FALL 2011 RAPTOR MIGRATION STUDIES IN THE GOSHUTE MOUNTAINS OF NORTHEASTERN NEVADA

HawkWatch International, Inc.
Salt Lake City, Utah

HAWK WATCH INTERNATIONAL
Conserving Raptors and Our Shared Environment

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INTRODUCTION

The Goshute Mountains Raptor Migration Project in northeastern Nevada is an ongoing 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 2011 season marking the 32nd consecutive season of banding and the 29th consecutive annual count at the site. Annual counts have ranged between ~12,000–25,000 migrants of up to 18 species, making this one of the largest concentrations in the western U.S. and Canada (Bildstein 2006). This report summarizes the 2011 count and banding results

The Goshute project was 1 of 8 long-term, annual migration count, and 1 of 4 migration banding studies conducted or co-sponsored by HWI in North America during 2011 fall migration season. The primary objective of these efforts is to track long-term population trends of diurnal raptors in western North America and around the Gulf Coast region (Hoffman and Smith 2003; Smith et al. 2008a, b). Raptors can serve as important biological indicators of ecosystem health (Bildstein 2001) and long-term migration counts are cost effective and efficient methods for monitoring the regional status and trends of many raptor species (Zalles and Bildstein 2000, Bildstein et al. 2008).

In coordination with the long-term counting and banding efforts, HWI has and will continue to explore related research activities to further help provide valuable information about migratory behavior of raptors, as well as identify species' ranges, migratory routes and connectivity, and track changes in raptor health and populations (e.g., Hoffman et al. 2002, Lott and Smith 2006, Goodrich and Smith 2008). In addition, these migration studies offer unique opportunities for the public to learn about raptors and the natural environment, and providing such opportunities is another important component of the Goshute Mountain Raptor Migration Project, as well as all other HWI affiliated migration projects.

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; Figure 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.

Before 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 Figure 1). 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 1), which provided an unobstructed view along the lower eastern flanks of the ridge. Beginning in 2001, OP2 was designated the standard observation site and season wide standardized counts have been conducted at this location every year since (cf. Vekasy and Smith 2002).

Two banding stations were in operation this past season; North and West. For a brief history, North station, located approximately 300 m north-northwest of the current observation location (OP2), was established mid-season in 1989, at an elevation of approximately 2,700 m. West station, located on a flank approximately 100 m to the southwest, was established in 1980 at approximately 2,720 m in elevation. Slight modifactions to the trapping arenas occurred at North during the 1998 season, and at West during the 1995, as well as the 2000 seasons.

Over the years, the number of trapping stations operated in any one year has varied as high as six. Since 2000, however, only four stations have been in operation. And due to both resource limitations and a reduced need for extensive banding, HWI now primarily use the two stations mentioned above.

METHODS

STANDARDIZED COUNTS

Weather permitting, two primary, official observers conducted daily counts throughout the season. Both official observers, Rachel Smith and Kerry Ross, came back for a second year and both also previously counted for us in the Florida Keys during the fall of 2008. (See Appendix A for a complete history of observer participation.) Other crew members and occasionally visitors regularly assisted with the counts as well.

Weather permitting, observations usually began between 0800 and 0900 H Mountain Standard Time (MST) and ended near sunset, usually between 1700 and 1900 H.

The observers routinely recorded the following data:

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

Calculation of "adjusted" (to standardize sampling periods and adjust for incompletely identified birds) passage rates (migrants counted per 100 hours of observation) and analysis of trends updated through 2011 follows Farmer et al. (2007). In comparing 2011 annual statistics against means and 95% confidence intervals for previous seasons, we equate significance with a 2011 value falling outside the bounds of the confidence interval for the associated mean.

TRAPPING AND BANDING

Weather permitting, variable crews of 2–4 trappers and processors operated one or both trapping stations on most days, generally between 0900 and 1700 H MST. Capture devices included mist nets, dho-gaza nets, and remotely triggered bow nets. Trappers lured migrating raptors into the capture stations from camouflaged blinds using live, non-native avian lures attached to lines manipulated from the blinds. Unless already banded, all captured birds were fitted with a uniquely numbered USGS Biological Resources Division aluminum leg band. Data gathering and recording followed standardized protocols used at all HWI migration-banding sites (Hoffman et al. 2002). All birds were released within 45 minutes of capture.

RESULTS AND DISCUSSION

WEATHER

Inclement weather forced the site to close one day early on 04 November (Appendix C). Three additional days were also precluded, and one day was shortened (reduced observation time to ≤4 hours) due to weather (see Appendix C for daily weather records). For comparison, weather, on an average seasonal basis (i.e., 1997-2010) has demonstrated to preclude 2.4, and severely hamper 1.6 days of observation in a givin season.

During active observation periods, skies were recorded as predominantly fair 49% of the time, 27% transitional (i.e., changed from fair or partly cloudy to mostly cloudly or overcast during the day, or vice versa), and 24% as mostly cloudy to overcast. The averages for the site are 50% fair, 32% transitional, and 18% as mostly cloudy or overcast, suggesting, in comparison, an influx of primarily mostly cloud cover and overcast conditions this past season, even though the predominant skies conformed pretty well with long-term averages. While there was an increase in mostly cloudy and overcast conditions, the season's mean daily temperature was above average (14.0°C vs. on average of 13.0°C), and good to excellent ranking of thermal lift was well above average (51% vs. the long-term average of 37.6%). However, the season's visibility rankings, affected by both fog and/or haze (38% of active observation days vs. on average of 25.5%), as well as rain and/or snow (20% vs. on average of 17.9% active observation days) were below average, both towards the east (67 km vs. the long-term average of 86.3 km) and the west (67 km vs. 85.7 km as the long term mean). Low visibility, in contrast with above average ranking of thermal lift favorable for raptor migration, suggests that raptors could have migrated over without being detected.

Similar to previous years, the season's wind conditions were again primarily light (<12 kph), occurring on 76% of active observation days (vs. on average of 70.3%). Winds blown at moderate speeds (12-29 kph) remained consistent compared to the long-term average (occurring on 24% of active observation days vs. 23.8%, on average), and no winds were recorded strong (>29 kph, vs. on average of 6.0%). Average wind directions in the past are typically recorded blowing from the SW-W (33.8%), SW-W for a major portion of the day, then switching to N-E for another major portion of the day (16.6%), NE-E (12.9%), and SW-NW (7.3%). This past season, winds were more variable, blowing from the W-NW (22% vs. on average of 4.8%), SW-NW for a portion of the day, then switching to NE-SE for another major portion (20% vs. 4.4% on average), SW-W (14% vs. 33.8% on average, see also above), SW-NW (14% vs. 7.3% on average, see above), and NE-E (11% vs. 12.9% on average, see above). Winds were also recorded from the N-E, calm/variable (6%), SW-W for a major portion of the day then switching to N-E for another major portion of the day (5%), SW-NW, calm/variable (3%), NE-SE, calm/variable (3%), S-SW for a portion of the day, then switching to NE-E for another portion (1%), and Calm/Variable (1%).

In summary, although comparable to previous wind conditions, light to moderate winds prevailed but directions were highly variable. Above average thermal lift rated as good to excellent are normally good conditions for raptor migration but with highly variable winds raptors could have migrated more broadly and may have used other ridges, rather than concentrate on the Goshute Mountains. In addition, the lower than average visibility could have caused raptors to be missed, but without testing some method of observer detectability bias (e.g., radar), that is unknown.

OBSERVATION EFFORT

Counts occurred on 79 of the 83 possible days standardized from 15 August through 5 November, which was on par with the long term average (79 ± 95% CI of 2.0 days, Appendix E). The number of observation hours (682.03), however, was above average (673.29 ± 23.70 hours, Appendix E). Similarly, the 2011 average of 2.2 observers per hour (including official and guest observers; value is mean of daily values, which are in turn means of hourly values) was also on par with the long-term (1983–2010) average of 2.2 ± 0.22 observers per hour.

MIGRATION SUMMARY

This past season, observers counted 13,205 migrants of 17 species (Table 1; see Appendix D for daily count records), which was a 9% decrease compared to the long term average (Table 1). Significant above average counts were observed for Ospreys, Rough-legged Hawks, and Peregrine Falcons, and non-significant above average counts were observed for Turkey Vultures, Sharp-shinned Hawks, Broad-winged Hawks, Red-tailed Hawks, and Merlins (Table 1). In contrast, significant below average counts were observed for Northern Harriers, Cooper's Hawks, Northern Goshawks, Golden Eagles, American Kestrels, and Prairie Falcons; whereas, non-significant below average counts were observed only for Ferruginous Hawks and Bald Eagles (Table 1). The season's tally for Swainson's Hawks was on par, compared to the long-term average (Table 1).

The flight consisted of 56% accipiters, 28% buteos, 9% falcons, 3% vultures, 2% eagles, 1% harriers, 1% Ospreys, and < 1% unidentified raptors. The proportions of accipiters, buteos, vultures, and Ospreys were above average, whereas the proportions of falcons, eagles, and harriers were below average (Figure 2). As per normal, Sharp-shinned Hawks were the most commonly observed species (39% of the total count), followed by the Red-tailed Hawk (25%), Cooper's Hawk (16%), American Kestrel (9%), Turkey Vulture (3%), Swainson's Hawk (2%), and Golden Eagle (2%). Other species that were observed only comprised of 1%, or less of the total.

Passage Rates and Long-Term Trends

For many species, adjusted passage rates show a common quadratic pattern of increasing trends through the late-1990s, followed by various curvatures of declines (Figs. 3-7). Northern Goshawks, however, are showing an overall quadratc trend of decline (Fig. 4). These quadratric trends may correspond with patterns of dry and wet cycles (Hoffman and Smith 2003, Smith et al. 2008a). However, Golden Eagles and American Kestrels have recently, and continue to demonstrate patterns of decline throughout North America (cf. Farmer et al. (2008) and Katzner et al. (2012) for Golden Eagles; and Farmer et al. (2008) and Farmer and Smith (2009) for American Kestrels, respectively). Other species, however, are showing significant increases, such as Turkey Vultures and Ospreys (Fig. 3); Broad-winged, Swainson's, and Red-tailed Hawks (Fig. 5); and Merlins and Peregrine Falcons (Fig. 7). Rough-legged Hawks are the only species showing no significant trend of overall increase or decrease over time (Fig. 5).

Age Ratios

Immature : adult ratios were below average in 2011 for Cooper's Hawks, Northern Goshawks, Red-tailed Hawks, Golden Eagles, and Peregrine Falcons, but above average for Broad-winged Hawks and Bald Eagles (Table 2). Typically with Sharp-shinned Hawks, immatures are seen in greater numbers than adults, but this past season observers identified and counted more adults (Table 2). A closer examination, however, indicates that 61% of those birds identified as Sharp-shinns weren't able to be aged. Likewise, it was often difficult to correctly identify immature vs. adults in many of the other species as well (see Table 2; Percentage of Unknown Age column). This type of detectability bias demonstrates the dangers of saying too much pertaining to year-to-year productivity, for example. Nevertheless, accurate age and gender identification allow us to understand flight volumes, passage dates, and trends in a more detailed context, and assessing annual and long-term changes in age ratios can be insightful to identify if one particular age of a species is declining; thus, causing the species to decline. In fact, regression results specifically looking at long-term Golden Eagle counts at the site suggest that adults are in decline (slope = -0.340, r^2 = 0.208, P-value = 0.013), not the immature and nonbreeding sub-adults (slope = -0.056, r^2 = 0.005, P-value = 0.709). Similarly, and in contrast, HWI data are showing that the adult age class Golden Eagles are in decline at Chelan Ridge, Washington (Hawks and Mika 2011a) and Bonney Butte, Oregon (Hawks and Mika 2011b), but the non-adult Golden Eagles are in decline at the Commissary Ridge, Wyoming site (Hawks and Mika 2011c).

Seasonal Timing

For a second straight year, the combined-species median passage date of 28 September was a significant three days later than the 1990–2010 long-term average (Table 3). On average, the combined-species seasonal distribution normally illustrates a bell-shaped pattern, where the peak migration is usually during the end of September (Fig. 8). In contrast, this past season showed a slower start and lower than average migration and the major peak occurred during the first five-day period in October, which is a week leater. A major lull occurred during the next 5-day period then peaked again during the five-day period of 11-15 October. Thereafter, the numbers dropped off steeply, picked up slightly during the five-day period of 21-25 October, then the numbers dropped intermittently but at a rapid descent to finish off the season (Fig. 8). At the species level, the Ferruginous Hawk was the only species that shifted early; whereas, all the other species shifted one to thirteen days later (Table 3). The age-specific median dates generally followed the same pattern except that both adult and immature Sharp-shinned Hawks and immature Northern Goshawks arrived one to three days early (Table 4). The arrival of both Sharp-shinned Hawk age groups early initially contrasts counterintuitively compared to the overall timing of Sharp-shinns arriving six days late (Table 3) but the discrepancy does not factor in the percentage of Sharp-shinned Hawks that were unable to be aged (Table 2).

TRAPPING EFFORT

The crews operated one or both of the two available banding stations on 57 of 73 days between 20 August and 01 November 2011 (see Appendix F for daily capture records and Appendix G for annual summaries). The number of trapping days was above the 1980–2010 long-term average for the site, but due to significant reduction in crews, the number of station days (59) and hours (429) were significantly below the long-term average (Appendix G).

