FALL 2016 RAPTOR MIGRATION ANNUAL REPORT: MANZANOS HAWKWATCH, CENTRAL NEW MEXICO

HawkWatch International, Inc.

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INTRODUCTION

The Manzanos HawkWatch in central New Mexico is an ongoing effort to monitor long-term regional population trends of diurnal raptors that migrate through the southern portion of the Rocky Mountain flyway (Hoffman et al. 2002, Hoffman and Smith 2003, Smith et al. 2008a). HawkWatch International (HWI) initiated standardized counts of the autumn raptor migration at the Manzanos in 1985, and began a trapping and banding program in 1990. To date, HWI observers have recorded 18 species of migratory raptors at the site, with counts typically ranging between 4,000 and 7,000 migrants per season. The 2016 season marked the 32nd consecutive count and the 27th consecutive season of trapping and banding efforts. This report summarizes the 2016 fall raptor migration season for the Manzanos HawkWatch.

The Manzanos HawkWatch was 1 of 8 long-term, annual fall migration counts and 1 of 4 migration-banding efforts conducted, or co-sponsored by, HWI in North America during 2016 (Fig.1). The primary objective of these efforts is to track long-term population trends of diurnal raptors in western North America and around the Gulf Coast region (Hoffman and Smith 2003; Smith et al. 2001, 2008a, b). Raptors can serve as important biological indicators of ecosystem health (Bildstein 2001) and long-term migration counts are one of the most cost-effective and efficient methods for monitoring the regional status and trends of multiple raptor species (Zalles and Bildstein 2000).

In addition to long-term counting and banding efforts, HWI conducts and supports other studies to further knowledge about the biology of migrating raptors. Some of these efforts include: telemetry work to identify species' ranges, migratory routes, and connectivity; and blood and feather sampling to track changes in raptor health and populations (e.g., Hoffman et al. 2002, DeLong and Hoffman 2004, McBride et al. 2004, Lott and Smith 2006, Goodrich and Smith 2008,).

Beyond having scientific and conservation value, each site in HWI's migration network offers unique opportunities for the public to learn about raptors and the natural environment. Providing such opportunities is another important component of the Manzanos HawkWatch, and outreach efforts here reach hundreds of people from the Albuquerque area, central New Mexico, and beyond each season.

STUDY SITE

The Manzano Mountains HawkWatch is located in the Manzano Wilderness Area of the Cibola National Forest (Mountainair Ranger District) near Capilla Peak, approximately 56 km south-southeast of Interstate 40 (34°42.25' N, 106°24.67' W; Fig. 2). The observation point sits at an elevation of 2,805 m (9,195 ft) on a northwest-southeast facing outcrop of a limestone ridge. It is reached by walking up a 1.2 km trail from the main road leading up to Capilla Peak (FS 522). The vegetation on the slopes of the ridge consists of Gambel oak (Q*uercus gambelli*), Douglas-fir (*Pseudotsuga menziesii*), white fir (*Abies concolor*), ponderosa pine (*Pinus ponderosa*), pinyon pine (*Pinus edulis*), New Mexico locust (*Robinia neomexicana*), and bigtooth maple (*Acer grandidentatum*).

Two banding stations operate within 0.25–1 km of the observation point (Fig. 1). **North** station, open every year since 1990, is located 100 m east and 50 m north of the observation point at an elevation of 2,790 m. **West** station, open every year since 1991, is located 0.5 km southwest of the observation point at an elevation of 2,684 m.

Many factors make the Manzano Lookout well suited for observing consistent flights of fall migrating raptors. Several mountain ranges to the north serve as leading lines (Bildstein 2006), which cause raptors to funnel into the area. The Manzano Mountains are also a relatively narrow and well-defined north–south range, which creates beneficial updrafts and serves as a distinct flight path for migrating raptors. Capilla Peak provides an excellent source of orographic lift. Two other peaks located 10–15 km north of the observation site also attract southbound migrants that benefit from strong ridge updrafts. The

concentration effect of the Manzano range is further enhanced by the absence of parallel ranges nearby to serve as alternate flight paths.

METHODS

STANDARDIZED COUNTS

Weather permitting, two designated observers conduct standardized, daily counts of migrating raptors from late August through late October. Observations typically begin between 0800–0900 hrs and end near 1700 hrs Pacific Standard Time (PST). Visitors occasionally assist with the count.

Data collection follows standardized protocols used at all HWI migration sites (Hoffman and Smith 2003). The observers routinely record 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 tables and figures).
2. Hour of passage for each migrant (e.g., the 1000–1059 hrs PST).
3. Wind speed and direction, air temperature, percent cloud cover, predominant cloud type(s), presence of precipitation, visibility, and an assessment of thermal-lift conditions are 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 (includes 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 that documents observer distraction by interactions with visitors.
7. Daily start and end times for each official observer.

In comparing 2016 counts against means and 95% confidence intervals for previous seasons, we consider a count value falling outside the 95% confidence interval of the historic site means as significantly different. Linear and quadratic regression was used on effort-adjusted annual passage rates (raptors/100hrs) to identify long-term trends in migrating raptors.

TRAPPING AND BANDING

Similar to the counts, trapping and banding efforts begin late August and continue through late October at the two banding stations, generally between 0900–1700 hrs MST. Capture devices include mist nets and remotely triggered bow nets. Trappers lure 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, we fit all captured birds with a uniquely numbered USGS Biological Resources Division aluminum leg band and release all birds within 45 minutes of capture. Data collection follows standardized protocols used at all HWI migration-banding sites (Hoffman et al. 2002). The crew measure mass, wingchord, and tail length on all trapped birds and, when possible, estimate age and sex based on molt patterns and other evidence.

2016 RESULTS AND DISCUSSION

OBSERVATION EFFORT AND WEATHER SUMMARY

The Manzano Mountains HawkWatch standard season runs 27 August—5 November; in 2016 observers counted on 68 of 71 possible days during this period for a total of 545.9 hours (Appendix C). Weather led to a shortened count (<4 hrs) on one day. Weather varies throughout every season; in 2016, based on hourly recording of conditions during observation, it was clear 38% of the time; partly cloudy 25% of the time; mostly cloudy 20% of the time; overcast 17% of the time; and raining or snowing 2% of the time.

2016 FLIGHT SUMMARY

Overall Flight:

A total of 2,747 migrating raptors representing 16 species were counted in 2016, 48% lower than the site long-term average (Table 1).

The flight consisted of 53% accipiters, 22% buteos, 11% falcons, 8% vultures, 4% eagles, 1% harriers, and 1% Ospreys. The relative proportions of eagles and Ospreys was high in 2016 compared to historic values, while all other groups occurred in average proportions (Fig. 3). Sharp-shinned Hawks were the most abundant species (33% of the total), followed by Cooper's Hawks (17%), Red-tailed Hawks (15%), Turkey Vultures (8%), American Kestrels (9%), Swainson's Hawks (5%), and Golden Eagles (4%). The remaining species each accounted for 1% or less of the total count (Table 1).

The following sections summarize the 2016 count relative to historic means at the site, and any statistically significant ($p < 0.05$) population trends based on first and second order regression analysis. HWI only depicts significant trends for species with a historic average count rate greater than or equal to 10 individuals per 100 hours. The rationale is that trends for counts below this point likely do not contain biologically useful information on regional populations—species with counts this low likely have a dispersed migration, another primary migration route, or large portions of the population that are resident. We do include count information for these less abundant species in the reports as occurrences of rarer species are of interest to both managers and the general public and could represent the beginning of meaningful, long-term changes.

Total Flight (Fig.4):

The Manzano Mountains HawkWatch crew counted 2,747 total birds at a passage rate of 503 raptors per 100 hours of observation in 2016, both significantly below site average and the second lowest ever for the site (Table 1). Despite recent low counts, no long term decline is indicated by regression analyses (no significant trend).

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

In 2016, the crew observed below average counts and passage rates for Turkey Vultures, Ospreys, and Northern Harriers (Table 1). Long-term passage rates for Osprey and Turkey Vulture are stable (no significant trend over time), but declining for Northern Harrier (slope = -0.17, $r^2 = 0.13$, F=4.29, p= 0.047

Accipiters (Fig. 5b):

Counts and passage rates for all three accipiter species fell below historic averages in 2016 (Table 1). We counted the second lowest totals in Manzanos history for both Sharp-shinned Hawks and Cooper's Hawks. Cooper's Hawks are the only accipiter species with a significant trend in passage rates, increasing from 1985 to 1998, but declining in recent years ($F_{2,29} = 11.45$, $r^2 = 0.44$, $p = 0.002$).

Buteoine Hawks (Fig. 5c):

Crewmembers counted average numbers of Broad-winged Hawks in 2016 and effort-adjusted passage rates were also average. We observed below average counts and passage rates for all other buteo species (Ferruginous Hawk, Red-tailed Hawk, Rough-legged Hawk, and Swainson's Hawk, Table 1). Long – term regression analysis indicates declining Red-tailed Hawks counted during fall migration since 2003 ($F_{2,29} = 5.78$, $r^2 = 0.29$, $p = 0.023$). We found no significant, long-term trends for other Buteo species with mean passage rates >10 birds/100hrs. The crew counted three Zone-tailed Hawks in 2016.

Eagles (Fig.5d):

We observed below average counts and passage rates for Golden Eagle and Bald Eagle in 2016 compared to historic site averages (Table 1). Regression analysis indicates a near-significant decline in Golden Eagles counted at the Manzano Mountains HawkWatch (slope = -0.25, $r^2 = 0.12$, $p = 0.058$). Similar declines are documented at other HawkWatch International migration sites and elsewhere.

Falcons (Fig. 5e):

The Manzano Mountains HawkWatch crew documented below average counts and passage rates for Peregrine Falcon, Merlin, and America Kestrel in 2016, while count and passage rate for Prairie Falcon were average (Table 1). Regional populations of American Kestrel are declining based on fall migration passage rates (slope = -3.04, $r^2 = 0.54$, $F = 35.6$, $p < 0.001$). Similar declines have been documented for this species across the HWI network and at other count sites. In response, HWI and many other North American researchers and Citizen Scientists are working to understand American Kestrel declines both locally (www.hawkwatch.org/our-work/kestrels) and at the continental scale and have partnered under the umbrella of the American Kestrel Partnership (http://kestrel.peregrinefund.org/). Mean passage rates for all other falcons do not meet the 10 birds/100hrs threshold for reporting trends.

