

**Survey of Early Post-Natal Habitats
of Bighorn Sheep and Mountain Goats on the
Kicking Horse Canyon Project:
April 2008 – July 2008**



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INTRODUCTION

The 26-kilometre Kicking Horse Canyon Project is broken down into four phases. Phase 1 (Yoho Bridge replacement and approaches) and Phase 2 (Park Bridge replacement and approaches) cover the middle nine kilometers, with Phases 3 & 4 covering the two ends of the 26 kilometres. The west segment of Phase 3 between Golden and Phase 4 is referred to as Golden Hill to West Portal and the segment between the eastern limits of Phase 2 and Yoho National Park is referred to as Brake Check to Yoho Park (Figure 1). Phases 1 and 2 are completed, and Brake Check to Yoho Park is under construction. The remaining segments are at various stages of procurement.

This report describes surveys of early post-natal habitats for Rocky Mountain bighorn sheep (*Ovis canadensis*) and mountain goat (*Oreamnos americana*) in the vicinity of the Kicking Horse Canyon Project (Figure 1). The surveys were conducted between April 27 and July 26, 2008.

The Trans-Canada Highway in the Kicking Horse Canyon passes through important wildlife habitats with high wildlife use. White-tailed deer (*Odocoileus virginianus*), mule deer (*Odocoileus hemionus*) and bighorn sheep (*Ovis canadensis*) occur in substantial numbers, along with lesser numbers of elk (*Cervus elaphus*), mountain goats, cougar and bears (Harper 2007, Demarchi and Searing 1997).

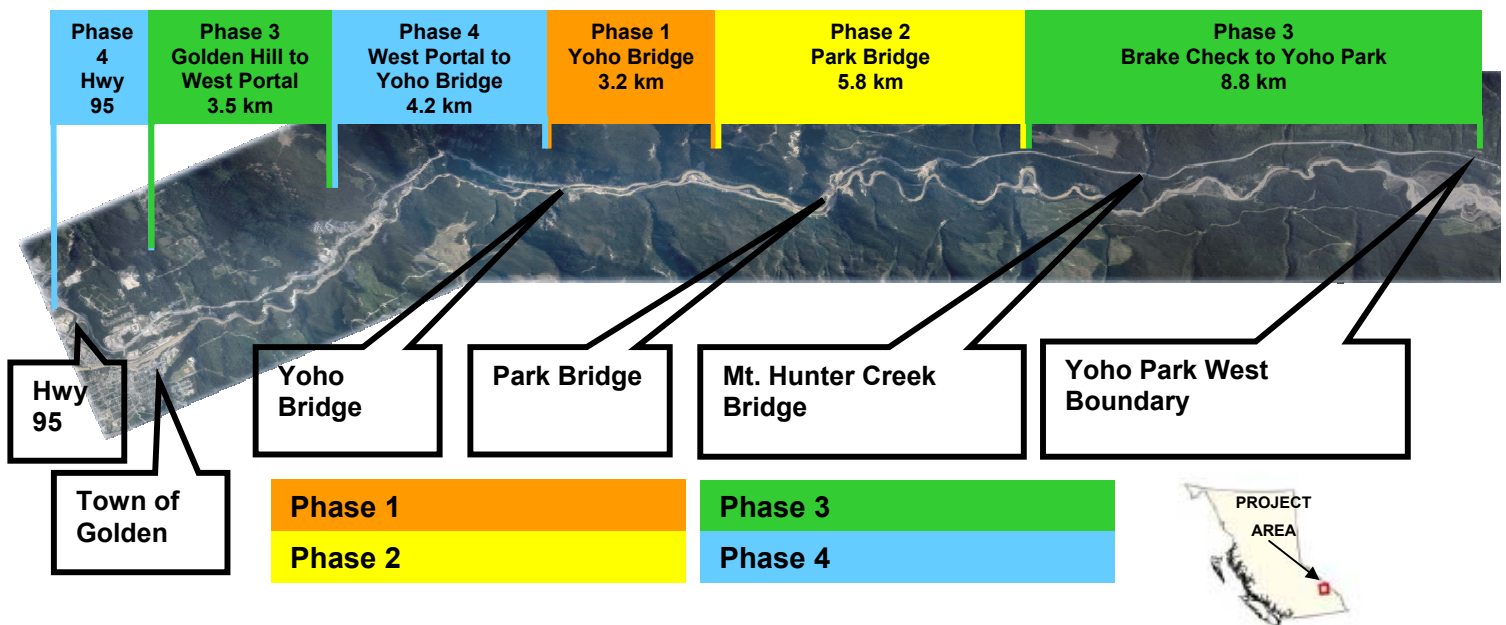


Figure 1. Kicking Horse Canyon Project area showing the various implementation phases.

An ecosystem and wildlife habitat and biodiversity inventory was undertaken in 2005 (Ketcheson 2006) and detailed wildlife population surveys were conducted in 1996 and 1997 (Demarchi and Searing 1997) and 2006 (Harper 2007). Ketcheson (2006) assessed wildlife habitat values along the existing highway alignment adjacent to the highway. Demarchi and Searing (1997) monitored wildlife movements through aerial surveys, track counts, and a “string” technique. Winter snow-tracking studies between Golden and Yoho Bridge in 2006 found the density of large animal tracks was highest near the Town of Golden (Harper 2007). Aerial surveys also showed a similar pattern with deer tracks (mostly White-tailed Deer) rated as High to Very High at lower elevations on the west-facing benches above the Columbia River near Golden. The steep south-facing benches above the Kicking Horse River immediately adjacent to the Trans-Canada Highway also had high densities of deer and bighorn sheep tracks based on aerial surveys. Mountain goat tracks in winter were more restricted in distribution, and were found at lower densities in steep, rugged terrain above Blackwall Bluffs (Harper 2007).

Bighorn sheep and mountain goats are both of high conservation and public value as part of East Kootenay ecosystem. They are a key component of this ecosystem, through their ecological role as a large herbivore, and through their social and economic role as a large charismatic species and game animal.

Bighorn Sheep

Bighorn sheep (*Ovis canadensis*, Shaw 1804) are members of the grandorder Ungulata, order Artiodactyla, suborder Ruminantia, infraorder Pecora, family Bovidae, subfamily Caprinae, and tribe Caprini (bharal, goats and sheep) (Shackleton 1985, Eisenberg 1981). Of the six species in the genus *Ovis*, two occur in the wild in North America (*Ovis canadensis* and *Ovis dalli*) and one occurs as a domestic animal (*Ovis aries*).

Subspecific taxonomy is controversial, but at present there are seven subspecies of *Ovis canadensis* recognized (Shackleton 1985). The Rocky Mountain bighorn sheep (*Ovis canadensis canadensis*) is the morph associated with grasslands and seral shrub lands along the western flanks of the southern Rocky Mountains, including the Kicking Horse Canyon (Demarchi et al. 2000).

