FALL 2013 RAPTOR MIGRATION STUDIES AT COMMISSARY RIDGE IN SOUTHWESTERN WYOMING

HawkWatch International, Inc.

Salt Lake City, Utah

HAWKWATCH INTERNATIONAL

Conserving Raptors and Our Shared Environment

May 2014

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INTRODUCTION

The Commissary Ridge Raptor Migration Project in southwest Wyoming is an ongoing effort to monitor long-term raptor migratory population trends along the Rocky Mountain Flyway (Hoffman et al. 2002). This project was 1 of 8 long-term, annual raptor migration studies conducted or co-sponsored by HWI in North America during this past season. The primary objective of these efforts is to track long-term population trends of diurnal raptors in western North America and around the Texas Gulf Coast region (Hoffman et al. 2002, Hoffman and Smith 2003, Smith et al. 2008a, b). HWI partners with Hawk Mountain Sanctuary, the Hawk Migration Association of North America (HMANA), and Bird Studies Canada (BSC) to provide western US data for the Raptor Population Index (RPI), a collaborative standardized effort to monitor raptor migration across North America. Raptors can serve as important biological indicators of ecosystem health (Bildstein 2001) and long-term migration counts can be a very cost effective and efficient method for monitoring the regional status and trends of multiple raptor species (Zalles and Bildstein 2000, Bildstein et al. 2008).

Before 2002, no long-term raptor migration counts were being conducted in the state of Wyoming, and coverage of the central Rocky Mountains between Montana and New Mexico was generally sparse. Following two years of exploratory surveys to assess the viability of conducting long-term autumn raptor migration studies somewhere in Wyoming, in 2002 HWI initiated standardized counts at Commissary Ridge, and annual counts continued each year since. This report summarizes the results of the fall 2013 efforts.

STUDY SITE

The study site is located atop the southern end of Commissary Ridge on the southwestern tip of South Fork Mountain about 37 km north of Kemmerer, Wyoming, on land managed by the Bureau of Land Management, Kemmerer Field Office (Figs. 1 and 2). The site is accessed from Hwy 233 just northeast of Lake Viva Naughton, and is located on the western edge of a broad ridgetop overlooking the Ham's Fork River Valley and Lake Viva Naughton to the west (42°01'29"N 110°35'22"W; T24 R116 S28 SESW; elevation ~2,700 m). The location provides an unobstructed 360° view of the surrounding landscape. The ridgetop features primarily rocky substrates and low growing desert shrubs and grasses, with scattered stands of mixed-conifer and aspen in sheltered pockets and ravines.

METHODS

STANDARDIZED COUNT

Weather permitting, trained observers conducted daily counts from a single observation post from 27 August through 05 November. Counts occurred daily, usually occurred from 0900–1700 or 1800 H Mountain Standard Time (MST). Data gathering and recording followed standardized protocols used at all HWI migration sites (Hoffman and Smith 2003). Observers record the following:

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

pointing out birds, recording data, etc.] for more than 10 minutes in a given hour), recorded on the hour.

6. A subjective visitor-disturbance rating (high, moderate, low, none) for each hour, recorded on the hour.
7. Daily start and end times for each official observer.

Calculation of "adjusted" (to standardize sampling periods and adjust for incompletely identified birds) passage rates (migrants counted per 100 hours of observation) and analysis of trends updated through 2013 follow Farmer et al. (2007). In comparing 2013 annual statistics against means and 95% confidence intervals for previous seasons, we equate significance with a 2013 value falling outside the bounds of the confidence interval for the associated mean.

TRAPPING AND BANDING

This past season, trapping and banding was nonstandardized and only occurred from 30 September through 06 October, and only at the north trapping blind. The focus was on 1) capturing Golden Eagles to attach satellite telemetry units and track movement patterns, 2) outreach activities for a school group, and 3) staff training. Capture devices included a mist net, dho-gaza nets, and remotely triggered bow nets. Trappers lured migrating raptors into the capture station from a camouflaged blind using live, non-native avian lures attached to lines manipulated from the blind. Unless already banded, all captured birds were fitted with a uniquely numbered USGS Biological Resources Division aluminum leg band. Data gathering and recording followed standardized protocols used at all HWI migration-banding sites (Hoffman et al. 2002). All birds were released within 45 minutes, usually quicker.

2013 RESULTS AND DISCUSSION

OBSERVATION EFFORT AND WEATHER SUMMARY

Observers counted on 57 of 71 possible days between 27 August and 05 November during the 2013 season (Appendix C). Usually the season ends on 05 November, but this past season a snowstorm caused the crew to end a week early. A total of 398.58 hours were logged, which was lower than the long term average of 475.91 hours, and most likely reflected the significant number of days lost compared to the long term average due to weather. In addition, eight more of the 57 days had abbreviated counts (<4 hrs), also due to weather. Weather varies throughout every season, and in 2013, based on hourly recording of conditions; it was clear 32% of the time, foggy 5% of the time, hazy 2% of the time, rainy 3% of the time, and snowy 2% of the time.

2013 FLIGHT SUMMARY

Overall Flight:

A total of 2,762 migrating raptors representing 17 species were tallied during the 2013 season, this is a significant ($p < 0.05$) decrease of 26% compared to the long-term average (Table 1). The flight consisted of: 41.0% accipiters, 36.0% buteos, 8.3% eagles, 5.9% falcons, 4.4% vultures, 1.5% Ospreys, 0.3% harriers, and 2.6% unknown raptors. The proportions of buteos, vultures, and Ospreys were above historic averages; while the proportion of accipiters, eagles, falcons, and harriers in the 2013 flight were all below historic averages (Fig. 3). This past season, the most abundant species counted were; Red-tailed Hawks (32% of the total), followed by Sharp-shinned Hawks (25%), Cooper's Hawks (14%), Golden Eagles (6%), American Kestrels (5%), Turkey Vultures (4%), and Bald Eagles (2%). The remaining species each accounted for 1% or less of the total count (Table 1).

The following sections summarize the 2013 count relative to historic means at the site, and any stastistically significant ($p < 0.05$) or near significant ($p < 0.1$) 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 threshold likely do not contain biologically useful information on regional populations—species with counts this low likely have a very dispersed migration, migrate along a different primary route, or large portions of the population that are resident. We do include count information in the reports, as occurrences of rarer species are of interest to both managers and the general public, and could represent the beginning of meaningful long-term changes.

