

MOUNT LORETTE, VICKI RIDGE AND STEEPLES FALL 2020

Peter Sherrington

Research Director, Rocky Mountain Eagle Research Foundation



www.eaglewatch.ca

Summary and highlights

This was the 29th consecutive year that some form of fall count has been conducted by RMERF observers at Mount Lorette; it was the 7th consecutive count and 4rd complete count at Vicki Ridge where a first simultaneous extended count was conducted at the western edge of the ridge complex at the WT 68 site in addition the complete count at the Waterton 61 site, and it was the 12th consecutive extended reconnaissance count at the Steeples site in BC. Temperatures at Mount Lorette were cooler than average but were above average at Vicki Ridge, and both sites produced above average days with snow and rain. Winds at Mount Lorette and Vicki Ridge were again predominantly favourable SW to W but with significantly more days with strong to very strong winds.

At Mount Lorette the combined species total of 3218, counted over 53 days, was 31.1% below the long-term average for valid counts and was the sixth lowest valid combined-species count ever. The Golden Eagle count of 2619 was 17.8% below the long-term average and is the third lowest valid count ever. Sixteen raptor species were recorded, with 9 occurring in above-average numbers and 7 in below-average numbers. The high single-day Golden Eagle count of 275 on October 5 was 30.1% below average and seven other days had three-figure Golden Eagle counts but only 3 were above 200. The Golden Eagle immature:adult ratio of 0.32 at both Mount Lorette and Vicki Ridge and 0.31 at Steeples represents the third straight year of decline from the 2018 record high ratio. Of the 11 species occurring in sufficient numbers, 8 moved earlier than average, 2 were average and only 1 (Red-tailed Hawk) was later than average but only by 1 day and this may have been an observation anomaly. The combined species median passage date of October 6 was 7 days earlier than average and record high September counts for several species at both Mount Lorette and Vicki Ridge strongly suggest that the migration was in full-flow when the counts started on September 20.

The fourth complete Vicki Ridge count in SW Alberta was a combination of counts at WT 61 and WT 68, two kilometres to the west, that produced a record 4823 migrants of 18 species in 52 days. This included a count of 2569 Golden Eagles that that was 50 fewer than at Mount Lorette, and the median passage date for the species was 7 days later than at Mount Lorette on October 14. The Golden Eagle immature:adult ratio was 0.36, identical to that at Mount Lorette. Route selection between the two sites proved to be dependent on the velocity of the westerly winds with strong winds favouring the western (WT 68) route. The pattern of cumulative-difference graphs between the Mount Lorette and Vicki Ridge counts proved to be remarkably similar for the last three counts.

The Steeples site on the western flanks of the Rocky Mountains near Cranbrook, BC was severely curtailed by both the weather and the work schedule of the principal observer with the 23-day count yielding a total of only 125 migrants (-67.5%) of 7 species. Only 54 Golden Eagles were counted but the immature:adult ratio of 0.31 was only 0.01 lower than at Mount Lorette and Vicki Ridge. There were only two brief periods of significant movement (2 days and 1 day) but each coincided with days of bad weather at both Mount Lorette and Vick Ridge and may represent birds displaced to the western flank of the Rockies by the weather.

Introduction

The Mount Lorette site is located in the Kananaskis Valley in the Front Ranges of the Rocky Mountains (50°58'N 115°8'W) 70 km due west of Calgary and immediately north-east of the Nakiska Ski Hill on Mount Allan. At this point the valley trends north-south and cuts obliquely across the NW-SE oriented trend of the Front Ranges. To the east of the observation site the Fisher Range has an average elevation of about 2500 m with Mount McDougall rising to 2726 m. Mount Lorette itself is 2487 m and is a geological continuation of the Fisher Range across the Kananaskis Valley to the NW. To the west the mountains of the Kananaskis Range are somewhat higher and include Mount Kidd (2958 m), Mount Bogart (3144 m) and Mount Allan (2819 m). The observation site is in a cleared area on the valley floor known as the Hay Meadow at about 1433 m. The site allows 360° views of the surrounding mountains and permits monitoring of raptors moving along the mountain ridges to the east and west, and especially those crossing the valley between Mount Lorette and the north end of the Fisher Range. The site is unique in that it allows observation of approximately the same high percentage of a population of migratory Golden Eagles both in spring and fall at exactly the same site, which has in the past been occupied for up to 190 days in a year. When downslope cloud obscures these mountains an alternate site at Lusk Creek, 13 km NE of the Hay Meadow site, is used to observe birds moving along the westernmost foothills ridge that have been displaced to the east from the Front Ranges. Birds seen here when active observation is occurring at Hay Meadow are not included in the official count.

Table 1A summarizes the fall counts from 1992 to 2020 at the principal observation sites for each year, while **Table 1B** summarizes the counts conducted solely at the Mount Lorette site. Migrating Golden Eagles were first seen moving to the NW over Mount Lorette on March 20, 1992, and the first extended (33 day, 280 hour) count was conducted there the following fall that yielded 2661 migrant raptors of which 2044 were Golden Eagles¹. Subsequently full-season fall counts (averaging 88 days, 865 hours) were conducted annually at Mount Lorette to 2005 with the exceptions of 1997 when a full count was conducted at Plateau Mountain and 2002 when serious illness of a key member of the team reduced the count to just 14 days. From 2006 to 2009 the principal fall observation site was moved to the Piitaistakis-South Livingstone location close to Frank in the Municipality of Crownsnest Pass in SW Alberta, during which time extended comparison counts were conducted at Mount Lorette during the main period of Golden Eagle migration. The Lorette counts in 2006, 2007 and 2008 lasted for 32 days, 25 days and 30 days respectively and are considered to be too short for valid statistical comparison with previous counts from which data from a standard 57-day count period September 20 to November 15 have been recalculated. The only exception is 2009 where a 46-day count from September 20 to November 9 has been included. The period September 20 to November 15 captured an average of 97% of the total Golden Eagle count at Mount Lorette between 1992 and 2005. Long-term averages of several other raptor species, however, will differ more widely from full count statistics where significant movement usually occurs before September 20 (e.g. Red-tailed Hawk) or after November 15 (e.g. Bald Eagle). In this report data variances (number, median passage dates, age ratios) are given for the period September 20 to November 15 for averages of the 22 years 1993-1996, 1998-2001, 2003-2005 and 2009-19.

At Mount Lorette this season observers spent a total of 53 days (552.6 hours) of a possible 57 days at the site between September 20 and November 15 (**Table 2**), the days and hours being 2.4% and 1.1% below average respectively. A fourth full count of 52 days (515 hours) was conducted on Vicki Ridge near Beaver Mines, Alberta between September 20 and November 15 (**Table 8**). Vicki Ridge is located 17 km SSE of the Piitaistakis-South Livingstone site and monitors many of the birds that would have passed south along the Livingstone Range over that site. The days and hours are equal to and 15.7% above average of the last three years respectively. Because of a combination of the observer's teaching commitments and poor weather the Steeples site on the western flanks of the Rocky Mountains near Cranbrook, BC, was only occupied for 23 partial days (71.5 hours) between October 2 and November 15 (**Table 12**). The days and hours are 30% and 43.6% below average respectively.

Table 14 summarizes the results from all three counts. **Table 16A** compares median passage and age ratio data between Mount Lorette and Vicki Ridge and **Table 16B** compares the percentage occurrences of raptor groups between the 3 sites.

Throughout the report the term juvenile refers to birds that were fledged in the current year, in this case 2020; subadults are birds that are not juvenile but have not yet achieved their final adult plumage and the term immature refers to any age-identified bird that is not an adult, i.e. undifferentiated juvenile and subadult birds.

Detailed daily summaries of these counts and counts from past years can be accessed on a blog published on the RMERF website at www.eaglewatch.ca.

Mount Lorette, Alberta

Weather

Table 3 summarizes the season's weather. As with the previous 2 fall counts four days, October 21 and 23 (snow) and November 5 (rain) and 10 (snow), were lost to persistent precipitation that completely obscured the mountains. This is 24.1% above the average for 2011-2019 and a further 3 days (-20.6%), were significantly shortened because of the weather. A record total of 25 active days saw precipitation (15 snow, 10 rain) which is 85.4% above the average of the previous nine years: snow days were 154.7% above average and rain days were 30.4% above average. The overall average daily maximum temperature was 7.2 °C which is 7.6% lower than the average of the last nine years. The average high temperature in September was 13.8 °C (2.3% below average), in October it was a cool 7C (-9.5%) and in November it was 2.5°C (-13.1%). The highest maximum temperature was 20 °C on September 29, the lowest minimum temperature was -23 °C on October 25, and on 14 active days the temperature failed to rise above freezing, which is 154.9% above the average of the last 9 years.

Wind data were taken from the Environment Canada Nakiska Ridgetop weather station situated 4 km west of the Hay Meadow site on Olympic Summit (Mount Allan) at 2543 m. Ridge winds were from the SSW-W 77.4% of the time (7.4 % above average) and variable (which were often light and generally had a significant easterly component) on the remaining 12 days (22.6%, 446.8% above average). Wind directions favourable to migration therefore generally prevailed throughout the count. These winds were calm to light (0-10 km/h) 9.4% of the time (33.4% below average), light to moderate (1-40 km/h) 9.4% of the time (58.1% below average), moderate (11-40 km/h) 3.8% (76.1% below average), moderate to strong (11-100 km/h) 45.3% (71.4% above average), and as strong to very strong (40-100+ km/h) 24.5% (38.7% above average). The strongest winds were experienced on November 3 when gusts were continuously above 110 km/h with a maximum gust at noon of 164 km/h.

No days were either completely cloudless or had a maximum cloud cover of up to 20% compared to an average of 7.9%. Cloud cover of between 80 and 100% occurred 17% of the time (30.3% above average). Most other days saw wide diurnal variation in percentage cloud cover with a record 40 days (64.2% and 19.2% above average) reaching a maximum cover of 100%. On most active days the cloud cover generally produced good observing conditions. The eastern ridges were 40-100% occluded on 9 active days (17%, 13.8% above average) and the western ridges were 40-100% occluded on 17 days (32.1%, 21.7% above average).

In summary, moderate La Niña oceanic conditions prevailed in the Pacific Ocean to the west of the British Columbian coast throughout the count that produced cooler temperatures and above average snowfall and rainfall. Generally, however, observing and migration conditions were usually fairly good with above average favourable SW-W winds with significantly higher than average velocities, but also significantly higher days with variable, generally light to moderate

winds with a predominant easterly component that generally brought snow. Cloud cover was higher than average but occlusion of the eastern ridge system (Fisher Range and Mount Lorette) was only slightly higher than average whereas the western route (Kananaskis Range) was significantly more highly occluded as a result of the strong to very strong SW-W winds.

General flight dynamics *September 20 to November 15*

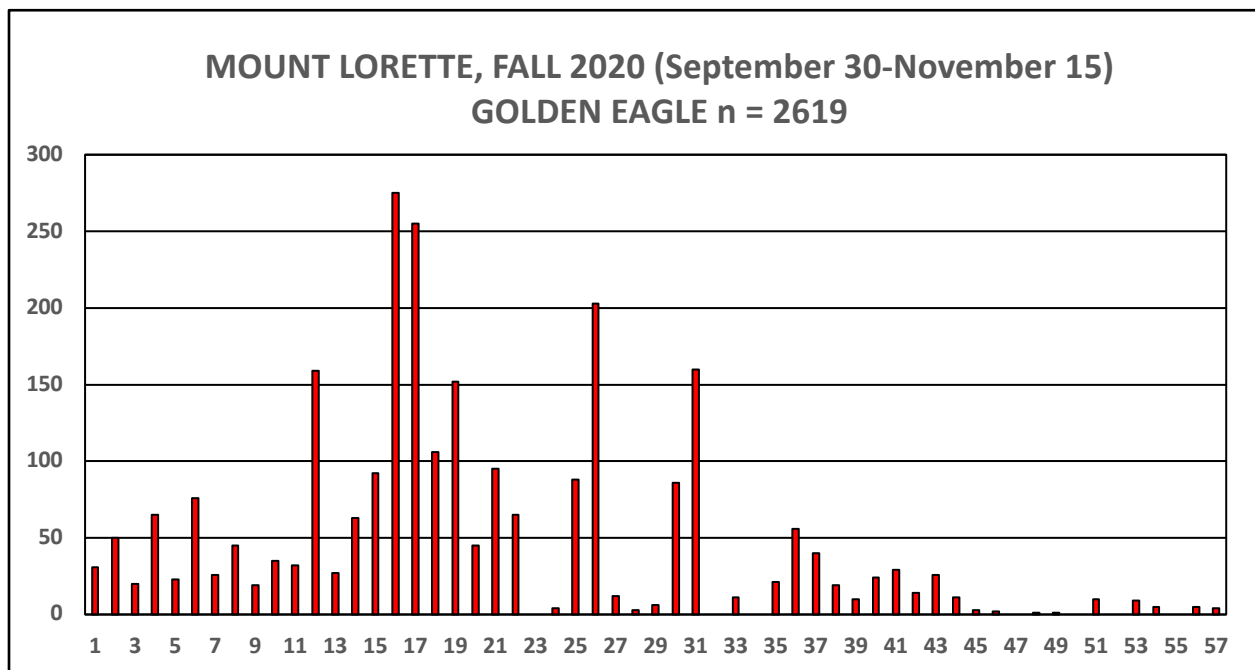
The combined species total of 2731 is 17.8% below the long-term average for valid counts and is the sixth-lowest valid count for the site (**Table 4**). The September count of 626 (**Table 5A**) was 29% above average; the October count of 2444 (**Table 5B**) was 19.8% below average, and the November count of 148 (**Table 5C**) was 52.1% below average. Migrant raptors were recorded on all of the 54 active days between September 20 and November 15 which is 0.52% above average (**Table 2**). Ten days (18.9%) between October 1 and 20 had a passage of at least 100 migrants, and the highest single-day count was 295 on October 4 which was 29.6% below the average fall high count. The most persistent movement was 1508 birds on 11 days between October 1 and 11 that comprised 46.9% of the total. The September total of 626 was 29% above average, the October total of 2444 comprised 75.9% of the total count but was 19.8% below average, and the November total of 148 was 52.1% below average (**Table 5**). The combined species median passage date of October 6 is 7 days earlier than the average for the count period September 20-November 15. Of the 11 species that occurred in sufficient numbers to calculate median passage dates (**Table 7**), 8 were earlier than average: Sharp-shinned Hawk and Broad-winged Hawk (7 days early), Northern Harrier and Merlin (6 days early), Northern Goshawk and Golden Eagle (5 days early), Osprey (3 days early) and Bald Eagle (1 day early); Cooper's Hawk and Rough-legged Hawk had average passage dates and only Red-tailed Hawk was 1 day later than average.

