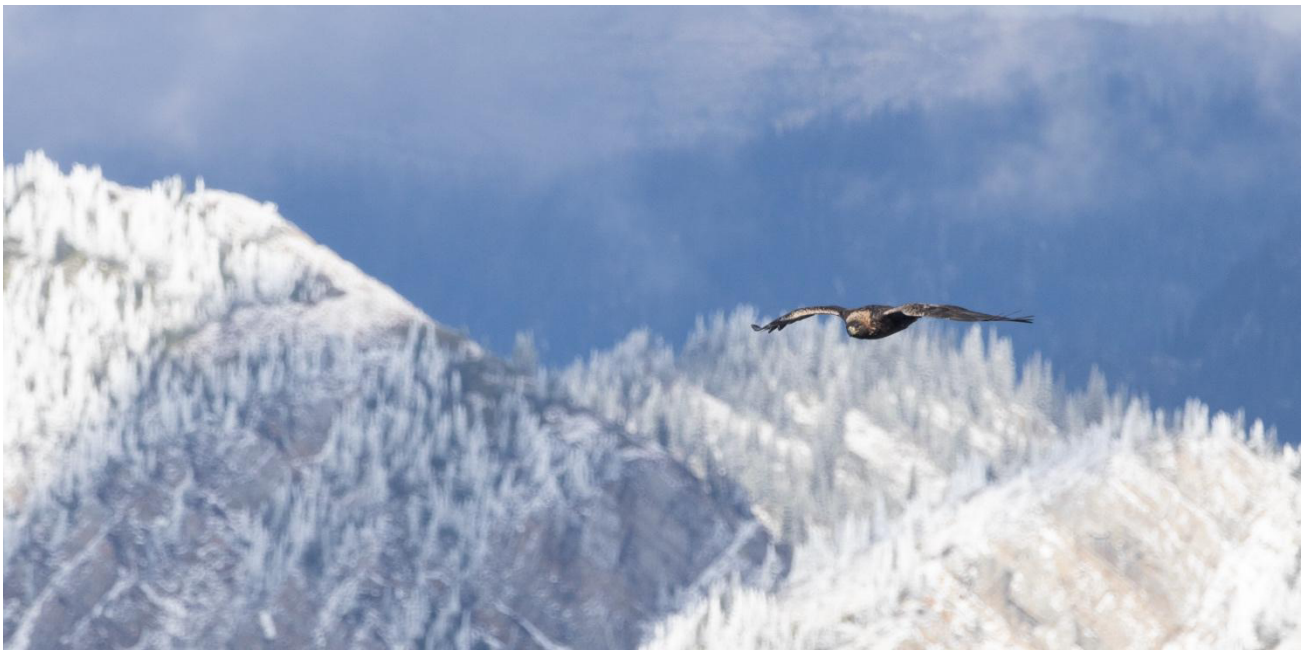
Raptor Migration Monitoring in the Jewel Basin
Autumn 2025 – Annual Report

31 March 2026



(Late season Golden Eagle: Jake Bramante photo)

A Report to:

USDA Forest Service: Flathead National Forest

Agreement #20-CS-11011000-026
Flathead Audubon Society

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Executive Summary. The 18th full monitoring season at the Jewel Basin Hawk Watch concluded on 31 October 2025. Another season characterized by few major weather events and consistent coverage led to above average numbers across almost all species. Ten primary observers conducted 1-20 surveys each (51 total), averaging 7.0 hours and 67 birds counted (961 birds/100hr). We counted 3,431 birds of 17 raptor species this season, our third highest total in 18 years. Sharp-shinned Hawks (1,852 counted) comprised 54% of the flight, as is typical for this count location. We have now counted 50,737 raptors since 2007 (our pilot year). Our 2025 season totals exceeded our previous 17-yr mean counts for 14 species, with only American Goshawk, Rough-legged Hawk and Golden Eagle recorded in below average numbers. We set new season-high count totals for Broad-winged Hawk (79) and Peregrine Falcon (24). This report summarizes the relative abundance and observed age and sex classification of the flight, by species, where appropriate.

As always, the success of the Jewel Basin Hawk Watch depended on Flathead Audubon members and others who volunteered their time to help spot and tally passing birds. This year at least 38 people joined our eight volunteer primary counters and two contracted primary counters to serve as additional observers for at least one day. We are thankful for the 594 hours, 2,370 miles of personal car use, and foregone per diem which served as in-kind support to the project, which in addition to donated administrative efforts (120 hr) resulted in a total in-kind donation of $17,221 to the project. Cash reimbursements to our paid technicians (mileage, per diem and stipend) totaled just $6,100 and were supported in part by both the Flathead National Forest and Montana Audubon.

Introduction. This report summarizes the 18th annual season-long survey of autumn raptor migration above Jewel Basin along the Swan Range near Mount Aeneas, on the Flathead National Forest northeast of Bigfork, MT (Figure 1). In addition to providing data to a network of migration monitoring sites in the region, our efforts continue to energize a citizen science base that can be used to conduct annual surveys during future migration seasons, providing valuable educational outreach to the surrounding communities.

More detailed descriptions of the location, history, funding partners, participants and regional context of the Jewel Basin site and our surveys there have been included in past annual reports (e.g. Casey and Bissell 2021) and are not reiterated here. The Hawk Watch continues to be conducted through a funding partnership between Flathead Audubon Society (FAS) and Flathead National Forest, currently through Agreement #20-CS-11011000-026, under which this report has been prepared. We have also been pleased to receive annual Wildlife Fund Grants from Montana Audubon to support our efforts in recent years.

This annual report summarizes the extent and results of our efforts during the 2025 field season (25 August – 31 October) and includes data summaries for the last 18 years of season-long surveys (plus our pilot year in 2007) Additional data and photos may be requested from FAS through Dan Casey. Data from the last nine survey years are also stored by the Hawk Migration Association of North America (HMANA), at www.Hawkcount.org.

Flathead Audubon provided Dan Stoken and Joshua Covill daily stipends which included compensation for personal car mileage and per diem for the 35 days they spent as primary counters this season. We relied on our growing cadre of experienced volunteers to survey on intervening days. Coordination with FAS's biannual Birds of Prey Festival and word-of-mouth through raptor ID workshops provided by FAS and Amy Seaman of Montana Audubon helped to increase interest and skills of volunteer observers in past years, and we continue to attract new volunteers due to their efforts and those of Jess Garby, the FAS Conservation and Education Coordinator. This year's Jewel Basin Hawk Watch project could not have been undertaken without all the support provided from these organizations and volunteers and, for this, FAS and Jewel Basin Coordinator are deeply grateful.

