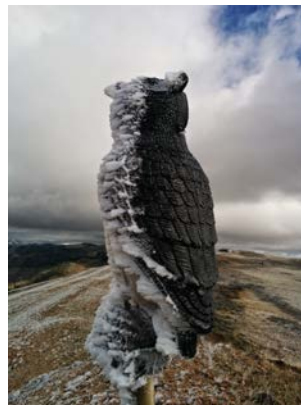


**FALL 2014 RAPTOR MIGRATION ANNUAL REPORT:
COMMISSARY RIDGE HAWKWATCH, SW WYOMING**



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



May 2015

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INTRODUCTION

The Commissary Ridge HawkWatch in southwest Wyoming is an ongoing effort to monitor long-term regional population trends of diurnal raptors that migrate along the Rocky Mountain Flyway (Hoffman et al. 2002). HawkWatch International (HWI) initiated standardized counts at Commissary Ridge, prior to this no long-term raptor migration counts occurred in Wyoming. To date HWI observers have recorded 17 species of migratory raptors at the site, with counts typically ranging between 3,000 and 4,300 migrants per season. The 2014 season marks the 13th consecutive season of counting at Commissary Ridge.

The Commissary Ridge HawkWatch was 1 of 9 long-term, annual raptor migration counts conducted or co-sponsored by HWI in North America during 2014 (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 Texas Gulf Coast region (Hoffman et al. 2002, Hoffman and Smith 2003, Smith et al. 2008a, b). Raptors can serve as important biological indicators of ecosystem health (Bildstein 2001) and long-term migration counts 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).

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 Commissary Ridge HawkWatch and outreach efforts here reach people from western Wyoming, eastern Utah, northwestern Colorado, and beyond each season.

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 (Fig. 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 and immediate landscape consists of 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; two designated observers conducted standardized daily counts of migrating raptors from late August through late October. Observations typically began between 0800–0900 hrs and ended near 1700 hrs Pacific Standard Time (PST). Visitors occasionally assisted with the count.

Data collection followed standardized protocols used at all HWI migration sites (Hoffman and Smith 2003). 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 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 were 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.

In comparing 2014 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.

2014 RESULTS AND DISCUSSION

OBSERVATION EFFORT AND WEATHER SUMMARY

The Commissary Ridge HawkWatch standard season runs 27 August—5 November; in 2014 observers counted on 66 of 71 possible days during this period for a total of 491.3 hours (Appendix C). Weather led to shortened counts (<4hrs) on four days. Weather varies throughout every season, in 2014 based on hourly recording of conditions during observation it was clear 37% of the time, hazy 2% of the time, rainy 5% of the time, and snowy 2% of the time.

2014 FLIGHT SUMMARY

Overall Flight:

A total of 1,866 migrating raptors representing 16 species were counted in 2014, a significant ($\alpha = 0.05$) 49% decrease compared to the site long term average (Table 1). Notable to this year's flight were record low passage rates overall and for a number of species (see below).

The flight consisted of 43% accipiters, 34% buteos, 14% eagles, 6% falcons, 1.6% vultures, and 0.3 % for both Northern Harriers and Ospreys. The relative proportions of eagles was high compared to historic values; accipiters and buteos were counted in proportions similar to historic averages; while falcons, vultures, Northern Harriers, and Ospreys made up less of the flight than they typically do (Fig. 3). Sharp-shinned Hawks were the most abundant species (32% of the total), followed by Red-tailed Hawks (28%), Cooper's Hawks (8%), Golden Eagles (8%), Bald Eagles (6%), American Kestrels (3%), and Turkey Vultures (2%). The remaining species each accounted for 1% or less of the total count (Table 1).

The following sections summarize the 2014 count relative to historic means at the site, and any statistically significant ($p < 0.05$) population trends, based on analyses of first and/or second order regression. 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.

Total Flight (Fig.4):

The 380 raptors counted per 100 hours of observation at the Commissary Ridge HawkWatch in 2014 was significantly lower than the historic average of 779 raptors/100 hrs—in fact it is the lowest passage rate ever documented at the site.

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

Seasonal counts and effort-adjusted passage rates for Turkey Vultures, Osprey, and Northern Harriers were the lowest ever recorded at Commissary Ridge (Appendix C).

Accipiters (Fig. 5b):

Counts and passage rates for all three accipiter species were also below average, with Cooper's Hawk and Goshawks setting record lows. Despite this year's low counts, long-term regional population trends for these species are stable (no significant trend based on regression analysis).

Buteoine Hawks (Fig. 5c):

Observers this season did not see a single Broad-winged Hawk, which is a first for Commissary Ridge. The 2014 flight set record lows for Swainson's Hawks, Rough-legged Hawks, and tied the record low for Ferruginous Hawks (Appendix C). Red-tailed Hawk count and passage rate in 2014 were also low compared to site average this season (Table 1). Again despite low counts this year, regional populations remain stable (no significant trend based on regression analysis).

Eagles (Fig.5d):

The 2014 Golden Eagle count of 136 birds tied the record low at Commissary Ridge, previously set in 2011 and the passage rate was also low compared to the site average. The season's Bald Eagle count and passage rate did not significantly differ from historic site averages (Table 1). Analyses of long-term passage rates indicate that regional populations of both eagle species remain stable (no significant trend based on regression analysis).

Falcons (Fig. 5e):

Peregrine Falcon count and passage rate were above average in 2014, while those for Prairie Falcons were similar to site average. This season set record low counts and passage rates for both Merlins and American Kestrels. Regional populations of Kestrels are declining based on fall migration passage rates (slope = -5.452, $r^2 = 0.76$, $p < 0.001$). Similar declines have been documented for this Kestrels across the HWI network and at other count sites. In response, HWI, along with many other North American researchers and Citizen Scientists are working to understand American Kestrel declines both locally and at the continental scale and have partnered under the umbrella of the American Kestrel Partnership (<http://kestrel.peregrinefund.org/>).

