FALL 2001 RAPTOR MIGRATION STUDIES IN THE GOSHUTE MOUNTAINS OF NORTHEASTERN NEVADA

HawkWatch International, Inc.
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Report prepared by:

Mark S. Vekasy and Jeff P. Smith

Counts conducted by:

Jerry Liguori and Nathan McNett

Banding conducted by:

Kara Donohue, Mark McCaustlin, Kirsten McDonnell, Susie Michaelson, Chris Neri, Deb Sandack, and Mark Vekasy

On-site education by:

Helena Kokes and Kim Tice

Camp cook:

Dave Main

Project coordinated by:

HawkWatch International, Inc.
Principal Investigator: Dr. Jeff P. Smith
1800 South West Temple, Suite 226, Salt Lake City, UT 84115
(801) 484-6808

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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 (*sensu* Hoffman et al. in press). 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 2001 season marking the 22nd consecutive season of banding and 19th consecutive counts at the site. Annual counts typically range between 17,000-25,000 migrants of up to 18 species, making this one of the largest concentrations in the western U.S. and Canada. This report summarizes the 2001 count and banding results.

The Goshute project was 1 of 15 long-term, annual migration counts (12 fall, 3 spring) and 1 of 8 migration banding studies (6 fall, 2 spring) conducted or co-sponsored by HWI in North America during 2001. 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). Raptors feed atop food pyramids, inhabit most ecosystems, occupy large home ranges, and are sensitive to environmental contamination and other human disturbances. Therefore, they serve as important biological indicators of ecosystem health (Cade et al. 1988, Bednarz et al. 1990a, Bildstein 2001). Moreover, due to the remoteness and widespread distribution of most raptor populations, migration counts likely represent the most cost-effective and efficient method for monitoring the regional status and trends of multiple raptor species (Bednarz and Kerlinger 1989, Titus et al. 1989, Bildstein et al. 1995, Dunn and Hussell 1995, Dixon et al. 1998, Smith and Hoffman 2000, Zalles and Bildstein 2000).

The intensive counting and banding operations also provide valuable information about breeding and wintering distributions, migratory routes and timing, migratory behavior, population demographics, mortality factors and longevity, morphometric variation, molt timing and sequences, and health assessments (e.g., Hoffman et al. in press). This information enables us to better understand the life histories, ecology, status, and conservation needs of raptor populations in North America. 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 HWI's mission. Accordingly, since 1993 the Goshute field crew has included one or more trained educators dedicated to conducting environmental education programs at the site and facilitating interactions between visitors and the field biologists.

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 Bureau of Land Management (BLM), Elko Field Office (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. The Goshute Mountains are typical of the Great Basin region: dry, sparsely forested, and rocky. Pinyon pine (*Pinus monophylla*) and Utah juniper (*Juniperus osteosperma*) dominate lower slopes. White fir (*Abies concolor*), limber pine (*Pinus flexilis*), and bristlecone pine (*Pinus aristata*) dominate the overstory along the crest and on north-facing slopes. Mountain mahogany (*Cercocarpus montanus*) is a prominent shrub, especially on exposed portions of the ridge.

The geographic location and physiographic characteristics of the Goshute observation site make it an ideal spot for monitoring the autumn raptor migration through the region. The relatively inhospitable

Great Salt Lake Desert lies immediately east of the Goshute range and represents a formidable barrier to most migrating raptors (Figure 2), providing neither prey, roosting habitat, nor strong updrafts that provide lift. Instead, migrating raptors moving south from breeding grounds north of the desert tend to funnel to the west (and east) and therefore concentrate along the Goshute range where steep slopes and forest habitat provide favorable migration conditions. Moreover, the Goshute Mountains lie at the southern tip of a large funnel that is fed by the Black Pine, Raft River, Grouse Creek, Pilot, and Toana Mountains. These ranges act as "leading lines"(*sensu* Geyr von Shweppenberg 1963:192) that guide raptors toward the Goshute range from the north and northeast. These conditions are responsible for the Goshute flyway attracting one of the largest known concentrations of migrant raptors in western North America.

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. Part of the reason this location was originally chosen as the main count site was that it provided a relatively large area for visitors to congregate near the main counters. However, 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 that provided an unobstructed view along the lower eastern flanks of the ridge (OP2 in Figure 1).

In 1988 and 1990, 3 and 17 days, respectively, of simultaneous comparison counts were conducted to quantify differences in counts from the two sites. The 1988 comparison suggested that, under light northeast or highly variable winds, observers at OP1 missed all east-side birds (265 total) seen from OP2 (actually a nearby location further out on the east side; Mongi 1989). However, the more extensive comparison during 1990, which included 7 days of predominantly east winds, yielded equivocal results (Tilly 1990). A great difference in the experience level of one observer (21 seasons of prior experience) compared to the other three (1–2 seasons) confounded analysis of the latter results. Accounting for this factor along with site and wind direction in a three-way, full-factorial analysis of variance (updated analysis by the author) revealed no significant effects, whether the dependent variable include all species, only inconspicuous species (accipiter and falcons) or only conspicuous species (all others). Moreover, although the more experienced observer team saw slightly more birds under west and variable winds at OP1 and slightly more birds at OP2 under east winds, the opposite was true for the less experienced team. In addition, disregarding differences relating to experience level, slightly more birds were seen at OP1 under east and variable winds, while OP2 yielded slightly more birds under west winds. Despite these equivocal results, the practice of switching to OP2 when east winds prevailed continued as a standard practice through 2000.

Subsequent to the 2000 season, concurrent with the full emergence of a new HWI management structure, the switching issue once again emerged as a topic of discussion. At that time, the prevailing feeling among HWI staff and the main Goshute counters for the past two years favored moving the main count site to OP2 and henceforth using only that site. The arguments in favor of the move included the following:

1) Previous use of OP2 was not governed by adequately standardized protocols (i.e., inadequate specificity as to when a switch should occur) and, even if it had been, many marginal cases arise, making application of even standardized switching protocols difficult. Moving back and forth between the sites also sacrificed data during the moves and unnecessarily complicated the daily routine.

2) OP2 provides an unobstructed view of the entire ridge through about a 270° arc from southwest to north to southeast, thereby rendering it a better single location to observe under all wind conditions. Visibility extends to the Ruby Mountains 100 km to the west and to the Cedar Mountains 120 km to

the east. Moreover, because OP2 is about 30–40 m lower than OP1, proportionately fewer birds pass by below eye level and against the forested landscape along the flanks of the ridge, which is a difficult backdrop against which to pick out birds.

3) Two trapping blinds are located upstream of OP1 (North and West blinds), whereas only one blind is located upstream of OP2 (North). Moreover, from OP2 the observers have a clear view of the North trapping blind, whereas neither blind can be seen clearly from OP1. Therefore, using OP2, observers are better able to monitor the activities of the single blind and, by keeping in radio contact with the blind, have a better chance, despite unusual post-release flight behaviors (e.g., heading off low on the east side), of observing and counting released birds as they pass the count site.

4) By using OP2 as the main count site, OP1 can be used as a staging area for HWI's on-site educators to entertain visitors without subjecting the main counters to unnecessary distraction.

For these reasons, HWI's Science Committee (which includes HWI staff and Board members, experienced HWI field observers, and outside experts) authorized moving the primary observation site to OP2 beginning with the 2001 season. The Committee recognized the potential risks of changing the protocol, given knowledge that even relatively small distances between observation sites can markedly influence what is seen (e.g., see confounded results in Kochenberger and Dunne 1985). However, problems with the existing protocols concerning use of OP1 and OP2 also were real. Field observers most experienced with the project felt strongly that adopting OP2 as the only observation point would greatly improve both the consistency and efficiency of the count. After lengthy discussions, the Committee concurred and authorized the change. The results of the 1990 comparison count bolstered the conclusion, which, although limited in extent and experimental design, indicated largely comparable counts at the two sites. Thus, the Committee concluded that there was more to gain than lose by making the change and that it was long overdue. However, their recommendation included the caveat that a well designed comparison count be conducted as soon as possible to better quantify the effect of the change on count efficiency and thereby preserve the validity of long-term trend analyses based on the project's count data. The Committee acknowledged that the motivation behind calling for the study was not to justify the change (already made and justified based on several objectives), but to provide a quantitative basis for assessing the effect on counts. HWI will conduct such a comparison count during the 2002 field season.

In 2001, four banding stations were located 100–700 m to the north, south, and southeast of OP2 (Figure 1). **North** station, established mid-season in 1989 and modified slightly in 1998, was located about 300 m north-northwest of OP2 directly 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. **South** station, established in 1982 and modified in 1998, was located 700 m south and slightly east of OP2 in a topographic saddle at 2,660 m elevation.

METHODS

STANDARDIZED COUNTS

Two official or designated observers, relieved or supplemented by other trained volunteers, conducted standardized daily counts of migrating raptors from a single observation site (OP2). Primary observers Jerry Liguori and Nathan McNett had 17 and 5 full-seasons, respectively, of previous experience counting migratory raptors (see Appendix A for a complete history of observer participation). Visitors

and other crewmembers also frequently assisted with spotting migrants. Weather permitting, observations usually began between 0800 and 0900 hrs Mountain Standard Time (MST) and ended near sunset, usually between 1800 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.

The observers used high quality 7–10x binoculars to spot and identify birds. Clark and Wheeler (1987), Dunne et al. (1988), and Wheeler and Clark (1995) served as primary identification references, as needed. Assessments of wind speed, cloud type, cloud cover, and flight altitude followed guidelines published by the Hawk Migration Association of North America (HMANA). Assessments of thermal lift conditions as poor, fair, good, or excellent involved subjective evaluations of solar intensity, wind speed, and migrant behavior.

The observers classified as residents and excluded from daily counts any raptor that exhibited hunting, territorial display, or perching behaviors for extended periods. The observers occasionally recorded as migrants birds that were not moving in a southerly direction, if such birds otherwise displayed migrant characteristics; i.e., continuous flight without stopping or substantially changing directions for several kilometers. Such birds may be dispersing juveniles or adults dispersing relatively short-distances from their nesting territories to favored wintering grounds in the same general region. However, we also know from recent satellite telemetry work that species such as Golden Eagles, Prairie Falcons and Ferruginous Hawks frequently "migrate" in non-standard directions to take advantage of favored post-breeding and wintering grounds (Steenhof et al. 1984, Watson and Pierce 2000, K. Steenhof personal communication, HWI unpublished data).

One of the four banding stations was located north of the observation lookout. The observers disregarded the trapping operations and counted all raptors that passed by observation. Some released birds fly low into cover or along the ridge, so banders maintained close radio contact with observers to assist with notification and detection of released birds. This procedure likely resulted in a slight undercount of migrants, but avoided the problem of duplicate counts associated with other methods, such as having observers try to identify and disregard released birds and later add trapping totals to the count.

For purposes of examining long-term variation in annual count statistics, we manipulated the count data to standardize annual sampling periods and adjust for daily variation in observation effort. The seasonal and daily duration of observation effort can greatly affect count statistics (Hussell 1985, Kerlinger 1989,

Bednarz et al. 1990b), and both have varied in the Goshutes during the course of the study, particularly during the first several years of observations. To generally adjust for variation in sampling effort due to inclement weather and other unforeseeable events, before analyzing population trends we converted counts to annual passage rates for each species (adjusted total count / total hours of observation for a given year * 100 = raptors/100 hrs). To further standardize seasonal sampling effort, we defined a consistent annual sample period following conventions proposed by Bednarz and Kerlinger (1989) and Bednarz et al. (1990b). Specifically, we converted counts to passage rates on a daily basis (raptors/10 hours of observation) to adjust for daily variation in sampling effort, summed daily rates by Julian date across all years, and defined standardized passage periods for each species by eliminating approximately 2.5% from each extreme of the cumulative passage-rate distributions. Because entire count days must be either included or excluded, the defined sample period for a given species included between 95–100% of the detected number of migrants. For some species, the sample periods defined in this way encompassed dates earlier or later than periods of continuous observations. In these cases, we further restricted the adjusted sample periods to between mean starting and ending dates of continuous observations for 1983–2001: 15 August – 2 November.

Observers commonly identify distant or otherwise poorly observed migrants only to genus or other common non-specific groupings (e.g., unidentified eagle or buteo, which each can include multiple genera). Such identifications sometimes constitute a sizeable proportion of the birds seen, especially for accipiters, varying with observer experience and weather conditions. Excluding these birds from population trend analyses may render inaccurate assessments of true flight volume. Accordingly, prior to analyzing trends in annual passage rates, we also adjusted the daily counts by distributing incompletely identified birds across relevant species in proportion to the relative abundance of birds identified to each species that day.

Hereafter, we refer to as "adjusted" any data based on counts adjusted for incompletely identified birds and/or truncated to standardized annual sampling periods.

In most cases, we limit the analyses in this report to comparing 2001 annual statistics against means ± 95% confidence intervals (CI) for previous seasons, in which case we equate significance with a 2001 value falling outside of the CI for the associated mean. We also limit most comparisons of age and sex statistics to 2001 values versus means for 1992–2000, because pre-1992 class data have not been fully computerized. To provide additional context, we refer to but do not provide in-depth details concerning recently completed analyses of long-term trends in adjusted annual passage rates (manuscript in review for publication). These analyses involved linear and quadratic regressions examining trends in annual passage rates for 1983–2001. We commonly refer to the results of these analyses as not significant ($P > 0.10$), marginally significant ($P < 0.10$), significant ($P \leq 0.05$), or highly significant ($P < 0.01$).

TRAPPING AND BANDING

Rotating crews of 1–5 trappers and processors operated each trapping station, with crew size depending on volunteer availability, trapper experience, characteristics of the station, and flight volume. The crews generally trapped between 0900 and 1700 hrs MST. Capture devices included mist nets, remotely triggered standard bow nets, remotely triggered surge bow nets, and dho-gaza nets (Bloom 1987). Each banding station operated from 3–6 standard bow nets, 1 surge bow net, 1–3 dho-gazas, and 3–4 mist nets. Trappers lured migrating raptors into the capture stations from camouflaged blinds using live, non-native Rock Doves (*Columba livia*), Ringed Turtle-doves (*Streptopelia risoria*), European Starlings (*Sturnus vulgaris*), and House Sparrows (*Passer domesticus*) attached to lure lines manipulated from the blinds. Unless already banded, all captured birds were fitted with a uniquely numbered USGS Biological Resources Division aluminum leg band. Processors identified species, subspecies, sexes, and ages using morphological characteristics described in the U.S. Bird Banding Laboratory (BBL) Manual, Clark and Wheeler (1985), Wheeler and Clark (1995), and Hoffman et al. (1990). Processors also recorded a series

of standard morphometric, health, and molt data for each bird. Unless selected for attachment of a satellite transmitter, all birds were released within 45 minutes from the time of capture. All birds with transmitters were released within one hour of capture.

