FALL 2015 RAPTOR MIGRATION ANNUAL REPORT: GOSHUTE MTS HAWKWATCH, NEVADA

HawkWatch International, Inc.

Salt Lake City, Utah

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

INTRODUCTION

The Goshutes HawkWatch in the Goshute Mountains of 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 been studying the fall raptor migration in the Goshute Mountains since 1980, when HWI founder Steve Hoffman and colleagues first began banding at the site. Standardized counts began in 1983 and have continued each year since. This is one of the longest running standardized, raptor-migration monitoring efforts in western North America, with the 2015 season marking the 36th consecutive season of banding and the 33nd 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 2015 fall migration at the Goshutes.

The Goshutes HawkWatch was 1 of 8 long-term, annual migration counts, and 1 of 4 migration banding studies conducted or co-sponsored by HWI in 2015 (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 Goshutes 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 blood and feather sampling to track changes in raptor health and populations (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 Goshutes 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 project site is located near the south end of the Goshute range and is reached 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 taking place there in every year since (cf. Vekasy and Smith 2002).

Over the years, as many as 6 trapping stations were operated at the Goshutes in a single year. Four stations have been used since 2000 and HWI has recently (including 2013) regularly operated two stations: North and West (Fig. 2a).

METHODS

STANDARDIZED COUNTS

Two designated observers occasionally relieved or supplemented by other staff and volunteers conducted standardized daily counts throughout the season. Weather permitting, daily counts usually began between 0800 and 0900 H Mountain Standard Time (MST) and ended near sunset, usually between 1700 and 1900 H. Data collection followed standardized protocols used at all HWI sites. Observers routinely record:

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 2015 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. Linear and quadratic regression was used on effort-adjusted annual passage rates (raptors/100hrs) to identify long-term trends in migrating raptors.

TRAPPING AND BANDING

Banding crews operated 1-2 trapping stations on most days, generally between 0900 and 1700 H MST. Crews trapped raptors using 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, all birds were fitted 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). All birds were released within 45 minutes of capture.

2015 RESULTS AND DISCUSSION

OBSERVATION EFFORT AND WEATHER SUMMARY

The Goshutes HawkWatch standard season runs 15 August – 5 November; in 2015 observers counted on 81 of 83 possible days during this period for a total of 680 hours, both above historic site averages of 79 days and 675.3 hours (Appendix C). Four days had abbreviated counts (< 4 hrs) due to weather. Weather varies throughout every season, in 2015 based on hourly recording of conditions during observation it was clear 32% of the time; partly cloudy 18% of the time; mostly cloudy 16% of the time; overcast 34% of the time; hazy 83% of the time; foggy 7% of the time; and raining or snowing 2% of the time.

2015 FLIGHT SUMMARY

Overall Flight:

A total of 25,282 migrants of 17 raptor species were counted in 2015, 76% higher than the historic site average (Table 1). Highlights of the flight included record high season totals for Turkey Vultures (1,102), Broad-winged Hawks (336), Swainson's Hawks (2,856), and Red-tailed Hawks (6,988). Swainson's Hawks had the largest single day count in site history on 3 October when 378 were recorded. The total buteo count set a new record at 10,277 and the grand total for all raptors counted was 8 birds shy of the all-time record (25,290) set in 1998.

The composition of the overall flight broke down as follows: 44.8% accipiters, 40.5% buteos, 8.1% falcons, 4.4% vultures, harriers, 0.7% eagles, 0.9%, and 0.6% Ospreys. The percent of buteos and turkey vultures in the flight were above historic averages; accipiters, harriers, eagles, and falcons made up a significantly smaller proportion of the flight compared to site historic averages; while ospreys composed an average proportion of the total flight (Fig. 3). The season's most commonly observed species in descending order were: Red-tailed Hawks (28% of the total), Sharp-shinned Hawks (27%), Cooper's Hawks 17%, Swainson's Hawks (11%), American Kestrels (7%), Turkey Vultures (4%), and all the other species made up $\leq 1\%$ of the total flight (Table 1).

The following sections summarize the 2015 count relative to historic means at the site, and any statistically significant ($p < 0.05$) 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 general public, and could represent the beginning of meaningful long-term changes.

Total Flight (Fig.4):

The 3719 raptors counted per 100 hours of observation at the Goshutes HawkWatch in 2015 was significantly higher than the historic site average passage rate of 2119 raptors per 100 hours. Both 2014 and 2015 counts were significantly higher than the historic average. Over the life the site counts have varied but no long-term trend exists.

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

Seasonal counts and effort-adjusted passage rates for Turkey Vultures, Ospreys, and Northern Harriers were high this year compared to site averages. Turkey Vulture counts set a new seasonal record at 1102 (Table 1). Regression results on fall passage rates suggest that regional populations of both Turkey Vultures and Osprey are growing (slope = 2.74, $r^2 = 0.56$, $p < 0.001$ and slope 0.3, $r^2 = 0.26$, $p = 0.002$, respectively). Conversely Northern Harrier populations are stable over the long-term (no significant trend).

Accipiters (Fig. 5b):

Counts and passage rates for Cooper's Hawks and Sharp-shinned Hawks were high at the Goshutes HawkWatch in 2015 (Table 1). Northern Goshawk counts were above average and passage rates were consistent with the historic average. Regression analyses indicate that that Northern Goshawk passage rates are declining (slope= -0.33, $r^2 = 0.15$, $p = 0.02$). Sharp-shinned Hawk regional populations are stable over the long-term (no significant trend).

Buteoine Hawks (Fig 5c):

The 10,277 buteos counted at the Goshutes is the most ever counted at the site in a season (Table 1) and was nearly double the site record high (5,874) set in 2014. Counts and passage rates for Broad-winged Hawks, Swainson's Hawks, Red-tailed Hawks, and Ferruginous Hawks were all significantly higher than site historic average. There were record count totals for Broad-winged Hawks, Swainson's Hawks, and Red-tailed Hawks in 2015 and a record number of Swainson's Hawks (378) were counted in a single day. Of the buteo species consistently counted from year to year (excluding Red-shouldered Hawks), Rough-legged Hawks were the only with counts and passage rates below historic averages. Moreover, regression analyses of passage rates indicate that regional populations of Broad-winged Hawks (slope = .87, r^2 = 0.52, $p < 0.001$), Swainson's Hawks (slope = 3.49, $r^2 = 0.21$, $p = 0.007$), and Red-tailed Hawks (slope = 9.5, $r^2 = 0.37$, $p = 0.001$) are increasing based upon fall migration counts.

Eagles (Fig. 5d):

Golden Eagle counts and effort-adjusted passage rates in 2015 were significantly lower than site long-term averages (Table 1). Regression results indicate long-term decline in regional populations (slope = -0.38, $r^2 = 0.17$, $p = 0.017$). Bald Eagle count and passage rate were above average at the Goshutes HawkWatch in 2015.

Falcons (Fig 5e):

Merlin, Prairie Falcon, and Peregrine Falcon counts and passage rates were all high in 2015 compared to site averages (Table 1). American Kestrel count and passage rate were average in 2015 for the second straight season. Despite an average year, long-term analysis shows Kestrel passage rates dropping since the turn of the century ($F_{2,30} = 9.115$, $r^2 = 0.4$, $p = 0.005$). Similar declines have been documented for this species across the HWI network and at other count sites. 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/).

TRAPPING EFFORT

Crews trapped on 61 of 69 possible days (totaling 501 hours) between 23 August and 31 October, and captured 1,244 raptors of eleven different species (Table 2). Although there were no site records for capture totals, capture rates were high for Sharp-shinned hawk and a new capture rate (# of captures/ 100 station hours) was set for Cooper's Hawk (Table 2). Additionally, 2015 had the highest capture rate (248.3 captures/100 station hours) in Goshutes history. Season highlights included: two hatch-year Broad-winged Hawks and a hatch-year male Golden Eagle.

RECAPTURES

There was one in-house (HWI banded bird) recapture of a Cooper's Hawk (female) originally banded as an after-hatch-year in 2012. There was also a single "foreign recapture" (recapture of bird banded elsewhere) of a hatch-year female Sharp-shinned Hawk banded 2 days earlier near Boise, Idaho.