Site Visitation and Public Outreach

One major school group of approximately 31 individuals visited the site from Salt Lake City, led by HWI staff, to learn about raptor migration ecology and data collecting for utilization in their statistics and other science coursework. The crew also continued to make good local acquaintances by visiting with hunters, ranchers, herdsman, and other locals from nearby Kemmerer, WY.

2014 FALL MIGRATION ACROSS HWI'S NETWORK

HawkWatch International and partners operated 9 fall count sites in 2014 (Fig. 1). During the 4,884.4 hours of standardized observation we counted 504,905 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 2014 included (Table 2):

- Below average counts for the fall flight at 4 of 9 sites
 - Both Pacific Northwest sites, Commissary Ridge, and Corpus Christi
- Low or average Golden Eagle counts at all network sites--no increases at any site
- Below historic average American Kestrel counts at 6 of 9 sites
- Low Northern Harrier counts at 8 of 9 network sites
- Above average Peregrine Falcon counts at 6 of 9 sites and average counts at the other 3
- Above average Broad-winged Hawk numbers at 6 western sites and below average Broad-winged numbers at Corpus Christi – does this signify a change in the migration pathways for this species?

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.

ACKNOWLEDGMENTS

We'd like to thank the Bureau of Land Management – Kemmerer Field Office for providing their encouragement and essential logistical support for our crew. We also want to thank the Kemmerer Recreation Center for also providing our staff local encouragement, camaraderie, and sometimes logistical support as well. Finally, many thanks to our fearless field crew: Erik Corredor, Keelan Dann, and Philip Kavouriaris —without all of your dedication, good spirits, grit, and willingness to brave the Wyoming wind and other elements this season would not have been possible.

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Table 1. Counts and historic records of fall migrating raptors at the Commissary Ridge HawkWatch, in sw Wyoming.

Species	1994-2013		2014	% Change	All-time Historic Records	
	Mean Count	± 95 % CI			Season	Daily
Turkey Vulture	99	± 28	31	-69	185 (2007)	7 (2013)
Osprey	34	± 8	6	-82	59 (2004)	6 (2009)
Northern Harrier	28	± 6	6	-79	38 (2009)	5 (2009)
Accipiters						
Sharp-shinned Hawk	951	± 233	600	-37	1687 (2005)	25 (2x)
Cooper's Hawk	422	± 71	148	-65	669 (2010)	22 (4x)
Northern Goshawk	35	± 13	4	-89	89 (2007)	6 (2012)
Unidentified accipiter	127	± 45	49	-61	296 (2010)	
TOTAL ACCIPITERS	1536	± 313	801	-48	2425 (2010)	
Buteos						
Red-shouldered Hawk		±				
Broad-winged Hawk	18	± 9	0	-100	58 (2010)	5 (2010)
Swainson's Hawk	187	± 189	16	-91	1211 (2010)	12 (2009)
Red-tailed Hawk	958	± 166	530	-45	1459 (2007)	38 (2007)
Ferruginous Hawk	7	± 2	3	-60	15 (2004)	4 (2009)
Rough-legged Hawk	13	± 6	3	-77	34 (2008)	6 (2010)
Unidentified buteo	55	± 19	73	32	144 (2008)	
TOTAL BUTEOS	1239	± 263	625	-50	2246 (2010)	
Eagles						
Golden Eagle	254	± 46	136	-46	352 (2002)	18 (2002)
Bald Eagle	152	± 47	108	-29	299 (2007)	16 (2008)
Unknown eagles	15	± 7	22	43	39 (2012)	
TOTAL EAGLES	420	± 93	266	-37	648 (2007)	
Falcons						
American Kestrel	224	± 55	64	-71	403 (2004)	21 (2004)
Merlin	17	± 6	4	-77	32 (2012)	5 (2004)
Prairie Falcon	11	± 3	9	-15	21 (2007)	4 (2x)
Peregrine Falcon	12	± 3	16	38	20 (2010)	3 (2x)
Unidentified falcon	8	± 3	10	24	16 (2x)	
TOTAL FALCONS	272	± 56	103	-62	458 (2004)	
Unidentified Raptor	43	± 18	28	-35	102 (2004)	
GRAND TOTAL	3672	± 626	1866	-49	5602 (2010)	125 (2013)

Table 2. Summary of the 2014 fall flight of migrating raptors across HWT'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.