TRAPPING SUMMARY

The 2011 capture total of 685 newly banded birds and one recapture involved eleven species (Appendix G). Sharp-shinned Hawks accounted for 61% of the total captures, followed by Cooper's Hawks (29%), Red-tailed Hawks (4%), American Kestrels (2%), Northern Goshawks (1%), and Merlins (1%). Each of the remaining species accounted for <1% of the total. Since inception, a total of 59,579 raptors have been captured, including 104 Goshute recaptures and 44 foreign recaptures (Appendix G)

Consistent with the recent reduction of staffed station hours (Appendix G), this past season's combined-species capture total of 686 raptors was again significantly below average (Table 5). Likewise, capture totals for nine out of eleven species (e.g., Northern Harriers, Sharp-shinned Hawks, Cooper's Hawks, Northern Goshawks, Red-tailed Hawks, Golden Eagles, American Kestrels, Merlins, and Prairie Falcons) were also significantly below average (Table 5). Only for two species, Broad-winged Hawks and Peregrine Falcons, were the capture totals above average, but considering these species are captured uncommonly (Table 5) and often in low number (Appendix G), it is equivicol to make major inferences. Along with the decline of captures, the percentage of capture success also declined significantly, and although the capture rates (birds captured per 100 station hours) also declined, overall and many of the species-specific capture rate results were nonsignificant (Table 5), suggesting that the efficiency of trapping is decreasing but still being relatively maintained.

As previously mentioned, with count data it is often difficult to separate age classes and with many species it is even more difficult to separate gender. Banding data offers the possibility to separate both, although with buteos especially, it is still difficult to separate gender unless genetics are also applied. For accipiters and falcons both gender and ages can accurately be determined and many banding sites capture enough birds to compare age and gender related ratios to see how they compare annually, as well as to monitor for the possibility of major changes over time. Typically, with Sharp-shinns and Northern Goshawks, as well as with American Kestrels, the number of young that are captured outnumber adults (Table 6). These patterns continued to hold true except this past year banders captured fewer young, when

compared to the overall average (Table 6). In contrast, with Cooper's Hawks, typically more adults are captured. The pattern again held true this past season, and as well, fewer birds were captured, which was also inline with the season trend (Table 6).

For comparing sex ratios, the number of females that are captured typically outnumber the number of males for both Cooper's Hawks and Northern Goshawks, and this past year was no exception (Table 6). With Sharp-shinns, in contrast, the number of females captured compared to males is usually a 1:1 ratio, but this past season more females were captured (Table 6). In further contrast, more male American Kestrels are typically captured than females. This past season's pattern remained consistent, but with significantly less birds (Table 6). Again, tracking deviations in annual sex and age ratios, and especially monitoring long term through banding helps better track changes in reproductive effort (e.g., major changes in sex ratios, or the lack of young being produced) or migratory behavior (e.g., major changes in adult gender being captured or observed).

ENCOUNTERS WITH PREVIOUSLY BANDED BIRDS

Concluding 2011, a total of 369 raptors banded at the Goshutes have subsequently been encountered elsewhere as foreign encounters. Throughout the year, we received notification of ten new recoveries: 2 Sharp-shinned Hawks, 4 Cooper's Hawks, 2 Red-tailed Hawks, 1 Golden Eagle, and 1 Merlin (Table 7). The most exciting recovery was the Golden Eagle because that was one of the birds that we had a satellite telemetry unit (PTT # 37433a) attached but lost transmission almost a year later (27 August, 2003) without reason near the southern border of Alberta and Saskatchewan, Canada (http://www.hawkwatch.org/conservation-science/satellite-tracking-program). For a brief history, this bird was originally captured as a hatch-year 15 October, 2002, then flew east-southeast and spent the winter near Beaver, Utah. Beginning spring migration in late May, the bird flew northwest to northeastern Oregon up to Prince George, British Columbia, Canada arriving late June, but the wandering continued throughout southern British Colubia and Alberta, Canada, into the U.S.-Montana, and eventually ending near the Alberta and Saskatchewan border (http://www.hawkwatch.org/conservation-science/satellite-tracking-program). Approximately 7.5 years later after HWI science staff lost track of the telemetry signal, Idaho state wildlife personnel reported that the bird was found in a field under two transistors with burnt marks on wings on 20 February, 2011near Buhl, Idaho, concluding that the bird most likely died of electrocution (Table 7). Golden Eagles begin to reach sexual maturity near the age of five. Thus, this bird was within the age where it could have been breeding. Whether it had established a mate and territory to produce young or not, we do not know. Regardless, information like this is still important to piece together causes of mortality, survivorship and longevity, and patterns of migratory, summer, winter, and habitat connectivity by combining telemetry with band recovery data.

Another interesting recovery was that of an adult male Cooper's Hawk that was found injured with a broken wing near Phoenix, Arizona on 19 January (Table 7). This bird was found by a government official and was taken to a local rehabilitation facility. We made several attempts to call the local facility but with no avail, so at this point it is unknown if the bird was successfully rehabilitated and released, or died in captivity. We did follow up with the person who reported the band and took the bird to the rehabilitation facility and he indicated that the bird most likely injured itself by hitting a powerline, based on where it was found. Unfortunately, two other birds (a female Sharp-shinned Hawk and a male Cooper's Hawk) were also found dead due to collisions (Table 7). Otherwise, most of the recoveries were found dead of unknown causes (Table 7), which is often the norm. Interestingly, all birds except the Red-tailed Hawk recovered nearby Riverside, California were all within the boundaries of the Intermountain Flyway (cf. Hoffman et al. 2002). The Red-tailed Hawk was recovered within the Pacific Coast Flyway, and likewise, the two Sharp-shinns were also within the boundaries of the Pacific Coast Flyway, at locations where the two flyways of the Pacific Coast and Intermountain overlap (cf. Hoffman et al. 2002). Also, even though the Golden Eagle was recovered within the Intermountain Flyway, as already mentioned, we know that from telemetry data that young Golden Eagles tend to wander and often fly over flyway boundaries throughout western North America. Again, these records are important to understand

the migratory behavior of raptors in terms of migratory fidelity and connectivity, as well as sources of mortality and longevity.

No “foreign recaptures” were encountered during the season but the crew did recapture one previously banded female Cooper’s Hawk on 13 October. This bird was originally captured and banded as a hatch-year bird on 24 September, 2005. Retrapping these birds at the same location identifies that they are either local residents or that they use the same migration routes, as well as helps us understand survivorship.

RESIDENT RAPTORS

A family of Red-tailed Hawks containing two adults and two young were seen from 15 through 22 August. Thereafter, both adults and one of the young were seen through the end of August. From 01 through 15 September, two adults were often seen. However, on 06 September, the observers recorded the adults to be two light morphs, but on the 7th, 8th, and 13th the observers recorded the adults to be of light and dark morphs. After 15 September, no Red-tailed Hawk was recorded as being resident until 24 October when an immature was observed with a broken secondary in the left wing. This bird was also observed on 26 and 29 October.

Throughout August, a family of Peregrine Falcons containing both adults and an immature female were recorded. Presumably, the adult female left the area sometime in August. 01 September was the last time the adult male was seen and on that day the immature female was also recorded. The immature female was again recorded on 04 September and an unknown aged Peregrine was recorded on 26 October.

Similarly, resident American Kestrels consisted of a male and female that were commonly seen from the beginning through 25 August. It is unknown whether these birds were a bonded pair, or even what their ages were.

From the beginning up to 15 September, a resident adult Golden Eagle was often seen perched on a green knoll and being harassed by resident Red-tailed Hawks. No resident Golden Eagles were identified again until 31 October and 01 November, when two unknown aged birds were recorded.

A number of resident Turkey Vultures were also recorded in the begging of the season as well, from the start of the season through 26 August. A peak of a total of eight were recorded on 21 August. Of note, one bird was observed to have white albinistic white feathers in the right wing, and it was seen multiple times from the beginning up through 20 August. This is the second straight year that observers observed a resident Turkey Vulture with albinisic feathers in the wing area.

Finally, a resident immature Northern Goshawk was recorded on seven days during the early part of the season between 26 August through 03 September, and observers identified the bird as being a probable female on four of the seven days. Whether these were the same birds, is unknown. However, the female that was identified on 28 August also got captured that same day, and was again recaptured on 02 September at the same north blind trapping station, as well as resighted by the observers.

SITE VISITATION

During the season, approximately 136 individuals visited the site from fifteen states and three countries. Visitors came from throughout the American West; Nevada, Utah, Washington, Oregon, California, Idaho, Montana, Wyoming, Colorado, New Mexico, and Arizona, as well as Connecticut, Illinois, and Florida. And even more spectacularly, the site received visitors from Sweden, Germany, and the Republic of Fiji! Organized groups led by HWI staff included: two groups of students from the Salt Lake Center for Science Education, as well as a group of teachers and zoo personnel from the Hogle Zoo in Salt Lake City.

Every hour observers assess the disturbance level of visitors to quantify how visitation may affect detectibility. In 2011, 692 hourly assessments of visitor disturbance resulted in the following ratings:

93.6% observers ranked their efforts as not being disturbed at all, 4.3% the crew had to deal with low, 1.6% moderate, and 0.4% high visitor disturbance levels.

ACKNOWLEDGMENTS

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We are also 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 clean buckets, even for allowing extra time outside hours! A much appreciated thanks also goes to Einstein's Bagels for supplying delicious fresh bagels, the Salt Lake Roasting Company of Salt Lake City for their very generous donation of high quality coffee, and to Toby Chipman and the Great Harvest Bread Company of Salt Lake City for regular generous donations of fresh bread, as well as Toby himself for his personal volunteer help. Also, we would like to thank the Wendover Nugget and the Knights Inn for providing discounted hotel accommodations to our crewmembers on their days off. Very special thanks also goes to our long-term volunteer support from Jerry Liguori, Leo Chidester, Mike Shaw, and Art Sandack. Lastly, special thanks to Roy Bouck, Bart Gross, Mike and Jake Braithwaite, John Shipley, and Wildlife Services from the Salt Lake City Airport for helping us secure lure birds for the trapping operations.

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Table 1. Annual raptor migration counts and adjusted (truncated to standardized annual sampling periods and adjusted for incompletely identified birds) annual passage rates by species in the Goshute Mountains, NV: 1983–2010 versus 2011.

	Counts			Raptors/100 hours[1]		
Species	1983–2010[2]	2011	% Change	1983–2010[2]	2011	% Change
Turkey Vulture	388 ± 71.9	443	+14	106.9 ± 18.89	130.2	+22
Osprey	92 ± 15.4	129	+40	21.0 ± 3.15	31.8	+51
Northern Harrier	173 ± 24.9	142	-18	26.6 ± 3.41	21.7	-19
Sharp-shinned Hawk	4494 ± 693.2	5171	+15	989.4 ± 126.35	1154.1	+17
Cooper's Hawk	3046 ± 506.8	2067	-32	756.3 ± 105.67	509.8	-33
Northern Goshawk	94 ± 21.5	58	-38	15.7 ± 3.44	9.5	-39
Unknown small accipiter[3]	248 ± 98.9	8	-97	–	–	–
Unknown large accipiter[3]	9 ± 6.0	3	-66	–	–	–
Unknown accipiter	253 ± 84.6	51	-80	–	–	–
Total Accipiters	7970 ± 1161.8	7358	-8	–	–	–
Red-shouldered Hawk	0.2 ± 0.2	0	-100	–	–	–
Broad-winged Hawk	61 ± 22.0	83	+36	24.9 ± 9.52	35.9	+44
Swainson's Hawk	269 ± 88.8	269	0	70.4 ± 23.49	69.4	-2
Red-tailed Hawk	3132 ± 336.1	3237	+3	515.9 ± 45.80	534.0	+4
Ferruginous Hawk	15 ± 2.5	14	-8	2.4 ± 0.39	2.2	-10
Rough-legged Hawk	14 ± 3.6	24	-77	5.7 ± 1.34	8.9	+56
Unidentified buteo	71 ± 17.4	24	-66	–	–	–
Total Buteos	3562 ± 398.9	3651	+2	–	–	–
Golden Eagle	249 ± 24.2	226	-9	38.9 ± 3.61	35.6	-8
Bald Eagle	12 ± 2.4	10	-16	2.4 ± 0.48	1.9	-19
Unidentified eagle	1 ± 0.5	0	-100	–	–	–
Total Eagles	261 ± 25.5	236	-10	–	–	–
American Kestrel	1795 ± 326.6	1132	-37	378.0 ± 63.36	226.5	-40
Merlin	41 ± 9.0	49	+20	7.8 ± 1.72	9.7	+24
Prairie Falcon	25 ± 5.3	13	-48	4.2 ± 0.78	2.2	-48
Peregrine Falcon	13 ± 3.8	46	+242	2.4 ± 0.64	8.3	+245
Unknown small falcon[3]	3.4 ± 2.4	0	-100	–	–	–
Unknown large falcon[3]	3 ± 1.5	0	-100	–	–	–
Unknown falcon	6 ± 1.9	0	-100	–	–	–
Total Falcons	1882 ± 337.9	1240	-34	–	–	–
Unidentified raptor	108 ± 32.7	5	-95	–	–	–
Grand Total	14436 ± 1777.4	13205	-9	–	–	–

[1] Adjusted for incompletely identified birds and to standardized, species-specific sampling periods.

[2] Mean ± 95% confidence interval.

[3] These categories represent new distinctions initiated as standard practice in 2001 (see Appendix B for classification details).

Table 2. Annual raptor migration counts by age classes and immature: adult ratios for selected species in the Goshute Mountains, NV: 1990–2010 versus 2011.