The major decline of North American populations occurred during the last half of the 19th century (Krausman 2000b). The Provincial Ranking for bighorn sheep at the species level under The Nature Conservancy system is S2S3; between imperiled because of rarity or because factors making it vulnerable to extirpation (S2), and rare and uncommon, susceptible to large-scale disturbances and/or may have lost extensive peripheral populations (S3) (British Columbia Conservation Data Centre 2009, Cannings et al. 1999b). The British Columbia Ministry of Water, Land and Air Protection include bighorn sheep on their Blue List (Cannings et al. 1999b), which includes vulnerable species that could become a candidate for the Red List (i.e. threatened or endangered) in the foreseeable future.

Demarchi et al. (2000) reflected concerns that many bighorn sheep populations are potentially imperiled by factors making them susceptible to extirpation. Demarchi et al. (2000) cited numerous and uncertain threats from disease, forest succession, access development, land alienation, housing development, and grazing competition, as well as the high vulnerability and sensitivity of bighorn sheep to human disturbance from

recreation, livestock grazing, and resource extraction, as reasons for increased conservation concern. This proposed upward ranking of bighorn sheep was accepted by the Conservation Data Centre, but did not affect their inclusion on the provincial Blue List.

The age of first mating in bighorn sheep females is usually at 2.5 years of age, and the pregnancy rate of breeding age females is typically over 90% (Shackleton et al. 1999). Pregnancy rates of female Rocky Mountain bighorns > 2 years old averaged 93%, regardless of whether or not the population was increasing or decreasing due to outbreaks of bronchopneumonia (Singer et al. 2000d).

The intrinsic rate of natural increase (r_m) for bighorn sheep has been calculated at 0.258, and occasionally been measured even higher (0.288 to 0.388) (Shackleton et al. 1999). This suggests that, in the absence of any limiting factors, bighorn populations have the potential for an exponential growth rate that would double their population every 2½ years.

In British Columbia, rutting begins in early November and parturition (lambing) occurs 175 days later beginning in early June and ending by the first week of July (Demarchi et al 2000). This is apparently later than that observed in the Ashnola River drainage where lambing begins in late April and peaks in May (Harper 1984).

Based on studies elsewhere in British Columbia, survivorship of newborn lambs is typically low. Harper (1984b) estimated neonatal mortality rates at 72% in the mid 1980s, with most occurring in the first 4 weeks postpartum, and all likely the result of coyote predation. A similar pattern of low survival of newborn lambs has been found in other bighorn populations in British Columbia, such as the Fraser metapopulation near William's Lake (Hebert 1987, Hebert and Harrison 1988). Like many ungulates, mortality rates of bighorn sheep decrease after the first year of life. Annual mortality estimated using marked individuals was 33% for yearlings, and 18% for two-year olds (Festa-Bianchet 1989). Annual mortality rates for adults 3 to 7 years of age can be as low as 5%, in the absence of disease and high predation rates on adults.

Female bighorn sheep show strong home range fidelity, returning to the same range 90% of the time (Geist 1971). Across their range, Rocky Mountain bighorn sheep eat a wide variety of different plants. Depending on how populations adjust to different seasons and habitat conditions, the diet can be dominated by grasses, forbs or shrubs (Shackleton et al. 1999). Forbs are particularly important in spring and summer, when they are most readily available and high in nutritional value (particularly the flower heads). Grasses are a significant component of the diet in all seasons, and shrubs can be important at various times of the year depending on location (Shackleton et al. 1999).

Selection indices for forage species of forbs and shrubs tend to show diet selection that is greater than species availability (Shackleton et al. 1999). Shrubs are an important component in the diet of a number of bighorn populations. For example, Douglas rabbitbrush (*Chrysothamnus viscidiflorus*) and winterfat (*Eurotia lanata*) received heavy use and made up 22% of the winter diet of bighorn sheep in Yellowstone National Park (Oldemeyer et al. 1971). In Colorado, true mountainmahogany (*Cercocarpus montanus*) leaves constituted 73-94% of the summer diet.

Potential predators of bighorn sheep in the Kicking Horse Canyon include coyote (*Canis latrans*), cougar (*Felis concolor*), lynx (*Lynx canadensis*), bobcat (*Lynx rufus*) and golden eagle (*Aquila chrysaetos*). Coyote predation has been implicated in the low neonatal survival of California bighorn lambs in the Ashnola (Harper 1984b) and William's Lake area (Hebert (1987). The year following extensive coyote control in Junction Wildlife Management Area, lamb: ewe ratios increased 2-3 times (Hebert and Harrison 1988). Bighorn lambs at the National Bison Range, Montana experienced over 75% mortality to coyote predation, most within 3 days of birth (Hass 1989). In Alaska, newborn Dall sheep lambs experienced a 40% mortality rate in the first year of life, almost all due to predation (Scotton 1997).

Cougar are an important cause of adult bighorn sheep mortality in North America, resulting in annual adult survival rates as low as 0.79 (Hayes *et al.* 2000) and 0.72 (Wehausen 1996) in southern California. Cougar predation by even a small number of cougar can affect adult survival rates (Ross *et al.* 1997), particularly of mature rams (Harrison and Hebert 1988).

The Golden Rod and Gun Club operates a supplemental winter-feeding program under permit from the BC Ministry of Environment to feed a herd of bighorn sheep on the south side of the highway approximately 3 km east of Golden (Figures 2, 7 and 8). Since the start of the program in 1986, this native herd has grown from 10 to 43 animals. The goal of the club is to reduce daily movements back and forth across the existing, undivided highway, improve local habitat with an enhancement project and maintain the herd to provide donor animals for transplant programs elsewhere in B.C. (G. Arlt, A. Pezderic pers. comm.) The club has requested that the highway design consider future access to the feeding site. Up until 2007 the population size was approximately 50 (for example on February 18 & 19, 2005 there were 43 bighorn sheep counted at the winter feeder operated by the Golden Fish and Game Club (17 females, 15 males and 11 lambs). The BC Ministry of Environment has completed several animal translocations using bighorn sheep captured at the winter-feeding site. In early 2007, a total of 25 bighorn sheep (about half the population) were translocated to other bighorn sheep ranges in BC in an effort to reduce the population to a level closer to the carrying capacity of the range. Again in March 2009, a total of 13 bighorn sheep were removed from the herd now estimated to total 33 animals.

There is potential for disruption of the winter feeding program during construction of the Phase 3 -Golden Hill to West Portal segment. A number of options were explored to move the feeding site to a different location, but these were rejected due to private land issues or lack of escape terrain. KHCP personnel will continue to work with Ministry of Environment staff and the Golden Rod and Gun Club to ensure any impacts to bighorn sheep and the winter-feeding program associated with highway construction and operation are minimized.

Human Disturbance

Bighorn sheep appear to be more sensitive to human activities than forest dwelling ungulates, as might be expected by a species living in open habitats. In addition to habitat needs generally described for hoofed mammals, wild sheep have additional needs for escape terrain on rugged cliffs, especially during lambing. Human activities that prevent bighorn sheep from accessing escape terrain or increase the time bighorn

sheep spent in these escape terrain probably increases stress, and may lower foraging efficiency. Human activities that stress bighorn sheep include viewing, helicopter and fixed-wing aircraft (Frid 1998, Legg 1998), vehicles and domestic dogs (MacArthur *et al.* 1982). While occasional exposure to these activities likely has minimal effect on bighorn sheep, chronic exposure potentially reduces foraging efficiency (Bleich *et al.* 1994) and can lead to range abandonment. Reductions in the effectiveness of bighorn sheep habitat, can lead to impacts in growth and survival, and can result in chronic stress, which, in turn, can lead to compromised bighorn sheep immune systems and an increased vulnerability to diseases.