Vultures, Osprey, and Harriers (Fig. 4a):

The season's passage rate for Turkey Vultures were near the upper 95% confidence limits of near average counts, where the last two seasons their passage rates were below average. Over the long term, regional population trends remain stable. For Osprey, the 2013 passage rates were above average, after being below average last year; but over the long term, Osprey regional population trends are also stable. Northern Harrier passage rates were seemingly quite a bit below average this past season, near the lower 95% confidence limits of near average counts in 2012, and again way below in 2011. Even though over the long term regression analyses suggest Northern Harrier regional populations are in significant decline ($r^2 = 0.498$, $p = 0.010$), as stated above we treat these types of trends with caution since their passage rates are low, under 10 birds per 100 hours (Table 1).

Accipiters (Fig. 4b):

For the third straight year, the Sharp-shinned Hawk passage rates were counted near average. The season's passage rates for Cooper's Hawks were also near average, after being slightly lower than average the previous two seasons. Northern Goshawk passage rates for 2013 were below average. Analyses indicate that the long-term population trends for these species are stable.

Buteoine Hawks (Fig. 4c):

After two seasons of near average passage rates for Broad-winged Hawks, this past season's rates were above average. This past season marked the third straight of near average passage rates for Swainson's Hawks, and the second consecutive season for Red-tailed Hawks. Long-term population trends indicate that Broad-winged Hawks are significantly increasing ($r^2 = 0.345$, $p = 0.045$), although rather slowly as their passage rates are still rather low, under 10 per 100 hours (Table 1). Long-term population trends for Swainson's and Red-tailed Hawks indicate that they are stable.

Eagles (Fig.4d):

Except for 2011, 2004, and 2002; Golden Eagle passage rates have been farily consistently near average, which also reflects that the regional proportion of the population that migrate through the site has been relatively stable. After three seasons of near average passage rates for Bald Eagles, this past season was below average. Analyses indicate that the long-term population trend for this species is also stable.

Falcons (Fig. 4e):

American Kestrel passage rates continue to decline ($r^2 = 0.741$, $p = 0.000$), similar to other sites in the West and across its range. Based on findings from this site, and other regional monitoring sites across North America, HWI scientists, along with many other North American researchers and Citizen Scientists are partnering to understand these declines locally and at the continental scale under the umbrella of the American Kestrel Partnership (http://kestrel.peregrinefund.org/). The season's passage rates for the other three falcons are all low, under 10 per 100 hours (Table 1). Nevertheless, over the long-term, analyses of population trends indicate those species are stable.

TRAPPING AND BANDING SUMMARY

For the seven days of trapping that occurred from 30 September up through 06 October, a total of 38.93 trapping hours were spent in the blind. During that time, a total of 15 raptors were captured and banded; six Cooper's Hawks (4 adult females and 2 adult males), seven Sharp-shinned Hawks (2 hatch-year females, and 5 adult females), one Northern Goshawk (hatch-year female), and one Red-tailed Hawk (unknown aged adult).

For this upcoming season, we hope to continue our trapping and banding efforts modeled after this past season where we are focused on trying to capture certain species for telemetry (e.g., Golden Eagles), or other specific sampling for physiological blood sampling metabolite work, as well as continued staff training and outreach.

SITE VISITATION AND PUBLIC OUTREACH

This past season, one major school group of approximately 15 individuals visited the site from Salt Lake City, led by HWI staff. Otherwise, the crew continued to make good local acquaintenances by visiting with hunters, ranchers, and herdsman, as well as folks in nearby Kemmerer.

ACKNOWLEDGMENTS

A special thanks of gratitude is owed to the Bureau of Land Management – Kemmerer Field Office for providing their encouragement and essential logistical support. We also want to thank the Kemmerer Recreation Center for also providing our staff local encouragement, camaraderie, and sometimes logistical support as well.

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Table 1. Annual raptor migration counts and passage rates by species at Commissary Ridge, Wyoming: 2002–2012 versus 2013.

	COUNTS			RAPTORS/100 HOURS		
SPECIES	2002–2012[1]	2013	% CHANGE	2002–2012[1]	2013	% CHANGE
Turkey Vulture	97.2 ± 30.6	121	+21	34.6 ± 11.9	47.3	+37
Osprey	33.6 ± 9.0	41	+22	9.0 ± 2.2	14.2	+58
Northern Harrier	30.4 ± 4.9	7	-77	6.5 ± 1.3	1.8	-72
Sharp-shinned Hawk	974.1 ± 250.1	698	-28	289.7 ± 68.2	244.5	-16
Cooper's Hawk	425.1 ± 77.6	389	-8	145.2 ± 27.7	156.3	+8
Northern Goshawk	37.5 ± 13.4	10	-73	8.9 ± 3.2	3.1	-66
Unknown small accipiter	95.1 ± 48.1	20	-79	–	–	–
Unknown large accipiter	11.4 ± 5.7	7	-38	–	–	–
Unknown accipiter	28.9 ± 20.0	9	-69	–	–	–
TOTAL ACCIPITERS	1,572.1 ± 334.2	1,133	-28	–	–	–
Broad-winged Hawk	17.1 ± 9.2	31	+81	6.4 ± 3.4	14.9	+132
Swainson's Hawk	202.0 ± 205.0	26	-87	91.0 ± 88.5	14.2	-84
Red-tailed Hawk	963.9 ± 181.3	892	-7	236.2 ± 46.4	245.7	+4
Ferruginous Hawk	7.7 ± 2.1	4	-48	1.8 ± 0.5	1.0	-46
Rough-legged Hawk	13.7 ± 6.7	8	-42	4.3 ± 1.9	3.9	-9.7
Unidentified buteo	57.3 ± 20.4	34	-41	–	–	–
TOTAL BUTEOS	1,261.7 ± 284.1	995	-21	–	–	–
Golden Eagle	262.1 ± 47.1	167	-36	57.6 ± 14.2	40.5	-30
Bald Eagle	160.6 ± 47.9	59	-63	46.4 ± 15.3	22.1	-52.5
Unidentified eagle	15.0 ± 7.5	4	-73	–	–	–
TOTAL EAGLES	437.7 ± 95.4	230	-47	–	–	–
American Kestrel	233.3 ± 56.6	127	-46	78.2 ± 20.8	47.8	-39
Merlin	18.2 ± 5.9	8	-56	4.7 ± 1.4	3.1	-33
Prairie Falcon	10.4 ± 3.5	13	+25	2.9 ± 0.9	4.0	+37
Peregrine Falcon	11.9 ± 3.5	8	-33	3.4 ± 1.0	2.6	-21.4
Unknown small falcon	3.5 ± 1.5	4	+16	–	–	–
Unknown large falcon	2.5 ± 1.4	2	-21	–	–	–
Unknown falcon	2.2 ± 1.5	1	-54	–	–	–
TOTAL FALCONS	281.9 ± 57.2	163	-42	–	–	–
Unidentified raptor	40.0 ± 18.4	72	+80	–	–	–
GRAND TOTAL	3,754.6 ± 662.2	2,762	-26	–	–	–

[1] Mean ± 95% confidence interval.

