

MPG Spring Migration Count 2013

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June 2013

Abstract: This report summarizes the spring 2013 raptor count on the MPG Ranch. During 59 days of observation from 18 March to 15 May, we counted 2,238 raptors of 17 species. This compares to past totals of 2,618 (2012) and 1,286 (2011). The five most abundant species counted included: Red-tailed Hawk (477), Sharp-shinned Hawk (318), Turkey Vulture (223), Rough-legged Hawk (198), and Cooper's Hawk (186). The proportion of each species' contribution to the total was similar to 2012's count, with the exception of fewer Osprey and more Turkey Vultures this season. Compared to fall counts, we observed proportionally more Turkey Vultures, Ospreys, and eagles, but fewer buteos and falcons. Though we were able to band three raptors, the percentage of passing migrants we attracted to our banding station was too small to justify extended trapping efforts.

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MPG Spring Raptor Migration Summary Report 2013

Introduction

The Bitterroot Valley is an obvious raptor migration corridor and wintering area, with the Bitterroot-Selway wilderness to the west and the Sapphire Mountains to the east (Figure 1). The Baldy Mountain Complex (BMC) is located on the MPG Ranch, at the north end of the Bitterroot Valley. The Bitterroot River and associated cottonwood-riparian forests lie approximately 4 kilometers to the west of the BMC and the Sapphire Mountains are located approximately 9.5 kilometers to the east.

Figure 1: Migration corridors of western Montana (Map courtesy of Montana Audubon).

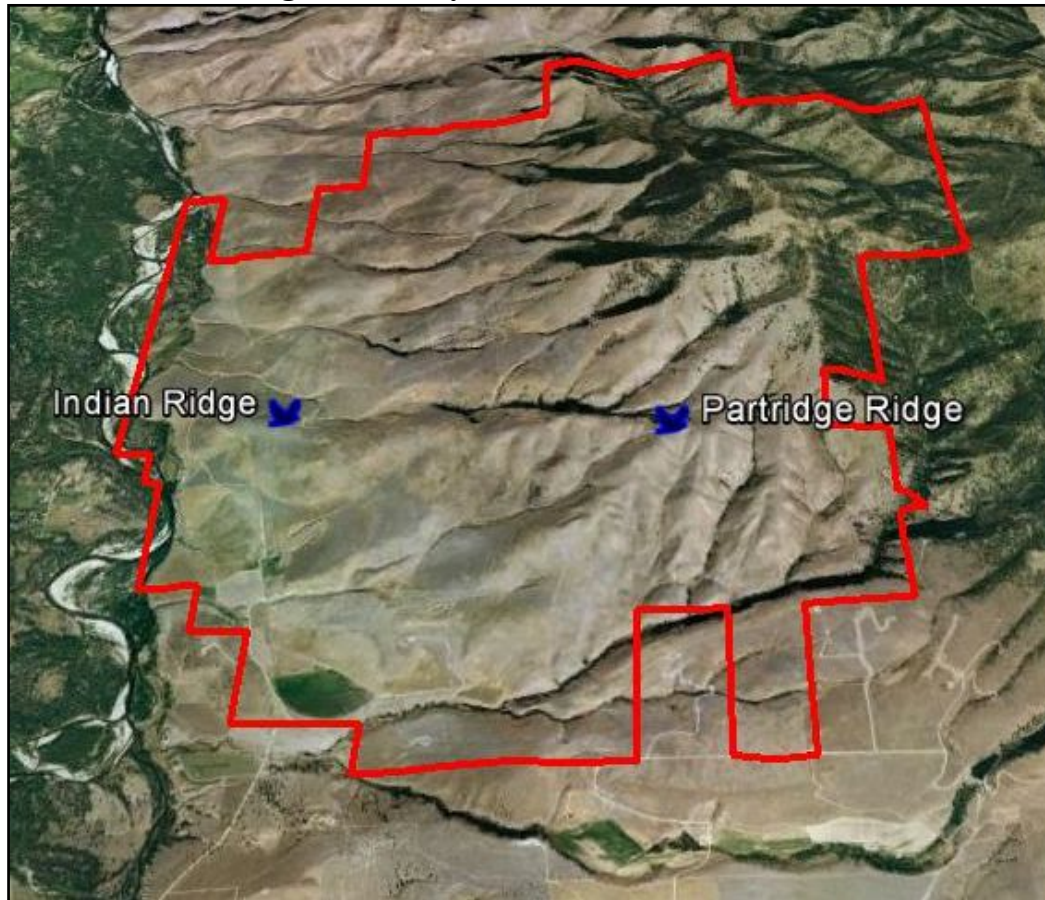


We initiated full-time spring raptor migration counts on the BMC in 2011. In our first year of sampling we counted 1,286 raptors of 17 different species. During this first season, we identified several ways in which we could improve our methodology to better sample raptors migrating over the BMC. In 2012, we chose two new locations to observe from, which allowed us to better monitor commonly used flightpaths we observed in 2011. We observed 2,618 migrants in 2012—over twice the number observed in 2011. Though weather was more favorable in the spring of 2012, we believe the count differences between years is most likely due to the efficiency of count sites (see Spring 2011 and Spring 2012 Summary Reports).

Sampling Locations

As in 2012, in 2013 we used two locations to sample the unique and inconsistent flight paths used by raptors migrating over the BMC. The primary lookout, Indian Ridge (GPS location: 46.692945°N, 114.029767°W) is located approximately four km southwest of Baldy Mountain on the western flank of the BMC at about 1100 m in elevation. We also counted from Partridge Ridge (46.688831°N, 113.991875°W), located approximately 2.2 km south of Baldy Mountain at about 1400 m in elevation (Figure 2). We counted from both sites on 42 days. On 16 days we counted only from Indian Ridge, as low cloud cover and inclement weather limited visibility from Partridge Ridge.

Figure 2: Study sites on the MPG Ranch.



Observation Effort

We counted from 18 March through 15 May for a total of 366 hours. Inclement weather prevented observations on one of the 59 days, and limited observation to three or less hours on two days. Four primary observers conducted this year's count, with assistance from volunteers and MPG Ranch and RVRI staff. Primary observers included Eric 'Kerr' Rasmussen (MPG Ranch), William Blake, Ben Turnock, and Kris Guymon (RVRI). We trained all observers in standard raptor counting protocol and used either 8X or 10X high-quality binoculars. Additionally, we used 20X – 60X spotting scopes for long-distance identifications.

We recorded species, age, sex (when possible), altitude, lateral direction, and approach and departure bearings for each bird that passed over the count sites. To avoid double counting, observers at different sites communicated with each other via handheld radios.

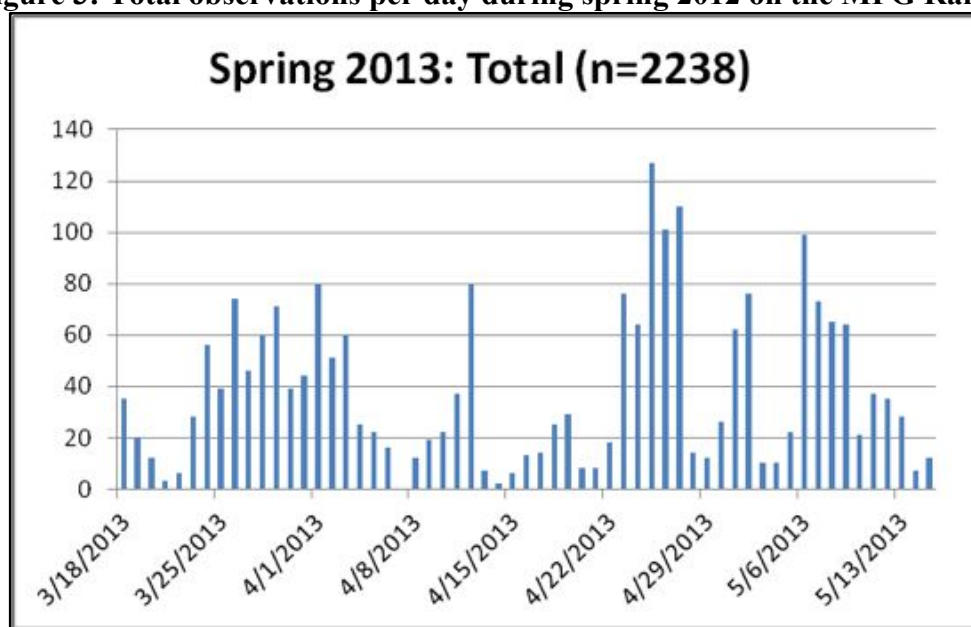
Weather

Of the 58 days we counted, 41 were overcast and cloudy. There was precipitation on 20 days. We were unable to count at all on 7 April and for three or less hours on 6 April and 13 April due to low visibility from heavy precipitation. The high temperature for the season was 28 °C (12 May), with an average morning temperature of 6.5 °C and an average afternoon temperature of 11 °C. Winds were variable in velocity; the median 50% of hourly records fell between 8-19 kph, with an hourly mean of 14.4 kph and an hourly median of 12.9 kph. Wind direction was also variable, though rarely eastern (35% southern, 32% northern, 25% western, 8% eastern).

General Raptor Migration Summary & Species Composition

We counted 2,238 raptors over the course of 366 observation hours, for an average of 6.11 birds counted per hour. Similar to previous seasons, we saw high day-to-day variation in raptor numbers. Our peak count day was 25 April, when we recorded 127 migrants (Figure 3).

Figure 3: Total observations per day during spring 2012 on the MPG Ranch.



We recorded 17 species. The five most abundant species included: Red-tailed Hawk (477), Sharp-shinned Hawk (318), Turkey Vulture (223), Rough-legged Hawk (198), and Cooper's Hawk (186). (Table 1 and Appendix A).

Table 1: Summary of raptors counted during spring 2013 on the MPG Ranch.

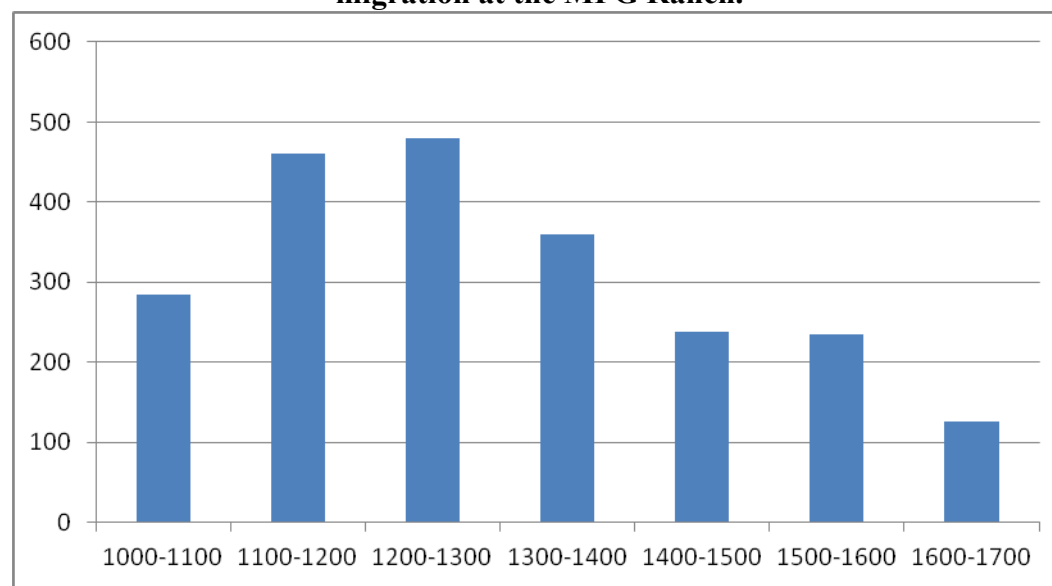
Raptor type	Species	2013 Count
Eagles	Golden Eagle	126
	Bald Eagle	51
	Unknown Eagle	4
Accipiters	Sharp-shinned Hawk	318
	Cooper's Hawk	186
	Northern Goshawk	11
	Unknown Accipiter	72
Buteos	Red-tailed Hawk	477
	Rough-legged Hawk	198
	Swainson's Hawk	36
	Broad-winged Hawk	11
	Ferruginous Hawk	7
	Unknown Buteo	58
Falcons	American Kestrel	156
	Merlin	9
	Peregrine Falcon	6
	Prairie Falcon	6
	Unknown Falcon	2
Other	Northern Harrier	149
	Osprey	85
	Turkey Vulture	223
	Unknown Hawk	47



Temporal Patterns of Raptor Migration

Migrant numbers varied throughout the day, with peak numbers occurring between 1100 and 1400. We observed few raptors before 1000 and after 1600 hours (Figure 4), though we only surveyed at these times on days with good flights; our typical survey period was 1000-1700. Most raptor species hunt and feed during the cool morning hours and begin migrating in late morning and early afternoon, when warming air currents (thermals) develop. As evening approaches, they typically pause migration to search for prey and locations to roost.

Figure 4: The number of raptors counted in one-hour intervals during 2013 spring migration at the MPG Ranch.

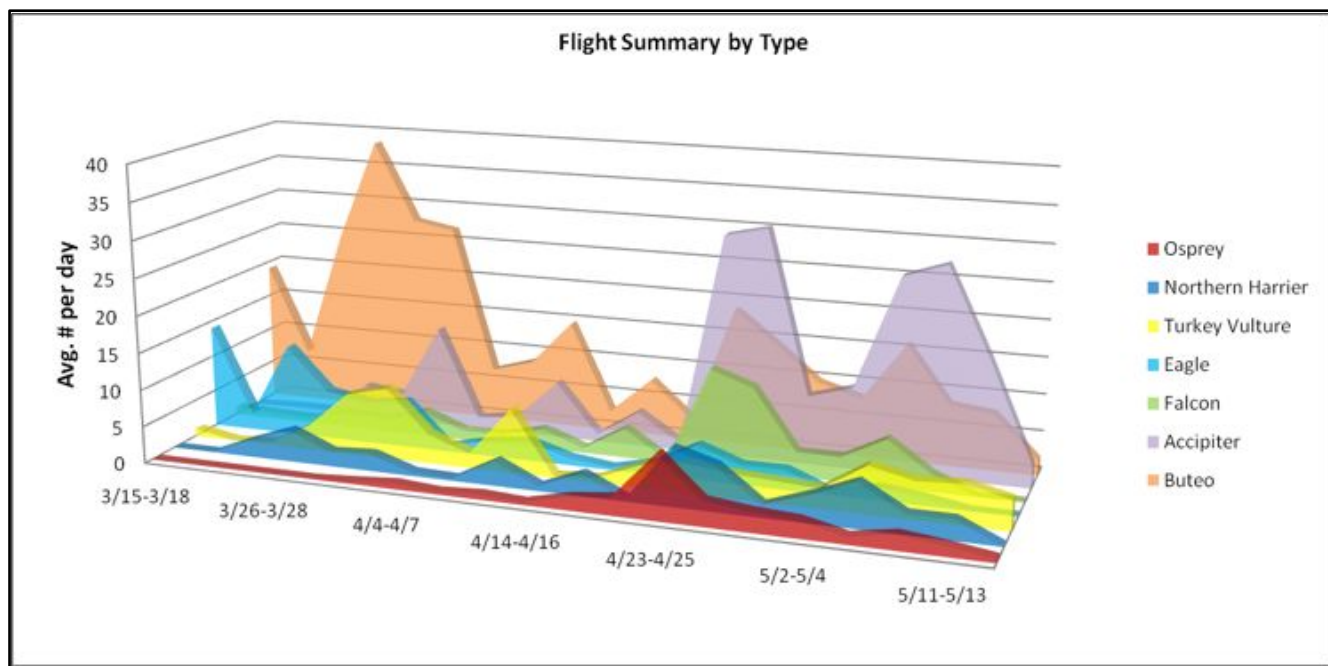


Seasonal Patterns of Raptor Migration

In the beginning of the season we counted a high proportion of buteos and eagles. As their numbers started to diminish towards early April, we observed increases of Turkey Vultures and accipiters. As the accipiter flight began to peak in the third week of April we recorded our highest numbers of Ospreys and falcons. We also noticed the start of a secondary peak of buteo migrants in the third week in April. Northern Harriers also peaked during the close of April, though their numbers were steadier throughout the survey than other groups (Figure 5).