	Total and Age-classified Counts								Immature : Adult Ratio	
	1990–2010 Average			2011			% Unknown Age			
Species	Total	Imm.	Adult	Total	Imm.	Adult	1990–2010[1]	2011	1990–2010[1]	2011
Northern Harrier	194	57	59	142	0	0	41 ± 6.1	0	1.13 ± 0.270	–
Sharp-shinned Hawk	4904	1665	1282	5171	991	1002	41 ± 5.0	61	1.34 ± 0.218	0.99
Cooper's Hawk	3391	765	911	2067	316	635	52 ± 4.4	54	0.83 ± 0.184	0.50
Northern Goshawk[2]	94	46	30	58	17	11	20 ± 5.1	52	2.08 ± 0.583	1.55
Broad-winged Hawk	76	14	27	83	8	13	40 ± 10.1	75	0.60 ± 0.179	0.62
Red-tailed Hawk	3495	696	1973	3237	574	2209	24 ± 3.7	14	0.35 ± 0.058	0.26
Ferruginous Hawk	16	4	5	14	0	0	46 ± 10.8	0	1.11 ± 0.460	–
Golden Eagle[2]	249	122	66	226	99	47	24 ± 4.5	35	2.19 ± 0.374	2.11
Bald Eagle	13	6	6	10	3	2	7 ± 4.1	50	1.02 ± 0.308	1.50
Peregrine Falcon	17	4	6	46	5	12	35 ± 10.5	63	0.84 ± 0.292	0.42

[1] Mean ± 95% confidence interval. For age ratios, note that long-term mean immature : adult ratios are averages of annual ratios and may differ from values obtained by dividing average numbers of immatures and adults. Discrepancies in the two values reflect high annual variability in the observed age ratio.

[2] Long-term averages based on data for 1983–2010.

Table 3. First and last observed, bulk passage, and median passage dates by species for migrating raptors in the Goshute Mountains, NV in 2011, with comparisons of the 2011 to long-term (1990–2010) average median passage dates.

	2011				1990–2010
Species	First Observed	Last Observed	Bulk Passage Dates[1]	Median Passage Date[2]	Median Passage Date[2, 3]
Turkey Vulture	15-Aug	20-Oct	8-Sep – 3-Oct	27-Sep	24-Sep ± 1.3
Osprey	17-Aug	17-Oct	31-Aug – 4-Oct	22-Sep	16-Sep ± 1.4
Northern Harrier	15-Aug	1-Nov	22-Aug – 20-Oct	2-Oct	27-Sep ± 3.4
Sharp-shinned Hawk	19-Aug	3-Nov	14-Sep – 16-Oct	3-Oct	27-Sep ± 1.8
Cooper's Hawk	17-Aug	2-Nov	15-Sep – 12-Oct	2-Oct	23-Sep ± 1.4
Northern Goshawk	18-Aug	31-Oct	10-Sep – 25-Oct	9-Oct	5-Oct ± 2.7
Broad-winged Hawk	1-Sep	13-Oct	17-Sep – 7-Oct	30-Sep	24-Sep ± 1.3
Swainson's Hawk	24-Aug	15-Oct	4-Sep – 4-Oct	21-Sep	20-Sep ± 3.1
Red-tailed Hawk	15-Aug	4-Nov	11-Sep – 26-Oct	12-Oct	7-Oct ± 2.2
Ferruginous Hawk	22-Sep	26-Oct	24-Sep – 16-Oct	25-Sep	30-Sep ± 4.2
Rough-legged Hawk	17-Sep	3-Nov	27-Sep – 28-Oct	25-Oct	23-Oct ± 1.6
Golden Eagle	15-Aug	3-Nov	4-Sep – 26-Oct	11-Oct	9-Oct ± 1.6
Bald Eagle	27-Aug	29-Oct	27-Aug – 26-Oct	17-Oct	21-Oct ± 4.4
American Kestrel	15-Aug	29-Oct	1-Sep – 11-Oct	26-Sep	16-Sep ± 1.6
Merlin	7-Sep	3-Nov	14-Sep – 23-Oct	4-Oct	3-Oct ± 2.3
Prairie Falcon	19-Aug	15-Oct	23-Aug – 11-Oct	28-Sep	15-Sep ± 3.5
Peregrine Falcon	15-Aug	23-Oct	11-Sep – 16-Oct	4-Oct	23-Sep ± 2.9
Total	15-Aug	4-Nov	13-Sep – 18-Oct	28-Sep	25-Sep ± 1.2

[1] Dates between which the central 80% of the flight passed the lookout.

[2] Date by which 50% of the flight had passed the lookout.

[3] Mean ± 95% confidence interval in days; calculated using only data for years with counts ≥5 birds.

Table 4. Median passage dates by age classes for selected species of migrating raptors in the Goshute Mountains, NV: 1990–2010 versus 2011.

	ADULT		IMMATURE / SUBADULT	
SPECIES	1990–2010[1]	2011	1990–2010[1]	2011
Northern Harrier	30-Sep ± 4.2	-	23-Sep ± 4.6	-
Sharp-shinned Hawk	07-Oct ± 1.4	04-Oct	16-Sep ± 1.0	25-Sep
Cooper's Hawk	27-Sep ± 1.7	04-Oct	18-Sep ± 1.0	27-Sep
Northern Goshawk[2]	14-Oct ± 4.0	11-Oct	30-Sep ± 3.6	05-Oct
Broad-winged Hawk	24-Sep ± 1.4	02-Oct	26-Sep ± 2.1	28-Sep
Red-tailed Hawk	10-Oct ± 1.8	14-Oct	20-Sep ± 4.1	29-Sep
Golden Eagle[2]	14-Oct ± 2.5	15-Oct	05-Oct ± 3.0	11-Oct
Peregrine Falcon	22-Sep ± 5.1	04-Oct	20-Sep ± 5.5	04-Oct

Note: Median passage dates are dates by which 50% of the flight had passed the lookout; values were calculated based only on counts of ≥5 birds per year.

[1] Mean ± 95% confidence interval in days; unless otherwise indicated, values were calculated only for species with ≥3 years of counts ≥5 birds per year.

[2] Average for 1983–2010.

Table 5. Capture totals, rates, and successes for migrating raptors in the Goshute Mountains, NV: 1983–2010 versus 2011.

	Capture Total		Capture Rate[1]		Capture Success (%)[2]	
Species	1983–2010[3]	2011	1983–2010[3]	2011	1983–2010[3]	2011
Northern Harrier	6 ± 1.7	1	0.5 ± 0.2	0.2	3.7 ± 1.0	0.7
Sharp-shinned Hawk	1203 ± 229.2	420	100.2 ± 7.6	98.0	25.4 ± 3.7	8.0
Cooper's Hawk	603 ± 118.3	200	50.5 ± 4.2	46.6	18.6 ± 2.2	9.6
Northern Goshawk	28 ± 7.7	9	2.5 ± 0.7	2.1	29.9 ± 5.4	15.5
Broad-winged Hawk	1 ± 0.3	2	0.1 ± 0.04	0.5	2.9 ± 1.3	2.4
Swainson's Hawk	0.2 ± 0.2	0	0.02 ± 0.02	0.0	0.08 ± 0.09	0.0
Red-tailed Hawk	67 ± 11.4	27	6.3 ± 1.5	6.3	2.1 ± 0.3	0.8
Rough-legged Hawk	0.1 ± 0.1	0	0.004 ± 0.008	0.0	0.3 ± 0.6	0.0
Golden Eagle	4 ± 1.1	2	0.4 ± 0.1	0.5	1.6 ± 0.4	0.9
Bald Eagle	0.04 ± 0.07	0	0.01 ± 0.02	0.0	0.4 ± 0.8	0.0
American Kestrel	132 ± 41.0	15	9.3 ± 1.7	3.5	6.6 ± 1.6	1.3
Merlin	9 ± 2.4	5	0.8 ± 0.2	1.2	19.7 ± 4.5	10.2
Prairie Falcon	5 ± 1.2	2	0.4 ± 0.1	0.5	21.0 ± 3.6	15.4
Peregrine Falcon	1 ± 0.4	2	0.08 ± 0.03	0.5	7.7 ± 3.7	4.3
All Species	2059 ± 392.3	685	171.2 ± 12.2	159.8	14.7 ± 2.0	5.6

[1] Captures / 100 station hours.

[2] Number of birds captured / number of birds observed * 100, with birds identified only to the generic group level (i.e., unknown accipiter, buteo, falcon, or eagle) allocated to relevant species in proportion to their occurrence. For calculating the "all species" values, non-trappable species and distant birds not identified at least to the generic group level were excluded.

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

Table 6. Capture totals by sex and age (HY = hatching year; AHY = after hatching year), female : male capture ratios, and immature : adult capture ratios for selected species of migrating raptors in the Goshute Mountains, NV: 1991–2010 averages versus 2011.

	Female			Male			Female : Male	HY : AHY
	AHY	HY	Unk.	AHY	HY	Unk.	Ratio[1]	Ratio[1]
Sharp-shinned Hawk								
1991–2010 mean	246	397	–	195	476	–	1.00	1.98
2011	88	140	–	53	139	0.1	1.19	1.98
Cooper's Hawk								
1991–2010 mean	221	170	–	121	157	0.1	1.46	0.94
2011	66	50	–	40	44	–	1.38	0.89
Northern Goshawk								
1991–2010 mean	4	10	–	2	11	–	1.47	7.36
2011	2	4	–	0	2	–	3.00	3.50
American Kestrel								
1991–2010 mean	7	54	17	20	60	2	0.97	4.79
2011	1	3	0	4	7	0	.36	2.00

[1] Long-term mean ratios are averages of annual ratios and may differ from values obtained by dividing long-term average numbers of relevant sex or age classes. Discrepancies between the two values reflect high annual variability in the observed age ratio.

Table 7. Foreign encounters in 2011 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	1623-21754	26-Sep-08	SY	26-Apr-11	ATY	Penticton, BC, Can.	1210	found dead – collision
Sharp-shinned Hawk	M	1232-36641	27-Sep-10	HY	16-May-11	SY	Wallowa, OR	840	found dead – cause unknown
Cooper's Hawk	M	0804-31305	01-Oct-04	AHY	19-Jan-11	ATY	Phoenix, AZ	688	found injured – broken wing
Cooper's Hawk	M	0874-01769	01-Oct-10	SY	14-Feb-11	SY	Zapopan, Jalisco, Mex.	2164	found dead – possible window collision
Cooper's Hawk	M	0874-00904	26-Sep-08	SY	12-Jul-11	ATY	Alamos, Sonora, Mex.	1367	found dead – cause unknown
Cooper's Hawk	M	1084-04887	03-Oct-10	SY	29-Oct-11	ASY	Cataldo, ID	814	found dead – cause unknown
Red-tailed Hawk	U	1177-52295	23-Aug-10	HY	01-Jan-11	HY	Green Valley, AZ	857	found dead – cause unknown
Red-tailed Hawk	U	1687-24046	04-Sep-10	HY	21-Jun-11	AHY	Riverside, CA	1080	found dead – cause unknown
Golden Eagle	M	0629-29198	15-Oct-02	HY	20-Feb-11	ATY	Buhl, ID	192	found dead - electrocution
Merlin	M	1623-22919	10-Oct-10	HY	24-Feb-11	HY	Cornville, AZ	587	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.

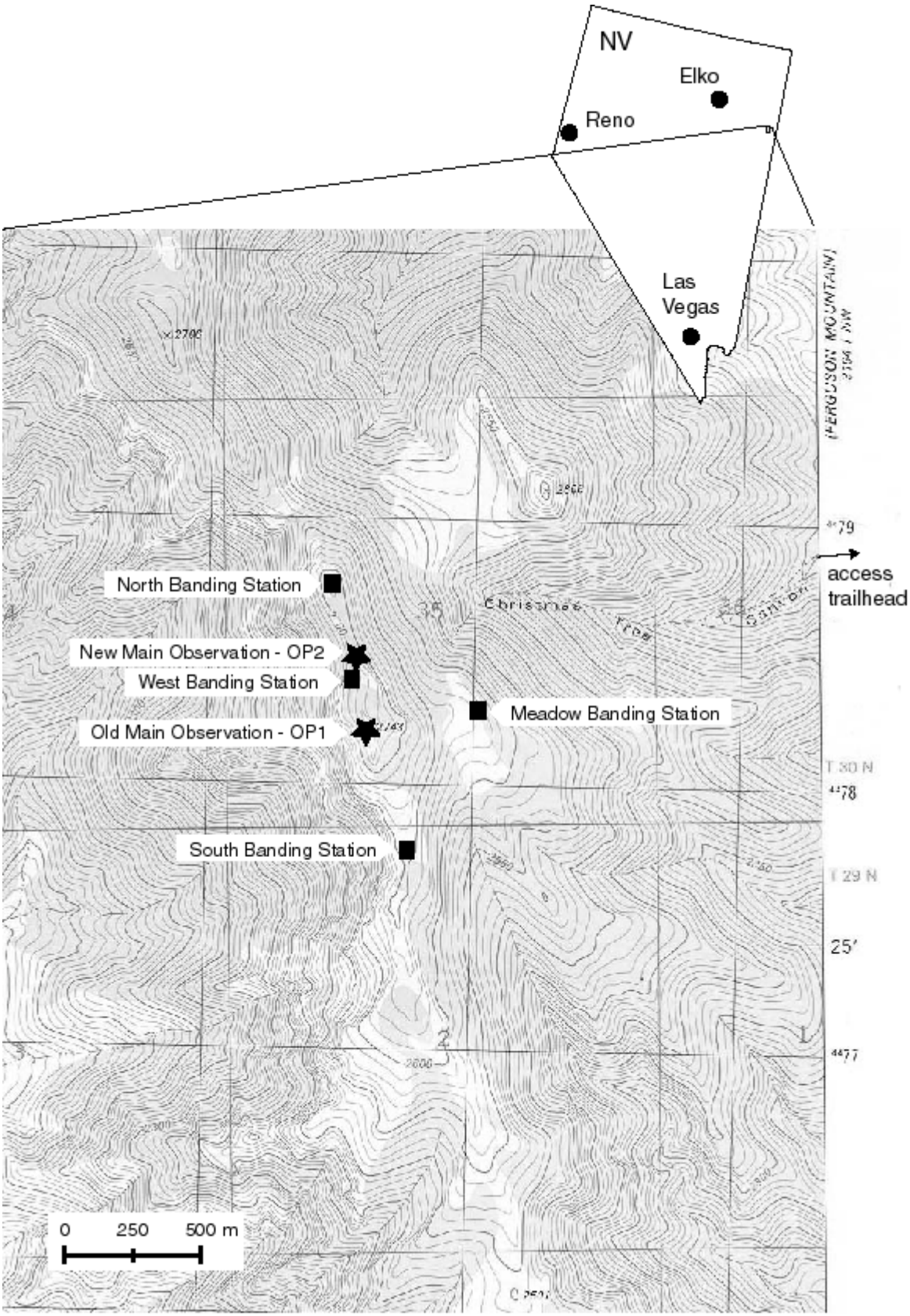

Figure 1. Location of the Goshute Mountains Raptor Migration Project study site.