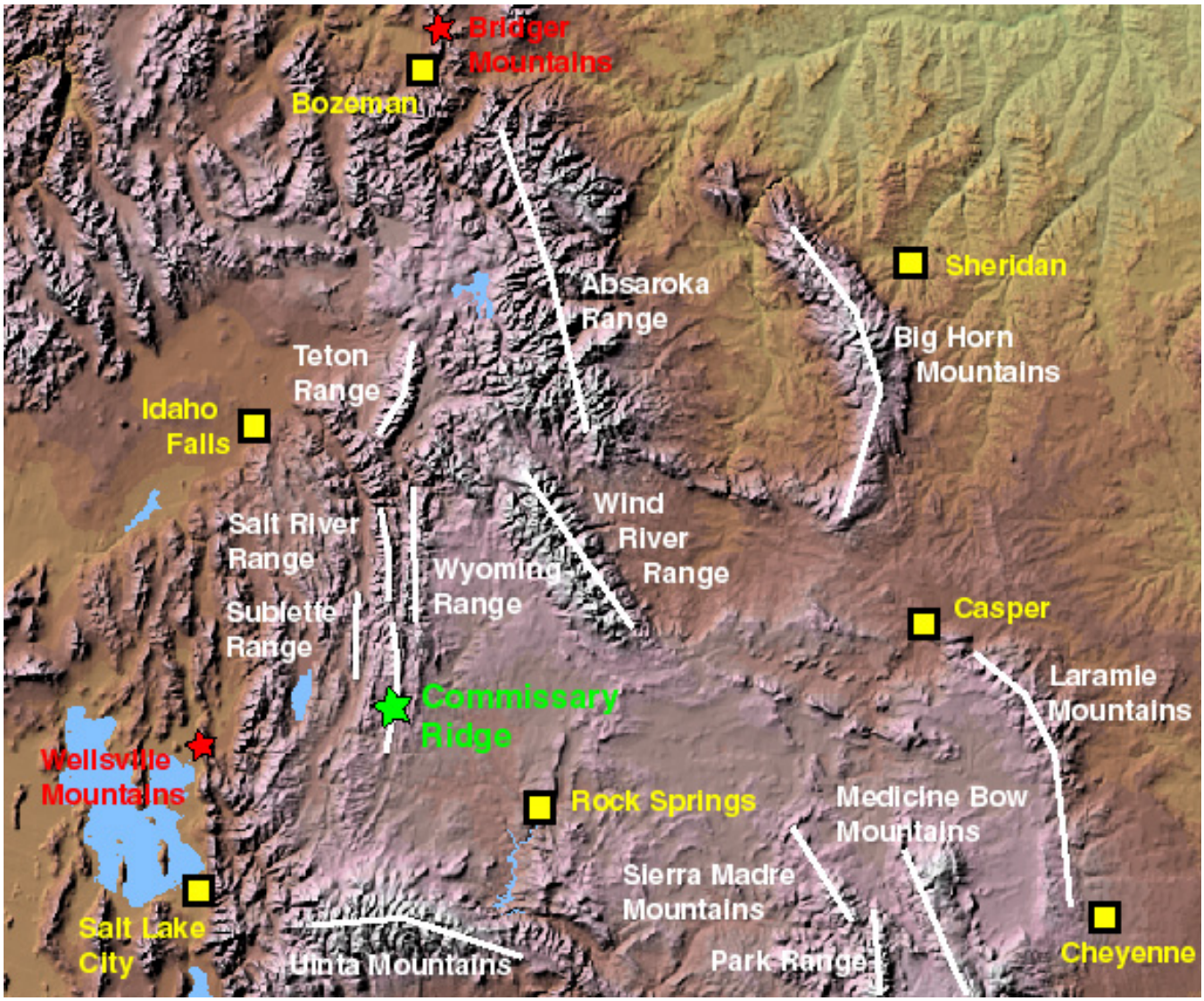

Figure 1. Location of Commissary Ridge Raptor Migration Project site in southwestern Wyoming. Red stars indicate other nearby HWI fall migration monitoring sites in Utah (currently inactive) and Montana.