Figure 5: Seasonal Patterns of Raptor Migration during spring 2013 at the MPG Ranch.

Raptors were grouped by genus, with the exception of Northern Harrier, Osprey, and Turkey Vulture. For illustrative purposes, numbers of detections were averaged over three day periods to minimize the effect of day-to-day variability.

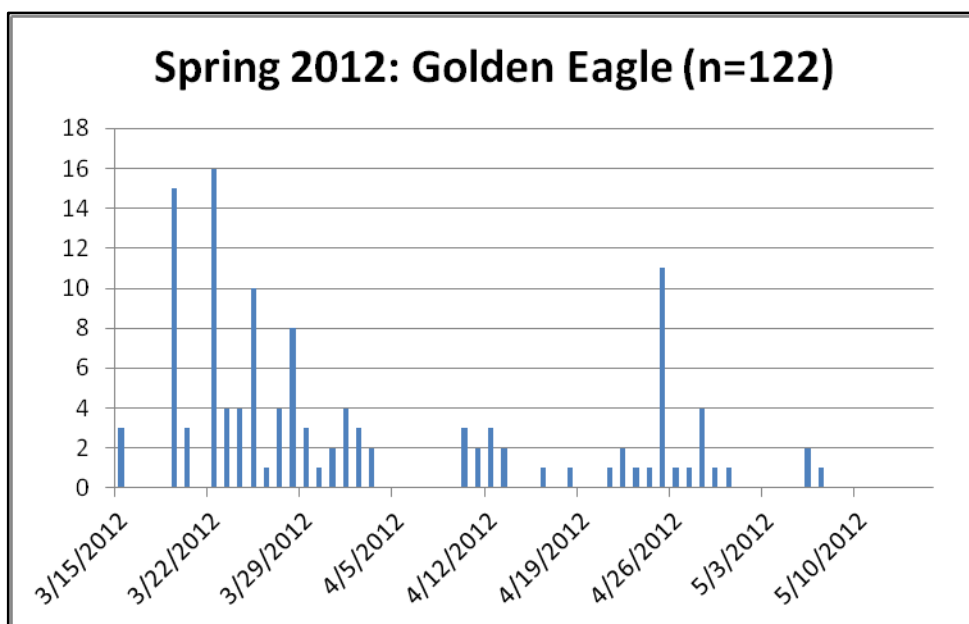
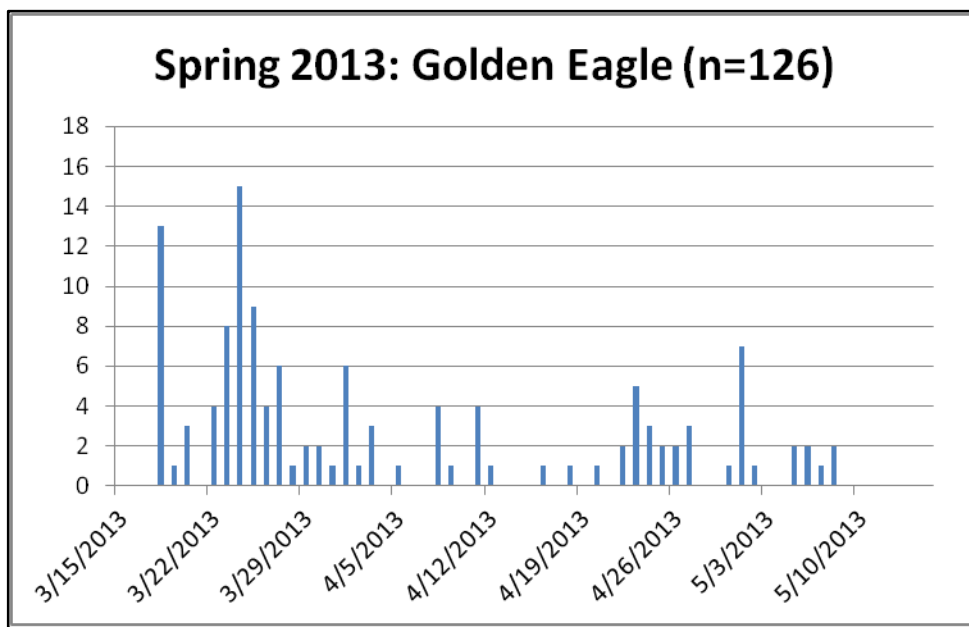


Species accounts

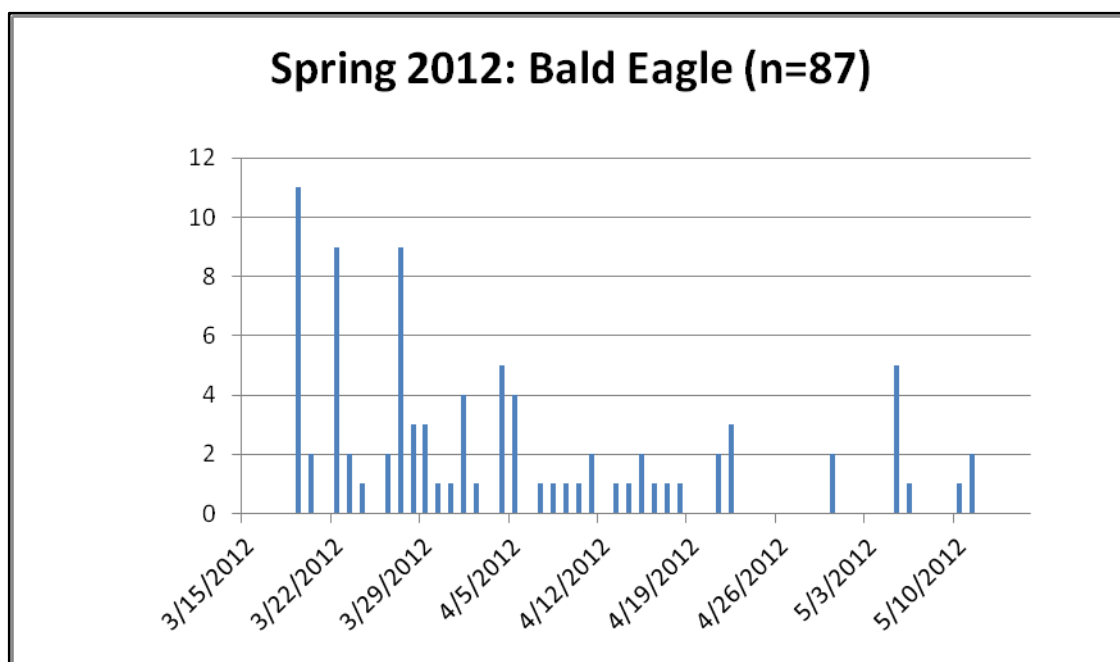
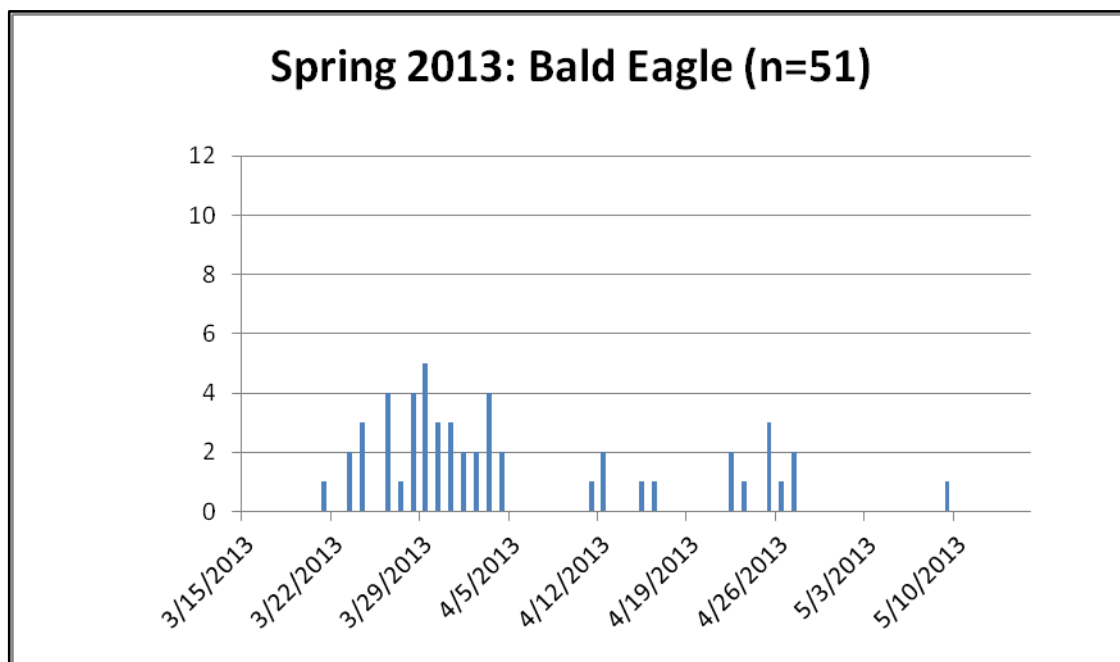
In this section, we present seasonal trends of migration for individual species and make comparisons between the springs of 2012 and 2013. For a few species (e.g. Golden Eagles, Rough-legged Hawks, Swainson's Hawks, and Ospreys) we saw similar temporal patterns in both years. More species, however, showed a later peak in migration in 2013 than 2012 (e.g. Bald Eagles, Sharp-shinned Hawks, Cooper's Hawks, Red-tailed Hawks, American Kestrels, Northern Harriers, and Turkey Vultures). We observe some species (e.g. Northern Goshawks, Ferruginous Hawks, Broad-winged Hawks, Merlins, and Peregrine and Prairie Falcons) so infrequently that we cannot make comparisons.

Eagles

Golden Eagle (*Aquila chrysaetos*): We counted 126 Golden Eagles from 18 March to 8 May. We recorded 69 in March, 42 in April, and 15 during the first half of May. Day-high counts were 13 and 15, and occurred on 18 March and 24 March. The timing and total of number of Golden Eagles counted this spring were very similar to 2012.

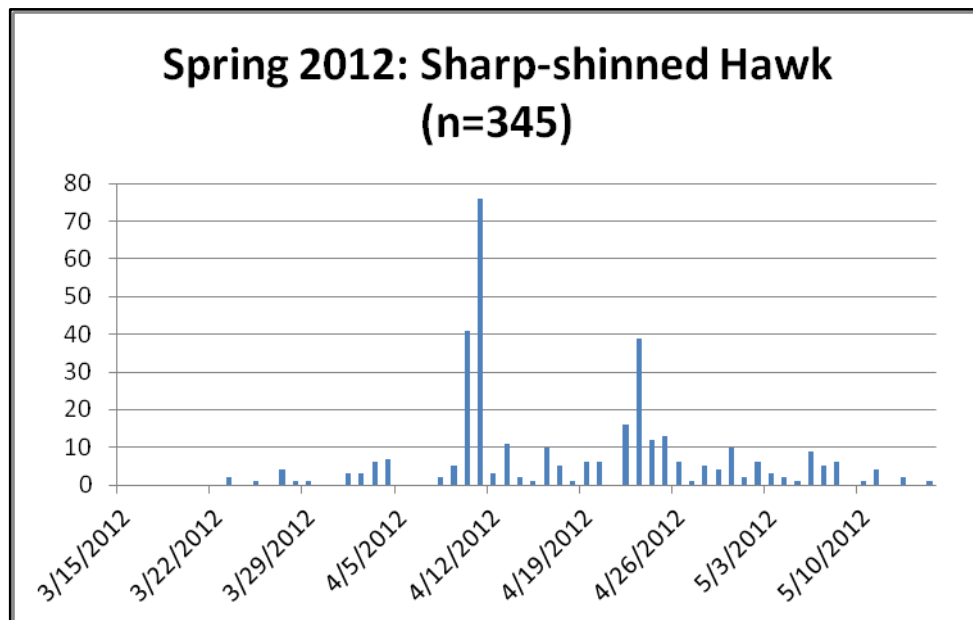
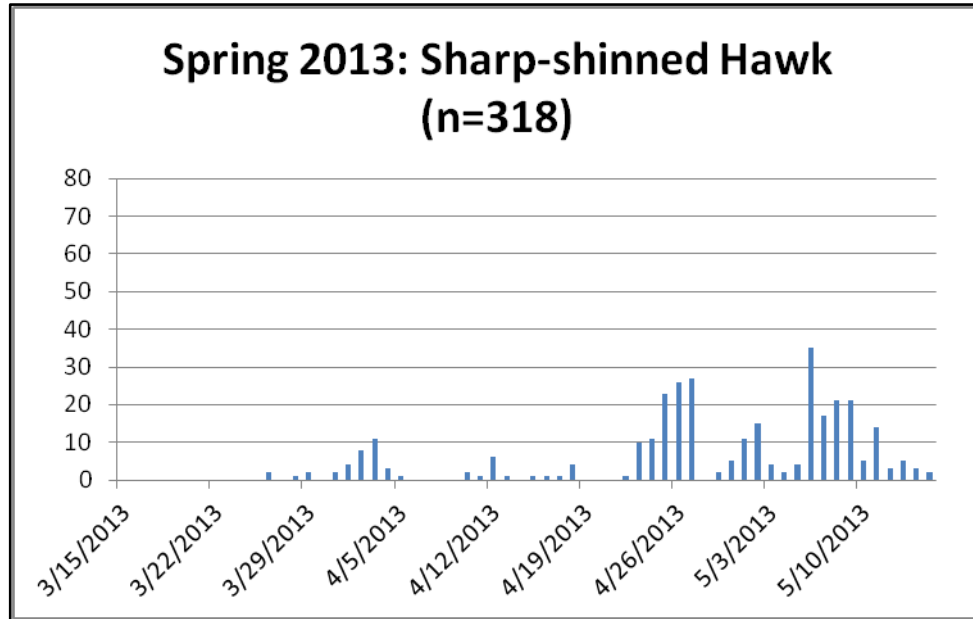


Bald Eagle (*Haliaeetus leucocephalus*): We counted 51 Bald Eagles from 21 March to 9 May. We recorded 26 in March, 24 in April, and one during the first fifteen days of May. Compared to 2012, we saw fewer Bald Eagle migrants and a later peak.