Of the 16 species recorded (**Table 4**), 9 occurred in above average numbers: Osprey 6 (+127.6%), Northern Harrier 14 (+40%), Cooper's Hawk 22 (+4.3%), Northern Goshawk (+59.6%), Swainson's Hawk 2 (+450%), Red-tailed Hawk 68 (+112.5%), Merlin 11 (49.4%), Peregrine Falcon 6 (+7.3%) and Prairie Falcon 4 (+76.6%); 7 occurred in below average numbers: Bald Eagle 207 (-10.7%), Sharp-shinned Hawk 104 (-18.9%), Broad-winged Hawk 4 (-27.3%), Rough-legged Hawk 26 (-45.1%), Golden Eagle 2819 (-21.8%), American Kestrel 2 (-13.7%) and Gyrfalcon 2 (-25.4%). Turkey Vulture and Ferruginous Hawk were not recorded having occurred previously on 1 and 9 previous fall counts within the current period respectively. The counts of Osprey (6) and Red-tailed Hawk (68) were new high counts for the site and Swainson's Hawk (2) and Prairie Falcon (4) equaled the previous high counts.

The final count was Turkey Vulture 0, Osprey 6, Bald Eagle 207, Northern Harrier 14, Sharp-shinned Hawk 104, Cooper's Hawk 22, Northern Goshawk 69, *Accipiter* sp. 6, Broad-winged Hawk 4, Swainson's Hawk 2, Red-tailed Hawk 68, Ferruginous Hawk 0, Rough-legged Hawk 26, *Buteo* sp. 6, Golden Eagle 2619, eagle sp. 29, American Kestrel 2, Merlin 11, Gyrfalcon 2, Peregrine Falcon 6, Prairie Falcon 4, *Falco* sp. 8, and indeterminate raptor 3, for a total of 3218 migrant raptors of 16 species.

Golden Eagle

Observers counted a total of 2619 migrating Golden Eagles on 50 active observation days between September 20 and November 15 (**Table 2** and **Figure 1**). The count is 21.8% below the long-term average of counts that are considered valid, and the number of days on which they occurred is 1.2% below average. The highest single-day count was 275 on October 5, which is 30.1% below the average maximum count. Seven days between October 1 and October 20 produced three-figure counts, but only three days were above 200: October 5 (275), October 6 (255) and October 15 (203). The September count of 422 was 19.4% above average, the October count of 2120 was 22% below average and the November count of 77 was 64.6% below average and was the 5th lowest November count ever. The migration dynamic for the species is discussed more fully in the section “Comparison of Eagle Species at Vicki Ridge and Mount Lorette” that forms part of the Vicki Ridge report.



(1 = September 20, 12 = October 1, 43 = November 1)

Figure 1

Golden Eagles comprised 81.3% of the total count this season which is lower than the last four years and results from significantly above-average counts of many of the other more common raptor species. The flight comprised 1458 adults, 164 subadults, 272 juveniles, 30 undifferentiated immature birds and 695 birds of unknown age yielding an immature:adult ratio of 0.32 that is 3.83% above average. The ratio of juvenile birds to subadults and adults was 0.17 which is 3.64% below average: both ratios indicate a fairly productive breeding season but well below the peak of three years ago.

The highest cumulative hourly counts were 346 (1500-1600), 342 (1300-1400), 337 (1200-1300) and 286 (1400-1500) MST. Four birds were recorded between 0600 and 0700 and 22 birds occurred after 1800. (**Figure 2** and **Table 6**). The highest single hourly counts were 48 between 1100 and 1200 on October 6, 48 between 1800 and 1900 on October 5 and 46 between 1000 and 1100 on October 8. The negatively skewed distribution curve approximates the cumulative hourly distribution curve recorded at the site over 12 years between 1992 and 2005 (**Figure 3**) with the same peak between 1500 and 1600, but which a flatter curve between 1200 and 1600

The species median passage date of October 7 was 5 days earlier than the average date; adult birds were 9 days later than average on October 5, while immature birds were 1 day earlier than average on October 7. Subadult birds were 1 day earlier than average on October 8 and juveniles were coincident with the average date on October 7.

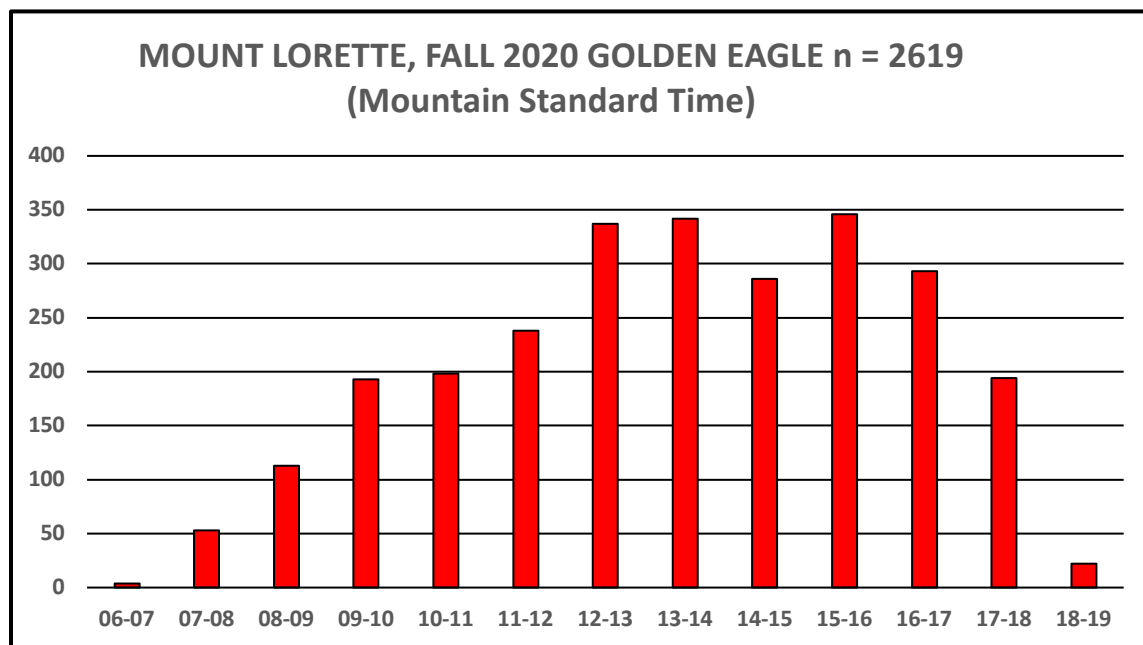


Figure 2

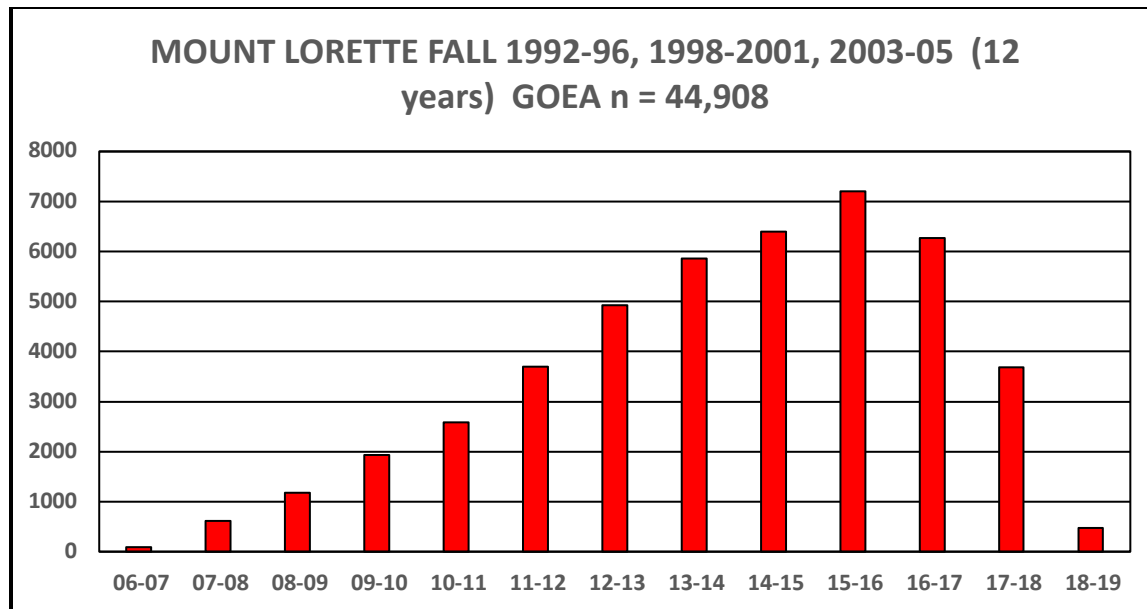


Figure 3

Fall Golden Eagle Trend

Figure 4 shows the linear trend of all counts at the site from 1993-2020 excluding 2002 when a full count was not possible, while **Figure 5** shows the trend excluding 2002 and the short counts of 2006, 2007 and 2008. Both show a clear diminishing trend with the removal of the short counts ameliorating but not significantly altering the trend. From 2012 there was a three-year increasing trend to 2015 followed by a slight decrease in 2016, a slight increase in 2017 and a decrease to 2019 which was the second lowest valid fall count at the site. The current count shows a slight increase in numbers but does not significantly alter the overall declining trend for the species at the site seen since 1993. A similar trend is also seen in spring counts at the site after 1995. This declining fall trend was also seen at a number of other sites in western North America up to 2005². In the Rocky Mountains region, both Mount Lorette (1993-2005), and the Bridger Mountains (Montana) (1992-2005) showed marginally significant declining trends, the Manzano Mountains (New Mexico) (1983-2005) showed a significant decline (especially since 1996), and the Wellsville Mountains (Utah) showed a significant decline since 1993. In the Intermountain Basin region the Goshute Mountains (Idaho) (1983-2005), Lipan Point (Arizona) (1991-2005) and the Grand Canyon combined count (Arizona) (1997-2005) all showed significant declines, while Boise Ridge (Idaho) (1993-2005) showed a non-significant increasing trend. With the exception of Boise Ridge (which has an average count of only 52 birds) the declines at all sites started in the early to mid-1990s.

