

**FALL 2004 RAPTOR MIGRATION STUDIES IN THE
GOSHUTE MOUNTAINS OF NORTHEASTERN NEVADA**



**HawkWatch International, Inc.
Salt Lake City, Utah**

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INTRODUCTION

The Goshute Mountains Raptor Migration Project in northeastern Nevada is an ongoing effort to monitor long-term trends in populations of raptors using the Intermountain Flyway (Hoffman et al. 2002, Hoffman and Smith 2003). 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 were begun in 1983 and have continued each year since. This is one of the longest running standardized, raptor-migration monitoring efforts in the West, with the 2004 season marking the 25th consecutive season of banding and 22nd 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. The Goshute project was 1 of 14 long-term, annual migration counts and 1 of 7 migration-banding studies conducted or co-sponsored by HWI in North America during 2004. The primary objective of these efforts is to track long-term population trends of diurnal raptors throughout primarily western North America (Smith and Hoffman 2000, Hoffman and Smith 2003). HWI also conducted a second full-season of owl banding, emphasizing Flammulated Owls (*Otus flammeolus*), in the Goshutes during fall 2004; the results of this work are summarized in a separate technical report (Smith 2005).

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 the 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 on the east side. Hence, to address the fact that the view to the east from the main count site was obstructed, in most years after 1983 when easterly winds prevailed, the observers commonly moved about 250 m north to a second observation post (OP2 in Figure 1) that provided an unobstructed view along the lower eastern flanks of the ridge. After considerable deliberation and for reasons describe in detail in Vekasy and Smith (2002), HWI's Science Committee (which includes HWI staff and Board members, experienced HWI field observers, and outside experts) decided to adopt a new standard of using only OP2 throughout the season beginning in 2001.

In 2004, three banding stations were located 100–700 m to the north and southeast of the observation post. **North** station, established mid-season in 1989 and modified slightly in 1998, was located about 300 m north-northwest of OP2 on top of the ridge at 2,700 m elevation, and was the first station southbound migrants encountered. **West** station, established in 1980 and modified slightly in 1995 and 2000, was located about 100 m south and slightly west of OP2 on the west flank of the ridge at 2,720 m elevation. **Meadow** station, established in 1987 and modified in 1996, 1998, and 2000, was located about 500 m southeast of OP2 on the east flank of the ridge in a natural sagebrush meadow at 2,620 m elevation. Over the years, the number of trapping stations operated in any one year has varied as high as six, with four stations most typical in the recent past. This year we purposefully reduced the size of the trapping crew and hence did not operate the **South** trapping station.

METHODS

STANDARDIZED COUNTS

Weather permitting, a rotating team of three primary observers conducted daily, two-observer counts throughout the season at OP2. The team consisted of full-time observers Alison Cebula and Ricardo Perez, assisted by on-site project coordinator and veteran Goshute observer, Nathan McNett, who served as the primary substitute when the other observers took days off. Visitors and other crewmembers also frequently assisted with spotting migrants and recording data. The three official observers each had between 1 and 8 full seasons of previous experience counting migratory raptors, all having counted previously for HWI (see Appendix A for a complete history of observer participation).

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

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 hrs 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 follows Hoffman and Smith (2003). In comparing 2003 annual statistics against means and 95% confidence intervals for previous seasons, I equate significance with a 2003 value falling outside the bounds of the confidence interval for the associated mean.

TRAPPING AND BANDING

Weather permitting, rotating crews of 1–3 trappers and processors operated each trapping station, with crew size depending on trapper experience, characteristics of the station, and the flight volume. The crews generally trapped between 0900 and 1700 hrs 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, usually much quicker, unless outfitted with a satellite transmitter, which takes longer.

RESULTS AND DISCUSSION

WEATHER

Inclement weather precluded seven full days of observation in 2004 and reduced observation time to ≤ 4 hours on two other days (see Appendix C for daily weather records). Six of the seven days of missed observations occurred between 19 and 27 October due to a series of unusually heavy snowstorms. The number of days missed entirely matched the highest seen since 1997, with the total number of days severely hampered by weather the highest in the past eight years (1997–2003 average of 5 days). The late October snows strongly impacted most of our interior western migration projects in 2004, in most cases forcing premature shutdowns. Otherwise, scattered thundershowers and rain were common during the last half of August. After that until late October, scattered rain or snow events occurred every week to 10 days, with mostly fair skies in between.

Compared to the last seven years, besides having included more days severely hampered by weather, the 2004 season also featured a slightly higher than average proportion of cloudy/unsettled weather during active observation periods. Fair skies predominated on 41% of the active observation days, transitional skies (i.e., changed from fair skies to mostly cloudy or overcast during the day, or vice versa) on 35%, and mostly cloudy to overcast skies on 24% (1997–2003 averages of 50%, 32%, and 18%, respectively). Visibility reducing fog and especially haze were also a much greater problem in 2004 than usual, with 62% of the active observation days featuring noteworthy instances of these factors (1997–2003 average of 13%). The prevalence of especially haze has increased markedly in the last three years, most likely reflecting the influence of widespread drought and the resulting dry, dusty, and fire-prone landscape. Visibility estimates recorded by our observers in 2004 at the Goshutes were the lowest in the past eight years (83–84 km versus 1991–2003 averages of 90–92 km)

Light winds (< 12 kph) prevailed on 71% of the active observation days, moderate winds on 26%, and strong winds (> 20 kph) on 3%. These values reflect a higher than average prevalence of light winds compared to averages for the past seven years (1997–2003 averages of 64% light, 26% moderate, and 10% strong), but similar conditions have applied in the last five years. Unlike last year, steady SW-W winds once again were the dominant wind pattern in 2004, prevailing on 37% of the active observation days (1997–2003 average of 33%). The second most common pattern was days where SW–NW winds prevailed for a significant portion of the day but then shifted to NE–SE winds during the rest of the day (or vice versa). This pattern applied to 22% of the active observation days, compared to an average of 16%. Third most common was NE–E winds, which prevailed on 14% of the days (average 15%). Most other days featured some other combination of westerly winds, with no substantial variation from usual patterns.

Average daily temperatures (averages of hourly readings) ranged from -4.3 to 25.2°C , averaging 12.9°C . These values fall well within the range seen since 1997. Average daily barometric pressure (averages of hourly readings) ranged from 29.66 to 30.54 in Hg, averaging 30.27 in Hg. These values are slightly on the low side compared to the last three years (the extent of records for this measure). Thermal lift was rated fair to poor on 57% of the active observation days and good to excellent on 43%. Similar to the last two years, these values represent a higher than average proportion of days with good thermal conditions (1997–2003 averages of 67% poor to fair and 33% good to excellent), most likely reflecting the higher prevalence of light winds.

In summary, the weather during the 2004 season featured a much heavier than usual snow event in late October that severely hampered our late-season efforts, and cloudier and more unsettled weather than usual during other active observation periods; a higher than usual prevalence of visibility reducing haze, continuing an increasing pattern that has emerged in the last three years likely related to the drought;

lighter winds than usual but otherwise a fairly typical array of wind directions; and better than average thermal lift conditions likely reflecting the influence of lighter winds.

OBSERVATION EFFORT

Counts occurred on 76 of 83 possible observation days between 15 August and 5 November 2004. The number of observation days and hours (642.75) were only 2 and 4%, respectively, below the 1983–2003 averages of $78 \pm 95\%$ CI of 2.4 days and $668.18 \pm 95\%$ CI of 31.81 hours. The 2004 average of 2.0 observers per hour (including official and guest observers; value is mean of daily values, which are in turn means of hourly values) was a significant 23% below the 1990–2003 (period of full-time two-observer system) average of $2.6 \pm 95\%$ CI of 0.28 observers/hr. Having moved the main count site to OP2 is the primary reason for this decline, because most general visitor activity now occurs at OP1 away from the main counters, where our site educators provide interpretive guidance. However, although the number of recorded observers has declined slightly due to the reduction in guest observers, the loss of these extra eyes is likely offset by a reduction in visitor disturbance of the primary observers.

MIGRATION SUMMARY

The observers counted 13,101 migrant raptors of 17 species during the 2004 season (see Appendix D for unadjusted daily count records). This count is a non-significant 13% below the 1983–2003 long-term average, but is the second lowest count (just ahead of an even lower count in 2001) since 1993, with the third lowest count since that time occurring last year. No record low or high counts occurred this season; however, the count of 122 Broad-winged Hawks marked only the second time in the history of the project that the count of this species has exceeded 100 birds (see Appendix E for annual summaries). In addition, the count of 685 Turkey Vultures ranked as the second highest count for this species, with the third highest count below 500 birds.

The 2004 flight was composed of 47% accipiters, 31% buteos, 13% falcons, 5% vultures, 1% eagles, and <1% each of harriers, Ospreys, and unidentified raptors. The proportions of buteos, vultures, and Ospreys were significantly above average, whereas the proportions of accipiters, eagles, harriers, and unidentified raptors were significantly below average (Figure 2). The most commonly observed species were the Red-tailed Hawk (27% of the total count), Sharp-shinned Hawk (24%), and Coopers' Hawk (21%), followed by American Kestrel (13%), and Turkey Vultures (5%). No other species comprised more than 2% of the total count. It is noteworthy that the last two years are the first seasons in the 22-year history of the count project that the counts of Red-tailed Hawks have exceeded the counts of Sharp-shinned Hawks (Appendix E), reflecting both a continuing, long-term increasing trend for red-tails and a sharp and continuing drop in the abundance of sharp-shins since 1998, coincident with the onset of widespread drought in the interior West.

Adjusted passage rates were 10% or more below average for 12 of 18 commonly observed species, with the differences significant for Northern Harriers, Sharp-shinned Hawks, Northern Goshawks, Ferruginous and Rough-legged Hawks, Golden Eagles, Merlins, and Prairie Falcons (Table 1). In contrast, adjusted passage rates were significantly above average for Turkey Vultures, Ospreys, Broad-winged Hawks, Red-tailed Hawks, and Peregrine Falcons.

For many species, adjusted passage rates show a common pattern of stable to increasing trends through the mid-1990s followed by either stabilizing or more often declining patterns, especially after 1998 when widespread drought set in (Figures 3–7). Several such species have shown at least a slight rebound in the past two years, including Turkey Vultures, Ospreys, all three accipiters, and American Kestrels; however, low counts in 2004 continued to accentuate the recent decline for Northern harriers, Ferruginous Hawks, Golden Eagles, Merlins, and Prairie Falcons. Significant ($P \leq 0.05$) to highly significant ($P \leq 0.01$) quadratic regressions continued to track through 2004 the overall pattern for

Ospreys, Northern Harriers, all three accipiters, Ferruginous Hawks, Golden Eagles, and the three smaller falcons. The same basic pattern is also evident for Peregrine Falcons; however, only an increasing linear trend provided a significant fit to the data (Figure 7). Similarly, until last year, Turkey Vultures had also shown the quadratic pattern, but strong rebounds in 2003 and especially 2004 have returned the pattern for this species to a highly significant long-term increasing trend. Other species that continue to show long-term, significant increasing trends include Broad-winged, Red-tailed, and Swainson's Hawks. As has been the case throughout the history of the project, only Bald Eagles (Figure 6) and Rough-legged Hawks (Figure 5) show no significant long-term trends; however, passage rates of Rough-legged Hawks dropped sharply for four consecutive years following a record high in 1999, and recovered only slightly in 2004.

The common pattern of increases through the mid-1990s followed by declines likely reflects the effects of variation in regional moisture conditions on productivity and perhaps flyway dynamics in the Intermountain region. In particular, declines since 1998 undoubtedly reflect adverse effects of the prolonged and extensive drought that has plagued much of the interior West since 1998 (Hoffman and Smith 2003). Prior to that, high moisture levels associated with a large-scale El Nino event in the Pacific likely contributed to enhanced productivity across much of the otherwise xeric Great Basin. Most recently, declining patterns in the Goshutes but high counts in coastal California and in the north Cascades of Oregon suggest that, after five years of extensive drought, some migrants may have shifted their migration routes around the severely parched central Great Basin. It is also important to recognize, however, another factor also may have contributed to the reduced counts in 2003 and 2004 in the Goshutes. Lighter winds, stronger thermal lift conditions, and a relatively high prevalence of days with nothing but clear blue skies most likely both dispersed the flight more than usual and made it more difficult to see migrants passing overhead.

Immature : adult ratios were below average in 2004 for 7 of 10 species with data suited to comparisons, significantly so for Broad-winged, Red-tailed and Ferruginous Hawks, and Peregrine Falcons (Table 2). In all such cases, the reduction was due at least in part to below average tallies of young birds; in fact, the tallies of immature birds were below average for all ten species. In contrast, counts of identified adults were above average for Broad-winged and Red-tailed Hawks, and matched the long-term averages for Bald Eagles and Peregrine Falcons. Only Northern Goshawks and Golden Eagles showed significantly above-average age ratios in 2004, although in both cases due to a proportionally greater reduction in the abundance of identified adults rather than a high count of young birds. It is also important to note, however, that for several species, significant variation in the proportions of unaged birds may confound the comparisons (Table 2). Nevertheless, the overall impression from these data is that regional productivity for raptors using the Intermountain Flyway was probably below average in 2004.

The 2004 combined-species median passage date of 25 September was 1 day later than average (Table 3); however, the overall, combined-species seasonal distribution showed some significant variation from the long-term average pattern (Figure 8). Relative flight volume followed a typical pattern through mid-September, but then activity was below average from 15–25 September, above average from 26 September through 5 October, then well below average again during the last half of October. At the species level, 8 of 17 species showed earlier than average median passage dates in 2004, with the differences significant for three species (Red-tailed Hawk, American Kestrel, and Prairie Falcon), and seven species showed later than average timing, with the differences significant for five species (Osprey, Cooper's Hawk, Northern Goshawk, Ferruginous Hawk, and Rough-legged Hawk; Table 3). Thus, there were no clear multi-species patterns of variation in seasonal timing in 2004. Age-specific timing data revealed additional detail but no markedly different results (Table 4).