TRAPPING EFFORT

Crews trapped for 60 days (totaling 506.7 hrs) between 2 September and 1 November and captured 351 raptors of 11 different species (Table 2). Both the number of hours trapped and capture totals were low compared to historic site averages (Appendix D). Season highlights included the capture of a dark morph, after-hatch-year Broad-winged Hawk, 4 Northern Goshawks, and 3 Golden Eagles.

RECAPTURES

In 2016, for the second season in a row, there were no in-house (HWI banded birds) or "foreign recaptures" (recaptures of birds banded elsewhere) at the site.

FOREIGN ENCOUNTERS WITH PREVIOUSLY BANDED BIRDS FROM THE MANZANO MOUNTAINS

A total of 130 birds banded at the Manzano Mountains HawkWatch have been recovered/recaptured elsewhere and reported to the Bird Banding Laboratory (Fig. 6). In 2016 we received notice of three recoveries: two female Cooper's Hawks (banded as a hatch-years in 2004 and 2016), and one, female Sharp-shinned Hawk (banded as a hatch-year bird in 2014, Table 3). The Cooper's Hawk from 2002 was found dead in Las Cruces, New Mexico in late December. The other Cooper's Hawk was captured in Guadalajara, Jalisco, Mexico in November due to an injury, no other details were reported. The Sharp-shinned Hawk was found dead on a highway near Belen, New Mexico in December.

SITE VISITATION

During the season, a total of 456 individuals visited the site, primarily from New Mexico. Visitors also traveled from Arizona, California, Florida, Illinois, Massachusetts, Tennessee, Texas, and Vermont. Visitors to the site see raptors in flight and in hand prior to release, learn to identify raptors in flight and also about raptor migration ecology and what banding and counting efforts can tell us about regional

raptor populations and the health of the landscapes they use. They also learn about the ecosystems found around the Manzanos HawkWatch and are introduced to/reminded about leave no trace outdoor ethics.

2016 FALL MIGRATION ACROSS HWI'S NETWORK

HawkWatch International and partners operated 8 fall count sites in 2016 (Fig. 1). During the 4,341 hours of standardized observation, we counted 714,248 migrating birds of prey. The power and utility of HWI's network of fall count sites, and long-term monitoring in general, lies in that it allows identification of patterns in regional raptor populations, both over time at a single site and also network-wide. Declines in counts or passage rates for a species or group of species at the regional level can highlight the need for more focused research or management attention at local scales, while increases may indicate the success of management and conservation efforts. While each site in HWI's network varied in terms of individual species or group counts, notable network-wide patterns in 2016 included (Table 4):

- Below average Kestrel numbers at 5 of 8 sites (no sites with above average counts).
- Below average counts for Prairie Falcons and Osprey at 5 of 8 sites and 4 of 8 sites, respectively.
- Above average Merlin counts at 5 of 8 sites, only exception was Manzanos with a count below average (this site had second lowest overall (all raptors) count in its 32-yr history).
- Above average counts at Bridger, Commissary, and Grand Canyon for second year in a row overall and for most species.
- Below average counts for Red-tailed Hawks at 4 of 8 sites, including a record low at Corpus Christi; above average counts at 3 sites.
- Record highs for:
    - Golden Eagles at Commissary (only network site with above average Golden Eagle count)
    - Northern Harriers and all falcons except Kestrels at the Grand Canyon
    - Bald Eagles at Chelan Ridge
    - Mississippi Kites at Corpus Christi (shattered previous record of 27,285)

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Table 1. Historic fall migration counts (mean±95% CI), counts from fall 2016, and site records at the Manzano Mountains, NM.

		1985-2015					All-time Historic Records		
	Species	**Mean Count ± 95 % CI**			**2016**	**% Change**	**Season**	**Year**	**Daily (Year)**
	Turkey Vulture	382.5	±	79.3	210	-45	**1116**	**1998**	256 (2012)
	Osprey	30.3	±	5.7	22	-27	**86**	**2003**	26 (2003)
	Northern Harrier	56.9	±	8.8	30	-47	**133**	**1998**	14 (1998)
Accipiters									
	Sharp-shinned Hawk	1463.3	±	146.6	903	-38	**2585**	**1998**	194 (1996)
	Cooper's Hawk	948.4	±	122.7	456	-52	2025	1998	239 (1996)
	Northern Goshawk	15.8	±	3.1	9	-43	42	2000	6 (2x)
	Unidentified accipiter	110.4	±	19.5	94	-15	266	1993	
	TOTAL ACCIPITERS	2537.9	±	253.7	1462	-42	4736	1998	
Buteos									
	Zone-tailed Hawk	0.7	±	1.0	3		4	2011	
	Broad-winged Hawk	8.5	±	1.8	8	-6	19	2012	8 (2008)
	Swainson's Hawk	930.4	±	566.2	149	-84	7301	1993	5006 (1993)
	Red-tailed Hawk	607.6	±	60.9	421	-31	1151	1998	138 (1997)
	Ferruginous Hawk	11.5	±	1.8	5	-57	25	1992	4 (1991)
	Rough-legged Hawk	0.4	±	0.3	0	-100	3	2014	2 (2013)
	Unidentified buteo	22.4	±	7.5	22	-2	106	2001	
	TOTAL BUTEOS	1580.9	±	564.3	608	-62	7916	1993	
Eagles									
	Golden Eagle	112.7	±	11.8	96	-15	172	1994	19 (1994)
	Bald Eagle	3.3	±	0.9	2	-40	9	1994	2 (10x)
	Unknown eagles	1.3	±	0.8	0	-100	9	2007	
	TOTAL EAGLES	117.3	±	12.0	98	-16	181	1994	
Falcons									
	American Kestrel	472.5	±	64.9	237	-50	905	1996	158 (1993)
	Merlin	29.4	±	5.3	17	-42	64	2012.0	8 (2014)
	Prairie Falcon	17.7	±	3.7	15	-15	58	1998.0	5 (1998)
	Peregrine Falcon	48.7	±	11.0	33	-32	127	2002.0	14 (2003)
	Unidentified falcon	4.3	±	1.6	9	111	21	2002	
	TOTAL FALCONS	572.5	±	68.4	311	-46	1033	1996	
	Unidentified Raptor	35.7	±	13.4	6	-83	142	1992	
GRAND TOTAL		5314.8	±	692.7	2747	-48	11895	1993	

Table 2. Capture totals and rates for fall migrating raptors at the Manzanos HawkWatch in central New Mexico: 1991–2015 versus 2016.

	Capture Totals			Capture Rate[1]		
	1991-2015[2]	2016	Seasonal Record	1991-2015[2]	2016	Seasonal Record
Northern Harrier	3.6 ± 1.3	5	14	0.5 ± 0.1	1.0	1.0
Sharp-Shinned Hawk	429.8 ± 78.1	160	987	57.3 ± 5.3	31.6	79.4
Coopers Hawk	313.5 ± 59.2	147	772	41.7 ± 4.5	29.0	69.9
Northern Goshawk	4.2 ± 1.4	4	16	0.6 ± 0.2	0.8	2.0
Broad-winged Hawk	0.3 ± 0.2	1	1	0.0 ± 0.0	0.2	0.2
Swainson's Hawk	0.3 ± 0.3	0	3	0.0 ± 0.0	0.0	0.4
Red-tailed Hawk	42.6 ± 9.3	23	112	5.7 ± 0.8	4.5	9.6
Zone-Tailed Hawk	0.0 ± 0.1	0	1	0.0 ± 0.0	0.0	0.1
Golden Eagle	3.4 ± 0.9	3	9	0.5 ± 0.1	0.6	1.5
Bald Eagle	0.0 ± 0.1	0	1	0.0 ± 0.0	0.0	0.2
American Kestrel	27.7 ± 9.4	2	92	3.4 ± 0.9	0.4	8.9
Merlin	4.6 ± 1.3	4	12	0.7 ± 0.2	0.8	1.6
Prairie Falcon	3.1 ± 1.1	1	13	0.4 ± 0.1	0.2	1.0
Peregrine Falcon	5.2 ± 1.5	1	13	0.7 ± 0.2	0.2	1.8
All species	838.5 ± 154.1	351	2005	111.5 ± 10.2	69.3	163.0

[1]Captures / 100 station hours.

[2]Mean of annual values ± 95 % confidence interval.

Table 3. Foreign encounters with raptors originally banded at the Manzanos HawkWatch in central New Mexico: 2016.

Band #	Species[1]	Sex	Banding Date	Banding Age[2]	Encounter Location	Encounter Date	Distance (KM)[3]	Status
1005-23118	COHA	F	15-Sep-04	HY	Las Cruces, New Mexico	30-Dec-16	263.6	Found dead - Band with skeleton or bone only
1783-90761	SSHA	F	28-Oct-14	HY	Belen, New Mexico	15-Dec-16	31.9	Found dead on highway
1075-02245	COHA	F	24-Sep-16	HY	Guadalajara, Jalisco, Mexico	9-Nov-16	1533.1	Caught due to injury

[1] Species: SSHA = Sharp-shinned Hawk; COHA = Cooper's Hawk.

[2] HY = hatch year.

[3] Straight-line distance from banding location.