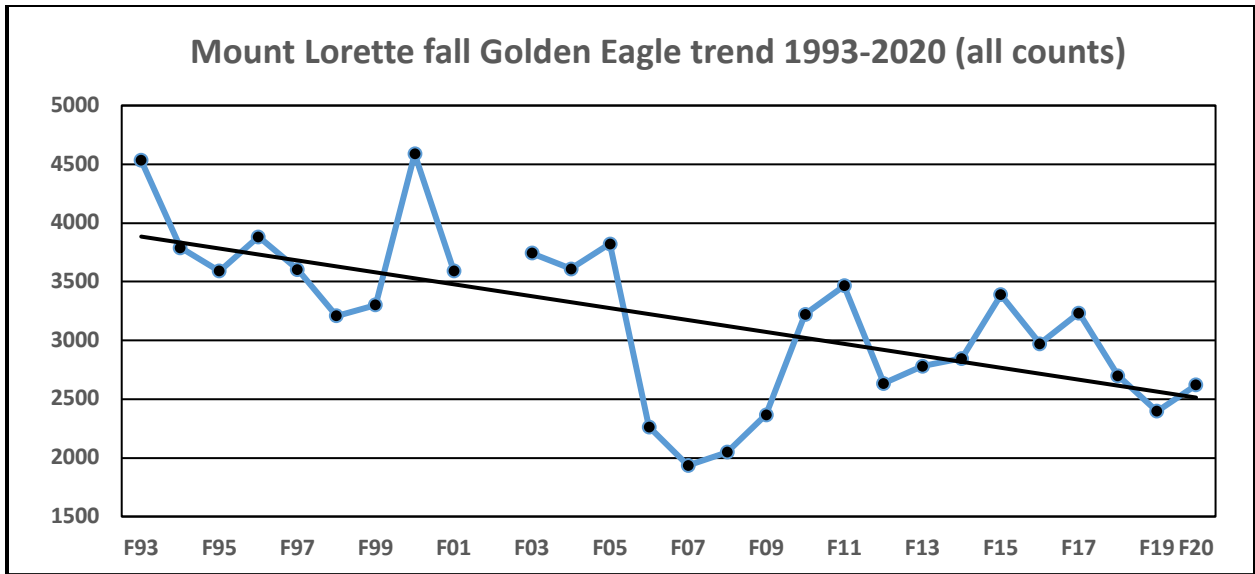


Figure 4

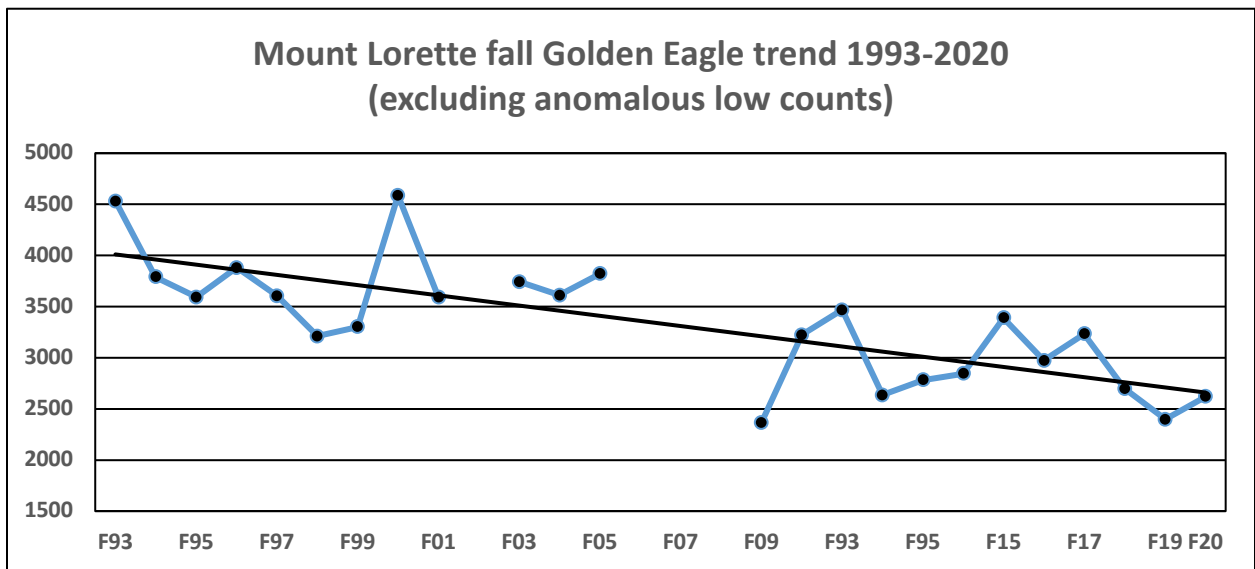


Figure 5

Golden Eagle Age Analysis

Figure 6 shows the trend of fall immature:adult ratios since 1994. Note that the 1997 count was at Plateau Mountain and the 2006-9 counts were at Piitaistakis-South Livingstone with the rest conducted at Mount Lorette. As the age ratios were found to be very similar between counts at Plateau Mountain, Piitaistakis-South Livingstone and Mount Lorette, it is reasonable to combine data from three sites along the migration trend: when plotted, the points form a consistent trend pattern. There is a generally increasing trend to 1999, followed by a decrease to 2002, then a steady increase to 2007 followed by a decrease to 2012. The 2013 count showed the start of the next rising trend and, after a slight decline in 2015, the 2017 ratio represented the height of the latest rising trend. It is interesting to note that the 2017 ratio of 0.49 was only slightly lower than the culmination of the previous cycle in 2007 that was observed on the Piitaistakis-South Livingstone count. The 2018 ratio, although still high, marked the beginning of the next diminishing trend which was extended by the 2019 count and the 2020 count further extends this trend. These trends (which are weakly paralleled by the spring trends) almost certainly reflect the reproduction cycles of the northern Snowshoe Hare population^(3, 4, and 5). It is interesting to note that the fall 2000 spike in numbers (**Figures 4 and 5**) occurred a year after the apparent peak in the snowshoe hare cycle and may represent a more complete southward movement of a population at its peak resulting from an increasing dearth of a fall and winter prey species. This also raises the possibility that part of the apparent overall decline in the species seen at the site may result from progressively more birds wintering north of the counting sites as hare numbers recover (“shortstopping”), but even allowing for this it appears that numbers counted during the second cycle (i.e. after 2000) are significantly lower than the first (<1993-1999). The last rising trend peaked in 2017, exactly 10 years after the previous peak in 2007. The cycle peaks seen during the 28 years of Alberta Front Range counts are 1999, 2007 and 2017 with 8 and 10 years respectively between the peaks.

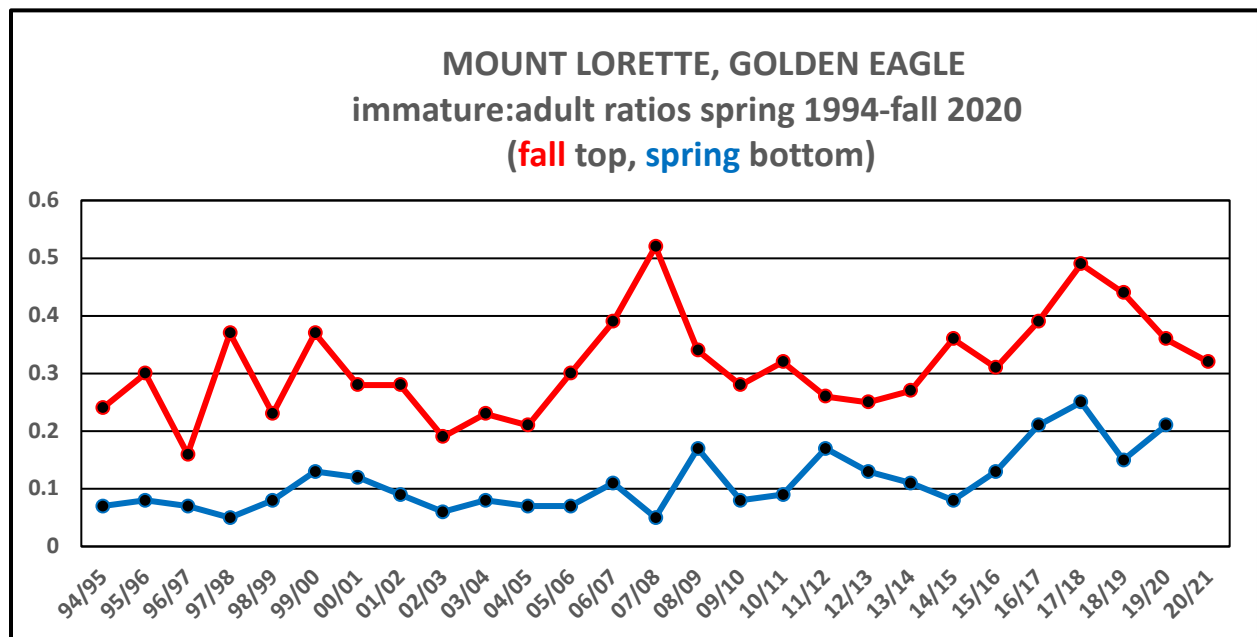
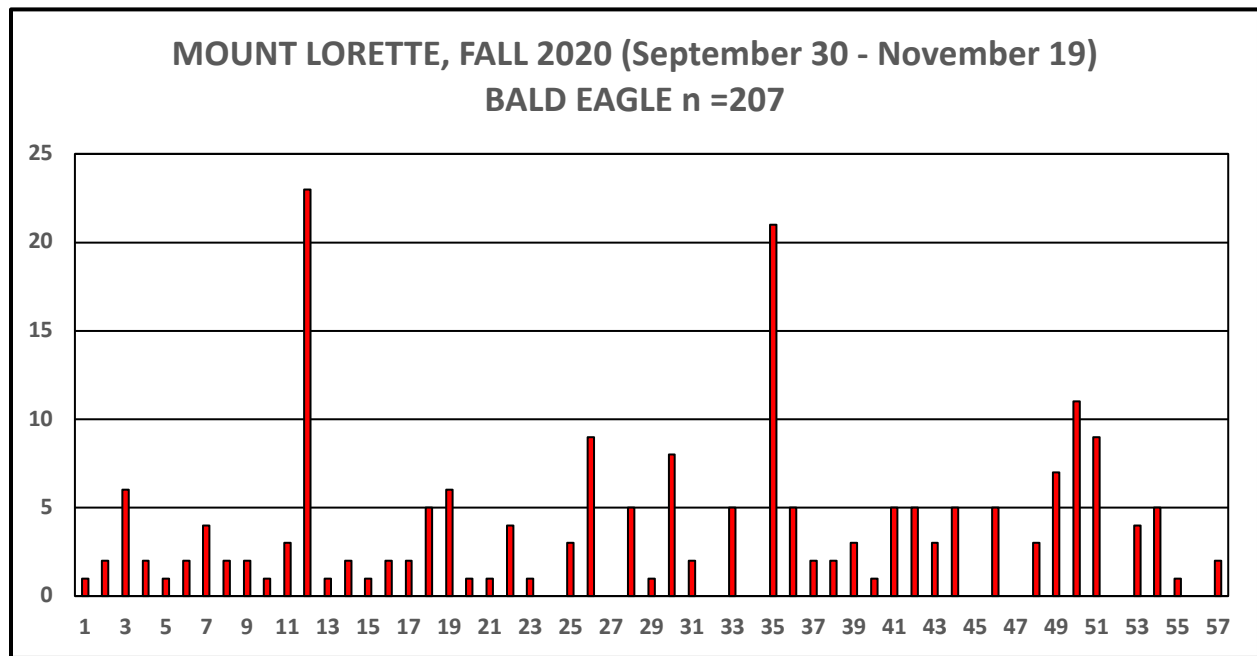


Figure 6

Bald Eagle

The count of 207 birds seen on 49 days between September 20 and November 15 was 10.7% below average (**Figure 7**). All 12 counts since 2009 have been lower than those of 1993-2005 with the exceptions of 1998 (174 birds) and 1999 (193 birds), and it is possible that increasingly warm autumns have resulted in water bodies to the north remaining ice-free later in the year and this has resulted in delayed southward migration of the species. The idea that on mild years the species migrates later appears to be borne out by the high number of south-bound Bald Eagles seen after November 25 at the Beauvais Ridge count in 2011 and early 2012 documented in the fall 2011 report. The highest single-day count was 23 on October 1 which is 2.3% above the average high count for the site. The second highest count was 21 on October 24 and the 11 birds seen on November 8 was the only other day when more than ten birds were seen which formed part of a three day peak of 27 birds. Otherwise the species regularly occurred in low numbers throughout the count (**Figure 7**).



(1 = September 20, 12 = October 1, 43 = November 1)

Figure 7

The monthly counts (**Table 5**) were 26 in September (45.5% above average), 126 in October (-4.9%), and 55 in November (-22.9%). The flight comprised 115 adults, 44 subadults (5 subadult 3, 14 subadult 2, 6 subadult 1 and 19 undifferentiated subadult birds), 33 juveniles, 5

undifferentiated immature birds and 10 birds of undetermined age giving an immature:adult ratio of 0.71 that is very similar to the last two years' ratio. The number of juvenile birds suggests a fairly successful breeding season. The median passage dates for the species and for adult birds was October 22 and for immature birds was October 18, which were 1 day, 2 days and 2 days earlier than average respectively.

Other Species (Lorette age-ratio and median passage data are summarised in **Table 7** and are compared to data from Vicki Ridge in **Table 15**)

Turkey Vulture Not recorded. A single bird seen on September 20, 1998 remains the only fall record of the species at the site during the current count period.

Osprey A record 6 birds were counted between September 21 and October 15 with 2 birds occurring on September 21. The total is 63% above average.

Northern Harrier A total of 14 birds were seen on 11 days between September 21 and November 1. The count is 40% above average. The highest daily count was 3 on September 22 (29.4% above average). The median passage date for the species was September 27 which was 6 days earlier than the long-term average date. The flight comprised 6 adults (5 males, 1 female, 2 undifferentiated female/juveniles, 5 juveniles and 1 indeterminate bird. The immature:adult ratio was 0.83 which is 29.4% below average. The September count was 8 (+67.6%), 5 occurred in October (+0.9%) and the single bird seen in November was 200% above average.

Sharp-shinned Hawk A total of 104 birds were counted on 26 days between September 20 and October 31. The count is 18.9% below average and the number of days on which they occurred is 6.5% below average. The highest single-day count was 33 on September 26, which is 39.9% above the average maximum count and was also the species median passage date, 7 days earlier than average. Adult birds were 3 days earlier than average on October 1. The flight comprised 21 adults, 3 juveniles and 80 birds of unknown age that gives an immature:adult ratio of 0.14 which is 64.1% below average although, as usual, the high percentage of unaged birds means that this figure should be treated with caution. The monthly counts were 70 in September (+31.4%), 34 in October (-50.5%), and 0 in November.

Cooper's Hawk A total of 22 birds moved on 14 days between September 22 and October 29, a count which is 25% below average, and the number of days on which they occurred is 9.6% above average. The highest daily count of 3 birds (-25%) occurred on September 22 and October 15. The September count of 9 birds is 14.7% below average, the October count of 13 birds is 31.8% above average and no birds were seen in November. The median passage date for

the species was October 1 which is coincident with the long term average date, and for adult birds was 4 days later than average on October 8. The flight comprised 6 adults, 0 juveniles and 16 birds of unknown age.

Northern Goshawk A total of 69 goshawks migrated on 32 days between September 20 and November 15. The total is 59.6% above average and is the highest count at the site since 2001, and the days of occurrence is 54.1% above average. The highest single-day counts were 5 on September 21 and 29, and on October 15, which is 12% below the average high count. The September count of 25 (+219.8%) is the highest September count ever at the site, the October count was 38 (+39.8%) and the November count was 6 (-1.6%). The median passage date for the species was October 6, 5 days earlier than average: adults were 4 days earlier than average on October 7 and juveniles were 12 days earlier than average on September 30. The flight comprised 27 adults, 10 juveniles and 32 birds of unknown age giving an immature: adult ratio of 0.37, which is 44.4% above average

Broad-winged Hawk Four juvenile light morph Broad-winged Hawks were counted: 3 on September 27 and 1 on September 28. The total is 27.3% below average and the median passage date of September 27 is 7 days earlier than average.

Swainson's Hawk Two adults, one light morph and one dark morph, occurred on September 20 which equals the previous highest count of 2 single birds on September 20 and 28 in 1995. The species has now been recorded on eight valid fall counts within the present count period.

Red-tailed Hawk The count of 68 birds on 27 days between September 20 and November 11 was the highest ever fall count at the site and follows last year's count of 11 birds that was the lowest ever. The count is 112.5% and the number of days seen is 83.3% above average respectively. The highest daily count was 13 on October 1, which is 93.2% above the average high count. The September count of 27 was 58.8% above average, the October count of 39 was 175.9% above average and is the highest ever October count, and 2 birds were seen in November that equals the highest ever November count and is 200% above average. The median passage date for the species was October 1 (1 day later than average), for adult birds it was September 29 (1 day earlier than average) and immature birds were 5 days later than average on October 5. The flight comprised 42 birds of the race *B.j. calurus*, 26 of which were light morphs (8 adults, 13 juveniles and 5 indeterminate birds), 10 were dark morph birds (6 adults and 4 juveniles), 5 birds were "Harlan's Hawks" (*B.j. harlani*) that comprised 1 adult and 2 juvenile dark morphs and 1 adult and 1 juvenile intermediate morphs, and 21 indeterminate birds of unknown race, or age that comprised 13 light morphs, 2 dark morphs and 5 undetermined morphs. The overall immature:adult ratio was 0.91 which is 106.2% above average.

There are a number of things that are anomalous about this Red-tailed Hawk count. Most serious is the age ratio of 0.91 that compares to a ratio of 0.13 at the Vicki Ridge site (where the birds are generally much closer to the observers). Juvenile Red-tailed Hawks are early fall migrants and in the Vicki Ridge area some start moving south in the second week of August. From information gleaned from complete counts at Mount Lorette and at Piitaistakis-South Livingstone it is clear that most young Red-tailed Hawks have moved south before the current starting count date of September 20 and with climate change this movement appears to be

becoming progressively earlier (as with several other species). Aging of high-flying Red-tailed Hawks when only the ventral surface is visible is difficult unless lighting conditions are ideal and it is probable that many of the juvenile birds were misidentified. Alternatively, it is possible that some resident birds lingered in the area much later than usual because of the mild conditions during the first half of the count and were erroneously counted as migrants (probably on more than one occasion). This would also have contributed to the anomalously high count at the site this season. It is also probably germane that for the first time ever at the site the number of Red-tailed Hawks seen in October (39) exceeded the count for Rough-legged Hawks (21).