	Bonney Butte, OR	Chelan Ridge, WA	Bridger Mtn, MT	Commissary Ridge, WY	Goshute Mts, NV	Yaki Pt, AZ	Lipan Pt, AZ	Manzano Mts, NM	Corpus Christi, TX
	<i>Hours Counted in 2014</i>								
Species	414.5	448.3	392.7	491.3	690	605.6	518.1	505.1	818.8
Black Vulture									228
Turkey Vulture	322	55	8	31	661	*	*	343	57128
Osprey	53	41	6	6	125	58	45	38	211
Northern Harrier	18	75	112	6	145	31	35	42	171
Crested Caracara									1
Common Black Hawk									0
Harris' Hawk									4
Accipiters									
Sharp-shinned Hawk	802	520	422	600	6141	1806	1572	1304	2101
Cooper's Hawk	465	190	203	148	3986	862	599	770	821
Northern Goshawk	53	21	59	4	152	4	2	11	0
Unidentified accipiter	41	64	66	49	42	342	281	51	105
TOTAL ACCIPITERS	1361	795	750	801	10321	3014	2454	2136	3027
Buteos									
Red-shouldered Hawk	2				0				15
Broad-winged Hawk	1	12	22	0	203	28	23	17	370575
Short-tailed Hawk									0
Swainson's Hawk	0	43	2	16	509	59	54	2279	8035
White-tailed Hawk									23
Zone-tailed Hawk									5
Red-tailed Hawk	415	119	239	530	5095	1262	1687	696	159
Ferruginous Hawk	0		8	3	32	12	2	7	6
Rough-legged Hawk	1	5	84	3	19	0		3	0
Unidentified buteo	6	22	37	73	16	28	28	7	22
TOTAL BUTEOS	425	201	392	625	5874	1389	1794	3009	378766
Eagles									
Golden Eagle	59	67	1222	136	230	2	16	103	1
Bald Eagle	38	14	106	108	16	12	7	6	15
Unknown eagles	5	0	11	22	0	0	0	0	0
TOTAL EAGLES	102	81	1339	266	246	14	23	109	16
Falcons									
American Kestrel	10	24	138	64	1730	474	440	200	1016
Merlin	80	42	28	4	110	16	12	37	98
Prairie Falcon	7	8	13	9	43	7	0	17	8
Peregrine Falcon	17	10	23	16	33	18	11	59	237
Aplomado Falcon									0
Unidentified falcon	7	7	7	10	0	5	4	2	8
TOTAL FALCONS	121	91	209	103	1916	520	467	315	1367
Kites									
Hook-billed Kite									0
Swallow-tailed Kite									59
White-tailed Kite									4
Mississippi Kite					1				20032
Unidentified Kites									0
TOTAL KITES									20095
Unidentified Raptor	21	45	63	28	0	19	38	0	157
GRAND TOTAL	2423	1384	2879	1866	19288	5045	4856	5993	461171

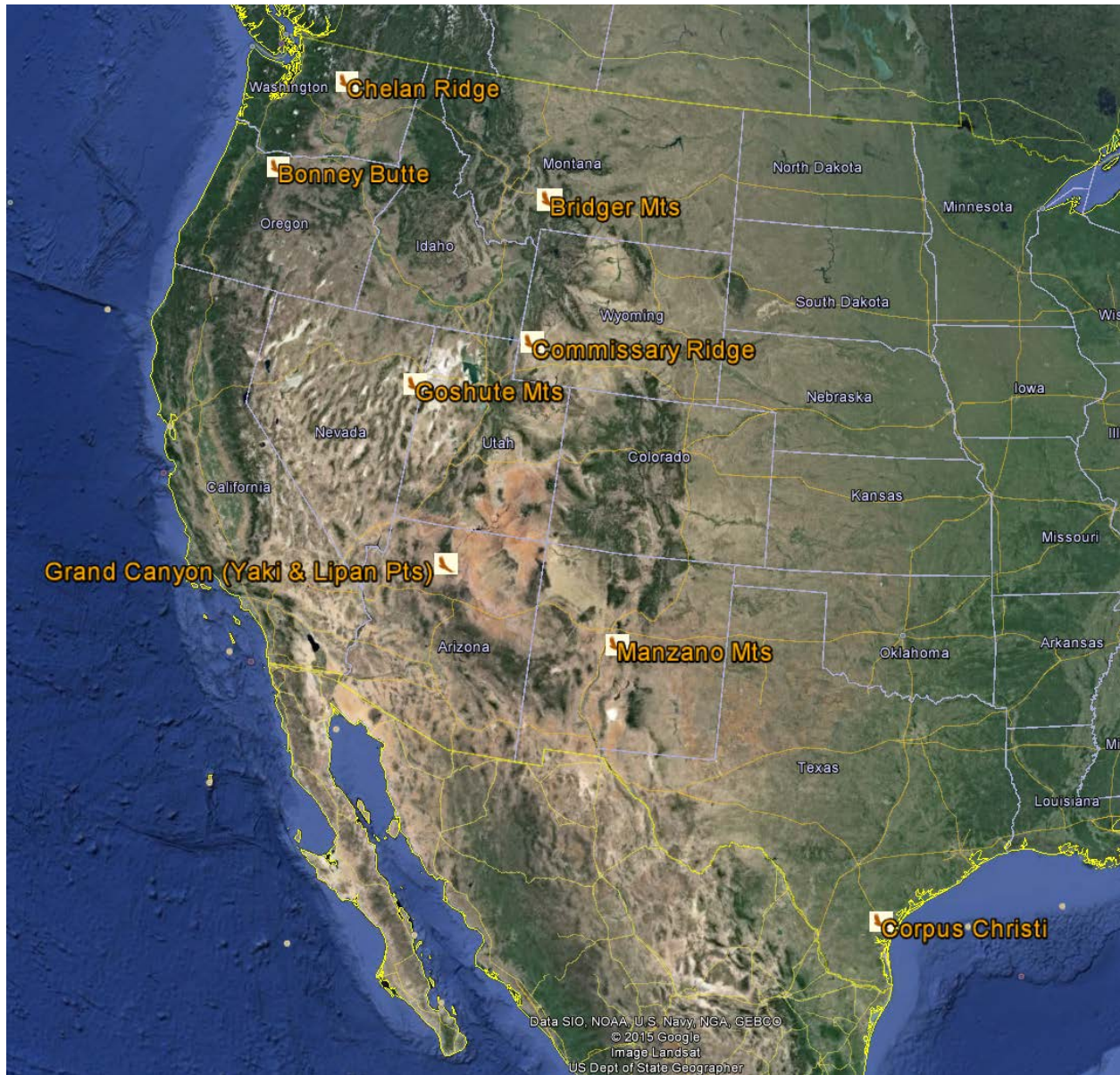


Figure 1. Locations of fall HawkWatch sites operated by HWI and partners.



Figure 2. Location of Commissary Ridge HawkWatch in southwestern Wyoming relative to Kemmerer, WY and other nearby towns.