Mountain Goat

Mountain goats (*Oreamnos americanus*, Blainville 1816) are members of the grandorder Ungulata, order Artiodactyla, suborder Ruminantia, infraorder Pecora, family Bovidae, subfamily Caprinae, and tribe Rupicaprini (goat-antelopes) (Eisenberg 1981). There are only four genera in the tribe Rupicaprini, the serow (*Capricornis*) of Central Asia (2 species), the goral (*Naemorhedus*) of Southeast Asia (2 species), the chamois (*Rupicapra*) of Europe (1 species) and the mountain goat (*Oreamnos*) of North America (1 species). Rupicaprini (goat-antelopes) are considered the most primitive members of the subfamily Caprinae (Shackleton 1999). Four subspecies of mountain goat were originally named, but mountain goats are now considered monotypic (i.e. no subspecies) (Cowan and McCrory 1970).

There are between 36,000–63,000 individuals in British Columbia (Cote and Festa-Bianchet 2001). The mating season is from late October to early December, peaking in mid-November, and the gestation period of mountain goats is approximately 190 days (Cote and Festa-Bianchet 2001). The kidding period for mountain goats is from mid-May to early June, and with most kids normally born within 2 weeks of the first birth (Holroyd 1967, Rideout 1978), although there can be few late births from mid-June to early July (Cote and Festa-Bianchet 2001).

Similar to bighorn sheep, mountain goat females isolate themselves to give birth, selecting a safe site from predators in rugged rocky outcrops or cliffs where they give birth and remain for a few days with the newborn kid (Holroyd 1967, Cote and Festa-Bianchet 2001). After 2–3 days of age the newborn kids can follow their mother. Some females return to the same birth site every year, but most do not.

Human Disturbance

Of all the ungulate species, mountain goats appear the most sensitive to disturbance, especially by helicopters. In the Rocky Mountains of Alberta, mountain goats moved in response to helicopters from a distance of at least up to 1.5 km (Cote 1996). In northern British Columbia, Foster and Rahe (1983) reported that goats required a buffer area of 2 km to completely avoid harassment. An extensive problem analysis and literature review on aircraft disturbance of Mountain Goats supports helicopter buffer areas on the order of 2 km (Wilson and Shackleton 2001).

The response of mountain goats to people, traffic and noise has also been examined in summer and in winter. In summer, goats can tolerate foot and vehicular traffic, “if they

are gradually acclimatized and negative associations are avoided” (Penner 1988), especially if the activity is localized and highly predictable, but do not appear to habituate to sudden, unpredictable stimuli such as aircraft over flights or predators. Penner (1988) reported that Mountain Goats accepted indirect, persistent noise (i.e. generator noise) but showed alarm responses to aircraft.

Several authors have noted that more research is needed about whether mountain goats can habituate to some types of human activities. Penner (1988) reported some habituation to persistent and predictable noise stimuli, but not to stimuli that were unpredictable, and not to helicopter flights.

Mountain goats that occur near Highway 97 in the Okanagan seem to be well habituated to vehicular traffic, and appear to be little disturbed by highway construction activities (Churchill 2009). Churchill's study of the response of highway-habituated mountain goats near Highway 97 should have significant bearing on the predicted behaviour of mountain goats within the Kicking Horse Canyon. The only direct observation we have in Kicking Horse Canyon found there was little reaction from a nanny-kid group at the Park Bridge bluffs mineral lick to a construction blast 800-900 m away on June 22, 2006 (E. Paré, pers. comm.). The nanny responded to the blast with a head up alert posture, but did not walk or run in any direction.

METHODS

Various observation points within the Kicking Horse Canyon were identified as good viewing areas and were visited regularly between April 27 and July 26, 2008 by Brian Gustafson. As well, general observations occurred while traveling along the Trans Canada Highway.

Chain up Area – the chain up area is located at the top of the hill before the Yoho Bridge. From this viewing location, the lower bluffs at bus corner could be viewed along with the black wall bluffs.

Lower Canyon Put-in – this viewing location is halfway down the Yoho hill where a rail service road descends to river level. Viewing happened from where the road takes off from the TCH, as well, the road was driven to river level in attempt to make more observations. The area viewed from this location included the bluff above the cement wall, and the area along the TCH down to the Yoho Bridge.

Yoho Bridge – from the Yoho Bridge, the bluffs above the TCH were viewed along with the area that was re-vegetated along the bridge approach.

Dart Creek FSR – the Dart Creek Forest Service Road (FSR) is located between Frenchman's Ridge and Black Wall Bluffs. The viewing area is located approximately 400m along the FSR where the vegetation opens to allow sight. The top of the mountain above Bus Corner down to the Yoho Bridge, the bluffs in the Dart Creek drainage, and Black Wall Bluff were all visible from this location.

Frenchman's Ridge – small pullouts along the TCH in this area allowed viewing of the bluff closest to the TCH.

Lower Mt 7 – this area was accessed via the Mt 7 FSR. A trail along the south side of the canyon was used to view the escape terrain from the TCH down to the river, from the avalanche gates to Frenchman's Ridge. Black Wall bluffs were also visible from some spots along the trail as well as the open grassy slopes above the TCH from the Purcell Heli Ski lawn to Frenchman's Ridge.

Upper Mt 7 – The Mt 7 FSR site gives a large view from the Avalanche Gates to Bus Corner from river level to the tops of the mountains. Frenchman's Ridge and the Dart Creek drainage are best viewed from this location.

Rest stop – the Kicking Horse rest area was a turn around point for the majority of the survey period. From this location, the bluff across the river was viewed along with the bluffs on the North side of Glenogle Creek.

RESULTS AND DISCUSSION

Early post-natal surveys were undertaken on 35 days between April 27, 2009 and July 26, 2009 (Table 1). There were a total of 241 separate observations (Appendix 1) of 696 animals, consisting of 563 observations of bighorn sheep, 107 observations of mountain goat, 17 observations of white-tailed deer, observations of 29 mule deer, 8 observations of elk and 2 observations of bear.

Maximum daily counts of bighorn sheep age-sex classes were 19 adult females, 14 adult males, 8 yearlings and 8 lambs, suggesting a total population of bighorn sheep in the canyon of at least 37 individuals. The highest daily count of mountain goats was 13.

The first newborn bighorn sheep lambs were observed nursing above Bus Corner on May 23, 2008 (Table 1, Figure 3). The first newborn mountain goat kid was observed higher on the mountain than the bighorn sheep in the same general area of Bus Corner on May 29, 2008 (Table 1, Figure 3). By the end of May the bighorn lambs had moved east to the area above the rock slide wall and by June bighorn lambs were observed most frequently on the west side of Yoho Bridge (Figure 4). Bighorn lambs were not observed in the area of west of Dart Creek on Frenchman's Ridge until the end of June (Figure 2). Mountain goat kids were only observed on two occasions (May 29 and June 8), both in the same general area high on the mountain above Bus Corner (Figure 3). Most mountain goat observations were also in the steep rugged terrain high above Bus Corner, but goats were occasionally observed closer to the highway on the steep south-facing slopes just west of Yoho Bridge (Figure 12).

