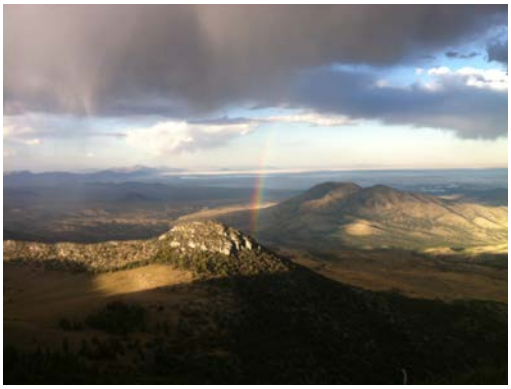
FALL 2014 RAPTOR MIGRATION ANNUAL REPORT: GOSHUTES HAWKWATCH, GOSHUTE MTS NEVADA



HawkWatch International, Inc.

Salt Lake City, Utah

May 2015

FALL 2014 RAPTOR MIGRATION ANNUAL REPORT: GOSHUTES HAWKWATCH- GOSHUTE MOUNTAINS, NEVADA

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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 2014 season marking the 35th consecutive season of banding and the 32nd 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 2014 fall migration at the Goshutes.

The Goshutes HawkWatch was 1 of 9 long-term, annual migration counts, and 1 of 4 migration banding studies conducted or co-sponsored by HWI during 2014 (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 2014 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.

2014 RESULTS AND DISCUSSION

OBSERVATION EFFORT AND WEATHER SUMMARY

The Goshutes HawkWatch standard season runs 15 August – 5 November; in 2014 observers counted on 81 of 83 possible days during this period for a total of 690 hours, both above historic site averages of 79 days and 674.46 hours (Appendix C). Three days had abbreviated counts (< 4 hrs) due to weather. Weather varies throughout every season, in 2014 based on hourly recording of conditions during observation it was clear 37 % of the time; hazy 68% of the time; rainy 10 % of the time, and snowy <1% of the time.

2014 FLIGHT SUMMARY

Overall Flight:

A total of 19,289 migrants of 18 raptor species were counted in 2014, 35% higher than the historic site average (Table 1). Highlights of the flight included the first ever Mississippi Kite counted at the site, record high season totals for Merlins (110) and Ferruginous Hawks (32), and the largest single day count in site history on 26 Sept when 2,202 migrating raptors were seen.

The percentage of the overall flight broke down as follows: 54% accipiters, 30% buteos, 10% falcons, 3.4% vultures, 1.3% eagles, 0.8% harriers, and 0.6% Ospreys. The compositions of buteos were above historic averages; accipiters, vultures, eagles, and Northern Harriers occurred in proportions similar to site historic averages; while falcons made up significantly less of the flight than usual (Fig. 3). The season's most commonly observed species in descending order were: Sharp-shinned Hawks (32% of the total), followed by Red-tailed Hawks (26%), Cooper's Hawks (21%), American Kestrels (9%), Turkey Vultures (3%), and Swainson's Hawks (3%). All the other species made up $\leq$ 1% of the total flight(Table 1).

The following sections summarize the 2014 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 2796 raptors counted per 100 hours of observation at the Goshutes HawkWatch in 2014 was significantly higher than the historic site average passage rate of 2119 raptors per 100 hours. Over the life the site counts increased between 1983-1998, but have been since ($F_{2,29}$ =5.27, r^2= 0.27, p=0.03), perhaps the above average flight in 2014 indicates a rebound in regional raptor populations.

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

Seasonal counts and effort-adjusted passage rates for both Turkey Vultures and Ospreys were high this year compared to site averages. In fact regression results on fall passage rates suggest that regional populations of both Turkey Vultures and Osprey are growing (slope = 4.9, r^2 = 0.57, $p < 0.001$ and slope 0.44, r^2 = 0.26, p = 0.003, respectively). Conversely the Northern Harrier count and passage rate were significantly below site averages in 2014, populations are stable over the long-term (no significant trend).

Accipiters (Fig. 5b):

Counts and passage rates were high for all three accipiters at the Goshutes HawkWatch in 2014 (Table 1). Despite this, regression analyses show that Cooper Hawk passage rates have been declining since 2000 ($F_{2,29}$ = 5.3, r^2 = 0.27, p=0.01) and that Northern Goshawk passage rates have been declining for even longer (slope= -0.41, r^2 = 0.18, p = 0.017). Sharp-shinned Hawk regional populations are stable over the long-term (no significant trend).

Buteoine Hawks (Fig 5c):

The 5,874 buteos counted at the Goshutes is the most ever counted at the site in a season (Table 1). Counts and passage rates for Broad-winged Hawks, Swainson's Hawks, Red-tailed Hawks, Ferruginous Hawks, and Rough-legged Hawks were all signigicantly higher than site historic average. Moreover, regression analyses of passage rates indicate that regional populations of Broad-winged Hawks (slope = 2.18, $r^2 = 0.498$, $p < 0.001$), Swainson's Hawks (slope = 2.87, $r^2 = 0.205$, $p = 0.009$), and Red-tailed Hawks (slope = 7.75, $r^2 = 0.314$, $p = 0.001$) are increasing based upon fall migration counts.

Eagles (Fig. 5d):

Golden Eagle counts and effort-adjusted passage rates in 2014 did not differ statistically from site long-term averages (Table 1). Despite this being and average year, regression results indicate long-term decline in regional populations (slope = -0.36, $r^2 = 0.14$, $p = 0.038$). Bald Eagle count and passage rate were above average at the Goshutes HawkWatch in 2014.

Falcons (Fig 5e):

Merlin, Prairie Falcon, and Peregrine Falcon counts and passage rates were all high in 2014 compared to site averages. In fact, the total count of 110 Merlins set a new season record (Table 1). American Kestrel count and passage rate were average in 2014, the first time in 9 years that this has been the case. Despite an average year, long-term analysis shows Kestrel passage rates dropping since the turn of the century ($F_{2,29} = 14.4$, $r^2 = 0.5$, $p < 0.001$). 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 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 68 of 70 possible days (totaling 582 hours) between 23 August and 31 October, and captured 1,404 raptors of twelve different species (Table 2). Highlights of the season included: 4 previously banded birds (3 banded elsewhere and once banded at the Goshutes); a site record high 12 Prairie Falcons captured on the year; captures of a Broad-winged Hawk, a Swainson's Hawk, and a Peregrine Falcon; significantly high numbers of Red-tailed Hawks and Merlins captured compared to the long-term averages; and four Golden Eagles (Table 2).

A total of 63,223 raptors have been captured at the Goshutes HawkWatch since efforts began in 1980-107 of these birds previously banded at the Goshutes, and 51were birds banded elsewhere and re-caught at the site (Appendix D). The capture rate was high compared to the long-term average (Table 2), suggesting that even though only two banding stations have significantly reduced station hours, capture efficiency is good.

ENCOUNTERS WITH PREVIOUSLY BANDED BIRDS

A total of 390 raptors banded at the Goshutes have been encountered elsewhere and reported to the Bird Banding Laboratory (Fig. 6). During 2014 we received notice of 10 recoveries: three Sharp-shinned Hawks, six Cooper's Hawks, and one Red-tailed Hawk (Table 3). All except one Cooper's Hawk were found dead. Most recoveries range throughout western North America and Mexico and for the most part this past year was no different (Fig. 4). One noteworthy exception this year was a Cooper's Hawk reported from Randolph, Mississippi (Band # 1705-22257, Table 3), 2,909 km from the Goshutes HawkWatch. Unfortunately the person who reported the recovery provided no information on the bird's status. Another interesting recovery was a Sharp-shinned Hawk recovered in British Columbia, Canada and now located at the Okanagan Heritage Museum (Table 3). This bird was originally banded in 1988,

but attempts to contact the museum to learn more history have been unsuccessful. Overall this year recovery distances for birds banded at the Goshutes HawkWatch and recovered elsewhere ranged from 264-2,909 km (mean = 888 km).

SITE VISITATION

Approximately 270 visitors made the adventurous 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, Montana, Idaho, Colorado, Arizona, Texas, Indiana, New York, Florida, and Virgina. We also had international visitors from British Columbia, Canada and Germany. A class from the Jesuit College Preparatory School of Dallas, Texas visited for the second year in a row to learn not only about raptor migration ecology, banding and counting and used data from HWI's sites to learn about science and statistics.

2014 FALL MIGRATION ACROSS HWI'S NETWORK

HawkWatch International and partners operated 9 fall count sites in 2014 (Fig. 1). During the 4,884.4 hours of standardized observation we counted 504,905 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 2014 included (Table 4):

- Below average counts for the fall flight at 4 of 9 sites
    - Both Pacific Northwest sites, Commissary Ridge, and Corpus Christi
- Low or average Golden Eagle counts at all network sites--no increases at any site
- Below historic average American Kestrel counts at 6 of 9 sites
- Low Northern Harrier counts at 8 of 9 network sites
- Above average Peregrine Falcon counts at 6 of 9 sites and average counts at the other 3
- Above average Broad-winged Hawk numbers at 6 western sites and below average Broad-winged numbers at Corpus Christi – does this signify a change in the migration pathways for this species?