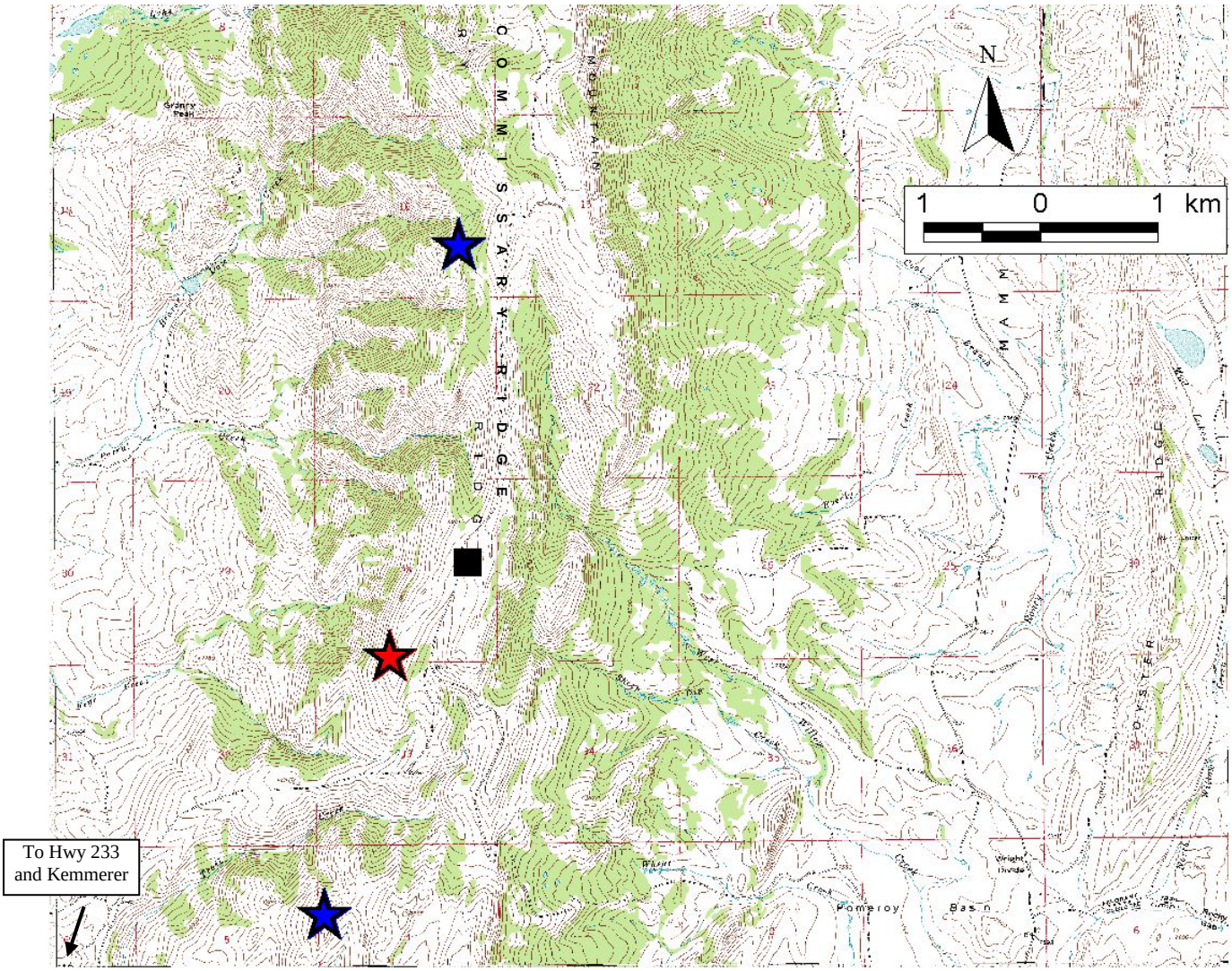

Figure 2. Close-up of Commissary Ridge Raptor Migration Project study site in southwestern Wyoming showing locations of the observation post (red star), the trapping locations (blue stars; south blind inactive), and base camp (black square).

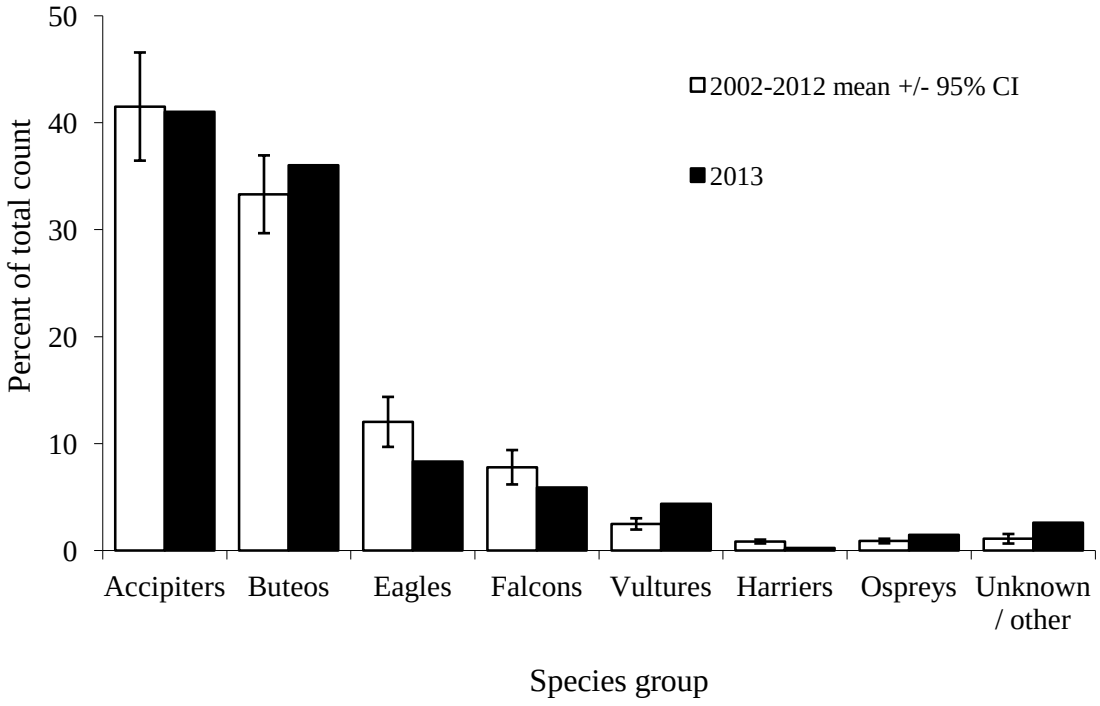

Figure 3. Composition of the fall flight by major raptor species groups of at Commissary Ridge, Wyoming: 2002–2012 average compared to 2013.