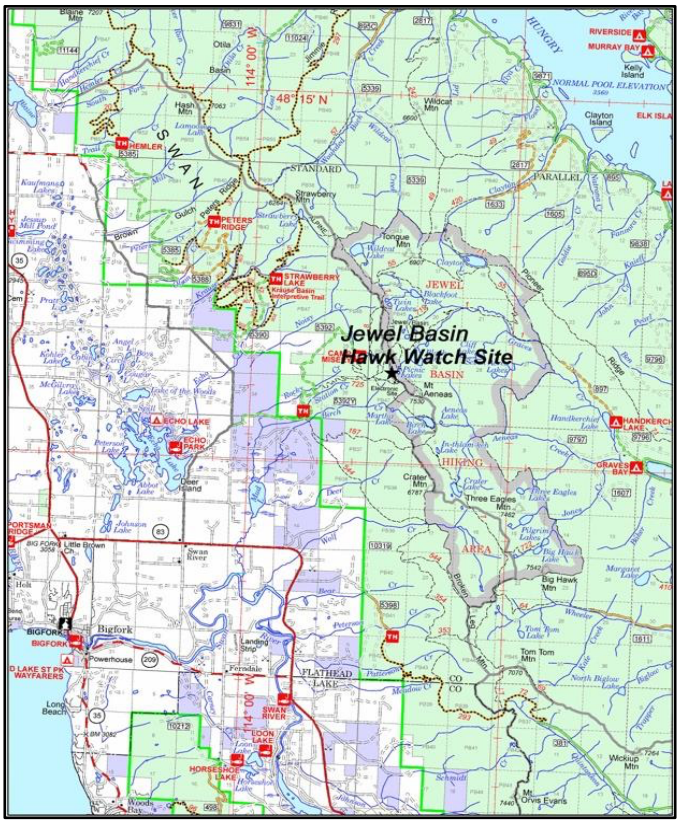

Figure 1. Location of the Jewel Basin Hawk Watch site, Flathead Co., Montana, northwest of Mt. Aeneas, Jewel Basin Hiking Area, Flathead National Forest (48.1552°N, -113.93294°W).

The following eight individuals served as primary counters in addition to our paid technicians this year: Bj Worth, Dan Casey, Dee Baginski, Denny Olson, Eric Godin, Jake Bramante, Lisa Bate, and Nickie Broesel. They committed a total of 312.4 hours (counting travel time) over 16 successful days as primary counters, and another 59.9 hours as secondary observers at the site. Dan Stoken was reimbursed $3,425 for 20 survey days., and Joshua Covill was reimbursed $2,675 for 15 days. At least 38 additional volunteers served as extra observers on one or more days. These secondary observers donated another 594 hr in observation and travel time. Flathead Audubon also provided an additional 120 hr of administration time for training, financials, and coordination. All in all, these amounted to $$5,876 in survey time donations, $8,345 travel and per diem donations, and $3,000 in administration donations for a total of $17,221 in donated match. A full accounting of donated and billed time is available upon request.

Methods. Our annual goal has been to survey on as many of the 75 days between 25 August and 7 November as weather, access to the site, and availability of observers will allow. This year our first survey was 25 August, and our "survey window" closed after our last of 51 counts on 31 October, after which strong winds and precipitation precluded surveys. Increased interest, communication and availability of trained primary observers have helped us improve coverage over the years; this year we missed five days during the survey window where conditions were suitable, but no observer was available. Surveys varied in length depending on apparent passage rates, weather conditions, and volunteer availability, ranging from 3.0 to 9.2 (average 7.0) hours per survey, totaling 356.9 survey hours for the season, our second largest effort to date. All surveys were conducted from the primary observation point selected based on preliminary (2007) data, a site (Figure 1) at 7,100 ft in elevation on the northwest flank of Mt. Aeneas (48.1552°N, -113.93294°W). This was the second year that we used real-time, on-site electronic data entry using Trektellen data entry software (www.trektellen.org). Dan Casey, the Jewel Basin Coordinator, provided significant daily/weekly field support via phone and email.

Count and weather data were entered during each survey. All raptors passing by in a southerly direction were identified to species, age and sex where feasible, with apparent local birds (identified by their hunting behavior, and/or local movements) excluded from daily and seasonal totals. We placed a plastic owl decoy on a pole in a prominent point near the counters during most surveys. This commonly used tool at hawk watch migration sites attracts many birds closer to the viewpoint allowing closer study for identification and classification.

Count data were recorded for each hourly period beginning and ending on the hour, with weather variables (e.g. wind speed and direction, ambient temperature, cloud cover, visibility) recorded every hour on the half hour. We also recorded characteristics of the flight according to Hawk Watch International protocols, using codes developed by HMANA, for the majority of passing birds during each hourly survey period. These included the average height above, direction to, and distance from the hawk watch site. All 2025 survey data were entered into the database that is automatically linked via Trektellen to the interactive database on the Hawk Count website (www.hawkcount.org). This site allows interested parties to review data not only from this site (by year and date), but also data from other sites across the continent.

Results. Our total count of 3,431 raptors for 2025 (Table 1) was our third highest total over the 18 years of full-season surveys at the site. Our season-long passage rate of 9.6 birds per hour was also above long-term average (9.4 birds/hr). We recorded above average numbers for all but three of the 17 species we recorded (see species accounts that follow). Our highest one-day count this season of 287birds (32/hr) occurred 25 September, consistent with the typical seasonal peak. The eleven days where we counted ≥100 birds spanned the period from 6 September (100) through 20 October (130). Complete daily survey results for the 2025 season, by species, are included in Appendix A.

Species Accounts. Accipitrine hawks (Sharp-shinned Hawk, Cooper's Hawk and American Goshawk) comprised most of the raptor flight (68%) with 2,330 birds counted. Eagles (411) comprised 12% of the birds recorded, buteos (361)11%, and falcons (189) 6%. The brief species accounts that follow describe the extent and nature of the migration data we collected in 2025, with comparisons to (and updated summaries of) our data from 18 full seasons at the site (Table 1). Where appropriate we have included adjustment of totals per unit effort (#/100hr). We include cursory analysis of sex and age ratios, timing and proportion of the flight, and any indication of trends revealed by this year's data. Note that throughout this section, we use the term "immature" to mean first-year (juvenile) birds, unless otherwise specified. Age ratios are expressed as the number of immatures per 100 adults (e.g. 58/100ad).

Turkey Vulture. 2025 Total: 8 (2/100hr) 18-yr Average: 4 (1/100hr)

This species has never comprised any significant portion of the flight at this ridgetop site. This year we recorded individual birds on eight separate surveys between 25 August and 28 September.

Osprey. 2025 Total: 17 (5/100hr) 18-yr Average: 9 (3/100hr)

We recorded Ospreys on 13 survey days between 31 August and 28 September. Though our season total was above average, our high daily count was just two birds, on four separate dates.

Bald Eagle. 2025 Total: 78 (22/100hr) 18-yr Average: 62 (22/100hr)

We had above average numbers of Bald Eagles this year, and recorded them on 38 counts throughout the season, including our first and last count (25 August, 31 October). Our high count of 12 birds occurred on 23 October. We were able to classify 97% of the birds to age class, with 42% adults, 56% immatures (1-2 yr olds) and 1%

subadults (3-5 yr olds). There were certainly some classification issues in the younger age classes, but our ratio of non-adults was 119/100 adults.

Table 1. Season totals for raptors counted at the Jewel Basin Hawk Watch site, 2008-2025. New (or tied) season-high totals are in **bold**. Updated all-time totals include limited data from preliminary surveys in 2007. All surveys were conducted between 25 Aug and 13 November, dependent on weather and volunteer availability (25 Aug – 31 Oct in 2025).