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.

ACKNOWLEDGMENTS

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As always, we are grateful for the West Wendover Public Water Works for supplying the season's much needed drinking water and for the City of West Wendover Water Reclamation and Compost for allowing us to dump our lure bird and human compost waste and allow us to clean the waste buckets. We also want to thank the Wendover Nugget and the Knights Inn for providing discounted hotel accommodations to our crewmembers on off days. Thanks also to Einstein's Bagels for their continuous supply of delicious fresh bagels, Neilsen-Kellerman for the donation of a new Kestrel weather meter, Robert Stevens for donation of a chord of firewood, and the Salt Lake Roasting Company of Salt Lake City for their ongoing generous donations of high quality coffee.

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, Nelson Holmes, Jon Seegmiller, Wayne Lammle, Catherine Hamilton and her daughter Frances, Allison Miller, Katie Anderle, Bryce Robinson, William Blake, Aaron Smolley, Annette Hansen, Aaron Barna, Leo Chidester, and Jerry Liguori. HawkWatch International and the Goshute "family" would like to pay special tribute to Chris Sprecher, who passed away last fall due to an unfortunate accident. Not only did Chris help us out with the hard work of setting up both this season and last, he also assisted with GIS and other data entry around the office. We'll definitely miss his support and we wish his family and friends all the best as they struggle with coping with his loss. Finally enormous thanks to all of the members of our 2014 field crew: Caitlin Davis, Russell Seeley, Rya Rubenthaler, Toby Chipman, Cherin Spencer-Bower, and Mike Shaw. Without your skill, dedication, and willingness to brave isolation and the elements over the course of a long field season these efforts would not be possible.

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Table 1. Historic fall raptor migration counts (mean ± 95% CI), counts from fall 2014, and site records at the Goshutes HawkWatch in eastern Nevada.

		1983-2013				All-time Historic Records	
	Species	**Mean Count ± 95 % CI**		**2014**	**% Change**	**Season**	**Daily**
	Turkey Vulture	407	± 75	661	63	980 (2013)	315 (2013)
	Osprey	94	± 14	125	33	187 (1997)	38 (2013)
	Northern Harrier	169	± 23	145	-14	356 (1999)	26 (1995)
	Mississippi Kite	--		1		1 (2014)	1 (2014)
Accipiters							
	Sharp-shinned Hawk	4445	± 634	6141	38	9598 (1998)	1001 (2001)
	Cooper's Hawk	2951	± 469	3986	35	6736 (1998)	913 (2001)
	Northern Goshawk	92	± 20	152	66	259 (1992)	19 (1996)
	Unidentified accipiter	322	± 65	42	-87	710 (1987)	
	TOTAL ACCIPITERS	7809	± 1066	10321	32	16508 (1998)	
Buteos							
	Red-shouldered Hawk	<1	± 0	0		2 (1996)	1 (6 times)
	Broad-winged Hawk	67	± 22	203	203	295 (2010)	76 (2010)
	Swainson's Hawk	271	± 80	509	88	933(2010)	353 (2003)
	Red-tailed Hawk	3175	± 308	5095	60	5137 (1999)	915 (2001)
	Ferruginous Hawk	15	± 2	32	112	32 (2014)	6 (1995)
	Rough-legged Hawk	15	± 3	19	31	50 (1999)	6 (3 times)
	Unidentified buteo	69	± 16	16	-77	185 (1983)	
	TOTAL BUTEOS	3612	± 365	5874	63	5874 (2014)	
Eagles							
	Golden Eagle	246	± 22	230	-6	344 (1996)	24 (1992/1997)
	Bald Eagle	12	± 2	16	32	31 (1999)	6 (1994)
	Unknown eagles	1	± 0	0		5 (1991)	
	TOTAL EAGLES	258	± 23	246	-5	372 (1999)	
Falcons							
	American Kestrel	1708	± 310	1730	1	3394 (1997)	586 (2000)
	Merlin	41	± 8	110	166	110 (2014)	20 (1998)
	Prairie Falcon	24	± 5	43	76	58 (1995)	7 (1998)
	Peregrine Falcon	15	± 4	33	122	46 (2011)	7 (2001)
	Unidentified falcon	7	± 2	0	-100	21 (1996)	
	TOTAL FALCONS	1796	± 319	1916	7	3556 (1997)	
	Unidentified Raptor	100	± 31	0	-100	446 (1983)	
	GRAND TOTAL	14246	± 1617	19289	35	25290 (1998)	2202 (2014)

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

	Capture Total		Capture Rate[1]	
Species	1983–2013[2]	2014	1983–2013[2]	2014
Northern Harrier	5 ± 1.6	4	0.5 ± 0.1	0.7
Sharp-shinned Hawk	1140 ± 218.0	730	100.6 ± 7.0	125.5
Cooper's Hawk	571 ± 112.5	478	50.6 ± 3.8	82.2
Northern Goshawk	26 ± 7.1	12	2.5 ± 0.6	2.1
Broad-winged Hawk	1 ± 0.5	1	0.2 ± 0.08	0.2
Swainson's Hawk	0.3 ± 0.2	1	0.03 ± 0.03	0.2
Red-tailed Hawk	68 ± 11.1	106	7.1 ± 1.7	18.2
Rough-legged Hawk	0.1 ± 0.1	0	0.010 ± 0.013	0.0
Golden Eagle	4 ± 1.0	4	0.4 ± 0.1	0.7
Bald Eagle	0.03 ± 0.06	0	0.01 ± 0.01	0.0
American Kestrel	122 ± 38.3	41	9.0 ± 1.6	7.0
Merlin	9 ± 2.2	14	0.9 ± 0.2	2.4
Prairie Falcon	5 ± 1.1	12	0.5 ± 0.1	2.1
Peregrine Falcon	1 ± 0.4	1	0.10 ± 0.04	0.2
All Species	1954 ± 372.6	1404	172.4 ± 11.3	241.3

[1] Captures / 100 station hours.

[2] Mean of annual values ± 95% confidence interval. Limited to years when at least three trapping blinds were operated.

Table 3. Foreign encounters in 2014 of raptors banded in the Goshute Mountains, NV.

Species	Sex	Band #	Banding Date	Banding Age[1]	Encounter Date	Encounter Age[1]	Encounter Location	Distance (km)	Status
Sharp-shinned Hawk	F	1623-22495	17-Oct-09	AHY	16-Feb-14	ATY	Westcliffe, CO	1032	found dead – car collision
Sharp-shinned Hawk	M	0952-78764	18-Oct-88	HY	May-14	AHY	Okanagan Heritage Museum, BC, Can.		dead – cause unknown
Sharp-shinned Hawk	F	1293-25346	03-Oct-14	HY	30-Oct-14	HY	Humboldt, AZ	590	found dead – collision
Cooper's Hawk	F	1705-22257	31-Aug-94	ASY	02-Oct-14	ASY	Randolph, MS	2909	unknown
Cooper's Hawk	F	1005-24258	18-Sep-05	ASY	03-Oct-14	ATY	Henderson, NV	403	found dead – cause unknown
Cooper's Hawk	F	1075-01624	17-Oct-12	ASY	Oct-14	ASY	Enaville, ID	678	found dead – cause unknown
Cooper's Hawk	F	1075-02811	28-Sep-13	AHY	19-Oct-14	ASY	Pearce, AZ	919	struck wire – released
Cooper's Hawk	F	1075-02767	05-Sep-14	AHY	16-Sep-14	AHY	Kingman, AZ	474	found dead – predation (other than cat)
Cooper's Hawk	F	1115-09498	03-Oct-14	HY	10-Oct-14	HY	Caliente, NV	264	found dead – cause unknown
Red-tailed Hawk	U	1177-06021	16-Sep-04	SY	24-Aug-14	ATY	Ramona, CA	728	found dead – cause unknown

[1] L = local or nestling; HY = hatching year; SY = second year; TY = third year; AHY = after hatching year; ASY = after second year; ATY = after third year; otherwise self-explanatory.

Table 4. Summary of the 2014 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.

