

# MOUNT LORETTE, FALL 2013

With a note on the Steeples, BC, site

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## ***Summary and highlights***

*This was the 22<sup>nd</sup> consecutive year that some form of fall count has been conducted by RMERF members and was the 21<sup>st</sup> conducted at Mount Lorette. Despite generally favourable observing conditions and a well conducted count the combined species count of 3110 is 25.4 % below average and is the third lowest valid fall count for the site. Both the September and November counts were the lowest ever. All species occurred in below average numbers, and the count of 95 Bald Eagles was the lowest ever for the site. Of the nine species that occurred in sufficient numbers to assess median passage dates, six were later than average (although only Sharp-shinned Hawk and Cooper's Hawk were significantly so), three were earlier than average, and the combined-species passage date was one day later than average. The Golden Eagle count of 2782 is 21.8% below average and is also the third-lowest valid fall count for the site, despite the fact that the highest single day count of 496 on October 14 was the fourth highest for the site. The declining trend for the species at the site is maintained. No systematic counts were conducted at the Piitaistakis-South Livingstone site, and a reconnaissance count of sixteen short days was conducted at the Steeples site on the western flanks of the Rocky Mountains near Cranbrook, BC.*

## **Introduction**

The Mount Lorette site is located in the Kananaskis Valley in the Front Ranges of the Rocky Mountains (50°58'N 115°08'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 Mt. 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 allows 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 generally not included in the official count. Migrating Golden Eagles were first seen moving over Mount Lorette on March 20, 1992, and the first extended (33 day, 280 hour) count was conducted that fall that yielded 2661 migrant raptors of which 2044 were Golden Eagles<sup>1</sup>. Subsequently full-season fall counts (averaging 88 days, 865 hours) were conducted annually at Mount Lorette to 2005 with the exception of 1997 when a full count was conducted at Plateau Mountain and 2002 when serious illness to 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 the Municipality of Crowsnest 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 statistical comparison with previous counts from which data from a standard 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 15 years 1993-1996, 1998-2001, 2003-2005 and 2009-12. For the third consecutive year no systematic daily count was held this season at the Piitaistakis-South Livingstone site. Brief (1 - 4.5 hours) reconnaissance counts were conducted on 15 days (40 hours) between October 6 and November 1 at the Steeples (Bill Nye site), and a further three hours on November 18 was spent west of the site at Wasa in the centre of the Columbia Valley observing Bald Eagle movement. At Mount Lorette observers spent at total of 51 days (516.85 hours) of a possible 57 days at the site between September 20 and November 15, the days and hours being 6.5% and 7.9% below average respectively.

Detailed daily summaries of this Mount Lorette count and Mount Lorette and Piitaistakis-South Livingstone counts from past years can be accessed on a blog published on the RMERF website [www.eaglewatch.ca](http://www.eaglewatch.ca).

## Mount Lorette, Alberta

### Weather

**Table 1** summarizes the season's weather. Six days were completely lost to bad weather: September 25 (rain and snow), October 16, 27, November 2, 3 and 8 (snow). This is the highest number of complete days lost to poor weather conditions and is 181.3% above the average number of 2.1 lost days for the count period. On the other hand bad weather on the 51 active observation days was not a significant factor, and the shortened day on November 9 resulted from the indisposition of the designated Principal Observer rather than from the weather. Rain, snow or flurries occurred only on 13 active count days (25.5%) of the count period but usually these events were sporadic or confined to short periods. The eastern ridges were occluded 10-30% on 14 days (27.5%) and only on November 4 did occlusion reach 70% making this year's count one of the clearest in recent years. Maximum daily temperatures ranged from 19°C on September 20 (the first day of the count) to -6.5°C on November 10, while minimum temperatures on active observation days ranged from 8°C on September 23 to -19°C on November 11. On only three active days (5.9%) did the temperature failed to rise above freezing making the count one

of the warmest in recent years. Regrettably, once again, the Environment Canada weather station (Nakiska Ridgetop) situated 4 km west of the Hay Meadow site on Olympic Summit (Mount Allan) at 2543 m was inoperative this season and ridge wind information had to be estimated by observers. It should be noted that experience has demonstrated that wind velocities tend to be underestimated by observers located in the valley, and on cloudless days or when the ridges were cloaked in cloud estimating wind direction and velocity proved to be impossible. Observers assessed ridge winds to be from the SSW-W 54.9%, W-NW 27.5% and N 3.9% of the time. It was impossible to assign a direction on 13.7% of active days, mainly because of cloudless conditions. The percentage of W-NW winds was considerably higher than normal, the percentage of SSW-W winds was lower than normal and the absence of easterly winds was notable. Observers assessed these winds as light 17.6% of the time, as strong (>41 km/h) 15.7%, as moderate to strong (11-100+ km/h) 23.5%, as moderate (11-40 km/h) 15.7%, and as light to moderate (1-40 km/h) 23.5% of the time. On two days (3.9%) it was not possible to assess the wind velocity. It appeared that this season wind velocities at ridge-level were less than average. Five active days (9.8%) were either completely cloudless or had a maximum cloud cover of less than 20% and only 6 active days (11.8%) experienced a cloud cover that was between 80 and 100%. Most other active days saw wide diurnal variation in percentage cloud cover. Cloud cover generally produced good observing conditions, although it should be noted that the season's highest count of 545 birds on October 14 occurred on one of the completely cloudless days. Persistent valley fog on the morning of October 11 obscured the mountains until 1100 and was the only occasion that weather on an active observation day may have resulted in a significant number of migrating birds being missed.

In summary, despite losing a season-high six days to poor weather, active observation days generally experienced above average temperatures, higher than average days with W-NW winds, lower than average wind velocities and lower than average cloud cover and ridge occlusions.

### **General flight dynamics** *September 20 to November 15*

Migrant raptors were recorded on 50 of the 51 active field days between September 20 and November 15 (**Table 2**). A total of ten days (19.6%) between October 6 and 21 had a passage of at least 100 migrants. The highest single-day count occurred on October 14 with the passage of 545 birds which is the fourth highest fall total for the site and is 23.6% above the average highest single-day count for the site. The combined species total, however, is 25.4% below the long-term average and is the third-lowest valid fall count for the site. The counts for September (**Table 4B**) and November (**Table 4C**) were particularly low at 217 (-58.3%) and 79 (-75.4%) respectively and both were the lowest ever counts at the site, whereas the October count (**Table 4A**: see below) of 2814 was only 13.8% below average. The combined species median passage date of October 12 is one day later than the average for the count period September 20-November 15. Of the nine species that occurred in sufficient numbers to assess median passage dates, six were later than average (although only Sharp-shinned Hawk and Cooper's Hawk were significantly so), and three were earlier than average. Despite the persistence of movement throughout the count period and the generally favourable observing conditions all species occurred in below average numbers (**Table 3**): Osprey 1 (-62.5%), Bald Eagle 95 (-63.4%) which is the lowest count ever at the site, Northern Harrier 7 (-31.4%), Sharp-shinned Hawk 97 (-28.4%), Cooper's Hawk 18 (-23.1%), Northern Goshawk 25 (-47%), Red-tailed Hawk 20 (-40.8%), Rough-legged Hawk 32 (-41.4%), Golden Eagle 2782 (-21.8%), American Kestrel 1 (-61.5%), Merlin 6 (-14.3%), Peregrine Falcon 4 (-25.9%) and Prairie Falcon 1 (-50%). Turkey Vulture, Broad-winged Hawk, Swainson's Hawk, Ferruginous Hawk and Gyrfalcon were not recorded this season.

The final count was Turkey Vulture 0, Osprey 1, Bald Eagle 95, Northern Harrier 7, Sharp-shinned Hawk 97, Cooper's Hawk 18, Northern Goshawk 25, *Accipiter* sp. 6, Broad-winged Hawk 0, Swainson's Hawk 0, Red-tailed Hawk 20, Ferruginous Hawk 0, Rough-legged Hawk 32, *Buteo* sp. 5,

Golden Eagle 2782, eagle sp. 5, American Kestrel 1, Merlin 6, Gyrfalcon 0, Peregrine Falcon 4, Prairie Falcon 1, *Falco* sp. 3, and indeterminate raptor 2, for a total of 3110 migrant raptors. A daily summary of the counts can be found on the Foundation's website.

*October summary (Table 4A)* The month of October sees the maximum fall movement and of the 22 fall counts conducted by RMERF at Mount Lorette since 1992 (the 1997 count was conducted at Plateau Mountain) all but four have included the whole of October excepting up to four days lost (this year) because of poor weather conditions. The years 1992, 2002, 2006 and 2007 had a significant number of non-weather days lost and are not included in the following comparison that involves the average of the 15 previous complete October counts at the site, with variance from average in parentheses. A total of 29 days (-3.3%) and 300.09 hours (-5.3%) were spent at the site during the month during which time 2814 migrant raptors of 12 species were counted. This total is 13.8% below average and is the fourth-lowest valid October count at the site. Only five species occurred in higher than average numbers: Northern Harrier 5 (+8.1%), Sharp-shinned Hawk 82 (+13.7%), Cooper's Hawk 14 (+42.7%), American Kestrel 1 (+33.3%) and Merlin 4 (+4.92%). Seven species occurred in lower than average numbers: Bald Eagle 60 (-61.4%), Northern Goshawk 19 (-40.0%), Red-tailed Hawk 8 (-36.6%), Rough-legged Hawk 32 (-28.2%), Golden Eagle 2573(-11.5%), Peregrine Falcon 2 (-36%) and Prairie Falcon 1 (-15.8%). Turkey Vulture, Osprey, Broad-winged Hawk, Swainson's Hawk, Ferruginous Hawk and Gyrfalcon were not recorded during the month.