Table 4. Summary of the 2016 fall flight of migrating raptors across HWI's monitoring network. Values are counts; green indicates a count significantly higher (outside the 95% confidence interval) than the historic site average, red indicates a count significantly lower than average, and black indicates a count that does not differ from the site average. Asterisks denote a record high or low count. *In 2016, HWI monitored fall migration for 4,451.7 hrs and counted 713,979 birds.*

	Bonney Butte, OR	Chelan Ridge, WA	Bridger Mtn, MT	Commissary Ridge, WY	Goshute Mts, NV	Yaki Pt, AZ	Manzano Mts, NM	Corpus Christi, TX
	Hours Counted in 2016							
Species	**366**	**421**	**381.8**	***573.8***	**698.5**	**600.8**	**553.5**	**856.3**
Black Vulture								140
Turkey Vulture	596	63	14	59	370		214	45293
Osprey	66	*16*	13	22	54	70	22	187
Northern Harrier	12	82	44	52	211	*68*	30	158
Crested Caracara								5
Common Black Hawk								0
Harris' Hawk								5
Accipiters								
Sharp-shinned Hawk	1146	490	616	1487	3204	1667	892	2159
Cooper's Hawk	362	196	198	536	1960	1255	466	824
Northern Goshawk	24	13	62	45	27	10	9	0
Unidentified accipiter	43	74	60	66	656	377	94	64
TOTAL ACCIPITERS	1575	773	936	2134	5847	3309	1461	3047
Buteos								
Red-shouldered Hawk	0	0		0	*3*	0	0	15
Broad-winged Hawk	4	8	31	25	91	37	8	594222
Short-tailed Hawk								0
Swainson's Hawk	0	6	4	96	180	59	149	2255
White-tailed Hawk								22
Zone-tailed Hawk							3	7
Red-tailed Hawk	344	151	212	1183	3128	1510	421	*44*
Ferruginous Hawk	0	0	3	8	9	10	5	2
Rough-legged Hawk	3	28	77	11	20	0	0	0
Unidentified buteo	25	35	16	37	102	60	22	24
TOTAL BUTEOS	376	228	343	1360	3533	1676	608	596591
Eagles								
Golden Eagle	66	87	1434	*476*	139	4	95	0
Bald Eagle	83	*18*	78	230	10	8	2	9
Unknown eagles	*11*	0	1	11	5	1	0	0
TOTAL EAGLES	160	105	1513	*717*	154	13	97	9
Falcons								
American Kestrel	9	26	88	167	893	496	237	810
Merlin	108	34	33	31	42	*22*	17	83
Prairie Falcon	2	6	14	5	11	*11*	13	7
Peregrine Falcon	17	9	30	13	26	*19*	35	224
Aplomado Falcon								0
Unidentified falcon	4	2	4	2	*43*	*33*	9	10
TOTAL FALCONS	140	77	169	218	1015	581	311	1134
Kites								
Hook-billed Kite								0
Swallow-tailed Kite								152
White-tailed Kite								13
Mississippi Kite								*35219*
Unidentified Kites								0
TOTAL KITES								*35384*
Unidentified Raptor	2	30	34	18	185	*71*	6	172
GRAND TOTAL	2927	1374	3066	4580	11369	5788	2749	682126

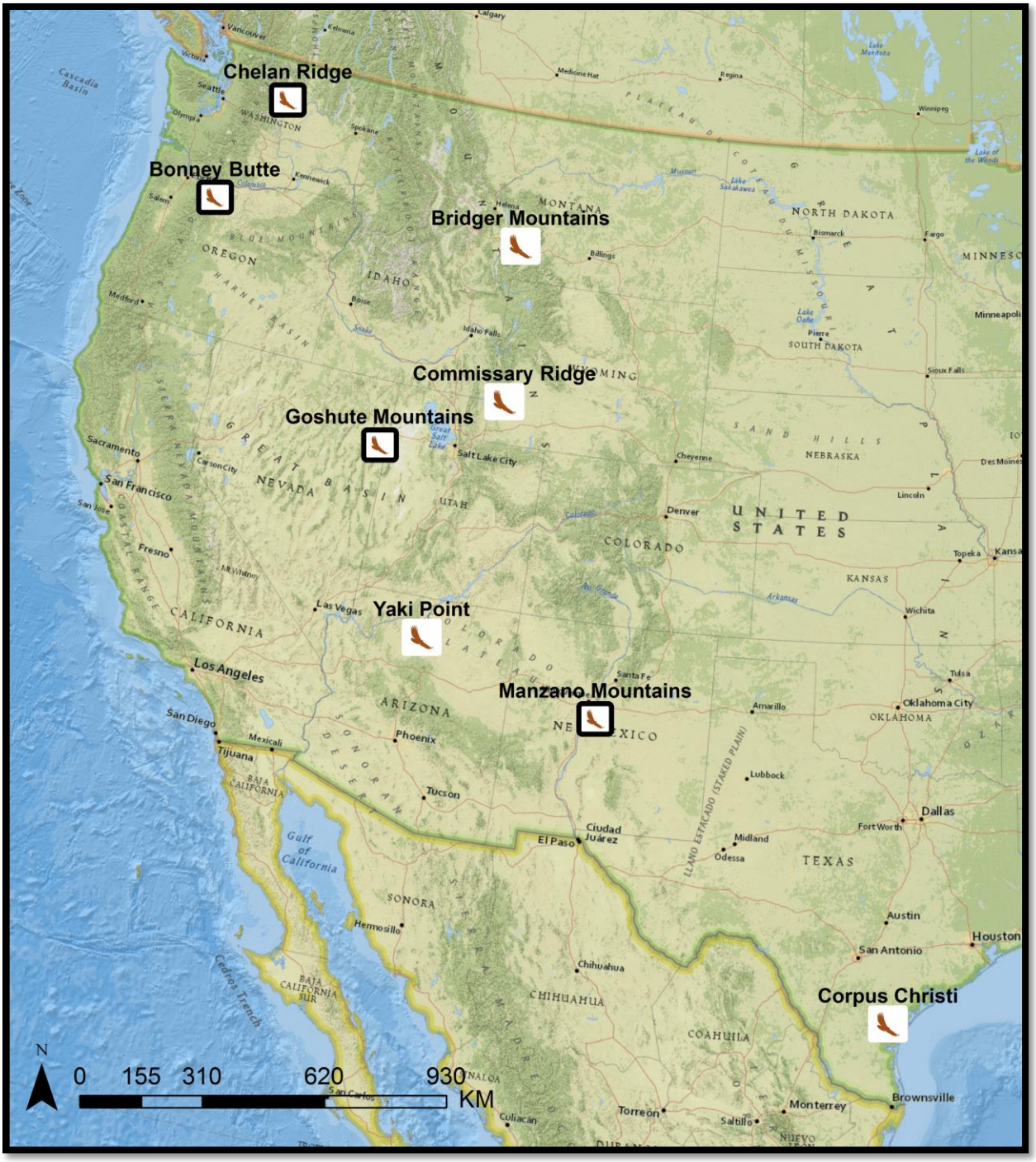

Figure 1. Locations of fall HawkWatch sites operated by HWI and partners (symbols with borders represent banding sites in 2016).

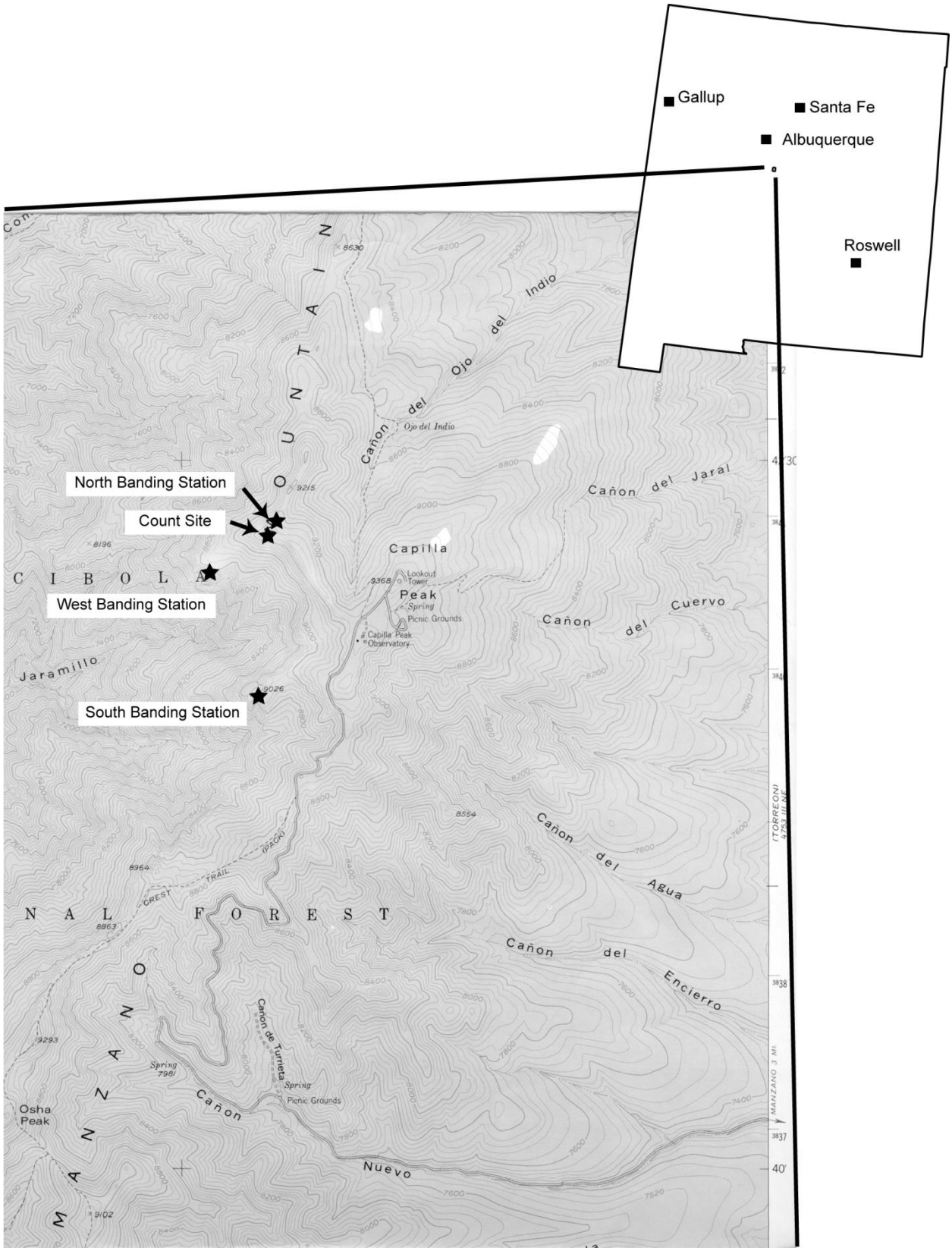

Figure 2. Location of the Manzanos HawkWatch in central New Mexico.