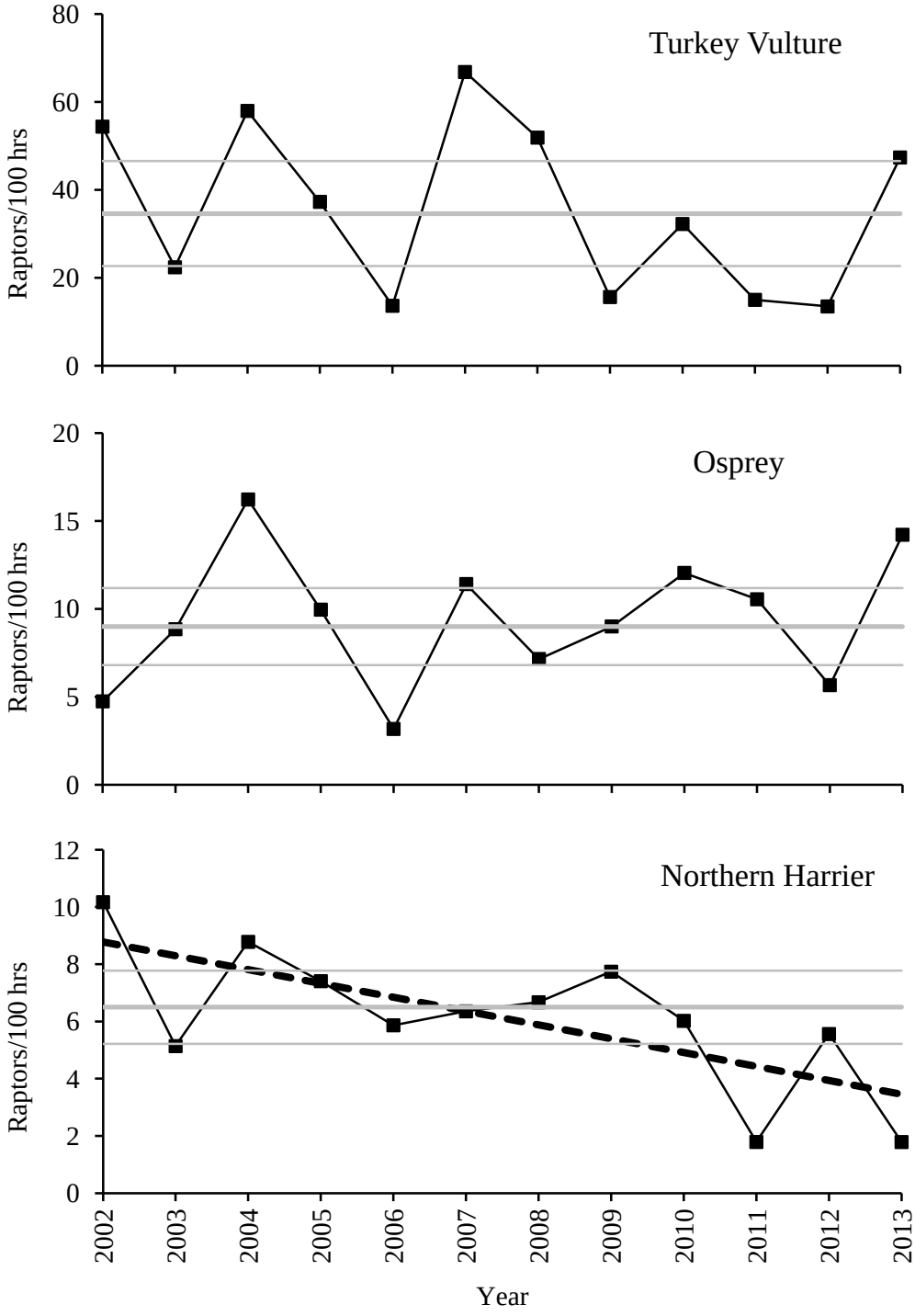

Figure 4a. Adjusted fall-migration passage rates at Commissary Ridge, WY for Turkey Vultures, Ospreys, and Northern Harriers: 2002–2013. Dashed lines indicate trends for significant ($p < 0.05$) linear or quadratic regressions. Solid grey lines represent mean (thick) and upper and lower 95% confidence intervals (thin) of historic counts (2002-2012) at Commissary Ridge.

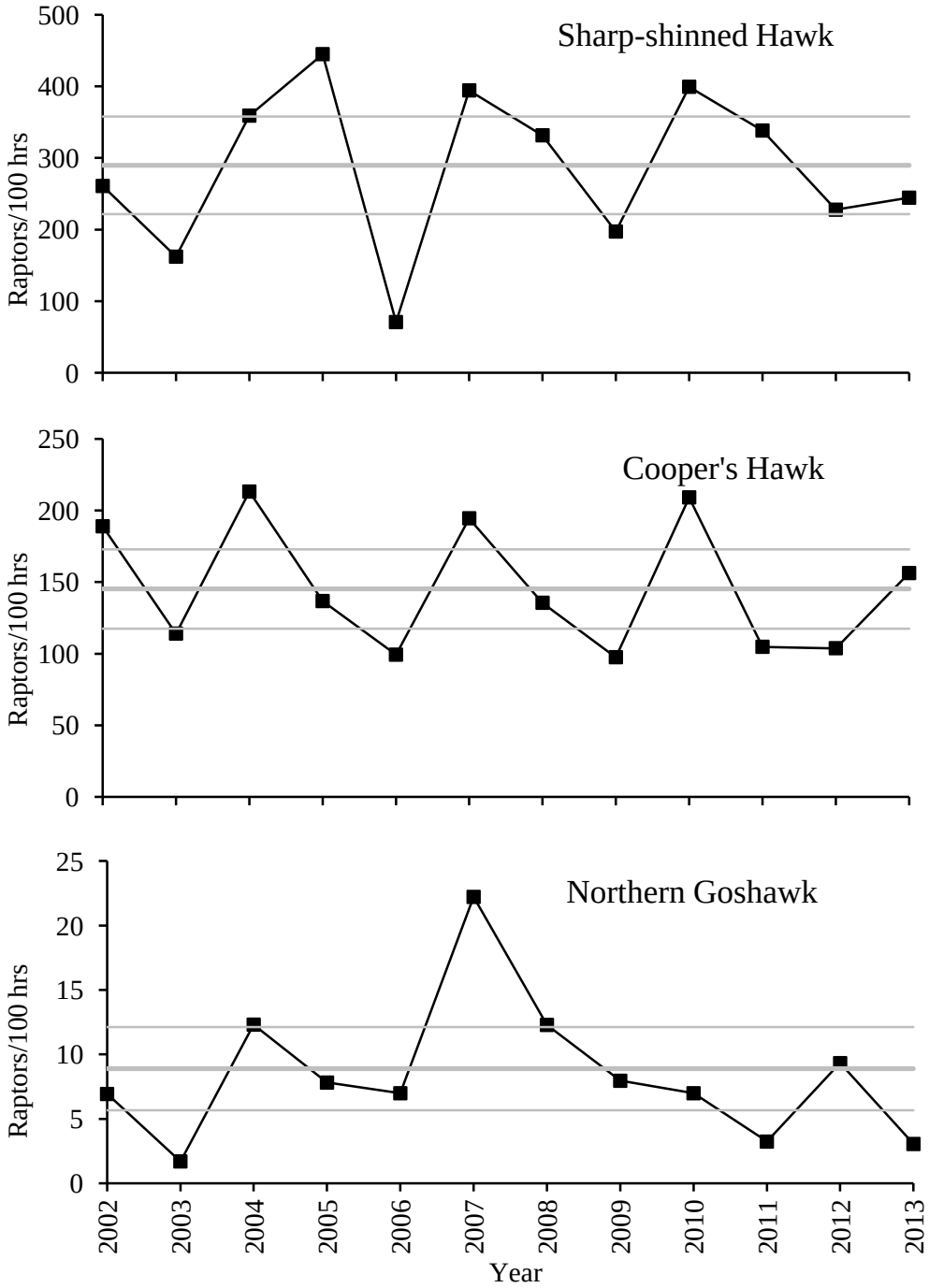

Figure 4b. Adjusted fall-migration passage rates at Commissary Ridge, WY for the three North American accipiter species: 2002–2013. Solid grey lines represent mean (thick) and upper and lower 95% confidence intervals (thin) of historic counts (2002-2012).