Table 1. Summary of bighorn sheep, mountain goat and other species observed during early post-natal surveys in the spring and early summer of 2008.

Date	species	Adult Female	Adult Male	Adult - sex unknown	Yearlings	lambs, kids, fawns (YOY)	Age-Sex Unknown	Total Number Observed
27/04/2008								0
28/04/2008								0
30/04/2008	sheep	9	3	0	8	0	0	20
30/04/2008	goat	2	1	1	1	0	0	5
30/04/2008	elk	8	0	0	0	0	0	8
30/04/2008	mule deer	1	0	0	0	0	0	1
2/5/2008	sheep	6	11	0	5	0	0	22
2/5/2008	goat	1	1	1	1	0	0	4
4/5/2008	sheep	14	1	0	2	0	0	17
4/5/2008	goat	2	0	1	1	0	0	4
4/5/2008	mule deer	2	0	0	0	0	0	2
4/5/2008	white-tailed deer	2	0	0	0	0	0	2
6/5/2008	sheep	14	8	0	2	0	0	24
6/5/2008	goat	1	0	8	1	0	0	10
6/5/2008	mule deer	0	0	4	0	0	0	4
6/5/2008	white-tailed deer	0	0	4	0	0	0	4
8/5/2008	sheep	13	1	0	5	0	0	19
8/5/2008	white-tailed deer	4	0	0	1	0	0	5
8/5/2008	goat	0	0	7	0	0	0	7
8/5/2008	mule deer	5	0	0	0	0	0	5
9/5/2008	sheep	15	7	0	8	0	0	30
9/5/2008	goat	2	0	2	1	0	0	5
12/5/2008	sheep	14	2	0	4	0	0	20

Sheep & Goat Natality Survey

		Adult Female	Adult Male	Adult - sex unknown	Yearlings	lambs, kids, fawns (YOY)	Age-Sex Unknown	
Date	species							Total Number Observed
12/5/2008	goat	3	0	8	1	0	0	12
12/5/2008	white-tailed deer	1	0	0	2	0	0	3
14/05/2008	sheep	9	13	0	7	0	0	29
14/05/2008	goat	0	0	6	0	0	0	6
14/05/2008	mule deer	1	1	0	0	0	0	2
14/05/2008	black bear	0	0	1	0	0	0	1
15/05/2008	sheep	11	13	0	2	0	0	26
15/05/2008	goat	1	0	4	0	0	0	5
15/05/2008	mule deer	0	1	0	0	0	0	1
16/05/2008	sheep	7	2	0	0	0	0	9
16/05/2008	goat	1	0	4	0	0	0	5
16/05/2008	white-tailed deer	1	0	0	2	0	0	3
19/05/2008	sheep	3	11	0	0	0	0	14
19/05/2008	goat	1	2	2	0	0	0	3
19/05/2008	mule deer	0	0	0	0	0	0	1
23/05/2008	sheep	5	0	0	0	0	0	17
23/05/2008	goat	0	11	3	0	0	0	3
23/05/2008	sheep	6	2	0	2	0	0	8
25/05/2008	goat	0	1	3	0	0	0	3
25/05/2008	mule deer	1	10	0	0	0	0	1
27/05/2008	goat	0	0	4	0	0	0	4
27/05/2008	sheep	3	0	0	0	0	0	3
27/05/2008	mule deer	1	0	0	1	0	0	2
29/05/2008	sheep	11	10	0	6	5	0	32
29/05/2008	goat	1	0	2	0	1	0	4
31/05/2008	sheep	5	0	0	3	4	0	12
31/05/2008	goat	2	0	2	1	1	0	6
2/6/2008	sheep	0	9	0	5	0	0	14
2/6/2008	goat	0	0	1	0	0	0	1

Date	species	Adult Female	Adult Male	Adult - sex unknown	Yearlings	lambs, kids, fawns (YOY)	Age-Sex Unknown	Total Number Observed
4/6/2008	sheep	8	12	0	4	5	0	29
4/6/2008	goat	0	1	2	0	0	0	3
4/6/2008	mule deer	0	8	0	0	0	0	8
6/6/2008	sheep	19	1	0	4	5	0	29
6/6/2008	goat	2	0	1	0	1	0	4
8/6/2008	sheep	2	9	0	1	0	0	12
8/6/2008	goat	1	0	1	0	0	0	2
10/6/2008	sheep	8	10	0	0	6	0	24
12/6/2008	sheep	2	2	0	0	2	0	6
13/6/2008	sheep	0	4	0	0	0	0	4
13/6/2008	mule deer	1	0	0	0	0	0	1
13/6/2008	black bear	1	0	0	0	0	0	1
21/06/2008	sheep	9	5	0	2	0	0	16
24/6/2008	sheep	9	6	0	5	5	0	25
24/6/2008	goat	0	0	1	0	0	0	1
28/6/2008	sheep	5	9	0	2	5	0	21
28/6/2008	mule deer	1	0	0	0	0	0	1
30/06/2008	sheep	8	8	0	4	4	0	24
5/7/2008	sheep	16	10	0	4	8	0	38
12/7/2008	sheep	0	4	0	0	0	0	4
15/7/2008	sheep	0	1	0	0	0	0	1
19/7/2008	sheep	0	9	0	0	0	0	9
19/7/2008	mule deer	1	0	0	0	0	0	1
26/7/2008	sheep	8	7	0	1	1	0	17

These observations of bighorn lambs do not necessarily confirm the exact location of where parturition takes place. Typically bighorn females will sequester themselves away from the herd in a rugged and isolated location to give birth. They will, however, join with other females and newborn lambs within a few days of parturition to form nursery groups of ewes and lambs. It is these nursery groups with newborn lambs that were observed during the course of this study.

RECOMMENDATIONS

Given the potential for highway construction activities to disturb newly formed bighorn sheep nursery groups and new born mountain goat kids that make use of the rugged terrain immediately adjacent to the highway, it is recommended that no blasting occur between May 1 and July 15 in the areas delineated on Figures 2, 3 and 4. It may be possible to assign a qualified biologist or technician the task of monitoring the exact location of bighorn sheep nursery groups during this period, with the opportunity to conduct some blasting activities in areas within the no blasting zones during this period, if the nursery groups are far enough away to not elicit any avoidance behaviours.

Itemized list of recommendations

1. No blasting occur between May 1 and July 15 in the newborn bighorn sheep and mountain goat areas delineated on Figures 2, 3 and 4, unless a qualified biologist confirms the nursery groups are far enough away to not elicit any avoidance behaviours.
2. Should helicopter activities be required during the pre-construction phase (e.g. geotechnical drilling) or during the construction phase, select heliports, helipads, and helispots for all helicopter activities to avoid the newborn bighorn sheep and mountain goat areas delineated on Figures 2, 3 and 4 between May 1 and July 15.
3. Minimize human access to cliffs or mountains with nursery refuges for mountain goats with kids and bighorn sheep with lambs in the areas delineated on Figures 2, 3 and 4 between May 1 and July 15.