## Golden Eagle

Observers counted a total of 2782 migrating Golden Eagles on 45 days between September 20 and November 15. The highest single-day count was 496 on October 14, which is the fourth highest ever at the site and 20% above average, and the second highest daily count was 387 on October 11 (**Figure 1**). A total of 8 days between October 6 and 17 saw passage of over 100 Golden Eagles, and the 6 active days between October 11 and 17 (interrupted by a snow day on October 16) yielded 1093 birds. Despite this the total was 21.8% below the long-term average. The monthly counts (**Table 4**) show that only 217 birds moved in September (-58.3% and the lowest ever September count), 2573 moved in October (-11.5%) and only 47 in November (-78.3% and the lowest ever November count). Golden Eagles comprised 89.5% of the total count this season, largely due to the fact that all other species counts were also low. The flight comprised 1727 adults, 185 subadults, 288 juveniles and 582 birds of unknown age yielding an immature:adult ratio of 0.27 that is 3.11% below average. The highest cumulative hourly counts were 506 (1200-1300), 433 (1300-1400), 399 (1500-1600) and 307 from (1600-1700) MST. No birds were recorded between 0600 and 0700 while only 7 birds occurred after 1800, although this may in part result from some observers starting late and leaving early. (**Figure 2, Table 5**). The highest single-hour passage was 146 between 1300 and 1400 on October 14, while the following hour yielded 134 birds, giving a two-hour count (1300-1500) of 270 birds. A further 4 hours yielded a passage in excess of a bird per minute: October 11, 88 (1200- 1300) and 84 (1300-1400); October 12, 79 (1200-1300); and October 14, 69 (1100-1200), while October 15 (1600-1700) yielded 58 birds. It is interesting to compare the overall distribution pattern with the cumulative distribution of the complete fall counts conducted at the site up to 2005, which was the last year that a complete count occurred there (**Figure 3**). This shows an almost perfect negatively skewed distribution curve peaking at 1500-1600 (MST), and individual year counts rarely varied from this average count. This structure has been lacking in all of the shorter counts conducted at the site since 2005, and whether this is a function of the length of the count (which historically, to 2005, captured 97% of the Golden Eagle count), or results from other factors is presently unclear. The species median passage date of October 13 was one day later than average, adult birds were one day earlier than

average also on October 13, while immature birds were 6 days later than average on October 14. It is unusual for all age classes to fall within a two-day period and probably results from the concentrated peak movement in October with significantly below-average passage in September and November.

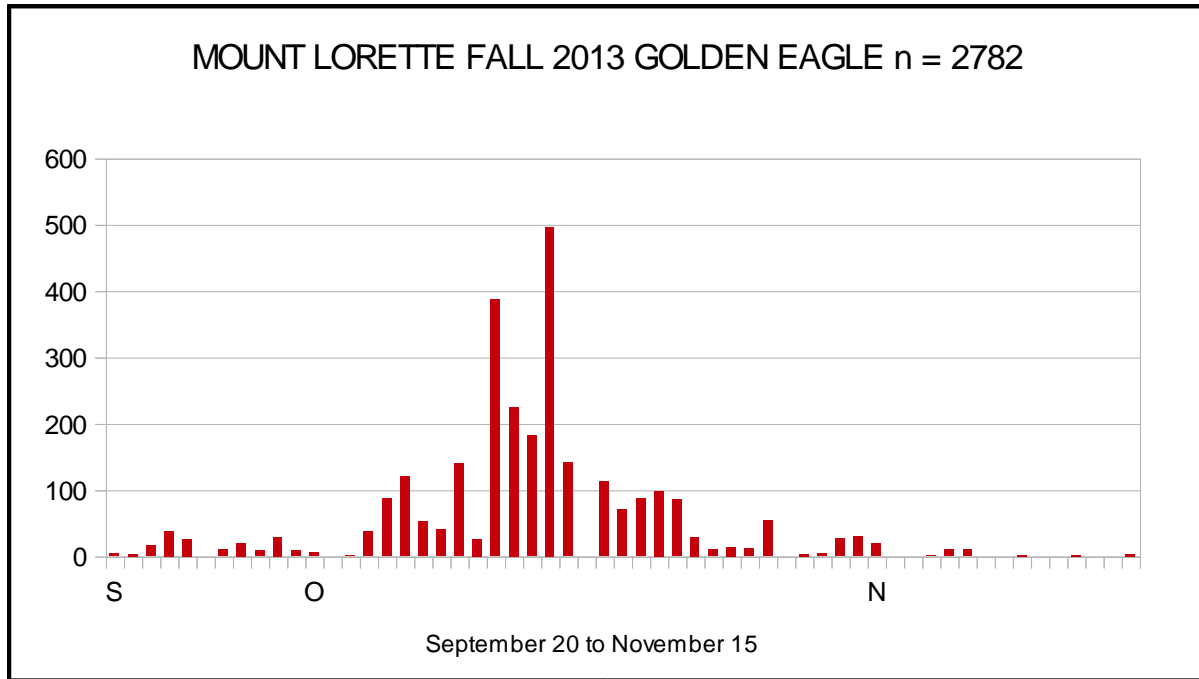


Figure 1

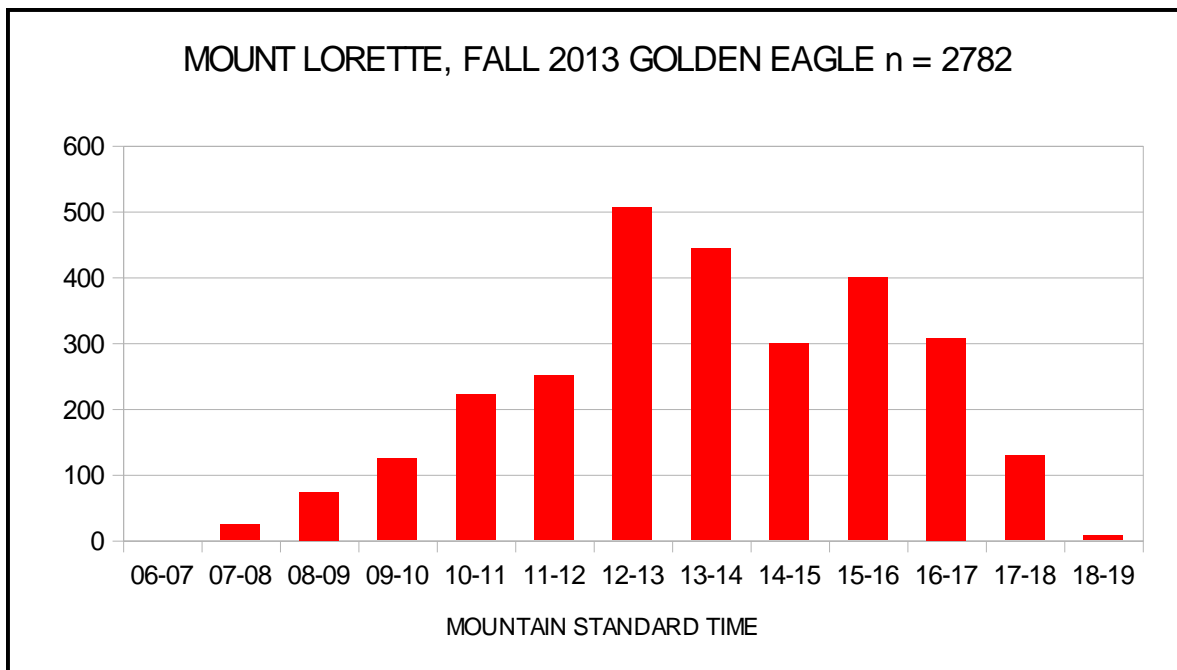
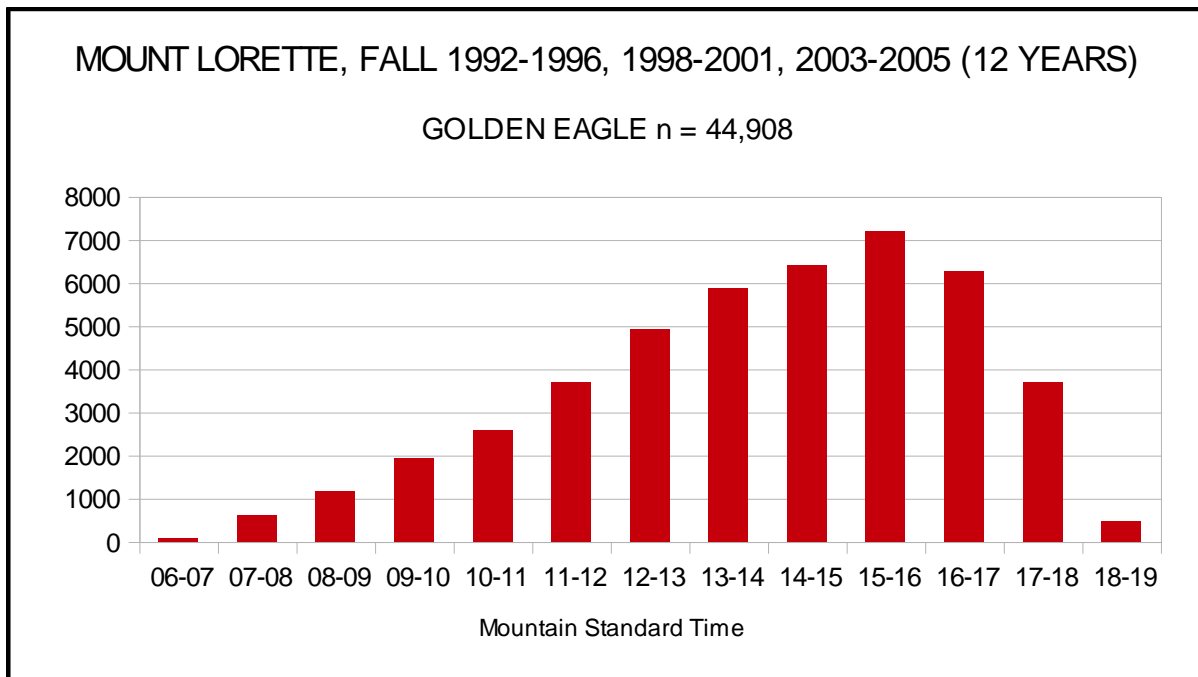


Figure 2



**Figure 3**

### Fall Golden Eagle Trend

**Figure 4** shows the linear trend of all counts from 1993-2013 excluding 2002, 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. A similar trend is also seen in spring counts at the site after 1995. This season's count, although slightly higher than last year, does not alter the declining trend for the species at the site seen since 1993. This declining fall trend was also seen at a number of other sites in western North America up to 2005<sup>2</sup>. 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.