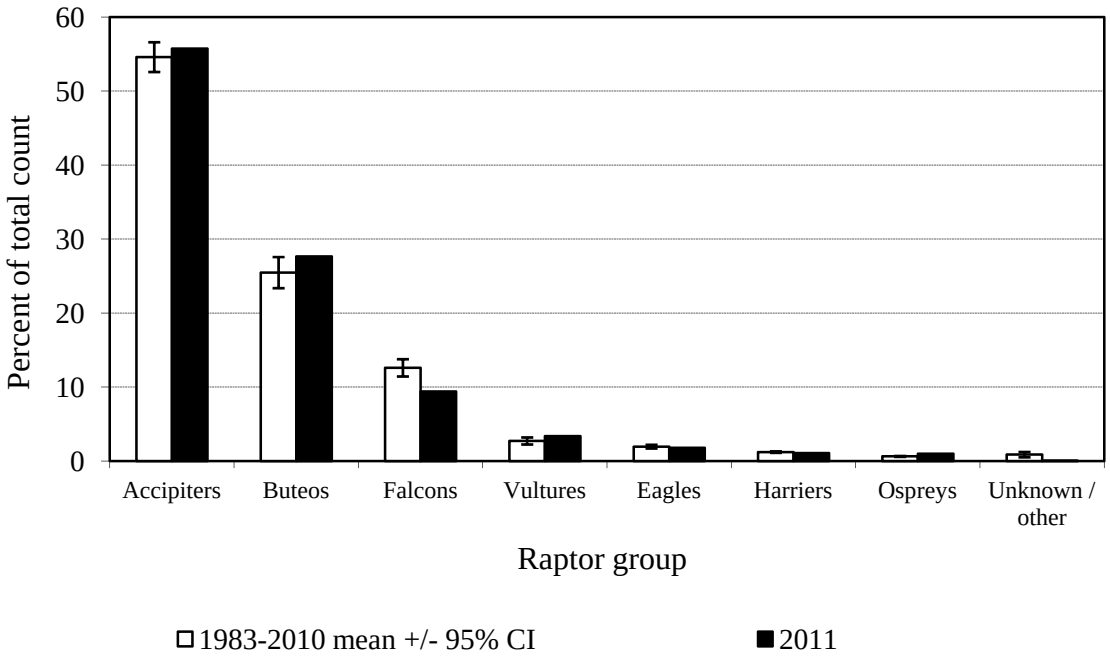

Figure 2. Fall migration flight composition by major species groups in the Goshute Mountains, Nevada: 1983–2010 versus 2011.

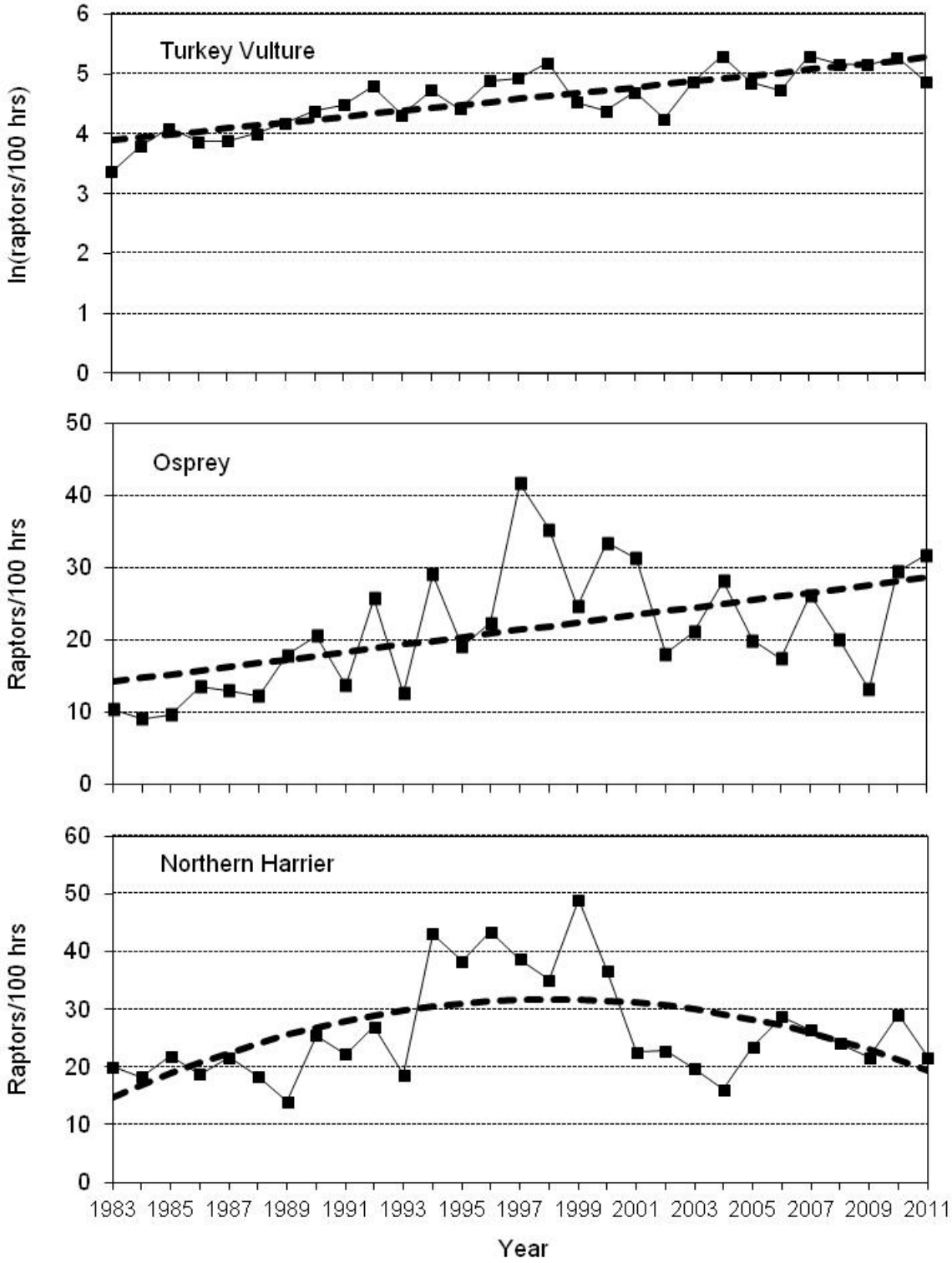

Figure 3. Adjusted fall-migration passage rates in the Goshute Mountains, Nevada for Turkey Vultures, Ospreys, and Northern Harriers: 1983–2011. Dashed lines indicate significant linear, second-order, or third-order polynomial regressions.

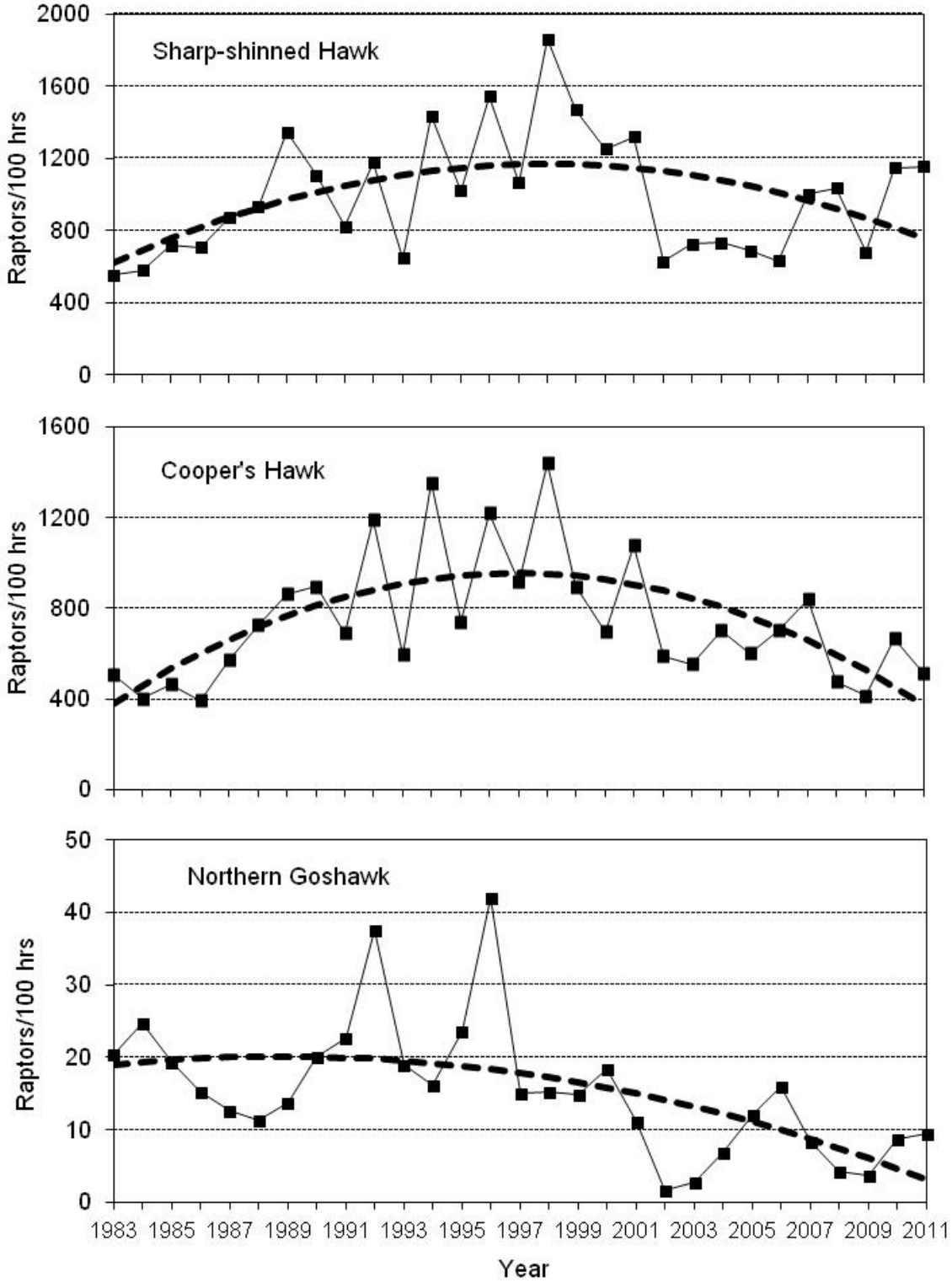

Figure 4. Adjusted fall-migration passage rates in the Goshute Mountains, Nevada for Sharp-shinned Hawks, Cooper's Hawks, and Northern Goshawks: 1983–2011. Dashed lines indicate significant linear, second-order, or third-order polynomial regressions.