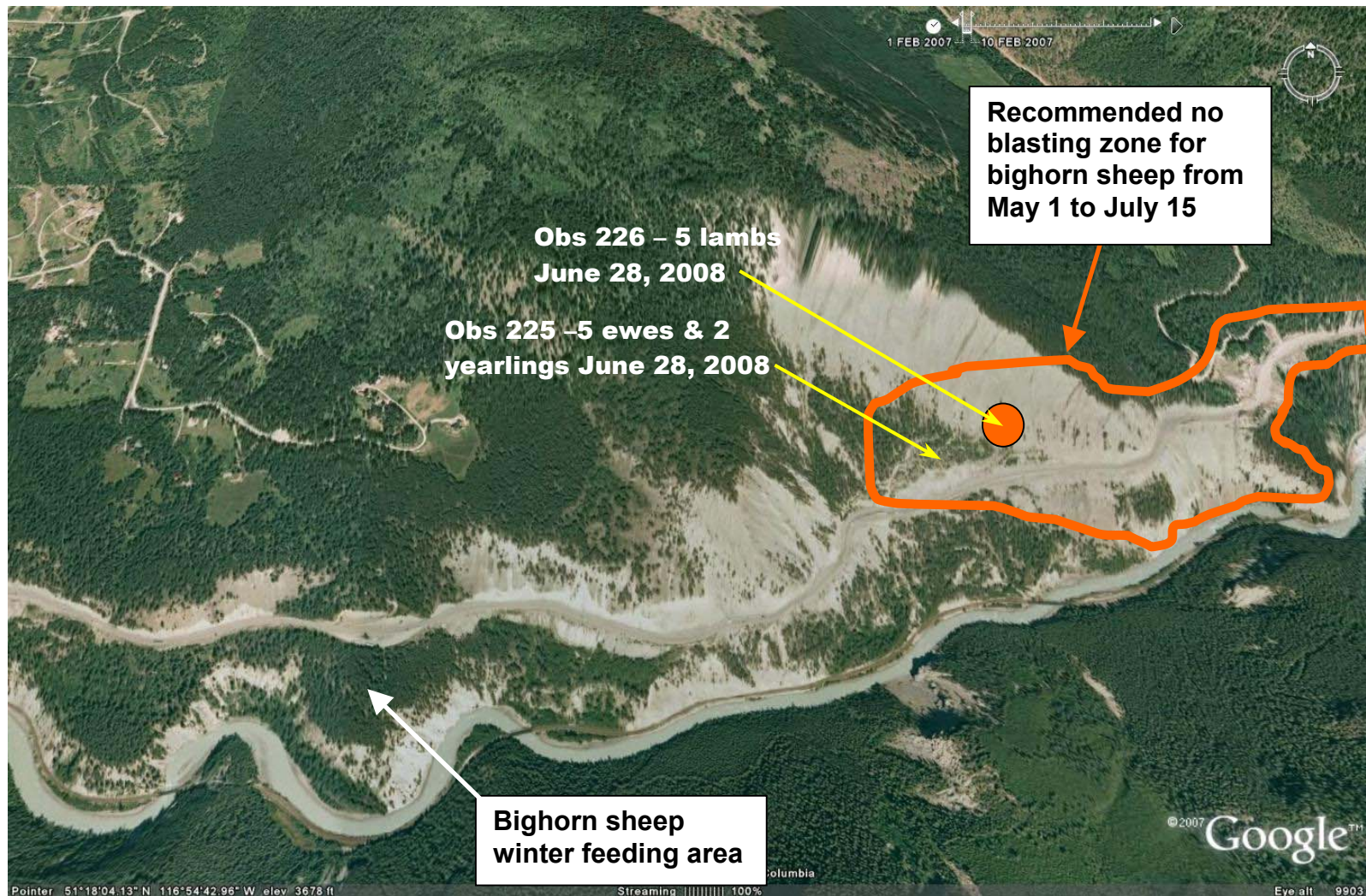


Figure 2. Bighorn sheep recommended no blasting zones and observations of neonates in the vicinity of Frenchman's Ridge east of Golden, BC.

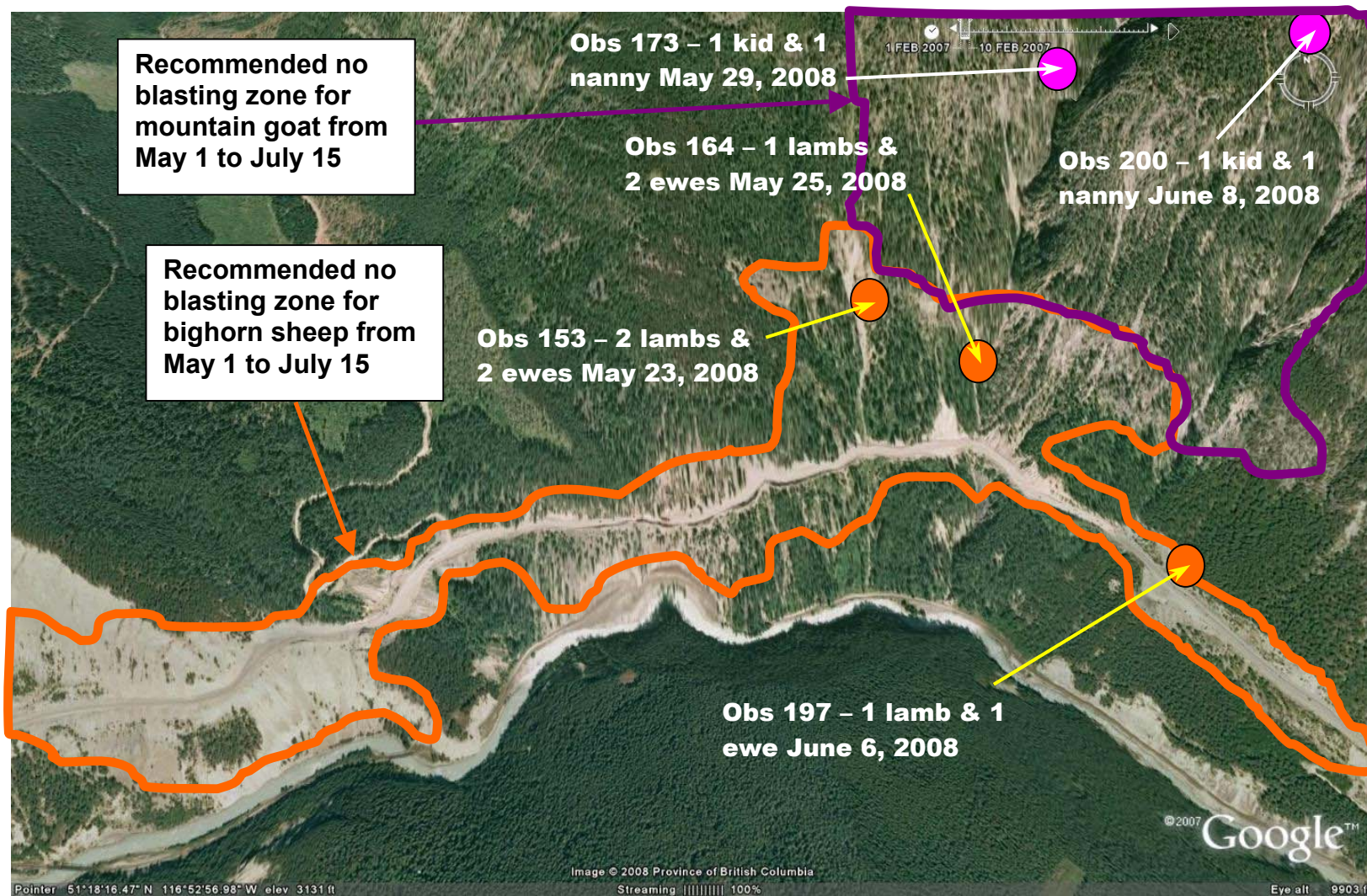


Figure 3. Bighorn sheep and mountain goat recommended no blasting zones and observations of neonates in the vicinity of Blackwall Bluffs.

