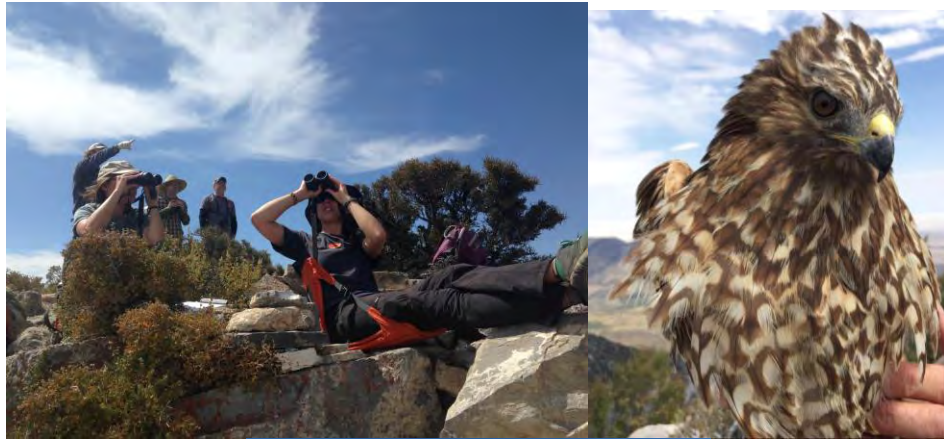


FALL 2016 RAPTOR MIGRATION ANNUAL REPORT:

GOSHUTE MTS HAWKWATCH, NEVADA



HawkWatch International, Inc.
Salt Lake City, Utah



**FALL 2016 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 2016 season marking the 37th consecutive season of banding and the 34th 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 2016 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 2016 (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 2016 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.

2016 RESULTS AND DISCUSSION

OBSERVATION EFFORT AND WEATHER SUMMARY

The Goshute Mountains HawkWatch standard season runs 15 August – 5 November; in 2016 observers counted on 80 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). Weather varies throughout every season, in 2016 based on hourly recording of conditions during observation it was clear 36% of the time; partly cloudy 23% of the time; mostly cloudy 15% of the time; overcast 23% of the time; hazy 4% of the time; foggy 1% of the time; and raining or snowing 2% of the time.

2016 FLIGHT SUMMARY

Overall Flight:

We counted 11,640 migrants of 18 raptor species in 2016, 21% lower than the site average (Table 1).

The composition of the 2016 flight broke down as follows: 51% accipiters, 32.1% buteos, 8.5% falcons, 3.2% vultures, 1.8% harriers, 1.3% eagles, and 0.5% Ospreys. The proportions of buteos and Harriers in the flight were above historic averages; accipiters, eagles, Osprey, and falcons made up a significantly smaller proportion of the flight compared to site historic averages (Fig. 3). The most commonly observed species in 2016 in descending order: Red-tailed Hawks (28.6% of the total), Sharp-shinned Hawks (27.9%), Cooper's Hawks (16.9%), American Kestrels (7.6%), Turkey Vultures (3.2%), Swainson's Hawks (1.5%), and all the other species made up $\leq 1\%$ of the total flight (Table 1).

The following sections summarize the 2016 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 1,668 raptors counted per 100 hours of observation at the Goshutes HawkWatch in 2016 was significantly low compared to average site passage rate of 2167 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 above average numbers of Northern Harriers, below average numbers of Osprey, and an average number of Turkey Vultures in 2016 (Table 1). Regression results on fall passage rates suggest that regional populations of Turkey Vultures are growing (slope = 2.45, $r^2 = 0.49$, $p < 0.001$) and recent declines in the number of Osprey counted on migration beginning around 2007 ($F_{2,31} = 7.51$, $r^2 = 0.33$, $p = 0.01$). 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, Cooper's Hawks and Northern Goshawks were below average at the Goshutes HawkWatch in 2016 (Table 1). Regression analysis results indicate that that Northern Goshawk passage rates are declining (slope = -0.33, $r^2 = 0.15$, $p = 0.02$); and that Sharp-shinned Hawk and Cooper's Hawk regional populations are stable over the long-term (no significant trend).

Buteoine Hawks (Fig 5c):

The 3,738 buteos counted at the Goshutes does not differ statistically from the site average of 3,880 (Table 1). Counts and passage rates for Broad-winged Hawks and Red-tailed Hawks did not differ from site averages in 2016. Ferruginous Hawk and Swainson's Hawk counts and passage rates were all significantly low compared to site averages; and we counted above average numbers of Rough-legged Hawks and Red-shouldered Hawks. Regression analyses of passage rates indicate long-term increases in

the number of Broad-winged Hawks (slope = .8, $r^2 = 0.49$, $p < 0.001$), Swainson's Hawks (slope = 3.1, $r^2 = 0.18$, $p = 0.014$), and Red-tailed Hawks (slope = 8.6, $r^2 = 0.33$, $p < 0.001$) counted at the Goshutes HawkWatch during fall migration counts.

Eagles (Fig. 5d):

We counted the second lowest number of Golden Eagles (142 total, 20.4 birds/100hrs) in the 34 year history of the Goshute Mountains HawkWatch. Regression results indicate a long-term decline in regional Golden Eagle populations (slope = -0.43, $r^2 = 0.21$, $p = 0.006$) based on migration counts. Bald Eagle count and passage rate were average at the Goshutes HawkWatch in 2016.

Falcons (Fig 5e):

Crews counted below average numbers of American Kestrels (893, 128 birds/100hrs) in 2016, the 9th season this has happened in the last 11 years. Regression analysis shows Kestrel passage rates dropping since the turn of the century ($F_{2,31} = 9.81$, $r^2 = 0.39$, $p = 0.004$). 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/>).

Prairie Falcon counts and passage rates were also below average in 2016. Merlin counts and passage rates were average, and Peregrine Falcon numbers were above average (Table 1). None of these species meet the 10 birds/100hrs average threshold for trend analysis.

TRAPPING EFFORT

Crews trapped on 68 of 78 possible days (totaling 597 hours) between 15 August and 31 October, and captured 763 raptors of twelve different species (Table 2 and Appendix D). All capture totals except: Broad-winged Hawk, Prairie Falcon, and Peregrine Falcon were below historical average. We also caught the site's first two Red-shouldered Hawks. After a record high in 2015, Goshutes had the highest lowest rate (127.7 captures/100 station hours) since 2006. Most species capture rates were below average with the notable exception of the Red-tailed Hawk which was above average (Table 2). Season highlights included 2 Broad-winged Hawks, 2 Red-shouldered Hawks, and a Golden Eagle.

RECAPTURES

There were no "in-house" (HWI banded bird) and no "foreign recaptures" (recapture of a bird banded elsewhere) at the Goshutes for the first time since 1988.

FOREIGN ENCOUNTERS WITH PREVIOUSLY BANDED BIRDS FROM THE GOSHUTES

A total of 396 raptors banded at the Goshutes have been recaptured or recovered elsewhere and reported to the Bird Banding Laboratory (Fig. 6). During 2016 we received notice of 4 encounters: (Table 3). All individuals were banded from 2009-2016. Dead recoveries included three Red-tailed Hawks, originally banded as after-second years and one hatch-year in Utah, Idaho, and Arizona, respectively. Also reported was Cooper's Hawk, originally banded as an after-second year without any additional information from Washington during the 2016 breeding season.

SITE VISITATION

Approximately 272 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. Three separate 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.