Ferruginous Hawk Not recorded this season. Single birds have been recorded on eight previous counts.

Rough-legged Hawk A total of 26 birds moved on 14 days between September 25 and the very early terminal date of October 22. The count is 46.1% below average and is the fourth lowest count ever at the site; the number of days on which the species was seen is 26.7% below average. The single-day high count was 5 on October 15 which is 45% below the average high count. The September count of 5 was 144.4% above average and equals the third highest count for the month, the October count of 21 was 45.3% below average and the November count of zero was only the third time that the species had not been counted in the month. The median passage date of October 7 was 10 days earlier than average. The dark:light morph ratio was 0.25.

American Kestrel Single birds of unknown sex were seen on September 24 and October 8. The total is 13.7% of average and they were the first migrants seen at the site since 2017.

Merlin A total of 11 Merlins were counted on 7 days between September 24 and October 11. The total was 49.4% above average and the number of days seen was 10% above average. The highest single-day count was 4 on September 29 that was 158.8% above average and was the highest ever single-day fall count at the site. Seven birds moved in September (+152.5%) and 4 in October (-7.4%). The median passage date for the species was September 29, 6 days earlier than average. The flight comprised 9 birds ascribed to the race *F.c.columbarius* (1 adult male and 8 birds of indeterminate sex or age), and 2 birds of indeterminate race, age or sex.

Gyrfalcon Single grey morph birds were seen on October 6 and October 18. The total is 25.4% below average.

Peregrine Falcon A total of 6 birds were seen on 3 days between September 22, when 4 birds moved, and September 30. The total is 7.3% above average, the number of days is 34% below average and the single-day count is 109.5% above average and equals the previous highest ever single-day counts in 1998 and 2009.

Prairie Falcon Four single birds were seen on September 22, October 1, 5 and 20, a total that is 2.2% above average.

Unidentified Birds Unidentified small *Accipiters* 6 (-12%), 6 unidentified *Buteos* (1 light morph and 5 indeterminate morphs) (+55.3%), 29 Unidentified eagles (+369.1% and the second highest

count ever), 8 unidentified falcons (3 small and 5 large) (+363.2% and the highest count ever), and 3 indeterminate raptors (-22.4%).

Observers at Mount Lorette

Principal Observers Blake Weis (10 days), Lori Anderson (9 days), Graeme Dunlop (9 days), Caroline Lambert (9 days), Bill Wilson (7 days), George Halmazna (6 days), Joel Duncan (2 days), Dan Parliament (1 day).

Assistants Patrick Farley (7 days), Rick Robb (7 days), Cliff Hansen (6 days), Dan Parliament (6 days), Graeme Dunlop (5 days), Glenn Webber (5 days), Caroline Lambert (4 days), Sandy Graham (3 days), Joel Duncan (2 days), Annie Finch (2 days), Heinz Unger (2 days).

Acknowledgments: RMERF gratefully extends thanks to the Board, members and supporters of the Rocky Mountain Eagle Research Foundation for their continuing financial and logistical support, and especially for funding received through the Alberta Gaming and Liquor and Cannabis Commission, \$25,000 from the Calgary Foundation through the efforts of Deanna Cottrell, \$2,500 from the Bow Valley Naturalists with thanks to Peter Duck, from Marilyn and Gord Webber's generosity and work, \$1400 from the RBC Foundation and their \$5000 donation through ATB-Benevity which was topped by an extra \$750. We thank Rosemary Power who organized the count and compiled the initial field data from Mount Lorette, and Vance Mattson for compiling his data from the Steeples site. The Rocky Mountain Eagle Research Foundation also gratefully acknowledges the continuing co-operation of the University of Calgary Biogeoscience Institute of the Canadian Rockies and Foothills Field Station at Barrier Lake and the G8 Chair for Wildlife Studies at the University of Calgary

References

¹Sherrington, P. 1993 "Golden Eagle Migration in the Front Ranges of the Alberta Rocky Mountains" *Birders Journal* 2(4)

²Jeff P. Smith, Christopher J. Farmer, Stephen W. Hoffman, Gregory S. Kaltenecker, Kent Z. Woodruff, and Peter F. Sherrington 2008. *Trends in Autumn Counts of Migratory Raptors in Western North America: 217-251* In *State of North America's Birds of Prey*, edited by Keith L. Bildstein, Jeff P. Smith, Ernesto Ruelas Inzunza and Richard R. Veit. Nuttall Ornithological Club and the American Ornithologists' Union, Series in Ornithology No. 3, viii + 466 pp.

³Boutin S, C.J. Krebs, M.R.T. Dales, S.J. Hannon, K. Martin, A.R.E. Sinclair, J.N.M. Smith, R. Turkington, M. Blowe, A. Byrom, F.I. Doyle, D. Hik, L. Hoefler, A. Hubbs, T. Karels, D.L. Murray, V. Nams, M. O'Donoghue, C. Rohner, and S. Schweiger. 1995. *Population changes of the vertebrate community during a snowshoe hare cycle in Canada's Boreal Forest*. *Oikos*, 74: 69-80.

⁴McIntyre, C.L., and L.G. Adams. 1999a. *Reproductive characteristics of migratory golden eagles in Denali National Park, Alaska*. *Condor* 101: 115-123.

⁵Sherrington, P. 2003. *Trends in a migratory population of golden eagle in the Canadian Rocky Mountains*. *Bird Trends Canada* 9: 34-39.

Vicki Ridge, Alberta

Introduction

Vicki Ridge is a NNW-SSE oriented foothills ridge located 4.5 km WNW of the Hamlet of Beaver Mines in SW Alberta. It is 17 km SSE of the Piitaistakis-South Livingstone site and monitors many of the birds that would have passed south along the Livingstone Range in the fall. The high point of the ridge is 1670 m and most observation was conducted near the south end of the ridge at 1533 m (49° 27' 59" N 114° 15' 13" W). On very windy or other adverse weather days observation is conducted from the end of a well-site access road about 400 m immediately west of the southern end of the ridge at 1418 m. This has become the principal observation site for the last two counts. Access to the ridge itself is from the Seven-Gates Road which goes west from Highway 507 1 km NW of Beaver Mines. The ridge top is a very easy climb from the road and affords excellent 360° views. The ridge has been well-known to locals for a number of years as a good place to observe raptors but no systematic counts had been conducted there before 2014.

In 2014 the site was sporadically occupied on 11 days between October 5 and November 8 for a total of 37.28 hours at an average of 3.39 hours a day. The count yielded a total of 405 migrants of 13 species at an average rate of 10.87/hour (**Table 10**).

In 2015 a second count was conducted on the ridge with a fairly continuous coverage of 32 days (134.8 hours) between September 22 and November 15 during which time 1340 raptors of 15 species were counted at a rate of 9.94 raptors/hour (**Table 10**).

In 2016 a full (September 20-November 15) was planned but because of an unexpected but important circumstance I had to be away for 12 days between September 29 and October 10 and only 1 day's count was conducted during this period. The final count comprised 43 days (282.5 hours) between September 23 and November 15 but because of the aforementioned gap the statistical usefulness of the count was limited but it served as a useful extended reconnaissance and yielded 2868 migrant raptors of 18 species at a rate of 10.15 raptors/hour (**Table 10**).

The fall 2017 count of 52 days (418.9 hours) was the first "complete" count at the site. Birds migrating south above the eastern edge of Kyлло ridge which runs parallel to and west of Vicki Ridge can be monitored both from the ridge-top and from the well-site, but birds moving along the western edge of Kyлло Ridge cannot be seen. The western edge of Kyлло Ridge near or north of the Waterton 68 well (about 2 km W of Vicki Ridge) was monitored on 12 days (mainly between October 16 and 30) by Raymond Toal and Denise Cocciolone-Amatto, and by Gord Petersen and the results were combined with those from Vicki Ridge in order to get a clearer picture of fall movement along the complete ridge system.

Fall 2018 was the second complete count conducted at the site between September 20 and November 15 and comprised 50 days (-3.8% cf. 2017) and 434.9 hours (+3.8%). During the 2018 fall season, Vicki Ridgetop was occupied on 8 days, Waterton 61 wellsite for 45 days, Waterton 68 wellsite/western Kyлло Ridge for 9 days, Township Road 6-5 north of the ridge for 2 days and the Seven-Gates road east of the ridge for 2 days. On occasions 2 or 3 sites were occupied on a given day.

2019 was the third consecutive complete count at the site and involved 54 of a possible 57 days between September 20 and November 15 observing exclusively from the Waterton 61 Wellsite on the western Flank of Vicki Ridge. This was supplemented by 23 partial-day counts at the western edge of the ridge complex near the Waterton 68 wellsite on October 2-5, 7, 10, 15-23, November 6-8 and 11-15. The count produced a record 4641 migrant raptors of 18 species at an average rate of 9.63 raptors/hour and included 2778 Golden Eagles (**Table 10**).

2020 was the fourth complete count on the ridge that comprised 52 days (515 hours) observation from the Waterton 61 site at an average of 9.9 hours/day, and 39 days observation from the Waterton 68 site averaged 5.5 hours/day which gave a much fuller picture of the migration across the ridge complex.

Weather and count summary

Table 9 summarizes the weather at the site. A total of 5 days, October 17 and 21, and November 6, 7 and 8, were lost to snow, rain and fog that completely obscured the ridges. A further 8 days (15.4%) had reduced observation days because of poor weather. Twenty-four active days (46.2%) saw precipitation in the form of rain, snow, sleet, hail or fog, with rain falling on 11 days (21.2%), snow on 11 days (21.2%) and rain and snow on 2 days (3.8%). Smoke haze was

present on 8 days (15.4%), most persistently between October 4 and 10, but was never thick enough to interfere with observation. September high temperatures averaged 15.4 °C (range 10.5 °C to 23.5 °C), October averaged 8.4°C (range -13 °C to 23 °C) and November averaged 4.6°C (range -6 °C to -16 °C). The most common wind direction was WSW-W on 40 days (76.9%) followed by ENE-SSE on 10 days (19.2%), with 2 days variable (3.8%). The winds gusted to at least 40 km/h on 41 days (78.8%), and gusted between 70 and 100+ km/h on 20 days (38.5%). Only 1 day (October 2) was completely cloudless and 41 days (78.8%) reached a cloud cover of 80-100% that were principally the high-wind cloud forms altostratus, altocumulus and lenticular that often formed a “Chinook Arch”. In summary temperatures were above average throughout, precipitation was above average with equal numbers of rain and snow days and with a daily high snowfall of only 24 cm. Winds, mainly from the WSW-W, were significantly stronger than average but “upslope” (easterly) winds were also above average and were associated with most of the precipitation.

The final count, which is a combination of the Waterton 61 and 68 counts, was a record 4823 migrant raptors (**Figure 8**) of 18 species at an average rate of 9.36 raptors/hour which is 8.4% lower than the average of the previous three years (**Tables 8 and 10**). The count at the WT61 site (**Table 8A**) was 2607 migrants of 18 species on 52 days at a rate of 5.06 raptors/hour and comprised 54.05% of the combined count. The count and rate are 42.6% and 50.5% below the 2017-2019 average respectively when the counts were essentially only at WT61 occasionally supplemented by reconnaissance counts at WT 68, with the September, October and November counts 9.2%, 45.9% and 65.6% below the 1917-1919 average respectively. (**Table 10**). The count at the Waterton 68 site (**Table 8B**) was 2216 migrants of 16 species on 39 days at a rate of 10.25 raptors/hour and comprised 45.95% of the combined count.

The highest single-day combined-site count of 346 raptors, which included 274 Golden Eagles occurred on October 8 and is 26.4% below the average of the last 3 years. The count comprised 172 migrants (143 Golden Eagles) at WT61 and 174 migrants (131 Golden Eagles) at WT 68.

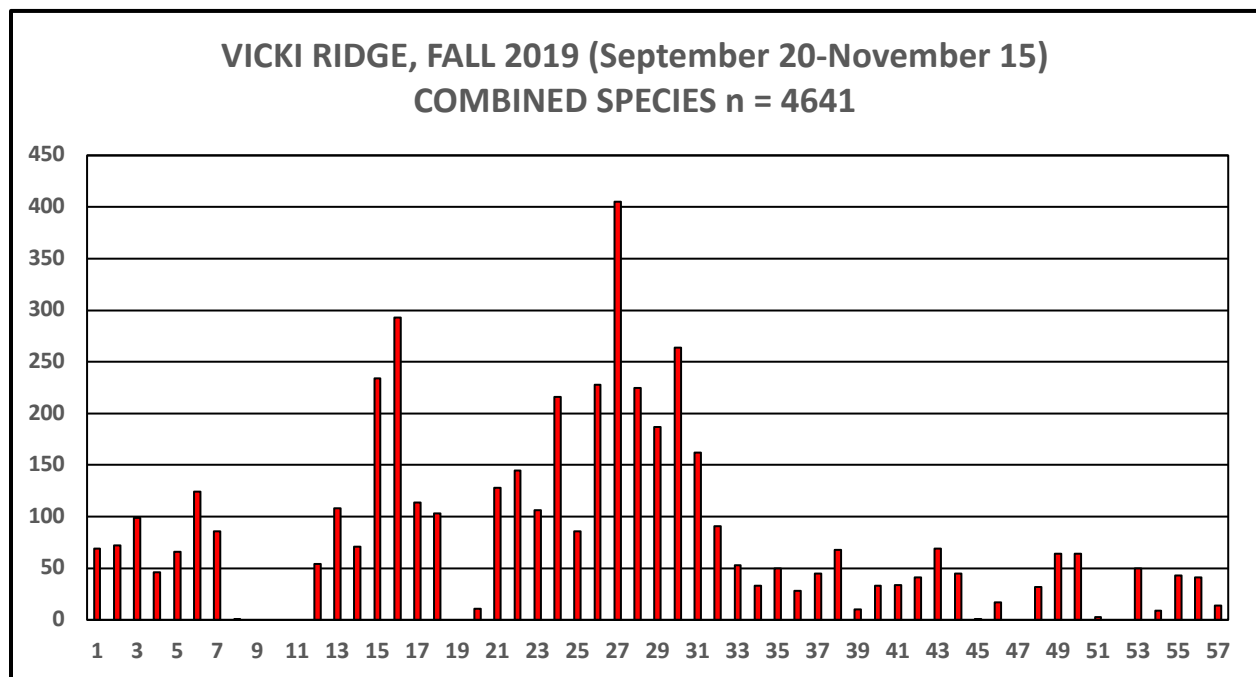
Table 9A correlates the counts at both sites on the 39 days when westerly winds prevailed and both sites were occupied. Overall a similar percentage of birds moved at both sites: 35.9% (14 days) when the higher count was at WT61, 38.5% (15 days) when the higher count was at WT68 and 25.6% (10 days) when the counts at both sites were equal or very close. During the 19 days when both sites were occupied and the winds peaked at 70 to 100+km/h, however, the comparison was 31.6% (6 days) when the higher count was at WT61 compared to 52.6% (10 days) when the higher count was at WT68 and 15.8% (3 days) when the counts at both sites were equal or very close. Strong to very strong westerly winds clearly result in migrants preferring the westerly route along the ridge complex. By contrast, for example, on October 2 light to moderate ENE-SE winds prevailed that resulted in 90 migrants being recorded at WT 61 but only 4 at WT 68.