	Bonney Butte, OR	Chelan Ridge, WA	Bridger Mtn, MT	Commissary Ridge, WY	Goshute Mts, NV	Yaki Pt, AZ	Lipan Pt, AZ	Manzano Mts, NM	Corpus Christi, TX
	Hours Counted in 2014								
Species	414.5	448.3	392.7	491.3	690	605.6	518.1	505.1	818.8
Black Vulture									228
Turkey Vulture	322	55	8	31	661	*	*	343	57128
Osprey	53	41	6	6	125	58	45	38	211
Northern Harrier	18	75	112	6	145	31	35	42	171
Crested Caracara									1
Common Black Hawk									0
Harris' Hawk									4
Accipiters									
Sharp-shinned Hawk	802	520	422	600	6141	1806	1572	1304	2101
Cooper's Hawk	465	190	203	148	3986	862	599	770	821
Northern Goshawk	53	21	59	4	152	4	2	11	0
Unidentified accipiter	41	64	66	49	42	342	281	51	105
TOTAL ACCIPITERS	1361	795	750	801	10321	3014	2454	2136	3027
Buteos									
Red-shouldered Hawk	2				0				15
Broad-winged Hawk	1	12	22	0	203	28	23	17	370575
Short-tailed Hawk									0
Swainson's Hawk	0	43	2	16	509	59	54	2279	8035
White-tailed Hawk									23
Zone-tailed Hawk									5
Red-tailed Hawk	415	119	239	530	5095	1262	1687	696	159
Ferruginous Hawk	0		8	3	32	12	2	7	6
Rough-legged Hawk	1	5	84	3	19	0		3	0
Unidentified buteo	6	22	37	73	16	28	28	7	22
TOTAL BUTEOS	425	201	392	625	5874	1389	1794	3009	378766
Eagles									
Golden Eagle	59	67	1222	136	230	2	16	103	1
Bald Eagle	38	14	106	108	16	12	7	6	15
Unknown eagles	5	0	11	22	0	0	0	0	0
TOTAL EAGLES	102	81	1339	266	246	14	23	109	16
Falcons									
American Kestrel	10	24	138	64	1730	474	440	200	1016
Merlin	80	42	28	4	110	16	12	37	98
Prairie Falcon	7	8	13	9	43	7	0	17	8
Peregrine Falcon	17	10	23	16	33	18	11	59	237
Aplomado Falcon									0
Unidentified falcon	7	7	7	10	0	5	4	2	8
TOTAL FALCONS	121	91	209	103	1916	520	467	315	1367
Kites									
Hook-billed Kite									0
Swallow-tailed Kite									59
White-tailed Kite									4
Mississippi Kite					1				20032
Unidentified Kites									0
TOTAL KITES									20095
Unidentified Raptor	21	45	63	28	0	19	38	0	157
GRAND TOTAL	2423	1384	2879	1866	19288	5045	4856	5993	461171

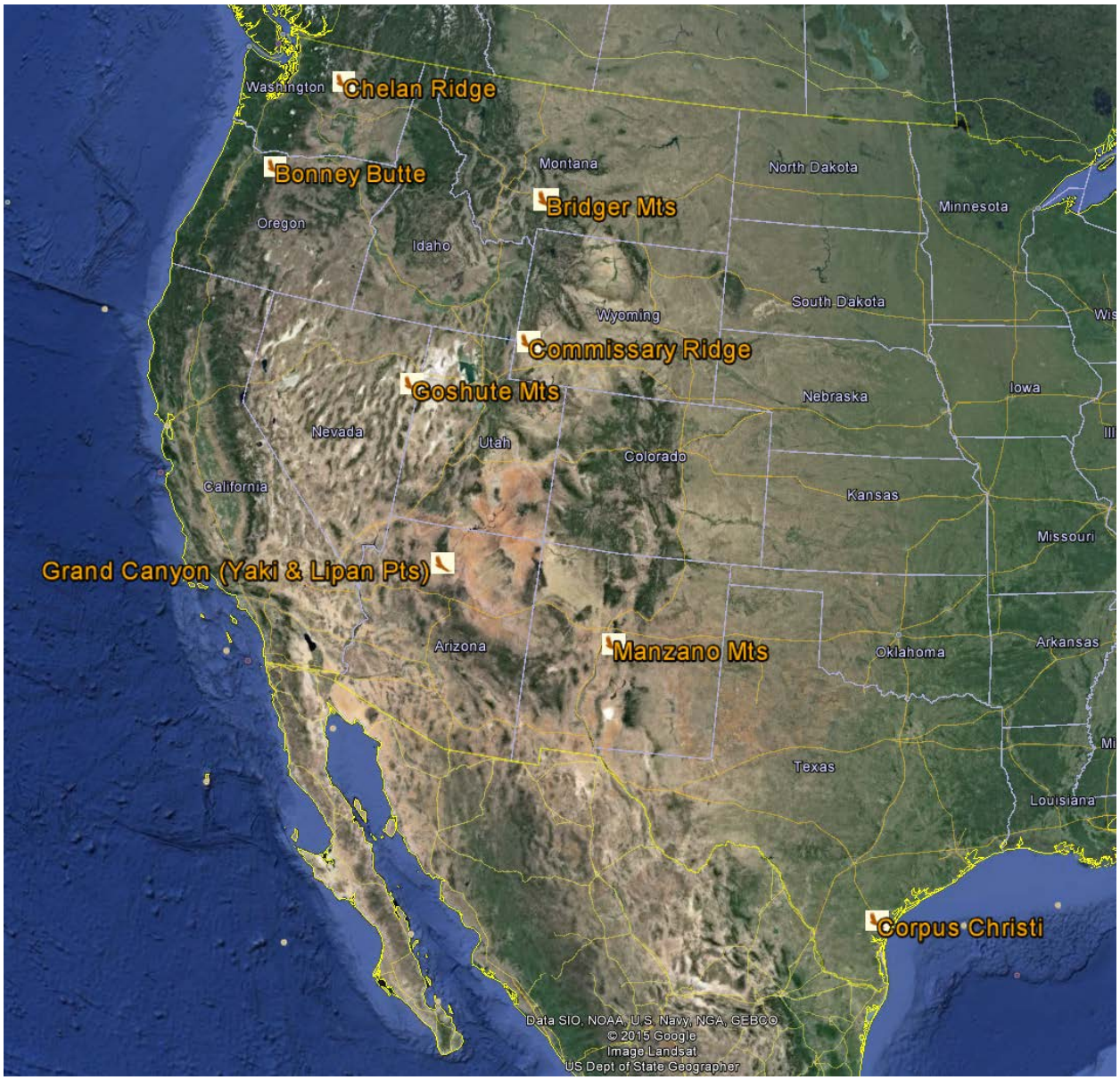
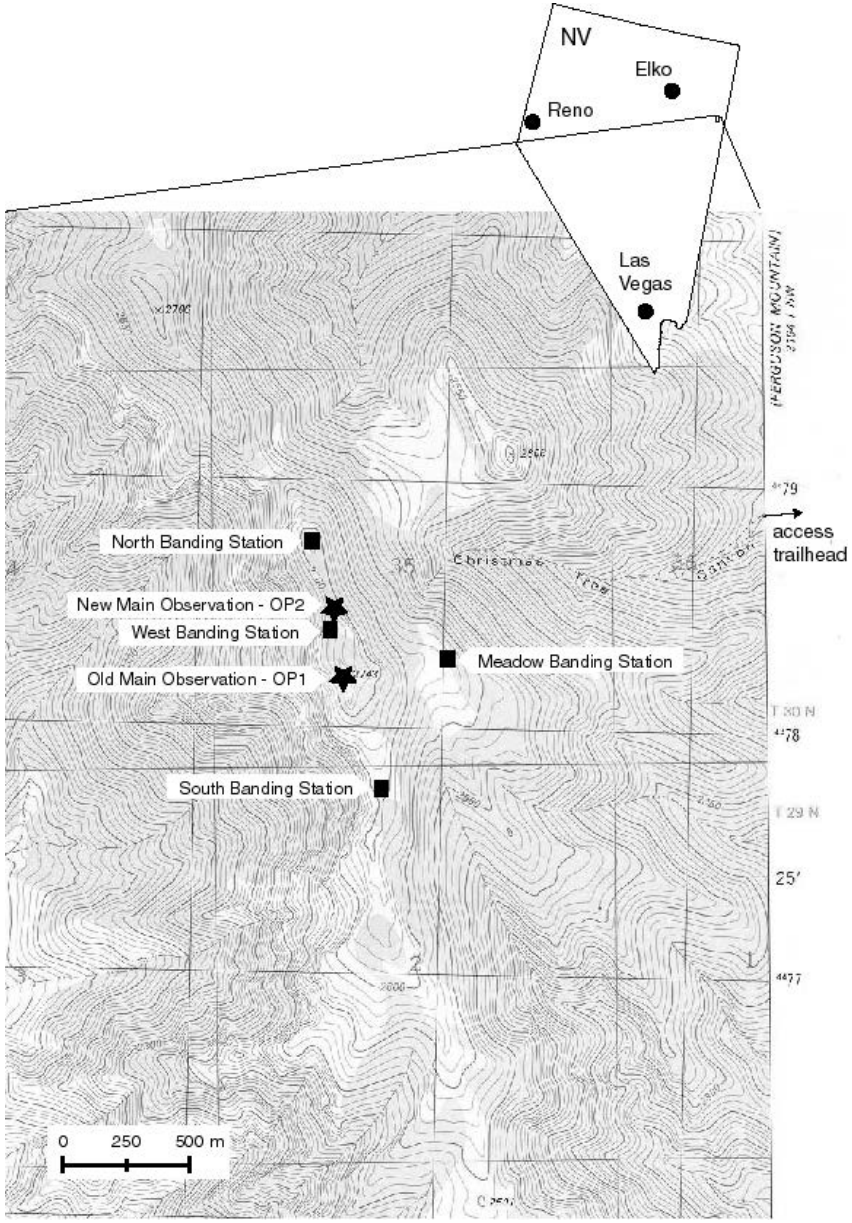


Figure 1. Locations of fall HawkWatch sites operated by HWI and partners.