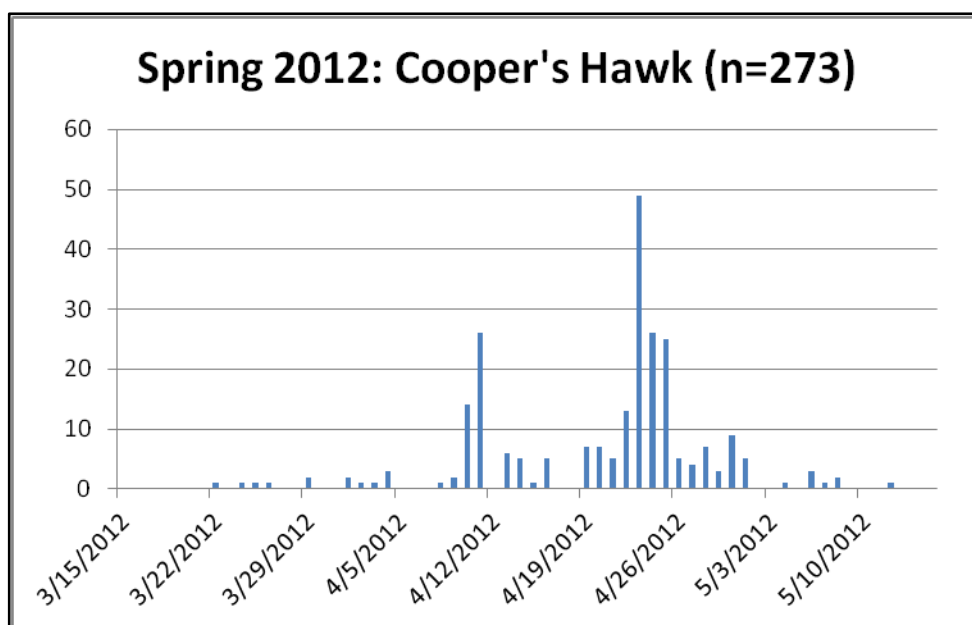
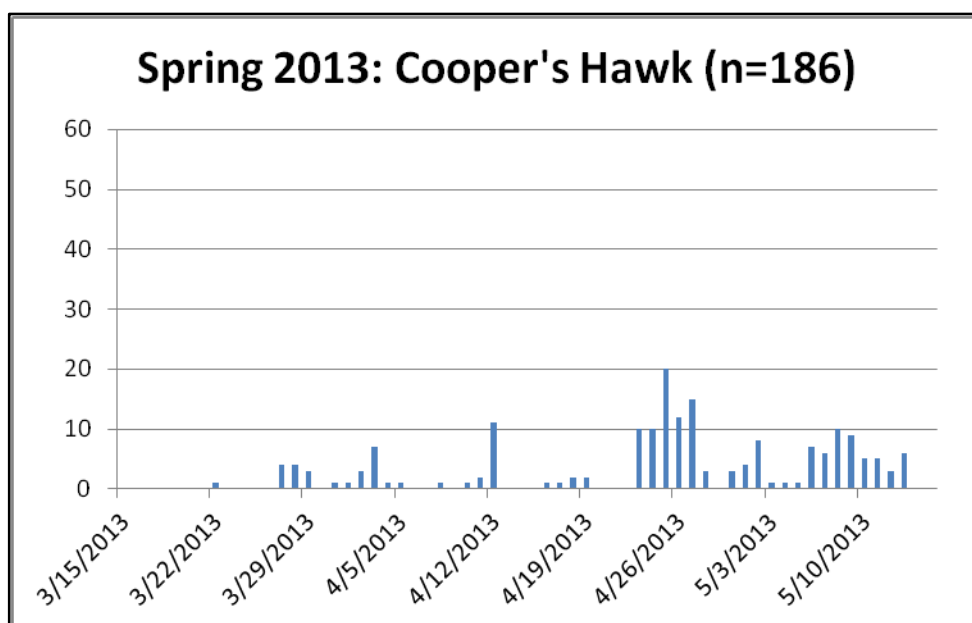


Accipiters

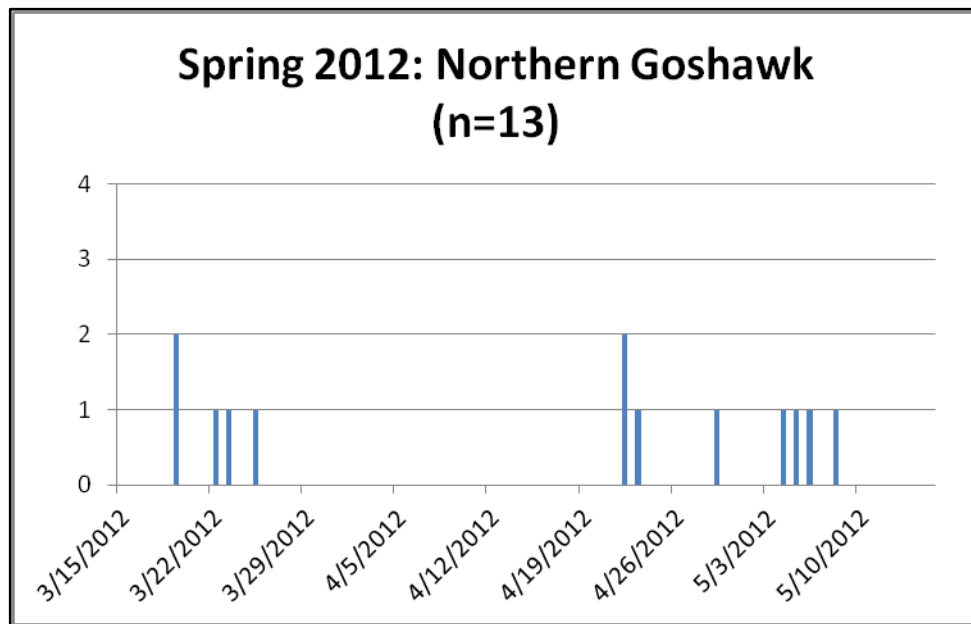
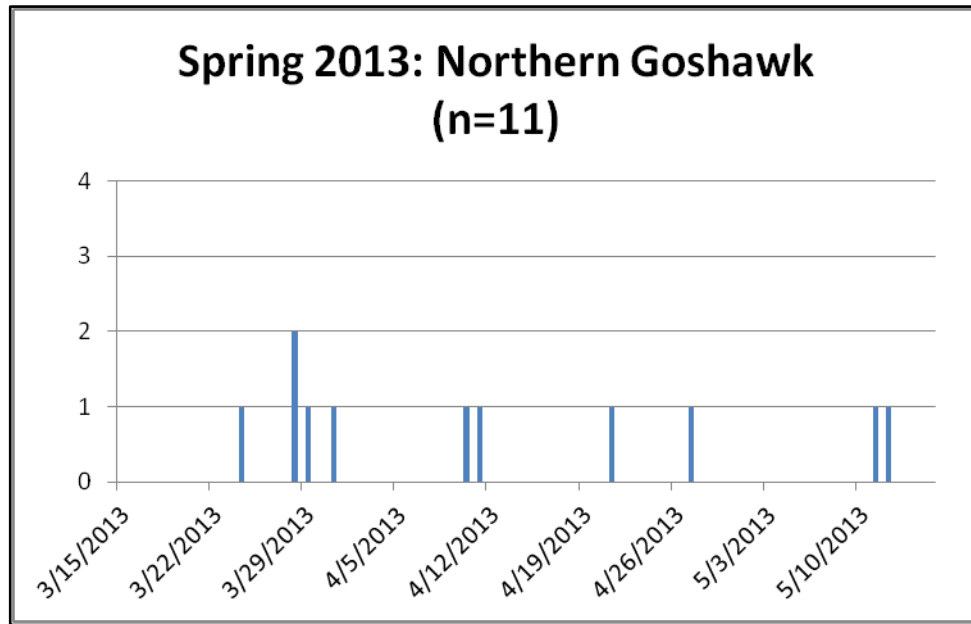
Sharp-shinned Hawk (*Accipiter striatus*): Sharp-shinned Hawks were our second most counted species during this year's survey; we counted a total of 318 from 26 March to 15 May. We observed most Sharp-shinned Hawks relatively late in the season. We saw 7 in March, 149 in April, and 162 during the first fifteen days of May. The daily high occurred on 6 May when we recorded 35 individuals. While the total number of Sharp-shinned Hawks counted this spring was relatively similar to 2012, their peak occurred approximately two weeks later.



Cooper's Hawk (*Accipiter Cooperii*): Cooper's Hawks were our fifth most counted species this season; we recorded 186 between 22 March and 13 May. Like the Sharp-shinned Hawks, most Cooper's Hawks migrated late in the season. We observed 13 in March, 107 in April, and 66 in May. The daily high occurred on 25 April when we saw 20. This spring's total number of Cooper's Hawks is approximately one-third less than last year's total, though each year's peak occurred at approximately the same time.

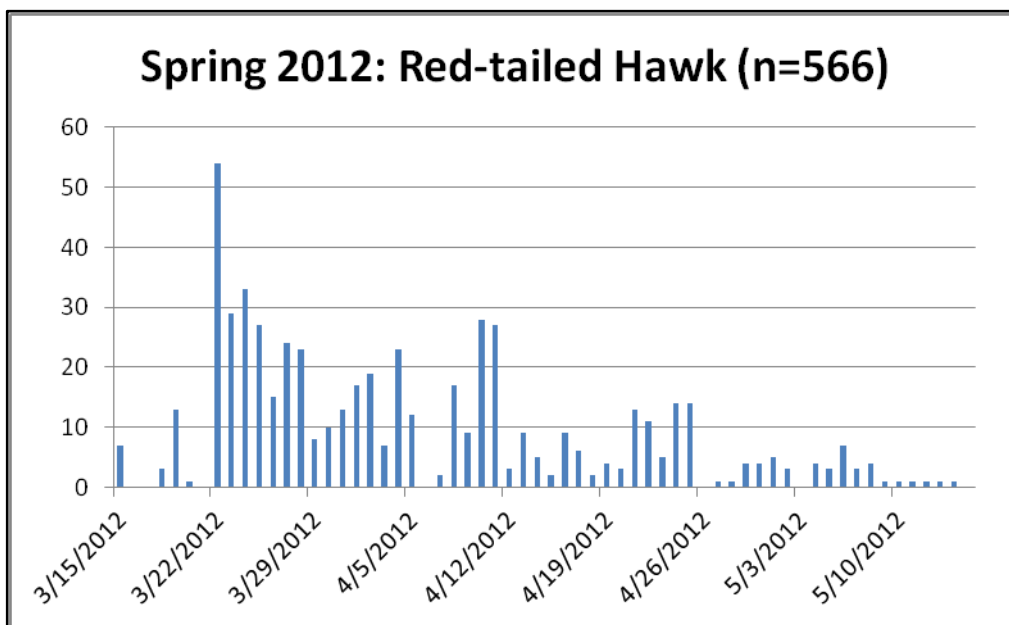
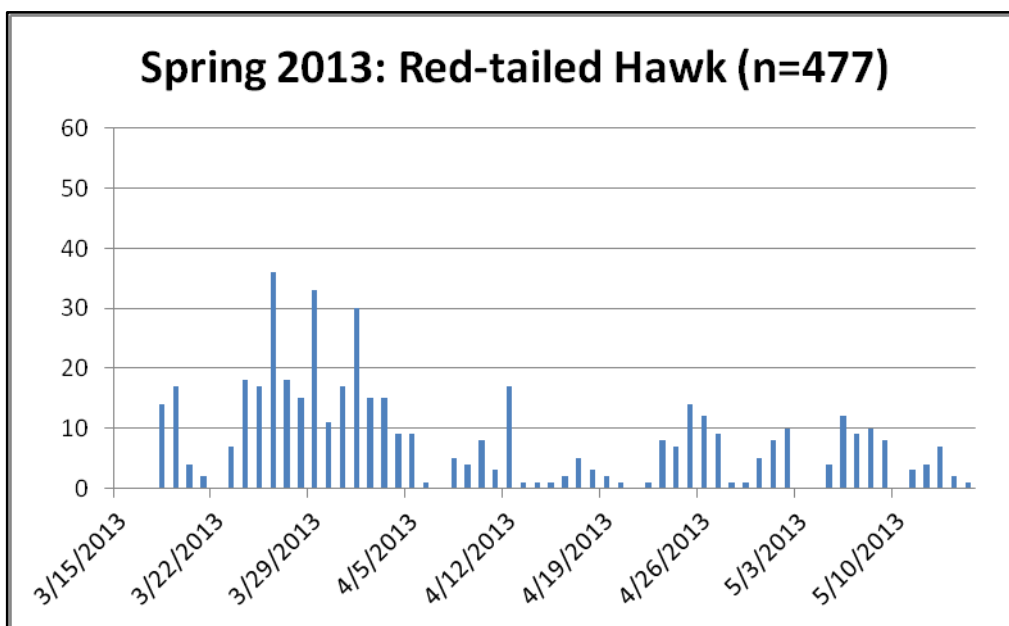


Northern Goshawk (*Accipiter gentilis*): We counted 11 Northern Goshawks this season; five in March, four in April and two in May. As in 2012, observations of Northern Goshawks were irregular throughout the season.

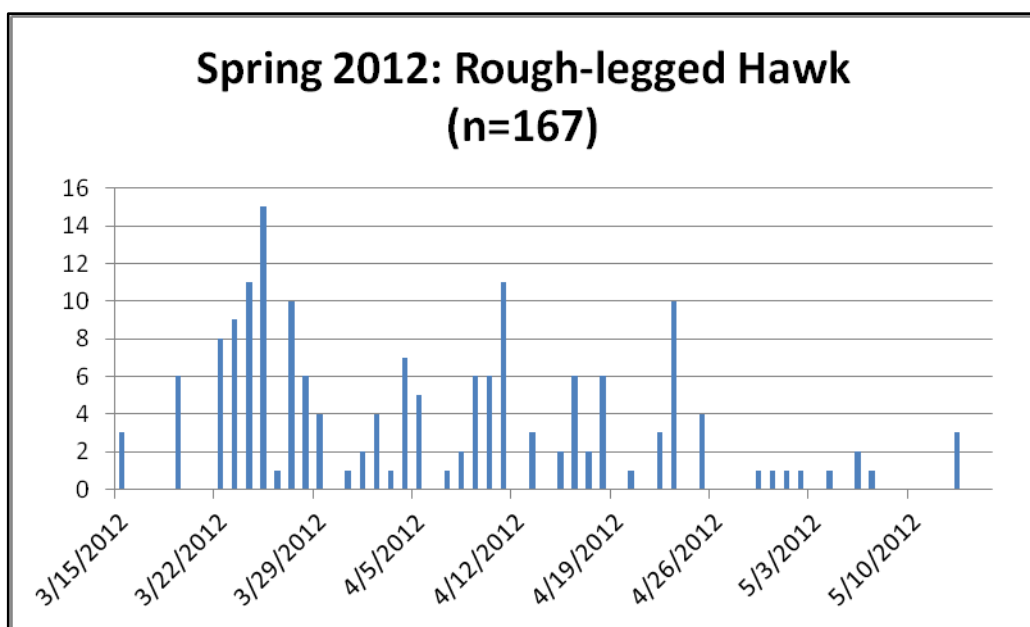
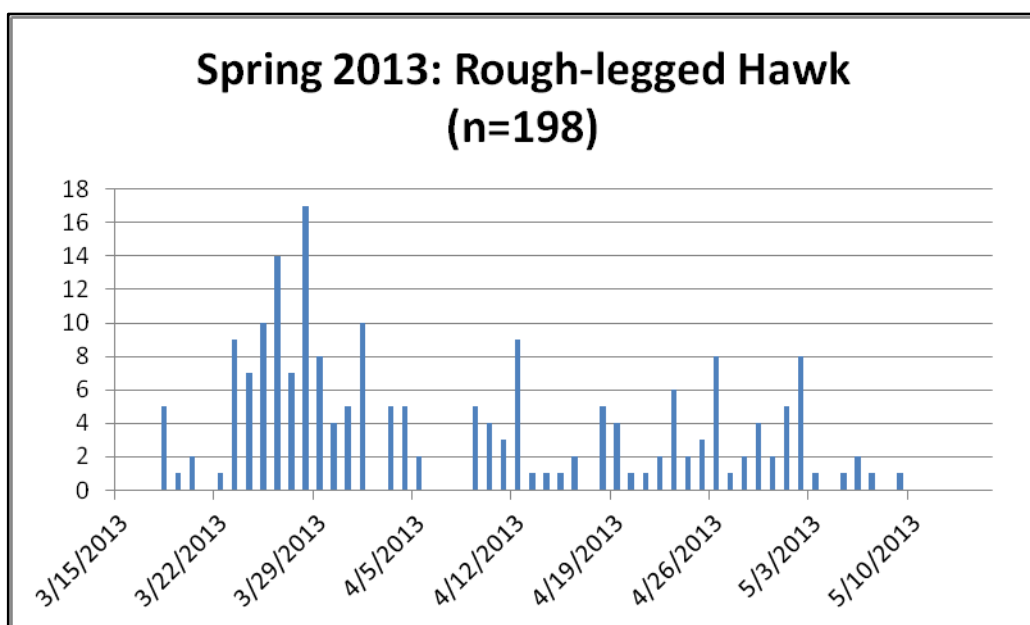