Only October 23 (2.5 hours) failed to produce migrant raptors and the average daily combined-site count throughout the season was 92.75 birds. The combined-sites count in September produced 1180 migrants (the highest ever September count) at a rate of 9.8 raptors/hour (85% and 17.3% above average respectively), October produced 3333 migrants at a rate of 12 raptors/hour (4.2% and 14.1% below average respectively), and November produced a record

low 310 migrants at a rate of 2.7 raptors/hour (-27.4% and -34.4% compared to average respectively). (Table 10). Table 10A shows the comparison using only data from the WT 61 site that gives a total of 2607 at a rate of 5.06 raptors/hour (-42.6% and -50.5% respectively). The September total of 579 at a rate of 4.8 raptors/hour was 9.2% and 81.3% below average respectively, the latter figure reflecting the record number of hours spent at the site during the month. The October total of 1881 at a rate of 6.8 raptors/hour were both 45.9% below average and the November total of 147 at a rate of 1.3 raptors/hour was 65.6% and 106.4% below average respectively.

The combined-species, combined-sites median passage date was October 11, 4 days earlier than average and 4 days later than at Mount Lorette.

The final combined-sites count of 4823 migrants of 18 species, with variance from the 2017-19 average count in parentheses, was 6 Turkey Vultures (+500%), 6 Ospreys (-21.7%), 355 Bald Eagles (-12.8%), 26 Northern Harriers (+62.5%), 958 Sharp-shinned Hawks (+52%) , 149 Cooper’s Hawks (+80%), 106 Northern Goshawks (+1.3%), 7 unidentified *Accipiters* (+23.5%), 19 Broad-winged Hawks (-26%), 3 Swainson’s Hawks (+80%), 215 Red-tailed Hawks (+17.9%), 2 Ferruginous Hawks (-79.4%), 300 Rough-legged Hawks (-36.1%), 8 unidentified *Buteos* (-52%), 2569 Golden Eagles (+2.6%), 34 unidentified eagles (+92.5%), 16 American Kestrels (-5.9%), 25 Merlins (+27.1%), 1 Gyrfalcon (-78.6%), 10 Peregrine Falcons (-23.1%), 6 Prairie Falcons (=), 1 unidentified falcon (-50%) and 1 unidentified raptor (-40%) for a total of 4823 (+6.1%).



(1 = September 20, 12 = October 1, 43 = November 1)

Figure 8

Species Accounts

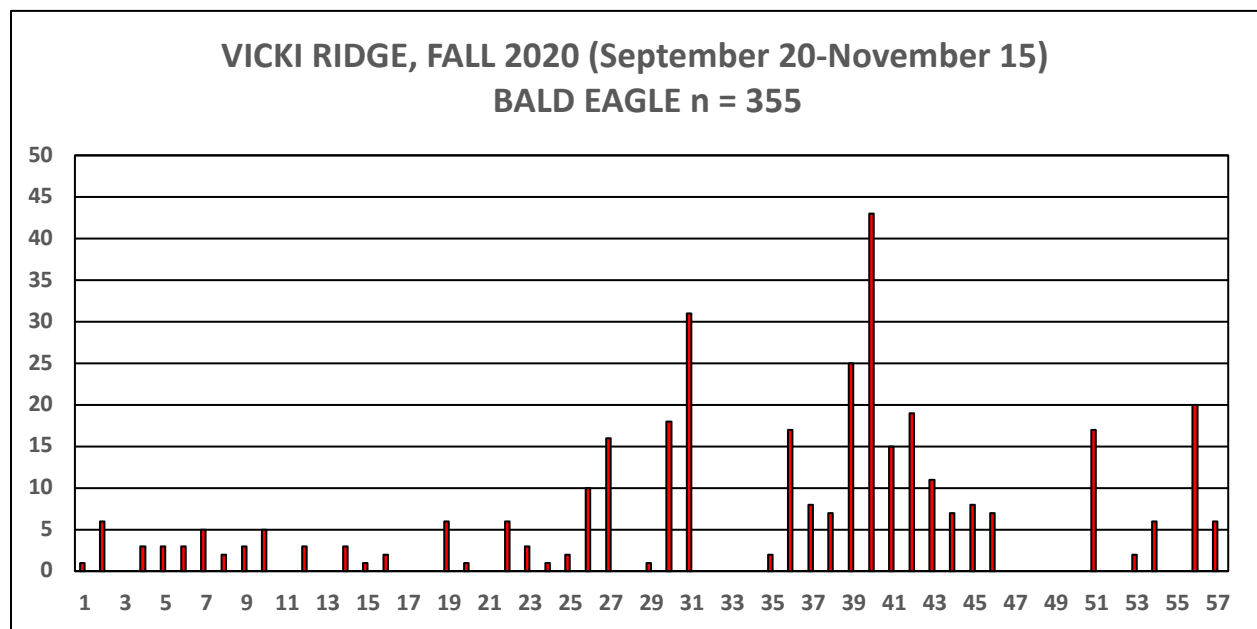
For the first time an extensive count was held at the Waterton 68 site at the western edge of the ridge complex and about 2 kilometres west of the Waterton 61 site. Table 11 is a summary of the data at the two observation sites and the combined-site data. There are several discrepancies in details between the two sites that are discussed in more detail below, but some introductory comments need to be made.

- 1) The WT 68 site was mainly occupied during the afternoon so the migrants were often back-lit by the westering sun that made detailed identification such as age, subspecies and morph more difficult compared to Waterton 61 where most birds are fore-lit.
- 2) The exposed nature of the WT 68 site to the strong westerly winds meant that most observation had to be conducted using only binoculars from within a vehicle whereas at the somewhat more sheltered WT 61 site observation was outside using a telescope and binoculars.
- 3) At WT 68 the nature of the movement was often low along the ridge edge that usually only permitted relatively brief views of the birds as they “popped up” above the ridge edge and before they disappeared out of sight, whereas at WT 61 birds moving south along Vicki Ridge proper can usually be tracked continuously over 2 or 3 kilometres.
- 4) The WT 61 site often had several observers that participated in the count whereas the nature of the WT 68 site precluded such participation.
- 5) Birds moving at each site are not normally detectable from the other with the exception of some birds above the eastern part of Kyll Ridge. If there is doubt the timing of the sighting is checked to ensure that there is no duplication.
- 6) Birds (mainly eagles) can also be seen moving along the Carbondale Ridge to the west of the WT 68 site but distance and lighting conditions often make species and age identification impossible.
- 7) In summary, the identification of birds at WT68 to species level was reliable but for some species other details are problematical as discussed below.

Turkey Vulture The combined-site count of 6 birds on 4 days between September 20 and 27 was a site record with the total and number of days on which they were seen both 500% above average. Two birds were seen on September 23 and on September 26. Four birds (1 adult, 2 immatures and 1u) occurred at WT 61 and 2 (1 adult, 1u) at Waterton 68). The median species passage date was September 23

Osprey A total of 6 birds were counted on 5 days between September 21 and October 3 with 2 occurring on September 23 which was also the median passage date, 2 days earlier than average. The total and number of days on which they were seen 21.7% and 16.7% below average respectively. Three birds occurred at each site.

Bald Eagle (Figure 9) A combined-site total of 355 birds (-12.9%) moved on 41 days (-4.7%) between September 20 and November 15. A record 31 birds moved in September (+126.8%), 240 in October (-1.9%) and a record low 84 in November (-43.5%). The single-day high count was 43 on October 29 (+18.4%). Twelve days saw the passage of ten or more birds and the most persistent movement was the 11 days between October 25 and November 4 that saw passage of 224 birds that represented 63.1% of the total flight. The flight comprised 204 adults, 50 subadults (13 sa3, 26 sa2, 3 sa1 and 8 undifferentiated subadults), 80 juveniles and 21 indeterminate birds giving an immature:adult ratio of 0.64 (-2.04%), compared to a ratio of 0.71 at Mount Lorette. The median passage date for the species and for adult birds was October 28 which is 1 day and 2 days earlier than average respectively and for immatures it was October 25 (1 day earlier than average). A total of 215 birds was seen at WT61 (60.5%) and 140 (39.5%) at WT 68. There was a broad concordance of other data between the two sites (**Table 11**).



(1 = September 20, 12 = October 1, 43 = November 1)

Figure 9

Northern Harrier A record count of 26 birds (+62.5%) occurred on 18 days (+58.8%) between September 20 and October 20, with a single-day high count of 3 on October 3 (-18.2%). The flight comprised 9 adults (6 males and 3 females) and 17 juveniles (9 males, 6 females and 2u) that gives an immature:adult ratio of 1.67 (-54.5%). The species median passage date was October 2, one day earlier than average, adults were 2 days earlier than average on October 1 and juveniles were 5 days earlier than average on September 27. Twenty-one birds (80.8%) were seen at WT 61 and 5 (19.2%) at WT 68, 4 of which (3 adult males and 1 adult female) occurred between October 9 and 21.

Sharp-shinned Hawk A record total of 958 birds (+52%) occurred on 40 days (+16.5%) between September 20 and November 14, with a single-day high count of 93 (+6.5%) on September 26. A record total of 459 birds were counted in September (+60.5%), a record 490 in October (+43.4%) and a record 9 in November (+237.5%). The combined-site count comprised 206 adults, 49 juveniles and 703 indeterminate birds, giving an immature:adult ratio of 0.24 (+157.1%) although the high number of unaged birds means that this figure should be used with caution. At WT 61 the 434 birds counted comprised 134 adults, 18 juveniles and 282 unaged birds with an age ratio of 0.13, and at WT 68 520 birds were counted that comprised 71 adults, 29 juveniles and 420 unaged birds with an age ratio of 0.41. The main difference between the sites is that a higher number of adult birds were identified at WT 61 and may have been under-counted at WT 68 reflected in the significantly higher number of unaged birds recorded there. The median passage date for the species and for adults was October 1 that was 1 day and 2 days earlier than average respectively and for juvenile birds it was September 27, 5 days later than average.

Cooper's Hawk The two sites saw a record total of 149 birds (+80.2%) that occurred on 32 days (+23.1%) between September 20 and November 4, with a single-day high count of 14 (+44.8%) on September 27. A record total of 83 birds was counted in September (+111%), a record 63 in October (+45%) and 3 birds occurred in November which were first records for the month. The combined flight comprised 47 adults, 22 juveniles and 80 indeterminate birds, which gives an immature:adult ratio of 0.47 (+176.5%) although the high number of unaged birds means that, as with the previous species, this figure should be used with caution. This becomes more apparent when the data from the two sites are compared. At WT 61 the 59 birds counted comprised 30 adults, 5 juveniles and 24 unaged birds with an age ratio of 0.17 (which is coincident with the average of the last three years). At WT 68 93 birds were counted that comprised 16 adults, 20 juveniles and 57 unaged birds with an age ratio of 1.25 which contributed largely to the anomalously high overall age ratio. Four times as many juveniles were counted and, as with the previous species adult birds at WT 68 appear to have been under-counted and this is probably again reflected in the significantly higher number of unaged birds recorded there. The combined-site species and adult birds median passage date was September 29 (2 and 1 day earlier than average respectively), and the date for juvenile birds was September 27, 4 days later than average, that largely results from the anomalously high juvenile count (or anomalously low adult count) at WT 68.

Northern Goshawk A combined-site total of 106 birds (+1.27%) occurred on 32 days (-16.5%) between September 21 and November 15, with a single-day high count of 16 (+60%) on October 20, which is a new site single-day record. A total of 8 birds were counted in September (-57.9%), 78 in October (+13.6%) and 20 in November (+17.6%). The combined flight comprised 69 adults, 18 juveniles and 19 indeterminate birds, which gives an immature:adult ratio of 0.26 (+23.8%). The count at WT 61 was 50 adults, 9 juveniles and 19 unaged birds that gave an age ratio of 0.18 compared to 20 adults, 9 juveniles and 12 unaged birds giving an age ratio of 0.45 at WT 68. As with the other two *Accipiter* species the anomalously high ratio at WT 68 resulted from a low count of adult birds. The combined-sites species median passage date was October 20 (2 days later than average), the adult date was October 26 (7 days later than average) and immature birds were 2 days later than average on October 15.

Broad-winged Hawk A combined-site total of 19 birds (-26%) occurred on 12 days (-10%) between September 20 and October 19, with a single-day high count of 4 (-20%) on September 21. A total of 12 birds were counted in September (+16.1%), 7 in October (-53.3%), and none in November. The flight comprised 17 light morph birds (9 adults, 7 juveniles and 1u) and 2 adult dark morph birds giving an immature:adult ratio of 0.64 (+23.9%). Sixteen of the birds were seen at WT 61 and 3 at WT 68 that included a light morph juvenile on October 19 that was 11 days later than the second-latest bird. The species median passage date was September 27 (8 days earlier than average), adults were also 8 days earlier than average on September 28 and immature birds were 11 days earlier than average on September 22.

Swainson's hawk One juvenile rufous morph bird was seen at WT 61 on September 21, 1 adult light morph bird was seen at WT 68 on September 25 and 1 juvenile dark morph bird was seen at WT 61 on September 29. The total of 3 birds is 80% above average and is the highest ever count at the site.