2016 FALL MIGRATION ACROSS HWI'S NETWORK

HawkWatch International and partners operated 8 fall count sites in 2016 (Fig. 1). During the 4,451 hours of standardized observation, we counted 713,979 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 2016 included (Table 4):

- Below average Kestrel numbers at 5 of 8 sites (no sites w/ above average counts).
- Below average counts for Prairie Falcons and Osprey at 5 of 8 sites.
- Above average Merlin counts at 5 of 8 sites, only exception was Manzanos with a count below average (this site had second lowest overall (all raptors) count in 32-yr history)
- Above average counts at Bridger, Commissary, and Grand Canyon for second year in a row overall and for most species.
- 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:
 - Golden Eagles at Commissary (only network site w above average Golden Eagle count)
 - All falcons except Kestrels and Northern Harriers at the Grand Canyon
 - Bald Eagles at Chelan Ridge
 - Mississippi Kites at Corpus Christi (shattered previous record of 27,285)

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Each year a number of dedicated volunteers help out with various aspects of logistics and data collection, and we truly give special thanks to all for their continued support.

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Table 1. Historic fall raptor migration counts (mean \pm 95% CI), counts from fall 2016, and site records at the Goshutes HawkWatch in eastern Nevada.

1983-2015				All-time Historic Records	
Species	Mean Count ± 95 % CI	2016	% Change	Season	Daily
Turkey Vulture	435.5 ± 82.8	370	-15.0	1102 (2015)	315 (2013)
Osprey	97.3 ± 14.0	54	-44.5	187 (1997)	38 (2013)
Northern Harrier	170.1 ± 22.2	212	24.7	356 (1999)	26 (1995)
Accipiters					
Sharp-shinned Hawk	4567.0 ± 618.5	3249	-28.9	9598 (1998)	1001 (2001)
Cooper's Hawk	3026.5 ± 452.1	1971	-34.9	6736 (1998)	913 (2001)
Northern Goshawk	93.8 ± 18.8	27	-71.2	259 (1992)	19 (1996)
Unidentified accipiter	304.6 ± 65.4	685	124.9	710 (1987)	
TOTAL ACCIPITERS	7991.9 ± 1031.5	5932	-25.8	16508 (1998)	
Buteos					
Red-shouldered Hawk	0.2 ± 0.2	3		3 (2016)	1 (6 times)
Broad-winged Hawk	79.4 ± 27.1	91	14.7	336 (2015)	76 (2010)
Swainson's Hawk	356.6 ± 171.1	180	-49.5	2856 (2015)	378 (2015)
Red-tailed Hawk	3349.1 ± 382.6	3327	-0.7	6988 (2015)	915 (2001)
Ferruginous Hawk	15.8 ± 2.4	9	-42.9	32 (2014)	6 (1995)
Rough-legged Hawk	14.5 ± 3.2	22	51.3	50 (1999)	6 (3 times)
Unidentified buteo	65.5 ± 15.7	106	61.9	185 (1983)	
TOTAL BUTEOS	3881.0 ± 535.5	3738	-3.7	10227 (2015)	
Eagles					
Golden Eagle	242.8 ± 21.3	142	-41.5	344 (1996)	24 (1992/1997)
Bald Eagle	12.3 ± 2.1	11	-10.6	31 (1999)	6 (1994)
Unknown eagles	0.6 ± 0.4	4	528.6	5 (1991)	
TOTAL EAGLES	255.8 ± 22.2	157	-38.6	372 (1999)	
Falcons					
American Kestrel	1714.1 ± 291.1	893	-47.9	3394 (1997)	586 (2000)
Merlin	44.4 ± 8.9	43	-3.1	110 (2014)	20 (1998)
Prairie Falcon	25.3 ± 4.7	12	-52.6	58 (1995)	7 (1998)
Peregrine Falcon	16.3 ± 4.4	26	59.5	46 (2011)	7 (2001)
Unidentified falcon	6.8 ± 1.7	12	77.6	21 (1996)	
TOTAL FALCONS	1806.8 ± 300.2	986	-45.4	3556 (1997)	
Unidentified Raptor	94.2 ± 30	186	97.5	446 (1983)	
GRAND TOTAL	14732.5 ± 1676.1	11640	-21	25290 (1998)	2202 (2014)

Table 2. Capture totals and rates for migrating raptors in the Goshute Mountains, NV: 1983–2015 versus 2016.

	Capture Totals		Seasonal Record	Capture Rate ¹		Seasonal Record
	1983-2015 ²	2016		1983-2015 ²	2016	
Northern Harrier	5.3 ± 1.5	6	18	0.5 ± 0.1	1.0	1.8
Sharp-shinned Hawk	1114.8 ± 207.5	416	2692	102.0 ± 7.1	69.6	146.6
Cooper's Hawk	564.0 ± 105.9	232	1478	52.3 ± 4.5	38.8	85.8
Northern Goshawk	25.2 ± 6.8	3	105	2.4 ± 0.6	0.5	7.2
Broad-winged Hawk	1.3 ± 0.5	2	7	0.2 ± 0.1	0.3	1.2
Swainson's Hawk	0.3 ± 0.2	0	2	0.0 ± 0.0	0.0	0.3
Red-tailed Hawk	69.3 ± 10.6	85	158	7.6 ± 1.8	14.2	25.0
Rough-legged Hawk	0.1 ± 0.1	0	2	0.0 ± 0.0	0.0	0.2
Red-shouldered Hawk	0.0 ± -	2	2	0.0 ± -	0.3	0.3
Golden Eagle	4.1 ± 0.9	1	11	0.4 ± 0.1	0.2	1.2
Bald Eagle	0.0 ± 0.1	0	1	0.0 ± 0.0	0.0	0.2
American Kestrel	117.1 ± 36.7	5	368	8.8 ± 1.5	0.8	22.2
Merlin	9.1 ± 2.1	6	26	0.9 ± 0.2	1.0	3.2
Prairie Falcon	4.9 ± 1.1	4	17	0.5 ± 0.1	0.7	2.1
Peregrine Falcon	1.0 ± 0.4	1	4	0.1 ± 0.0	0.2	0.6
All Species	1916.5 ± 353.3	763	4697	175.8 ± 12.2	127.7	248.3

¹ Captures / 100 station hours.

² Mean of annual values ± 95% confidence interval.

Table 3. Foreign encounters with raptors originally banded at the Goshutes HawkWatch in Nevada: 2016.

Band #	Species ¹	Sex	Banding Date	Banding Age ²	Encounter Location	Encounter Date	Distance (KM) ³	Status
1177-52215	RTHA	U	22-Sep-09	ASY	Cedar City, Utah	27-Sep-16	294.6	Killed or caught by a predator other than a cat
1177-52281	RTHA	U	20-Sep-12	ASY	Twin Falls, Idaho	13-Feb-16	223.6	Found dead - Unknown cause
1075-01688	COHA	F	21-Sep-13	ASY	Danville, Washington	8-May-16	951.4	Unknown
1957-19082	RTHA	U	3-Sep-16	HY	McNeal, Arizona	3-Nov-16	1018.1	Found dead - Unknown cause

¹ Species: RTHA = Red-tailed hawk; COHA = Cooper's Hawk.

² HY = hatch year; ASY = After Second Year.

³ Straight-line distance from banding location.