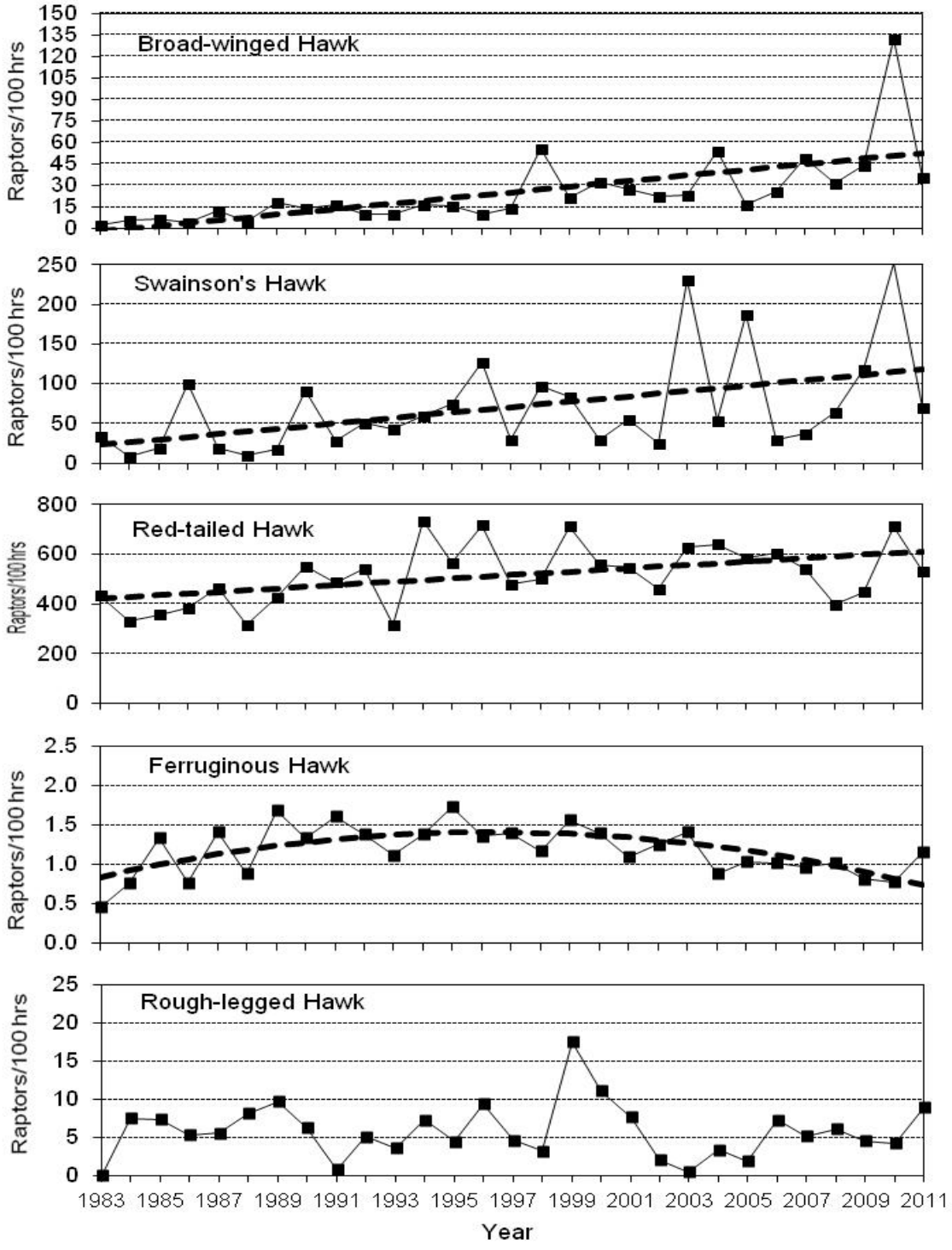

Figure 5. Adjusted fall-migration passage rates in the Goshute Mountains, Nevada for Broad-winged, Swainson's, Red-tailed, Ferruginous, and Rough-legged Hawks: 1983–2011. Dashed lines indicate significant linear, second-order, or third-order polynomial regressions.

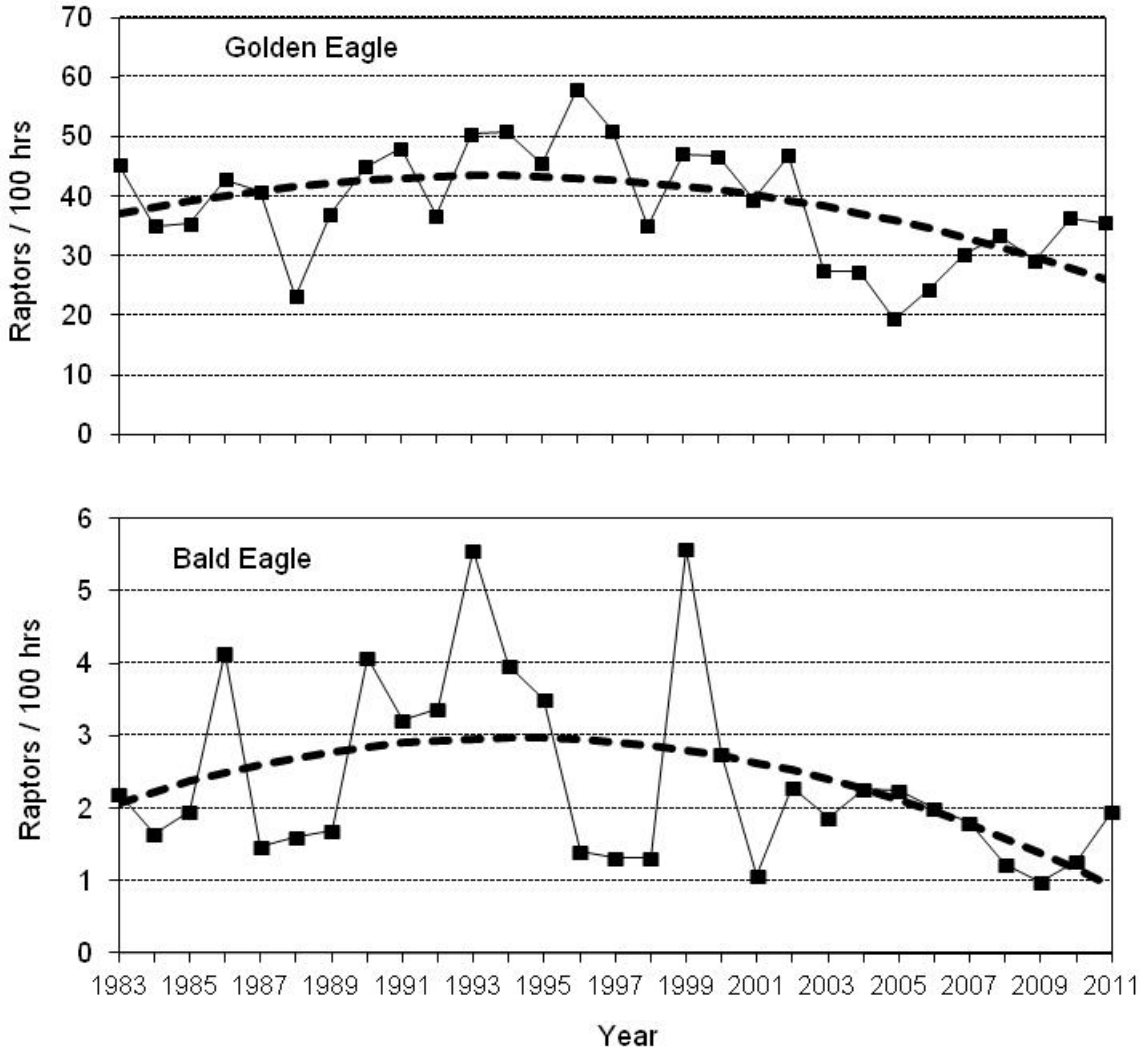

Figure 6. Adjusted fall-migration passage rates in the Goshute Mountains, Nevada for Golden and Bald Eagles: 1983–2011. Dashed lines indicate significant linear, second-order, or third-order polynomial regressions.

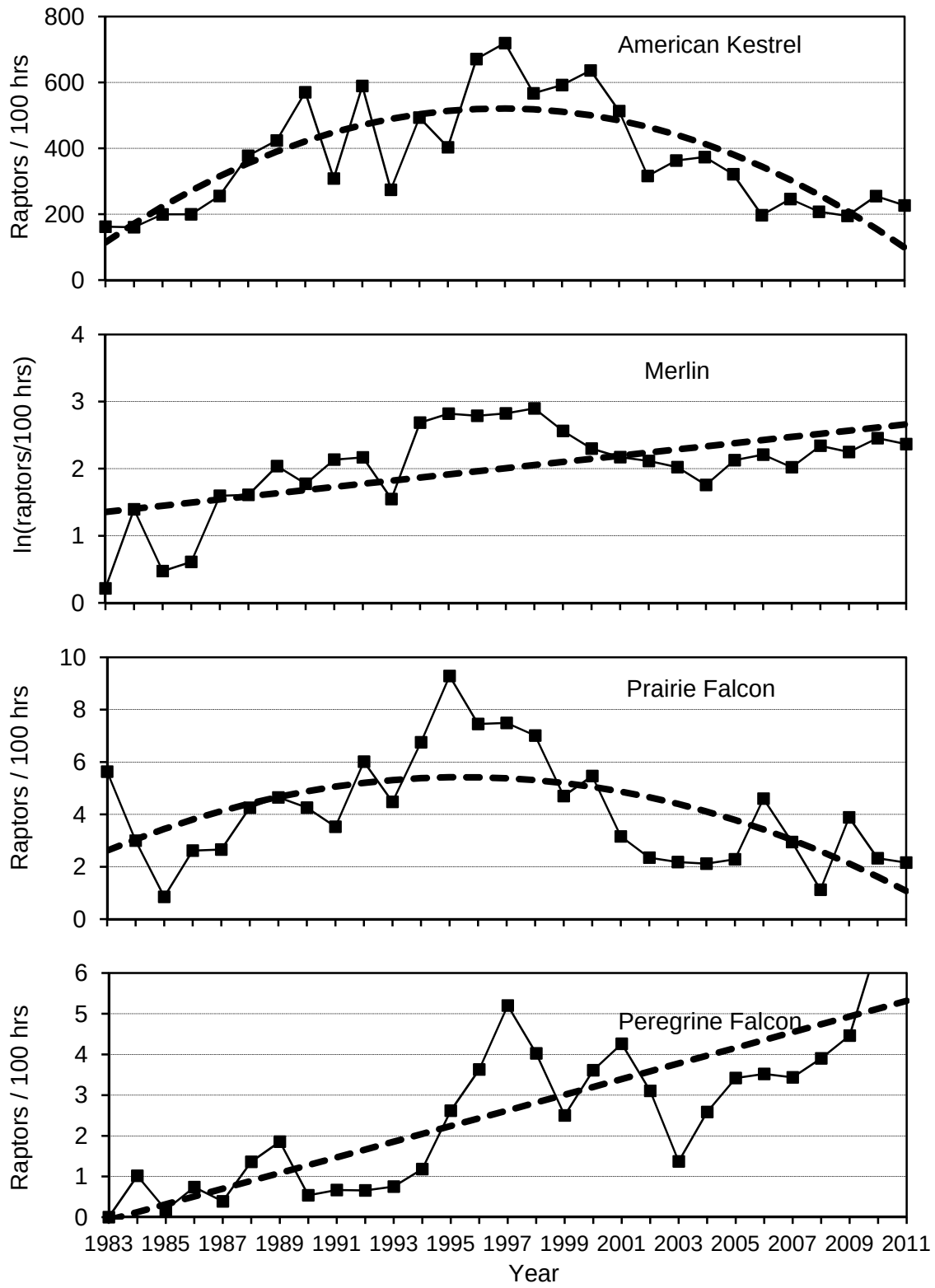

Figure 7. Adjusted fall-migration passage rates in the Goshute Mountains, Nevada for American Kestrels, Merlins, Prairie Falcons, and Peregrine Falcons: 1983–2011. Dashed lines indicate significant linear, second-order, or third-order polynomial regressions.

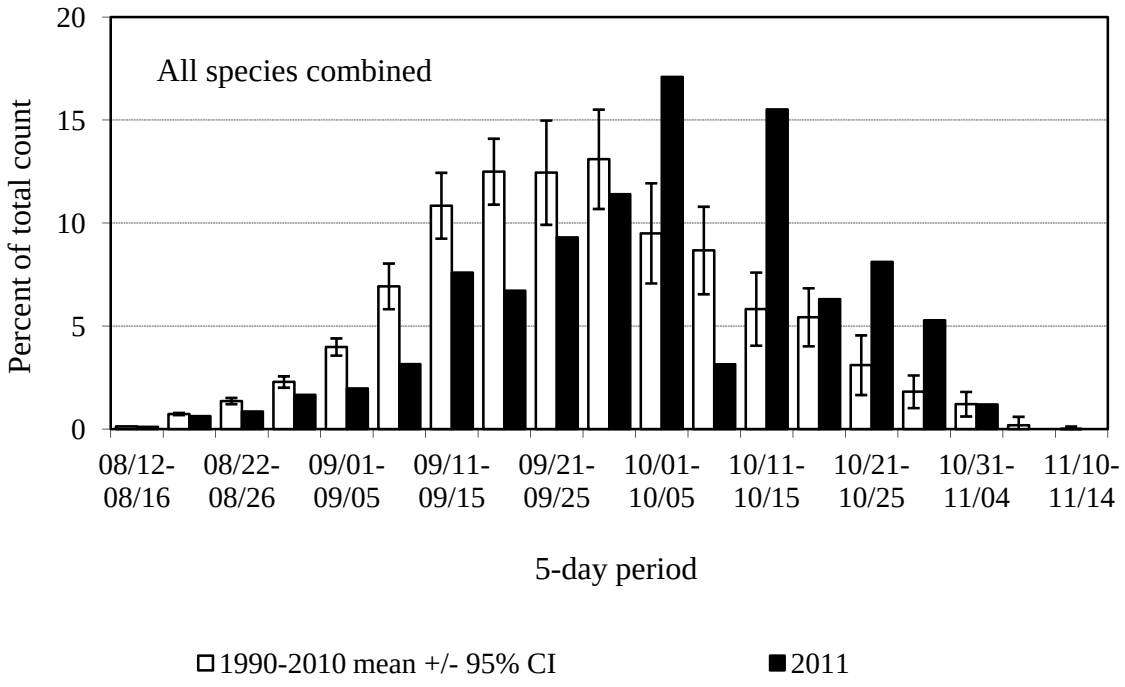

Figure 8. Combined-species passage volume by five-day periods: 1990–2010 versus 2011.

Appendix A. History of official observer participation on the Goshute Mountains Raptor Migration Project.

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 (14) and Mike Lanzone (0).

1999: Two observers throughout. Jerry Liguori (15) and Aaron Barna (4).

2000: Two observers throughout. Jerry Liguori (16), Jeff Maurer (3), Nathan McNett (4), and Aaron Barna (5).

2001: Two observers throughout. Jerry Liguori (17) 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+).

