	79	79	79
Observation hours	703.00	698.5	733.6	692.60	682.03	741.00	641.75	682.03	682.03	741.00	641.75	682.03	682.03	641.75	690.00	690.00	680	697.7	697.7	697.75	697.75	697.75	676.6
Raptors / 100 hours	2,125	1,758	1,502	2,336	1,936	1,650	1,869	1,936	1,936	1,650	1,869	1,936	1,936	1,869	2,796	2,796	3,719	1,668	1,668	1,549	1,549	1,549	2152.7
SPECIES																							
Turkey Vulture	735	637	640	682	443	329	980	443	443	329	980	980	980	980	661	1,102	370	370	264	264	264	264	428.7
Osprey	113	89	59	126	129	95	117	129	129	95	117	117	117	117	125	162	54	54	88	88	88	88	95.8
Northern Harrier	186	158	154	201	142	162	88	142	142	162	88	88	88	88	145	239	212	212	157	157	157	157	170.9
Mississippi Kite	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0.0
Sharp-shinned Hawk	4,635	4,967	3,251	5,063	5,171	3,527	3,271	5,171	5,171	3,527	3,271	3,271	3,271	3,271	6,141	6,769	3,249	3,249	2519	2519	2519	2519	4470.8
Cooper's Hawk	3,422	1,957	1,691	2,599	2,067	2,130	1,997	2,067	2,067	2,130	1,997	1,997	1,997	1,997	3,986	4,418	1,971	1,971	1,528	1,528	1,528	1,528	2954.2
Northern Goshawk	55	27	26	54	58	53	92	58	58	53	92	92	92	92	152	100	27	27	125	125	125	125	92.8
Unknown accipiter	366	221	280	169	62	394	116	62	62	394	116	116	116	116	42	43	685	685	324	324	324	324	316.0
TOTAL ACCIPITERS	8,478	7,172	5,248	7,885	7,358	6,104	5,476	7,358	7,358	6,104	5,476	5,476	5,476	5,476	10,321	11,330	5,932	5,932	4,496	4,496	4,496	4,496	7833.8
Red-shouldered Hawk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	0	0	0	0	0.3
Broad-winged Hawk	122	81	101	295	83	78	204	83	83	78	204	204	204	204	203	336	91	91	95	95	95	95	80.1
Swainson's Hawk	163	248	445	933	269	308	285	269	269	308	285	285	285	285	509	2,856	180	180	499	499	499	499	355.6
Red-tailed Hawk	3,511	2,439	2,913	4,427	3,237	3,928	3,579	3,237	3,237	3,928	3,579	3,579	3,579	3,579	5,095	6,988	3,327	3,327	3,884	3,884	3,884	3,884	3363.7
Ferruginous Hawk	11	10	8	8	14	11	18	14	14	11	18	18	18	18	32	21	9	9	26	26	26	26	15.9
Rough-legged Hawk	13	15	12	10	24	30	17	24	24	30	17	17	17	17	19	11	22	22	19	19	19	19	14.9
Unidentified buteo	44	91	120	34	24	76	41	24	24	76	41	41	41	41	16	15	106	106	212	212	212	212	70.8
TOTAL BUTEOS	3,864	2,884	3,599	5,707	3,651	4,431	4,144	3,651	3,651	4,431	4,144	4,144	4,144	4,144	5,874	10,227	3,738	3,738	4735	4735	4735	4735	3901.3
Golden Eagle	218	226	206	236	226	213	212	226	226	213	212	212	212	212	230	170	142	142	252	252	252	252	240.2
Bald Eagle	10	6	6	6	10	16	15	10	10	16	15	15	15	15	16	15	11	11	14	14	14	14	12.3
Unidentified eagle	0	0	0	0	0	2	1	0	0	2	1	1	1	1	0	0	4	4	3	3	3	3	0.8
TOTAL EAGLES	228	232	212	242	236	231	228	236	236	231	228	228	228	228	246	185	157	157	269	269	269	269	253.3
American Kestrel	1,174	965	940	1,170	1,132	726	839	1,132	1,132	726	839	839	839	839	1,730	1,881	893	893	616	616	616	616	1659.1
Merlin	34	51	50	54	49	35	57	49	49	35	57	57	57	57	110	73	43	43	60	60	60	60	44.8
Prairie Falcon	19	10	21	14	13	20	25	13	13	20	25	25	25	25	43	37	12	12	31	31	31	31	25.1
Peregrine Falcon	18	22	23	42	46	11	26	46	46	11	26	26	26	26	33	45	26	26	25	25	25	25	16.8
Unidentified falcon	6	6	10	2	1	4	1	1	1	4	1	1	1	1	0	1	12	12	17	17	17	17	7.2
TOTAL FALCONS	1,251	1,054	1,044	1,282	1,240	796	948	1,240	1,240	796	948	948	948	948	1,916	2,037	986	986	749	749	749	749	1753.1
Unidentified raptor	86	51	60	52	5	79	13	5	5	79	13	13	13	13	0	0	186	186	48	48	48	48	95.5
GRAND TOTAL	14,941	12,277	11,016	16,177	13,205	12,227	11,994	13,205	13,205	12,227	11,994	11,994	11,994	11,994	19,289	25,282	11,640	11,640	10,806	10,806	10,806	10,806	14532.6

Appendix D. Annual summaries of banding effort and capture totals by species at the Goshutes HawkWatch in eastern NV: 1980–2017.