Buteos

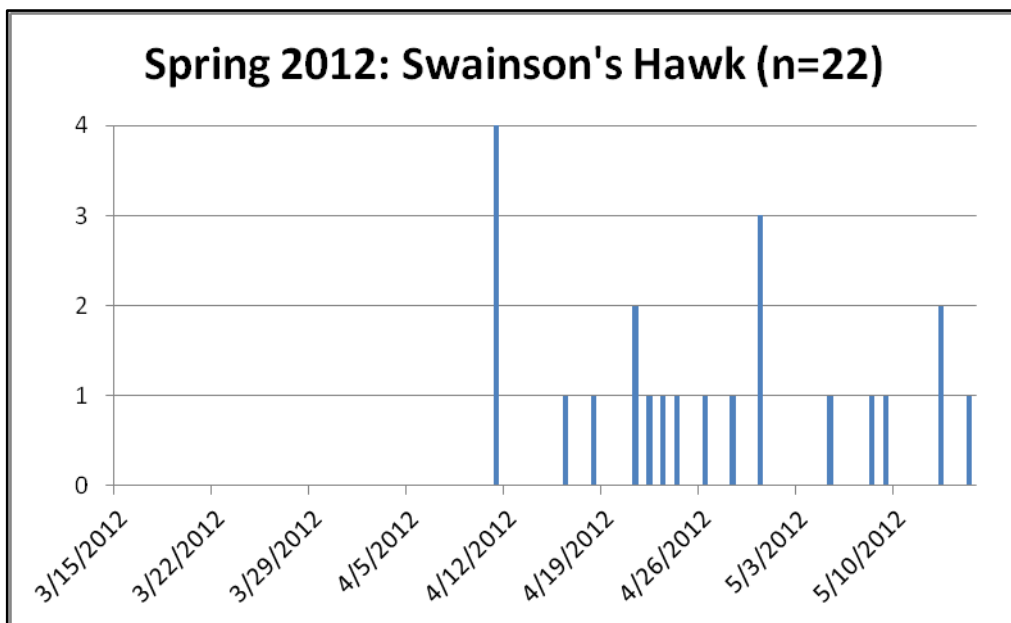
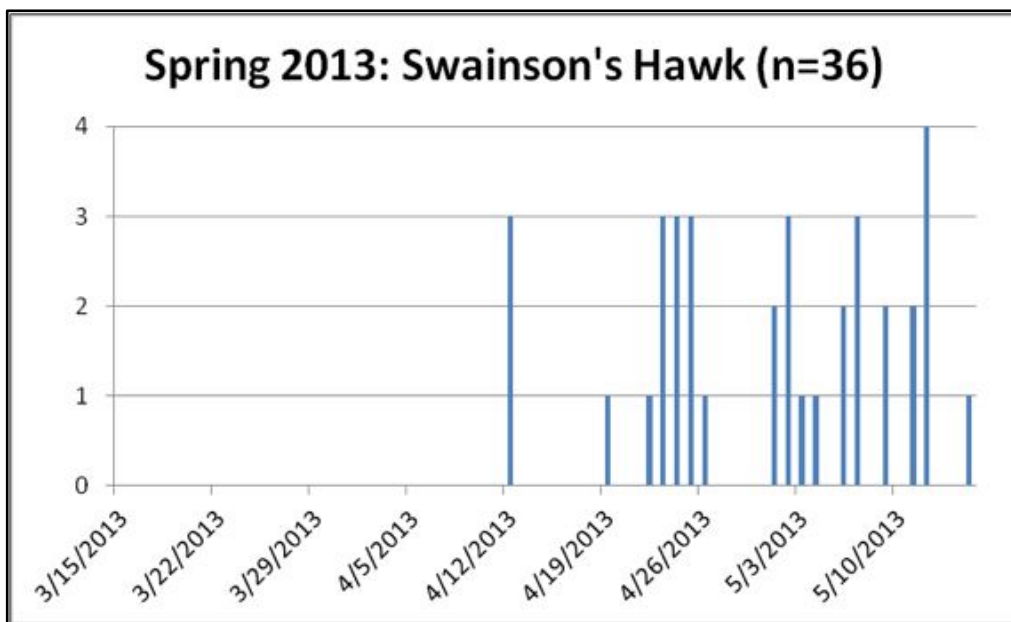
Red-tailed Hawk (*Buteo jamaicensis*): We observed more Red-tailed Hawks than any other species in the spring counts of both 2012 and 2013. This season, we counted 209 in March, 190 in April and 78 in May, for a total of 477. Our peak day occurred on 26 March, when we counted 36. Though we saw 89 fewer Red-tailed Hawks this season than in 2012, they made up 21% of the total count, very close to the 22% of the total count in 2012. Like last spring, the peak of Red-tailed Hawk numbers occurred in the third week of March and dropped into mid-April. This year, however, we noticed a smaller, second surge in late April that lasted through the first week in May.



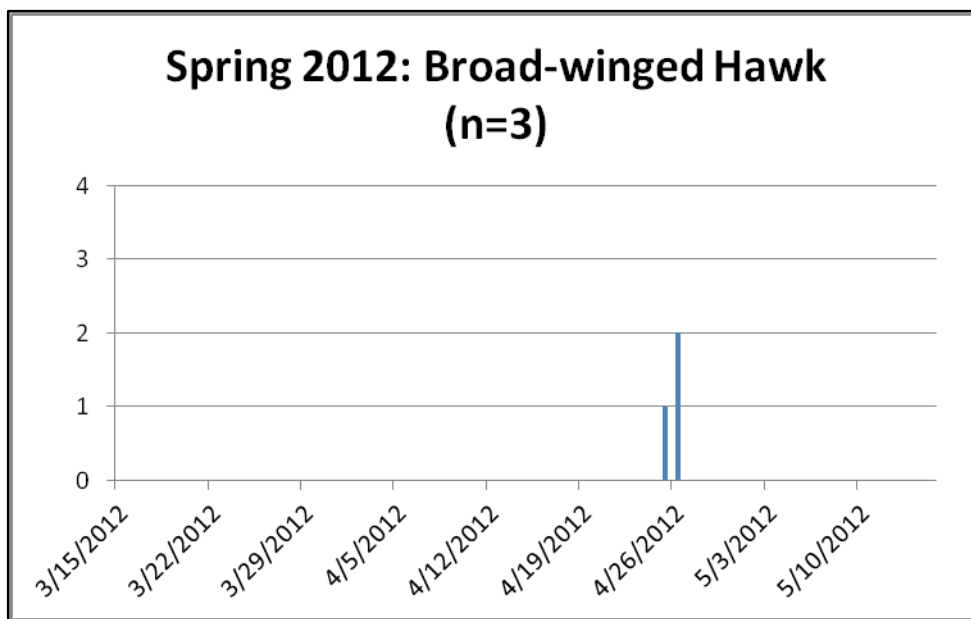
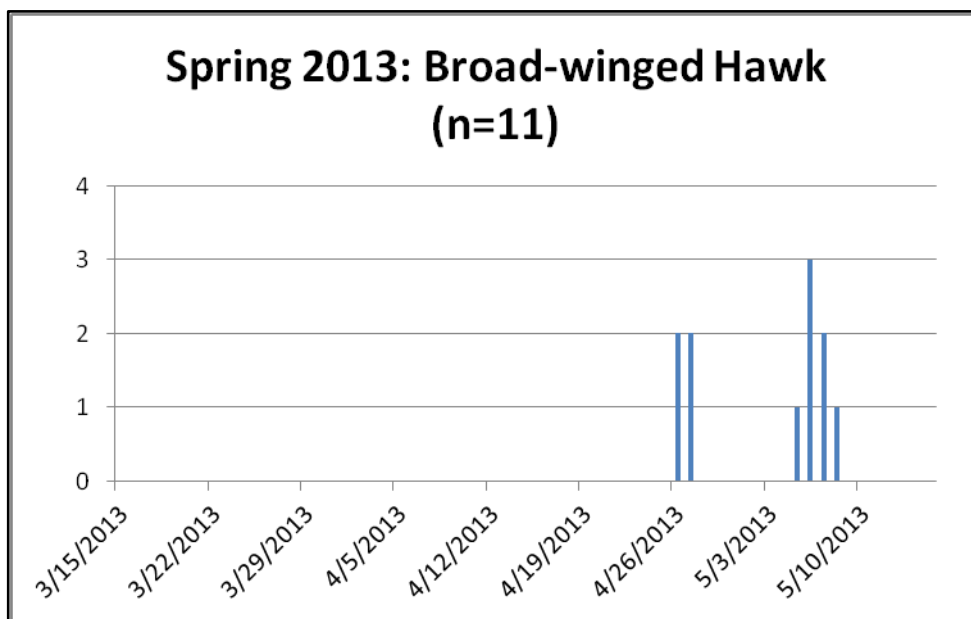
Rough-legged Hawk (*Buteo lagopus*): We counted 198 Rough-legged Hawks from 18 March through 9 May. Our highest count occurred on 28 March when we counted 17. Like last spring, the highest number of Rough-legged Hawks moved through the Bitterroot Valley in late March. Because Rough-legged Hawks breed at extremely northern latitudes, we were surprised this year to see a fairly consistent number still migrating in early May.



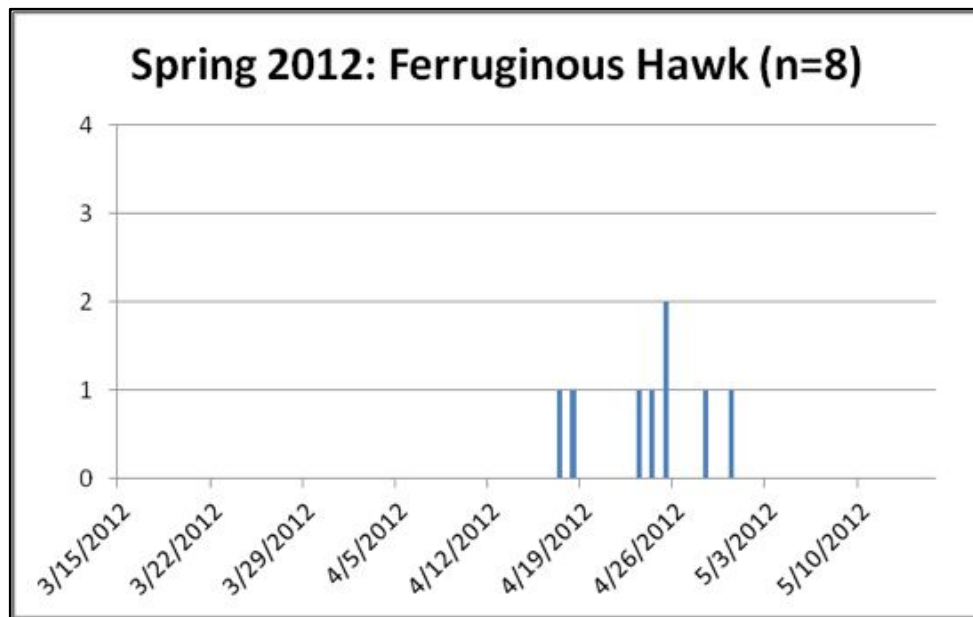
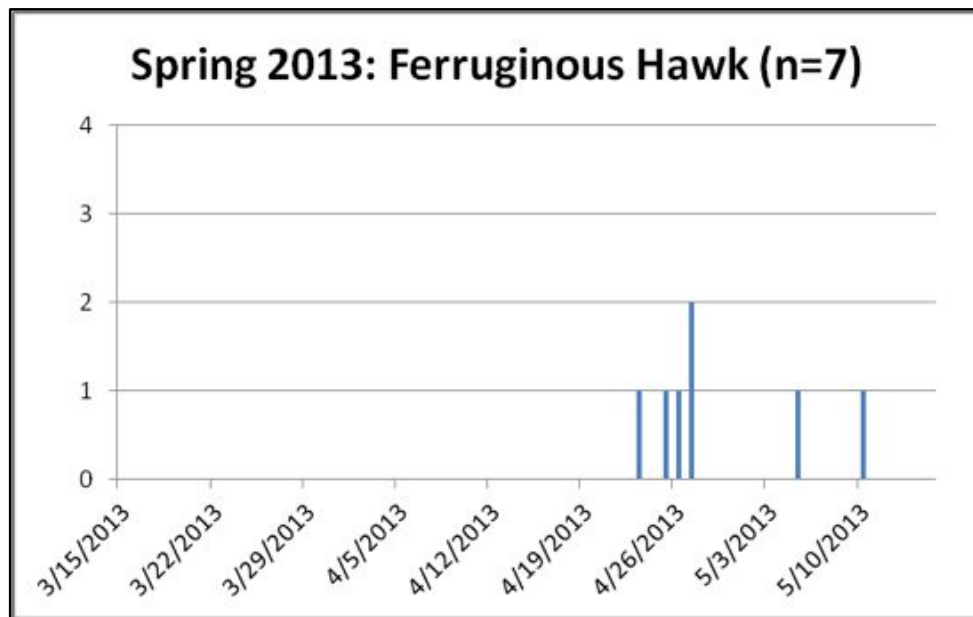
Swainson's Hawk (*Buteo swainsoni*): We observed 36 Swainson's Hawks from mid April through 15 May. The timing of this year's Swainson's Hawk observations were very similar to those in 2012, though we saw more in 2013 than 2012. Swainson's Hawks winter as far south as Argentina, further than any other Montana raptor species. This long-distance migration, combined with the fact that Montana is at the northern edge of Swainson's Hawks' breeding range, may explain their relatively late detection date.



Broad-winged Hawk (*Buteo platypterus*): We counted a total of 11 Broad-winged Hawks, compared to three in 2012. Broad-winged Hawks do not breed in Montana; the few we see each year are likely headed to the far western extent of their breeding range, in western Alberta and eastern British Columbia.