Table 4. Summary of the 2016 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 2016 HWI monitored fall migration for 4,451.7 hrs and counted 713,979 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
	<i>Hours Counted in 2016</i>							
Species	366	421	381.8	*573.8*	698.5	600.8	553.5	856.3
Black Vulture								140
Turkey Vulture	596	63	14	59	370		214	45293
Osprey	66	*16*	13	22	54	70	22	187
Northern Harrier	12	82	44	52	211	*68*	30	158
Crested Caracara								5
Common Black Hawk								0
Harris' Hawk								5
Accipiters								
Sharp-shinned Hawk	1146	490	616	1487	3204	1667	892	2159
Cooper's Hawk	362	196	198	536	1960	1255	466	824
Northern Goshawk	24	13	62	45	27	10	9	0
Unidentified accipiter	43	74	60	66	656	377	94	64
TOTAL ACCIPITERS	1575	773	936	2134	5847	3309	1461	3047
Buteos								
Red-shouldered Hawk	0	0		0	*3*	0	0	15
Broad-winged Hawk	4	8	31	25	91	37	8	594222
Short-tailed Hawk								0
Swainson's Hawk	0	6	4	96	180	59	149	2255
White-tailed Hawk								22
Zone-tailed Hawk							3	7
Red-tailed Hawk	344	151	212	1183	3128	1510	421	*44*
Ferruginous Hawk	0	0	3	8	9	10	5	2
Rough-legged Hawk	3	28	77	11	20	0	0	0
Unidentified buteo	25	35	16	37	102	60	22	24
TOTAL BUTEOS	376	228	343	1360	3533	1676	608	596591
Eagles								
Golden Eagle	66	87	1434	*476*	139	4	95	0
Bald Eagle	83	*18*	78	230	10	8	2	9
Unknown eagles	*11*	0	1	11	5	1	0	0
TOTAL EAGLES	160	105	1513	*717*	154	13	97	9
Falcons								
American Kestrel	9	26	88	167	893	496	237	810
Merlin	108	34	33	31	42	*22*	17	83
Prairie Falcon	2	6	14	5	11	*11*	13	7
Peregrine Falcon	17	9	30	13	26	*19*	35	224
Aplomado Falcon								0
Unidentified falcon	4	2	4	2	*43*	*33*	9	10
TOTAL FALCONS	140	77	169	218	1015	581	311	1134
Kites								
Hook-billed Kite								0
Swallow-tailed Kite								152
White-tailed Kite								13
Mississippi Kite								*35219*
Unidentified Kites								0
TOTAL KITES								*35384*
Unidentified Raptor	2	30	34	18	185	*71*	6	172
GRAND TOTAL	2927	1374	3066	4580	11369	5788	2749	682126



Figure 1. Locations of fall HawkWatch sites operated by HWI and partners (symbols with borders represent sites that conducted banding in 2016).

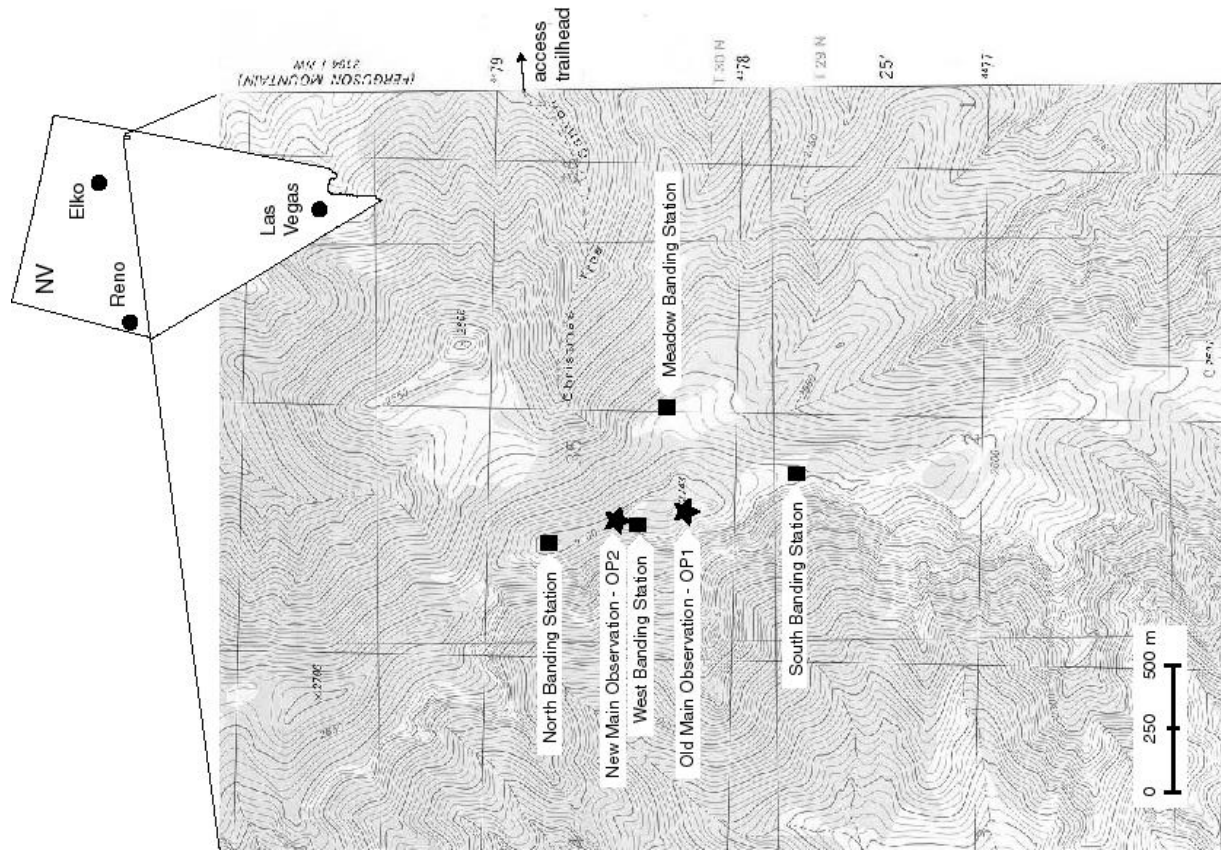
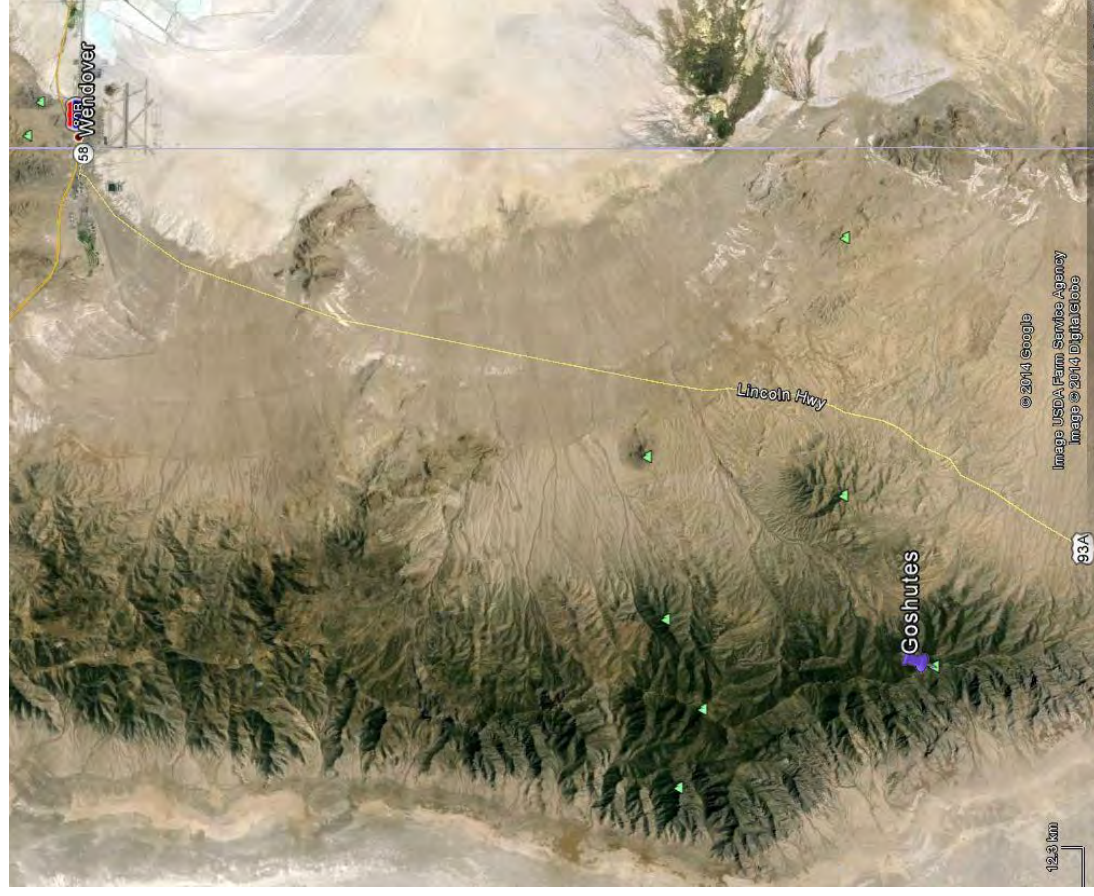


Figure 2. Location of the Goshutes HawkWatch in eastern Nevada.