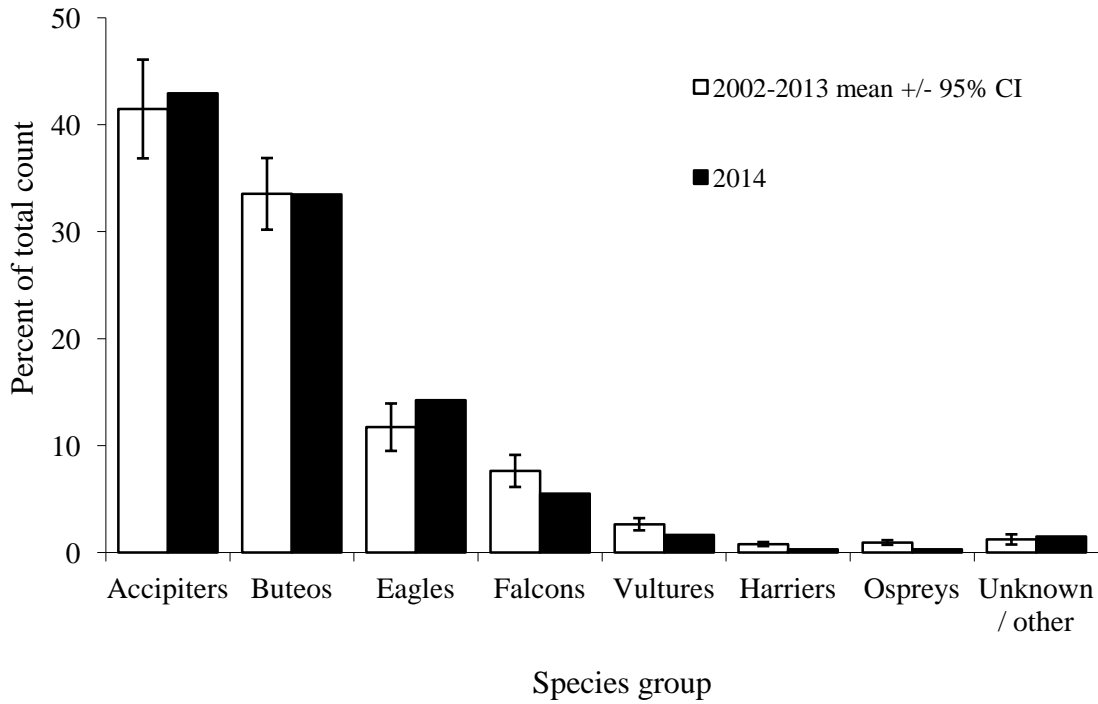


Figure 3. Composition of the fall flight by major raptor species groups of at the Commissary Ridge HawkWatch in sw Wyoming: 2002–2013 average compared to 2014.

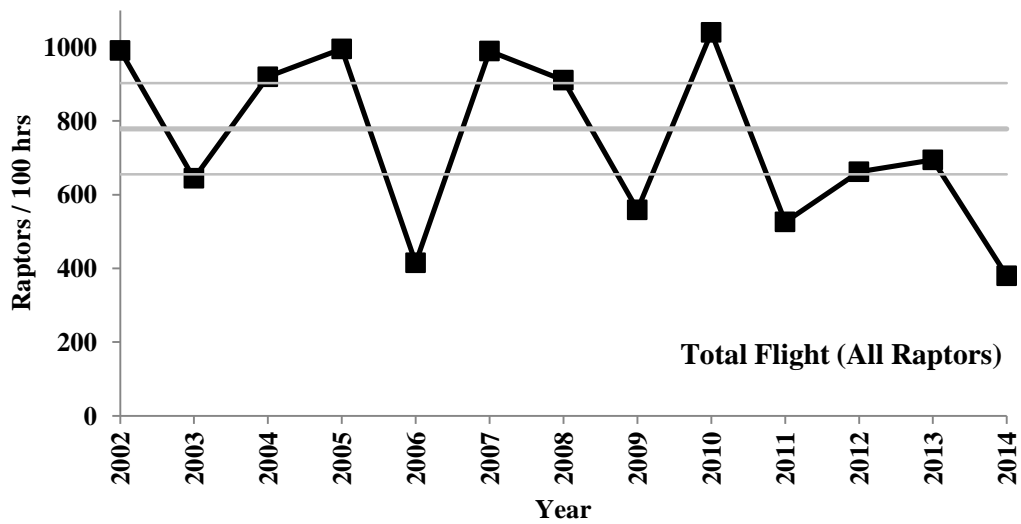


Figure 4. Fall migration passage rates at the Commissary Ridge HawkWatch in sw Wyoming for all migrating raptors: 2002-2014. Solid grey lines represent mean (thick) and upper and lower 95% confidence intervals (thin) of historic counts (1985-2013) at Commissary Ridge.