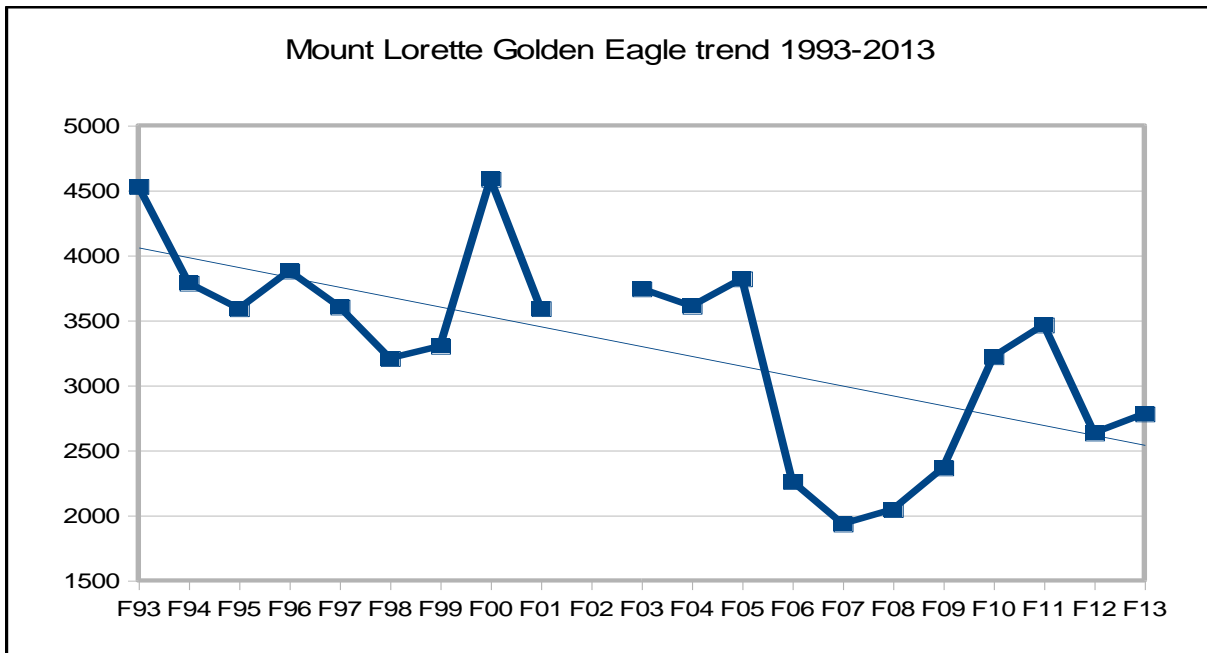


Figure 4

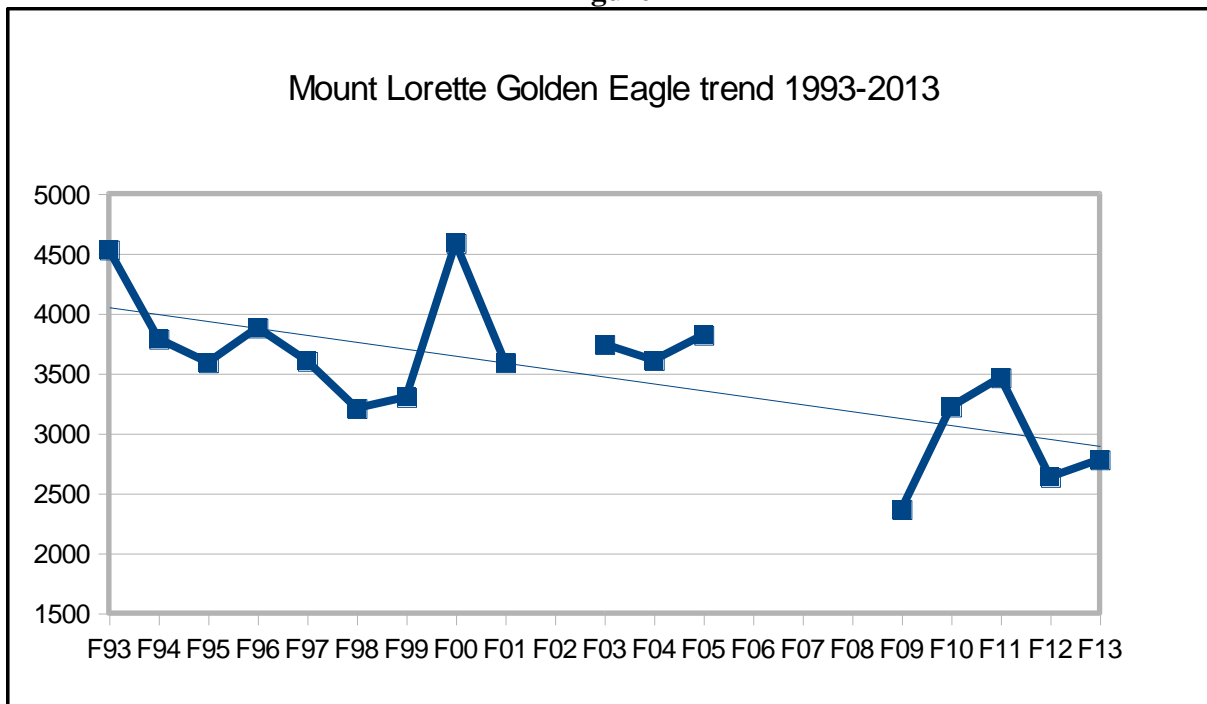
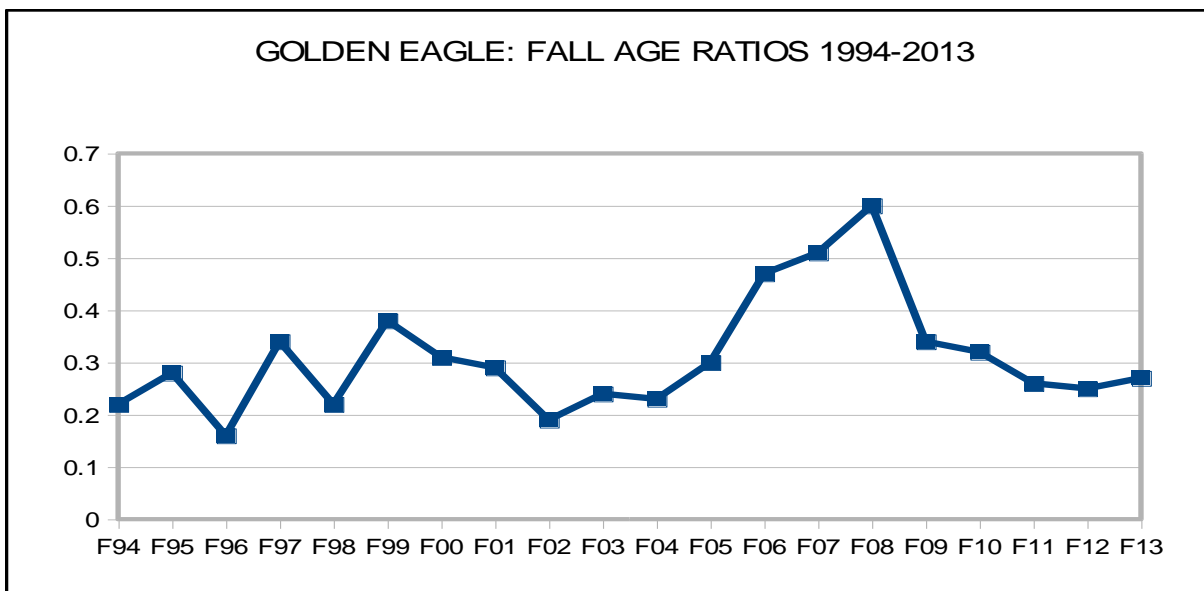


Figure 5

### 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 have been found to be very similar between counts at Plateau

Mountain, Piitaistakis-South Livingstone and 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 2008 followed by a decrease to 2012. The 2013 count shows a slight rise in the ratio, which is the first since 2007. This trend (which is paralleled by the spring trend) almost certainly reflects the reproduction cycles of the northern Snowshoe Hare population<sup>(3,4,5)</sup>. 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). It appears that fall 2009 marked the start of the declining phase of the hare cycle, 9 or 10 years after the previous peak and the 2013 ratio may indicate the start of the next increasing phase.