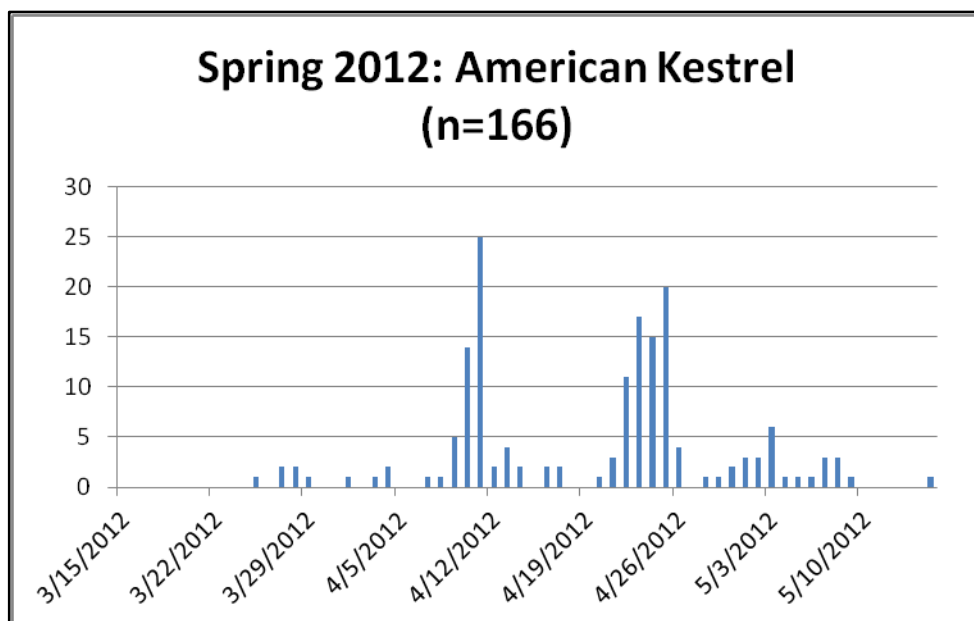
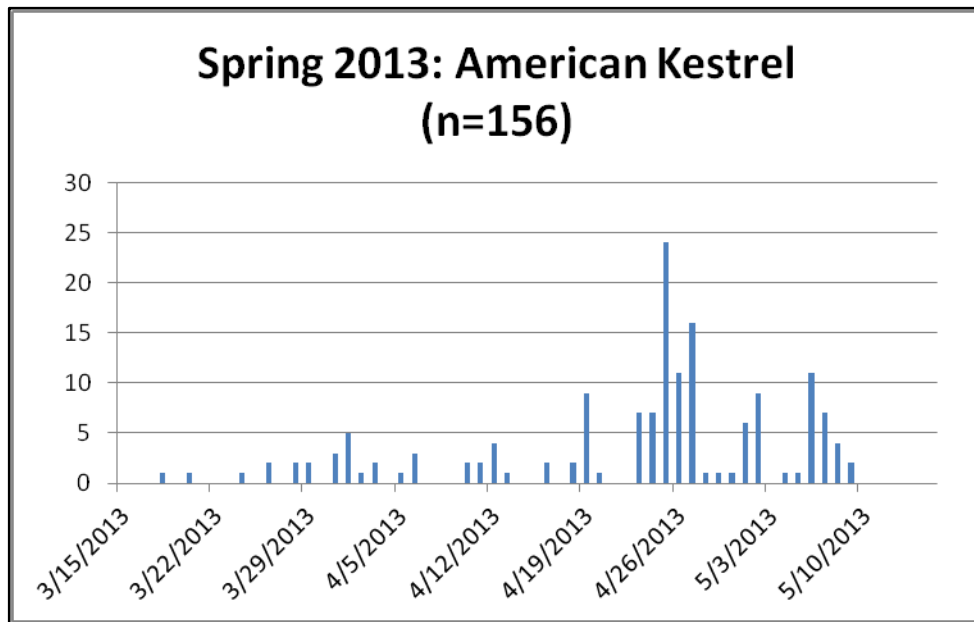


Ferruginous Hawk (*Buteo regalis*): We counted 7 Ferruginous Hawks from 23 April to 10 May. Ferruginous Hawks are rarely seen at migration count sites. In Montana, Ferruginous Hawks breed in open habitats east of the Continental Divide.

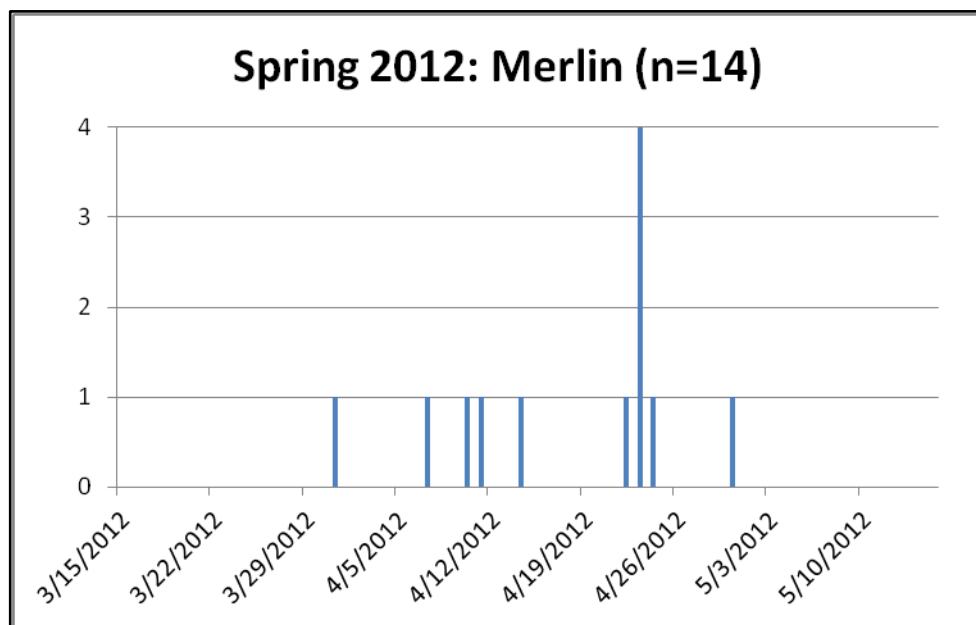
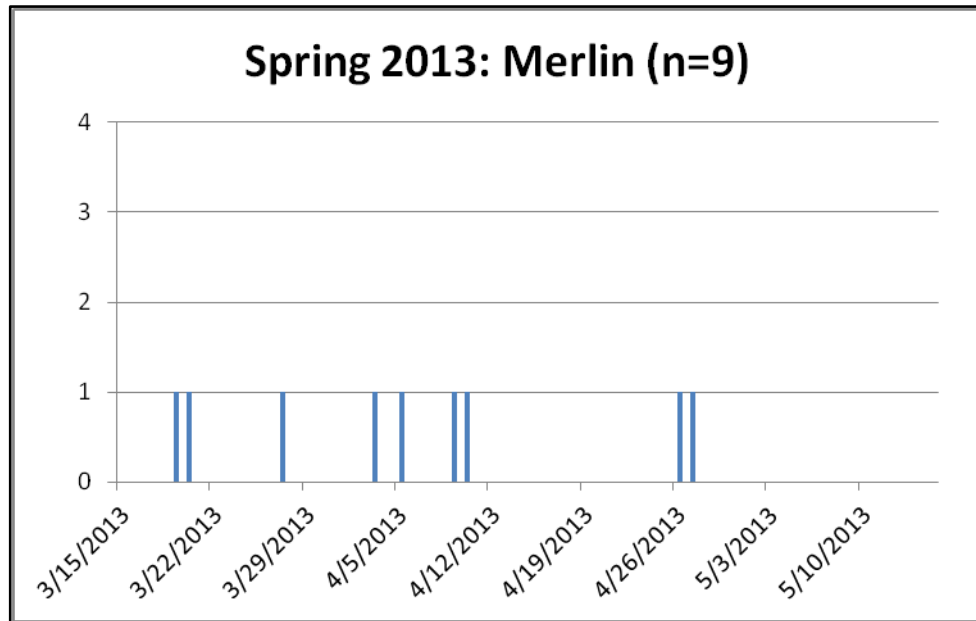


Falcons

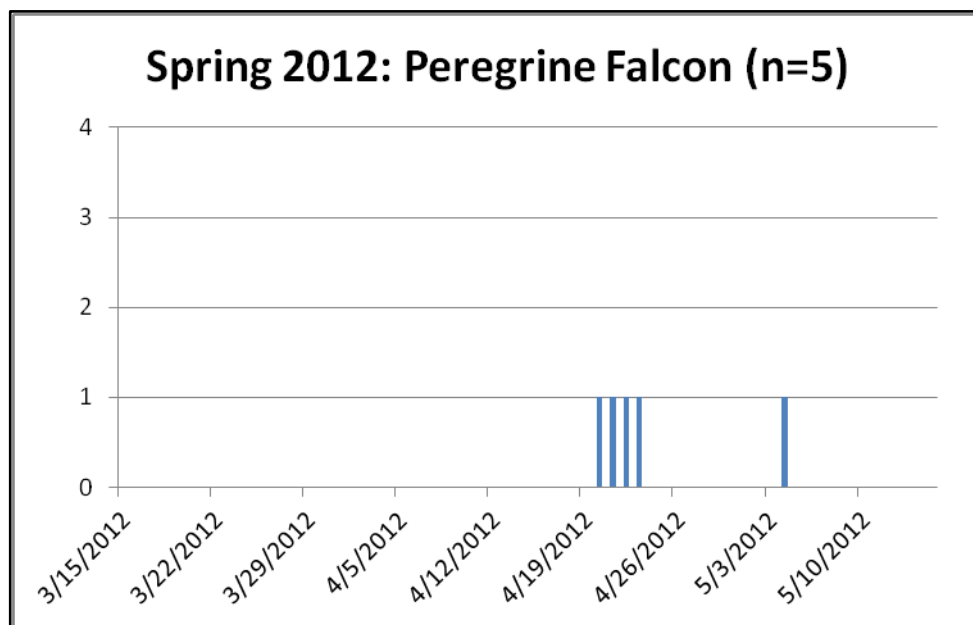
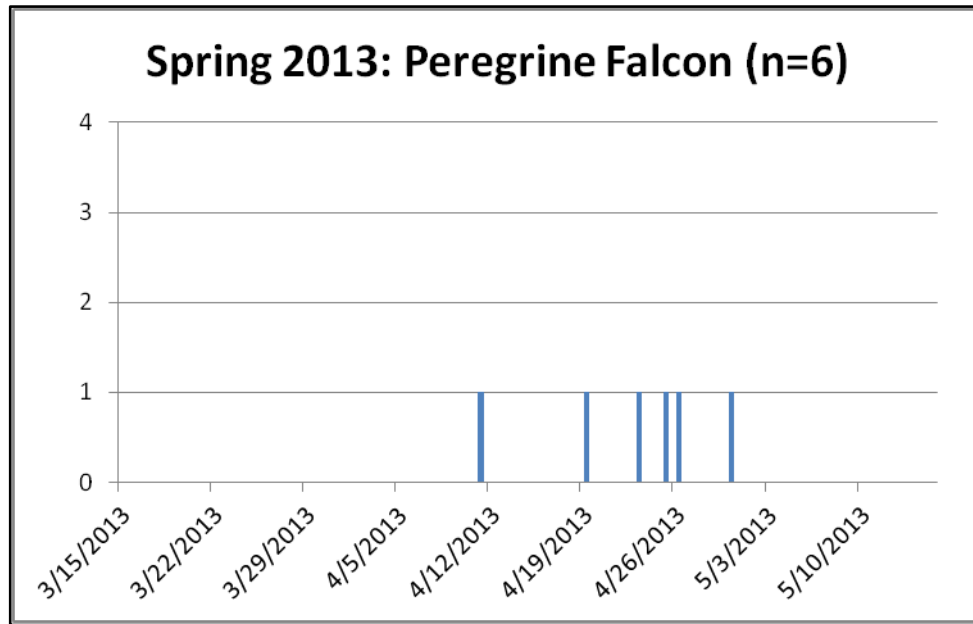
American Kestrel (*Falco sparverius*): We counted 156 American Kestrels from 18 March through 9 May. Unlike last season, we did not see high numbers of kestrels passing by until late April. As one of our smaller migrants, we typically see their numbers peak later than other raptor species.



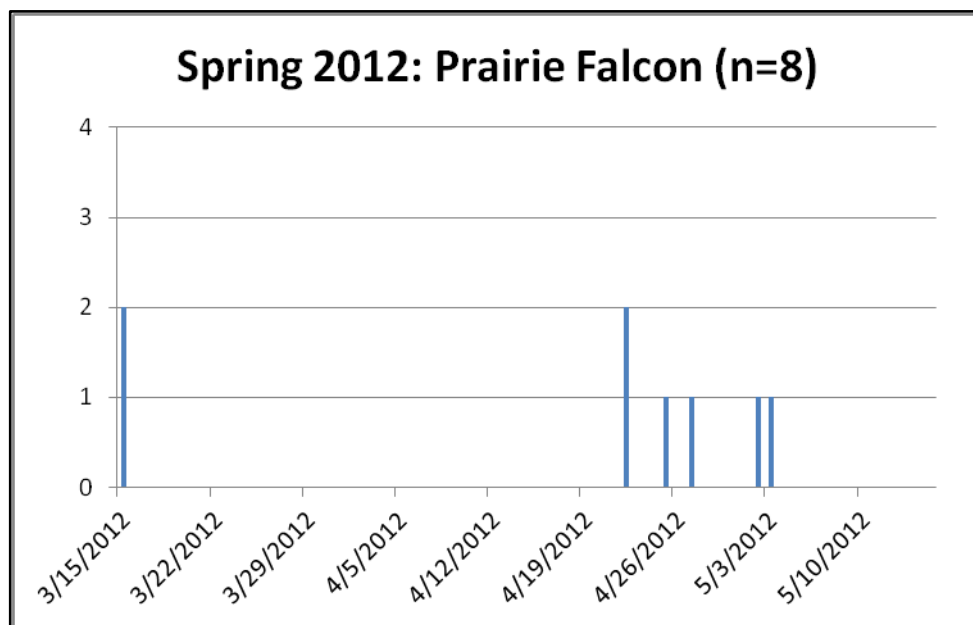
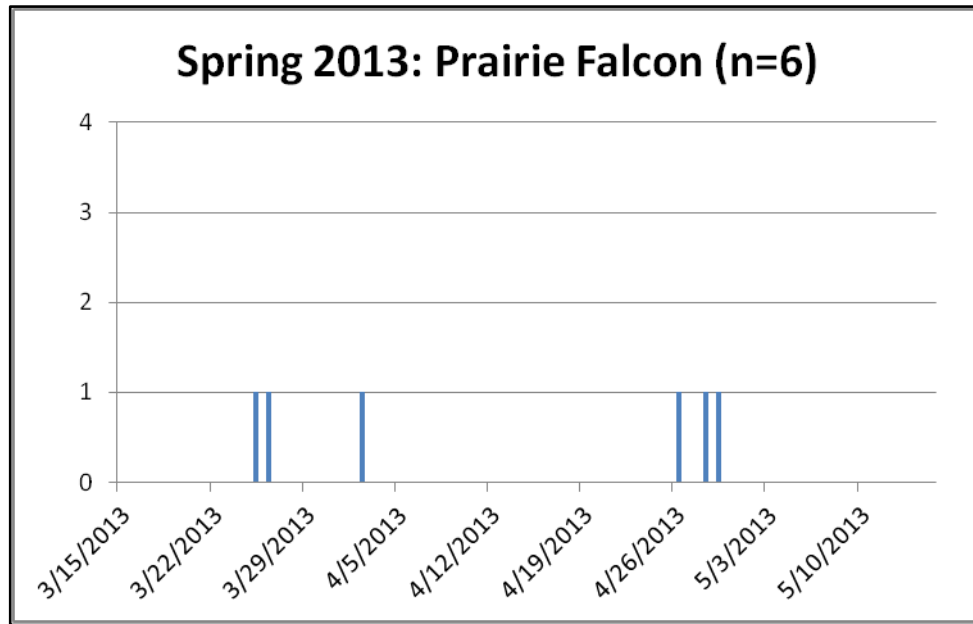
Merlin (*Falco columbarius*): We counted 9 Merlins from 19 March through 27 April. Merlins commonly migrate over coastal raptor sites, but are rarely counted at intermountain ridge sites. Falcons are built differently than other raptors, and typically use powered flight more than groups better adapted for soaring. As a result they are probably less reliant on the thermal/wind lift provided by ridge systems where intermountain counts take place. At coastal sites, however, their flightlines become more concentrated as they minimize travel over the ocean.



Peregrine Falcon (*Falco peregrinus*): We counted 6 Peregrine Falcons from 11 April through 30 April. Like Merlins, Peregrine Falcons are more commonly seen at coastal count sites.