Species	2008-2024 Minimum	2008-2024 Maximum	2008-2024 Mean	2025 Total	All-time Total
Turkey Vulture	0	7	3	8	69
Osprey	4	19	8	17	171
Bald Eagle	25	107	59	78	1,121
Northern Harrier	13	102	45	97	924
Sharp-shinned Hawk	687	2,490	1,250	1,852	24,686
Cooper's Hawk	215	603	388	410	7,319
American Goshawk	24	62	36	19	635
Unidentified Accipiter	32	93	57	49	1,009
Broad-winged Hawk	2	57	21	**79**	496
Swainson's Hawk	0	7	2	3	42
Red-tailed Hawk	136	328	214	252	3,862
Ferruginous Hawk	0	4	1	1	16
Rough-legged Hawk	1	41	21	21	393
Unidentified Buteo	8	22	16	5	265
Golden Eagle	212	600	386	332	6,861
American Kestrel	35	100	70	106	1,423
Merlin	9	66	25	38	496
Peregrine Falcon	3	24	13	**24**	246
Prairie Falcon	1	27	11	16	208
Gyrfalcon	0	1	<1	0	2
Unidentified Falcon	1	14	5	5	98
Unidentified Eagle	0	6	3	1	40
Unidentified Raptor	8	46	20	18	355
TOTAL	1,638	4,418	2,651	3,431	50,737
Survey Days	36	52	44	51	826
Effort: In hours	226.0	339.0	280	356.9	5,285
Passage Rate (per hr)	6.3	13.4	9.4	9.6	9.6
Total Species	15	17	16	17	18

Northern Harrier. 2025 Total: 97 (27/100hr) 18-yr Average: 51 (18/100hr)

We recorded harriers in well above average numbers, and once again we were able to classify a large percentage of the birds to age class (83%). Thirteen were counted (16%), with an observed ratio of 515 imm/100ad. Adult males outnumbered adult females by nine to four. We recorded harriers on 37 (73%) of our 51 surveys, 25 August

through 30 October, with a high count of nine birds on 28 September. Occasional local immature birds were seen in the vicinity of the survey site throughout the season.

Sharp-shinned Hawk. 2025 Total: 1,852 (519/100hr) 18-yr Average: 1,364 (466/100hr)

We continue to record more Sharp-shinned Hawks (Jake Bramante photo) at the Jewel Basin site than any other Montana Hawk Watch, both in total numbers and as a percentage of the flight. They make up 47% of the fall flight here on average (Table 1), and once again this year 54% of all birds counted were this species. They were recorded on all but two of our 51 surveys, with a high count of 191 on 25 September, a typical peak passage period for accipitrine hawks at the Jewel Basin. Our passage rate of 519 birds per 100hr was above our long-term average, but well below 2021's all-time high of 755/100hr (Figure 2). We were able to classify 83% of the birds to age class, with an observed ratio of 94imm/100ad, well above 2024 number but still below our long-term average (104/100ad) for the fifth consecutive year (Figure 3).

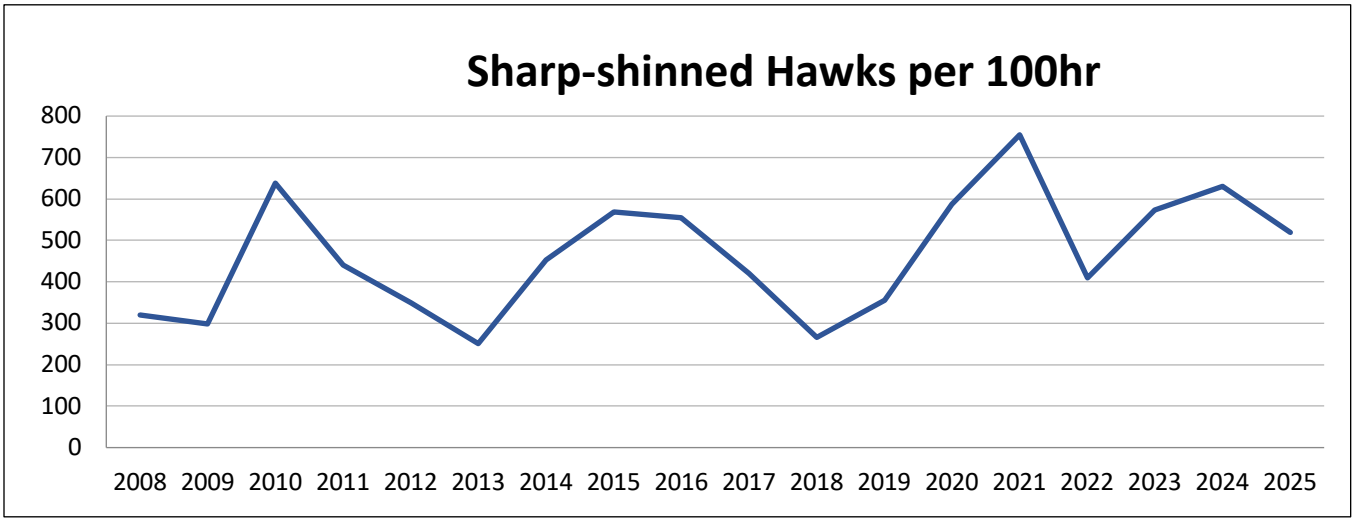

Figure 2. Abundance of Sharp-shinned Hawks reported at the Jewel Basin Hawk Watch site, corrected for effort (birds/100hr), 2008-2025.

Cooper's Hawk. 2025 Total: 410 (115/100hr) 18-yr Average: 405 (140/100hr)

Cooper's Hawk is typically one of the four most abundant migrant species at our site, and this year we counted 410 birds on 41 surveys between 25 August and 23 October. Our high count was 30 birds on 25 September, well below some previous annual high counts. Adjusted Cooper's Hawk numbers have fluctuated somewhat less dramatically than Sharp-shinned Hawks at our site (Figure 4) and were somewhat below average this year at 115/100hr. Like Sharp-shinned, the observed ratio of immatures to adults (108/100ad) was far below previous high observed ratios (e.g. 2008, 2016; Figure 3), and well below our long-term average of 140/100ad. Our confidence in expressing these ratios remains high for these close-flying accipitrine hawks; this year we were once again able to classify 88% of the passing Cooper's Hawks to age class.