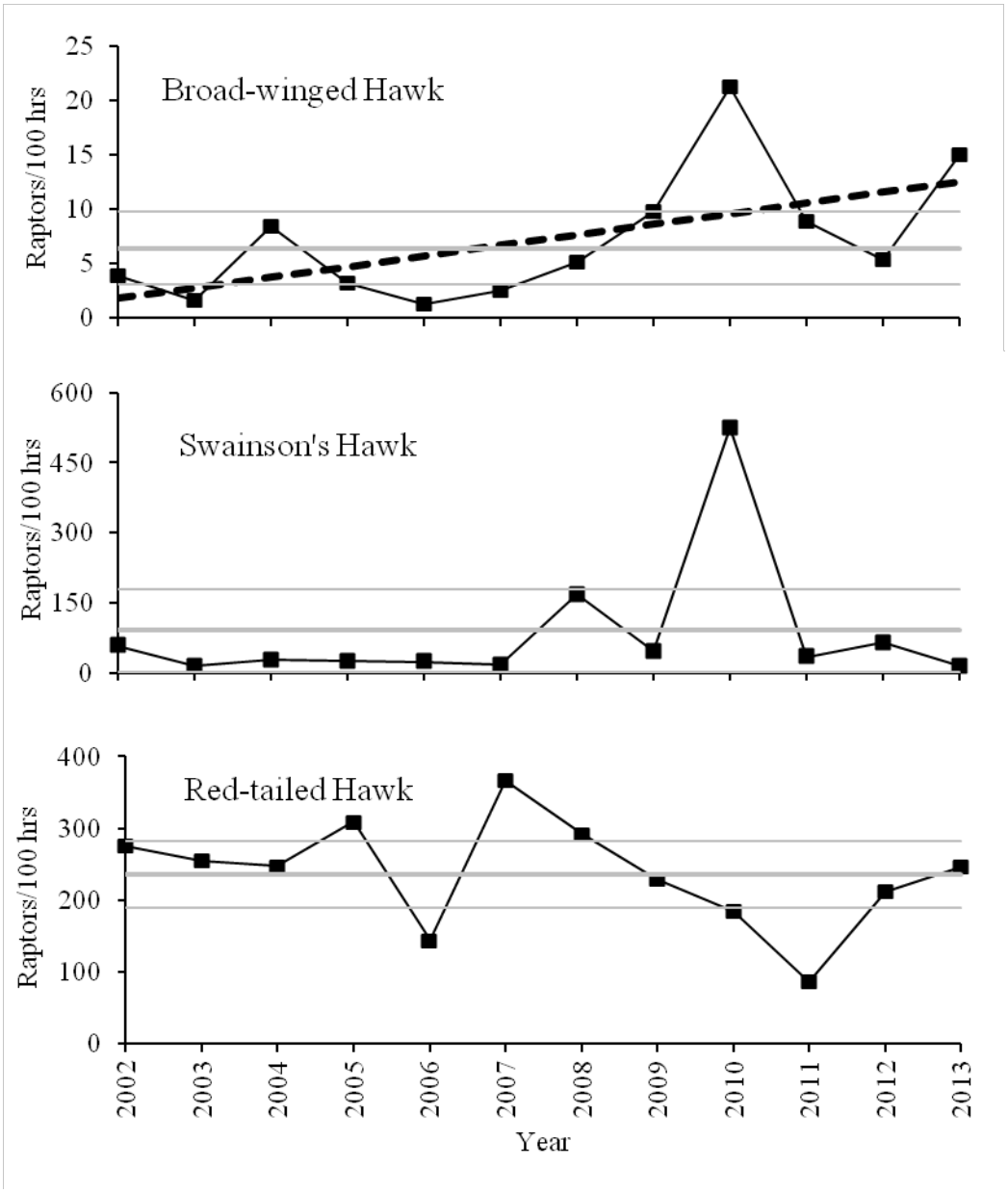

Figure 4c. Adjusted fall-migration buteo passage rates at Commissary Ridge, WY: 2002–2013. Dashed lines indicate significant($p < 0.05$) population trends based on linear or quadratic regressions. Solid grey lines represent mean (thick) and upper and lower 95% confidence intervals (thin) of historic counts (2002-2012).