RESULTS AND DISCUSSION

WEATHER

The weather was dry and mild for most of the 2001 season, and included only one significant snowstorm and only seven observation days with some precipitation (see Appendix C for daily weather records). Most weather fronts were insubstantial, resulting in little or no rain or snowfall, with clear skies predominating throughout most the season. The observers missed no full days of observation due to inclement weather, and rain, snow, or fog limited observations to <5 hrs on only 1 day. Wildfire danger remained high in the area for the third consecutive year and several fires burned nearby during the season; however, unlike in 1999, no observation days were missed due to wildfire smoke. Average daily temperatures ranged from 1.0°C to 24.9°C throughout the season and remained above 14°C until the second week of October, at which time temperatures dropped and generally averaged between 3 and 10°C for the remainder of the season. Thermal lift was rated fair to poor on 62% of all days, a near normal value, with nearly all the remaining observation days (34%) receiving a good rating. Strong winds (>20 kph) prevailed on only 10% of the active observation days and were generally associated with smaller flights compared to days with similar weather but lighter winds. Southwest winds, which typically have been associated with peak flights, predominated on 49% of days and occurred during part of another 22% of the active observation days this season. Northeast winds were the next most common (9% of days). Of 14 days with flights above 40 raptors/hr, 43% had southwest winds, 21% had northeast winds, and 36% had winds generally split between southwest and northeast or variable.

OBSERVATION EFFORT

The observers worked at least part of all 83 possible observation days between 15 August and 5 November. The number of observation days was significantly higher (8%) than the 1983–2000 average of 77 ± 95% CI of 2.7 days. The total hours of observation (787.30) also was significantly higher (20%) than the 1983–2000 average of 657.25 ± 95% CI of 33.716 hours. The 2001 average of 1.9 observers per hour (including official and guest observers; value is mean of daily values, which are in turn means of hourly values) was significantly lower (33%) than the 1992–2000 mean of 2.8 ± 95% CI of 0.35 observers/hr.

MIGRATION SUMMARY

The observers counted 20,954 migrant raptors of 17 species during the 2001 season (see Appendix D for unadjusted daily count records). No record high or low counts occurred this season. However, the Peregrine Falcon count tied the 1996 high count of 29, the count for Turkey Vulture ranked as the second highest count on record, and counts for Broad-winged Hawk, Rough-legged Hawk, Sharp-shinned Hawk and Osprey all ranked third highest (see Appendix E for annual summaries for each year of the project). No Red-shouldered Hawks were seen this season, although an adult was seen at the base of the mountain near Ferguson Springs.

The 2001 flight was composed of 61% accipiters, 21% buteos, 14% falcons, 2% vultures, 1% eagles, and <1% each of harriers, Ospreys, and unidentified raptors. The 2001 season featured significantly above average proportions of accipiters and Ospreys, and significantly below average proportions of buteos, eagles, harriers, and unidentified raptors (Figure 3). The most commonly observed species was the

Sharp-shinned Hawk (36% of the total count), followed by Coopers' Hawk (24%), Red-tailed Hawk (19%), American Kestrel (13%), and Turkey Vulture (2%). No other species comprised more than 2% of the total count.

Adjusted passage rates were significantly higher than average for seven species seen this season (Turkey Vulture, Osprey, Sharp-shinned Hawk, Coopers' Hawk, Broad-winged Hawk, American Kestrel, and Peregrine Falcon), whereas five commonly observed species showed significantly lower than average adjusted passage rates (Northern Harrier, Northern Goshawk, Ferruginous Hawk, Bald Eagle, and Prairie Falcon; Table 1). For those species showing above average passage rates in 2001, the results are consistent with the 1983–2001 regression analyses, which indicated highly significant linear increasing trends for each of these species (Figures 4–8). Similarly, regression analysis indicated a highly significant linear increasing trend for Red-tailed Hawks, which showed a 10%, albeit non-significant, above average passage rate in 2001 (Figure 6).

The regression analyses also indicated a highly significant long-term, linear increasing trend for Northern Harriers due to an abrupt and sustained jump in activity between 1994 and 2000; however, the low 2001 passage rate returned the activity level for this species to pre-1994 levels (Figure 4). Several other species also showed increasing patterns into the mid-1990s, but have since shown declines. A significant, long-term increasing trend was still indicated for Prairie Falcons, but passage rates for this species have declined steadily since peaking in 1995 (Figure 8). A highly significant quadratic regression for Merlins reflected a strong increasing trend through 1998 that has since stabilized and then declined sharply during the last two years (Figure 8). Similarly, a significant quadratic regression for Ferruginous Hawks reflected an increasing pattern through 1995 but stabilization and a slow decline thereafter (Figure 6). A marginally significant linear increasing trend was still indicated for Swanson's Hawks, but a low 2000 passage rate followed by an average 2001 rate substantially dampened the previous increasing pattern for this species (Figure 6).

Sharp-shinned and Cooper's Hawks showed remarkably similar patterns of annual oscillations between 1990 and 1999, both with an increasing trajectory (Figure 5). Moderate passage rates in 2000 broke the pattern for both species, but higher rates again in 2001 may have reestablished the oscillating pattern.

No distinct long-term trends were indicated for Northern Goshawks (Figure 5), Rough-legged Hawks (Figure 6), and Golden and Bald Eagles (Figure 7).

Immature : adult ratios were below average for 7 of 10 species with data suited to comparisons, significantly so for Northern Goshawk, Red-tailed Hawk, Ferruginous Hawk, and Bald Eagle (Table 2). Moreover, in all cases the lower age ratios reflected lower than average abundances of immature birds, while in all but two cases (Northern Harriers and Bald Eagles) adults were more common than usual. Among the three species with above average age-ratios, for Broad-winged Hawks and Peregrine Falcons counts of both immatures and adults were above average, whereas for Golden Eagles immatures and subadults were more common that usual while adults were comparatively scarce (Table 2). Low abundance of immature birds for most species probably reflects the negative effects on recruitment of the prolonged drought and extensive wildfires that have plagued much of the interior West for the past 2–3 years. For goshawks, in particular, the significantly below average age-ratio corresponds to reports of dismal breeding success from many areas, including Utah, Arizona, Idaho, and Washington (anecdotal reports from various colleagues).

At first glance, above average passage rates for several common species in the Goshutes during 2001 appear anomalous relative to showings of distinctly depressed activity at most other HWI sites in the West (e.g., Smith 2002), which we believe reflect the cumulative negative effects of prolonged drought on juvenile recruitment and survival. A closer look at the Goshute data revealed, however, that, compared to the last five years, the 2001 adjusted passage rates were below average (8–72%) for all species except Osprey, Cooper's Hawk, Broad-winged Hawk, and Peregrine Falcon (1–13% above

average). Data on immature : adult ratios provide additional evidence that, in fact, the Goshute counts were depressed in 2001 due to poor juvenile recruitment. In fact, comparing current and long-term average passage rates is especially misleading in the Goshutes with regard to illustrating short-term patterns because, more so than at most other sites, most species have shown pronounced long-term increases in the Goshutes. This unique prevalence of increasing trends may reflect unique regional effects of climatic variation during the 1990s on populations in the northern Intermountain and Great Basin regions. Nevertheless, as highlighted above, during the past several years several species that previously showed strong increasing trends are now showing downward trends, mostly likely due to the effects of prolonged drought. This pattern also applies to most species HWI monitors in the Wellsville Mountains of Utah (Smith 2002).

The 2001 combined-species median passage date of 26 September was significantly later than average (4 days; Table 3), which a comparison of seasonal patterns clearly illustrates (Figure 9). Only 8 of 17 species showed significantly late timing, however, while three species (Broad-winged Hawk, Bald Eagle, and Peregrine Falcon) showed significantly early timing (Table 3). Within species groups, the only consistent pattern was that all three accipiters were at least slightly later than average (Table 3); however, examination of age-specific data indicated that this applied only to immature Sharp-shinned and Cooper's Hawks and adult goshawks, whereas adult Sharp-shinned Hawks and immature goshawks were significantly earlier than average (Table 4). Similar to the species-level data, no other consistent, multi-species patterns emerged from age-specific comparisons. Thus, as far as seasonal timing is concerned, the 2001 season was a mixed bag.

TRAPPING EFFORT

The crews operated at least one and up to four banding stations on 72 of 75 days between 22 August and 4 November (see Appendix F for daily capture records and Appendix G for annual summaries). The number of trapping days and station hours (1,666) were 26% and 33% higher than the 1980–2000 averages (average of two stations per season), respectively, but very similar to the 1987–2000 averages (average of 4.5 stations/season) of 65 days and 1,678 hours.

TRAPPING SUMMARY

The 2001 capture total of 2,882 raptors included 13 species, 2,869 newly banded birds, 9 recaptures of birds previously banded in the Goshutes, and 4 foreign recaptures (i.e., recaptures of birds originally banded elsewhere; Table 5, Appendix G). The 2001 effort raises the total number of birds captured since project inception to 46,952, including 75 Goshute recaptures and 29 foreign recaptures. Sharp-shinned Hawks accounted for 56% of the total captures, followed by Cooper's Hawks (34%) and American Kestrels (6%). Each of the remaining species accounted for less than 5% of the total. Two Rough-legged Hawks (one adult male and one immature bird) were the first of this species ever captured at the site.

The 2001 combined-species capture total was 3% above average, primarily due to a large increase (24%) in Cooper's Hawk captures (Table 5). Capture totals for Northern Harrier were also above average, while totals for Northern Goshawk, Golden Eagle, and Prairie Falcon were significantly below average. Capture rates generally mirrored these results and the estimates of capture success were average except for Sharp-shinned Hawk, Golden Eagle, Prairie Falcon, and Peregrine Falcon (all significantly below average; Table 5). For goshawks, average capture success but a below average capture total and rate clearly reflect the low total count.

Compared to the counts, a this site banding data yield unique and sufficient sex–age specific data only for the three accipiters and American Kestrels (Table 6). The capture and count data yielded similar age-ratio patterns for Sharp-shinned Hawks (11 and 24% below average) and Northern Goshawks (82% and

96% below average), in all cases resulting at least in part from low abundances of immature birds. For Cooper's Hawks, however, the count data indicated a 31% below-average ratio, whereas the banding data indicated an 8% above-average ratio. For Cooper's Hawks, the adult count was 44% above average while the immature count was 3% below average (Table 2). In contrast, both adult and immature capture totals were above average (9% and 18%, respectively). Thus, the capture totals underestimated the true relative abundance of adults and overestimated to the true relative abundance of immature Cooper's Hawks. Looking more closely at the capture totals, it appeared that males, especially immature males, were more strongly represented than usual, whereas females were only slightly more common than usual. Together these data suggest that immature birds, especially males, were more susceptible to capture than usual, whereas adults, especially females, were probably slightly less susceptible to capture in 2001.

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 indicated a 36% below average immature : adult ratio, which was largely due to poor representation of immature birds (Table 6). Again, this emphasizes that low recruitment appeared to reflect abundances in 2001.

Female : male ratios were 5–20% below average for Sharp-shinned Hawks, Cooper's Hawks, and American Kestrels, but 125% above average for Northern Goshawks (Table 6). The unusually high ratio for goshawks primarily reflects over-representation of adult females and extreme under-representation of immature males.

ENCOUNTERS WITH PREVIOUSLY BANDED BIRDS

Recaptures

The 2001 captures included six recaptures of Cooper's Hawks and three recaptures of Sharp-shinned Hawks originally banded in the Goshutes between 1995–2000 (Table 7). This brings the total number of Goshute recaptures since 1980 to 75 birds, all accipiters (Appendix G).

Foreign Recaptures

The 2001 captures included four foreign recaptures of birds originally banded elsewhere (Table 7). These included the sixth exchange of banded Northern Goshawks between the Goshutes and Dr. Marc Bechard's nest-monitoring project in the Independence Mountains of north-central Nevada, and the twelfth exchange of banded birds between the Goshutes and Idaho Bird Observatory's migration monitoring project on Boise Ridge, Idaho.

Foreign Encounters

Nine raptors originally banded in the Goshutes were encountered elsewhere in 2001, which is only slightly less than the long-term average of 11 per year (Table 8, Appendix G). This brings the total foreign encounters since 1980 to 247 birds. We are still awaiting full reports from the Bird Banding Lab concerning recoveries of a Cooper's Hawk and a Red-tailed Hawk banded during fall 2001. Otherwise, with the exception of a female Cooper's Hawk caught and released at a passerine banding station in Selkirk, Ontario, all of the known-fate foreign encounters involved injured or dead birds, most with the cause of death unknown (Table 8). Most of the encounter locations were within the expected bounds of the Intermountain Flyway (Hoffman et al. in press). The Ontario encounter is suspect due the unusual recovery location and a reported eye color and wing chord measurement that did not correspond with the original capture information; however, the Ontario bander was confident that no band-transcription error occurred. This is actually the second reported recovery of a HWI western Cooper's Hawk in the northeast; the first bird was banded in the Manzano Mountains, NM as a hatch-year bird and recovered dead five years later during the breeding season in Massachusetts. Thus, perhaps these are in fact true examples of extreme wandering in Cooper's Hawks. The other exception to the Intermountain Flyway recovery locations was a Red-tailed Hawk found injured near Edwards Air Force Base on the coast of

southern California. Although a recovery from southern California is not unprecedented, especially for Red-tailed Hawks, most Goshute recoveries occur further east or south of this area (Hoffman et al. in press).

RESIDENT RAPTORS

Residents seen this season included a pair of adult Golden Eagles, which were usually seen to the north of the count site but also frequented the Ferguson Butte area to the east. A pair of adult, light-morph Red-tailed Hawks was seen through much of the season over the knoll to the northwest of the project site. At least one and probably a pair of Prairie Falcons were seen to the east of the count site during September. A pair of adult Northern Goshawks and one juvenile were seen around the count site and to the north throughout September. An adult Peregrine Falcon also remained in the area for a number of days, making attacks on many of the passing migrants, particularly Sharp-shinned Hawks. This resident assemblage is typical for the site. In addition, for the past few of years, Red-shouldered Hawk(s) have been seen during the first few weeks of the migration season near Ferguson Springs to the east of the Goshute ridge. This species is rare in Nevada, having been recorded as a Goshute migrant only six times in 20 years (Appendix E). However, individuals have been seen throughout the year in the state and the species was recently confirmed as a breeder at Pahranagat National Wildlife Refuge near Alamo, NV. Young birds are also being reported with increasing frequency in late summer and early fall in several areas, including the Ruby Valley about 90 km west of the Goshutes (Chisholm et al. 2000).