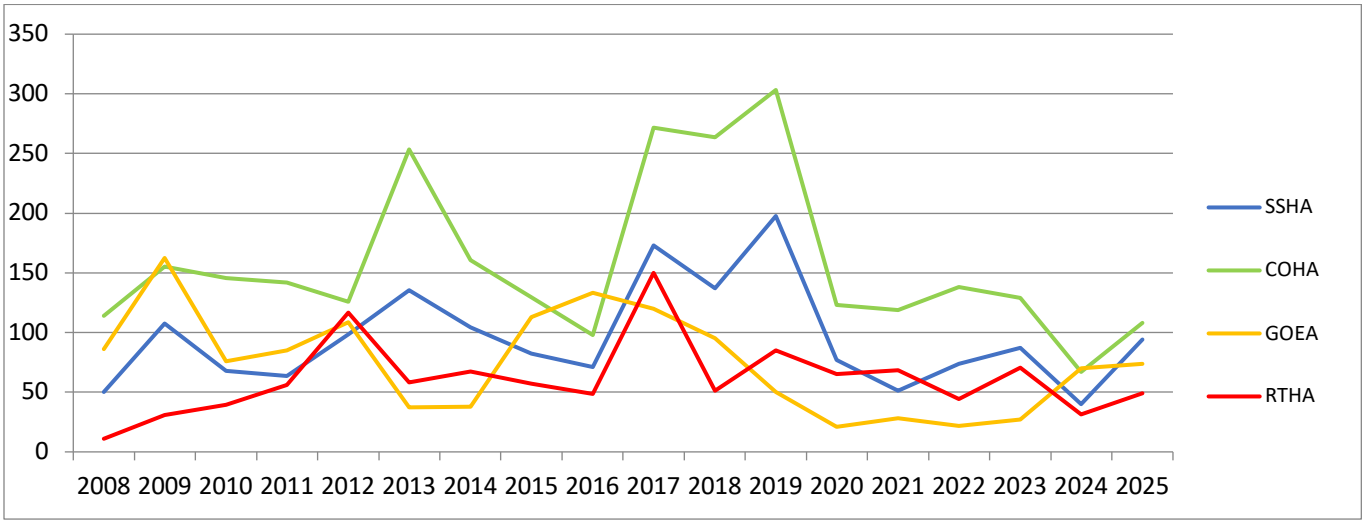

Figure 3. Ratios of immatures per 100 adults counted at the Jewel Basin Hawk Watch, 2008 – 2025, for the four most common species surveyed. SSHA = Sharp-shinned Hawk; COHA = Cooper's Hawk; GOEA = Golden Eagle; RTHA = Red-tailed Hawk

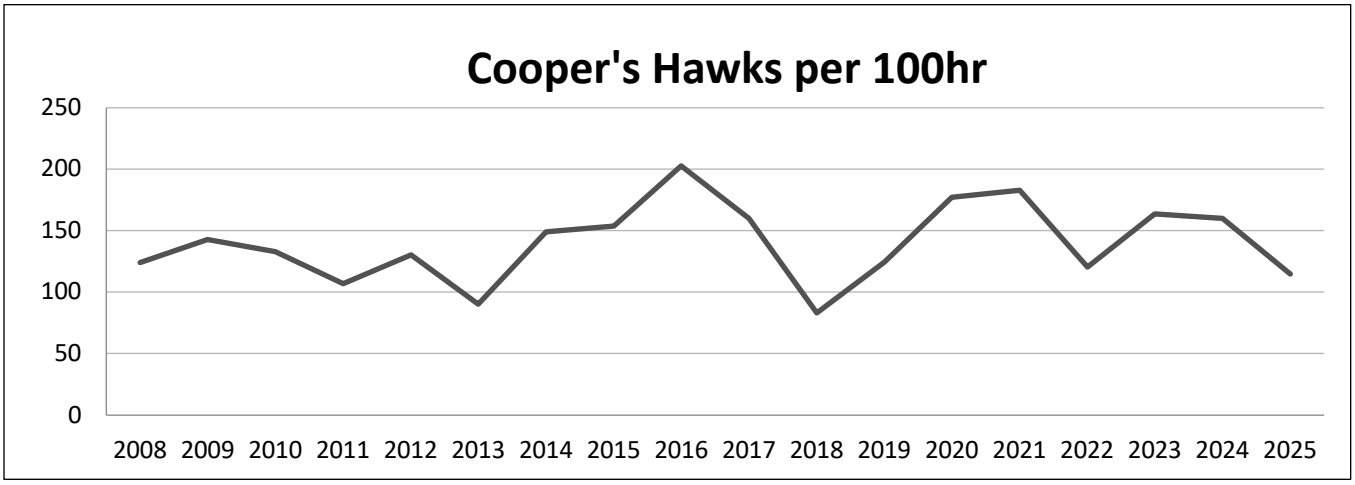

Figure 4. Abundance of Cooper's Hawks reported at the Jewel Basin Hawk Watch site, corrected for effort (birds/100hr), 2008-2025.

American Goshawk. 2025 Total: 19 (5/100hr) 18-yr Average: 35 (12/100hr)

We recorded American (formerly Northern) Goshawks on just 14 surveys (from 1 September through 23 October), and in well below-average numbers. Our peak count was just two birds, recorded on five separate days. Relative abundance (5/100hr) was also well below average. Our observed ratio of immatures (Joshua Covill to adults (367/100ad) was quite high compared to past years, in spite of completing surveys throughout the month of October. In some past years (e.g. 2023), bad weather has ended our survey season before the period when adult Goshawks are more prevalent in the flight.

Broad-winged Hawk. 2025 Total: 79 (22/100hr) 18-yr Average: 28 (9/100hr)

This species is now known to be an uncommon but regular migrant at western MT sites. We have now seen 496 Broad-winged Hawks over the history of the Jewel Basin count (Table 1), following the record 79 birds we recorded this year. These included a new all-time maximum daily count of 40, seen on 18 September. They were counted on 18 surveys between 25 August and 27 September, and at more than twice the average rate of previous years (22/100hr). We classified 75% to age; 42 (64%) were adults. Light morph birds made up 91% of the 65 birds identified to color morph, with just 6 dark morph birds (see Joshua Covill photo) seen.

Swainson's Hawk. 2025 Total: 3 (1/100hr) 18-yr Average: 2 (1/100hr)

Seen at a rate of 1/100hr, the Swainson's Hawk continues to be a scarce migrant at the Jewel Basin site, averaging just two birds per year (Table 1). This year we saw three birds during two surveys (3 September, 13 September). Interestingly, all three birds seen this year were dark morph individuals.

Red-tailed Hawk. 2025 Total: 252 (71/100hr) 18-yr Average: 213 (74/100hr)

We recorded Red-tailed Hawks on 43 of our 51 surveys. This widespread and variable species has traditionally been the fourth-most abundant migrant at the Jewel Basin site, and one for which our data implied a slight upward trend overall from 2008 through 2020. However, this was the fifth consecutive year that our corrected abundance (71/100hr) was down from the 2020 peak (Figure 5). Our peak daily count was 23 birds on 18 September. We were able to assign an age class to 225 individuals (89%), with an observed ratio of 49imm/100 ad, up again from the low in 2023 (Figure 3), but still below our long-term average of 64imm/100ad. Dark morph birds comprised 15% of the 213 individuals we classified to color morph. We recorded just two "Harlan's" Red-tailed Hawks this season, an adult of each color morph (22 September, 6 October). (Juvenile Red-tailed Hawk photo by Jake Bramante)