FOREIGN ENCOUNTERS WITH PREVIOUSLY BANDED BIRDS

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 2015 we received notice of 6 recoveries: two Sharp-shinned Hawks, two Cooper's Hawks, one Red-tailed Hawk, and one Northern Goshawk (Table 3). Both Sharp-shinned Hawks (banded in 2014 as an after-second-year male and hatch-year female respectively), were found dead due to striking an object rather than a wire or tower in flight in British Columbia and Washington respectively. One Cooper's Hawk (female), originally banded in 2007 as a second-year was captured due to injury in Arizona, her status is unknown. The second Cooper's Hawk (female), captured

as a hatch-year in 2014, was found injured and was alive in captivity at last report. The Red-tailed Hawk, banded in 2014 as an after-second-year, was found dead in California. The Northern Goshawk (male), banded as a hatch-year in 2004, was captured and released in Idaho.

SITE VISITATION

Approximately 218 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 to the site 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 not only about raptor migration ecology, but also banding, counting and using data from HWI's sites to learn about science and statistics. These school groups included Providence Hall, Saratoga Spring (8 students, 2 teachers); Stansbury Academy, Salt Lake City (9 students, 2 teachers); and Salt Lake Center for Science Education, Salt Lake City (23 students, 3 teachers).

2015 FALL MIGRATION ACROSS HWI'S NETWORK

HawkWatch International and partners operated 8 fall count sites in 2015(Fig. 1). During the 4,252 hours of standardized observation we counted 700,457 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 2015 included (Table 2):

- Above average or average counts at 6 of 8 sites
    - Exceptions were Chelan Ridge and Manzano Mountain sites which had significantly low counts.
- Below average Golden Eagle counts at 6 of 8 sites—only above average count was at Commissary Ridge, WY
- Below historic average American Kestrel counts at 6 of 9 sites
- Significantly low counts of all accipiter species at both Pacific Northwest sites
- Significantly high Turkey Vulture counts at 5 of 7 sites where counted (record set at 3 sites: Chelan Ridge, Goshute Mountains, and Corpus Christi-where 170,976 were counted!)
- Above average or average Broad-winged Hawk numbers at all sites with record numbers at 3 sites (Chelan Ridge, Goshute Mountains, and Yaki Point).

HWI partners with Hawk Mountain Sanctuary, the Hawk Migration Association of North America (HMANA), and Bird Studies Canada (BSC) to provide western US data for the Raptor Population Index (RPI), a collaborative standardized effort to monitor raptor migration across North America.

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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 these folks for their continued support: Tom Jones, Don Ries, Jon Seegmiller, , Bryce Robinson, Aaron Smolley, Annette Hansen, Aaron Barna, Leo Chidester, and Jerry Liguori.

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Table 1. Historic fall raptor migration counts (mean ± 95% CI), counts from fall 2015, and site records at the Goshutes HawkWatch in eastern Nevada.

		1983-2015					All-time Historic Records	
	Species	**Mean Count**	**±**	**95 % CI**	**2015**	**% Change**	**Season**	**Daily**
	Turkey Vulture	414.6	±	74.3	1102	165.8	1102 (2015)	315 (2013)
	Osprey	95.3	±	13.9	162	70.0	187 (1997)	38 (2013)
	Northern Harrier	167.9	±	22.5	239	42.3	356 (1999)	26 (1995)
Accipiters								
	Sharp-shinned Hawk	4498.2	±	622.8	6769	50.5	9598 (1998)	1001 (2001)
	Cooper's Hawk	2983.0	±	458.1	4418	48.1	6736 (1998)	913 (2001)
	Northern Goshawk	93.6	±	19.4	100	6.8	259 (1992)	19 (1996)
	Unidentified accipiter	312.8	±	65.5	43	-86.3	710 (1987)	
	TOTAL ACCIPITERS	7887.6	±	1043.2	11330	43.6	16508 (1998)	
Buteos								
	Red-shouldered Hawk	0.2	±	0.2	0		2 (1996)	1 (6 times)
	Broad-winged Hawk	71.3	±	22.7	336	371.0	336 (2015)	76 (2010)
	Swainson's Hawk	278.5	±	79.0	2856	925.6	2856 (2015)	378 (2015)
	Red-tailed Hawk	3235.3	±	320.8	6988	116.0	6988 (2015)	915 (2001)
	Ferruginous Hawk	15.6	±	2.4	21	34.7	32 (2014)	6 (1995)
	Rough-legged Hawk	14.7	±	3.3	11	-24.9	50 (1999)	6 (3 times)
	Unidentified buteo	67.1	±	15.9	15	-77.6	185 (1983)	
	TOTAL BUTEOS	3682.7	±	380.0	10227	177.7	10227 (2015)	
Eagles								
	Golden Eagle	245.1	±	21.4	170	-30.6	344 (1996)	24 (1992/1997)
	Bald Eagle	12.2	±	2.1	15	22.8	31 (1999)	6 (1994)
	Unknown eagles	1.2	±	0.5	0	-100.0	5 (1991)	
	TOTAL EAGLES	258.0	±	22.5	185	-28.3	372 (1999)	
Falcons								
	American Kestrel	1708.8	±	300.1	1881	10.1	3394 (1997)	586 (2000)
	Merlin	43.5	±	9.0	73	67.8	110 (2014)	20 (1998)
	Prairie Falcon	25.0	±	4.8	37	48.2	58 (1995)	7 (1998)
	Peregrine Falcon	15.4	±	4.1	45	192.1	46 (2011)	7 (2001)
	Unidentified falcon	6.9	±	1.7	1	-85.6	21 (1996)	
	TOTAL FALCONS	1799.7	±	309.4	2037	13.2	3556 (1997)	
	Unidentified Raptor	100.3	±	30.3	0	-100.0	446 (1983)	
	GRAND TOTAL	14402.9	±	1595.7	25282	75.5	25290 (1998)	2202 (2014)

Table 2. Capture totals and rates for migrating raptors in the Goshute Mountains, NV: 1983–2013 versus 2014.

	Capture Totals			Capture Rate[1]		
	1983-2014[2]	2015	Seasonal Record	1983-2014[2]	2015	Seasonal Record
Northern Harrier	5.4 ± 1.5	1	18	0.5 ± 0.1	0.2	1.8
Sharp-shinned Hawk	1128.3 ± 212.4	686	2692	100.9 ± 6.9	136.9	146.8
Cooper's Hawk	568.3 ± 108.9	430	1478	51.2 ± 4.1	85.8	85.8
Northern Goshawk	25.7 ± 7.0	12	105	2.4 ± 0.6	2.4	7.2
Broad-winged Hawk	1.3 ± 0.5	2	7	0.2 ± 0.1	0.4	1.2
Swainson's Hawk	0.3 ± 0.2	0	2	0.0 ± 0.0	0.0	0.3
Red-tailed Hawk	69.2 ± 11.0	74	158	7.4 ± 1.8	14.8	25.0
Rough-legged Hawk	0.1 ± 0.1	0	2	0.0 ± 0.0	0.0	0.2
Golden Eagle	4.2 ± 1.0	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	119.8 ± 37.5	28	368	8.9 ± 1.5	5.6	22.2
Merlin	9.3 ± 2.2	3	26	0.9 ± 0.3	0.6	3.2
Prairie Falcon	5.0 ± 1.2	4	17	0.5 ± 0.1	0.8	2.1
Peregrine Falcon	0.9 ± 0.3	3	4	0.1 ± 0.0	0.6	0.6
All Species	1937.7 ± 362.0	1244	4697	173.6 ± 11.7	248.3	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: 2015.

Band #	Species[1]	Sex	Banding Date	Banding Age[2]	Encounter Location	Encounter Date	Distance (KM)[3]	Status
1957-19016	RTHA	U	22-Sep-14	ASY	Santa Margarita, California	25-Jan-15	744	Found dead - Unknown cause
1352-58354	SSHA	M	24-Oct-14	ASY	Cranbrook, British Columbia, Canada	14-Apr-15	974	Found dead - Struck object other than wire or tower in flight
1075-02955	COHA	F	17-Sep-14	HY	Kelowna, British Columbia, Canada	6-May-15	1054	Found injured - Alive in captivity
1833-07916	SSHA	F	6-Sep-14	HY	Kettle Falls, Washington	8-May-15	890	Found dead - Struck object other than wire or tower in flight
2206-65587	NOGO	M	22-Sep-04	HY	Marion, Idaho	30-Jun-15	182	Captured - Released during banding operations
1075-00252	COHA	F	19-Sep-07	SY	Phoenix, Arizona	4-Nov-15	754	Captured due to inury - Unknown status

[1] Species: RTHA = Red-tailed hawk; SSHA = Sharp-shinned Hawk; COHA = Cooper's Hawk; NOGO = Northern goshawk.