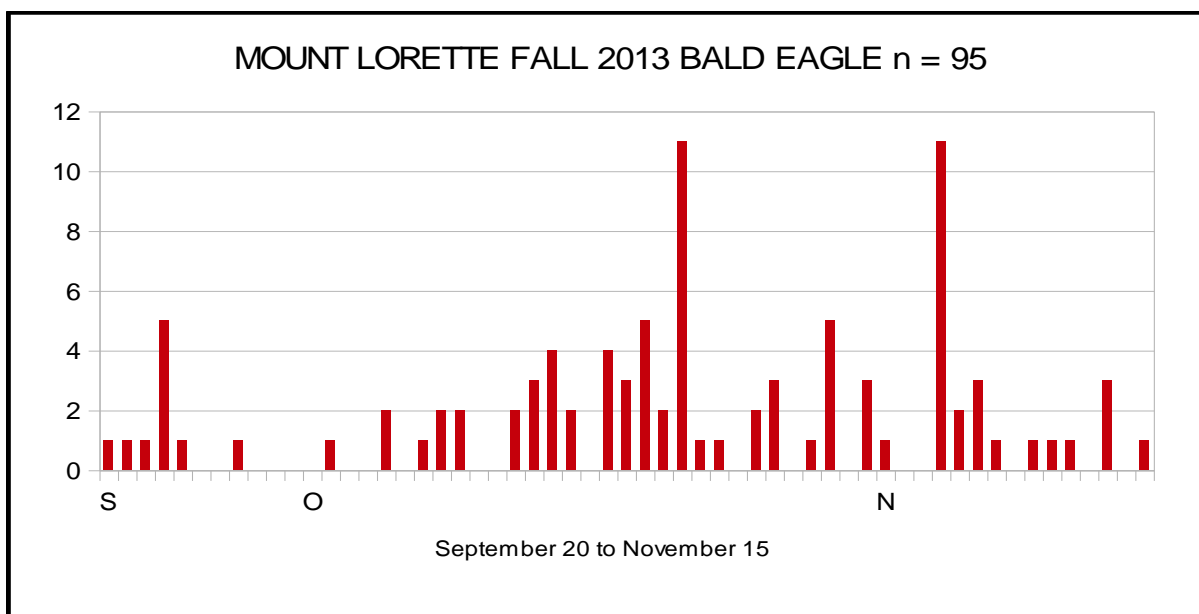


**Figure 6**

### Bald Eagle

The count of 95 birds seen on 37 days between September 20 and November 15 was 63.4% below average and was the lowest count ever for the period at the site (**Figure 7**). The five lowest fall counts at the site have occurred in the last five years. The monthly counts were 10 in September (-49.2%), 60 in October (-61.4%) and 25 in November (-69.8%). The highest single-day counts were 11 (the lowest ever) on October 21 and November 4 which are 55.2% below the average high count. The flight comprised 60 adults, 4 subadults, 20 juveniles, 10 undifferentiated immature birds and 1 bird of unknown age giving an immature:adult ratio of 0.57 which is 22.1% below the average ratio. The median passage dates for the species, for adults and for juvenile birds were October 21, October 22 and October 17 which were two, three and three days earlier than average respectively.





**Figure 7**

The low counts of the last five years may result from the relative mildness of the weather during the count period and especially the lack of the southward passage of severe arctic cold fronts which tend to accelerate the southward movement of the species as water bodies to the north freeze. The idea that on mild years the species migrates later appears to be borne out by the high numbers of southward-bound Bald Eagles seen after November 25 at the Beauvais Ridge count in 2011 and early 2012, documented in the fall 2011 site report.

### **Other Species**

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

**Osprey** The only Osprey recorded was a single bird on September 29. The total is 62.5% below average.

**Northern Harrier** A total of 7 birds were seen on five days between September 20 and October 13. Two birds were seen on both October 9 and 11. The total is 31.4% below average. The count comprised 4 adult males, 1 undifferentiated female/juvenile, and 2 birds of indeterminate age, and the median passage date of the species was October 9, six days later than average.

**Sharp-shinned Hawk** The total of 97 birds counted on 26 days between September 21 and the relatively late date of November 12 was the fifth lowest fall count for the site and 28.4% below average. This was despite the fact that highest single-day count of 36 on October 14 was 70.9% above the average and equals the second highest one-day count at the site in 1994. The highest remains the 47 counted on October 1 in 1993. The monthly counts were 12 in September (-79.6% and the lowest ever), 82 in October (+13.7%) and 3 in November (+82.6%). The flight comprised 31 adults, 3 juveniles and 63 birds of unknown age yielding an immature:adult ratio of 0.1, which is 77% below average although the high percentage of unaged birds renders this figure meaningless. The median passage date for the species was October 14, 12 days later than average and adult birds were 9 days later than average on

October 9.

**Cooper's Hawk** A total of 18 birds moved on 14 days between September 21 and October 21, with a maximum passage of 4 birds on October 12. The flight comprised 10 adults, 1 juvenile and 7 birds of indeterminate age. The median passage date for the species was October 11 and for adults was October 12, each being 11 days later than average respectively. Sharp-shinned Hawk and Cooper's Hawk were the only species having significantly later than average median passage dates this season.

**Northern Goshawk** A total of 25 goshawks migrated on 14 days between September 27 and November 6. The total is 47% below average for the site. The highest single-day count was 6 on October 13 which is close to average (+4.7%). The flight comprised 13 adults, 4 juveniles and 8 birds of unknown age giving an age ration of 0.31, 24.7% above average. The median passage date for the species was October 13, one day later than average while the adult median passage date was October 14, three days later than average.

**Broad-winged Hawk** For only the second time, the other being 2011, no Broad-winged Hawks were recorded. Only three birds have been seen in the last five years: single birds in 2009, 2010 and 2012.

**Swainson's Hawk** Not recorded this year. It has only occurred on five of the sixteen valid fall counts at the site and apart from two birds that occurred in 1995 only single birds were involved.

**Red-tailed Hawk** The count of 20 birds on 15 days between September 20 and October 28 was 40.8% below average, and the highest single-day count of 7 on September 23 was close to the average high count (+0.96%). The flight comprised 19 birds of the race *B.j.calurus*, 18 of which were light morphs (15 adults, 1 juvenile, 2 indeterminate), 1 was an adult rufous (intermediate) morph; and 1 bird was un-assignable to race, morph or age. The overall immature:adult ratio was 0.1 which is 88% below average. The species and adult median passage dates were both September 24, 5 days earlier than average in both cases.

**Ferruginous Hawk** The species was not recorded this season. Single birds have been recorded on five previous counts.

**Rough-legged Hawk** A total of 32 birds moved on 14 days between October 5 and November 4, with a single-day high count of 7 on October 22. The total and daily maximum were 41.4% and 36.4% below average respectively. The flight comprised 22 light, 4 dark and 6 indeterminate morphs giving a dark:light ratio of 0.15, close to the average ratio (+7.7%). The median passage date of October 20 was 3 days later than average.

**American Kestrel** The only record of the species was a male bird on October 12. The total is 61.5% below average.

**Merlin** Six merlins were counted on five days between September 22 and October 13, with two birds occurring on October 9. The total and high count are 14.3% below and 30.4% above average respectively. Three birds (2 adult males and 1 adult female) were ascribed to the race *F.c.columbarius*, 1 bird was a male of the race *F.c.richardsoni* and 2 birds were of unknown race, sex or age. The median passage date for the species was October 6, 4 days later than average.

**Gyr Falcon** For only the third time the species went unrecorded at the site.

**Peregrine Falcon** A total of 4 birds was counted on 3 days between September 21 and October 12 when two birds were recorded. The count is 25.9% below average and the high count 11.1% above average. The flight comprised 2 adults and 2 birds of indeterminate age.

**Prairie Falcon** The only record was a single bird on October 14. The average fall count is two.

### **Observers at Mount Lorette**

**Principal Observers** Joel Duncan (13.5 days), Cliff Hansen (12 days), Terry Waters (10.5 days), George Halmazna (7 days), Bill Wilson (7 days) and Alan Hingston (1 day); with the assistance of Rod Smith (9 days), Cliff Hansen (7 days), Kevin Barker (5 days), Gord Petersen (4 days), Doug Pedersen (3 days), Angela Luck (2 days), Alan Hingston (2 days), Jim Davis (1 day), Ed McCulloch (1 day), Ruth Morrow (1 day), Dan Parliament (1 day), Heinz Unger (1 day) and Jennifer Waters (1 day).

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## **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 (Rocky Mountain Trench) 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 significance is that it is located about 80 km almost due W of the Piitaistakis-South Livingstone site giving the possibility of simultaneously monitoring movement along the eastern and western flanks of the Rocky Mountains at the same latitude. This year, with the exception of November 18, all counts were conducted 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 10km from the Lazy Lake Road turn off on Wasa Lake Park Drive on the southern edge of Wasa Lake. The site is located about 5 km southeast from the back road turnoff, although it may require detailed instructions to arrive there. The site offers views of the birds as they pass over, or in front of, the ridge. 'Scarface Peak' (2400m) is the most westerly and visibly craggy peak of Mount Bill Nye (2600m). The fall 2013 season is the fifth reconnaissance count at the site (**Table 6**)

### **Weather and count summary**

A total 15 days (40 hours) were spent observing at the Bill Nye site between October 6 and November 1 (**Table 7**). Periods of poor weather at the site contributed to generally low daily and hourly totals, and there were several periods when observation was impossible because of wet conditions and low cloud that obscured the mountains (**Table 8**). One hundred and twenty of the total 140 migrants recorded at the site (85.7%) moved between October 13 and October 18, with a highest single-day count of 69 birds (including 63 Golden Eagles) on October 13. This movement followed a period of overcast conditions from October 8 to 12. The peak count was a day earlier than the maximum Golden Eagle count at Mount Lorette, but coincided with the median passage date of the species at that site. Following a prolonged period of poor weather that started on November 2, the clouds cleared above the centre of the valley on November 18 and allowed a three-hour observation that saw the passage of 10 Bald Eagles over the hamlet of Wasa. This represented 47.6% of the total Bald Eagle movement recorded during the migration.