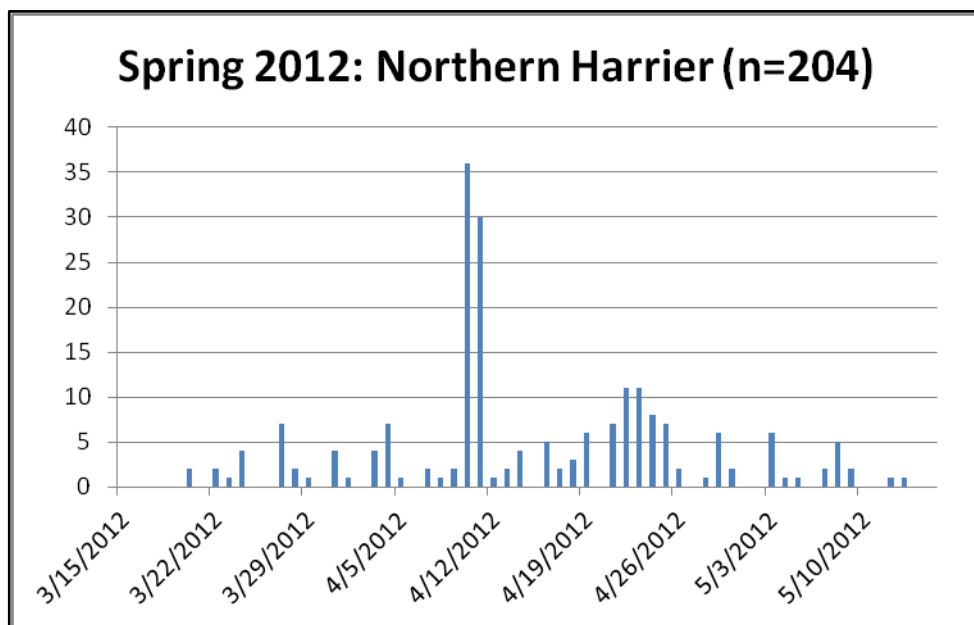
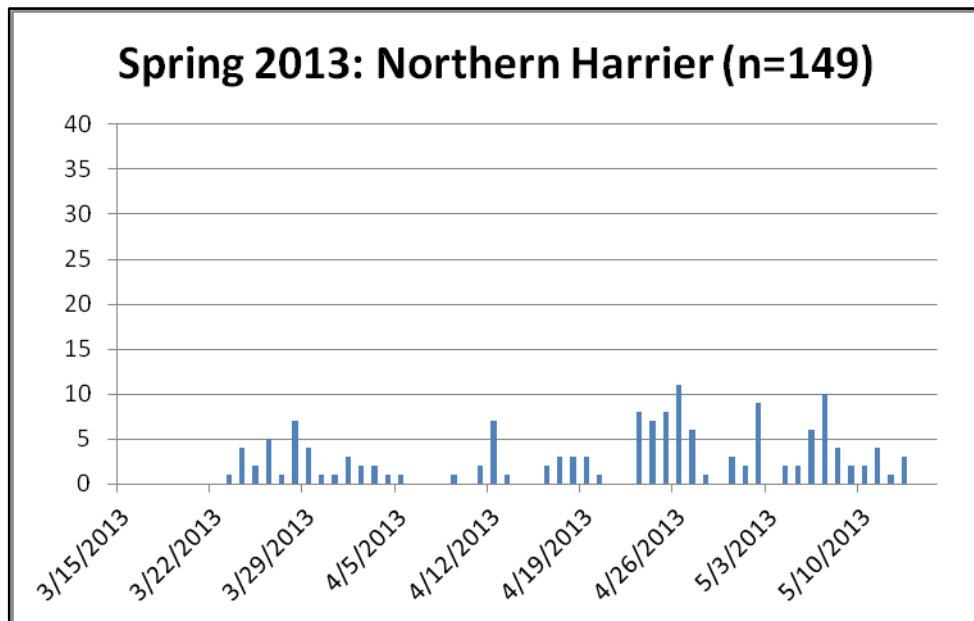


Prairie Falcon (*Falco mexicanus*): We recorded six Prairie Falcons. Prairie Falcons tend to be non-migratory or exhibit latitudinal (east-west, west-east) migration and are rarely counted at any site in North America.

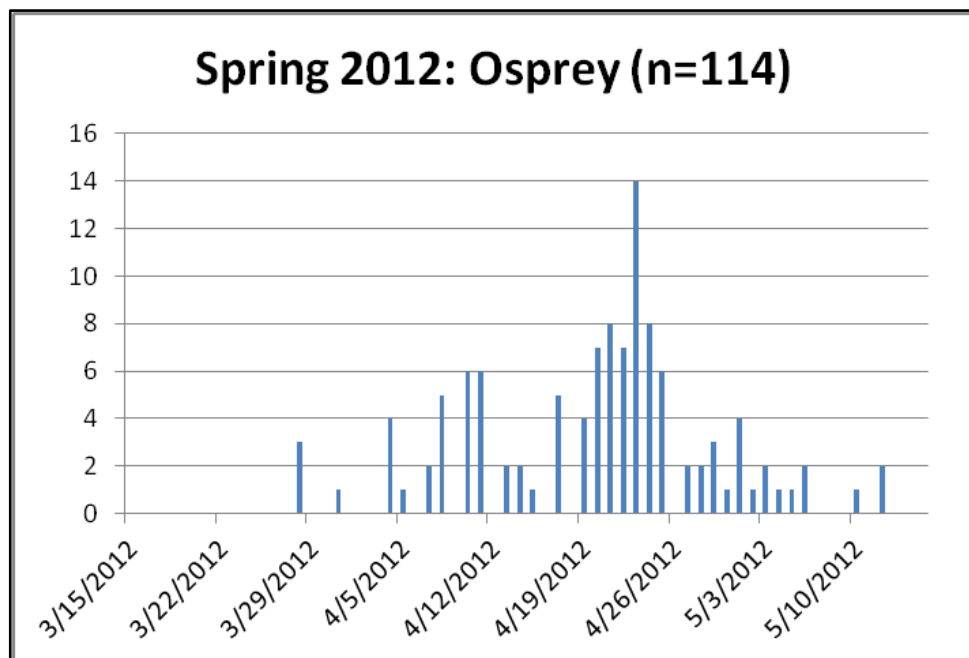
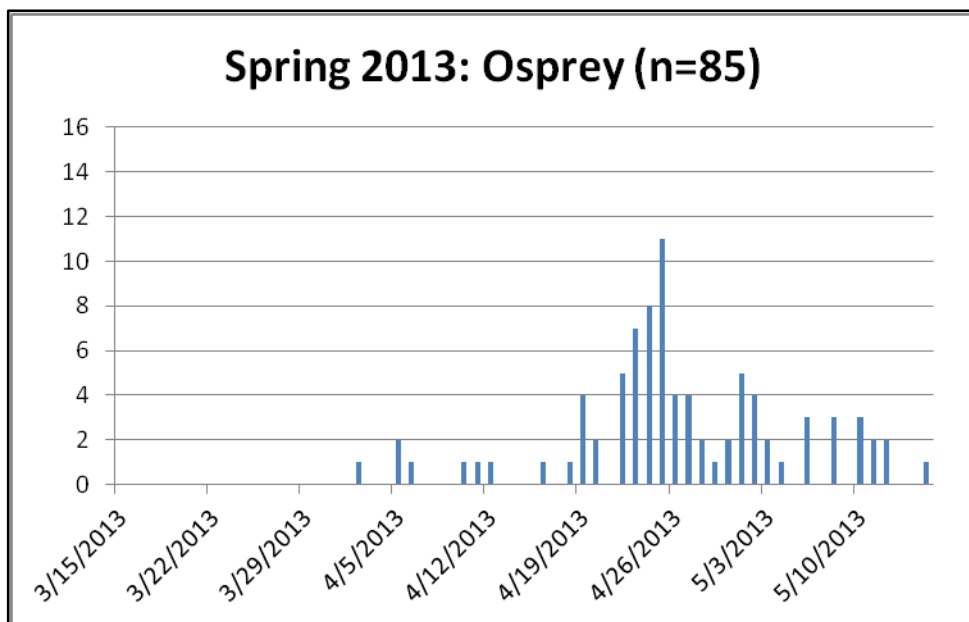


Other

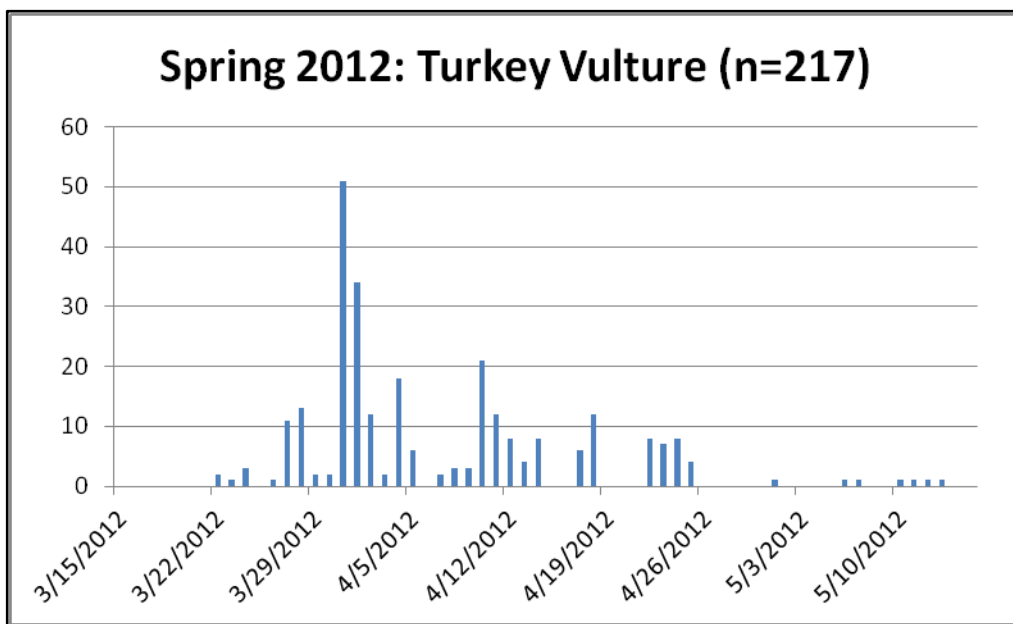
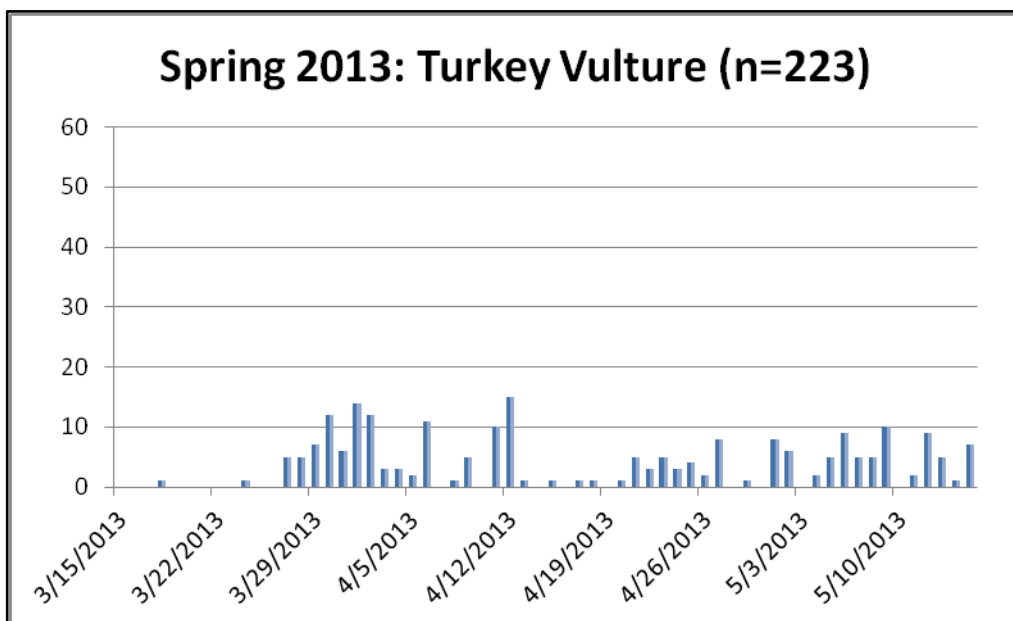
Northern Harrier (*Circus cyaneus*): We counted 149 Northern Harriers from 23 March through 13 May. We saw fairly steady numbers throughout the season, with a slight peak in early May. In contrast, in 2012 we observed a major push over just two days; we counted 66 on 10-11 April. In total we counted 55 fewer Northern Harriers in spring 2013 than in 2012.



Osprey (*Pandion haliaetus*): We counted 85 Ospreys from 2 April to 15 May. This year's Osprey migration was very similar to last, with high counts centered around a peak in late April. The three adult Ospreys outfitted with GPS transmitters last breeding season arrived to the Bitterroot Valley just before the highest number of migrants moved through; the male from the ranch entrance nest, female from the ranch entrance nest, and male from the north center pivot nest arrived 11 April, 19 April, and 22 April respectively.



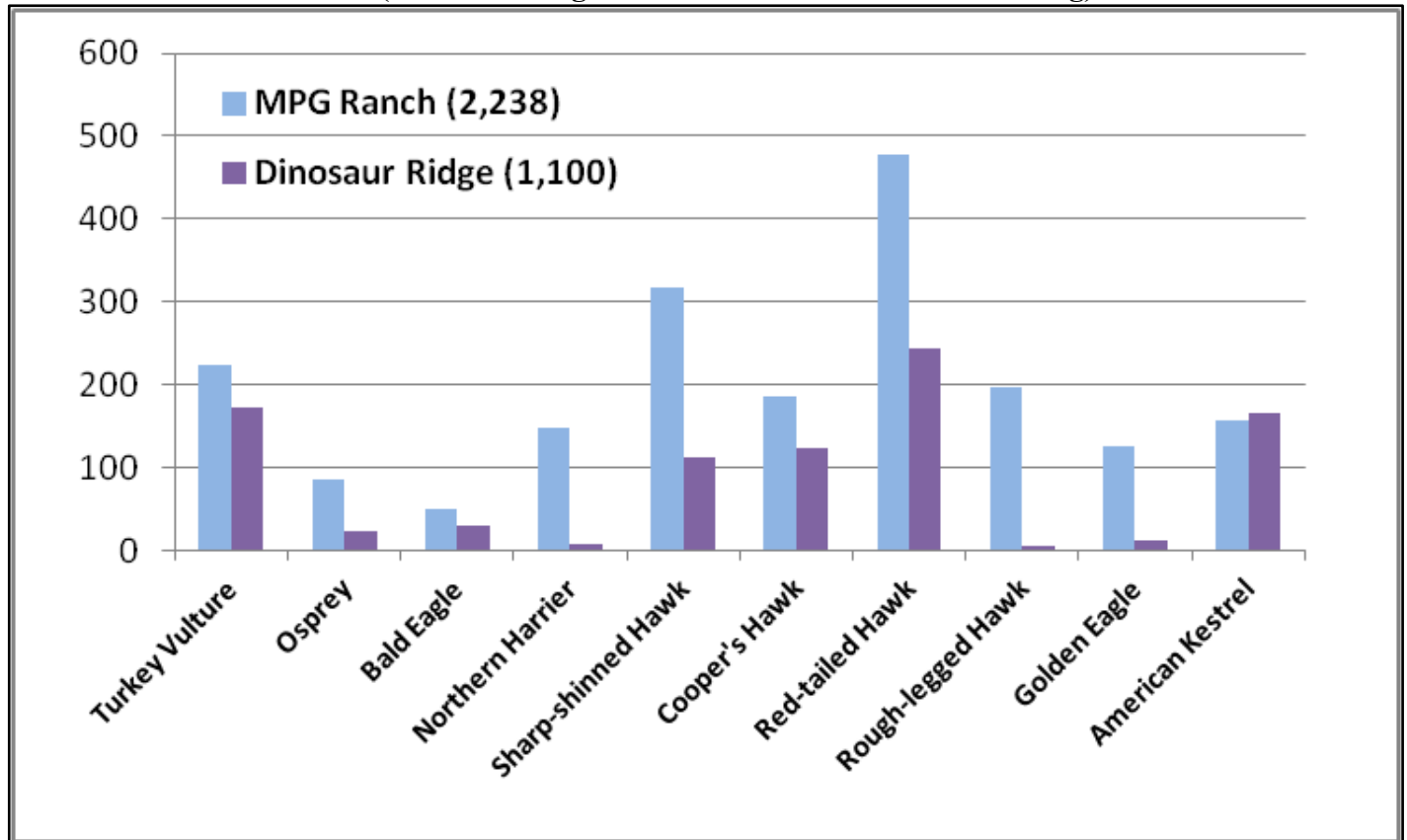
Turkey Vulture (*Cathartes aura*): The Turkey Vulture was the third most counted species; we observed 223 Turkey Vultures from 18 March to 15 May. Though we saw a peak of vulture migration in early April in both years, the peak was far less pronounced this season than in 2012.