TRAPPING EFFORT

The crews operated one or more of the three available banding stations every day between 27 August and 22 October 2004 (see Appendix F for daily capture records and Appendix G for annual summaries). The number of trapping days was 10% lower than the 1980–2003 average for the site, while the number of station hours (807) was 37% lower than average. Causes of the reduced effort included a season shortened by a week due to heavy late October snow and a purposefully reduced crew size with one less trapping blind than usual in operation.

TRAPPING SUMMARY

The 2004 capture total of 1,277 raptors included 10 species, 1,273 newly banded birds, 2 recaptures of birds previously banded in the Goshutes, and 2 foreign recaptures (i.e., recaptures of birds originally banded elsewhere; Table 5, Appendix G). The 2004 effort raises the total number of birds captured since project inception to 52,048, including 84 Goshute recaptures and 33 foreign recaptures. Sharp-shinned Hawks accounted for 62% of the total captures, followed by Cooper's Hawks (27%), Red-tailed Hawks (5%), and American Kestrels (3%). Each of the remaining species accounted for less than 1% of the total.

The 2004 combined-species capture total was 40% below the 1980–2003 average (Table 5). Capture totals were markedly below average for Northern Harriers, Sharp-shinned Hawks, Cooper's Hawks, and American Kestrels, reflecting the effects of both low flight volume and reduced effort. Capture success also was substantially below average for most species because of the reduced effort (Table 5). The capture total for Merlins was above average, however, and the crew captured one Broad-winged Hawk, which is always a rarity in the West. Moreover, the capture rate for Sharp-shinned Hawks matched the long-term average; estimates of both capture rate and success were above average for Northern Goshawks, Merlins, and Prairie Falcons; and the capture rate for Red-tailed Hawks was above average. Capture totals for Golden Eagles, adult Red-tailed Hawks, and adult Northern Goshawks also would have been higher had not heavy snow shut the operation down early.

At this site, compared to the counts, banding data yield unique and sufficient sex–age specific data only for the three accipiters and American Kestrels (Table 6). The 2004 count and capture data yielded very different age ratios for the three accipiters: Sharp-shinned Hawks, 14% above versus 28% below average; Cooper's Hawks, 27% below versus 1% above average; and Northern Goshawks, 141% above versus 5% below average. These data suggest that adult Sharp-shinned Hawks and Northern Goshawks were proportionally less abundant than young birds in 2004 and were more susceptible to capture than usual, whereas this same pattern applied to immature Cooper's Hawks.

The trapping data alone also indicated a near-equal sex ratio among captured Sharp-shinned Hawks, which was only slightly higher than average. In contrast, captured female Cooper's Hawks outnumbered captured males 2:1, which was a little more than a third higher than average. Goshawks showed the opposite pattern, with males about 30% more common than females in 2004, but females typically 50% more common than males among captured birds. This suggests that female Cooper's Hawks and male goshawks were either proportionately more abundant or more susceptible to capture in 2004.

The count data do not yield age-specific data for American Kestrels, so the banding data for this species are particularly useful. The banding data yielded an immature : adult ratio that was 48% below average, reflecting a proportionately greater reduction in captures of immature birds rather than high capture totals for adults (Table 6). This suggests that young kestrels may have been relatively scarce this year; however, very low overall capture totals in 2004 for this species may confound this comparison. The sex ratio of kestrels captured in 2004 nearly matched the long-term average at near 1:1 (Table 6).

ENCOUNTERS WITH PREVIOUSLY BANDED BIRDS

Recaptures

The 2004 captures included two male Sharp-shinned Hawks originally banded in the Goshutes as hatch-year birds in 2002 and 2003 (Table 7). Note the substantial difference in the timing of each bird's two captures; for older birds to pass through later is typical for Sharp-shinned Hawks and many other raptor species, but the two-month difference in timing for both birds is surprising. This brings the total number of Goshute recaptures since 1980 to 86 birds, all accipiters (Appendix G).

Foreign Recaptures

The 2004 captures included two foreign recaptures of Sharp-shinned Hawks that were originally banded as hatch-year birds at Idaho Bird Observatory's raptor migration study site on Boise Ridge in 2002 (male) and 2003 (female; Table 7). This raises to 35 the total number of foreign recaptures for the site since 1980, involving five species and including 15 recaptures of Sharp-shinned and Cooper's Hawks banded at Boise Ridge.

Foreign Encounters

Fifteen raptors originally banded in the Goshutes were encountered elsewhere in 2004, which is three more than the long-term average for the site (Table 8, Appendix G). The encounters involved 3 Sharp-shinned Hawks, 6 Cooper's Hawks, 1 Northern Goshawk, and 4 Red-tailed Hawks. This raises the total number of foreign encounters for the project since 1980 to 300. Nine of the birds were found dead with no known or suspected cause of mortality: 2 Sharp-shinned Hawks in Utah (February) and British Columbia (April); 4 Cooper's Hawks in California (January), Arizona, (January), Idaho (July), and Sonora, Mexico (August); and 3 Red-tailed Hawks in Wyoming (February), Utah (March), and Idaho (August). One second-year female Cooper's Hawk was caught in some manor of non-avian trap in Michoacán, Mexico, and was then released after its band was removed. One female Sharp-shinned Hawk and one female Cooper's Hawk, both banded as hatch-year birds, were killed the following spring in Montana and Idaho, respectively, when they collided with some manor of manmade object. One female Northern Goshawk, originally banded five years earlier, was recaptured as a breeder in the Valley Creek Watershed of the Upper Salmon River on Sawtooth National Recreation Area in Idaho by colleagues from Idaho Bird Observatory.

Tragically, one 17-year old Red-tailed Hawk was electrocuted in Riverside, California in August 2004. This death was witnessed by a woman living with the problem power pole behind her house; the bird had just captured a gopher and was attempting to alight atop the pole with its quarry when the electrocution occurred. This is the oldest Red-tailed Hawk documented through HWI band returns and only the third record for a red-tail 10 years or older; however, the oldest Red-tailed Hawk in the National Bird Banding Laboratory records was 28 years old, and birds in their late "teens" are fairly common. Besides this red-tail, our 2004 encounter records include a high number of other older birds, as well. The 11-year old Cooper's Hawk found dead in Sonora, Mexico, ranks among the oldest of this species. The current longevity record involves another Goshute Mountains migrant that was banded as an after-hatch-year bird in 1988 and was later found dead in Indiana 15 years later (so at least 15.5 years old). The 7+ year old Sharp-shinned Hawk found in British Columbia also ranks among the oldest for this species, with only six HWI recoveries of birds 7 years or older, the oldest being just under 10 years old.

SATELLITE TRACKING OF MIGRANTS

Our objective was to outfit two adult Northern Goshawks and two Golden Eagles with satellite transmitters during the 2004 season. We captured only one suitable goshawk, but otherwise succeeded in achieving this objective. Early closure of the banding operation due to heavy snowfall limited late-season trapping when adult goshawks are often most abundant.

Golden Eagles

One of the 2004 eagles, a hatch-year male, initially remained in the southern Goshute Mountains area for just over a month, suggesting that he may have been a local bird. However, he then traveled roughly 550 km south and then southeast to reach the north rim of the Grand Canyon, backtracked to the northwest for a while, and ultimately ended up another 200 km to the south in the western section of Prescott National Forest in western Arizona, where he has remained since. The area is the same basic region where another eagle outfitted in the Goshutes in 2002 may now be setting up a full-time residence. This male summered in central Idaho in 2003, but in west-central Arizona in 2004. He spent nearly two months in the second area during early spring 2003 before heading for Idaho. Moreover, although he spent the winters of 2002/03 and 2003/04 along the Sonora–Chihuahua border in northern Mexico, other than a brief excursion to east-central New Mexico in the fall to an area where he had previously spent short periods during both fall 2003 and fall 2004, he has now resided in western Arizona since spring 2004. This eagle is now a full adult and may have finally settled on a permanent range.

The transmitter on our second 2004 eagle, another hatch-year male, unfortunately has not functioned properly, giving us only three good location signals since deployment. We received signals over two days in early December from northwest Utah, and then once in late January from ~50 km farther north in southern Idaho. Hopefully we will continue to get at least intermittent signals that will allow us to keep track of this bird's general whereabouts.

We tracked another 2002 Golden Eagle outfitted during fall 2002 through June 2004, but then the signals abruptly ceased, possibly due to premature battery failure. This eagle occupied the same winter and summer ranges two in years in a row, commuting between the Independence Mountains area of north-central Nevada and the Hurricane Cliffs and Dixie National Forest regions of southwestern Utah. This bird was in its fourth year when outfitted, so by the time it returned to its summer range in 2003, it was a full adult.

Northern Goshawks

Unfortunately, it also appears that the 2004 goshawk, a second-year male, either shed its transmitter or died after only about six weeks. The bird had moved only a short ways to a lower elevation area just east of the project site, suggesting that it may have been a local bird. We hope to recover this transmitter soon and confirm the bird's fate. Our primary objective this year was to outfit some adult goshawks to assess their survival in comparison to the immature birds we sought to study initially. This second-year bird clearly did not fare any better than the first-year birds we outfitted previously, none of which survived the winter following their transmitter deployments. However, the only other goshawk we outfitted in 2004 was a hatch-year female in Wyoming, which as of late February was still alive and active.

Red-tailed Hawks

During June 2004, the batteries finally failed on three remaining Red-tailed hawk transmitters deployed during fall 2002. After being outfitted in the Goshutes, two of these birds proceeded to apparent winter ranges in southern California and northern Baja California, but then proceeded to remain in these locations for the next 20-21 months. This suggests that these birds are permanent residents in these areas, probably having undertaken late summer/fall northward ventures in 2002 before returning south for the winter. Sensor data confirmed that both birds remained alive and active until their transmitter batteries failed. The third bird occupied the same winter and summer ranges two in years in a row. In both 2003 and 2004, the bird's northbound spring migration included stops (a month in 2003, several days in 2004) in the northern Blue Mountains of southeastern Washington, after which the bird traveled southwest to reach its primary summer range in the Wallowa Mountains of northeastern Oregon.

Tracking summaries and maps for all of HWI's satellite-tracked raptors can be found at www.hawkwatch.org.

IDENTIFYING MIGRANT ORIGINS THROUGH STABLE ISOTOPE ANALYSES

In 2004, we continued to collect feather samples from a variety of species to support our on-going stable-isotope research, which seeks to use analyses of hydrogen stable-isotope ratios to identify the approximate natal origins of migrants monitored at migration sites across the West (e.g., Meehan et al. 2001, Lott et al. 2003, Smith et al. 2003). HWI scientists currently have in a review at a respected ornithological journal a manuscript detailing a new GIS-based approach for mapping the origins of raptors based on this technique, and we hope to begin producing several other relevant publications in the next several months.

RESIDENT RAPTORS

One family group of Golden Eagles, two adults and a hatch-year bird, were present throughout the season and occupied a territory to the north of the project area. One subadult bird was also seen frequenting the area in early September. A family group of Red-tailed Hawks, including three hatch-year birds (two light morphs and rufous morph), occupied a territory to the northwest of the project area, and was present throughout the season. As usual, the adults appeared to include a light-morph (seen throughout the season) and a dark morph (seen regularly only through mid-September).

A family group of Northern Goshawks, including two hatch-year birds, occupied their usual territory very near the project site. As usual, the adults were seen only infrequently; most notably an adult male was seen displaying and "escorting" another bird through the area in late October and early November. The young birds were seen frequently throughout August and September, often attacking a plastic owl erected near the count site. At least one adult Sharp-shinned Hawk was recorded as a local bird three times early in the season, and at least one immature bird frequented the project area until mid-October. At least one immature Cooper's Hawk frequented the project area through the third week of September, and was seen flying with an adult in early September.

Local American Kestrels were relatively scarce this year; only three observations of apparently local birds were recorded, whereas typically at least one family group (two in 2003) frequents the immediate project area. Apparently local Prairie Falcons were recorded on three occasions in late August and once in early October. Two Peregrine Falcons, one adult and one immature, were observed exhibiting resident behavior both apart and together in late August, and another sighting of a local adult was recorded in mid-October. In 2003, a single adult was seen throughout the much of the season occupying and defending a roosting and foraging territory to the southwest of the project area; this was not the case in 2004.

This is a typical resident assemblage for the site, except for limited sightings of American Kestrels and Prairie Falcons. It seems possible that there may be a correlation between increasing Peregrine Falcon activity and declining Prairie Falcon activity in the last two years.

SITE VISITATION

In 2004, ~150 individuals signed the HWI Goshute visitor logs. The relatively low visitation level this year reflected in part poor weather; in particular, heavy snowfall effectively precluded any visitation during the last half of October. The visitors included an organized group of 28 ornithology students from the University of Utah and two family groups that participated in guided ecotours. The latter resulted from HWI donating ecotour packages to two other Salt Lake City non-profit groups for their fundraising purposes. Aside from casual visitors, we were also happy to have four visiting trappers assist with the project in 2004: Eric Jepsen (former Goshute trapper) and Steve Rock (Golden Gate Raptor Observatory

affiliate) from California, and regular Goshute visiting trappers Steve Wilson from Colorado and Leo Chidester from Utah. The project and HWI Science Director, Jeff Smith, were also prominently featured in a local outdoor news presentation by Reese Stein of KTVU News in Salt Lake City in October 2004.

In 2004 at the Goshutes, 684 hourly assessments of visitor disturbance resulted in the following ratings: 97% none and 3% low.

ACKNOWLEDGMENTS

For financial support in 2004, we enthusiastically thank the Bureau of Land Management–Elko Field Office, National Fish and Wildlife Foundation, Bureau of Reclamation–Upper Colorado Region, Signals of Spring, North Star Science and Technology and the American Bird Conservancy (free eagle transmitters), Walbridge Fund, and HWI private donors and members. The BLM Elko Field Office also provided helicopter-airlift and other essential logistical support; special thanks to Ray Lister and Tamara Hawthorne for their assistance and oversight. We are also grateful for discounted hotel accommodations provided to our field crews on their days off by Stateline Nugget Hotel and Casino of Wendover, Nevada; for logistical support of the West Wendover Waste Water Treatment Plant and West Wendover Public Water Works; and for generous donations of supplies for the crew provided by Einstein’s Bagels and Salt Lake Roasting Company in Salt Lake City. Lastly, special thanks to Stephen Wilson, Leo Chidester, Eric Jepsen, and Steve Rock for volunteering their time to assist our banding crews; to Paul Dutson, Orville Hayes, Leo Nelson, and Dan Bullock for their help in providing or helping us secure lure birds for the trapping operations; to Aviva Milgalter, Dr. Denkers, and Dr. Mortensen for donating lure-bird care supplies; and to Vicki Hinz for donating incense that helped the crew manage the "bog" aroma.