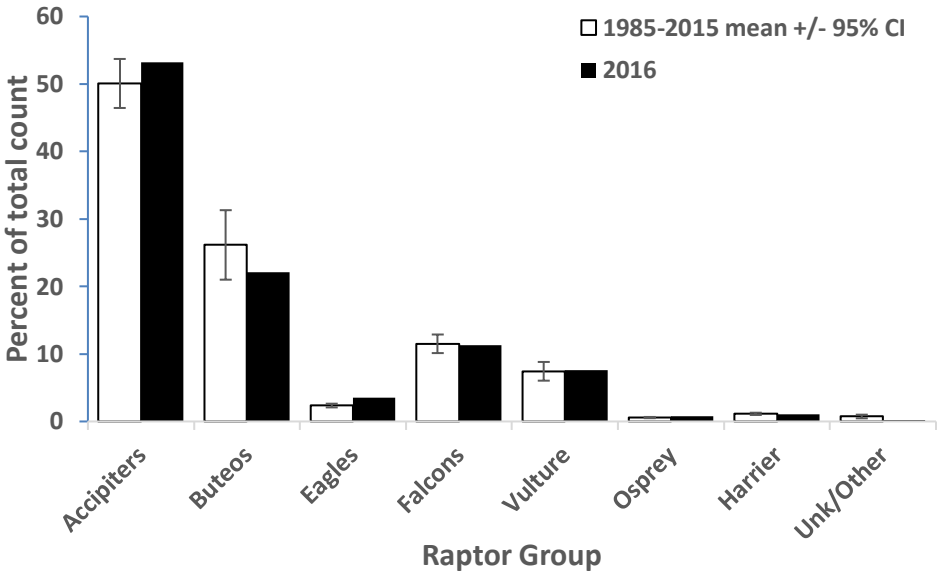

Figure 3. Fall raptor-migration flight composition by major species groups at the Manzanos HawkWatch in central New Mexico: 1985–2015 versus 2016.

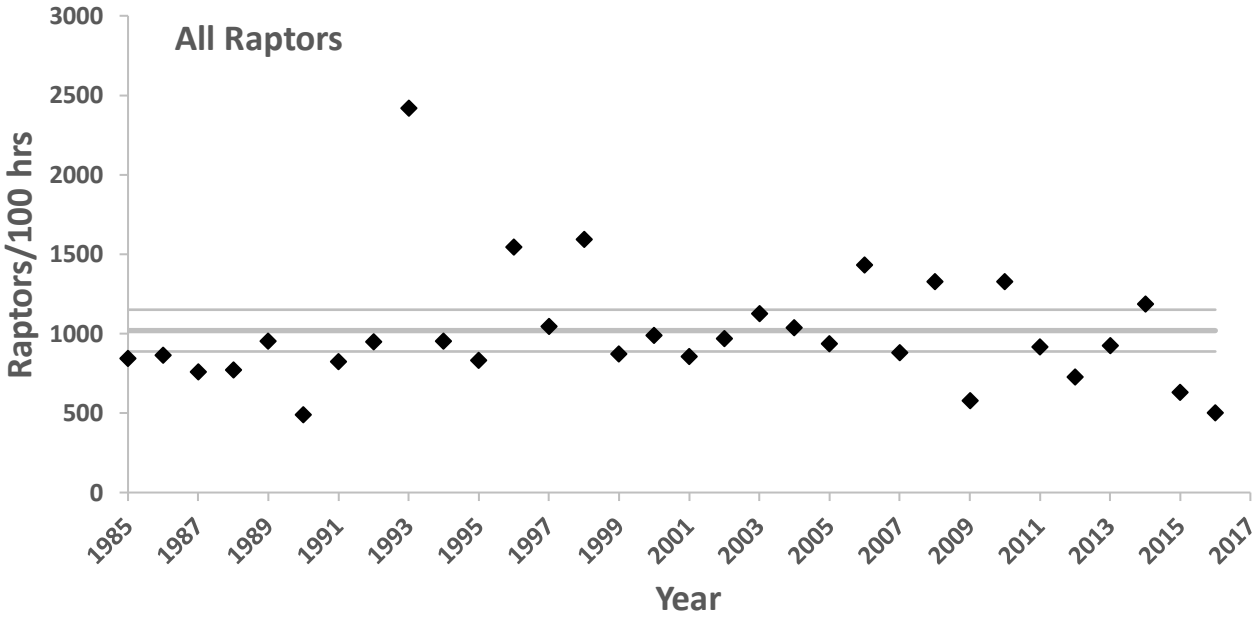

Figure 4. Fall migration passage rates at Manzanos HawkWatch in central New Mexico for all migrating raptors: 1985-2016. Solid grey lines represent mean (thick) and upper and lower 95% confidence intervals (thin) of historic counts (1985-2015) at the Manzanos.

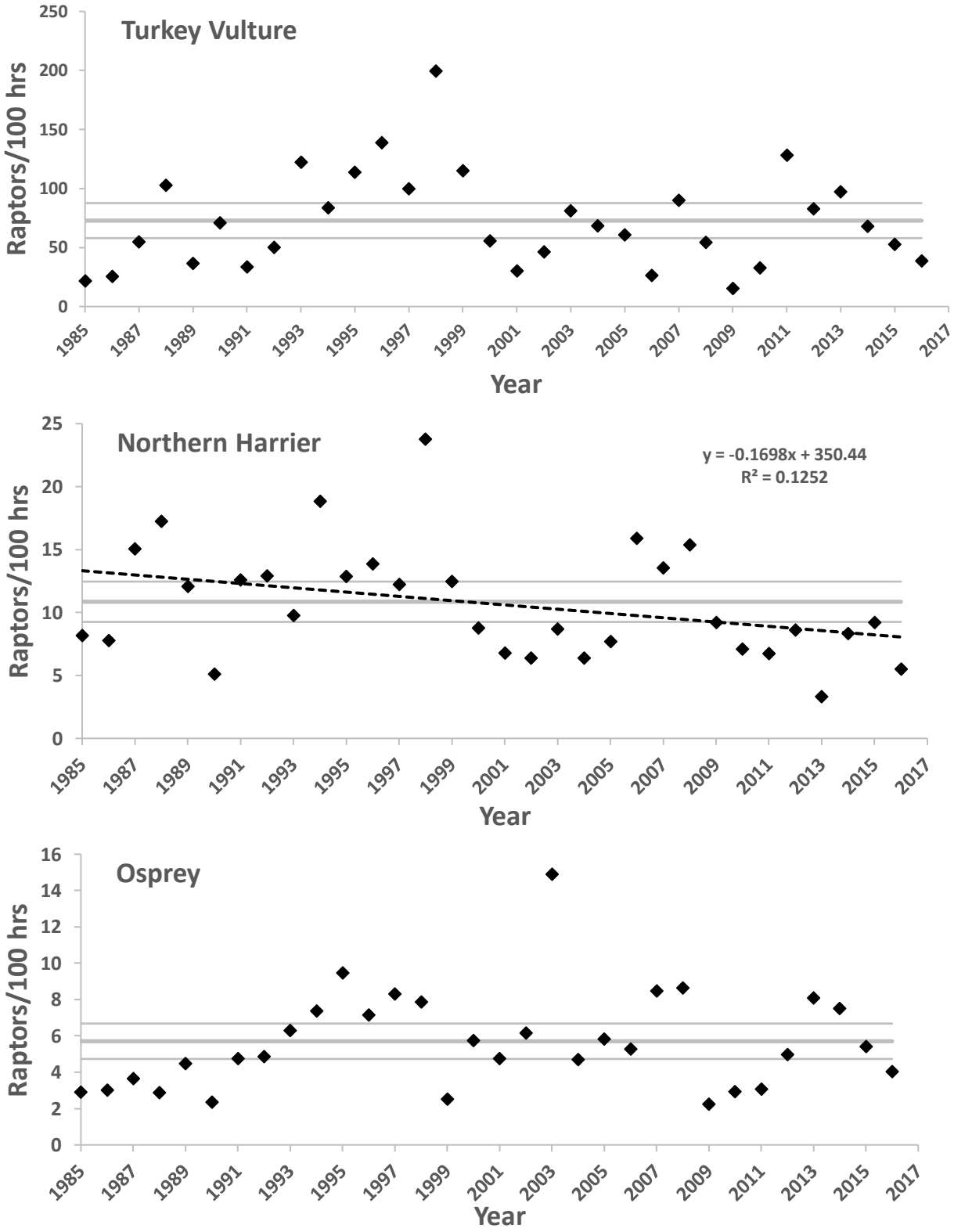

Figure 5a. Effort-adjusted fall-migration passage rates at the Manzanos HawkWatch in central New Mexico for Turkey Vultures, Ospreys, and Northern Harriers: 1985–2016. Dashed line indicates trend for significant ($p < 0.05$) linear regression. Solid grey lines represent mean (thick) and upper and lower 95% confidence intervals (thin) of historic counts (1985-2015) at the Manzano Mountains.