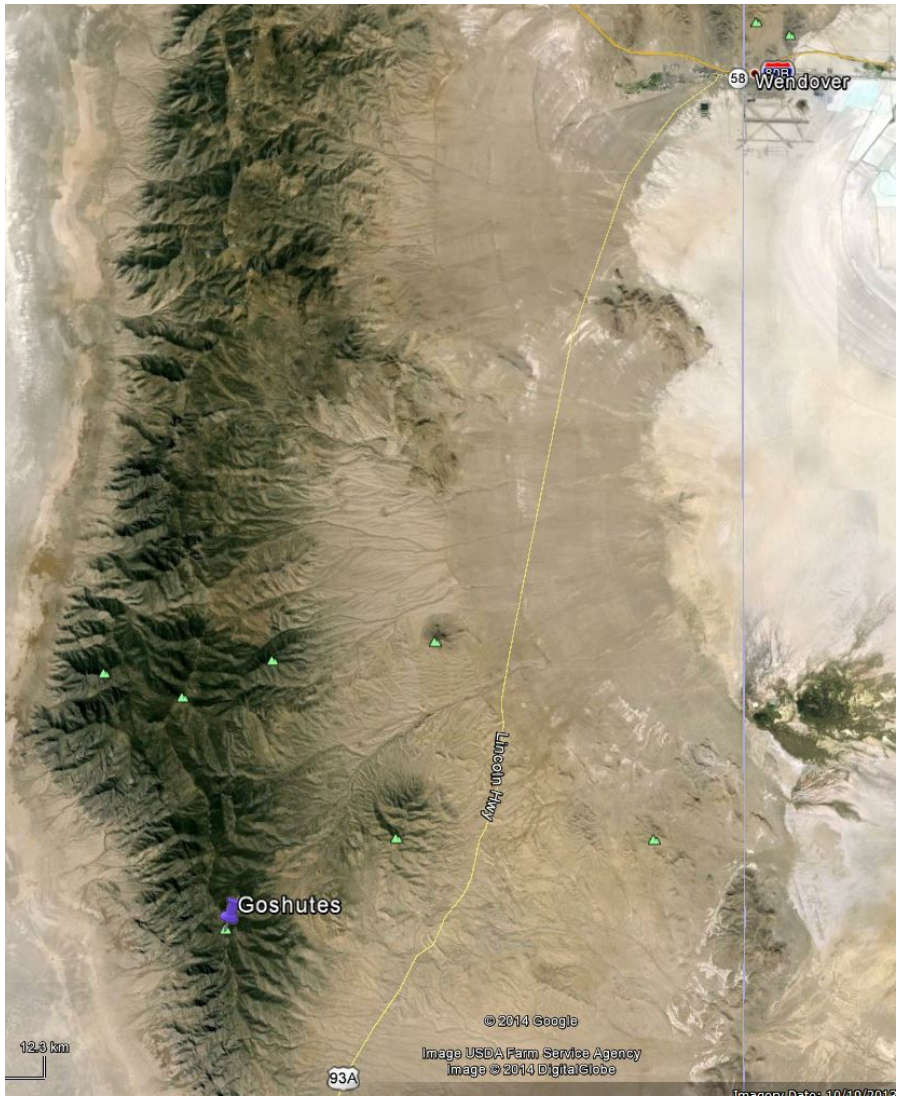


Figure 2. Location of the Goshutes HawkWatch in eastern Nevada.

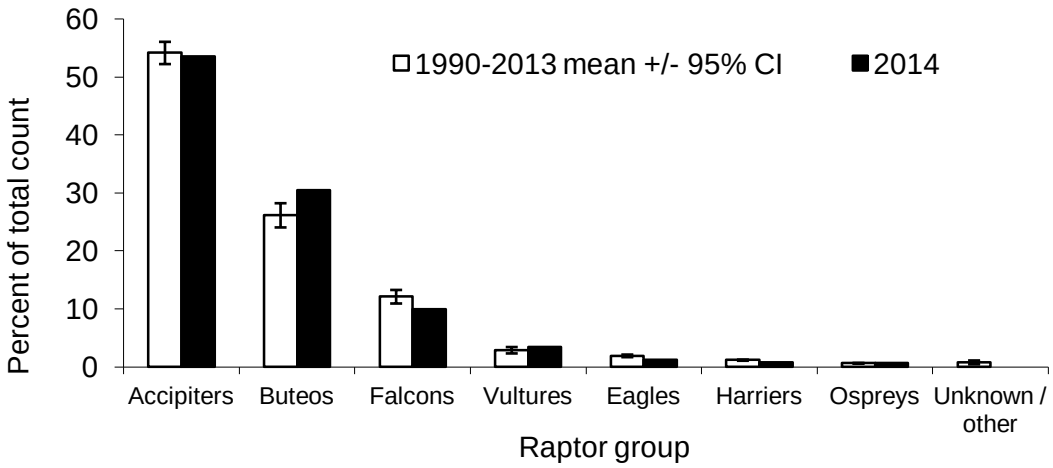


Figure 3. Fall migration flight composition by major species groups at the Goshutes HawkWatch in eastern Nevada: 1983–2013 versus 2014.

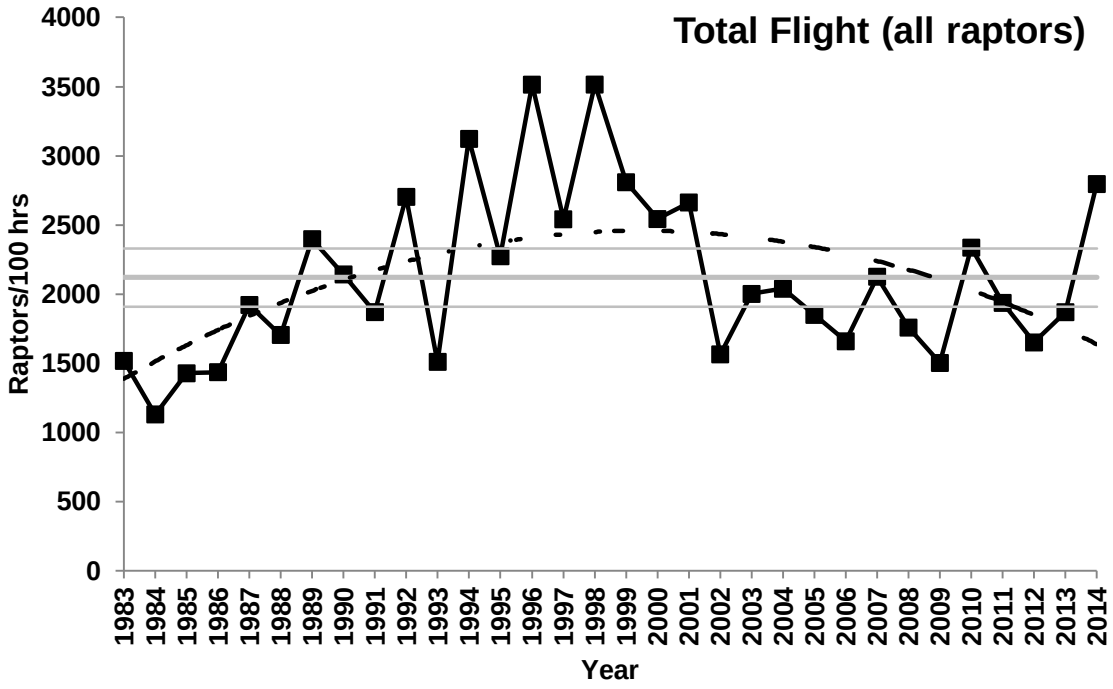


Figure 4. Fall migration passage rates at the Goshutes HawkWatch in eastern NV for all migrating raptors: 1983-2014. Solid grey lines represent mean (thick) and upper and lower 95% confidence intervals (thin) of historic counts (1983-2013) at the Goshutes. Dashed line represents trend for significant ($p < 0.05$) quadratic regression.