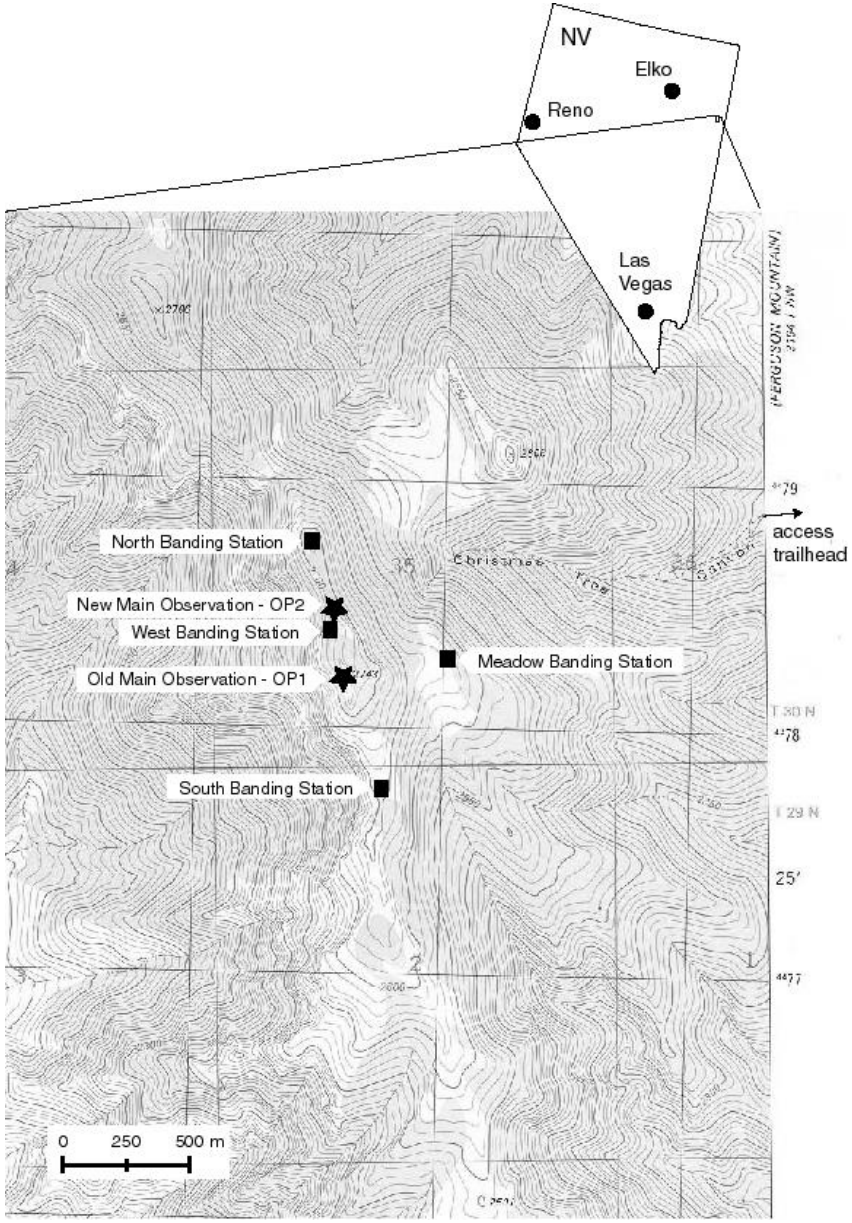
[2] HY = hatch year; ASY = After Second Year; SY = Second Year.

[3] Straight-line distance from banding location.

Table 4. Summary of the 2015 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 count. *In 2015 HWI*

	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 2015							
Species	**365.7**	**338.8**	**399.1**	**532.5**	**679.8**	**568.3**	**553.4**	**814.8**
Black Vulture								186
Turkey Vulture	494	*81*	5	90	*1102*		292	*170976*
Osprey	67	28	*22*	39	162	*75*	30	194
Northern Harrier	24	73	141	*64*	239	55	51	169
Crested Caracara								4
Common Black Hawk								0
Harris' Hawk								2
Accipiters								
Sharp-shinned Hawk	964	367	*655*	1321	6769	2209	1420	1914
Cooper's Hawk	226	179	306	526	4418	1538	469	1094
Northern Goshawk	19	15	38	48	100	3	3	0
Unidentified accipiter	44	41	94	71	43	*728*	39	69
TOTAL ACCIPITERS	1253	602	*1093*	1966	11330	*4478*	1931	3077
Buteos								
Red-shouldered Hawk	1	0	0	0	0	0	0	23
Broad-winged Hawk	4	*16*	29	30	*336*	*47*	18	472276
Short-tailed Hawk								2
Swainson's Hawk	1	14	2	202	*2856*	138	388	2941
White-tailed Hawk								43
Zone-tailed Hawk							1	13
Red-tailed Hawk	614	139	*382*	1070	*6988*	*1723*	384	68
Ferruginous Hawk	0	0	6	3	21	8	2	4
Rough-legged Hawk	1	35	*96*	11	11	0	0	0
Unidentified buteo	3	30	29	47	15	68	16	9
TOTAL BUTEOS	624	234	*544*	1363	*10227*	*1984*	809	475379
Eagles								
Golden Eagle	56	60	1134	*359*	170	1	43	2
Bald Eagle	78	*16*	81	169	15	11	1	14
Unknown eagles	1	1	2	9	0	0	1	0
TOTAL EAGLES	135	77	1217	537	185	12	45	16
Falcons								
American Kestrel	8	16	*180*	189	1881	595	267	1171
Merlin	69	34	*36*	19	73	10	37	*117*
Prairie Falcon	4	7	6	11	37	6	5	4
Peregrine Falcon	12	7	21	8	45	9	23	146
Aplomado Falcon								0
Unidentified falcon	7	2	7	11	1	17	3	11
TOTAL FALCONS	100	66	*250*	238	2037	637	335	1449
Kites								
Hook-billed Kite								0
Swallow-tailed Kite								89
White-tailed Kite								5
Mississippi Kite								8506
Unidentified Kites								0
TOTAL KITES								8600
Unidentified Raptor	7	31	9	12	0	49	7	137
GRAND TOTAL	2704	1192	3281	4309	25282	*7290*	3500	660189

Figure 1. Locations of fall HawkWatch sites operated by HWI and partners (symbols with borders represent sites that conducted banding in 2015).



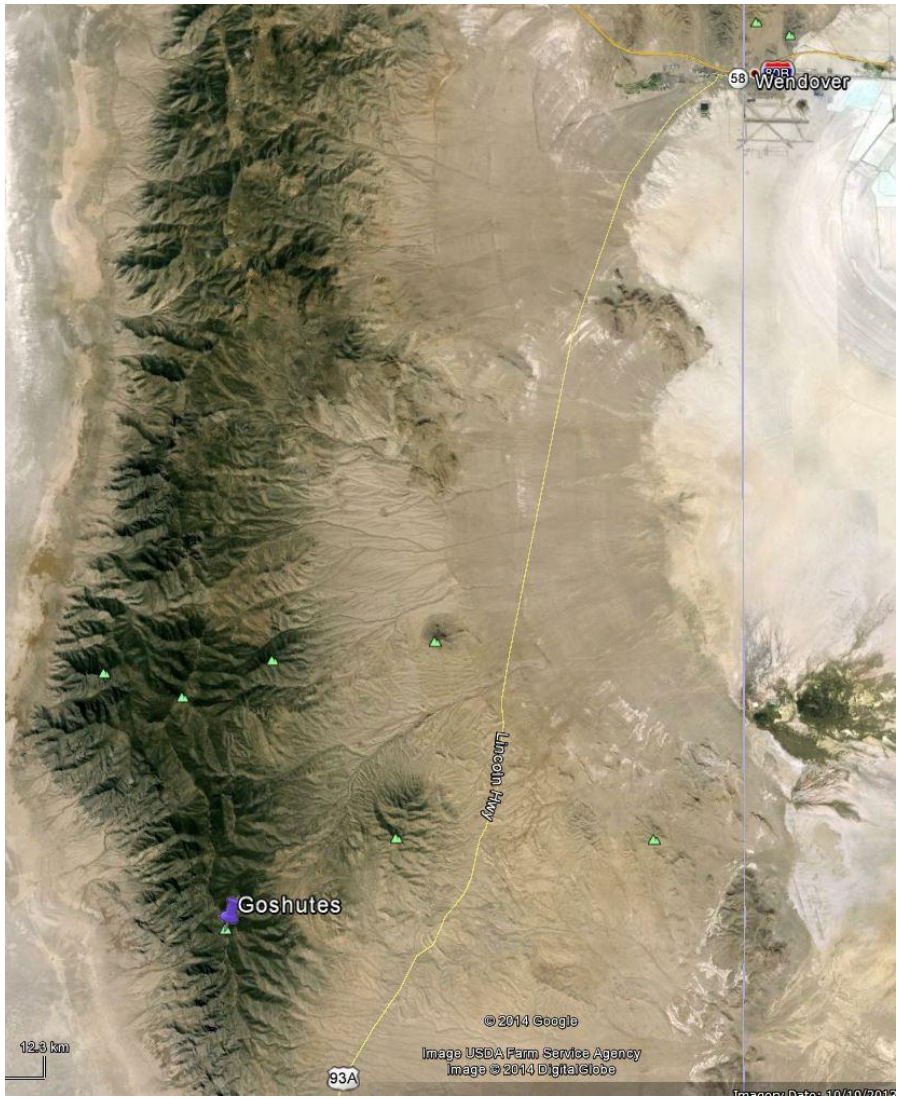


Figure 2. Location of the Goshutes HawkWatch in eastern Nevada.