The final count of 150 birds comprised 21 Bald Eagles (13 adults, 2 subadults and 6 juveniles), 12 Sharp-shinned Hawks (4 adults, 1 juvenile and 7 birds of unknown age), 2 adult Northern Goshawks, 6 Red-tailed Hawks (*B.j.calurus*): 4 light morphs (1 adult, 3 juveniles) and 2 dark morphs (1 adult, 1 juvenile), 3 Rough-legged Hawks (1 light and 2 dark morphs) and 106 Golden Eagles (81 adults, 4 subadults, 15 juveniles and 6 of unknown age). **Table 6** compares the fall 2013 count with those of the previous four years, although the low number of observational days and hours in 2012 and 2013 mean that the variances have little significance.

### **Observer at Steeples**

All counts were conducted by Vance Mattson.

# Appendix

TABLE 1															
MOUNT LORETTE, FALL 2013															
SUMMARY WEATHER															
Day #			TEMP		RIDGE WIND		max gust	CLOUD		PRECIPITATION & NOTES	% TIME RIDGES		# migrant raptors		
			Max	Min	Direction	Velocity		Max%	Min%		type	West		East	
1	Sep	20	19	4	?	L?		70	0	Cu,Ci,Ac			7		
2	Sep	21	17	-2	SW	M-S		90	10	Cu,Ci,St		5	10	8	
3	Sep	22	13	4	WSW	M		100	70	Cu,St		5	tr	20	
4	Sep	23	11	8	SW	S		90	40	Cu			10	54	
5	Sep	24	10	-1	SW	M		100	60	Ac,Cu,Ci				35	
	Sep	25	NO OBSERVATION						100	100	low St		100	100	0
6	Sep	26	8	4	W-NW	M		100	20	Cu,Ac,Sc		20		10	
7	Sep	27	8	3	W	M-S		100	70	Ci,Cs,Ac,As				26	
8	Sep	28	12	4	SW	M-S		100	40	Cu,Ci,Ac,As		5		9	
9	Sep	29	8.5	4	WSW	M-S		100	30	Cu,St		50	20	37	
10	Sep	30	7	4	SW	S		100	70	Cu,St		70	20	11	
11	Oct	1	8	-2	W	M		100	20	Cu,Ac		tr		9	
12	Oct	2	9	-3	NW	L-M		50	tr	Ac				8	
13	Oct	3	5	-1	W	L-M		100	40	Cu,Ac,St		70	20	2	
14	Oct	4	11	-4	W	L-M		70	tr	Ci				43	
15	Oct	5	12	4	W-NW	S		100	40	Cu,St,Ac,Ci		50		90	
16	Oct	6	17	7	W	M-S		100	80	Cu,As				128	
17	Oct	7	12	6	SW	M-S		100	20	Cu,Sc		30	10	57	
18	Oct	8	7	3	SW-N	M		100	80	Cu,As,Ac		50	30	44	
19	Oct	9	9	0	SW	M-S		10	tr	Ci,Ac				152	
20	Oct	10	9	4	W-NNW	M-S		100	30	Cu,Ac,As		40	10	27	
21	Oct	11	6	-3	NW	L-M		100	30	Ac		10	10	393	
22	Oct	12	4	-1	SSW-SW	L-M		100	70	Cu,Ac,Sc		40		246	
23	Oct	13	4.5	-2	W	L		100	90	Cu		tr	10	206	
24	Oct	14	7.5	-10	?	L?		0	0					545	
25	Oct	15	4	-5	?	L-M?		100	10	Ci,Cs,Ac				148	
	Oct	16	NO OBSERVATION						100	80	St		100	100	0
26	Oct	17	6	2	NW	M		90	10	Cu,Sc		40		121	
27	Oct	18	5	-4	WNW-NW	L-M		80	0	Ci				74	
28	Oct	19	12	-1.5	NW	L-M		100	20	Ac,As,Cu,Sc,Ci				98	
29	Oct	20	13	-4	?	L?		100	0	Ac,Ci				105	
30	Oct	21	15.5	-3	SW?	L-M?		60	0	Ci				101	
31	Oct	22	15	-3	?	?		40	0	lent,Ac				39	
32	Oct	23	11	0	NW	L		50	0	Ci				14	
33	Oct	24	18	-3	W	L-M		80	10	Cu,AS,Ci				15	
34	Oct	25	12.5	-4	?	L?		0	0					13	
35	Oct	26	15	-4	NW	L-M		100	20	Ci,Cu				58	
	Oct	27	NO OBSERVATION						100	100	St		100	100	0
36	Oct	28	-3	-9	W	M		70	0	As,Ac		50		7	
37	Oct	29	4.5	-13	N?	L?		tr	0	Ac				10	
38	Oct	30	1	-4	W	L		100	80	Ac				27	
39	Oct	31	7	1	NW	M-S		60	20	Cu,Ac,As				34	
40	Nov	1	6	2	W-NW	S		100	30	Cu,As,Cs,lent		tr		20	
	Nov	2	NO OBSERVATION						100	100	St		100	100	0
	Nov	3	NO OBSERVATION						100	100	St		100	100	0
41	Nov	4	0	-7	N-W	L		100	40	St,Cu		80	70	12	
42	Nov	5	-1	-9	W	S		100	10	Ac,As,lent				16	
43	Nov	6	0.5	-6	W	M-S		20	0	Cu,Ci				14	
44	Nov	7	2	-6	SW	M-S		100	40	Cu,Ac,As,Sc,Ci		50	30	1	
	Nov	8	NO OBSERVATION						100	100	St		100	100	0
45	Nov	9	2	0	WSW	M		100	50	Cu,AS,Ci		10		3	
46	Nov	10	-6.5	-9	W?	L-M?		100	90	St,Cu		70	20	1	
47	Nov	11	0	-19	?	?		0	0					1	
48	Nov	12	9	-6	SW	M-S		90	50	lent,Cu,Ci,As				4	
49	Nov	13	7	4	W	S		90	50	Cu,Ci				3	
50	Nov	14	4	0.5	NW-WNW	S		90	30	St,Cu,Ci		10	10	0	
51	Nov	15	1	0	W-WNW	S		100	80	St,As,Ac,Cu,Ci		70	10	4	