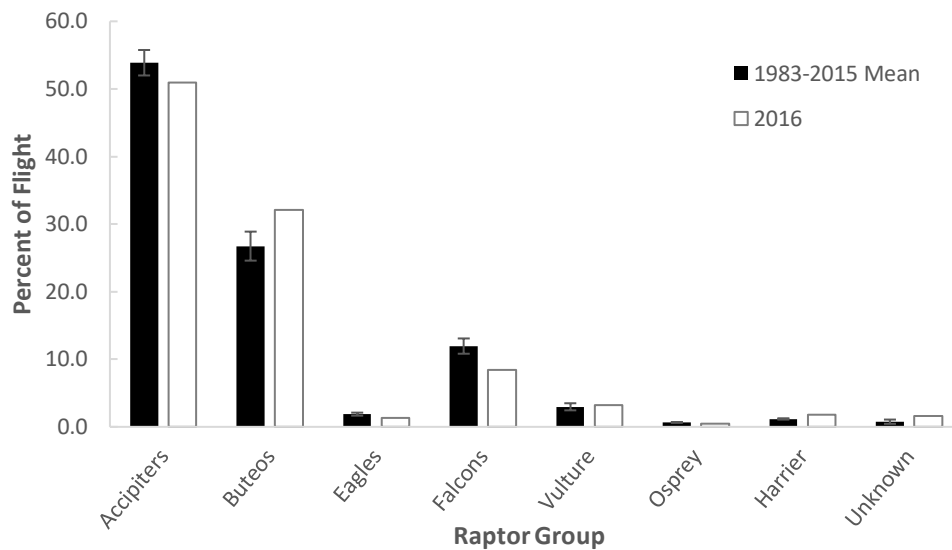


Figure 3. Fall migration flight composition by major species groups at the Goshutes HawkWatch in eastern Nevada: 1983–2015 versus 2016.

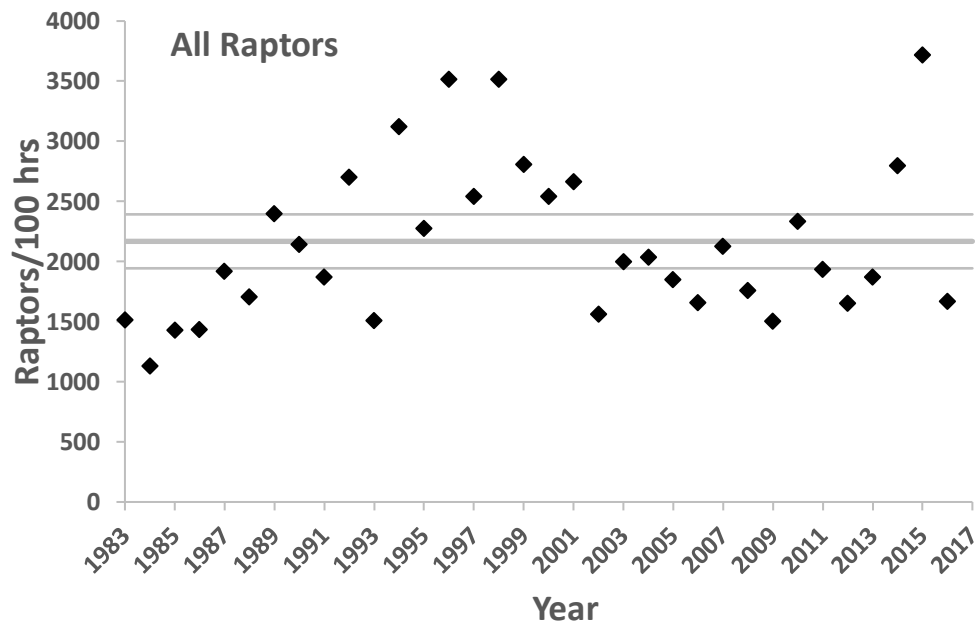


Figure 4. Fall migration passage rates at the Goshutes HawkWatch in eastern NV for all migrating raptors: 1983–2016. Solid grey lines represent mean (thick) and upper and lower 95% confidence intervals (thin) of historic counts (1983–2015) at the Goshutes. Dashed line (if present) represents trend for significant ($p < 0.05$) quadratic regression.