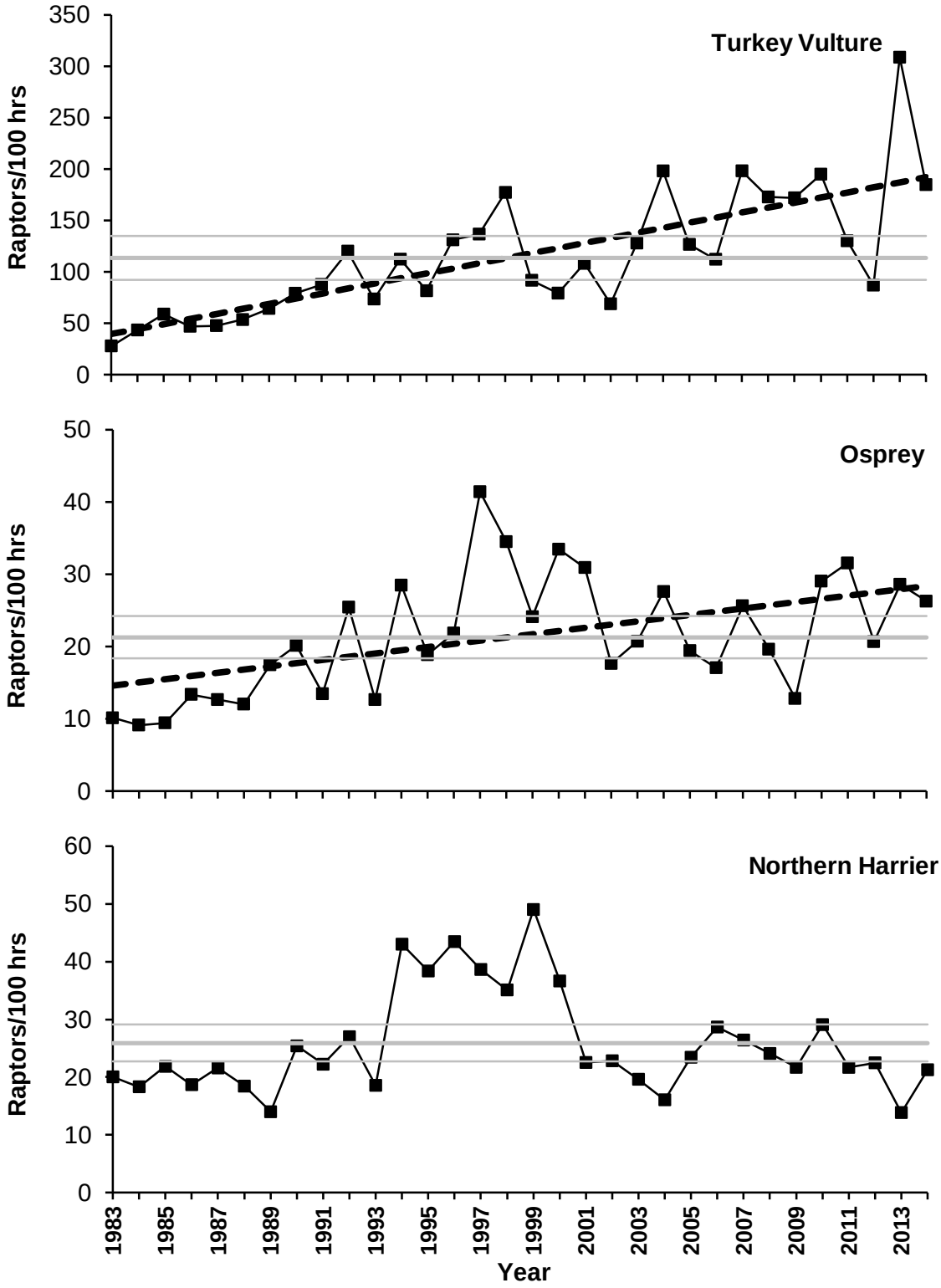


Figure 5a. Fall-migration passage rates at the **Goshutes HawkWatch in eastern NV for Turkey Vultures, Ospreys, and Northern Harriers: 1983–2014. Dashed lines indicate trends for significant ($p < 0.05$) linear or quadratic regressions. Solid grey lines represent mean (thick) and upper and lower 95% confidence intervals (thin) of historic counts (1983-2013).**

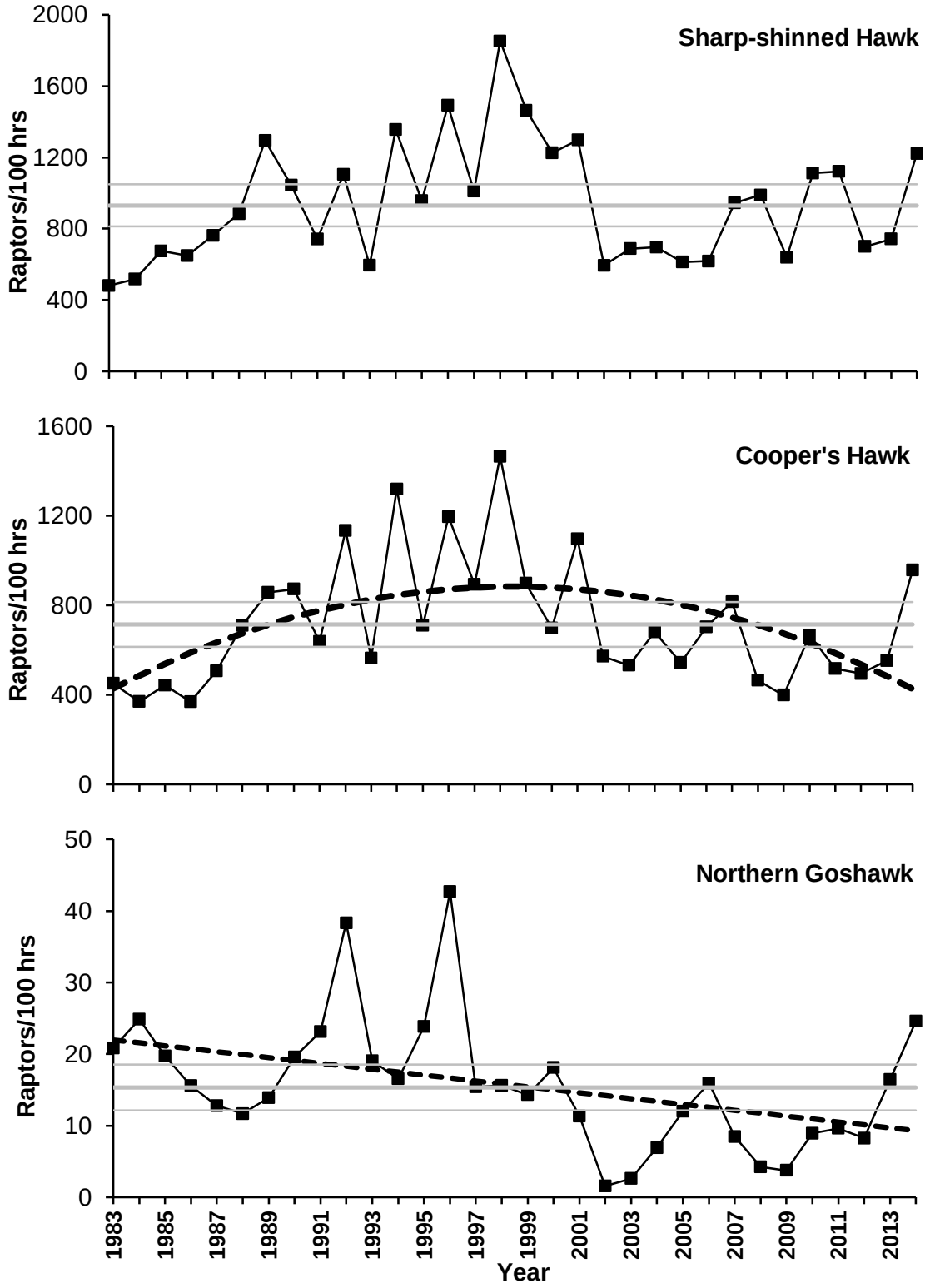


Figure 5b. Fall-migration Accipiter passage rates at the **Goshutes HawkWatch in eastern NV: 1983–2014. Dashed lines indicate trends for significant ($p < 0.05$) linear or quadratic regressions. Solid grey lines represent mean (thick) and upper and lower 95% confidence intervals (thin) of historic counts (1983-2013).**