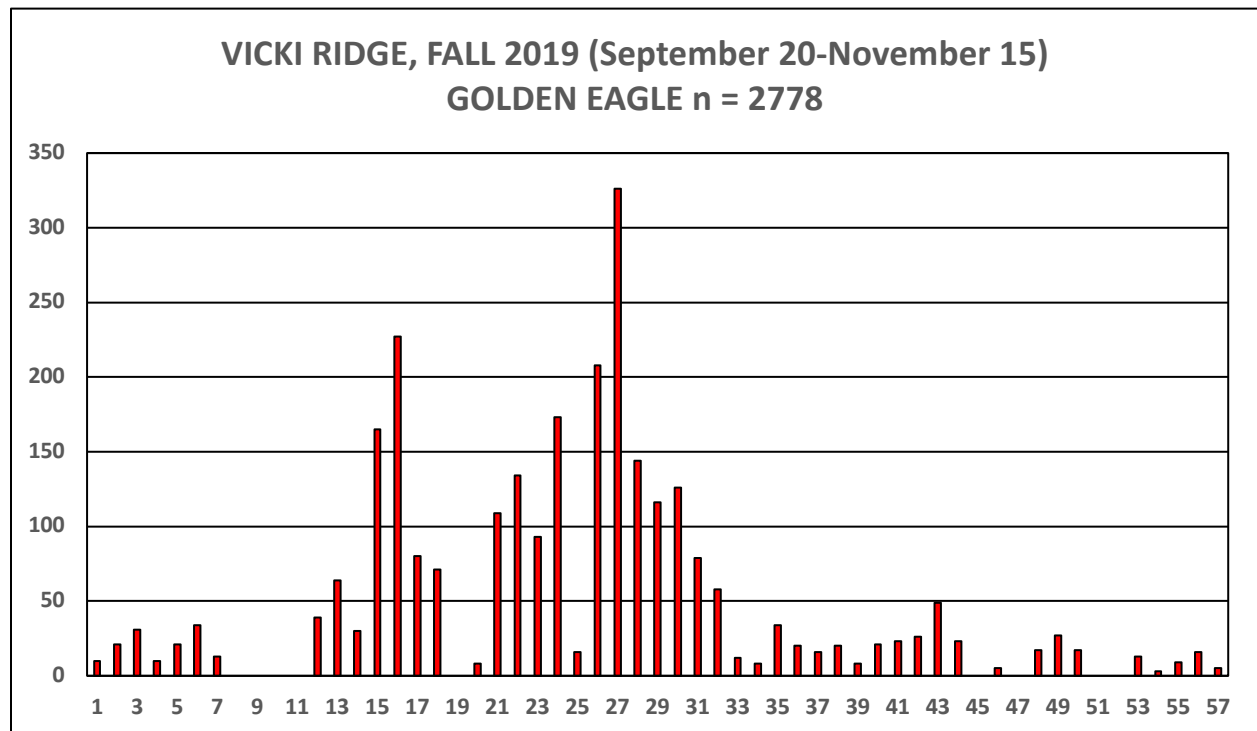
Red-tailed Hawk A combined-sites total of 215 birds (+17.9%) occurred on 30 days (-1.1%) between September 20 and a very late bird on November 14 (an adult dark morph *calurus* at WT 68). There were single-day high counts of 21 (-23.2%) on September 20 and 26. A record total of 121 birds were counted in September (+87.1%), 90 in October (-22.9%) and a surprising record 8 birds in November (+300%). The combined flight comprised 162 birds of the race *B.j.calurus*, 134 of which were light morphs (101 adults, 13 juveniles and 20 indeterminate birds), 8 were rufous (intermediate) morphs (6 adults, 1 juvenile and 1 indeterminate bird) and 33 were dark morphs (30 adults, 2 juveniles and 1 indeterminate bird); 23 birds were of the race *B.j.harlani*, 20 of which were dark morphs (16 adults and 4 juveniles), 1 was an adult intermediate morph and 1 was a light morph adult; 12 birds (1 light and 11 dark) were of indeterminate race or age and 5 were of indeterminate race, morph or age. The overall immature:adult ratio was 0.13 (+11.4%). The species count at WT 61 was 144 birds (67%) and at WT 68 was 71 birds (33%) but there was a significant discrepancy between the age ratio at WT 61 (0.08) and at WT 68 (0.27) that was a combination of a lower count of adult birds at WT 68 (60% of the total seen there compared to 79.2% at WT 61) and a higher count of juvenile birds at WT 68 (15.7% of the total seen there compared to 7.9% at WT 61; i.e. about twice as many). There was no sign of the anomalously high number of immature birds recorded in the latter part of the count at Mount Lorette. The combined-sites species median passage date was September 28 (6 days earlier than average), adults were 3 days earlier than average also on September 28 and juveniles were 13 days earlier, again on September 28. The median passage date for *calurus* was September 27 (5 days earlier than average) and *harlani* was October 3 (7 days later than average).

Ferruginous Hawk Only 2 adult light morph birds were seen at WT 61: 1 on September 20 and 1 on October 9. The total is the lowest ever at the site and is 71.4% below average.

Rough-legged Hawk A combined-sites total of 300 birds (-36.1%) were observed on 40 days (+3.5%) between September 23 and November 15. The highest single-day count was 61 (-6.6%) on October 16 when 45 birds moved south at the WT68 site between 1700 and 1813 ahead of a slow-moving northern cold front. The overall flight consisted of 229 light morphs, 48 dark morphs and 23 undetermined morphs giving a light:dark ratio of 0.21 (+110%): the ratio at WT 61 was 0.11 (125 birds: 41.7% of the flight) which is close to the long-range average for counts

on the eastern flanks of the Rockies (i.e. one bird in ten is a dark morph) whereas at WT 68 the ratio was 0.21 (175 birds: 58.3% of the flight) suggesting that lighting conditions, especially on October 16, resulted in the over-identification of dark morph birds. The species median passage date was October 16 (4 days earlier than average).

Golden Eagle A combined-sites total of 2569 birds (+2.6%) occurred on 48 days (+2.1%) between September 20 and November 15, with a single-day high count of 274 (-28.3%) on October 14 (**Figure 10**). There were 9 other three-figure counts: 113 on September 25, 188 on October 11, 156 on October 14, 172 on October 15, 108 on October 16, 161 on October 19, 162 on October 20, 107 on October 25 and 132 on October 26. The September count was a record 391 (+170.9%), October yielded 2062 birds (-4.2%) and a record low 116 moved in November (-44.2%). The combined-sites flight comprised 1760 adults, 139 subadults, 422 juveniles and 248 indeterminate birds, which gives an immature:adult ratio of 0.32 (-28.4%) and a juvenile: adult/subadult ratio of 0.22 (-15.4%). These compare to the almost identical ratios of 0.32 and 0.17 respectively at Mount Lorette. The median passage date for the species was 1 day earlier than average on October 14, adults were 2 days earlier than average on October 15 and immatures were 3 days earlier than average on October 8. At WT 61 1455 were counted that comprised 56.8% of the total count and 1114 birds were seen at WT 68 that comprised 43.4% of the count. The significant difference between the immature:adult ratios of 0.26 at WT 61 and 0.44 at WT 68 results from the low count of adult birds and concomitant high count of unaged birds at the latter site (**Table 11**).



(1 = September 20, 12 = October 1, 43 = November 1)

Figure 10

American Kestrel A combined-sites total of 16 birds (-5.9%) occurred on 11 days (+17.9%) between September 20 and the late date of October 28, with a single-day high count of 3 birds (-35.9%) on September 21 and 27. The flight comprised 5 males, 7 females and 4 birds of undetermined sex giving a female:male ratio of 1.4 (+14.8%). Ten birds moved in September (-18.9%) and 6 in October (+28.6%), and the median passage date for the species was September 27, 2 days later than average. Ten birds (5 males and 5 females) were seen at WT 61 and 6 birds (2 females and 4 unsexed) at WT 68.

Merlin A record total of 25 birds (+27.1%) were counted on a record 16 days (+20%) between September 20 and October 29 with a single-day record high count of 5 birds (+50%) on September 23. The flight comprised 19 birds of the race *F.c.columbarius*: 6 males (1a, 5 indeterminate age), 6 females (1 adult, 3 juvenile and 2 of indeterminate age) and 7 birds of unknown age or sex; and 3 birds of unknown age or sex of the race *F.c.richardsonii*. A record 13 birds (+34.5%) were seen in September, and 12 in October (+24.1% that equals the site record). The median passage date for the species was September 30, 3 days earlier than average. 17 Merlins were counted at WT 61 (16 *columbarius* and 1 indeterminate bird) and 8 were seen at WT 68 (2 *columbarius*, 3 *richardsonii* and 3 indeterminate birds). Unlike *columbarius* Merlins, *richardsonii* Merlins are not highly migratory and it is possible that sightings at WT 68 on September 21, 23 and October 5 may have been of a resident bird.

Gyrfalcon The only bird seen was a single adult male grey morph bird at WT 61 on October 15. The count is 78.6% below average and is the lowest ever at the site.

Peregrine Falcon A combined-sites total of 10 birds (-23.1%) occurred on 9 days (-18.2%) between September 25 and November 13, with a single-day high count of 2 (=average) on October 26. The flight comprised 5 males (3 adults, 2 of indeterminate age), 2 females (1 adult, 1 of indeterminate age), and 1 adult and 1 juvenile of indeterminate sex, giving an immature:adult ratio of 0.2 (-18.9%). Only 2 birds were seen in September (-60% and the lowest count ever), 5 occurred in October (-28.6%) and 3 in November (+200% and equals the record for the month). The median passage date for the species was October 26, 20 days later than average, and adults were 25 days later than average on October 28. Nine of the birds were seen at WT 61, and only 1 (a juvenile of undetermined sex) was seen at WT 68 on October 11.

Prairie Falcon A combined-sites total of 6 birds (= average) occurred on 5 days (-11.8%) between September 21 and November 9, with 2 birds (-25%) occurring on October 2. Two birds occurred in September (+100%), 2 in October (-33.3%) and 2 in November (= average) and the median passage date for the species was October 2 (23 days earlier than average).

Also recorded were 7 undifferentiated small *Accipiters* (+23.5%), 8 undifferentiated *Buteos* (6 dark, 2u) (-52.7%), 34 undifferentiated eagles (+92.5%), 1 undifferentiated small falcon (-50%) and 1 unidentified raptor (-40%).

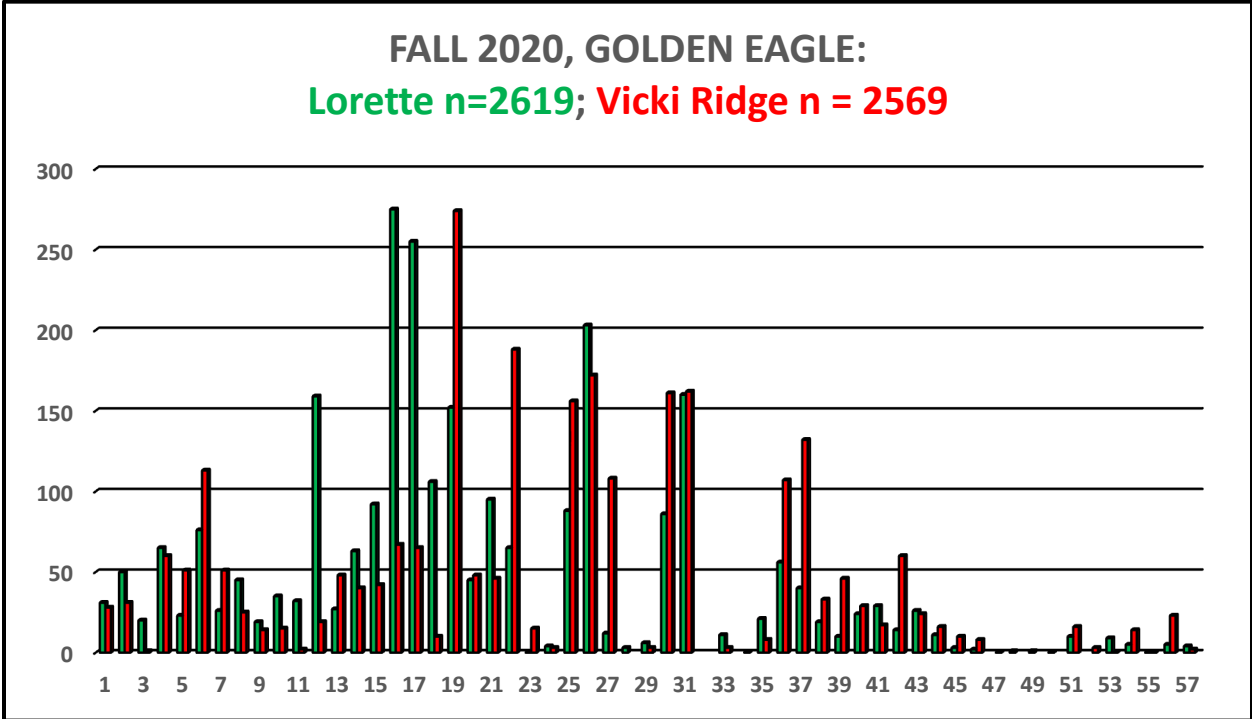
Comparison of Eagle Species at Vicki Ridge and Mount Lorette

In 2018 for the first time the **Golden Eagle** counts at Vicki Ridge (2735) and at Mount Lorette (2698) were very similar and at both sites Golden Eagles moved in four coincident pulses each terminated by 2 to 3 days of bad weather that stopped all raptor movement. In 2019 Mount Lorette (2398) recorded 380 fewer Golden Eagles than did Vicki Ridge (2778), but the age ratios at the two sites were almost identical and each showed a similar diminution from the 2018 highly successful breeding season but the species median passage date at Mount Lorette was six days earlier on October 9 than it was at Vicki Ridge.

This season the total Golden Eagles seen at each site was again similar with Mount Lorette counting 2619 birds and Vicki Ridge 2569, a difference of only 50 birds, and the immature: adult ratio was 0.32 at both sites. The species median passage date at Mount Lorette was October 7, seven days earlier than at Vicki Ridge on October 14. The highest single day count at Mount Lorette was 337 on October 4, but at Vicki Ridge the maximum count was a similar 326 birds but occurred 12 days later on October 16 (**Figure 11**). These differences are reflected in **Figure 12A** that is a cumulative-difference graph for the species at the two sites, which shows a remarkable similarity to the graphs for 2019 (**Figure 12B**) and 2018 (**Figure 12C**).