SITE VISITATION

In 2001, 319 individuals signed the HWI visitor logs. Utah represented the most common point of origin, with 61% of visitors originating in this state. Another 17% of visitors originated in Nevada, with the remainder hailing from Colorado, California, Idaho, Oregon, Wyoming, Montana, Arizona, Iowa, Illinois, Michigan, New York, Canada, England, and Germany. The visitors included 115 members of eight organized groups (36% of the visitation). The groups include six school groups from Wendover, Elko and Taylorsville High Schools, Great Basin College, Realms of Inquiry in Salt Lake City, and Wendover Elementary. Other groups included the Sierra Club and a scout troop.

As in past years, the project generated significant media coverage. Brian Beffort from Reno, Nevada came to gather information for an article that will run in Sunset magazine in September 2002. Reporters from Ogden spent a night on the mountain to collect information for their newspaper. Camilla Carlbon and Matthew Testa spent several days on the mountain gathering footage for a documentary about the Goshute Raptor Migration Project that will air on cable television. The U.S. Forest Service also sent a crew to film the project for Olympic-related resource information.
A number of special guests also visited the Goshutes. Photographer Howie Garber and author Steven Trimble both spent time at the site this season. Two visitors stayed for a weekend under the auspices of HWI's Ecotour program. These visitors were treated to inside looks at the actual operation of the project. Tamara Hawthorne, the new resource specialist from the Elko Field Office of the BLM, also visited the site for the first time this year.

Beginning with the fall 2001 season, HWI adopted a new approach to quantifying the influence of visitors on counts at all of its project sites. Encouraging visitation and achieving positive public education and outreach are important goals for all HWI projects; however, during migration counts, visitors can represent a distraction for the official observers that may compromise the integrity of the count. Tolerating a certain level of distraction in the interest of positive outreach is a tradeoff that we gladly accept as part of our operations; however, because the distraction potential fluctuates considerably through time, it is important that the data we record include a means of quantifying the distraction potential through statistical modeling. Previously, at each site we had the observers estimate the number

of visitors present during each hour of active counts. Two primary problems confounded use of this system for quantifying the visitor-distraction factor.

First, during busy periods (in terms of birds to count or visitors present) tracking visitors often became a difficult task for the observers. This difficulty led to both inconsistent estimation and, in some cases, in and of itself represented an unnecessary distraction. Second, careful reflection over the years suggested that simply recording the number of visitors often failed to capture the true effect of specific situations. For example, a single, highly curious, and talkative individual often represents more of a distraction for the observers than a large group of relatively quiet visitors.

In an effort to overcome these limitations, we have adopted a new system for recording visitor effects, whereby the observers record a subjective, visitor-distraction rating for each hour (none, low, moderate, or high). The new system still requires that the observers keep track of the effects of visitors through the hour, but the task is much easier without having to specify numbers. Furthermore, the new rating system allows the observers to incorporate a broader range of input to generate a more representative index of true visitor effects on their performance. Thus, although data-recording protocol changes such as this can be troublesome with regard to analysis of long-term trends, we believe that in the end this new approach to estimating visitor-distraction effects will significantly improve the integrity of our count systems.

In 2001 at the Goshutes, 823 hourly assessments of visitor disturbance resulted in the following ratings: 95% none, 4% low, and 1% moderate. This very low level of visitor disturbance experienced by the official observers can be attributed to two principal factors. First, having two on-site education specialists on hand throughout the season largely obviates the need for the observers to field general questions or worry about managing visitors, leaving them free to focus on their work and on incorporating the positive benefits of guest observers. Second, with the shift to using OP2 as the sole observation point, the educators were able to freely use the OP1 site as a staging area for large groups, thereby greatly reducing the potential observer distraction.

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Table 1. Unadjusted counts and adjusted passage rates by species: 1983–2000 versus 2001.

	COUNTS			RAPTORS/100 HOURS[1]		
SPECIES	1983–2000[2]	2001	% CHANGE	1983–2000[2]	2001	% CHANGE
Turkey Vulture	315 ± 72.0	441	+40	89 ± 19.1	116	+30
Osprey	92 ± 21.9	152	+65	21 ± 4.6	33	+56
Northern Harrier	181 ± 35.2	178	-2	29 ± 5.0	23	-20
Sharp-shinned Hawk	4990 ± 964.7	7429	+49	1052 ± 167.2	1319	+25
Cooper's Hawk	3401 ± 701.5	5107	+50	807 ± 145.9	1079	+34
Northern Goshawk	121 ± 23.5	80	-34	20 ± 3.8	11	-44
Unknown small accipiter[3]	–	55	–	–	–	–
Unknown large accipiter[3]	–	0	–	–	–	–
Unknown accipiter	356 ± 91.5	0	–	–	–	–
TOTAL ACCIPITERS	8871 ± 1608.7	12671	+43	–	–	–
Red-shouldered Hawk	0.3 ± 0.26	0	-100	–	–	–
Broad-winged Hawk	41 ± 16.2	79	+91	15 ± 5.9	28	+85
Swainson's Hawk	205 ± 64.5	251	+22	50 ± 16.4	54	+7
Red-tailed Hawk	2997 ± 456.1	3924	+31	490 ± 61.7	541	+10
Ferruginous Hawk	16 ± 3.1	14	-15	3 ± 0.5	2	-30
Rough-legged Hawk	15 ± 4.9	23	+50	7 ± 2.1	8	+10
Unidentified buteo	72 ± 22.9	13	-82	–	–	–
TOTAL BUTEOS	3348 ± 501.5	4304	+29	–	–	–
Golden Eagle	270 ± 26.3	295	+9	43 ± 3.8	40	-9
Bald Eagle	13 ± 3.3	8	-40	3 ± 0.6	1	-67
Unidentified eagle	0.8 ± 0.64	0	-100	–	–	–
TOTAL EAGLES	284 ± 28.2	303	+7	–	–	–
American Kestrel	2062 ± 436.5	2774	+35	422 ± 86.9	513	+22
Merlin	42 ± 13.3	51	+23	8 ± 2.6	8	-2
Prairie Falcon	31 ± 6.4	23	-25	5 ± 1.0	3	-40
Peregrine Falcon	11 ± 4.4	29	+166	2 ± 0.7	5	+142
Unknown small falcon[3]	–	0	–	–	–	–
Unknown large falcon[3]	–	0	–	–	–	–
Unknown falcon	7 ± 2.2	2	-73	–	–	–
TOTAL FALCONS	2153 ± 455.4	2879	+34	–	–	–
Unidentified raptor	129 ± 44.6	26	-80	–	–	–
GRAND TOTAL	15374 ± 2563.1	20954	+36	–	–	–

[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 counts by age classes and immature : adult ratios for selected species: 1992–2000 versus 2001.

	Total and Age-classified Counts								Immature : Adult Ratio	
	1992–2000 Average			2001			% Unknown Age			
Species	Total	Imm.	Adult	Total	Imm.	Adult	1992–2000[1]	2001	1992–2000[1]	2001
Northern Harrier	243	76	73	178	55	59	40 ± 13.3	36	1.21 ± 0.377	0.93
Sharp-shinned Hawk	6174	2264	1794	7429	2232	1997	34 ± 5.3	43	1.29 ± 0.374	1.12
Cooper's Hawk	4332	1078	1231	5107	1007	1773	47 ± 4.7	46	0.85 ± 0.359	0.57
Northern Goshawk[2]	123	61	38	80	20	54	19 ± 5.3	8	2.17 ± 0.748	0.37
Broad-winged Hawk	56	14	23	79	25	34	36 ± 9.2	25	0.67 ± 0.251	0.74
Red-tailed Hawk	3602	782	1990	3924	552	2506	23 ± 6.3	22	0.38 ± 0.079	0.22
Ferruginous Hawk	20	6	5	14	2	9	46 ± 15.5	21	1.67 ± 0.843	0.22
Golden Eagle[2]	269	136	80	295	161	57	19 ± 3.7	26	2.04 ± 0.482	2.82
Bald Eagle	16	8	8	8	3	5	5 ± 4.2	0.0	1.15 ± 0.509	0.60
Peregrine Falcon	16	5	7	29	12	14	35 ± 16.9	10	0.68 ± 0.406	0.86

[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 1983–2000.

Table 3. First and last observed, bulk passage, and median passage dates by species for 2001, with a comparison of 2001 and 1983–2000 average median passage dates.

	2001				1983–2000
Species	First Observed	Last Observed	Bulk Passage Dates[1]	Median Passage Date[2]	Median Passage Date[2, 3]
Turkey Vulture	15-Aug	20-Oct	14-Sep – 30-Sep	22-Sep	21-Sep ± 1.7
Osprey	17-Aug	8-Oct	4-Sep – 27-Sep	17-Sep	14-Sep ± 1.6
Northern Harrier	15-Aug	5-Nov	22-Aug – 29-Oct	25-Sep	24-Sep ± 3.2
Sharp-shinned Hawk	15-Aug	5-Nov	11-Sep – 19-Oct	26-Sep	24-Sep ± 2.2
Cooper's Hawk	15-Aug	29-Oct	14-Sep – 1-Oct	24-Sep	20-Sep ± 1.6
Northern Goshawk	1-Sep	5-Nov	15-Sep – 29-Oct	12-Oct	6-Oct ± 3.7
Broad-winged Hawk	9-Sep	8-Oct	15-Sep – 5-Oct	20-Sep	23-Sep ± 1.9
Swainson's Hawk	15-Aug	18-Oct	5-Sep – 29-Sep	21-Sep	18-Sep ± 3.3
Red-tailed Hawk	15-Aug	5-Nov	8-Sep – 25-Oct	9-Oct	2-Oct ± 2.1
Ferruginous Hawk	9-Sep	29-Oct	15-Sep – 28-Oct	29-Sep	25-Sep ± 2.5
Rough-legged Hawk	1-Oct	5-Nov	15-Oct – 4-Nov	20-Oct	22-Oct ± 2.0
Golden Eagle	15-Aug	5-Nov	5-Sep – 29-Oct	11-Oct	6-Oct ± 1.9
Bald Eagle	24-Aug	5-Nov	24-Aug – 5-Nov	3-Oct	20-Oct ± 4.3
American Kestrel	15-Aug	30-Oct	27-Aug – 28-Sep	18-Sep	15-Sep ± 1.8
Merlin	3-Sep	5-Nov	16-Sep – 24-Oct	6-Oct	1-Oct ± 2.3
Prairie Falcon	15-Aug	27-Oct	28-Aug – 17-Oct	9-Sep	12-Sep ± 3.1
Peregrine Falcon	15-Aug	4-Oct	22-Aug – 29-Sep	17-Sep	24-Sep ± 3.7
Total	15-Aug	5-Nov	8-Sep – 19-Oct	26-Sep	22-Sep ± 1.7

[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: 1992–2000 versus 2001.

	ADULT		IMMATURE / SUBADULT	
SPECIES	1992–2000[1]	2001	1992–2000[1]	2001
Northern Harrier	26-Sep ± 7.3	20-Sep	17-Sep ± 8.9	25-Sep
Sharp-shinned Hawk	6-Oct ± 2.1	29-Sep	14-Sep ± 1.5	18-Sep
Cooper's Hawk	24-Sep ± 3.1	25-Sep	16-Sep ± 1.6	21-Sep
Northern Goshawk[2]	14-Oct ± 4.6	19-Oct	2-Oct ± 4.2	20-Sep
Broad-winged Hawk	22-Sep ± 2.4	21-Sep	23-Sep ± 4.5	22-Sep
Red-tailed Hawk	6-Oct ± 2.4	13-Oct	13-Sep ± 4.5	14-Sep
Ferruginous Hawk	11-Oct ± 5.4	30-Sep	26-Sep ± 12.9	–
Golden Eagle[2]	10-Oct ± 2.9	18-Oct	5-Oct ± 2.5	1-Oct
Bald Eagle	23-Oct ± 2.9	4-Oct	23-Oct ± 3.3	–
Peregrine Falcon	26-Sep ± 5.6	10-Sep	19-Sep ± 3.7	24-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 1983–2000.

Table 5. Capture totals, rates, and successes: 1987–2000 versus 2001.

	CAPTURE TOTAL		CAPTURE RATE[1]		CAPTURE SUCCESS (%)[2]	
SPECIES	1987–2000[3]	2001	1987–2000[3]	2001	1987–2000[3]	2001
Northern Harrier	7 ± 2.9	11	0.5 ± 0.20	0.7	4.2 ± 1.74	6.2
Sharp-shinned Hawk	1651 ± 264.0	1608	100.4 ± 8.56	96.5	29.9 ± 5.34	21.5
Cooper's Hawk	788 ± 157.4	975	47.5 ± 5.23	58.5	20.1 ± 3.27	19.0
Northern Goshawk	36 ± 12.4	23	2.2 ± 0.54	1.4	27.9 ± 4.41	28.8
Broad-winged Hawk	1 ± 0.5	1	0.1 ± 0.03	0.1	2.8 ± 1.33	1.3
Swainson's Hawk	0 ± 0.3	1	0.0 ± 0.02	0.1	0.1 ± 0.17	0.4
Red-tailed Hawk	76 ± 16.4	76	4.6 ± 0.65	4.6	2.3 ± 0.34	1.9
Rough-legged Hawk	0	2	0	0.1	0	8.7
Golden Eagle	5 ± 1.5	1	0.4 ± 0.13	0.1	2.0 ± 0.60	0.3
American Kestrel	206 ± 56.4	168	11.8 ± 2.52	10.1	8.8 ± 2.53	6.1
Merlin	12 ± 3.7	12	0.7 ± 0.22	0.7	21.6 ± 5.02	23.5
Prairie Falcon	6 ± 2.0	3	0.4 ± 0.10	0.2	19.0 ± 4.80	13.0
Peregrine Falcon	1 ± 0.6	1	0.1 ± 0.04	0.1	10.1 ± 6.17	3.4
All Species	2790 ± 470.5	2882	168.5 ± 12.85	173.0	17.6 ± 2.79	14.4

[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 classes for selected species: 1992–2000 versus 2001.