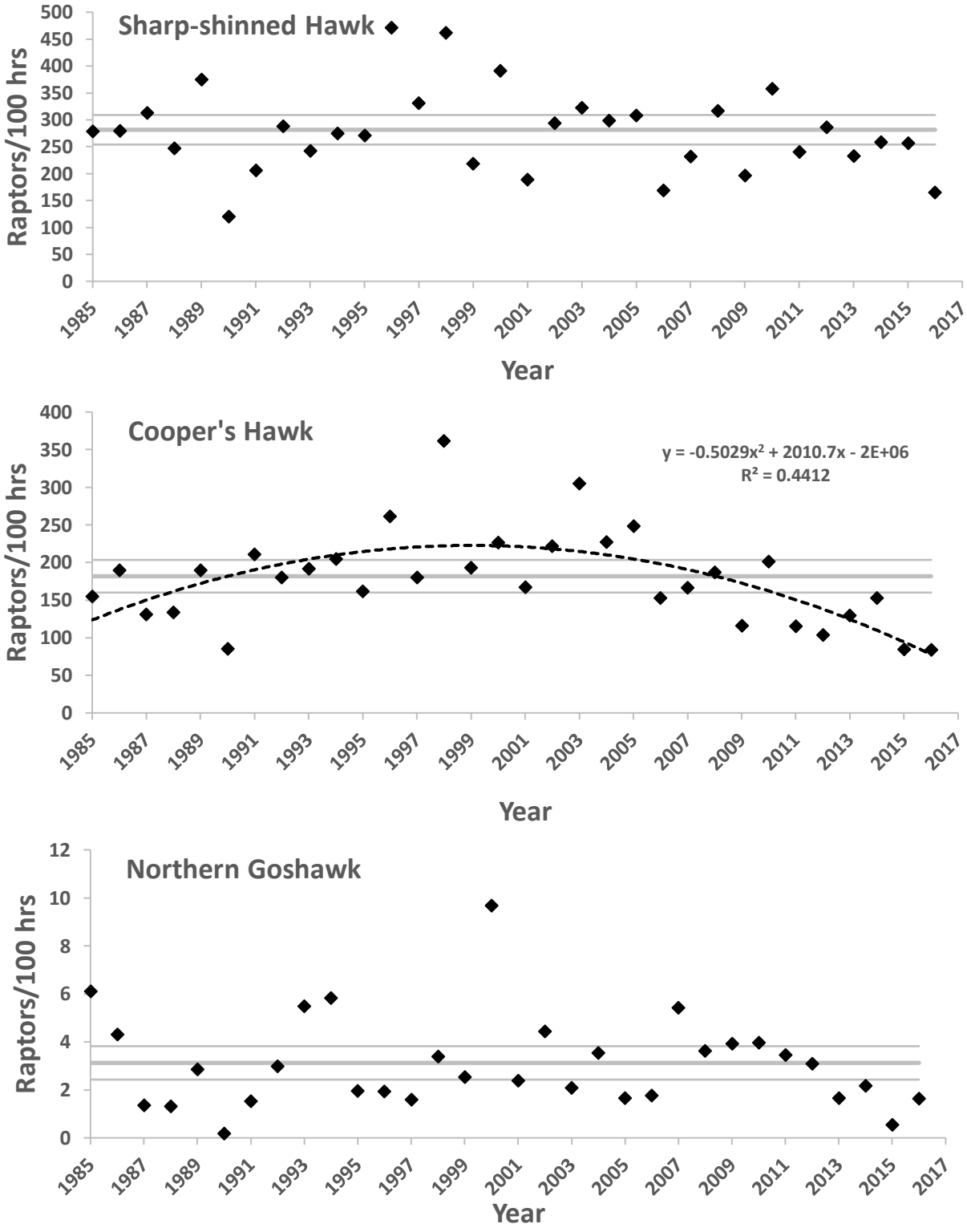

Figure 5b. Effort-adjusted fall-migration passage rates at the Manzanos HawkWatch in central New Mexico for Accipiters: 1985–2016. Dashed line indicates trend for significant ($p < 0.05$) quadratic regression. Solid grey lines represent mean (thick) and upper and lower 95% confidence intervals (thin) of historic counts (1985-2015).

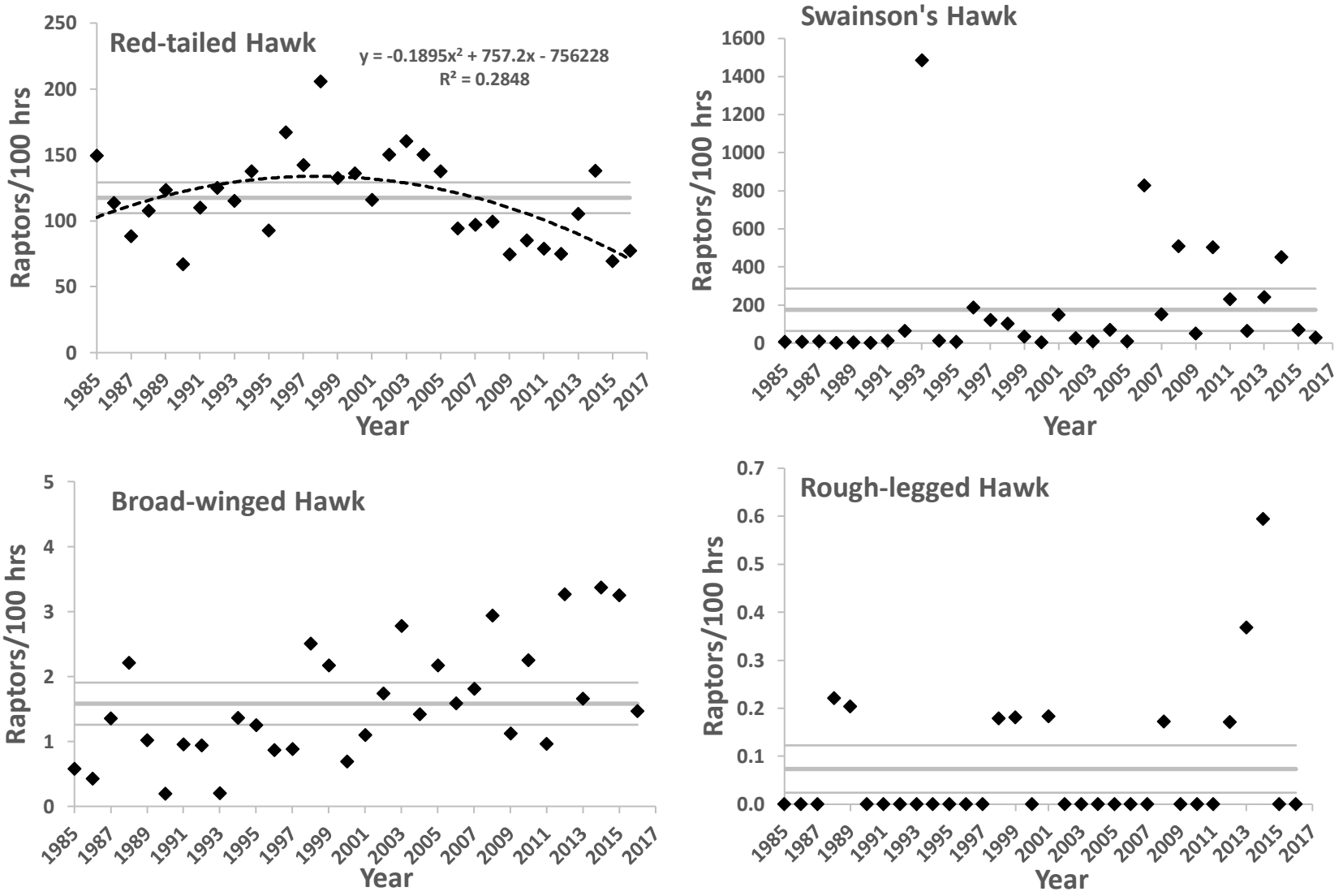

Figure 5c. Effort-adjusted fall-migration passage rates at the Manzanos HawkWatch in central New Mexico for buteoine hawks: 1985–2016. Dashed line indicates significant ($p < 0.05$) population trend based on quadratic regression. Solid grey lines represent mean (thick) and upper and lower 95% confidence intervals (thin) of historic counts (1985-2015).

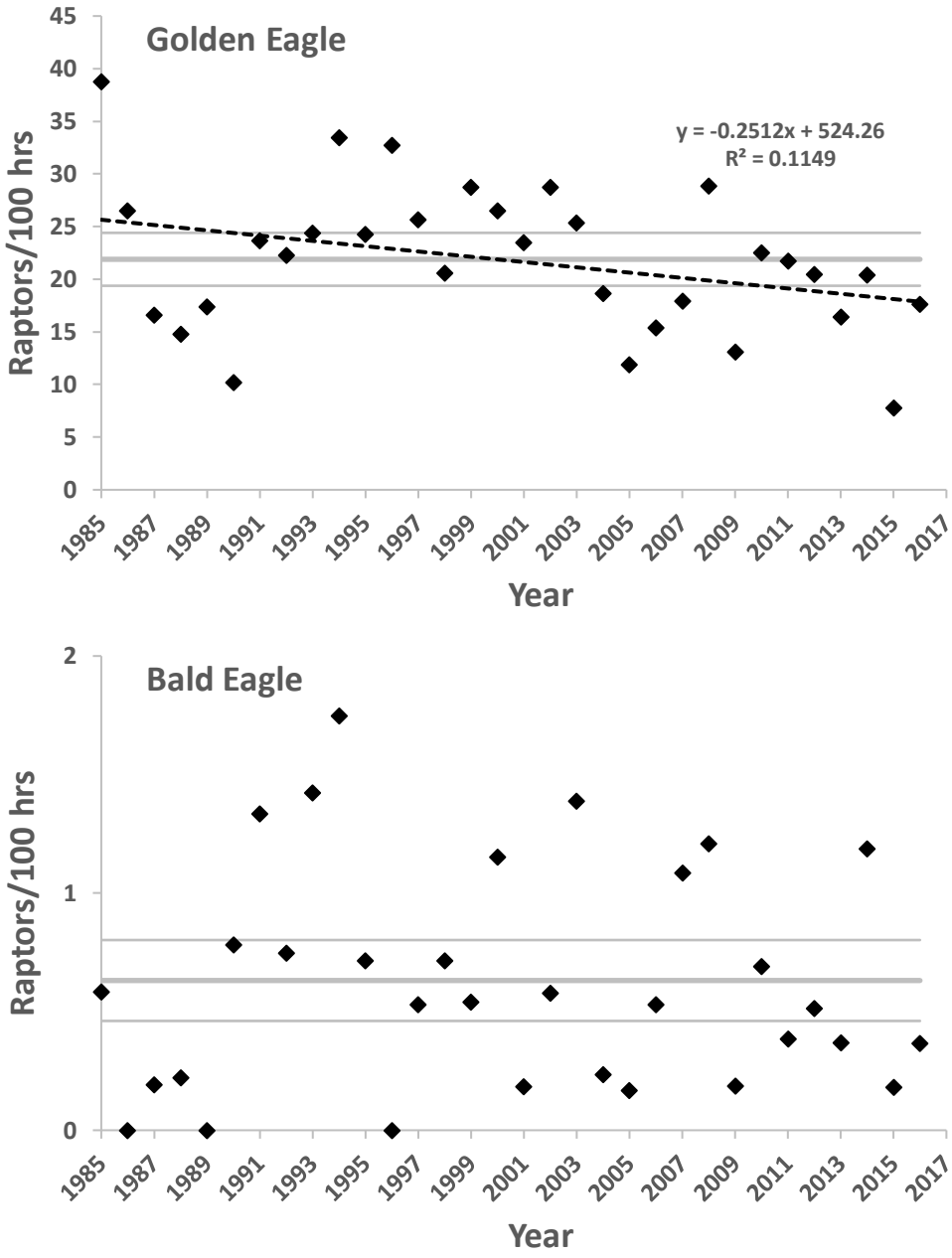

Figure 5d. Effort-adjusted fall-migration passage rates at the Manzanos HawkWatch in central New Mexico for Golden and Bald Eagles: 1985–2016. Dashed line indicates trend for significant ($p < 0.05$) linear regression. Solid grey lines represent mean (thick) and upper and lower 95% confidence intervals (thin) of historic counts (1985-2015).