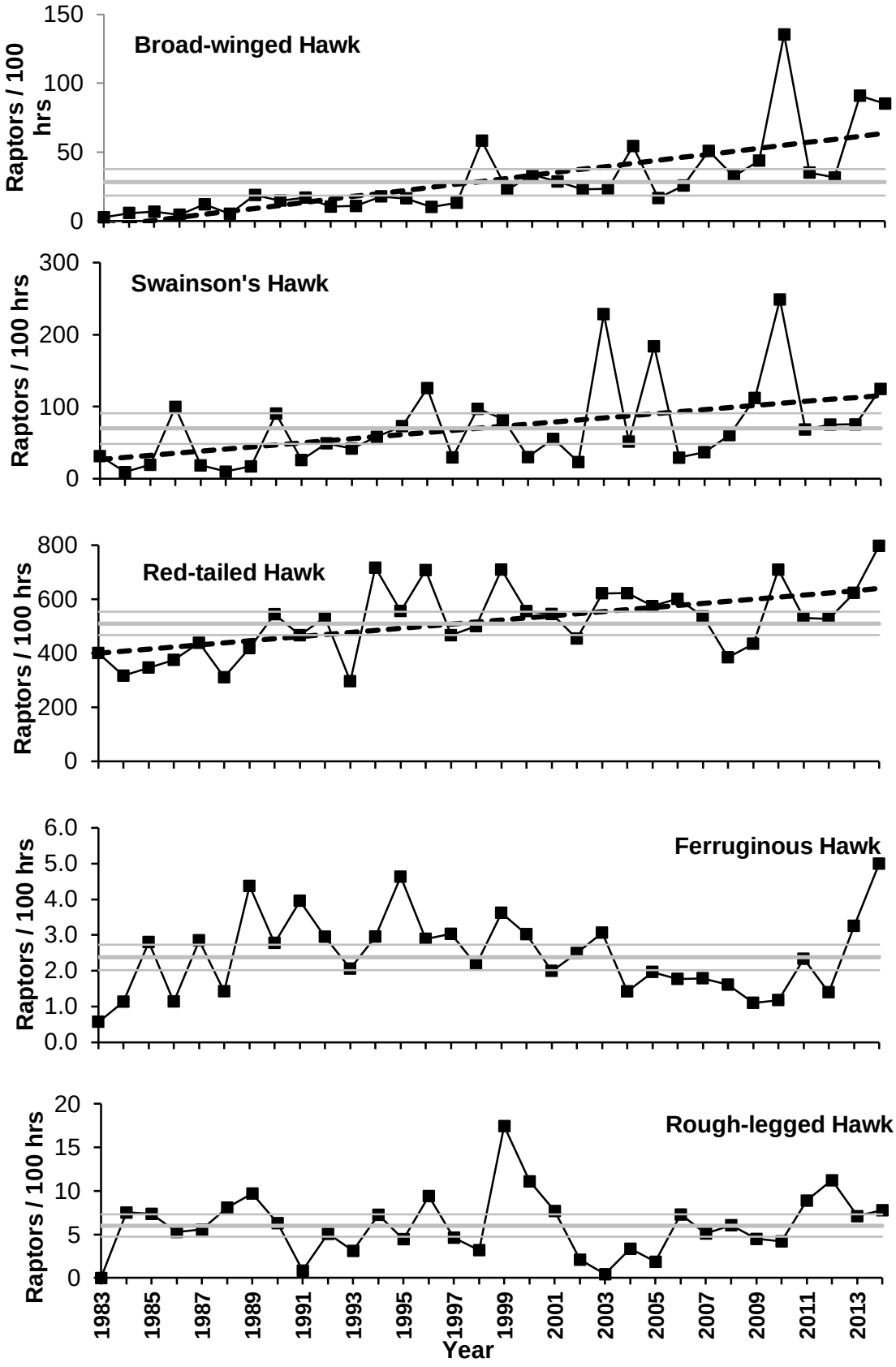

Broad-winged Hawk
Raptors / 100 hrs
150
100
50
0
Swainson's Hawk
Raptors / 100 hrs
300
200
100
0
Red-tailed Hawk
Raptors / 100 hrs
800
600
400
200
0
Ferruginous Hawk
Raptors / 100 hrs
6.0
5.0
4.0
3.0
2.0
1.0
0.0
Rough-legged Hawk
Raptors / 100 hrs
20
15
10
5
0
1983
1985
1987
1989
1991
1993
1995
1997
1999
2001
2003
2005
2007
2009
2011
2013
Year

Figure 5c. Fall-migration buteo passage rates at the **Goshutes HawkWatch in eastern NV: 1983–2014. 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 (1983-2013).**

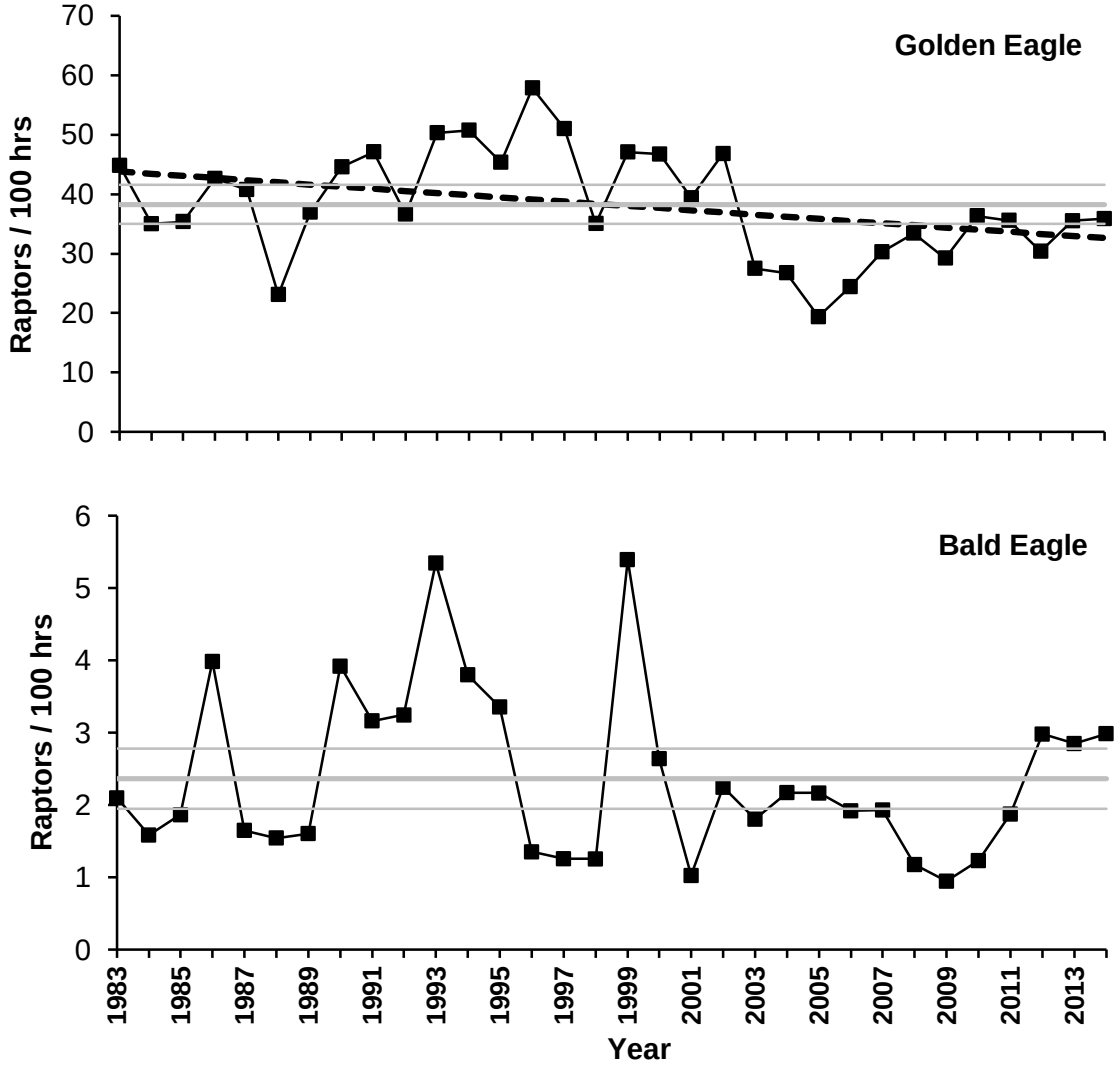


Figure 5d. Eagle passage rates for the fall migration at the **Goshutes HawkWatch in eastern NV: 1983–2014. Dashed lines indicate significant (p< 0.05) population trends based on linear regressions. Solid grey lines represent mean (thick) and upper and lower 95% confidence intervals (thin) of historic counts (1983-2013).**