	Female			Male			Female : Male	HY : AHY
	AHY	HY	Unk.	AHY	HY	Unk.	Ratio[1]	Ratio[1]
Sharp-shinned Hawk								
1992–2000 mean	312	554	–	256	672	–	0.94	2.29
2001	331	427	–	258	592	–	0.89	1.73
Cooper's Hawk								
1992–2000 mean	278	225	–	153	204	–	1.43	0.99
2001	294	227	–	176	278	–	1.15	1.07
Northern Goshawk								
1992–2000 mean	6	14	–	3	16	–	1.02	9.89
2001	11	5	–	5	2	–	2.29	0.44
American Kestrel								
1992–2000 mean	8	88	28	31	93	3	0.99	6.35
2001	13	47	19	16	70	3	0.89	4.03

[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 of previously banded birds in the Goshute Mountains during 2001.

Species	Sex	Band #	Banding Site	Banding Date	Banding Age[1]	Recapture Date	Recapture Age[1]	Distance (km)
Recaptures								
Sharp-shinned Hawk	F	2003 – 76830	Goshute Mts., NV	20 Sept 96	HY	28 Sept 01	6th Yr	–
Sharp-shinned Hawk	F	1523 – 72269	Goshute Mts., NV	18 Sept 98	HY	7 Oct 01	4th Yr	–
Sharp-shinned Hawk	F	2003 – 64851	Goshute Mts., NV	13 Sept 95	HY	15 Oct 01	7th Yr	–
Cooper's Hawk	F	1705 28505	Goshute Mts., NV	21 Sept 95	HY	9 Sept 01	7th Yr	–
Cooper's Hawk	F	1705 40468	Goshute Mts., NV	23 Sept 98	ASY	14 Sept 01	>5th Yr	–
Cooper's Hawk	F	0745 – 50479	Goshute Mts., NV	6 Sept 95	HY	15 Sept 01	7th Yr	–
Cooper's Hawk	F	1705 – 24065	Goshute Mts., NV	15 Oct 97	ASY	22 Sept 01	>6th Yr	–
Cooper's Hawk	F	1705 35262	Goshute Mts., NV	10 Oct 97	ASY	27 Sept 01	>6th Yr	–
Cooper's Hawk	F	1005 – 01919	Goshute Mts., NV	21 Sept 00	HY	28 Sept 01	SY	–
Foreign Recaptures								
Sharp-shinned Hawk	M	1152 – 03121	*	*	*	28 Oct 01	AHY	*
Cooper's Hawk	F	0995 – 11198	*	2001	HY	13 Sept 01	HY	*
Cooper's Hawk	M	0804 – 04618	*	2001	HY	20 Sept 01	HY	*
Northern Goshawk	F	1807 – 70440	Independence Mts., NV	21 June 99	L	10 Sept 01	TY	210

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

* Indicates that we have not yet received a full report from the Bird Banding Lab.

Table 8. Foreign encounters during 2001 with birds banded in the Goshute Mountains.

Species	Sex	Band #	Banding date	Banding age	Encounter Date	Encounter Age[1]	Encounter Location	Distance (km)	Status
SS	F	1343 – 88260	17-Oct-97	SY	07-Nov-01	6th Yr	Waddell, AZ	660	found dead
SS	F	1523 – 89251	27Sep-00	HY	25-Dec-01	SY	Guasave, Sinaloa, Mexico	1501	shot dead
SS	M	1162 – 39443	29-Sep-00	HY	29-Dec-01	SY	Chino Valley, AZ	562	found dead
CH	F	1005 – 01500	28-Sep-00	ASY	06-May-01	TY	Fairmont, BC, Canada	909	found dead
CH	F	1705 – 35149	29-Sep-96	ASY	18-Aug-01	>7th Yr	Selkirk, ON, Canada	3890.61	trapped/released
CH	F	1005 – 10834	27-Sep-01	HY	*	*	*	*	*
RT	U	1177 – 02074	10-Oct-98	HY	27-Mar-01	4th Yr	Tucson, AZ	1006	found dead
RT	U	1177 – 06312	18-Sep-00	HY	26-Jun-01	SY	Edwards AFB, CA	727	injured/captive
RT	U	1807 – 81519	27-Aug-01	HY	*	*	*	*	*

[1] HY = hatching year; SY = second year; TY = third year; otherwise self-explanatory.

* Awaiting full report from the Bird Banding Lab.

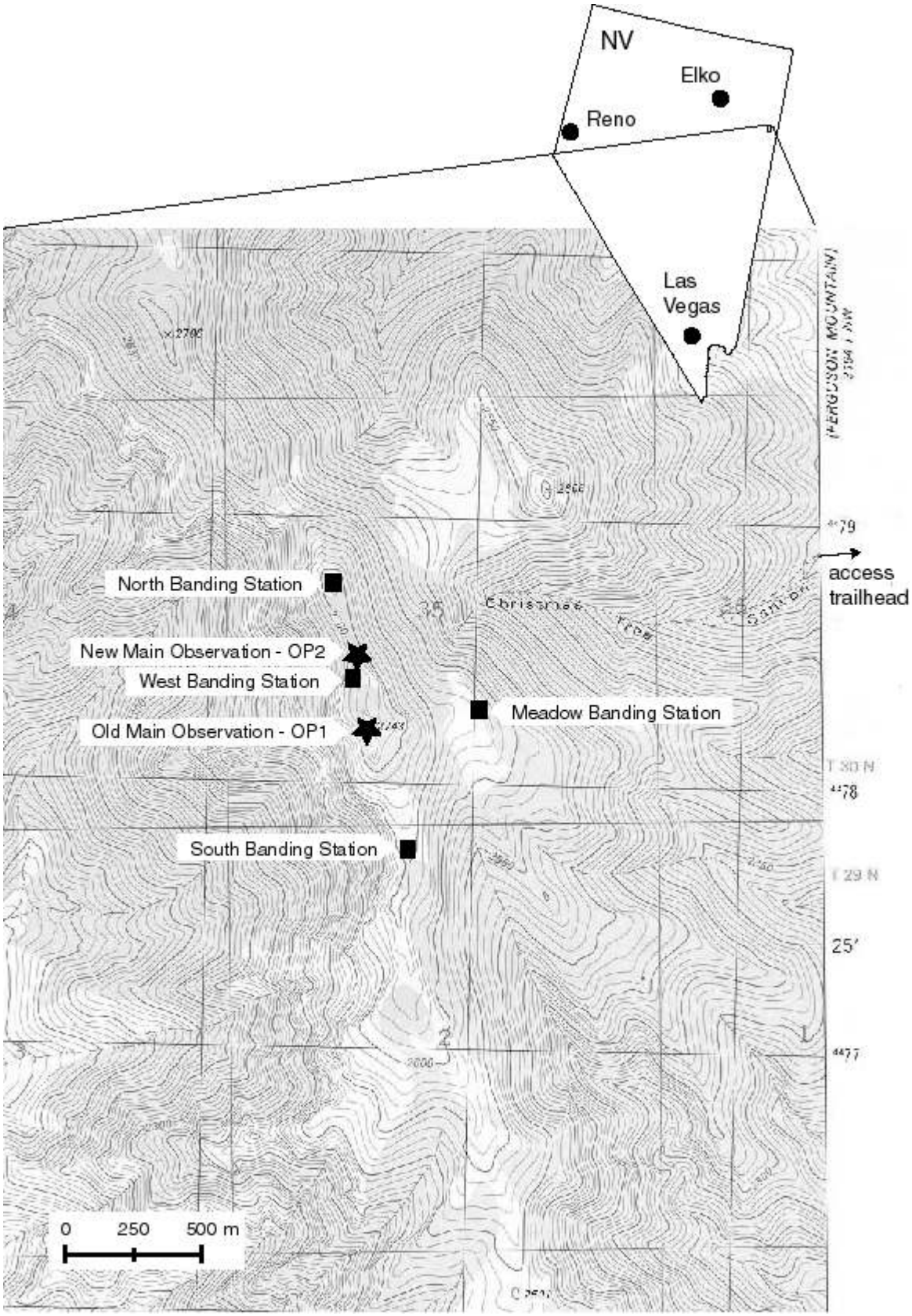

Figure 1. Location of the Goshute Mountains study site.

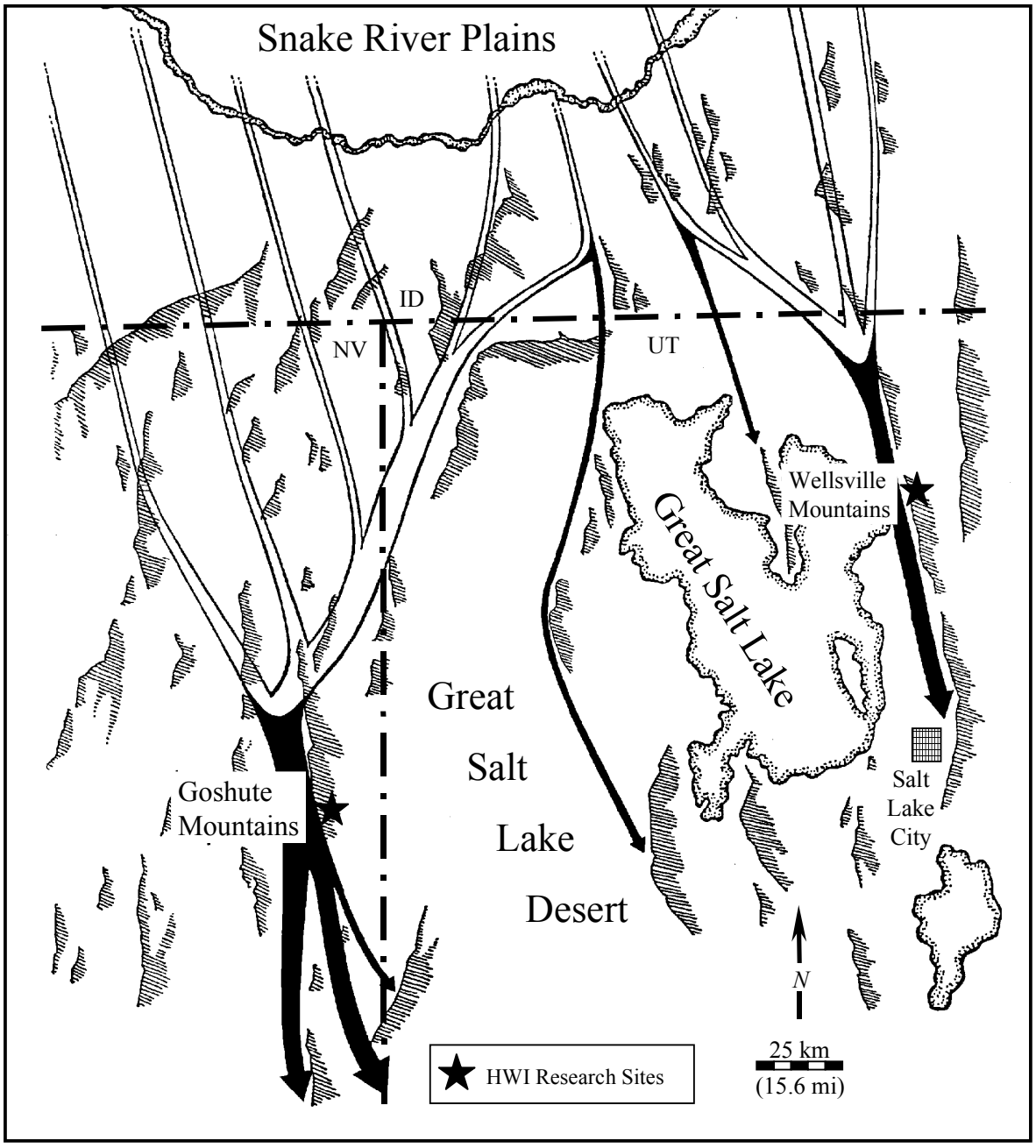

Figure 2. Location of the Goshute Mountains study site in relation to regional raptor flyways and the Great Salt Lake and Desert region.

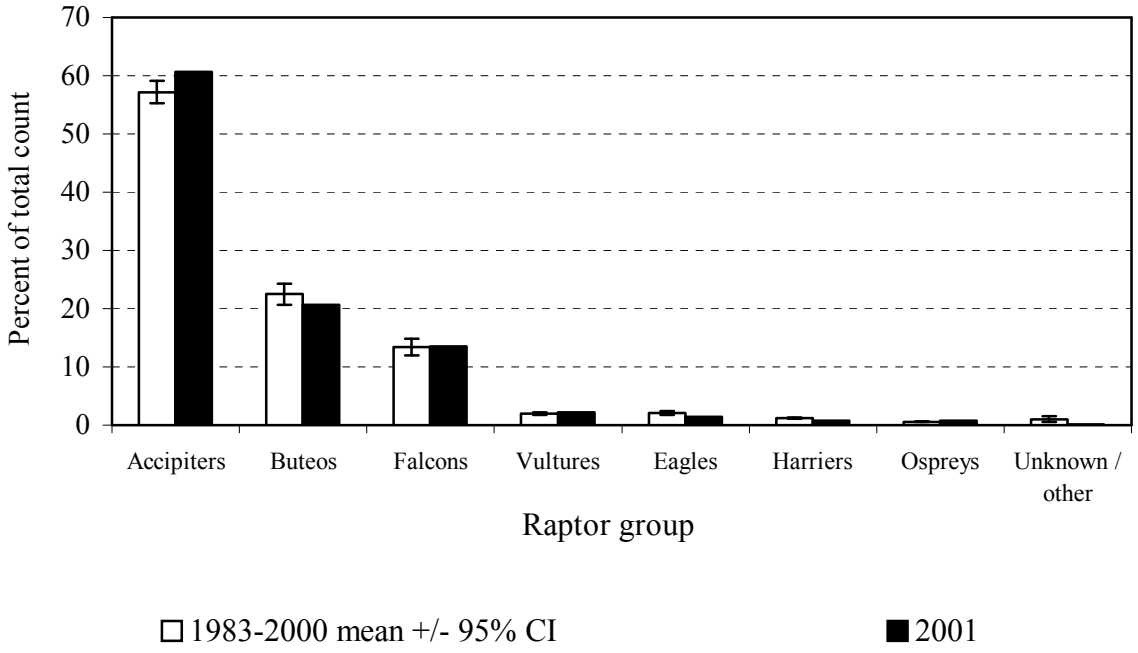

Figure 3. Flight composition by major species groups: 1983–2000 versus 2001.