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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
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. Daily observation effort, visitor disturbance ratings, weather records, and flight summaries: 2011.

Date	Obs. Hours	Obsrvr / Hour[1]	Median Visitor Disturb[2]	Predominant Weather[3]	Wind Speed (kph)[1]	Wind Direction	Temp (°C)[1]	Barom. Press. (in Hg)[1]	Median Thermal Lift[4]	Visib. West (km)[1]	Visib. East (km)[1]	Median Flight Distance[5]	Birds / Hour
15-Aug	9.00	2.0	0	pc-clr, haze	6.1	sw-nw, ne-se	20.8	27.77	1	50	50	1	1.4
16-Aug	9.00	2.0	0	clr-pc, haze	8.0	ne-e	18.5	27.86	1	14	14	0	0.1
17-Aug	9.00	2.0	0	clr-pc, haze	8.6	w-nw	24.4	27.91	1	61	52	2	2.1
18-Aug	9.00	2.0	0	pc-mc, haze	3.5	calm/var	23.4	27.86	1	60	60	1	1.1
19-Aug	9.00	2.0	0	pc-clr-pc, haze	3.9	s-sw, ne-e	23.9	27.78	1	60	60	1	1.7
20-Aug	9.00	2.0	0	clr-pc, haze	3.5	sw-nw, ne-se	22.1	27.81	2	46	40	1	1.1
21-Aug	9.00	2.0	0	mc, haze	9.3	w-nw	22.3	27.86	2	59	57	1	3.2
22-Aug	9.00	2.0	0	clr-pc-mc-ovc	17.6	w-nw	22.9	27.88	3	88	86	1	1.3
23-Aug	9.00	2.0	0	pc-mc	5.6	ne-e	24.3	27.90	1	80	75	2	2.6
24-Aug	9.00	2.0	0	clr-mc-ovc	6.4	sw-w	27.0	27.89	2	83	83	1	1.9
25-Aug	9.00	2.0	0	clr-mc, rain	10.9	sw-w	24.8	27.86	3	75	75	2	3.2
26-Aug	8.33	2.0	0	pc-mc-ovc, rain/ts	7.8	sw-nw, ne-se	25.4	27.92	3	80	79	1	3.7
27-Aug	7.50	2.4	0	pc-mc-ovc, rain/ts	7.0	w-nw	26.4	27.94	3	64	73	2	4.3
28-Aug	6.50	2.4	0	mc-ovc, rain/ts	2.6	sw-nw, ne-se	24.5	27.89	3	69	73	2	2.5
29-Aug	9.00	2.0	0	clr-pc-mc-pc, rain	5.2	sw-nw, ne-se	22.2	27.82	1	86	86	2	4.1
30-Aug	9.00	2.0	0	mc-pc-mc, rain	5.0	sw-nw, ne-se	24.3	27.73	3	80	80	1	7.6
31-Aug	9.00	2.0	0	clr	17.3	w-nw	22.2	27.65	3	83	85	3	7.3
01-Sep	9.00	2.0	0	clr-pc, haze	3.1	sw-w, n-e	20.8	27.76	1	19	18	2	4.1
02-Sep	9.00	2.9	0	clr, haze	3.8	sw-nw, ne-se	15.9	27.84	1	40	38	2	5.7
03-Sep	9.00	2.0	0	clr, haze	3.2	ne-se, calm/var	18.9	27.85	1	75	65	3	5.6
04-Sep	9.00	2.0	0	clr-pc	2.8	ne-e	19.6	27.90	2	76	70	2	6.2
05-Sep	9.00	2.0	0	ovc, rain	23.8	w-nw	16.2	28.74	4	62	64	2	7.3
06-Sep	9.00	2.0	0	clr-pc, haze	4.3	ne-e	17.5	28.85	2	58	62	2	6.4
07-Sep	9.00	2.0	0	clr-pc, haze	3.4	ne-e	18.3	28.93	2	16	10	2	10.3
08-Sep	9.00	2.0	0	clr-pc, haze	6.5	ne-se, calm/var	16.8	28.88	1	76	86	2	5.7
09-Sep	9.00	2.7	0	pc-mc	15.6	ne-e	15.5	28.77	3	60	60	3	14.2
10-Sep	9.00	5.0	0	mc-ovc-mc	5.9	ne-e	14.4	28.75	3	60	60	2	9.6
11-Sep	9.00	3.7	0	ovc-mc, rain	5.9	w-nw	15.6	28.84	3	59	55	2	8.8
12-Sep	9.00	2.0	0	ovc-mc, rain	6.2	w-nw	15.3	28.84	3	59	55	2	5.2
13-Sep	8.50	2.0	0	mc-ovc, rain	2.5	sw-nw, ne-se	14.1	28.83	3	55	58	3	16.5
14-Sep	9.00	2.5	0	pc	1.4	ne-e, calm/var	16.8	28.70	1	70	100	0	53.2
15-Sep	9.00	2.7	0	clr-pc-mc	1.7	n-e, calm/var	16.0	28.65	2	60	60	3	28.7
16-Sep	5.25	2.7	0	ovc, fog-rain	15.3	sw-nw	11.4	28.61	4	40	40	1	19.0
17-Sep	9.00	2.0	0	pc-ovc	10.4	w-nw	10.7	28.72	3	64	66	3	19.2
18-Sep	9.00	2.0	0	clr	1.0	sw-nw, ne-se	13.0	28.86	1	80	67	3	16.1
19-Sep	9.25	2.0	0	clr-pc	9.5	sw-nw	14.4	28.83	2	86	79	3	31.4
20-Sep	9.00	2.0	1	clr	4.6	w-nw	15.9	28.80	1	79	76	3	19.9
21-Sep	9.00	2.7	0	clr	2.7	sw-nw, calm/var	14.6	28.82	1	68	70	3	20.0
22-Sep	9.00	2.0	2	clr	3.2	sw-w, n-e	16.7	28.89	1	75	69	3	18.6
23-Sep	9.00	3.0	0	clr	3.8	sw-w, n-e	16.8	28.92	1	79	70	3	18.8
24-Sep	9.00	3.0	0	clr-pc, haze	5.1	sw-w, n-e	16.2	28.79	1	80	70	2	31.2
25-Sep	9.00	3.0	0	pc-mc, haze-rain	14.6	sw-nw	16.8	28.72	2	68	70	3	47.9
26-Sep	9.00	2.3	0	clr-pc-clr, haze	4.1	n-e, calm/var	14.0	28.79	1	65	65	3	44.6
27-Sep	9.00	2.8	0	clr-pc, haze	6.4	sw-w	16.0	28.84	1	70	70	2	48.4
28-Sep	9.00	2.9	0	clr	3.0	sw-nw, ne-se	18.2	28.87	1	66	66	3	31.6
29-Sep	9.00	2.0	0	clr	4.0	n-e, calm/var	20.6	28.86	1	68	68	3	25.2
30-Sep	8.25	2.0	0	clr-pc-mc-ovc, rain-ts	5.9	w-nw	18.6	28.81	2	61	68	2	19.0
01-Oct	9.00	2.0	1	pc-ovc, rain	14.5	sw-nw	15.5	28.75	4	70	70	2	54.9
02-Oct	9.25	2.0	0	mc-ovc-mc	14.5	sw-nw	15.2	28.74	3	67	70	3	71.9
03-Oct	8.75	2.0	0	ovc, rain-ts	14.6	sw-w	13.1	28.67	4	48	59	2	90.2

Appendix C. continued

Date	Obs. Hours	Obsrvr / Hour[1]	Median Visitor Disturb[2]	Predominant Weather[3]	Wind Speed (kph)[1]	Wind Direction	Temp (°C)[1]	Barom. Press. (in Hg)[1]	Median Thermal Lift[4]	Visib. West (km)[1]	Visib. East (km)[1]	Median Flight Distance[5]	Birds / Hour
04-Oct	5.50	2.3	0	ovc	21.0	sw-w	7.8	28.45	4	59	69	2	56.2
05-Oct	0.00			Weather Day									
06-Oct	0.00			Weather Day									
07-Oct	0.00			Weather Day									
08-Oct	7.50	2.0	0	ovc, fog	4.9	ne-e	1.5	28.68	4	51	78	3	2.9
09-Oct	9.00	2.0	0	mc-ovc-mc, fog	2.4	sw-nw, ne-se	2.9	28.61	2	69	44	2	32.7
10-Oct	5.00	2.0	0	mc-ovc, fog/snow	17.0	w-nw	5.3	28.53	4	72	69	-	19.8
11-Oct	9.00	2.0	0	ovc-mc	19.3	w-nw	7.4	28.61	3	74	79	3	24.6
12-Oct	9.00	2.0	0	clr-pc	3.9	w-nw	11.6	28.78	2	60	60	2	34.6
13-Oct	9.00	2.0	0	clr-pc, haze	18.2	sw-nw	10.3	28.72	2	75	65	3	64.6
14-Oct	9.00	2.0	0	clr	6.7	sw-w	10.2	28.73	1	77	78	3	53.9
15-Oct	9.00	2.0	0	ovc-pc-ovc	9.7	sw-w	14.5	28.71	2	78	79	2	50.1
16-Oct	9.00	2.0	0	ovc-mc	17.7	sw-w	10.7	28.69	3	73	77	3	35.3
17-Oct	9.00	2.0	0	clr	4.4	sw-nw, ne-se	5.9	28.85	1	77	75	3	28.4
18-Oct	9.00	2.0	0	clr, haze	4.4	sw-nw, ne-se	5.7	28.85	1	73	70	2	6.3
19-Oct	9.00	2.0	0	clr-pc	6.9	sw-nw	11.9	28.63	3	100	100	3	7.0
20-Oct	9.00	2.0	0	clr	2.0	ne-e	8.8	28.73	1	67	67	3	15.3
21-Oct	9.00	2.0	0	pc	9.8	sw-nw	8.9	28.79	1	67	66	2	21.0
22-Oct	9.00	2.0	0	pc-clr, haze	4.8	w-nw	9.7	28.85	2	67	69	3	35.7
23-Oct	9.00	2.0	0	clr-pc, haze	11.4	sw-nw	10.9	28.78	1	72	79	2	37.9
24-Oct	9.00	2.0	0	ovc	21.8	sw-w	10.3	28.61	3	76	79	3	16.6
25-Oct	8.75	2.0	0	ovc-mc, fog	3.6	sw-nw	2.2	28.58	4	58	78	2	8.1
26-Oct	9.00	1.8	0	clr	8.0	n-e, calm/var	-3.1	28.63	3	77	65	2	3.2
27-Oct	8.75	2.7	0	mc-pc	3.2	sw-nw, ne-se	3.1	28.66	2	77	74	2	23.2
28-Oct	8.75	2.8	0	mc-pc, haze	7.0	sw-nw, calm/var	4.9	28.73	2	64	62	2	14.7
29-Oct	8.75	2.7	0	ovc-mc-pc	13.6	sw-nw	5.6	28.74	3	76	71	2	13.7
30-Oct	8.75	2.2	0	clr, haze	4.1	sw-w	6.4	28.79	1	77	77	2	24.7
31-Oct	8.60	2.0	0	pc-mc-ovc	11.5	w-nw	8.0	28.67	3	82	82	2	6.9
01-Nov	8.60	1.8	0	pc-clr	16.0	sw-nw, ne-se	-4.3	28.58	2	97	59	0	4.2
02-Nov	8.50	2.0	0	clr-pc, haze	5.3	sw-nw, ne-se	-4.7	28.76	4	86	76	2	5.2
03-Nov	8.50	2.0	0	pc-mc-ovc	20.6	sw-w	1.2	28.43	4	83	78	2	2.0
04-Nov	1.50	2.0	0	mc, fog	20.7	w-nw	0.2	28.17	4	30	47	1	0.7
05-Nov	0.00			Weather Day									

[1] Average of hourly records.

[2] Median hourly visitor-disturbance rating (subjective assessment by observers): 0 = none, 1 = low, 2 = moderate, 3 = high.

[3] Predominant sky condition during day: clr = clear (0-15% cloud cover); pcl = partly cloudy (16-50% cover); mcl = mostly cloudy (51-75% cover); ovc = overcast (76-100% cover); ts = thunderstorms.

[4] Median hourly rating concerning prevalence of lift-generating thermals, based on subjective assessments of solar intensity, wind speeds, and migrant behavior: 1 = excellent, 2 = good, 3 = fair, 4 = poor.

[5] Median hourly rating concerning line-of-sight distance of flight from observation site: 1 = close, detection and identification possible with naked eye; 2 = moderate, detection possible with naked eye, but binoculars needed for identification; 3 = far, binoculars needed for both detection and identification; 4 = distant, birds detected and identified only with excellent binoculars or spotting scope and by experienced observers.

Appendix D. Daily unadjusted raptor counts by species: 2011.