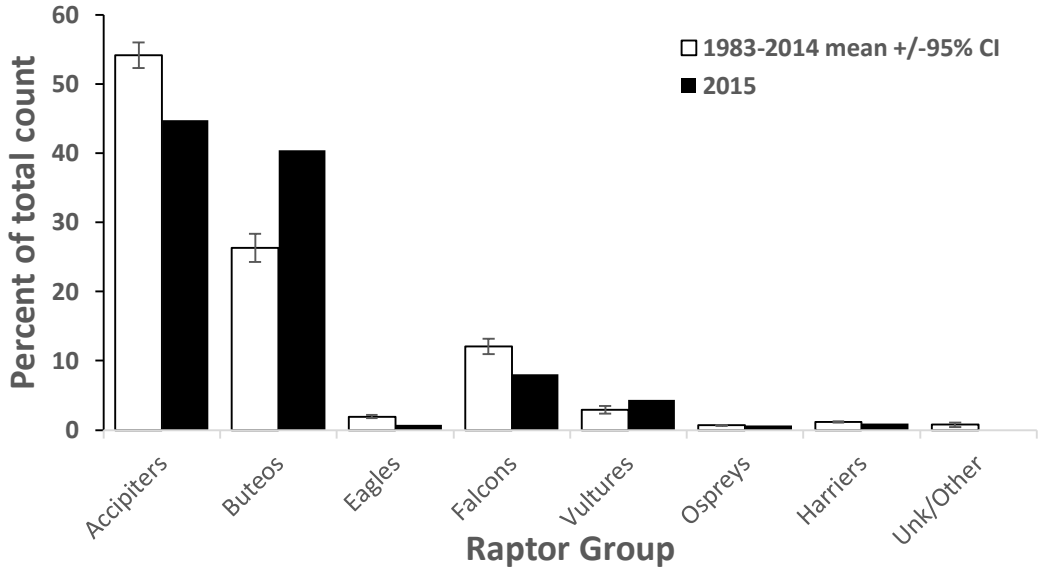


Figure 3. Fall migration flight composition by major species groups at the Goshutes HawkWatch in eastern Nevada: 1983–2014 versus 2015.

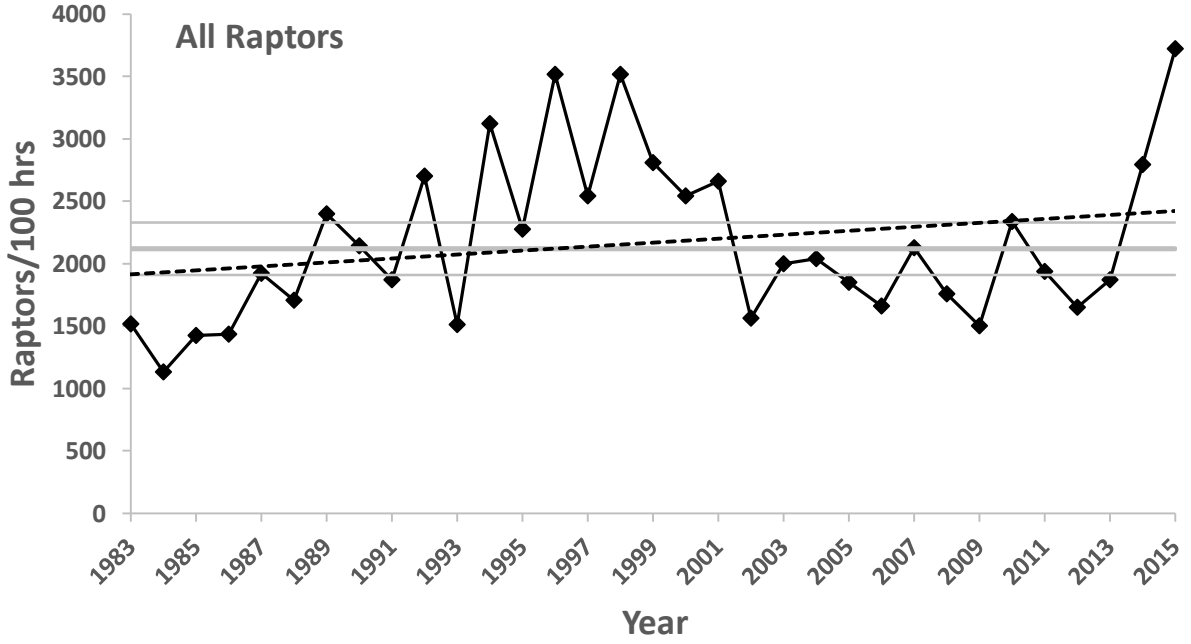


Figure 4. Fall migration passage rates at the Goshutes HawkWatch in eastern NV for all migrating raptors: 1983-2015. Solid grey lines represent mean (thick) and upper and lower 95% confidence intervals (thin) of historic counts (1983-2014) at the Goshutes. Dashed line represents trend for significant ($p < 0.05$) quadratic regression.