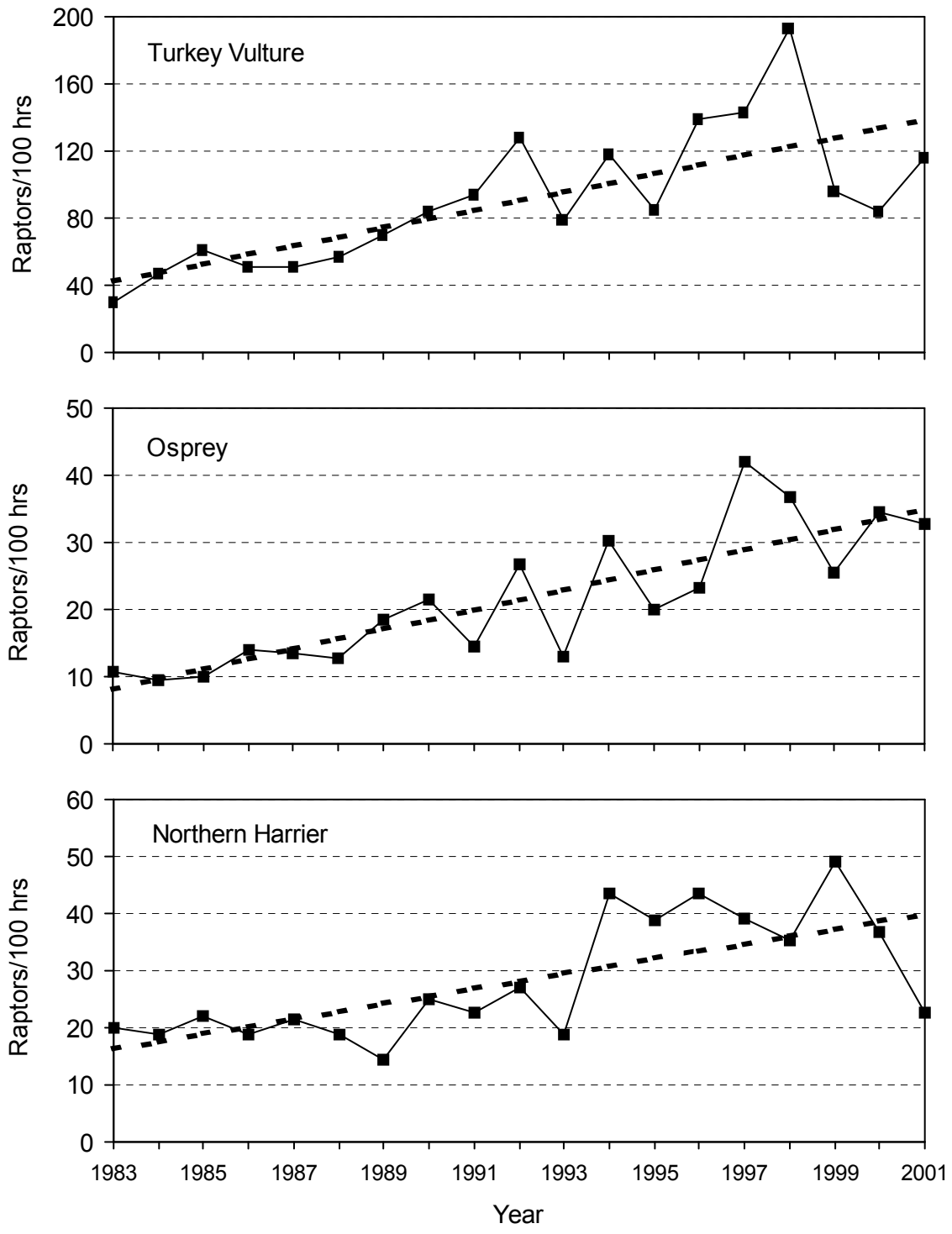

Figure 4. Adjusted annual passage rates for Turkey Vultures, Ospreys, and Northern Harriers: 1983–2001. Dashed lines indicate significant regressions.

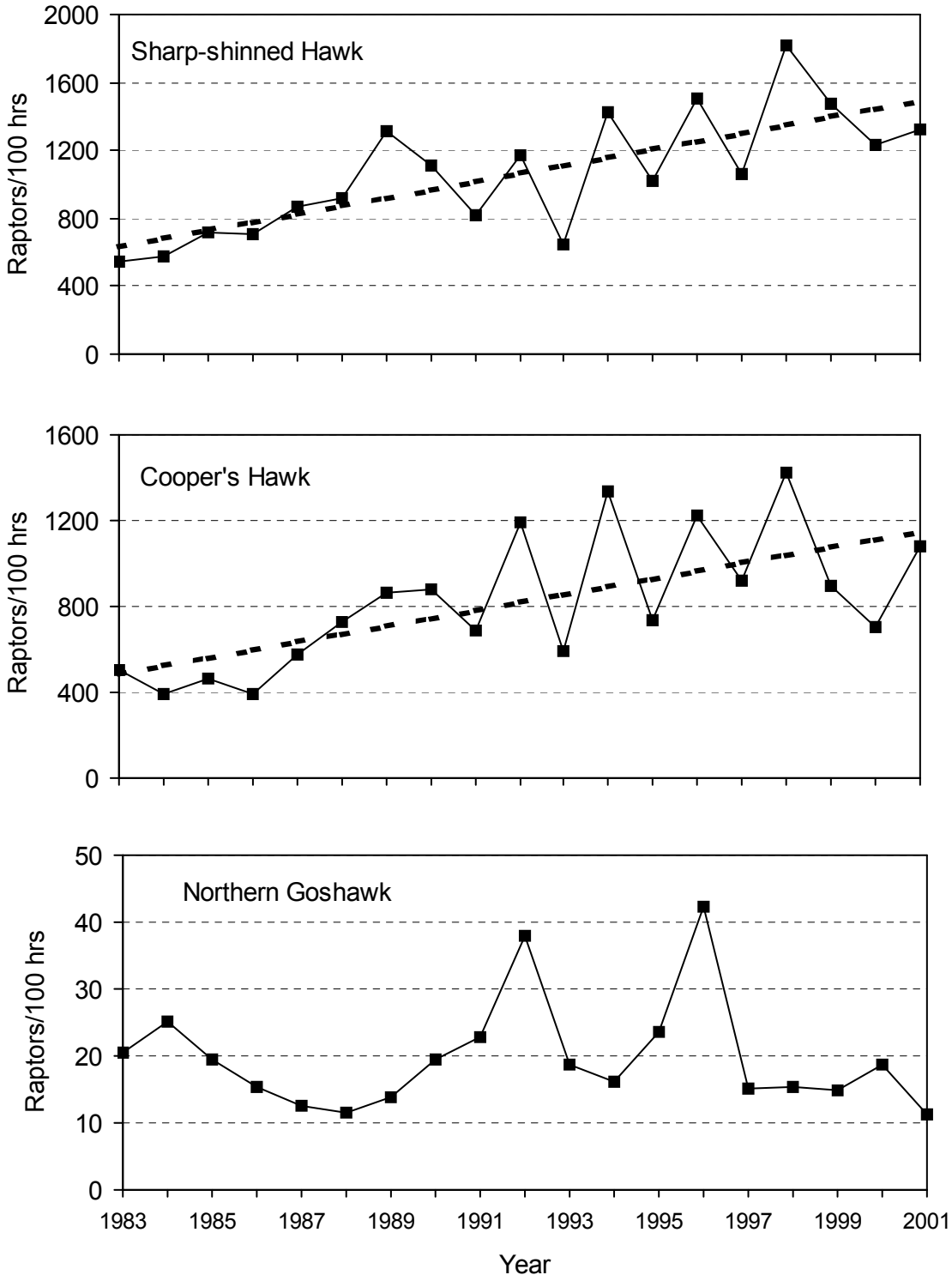

Figure 5. Adjusted annual passage rates for Sharp-shinned Hawks, Cooper's Hawks, and Northern Goshawks: 1983–2001. Dashed lines indicate significant regressions.

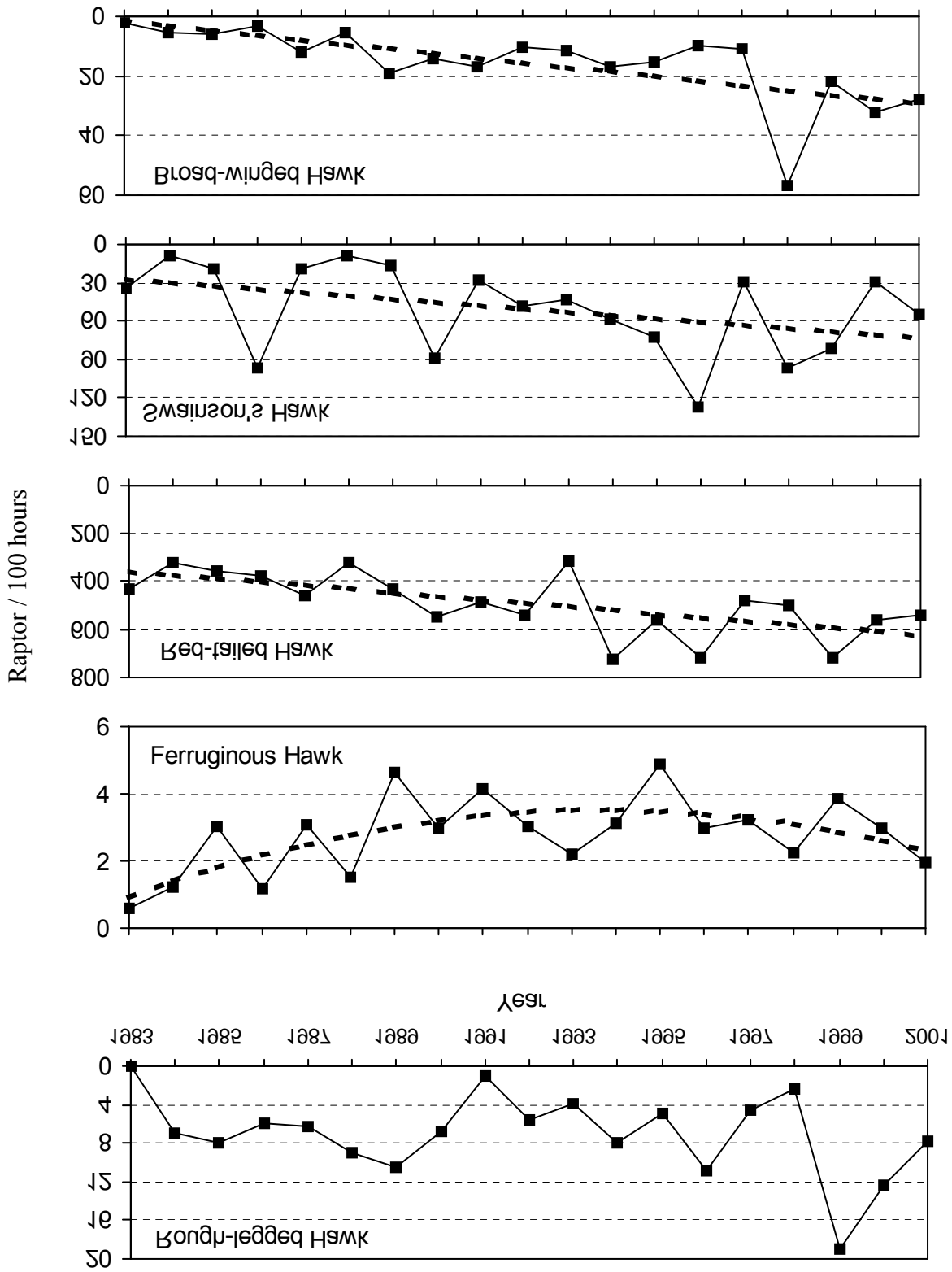

Figure 6. Adjusted annual passage rates for Broad-winged, Swainson's, Red-tailed, Ferruginous, and Rough-legged Hawks: 1983–2001. Dashed lines indicate significant regressions.

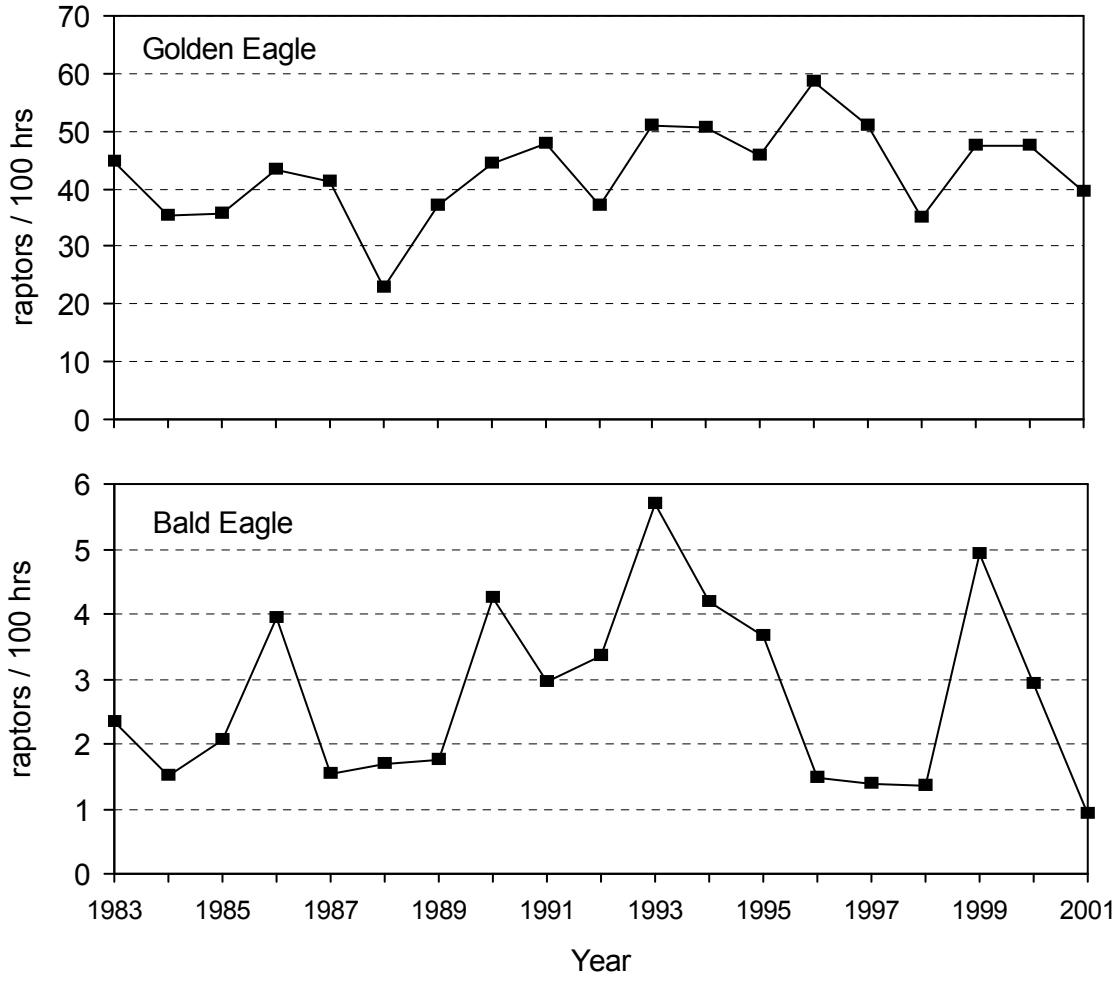

Figure 7. Adjusted annual passage rates for Golden and Bald Eagles: 1983–2001.