		Species[1]																										Birds	
Date	Hours	TV	OS	NH	SS	CH	NG	SA	LA	UA	RS	BW	SW	RT	FH	RL	UB	GE	BE	UE	AK	ML	PR	PG	SF	LF	UF	UU	Total	/ Hour
15-Aug	9.00	2	0	2	0	0	0	0	0	0	0	0	0	6	0	0	0	1	0	0	1	0	0	1	0	0	0	0	13	1.4
16-Aug	9.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0.1
17-Aug	9.00	0	1	2	0	1	0	0	0	0	0	0	0	6	0	0	0	2	0	0	7	0	0	0	0	0	0	0	19	2.6
18-Aug	9.00	0	0	2	0	0	1	0	0	0	0	0	0	3	0	0	0	0	0	0	4	0	0	0	0	0	0	0	10	1.1
19-Aug	9.00	0	0	4	1	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	3	0	1	0	0	0	0	0	15	1.7
20-Aug	9.00	0	0	1	2	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	3	0	0	0	0	0	0	0	10	1.1
21-Aug	9.00	2	1	1	4	0	0	0	0	0	0	0	0	17	0	0	0	1	0	0	3	0	0	0	0	0	0	0	29	3.2
22-Aug	9.00	3	0	3	1	2	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	12	1.3
23-Aug	9.00	0	0	0	5	1	0	0	0	0	0	0	0	12	0	0	0	0	0	0	4	0	1	0	0	0	0	0	23	2.6
24-Aug	9.00	0	1	2	0	1	0	0	0	0	0	0	1	6	1	0	1	0	0	0	4	0	0	0	0	0	0	0	17	1.9
25-Aug	9.00	2	0	0	2	3	0	0	0	0	0	0	2	10	0	0	0	3	0	0	6	0	1	0	0	0	0	0	29	3.2
26-Aug	8.33	0	3	2	3	1	0	0	0	0	0	0	3	6	0	0	0	0	0	0	11	0	2	0	0	0	0	0	31	3.7
27-Aug	7.50	0	1	0	6	0	0	0	0	0	0	0	0	11	1	0	0	4	1	0	8	0	0	0	0	0	0	0	32	4.3
28-Aug	6.50	0	1	1	2	3	0	0	0	0	0	0	0	6	0	0	0	0	0	0	3	0	0	0	0	0	0	0	16	2.5
29-Aug	9.00	2	3	0	1	0	0	0	0	0	0	0	2	20	0	0	3	1	0	0	5	0	0	0	0	0	0	0	37	4.1
30-Aug	9.00	3	1	2	8	3	3	0	0	0	0	0	1	25	0	0	0	2	0	0	20	0	0	0	0	0	0	0	68	7.6
31-Aug	9.00	7	2	5	8	6	0	0	0	0	0	0	3	13	1	0	1	3	0	0	17	0	0	0	0	0	0	0	66	7.3
01-Sep	9.00	0	3	0	8	4	0	0	1	0	0	1	1	5	0	0	0	0	0	0	13	0	0	1	0	0	0	0	37	4.1
02-Sep	9.00	2	0	2	12	4	0	0	0	0	0	0	1	16	0	0	0	1	0	0	13	0	0	0	0	0	0	0	51	5.7
03-Sep	9.00	4	1	3	6	4	0	0	0	0	0	0	4	21	0	0	0	2	0	0	5	0	0	0	0	0	0	0	50	5.6
04-Sep	9.00	1	2	2	5	4	0	0	0	0	0	0	11	14	0	0	0	2	0	0	14	0	0	1	0	0	0	0	56	6.2
05-Sep	9.00	0	4	0	5	3	0	0	0	1	0	0	29	19	0	0	1	0	0	0	4	0	0	0	0	0	0	0	66	7.3
06-Sep	9.00	1	1	1	19	6	1	0	0	0	0	0	3	18	0	0	0	1	0	0	7	0	0	0	0	0	0	0	58	6.4
07-Sep	9.00	3	0	0	21	6	1	0	0	0	0	0	11	35	0	0	0	1	0	0	14	1	0	0	0	0	0	0	93	10.3
08-Sep	9.00	14	0	0	17	3	0	0	0	0	0	0	0	11	0	0	1	1	0	0	2	0	0	1	0	0	0	1	51	5.7
09-Sep	9.00	2	3	1	46	10	0	0	0	0	0	0	7	20	1	0	0	2	0	0	36	0	0	0	0	0	0	0	128	14.2
10-Sep	9.00	1	6	0	38	13	1	0	0	0	0	0	7	10	0	0	0	1	0	0	9	0	0	0	0	0	0	0	86	9.6
11-Sep	9.00	3	0	1	37	13	0	0	0	0	0	0	5	7	0	0	0	0	0	0	10	2	0	1	0	0	0	0	79	8.8
12-Sep	9.00	1	2	0	25	7	0	0	1	0	0	0	0	5	0	0	0	1	0	0	5	0	0	0	0	0	0	0	47	5.2
13-Sep	8.50	3	4	0	70	21	2	0	0	0	0	0	5	17	0	0	0	3	0	0	15	0	0	0	0	0	0	0	140	16.5
14-Sep	9.00	15	7	4	232	84	1	5	0	4	0	1	7	48	1	0	2	6	0	0	56	3	0	1	0	0	0	1	479	50.2

Appendix D. continued

		Species[1]																										Birds	
Date	Hours	TV	OS	NH	SS	CH	NG	SA	LA	UA	RS	BW	SW	RT	FH	RL	UB	GE	BE	UE	AK	ML	PR	PG	SF	LF	UF	UU	Total	/ Hour
15-Sep	9.00	5	14	1	123	40	3	0	0	1	0	3	7	45	0	0	0	3	0	0	13	0	0	0	0	0	0	0	258	28.7
16-Sep	5.25	0	1	0	51	30	1	0	0	2	0	2	1	7	0	0	0	1	0	0	4	0	0	0	0	0	0	0	100	19.0
17-Sep	9.00	5	1	2	72	38	1	0	0	1	0	3	6	12	0	1	0	1	0	0	27	1	0	2	0	0	0	0	173	19.2
18-Sep	9.00	2	0	1	61	34	0	0	0	1	0	0	5	14	0	0	0	4	0	0	27	0	0	0	0	0	0	0	145	16.1
19-Sep	9.25	5	0	0	154	45	1	0	0	4	0	1	9	16	0	0	2	1	0	0	48	3	0	1	0	0	0	0	290	31.4
20-Sep	9.00	5	1	1	72	26	0	0	0	0	0	0	9	26	0	0	2	1	0	0	35	0	0	0	0	0	0	1	179	19.9
21-Sep	9.00	6	2	2	71	20	0	0	0	2	0	0	7	36	0	0	1	2	0	0	30	1	0	0	0	0	0	0	180	20.0
22-Sep	9.00	29	7	1	45	25	2	0	1	3	0	10	3	23	0	0	0	0	0	0	18	0	0	0	0	0	0	0	167	18.6
23-Sep	9.00	24	1	0	65	34	0	0	0	0	0	2	2	14	0	1	1	0	0	0	24	0	0	1	0	0	0	0	169	18.8
24-Sep	9.00	31	1	1	133	54	0	0	0	0	0	4	5	31	1	0	0	3	0	0	16	0	1	0	0	0	0	0	281	31.2
25-Sep	9.00	12	1	3	217	128	0	0	0	0	0	0	6	28	0	0	0	5	0	0	27	3	0	1	0	0	0	0	431	47.9
26-Sep	9.00	96	0	4	127	95	0	0	0	2	0	7	11	27	0	0	0	6	0	0	25	1	0	0	0	0	0	0	401	44.6
27-Sep	9.00	19	5	6	228	55	0	0	0	8	0	7	14	53	0	1	3	4	0	0	27	4	1	1	0	0	0	0	436	48.4
28-Sep	9.00	9	3	1	115	41	0	1	0	2	0	1	3	33	0	0	1	2	0	0	68	1	1	0	0	0	0	2	284	31.6
29-Sep	9.00	10	2	2	99	44	0	0	0	1	0	3	8	32	0	0	0	3	0	0	22	1	0	0	0	0	0	0	227	25.2
30-Sep	8.25	5	3	1	82	29	0	0	0	1	0	2	1	18	0	0	1	2	0	0	11	1	0	0	0	0	0	0	157	19.0
01-Oct	9.00	20	2	5	234	121	2	0	0	1	0	6	10	48	0	0	0	4	0	0	38	1	1	1	0	0	0	0	494	54.9
02-Oct	9.25	46	13	8	270	112	2	0	0	1	0	6	13	71	0	0	0	4	0	0	114	1	0	4	0	0	0	0	665	71.9
03-Oct	8.75	23	12	3	402	218	1	0	0	0	0	7	18	58	1	0	0	4	0	0	34	1	1	6	0	0	0	0	789	90.2
04-Oct	5.50	0	1	0	171	88	3	0	0	0	0	2	3	28	0	0	0	1	0	0	11	1	0	0	0	0	0	0	309	56.2
05-Oct	0.00																													
06-Oct	0.00																													
07-Oct	0.00																													
08-Oct	7.50	0	0	0	5	6	0	0	0	0	0	2	0	8	0	0	0	1	0	0	0	0	0	0	0	0	0	0	22	2.9
09-Oct	9.00	7	5	1	69	22	1	0	0	1	0	5	0	177	0	0	0	1	0	0	2	2	0	1	0	0	0	0	294	32.7
10-Oct	5.00	5	1	0	40	10	0	0	0	1	0	1	0	37	0	0	0	1	0	0	3	0	0	0	0	0	0	0	99	19.8
11-Oct	9.00	4	2	5	82	35	2	0	0	0	0	0	3	38	0	0	0	4	0	0	44	1	0	1	0	0	0	0	221	24.6
12-Oct	9.00	0	1	1	68	63	2	0	0	7	0	3	12	131	1	1	1	4	0	0	8	2	0	6	0	0	0	0	311	34.6
13-Oct	9.00	1	1	3	282	102	10	0	0	1	0	4	5	122	0	0	0	15	1	0	27	2	1	4	0	0	0	0	581	64.6
14-Oct	9.00	1	0	7	267	72	1	0	0	1	0	0	0	86	1	0	1	9	0	0	33	4	1	1	0	0	0	0	485	53.9
15-Oct	9.00	0	0	4	207	69	4	0	0	2	0	0	5	95	1	0	0	20	0	0	40	2	1	1	0	0	0	0	451	50.1

Appendix D. continued

		Species[1]																										Birds	
Date	Hours	TV	OS	NH	SS	CH	NG	SA	LA	UA	RS	BW	SW	RT	FH	RL	UB	GE	BE	UE	AK	ML	PR	PG	SF	LF	UF	UU	Total	/ Hour
16-Oct	9.00	1	1	5	142	49	0	0	0	0	0	0	0	74	0	1	0	9	0	0	32	2	0	2	0	0	0	0	318	35.3
17-Oct	9.00	0	1	4	56	23	1	0	0	1	0	0	0	158	0	0	0	6	1	0	3	1	0	1	0	0	0	0	256	28.4
18-Oct	9.00	0	0	0	27	5	0	0	0	0	0	0	0	21	0	0	0	1	1	0	1	1	0	0	0	0	0	0	57	6.3
19-Oct	9.00	0	0	2	27	9	0	1	0	3	0	0	0	16	2	0	0	2	2	0	0	0	0	2	0	0	0	0	63	7.0
20-Oct	9.00	1	0	6	38	10	1	0	0	0	0	0	0	70	0	2	0	5	0	0	5	0	0	0	0	0	0	0	138	15.3
21-Oct	9.00	0	0	4	86	17	0	0	0	0	0	0	0	74	0	0	1	4	0	0	2	0	0	1	0	0	0	0	189	21.0
22-Oct	9.00	0	0	3	97	20	2	0	0	0	0	0	0	182	0	1	1	13	0	0	0	0	0	2	0	0	0	0	321	35.7
23-Oct	9.00	0	0	3	99	36	1	0	0	0	0	0	0	191	0	1	0	7	0	0	2	0	0	1	0	0	0	0	341	37.9
24-Oct	9.00	0	0	3	67	5	0	0	0	0	0	0	0	63	0	2	0	5	0	0	3	1	0	0	0	0	0	0	149	16.6
25-Oct	8.75	0	0	1	16	3	0	0	0	0	0	0	0	49	0	1	0	1	0	0	0	0	0	0	0	0	0	0	71	8.1
26-Oct	9.00	0	0	0	4	0	0	0	0	0	0	0	0	21	1	0	0	2	0	0	0	1	0	0	0	0	0	0	29	3.2
27-Oct	8.75	0	0	0	14	8	0	0	0	1	0	0	0	171	0	1	0	4	2	0	1	1	0	0	0	0	0	0	203	23.2
28-Oct	8.75	0	0	1	33	10	2	0	0	0	0	0	0	76	0	1	0	3	0	0	3	0	0	0	0	0	0	0	129	14.7
29-Oct	8.75	0	0	0	12	3	0	0	0	0	0	0	0	85	0	4	0	12	2	0	1	1	0	0	0	0	0	0	120	13.7
30-Oct	8.75	0	0	3	33	7	4	0	0	1	0	0	0	159	0	1	0	7	0	0	0	1	0	0	0	0	0	0	216	24.7
31-Oct	8.60	0	0	2	19	2	1	0	0	0	0	0	0	29	0	4	0	2	0	0	0	0	0	0	0	0	0	0	59	6.9
01-Nov	8.60	0	0	1	0	0	0	1	0	0	0	0	0	33	0	0	0	1	0	0	0	0	0	0	0	0	0	0	36	4.2
02-Nov	8.50	0	0	0	0	1	0	0	0	0	0	0	0	43	0	0	0	0	0	0	0	0	0	0	0	0	0	0	44	5.2
03-Nov	8.50	0	0	0	5	0	0	0	0	0	0	0	0	9	0	1	0	1	0	0	0	0	0	0	0	0	0	0	17	2.0
04-Nov	1.50	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.7
05-Nov	0.00																													
Total	682.03	443	129	142	5171	2067	58	8	3	51	0	83	269	3237	14	24	24	226	10	0	1132	49	13	46	0	0	0	5	13205	19.4

[1] See Appendix B for explanation of species codes.

Appendix E. Annual summaries of observation effort and unadjusted raptor counts by species: 1983–2011.