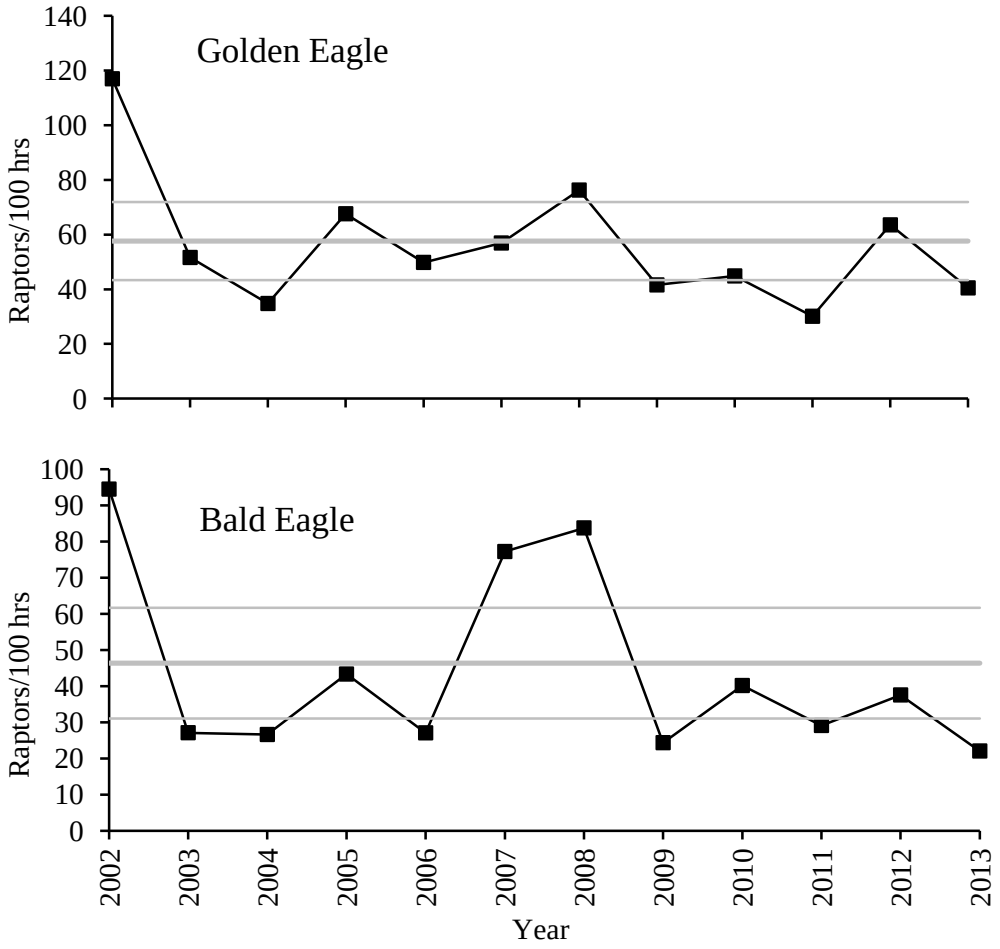

Figure 4d. Adjusted eagle passage rates for the fall migration at Commissary Ridge, WY: 2002–2013. Solid grey lines represent mean (thick) and upper and lower 95% confidence intervals (thin) of historic counts (2002-2012).

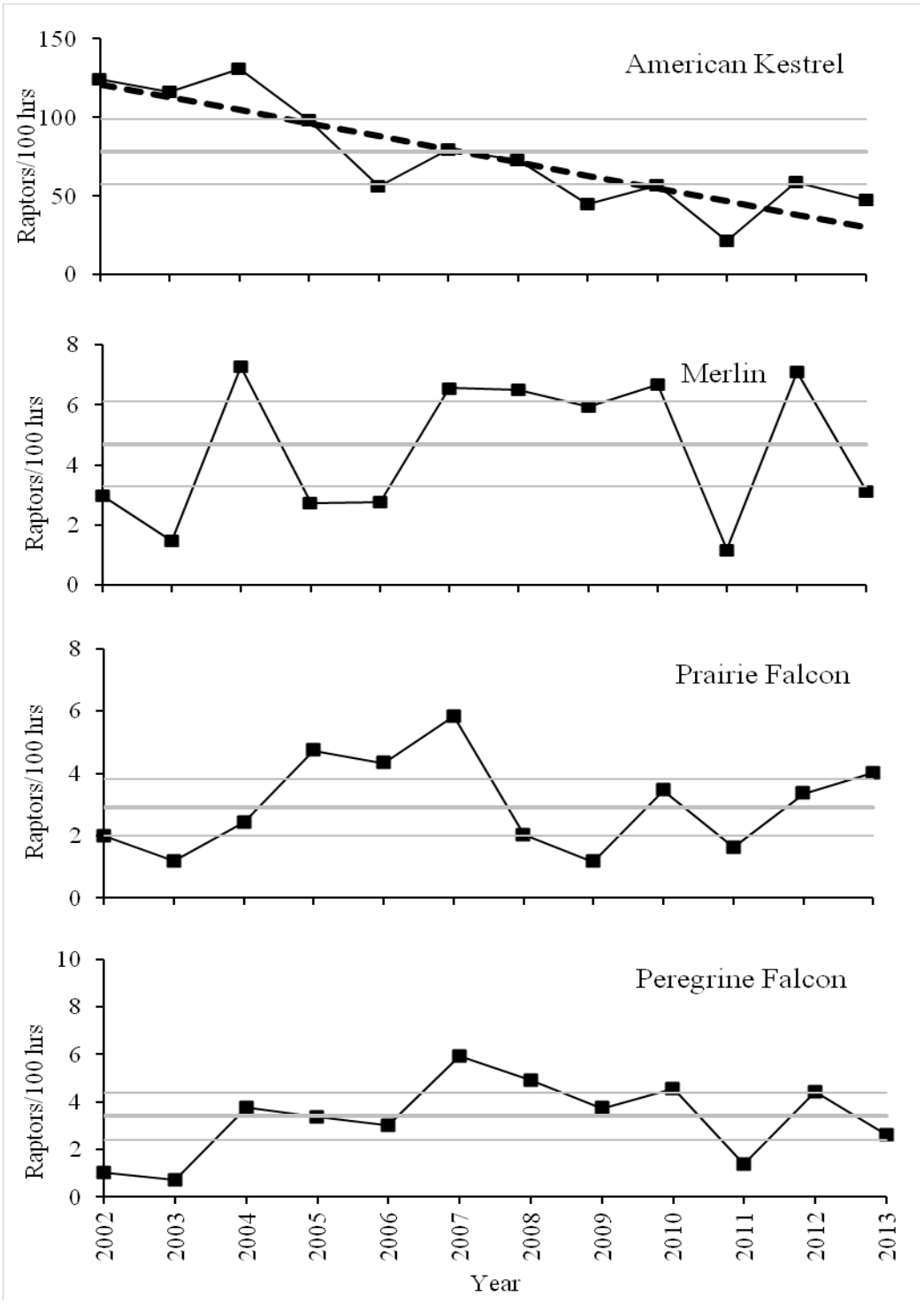

Figure 4e. Adjusted fall-migration falcon passage rates at Commissary Ridge, WY: 2002–2013. Dashed lines indicate significant ($p < 0.05$) population trends based on linear or quadratic regressions. Solid grey lines represent mean (thick) and upper and lower 95% confidence intervals (thin) of historic counts (2002-2012).

Appendix A. History of official observer participation at the Commissary Ridge Raptor Migration Project.

2000: Exploratory count, single observer throughout, rotating observers: Mike Neal (3)[1] and Margarite Lomow (0).

2001: Exploratory count, single observer throughout: Mike Neal (4)

2002: Single observer throughout, two observers for peak: Mike Neal (5), Nick Meyer (1), assisted by other trained crew members and staff.

2003: Two observers throughout: Chadette Pfaff (+), Don Higgins (0), Jason Farrell (0), assisted by Mike Neal (6).

2004: Two observers throughout: Mark Vukovich (1), Jennifer Nagy (0), assisted by other trained crew members and staff.

2005: Two observers throughout: Rob Spaul (1), Mary Ann Donnovan (0), assisted by other trained crew members and staff.

2006: Two observers throughout: David Jansen (0), Tiara Westcott (0), assisted by other trained crew members and staff.

2007: Two observers throughout: Tiffany Russell (0), Patty Brundage (0), assisted by other trained crew members and staff.