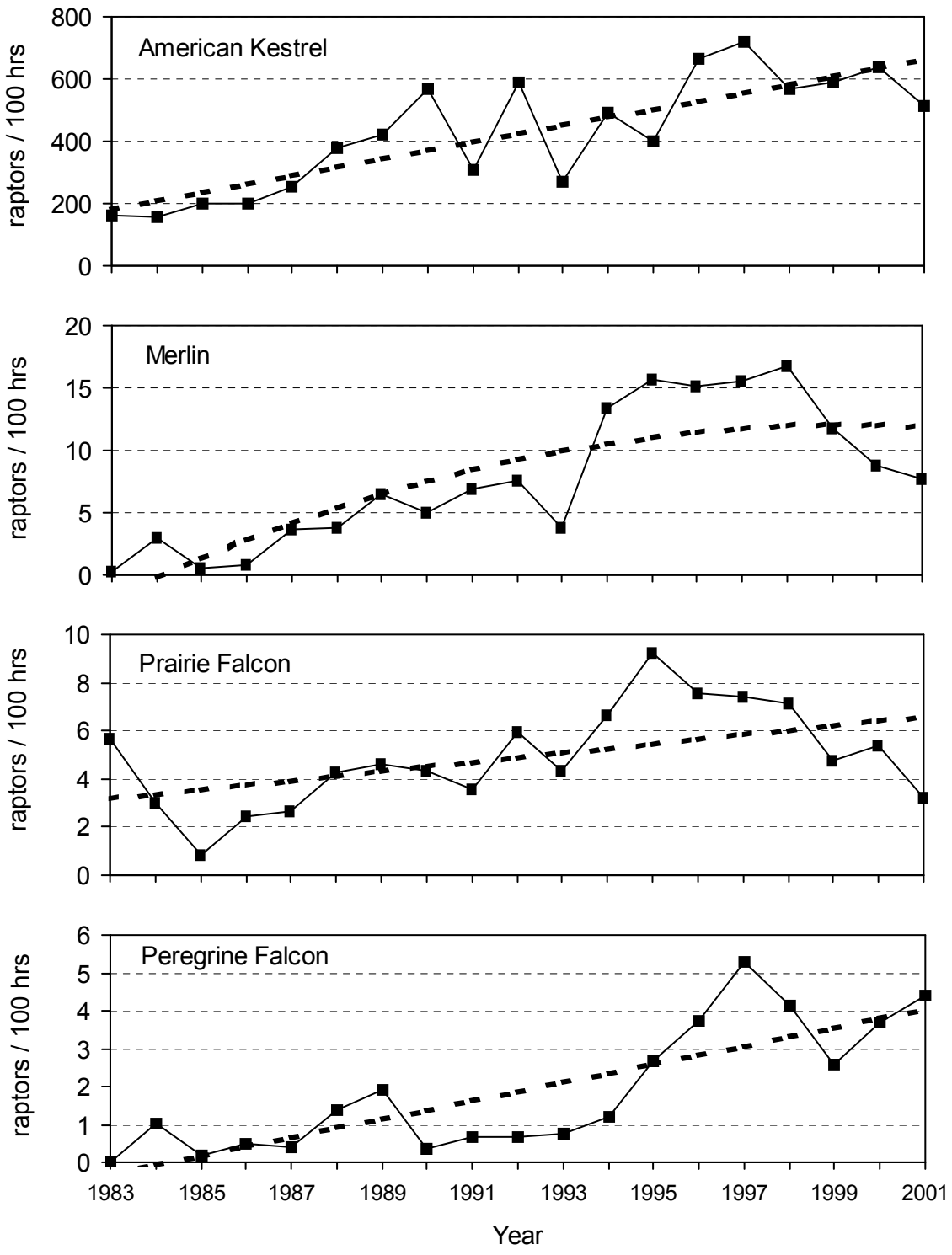

Figure 8. Adjusted annual passage rates for American Kestrels, Merlins, Prairie Falcons, and Peregrine Falcons: 1983–2001. Dashed lines indicate significant regressions.

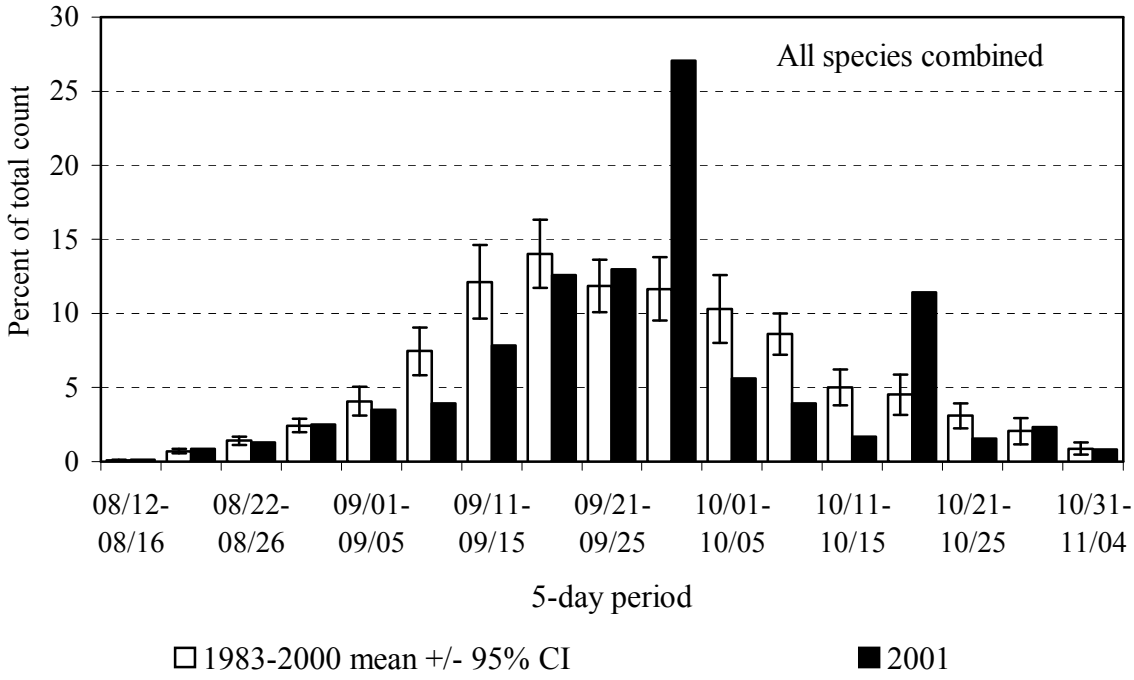

Figure 9. Combined-species passage volume by five-day periods: 1983–1999 versus 2001.

Appendix A. History of official observer participation.

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 observer 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 (16) and Nathan McNett (5).

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[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.

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: 2001.

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	8.50	1.7	0	pc-mc, AM haze	11.6	sw, e	22.1	30.50	2	42	42	3	5.3
16-Aug	7.50	2.0	0	clr/haze	4.3	sw	20.1	30.56	1	50	50	3	3.9
17-Aug	8.00	2.0	0	clr-pc, haze	2.3	sw-w, e	23.4	30.60	1	66	63	var	3.3
18-Aug	8.00	2.0	0	pc-mc, haze	14.5	wsw	24.5	30.54	3	75	80	2	4.9
19-Aug	9.00	2.0	1	clr-ovc	8.0	wsw	24.9	30.43	2	80	80	2	8.7
20-Aug	7.50	1.9	0	pc-ovc	17.8	w	22.4	30.33	4	68	68	2	4.5
21-Aug	5.00	1.0	0	mc-ovc, scat rain	7.7	w, e	17.7	30.30	4	70	70	1	0.8
22-Aug	9.50	1.0	0	clr-mc	8.0	var, ne	18.1	30.38	3	100	100	2	3.4
23-Aug	9.00	2.0	0	clr	5.7	w, e, var	20.8	30.44	1	70	70	3	6.6
24-Aug	10.00	2.0	0	ovc-clr	7.0	w, e	20.8	30.43	3	94	94	2	7.0
25-Aug	9.50	1.9	0	clr	7.0	e	22.0	30.52	1	100	100	3	7.8
26-Aug	9.00	2.0	0	clr	5.7	w, e	23.1	30.53	1	100	100	3	3.9
27-Aug	10.50	1.9	0	clr-pc, AM haze	6.7	var, ene	24.6	30.50	1	68	68	3	15.1
28-Aug	10.00	2.0	0	clr-pc	7.7	ne-ene	24.0	30.37	1	100	100	2	15.7
29-Aug	6.75	2.0	0	mc-ovc, scat ts	6.0	var	21.5	30.31	3	100	100	3	12.7
30-Aug	6.50	2.0	0	clr-ovc	9.6	sw, e	19.4	30.33	4	93	93	2	10.6
31-Aug	9.50	2.0	0	clr-ovc	5.4	sw-wsw, var	18.5	30.37	3	100	100	3	5.4
1-Sep	10.00	1.0	0	clr-ovc, scat rain	8.8	sw	20.6	30.39	2	100	100	3	6.6
2-Sep	10.25	2.0	0	clr-ovc	2.6	sw, var, ne	22.2	30.44	3	100	100	2	16.2
3-Sep	9.75	1.0	0	clr-ovc	4.3	sw, var	22.2	30.46	2	100	100	3	17.5
4-Sep	7.50	2.0	0	mc-ovc	2.1	ne, var	19.8	30.42	3	91	100	2	7.6
5-Sep	11.00	1.8	0	pc-ovc	9.7	sw	19.6	30.26	4	88	88	2	24.5
6-Sep	10.50	1.8	0	clr	19.0	sw	9.3	30.01	4	100	100	2	3.2
7-Sep	11.00	1.0	0	clr	18.9	sw	11.5	29.99	4	100	100	2	14.6
8-Sep	10.00	2.0	0	clr	4.2	var	11.3	30.13	3	100	100	2	18.2
9-Sep	9.50	2.0	0	clr	5.9	sw, ne	14.0	30.14	3	100	100	2	20.0
10-Sep	12.50	1.8	0	clr	6.4	sw, var	14.9	30.16	3	100	100	2	19.9
11-Sep	9.50	2.0	0	mc-ovc	3.8	sw, ne	18.8	30.23	4	100	100	2	33.6
12-Sep	3.00	1.5	0	ovc, ts-rain	9.0	var	16.0	30.10	4	98	54	1	1.0
13-Sep	11.00	1.9	0	clr-mc	10.1	s-sw	14.6	30.08	4	95	100	3	25.2
14-Sep	12.00	2.0	0	clr	3.3	sw, var, ne	14.8	30.19	2	100	100	3	32.3
15-Sep	11.00	2.0	0	clr-mc	3.0	sw, ene	15.6	30.11	3	100	100	2	59.5
16-Sep	9.50	2.0	0	mc-ovc, PM rain	8.2	ne	16.1	30.05	3	100	100	3	62.1
17-Sep	11.25	1.8	0	clr-mc	11.4	sw, e	13.3	30.10	3	100	100	2	29.7
18-Sep	10.00	2.0	0	clr	2.1	var, ene	14.8	30.14	2	100	100	2	71.4
19-Sep	10.50	2.0	0	clr	9.9	wsw	16.1	30.13	2	100	100	3	45.8
20-Sep	10.00	2.0	0	clr	4.3	var, ene	17.0	30.22	1	100	100	3	50.6
21-Sep	10.50	1.9	0	pc-ovc	8.5	sw, ne	17.5	30.23	2	100	100	3	43.1
22-Sep	10.50	2.0	0	clr	8.5	ne	17.1	30.27	3	100	100	3	64.6
23-Sep	10.50	2.0	0	clr	4.0	ne	18.3	30.26	2	100	100	2	31.1
24-Sep	10.50	2.0	0	clr-ovc	6.1	sw	19.6	30.29	3	100	100	1	33.4
25-Sep	11.50	1.8	0	pc-mc	24.3	sw	17.1	30.09	4	100	100	3	78.3
26-Sep	11.00	1.9	0	clr	6.3	sw, ne	15.9	30.12	4	100	100	2	61.0
27-Sep	11.00	1.8	0	clr	21.5	sw	17.6	30.11	4	100	100	2	199.8
28-Sep	11.50	2.8	0	ovc	24.0	sw	17.7	30.03	4	100	100	2	144.0
29-Sep	10.00	2.9	1	clr	10.0	ne	14.0	30.21	4	100	100	3	83.4
30-Sep	10.50	2.0	0	clr	5.1	ne	14.4	30.31	1	100	100	3	28.3
1-Oct	10.50	2.0	0	pc-ovc	9.1	sw	17.5	30.26	4	100	100	2	38.6
2-Oct	10.75	2.0	0	clr	7.5	var, sw	16.2	30.21	1	100	100	3	9.6
3-Oct	10.50	2.0	0	clr	9.6	ssw	14.8	30.18	4	100	100	3	11.1