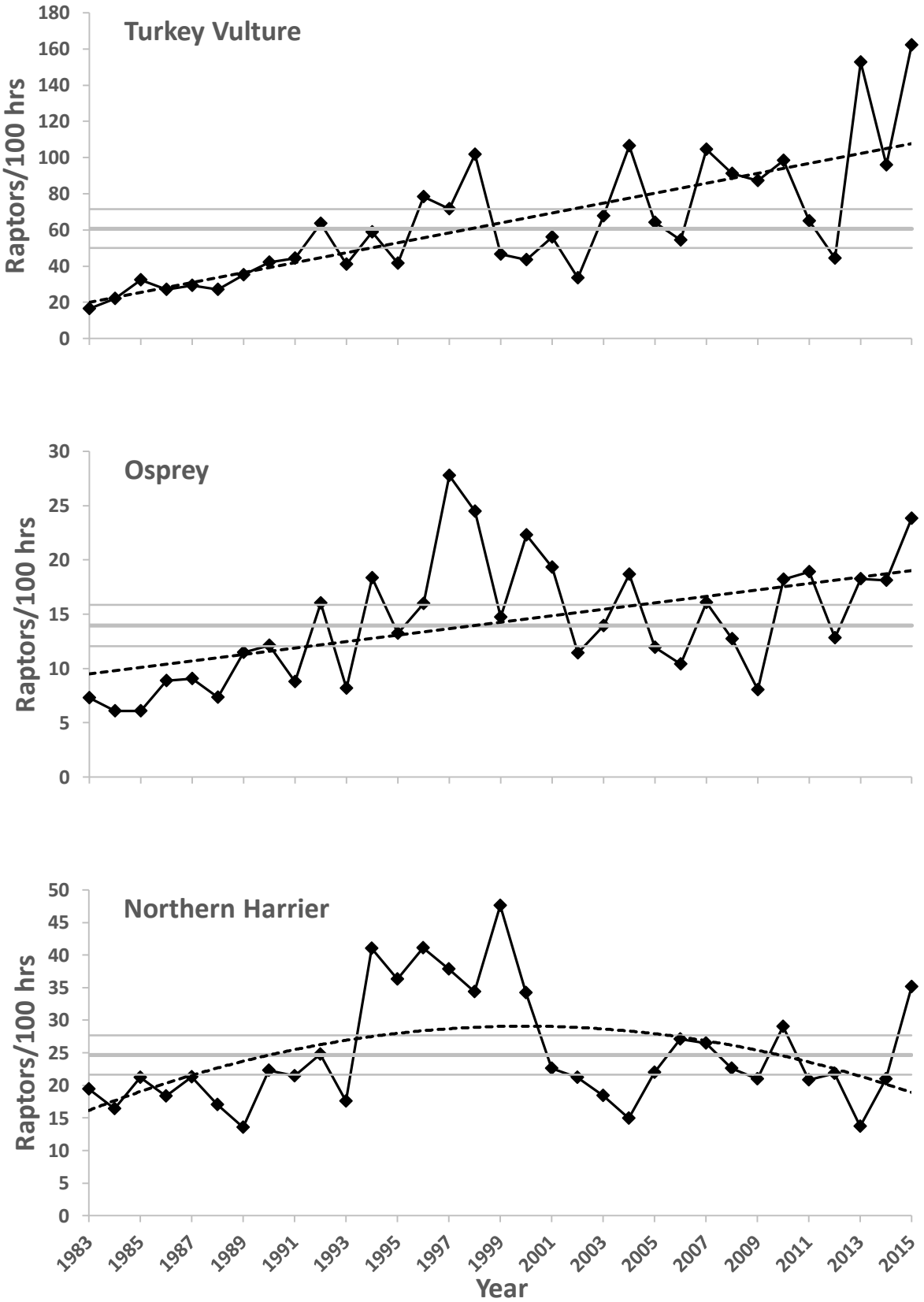


Figure 5a. Fall-migration passage rates at the **Goshutes HawkWatch in eastern NV for Turkey Vultures, Ospreys, and Northern Harriers: 1983–2015. Dashed lines indicate trends for significant ($p < 0.05$) linear or quadratic regressions. Solid grey lines represent mean (thick) and upper and lower 95% confidence intervals (thin) of historic counts (1983-2014).**

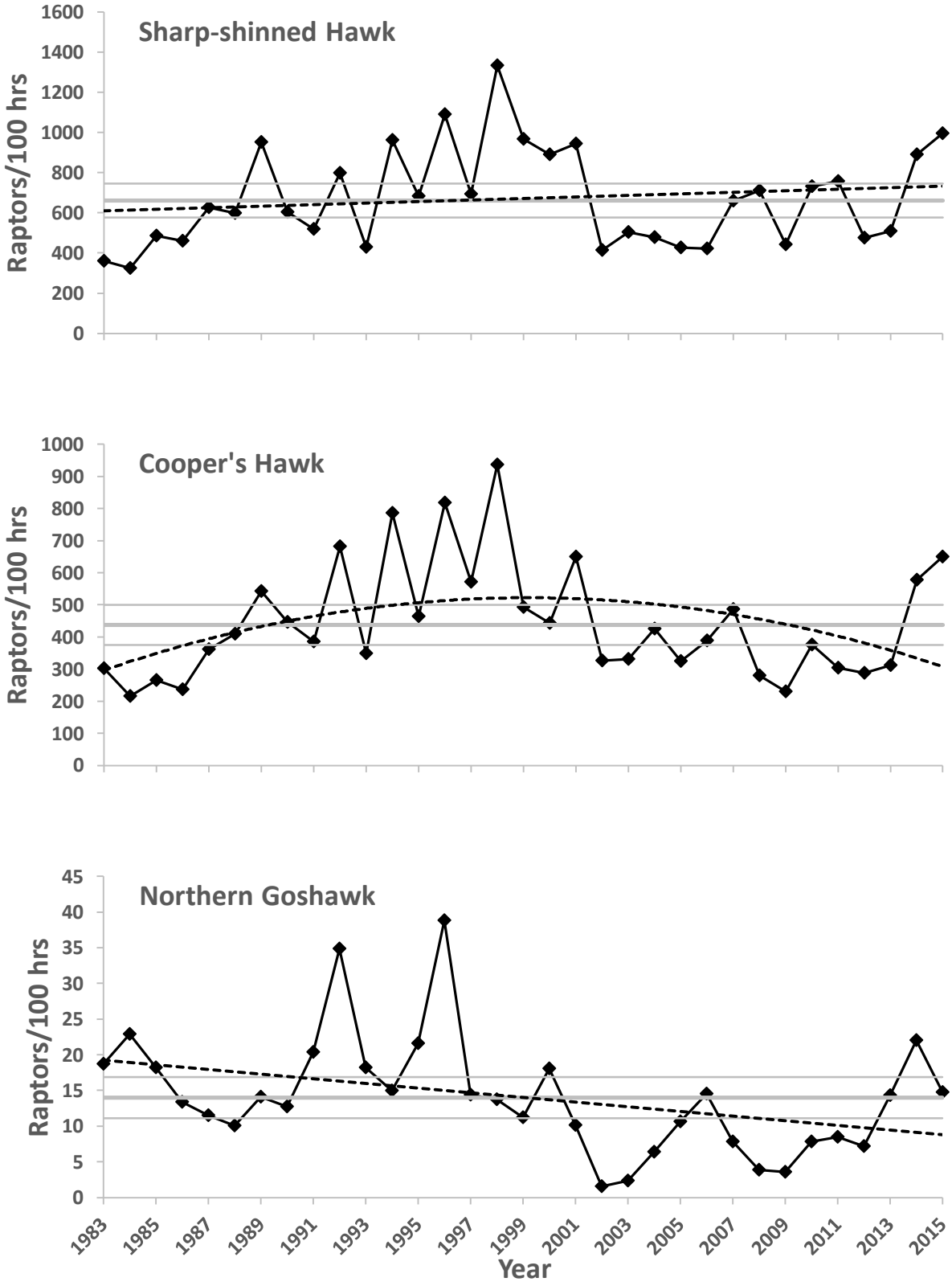


Figure 5b. Fall-migration Accipiter passage rates at the **Goshutes HawkWatch in eastern NV: 1983–2015. Dashed lines indicate trends for significant ($p < 0.05$) linear or quadratic regressions. Solid grey lines represent mean (thick) and upper and lower 95% confidence intervals (thin) of historic counts (1983-2014).**