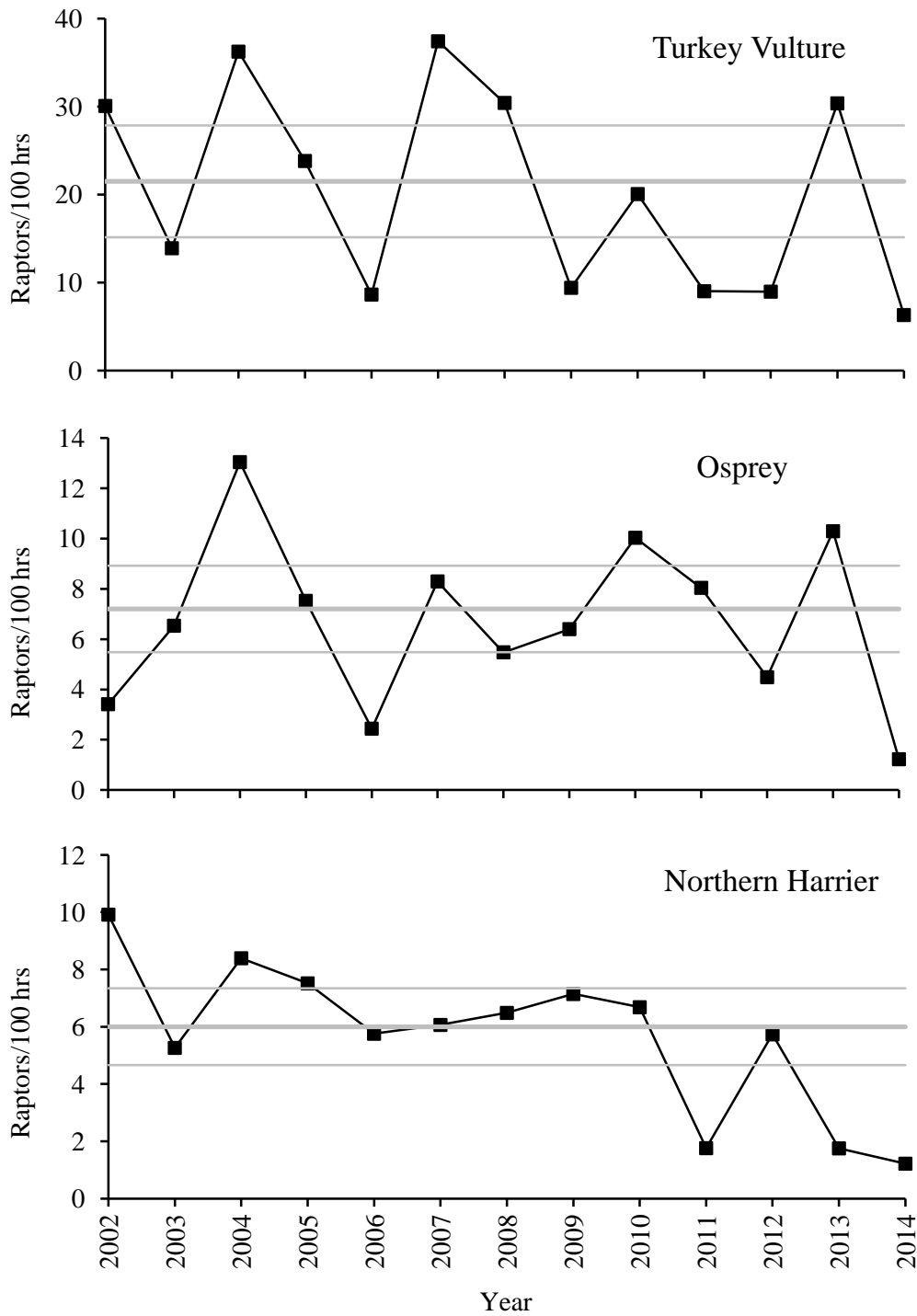


Figure 4a. Fall-migration passage rates at the Commissary Ridge HawkWatch in sw Wyoming for Turkey Vultures, Ospreys, and Northern Harriers: 2002–2014. Solid grey lines represent mean (thick) and upper and lower 95% confidence intervals (thin) of historic counts (2002-2013) at Commissary Ridge.