Comparison of Spring 2013 Counts at MPG Ranch and Other Sites

As in 2012, only one other western count site was active during the spring 2013 migration: Dinosaur Ridge, a foothills site on the outskirts of Denver, Colorado. This year, Dinosaur Ridge's observers counted 1,100 raptors in 371 hours of observation, for an average of 2.96 raptors/hour. In both 2012 and 2013, the Dinosaur Ridge site showed some similarity in species composition to the MPG Ranch count (e.g., relatively high numbers of Red-tailed Hawks, Turkey Vultures, and American Kestrels), but lacked other species that we detected in high numbers (e.g., Northern Harrier and Rough-legged Hawk) (Figure 6). In both seasons, our count had a much higher average number of raptors/hour. Totals from Dinosaur Ridge vary widely from year to year, and they have observed over 2,000 raptors in a single season in the past (S. Hoffman, pers. com.).

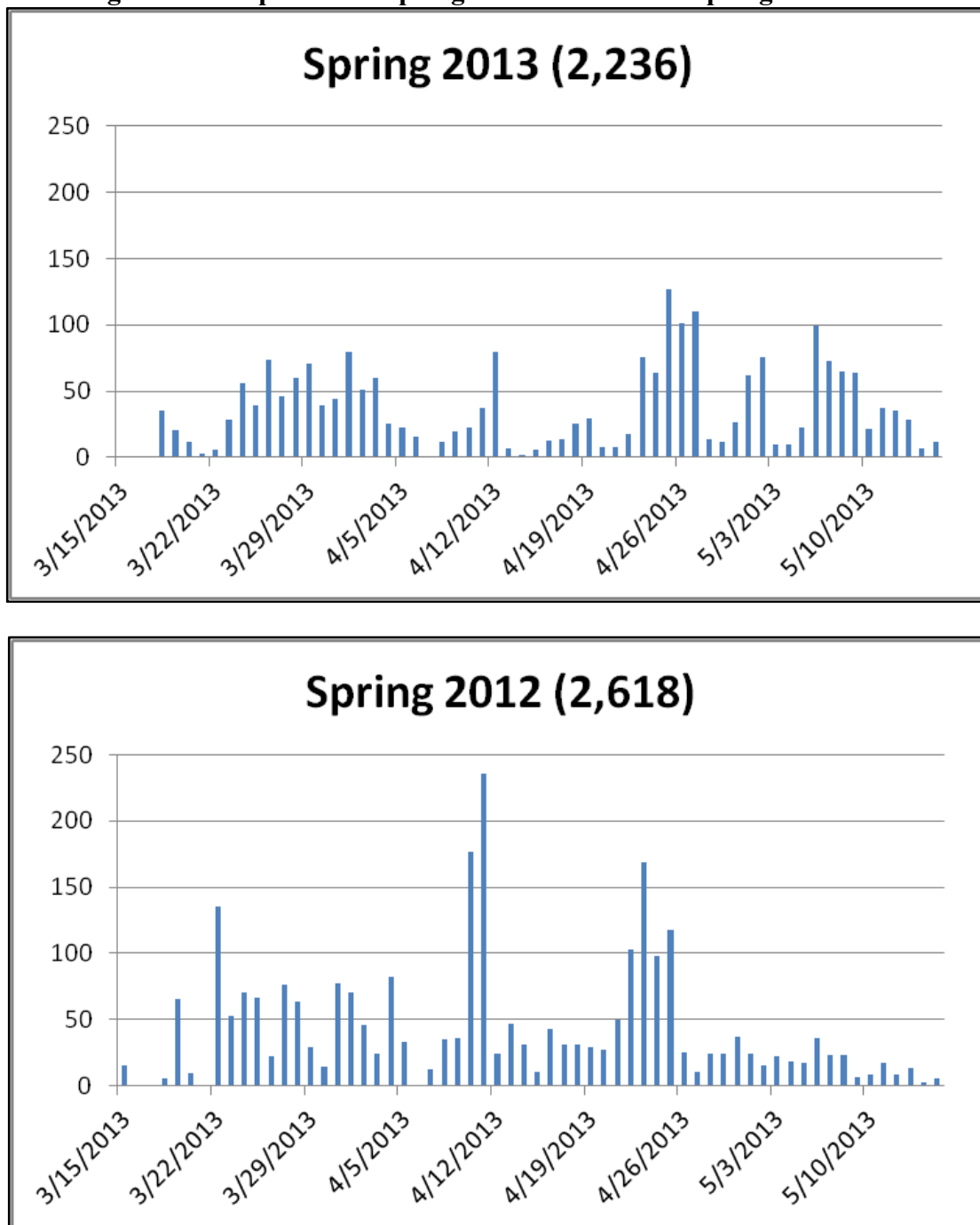
Figure 6: Number of Migratory raptors counted at the MPG Ranch and Dinosaur Ridge during spring 2013 (Dinosaur Ridge data available www.hawkcount.org).



Comparison Between 2013 and 2012

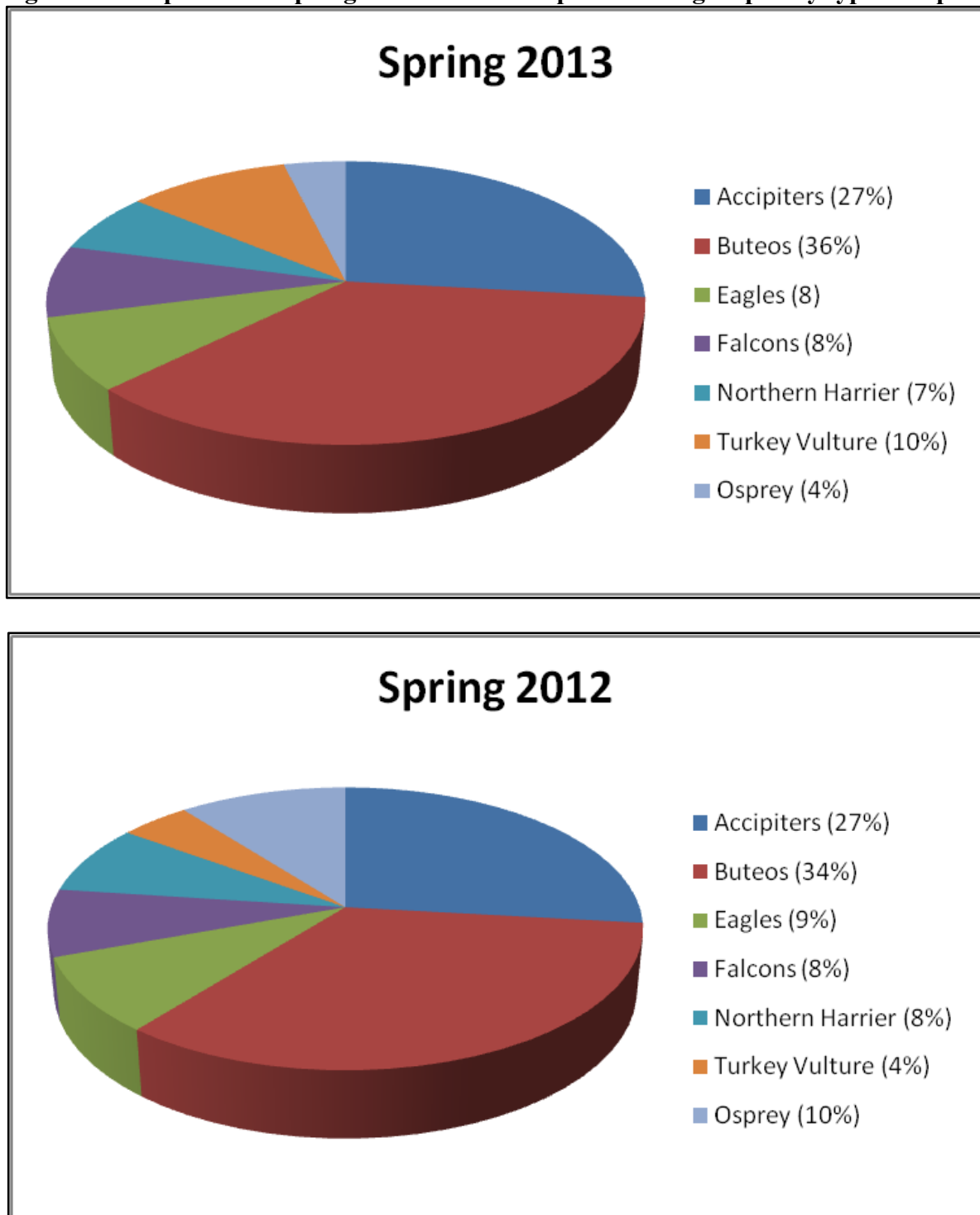
We observed approximately 15% fewer migrating raptors in 2013 as in 2012 (Figure 7). This pattern is largely attributable to a lack of very high daily counts this year. In 2012 we counted over 150 raptors on three separate days (including a daily high of 236 on 11 April), compared to this season's daily high of 127. This year's peak was relatively late compared to last; we saw numbers climb during the last week of April and stay high through the first week of May, whereas 2012's flight had mostly subsided by April's end. Because weather conditions were similar between years, it is difficult to determine what caused the later peak.

Figure 7: Comparison of spring 2013 count versus spring 2012 count.



In general, species composition was extremely similar in the spring 2012 and 2013 counts. Proportions of accipiters, buteos, eagles, falcons and Northern Harriers were remarkably similar, while the proportion of Ospreys and Turkey Vultures switched (Figure 8).

Figure 8. Comparison of spring 2013 and 2012 raptor counts grouped by type of raptor.

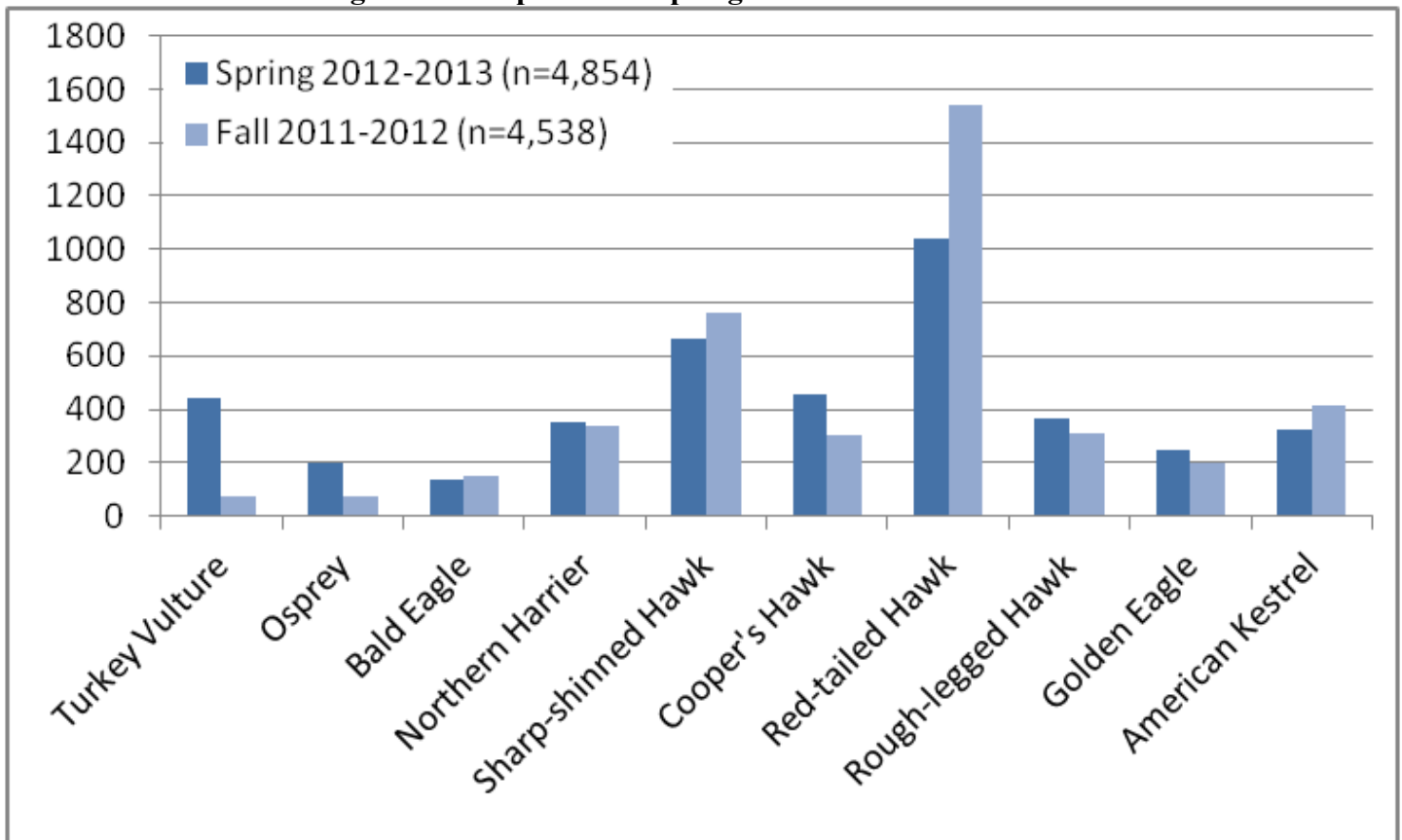


Comparison Between Fall and Spring Counts

In the past two years, we have counted more migrating raptors in spring than fall. Because spring flights are typically less temporally and geographically concentrated than those in the fall, there are few sites suitable for surveys. The fact that the MPG Ranch sees such high numbers in both spring and fall is remarkable; to our knowledge it is the only site in the West where both spring and fall counts are conducted.