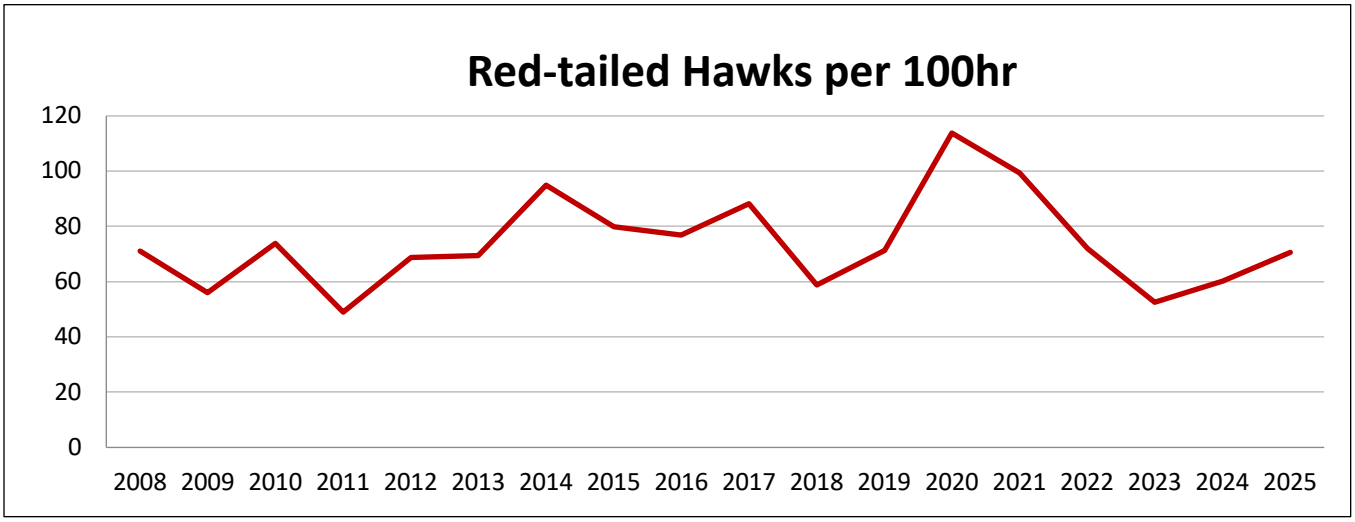

Figure 5. Abundance of Red-tailed Hawks reported at the Jewel Basin Hawk Watch site, corrected for effort (birds/100hr), 2008-2025.

Ferruginous Hawk. 2025 Total: 1 (<1/100hr) 18-yr Average: <1 (<1/100hr)

We have recorded just 16 individuals of this prairie species over the history of the count (Table 1). This year a single light morph adult bird was seen on 28 September.

Rough-legged Hawk. 2025 Total: 21 (6/100hr) 18-yr Average: 22 (7/100hr)

The Rough-legged Hawk is a boreal breeder and a common winter resident in western Montana. Not surprisingly, our annual counts have been highest when we have consistent coverage throughout October and/or into November. This we surveyed through 31 October and had essentially average numbers (Table 1), with 21 counted. They were seen on 12 surveys from 27 September through 31 October, with a high count of 3 birds on multiple dates. Just one dark-morph bird was seen; light-morph adults were the most common birds encountered, making up 57% of the total.

Golden Eagle. 2025 Total: 332 (93/100hr) 18-yr Average: 379 (131/100hr)

Local resident Golden Eagles always pose a challenge at our site, as they are present throughout the season. But our protocol to count only those birds clearly on a N-S migration path helps reduce (but not eliminate) the chance of biasing our survey data. This year we counted passing birds throughout the season (30 August – 28 October), with a peak of 42 counted on 17 October. This year our observed abundance of 93 birds/100hr was the fourth lowest in the history of our count (Figure 6), despite being able to survey into late October. (Peter Motyka photo)

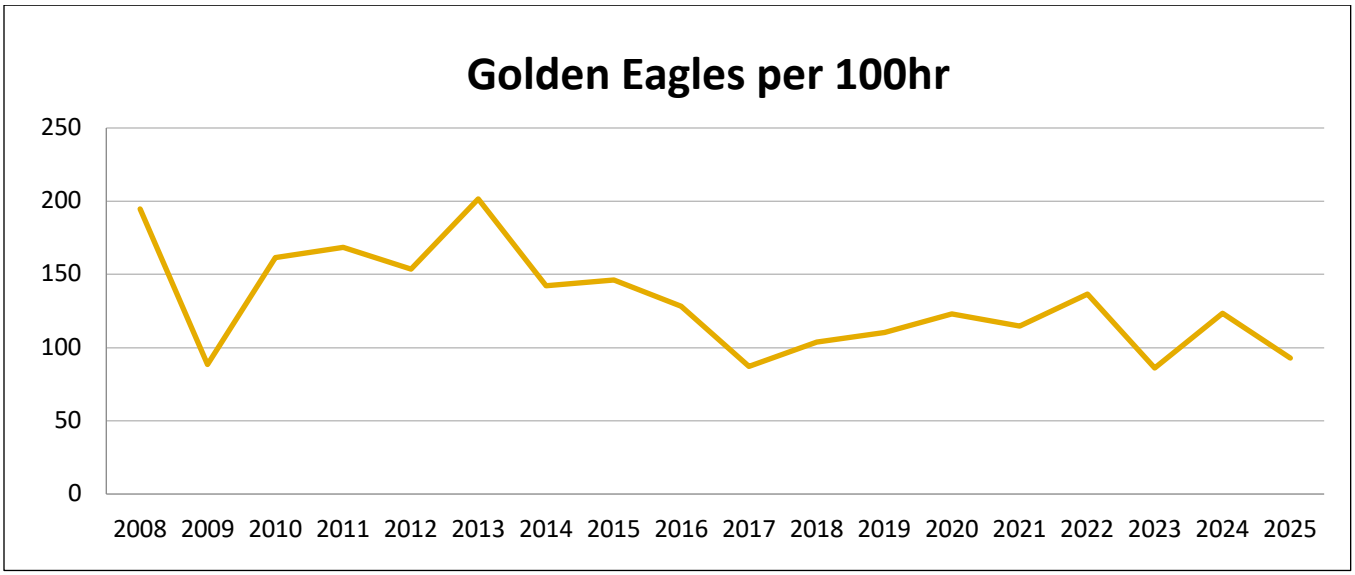

Figure 6. Abundance of Golden Eagles reported at the Jewel Basin Hawk Watch site, corrected for effort (birds/100hr), 2008-2025.

American Kestrel. 2025 Total: 106 (30/100hr) 18-yr Average: 79 (27/100hr)

We counted more than 100 American Kestrels for the third consecutive year, with 106 this season. This year we had them on 28 surveys from 25 August through 10 October. The high count was of 16 birds on 25 September. We classified the sex of 81(76%) of the birds. The ratio of 1.7 males per female (63:37) was near the high end of the range we have previously recorded at the site (1.1 – 1.9).

Merlin. 2025 Total: 38 (11/100hr) 18-yr Average: 28 (9/100hr)

Our Merlin count of 38 birds was above average. This year we saw them during 23 surveys, the first on 31 August, and the last on 23 October. Our daily high count was five birds on 20 September. We recorded just one (male) "Prairie" Merlin this year, and 2 "Black" Merlins. Although we did not explicitly record the majority of birds as the "Taiga" subspecies (just 4 this year), our previous experience has shown the vast majority of passage birds at this site belong to that subspecies.

Peregrine Falcon. 2025 Total: 24 (7/100hr). 18-yr Average: 14 (5/100hr)

Peregrines were seen on 14 surveys. The first was 30 August, and the last was 6 October; we had a peak count of seven birds on 23 September. Fifteen of the 21 birds classified to age were adults (71%).

Prairie Falcon. 2025 Total: 16 (4/100hr) 17-yr Average: 11 (4/100hr)

Prairie Falcons were seen on 14 surveys, 30 August to 24 October. We had two birds on 26 September and 8 October. Our total count of 16 was above average for this uncommon species at our site.

Gyrfalcon. 2024 Total: 0 17-yr Average: <1 (<1/100hr)

No Gyrfalcons were recorded at the Jewel Basin Hawk Watch site in 2025, marking the 17th time over 19 seasons that we have not seen this species. We only expect sporadic individuals of this rare winter visitor in those seasons when we can sample into early or mid-November. Our two previous records (in 2012 and 2016) were both during the first week of that month.