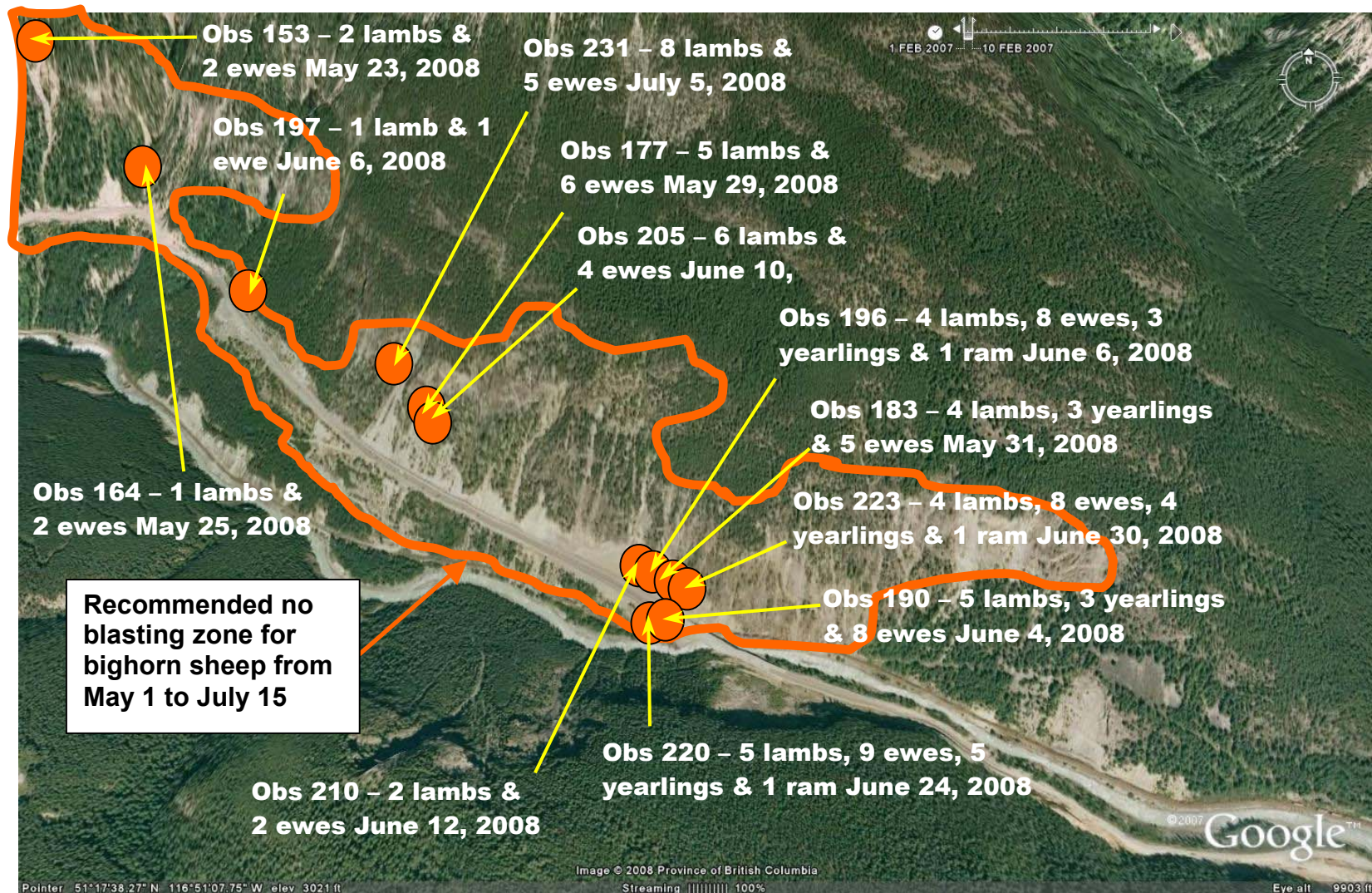


Figure 4. Bighorn sheep recommended no blasting zones and observations of neonates in the vicinity of Yoho Bridge east of Golden, BC.

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Appendix 1. Detailed locations of bighorn sheep observations between April 30 and July 26, 2008 (see Table 2).