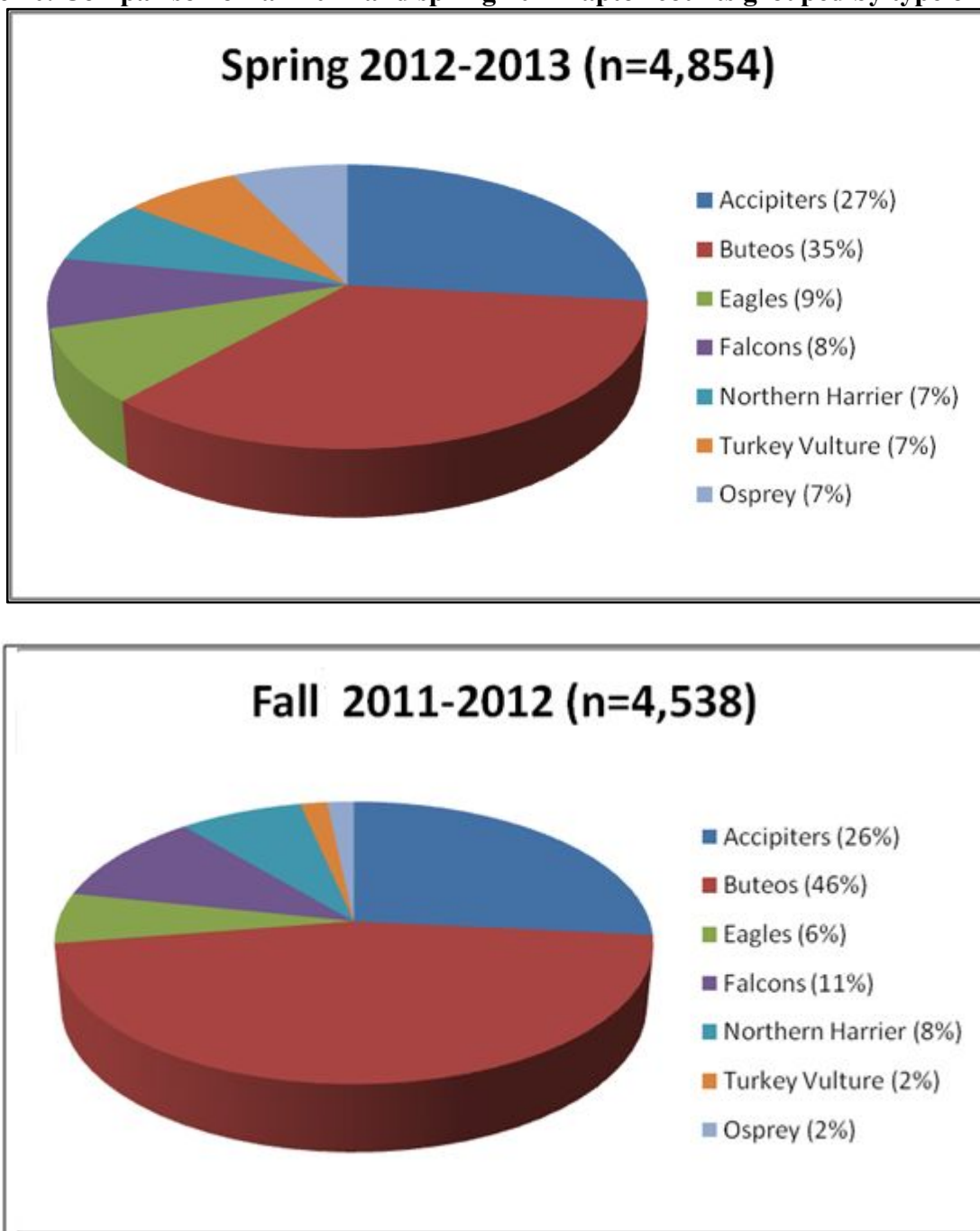
Red-tailed Hawks and Sharp-shinned Hawks are the most abundant species in both fall and spring counts. So far, we have observed many more Turkey Vultures and Ospreys in the spring, while American Kestrel and Red-tailed Hawk numbers are higher in the fall (Figure 9).

Figure 9: Comparison of spring vs. fall cumulative totals.



As a group, buteos and accipiters dominate raptor counts in both fall and spring. While the proportion of accipiters is similar in both seasons, we see higher proportions of Ospreys, Turkey Vultures, and eagles and lower proportions of buteos and falcons in the spring (Figure 10).

Figure 10. Comparison of fall 2011 and spring 2012 raptor counts grouped by type of raptor.



Trapping Efforts

This season we initiated a pilot spring banding effort. We constructed our blind on top of a small hill (46.700228°N, -114.010049°W) approximately one mile northeast of the Indian Ridge count site (Figure 11). We chose the location of the trapping blind based on anecdotal observations of how birds moved over the ranch in previous seasons. This location seemed suitable because of its visibility from the south (i.e., perspective of migrating raptors), its position amongst commonly used flightpaths, and proximity to the Indian Ridge count site, which allowed observers to notify the trappers of approaching birds. We used live Rock Doves, European Starlings, and House Sparrows as lures. We trapped intermittently between 16 April and 1 May and banded a total of three birds: an adult Cooper's Hawk, an adult American Kestrel, and a second-year Red-tailed Hawk. Though we trapped on days with relatively high counts and in a variety of weather conditions, we attracted few birds to our station. For unknown reasons, spring migrants are typically less aggressive towards than fall migrants, and generally more difficult to capture. As the peak of the count passed in early May, we decided our location was inefficient and suspended trapping operations. Due to the complexity of variables, both known and unknown, selecting a suitable trapping location is far more art than science. We may search for an alternative location next year.

Figure 11. Location of trapping station during spring 2013 season.



Conclusion

We counted 2,238 raptors of 17 species between 18 March and 15 May. Our five most abundant species included: Red-tailed Hawk (477), Sharp-shinned Hawk (318), Turkey Vulture (223), Rough-legged Hawk (198), and Cooper's Hawk (186). Our peak count day was 25 April, though we observed high day-to-day variation in raptor numbers throughout the season. We also observed obvious temporal trends in migration by species group, with a high proportion of eagles and buteos migrating early in the season, and a high proportion of accipiters migrating late in the season. Most raptors passed by our count sites between 1100 and 1400.

Proportionally, we saw similar numbers of eagles, buteos, falcons, and Northern Harriers as in the spring of 2012, but fewer Osprey and more Turkey Vultures. Our total was over twice the number observed at Dinosaur Ridge, Colorado, the only other known spring migration count conducted in the West. As in years past, we observed more raptors migrating during the spring of 2013 than in the fall of 2012. In both seasons, Red-Tailed Hawks and Sharp-shinned Hawks were the top two species counted.

Our trapping efforts proved less productive than we hoped. Though we were able to band three raptors, the percentage of passing migrants we attracted to our banding station was too small to justify extended efforts.



Appendix A: Daily count summaries for 2011 fall migration at the MPG Ranch.

Date	Hours	TV	OS	BE	NH	SS	CH	NG	BW	SH	RT	FH	RL	GE	AK	ML	PG	PR	UA	UB	UE	UF	UU	Total
3/18/2013	6.5	1	0	0	0	0	0	0	0	0	14	0	5	13	1	0	0	0	0	0	1	0	0	35
3/19/2013	6.5	0	0	0	0	0	0	0	0	0	17	0	1	1	0	1	0	0	0	0	0	0	0	20
3/20/2013	5.75	0	0	0	0	0	0	0	0	0	4	0	2	3	1	1	0	0	0	1	0	0	0	12
3/21/2013	5	0	0	1	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	3
3/22/2013	5	0	0	0	0	0	1	0	0	0	0	0	1	4	0	0	0	0	0	0	0	0	0	6
3/23/2013	5.75	0	0	2	1	0	0	0	0	0	7	0	9	8	0	0	0	0	0	1	0	0	0	28
3/24/2013	7.5	1	0	3	4	0	0	1	0	0	18	0	7	15	1	0	0	0	0	4	0	0	2	56
3/25/2013	7.25	0	0	0	2	0	0	0	0	0	17	0	10	9	0	0	0	1	0	0	0	0	0	39
3/26/2013	7.25	0	0	4	5	2	0	0	0	0	36	0	14	4	2	0	0	1	0	4	0	0	2	74
3/27/2013	6.5	5	0	1	1	0	4	0	0	0	18	0	7	6	0	1	0	0	0	3	0	0	0	46
3/28/2013	6.5	5	0	4	7	1	4	2	0	0	15	0	17	1	2	0	0	0	0	1	0	0	1	60
3/29/2013	7	7	0	5	4	2	3	1	0	0	33	0	8	2	2	0	0	0	0	3	0	0	1	71
3/30/2013	6.75	12	0	3	1	0	0	0	0	0	11	0	4	2	0	0	0	0	1	1	1	0	3	39
3/31/2013	6.75	6	0	3	1	2	1	1	0	0	17	0	5	1	3	0	0	0	0	1	0	0	3	44
March Sub.	90	37	0	26	26	7	13	5	0	0	209	0	90	69	12	3	0	2	1	19	2	0	12	533

Turkey Vulture (TV), Osprey (OS), , Bald Eagle (BE), Northern Harrier (NH), Sharp-shinned Hawk (SS), Cooper's Hawk (CH), Northern Goshawk (NG), Broad-winged Hawk (BW), Swainson's Hawk (SH), Red-tailed Hawk (RT), Ferruginous Hawk (FH), Rough-legged Hawk (RL), Golden Eagle (GE), American Kestrel (AK), Merlin (ML), Peregrine Falcon (PG), Prairie Falcon (PR), Unidentified Accipiter (UA), Unidentified Buteo (UB), Unidentified Eagle (UE), Unidentified Falcon (UF), Unidentified Raptor spp. (UU).

Appendix A (cont)

Date	Hours	TV	OS	BE	NH	SS	CH	NG	BW	SH	RT	FH	RL	GE	AK	ML	PG	PR	UA	UB	UE	UF	UU	Total
4/1/2013	6.5	14	0	2	3	4	1	0	0	0	30	0	10	6	5	0	0	0	1	1	1	0	2	80
4/2/2013	6.5	12	1	2	2	8	3	0	0	0	15	0	0	1	1	0	0	1	1	3	0	0	1	51
4/3/2013	7	3	0	4	2	11	7	0	0	0	15	0	5	3	2	1	0	0	5	1	0	0	1	60
4/4/2013	6.5	3	0	2	1	3	1	0	0	0	9	0	5	0	0	0	0	0	0	1	0	0	0	25
4/5/2013	5.5	2	2	0	1	1	1	0	0	0	9	0	2	1	1	1	0	0	0	1	0	0	0	22
4/6/2013	3	11	1	0	0	0	0	0	0	0	1	0	0	0	3	0	0	0	0	0	0	0	0	16
4/7/2013	No Count Due to Weather																							
4/8/2013	6	1	0	0	0	0	1	0	0	0	5	0	0	4	0	0	0	0	0	0	0	0	1	12
4/9/2013	6.5	5	0	0	1	0	0	0	0	0	4	0	5	1	0	1	0	0	0	0	1	0	1	19
4/10/2013	6	0	1	0	0	2	1	1	0	0	8	0	4	0	2	1	0	0	2	0	0	0	0	22
4/11/2013	6.25	10	1	1	2	1	2	1	0	0	3	0	3	4	2	0	1	0	0	4	0	0	2	37
4/12/2013	7	15	1	2	7	6	11	0	0	3	17	0	9	1	4	0	0	0	1	2	0	0	1	80
4/13/2013	1.25	1	0	0	1	1	0	0	0	0	1	0	1	0	1	0	0	0	0	1	0	0	0	7
4/14/2013	4.5	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	2
4/15/2013	6	1	0	1	0	1	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	1	6
4/16/2013	6.5	0	1	1	2	1	1	0	0	0	2	0	2	1	2	0	0	0	0	0	0	0	0	13
4/17/2013	6.5	1	0	0	3	1	1	0	0	0	5	0	0	0	0	0	0	0	0	2	0	0	1	14
4/18/2013	6	1	1	0	3	4	2	0	0	0	3	0	5	1	2	0	0	0	1	1	0	0	1	25
4/19/2013	6	0	4	0	3	0	2	0	0	1	2	0	4	0	9	0	1	0	3	0	0	0	0	29
4/20/2013	6	1	2	0	1	0	0	0	0	0	1	0	1	1	1	0	0	0	0	0	0	0	0	8
4/21/2013	3.5	5	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	8
4/22/2013	7.5	3	5	2	0	1	0	0	0	1	1	0	2	2	0	0	0	0	0	1	0	0	0	18
4/23/2013	8.25	5	7	1	8	10	10	0	0	3	8	1	6	5	7	0	1	0	2	0	0	0	2	76
4/24/2013	8	3	8	0	7	11	10	0	0	3	7	0	2	3	7	0	0	0	1	0	0	0	2	64
4/25/2013	7.5	4	11	3	8	23	20	0	0	3	14	1	3	2	24	0	1	0	3	5	0	0	2	127
4/26/2013	8.5	2	4	1	11	26	12	0	2	1	12	1	8	2	11	1	1	1	1	1	0	0	3	101
4/27/2013	8.5	8	4	2	6	27	15	1	2	0	9	2	1	3	16	1	0	0	6	1	0	1	5	110
4/28/2013	6.5	0	2	0	1	0	3	0	0	0	1	0	2	0	1	0	0	1	3	0	0	0	0	14
4/29/2013	5	1	1	0	0	2	0	0	0	0	1	0	4	0	1	0	0	1	1	0	0	0	0	12
4/30/2013	5.5	0	2	0	3	5	3	0	0	0	5	0	2	1	1	0	1	0	1	1	0	0	1	26
April Sub.	178	112	59	24	76	149	107	4	4	15	190	5	89	42	103	6	6	4	33	26	2	1	27	1084

Appendix A (cont):

Date	Hours	TV	OS	BE	NH	SS	CH	NG	BW	SH	RT	FH	RL	GE	AK	ML	PG	PR	UA	UB	UE	UF	UU	Total
5/1/2013	7	8	5	0	2	11	4	0	0	2	8	0	5	7	6	0	0	0	1	1	0	0	2	62
5/2/2013	7.5	6	4	0	9	15	8	0	0	3	10	0	8	1	9	0	0	0	2	0	0	0	1	76
5/3/2013	5.75	0	2	0	0	4	1	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	1	10
5/4/2013	6	2	1	0	2	2	1	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	10
5/5/2013	6	5	0	0	2	4	1	0	1	0	4	1	1	2	1	0	0	0	0	0	0	0	0	22
5/6/2013	6.75	9	3	0	6	35	7	0	3	2	12	0	2	2	11	0	0	0	2	3	0	0	2	99
5/7/2013	6.75	5	0	0	10	17	6	0	2	3	9	0	1	1	7	0	0	0	7	4	0	0	1	73
5/8/2013	6.5	5	3	0	4	21	10	0	1	0	10	0	0	2	4	0	0	0	4	1	0	0	0	65
5/9/2013	6.75	10	0	1	2	21	9	0	0	2	8	0	1	0	2	0	0	0	7	0	0	1	0	64
5/10/2013	6.3	0	3	0	2	5	5	0	0	0	0	1	0	0	0	0	0	0	3	1	0	0	1	21
5/11/2013	7	2	2	0	4	14	5	1	0	2	3	0	0	0	0	0	0	0	3	1	0	0	0	37
5/12/2013	6.75	9	2	0	1	3	3	1	0	4	4	0	0	0	0	0	0	0	7	1	0	0	0	35
5/13/2013	6.5	5	0	0	3	5	6	0	0	0	7	0	0	0	0	0	0	0	1	1	0	0	0	28
5/14/2013	6.5	1	0	0	0	3	0	0	0	0	2	0	0	0	0	0	0	0	1	0	0	0	0	7
5/15/2013	5.5	7	1	0	0	2	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	12
May Sub.	97.6	74	26	1	47	162	66	2	7	21	78	2	19	15	41	0	0	0	38	13	0	1	8	621
Season Totals		TV	OS	BE	NH	SS	CH	NG	BW	SH	RT	FH	RL	GE	AK	ML	PG	PR	UA	UB	UE	UF	UU	Total
		223	85	51	149	318	186	11	11	36	477	7	198	126	156	9	6	6	72	58	4	2	47	2238

Turkey Vulture (TV), Osprey (OS), , Bald Eagle (BE), Northern Harrier (NH), Sharp-shinned Hawk (SS), Cooper's Hawk (CH), Northern Goshawk (NG), Broad-winged Hawk (BW), Swainson's Hawk (SH), Red-tailed Hawk (RT), Ferruginous Hawk (FH), Rough-legged Hawk (RL), Golden Eagle (GE), American Kestrel (AK), Merlin (ML), Peregrine Falcon (PG), Prairie Falcon (PR), Unidentified Accipiter (UA), Unidentified Buteo (UB), Unidentified Eagle (UE), Unidentified Falcon (UF), Unidentified Raptor spp. (UU).