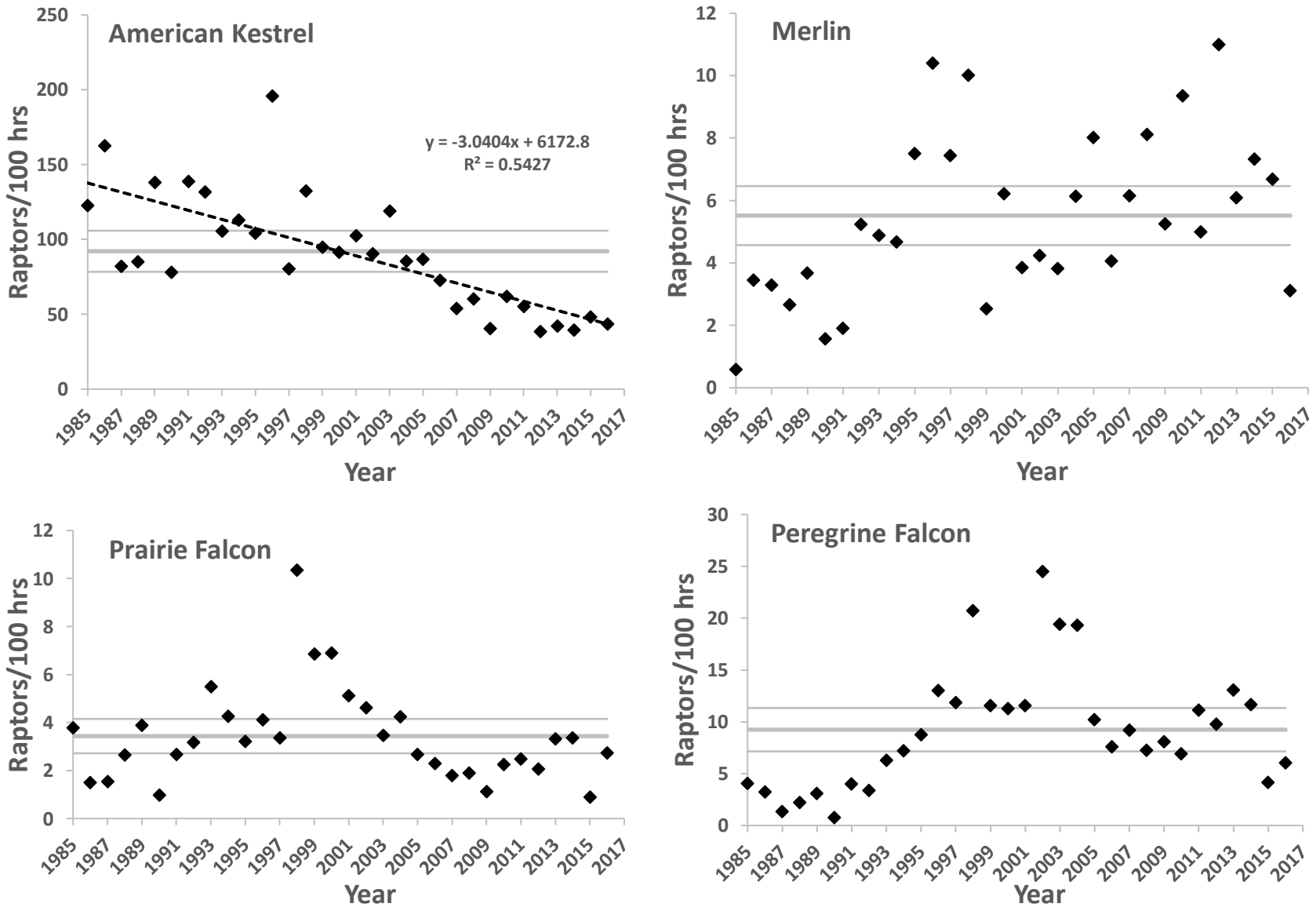

Figure 5e. Effort-adjusted fall-migration passage rates at the Manzanos HawkWatch in central New Mexico for falcons: 1985–2016. Dashed line indicates significant ($p < 0.05$) population trend based on linear regression. Solid grey lines represent mean (thick) and upper and lower 95% confidence intervals (thin) of historic counts (1985-2015).

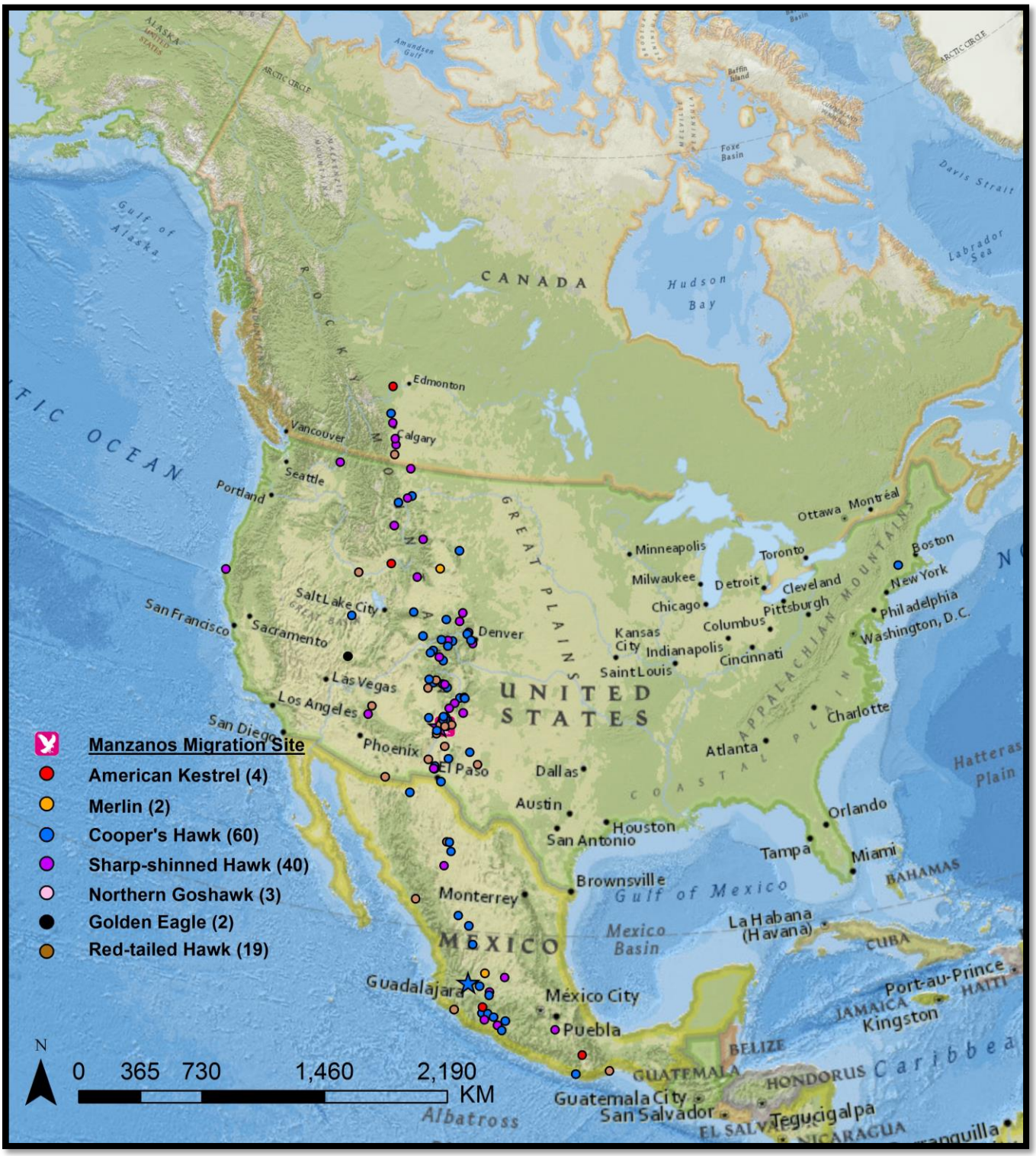

Figure 6. Foreign encounters of raptors banded at the Manzanos HawkWatch in central New Mexico. Circles represent encounters from 1990 to 2015, stars represent 2016 encounters.

Appendix A. History of official observer participation at the Manzanos HawkWatch: 1985–2016.