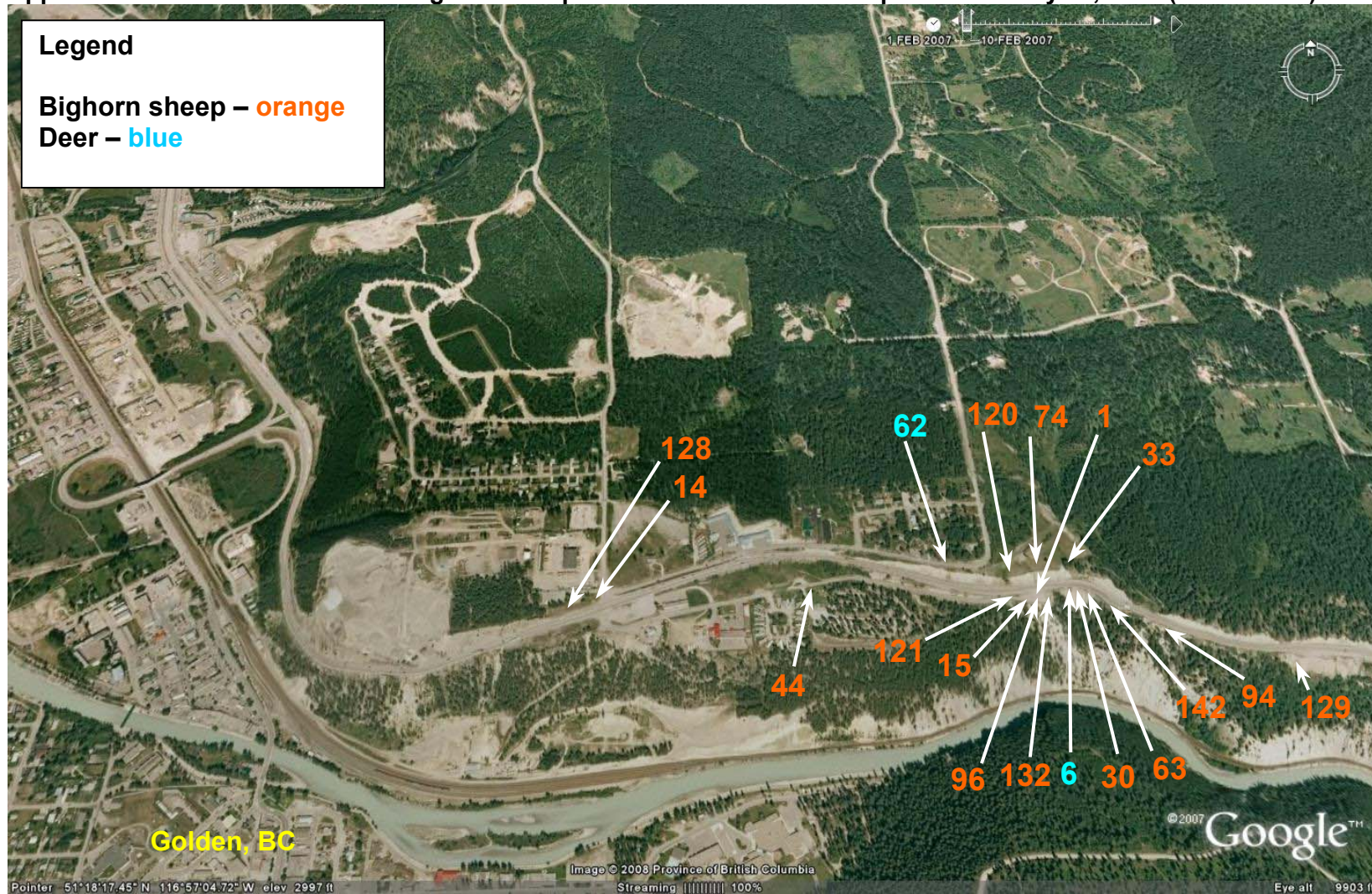


Figure 5. Bighorn sheep and deer observations in the vicinity of Lafontaine Rd near Golden, BC – April 30 to May 19, 2008.

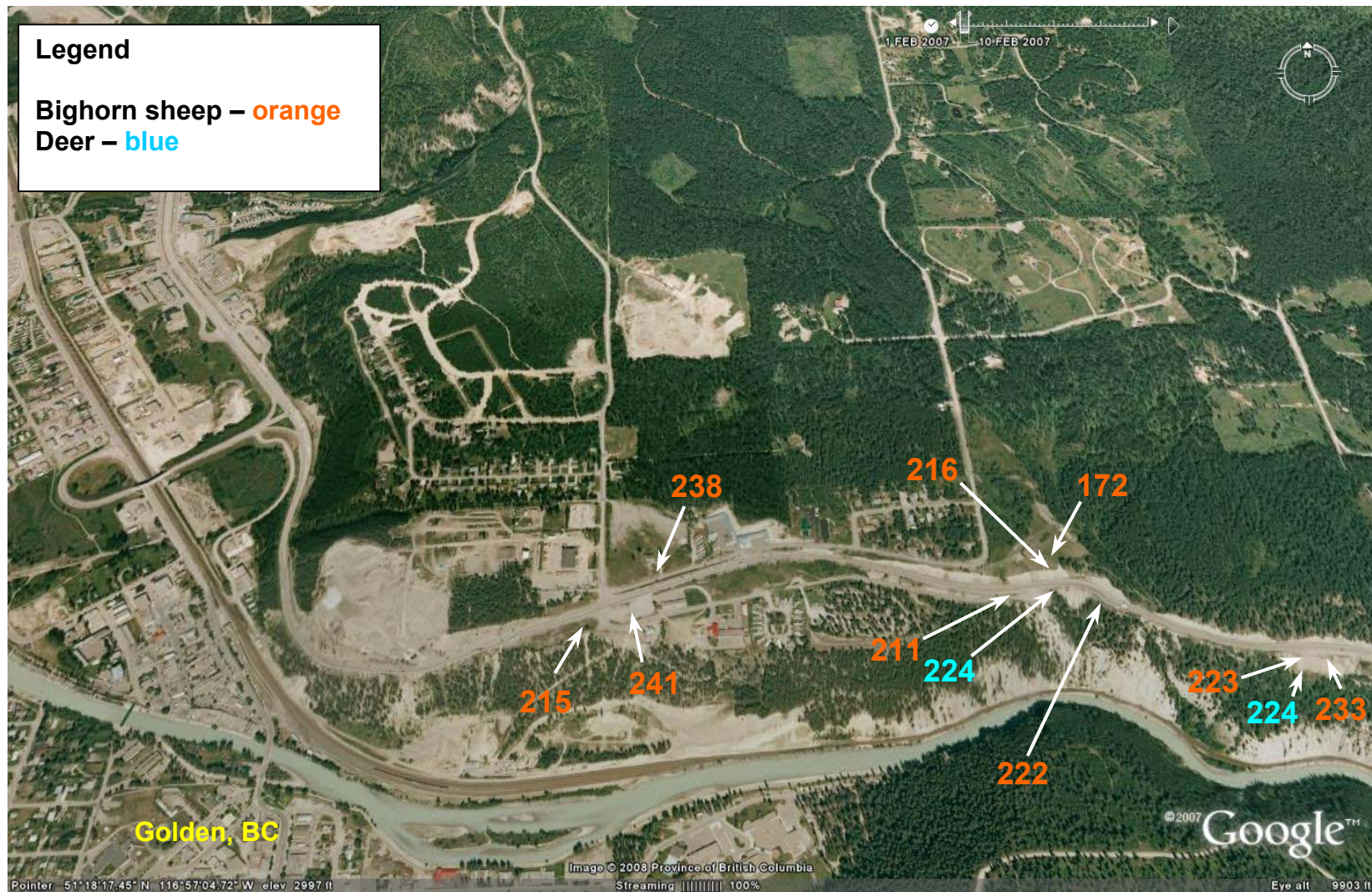


Figure 6. Bighorn sheep and deer observations in the vicinity of Lafontaine Rd near Golden, BC – May 29 to July 19, 2008.