	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
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 small accipiter[1]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Unknown large accipiter[1]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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
Unknown small falcon[1]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Unknown large falcon[1]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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

[1] Designations used consistently beginning in 2002.

Appendix E. 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
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 small accipiter[1]	-	-	-	-	-	246	268
Unknown large accipiter[1]	-	-	-	-	-	4	3
Unknown accipiter	368	75	132	87	56	7	0
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
Unknown small falcon[1]	-	-	-	-	-	0	10
Unknown large falcon[1]	-	-	-	-	-	4	1
Unidentified falcon	7	2	7	3	2	2	2
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

[1] Designations used consistently beginning in 2002.

Appendix E. continued

	2004	2005	2006	2007	2008	2009	2010	2011	MEAN
Start Date	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	4-Nov
Observation days	76	83	82	82	82	83	82	79	79
Observation hours	642.75	695.30	652.58	703.00	698.51	733.59	692.60	682.03	673.29
Raptors / 100 hours	2,038	1,849	1,658	2,125	1,758	1,502	2,336	1,936	2,127
SPECIES	RAPTOR COUNTS								
Turkey Vulture	685	445	355	735	637	640	682	443	390
Osprey	120	83	68	113	89	59	126	129	94
Northern Harrier	96	153	177	186	158	154	201	142	172
Sharp-shinned Hawk	3,073	2,973	2,745	4,635	4,967	3,251	5,063	5,171	4,517
Cooper's Hawk	2,736	2,260	2,541	3,422	1,957	1,691	2,599	2,067	3,013
Northern Goshawk	41	74	95	55	27	26	54	58	93
Unknown small accipiter[1]	299	521	57	360	204	262	14	8	224
Unknown large accipiter[1]	11	32	6	1	6	7	10	3	8
Unknown accipiter	8	37	9	5	11	11	145	51	246
TOTAL ACCIPITERS	6,168	5,897	5,453	8,478	7,172	5,248	7,885	7,358	7,949
Red-shouldered Hawk	0	0	0	0	0	0	0	0	0
Broad-winged Hawk	122	36	57	122	81	101	295	83	62
Swainson's Hawk	197	664	109	163	248	445	933	269	269
Red-tailed Hawk	3,589	3,678	3,492	3,511	2,439	2,913	4,427	3,237	3,136
Ferruginous Hawk	8	12	10	11	10	8	8	14	15
Rough-legged Hawk	7	6	17	13	15	12	10	24	14
Unidentified buteo	117	97	13	44	91	120	34	24	69
TOTAL BUTEOS	4,040	4,493	3,698	3,864	2,884	3,599	5,707	3,651	3,565
Golden Eagle	160	130	152	218	226	206	236	226	248
Bald Eagle	12	11	9	10	6	6	6	10	12
Unidentified eagle	4	0	0	0	0	0	0	0	1
TOTAL EAGLES	176	141	161	228	232	212	242	236	260
American Kestrel	1,709	1,468	820	1,174	965	940	1,170	1,132	1,772
Merlin	22	40	40	34	51	50	54	49	41
Prairie Falcon	11	9	26	19	10	21	14	13	25
Peregrine Falcon	11	14	17	18	22	23	42	46	15
Unknown small falcon[1]	9	1	2	3	4	2	0	0	3
Unknown large falcon[1]	3	6	2	1	0	6	1	0	2
Unidentified falcon	0	4	0	2	2	2	1	0	6
TOTAL FALCONS	1,765	1,542	907	1,251	1,054	1,044	1,282	1,240	1,859
Unidentified raptor	51	104	3	86	51	60	52	5	104
GRAND TOTAL	13,101	12,858	10,822	14,941	12,277	11,016	16,177	13,205	14,393

[1] Designations used consistently beginning in 2002.

Appendix F. Daily trapping effort and captures by species: 2011.

	Station	Species[1]													Captures
Date	Hours	NH	SS	CH	NG	BW	SW	RT	RL	GE	AK	ML	PR	PG	Total	/ stn hr
17-Aug	1.50	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0.7
18-Aug	0.00															
19-Aug	0.00															
20-Aug	0.00															
21-Aug	6.00	0	0	0	0	0	0	2	0	0	0	0	0	0	2	0.3
22-Aug	0.00															
23-Aug	6.75	0	0	0	0	0	0	1	0	0	1	0	0	0	2	0.3
24-Aug	7.50	0	0	0	0	0	0	1	0	0	1	0	0	0	2	0.3
25-Aug	7.50	0	1	1	0	0	0	1	0	0	0	0	1	0	4	0.5
26-Aug	6.75	0	1	0	0	0	0	0	0	0	0	0	1	0	2	0.3
27-Aug	0.00															
28-Aug	8.00	0	0	1	1	0	0	0	0	0	0	0	0	0	2	0.3
29-Aug	7.75	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0.1
30-Aug	7.75	0	3	3	1	0	0	0	0	0	0	0	0	0	7	0.9
31-Aug	7.75	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0.1
01-Sep	8.00	0	1	1	0	0	0	0	0	0	1	0	0	0	3	0.4
02-Sep	7.75	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0.1
03-Sep	8.00	0	1	0	0	0	0	2	0	0	0	0	0	0	3	0.4
04-Sep	7.75	0	0	1	0	0	0	1	0	0	0	0	0	1	3	0.4
05-Sep	8.00	0	4	1	0	0	0	0	0	0	0	0	0	0	5	0.6
06-Sep	7.50	0	3	1	1	0	0	0	0	0	0	0	0	0	5	0.7
07-Sep	7.50	0	1	0	1	0	0	0	0	0	0	0	0	0	2	0.3
08-Sep	0.00															
09-Sep	8.00	0	3	3	0	0	0	0	0	0	0	0	0	0	6	0.8
10-Sep	8.00	0	6	4	0	0	0	0	0	0	1	0	0	0	11	1.4
11-Sep	11.00	0	13	2	0	0	0	0	0	0	0	0	0	0	15	1.4
12-Sep	14.75	0	14	3	0	0	0	0	0	0	1	0	0	0	18	1.2
13-Sep	8.25	0	21	1	0	0	0	0	0	0	0	0	0	0	22	2.7
14-Sep	8.00	0	27	5	0	0	0	0	0	0	3	1	0	0	36	4.5
15-Sep	7.75	0	15	9	0	0	0	0	0	0	0	0	0	0	24	3.1
16-Sep	0.00															
17-Sep	8.00	0	10	3	1	0	0	0	0	0	1	1	0	0	16	2.0
18-Sep	7.75	0	9	8	0	0	0	1	0	0	1	0	0	0	19	2.5
19-Sep	4.75	0	9	5	0	0	0	0	0	0	1	0	0	0	15	3.2
20-Sep	6.75	0	18	2	0	0	0	0	0	0	0	0	0	0	20	3.0
21-Sep	0.00															
22-Sep	0.00															
23-Sep	6.25	0	12	1	0	0	0	0	0	0	0	0	0	0	13	2.1
24-Sep	8.00	0	21	8	0	0	0	0	0	0	0	0	0	0	29	3.6
25-Sep	8.00	0	23	8	0	0	0	1	0	0	0	0	0	0	32	4.0
26-Sep	7.25	0	11	13	0	0	0	0	0	0	0	0	0	0	24	3.3
27-Sep	7.75	0	16	12	0	0	0	0	0	0	0	1	0	0	29	3.7
28-Sep	8.25	0	4	8	0	0	0	0	0	0	2	0	0	0	14	1.7
29-Sep	7.25	0	12	6	0	0	0	0	0	0	0	0	0	0	18	2.5
30-Sep	7.75	0	15	8	0	0	0	0	0	0	0	0	0	0	23	3.0
01-Oct	8.00	0	14	16	0	1	0	0	0	0	0	0	0	0	31	3.9
02-Oct	8.00	1	13	12	0	0	0	0	0	0	1	0	0	0	27	3.4

Appendix F. continued

	Station	Species[1]													Captures
Date	Hours	NH	SS	CH	NG	BW	SW	RT	RL	GE	AK	ML	PR	PG	Total	/ stn hr
03-Oct	8.00	0	41	14	0	1	0	0	0	0	0	0	0	1	57	7.1
04-Oct	3.00	0	8	5	1	0	0	0	0	0	0	0	0	0	14	4.7
05-Oct	0.00															
06-Oct	0.00															
07-Oct	0.00															
08-Oct	0.00															
09-Oct	0.00															
10-Oct	0.00															
11-Oct	7.00	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0.1
12-Oct	0.00															
13-Oct	7.75	0	12	9	0	0	0	1	0	0	0	0	0	0	22	2.8
14-Oct	7.75	0	11	1	0	0	0	0	0	1	0	0	0	0	13	1.7
15-Oct	7.50	0	8	5	0	0	0	1	0	1	0	0	0	0	15	2.0
16-Oct	7.75	0	8	2	0	0	0	0	0	0	1	0	0	0	11	1.4
17-Oct	7.00	0	2	4	1	0	0	3	0	0	0	0	0	0	10	1.4
18-Oct	7.50	0	2	1	0	0	0	0	0	0	0	1	0	0	4	0.5
19-Oct	0.00															
20-Oct	7.50	0	3	2	0	0	0	2	0	0	0	0	0	0	7	0.9
21-Oct	8.00	0	5	1	0	0	0	0	0	0	0	0	0	0	6	0.8
22-Oct	8.00	0	7	3	0	0	0	0	0	0	0	0	0	0	10	1.3
23-Oct	6.25	0	5	3	0	0	0	1	0	0	0	0	0	0	9	1.4
24-Oct	0.00															
25-Oct	0.00															
26-Oct	0.00															
27-Oct	7.00	0	0	1	0	0	0	3	0	0	0	0	0	0	4	0.6
28-Oct	7.50	0	3	0	1	0	0	2	0	0	0	0	0	0	6	0.8
29-Oct	7.50	0	0	1	0	0	0	0	0	0	0	1	0	0	2	0.3
30-Oct	7.50	0	2	1	1	0	0	2	0	0	0	0	0	0	6	0.8
31-Oct	6.25	0	2	0	0	0	0	1	0	1	0	0	0	0	4	0.6
Total	413.75	1	420	200	9	2	0	27	0	2	15	5	2	2	685	1.7

[1] See Appendix B for explanation of species codes.

Appendix G. Annual summaries of banding effort and capture totals by species: 1980–2011.

	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 G. continued

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	MEAN
Start date	22 Aug	19 Aug	18 Aug	18 Aug	21 Aug	21 Aug	22-Aug	24-Aug	24-Aug	27-Aug	23-Aug	22-Aug	20-Aug	21-Aug	22-Aug	20-Aug	17-Aug	24-Aug
End date	25 Oct	23 Oct	22 Oct	22 Oct	3 Nov	28 Oct	4-Nov	5-Nov	28-Oct	22-Oct	1-Nov	5-Nov	25-Oct	28-Oct	31-Oct	1-Nov	30-Oct	26-Oct
Blinds in operation	6	5	5	5	3	4	4	4	4	3	4	3	3	2	2	2	2	3.4
Trapping days	63	61	62	63	72	62	72	68	66	53	69	72	63	62	64	62	57	60.2
Station days	312	270	264	236	131	174	210	188	163	105	150	128	81	69	66	68	59	157.9
Station hours	2,382	2,061	2,087	1,690	939	1,286	1,666	1,474	1,276	807	1,073	888	550	503	476	476	429	1,114.5
Captures /100 stn hrs	120.1	160.7	147.0	202.3	163.6	167.0	173.0	159.9	114.7	158.2	153.8	112.1	210.9	204.2	176.7	245.5	159.8	174.8
SPECIES	RAPTOR CAPTURES																	
Northern Harrier	2	1	18	4	0	17	11	8	7	2	3	2	6	2	0	1	1	5.1
Sharp-shinned Hawk	1,823	2,091	1,783	2,131	897	1,235	1,608	1,283	825	791	902	503	683	616	432	700	420	1,085.4
Cooper's Hawk	695	737	767	1,006	438	504	975	791	460	342	562	356	383	314	307	280	200	548.7
Northern Goshawk	27	68	20	20	20	24	23	7	9	28	21	26	18	2	3	5	9	25.0
Broad-winged Hawk	3	0	0	1	0	3	1	0	2	1	2	1	2	0	1	1	2	1.0
Swainson's Hawk	0	0	0	0	0	0	1	0	0	0	1	1	0	0	0	1	0	0.2
Red-tailed Hawk	93	84	67	69	49	58	76	109	63	61	67	56	39	40	43	119	27	61.3
Rough-legged Hawk	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0.1
Golden Eagle	4	7	5	4	8	2	1	9	1	2	1	1	0	4	4	4	2	3.8
Bald Eagle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
American Kestrel	193	290	351	149	97	285	168	127	88	35	76	38	19	42	41	38	15	117.9
Merlin	13	18	26	13	16	11	12	15	5	11	11	5	6	6	6	15	5	8.2
Prairie Falcon	3	7	17	7	3	8	3	4	3	4	3	5	3	0	4	3	2	4.3
Peregrine Falcon	1	1	4	0	1	1	1	3	0	0	2	2	0	0	0	1	2	0.8
All Species	2,857	3,304	3,058	3,404	1,529	2,148	2,882	2,356	1,463	1,277	1,651	995	1,159	1,026	841	1,168	685	1,861.8
Recaptures[1]	3	3	7	9	4	6	9	7	2	2	2	2	3	4	3	3	1	3.3
Foreign Recaptures[2]	1	4	3	5	2	3	4	3	1	2	4	0	1	2	0	2	0	1.4
Foreign Encounters[3]	16	9	18	15	10	19	10	28	12	16	10	8	10	12	3	7	10	11.4

[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.