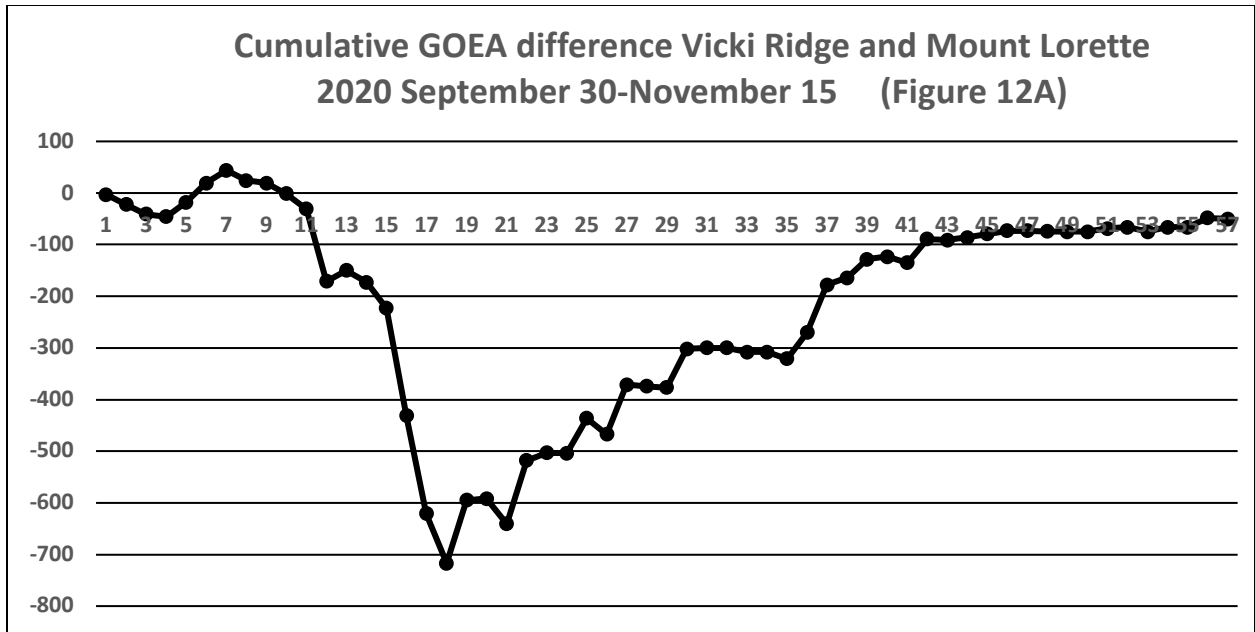
Between September 20 and October 2 the count rate was similar at the two sites with a September count at Mount Lorette of 433 (19.4% above average) and a record 391 at Vicki Ridge). This indicates that the Golden Eagle migration was well underway when the counts started on September 20 which is also reflected in the early median passage date at Mount Lorette. Between October 4 and 7 Mount Lorette (728) recorded 544 more Golden Eagles than Vicki ridge (184). From October 8 to 31 the Vicki Ridge count steadily “caught-up” with Mount Lorette with the exception of October 19-24 when the counts at both sites were similar. For the rest of the count in November Golden Eagle counts were generally low with similar numbers at both sites and the final difference between the totals was only 50 birds. As with last year it seem highly unlikely that the observers at the Vicki Ridge sites would have substantially missed most of the birds seen at Mount Lorette between October 4 and 7 and the likely explanation again is that poor weather between the sites delayed the movement of the birds. While the graphs for the last three years (**Figures 12 A, B and C**) show the same general pattern and timing, that for 2017 (**Figure 12D**), which was the first complete count at the site and was conducted almost exclusively from the ridge-top, is quite different. The cumulative difference increased steadily to October 28 after which the counts at both sites were similar for the rest of the count. The final difference between the sites was 1232 birds (3233 at Mount Lorette and 2001 at Vicki Ridge). It appears clear that a substantial number of birds were not seen from the ridge-top and probably moved along the western part of the ridge (WT 68) or farther to the west on the Carbondale Ridge). If the 2020 count had been exclusively from WT 61 the resulting trend closely resembles that of 2017 with a final difference of 1141 birds: 2619 at Mount Lorette and 1455 at Vicki Ridge which would have been the lowest ever count at the site. (**Figure 12E**).

It is clear that in the future we must attempt to conduct full counts at both WT 61 and 68 in order to fully evaluate the movement across the entire Vicki Ridge lineation.

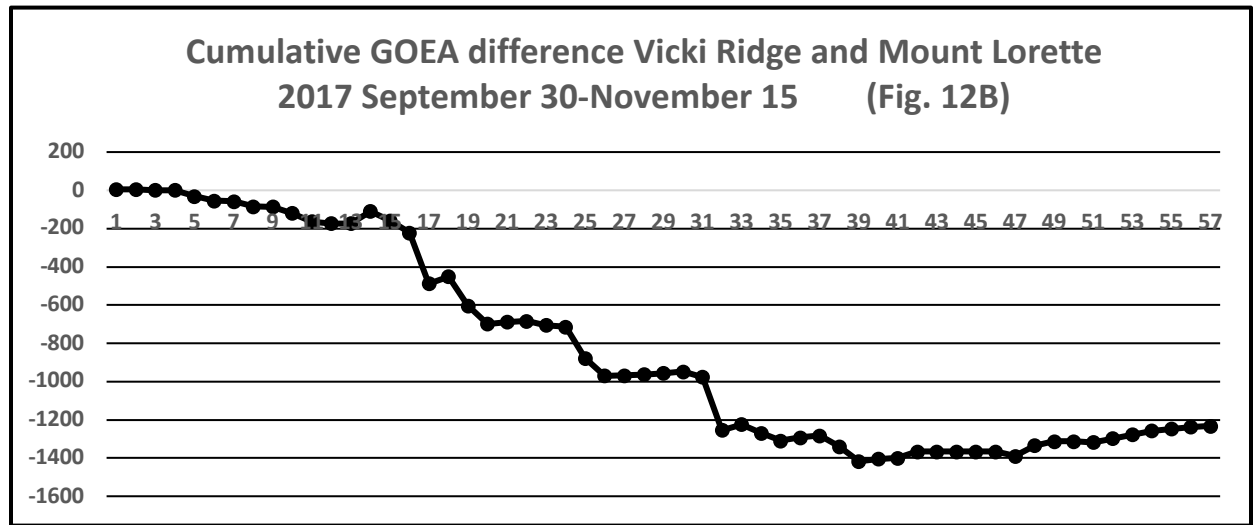


(1 = September 20, 12 = October 1, 43 = November 1)

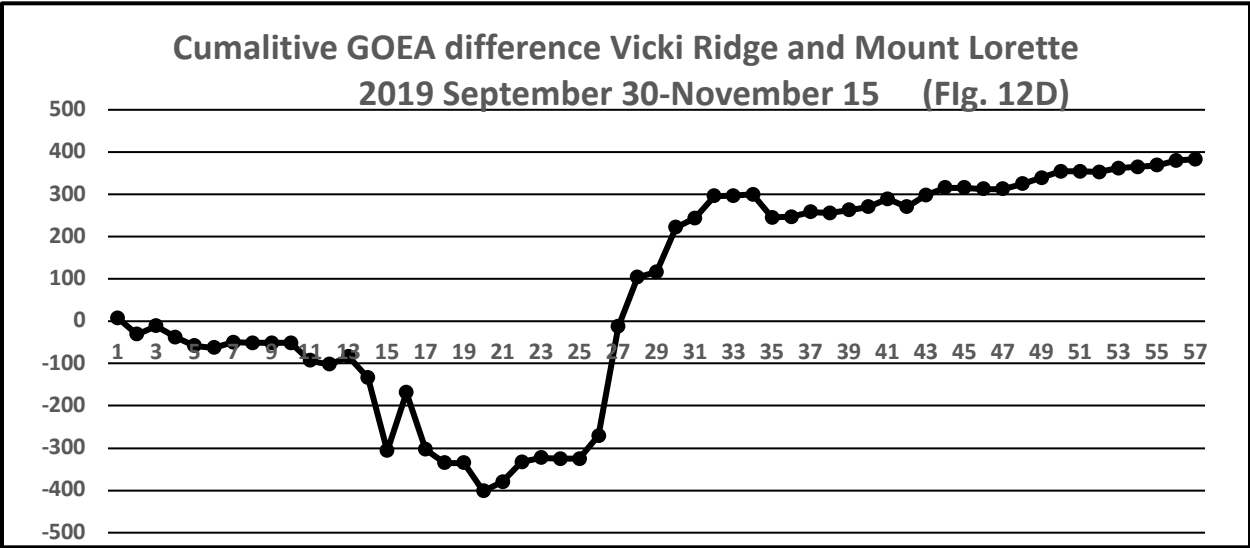
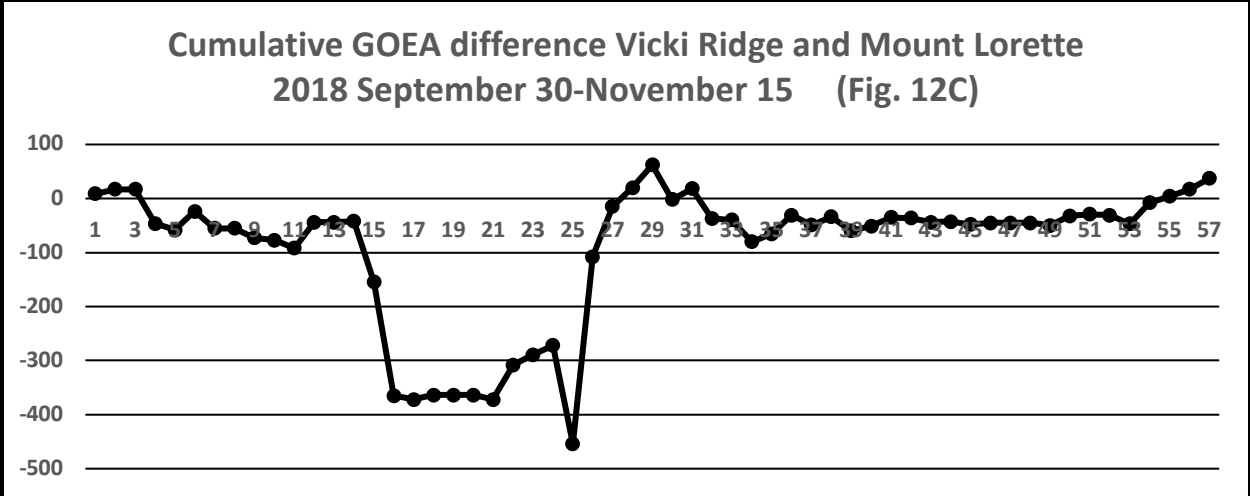
Figure 11



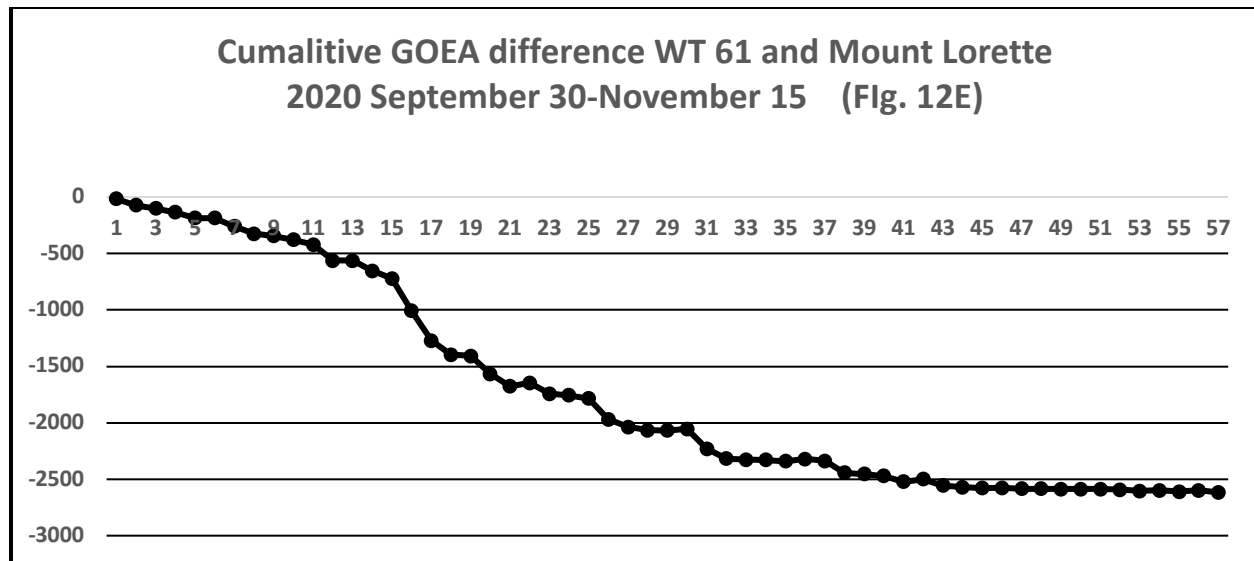
(1 = September 20, 12 = October 1, 43 = November 1)



(1 = September 20, 12 = October 1, 43 = November 1)



(1 = September 20, 12 = October 1, 43 = November 1)

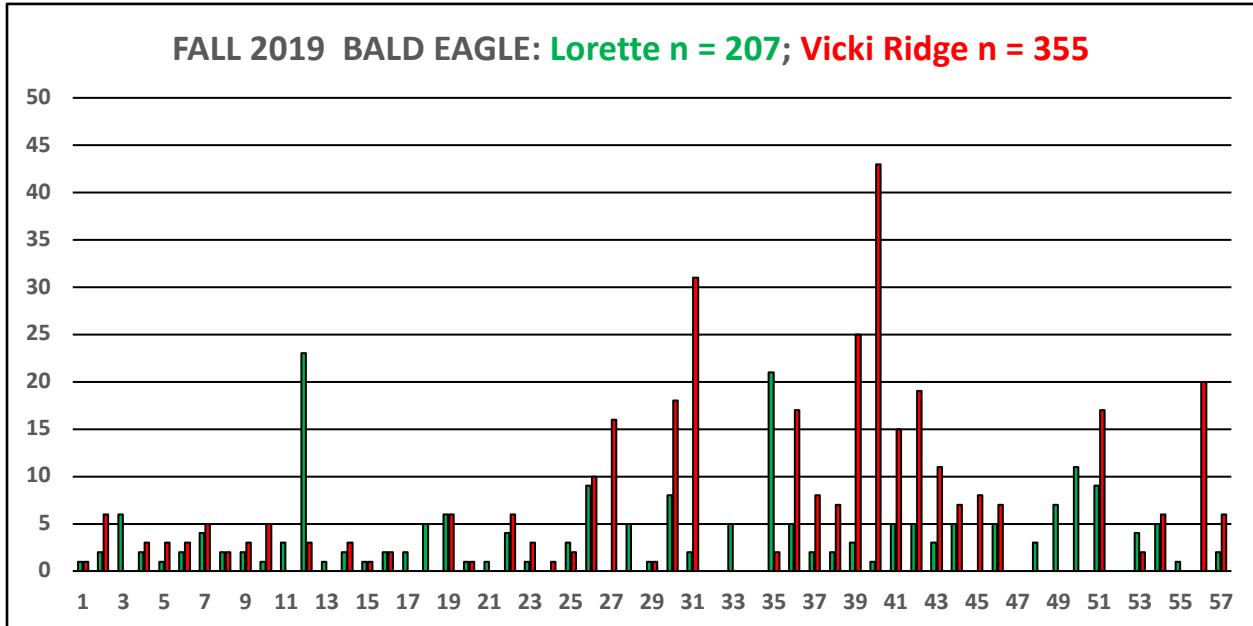


(1 = September 20, 12 = October 1, 43 = November 1)

As in the previous two years substantially more **Bald Eagles** were counted at Vicki Ridge (355) than at Mount Lorette (207) (**Figure 13**). The September counts at the two sites were similar: 26 at Mount Lorette (+45.5%) and 31 at Vicki Ridge (126.8%) which indicates that, as with Golden Eagles, the movement was underway before September 20. The October movement was slightly below average at both sites: 126 (-4.9%) at Mount Lorette and 240 (-1.9%) at Vicki Ridge and significantly below average in November probably resulting from the poor weather conditions: 55 (-22.9%) at Mount Lorette and 94 (-43.6%), which is the lowest count ever at Vicki Ridge. The median passage date at both sites was 1 day earlier than average; at Mount Lorette it was October 22 but at Vicki Ridge it was 6 days later on October 29. The early Mount Lorette count results mainly from an anomalous count of 23 birds on October 1. The only other daily count above 11 birds was 21 on October 24. Otherwise there was just a steady movement of low numbers of birds throughout the count with a slight peak of 30 birds on four days between October 6 and 9 that was sandwiched between non-observation days of poor weather. By contrast there was a continuous movement at Vicki Ridge of 169 birds on 12 days between October 24 and November 4 with a single-day high count of 43 on October 29. Twenty birds were also counted on November 14.