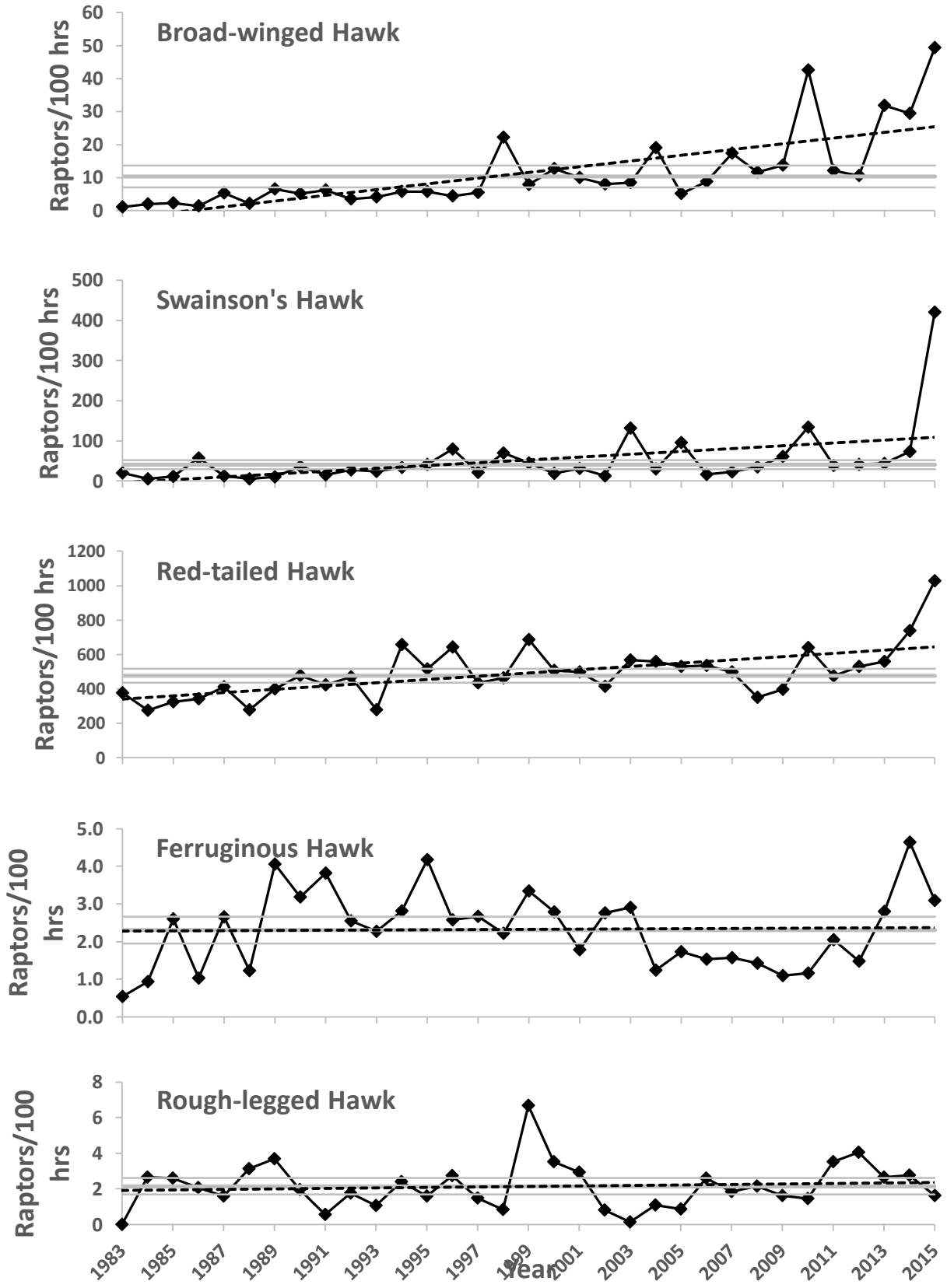


Figure 5c. Fall-migration buteo passage rates at the **Goshutes HawkWatch in eastern NV: 1983–2015. Dashed lines indicate significant (p< 0.05) population trends based on linear regression. Solid grey lines represent mean (thick) and upper and lower 95% confidence intervals (thin) of historic counts (1983-2014).**

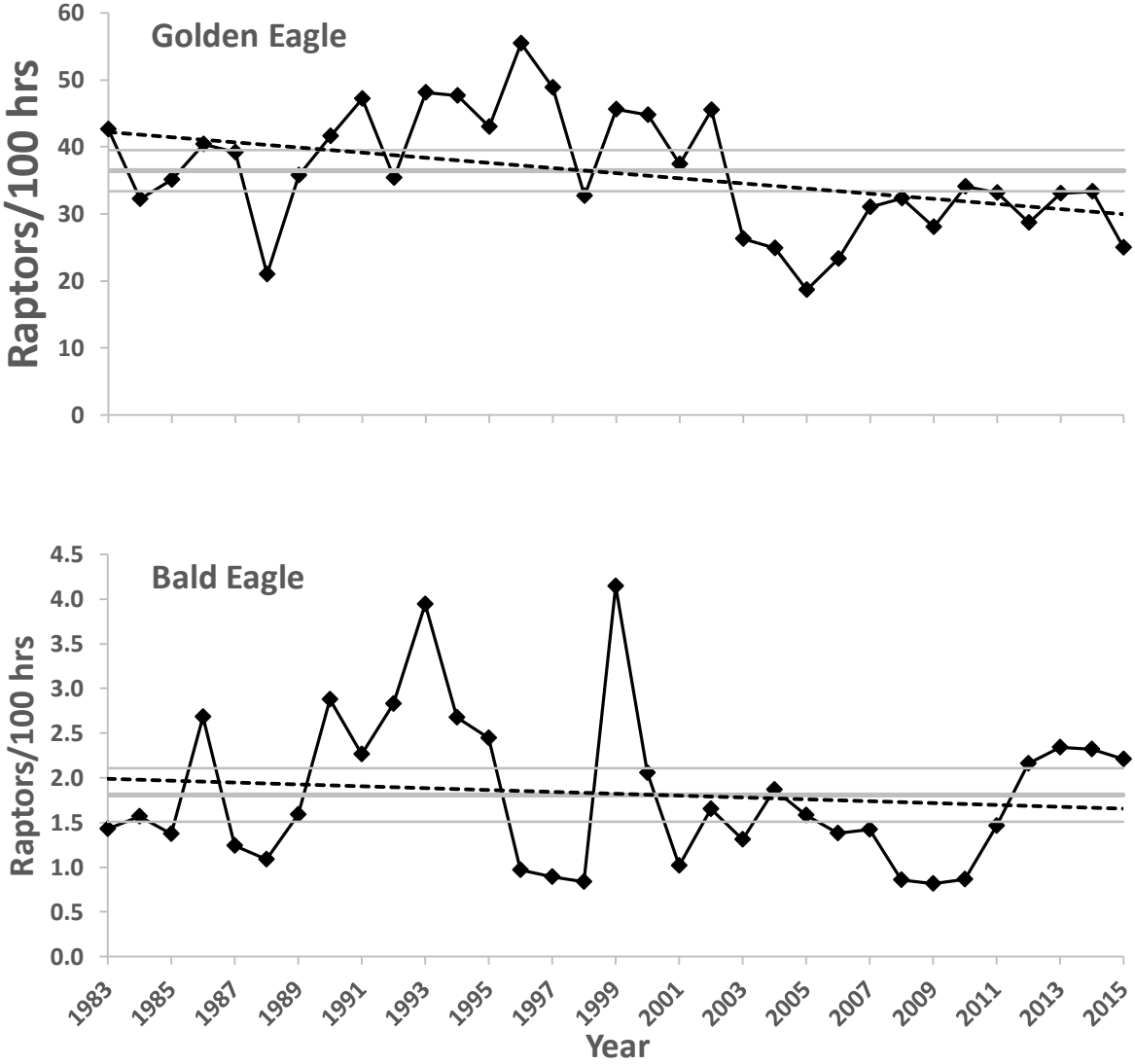


Figure 5d. Eagle passage rates for the fall migration at the **Goshutes HawkWatch in eastern NV: 1983–2015. Dashed lines indicate significant (p< 0.05) population trends based on linear regressions. Solid grey lines represent mean (thick) and upper and lower 95% confidence intervals (thin) of historic counts (1983-2014).**

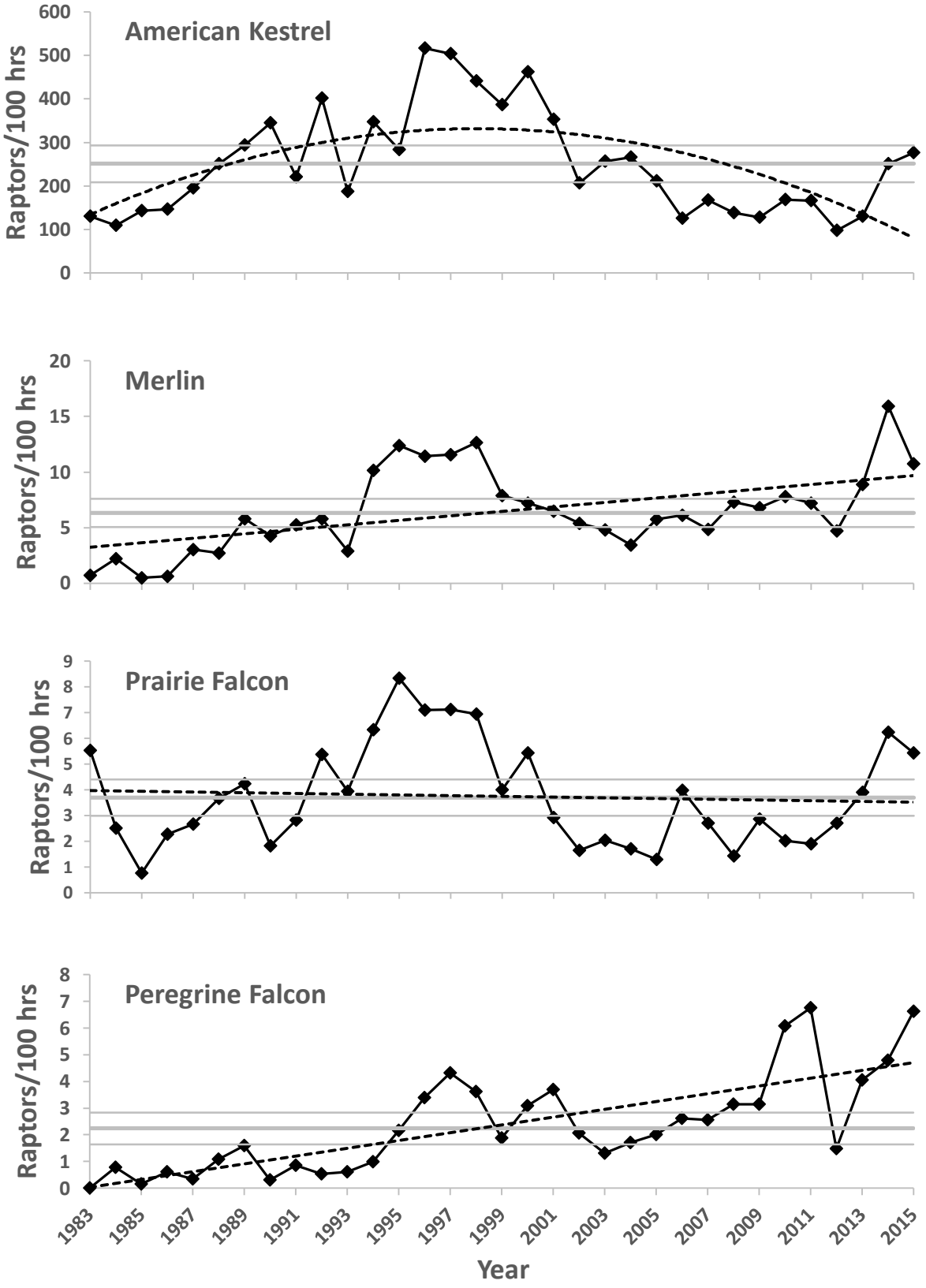


Figure 5e. Fall-migration falcon passage rates at the **Goshutes HawkWatch in eastern NV: 1983–2015. Dashed lines indicate significant ($p < 0.05$) population trends based on linear or quadratic regressions. Solid grey lines represent mean (thick) and upper and lower 95% confidence intervals (thin) of historic counts (1983-2014).**