Classification Data. We continue to be able to classify a high percentage of the passing birds to species, age, and (for some species) sex, because so many of the migrants at the Jewel Basin site fly very near the observers, often enhanced by their approach to our owl decoy. This year we identified 98% (3,353) of all birds to species, including 98% (2,281) of all accipitrine hawks, 99% (356) of all buteos, 99% (409) of all eagles, and 97% (184) of all falcons. We recorded the age class of 82% (2,801) of all raptors, and sex of 42% of Northern Harriers, Rough-legged Hawks, American Kestrels, and Merlins (in combination). We do know that the seasonal distribution of our surveys can influence observed age ratios, with immature birds generally flying earlier in the season. It is important to note that our observed age ratios are indices, not estimates, and for some late migrant species such as eagles and Northern Goshawks, we may regularly overestimate the number of immatures in the flight. Our hope is that these data can continue to be looked at in combination with data from other migration sites across the West to clarify whether age ratios indicate any long-term trends in productivity. But our sample sizes for Sharp-shinned Hawks, Cooper's Hawks, Red-tailed Hawks and Golden Eagles may be large enough to truly identify such trends when considered in light of other migration sites.

Passage Rate. The vast majority of our 2025 survey efforts once again took place between the hours of 1000 and 1700, with daily peak rates generally between 1100 and 1600. Our season-long passage rate of over the history of our survey (Table 1). Average daily passage rates for our four most common species have shown fairly consistent season variation over time, as shown by analysis of 5-day mean counts over our first 12 years of data collection, with Sharp-shinned, Cooper's and Red-tailed Hawks peaking in the latter half of September, and Golden Eagles in mid-October (Figure 7). This pattern has continued to hold true over the past six years of surveys.

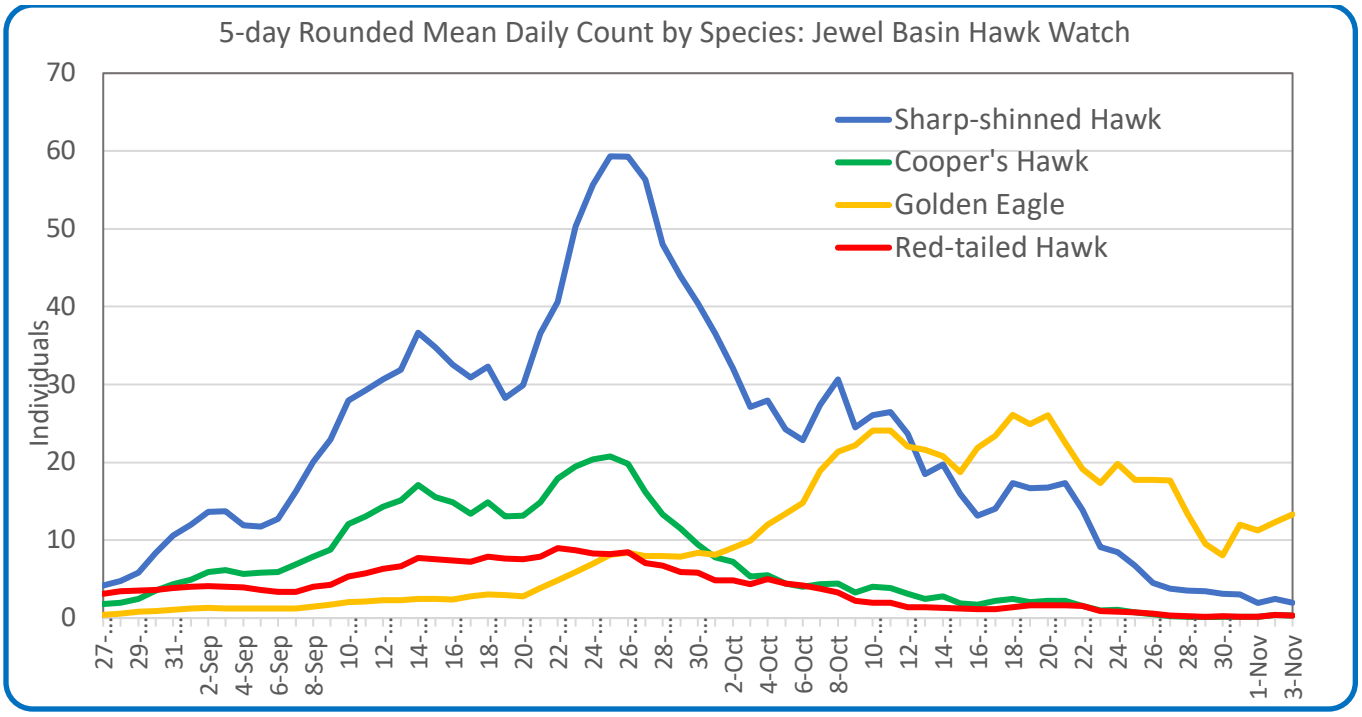

Figure 7. Five-day rounded mean daily count totals for the four most common raptor species at the Jewel Basin Hawk Watch, 2008-2019.

Discussion. Our 18 years of season-long data continue to indicate that the Jewel Basin site is one of the best places in the northern Rockies to monitor passing accipiters. It appears that with adequate coverage (and suitable weather), we can expect to consistently record and classify 2,000 – 4,000 birds (or more) annually at the site, although poor weather and access issues can sometimes suppress survey efforts. Accipitrine hawks consistently comprise the bulk (51%-72%) of the flight in the Jewel Basin, with 2,330 (68%) counted this year. This combination of an abundance of accipiters, and a diversity of other raptors seen, make the Jewel Basin a valuable addition to the network of monitoring sites in the state and the West. In 2024 we were approached by HMANA to include our data set in their Raptor Population Index efforts to identify regional and continental trends. We are excited to see the realization of our local effort contributing to continental trend analyses.

We have now counted 50,737 raptors of 18 species since beginning our pilot efforts in 2007. Our observers have come to consider 100-bird days as "great day on the ridge". Those days when we reach this admittedly arbitrary threshold are the days that keep our primary counters and our many volunteer observers excited about future visits. This year we averaged 67 birds per survey, with eleven days >100, and one day with >200 birds counted. Our best day (25 September) totaled 287 birds, our tenth highest one day total. But of course, we measure success not only by the number of birds we count, but also by the level of participation we are experiencing. With no fewer than 49 people involved in observations this year, and at least 16 days with additional interested visitors, we are clearly succeeding in engaging the public. This is perhaps the greatest benefit of continuing this project into the future, as long-term data, in combination with an engaged public, should enhance conservation decisions and actions moving forward.

Future Survey Recommendations. Our recommendations have varied little over the recent years of our survey effort. The value of survey data such as these is enhanced not only by comparison and synthesis with data from other sites, but also from long-term continuity. We believe that surveys should be continued annually at the Jewel Basin site, with target dates of 25 Aug through at least 7 Nov, weather permitting. We expect continued

community support for this project, based on the very favorable response to our results and outreach efforts over the past 19 years, particularly with volunteers. Flathead Audubon has assumed primary responsibility of the Jewel Basin Hawk Watch, and we very much depend on our continued partnership with Flathead National Forest.