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
4-Oct	9.50	1.9	0	clr	19.4	w	14.7	30.05	4	100	100	3	8.8
5-Oct	9.50	2.0	0	clr-ovc	3.0	sw	12.3	30.05	2	100	100	3	48.8
6-Oct	10.00	2.8	1	ovc	9.5	sw, ne	14.3	30.04	4	100	100	2	21.5
7-Oct	10.25	2.0	1	clr-mc	5.7	sw	13.1	30.08	3	100	100	3	23.9
8-Oct	10.00	1.9	0	ovc, scat snow	8.8	sw	11.2	29.94	4	100	100	3	16.4
9-Oct	9.75	1.7	0	clr	13.0	ssw	3.2	29.95	4	100	100	3	4.1
10-Oct	10.25	1.0	0	clr-ovc	7.9	sw	4.5	30.10	4	100	100	3	15.4
11-Oct	5.25	1.0	0	ovc, rain/snow	25.0	sw	4.3	29.83	4	100	100	1	3.8
12-Oct	9.50	2.0	0	clr	10.2	e, w	2.3	30.11	4	100	100	1	3.5
13-Oct	8.25	2.0	0	clr	14.0	sw	7.3	30.07	4	100	100	1	1.2
14-Oct	10.00	2.0	0	clr	24.0	sw	8.4	30.04	4	100	100	3	10.7
15-Oct	10.00	2.0	0	clr	1.0	var	8.0	30.25	3	100	100	3	18.2
16-Oct	10.00	1.9	0	mc-ovc	15.9	sw	12.7	30.21	4	100	100	2	31.4
17-Oct	10.50	1.0	0	pc-ovc	5.5	sw, var	10.7	30.09	4	100	100	3	15.1
18-Oct	10.00	1.9	0	clr	16.0	sw	7.0	30.17	4	100	100	3	34.4
19-Oct	10.30	1.9	0	clr	8.7	sw	8.4	30.15	3	100	100	2	131.0
20-Oct	10.00	2.0	0	pc-ovc	9.3	sw, var	9.1	29.99	3	100	100	2	22.0
21-Oct	9.00	1.0	0	pc-ovc	6.8	sw	10.4	29.93	3	100	100	3	5.8
22-Oct	10.00	1.9	0	pc-ovc	13.0	sw	6.9	29.92	2	100	100	3	4.2
23-Oct	10.00	1.8	0	pc-mc	36.0	wsw	5.8	29.76	4	100	100	3	2.5
24-Oct	9.50	1.9	0	clr	6.5	sw	1.0	30.03	4	100	100	2	8.7
25-Oct	9.50	1.0	0	clr	6.0	sw	6.0	30.20	4	100	100	2	13.1
26-Oct	9.50	2.0	0	pc-mc	5.6	sw	9.8	30.29	4	100	100	2	12.9
27-Oct	9.50	2.0	0	mc-ovc	18.0	wsw	11.4	30.09	4	100	100	3	9.1
28-Oct	10.00	2.0	0	ovc	15.5	wsw	10.9	30.10	4	100	100	3	3.5
29-Oct	9.00	2.0	0	mc	17.0	sw	11.1	30.19	4	100	100	2	23.3
30-Oct	7.50	1.0	0	ovc	21.0	sw	7.5	29.92	4	100	100	2	3.9
31-Oct	8.00	2.0	0	pc-ovc	22.4	sw	3.0	29.87	4	100	100	2	1.1
1-Nov	8.50	2.0	0	clr-pc	2.7	sw	2.7	30.00	3	100	100	2	4.2
2-Nov	8.00	2.0	0	clr-mc	4.4	sw	5.4	30.14	1	100	100	3	8.6
3-Nov	8.50	1.9	0	pc	13.3	ene	5.4	30.32	4	100	100	2	3.8
4-Nov	8.00	2.0	0	clr-ovc	6.0	ssw	8.4	30.24	4	100	100	1	2.8
5-Nov	7.00	2.0	0	mc	14.0	sw	9.9	30.10	4	100	100	2	2.9

[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 = thunder storms.

[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: 2001.

		Species[1]																						Birds
Date	Hours	TV	OS	NH	SS	CH	NG	SA	BW	SW	RT	FH	RL	UB	GE	BE	AK	ML	PR	PG	UF	UU	Total	/ Hour
15-Aug	8.50	2	0	1	6	2	0	0	0	2	13	0	0	0	1	0	15	0	1	1	0	1	45	5.3
16-Aug	7.50	0	0	2	2	2	0	0	0	2	9	0	0	0	0	0	11	0	0	1	0	0	29	3.9
17-Aug	8.00	0	1	0	3	0	0	0	0	1	9	0	0	0	1	0	11	0	0	0	0	0	26	3.3
18-Aug	8.00	1	0	6	7	0	0	0	0	1	6	0	0	0	1	0	16	0	1	0	0	0	39	4.9
19-Aug	9.00	2	1	5	6	4	0	0	0	2	17	0	0	0	1	0	39	0	0	0	0	1	78	8.7
20-Aug	7.50	0	0	1	6	2	0	0	0	2	7	0	0	0	0	0	16	0	0	0	0	0	34	4.5
21-Aug	5.00	0	0	0	1	0	0	0	0	0	1	0	0	0	1	0	1	0	0	0	0	0	4	0.8
22-Aug	9.50	0	0	4	9	0	0	0	0	0	9	0	0	1	0	0	8	0	0	1	0	0	32	3.4
23-Aug	9.00	0	2	2	6	1	0	0	0	0	15	0	0	0	1	0	32	0	0	0	0	0	59	6.6
24-Aug	10.00	1	1	2	15	3	0	0	0	3	13	0	0	0	1	2	28	0	0	1	0	0	70	7.0
25-Aug	9.50	0	0	1	8	6	0	0	0	1	19	0	0	1	1	0	36	0	0	0	0	1	74	7.8
26-Aug	9.00	0	0	0	6	5	0	0	0	1	5	0	0	1	2	0	15	0	0	0	0	0	35	3.9
27-Aug	10.50	0	0	2	22	3	0	0	0	1	12	0	0	0	2	0	117	0	0	0	0	0	159	15.1
28-Aug	10.00	1	1	2	36	12	0	0	0	3	37	0	0	0	3	0	59	0	2	0	0	1	157	15.7
29-Aug	6.75	0	2	1	7	8	0	0	0	2	39	0	0	0	1	0	25	0	0	1	0	0	86	12.7
30-Aug	6.50	0	0	0	26	5	0	0	0	0	18	0	0	0	1	0	18	0	0	0	0	1	69	10.6
31-Aug	9.50	0	3	0	5	7	0	0	0	1	16	0	0	0	2	0	14	0	1	2	0	0	51	5.4
01-Sep	10.00	4	2	1	5	5	1	0	0	2	21	0	0	1	1	0	23	0	0	0	0	0	66	6.6
02-Sep	10.25	1	1	3	33	14	0	0	0	1	20	0	0	0	4	0	88	0	0	0	1	0	166	16.2
03-Sep	9.75	0	1	7	31	12	0	0	0	0	22	0	0	0	0	0	97	1	0	0	0	0	171	17.5
04-Sep	7.50	2	1	1	32	10	0	1	0	0	3	0	0	0	2	0	5	0	0	0	0	0	57	7.6
05-Sep	11.00	5	4	4	58	36	1	0	0	25	44	0	0	0	5	0	84	0	3	0	0	0	269	24.5
06-Sep	10.50	1	3	0	10	5	0	0	0	0	6	0	0	0	0	0	8	1	0	0	0	0	34	3.2
07-Sep	11.00	1	1	2	51	11	1	1	0	2	22	0	0	0	2	0	64	0	1	1	0	1	161	14.6
08-Sep	10.00	6	0	0	90	39	0	0	0	0	19	0	0	0	0	0	26	1	0	0	0	1	182	18.2
09-Sep	9.50	1	8	1	97	43	0	0	1	0	16	1	0	0	1	0	20	0	1	0	0	0	190	20.0
10-Sep	12.50	4	3	2	134	47	2	1	0	3	14	0	0	0	1	0	35	0	2	1	0	0	249	19.9
11-Sep	9.50	3	5	0	173	79	1	0	0	2	29	0	0	0	2	1	22	0	0	2	0	0	319	33.6
12-Sep	3.00	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	3	1.0
13-Sep	11.00	2	2	2	108	69	2	1	1	0	27	0	0	1	1	0	58	1	1	0	0	1	277	25.2
14-Sep	12.00	17	6	0	116	125	0	0	1	15	36	0	0	0	3	0	66	1	2	0	0	0	388	32.3
15-Sep	11.00	6	14	4	180	228	1	1	7	28	64	1	0	0	7	0	113	0	0	0	0	0	654	59.5

Appendix D. continued

		Species[1]																					Birds
Date	Hours	TV	OS	NH	SS	CH	NG	SA	BW	SW	RT	FH	RL	UB	GE	BE	AK	ML	PR	PG	UF	UU	Total	/ Hour
16-Sep	9.50	18	3	3	220	207	2	5	14	7	55	1	0	0	4	0	49	1	0	1	0	0	590	62.1
17-Sep	11.25	20	3	2	106	103	0	2	4	2	29	0	0	0	3	0	58	1	0	0	0	1	334	29.7
18-Sep	10.00	29	13	2	266	201	1	3	7	5	97	0	0	0	1	0	81	3	0	3	0	2	714	71.4
19-Sep	10.50	17	1	1	136	172	5	1	2	4	16	0	0	0	4	0	116	0	0	1	1	4	481	45.8
20-Sep	10.00	13	3	1	171	175	0	1	1	2	45	1	0	0	3	0	88	1	0	0	0	1	506	50.6
21-Sep	10.50	36	1	1	133	140	3	0	3	3	40	0	0	0	3	0	85	3	1	0	0	1	453	43.1
22-Sep	10.50	21	2	4	212	267	2	2	8	12	79	0	0	1	5	0	63	0	0	0	0	0	678	64.6
23-Sep	10.50	8	4	5	157	93	1	1	3	2	23	0	0	0	2	0	26	2	0	0	0	0	327	31.1
24-Sep	10.50	6	0	2	170	108	0	0	1	3	27	0	0	0	5	0	29	0	0	0	0	0	351	33.4
25-Sep	11.50	24	28	5	311	332	1	2	3	11	97	1	0	0	8	0	67	3	1	7	0	0	901	78.3
26-Sep	11.00	26	11	8	253	249	2	4	0	8	23	1	0	1	0	0	85	0	0	0	0	0	671	61.0
27-Sep	11.00	25	6	5	1001	913	2	3	5	13	69	0	0	0	10	0	143	0	1	2	0	0	2198	199.8
28-Sep	11.50	20	5	5	699	380	0	7	1	13	58	0	0	1	7	0	456	2	0	1	0	1	1656	144.0
29-Sep	10.00	61	1	0	226	347	1	5	3	48	108	0	0	2	4	0	26	0	0	2	0	0	834	83.4
30-Sep	10.50	18	1	2	86	79	0	1	0	14	61	1	0	1	4	0	29	0	0	0	0	0	297	28.3
01-Oct	10.50	10	0	5	107	103	1	2	0	1	98	1	1	0	3	0	70	1	2	0	0	0	405	38.6
02-Oct	10.75	3	0	1	38	19	0	1	0	0	22	0	0	0	1	0	18	0	0	0	0	0	103	9.6
03-Oct	10.50	0	1	0	41	28	2	1	1	1	29	0	0	0	1	0	10	0	0	0	0	2	117	11.1
04-Oct	9.50	4	1	0	29	23	1	0	0	0	9	0	0	0	2	1	13	0	0	1	0	0	84	8.8
05-Oct	9.50	16	3	3	111	109	0	0	10	1	184	1	0	0	7	1	16	2	0	0	0	0	464	48.8
06-Oct	10.00	0	1	2	90	61	1	1	2	0	46	0	0	0	3	0	8	0	0	0	0	0	215	21.5
07-Oct	10.25	2	0	0	118	60	0	1	0	0	35	0	0	1	5	0	16	7	0	0	0	0	245	23.9
08-Oct	10.00	0	2	2	102	16	1	0	1	0	26	0	0	0	3	0	10	1	0	0	0	0	164	16.4
09-Oct	9.75	0	0	1	17	3	2	0	0	0	9	0	0	0	4	0	3	0	0	0	0	1	40	4.1
10-Oct	10.25	2	0	0	36	9	2	0	0	0	99	0	1	0	3	0	4	2	0	0	0	0	158	15.4
11-Oct	5.25	1	0	0	10	1	0	0	0	0	4	0	0	0	4	0	0	0	0	0	0	0	20	3.8
12-Oct	9.50	0	0	2	14	1	0	0	0	0	13	0	0	0	3	0	0	0	0	0	0	0	33	3.5
13-Oct	8.25	0	0	0	4	1	1	0	0	0	1	0	0	1	1	0	0	0	0	0	0	1	10	1.2
14-Oct	10.00	0	0	1	27	7	1	0	0	0	52	0	0	0	11	0	8	0	0	0	0	0	107	10.7
15-Oct	10.00	0	0	0	85	6	0	0	0	0	81	0	2	0	7	0	0	1	0	0	0	0	182	18.2
16-Oct	10.00	0	0	4	209	16	0	1	0	0	58	0	4	0	13	0	6	3	0	0	0	0	314	31.4
17-Oct	10.50	0	0	6	95	3	1	0	0	0	36	1	0	0	9	1	5	1	1	0	0	0	159	15.1

Appendix D. continued

		Species[1]																					Birds
Date	Hours	TV	OS	NH	SS	CH	NG	SA	BW	SW	RT	FH	RL	UB	GE	BE	AK	ML	PR	PG	UF	UU	Total	/ Hour
18-Oct	10.00	0	0	6	114	12	0	1	0	1	193	1	0	0	11	0	3	2	0	0	0	0	344	34.4
19-Oct	10.30	0	0	8	338	59	6	2	0	0	915	1	3	0	13	0	3	1	0	0	0	0	1349	131.0
20-Oct	10.00	1	0	3	94	7	5	2	0	0	95	0	0	0	10	0	0	3	0	0	0	0	220	22.0
21-Oct	9.00	0	0	0	17	5	2	0	0	0	22	0	1	0	4	0	1	0	0	0	0	0	52	5.8
22-Oct	10.00	0	0	4	10	1	1	0	0	0	19	0	1	0	6	0	0	0	0	0	0	0	42	4.2
23-Oct	10.00	0	0	0	2	0	1	0	0	0	16	0	0	0	5	0	0	0	0	0	0	1	25	2.5
24-Oct	9.50	0	0	2	12	1	2	1	0	0	53	0	2	0	8	0	1	1	0	0	0	0	83	8.7
25-Oct	9.50	0	0	3	11	1	1	0	0	0	98	0	1	0	7	0	1	0	1	0	0	0	124	13.1
26-Oct	9.50	0	0	2	43	1	4	0	0	0	68	0	0	0	3	0	2	0	0	0	0	0	123	12.9
27-Oct	9.50	0	0	0	32	2	5	0	0	0	38	0	2	0	5	0	1	0	1	0	0	0	86	9.1
28-Oct	10.00	0	0	3	19	0	0	0	0	0	10	1	0	0	2	0	0	0	0	0	0	0	35	3.5
29-Oct	9.00	0	0	9	102	2	5	0	0	0	76	1	1	0	8	1	2	0	0	0	0	3	210	23.3
30-Oct	7.50	0	0	1	13	0	2	0	0	0	9	0	0	0	3	0	1	0	0	0	0	0	29	3.9
31-Oct	8.00	0	0	0	5	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	9	1.1
01-Nov	8.50	0	0	2	8	0	0	0	0	0	19	0	0	0	7	0	0	0	0	0	0	0	36	4.2
02-Nov	8.00	0	0	1	22	0	2	0	0	0	40	0	0	0	3	0	0	1	0	0	0	0	69	8.6
03-Nov	8.50	0	0	3	6	0	0	0	0	0	19	0	1	0	3	0	0	0	0	0	0	0	32	3.8
04-Nov	8.00	0	0	1	7	0	1	0	0	0	8	0	1	0	2	0	0	2	0	0	0	0	22	2.8
05-Nov	7.00	0	0	1	4	0	1	0	0	0	5	0	2	0	4	1	0	2	0	0	0	0	20	2.9
Total	787.30	441	152	178	7429	5107	80	55	79	251	3924	14	23	13	295	8	2774	51	23	29	2	26	20954	26.6

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

Appendix E. Annual summaries of observation effort and unadjusted raptor counts by species: 1983–2001.