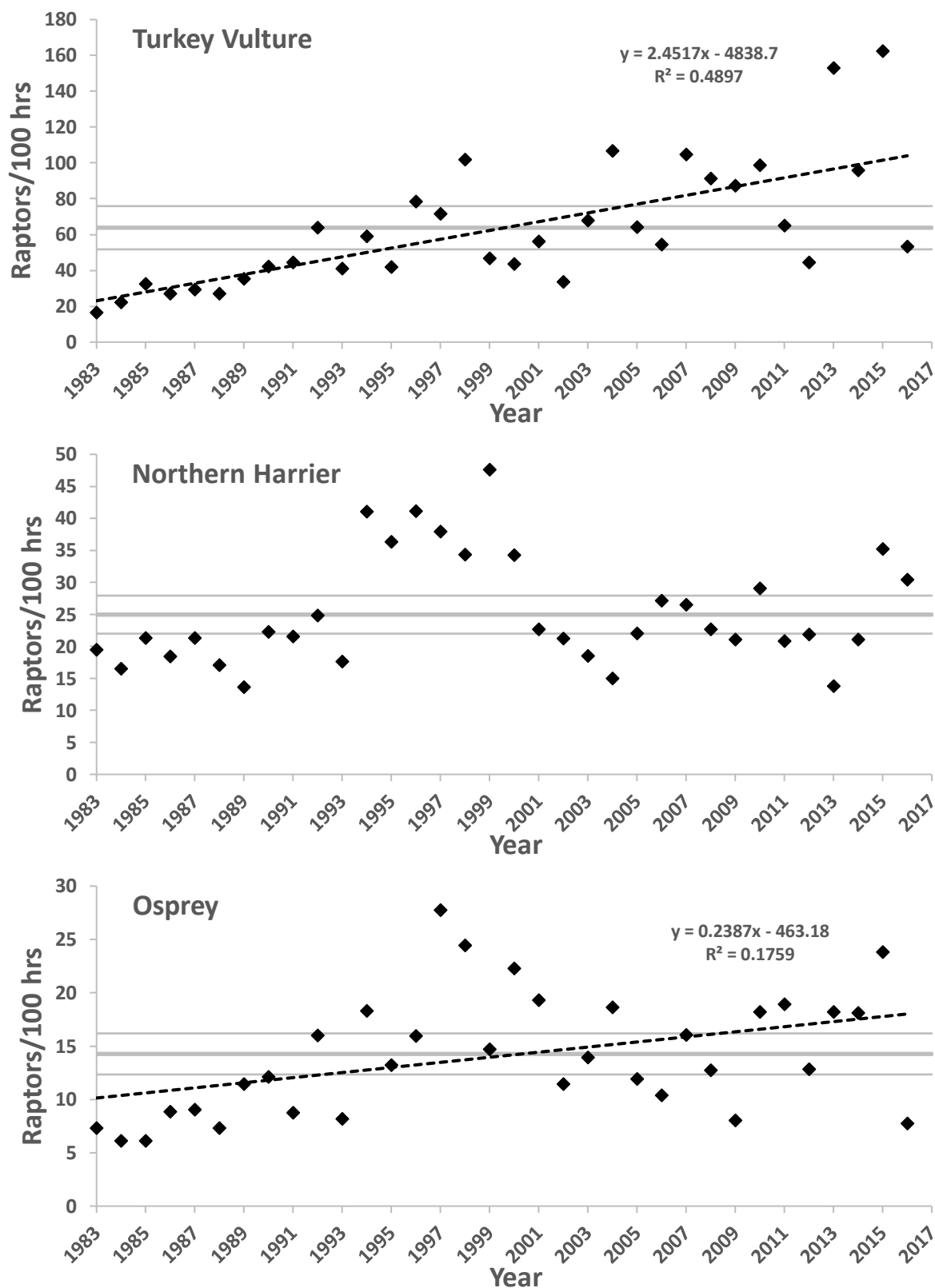


Figure 5a. Fall-migration passage rates at the Goshutes HawkWatch in eastern NV for Turkey Vultures, Ospreys, and Northern Harriers: 1983–2016. Dashed lines indicate trends for significant ($p < 0.05$) linear or quadratic regressions. Solid grey lines represent mean (thick) and upper and lower 95% confidence intervals (thin) of historic counts (1983-2015).

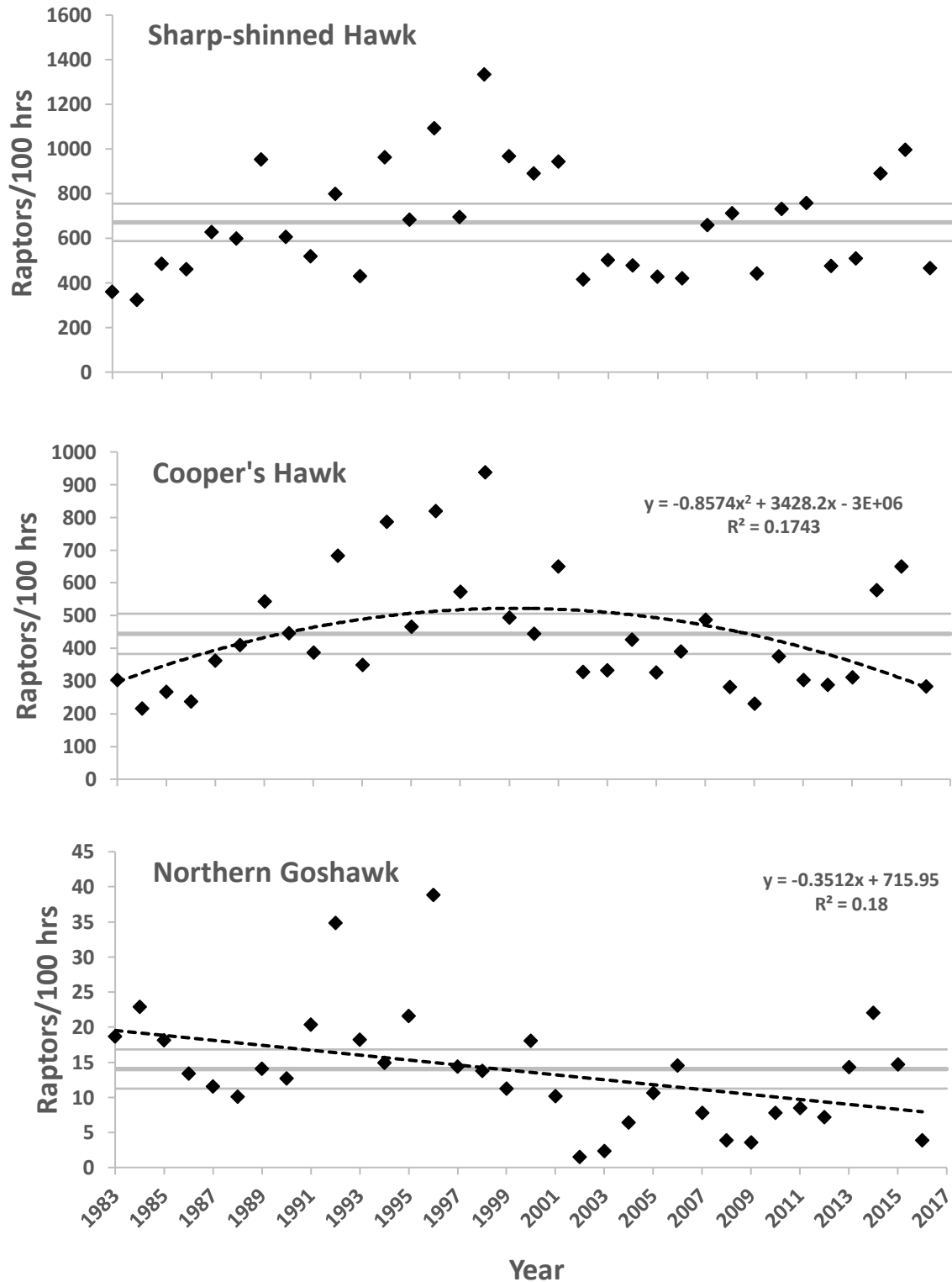


Figure 5b. Fall-migration Accipiter passage rates at the Goshutes HawkWatch in eastern NV: 1983–2016. Dashed lines indicate trends for significant ($p < 0.05$) linear or quadratic regressions. Solid grey lines represent mean (thick) and upper and lower 95% confidence intervals (thin) of historic counts (1983-2015).