TABLE 2

MOUNT LORETTE, ALBERTA, FALL 2013

September 20 to November 15

Date	HRS	TV	OS	BE	NH	SS	CH	NG	BW	SW	RT	FH	RL	GE	AK	ML	GY	PG	PR	UA	UB	UE	UF	UU	TOTAL		
2013-09-20	12	0	0	1	1	0	0	0	0	0	0	1	0	0	4	0	0	0	0	0	0	0	0	0	7	CHa	1
2013-09-21	12.67	0	0	1	0	1	1	0	0	0	0	0	0	3	0	0	0	1	0	0	0	1	0	0	8	CHa/JDu	2
2013-09-22	10.42	0	0	1	0	1	0	0	0	0	0	0	0	16	0	1	0	0	0	0	1	0	0	0	20	BW	3
2013-09-23	12.25	0	0	5	0	3	1	0	0	0	7	0	0	38	0	0	0	0	0	0	0	0	0	0	54	GH	4
2013-09-24	12	0	0	1	0	0	1	0	0	0	3	0	0	26	0	1	0	0	0	2	0	0	0	1	35	CHa	5
2013-09-25	NO OBSERVATION																								0		
2013-09-26	10	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	10	JDu	6
2013-09-27	9	0	0	1	0	3	1	1	0	0	0	0	0	20	0	0	0	0	0	0	0	0	0	0	26	TW	7
2013-09-28	10.5	0	0	0	0	1	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	9	JDu	8
2013-09-29	11.92	0	1	0	1	1	0	4	0	0	0	0	0	29	0	0	0	1	0	0	0	0	0	0	37	BW	9
2013-09-30	12	0	0	0	0	2	0	0	0	0	1	0	0	8	0	0	0	0	0	0	0	0	0	0	11	GH	10
<b>September</b>	<b>112.8</b>	<b>0</b>	<b>1</b>	<b>10</b>	<b>2</b>	<b>12</b>	<b>4</b>	<b>5</b>	<b>0</b>	<b>0</b>	<b>12</b>	<b>0</b>	<b>0</b>	<b>162</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>217</b>		
2013-10-01	11.67	0	0	0	0	1	1	0	0	0	2	0	0	5	0	0	0	0	0	0	0	0	0	0	9	CHa	11
2013-10-02	9	0	0	1	0	3	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	2	0	8	TW	12
2013-10-03	10	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2	JDu	13
2013-10-04	9	0	0	0	0	3	0	0	0	0	2	0	0	37	0	0	0	0	0	1	0	0	0	0	43	TW	14
2013-10-05	11.5	0	0	2	0	0	0	0	0	0	0	0	1	87	0	0	0	0	0	0	0	0	0	0	90	JDu	15
2013-10-06	13.25	0	0	0	2	0	0	1	0	0	0	0	4	120	0	1	0	0	0	0	0	0	0	0	128	BW	16
2013-10-07	11.67	0	0	1	0	3	1	0	0	0	0	0	0	52	0	0	0	0	0	0	0	0	0	0	57	GH	17
2013-10-08	9.83	0	0	2	0	1	0	0	0	0	0	0	0	40	0	0	0	0	0	0	1	0	0	0	44	CHa	18
2013-10-09	9.5	0	0	2	2	4	0	1	0	0	1	0	0	140	0	2	0	0	0	0	0	0	0	0	152	TW	19
2013-10-10	8.75	0	0	0	0	0	1	0	0	0	0	0	0	26	0	0	0	0	0	0	0	0	0	0	27	JDu	20
2013-10-11	9	0	0	0	2	1	1	2	0	0	0	0	0	387	0	0	0	0	0	0	0	0	0	0	393	TW	21
2013-10-12	10	0	0	2	0	8	4	1	0	0	0	1	225	1	0	0	2	0	0	1	1	0	0	0	246	JDu	22
2013-10-13	12.5	0	0	3	1	10	0	6	0	0	0	2	182	0	1	0	0	0	0	0	0	0	1	0	206	BW	23
2013-10-14	12.75	0	0	4	0	36	1	3	0	0	0	4	496	0	0	0	0	1	0	0	0	0	0	0	545	GH	24
2013-10-15	11.42	0	0	2	0	3	0	1	0	0	0	1	141	0	0	0	0	0	0	0	0	0	0	0	148	CHa	25
2013-10-16	NO OBSERVATION																								0		
2013-10-17	8	0	0	4	0	1	1	1	0	0	0	0	1	112	0	0	0	0	0	0	0	1	0	0	121	JDu	26
2013-10-18	9.5	0	0	3	0	0	1	0	0	0	0	0	0	70	0	0	0	0	0	0	0	0	0	0	74	TW	27
2013-10-19	10.5	0	0	5	0	1	1	1	0	0	0	0	1	87	0	0	0	0	0	0	0	1	0	1	98	JDu	28
2013-10-20	12.25	0	0	2	0	2	0	0	0	0	0	0	3	98	0	0	0	0	0	0	0	0	0	0	105	BW	29
2013-10-21	12	0	0	11	0	0	1	1	0	0	0	0	3	85	0	0	0	0	0	0	0	0	0	0	101	GH	30
2013-10-22	11	0	0	1	0	2	0	0	0	0	0	0	7	29	0	0	0	0	0	0	0	0	0	0	39	CHa	31
2013-10-23	8	0	0	1	0	1	0	0	0	0	0	0	1	10	0	0	0	0	0	1	0	0	0	0	14	TW	32
2013-10-24	10	0	0	0	0	0	0	0	0	0	0	0	0	14	0	0	0	0	0	0	1	0	0	0	15	JDu	33
2013-10-25	11	0	0	2	0	0	0	0	0	0	0	0	0	11	0	0	0	0	0	0	0	0	0	0	13	JDu	34
2013-10-26	9	0	0	3	0	0	0	1	0	0	0	0	0	54	0	0	0	0	0	0	0	0	0	0	58	TW	35
2013-10-27	NO OBSERVATION																								0		
2013-10-28	10.25	0	0	1	0	0	0	0	0	0	1	0	2	3	0	0	0	0	0	0	0	0	0	0	7	AH	36
2013-10-29	11	0	0	5	0	0	0	0	0	0	0	0	1	4	0	0	0	0	0	0	0	0	0	0	10	BW	37
2013-10-30	9	0	0	0	0	0	0	0	0	0	0	0	0	27	0	0	0	0	0	0	0	0	0	0	27	TW	38
2013-10-31	8.75	0	0	3	0	0	0	0	0	0	0	0	0	30	0	0	0	0	0	0	1	0	0	0	34	JDu	39
<b>October</b>	<b>300.1</b>	<b>0</b>	<b>0</b>	<b>60</b>	<b>5</b>	<b>82</b>	<b>14</b>	<b>19</b>	<b>0</b>	<b>0</b>	<b>8</b>	<b>0</b>	<b>32</b>	<b>2573</b>	<b>1</b>	<b>4</b>	<b>0</b>	<b>2</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>3</b>	<b>1</b>	<b>2814</b>		
2013-11-01	10	0	0	1	0	0	0	0	0	0	0	0	0	19	0	0	0	0	0	0	0	0	0	0	20	CHa	40
2013-11-02	NO OBSERVATION																								0		
2013-11-03	NO OBSERVATION																								0		
2013-11-04	10.5	0	0	11	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	12	GH	41
2013-11-05	11.17	0	0	2	0	2	0	0	0	0	0	0	0	10	0	0	0	0	0	1	1	0	0	0	16	CHa	42
2013-11-06	7	0	0	3	0	0	0	1	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	14	CHa/TW	43
2013-11-07	9.5	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	JDu	44
2013-11-08	NO OBSERVATION																								0		
2013-11-09	3.83	0	0	1	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	3	CHa	45
2013-11-10	11	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	BW	46
2013-11-11	9.5	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	GH	47
2013-11-12	9	0	0	0	0	1	0	0	0	0	0	0	0	2	0	0	0	0	0	1	0	0	0	0	4	CHa	48
2013-11-13	6.5	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	TW	49
2013-11-14	8.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	JDu	50
2013-11-15	7.5	0	0	1	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	4	CHa	51
<b>November</b>	<b>104</b>	<b>0</b>	<b>0</b>	<b>25</b>	<b>0</b>	<b>3</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>47</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>79</b>		
<b>TOTALS</b>	<b>516.9</b>	<b>0</b>	<b>1</b>	<b>95</b>	<b>7</b>	<b>97</b>	<b>18</b>	<b>25</b>	<b>0</b>	<b>0</b>	<b>20</b>	<b>0</b>	<b>32</b>	<b>2782</b>	<b>1</b>	<b>6</b>	<b>0</b>	<b>4</b>	<b>1</b>	<b>6</b>	<b>5</b>	<b>5</b>	<b>3</b>	<b>2</b>	<b>3110</b>		
Date	HRS	TV	OS	BE	NH	SS	CH	NG	BW	SW	RT	FH	RL	GE	AK	ML	GY	PG	PR	UA	UB	UE	UF	UU	TOTAL		

TABLE 3

MOUNT LORETTE SUMMARY TOTALS, September 20 - November 15, 1993-1996, 1998-2001, 2003-2005, 2009-2013

	days	hrs.	TV	OS	BE	NH	SS	CH	NG	BW	SW	RT	FH	RL	GE	AK	ME	GY	PG	PR	UA	UB	UE	UF	UU	T	
1993	55	474.8	0	2	455	13	217	46	82	5	0	47	1	59	4532	1	4	8	4	1	2	0	0	1	0	5480	
1994	56	516.8	0	0	294	7	175	29	25	15	0	39	0	37	3788	2	15	2	5	4	1	2	1	0	0	4441	
1995	54	463.3	0	2	296	27	251	31	11	5	2	52	0	67	3591	4	12	3	4	2	1	3	0	1	0	4365	
1996	53	485.6	0	2	271	11	173	23	8	25	0	32	1	65	3881	8	9	0	5	2	0	4	0	0	0	4520	
1998	52	483.2	1	1	174	12	80	20	28	14	0	59	1	82	3209	8	2	5	5	1	6	2	0	1	3	3714	
1999	57	596.6	0	4	193	13	134	21	25	18	1	32	0	67	3302	1	6	5	8	1	5	1	1	2	7	3847	
2000	57	623.6	0	2	510	15	175	25	140	3	0	17	0	68	4587	1	12	2	2	1	7	0	1	1	6	5575	
2001	57	646.5	0	4	330	11	183	18	101	3	0	43	0	52	3592	2	9	5	6	0	4	2	0	3	0	4368	
2003	55	615.6	0	3	258	4	131	25	59	1	1	40	0	33	3744	3	8	1	5	1	11	2	2	0	10	4342	
2004	57	658.7	0	4	338	15	125	26	57	5	1	14	0	70	3610	2	8	9	11	4	10	1	4	1	16	4331	
2005	57	662.1	0	3	242	6	89	19	41	6	1	16	1	78	3821	2	3	1	2	3	14	2	2	2	8	4362	
2009*	46	492.3	0	4	100	5	57	10	25	1	0	18	0	16	2367	1	4	1	4	2	3	0	1	1	3	2623	
2010	55	577.2	0	4	165	6	67	15	34	1	0	44	1	23	3222	2	2	0	4	4	16	9	12	1	10	3642	
2011	55	590.8	0	3	137	2	113	33	42	0	0	28	0	41	3466	2	6	2	10	2	3	2	2	3	2	3899	
2012	52	530.1	0	2	128	6	63	10	30	1	0	26	0	61	2635	0	5	1	6	2	5	2	2	1	1	2987	
2013	51	516.9	0	1	95	7	97	18	25	0	0	20	0	32	2782	1	6	0	4	1	6	5	5	3	2	3110	
TOTAL	869	8934	1	41	3986	160	2130	369	733	103	6	527	5	851	56129	40	111	45	85	31	94	37	33	21	68	65606	
Av 93-12	54.5	561.1	0.067	2.67	259	10.2	136	23.4	47.2	6.867	0.4	33.8	0.333	54.6	3556.5	2.6	7	3	5.4	2	5.87	2.13	1.87	1.2	4.4	4166.4	
13 cf Av	-6.5	-7.9		-62.5	-63.4	-31.4	-28.4	-23.1	-47.0			-40.8	-100.0	-41.4	-21.8	-61.5	-14.3	-100.0	-25.9	-50.0	2.3	134	168	150	-54.5	-25.4	
*	Count ended Nov 9, but considered valid																										
1992	short count																										
1997	count at Plateau Mountain																										
2002	no systematic count																										
2006-08	anomalously low , short counts																										