While season long surveys of eight hours per day from the last week of August through the first or second week of November will maximize coverage, we have found that travel logistics, weather and volunteer availability will invariably impede thorough coverage. Because volunteer interest often wanes as the days get colder and hunting seasons begin, we will need to emphasize the responsibility of contracted observers to be available late in the season. To sustain a minimum of 35 to 45 surveys/year, we will continue to need sources of funding to ensure the consistent coverage throughout the season and may again need to split responsibilities between two paid counters. Every attempt has been (and should be) made to ensure that at least the period 1100-1600 each day with suitable weather is covered, as it typically represents more than 75% of the flight. Similarly, past analysis has shown that roughly 75% of the flight occurs between 15 September and 15 October (62% this year).

We have developed a summary (Table 2) of our seasonal coverage since 2011 to assess how well we have done at maximizing our survey efforts during our target season, from 25 Aug through 7 Nov (N=75 days). as weather and observer availability/interest would allow. Beginning in 2011, we made a concerted effort to track the number of days during that period where weather was suitable for counts, and the number (%) of days surveys were conducted. Suitable days have varied from just 43 during that 75-day window in 2017, to a high of 59 days in 2018. This year we had 56(75%) of the 75-day survey period with weather suitable for surveys, and we conducted surveys on 51 (91%) of those days (Table 2). We have never surveyed fewer than 76% of the suitable days since we began tracking this statistic.

Table 2. Seasonal survey effort, Jewel Basin Hawk Watch, 2011-2024. Percent of days by category by Season (25 Aug – 7 Nov; N=75) and by Survey Window (days between first and last survey each year, inclusive (68 in 2025).

Year(s):	2011 - 2015	2016-2020	2021-2024	2025
Suitable Days: Season (N=75)	67 - 77%	49-79%	57%	75%
Suitable Days: Surveyed	87 - 94%	76-98%	98%	91%
Surveyed Window Days: (N=49-81)	61 - 78%	49-79%	66%	75%
Window Days Bad Weather	15 - 23%	5-33%	22%	16%
Window Days No Access	5 - 9%	2-17%	2%	1%
Window Days Suitable No Survey	0 - 5%	0-11%	11%	6%
Window Days No Data	0 - 8%	0%	0%	0%

We have further defined our survey opportunity and effort during each annual “survey window”, or those dates from the first survey each year until the last (when access is no longer safe). This survey window has varied from a low of 52 days (2020), to a high of 81 days in 2016, when our last survey was l3 November. This year that window was 68 days (25 August – 31 October) and we completed surveys on 51 (75%) of those days, including all but four days with suitable weather and safe access. Extreme weather and dangerous access negated any surveys after 31 October. See Appendix B for a summary of those days (and reasons) that surveys were not conducted. Our continued ability to conduct surveys on most suitable days is a testament to outreach efforts and

our growing pool of qualified observers, for a site with moderately difficult access and without a season-long, full-time onsite observer.

Flathead Audubon continues to offer field trips and one on one training for individuals interested or with experience in raptor observations. In addition to public field trips, Jess Garby guided 2 high school conservation groups for a day on the ridge. We have had 50 people serve as primary counters for at least one survey since this project began and have a solid base of more than a dozen experienced local observers still available, including 16 who have served as primary observers 10 or more (10-134) times. With each passing survey season, we ignite a "spark" in additional individuals that return in subsequent years. We still plan to contract with at least one individual to cover up to 35 survey days/season in future seasons, to ensure that we continue to maximize efforts when weather and access allow. Montana Audubon staff have been involved as counters in the past and we hope and expect that partnership to continue, improving training and coverage.

Summary. The U.S. Forest Service is a primary forest steward in the Northern Rockies. Our efforts at this monitoring site indicate that it is an excellent site to monitor the migration and age structure of regional populations of forest-dwelling accipitrine raptors (e.g. Sharp-shinned Hawk, Cooper's Hawk, American Goshawk). Monitoring results from this site complement data collected at other raptor monitoring sites in the state and region, and we are now entering our data directly into the www.hawkcount.org website to make them available to the public and to other researchers, in addition to our annual reports. Our long-term data has been used as part of the HMANA Raptor Population Index effort describing population status and trends at broader scales. Because this site allows close study of passing birds, we can track age and (for some species) sex ratios, in addition to overall abundance, indicating the health of populations (and therefore the health of forest ecosystems) over time. The accipiters passing this site are certainly reliant on both public and corporate timberlands; indeed, as they continue south from this site they pass over and through extensive corporate timber and USFS lands. We have observed that a large percentage of the passage birds at this site have full crops, indicating that these birds rely on local habitats to feed before proceeding on migration, though we have not quantified the extent of the phenomenon. Clearly, all the lands along this important migration corridor play a role in its continued value to these birds.

Montana Audubon and the FAS are committed to environmental education and developing citizen science opportunities. Because of its accessibility, the Jewel Basin Hawk Watch site offers exceptional opportunities to involve the local community and educate and inform them about the ties between sustainable forest management and bird conservation. It may also allow the Flathead National Forest, Montana Audubon and FAS to nurture a volunteer base for other bird monitoring efforts in the region. On-site education opportunities is another area of outreach to explore and expand in future years.

There are a few other components we continue to feel could be added to the Jewel Basin Hawk Watch to improve coverage, attract observers, and improve safety in 2026 and beyond, and to improve and expand on the scientific value of our efforts. We look forward to enhancing our partnership further for the 2026 field season and beyond:

- Many of the hawk watch sites in North America (including two sites in Montana) supplement their counting efforts with additional efforts to trap, band and release raptors to improve our understanding of migration patterns, distribution, longevity, plumage/molt, and more. There are now also multiple lightweight transmitter options that would work well to help identify connectivity between breeding and wintering areas of the Sharp-shinned Hawks passing the Jewel Basin site. Jess Garby, the Conservation and Education Coordinator for FAS has experience trapping raptors, as do several volunteers in the area. We have initiated a dialogue with Montana Fish, Wildlife and Parks, Flathead National Forest and the Hungry Horse District about initiating a pilot banding operation during the 2026 season, with a goal of banding and affixing transmitters on Sharp-shinned Hawks.
- Limited use of the Camp Misery cabin by our contracted primary observer and/or limited others for a portion of the survey season, with responsibilities and expectations explicitly stated (e.g. public outreach,

maintenance, winterizing). This would improve safety (fewer tired trips up and down the access road), coverage (based on being onsite with reduced travel time), and public outreach (presence for other Jewel Basin users). Logically, perhaps the cabin could be available from the time it is vacated by USFS seasonal staff until 10-15 October, under a signed agreement?

- Continued bear awareness training should accompany annual raptor ID and protocol training for volunteer and contracted primary observers. Training should also include the use of Trektellen software. Training would need to take place no later than mid-August annually.

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APPENDIX A. Daily count data, Jewel Basin Hawk Watch, 25 August – 31 October 2025. Species codes listed below table.