2008: Two observers throughout: Sue Bruner (4), Sedona Maniak (0), Chase Cammarota (0); assisted by other trained crew members and staff.

2009: Two observers throughout: Andrew Eberly (1), Julia Fromfeld (0), Andrew Grant (+).

2010: Two observers throughout: Robert Baez (1), John Cannon (0), Ben Zyla (0).

2011: Two observers throughout: Lainie LaHaye (1), Mary Raikes (0), Emily Underwood (0).

2012: Two observers throughout: Russell Seeley (2), Rya Rubenthaler (0), Donna Wilhelm (0).

2013: Two observers throughout: Cherin Spencer-Bower (1), Meghan McPherson (0), Bradley Wilkinson (0), and Dan D. Tempest (+).

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

Appendix B. Common and scientific names, species codes, and regularly applied age, sex, and color-morph classifications for all raptors observed on migration at Commissary Ridge, Wyoming.

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
Broad-winged Hawk	*Buteo platypterus*	BW	A I U	U	D L U
Swanson's Hawk	*Buteo swainsoni*	SW	U	U	D L U
Red-tailed Hawk	*Buteo jamaicensis*	RT	A I U	U	D L U
Ferruginous Hawk	*Buteo regalis*	FH	A I U	U	D L U
Rough-legged Hawk	*Buteo lagopus*	RL	U	U	D L U
Unknown buteo	*Buteo* spp.	UB	U	U	D L U
Golden Eagle	*Aquila chrysaetos*	GE	I, S, NA, A, U[4]	U	NA
Bald Eagle	*Haliaeetus leucocephalus*	BE	I, S1, S2, NA, A, U[5]	U	NA
Unknown eagle	*Aquila* or *Haliaeetus spp.*	UE	U	U	NA
American Kestrel	*Falco sparverius*	AK	U	M F U	NA
Merlin	*Falco columbarius*	ML	AM Br	AM U	NA
Prairie Falcon	*Falco mexicanus*	PR	U	U	NA
Peregrine Falcon	*Falco peregrinus*	PG	A I U	U	NA
Unknown small falcon	*F. sparverius* or *columbarius*	SF	U	U	NA
Unknown large falcon	*F. mexicanus* or *peregrinus*	LF	U	U	NA
Unknown falcon	*Falco* spp.	UF	U	U	NA
Unknown raptor	Falconiformes	UU	U	U	NA

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

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

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

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

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

Appendix C. Annual observation effort and raptor counts by species during fall migration at Commissary Ridge, Wyoming: 2001–2013.

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Mean
Start date	3-Sep	27-Aug	27-Aug	27-Aug	27-Aug	27-Aug	27-Aug	27-Aug	27-Aug	27-Aug	27-Aug	27-Aug	27-Aug	26-Aug
End date	23-Oct	29-Oct	29-Oct	3-Nov	31-Oct	31-Oct	5-Nov	5-Nov	5-Nov	5-Nov	31-Oct	5-Nov	28-Oct	1-Nov
Observation days	22	45	63	65	64	56	66	66	64	65	61	68	57	62
Observation hours	145.88	322.67	474.85	452.67	478.83	443.58	494.56	493.33	531.82	538.58	510.25	557.83	398.58	475.91
Raptors/100 hrs	1,156	991	644	917	985	415	990	911	559	1040	526	662	693	777
SPECIES										RAPTOR COUNTS				
Turkey Vulture	67	97	66	164	114	39	185	150	50	108	46	50	121	99
Osprey	16	11	31	59	36	11	41	27	34	54	41	25	41	34
Northern Harrier	40	32	25	38	36	26	30	32	38	36	9	32	7	28
Sharp-shinned Hawk	303	675	516	1,118	1,687	217	1,214	1,109	690	1425	1,140	924	698	951
Cooper's Hawk	256	409	329	614	462	289	535	382	298	669	296	393	389	422
Northern Goshawk	11	21	7	49	35	26	89	52	32	35	14	53	10	35
Unknown small accipiter	11	78	75	75	55	39	61	25	92	293	208	45	20	89
Unknown large accipiter	4	6	13	34	11	6	21	8	17	3	2	4	7	11
Unknown accipiter	29	16	58	69	2	6	98	49	15	0	4	1	9	27
TOTAL ACCIPITERS	614	1,205	998	1,959	2,252	583	2,018	1,625	1,144	2,425	1,664	1,420	1,133	1,536
Broad-winged Hawk	1	8	5	22	9	3	7	13	26	58	21	16	31	18
Swainson's Hawk	18	82	28	62	52	47	36	352	119	1,211	80	153	26	187
Red-tailed Hawk	323	823	1,042	961	1,319	563	1,459	1,148	987	872	386	1,043	892	958
Ferruginous Hawk	7	6	3	15	8	7	3	7	9	11	5	11	4	7
Rough-legged Hawk	20	5	5	8	13	5	13	34	7	33	4	24	8	13
Unidentified buteo	19	17	87	63	42	35	63	144	43	61	44	31	34	55
TOTAL BUTEOS	388	941	1,170	1,131	1,443	660	1,581	1,698	1,191	2,246	540	1,278	995	1,240
Golden Eagle	279	352	233	152	316	211	324	345	211	253	136	350	167	254
Bald Eagle	72	233	90	76	137	82	299	262	86	193	102	207	59	152
Unidentified eagle	5	10	7	10	2	6	25	34	0	16	16	39	4	14
TOTAL EAGLES	356	595	330	238	455	299	648	641	297	462	254	596	230	420
American Kestrel	166	258	355	403	317	156	229	219	151	196	73	209	127	224
Merlin	7	9	6	26	11	10	24	25	23	29	5	32	8	17
Prairie Falcon	1	6	5	6	18	13	21	6	4	15	7	13	13	11
Peregrine Falcon	5	3	3	11	13	9	18	15	16	20	6	17	8	12
Unknown small falcon	2	0	3	6	2	5	3	9	1	1	4	4	4	4
Unknown large falcon	5	0	0	5	2	4	6	5	1	1	0	4	2	3
Unknown falcon	0	2	0	1	0	7	7	1	1	2	3	0	1	2
TOTAL FALCONS	186	278	372	458	363	204	308	280	197	264	98	279	163	272
Unidentified raptor	19	38	68	102	19	19	83	39	20	7	32	13	72	43
ALL SPECIES	1,686	3,197	3,060	4,149	4,718	1,841	4,894	4,492	2,971	5,602	2,684	3,693	2,762	3,672

[1] Designations used for the first time in 2001.