TABLE 4A

OCTOBER SUMMARY TOTALS, MOUNT LORETTE (excluding 1992,1997,2002,2006,2007)

	days	hrs.	TV	OS	BE	NH	SS	CH	NG	BW	SW	RT	FH	RL	GE	AK	ME	GY	PG	PR	UA	UB	UE	UF	UU	T
1993	30	263.8	0	0	342	6	119	9	60	5	0	7	0	46	3347	0	2	3	3	0	0	0	0	1	0	3950
1994	30	284.8	0	0	187	5	75	14	14	14	0	16	0	22	3404	0	6	1	4	1	0	2	0	0	0	3765
1995	29	254.3	0	0	125	6	174	8	8	3	0	25	0	51	3052	3	8	3	2	2	0	1	0	1	0	3472
1996	31	313.6	0	0	193	8	70	10	5	8	0	13	0	63	3552	2	5	0	1	2	0	3	0	0	0	3935
1998	30	287.5	0	0	95	4	40	4	10	3	0	14	0	61	2837	2	0	1	4	0	0	1	0	1	1	3078
1999	31	336.1	0	1	126	6	85	10	21	15	0	9	0	58	2752	0	2	5	6	1	3	0	1	2	3	3106
2000	31	353.4	0	1	337	7	112	15	110	3	0	12	0	65	3817	1	7	1	1	1	1	0	0	1	3	4495
2001	31	354.4	0	0	208	8	126	9	66	3	0	23	0	48	2903	0	4	3	4	0	2	1	0	2	0	3410
2003	30	342.5	0	0	150	3	60	5	42	0	0	11	0	31	3216	0	3	0	2	1	5	2	1	0	5	3537
2004	31	358.1	0	0	175	3	49	8	34	4	1	5	0	63	2588	1	4	6	4	3	9	0	1	0	9	2967
2005	31	369.4	0	1	188	4	44	10	32	1	0	6	1	73	3297	1	2	0	0	2	5	1	2	1	5	3676
2008	30	314.4	0	1	66	7	25	10	18	3	0	4	0	12	2047	1	6	0	1	1	2	6	13	4	7	2234
2009	29	307.2	0	1	77	2	19	3	13	1	0	2	0	13	1831	0	4	1	4	0	3	0	2	1	2	1979
2010	29	318.5	0	2	78	4	27	8	16	1	0	21	1	20	2648	1	2	0	4	3	11	8	9	1	5	2870
2011	29	324.1	0	1	90	0	84	28	38	0	0	21	0	31	3168	0	5	2	6	0	1	2	2	3	1	3483
2012	28	287.9	0	0	50	1	45	6	20	1	0	13	0	56	2045	0	1	1	4	2	3	2	1	0	0	2251
2013	29	300.1	0	0	60	5	82	14	19	0	0	8	0	32	2573	1	4	0	2	1	2	3	4	3	1	2814
TOTAL	509	5370	0	8	2547	79	1236	171	526	65	1	210	2	745	49077	13	65	27	52	20	47	32	36	21	42	55022
Av 93-12	30	316.9	0.0	0.5	155.4	4.6	72.1	9.8	31.7	4.1	0.1	12.6	0.1	44.6	2906.5	0.8	3.8	1.7	3.1	1.2	2.8	1.8	2.0	1.1	2.6	3263
13 cf Av	-3.3	-5.3	0.0		-61.4	8.1	13.7	42.7	-40.0			-36.6		-28.2	-11.5	33.3	4.9		-36.0	-15.8	-28.9	65.5	100.0	166.7	-61.0	-13.8

TABLE 4B

SEPTEMBER 20-30, SUMMARY TOTALS, MOUNT LORETTE (excluding 1992,1997,2002,2006,2007,2008)

	days	hrs.	TV	OS	BE	NH	SS	CH	NG	BW	SW	RT	FH	RL	GE	AK	ME	GY	PG	PR	UA	UB	UE	UF	UU	T
1993	10	102.6	0	2	31	6	98	37	7	0	0	40	1	10	1004	1	1	0	1	0	2	0	0	0	0	1241
1994	11	108.4	0	0	11	1	100	15	6	1	0	21	0	0	218	2	8	0	1	3	1	0	0	0	0	388
1995	11	105.8	0	2	36	20	75	22	1	2	2	26	0	2	222	1	4	0	0	0	1	2	0	0	0	418
1996	10	89.99	0	2	13	3	103	13	1	17	0	19	1	2	131	6	4	0	4	0	0	1	0	0	0	320
1998	10	100.8	1	1	8	7	40	14	10	10	0	44	1	0	170	6	1	0	0	1	6	1	0	0	2	323
1999	11	110.1	0	3	5	7	47	11	1	2	1	22	0	2	278	1	4	2	0	0	2	1	0	0	4	393
2000	11	118.6	0	1	33	7	63	9	1	0	0	5	0	1	497	0	5	1	0	0	6	0	0	0	2	631
2001	11	134	0	4	25	3	52	9	2	0	0	18	0	3	363	1	5	0	2	0	1	1	0	1	0	490
2003	11	132.6	0	3	23	1	69	18	14	1	1	29	0	1	433	3	5	0	3	0	6	0	0	0	5	615
2004	11	141.7	0	4	29	11	76	18	22	1	0	9	0	5	954	1	2	0	6	1	1	1	2	0	6	1149
2005	11	133.7	0	2	13	2	45	9	3	5	1	10	0	0	379	0	1	0	0	1	9	1	0	1	3	485
2009	11	133.3	0	3	10	3	38	7	11	0	0	15	0	3	355	1	0	0	0	2	0	0	0	0	1	449
2010	11	117.2	0	2	30	2	34	4	10	0	0	22	1	1	223	1	0	0	0	1	3	1	0	0	2	337
2011	11	134.6	0	1	11	2	25	3	3	0	0	5	0	1	169	2	0	0	4	0	1	0	0	0	1	228
2012	11	124.5	0	2	17	4	16	4	6	0	0	11	0	0	273	0	4	0	1	0	2	0	1	0	1	342
2013	10	112.8	0	1	10	2	12	4	5	0	0	12	0	0	162	0	2	0	2	0	2	1	1	0	1	217
TOTAL	172	1900	1	33	305	81	893	197	103	39	5	308	4	31	5831	26	46	3	24	9	43	10	4	2	28	8026
Av 93-12	10.8	119.2	0.1	2.1	19.7	5.3	58.7	12.9	6.5	2.6	0.3	19.7	0.3	2.1	377.9	1.7	2.9	0.2	1.5	0.6	2.7	0.6	0.2	0.1	1.8	520.6



**TABLE 5**  
**MOUNT LORETTE GOLDEN EAGLE PASSAGE BY HOUR, FALL 2013**

	MST	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	n	T	
		0	24	73	124	221	250	506	443	299	399	307	129	7			
	MDT	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20			
SEP	20	0	0	0	0	0	0	0	0	0	1	3	0	4	4		
	21	0	0	0	0	1	0	1	1	0	0	0	0	3	7		
	22	0	0	7	2	2	1	0	3	1	0	0	0	-	16	23	
	23	0	0	0	3	0	0	8	5	3	10	7	2	0	38	61	
	24	0	0	0	1	0	1	2	8	1	5	4	4	0	26	87	
	25	w	w	w	w	w	w	w	w	w	w	w	w	w	0	87	
	26	-	-	0	0	0	1	1	0	3	3	2	-	10	97		
	27	-	-	0	1	2	0	0	5	3	7	2	0	-	20	117	
	28	-	-	1	0	0	0	0	0	1	5	0	1	0	8	125	
	29	0	2	1	6	0	3	0	6	4	6	1	0	-	29	154	
	30	w	w	w	0	0	0	2	5	1	0	0	0	-	8	162	
OCT	1	0	2	0	0	0	0	0	0	2	1	0	0	0	5	167	
	2	-	-	0	0	0	0	0	0	0	0	0	-	-	0	167	
	3	w	w	w	w	w	0	0	0	0	1	0	0	1	168		
	4	-	-	0	1	1	2	6	9	3	5	10	0	0	37	205	
	5	-	5	2	0	3	4	26	25	11	7	1	3	0	87	292	
	6	0	5	8	12	5	13	19	7	8	7	12	17	7	120	412	
	7	0	5	7	10	3	3	8	6	5	5	(W)	(W)	(w)	52	464	
	8	0	0	21	10	0	0	8	1	w	w	w	w	w	40	504	
	9	-	-	0	0	17	13	17	7	14	29	29	14	-	140	644	
	10	-	-	6	8	7	3	1	1	0	0	w	w	w	26	670	
	11	-	-	0	0	31	30	88	84	58	44	48	4	-	387	1057	
	12	-	-	0	1	4	1	79	29	44	63	4	0	-	225	1282	
	13	0	0	0	8	45	30	26	27	6	27	12	1	0	182	1464	
	14	0	0	5	10	23	69	146	134	11	28	49	21	0	496	1960	
	15	0	2	0	1	0	3	0	5	13	40	58	19	0	141	2101	
	16	w	w	w	w	w	w	w	w	w	w	w	w	w	0	2101	
	17	-	-	-	20	45	21	9	6	7	4	0	0	-	112	2213	
	18	-	-	0	0	1	0	3	13	11	17	10	15	-	70	2283	
	19	-	0	1	14	15	14	19	9	10	2	3	(W)	(w)	87	2370	
	20	0	0	1	6	3	8	10	8	20	22	9	11	0	98	2468	
	21	-	3	7	3	0	2	6	9	17	27	4	7	0	85	2553	
	22	-	0	0	1	0	7	8	1	2	8	2	0	-	29	2582	
	23	w	w	w	w	w	0	0	4	5	1	0	-	-	10	2592	
	24	-	0	0	0	5	2	0	1	0	3	3	0	-	14	2606	
	25	-	0	0	0	0	0	0	0	1	1	5	4	-	11	2617	
	26	-	-	5	6	3	11	11	6	6	3	3	-	-	54	2671	
	27	w	w	w	w	w	w	w	w	w	w	w	w	w	0	2671	
	28	-	0	0	0	0	1	1	0	1	0	0	0	-	3	2674	
	29	0	0	1	0	0	0	0	1	1	1	0	0	-	4	2678	
	30	-	-	0	0	0	0	0	0	2	3	21	1	-	27	2705	
	31	-	-	-	0	0	1	0	6	12	6	5	0	-	30	2735	
NOV	1	-	0	0	0	1	5	0	6	4	3	0	0	-	19	2754	
	2	w	w	w	w	w	w	w	w	w	w	w	w	w	0	2754	
	MDT	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20			
	MST	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19			
	3	w	w	w	w	w	w	w	w	w	w	w	w	w	0	2754	
	4	w	w	w	w	1	0	w	w	(W)	0	0	0	0	-	1	2755
	5	-	0	0	0	3	1	0	0	4	2	0	0	0	10	2765	
	6	-	-	-	-	0	0	0	4	4	2	0	0	-	10	2775	
	7	w	w	w	w	w	0	0	0	0	0	0	0	-	0	2775	
	8	w	w	w	w	w	w	w	w	w	w	w	w	w	0	2775	
	9	-	-	-	-	-	-	-	0	0	2	0	0	-	2	2777	
	10	(w)	(W)	(W)	(W)	(W)	0	0	0	0	0	0	-	-	0	2777	
	11	-	0	0	0	0	0	0	0	0	0	0	-	-	0	2777	
	12	-	-	0	0	0	1	1	0	0	0	0	0	-	2	2779	
	13	-	-	-	-	0	0	0	0	0	0	0	-	-	0	2779	
	14	w	w	w	0	0	0	0	0	0	0	0	-	-	0	2779	
	15	(w)	(W)	(W)	(W)	0	0	0	0	3	0	0	-	-	3	2782	
TOTALS	MST	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19			
		0	24	73	124	221	250	506	443	299	399	307	129	7	2782		