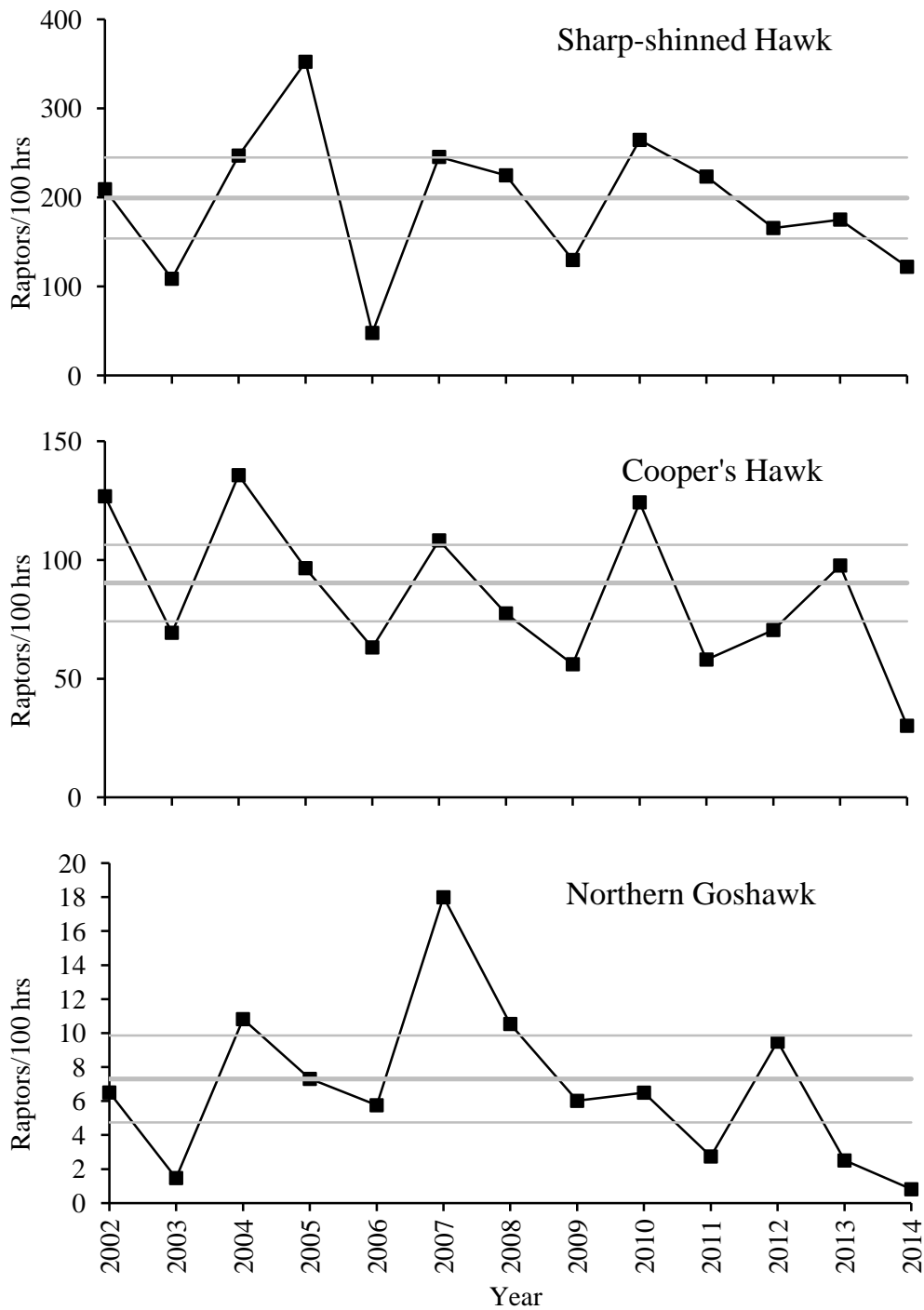


Figure 4b. Fall-migration passage rates at the Commissary Ridge HawkWatch in sw Wyoming for the three North American accipiter species: 2002–2014. Solid grey lines represent mean (thick) and upper and lower 95% confidence intervals (thin) of historic counts (2002-2013).

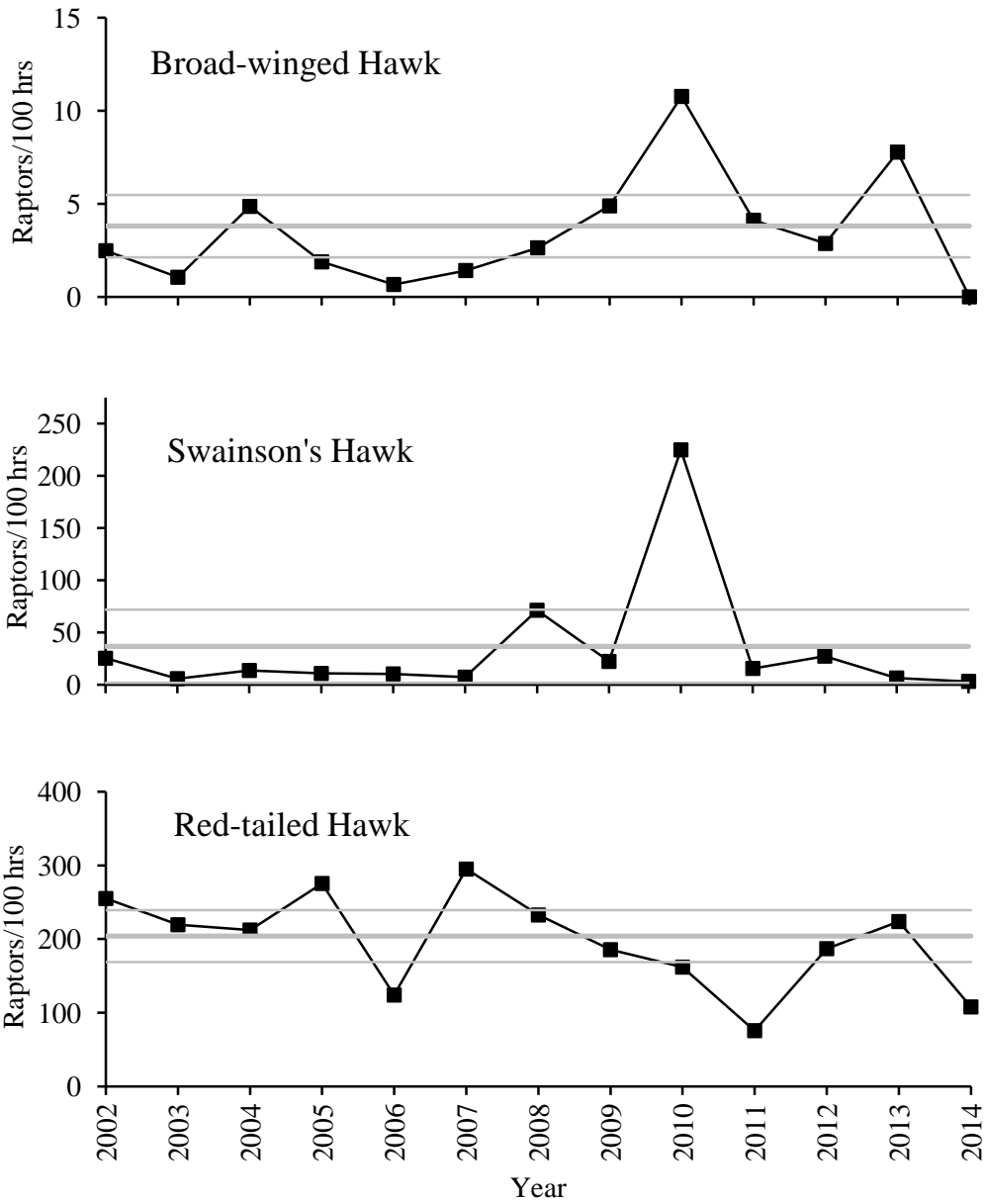


Figure 4c. Fall-migration buteo passage rates at the Commissary Ridge HawkWatch in sw Wyoming: 2002–2014. Solid grey lines represent mean (thick) and upper and lower 95% confidence intervals (thin) of historic counts (2002-2013).