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
Start date	23-Sep	2-Sep	8-Sep	25-Aug	28-Aug	2-Sep	27-Aug	30-Aug	28-Aug	30-Aug
End date	19-Oct	10-Oct	16-Oct	22-Oct	17-Nov	8-Nov	10-Oct	27-Oct	23-Oct	24-Oct
Blinds in operation	1	1	2	2	2	3	3	3	4	4
Trapping days	21	37	27	55	69	?	?	?	?	?
Station days	21	37	?	66	104	?	?	?	?	159
Station hours	149	227	159	443	622	654	484	833	1085	1203
Captures/100 stn hrs	84.6	341.4	214.5	230.0	148.9	185.3	127.5	168.2	175.5	196.7
Species	Raptor Captures									
Northern Harrier	0	2	0	8	3	6	2	4	10	9
Sharp-shinned Hawk	62	376	186	571	548	705	410	886	1,177	1,527
Cooper's Hawk	36	300	129	306	261	366	164	395	553	652
Northern Goshawk	6	11	3	32	40	42	5	27	22	29
Broad-winged Hawk	0	0	0	0	2	0	1	1	1	1
Swainson's Hawk	0	0	0	0	0	0	0	0	0	0
Red-tailed Hawk	14	26	13	43	31	51	15	43	37	66
Rough-legged Hawk	0	0	0	0	0	0	0	0	0	0
Red-shouldered Hawk	0	0	0	0	0	0	0	0	0	0
Golden Eagle	1	1	1	1	5	6	2	4	7	6
Bald Eagle	0	0	0	1	0	0	0	0	0	0
American Kestrel	7	58	8	51	28	34	17	37	85	61
Merlin	0	1	1	0	2	0	0	1	5	8
Prairie Falcon	0	0	0	6	5	2	1	3	7	5
Peregrine Falcon	0	0	0	0	1	0	0	0	0	2
All Species	126	775	341	1,019	926	1,212	617	1,401	1,904	2,366
Recaptures ¹	0	0	0	0	0	0	0	0	0	0
Foreign Recaptures ²	0	0	1	0	0	0	0	0	0	2

¹ Recaptures at the Goshutes of birds originally banded at the Goshutes.

² Recaptures at the Goshutes of birds originally banded elsewhere.

Appendix D. Annual summaries of banding effort and capture totals by species at the Goshutes HawkWatch in eastern NV: 1980–2017.

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Start date	24-Aug	21-Aug	19-Aug	22-Aug	19-Aug	22-Aug	19-Aug	18-Aug	18-Aug	21-Aug
End date	31-Oct	26-Oct	7-Nov	22-Oct	29-Oct	25-Oct	23-Oct	22-Oct	22-Oct	3-Nov
Blinds in operation	4	4	5	5	5	6	5	5	5	3
Trapping days	66	64	74	59	65	63	61	62	63	72
Station days	205	240	296	254	278	312	270	264	236	131
Station hours	1454	1899	2316	1971	2290	2382	2061	2087	1690	939
Captures/100 stn hrs	190.0	159.6	166.7	136.0	205.1	120.1	160.7	147.0	202.2	163.4
Species	Raptor Captures									
Northern Harrier	4	9	10	4	7	2	1	18	4	0
Sharp-shinned Hawk	1,583	1695	2040	1531	2692	1824	2095	1786	2137	899
Cooper's Hawk	821	911	1220	825	1478	697	739	772	1014	440
Northern Goshawk	44	34	105	28	35	27	69	20	20	21
Broad-winged Hawk	1	2	0	2	1	3	0	0	1	0
Swainson's Hawk	0	0	0	2	1	0	0	0	0	0
Red-tailed Hawk	99	93	97	53	158	93	84	68	69	49
Rough-legged Hawk	0	0	0	0	0	0	0	0	0	0
Red-shouldered Hawk	0	0	0	0	0	0	0	0	0	0
Golden Eagle	10	3	3	2	11	4	7	5	4	8
Bald Eagle	0	0	0	0	0	0	0	0	0	0
American Kestrel	190	266	368	224	286	194	290	352	149	97
Merlin	2	9	10	8	21	13	18	26	13	16
Prairie Falcon	7	7	8	1	7	3	7	17	7	3
Peregrine Falcon	1	1	0	1	0	1	1	4	0	1
All Species	2,762	3,030	3,861	2,681	4,697	2,861	3,311	3,068	3,418	1,534
Recaptures ¹	4	4	7	9	10	3	3	7	9	4
Foreign Recaptures ²	0	0	1	1	2	1	4	3	5	2

¹ Recaptures at the Goshutes of birds originally banded at the Goshutes.