	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	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
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	3-Nov
Observation days	68	83	76	67	66	85	76	78	79	85	80	78	83	74	79	71	82	78	83	77
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	664.10
Raptors / 100 hours	1517	1130	1427	1435	1921	1704	2397	2527	1879	2703	1510	3122	2276	3514	2541	3515	3003	2542	2662	2280
SPECIES	RAPTOR COUNTS																			
Turkey Vulture	92	141	211	131	165	198	200	285	327	473	270	418	289	486	482	732	349	297	441	315
Osprey	41	39	40	43	51	54	65	86	62	119	54	130	92	99	187	176	110	152	152	92
Northern Harrier	109	105	139	89	120	125	77	161	152	184	116	292	252	255	255	247	356	233	178	181
Sharp-shinned Hawk	2021	2067	3177	2233	3537	4405	5404	5275	3702	5931	2838	6835	4752	6773	4677	9598	8094	6071	7429	4990
Cooper's Hawk	1698	1378	1741	1149	2042	3012	3074	3647	2779	5071	2298	5576	3252	5075	3848	6736	4109	3022	5107	3401
Northern Goshawk	105	146	119	65	65	74	80	123	146	259	120	105	150	241	97	99	103	123	80	121
Unkown small accipiter	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	55	55
Unkown large accipiter	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0	0
Unknown accipiter	562	362	311	251	710	295	204	374	648	639	348	522	416	464	368	75	132	87	0	356
TOTAL ACCIPITERS	4386	3953	5348	3698	6354	7786	8762	9419	7275	11900	5604	13038	8570	12553	8990	16508	12438	9303	12671	8871
Red-shouldered Hawk	0	0	0	1	1	0	0	1	0	0	0	0	0	2	0	0	0	1	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	41
Swainson's Hawk	116	34	78	276	69	43	60	351	108	208	159	244	287	498	143	507	334	132	251	205
Red-tailed Hawk	2105	1765	2132	1663	2317	2048	2263	3336	2976	3489	1827	4663	3572	3990	2922	3329	5183	3446	3924	2997
Ferruginous Hawk	3	6	17	5	15	9	23	17	26	19	15	20	29	16	18	16	25	19	14	16
Rough-legged Hawk	0	17	17	10	9	23	21	14	3	13	7	17	11	17	10	6	50	24	23	15
Unidentified buteo	185	74	65	42	156	44	47	36	147	70	128	110	69	62	77	5	24	21	13	72
TOTAL BUTEOS	2415	1909	2324	2004	2597	2183	2451	3790	3304	3825	2163	5095	4008	4612	3207	4023	5675	3730	4340	3348
Golden Eagle	239	206	230	196	221	154	203	290	324	263	317	338	299	344	329	235	348	305	295	270
Bald Eagle	8	10	9	13	7	8	9	19	16	21	26	19	17	6	6	6	31	14	8	13
Unidentified eagle	2	0	0	1	0	0	0	2	6	1	1	1	1	1	0	0	0	0	0	1
TOTAL EAGLES	249	216	239	210	228	162	212	311	346	285	344	358	317	351	335	241	379	319	303	284
American Kestrel	731	697	934	708	1099	1844	1669	2634	1564	2982	1234	2461	1964	3199	3394	3169	2974	3149	2774	2062
Merlin	4	14	3	3	17	20	33	25	37	43	19	72	86	71	78	91	74	49	51	42
Prairie Falcon	31	16	5	11	15	27	24	26	23	40	26	45	58	44	48	50	33	37	23	31
Peregrine Falcon	0	5	1	3	2	8	9	3	5	4	4	7	15	21	29	26	15	21	59	11
Unknown small falcon	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0	0
Unknown large falcon	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0	0
Unidentified falcon	6	7	2	8	6	7	5	10	11	4	6	9	18	21	7	2	7	3	2	7
TOTAL FALCONS	772	739	945	733	1139	1906	1740	2698	1640	3073	1289	2594	2141	3356	3556	3338	3103	3259	2879	2153
Unidentified raptor	446	113	94	53	186	107	96	106	193	234	117	229	149	83	102	25	57	34	26	129
GRAND TOTAL	8510	7215	9340	6961	10840	12521	13603	16856	13299	20093	9957	22154	15818	21795	17114	25290	22467	17327	20954	15374

Appendix F. Daily trapping effort and captures by species: 2001.

Date	Station Hours	Species[1]													Captures	
		NH	SS	CH	NG	BW	SW	RT	RL	GE	AK	ML	PR	PG	Total	/ stn hr
22-Aug	6.00	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0.2
23-Aug	7.00	0	2	0	0	0	0	1	0	0	0	0	0	0	3	0.4
24-Aug	6.00	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0.2
25-Aug	18.83	0	4	1	0	0	0	0	0	0	0	0	0	0	5	0.3
26-Aug	8.50	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0.1
27-Aug	16.50	0	4	0	0	0	0	2	0	0	10	0	0	0	16	1.0
28-Aug	24.00	0	6	1	0	0	0	7	0	0	9	0	1	0	24	1.0
29-Aug	20.17	0	3	4	0	0	0	4	0	0	5	0	0	0	16	0.8
30-Aug	15.17	0	5	2	0	0	0	2	0	0	0	0	0	0	9	0.6
31-Aug	24.50	0	1	1	0	0	0	2	0	0	4	0	0	0	8	0.3
01-Sep	25.00	0	9	0	1	0	0	1	0	0	6	0	0	0	17	0.7
02-Sep	36.50	0	10	2	0	0	0	2	0	0	9	0	0	0	23	0.6
03-Sep	27.75	0	12	2	0	0	0	0	0	0	17	0	0	0	31	1.1
04-Sep	17.50	0	11	1	0	0	0	0	0	0	1	0	0	0	13	0.7
05-Sep	23.00	0	15	6	0	0	0	1	0	0	15	0	0	0	37	1.6
06-Sep	23.17	0	4	0	0	0	0	0	0	0	0	0	0	0	4	0.2
07-Sep	26.00	0	6	2	0	0	0	0	0	0	4	0	0	0	12	0.5
08-Sep	33.00	0	39	13	0	0	0	4	0	0	6	1	0	0	63	1.9
09-Sep	32.25	0	46	14	0	0	0	1	0	0	3	0	1	0	65	2.0
10-Sep	25.00	1	51	11	1	0	0	1	0	0	0	0	1	0	66	2.6
11-Sep	24.00	0	51	23	1	0	0	0	0	0	1	0	0	0	76	3.2
12-Sep	0.00															
13-Sep	27.75	0	31	10	0	0	0	6	0	0	3	0	0	0	50	1.8
14-Sep	25.00	0	30	17	0	0	0	1	0	0	6	1	0	0	55	2.2
15-Sep	26.25	1	51	26	0	0	0	0	0	0	5	0	0	0	83	3.2
16-Sep	24.50	0	55	46	0	0	0	2	0	0	3	0	0	0	106	4.3
17-Sep	28.00	1	30	20	0	1	0	2	0	0	6	1	0	0	61	2.2
18-Sep	27.00	0	61	30	0	0	0	0	0	0	10	1	0	0	102	3.8
19-Sep	26.75	0	33	45	0	0	0	1	0	0	4	0	0	0	83	3.1
20-Sep	26.50	0	54	45	0	0	0	1	0	0	8	0	0	0	108	4.1
21-Sep	26.17	0	37	20	0	0	0	0	0	0	5	1	0	0	63	2.4
22-Sep	27.00	0	48	67	1	0	0	1	0	0	1	0	0	0	118	4.4
23-Sep	25.50	0	51	42	1	0	0	1	0	0	2	0	0	0	97	3.8
24-Sep	26.75	1	45	22	0	0	0	1	0	1	0	0	0	0	70	2.6
25-Sep	25.42	0	36	51	0	0	0	1	0	0	0	0	0	1	89	3.5
26-Sep	33.75	1	62	54	1	0	0	0	0	0	2	0	0	0	120	3.6
27-Sep	27.40	0	150	114	0	0	0	1	0	0	1	0	0	0	266	9.7
28-Sep	27.05	0	90	56	0	0	0	2	0	0	12	1	0	0	161	6.0
29-Sep	33.50	0	31	57	0	0	0	1	0	0	0	0	0	0	89	2.7
30-Sep	33.50	0	30	30	0	0	0	1	0	0	2	0	0	0	63	1.9

Appendix F. continued

Date	Station Hours	Species													Captures
		NH	SS	CH	NG	BW	SW	RT	RL	GE	AK	ML	PR	PG	Total / stn hr
01-Oct	27.00	1	44	20	0	0	0	1	0	0	1	0	0	0	67 2.5
02-Oct	33.75	0	4	6	0	0	0	0	0	0	0	0	0	0	10 0.3
03-Oct	25.75	0	7	4	1	0	0	1	0	0	0	0	0	0	13 0.5
04-Oct	25.00	0	4	9	1	0	0	0	0	0	0	0	0	0	14 0.6
05-Oct	33.50	0	35	26	0	0	0	2	0	0	1	0	0	0	64 1.9
06-Oct	29.50	0	38	14	0	0	0	0	0	0	0	0	0	0	52 1.8
07-Oct	24.50	0	24	17	0	0	0	1	0	0	2	0	0	0	44 1.8
08-Oct	24.25	0	15	5	0	0	0	0	0	0	0	0	0	0	20 0.8
09-Oct	23.50	0	3	1	1	0	0	0	0	0	0	0	0	0	5 0.2
10-Oct	23.50	0	6	4	1	0	0	1	0	0	0	0	0	0	12 0.5
11-Oct	0.00														
12-Oct	26.05	0	3	2	0	0	0	0	0	0	0	0	0	0	5 0.2
13-Oct	24.00	0	2	0	0	0	0	0	0	0	0	0	0	0	2 0.1
14-Oct	25.25	0	3	2	0	0	0	0	0	0	0	0	0	0	5 0.2
15-Oct	33.00	0	27	3	0	0	0	0	0	0	0	1	0	0	31 0.9
16-Oct	25.30	2	40	6	0	0	0	0	1	0	0	1	0	0	50 2.0
17-Oct	25.00	0	13	0	0	0	0	1	0	0	2	0	0	0	16 0.6
18-Oct	25.00	2	13	5	0	0	1	1	0	0	0	0	0	0	22 0.9
19-Oct	30.00	0	34	8	1	0	0	4	0	0	0	1	0	0	48 1.6
20-Oct	24.25	0	17	1	2	0	0	0	0	0	0	1	0	0	21 0.9
21-Oct	24.10	0	7	2	3	0	0	2	0	0	0	0	0	0	14 0.6
22-Oct	24.00	0	4	1	0	0	0	0	0	0	0	0	0	0	5 0.2
23-Oct	24.00	0	0	0	0	0	0	1	0	0	0	0	0	0	1 0.0
24-Oct	24.40	0	4	0	0	0	0	1	0	0	1	0	0	0	6 0.2
25-Oct	15.50	1	2	0	0	0	0	1	0	0	0	0	0	0	4 0.3
26-Oct	24.75	0	22	1	2	0	0	0	0	0	1	0	0	0	26 1.1
27-Oct	16.00	0	8	1	1	0	0	1	0	0	0	0	0	0	11 0.7
28-Oct	16.50	0	8	0	0	0	0	1	0	0	0	0	0	0	9 0.5
29-Oct	5.50	0	8	1	2	0	0	2	0	0	0	0	0	0	13 2.4
30-Oct	5.33	0	0	0	0	0	0	1	0	0	0	0	0	0	1 0.2
1-Nov	6.75	0	2	0	0	0	0	0	0	0	0	0	0	0	2 0.3
2-Nov	6.50	0	2	0	1	0	0	3	0	0	0	1	0	0	7 1.1
3-Nov	3.50	0	1	0	0	0	0	0	0	0	0	0	0	0	1 0.3
4-Nov	7.00	0	3	0	1	0	0	0	1	0	0	1	0	0	6 0.9
Total	1649.56	11	1608	975	23	1	1	76	2	1	168	12	3	1	2882 1.7

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

Appendix G. Annual summaries of banding effort and capture totals by species: 1980–2001.

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	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	
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	
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	
Trapping days	21	37	27	55	69	?	?	?	?	?	66	64	74	59	65	63	61	62	63	72	62	72	57
Station days	21	37	?	66	104	?	?	?	?	159	205	240	296	254	278	312	270	264	236	131	174	210	192
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	1250
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	175.6
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	6
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	1237
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	599
Northern Goshawk	6	11	3	32	40	42	5	27	22	29	44	33	104	27	35	27	68	20	20	20	24	23	31
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	1
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
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	60
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
Golden Eagle	1	1	1	1	5	6	2	4	7	6	10	3	3	2	11	4	7	5	4	8	2	1	4
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
American Kestrel	7	58	8	51	28	34	17	37	85	61	190	266	367	223	285	193	290	351	149	97	285	168	147
Merlin	0	1	1	0	2	0	0	1	5	8	2	9	10	8	21	13	18	26	13	16	11	12	8
Prairie Falcon	0	0	0	6	5	2	1	3	7	5	7	7	8	1	7	3	7	17	7	3	8	3	5
Peregrine Falcon	0	0	0	0	1	0	0	0	0	2	1	1	0	1	0	1	1	4	0	1	1	1	1
All Species	126	775	341	1019	926	1212	617	1401	1904	2366	2762	3026	3855	2671	4685	2857	3304	3058	3404	1529	2148	2882	2099
Recaptures[1]	0	0	0	0	0	0	0	0	0	0	4	4	7	9	10	3	3	7	9	4	6	9	3
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	1
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	11

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

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

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