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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: 1983–2003 versus 2004.

SPECIES	COUNTS			RAPTORS/100 HOURS ¹		
	1983–2003 ²	2004	% CHANGE	1983–2003 ²	2004	% CHANGE
Turkey Vulture	318 ± 66.9	685	+115	94.3 ± 17.60	220.8	+134
Osprey	92 ± 19.8	120	+31	21.1 ± 3.99	28.8	+37
Northern Harrier	177 ± 32.3	96	-46	27.6 ± 4.40	16.3	-41
Sharp-shinned Hawk	4720 ± 876.4	3073	-35	1037.2 ± 156.78	732.8	-29
Cooper's Hawk	3243 ± 644.5	2736	-16	810.8 ± 134.06	718.5	-11
Northern Goshawk	108 ± 25.5	41	-62	18.0 ± 4.02	6.8	-62
Unknown small accipiter ³	171 ± 168.4	299	+75	–	–	–
Unknown large accipiter ³	2 ± 2.4	11	+371	–	–	–
Unknown accipiter	327 ± 92.7	8	-98	–	–	–
TOTAL ACCIPITERS	8422 ± 1479.0	6168	-27	–	–	–
Red-shouldered Hawk	0.3 ± 0.2	0	-100	–	–	–
Broad-winged Hawk	43 ± 14.8	122	+184	16.8 ± 5.41	56.5	+236
Swainson's Hawk	228 ± 88.0	197	-13	57.7 ± 21.82	51.8	-10
Red-tailed Hawk	3031 ± 417.2	3589	+18	502.4 ± 54.61	613.5	+22
Ferruginous Hawk	17 ± 2.9	8	-53	2.7 ± 0.45	1.4	-47
Rough-legged Hawk	14 ± 4.6	7	-51	6.5 ± 1.90	3.9	-41
Unidentified buteo	70 ± 21.0	117	+67	–	–	–
TOTAL BUTEOS	3403 ± 473.5	4040	19	–	–	–
Golden Eagle	268 ± 25.8	160	-40	42.3 ± 3.57	27.3	-35
Bald Eagle	13 ± 3.0	12	-8	2.6 ± 0.57	2.4	-10
Unidentified eagle	1 ± 0.5	4	+500	–	–	–
TOTAL EAGLES	282 ± 27.4	176	-38	–	–	–
American Kestrel	2000 ± 392.6	1709	-15	418.6 ± 75.55	373.3	-11
Merlin	40 ± 11.7	22	-46	7.7 ± 2.22	4.7	-39
Prairie Falcon	28 ± 6.4	11	-61	4.7 ± 0.94	2.2	-54
Peregrine Falcon	11 ± 4.0	11	0	1.9 ± 0.66	2.6	+37
Unknown small falcon ³	3.3 ± 6.5	9	+170	–	–	–
Unknown large falcon ³	2 ± 2.4	3	+80	–	–	–
Unknown falcon	7 ± 2.2	0	-100	–	–	–
TOTAL FALCONS	2088 ± 409.7	1765	-15	–	–	–
Unidentified raptor	124 ± 40.8	51	-59	–	–	–
GRAND TOTAL	14905 ± 2303.5	13101	-12	–	–	–

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: 1990–2003 versus 2004.

SPECIES	TOTAL AND AGE-CLASSIFIED COUNTS						% UNKNOWN AGE		IMMATURE : ADULT RATIO	
	1990–2003 AVERAGE			2004			1990–2003 ¹	2004	1990–2003 ¹	2004
	TOTAL	IMM.	ADULT	TOTAL	IMM.	ADULT				
Northern Harrier	211	67	60	96	25	23	41 ± 8.6	50	1.33 ± 0.332	1.09
Sharp-shinned Hawk	5449	1930	1505	3073	715	522	38 ± 5.6	60	1.31 ± 0.294	1.37
Cooper's Hawk	3857	921	1093	2736	245	436	48 ± 4.2	75	0.83 ± 0.248	0.56
Northern Goshawk ²	108	52	35	41	30	6	17 ± 5.1	12	2.05 ± 0.696	5.00
Broad-winged Hawk	56	15	24	122	6	55	33 ± 6.6	50	0.62 ± 0.178	0.11
Red-tailed Hawk	3525	745	1973	3589	422	2116	23 ± 4.0	29	0.38 ± 0.063	0.20
Ferruginous Hawk	20	5	6	8	0	4	42 ± 10.6	50	1.20 ± 0.616	0.00
Golden Eagle ²	268	130	75	160	77	29	23 ± 5.5	34	2.09 ± 0.464	2.66
Bald Eagle	15	7	7	12	5	7	7 ± 5.6	0.0	1.03 ± 0.365	0.71
Peregrine Falcon	14	5	6	11	0	7	29 ± 12.2	18	0.72 ± 0.278	0.00

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 1983–2003.

Table 3. First and last observed, bulk passage, and median passage dates by species for migrating raptors in the Goshute Mountains, NV in 2004, with comparisons of 2004 and 1990–2003 average median passage dates.

SPECIES	2004				1990–2003
	FIRST OBSERVED	LAST OBSERVED	BULK PASSAGE DATES ¹	MEDIAN PASSAGE DATE ²	MEDIAN PASSAGE DATE ^{2, 3}
Turkey Vulture	20-Aug	13-Oct	13-Sep – 1-Oct	24-Sep	23-Sep ± 1.6
Osprey	20-Aug	29-Oct	7-Sep – 1-Oct	18-Sep	14-Sep ± 1.6
Northern Harrier	19-Aug	5-Nov	28-Aug – 16-Oct	24-Sep	25-Sep ± 4.0
Sharp-shinned Hawk	15-Aug	5-Nov	8-Sep – 9-Oct	25-Sep	26-Sep ± 2.6
Cooper's Hawk	20-Aug	1-Nov	10-Sep – 4-Oct	26-Sep	22-Sep ± 1.7
Northern Goshawk	2-Sep	5-Nov	10-Sep – 30-Oct	28-Sep	05-Oct ± 2.9
Broad-winged Hawk	20-Sep	4-Oct	22-Sep – 28-Sep	23-Sep	23-Sep ± 1.8
Swainson's Hawk	21-Aug	15-Oct	31-Aug – 30-Sep	18-Sep	20-Sep ± 4.0
Red-tailed Hawk	15-Aug	5-Nov	6-Sep – 18-Oct	3-Oct	06-Oct ± 2.6
Ferruginous Hawk	8-Sep	31-Oct	8-Sep – 31-Oct	5-Oct	27-Sep ± 3.3
Rough-legged Hawk	7-Oct	31-Oct	7-Oct – 31-Oct	29-Oct	21-Oct ± 1.6
Golden Eagle	20-Aug	3-Nov	4-Sep – 30-Oct	6-Oct	08-Oct ± 2.1
Bald Eagle	18-Sep	5-Nov	18-Sep – 5-Nov	17-Oct	19-Oct ± 5.8
American Kestrel	15-Aug	18-Oct	30-Aug – 28-Sep	11-Sep	17-Sep ± 1.9
Merlin	17-Sep	30-Oct	22-Sep – 17-Oct	1-Oct	01-Oct ± 2.4
Prairie Falcon	21-Aug	7-Oct	23-Aug – 27-Sep	6-Sep	15-Sep ± 4.2
Peregrine Falcon	25-Aug	22-Oct	8-Sep – 16-Oct	24-Sep	24-Sep ± 3.7
Total	15-Aug	5-Nov	6-Sep – 12-Oct	25-Sep	24-Sep ± 1.6

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: 1990–2003 versus 2004.

SPECIES	ADULT		IMMATURE / SUBADULT	
	1990–2003 ¹	2004	1990–2003 ¹	2004
Northern Harrier	28-Sep ± 5.0	25-Sep	21-Sep ± 6.4	28-Sep
Sharp-shinned Hawk	07-Oct ± 1.8	4-Oct	16-Sep ± 1.3	13-Sep
Cooper's Hawk	26-Sep ± 2.0	28-Sep	18-Sep ± 1.4	18-Sep
Northern Goshawk ²	14-Oct ± 4.2	21-Sep	29-Sep ± 4.1	27-Sep
Broad-winged Hawk	23-Sep ± 1.6	22-Sep	24-Sep ± 2.8	26-Sep
Red-tailed Hawk	09-Oct ± 2.1	5-Oct	18-Sep ± 5.1	13-Sep
Ferruginous Hawk	13-Oct ± 2.9	12-Oct	05-Oct ± 4.4	5-Oct
Golden Eagle ²	21-Oct ± 4.5	17-Oct	25-Oct ± 2.6	30-Oct
Bald Eagle	21-Sep ± 7.8	24-Sep	22-Sep ± 3.3	–
Peregrine Falcon	28-Sep ± 5.0	25-Sep	21-Sep ± 6.4	28-Sep

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 1983–2003.

Table 5. Capture totals, rates, and successes for migrating raptors in the Goshute Mountains, NV: 1985–2003 versus 2004.

SPECIES	CAPTURE TOTAL		CAPTURE RATE ¹		CAPTURE SUCCESS (%) ²	
	1985–2003 ³	2004	1985–2003 ³	2004	1985–2003 ³	2004
Northern Harrier	7 ± 2.4	2	0.5 ± 0.17	0.2	4.5 ± 1.45	2.1
Sharp-shinned Hawk	1578 ± 238.6	791	97.3 ± 8.22	98.0	29.6 ± 4.73	24.4
Cooper's Hawk	780 ± 136.3	342	47.8 ± 4.73	42.4	20.7 ± 3.00	11.9
Northern Goshawk	32 ± 11.1	28	2.0 ± 0.51	3.5	31.7 ± 6.24	68.3
Broad-winged Hawk	1 ± 0.5	1	0.1 ± 0.03	0.1	2.6 ± 1.15	0.8
Swainson's Hawk	0.2 ± 0.3	0	0.0 ± 0.01	0.0	0.1 ± 0.15	0.0
Red-tailed Hawk	77 ± 14.0	61	4.8 ± 0.62	7.6	2.3 ± 0.33	1.7
Rough-legged Hawk	0.1 ± 0.2	0	0.0 ± 0.01	0.0	0.5 ± 1.00	0.0
Golden Eagle	5 ± 1.5	2	0.3 ± 0.12	0.2	1.9 ± 0.56	1.2
American Kestrel	192 ± 48.9	35	11.2 ± 2.17	4.3	8.4 ± 2.14	2.0
Merlin	11 ± 3.1	11	0.7 ± 0.19	1.4	22.3 ± 4.63	50.0
Prairie Falcon	6 ± 1.7	4	0.4 ± 0.09	0.5	19.7 ± 4.34	36.4
Peregrine Falcon	1 ± 0.6	0	0.1 ± 0.04	0.0	9.7 ± 5.38	0.0
All Species	2691 ± 416.4	1277	165.1 ± 12.25	158.2	17.3 ± 2.46	10.6

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: 1991–2003 averages versus 2004.

	FEMALE			MALE			FEMALE : MALE	HY : AHY
	AHY	HY	UNK.	AHY	HY	UNK.	RATIO ¹	RATIO ¹
Sharp-shinned Hawk								
1992–2003 mean	297.1	505.4	–	248.3	614.8	–	0.93	2.13
2004	176	229	–	135	250	–	1.05	1.54
Cooper's Hawk								
1992–2003 mean	269.2	215.0	–	148.6	200.1	–	1.43	1.00
2004	118	110	–	52	62	–	2.00	1.01
Northern Goshawk								
1992–2003 mean	5.3	11.7	–	2.3	12.8	–	1.53	8.79
2004	1	10	–	2	14	–	0.69	8.33
American Kestrel								
1992–2003 mean	7.9	75.3	25.3	26.8	84.5	2.7	0.95	6.07
2004	5	10	2	3	15	0	0.94	3.13

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. Recaptures during fall 2004 of raptors previously banded in the Goshute Mountains, NV.

SPECIES	SEX	BAND #	BANDING DATE	BANDING AGE ¹	RECAPTURE DATE	RECAPTURE AGE ¹
Sharp-shinned Hawk	M	1202 – 22901	29-Aug-03	HY	21-Sep-04	SY
Sharp-shinned Hawk	M	1005 – 01950	30-Aug-02	HY	09-Oct-04	TY

¹ HY = hatching year; SY = second year; TY = third year.

Table 8. Recaptures during fall 2004 in the Goshute Mountains, NV, of raptors previously banded elsewhere.

SPECIES	SEX	BAND #	BANDING SITE	BANDING DATE	BANDING AGE ¹	RECAPTURE DATE	RECAPTURE AGE ¹
Sharp-shinned Hawk	F	1563 – 09551	Boise Ridge, ID	30-Aug-03	HY	19-Sep-04	SY
Sharp-shinned Hawk	M	1202 – 24983	Boise Ridge, ID	02-Oct-02	HY	16-Oct-04	TY

¹ HY = hatching year; SY = second year; TY = third year.

Table 9. Foreign encounters during 2004 with raptors banded in the Goshute Mountains, Nevada.