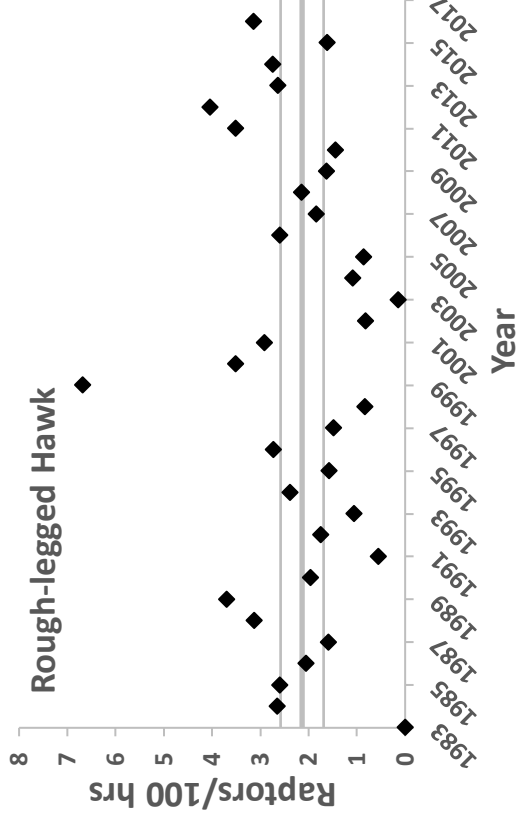
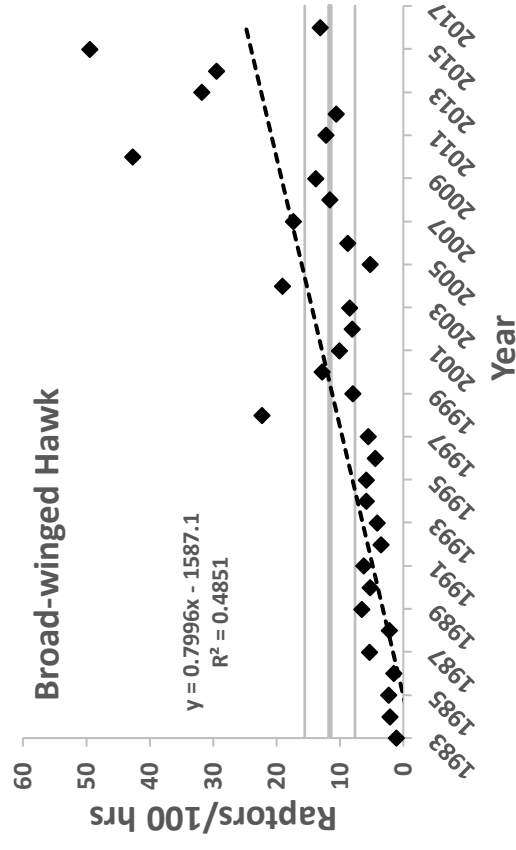
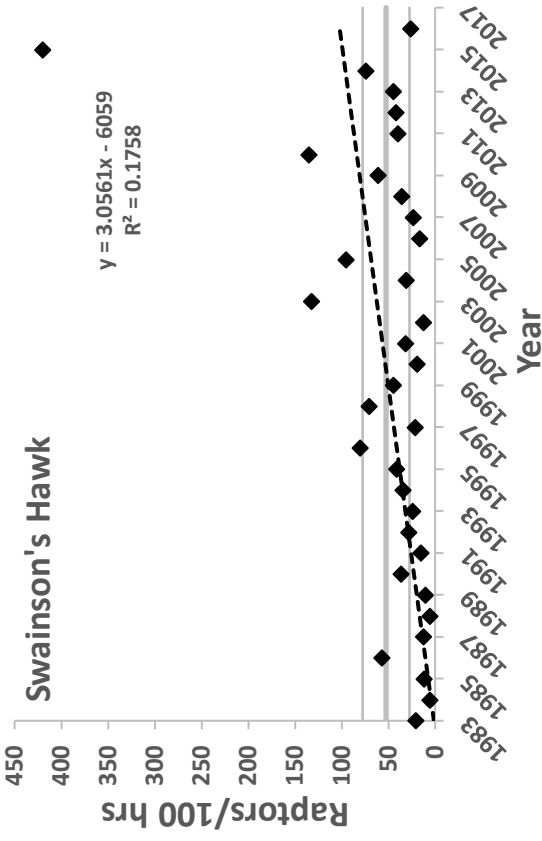
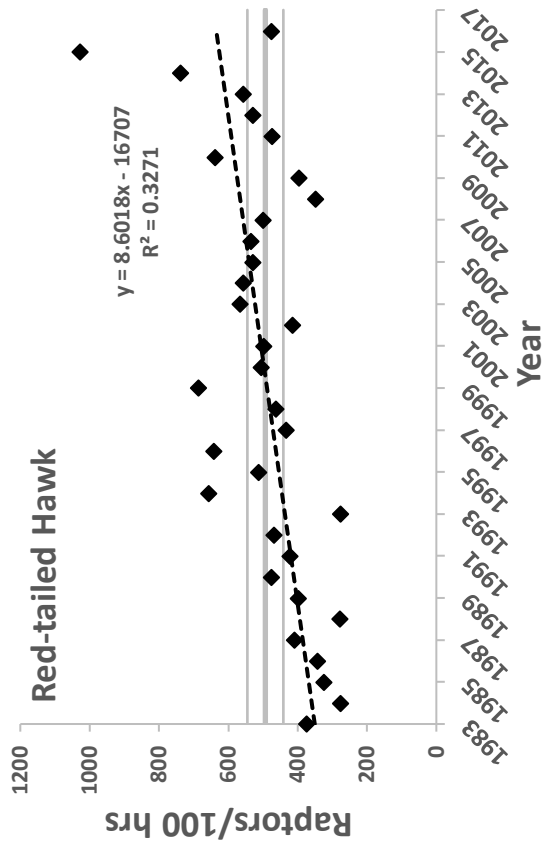


Figure 5c. Fall-migration buteo passage rates at the Goshutes HawkWatch in eastern NV: 1983–2016. Dashed lines indicate significant ($p < 0.05$) population trends based on linear regression. Solid grey lines represent mean (thick) and upper and lower 95% confidence intervals (thin) of historic counts (1983–2015).