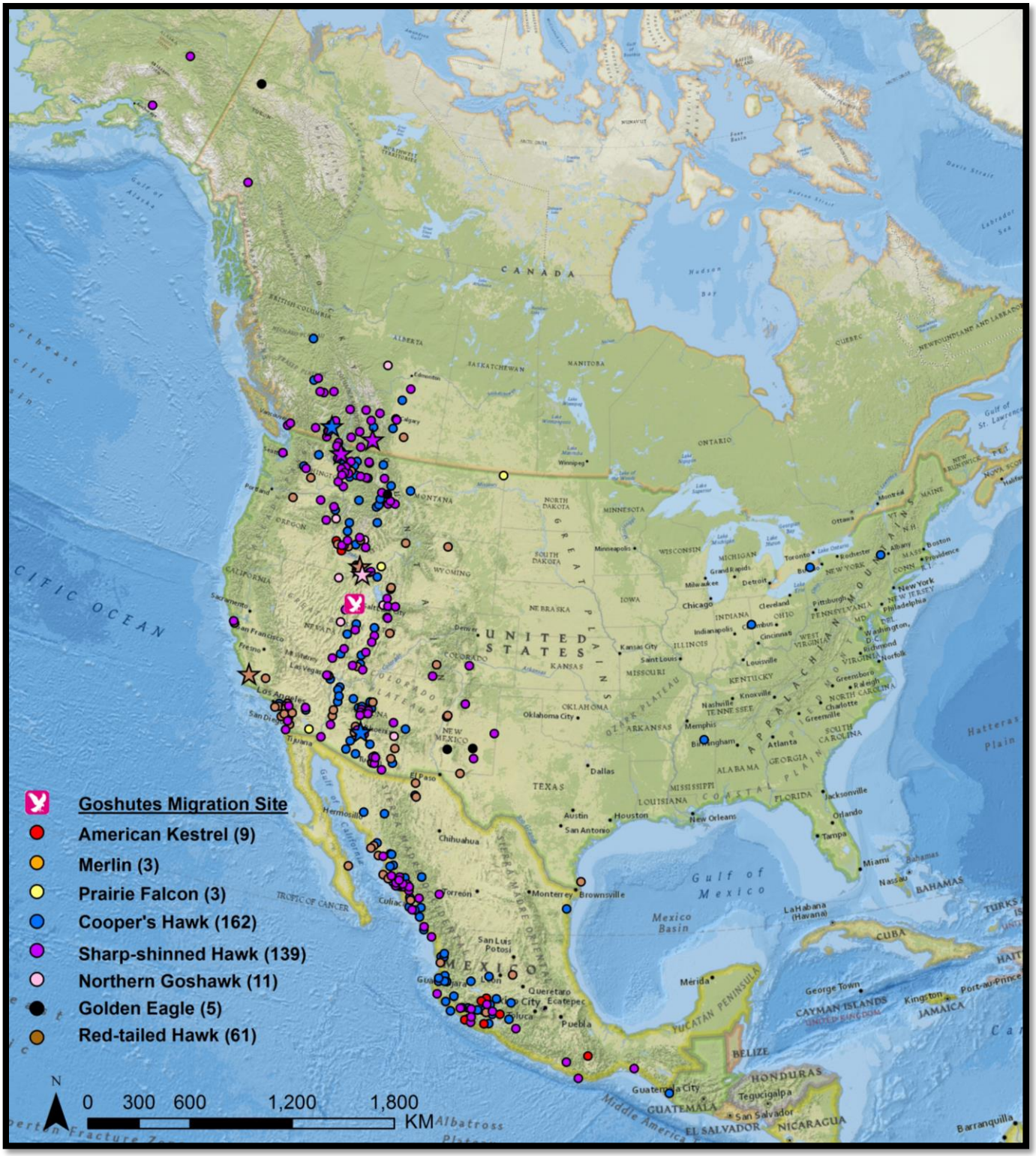


Figure 6. Locations of raptors banded at the Goshutes HawkWatch in eastern NV that were-encountered elsewhere. Circles represent re-encounters from 1981 to 2014, stars represent 2015 encounters.

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)

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[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	*Cathartes aura*	TV	U	U	NA
Osprey	*Pandion haliaetus*	OS	U	U	NA
Northern Harrier	*Circus cyaneus*	NH	A I Br U	M F U	NA
Mississippi Kite	*Ictinia mississippiensis*	MK	A I U	U	NA
Sharp-shinned Hawk	*Accipiter striatus*	SS	A I U	U	NA
Cooper's Hawk	*Accipiter cooperii*	CH	A I U	U	NA
Northern Goshawk	*Accipiter gentilis*	NG	A I U	U	NA
Unknown small accipiter	*A. striatus* or *cooperii*	SA	U	U	NA
Unknown large accipiter	*A. cooperii* or *gentilis*	LA	U	U	NA
Unknown accipiter	*Accipiter* spp.	UA	U	U	NA
Red-shouldered Hawk	*Buteo lineatus*	RS	A I U	U	NA
Broad-winged Hawk	*Buteo platypterus*	BW	A I U	U	D L U
Swanson's Hawk	*Buteo swainsoni*	SW	U	U	D L U
Red-tailed Hawk	*Buteo jamaicensis*	RT	A I U	U	D L U
Ferruginous Hawk	*Buteo regalis*	FH	A I U	U	D L U
Rough-legged Hawk	*Buteo lagopus*	RL	U	U	D L U
Unknown buteo	*Buteo* spp.	UB	U	U	D L U
Golden Eagle	*Aquila chrysaetos*	GE	I, S, NA, A, U[4]	U	NA
Bald Eagle	*Haliaeetus leucocephalus*	BE	I, S1, S2, NA, A, U[5]	U	NA
Unknown eagle	*Aquila* or *Haliaeetus spp.*	UE	U	U	NA
American Kestrel	*Falco sparverius*	AK	U	M F U	NA
Merlin	*Falco columbarius*	ML	AM Br	AM U	NA
Prairie Falcon	*Falco mexicanus*	PR	U	U	NA
Peregrine Falcon	*Falco peregrinus*	PG	A I U	U	NA
Unknown small falcon	*F. sparverius* or *columbarius*	SF	U	U	NA
Unknown large falcon	*F. mexicanus* or *peregrinus*	LF	U	U	NA
Unknown falcon	*Falco* 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
Start Date	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
Observation days	79	71	82	78	83	81	79
Observation hours	673.58	719.50	748.08	681.50	787.30	725.67	688.21
Raptors / 100 hours	2,541	3,515	3,003	2,542	2,662	1,564	2,001
SPECIES	RAPTOR COUNTS						
Turkey Vulture	482	732	349	297	441	243	466
Osprey	187	176	110	152	152	83	96
Northern Harrier	255	247	356	233	178	154	127
Mississippi Kite	0	0	0	0	0	0	0
Sharp-shinned Hawk	4,677	9,598	7,236	6,071	7,429	3,009	3,460
Cooper's Hawk	3,848	6,736	3,689	3,022	5,110	2,369	2,281
Northern Goshawk	97	99	84	123	80	11	16
Unknown accipiter	368	75	132	87	56	257	271
TOTAL ACCIPITERS	8,990	16,508	11,141	9,303	12,675	5,646	6,028
Red-shouldered Hawk	0	0	0	1	0	0	0
Broad-winged Hawk	37	160	59	87	79	58	58
Swainson's Hawk	143	507	334	132	251	91	908
Red-tailed Hawk	2,922	3,329	5,137	3,446	3,926	3,008	3,903
Ferruginous Hawk	18	16	25	19	14	20	20
Rough-legged Hawk	10	6	50	24	23	6	1
Unidentified buteo	77	5	24	21	13	42	57
TOTAL BUTEOS	3,207	4,023	5,629	3,730	4,306	3,225	4,947
Golden Eagle	329	235	341	305	295	330	181
Bald Eagle	6	6	31	14	8	12	9
Unidentified eagle	0	0	0	0	0	0	0
TOTAL EAGLES	335	241	372	319	303	342	190
American Kestrel	3,394	3,169	2,887	3,149	2,774	1,503	1,768
Merlin	78	91	59	49	51	39	33
Prairie Falcon	48	50	30	37	23	12	14
Peregrine Falcon	29	26	14	21	29	15	9
Unidentified falcon	7	2	7	3	2	6	13
TOTAL FALCONS	3,556	3,338	2,997	3,259	2,879	1,575	1,837
Unidentified raptor	102	25	57	34	26	81	79
GRAND TOTAL	17,114	25,290	21,011	17,327	20,960	11,349	13,770