SPECIES	SEX	BAND #	BANDING DATE	BANDING AGE	ENCOUNTER DATE	ENCOUNTER AGE ¹	ENCOUNTER LOCATION	DISTANCE (KM)	STATUS	
CH	F	1705	40241	14-Sep-98	HY	06-Jan-04	7 th year	San Jose, CA	704	found dead
CH	F	1005	21837	16-Oct-03	AHY	14-Jan-04	ASY	Scottsdale, AZ	695	found dead
SS	F	1593	53722	16-Oct-03	HY	06-Feb-04	SY	St. George, UT	320	found dead
RT	U	1387	48427	03-Sep-94	HY	10-Feb-04	11 th year	Greybull, WY	797	found dead
CH	F	1005	18334	09-Sep-03	HY	04-Mar-04	SY	Michoacán, Mexico	2324	caught in non-avian trap, released without band
RT	U	1807	81579	26-Sep-03	HY	10-Mar-04	SY	Payson, UT	296	found dead
SS	F	1523	72400	03-Oct-98	AHY	29-Apr-04	≥8 th year	Sheridan Lake, BC, Canada	1242	found dead
SS	F	1593	53606	04-Sep-03	HY	09-May-04	SY	Hall, MT	561	collision kill
CH	F	1005	10666	20-Sep-03	HY	12-May-04	SY	McCall, ID	442	collision kill
CH	F	1005	18995	25-Sep-02	SY	08-Jul-04	4 th year	Crystal Creek, ID	733	found dead
NG	F	1807	81062	09-Oct-00	HY	15-Jul-04	4 th year	Sawtooth NRA, ID	329	research recapture
RT	U	1387	24016	06-Oct-87	HY	10-Aug-04	17 th year	Riverside, CA	680	electrocuted
CH	F	0745	92477	18-Sep-94	HY	15-Aug-04	11 th year	N of Ciudad Obregon, Sonora, Mexico	1266	found dead
RT	U	1807	93721	05-Nov-02	ASY	24-Aug-04	≥5 th year	Island Park, ID	483	found dead

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.

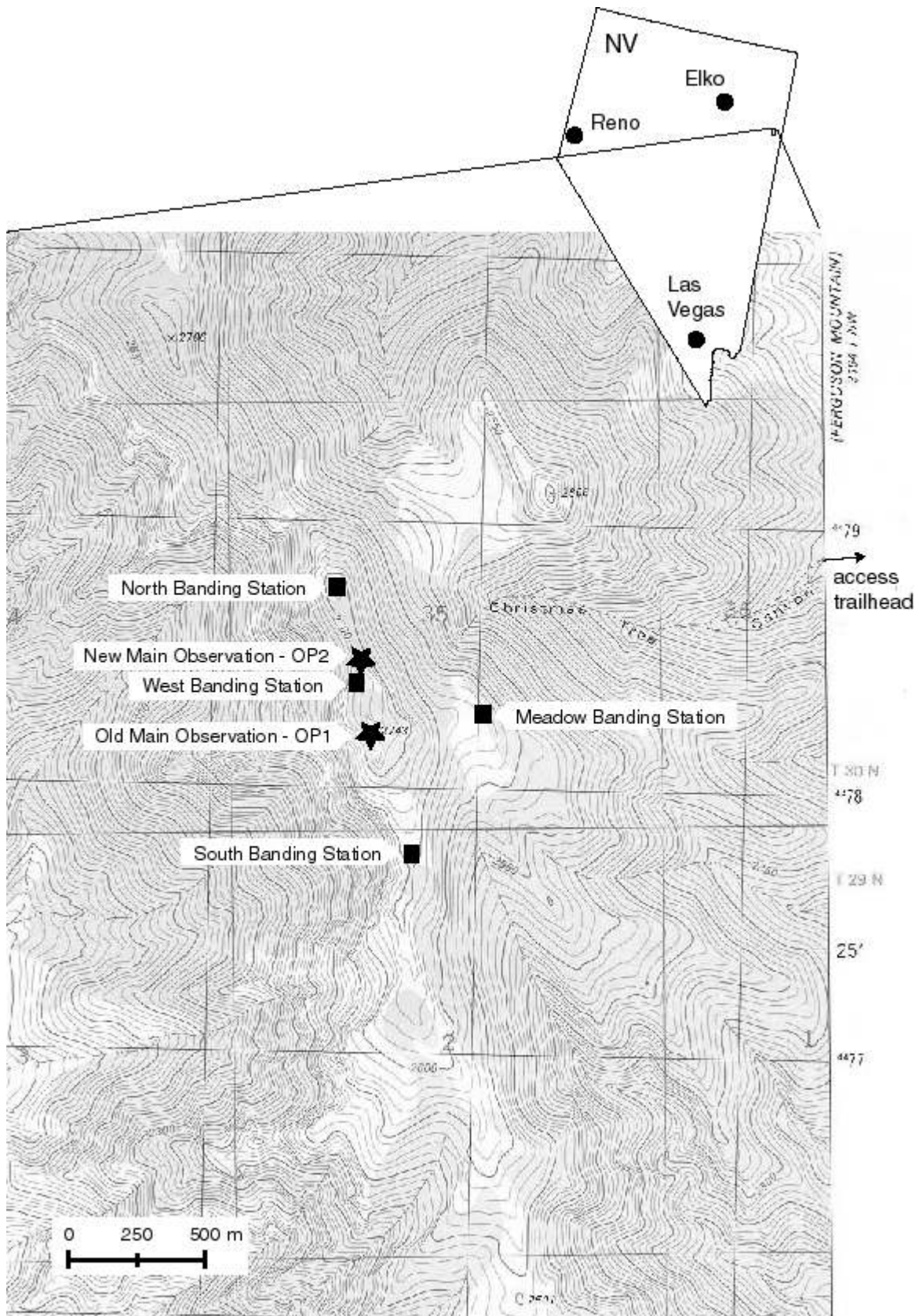


Figure 1. Location of the Goshute Mountains Raptor Migration Project study site.

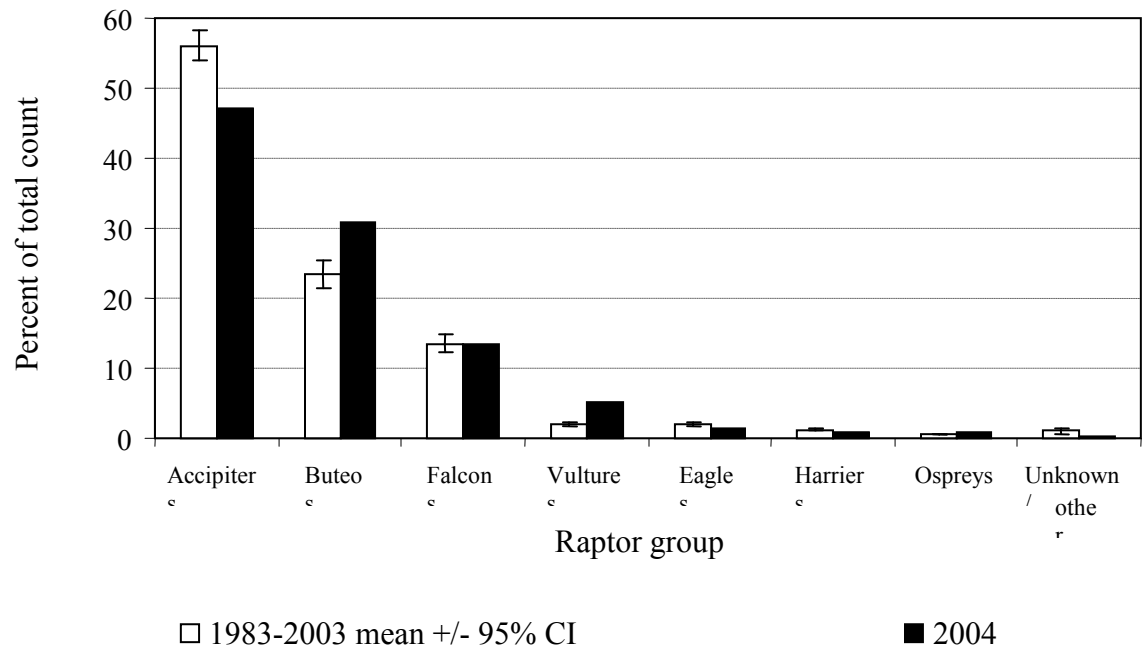


Figure 2. Fall migration flight composition by major species groups in the Goshute Mountains, Nevada: 1983–2003 versus 2004.

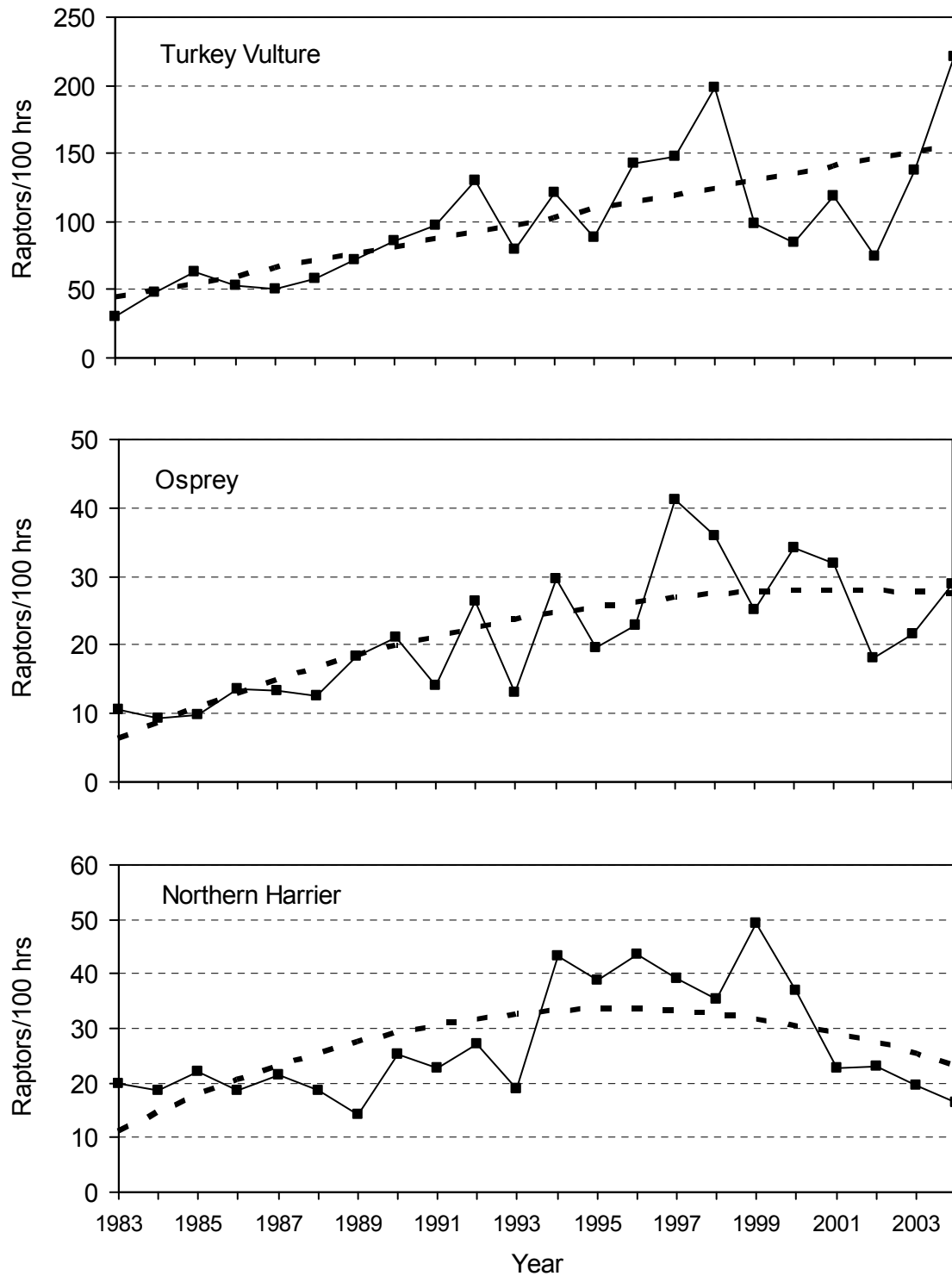


Figure 3. Adjusted fall-migration passage rates in the Goshute Mountains, Nevada for Turkey Vultures, Ospreys, and Northern Harriers: 1983–2004. Dashed lines indicate significant linear or quadratic regressions.

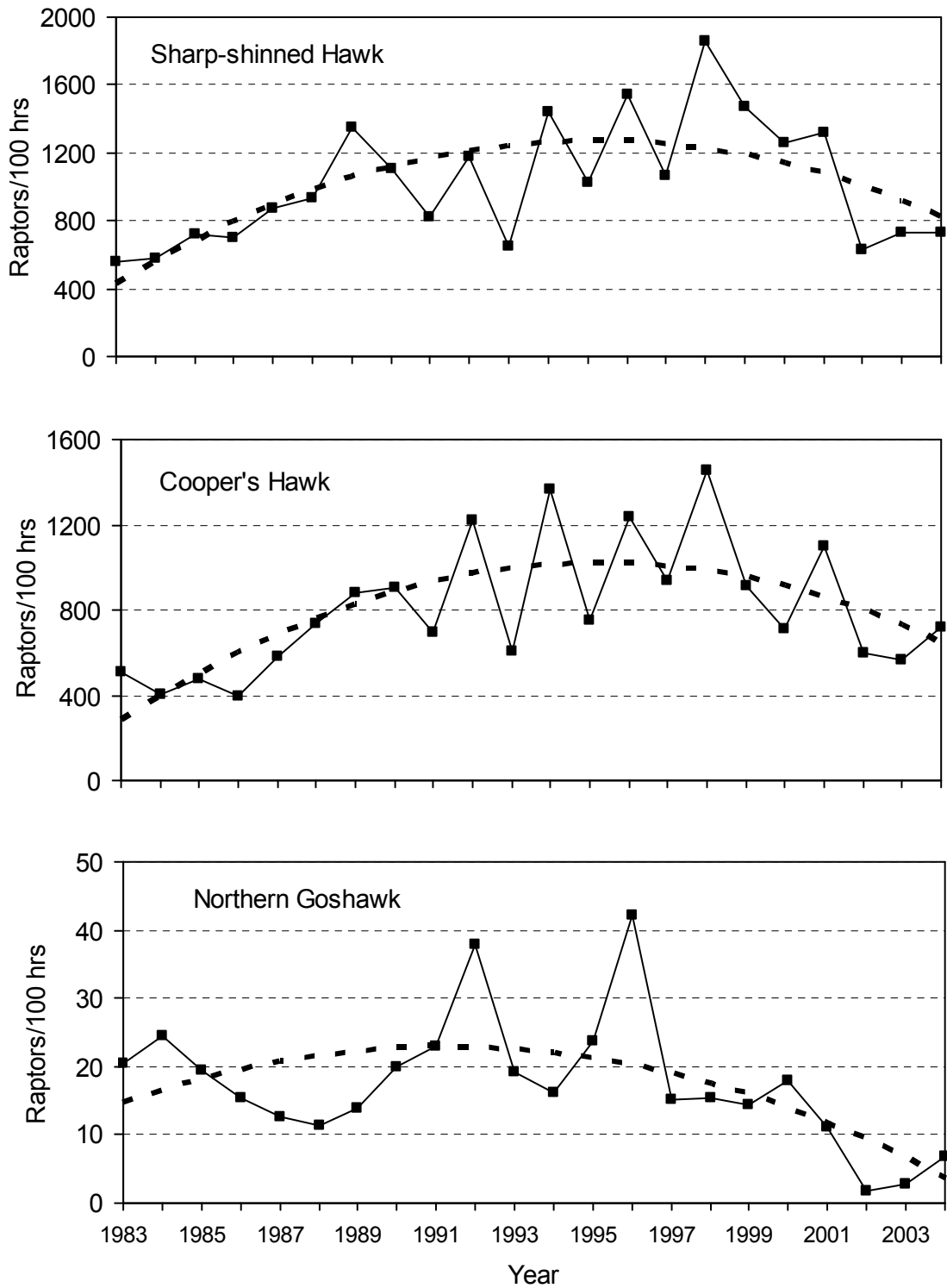


Figure 4. Adjusted fall-migration passage rates in the Goshute Mountains, Nevada for Sharp-shinned Hawks, Cooper's Hawks, and Northern Goshawks: 1983–2004. Dashed lines indicate significant linear or quadratic regressions.