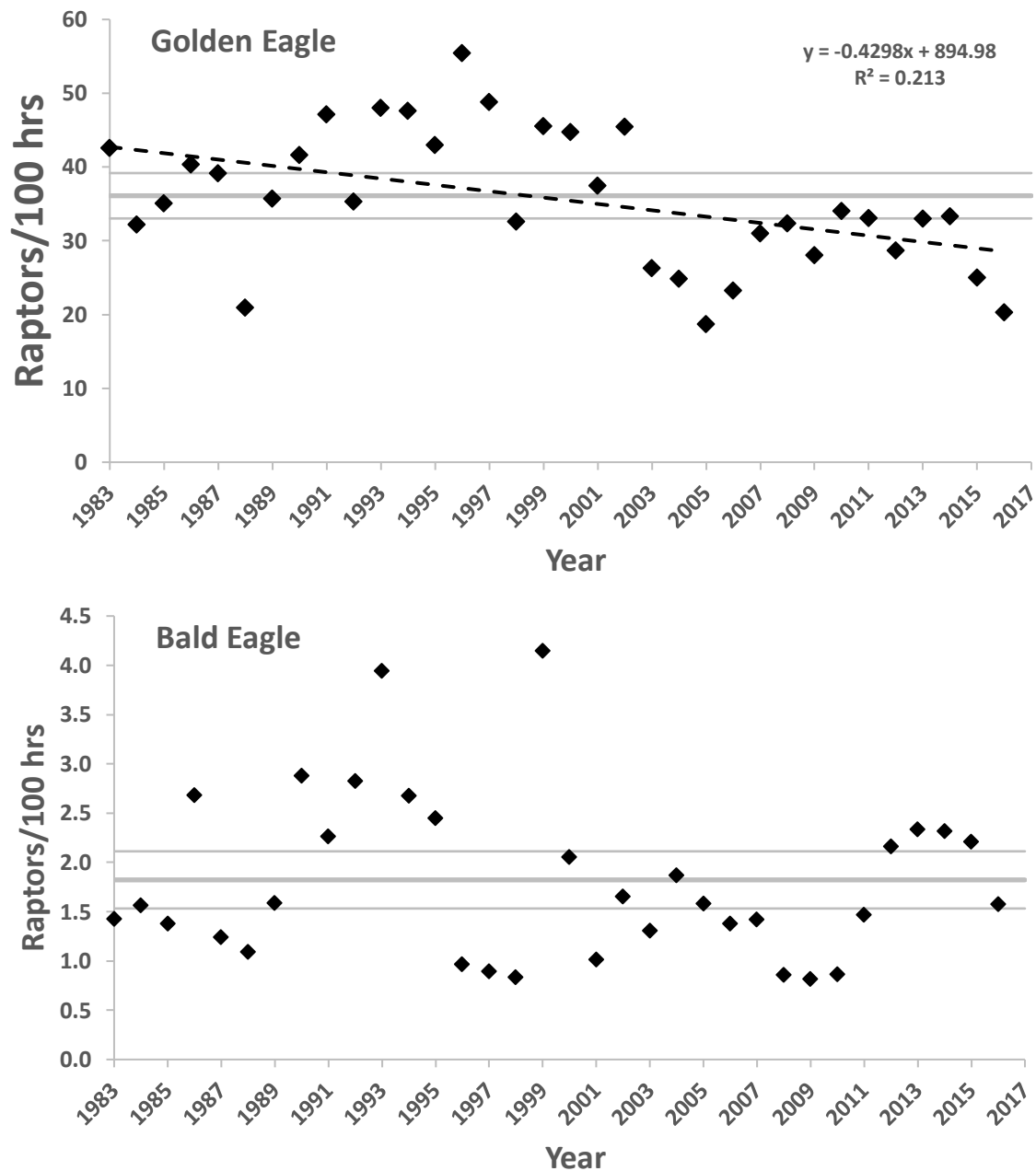


Figure 5d. Eagle passage rates for the fall migration at the Goshutes HawkWatch in eastern NV: 1983–2016. Dashed lines indicate significant ($p < 0.05$) population trends based on linear regressions. Solid grey lines represent mean (thick) and upper and lower 95% confidence intervals (thin) of historic counts (1983–2015).

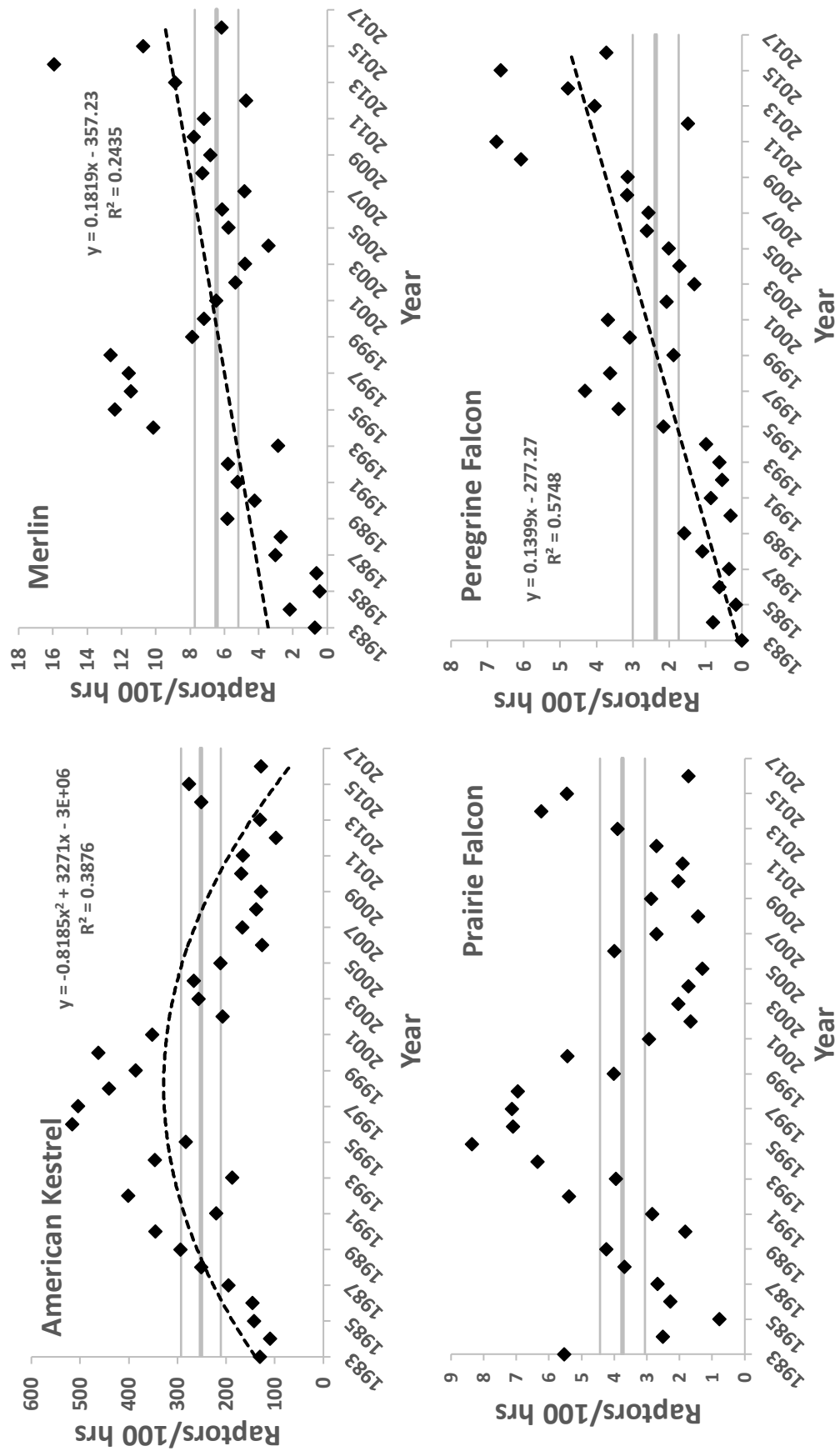


Figure 5e. Fall-migration falcon passage rates at the Goshutes HawkWatch in eastern NV: 1983–2016. Dashed lines indicate significant ($p < 0.05$) population trends based on linear or quadratic regressions. Solid grey lines represent mean (thick) and upper and lower 95% confidence intervals (thin) of historic counts (1983–2015).