Date	Hours	TV	OS	BE	NH	SS	CH	NG	UA	BW	SW	RT	FE	RL	UB	GE	AK	ME	PG	PR	GY	UF	UE	UU	TOTAL	Birds/Hr
25-Aug	6.90			1	2	8	2		1	1		2					3								20	2.9
28-Aug	5.00					1																			1	0.2
30-Aug	6.10			5	1	24	12		2			3				2	3		1	1		3			57	9.3
31-Aug	8.70	1	**2**	1	1	36	7					3					4	1							56	6.4
1-Sep	6.00		1		1	12	7	**2**				1							1	1					26	4.3
2-Sep	7.10	1	1		1	38	9		1	1		5				2	2	1	1						63	8.9
3-Sep	7.00			1	6	45	12		1		**2**	4				1	1	2							75	10.7
4-Sep	7.50				1	10	6	1				1					3								22	2.9
5-Sep	7.25		1		1	17	2					1				1		1							24	3.3
6-Sep	9.10		**2**		8	47	20	**2**				5				6	9	1							100	11.0
7-Sep	7.00				6	32	5		3			4					2	2	1	1		1			57	8.1
8-Sep	3.70					17	6		1			1													25	6.8
9-Sep	7.50	1			3	47	18			1		16				2	1			1					90	12.0
10-Sep	7.00	1	1		1	28	11	1		2		3				1	1							2	52	7.4
11-Sep	7.90		**2**		1	27	16	**2**	2	1		10				7	6	1						2	77	9.7
12-Sep	6.80		1		4	44	15		1	3		14			2	1			1						86	12.6
13-Sep	9.20	1	1		7	56	10	1	1	2	1	14				1	4							1	100	10.9
14-Sep	6.50			2	1	57	9					15			1	3	2		1	1					92	14.2

16-Sep	7.70	1			3	30	13		1	1	7			1	1							1	59	7.7
17-Sep	7.30	1	1		3	36	24		1	3	9			3	3	1							85	11.6
18-Sep	8.60			2	2	60	**30**			**40**	**23**			2	7	1	2						169	19.7
19-Sep	6.00				1	17	3	1	2		2				4								30	5.0
20-Sep	8.40		1	3	4	86	28		1	10	11			3	6	**5**	2						160	19.0
21-Sep	4.00					3								4									7	1.8
22-Sep	7.00			2	1	9	4			1	1			1									19	2.7
23-Sep	7.90			1	1	35	9		5	5	6			3	1								66	8.4
24-Sep	9.10			3	5	98	22		3	3	11			7	8		3	1				1	165	18.1
25-Sep	8.90	1	1	2	2	**19** **1**	29		6	2	16		1	10	**16**		**7**	1				2	287	32.2
26-Sep	6.50			2	1	12	13	1		1	2			5		1		**2**				2	42	6.5

APPENDIX A (cont'). Daily count data, Jewel Basin Hawk Watch, 25 August – 31 October 2025. Species codes listed below table.

Date	Hours	TV	OS	BE	NH	SS	CH	NG	UA	BW	SW	RT	FE	RL	UB	GE	AK	ME	PG	PR	GY	UF	UE	UU	TOTAL	Birds/Hr
27-Sep	6.70			5	3	63	12		2	1		3		1		3	1	1	1						96	14.3
28-Sep	7.25		**2**		**9**	81	7		1			5	**1**			3		4		1		1			115	15.9
29-Sep	6.50			1	1	96	17	**2**	2			8				4	3	1							135	20.8
1-Oct	3.00					4	1					1				3									9	3.0
2-Oct	6.00					13	3	1								5		2						1	25	4.2
3-Oct	7.30			1		52	7		3			10				20	3		1	1					98	13.4

5-Oct	8.00			3	2	10	4					8			19			1	1						48	6.0
6-Oct	7.10			4		25	1		1			4			25			1					3		64	9.0
7-Oct	8.50			2	1	62	5	1		1		4		1	18	4	3						1		103	12.1
8-Oct	7.80			4	2	122	2		1			6		1	31	3	1		**2**						175	22.4
9-Oct	7.20				6	24	5		1			3		1	3	2	1								46	6.4
10-Oct	8.50			1	2	102	2					4		**3**	9	3	3		1						130	15.3
15-Oct	6.00			1		2								**3**			1								7	1.2
17-Oct	7.25			3								1			**42**										46	6.3
18-Oct	6.90			5		10			1			1			34		1								52	7.5
21-Oct	6.30			2		12		1	2					**3**	4		2								26	4.1
22-Oct	6.50			4	1	12	1	1				1		1	6										27	4.2
23-Oct	7.35			**12**	1	15	1	**2**	1			1		1	20		1					1			57	7.8
24-Oct	6.00					18			1			2			11				1				2		35	5.8
28-Oct	6.00			1		5								1	6										13	2.2
30-Oct	6.90				1									2											3	0.4
31-Oct	6.20			4		1			1					**3**											9	1.5
Totals	356.90	8	17	78	97	1852	41 0	19	49	79	3	25 2	1	21	33 2	10 6	38	24	16	0	5	1	18	3431		9.6

Species Code:

TV Turkey Vulture UA Unidentified Accipiter GE Golden Eagle UE Unidentified Eagle

OS	Osprey	BW	Broad-winged Hawk	AK	American Kestrel	UU	Unidentified Raptor
BE	Bald Eagle	SW	Swainson's Hawk	ML	Merlin		
NH	Northern Harrier	RT	Red-tailed Hawk	PG	Peregrine Falcon		
SS	Sharp-shinned Hawk	FH	Ferruginous Hawk	PR	Prairie Falcon		
CH	Cooper's Hawk	RL	Rough-legged Hawk	GY	Gyrfalcon		
NG	Northern Goshawk	UB	Unidentified Buteo	UF	Unidentified Falcon		

APPENDIX B. Dates and causes for those days where surveys were not conducted, Jewel Basin Hawk Watch, 25 August-7 November 2025

Date	Conditions
26 Aug	Conditions suitable, but **no survey** conducted (no observer available)
27 Aug	Conditions suitable, but **no survey** conducted (no observer available)
29 Aug	**Weather** conditions unsuitable for survey (rain clouds all day)
15 Sep	**Weather** conditions unsuitable for survey (ridge encased in clouds)
30 Sep	**Weather** conditions unsuitable for survey (ridge encased in clouds until late afternoon)
4 Oct	**Weather** conditions unsuitable for survey (clouds, then rain showers)
11 Oct	Conditions suitable, but **no survey** conducted (observer left early, then it cleared)
12 Oct	**Weather** conditions unsuitable for survey (rain/snow all day)
13 Oct	Conditions suitable, but **access** limited/restricted by downed trees across road
14 Oct	Condition marginally suitable (sunshine most of day), but **no survey** conducted
16 Oct	**Weather** conditions unsuitable for survey (snow, low clouds)
19 Oct	**Weather** conditions unsuitable for survey (snow, low clouds)
20 Oct	**Weather** conditions unsuitable for survey (snow, low clouds)
25 Oct	**Weather** conditions unsuitable for survey (clear briefly in am, then snow, low clouds)
26 Oct	**Weather** conditions unsuitable for survey (ridge engulfed in clouds all day)
27 Oct	**Weather** conditions unsuitable for survey (ridgetop encased in low clouds)
29 Oct	**Weather** conditions unsuitable for survey (socked in until late afternoon)
1 Nov	**Weather** conditions unsuitable for survey (rain all day)
2 Nov	Conditions suitable, but **no survey** conducted (sun and strong winds in pm)
3-7 Nov	**Weather** conditions unsuitable (snow, low clouds) and icy road precluding safe **access.** (season over)