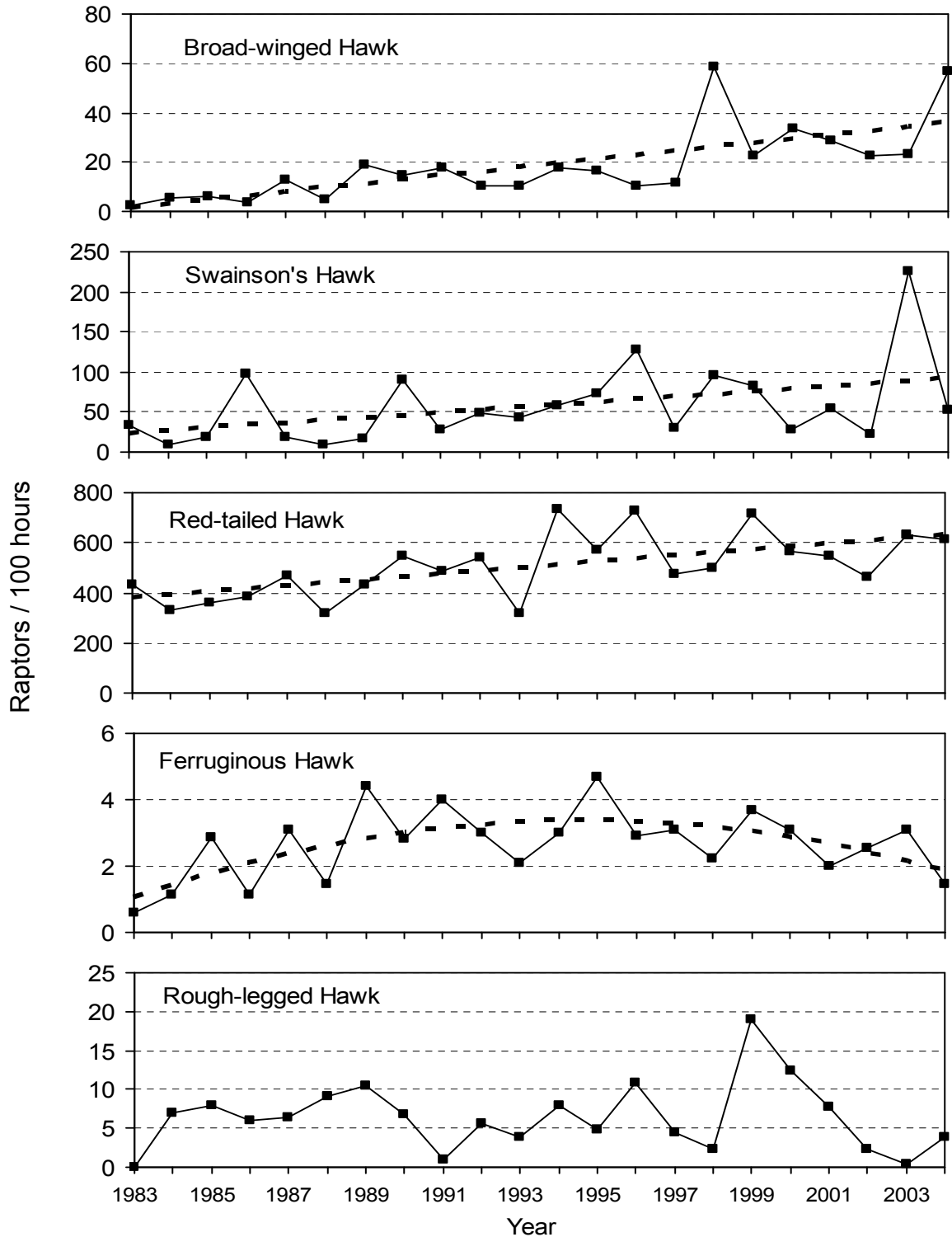


Figure 5. Adjusted fall-migration passage rates in the Goshute Mountains, Nevada for Broad-winged, Swainson's, Red-tailed, Ferruginous, and Rough-legged Hawks: 1983–2004. Dashed lines indicate significant linear or quadratic regressions.

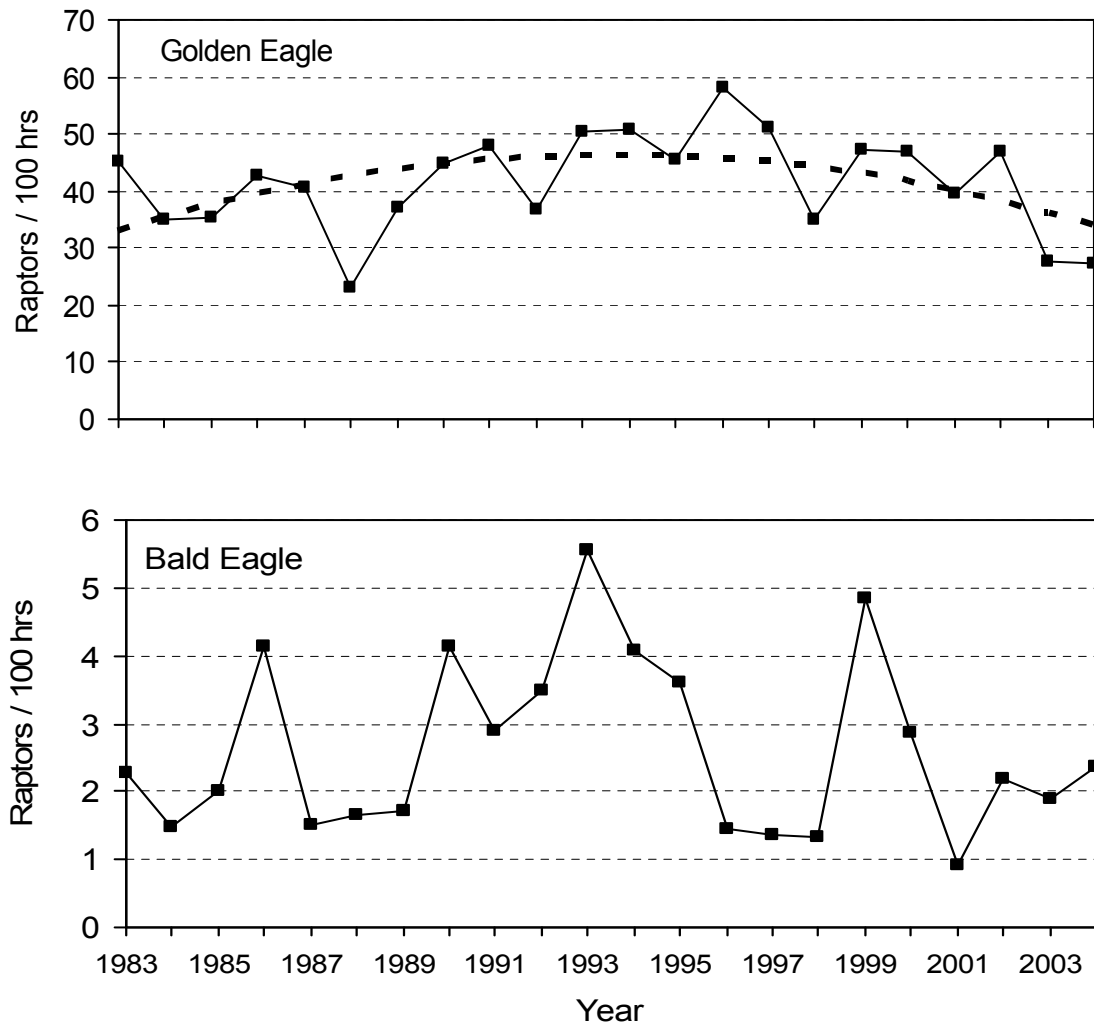


Figure 6. Adjusted fall-migration passage rates in the Goshute Mountains, Nevada for Golden and Bald Eagles: 1983–2004. Dashed lines indicate significant linear or quadratic regressions.

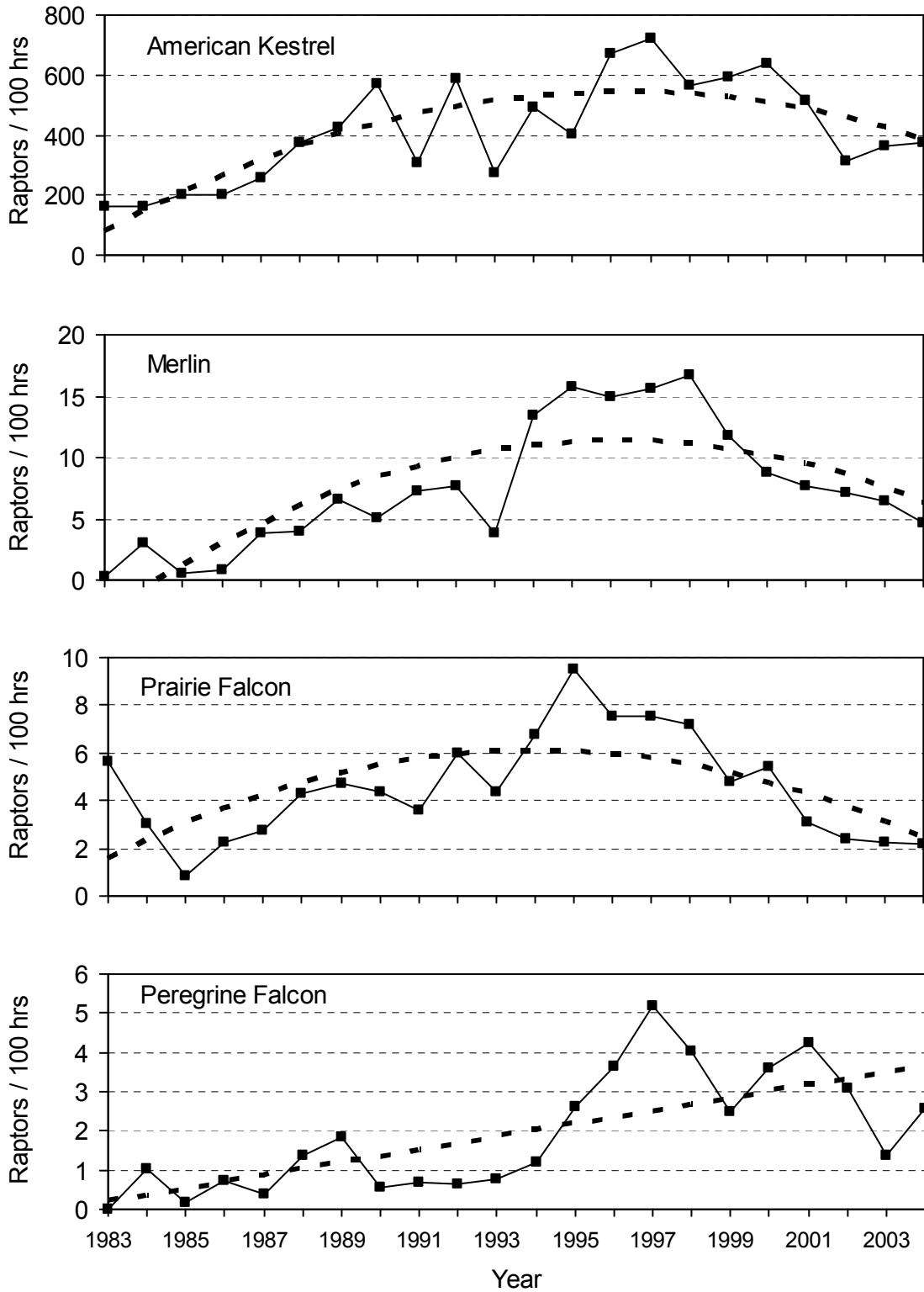


Figure 7. Adjusted fall-migration passage rates in the Goshute Mountains, Nevada for American Kestrels, Merlins, Prairie Falcons, and Peregrine Falcons: 1983–2004. Dashed lines indicate significant linear or quadratic regressions.