The age classes at Mount Lorette were 55.6% adults and 39.6% immature birds (21.3% subadults and 15.9% juveniles) compared to 57.5% adults, 36.6% immature birds (14.1% subadults and

22.5% juveniles at Vicki Ridge. These numbers are broadly comparable as are the immature: adult ratios of 0.71 at Mount Lorette and 0.64 at Vicki Ridge.



(1 = September 20, 12 = October 1, 43 = November 1)

Figure 13

Observers

Principal Observers at Waterton 61 site: Peter Sherrington and Hilary Atkinson (52 days)

Assisted by Denise Cocciolone-Amatto (4 days), Raymond Toal (4 days), Pat Lucas (3 days), Phil Nicholas (3 days), Doug and Teresa Dolmen (2 days), Trevor Lewis (2 days), John Kinnear (1 day), David McNeil (1 day), Gord Petersen (1 day) and Cornell and Carol van Ryk (1 day).

Principal Observers at Waterton 68 site: Gord Petersen (38 days) and Phil Nicholas (1 day).

Assisted by Cathy Scrimshaw (14 days) and Denise Cocciolone-Amatto, Pat Lucas and Raymond Toal (1 day).

Steeple Ridge extended reconnaissance count, British Columbia (Vance Mattson)

Introduction

In the fall of 2009 Vance Mattson conducted the first extended reconnaissance count at or near the Steeple Ridge which is located on the east side of the Kootenay Valley that forms part of the Rocky Mountain Trench about 25 km NE of Cranbrook, British Columbia. Three sites were used to monitor raptor movement along, or just north of, the NNW-SSE oriented Steeple Ridge which forms the southern part of the Hughes Range on the western flank of the Rocky Mountains. Of potential significance is that it is located about 80 km almost due west of the Piitaistakis-South Livingstone and Vicki Ridge sites in SW Alberta giving the possibility of simultaneously monitoring movement along the eastern and western flanks of the Rocky Mountains at the same latitude.

This year 20 days in the field were spent at the Bill Nye site (49° 45' 11.10''N, 115° 38' 49.14''W, at 1041m). The site, located beneath a prominent 'scar' on the face of the mountain) can be accessed from Wasa Lake by following Lazy Lake Road east toward Lazy Lake. It is located south of an unmarked back road approximately 6.9 km from the Lazy Lake Road turn off on Wasa Lake Park Drive on the southern edge of Wasa Lake. The site is located by turning right into a clearing at 2.2 km from the turnoff and a full 2.3 km takes you to the site. The site offers views of the birds as they pass over, or in front of, the main ridge that has an average elevation of 1856 m. Mount Bill Nye is 2648 m high though only the most westerly visible craggy peak at 2419 m is visible from the site. The road is somewhat rough but does not require a 4WD vehicle unless the conditions are excessively snowy or wet.

Two days (October 28 and 29) were spent at the Wolf Creek site which is 10 km NW of the Mount Bill Nye site, and 1 day (November 15) was spent at Diorite Creek which is 22 km NW of the Mount Bill Nye site.

The fall 2020 season is the eleventh extended reconnaissance count conducted at the site (**Table 14**), but because of a combination of teaching commitments and bad weather it comprised only 23 days and 71.5 hours of observation which are 30% and 43.8% below average respectively, and most of the observation was conducted late in the afternoon. Vance Mattson was the principle observer each day. Observation did not begin until October 2 and subsequently 15 days were lost to bad weather (although on some of these days work would have precluded observation anyway) (**Table 13**), and a further 7 days were lost because of work commitments

Weather and count summary

Table 13 summarizes the weather at the site. A total of 12 days between October 2 and November 15 saw precipitation (5 rain days that included one active day on October 30, 2 days of rain and snow and 5 days of snow). A further 4 days saw low overcast conditions but no precipitation. The average high temperature for 17 active days in October was 10.4 °C (range -3 °C to 23 °C) and the average high temperature for 6 active days in November was 5.7 °C (range 2 °C to 9 °C). Conditions were assessed as calm on 12 days (52.2%), SW-W winds blew on 6 days (26.1%), S winds on 2 days (8.7%), and variable, N and SE winds each 1 day (4.3%). Wind velocities were assessed as calm to light on 15 active days (65.2%), moderate to strong on 1 day (4.3%), strong on 1 day (4.3%) and variable on 2 days (8.7%). The mountain ridges on active days were assessed as clear on 18 active days (78.3%), partially obscured on 4 days (17.4%) and obscured on 1 day (4.3%).

The total of 125 migrant raptors of 7 species is 67.5% below average and is the second lowest fall count for the site, and the rate of 1.75 raptors/hour is 43.2% below average which is the lowest ever (**Tables 12 and 14**). Only 3 days saw double-digit counts: 33 on October 11, 39 on October 12 and 21 on October 2, which together comprised 74.4% of the total count (**Figure 14**). Interestingly both periods coincide with bad-weather breaks in the Mount Lorette and Vicki Ridge counts (**Figure 11**) and may represent short-term deflections of the migration to the western Flank of the Rockies. October produced 116 migrants, 92.8% of the total, and November 9 migrants (7.2%).

The final count, with variance from the 2009-2019 11-year average (**Table 14**), was 48 Bald Eagles (-68.7%), 13 Sharp-shinned Hawks (-83.6%), 2 Northern Goshawks (-59.3%), 4 Red-tailed Hawks (-84.8%), 1 Rough-legged Hawk (-83.6%), 54 Golden Eagles (-60.1%), 2 unidentified eagles (+29.4%) and 1 American Kestrel (-62.1%), Species previously recorded but absent this fall were Turkey Vulture, Osprey, Northern Harrier, Cooper's Hawk, Broad-winged Hawk, Merlin, Gyrfalcon, Peregrine Falcon and Prairie Falcon. Swainson's Hawk and Ferruginous Hawk have never been recorded at the site.

Bald Eagle The total of 48 birds counted on 9 days between September 24 and November 7 is 68.7% below average. The highest single-day counts were 17 on October 11 and 19 on October 12 which together comprised 75% of the total. The flight comprised 26 adults, 2 subadults and 20 juveniles giving an immature:adult ratio of 0.85 compared to 0.71 at Mount Lorette and 0.64 at Vicki Ridge.

Sharp-shinned Hawk The total of 13 birds seen on 5 days between October 2 and November 5 was 67.6% below average. The highest single-day counts were 4 on October 11 and 5 on October 12 which together comprised 69.2% of the total. The flight comprised 5 adults, 1 juvenile and 7 indeterminate birds.

Northern Goshawk Single adult birds were seen on October 11 and November 1. The total is 59.3% below average.

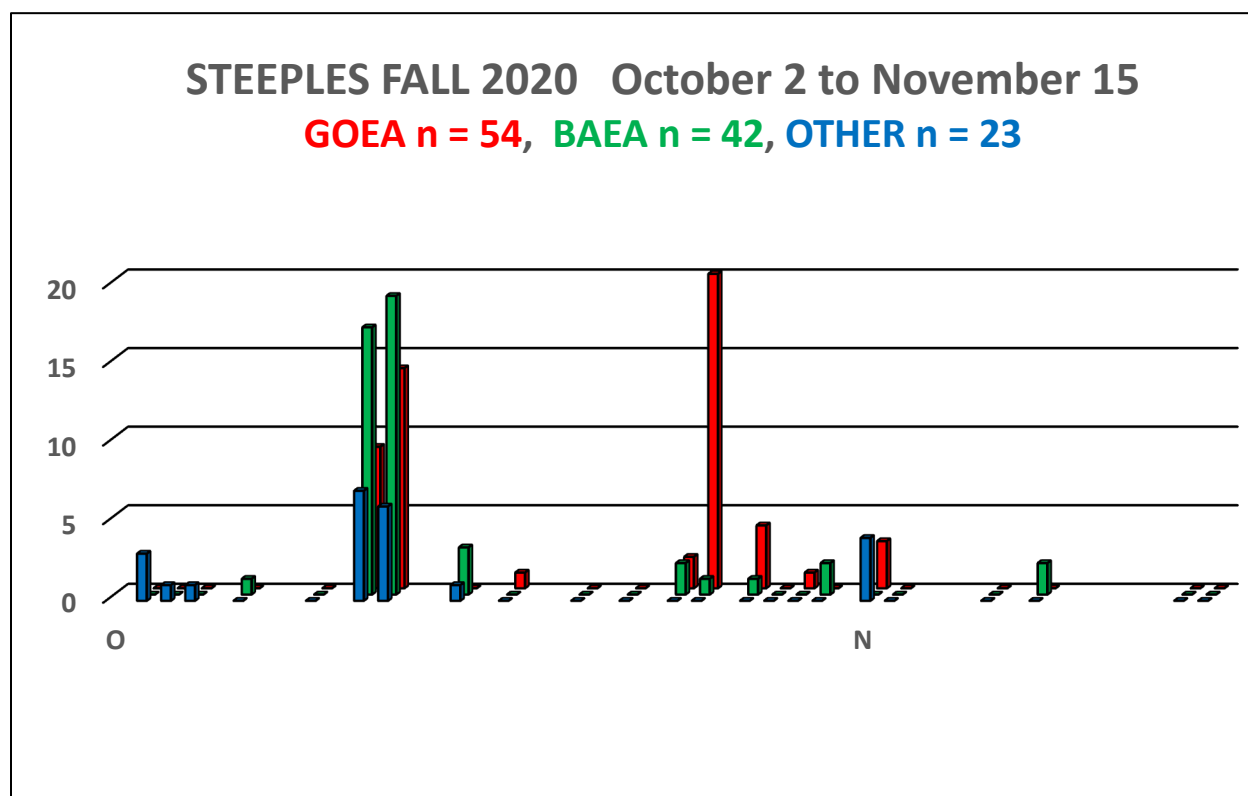


Figure 14

Red-tailed Hawk Single adult light morph birds of the race *B.j.calurus* were seen on October 2, 3, 11 and 12, a total that is 84.8% below average.

Rough-legged Hawk The only record was a light morph bird on November 1. The total is 83.6% below average.

Golden Eagle The total of 54 birds counted on 8 days between October 11 and November 1 was 61.1% below average. Only two days had double-digit counts: 14 on October 12, and 20 on October 25 which made up 63% of the flight. The flight comprised 39 adults, 4 subadults, 8 juveniles and 3 indeterminate birds giving an immature: adult ratio of 0.31, compared to a ratios of 0.32 at both Mount Lorette and at Vicki Ridge, which is remarkable considering the small size of the count.

American Kestrel The only record was a female bird on October 2. The total is 62.1% below average.

Also recorded were 2 unidentified eagles (+29.4%).

Observers

Vance Mattson (23 days)

Appendix (separate attachment)

List of Tables

Table 1A RMERF Front Ranges fall counts: principal sites, 1992-2020: 1B Mount Lorette fall counts 1992-2020.

Table 2 Mount Lorette daily counts September 20 to November 15, fall 2020.

Table 3 Mount Lorette summary weather, fall 2020.

Table 4 Mount Lorette summary counts 1993-2020 (excluding short counts).

Table 5 Mount Lorette monthly summary counts 1993-2020 (excluding short counts): 5A September, 5B October and 5C November.

Table 6 Mount Lorette, Golden Eagle passage by hour, fall 2020.

Table 7 Median passage dates and age ratios, Mount Lorette fall 2020.

Table 8 Vicki Ridge daily counts September 22 to November 15, fall 2020.

Table 8A Vicki Ridge (WT 61) daily counts September 22 to November 15, fall 2020.

Table 8B Vicki Ridge (WT 68) daily counts September 22 to November 15, fall 2020.

Table 9 Vicki Ridge summary weather, fall 2020.

Table 9A Comparison of raptor movement at WT 61 and WT 68 relative to wind direction and velocity, fall 2020.

Table 10 Vicki Ridge summary fall counts 2014-2020.

Table 11 Comparison of Vicki Ridge fall 2020 sites: combined-sites, WT 61 and T 68.

Table 12 Steeples daily counts October 2 to November 15, fall 2020.

Table 13 Steeples summary weather, fall 2020.

Table 14 Steeples summary fall counts 2009-2019.

Table 14 Summary of the fall 2019 Mount Lorette, Vicki Ridge and Steeples counts.

Table 15 Comparison of the three RMERF sites, fall 2020.

Table 16A Comparison of fall 2020 median passage dates and age ratios, Mount Lorette and Vicki Ridge.

Table 16B Percentage of raptor groups at the three sites, fall 2019