1985 Single observer throughout, shared duty: Gary Cress (0)[1], Jim Daly (1), Allen Hale (1)

1986 Single observer throughout: Jim Daly (2)

1987 Single observer throughout: Jim Daly (3)

1988 Single observer throughout: Gordon Vickrey (1)

1989 Two observers during peak 3/4 of the season, one observer otherwise: Brett Ewald (2), Tim Menard (0)

1990 Two observers during peak 3/4 of the season, one observer otherwise: David Curson (0), Gary Cress (1)

1991 Two observers throughout: Eric Meyer (1), Tylan Dean (0)

1992 Two observers throughout: Eric Meyer (3), Jessie Jewell (0)

1993 Two observers throughout: Jessie Jewell (2), John Haskell (0)

1994 Two observers throughout: Jessie Jewell (4), Jeff Ogburn (1)

1995 Two observers throughout: Jessie Jewell (6), Jeff Ogburn (2)

1996 Two observers throughout: Jessie Jewell (8), Sean O'Connor (3)

1997 Two observers throughout: Jeff Ogburn (4), Sean O'Connor (4)

1998 Two observers throughout: Dan Rossman (1), Lawry Sager (0)

1999 Two observers throughout: Jason Beason (4), Lawry Sager (1)

2000 Two observers throughout: Jorge Canaca (1), Laura Lutz (1)

2001 Two observers throughout: Tim Meehan (1), Carrie Hisaoka (0)

2002 Two observers throughout: Carrie Hisaoka (1), Richard Sim (0)

2003 Two observers throughout: Carrie Hisaoka (2), Tim Hanks (1)

2004 Two observers throughout: Paula Shannon (3), Frank Mayer (2)

2005 Two observers throughout: Tim Hanks (2), Geoff Gould (0)

2006 Two observers throughout: Tim Hanks (3), Greg Levandoski (3)

2007 Two observers throughout: Tim Hanks (4), Aldo Raul Coutreras Reyes (4)

2008 Two observers throughout: Tim Hanks (5), Aldo Raul Coutreras Reyes (5), Roger Grimshaw (1)

2009 Two observers throughout: Kimberly Cullen (1), Amber Wingert (1), Roger Grimshaw (2)

2010 Two observers throughout: Tim Hanks (6+), Russell Seeley (0), Roger Grimshaw (3+)

2011 Two observers throughout: Tim Hanks (7+), Russell Seeley (1), Roger Grimshaw (4+)

2012 Two observers throughout: Robert Baez (3), Ian Dolly (+), Dan D. Tempest (0), Roger Grimshaw (5+), Steve deLaPena (+)

2013 Two observers throughout: Robert Baez (4), Sarah Dudek (0), Ian Dolly (1+), Roger Grimshaw (6+), Steve deLaPena (+)

2014 Two observers throughout: Robert Baez (5), Olivia DeRugna (1), Stephen Brenner (+), Roger Grimshaw (7+), Steve deLaPena (+)

2015 Two observers throughout: Olivia DeRugna(3), Phil Kavouriaris (1), Keelan Dann (1), Istvan Balasz (0), Roger Grimshaw (7+), Steve deLaPena (+)

2016 Two observers throughout: Phil Kavouriaris (2), Keelan Dann (2), Stephanie Szarmach (1), Marie Soderberg (0), Brian Long (0), Roger Grimshaw (8+), Steve deLaPena (+)

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[1] Numbers in parentheses indicate previous full seasons of observation experience.

Appendix B. Common and scientific names, species codes, and regularly applied age, sex, and color-morph classifications for all diurnal raptor species observed during fall migration at the Manzanos HawkWatch in central New Mexico.

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 accipiter	*Accipiter* spp.	UA	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
Zone-tailed Hawk	*Buteo albonotus*	ZT	A I U	U	NA
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 falcon	*Falco* spp.	UF	U	U	NA
Unknown raptor	Falconiformes	UU	U	U	NA

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

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

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

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

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

Appendix C. Annual observation effort and fall raptor migration counts by species at the Manzanos HawkWatch in central NM: 1985–2016.

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Start date	6-Sep	23-Aug	25-Aug	30-Aug	28-Aug	27-Aug	27-Aug	25-Aug	25-Aug	25-Aug
End date	2-Nov	31-Oct	4-Nov	31-Oct	31-Oct	31-Oct	5-Nov	5-Nov	5-Nov	2-Nov
Days of observation	50	63	65	60	63	62	67	70	68	66
Hours of observation	343.33	464.5	517.92	453.08	489.75	510.75	524.58	537.25	489.67	508.75
Raptors / 100 hours	843.2	863.9	758.6	772.3	955.4	494.6	825.6	946.3	2429.2	966.5
SPECIES	RAPTOR COUNTS									
Turkey Vulture	74	118	283	466	178	295	176	268	601	430
Osprey	10	14	19	13	22	12	24	26	31	38
Northern Harrier	28	36	78	78	59	27	66	69	48	97
Mississippi Kite	0	0	0	0	0	0	0	0	0	0
Sharp-shinned Hawk	956	1300	1622	1118	1834	688	1080	1540	1193	1415
Cooper's Hawk	531	881	679	604	929	471	1105	961	944	1054
Northern Goshawk	21	20	7	6	14	3	8	16	27	30
Unknown accipiter	78	104	119	111	121	133	156	117	266	118
TOTAL ACCIPITERS	1586	2305	2427	1839	2898	1186	2349	2634	2430	2617
Broad-winged Hawk	2	2	7	10	5	2	5	5	1	7
Swainson's Hawk	27	33	44	3	16	9	58	344	7301	67
Red-tailed Hawk	513	527	457	486	604	329	577	667	566	707
Ferruginous Hawk	14	15	17	20	16	13	19	25	17	13
Rough-legged Hawk	0	0	0	1	1	0	0	0	0	0
Zone-tailed Hawk	0	0	0	0	0	0	0	2	0	1
Unknown buteo	21	12	11	16	4	19	30	11	31	22
TOTAL BUTEOS	577	589	536	536	646	372	689	1054	7916	817
Golden Eagle	133	123	86	67	85	52	124	119	120	172
Bald Eagle	2	0	1	1	3	4	7	4	7	9
Unknown Eagle	0	0	0	4	0	4	0	0	0	0
TOTAL EAGLES	135	123	87	72	88	60	131	123	127	181
American Kestrel	421	755	426	385	677	409	728	704	520	582
Merlin	2	16	17	12	18	9	10	28	24	24
Prairie Falcon	13	7	8	12	19	9	14	17	27	22
Peregrine Falcon	14	15	7	10	15	5	21	18	31	37
Unknown falcon	4	0	1	0	3	7	3	1	0	1
TOTAL FALCONS	454	793	459	419	732	437	776	768	602	666
Unknown raptor	31	35	40	76	56	41	120	142	140	71
TOTAL	2895	4013	3929	3499	4679	2526	4331	5084	11895	4917

Appendix C. Continued

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Start date	27-Aug	27-Aug	27-Aug	27-Aug	27-Aug	27-Aug	27-Aug	27-Aug	27-Aug	28-Aug
End date	08-Nov	05-Nov	5-Nov	5-Nov	5-Nov	2-Nov	4-Nov	3-Nov	5-Nov	30-Oct
Days of observation	70	59	68	65	70	57	68	65	69	57
Hours of observation	560.00	461.67	565.08	559.58	553.77	434.33	545.47	518.50	577.25	424.08
Raptors / 100 hours	832.9	1545.9	1044.8	1594.2	873.1	991.6	855.8	972.0	1126.4	1039.9
SPECIES	RAPTOR COUNTS									
Turkey Vulture	636	640	563	1116	637	241	164	239	468	289
Osprey	53	33	47	44	14	25	26	32	86	20
Northern Harrier	72	64	69	133	69	38	37	33	50	27
Mississippi Kite	0	0	0	0	0	0	0	0	0	0
Sharp-shinned Hawk	1519	2174	1872	2585	1212	1698	1032	1524	1861	1268
Cooper's Hawk	907	1205	1018	2025	1069	984	913	1149	1758	964
Northern Goshawk	11	9	9	19	14	42	13	23	12	15
Unknown accipiter	44	147	76	107	51	29	86	202	215	201
TOTAL ACCIPITERS	2481	3535	2975	4736	2346	2753	2044	2898	3846	2448
Broad-winged Hawk	7	4	5	14	12	3	6	9	16	6
Swainson's Hawk	32	867	679	572	194	19	815	139	53	291
Red-tailed Hawk	519	771	803	1151	733	591	632	778	924	636
Ferruginous Hawk	13	4	13	10	8	3	10	14	7	8
Rough-legged Hawk	0	0	0	1	1	0	1	0	0	0
Zone-tailed Hawk	1	0	1	2	0	3	1	1	0	0
Unknown buteo	9	11	3	28	5	2	106	32	30	69
TOTAL BUTEOS	581	1657	1504	1778	953	621	1571	973	1030	1010
Golden Eagle	136	151	145	115	159	115	128	149	146	79
Bald Eagle	4	0	3	4	3	5	1	3	8	1
Unknown Eagle	0	0	0	0	0	1	0	0	1	0
TOTAL EAGLES	140	151	148	119	162	121	129	152	155	80
American Kestrel	584	905	455	742	525	397	560	470	686	362
Merlin	42	48	42	56	14	27	21	22	22	26
Prairie Falcon	18	19	19	58	38	30	28	24	20	18
Peregrine Falcon	49	60	67	116	64	49	63	127	112	82
Unknown falcon	0	1	0	12	2	1	5	21	6	7
TOTAL FALCONS	693	1033	583	984	643	504	677	664	846	495
Unknown raptor	8	24	15	11	11	4	20	49	21	41
TOTAL	4664	7137	5904	8921	4835	4307	4668	5040	6502	4410