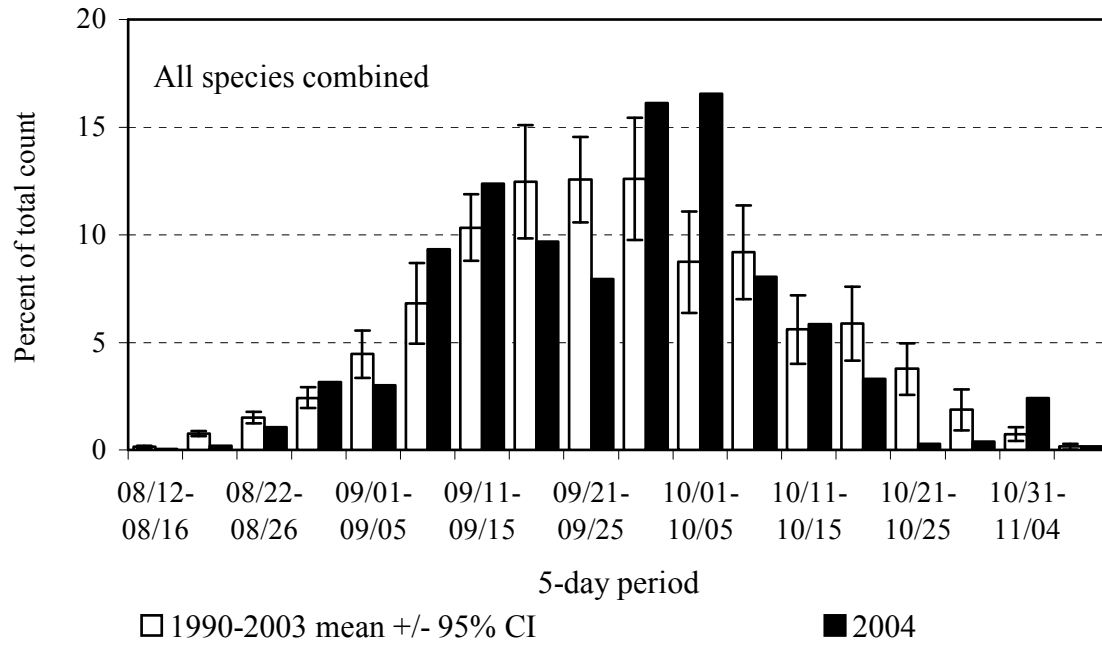


Figure 8. Combined-species passage volume by five-day periods: 1983–2003 versus 2004.

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

1983-1986: Single observer throughout with occasional scribe. 1983, David Sherman (0)¹; 1984, three principal observers: Jim Daly (0), Jeff Smith (0), and Fred Tilly (14); 1985, two principal observers: Jim Daly (1) and Fred Tilly (15); 1986, principal observer: John Lower (0).

1987-1989: Single observer throughout, two observers during the peak month. 1987, two principal observers: Victor Fazio (2) and Fred Tilly (16); 1988, two principal observers: Brian Mongi (2) and Fred Tilly (17); 1989, two principal observers: Brian Mongi (3) and Fred Tilly (19).

1990: Two observers throughout with two teams of two for a comparison count during the peak month. Four principal observers: 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. Three 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. Principal observers: Jerry Liguori (14) and Mike Lanzone (0).

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

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

2001: Two observers throughout. Principle observers: Jerry Liguori (17) and Nathan McNett (5).

2002: Two observers throughout. Principle observers: Nathan McNett (6) and Greg Levandoski (2).

2003: Two observers throughout. Principle observers: Nathan McNett (7), Adam Hutchins (4), Allison Cebula (3), Eric Hallingstad (2).

2004: Two observers throughout. Principle observers: Allison Cebula (4), Ricardo Perez (1+), and Nathan McNett (8).

¹ Numbers in parentheses indicate the number of years of previous experience conducting season-long migratory raptor counts.

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

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

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

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

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

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

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

Appendix C. Daily observation effort, visitor disturbance ratings, weather records, and flight summaries: 2004.

DATE	OBS. HOURS	OBSRVR / HOUR ¹	MEDIAN	PREDOMINANT WEATHER ³	WIND	TEMP (°C) ¹	BAROM. PRESS. (IN HG) ¹	MEDIAN	VISIB.	VISIB.	MEDIAN	BIRDS / HOUR	
			VISITOR DISTURB ²		SPEED (KPH) ¹			WIND DIRECTION	THERMAL LIFT ⁴	WEST (KM) ¹	EAST (KM) ¹		FLIGHT DISTANCE ⁵
15-Aug	7.50	2.0	0	pc-mc	4.4	w, ne-e	25.2	30.16	4	63	82	1	0.9
16-Aug	8.00	2.0	0	ovc/ts, pc-mc	8.2	w, var, w	17.2	30.15	4	60	53	2	0.3
17-Aug	6.75	1.9	0	pc-mc/haze, fog/rain	14.2	w-nw	16.2	30.12	4	50	46	1	0.1
18-Aug	0.00			rain/fog									
19-Aug	6.25	1.4	0	pc-mc/haze, AM rain	4.0	ne-e	18.8	30.12	4	41	54	1	0.2
20-Aug	9.00	1.9	0	mc-ovc/haze, PM rain	4.6	ne, w	19.0	30.14	3	65	87	2	2.4
21-Aug	9.50	1.9	0	clr-pc, haze	6.8	w-nw	20.9	30.04	3	94	89	2	4.5
22-Aug	7.08	2.2	0	pc-mc/haze, ovc/ts-rain	17.8	w	19.0	29.84	4	79	76	2	2.4
23-Aug	8.00	2.4	0	ovc, AM haze, PM ts	6.9	w	13.7	29.83	4	66	63	2	3.3
24-Aug	9.00	2.5	0	mc, PM rain	10.8	w	15.0	29.89	3	96	95	2	4.1
25-Aug	9.00	2.2	0	clr-mc, haze	17.8	wnw-nw, w	19.5	29.85	3	86	85	2	1.9
26-Aug	8.00	2.4	0	pc-ovc, AM fog, scat rain	11.5	w	11.5	29.92	4	86	67	2	2.5
27-Aug	9.00	2.7	0	clr-pc, haze	7.1	ne-e	12.9	30.13	3	91	94	1	5.3
28-Aug	9.00	2.0	0	clr	2.2	n-ne, var	16.9	30.41	1	100	97	2	7.1
29-Aug	9.00	2.6	0	clr/haze	5.2	nne-e	18.8	30.40	2	97	97	3	14.2
30-Aug	9.25	1.8	0	clr-pc, haze	3.2	var-w, e-se	20.7	30.45	1	98	97	1	16.5
31-Aug	9.00	2.8	1	clr-pc, haze	5.2	ne-e	23.4	30.54	2	94	96	2	10.9
1-Sep	9.00	1.9	0	clr-mc, haze	12.1	w	24.3	30.45	3	86	93	1	8.1
2-Sep	6.75	1.9	0	ovc, haze, ts/rain	7.0	w	16.9	30.13	4	57	87	2	10.1
3-Sep	8.00	2.2	0	mc-ovc/haze, AM fog	6.7	e	5.5	30.02	4	67	94	3	2.5
4-Sep	9.50	2.0	0	pc-mc/haze	5.4	ne-e, w	10.8	30.20	3	79	89	2	14.3
5-Sep	9.00	2.3	0	clr/haze	7.0	w	16.6	30.37	2	95	93	-	22.1
6-Sep	9.00	1.9	0	clr/haze	5.5	w, e	16.6	30.46	2	92	94	3	22.1
7-Sep	9.00	1.4	0	clr/haze	5.4	w, e	17.9	30.41	1	95	91	2	13.9
8-Sep	10.00	2.3	0	clr-pc, haze	11.9	wsw	22.7	30.36	2	93	90	-	40.5
9-Sep	9.00	2.8	0	clr-pc, haze	5.1	w, e	21.2	30.35	2	90	93	-	32.7
10-Sep	9.25	1.9	0	clr/haze	8.4	w	20.2	30.41	2	93	93	2	48.5
11-Sep	9.00	3.3	0	clr-pc, haze	5.2	w, e	21.5	30.45	2	96	96	1	27.4
12-Sep	9.25	2.4	0	mc-ovc/haze, PM rain	20.9	w	19.4	30.15	4	71	81	2	46.2
13-Sep	9.00	2.3	0	clr/haze	16.3	w	15.9	30.09	2	94	94	-	48.0
14-Sep	9.00	1.9	0	clr-pc	6.7	w	9.8	30.16	2	98	96	2	7.2
15-Sep	9.00	1.1	0	clr	1.6	w, var	13.5	30.23	1	99	98	2	9.8
16-Sep	9.00	1.6	0	clr	11.7	w	17.5	30.21	2	98	95	1	25.4
17-Sep	9.25	2.0	0	clr/haze	23.2	w	20.3	30.11	2	89	92	3	36.5
18-Sep	9.50	2.8	0	clr-mc, haze	26.0	w	16.9	29.86	4	63	52	2	61.8
19-Sep	2.50	2.7	0	ovc, fog/rain/snow	10.3	sw-w	8.3	29.66	4	44	13	-	10.4
20-Sep	4.00	1.2	0	ovc, PM snow	5.1	w-nw	5.1	30.12	4	99	81	3	5.8
21-Sep	8.50	2.0	0	mc-ovc	4.9	ne, w-nnw	5.4	30.31	4	99	97	3	8.0
22-Sep	10.00	1.8	0	clr	7.0	ne, w	9.6	30.34	2	94	98	2	29.9
23-Sep	9.50	1.9	0	clr-pc	5.8	sw, e	12.7	30.40	2	99	97	3	29.5
24-Sep	9.75	1.8	0	clr	4.1	e	15.3	30.47	1	99	95	3	38.2
25-Sep	9.25	2.3	0	clr/haze	4.0	var, e	15.4	30.44	1	98	97	2	55.8
26-Sep	9.50	2.4	0	pc-mc	7.7	sw-wnw, e	17.5	30.37	2	100	96	-	56.7
27-Sep	9.25	2.3	0	pc-mc/haze	6.5	var, e	16.8	30.37	3	95	80	2	34.4
28-Sep	9.25	2.4	0	clr-ovc, haze	9.4	w-wnw	16.8	30.38	2	91	92	3	68.6
29-Sep	7.25	1.2	0	mc-ovc/haze, PM rain	4.2	var, e	11.0	30.09	4	78	67	2	14.3
30-Sep	9.17	2.1	0	mc-ovc, AM fog, scat rain	1.3	var, w	10.3	30.06	3	71	57	2	29.7
1-Oct	9.00	1.8	0	pc-mc/haze, PM snow	4.3	e	10.5	30.32	3	81	71	3	49.3
2-Oct	8.50	2.0	0	clr-ovc, haze	6.1	var, w	12.5	30.44	3	92	79	1	55.8
3-Oct	9.50	2.0	0	clr-pc, haze	2.4	e	12.3	30.46	2	92	89	2	51.5
4-Oct	8.00	1.8	0	pc-ovc, haze, PM ts	4.9	var-w	13.8	30.39	2	91	84	2	60.9
5-Oct	9.50	1.9	0	clr-mc, haze	6.5	var-nnw	13.0	30.32	2	93	92	2	13.3
6-Oct	9.25	1.9	0	clr/haze	10.2	w	13.6	30.34	1	94	93	2	6.9

Appendix C. continued

DATE	OBS. HOURS	OBSRVR / HOUR ¹	MEDIAN		PREDOMINANT WEATHER ³	WIND		TEMP (°C) ¹	BAROM. PRESS. (IN HG) ¹	MEDIAN THERMAL LIFT ⁴	VISIB. WEST (KM) ¹	VISIB. EAST (KM) ¹	MEDIAN FLIGHT DISTANCE ⁵ / HOUR	BIRDS / HOUR
			VISITOR DISTURB ²	SPEED (KPH) ¹		WIND DIRECTION								
7-Oct	9.25	2.0	0		clr/haze	8.4	wsw-w, e	14.1	30.38	2	91	93	2	10.2
8-Oct	9.50	2.2	0		clr-pc, haze	11.5	w, var	17.1	30.42	2	95	95	2	38.8
9-Oct	9.25	2.1	0		ovc, haze, PM rain	15.2	w, ne	14.5	30.07	4	82	78	2	43.5
10-Oct	7.75	1.9	0		ovc, scat snow	5.6	e	7.0	30.14	4	92	51	1	7.6
11-Oct	9.25	1.9	0		clr-ovc, haze	11.2	ne-e	6.5	30.27	3	78	71	3	4.4
12-Oct	9.75	1.7	0		clr-mc, haze	4.6	var	12.3	30.39	2	92	94	2	25.0
13-Oct	9.00	2.4	0		clr	8.2	e, w-wnw	11.8	30.47	3	97	97	1	12.4
14-Oct	9.50	2.1	0		clr/haze	6.7	sw-w	13.5	30.39	2	95	97	2	32.8
15-Oct	9.25	2.1	0		clr-mc	16.9	w-wnw	14.9	30.22	4	97	97	2	9.2
16-Oct	9.50	2.1	0		pc-ovc, PM haze	20.2	w	13.8	29.97	4	80	83	2	15.6
17-Oct	8.75	2.1	0		mc-ovc/haze	25.3	w	7.7	29.75	4	65	52	2	18.3
18-Oct	7.50	1.9	0		pc-ovc, PM snow	6.2	w	3.9	29.83	4	88	76	2	5.6
19-Oct	0.00				snow									
20-Oct	0.00				snow									
21-Oct	0.00				snow									
22-Oct	9.00	1.6	0		mc-ovc, AM fog	18.5	w	1.9	29.93	4	60	55	2	3.6
23-Oct	6.00	2.0	0		ovc, PM fog	31.0	w	2.5	29.80	4	73	60	2	1.2
24-Oct	0.00				snow									
25-Oct	0.00				snow									
26-Oct	4.50	1.0	0		ovc/fog/snow	15.3	sw	3.0	29.70	4	9	13	1	1.3
27-Oct	0.00				snow									
28-Oct	2.50	1.5	0		pc-mc	28.5	wnw	-1.3	29.84	3	79	83	3	15.2
29-Oct	8.50	1.9	0		pc-ovc, haze, AM fog	14.8	w	0.5	30.10	3	60	66	2	1.1
30-Oct	8.50	1.9	0		mc-ovc, haze	17.9	w	1.7	30.03	4	86	91	2	2.8
31-Oct	7.75	1.6	0		pc-ovc, PM snow	22.5	w	-4.3	30.03	3	85	62	3	3.9
1-Nov	8.75	2.1	0		clr	5.7	nne-ene, w	-3.5	30.35	2	94	99	1	25.1
2-Nov	8.50	1.9	0		clr	9.5	sw-w	6.0	30.44	1	100	99	3	2.9
3-Nov	8.50	1.9	0		pc-mc/haze	6.2	wsw-w, s	5.9	30.09	3	94	98	1	2.2
4-Nov	8.50	1.7	0		pc-ovc, haze	9.8	e	4.7	30.26	3	96	100	1	0.4
5-Nov	7.00	1.6	0		clr/haze	6.9	e, w-wnw	8.7	30.43	1	97	99	1	2.7

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); pc = partly cloudy (16-50% cover); mc = 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: 2004.