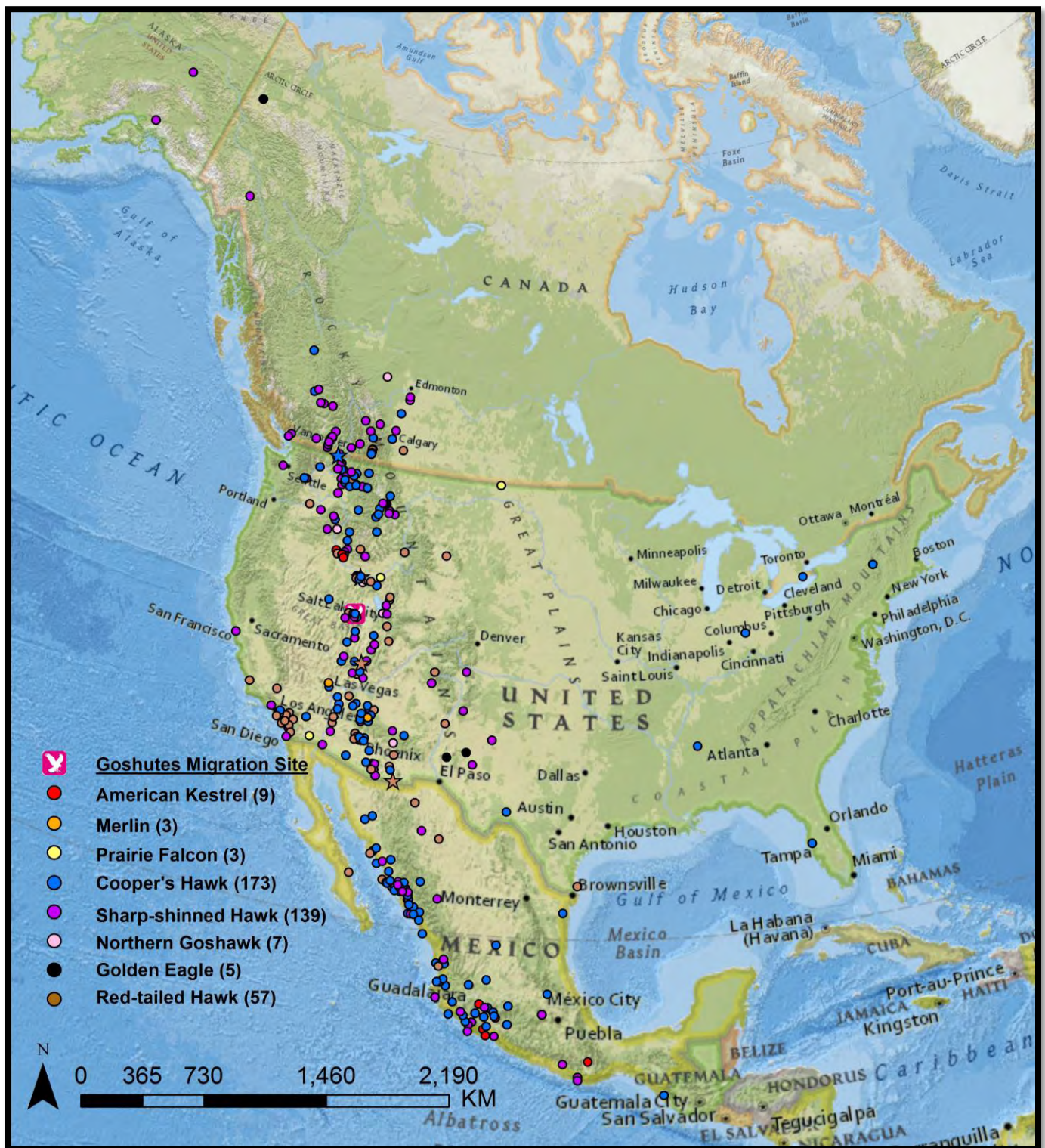


Figure 6. Locations of raptors banded at the Goshutes HawkWatch in eastern NV that were encountered elsewhere. Circles represent re-encounters from 1981 to 2015, stars represent 2016 encounters.

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).

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 spp.</i>	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 spp.</i>	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 spp.</i>	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 spp.</i>	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	1,435	1,921	1,704	2,397	2,527	1,879	2,703	1,510	3,122	2,276	3,514
RAPTOR COUNTS														
SPECIES														
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		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
End Date	5-Nov		5-Nov		5-Nov		5-Nov		5-Nov		5-Nov		5-Nov		5-Nov		5-Nov		5-Nov		4-Nov
Observation days	82		82		83		82		79		83		80		81		81		80		79.0
Observation hours	703.00		698.5		733.6		692.60		682.03		741.00		641.75		690.00		680		697.7		675.3
Raptors / 100 hours	2,125		1,758		1,502		2,336		1,936		1,650		1,869		2,796		3,719		1,668		2185.6
SPECIES																					
Turkey Vulture	735		637		640		682		443		329		980		661		1,102		370		435.5
Osprey	113		89		59		126		129		95		117		125		162		54		97.3
Northern Harrier	186		158		154		201		142		162		88		145		239		212		170.1
Mississippi Kite	0		0		0		0		0		0		0		1		0		0		0.0
Sharp-shinned Hawk	4,635		4,967		3,251		5,063		5,171		3,527		3,271		6,141		6,769		3,249		4567.0
Cooper's Hawk	3,422		1,957		1,691		2,599		2,067		2,130		1,997		3,986		4,418		1,971		3027.2
Northern Goshawk	55		27		26		54		58		53		92		152		100		27		93.8
Unknown accipiter	366		221		280		169		62		394		116		42		43		685		304.6
TOTAL ACCIPITERS	8,478		7,172		5,248		7,885		7,358		6,104		5,476		10,321		11,330		5,932		7992.6
Red-shouldered Hawk	0		0		0		0		0		0		0		0		0		3		0.2
Broad-winged Hawk	122		81		101		295		83		78		204		203		336		91		79.4
Swainson's Hawk	163		248		445		933		269		308		285		509		2,856		180		356.6
Red-tailed Hawk	3,511		2,439		2,913		4,427		3,237		3,928		3,579		5,095		6,988		3,327		3349.1
Ferruginous Hawk	11		10		8		8		14		11		18		32		21		9		15.8
Rough-legged Hawk	13		15		12		10		24		30		17		19		11		22		14.5
Unidentified buteo	44		91		120		34		24		76		41		16		15		106		65.5
TOTAL BUTEOS	3,864		2,884		3,599		5,707		3,651		4,431		4,144		5,874		10,227		3,738		3881.0
Golden Eagle	218		226		206		236		226		213		212		230		170		142		242.8
Bald Eagle	10		6		6		6		10		16		15		16		15		11		12.3
Unidentified eagle	0		0		0		0		0		2		1		0		0		4		0.6
TOTAL EAGLES	228		232		212		242		236		231		228		246		185		157		255.8
American Kestrel	1,174		965		940		1,170		1,132		726		839		1,730		1,881		893		1714.0
Merlin	34		51		50		54		49		35		57		110		73		43		44.4
Prairie Falcon	19		10		21		14		13		20		25		43		37		12		25.3
Peregrine Falcon	18		22		23		42		46		11		26		33		45		26		16.3
Unidentified falcon	6		6		10		2		1		4		1		0		1		12		6.8
TOTAL FALCONS	1,251		1,054		1,044		1,282		1,240		796		948		1,916		2,037		986		1806.8
Unidentified raptor	86		51		60		52		5		79		13		0		0		186		94.2
GRAND TOTAL	14,941		12,277		11,016		16,177		13,205		12,227		11,994		19,289		25,282		11,640		14732.5

Appendix D. Annual summaries of banding effort and capture totals by species at the Goshutes HawkWatch in eastern NV: 1980–2016.

	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: 1980–2016.

	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: 1980–2016.

	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: 1980–2016.

	2010	2011	2012	2013	2014	2015	2016	Mean	Total
Start date	20-Aug	17-Aug	25-Aug	20-Aug	23-Aug	23-Aug	15-Aug	24-Aug	---
End date	1-Nov	30-Oct	31-Oct	31-Oct	31-Oct	31-Oct	31-Oct	27-Oct	---
Blinds in operation	2	2	2	2	2	2	2	3.2	---
Trapping days	62	57	63	67	68	61	68	61.1	1955
Station days	68	59	80	92	88	79	86	148.7	4759
Station hours	476	429	572	576	582	501	597	1045.4	38680.2
Captures/100 stn hrs	245.0	159.7	203.1	187.8	242.1	248.3	127.7	177.6	---
Species	Raptor Captures								
Northern Harrier	1	1	4	4	4	1	6	4.9	182
Sharp-shinned Hawk	698	420	661	587	732	686	416	1022.4	37830
Cooper's Hawk	280	200	297	316	480	430	232	521.9	19310
Northern Goshawk	5	9	17	10	12	12	3	23.1	855
Broad-winged Hawk	1	2	0	7	1	2	2	1.2	44
Swainson's Hawk	1	0	0	2	1	0	0	0.2	9
Red-tailed Hawk	119	27	112	88	107	74	85	65.6	2426
Rough-legged Hawk	0	0	1	0	0	0	0	0.1	3
Red-shouldered Hawk	0	0	0	0	0	0	2	0.1	2
Golden Eagle	4	2	7	5	4	1	1	3.8	139
Bald Eagle	0	0	0	0	0	0	0	0.0	1
American Kestrel	38	15	48	44	41	28	5	106.5	3941
Merlin	15	5	12	11	14	3	6	8.3	308
Prairie Falcon	3	2	2	6	12	4	4	4.5	167
Peregrine Falcon	1	2	1	2	1	3	1	0.9	34
All Species	1,166	685	1,162	1,082	1,409	1,244	763	1763.5	65,251
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.