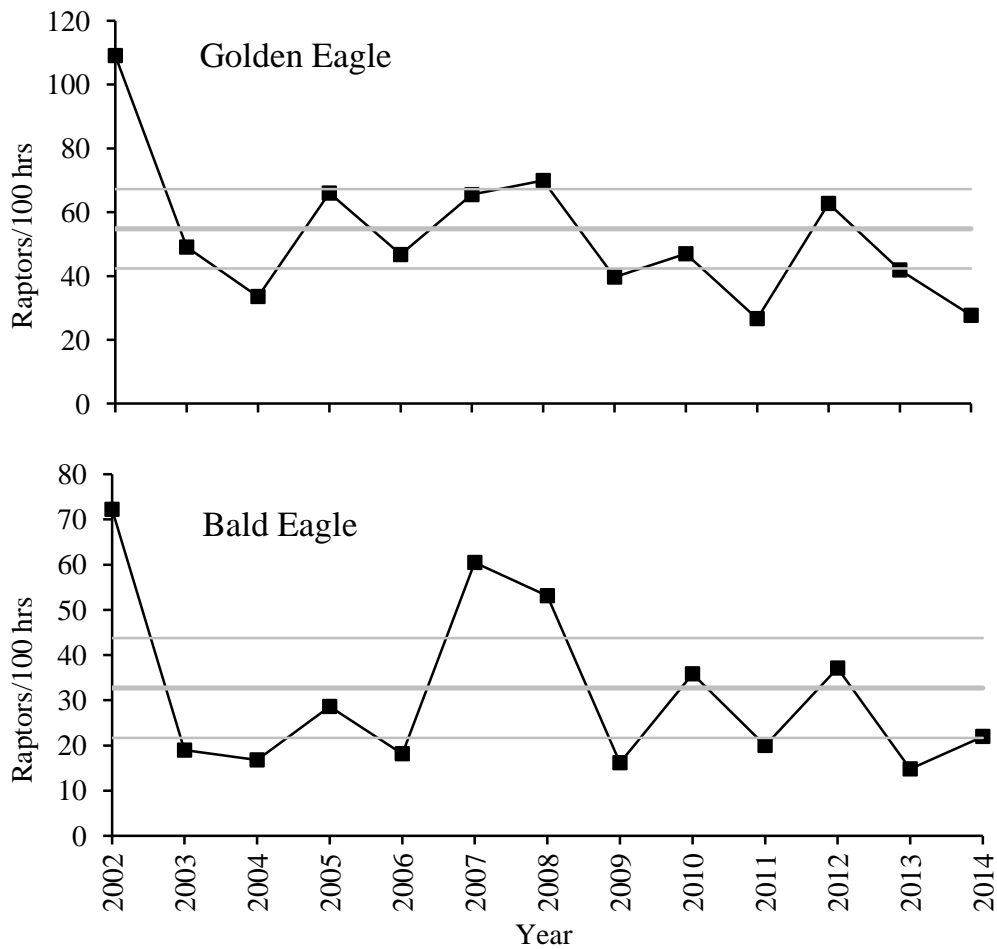


Figure 4d. Eagle passage rates for the fall migration at the Commissary Ridge HawkWatch in sw Wyoming: 2002–2014. Solid grey lines represent mean (thick) and upper and lower 95% confidence intervals (thin) of historic counts (2002-2013).