DATE	HOURS	SPECIES ¹																								BIRDS				
		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	7.50	0	0	0	3	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	7	3.5
16-Aug	8.00	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1.0	
17-Aug	6.75	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	0.5	
18-Aug	0.00																													
19-Aug	6.25	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.7	
20-Aug	9.00	2	1	0	0	1	0	1	0	0	0	0	12	0	0	2	3	0	0	0	0	0	0	0	0	0	0	22	11.6	
21-Aug	9.50	0	0	1	2	1	0	4	0	0	0	2	19	0	0	2	2	0	0	7	0	1	0	0	0	0	2	43	22.6	
22-Aug	7.08	2	1	0	2	1	0	0	0	0	0	0	5	0	0	1	1	0	0	4	0	0	0	0	0	0	0	17	7.8	
23-Aug	8.00	1	1	1	0	2	0	0	0	0	0	0	16	0	0	1	1	0	0	0	0	2	0	0	0	0	1	26	10.6	
24-Aug	9.00	0	0	0	0	3	0	0	0	0	0	5	26	0	0	0	2	0	0	1	0	0	0	0	0	0	0	37	14.9	
25-Aug	9.00	0	0	1	2	0	0	0	0	0	0	0	9	0	0	1	0	0	0	2	0	1	1	0	0	0	0	17	7.7	
26-Aug	8.00	1	0	0	0	1	0	0	0	0	0	0	17	0	0	0	0	0	0	1	0	0	0	0	0	0	0	20	8.2	
27-Aug	9.00	0	0	3	3	1	0	1	0	0	0	0	14	0	0	0	2	0	0	24	0	0	0	0	0	0	0	48	17.9	
28-Aug	9.00	1	0	3	9	4	0	3	0	1	0	4	24	0	0	1	0	0	0	14	0	0	0	0	0	0	0	64	32.0	
29-Aug	9.00	1	2	1	8	7	0	1	0	0	0	6	33	0	0	4	1	0	0	62	0	1	0	0	0	0	1	128	48.8	
30-Aug	9.25	1	2	0	14	6	0	0	0	0	0	2	27	0	0	1	0	0	0	100	0	0	0	0	0	0	0	153	86.9	
31-Aug	9.00	0	0	3	16	6	0	3	0	0	0	3	26	0	0	2	0	0	0	38	0	0	0	0	0	0	1	98	34.7	
01-Sep	9.00	0	0	1	15	10	0	2	0	0	0	1	7	0	0	0	3	0	0	34	0	0	0	0	0	0	0	73	38.9	
02-Sep	6.75	1	0	1	14	6	1	2	0	0	0	2	14	0	0	6	0	0	0	20	0	0	0	0	0	0	1	68	35.8	
03-Sep	8.00	0	0	0	4	2	0	1	0	0	0	0	12	0	0	0	0	0	0	1	0	0	0	0	0	0	0	20	9.1	
04-Sep	9.50	4	1	2	34	22	0	6	0	0	0	3	40	0	0	3	2	0	0	17	0	0	0	0	0	0	2	136	68.0	
05-Sep	9.00	4	1	1	42	40	0	11	0	0	0	2	35	0	0	0	1	0	0	61	0	0	0	0	0	0	1	199	85.3	
06-Sep	9.00	5	0	1	60	18	0	9	1	2	0	0	31	0	0	2	0	0	0	65	0	2	0	0	0	0	3	199	107.2	
07-Sep	9.00	3	5	1	45	11	0	7	0	2	0	1	12	0	0	2	1	0	0	35	0	0	0	0	0	0	0	125	92.2	
08-Sep	10.00	2	2	1	133	61	2	16	1	0	0	17	33	1	0	4	1	0	0	128	0	0	1	0	0	0	2	405	176.9	
09-Sep	9.00	10	1	4	118	44	1	4	0	0	0	6	33	0	0	3	0	0	0	69	0	0	0	0	0	0	1	294	104.2	
10-Sep	9.25	10	3	3	134	98	2	17	1	0	0	3	32	0	0	3	1	0	0	138	0	1	0	0	0	0	3	449	236.3	
11-Sep	9.00	9	2	0	71	67	0	7	0	3	0	4	21	0	0	2	2	0	0	57	0	0	0	0	0	0	2	247	75.4	
12-Sep	9.25	2	10	1	135	103	0	14	1	0	0	3	43	0	0	4	4	0	0	106	0	0	0	0	0	0	1	427	177.9	
13-Sep	9.00	30	1	4	155	114	0	14	0	0	0	2	30	0	0	1	2	0	0	75	0	0	0	1	0	0	3	432	185.1	
14-Sep	9.00	4	1	1	16	17	1	4	0	0	0	1	9	0	0	1	3	0	0	7	0	0	0	0	0	0	0	65	34.4	
15-Sep	9.00	7	4	0	27	17	0	3	0	0	0	2	22	0	0	0	3	0	0	3	0	0	0	0	0	0	0	88	81.6	

Appendix D. continued

DATE	HOURS	SPECIES ¹																								BIRDS			
		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
16-Sep	9.00	40	6	2	47	66	2	5	0	0	0	4	22	0	0	0	0	0	0	34	0	0	0	0	1	0	0	229	145.1
17-Sep	9.25	26	10	1	111	82	1	4	0	0	0	6	37	0	0	1	2	0	0	55	2	0	0	0	0	0	338	165.7	
18-Sep	9.50	112	30	3	52	129	1	3	3	0	0	30	109	0	0	1	4	2	3	100	0	0	2	0	1	0	2	587	207.4
19-Sep	2.50	0	0	0	15	6	0	1	0	0	0	0	2	0	0	1	0	0	0	0	0	0	0	0	0	0	1	26	9.8
20-Sep	4.00	0	1	0	4	2	0	2	0	0	2	0	11	0	0	1	0	0	0	0	0	0	0	0	0	0	0	23	19.2
21-Sep	8.50	3	0	0	6	32	2	4	0	0	0	1	14	0	0	2	1	0	0	2	0	0	0	0	0	0	1	68	33.6
22-Sep	10.00	32	2	2	22	43	2	8	0	0	45	7	117	0	0	7	0	0	0	8	2	0	1	0	0	0	1	299	162.5
23-Sep	9.50	24	1	1	74	74	0	10	0	0	17	0	45	1	0	8	0	0	0	19	2	0	0	0	0	0	4	280	145.8
24-Sep	9.75	73	2	4	45	52	0	24	0	0	3	7	75	0	0	5	0	0	0	76	1	0	1	0	0	0	4	372	207.7
25-Sep	9.25	11	3	6	115	167	2	18	0	0	16	7	110	0	0	1	4	0	0	55	0	1	0	0	0	0	0	516	225.3
26-Sep	9.50	15	4	1	161	244	0	11	0	0	22	5	53	0	0	2	2	0	0	16	0	0	0	0	0	0	3	539	228.4
27-Sep	9.25	27	4	1	67	122	3	9	0	0	1	5	42	1	0	5	2	1	0	25	1	1	0	0	0	0	1	318	135.9
28-Sep	9.25	52	3	3	150	187	1	8	1	0	6	32	92	0	0	5	3	0	0	90	2	0	0	0	0	0	0	635	264.6
29-Sep	7.25	0	0	0	43	40	0	4	1	0	2	0	11	0	0	1	0	0	0	2	0	0	0	0	0	0	0	104	90.0
30-Sep	9.17	58	1	1	18	38	0	1	0	0	4	9	123	0	0	2	0	0	0	15	0	0	1	0	0	1	272	132.7	
01-Oct	9.00	54	5	1	48	148	1	10	0	0	2	3	147	0	0	3	2	1	0	17	1	0	0	0	0	0	1	444	242.2
02-Oct	8.50	19	3	1	98	200	0	7	0	0	0	6	115	0	0	3	3	0	0	19	0	0	0	0	0	0	0	474	232.4
03-Oct	9.50	19	4	3	81	166	1	8	0	0	1	3	169	0	0	6	7	1	0	16	1	0	0	2	0	0	1	489	248.2
04-Oct	8.00	8	1	2	128	103	1	6	0	0	1	1	213	0	0	2	6	0	0	13	0	0	0	1	0	0	1	487	270.6
05-Oct	9.50	7	0	1	37	18	1	3	0	0	0	0	39	1	0	0	6	0	0	11	1	0	1	0	0	0	0	126	66.3
06-Oct	9.25	3	0	0	22	8	1	1	0	0	0	1	18	1	0	0	3	0	0	5	1	0	0	0	0	0	0	64	33.0
07-Oct	9.25	0	0	0	31	7	0	2	0	0	0	0	39	0	1	1	4	0	0	6	1	1	0	1	0	0	0	94	48.2
08-Oct	9.50	0	1	2	190	43	0	2	0	0	0	0	104	0	0	1	6	0	0	20	0	0	0	0	0	0	0	369	171.6
09-Oct	9.25	1	0	5	176	43	2	2	1	0	0	0	150	0	0	0	5	0	0	14	1	0	0	2	0	0	0	402	189.6
10-Oct	7.75	0	0	0	18	11	1	2	0	0	0	0	27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	59	30.4
11-Oct	9.25	0	0	3	11	6	1	1	0	0	0	0	15	0	0	1	2	0	0	1	0	0	0	0	0	0	0	41	21.6
12-Oct	9.75	0	0	3	34	10	1	4	0	0	0	0	169	2	0	2	12	0	0	5	1	0	0	1	0	0	0	244	142.0
13-Oct	9.00	1	0	0	14	6	0	0	0	0	0	0	89	0	0	0	0	0	0	2	0	0	0	0	0	0	0	112	46.0
14-Oct	9.50	0	0	3	26	5	1	2	0	0	0	0	265	0	0	1	3	0	0	4	2	0	0	0	0	0	0	312	149.9
15-Oct	9.25	0	0	1	24	5	0	3	0	0	0	1	41	0	0	2	7	0	0	1	0	0	0	0	0	0	0	85	40.5
16-Oct	9.50	0	0	4	54	2	1	1	1	0	0	0	69	0	0	0	9	0	1	3	0	0	2	0	0	0	1	148	71.8
17-Oct	8.75	0	0	2	48	6	0	3	0	0	0	0	89	0	0	1	2	1	0	2	1	0	0	1	0	0	4	160	78.0

Appendix D. continued

DATE	HOURS	SPECIES ¹																								BIRDS				
		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
18-Oct	7.50	0	0	0	13	1	1	0	0	0	0	0	0	22	0	1	0	1	0	0	2	1	0	0	0	0	0	0	42	22.1
19-Oct	0.00																													
20-Oct	0.00																													
21-Oct	0.00																													
22-Oct	9.00	0	0	1	3	0	0	0	0	0	0	0	17	0	1	1	7	0	0	0	0	0	1	0	1	0	0	32	19.9	
23-Oct	6.00	0	0	0	3	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	3.4	
24-Oct	0.00																													
25-Oct	0.00																													
26-Oct	4.50	0	0	0	3	0	0	0	0	0	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	6	6.0	
27-Oct	0.00																													
28-Oct	2.50	0	0	0	2	0	0	0	0	0	0	0	32	0	0	1	3	0	0	0	0	0	0	0	0	0	0	38	25.3	
29-Oct	8.50	0	1	0	1	0	1	0	0	0	0	0	4	0	2	0	0	0	0	0	0	0	0	0	0	0	0	9	4.7	
30-Oct	8.50	0	0	1	5	0	2	0	0	0	0	0	7	0	1	0	5	2	0	0	1	0	0	0	0	0	0	24	12.8	
31-Oct	7.75	0	0	0	0	0	1	0	0	0	0	0	22	1	1	2	3	0	0	0	0	0	0	0	0	0	0	30	18.6	
01-Nov	8.75	0	0	2	3	1	1	0	0	0	0	0	203	0	0	1	7	1	0	0	0	0	0	0	0	0	1	220	102.6	
02-Nov	8.50	0	0	0	1	0	0	0	0	0	0	0	22	0	0	1	1	0	0	0	0	0	0	0	0	0	0	25	12.9	
03-Nov	8.50	0	0	0	3	0	0	0	0	0	0	0	13	0	0	0	2	1	0	0	0	0	0	0	0	0	0	19	10.1	
04-Nov	8.50	0	0	0	0	0	1	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	1.7	
05-Nov	7.00	0	0	1	4	0	1	0	0	0	0	0	11	0	0	0	0	2	0	0	0	0	0	0	0	0	0	19	11.9	
Total	642.75	685	120	96	3073	2736	41	299	11	8	0	122	197	3589	8	7	117	160	12	4	1709	22	11	11	9	3	0	51	13101	85.4

¹ See Appendix B for explanation of species codes.

Appendix E. Annual summaries of observation effort and unadjusted raptor counts by species: 1983–2004.