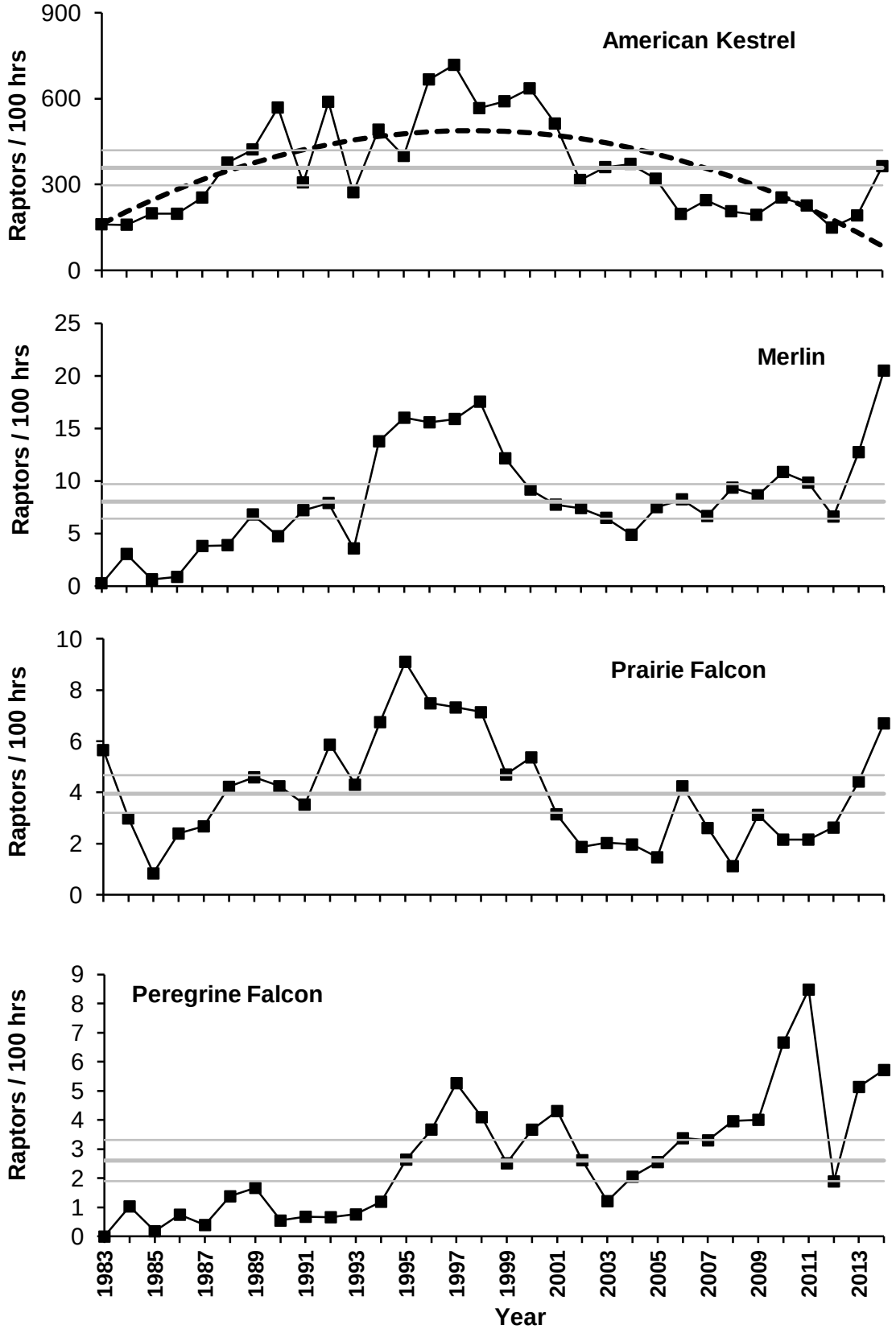


Figure 5e. Fall-migration falcon passage rates at the **Goshutes HawkWatch in eastern NV: 1983–2014. Dashed lines indicate significant ($p < 0.05$) population trends based on linear or quadratic regressions. Solid**

grey lines represent mean (thick) and upper and lower 95% confidence intervals (thin) of historic counts (1983-2013).

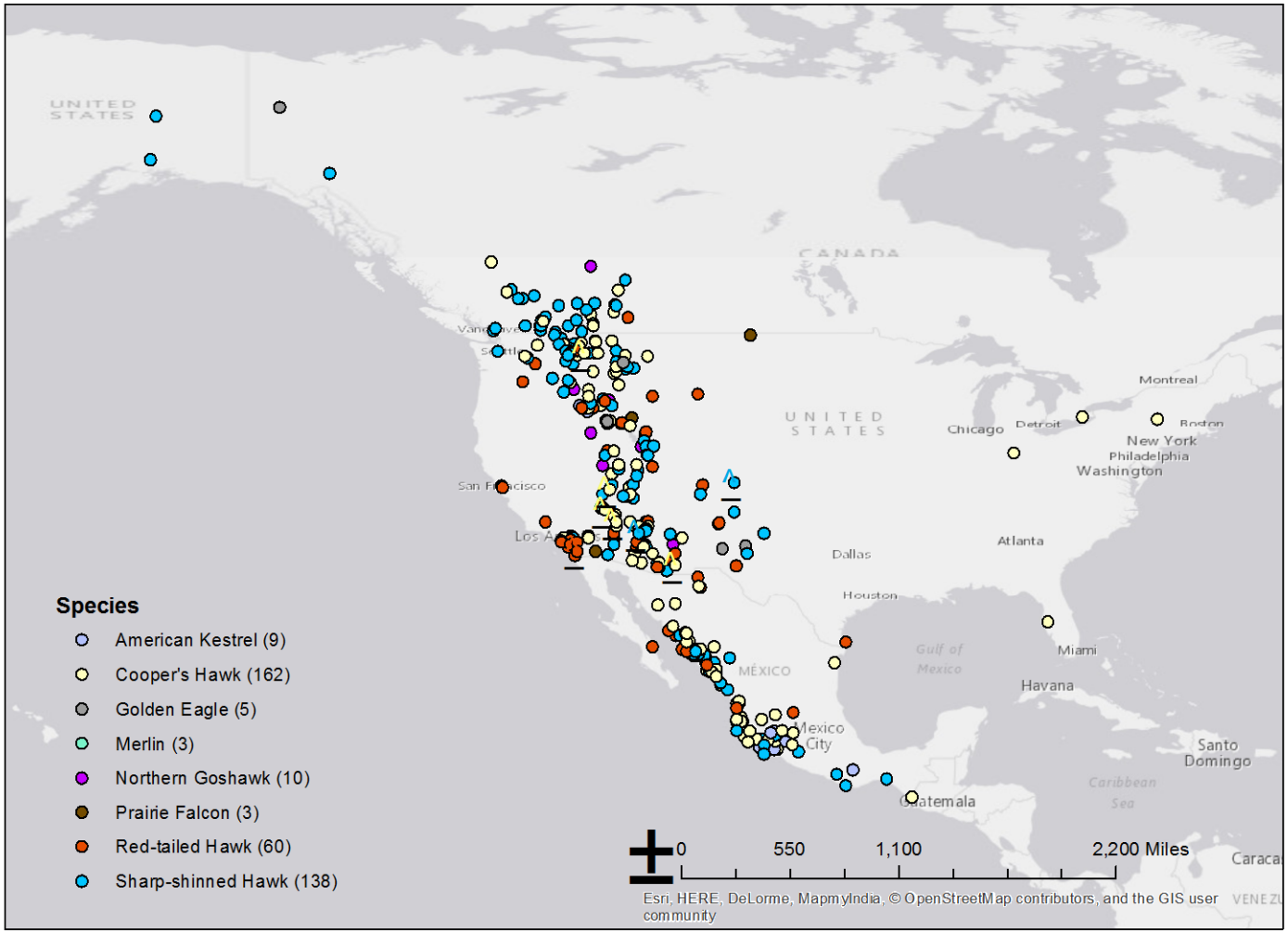


Figure 6. Recovery locations of raptors banded at the Goshutes HawkWatch in eastern NV. Circles represent recaptures from 1981 to 2013, stars represent 2014 recoveries.

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)

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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: 1983–2014.

	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	MEAN
Start Date	15-Aug	15-Aug	15-Aug	15-Aug	15-Aug	15-Aug	15-Aug	15-Aug	15-Aug	15-Aug	15-Aug	15-Aug
End Date	5-Nov	5-Nov	5-Nov	5-Nov	5-Nov	5-Nov	5-Nov	5-Nov	5-Nov	5-Nov	5-Nov	4-Nov
Observation days	76	83	82	82	82	83	82	79	83	80	81	79
Observation hours	642.75	695.30	652.58	703.00	698.51	733.59	692.60	682.03	741.00	641.75	690.00	674.46
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	2,098
SPECIES	RAPTOR COUNTS											
Turkey Vulture	685	445	355	735	637	640	682	443	329	980	661	407
Osprey	120	83	68	113	89	59	126	129	95	117	125	94
Northern Harrier	96	153	177	186	158	154	201	142	162	88	145	169
Mississippi KIte	0	0	0	0	0	0	0	0	0	0	1	0
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	4,445
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	2,951
Northern Goshawk	41	74	95	55	27	26	54	58	53	92	152	92
Unknown accipiter	318	590	72	366	221	280	169	62	394	116	42	322
TOTAL ACCIPITERS	6,168	5,897	5,453	8,478	7,172	5,248	7,885	7,358	6,104	5,476	10,321	7,810
Red-shouldered Hawk	0	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	67
Swainson's Hawk	197	664	109	163	248	445	933	269	308	285	509	271
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	3,175
Ferruginous Hawk	8	12	10	11	10	8	8	14	11	18	32	15
Rough-legged Hawk	7	6	17	13	15	12	10	24	30	17	19	15
Unidentified buteo	117	97	13	44	91	120	34	24	76	41	16	69
TOTAL BUTEOS	4,040	4,493	3,698	3,864	2,884	3,599	5,707	3,651	4,431	4,144	5,874	3,612
Golden Eagle	160	130	152	218	226	206	236	226	213	212	230	246
Bald Eagle	12	11	9	10	6	6	6	10	16	15	16	12
Unidentified eagle	4	0	0	0	0	0	0	0	2	1	0	1
TOTAL EAGLES	176	141	161	228	232	212	242	236	231	228	246	258
American Kestrel	1,709	1,468	820	1,174	965	940	1,170	1,132	726	839	1,730	1,708
Merlin	22	40	40	34	51	50	54	49	35	57	110	41
Prairie Falcon	11	9	26	19	10	21	14	13	20	25	43	24
Peregrine Falcon	11	14	17	18	22	23	42	46	11	26	33	15
Unidentified falcon	12	11	4	6	6	10	2	1	4	1	0	7
TOTAL FALCONS	1,765	1,542	907	1,251	1,054	1,044	1,282	1,240	796	948	1,916	1,796
Unidentified raptor	51	104	3	86	51	60	52	5	79	13	0	100