Appendix C. continued

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
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	5-Nov
Observation days	76	83	82	82	82	83	82	79	83	80	81
Observation hours	642.75	695.30	652.58	703.00	698.51	733.59	692.60	682.03	741.00	641.75	690.00
Raptors / 100 hours	2,038	1,849	1,658	2,125	1,758	1,502	2,336	1,936	1,650	1,869	2,796
SPECIES	RAPTOR COUNTS										
Turkey Vulture	685	445	355	735	637	640	682	443	329	980	661
Osprey	120	83	68	113	89	59	126	129	95	117	125
Northern Harrier	96	153	177	186	158	154	201	142	162	88	145
Mississippi Kite	0	0	0	0	0	0	0	0	0	0	1
Sharp-shinned Hawk	3,073	2,973	2,745	4,635	4,967	3,251	5,063	5,171	3,527	3,271	6,141
Cooper's Hawk	2,736	2,260	2,541	3,422	1,957	1,691	2,599	2,067	2,130	1,997	3,986
Northern Goshawk	41	74	95	55	27	26	54	58	53	92	152
Unknown accipiter	318	590	72	366	221	280	169	62	394	116	42
TOTAL ACCIPITERS	6,168	5,897	5,453	8,478	7,172	5,248	7,885	7,358	6,104	5,476	10,321
Red-shouldered Hawk	0	0	0	0	0	0	0	0	0	0	0
Broad-winged Hawk	122	36	57	122	81	101	295	83	78	204	203
Swainson's Hawk	197	664	109	163	248	445	933	269	308	285	509
Red-tailed Hawk	3,589	3,678	3,492	3,511	2,439	2,913	4,427	3,237	3,928	3,579	5,095
Ferruginous Hawk	8	12	10	11	10	8	8	14	11	18	32
Rough-legged Hawk	7	6	17	13	15	12	10	24	30	17	19
Unidentified buteo	117	97	13	44	91	120	34	24	76	41	16
TOTAL BUTEOS	4,040	4,493	3,698	3,864	2,884	3,599	5,707	3,651	4,431	4,144	5,874
Golden Eagle	160	130	152	218	226	206	236	226	213	212	230
Bald Eagle	12	11	9	10	6	6	6	10	16	15	16
Unidentified eagle	4	0	0	0	0	0	0	0	2	1	0
TOTAL EAGLES	176	141	161	228	232	212	242	236	231	228	246
American Kestrel	1,709	1,468	820	1,174	965	940	1,170	1,132	726	839	1,730
Merlin	22	40	40	34	51	50	54	49	35	57	110
Prairie Falcon	11	9	26	19	10	21	14	13	20	25	43
Peregrine Falcon	11	14	17	18	22	23	42	46	11	26	33
Unidentified falcon	12	11	4	6	6	10	2	1	4	1	0
TOTAL FALCONS	1,765	1,542	907	1,251	1,054	1,044	1,282	1,240	796	948	1,916
Unidentified raptor	51	104	3	86	51	60	52	5	79	13	0
GRAND TOTAL	13,101	12,858	10,822	14,941	12,277	11,016	16,177	13,205	12,227	11,994	19,289

Appendix C. continued

	2015	Mean
Start Date	15-Aug	15-Aug
End Date	5-Nov	4-Nov
Observation days	812	79.0
Observation hours	680	675.3
Raptors / 100 hours	3,719	2185.6
SPECIES		
Turkey Vulture	1,102	435.5
Osprey	162	97.3
Northern Harrier	239	170.1
Mississippi Kite	0	0.0
Sharp-shinned Hawk	6,769	4567.0
Cooper's Hawk	4,418	3027.2
Northern Goshawk	100	93.8
Unknown accipiter	43	304.6
TOTAL ACCIPITERS	11,330	7992.6
Red-shouldered Hawk	0	0.2
Broad-winged Hawk	336	79.4
Swainson's Hawk	2,856	356.6
Red-tailed Hawk	6,988	3349.1
Ferruginous Hawk	21	15.8
Rough-legged Hawk	11	14.5
Unidentified buteo	15	65.5
TOTAL BUTEOS	10,227	3881.0
Golden Eagle	170	242.8
Bald Eagle	15	12.3
Unidentified eagle	0	0.6
TOTAL EAGLES	185	255.8
American Kestrel	1,881	1714.0
Merlin	73	44.4
Prairie Falcon	37	25.3
Peregrine Falcon	45	16.3
Unidentified falcon	1	6.8
TOTAL FALCONS	2,037	1806.7
Unidentified raptor	0	94.2
GRAND TOTAL	25,282	14733.2

Appendix D. Annual summaries of banding effort and capture totals by species at the **Goshutes HawkWatch in eastern NV: 1980–2015.**

	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	1,085	1,203
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
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

Appendix D. continued

	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	1,454	1,899	2,316	1,971	2,290	2,382	2,061	2,087	1,690	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	1,695	2,040	1,531	2,692	1,824	2,095	1,786	2,137	899
Cooper's Hawk	821	911	1,220	825	1,478	697	739	772	1,014	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
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

Appendix D. continued

	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	1,286	1,666	1,474	1,276	807	1,073	888	550	503	476
Captures/100 stn hrs	167.0	172.9	160.0	116.6	158.2	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	1,235	1,608	1,284	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	29	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
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	2,881	2,358	1,488	1,277	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

Appendix D. continued

	2010	2011	2012	2013	2014	2015	Mean	Total
Start date	20-Aug	17-Aug	25-Aug	20-Aug	23-Aug	23-Aug	24-Aug	---
End date	1-Nov	30-Oct	31-Oct	31-Oct	31-Oct	31-Oct	27-Oct	---
Blinds in operation	2	2	2	2	2	2	3.3	---
Trapping days	62	57	63	67	68	61	60.9	1,887
Station days	68	59	80	92	88	79	150.7	4,673
Station hours	476	429	572	576	582	501	1,057.9	38,082.3
Captures/100 stn hrs	245.4	159.7	203.1	187.8	242.1	248.3	179.0	---
Species								
Northern Harrier	1	1	4	4	4	1	4.9	176
Sharp-shinned Hawk	699	420	661	587	732	686	1,039.4	37,417
Cooper's Hawk	281	200	297	316	480	430	530.0	19,079
Northern Goshawk	5	9	17	10	12	12	23.7	853
Broad-winged Hawk	1	2	0	7	1	2	1.2	42
Swainson's Hawk	1	0	0	2	1	0	0.3	9
Red-tailed Hawk	119	27	112	88	107	74	65.0	2,341
Rough-legged Hawk	0	0	1	0	0	0	0.1	3
Golden Eagle	4	2	7	5	4	1	3.8	138
Bald Eagle	0	0	0	0	0	0	0.0	1
American Kestrel	38	15	48	44	41	28	109.3	3,936
Merlin	15	5	12	11	14	3	8.4	302
Prairie Falcon	3	2	2	6	12	4	4.5	163
Peregrine Falcon	1	2	1	2	1	3	0.9	33
All Species	1,168	685	1,162	1,082	1,409	1,244	1,791.5	64,493
Recaptures[1]	3	1	2	0	1	1	3.0	108
Foreign Recaptures[2]	2	0	3	1	3	1	1.4	52

[1] Recaptures in the Goshutes of birds originally banded in the Goshutes.

[2] Recaptures in the Goshutes of birds originally banded elsewhere.