W weather not conducive to raptor migration, directly observed.  
w weather not conducive to raptor migration, not directly observed.  
(W) weather with low probability of raptor migration, directly observed.  
(w) weather with low probability of raptor migration, not directly observed.  
- observer not present at site

TABLE 6

YEARLY SUMMARY FALL TOTALS, STEEPLES 2009-2013

	days	hrs.	TV	OS	BE	NH	SS	CH	NG	BW	SW	RT	FH	RL	GE	AK	ME	GY	PG	PR	UA	UB	UE	UF	UU	T
2009	41	148	2	1	146	7	37	4	5	0	0	9	0	13	226	1	1	0	0	0	0	0	1	0	0	453
2010	34	145.5	0	1	191	2	18	0	2	0	0	7	0	8	162	0	0	0	0	0	0	4	4	0	0	399
2011	23	73.5	0	1	130	0	15	0	2	0	0	18	0	1	93	1	0	0	1	0	0	0	1	0	0	263
2012	12	36	1	0	74	1	3	0	2	0	0	0	0	5	22	0	0	0	0	0	0	0	0	0	0	108
2013	16	43	0	0	21	0	12	0	2	0	0	6	0	3	106	0	0	0	0	0	0	0	0	0	0	150
TOTAL	126	446	3	3	562	10	85	4	13	0	0	40	0	30	609	2	1	0	1	0	0	4	6	0	0	1373
Av 09-12	27.5	100.8	0.75	0.75	135	2.5	18.3	1	2.75	0	0	8.5	0	6.75	125.75	0.5	0.25	0	0.25	0	0	1	1.5	0	0	305.75
13 cf Av	-42	-57.3	-100	-100	-84	-100	-34	-100	-27			-29		-56	-15.71	-100	-100		-100			-100	-100			-50.94

TABLE 7

STEEPLES, BRITISH COLUMBIA, FALL 2013

October 6 to November 18 (16 days, 43 hours)

Date	HRS	TV	OS	BE	NH	SS	CH	NG	BW	SW	RT	FH	RL	GE	AK	ML	GY	PG	PR	UA	UB	UE	UF	UU	TOTAL
2013-10-06	4	0	0	5	0	1	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	8
2013-10-07	NO OBSERVATION																							0	
2013-10-08	NO OBSERVATION																							0	
2013-10-09	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2013-10-10	NO OBSERVATION																							0	
2013-10-11	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2013-10-12	NO OBSERVATION																							0	
2013-10-13	4.5	0	0	0	0	4	0	1	0	0	1	0	0	63	0	0	0	0	0	0	0	0	0	0	69
2013-10-14	3	0	0	0	0	1	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	5
2013-10-15	3.5	0	0	0	0	2	0	0	0	0	2	0	0	8	0	0	0	0	0	0	0	0	0	0	12
2013-10-16	NO OBSERVATION																							0	
2013-10-17	3	0	0	1	0	2	0	0	0	0	0	0	2	9	0	0	0	0	0	0	0	0	0	0	14
2013-10-18	3	0	0	4	0	1	0	0	0	0	0	0	0	11	0	0	0	0	0	0	0	0	0	0	16
2013-10-19	3.5	0	0	1	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	6
2013-10-20	3	0	0	0	0	1	0	0	0	0	1	0	0	4	0	0	0	0	0	0	0	0	0	0	6
2013-10-21	NO OBSERVATION																							0	
2013-10-22	2.5	0	0	0	0	0	0	1	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	4
2013-10-23	NO OBSERVATION																							0	
2013-10-24	NO OBSERVATION																							0	
2013-10-25	NO OBSERVATION																							0	
2013-10-26	NO OBSERVATION																							0	
2013-10-27	NO OBSERVATION																							0	
2013-10-28	NO OBSERVATION																							0	
2013-10-29	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2013-10-30	2																							0	
2013-10-31	2																							0	
<b>October</b>	<b>38</b>	<b>0</b>	<b>0</b>	<b>11</b>	<b>0</b>	<b>12</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>6</b>	<b>0</b>	<b>3</b>	<b>106</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>140</b>
2013-11-01	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2013-11-02	NO OBSERVATION																							0	
2013-11-03	NO OBSERVATION																							0	
2013-11-04	NO OBSERVATION																							0	
2013-11-05	NO OBSERVATION																							0	
2013-11-06	NO OBSERVATION																							0	
2013-11-07	NO OBSERVATION																							0	
2013-11-08	NO OBSERVATION																							0	
2013-11-09	NO OBSERVATION																							0	
2013-11-10	NO OBSERVATION																							0	
2013-11-11	NO OBSERVATION																							0	
2013-11-12	NO OBSERVATION																							0	
2013-11-13	NO OBSERVATION																							0	
2013-11-14	NO OBSERVATION																							0	
2013-11-15	NO OBSERVATION																							0	
2013-11-16	NO OBSERVATION																							0	
2013-11-17	NO OBSERVATION																							0	
2013-11-18	3	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
<b>November</b>	<b>5</b>	<b>0</b>	<b>0</b>	<b>10</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>10</b>
<b>TOTALS</b>	<b>43</b>	<b>0</b>	<b>0</b>	<b>21</b>	<b>0</b>	<b>12</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>6</b>	<b>0</b>	<b>3</b>	<b>106</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>150</b>
<b>Date</b>	<b>HRS</b>	<b>TV</b>	<b>OS</b>	<b>BE</b>	<b>NH</b>	<b>SS</b>	<b>CH</b>	<b>NG</b>	<b>BW</b>	<b>SW</b>	<b>RT</b>	<b>FH</b>	<b>RL</b>	<b>GE</b>	<b>AK</b>	<b>ML</b>	<b>GY</b>	<b>PG</b>	<b>PR</b>	<b>UA</b>	<b>UB</b>	<b>UE</b>	<b>UF</b>	<b>UU</b>	<b>TOTAL</b>

**TABLE 8**

**STEEPLES, SPRING 2013  
SUMMARY WEATHER**

Day #			RIDGE WIND		CLOUD		PRECIPITATION & NOTES	RIDGES	#	
			TEMP	Direction	Velocity	%				type
1	Oct	6	19	SE	L	?	?	sunny	?	8
	Oct	7	NO OBSERVATION							no
	Oct	8	NO OBSERVATION					w et, poor conditions		no
2	Oct	9	?	?	?	?	?	w et, poor conditions	?	0
	Oct	10	NO OBSERVATION					w et, poor conditions		no
3	Oct	11	?	?	?	?	?	w et, poor conditions	?	0
	Oct	12	NO OBSERVATION					w et, poor conditions		no
4	Oct	13	13	?	L-M	70	?		?	69
5	Oct	14	12	?	L-M	?	?	sunny	?	5
6	Oct	15	10	?	L			sunny	?	12
	Oct	16	NO OBSERVATION					rain		no
7	Oct	17	10	?	L-M	?	?	partly cloudy	?	14
8	Oct	18	?	?	?	?	?	?	?	16
9	Oct	19	10	?	L	?	?	sunny	?	6
10	Oct	20	7	?	L	?	?	partly cloudy	?	6
	Oct	21	NO OBSERVATION							no
11	Oct	22	8	?	L	?	?	partly cloudy	?	4
	Oct	23	NO OBSERVATION			100	St		all obscured	no
	Oct	24	NO OBSERVATION			100	St		all obscured	no
	Oct	25	NO OBSERVATION			100	St		all obscured	no
	Oct	26	NO OBSERVATION			100	St		all obscured	no
	Oct	27	NO OBSERVATION			100	St		all obscured	no
	Oct	28	NO OBSERVATION			100	St		all obscured	no
12	Oct	29	?	?	?	?	?	poor conditions	?	0
13	Oct	30	?	?	?	?	?	?	?	0
14	Oct	31	?	?	?	?	?	?	?	0
15	Nov	1	10	?	L	?	?	sunny	?	0
	Nov	2	NO OBSERVATION							no
	Nov	3	NO OBSERVATION							no
	Nov	4	NO OBSERVATION							no
	Nov	5	NO OBSERVATION							no
	Nov	6	NO OBSERVATION							no
	Nov	7	NO OBSERVATION							no
	Nov	8	NO OBSERVATION					Nov 2-17: overcast weather		no
	Nov	9	NO OBSERVATION					with the mountains usually		no
	Nov	10	NO OBSERVATION					obscured		no
	Nov	11	NO OBSERVATION							no
	Nov	12	NO OBSERVATION							no
	Nov	13	NO OBSERVATION							no
	Nov	14	NO OBSERVATION							no
	Nov	15	NO OBSERVATION							no
	Nov	16	NO OBSERVATION							no
	Nov	17	NO OBSERVATION							no
16	Nov	18	?	?	?	100	St	clearing in mid-valley	mainly obscured	10
									TOTAL	150