	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	MEAN	
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	15-Aug	15-Aug	15-Aug	15-Aug	15-Aug	15-Aug	15-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	5-Nov	31-Oct	5-Nov	5-Nov	5-Nov	5-Nov	5-Nov	5-Nov	3-Nov	
Observation days	68	83	76	67	66	85	76	78	79	85	80	78	83	74	79	71	82	78	83	81	79	76	78	
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	673.58	719.50	748.08	681.50	787.30	725.67	688.21	642.75	668.18	
Raptors / 100 hours	1517	1130	1427	1435	1921	1704	2397	2527	1879	2703	1510	3122	2276	3514	2541	3515	3003	2542	2662	1564	2001	2038	2224	
SPECIES	RAPTOR COUNTS																							
Turkey Vulture	92	141	211	131	165	198	200	285	327	473	270	418	289	486	482	732	349	297	441	243	466	685	319	
Osprey	41	39	40	43	51	54	65	86	62	119	54	130	92	99	187	176	110	152	152	83	96	120	92	
Northern Harrier	109	105	139	89	120	125	77	161	152	184	116	292	252	255	255	247	356	233	178	154	127	96	177	
Sharp-shinned Hawk	2021	2067	3177	2233	3537	4405	5404	5275	3702	5931	2838	6835	4752	6773	4677	9598	8094	6071	7429	3009	3460	3073	4782	
Cooper's Hawk	1698	1378	1741	1149	2042	3012	3074	3647	2779	5071	2298	5576	3252	5075	3848	6736	4109	3022	5107	2369	2281	2736	3278	
Northern Goshawk	105	146	119	65	65	74	80	123	146	259	120	105	150	241	97	99	103	123	80	11	16	41	110	
Unknown small accipiter ¹	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	55	246	268	299	257	
Unknown large accipiter ¹	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0	4	3	11	4	
Unknown accipiter	562	362	311	251	710	295	204	374	648	639	348	522	416	464	368	75	132	87	0	7	0	8	325	
TOTAL ACCIPITERS	4386	3953	5348	3698	6354	7786	8762	9419	7275	11900	5604	13038	8570	12553	8990	16508	12438	9303	12671	5646	6028	6168	8521	
Red-shouldered Hawk	0	0	0	1	1	0	0	1	0	0	0	0	0	2	0	0	0	1	0	0	0	0	0	0.3
Broad-winged Hawk	6	13	15	7	30	16	37	35	44	26	27	41	40	27	37	160	59	87	79	58	58	122	43	
Swainson's Hawk	116	34	78	276	69	43	60	351	108	208	159	244	287	498	143	507	334	132	251	91	908	197	233	
Red-tailed Hawk	2105	1765	2132	1663	2317	2048	2263	3336	2976	3489	1827	4663	3572	3990	2922	3329	5183	3446	3924	3008	3903	3589	3039	
Ferruginous Hawk	3	6	17	5	15	9	23	17	26	19	15	20	29	16	18	16	25	19	14	20	20	8	17	
Rough-legged Hawk	0	17	17	10	9	23	21	14	3	13	7	17	11	17	10	6	50	24	23	6	1	7	14	
Unidentified buteo	185	74	65	42	156	44	47	36	147	70	128	110	69	62	77	5	24	21	13	42	57	117	70	
TOTAL BUTEOS	2415	1909	2324	2004	2597	2183	2451	3790	3304	3825	2163	5095	4008	4612	3207	4023	5675	3730	4340	3225	4947	4040	3417	
Golden Eagle	239	206	230	196	221	154	203	290	324	263	317	338	299	344	329	235	348	305	295	330	181	160	269	
Bald Eagle	8	10	9	13	7	8	9	19	16	21	26	19	17	6	6	6	31	14	8	12	9	12	13	
Unidentified eagle	2	0	0	1	0	0	0	2	6	1	1	1	1	1	0	0	0	0	0	0	0	4	1	
TOTAL EAGLES	249	216	239	210	228	162	212	311	346	285	344	358	317	351	335	241	379	319	303	342	190	176	282	
American Kestrel	731	697	934	708	1099	1844	1669	2634	1564	2982	1234	2461	1964	3199	3394	3169	2974	3149	2774	1503	1768	1709	2017	
Merlin	4	14	3	3	17	20	33	25	37	43	19	72	86	71	78	91	74	49	51	39	33	22	40	
Prairie Falcon	31	16	5	11	15	27	24	26	23	40	26	45	58	44	48	50	33	37	23	12	14	11	29	
Peregrine Falcon	0	5	1	3	2	8	9	3	5	4	4	7	15	21	29	26	15	21	59	15	9	11	11	
Unknown small falcon ¹	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0	0	10	9	5	
Unknown large falcon ¹	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0	4	1	3	3	
Unidentified falcon	6	7	2	8	6	7	5	10	11	4	6	9	18	21	7	2	7	3	2	2	2	0	7	
TOTAL FALCONS	772	739	945	733	1139	1906	1740	2698	1640	3073	1289	2594	2141	3356	3556	3338	3103	3259	2879	1575	1837	1765	2105	
Unidentified raptor	446	113	94	53	186	107	96	106	193	234	117	229	149	83	102	25	57	34	26	81	79	51	124	
GRAND TOTAL	8510	7215	9340	6961	10840	12521	13603	16856	13299	20093	9957	22154	15818	21795	17114	25290	22467	17327	20954	11349	13770	13101	15037	

¹ Designations used consistently beginning in 2001.

Appendix F. Daily trapping effort and captures by species: 2004.

DATE	STATION		SPECIES ¹												CAPTURES		
	HOURS		NH	SS	CH	NG	BW	SW	RT	RL	GE	AK	ML	PR	PG	TOTAL	/STN HR
27-Aug	5.75		0	0	1	0	0	0	2	0	0	0	0	0	0	3	0.5
28-Aug	6.75		0	0	0	0	0	0	1	0	0	0	0	0	0	1	0.1
29-Aug	8.00		0	0	0	0	0	0	0	0	0	3	0	0	0	3	0.4
30-Aug	8.50		0	2	1	0	0	0	3	0	0	2	0	0	0	8	0.9
31-Aug	14.50		0	4	1	0	0	0	1	0	0	0	0	0	0	6	0.4
01-Sep	15.75		0	7	1	3	0	0	0	0	0	0	0	1	0	12	0.8
02-Sep	13.25		0	8	1	0	0	0	1	0	0	3	0	1	0	14	1.1
03-Sep	3.00		0	1	0	0	0	0	0	0	0	0	0	0	0	1	0.3
04-Sep	16.50		0	7	6	2	0	0	1	0	0	1	0	0	0	17	1.0
05-Sep	16.25		0	7	8	0	0	0	3	0	0	0	0	0	0	18	1.1
06-Sep	15.50		0	9	5	1	0	0	4	0	0	5	0	1	0	25	1.6
07-Sep	8.25		0	5	1	0	0	0	1	0	0	3	0	0	0	10	1.2
08-Sep	13.75		0	30	5	0	0	0	1	0	1	2	0	0	0	39	2.8
09-Sep	8.25		0	10	6	1	0	0	6	0	0	0	0	0	0	23	2.8
10-Sep	16.00		0	23	10	2	0	0	1	0	0	2	0	0	0	38	2.4
11-Sep	16.75		0	17	4	0	0	0	1	0	0	0	0	0	0	22	1.3
12-Sep	16.00		0	19	7	0	0	0	0	0	0	1	0	0	0	27	1.7
13-Sep	8.15		0	19	8	0	0	0	1	0	0	0	0	0	0	28	3.4
14-Sep	15.75		0	4	3	0	0	0	1	0	0	1	0	0	0	9	0.6
15-Sep	16.75		0	11	11	0	0	0	1	0	0	0	0	0	0	23	1.4
16-Sep	16.75		0	23	6	2	0	0	3	0	0	0	0	0	0	34	2.0
17-Sep	18.00		0	28	10	0	0	0	3	0	0	1	0	0	0	42	2.3
18-Sep	16.00		0	2	7	0	0	0	1	0	0	0	0	0	0	10	0.6
19-Sep	3.25		0	4	4	0	0	0	0	0	0	0	0	0	0	8	2.5
20-Sep	0.00																
21-Sep	11.00		0	4	0	0	0	0	1	0	0	0	0	0	0	5	0.5
22-Sep	22.75		1	11	19	1	0	0	2	0	0	0	2	0	0	36	1.6
23-Sep	16.25		0	26	25	0	0	0	0	0	0	0	2	0	0	53	3.3
24-Sep	17.00		0	5	4	0	0	0	0	0	0	2	0	0	0	11	0.6
25-Sep	17.28		0	32	10	2	0	0	1	0	1	1	0	0	0	47	2.7
26-Sep	16.75		0	37	33	0	1	0	0	0	0	0	0	0	0	71	4.2
27-Sep	17.00		0	21	16	2	0	0	0	0	0	2	1	0	0	42	2.5
28-Sep	20.00		0	54	23	0	0	0	0	0	0	6	0	0	0	83	4.2
29-Sep	15.75		0	9	4	1	0	0	1	0	0	0	0	0	0	15	1.0
30-Sep	15.50		0	5	2	0	0	0	0	0	0	0	0	0	0	7	0.5
01-Oct	23.50		0	24	20	0	0	0	1	0	0	0	1	0	0	46	2.0
02-Oct	24.25		0	27	17	0	0	0	2	0	0	0	0	0	0	46	1.9
03-Oct	25.25		1	31	19	0	0	0	1	0	0	0	0	0	0	52	2.1
04-Oct	22.25		0	57	13	0	0	0	1	0	0	0	0	0	0	71	3.2
05-Oct	26.75		0	14	5	1	0	0	0	0	0	0	0	0	0	20	0.7
06-Oct	18.50		0	11	3	1	0	0	1	0	0	0	1	0	0	17	0.9

Appendix F. continued

DATE	STATION	SPECIES ¹													CAPTURES	
	HOURS	NH	SS	CH	NG	BW	SW	RT	RL	GE	AK	ML	PR	PG	TOTAL	/STN HR
07-Oct	17.00	0	17	1	0	0	0	1	0	0	0	1	1	0	21	1.2
08-Oct	17.75	0	68	5	0	0	0	1	0	0	0	0	0	0	74	4.2
09-Oct	16.50	0	50	8	1	0	0	2	0	0	0	1	0	0	62	3.8
10-Oct	12.75	0	3	4	2	0	0	0	0	0	0	0	0	0	9	0.7
11-Oct	16.50	0	8	1	1	0	0	2	0	0	0	0	0	0	12	0.7
12-Oct	15.50	0	12	0	1	0	0	1	0	0	0	0	0	0	14	0.9
13-Oct	16.00	0	3	0	1	0	0	2	0	0	0	0	0	0	6	0.4
14-Oct	15.75	0	4	3	0	0	0	1	0	0	0	0	0	0	8	0.5
15-Oct	16.00	0	2	0	0	0	0	0	0	0	0	0	0	0	2	0.1
16-Oct	16.25	0	5	1	2	0	0	1	0	0	0	0	0	0	9	0.6
17-Oct	16.00	0	8	0	0	0	0	2	0	0	0	1	0	0	11	0.7
18-Oct	13.50	0	3	0	1	0	0	1	0	0	0	1	0	0	6	0.4
19-Oct	0.00															
20-Oct	0.00															
21-Oct	0.00															
22-Oct	10.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Total	807.18	2	791	342	28	1	0	61	0	2	35	11	4	0	1277	1.6

¹ See Appendix B for explanation of species codes.

Appendix G. Annual summaries of banding effort and capture totals by species: 1980–2004.

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	MEAN
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	22 Aug	19 Aug	18 Aug	18 Aug	21 Aug	21 Aug	22-Aug	24-Aug	24-Aug	27-Aug	27-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	25 Oct	23 Oct	22 Oct	22 Oct	3 Nov	28 Oct	4-Nov	5-Nov	28-Oct	22-Oct	22-Oct
Blinds in operation	1	1	2	2	2	3	3	3	4	4	4	4	5	5	5	6	5	5	5	3	4	4	4	4	3	3.6
Trapping days	21	37	27	55	69	?	?	?	?	?	66	64	74	59	65	63	61	62	63	72	62	72	68	66	53	58.6
Station days	21	37	?	66	104	?	?	?	?	159	205	240	296	254	278	312	270	264	236	131	174	210	188	163	105	186.1
Station hours	149	227	159	443	622	654	483.8	833	1085	1203	1454	1899	2316	1971	2290	2382	2061	2087	1690	939	1286	1666	1474	1276	807	1258.2
Capture/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	120.1	160.7	147.0	202.3	163.6	167.0	173.0	159.9	114.7	158.2	171.9
SPECIES	RAPTOR CAPTURES																									
Northern Harrier	0	2	0	8	3	6	2	4	10	9	4	9	10	4	7	2	1	18	4	0	17	11	8	7	2	5.9
Sharp-shinned Hawk	62	376	186	571	548	705	410	886	1177	1527	1583	1694	2036	1526	2686	1823	2091	1783	2131	897	1235	1608	1283	825	791	1219.1
Cooper's Hawk	36	300	129	306	261	366	164	395	553	652	821	909	1220	822	1473	695	737	767	1006	438	504	975	791	460	342	606.2
Northern Goshawk	6	11	3	32	40	42	5	27	22	29	44	33	104	27	35	27	68	20	20	20	24	23	7	9	28	28.4
Broad-winged Hawk	0	0	0	0	2	0	1	1	1	1	1	2	0	2	1	3	0	0	1	0	3	1	0	2	1	0.9
Swainson's Hawk	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	1	0	0	0	0.2
Red-tailed Hawk	14	26	13	43	31	51	15	43	37	66	99	93	97	53	158	93	84	67	69	49	58	76	109	63	61	62.8
Rough-legged Hawk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0.1
Golden Eagle	1	1	1	1	5	6	2	4	7	6	10	3	3	2	11	4	7	5	4	8	2	1	9	1	2	4.2
Bald Eagle	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	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	193	290	351	149	97	285	168	127	88	35	140.2
Merlin	0	1	1	0	2	0	0	1	5	8	2	9	10	8	21	13	18	26	13	16	11	12	15	5	11	8.3
Prairie Falcon	0	0	0	6	5	2	1	3	7	5	7	7	8	1	7	3	7	17	7	3	8	3	4	3	4	4.7
Peregrine Falcon	0	0	0	0	1	0	0	0	0	2	1	1	0	1	0	1	1	4	0	1	1	1	3	0	0	0.8
All Species	126	775	341	1019	926	1212	617	1401	1904	2366	2762	3026	3855	2671	4685	2857	3304	3058	3404	1529	2148	2882	2356	1463	1277	2081.9
Recaptures ¹	0	0	0	0	0	0	0	0	0	0	4	4	7	9	10	3	3	7	9	4	6	9	7	2	2	3.4
Foreign Recaptures ²	0	0	1	0	0	0	0	0	0	2	0	0	1	1	2	1	4	3	5	2	3	4	3	1	2	1.4
Foreign Encounters ³	0	1	5	3	9	12	5	7	11	12	15	18	14	21	19	16	9	18	14	10	19	9	27	10	14	12.0

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.