GRAND TOTAL	13,101	12,858	10,822	14,941	12,277	11,016	16,177	13,205	12,227	11,994	19,289	14,246

Appendix D. Annual summaries of banding effort and capture totals by species at the **Goshutes HawkWatch in eastern NV: 1980–2014.**

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Start date	23 Sep	2 Sep	8 Sep	25 Aug	28 Aug	2 Sep	27 Aug	30 Aug	28 Aug	30 Aug	24 Aug	21 Aug	19 Aug	22 Aug	19 Aug
End date	19 Oct	10 Oct	16 Oct	22 Oct	17 Nov	8 Nov	10 Oct	27 Oct	23 Oct	24 Oct	31 Oct	26 Oct	7 Nov	22 Oct	29 Oct
Blinds in operation	1	1	2	2	2	3	3	3	4	4	4	4	5	5	5
Trapping days	21	37	27	55	69	?	?	?	?	?	66	64	74	59	65
Station days	21	37	?	66	104	?	?	?	?	159	205	240	296	254	278
Station hours	149	227	159	443	622	654	483.8	833	1,085	1,203	1,454	1,899	2,316	1,971	2,290
Captures /100 stn hrs	84.5	341.0	215.1	228.9	149.1	185.2	127.5	168.2	175.4	196.9	190.3	159.8	166.8	136.0	205.1
SPECIES	RAPTOR CAPTURES														
Northern Harrier	0	2	0	8	3	6	2	4	10	9	4	9	10	4	7
Sharp-shinned Hawk	62	376	186	571	548	705	410	886	1,177	1,527	1,583	1,694	2,036	1,526	2,686
Cooper's Hawk	36	300	129	306	261	366	164	395	553	652	821	909	1,220	822	1,473
Northern Goshawk	6	11	3	32	40	42	5	27	22	29	44	33	104	27	35
Broad-winged Hawk	0	0	0	0	2	0	1	1	1	1	1	2	0	2	1
Swainson's Hawk	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1
Red-tailed Hawk	14	26	13	43	31	51	15	43	37	66	99	93	97	53	158
Rough-legged Hawk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Golden Eagle	1	1	1	1	5	6	2	4	7	6	10	3	3	2	11
Bald Eagle	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
American Kestrel	7	58	8	51	28	34	17	37	85	61	190	266	367	223	285
Merlin	0	1	1	0	2	0	0	1	5	8	2	9	10	8	21
Prairie Falcon	0	0	0	6	5	2	1	3	7	5	7	7	8	1	7
Peregrine Falcon	0	0	0	0	1	0	0	0	0	2	1	1	0	1	0
All Species	126	775	341	1,019	926	1,212	617	1,401	1,904	2,366	2,762	3,026	3,855	2,671	4,685
Recaptures[1]	0	0	0	0	0	0	0	0	0	0	4	4	7	9	10
Foreign Recaptures[2]	0	0	1	0	0	0	0	0	0	2	0	0	1	1	2
Foreign Encounters[3]	0	1	5	3	9	12	5	7	11	12	15	18	14	21	19

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

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

[3] Birds originally banded in the Goshutes and subsequently encountered elsewhere.

Appendix D. continued

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Start date	22 Aug	19 Aug	18 Aug	18 Aug	21 Aug	21 Aug	22-Aug	24-Aug	24-Aug	27-Aug
End date	25 Oct	23 Oct	22 Oct	22 Oct	3 Nov	28 Oct	4-Nov	5-Nov	28-Oct	22-Oct
Blinds in operation	6	5	5	5	3	4	4	4	4	3
Trapping days	63	61	62	63	72	62	72	68	66	53
Station days	312	270	264	236	131	174	210	188	163	105
Station hours	2,382	2,061	2,087	1,690	939	1,286	1,666	1,474	1,276	807
Captures /100 stn hrs	120.1	160.7	147.0	202.3	163.6	167.0	173.0	159.9	114.7	158.2
SPECIES	RAPTOR CAPTURES									
Northern Harrier	2	1	18	4	0	17	11	8	7	2
Sharp-shinned Hawk	1,823	2,091	1,783	2,131	897	1,235	1,608	1,283	825	791
Cooper's Hawk	695	737	767	1,006	438	504	975	791	460	342
Northern Goshawk	27	68	20	20	20	24	23	7	9	28
Broad-winged Hawk	3	0	0	1	0	3	1	0	2	1
Swainson's Hawk	0	0	0	0	0	0	1	0	0	0
Red-tailed Hawk	93	84	67	69	49	58	76	109	63	61
Rough-legged Hawk	0	0	0	0	0	0	2	0	0	0
Golden Eagle	4	7	5	4	8	2	1	9	1	2
Bald Eagle	0	0	0	0	0	0	0	0	0	0
American Kestrel	193	290	351	149	97	285	168	127	88	35
Merlin	13	18	26	13	16	11	12	15	5	11
Prairie Falcon	3	7	17	7	3	8	3	4	3	4
Peregrine Falcon	1	1	4	0	1	1	1	3	0	0
All Species	2,857	3,304	3,058	3,404	1,529	2,148	2,882	2,356	1,463	1,277
Recaptures[1]	3	3	7	9	4	6	9	7	2	2
Foreign Recaptures[2]	1	4	3	5	2	3	4	3	1	2
Foreign Encounters[3]	16	9	18	15	10	19	10	28	12	16

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

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

[3] Birds originally banded in the Goshutes and subsequently encountered elsewhere.

Appendix D. continued

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	MEAN
Start date	23-Aug	22-Aug	20-Aug	21-Aug	22-Aug	20-Aug	17-Aug	25-Aug	20-Aug	23-Aug	23-Aug
End date	1-Nov	5-Nov	25-Oct	28-Oct	31-Oct	1-Nov	30-Oct	31-Oct	31-Oct	31-Oct	26-Oct
Blinds in operation	4	3	3	2	2	2	2	2	2	2	3.4
Trapping days	69	72	63	62	64	62	57	63	67	68	61
Station days	150	128	81	69	66	68	59	80	92	88	153
Station hours	1,073	888	550	503	476	476	429	572	576	582	1,082.5
Captures /100 stn hrs	153.8	112.1	210.9	204.2	176.7	245.5	159.8	203.0	187.1	241.3	176.0
SPECIES	RAPTOR CAPTURES										
Northern Harrier	3	2	6	2	0	1	1	4	4	4	5
Sharp-shinned Hawk	902	503	683	616	432	700	420	661	585	730	1,058
Cooper's Hawk	562	356	383	314	307	280	200	297	314	478	534
Northern Goshawk	21	26	18	2	3	5	9	17	10	12	24
Broad-winged Hawk	2	1	2	0	1	1	2	0	7	1	1.1
Swainson's Hawk	1	1	0	0	0	1	0	0	2	1	0.2
Red-tailed Hawk	67	56	39	40	43	119	27	112	88	106	64
Rough-legged Hawk	0	0	0	0	0	0	0	1	0	0	0.0
Golden Eagle	1	1	0	4	4	4	2	7	5	4	3.9
Bald Eagle	0	0	0	0	0	0	0	0	0	0	0.0
American Kestrel	76	38	19	42	41	38	15	48	44	41	114
Merlin	11	5	6	6	6	15	5	12	11	14	8.4
Prairie Falcon	3	5	3	0	4	3	2	2	6	12	4.3
Peregrine Falcon	2	2	0	0	0	1	2	1	2	1	0.9
All Species	1,651	995	1,159	1,026	841	1,168	685	1,162	1,078	1,404	1,818
Recaptures[1]	2	2	3	4	3	3	1	2	0	1	3
Foreign Recaptures[2]	4	0	1	2	0	2	0	3	1	3	1
Foreign Encounters[3]	10	8	10	12	3	8	10	6	7	10	11

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

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

[3] Birds originally banded in the Goshutes and subsequently encountered elsewhere.