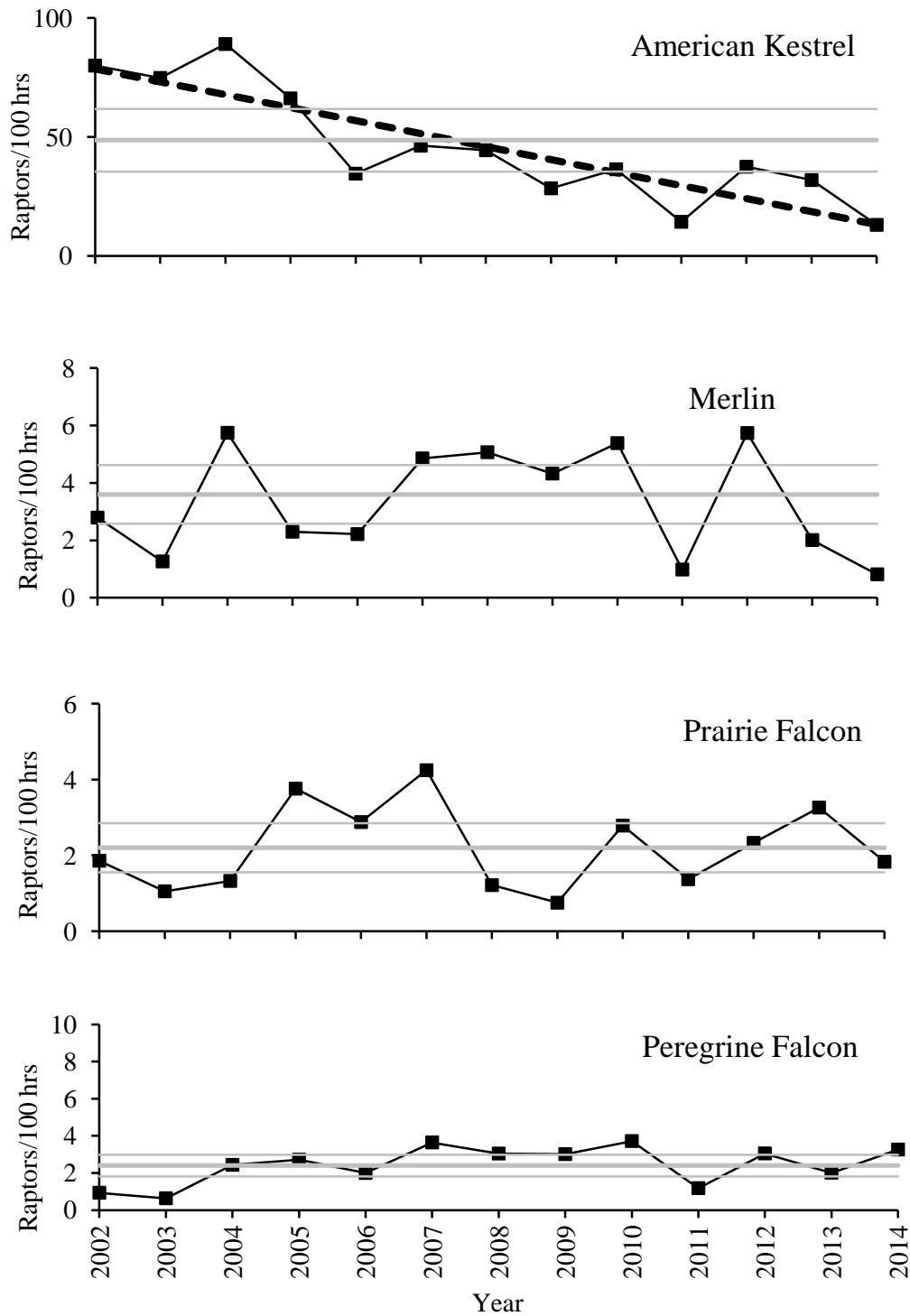


Figure 4e. Fall-migration falcon passage rates at the Commissary Ridge HawkWatch in sw Wyoming: 2002–2014. Dashed lines indicate significant ($p < 0.05$) population trends based on linear or quadratic regressions. Solid grey lines represent mean (thick) and upper and lower 95% confidence intervals (thin) of historic counts (2002-2013).

Appendix A. History of official observer participation at the Commissary HawkWatch in southwestern Wyoming:

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 Donovan (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 (+).

2014: Two observers throughout: Erik Corredor (0), Philip Kavouriaris (0), and Keelan Dann (0).

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

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

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

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

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

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

Appendix C. Annual observation effort and raptor counts by species during fall migration at Commissary Ridge, Wyoming: 2002–2014.

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Mean
Start date	27-Aug	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	29-Oct	29-Oct	3-Nov	31-Oct	31-Oct	5-Nov	5-Nov	5-Nov	5-Nov	31-Oct	5-Nov	28-Oct	4-Nov	1-Nov
Observation days	45	63	65	64	56	66	66	64	65	61	68	57	66	62
Observation hours	322.67	474.85	452.67	478.83	443.58	494.56	493.33	531.82	538.58	510.25	557.83	398.58	491.33	475.46
Raptors/100 hrs	991	644	917	985	415	990	911	559	1040	526	662	693	380	777
SPECIES	RAPTOR COUNTS													
Turkey Vulture	97	66	164	114	39	185	150	50	108	46	50	121	31	99
Osprey	11	31	59	36	11	41	27	34	54	41	25	41	6	34
Northern Harrier	32	25	38	36	26	30	32	38	36	9	32	7	6	28
Sharp-shinned Hawk	675	516	1,118	1,687	217	1,214	1,109	690	1425	1,140	924	698	600	951
Cooper's Hawk	409	329	614	462	289	535	382	298	669	296	393	389	148	422
Northern Goshawk	21	7	49	35	26	89	52	32	35	14	53	10	4	35
Unknown accipiter	100	146	178	68	51	180	82	124	296	214	50	36	49	127
TOTAL ACCIPITERS	1,205	998	1,959	2,252	583	2,018	1,625	1,144	2,425	1,664	1,420	1,133	801	1,536
Broad-winged Hawk	8	5	22	9	3	7	13	26	58	21	16	31	0	18
Swainson's Hawk	82	28	62	52	47	36	352	119	1,211	80	153	26	16	187
Red-tailed Hawk	823	1,042	961	1,319	563	1,459	1,148	987	872	386	1,043	892	530	958
Ferruginous Hawk	6	3	15	8	7	3	7	9	11	5	11	4	3	7
Rough-legged Hawk	5	5	8	13	5	13	34	7	33	4	24	8	3	13
Unidentified buteo	17	87	63	42	35	63	144	43	61	44	31	34	73	55
TOTAL BUTEOS	941	1,170	1,131	1,443	660	1,581	1,698	1,191	2,246	540	1,278	995	625	1,240
Golden Eagle	352	233	152	316	211	324	345	211	253	136	350	167	136	254
Bald Eagle	233	90	76	137	82	299	262	86	193	102	207	59	108	152
Unidentified eagle	10	7	10	2	6	25	34	0	16	16	39	4	22	14
TOTAL EAGLES	595	330	238	455	299	648	641	297	462	254	596	230	266	420
American Kestrel	258	355	403	317	156	229	219	151	196	73	209	127	64	224
Merlin	9	6	26	11	10	24	25	23	29	5	32	8	4	17
Prairie Falcon	6	5	6	18	13	21	6	4	15	7	13	13	9	11
Peregrine Falcon	3	3	11	13	9	18	15	16	20	6	17	8	16	12
Unknown falcon	2	3	12	4	16	16	15	3	4	7	8	7	10	8
TOTAL FALCONS	278	372	458	363	204	308	280	197	264	98	279	163	103	272
Unidentified raptor	38	68	102	19	19	83	39	20	7	32	13	72	28	43
ALL SPECIES	3,197	3,060	4,149	4,718	1,841	4,894	4,492	2,971	5,602	2,684	3,693	2,762	1,866	3,672