² Recaptures at the Goshutes of birds originally banded elsewhere.

Appendix D. Annual summaries of banding effort and capture totals by species at the Goshutes HawkWatch in eastern NV: 1980–2017.

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Start date	21-Aug	22-Aug	24-Aug	24-Aug	27-Aug	23-Aug	22-Aug	20-Aug	21-Aug	22-Aug
End date	28-Oct	4-Nov	5-Nov	28-Oct	22-Oct	1-Nov	5-Nov	25-Oct	28-Oct	31-Oct
Blinds in operation	4	4	4	4	3	4	3	3	2	2
Trapping days	62	72	68	66	53	69	72	63	62	64
Station days	174	210	188	163	105	150	128	81	69	66
Station hours	1286	1666	1474	1276	807	1073	888	550	503	476
Captures/100 stn hrs	167.0	172.9	159.9	116.6	158.1	153.9	112.3	210.7	205.2	176.9

Species	Raptor Captures									
Northern Harrier	17	11	8	7	2	3	2	6	2	0
Sharp-shinned Hawk	1235	1607	1283	848	790	902	504	683	616	432
Cooper's Hawk	504	974	792	462	342	562	356	383	314	307
Northern Goshawk	24	23	7	9	28	21	27	18	6	4
Broad-winged Hawk	3	1	0	2	1	2	1	2	0	1
Swainson's Hawk	0	1	0	0	0	1	0	0	0	0
Red-tailed Hawk	58	76	109	63	61	67	56	39	40	43
Rough-legged Hawk	0	2	0	0	0	0	0	0	0	0
Red-shouldered Hawk	0	0	0	0	0	0	0	0	0	0
Golden Eagle	2	1	8	1	2	1	1	0	4	4
Bald Eagle	0	0	0	0	0	0	0	0	0	0
American Kestrel	285	168	128	88	35	76	38	19	42	41
Merlin	11	12	15	5	11	11	5	6	6	6
Prairie Falcon	8	3	4	3	4	3	5	3	1	4
Peregrine Falcon	1	1	3	0	0	2	2	0	1	0
All Species	2,148	2,880	2,357	1,488	1,276	1,651	997	1,159	1,032	842
Recaptures ¹	6	9	7	2	2	2	2	3	4	3
Foreign Recaptures ²	3	4	3	1	2	4	0	1	2	0

¹ Recaptures at the Goshutes of birds originally banded at the Goshutes.

² Recaptures at the Goshutes of birds originally banded elsewhere.

Appendix D. Annual summaries of banding effort and capture totals by species at the Goshutes HawkWatch in eastern NV: 1980–2017.

	2010	2011	2012	2013	2014	2015	2016	2017	Mean	Total
Start date	20-Aug	17-Aug	25-Aug	20-Aug	23-Aug	23-Aug	15-Aug	15-Aug	24-Aug	---
End date	1-Nov	30-Oct	31-Oct	31-Oct	31-Oct	31-Oct	31-Oct	31-Oct	27-Oct	---
Blinds in operation	2	2	2	2	2	2	2	2	3.2	---
Trapping days	62	57	63	67	68	61	68	69	61.1	1955
Station days	68	59	80	92	88	79	86		148.7	4759
Station hours	476	429	572	576	582	501	597	608.9	1045.4	38680.2
Captures/100 stn hrs	245.0	159.7	203.1	187.8	242.1	248.3	127.7	111.0	177.6	---
Species	Raptor Captures									
Northern Harrier	1	1	4	4	4	1	6	2	4.9	184
Sharp-shinned Hawk	698	420	661	587	732	686	416	313	1022.4	38156
Cooper's Hawk	280	200	297	316	480	430	232	200	521.9	19524
Northern Goshawk	5	9	17	10	12	12	3	12	23.1	868
Broad-winged Hawk	1	2	0	7	1	2	2	0	1.2	44
Swainson's Hawk	1	0	0	2	1	0	0	0	0.2	9
Red-tailed Hawk	119	27	112	88	107	74	85	101	65.6	2528
Rough-legged Hawk	0	0	1	0	0	0	0	0	0.1	3
Red-shouldered Hawk	0	0	0	0	0	0	2	0	0.1	2
Golden Eagle	4	2	7	5	4	1	1	3	3.8	143
Bald Eagle	0	0	0	0	0	0	0	0	0.0	1
American Kestrel	38	15	48	44	41	28	5	24	106.5	3965
Merlin	15	5	12	11	14	3	6	8	8.3	316
Prairie Falcon	3	2	2	6	12	4	4	7	4.5	174
Peregrine Falcon	1	2	1	2	1	3	1	7	0.9	41
All Species	1,166	685	1,162	1,082	1,409	1,244	763	677	1763.5	65,958
Recaptures ¹	3	1	2	0	1	1	0		2.9	111
Foreign Recaptures ²	2	0	3	1	3	1	0		1.4	53

¹ Recaptures at the Goshutes of birds originally banded at the Goshutes.

² Recaptures at the Goshutes of birds originally banded elsewhere.