Appendix C. Continued

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Start date	27- Aug	27- Aug	27-Aug	27-Aug	27-Aug	27-Aug	27-Aug	27-Aug	27-Aug	27-Aug
End date	5-Nov	5-Nov	5-Nov	5-Nov	5-Nov	4-Nov	4-Nov	5-Nov	4-Nov	03-Nov
Days of observation	69	68	63	69	68	70	68	70	67	65
Hours of observation	599.58	566.41	553.58	579.00	535.68	578.00	521.00	582.42	542.92	506.13
Raptors / 100 hours	937.8	1433.4	883.2	1327.5	577.0	1327.7	919.4	729.4	923.7	1184.1
SPECIES	RAPTOR COUNTS									
Turkey Vulture	363	150	499	315	82	189	668	481	527	343
Osprey	35	30	47	50	12	17	16	29	44	38
Northern Harrier	46	90	75	89	49	41	35	50	18	42
Mississippi Kite	0	0	0	0	0	0	1	0	0	0
Sharp-shinned Hawk	1842	958	1283	1836	1051	2067	1252	1665	1263	1304
Cooper's Hawk	1486	865	922	1084	620	1162	602	603	703	770
Northern Goshawk	10	10	30	21	21	23	18	18	9	11
Unknown accipiter	135	127	91	83	118	114	36	73	74	51
TOTAL ACCIPITERS	3473	1960	2326	3024	1810	3366	1908	2359	2049	2136
Broad-winged Hawk	13	9	10	17	6	13	5	19	9	17
Swainson's Hawk	52	4695	841	2952	274	2906	1204	371	1317	2279
Red-tailed Hawk	823	534	537	575	398	491	410	435	570	696
Ferruginous Hawk	13	9	8	10	8	9	14	8	11	7
Rough-legged Hawk	0	0	0	1	0	0	0	1	2	3
Zone-tailed Hawk	1	0	0	0	0	1	4	0	1	1
Unknown buteo	33	23	19	11	57	22	10	9	13	7
TOTAL BUTEOS	935	5270	1415	3566	743	3442	1647	843	1923	3010
Golden Eagle	71	87	99	167	70	130	113	119	89	103
Bald Eagle	1	3	6	7	1	4	2	3	2	6
Unknown Eagle	4	1	9	2	4	4	5	0	0	0
TOTAL EAGLES	76	91	114	176	75	138	120	122	91	109
American Kestrel	520	412	298	350	216	359	288	224	230	200
Merlin	48	23	34	47	28	54	26	64	33	37
Prairie Falcon	16	13	10	11	6	13	13	12	18	17
Peregrine Falcon	61	43	51	42	43	40	58	57	71	59
Unknown falcon	13	5	3	4	9	7	5	3	3	2
TOTAL FALCONS	658	496	396	454	302	473	390	360	355	315
Unknown raptor	37	32	17	12	18	8	5	4	8	0
TOTAL	5623	8119	4889	7686	3091	7674	4790	4248	5015	5993

Appendix C. Continued

	2015	2016	Mean
Start date	27-Aug	27-Aug	27-Aug
End date	4-Nov	3-Nov	3-Nov
Days of observation	66	68	65.29
Hours of observation	553.4	545.9	521.21
Raptors / 100 hours	632.5	503.3	1019.61
	RAPTOR SPECIES		
Turkey Vulture	292	210	380.4
Osprey	30	22	30.2
Northern Harrier	51	30	56.9
Mississippi Kite	0		0.0
Sharp-shinned Hawk	1420	903	1465.5
Cooper's Hawk	469	456	949.6
Northern Goshawk	3	9	15.9
Unknown accipiter	39	94	110.4
TOTAL ACCIPITERS	1931	1462	2537.9
Broad-winged Hawk	18	8	8.5
Swainson's Hawk	388	149	930.4
Red-tailed Hawk	384	421	607.2
Ferruginous Hawk	2	5	11.5
Rough-legged Hawk	0	0	0.4
Zone-tailed Hawk	1		0.7
Unknown buteo	16	22	22.3
TOTAL BUTEOS	809	608	1581.1
Golden Eagle	43	96	112.7
Bald Eagle	1	2	3.4
Unknown Eagle	1	0	1.3
TOTAL EAGLES	45	98	117.5
American Kestrel	267	237	472.8
Merlin	37	17	29.4
Prairie Falcon	5	15	17.9
Peregrine Falcon	23	33	48.7
Unknown falcon	3	9	4.3
TOTAL FALCONS	335	311	573.0
Unknown raptor	7	6	35.6
TOTAL	3500	2747	5315.6

Appendix D. Annual trapping and banding effort and capture totals of migrating raptors by species at the Manzanos HawkWatch in central NM: 1990–2016.

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Start Date	28-Aug	5-Sep	31-Aug	3-Sep	1-Sep	4-Sep	2-Sep	31-Aug	29-Aug	31-Aug
End Date	27-Oct	29-Oct	30-Oct	24-Oct	25-Oct	31-Oct	19-Oct	28-Oct	29-Oct	16-Oct
Blinds in operation	1	3	3	3	3	4	4	4	3	3
Trapping days	47	54	57	50	48	53	45	54	58	46
Station days	47	95	131	120	121	136	132	151	114	86
Station hours	511.0	693.0	967.0	889.0	926.0	1041.0	1030.0	1211.0	1352.6	663.8
Captures / 100 hours	47.7	72.4	108.2	100.8	110.7	85.6	137.0	94.9	148.2	115.6
Species	Raptor Captures									
Northern Harrier	1	2	2	3	9	2	1	8	14	0
Sharp-shinned Hawk	124	262	589	430	502	493	778	611	987	320
Cooper's Hawk	95	195	335	374	353	309	460	427	772	323
Northern Goshawk	1	7	6	6	7	1	5	3	6	6
Broad-winged Hawk	0	0	0	0	0	0	0	0	1	0
Swainson's Hawk	0	0	0	0	0	0	0	0	0	0
Red-tailed Hawk	8	18	61	55	83	50	50	46	112	56
Zone-tailed Hawk	0	0	0	0	0	0	0	0	1	0
Golden Eagle	1	3	4	4	4	4	6	4	5	2
Bald Eagle	0	0	0	0	0	0	0	0	0	0
American Kestrel	10	13	42	14	59	28	92	32	75	44
Merlin	1	0	2	4	1	1	11	6	7	2
Prairie Falcon	1	1	3	5	3	1	3	5	13	6
Peregrine Falcon	2	1	2	1	4	2	5	7	12	8
All Species	244	502	1046	896	1025	891	1411	1149	2005	767
Recaptures[1]	0	0	1	1	2	2	1	2	4	4
Foreign Recaptures[2]	2	1	1	1	2	0	5	1	2	2

[1] Recaptures at the Manzanos of birds originally banded in the Manzanos.

[2] Recaptures at the Manzanos of birds originally banded elsewhere (includes birds initially captured at other HWI sites).

Appendix D. Continued

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Start Date	2-Sep	1-Sep	3-Sep	7-Sep	5-Sep	4-Sep	4-Sep	2-Sep	3-Sep	3-Sep
End Date	27-Oct	25-Oct	25-Oct	24-Oct	28-Oct	28-Oct	24-Oct	27-Oct	30-Oct	27-Oct
Blinds in operation	3	3	3	3	3	2	2	2	2	2
Trapping days	49	55	50	45	47	51	48	46	56	48
Station days	91	145	131	84	105	99	94	65	80	61
Station hours	791.4	1036.7	956.9	632.5	756.2	707.8	677.7	453.0	586.0	390.3
Captures / 100 hours	121.7	85.9	135.4	152.7	136.0	163.0	96.5	83.2	104.3	138.4
Species										
Northern Harrier	5	7	6	3	0	3	6	3	4	2
Sharp-shinned Hawk	495	426	636	458	566	562	299	196	313	273
Cooper's Hawk	330	337	510	400	378	495	280	142	246	200
Northern Goshawk	16	1	10	1	2	3	3	3	3	8
Broad-winged Hawk	0	0	1	1	1	0	1	1	0	0
Swainson's Hawk	0	1	3	0	0	0	1	0	0	0
Red-tailed Hawk	76	39	56	38	43	35	35	9	20	34
Zone-tailed Hawk	0	0	0	0	0	0	0	0	0	0
Golden Eagle	4	5	7	8	2	2	1	1	9	0
Bald Eagle	0	0	0	0	0	0	0	0	0	0
American Kestrel	25	56	37	43	18	37	10	9	4	18
Merlin	8	2	12	3	10	3	2	5	8	2
Prairie Falcon	3	7	5	4	3	4	4	2	1	1
Peregrine Falcon	1	10	13	7	5	10	12	6	3	2
All Species	963	891	1296	966	1028	1154	654	377	611	540
Recaptures[1]	3	2	3	2	2	3	2	0	1	1
Foreign Recaptures[2]	0	0	3	2	0	0	1	0	0	1

[1] Recaptures at the Manzanos of birds originally banded in the Manzanos.

[2] Recaptures at the Manzanos of birds originally banded elsewhere (includes birds initially captured at other HWI sites).

Appendix D. Continued

	2010	2011	2012	2013	2014	2015	2016	Mean	Total
Start Date	2-Sep	1-Sep	31-Aug	29-Aug	28-Aug	28-Aug	2-Sep	1-Sep	---
End Date	27-Oct	28-Oct	28-Oct	30-Oct	29-Oct	31-Oct	1-Nov	26-Oct	---
Blinds in operation	2	2	2	2	2	2	2	2.6	---
Trapping days	52	46	56	60	55	59	60	51.7	1395
Station days	61	58	76	79	73	68	78	95.6	2581
Station hours	408.7	397.0	495.3	527.8	500.5	440.8	506.7	724.1	19549.4
Captures / 100 hours	93.2	80.6	121.6	134.0	76.5	90.1	69.3	109.0	---
Species									
Northern Harrier	2	2	2	2	0	3	5	3.5	97
Sharp-shinned Hawk	183	171	362	387	218	227	160	418.0	11028
Cooper's Hawk	160	105	171	257	140	139	147	305.1	8080
Northern Goshawk	2	1	2	3	1	0	4	4.1	111
Broad-winged Hawk	0	0	1	0	0	0	1	0.3	8
Swainson's Hawk	0	0	0	2	1	0	0	0.3	8
Red-tailed Hawk	22	27	41	31	13	14	23	41.2	1095
Zone-tailed Hawk	0	0	0	0	0	0	0	0.0	1
Golden Eagle	1	1	4	3	1	1	3	3.3	90
Bald Eagle	0	0	0	0	1	0	0	0.0	1
American Kestrel	5	8	9	10	2	2	2	27.0	704
Merlin	2	3	8	5	3	5	4	4.5	120
Prairie Falcon	3	0	0	1	0	0	1	3.0	80
Peregrine Falcon	1	2	2	6	3	6	1	5.1	134
All Species	381	320	602	707	383	397	351	815.6	21557
Recaptures[1]	2	1	1	1	1	0	0	1.6	42
Foreign Recaptures[2]	0	0	0	0	1	0	0	0.9	25

[1] Recaptures at the Manzanos of birds originally banded in the Manzanos.

[2] Recaptures at the Manzanos of birds originally banded elsewhere (includes birds initially captured at other HWI sites).