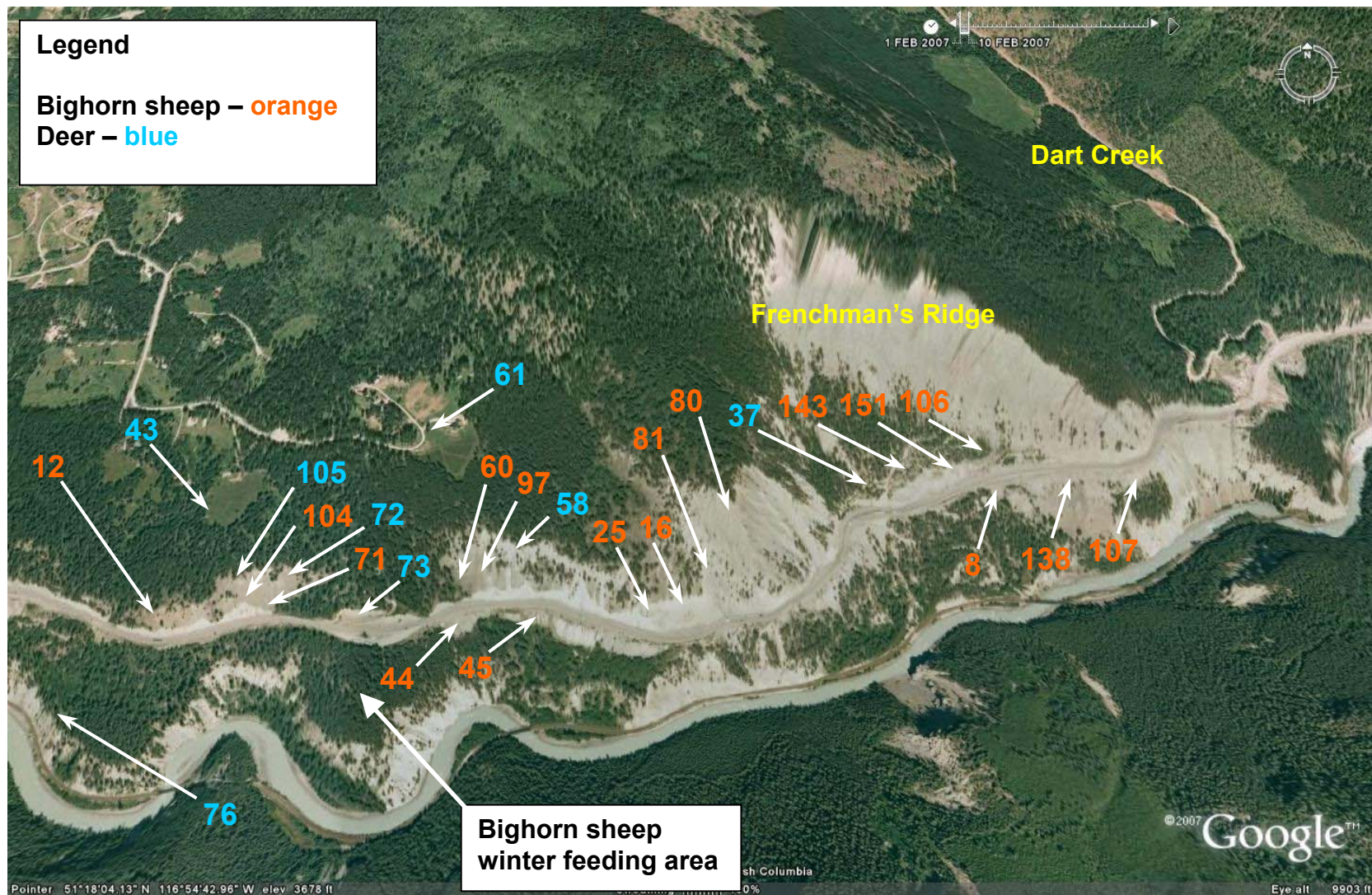


Figure 7. Bighorn sheep and deer observations in the vicinity of Frenchman's Ridge east of Golden, BC – April 30 to May 23, 2008.

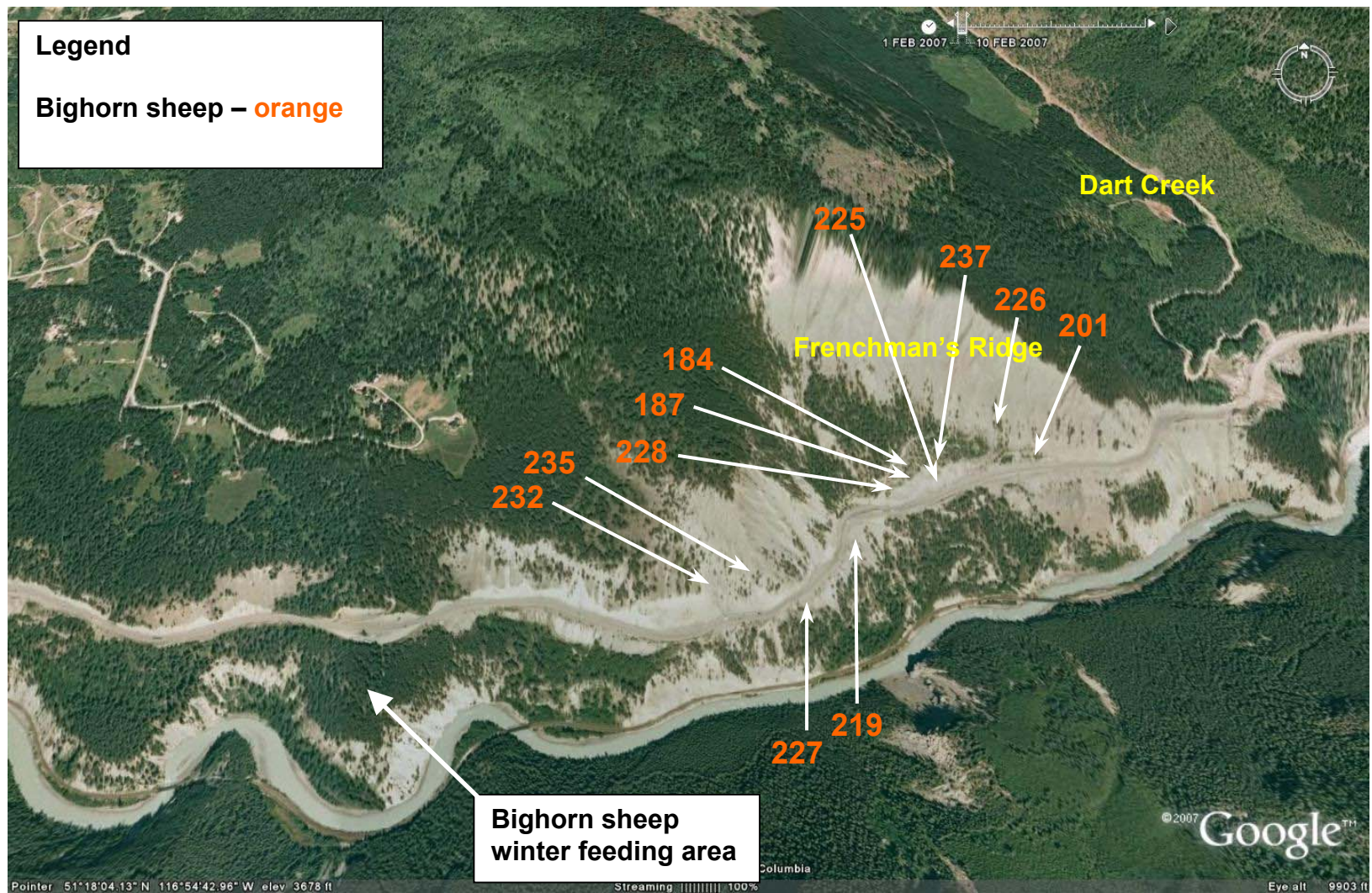


Figure 8. Bighorn sheep observations in the vicinity of Frenchman's Ridge east of Golden, BC – June 2 to July 19, 2008.

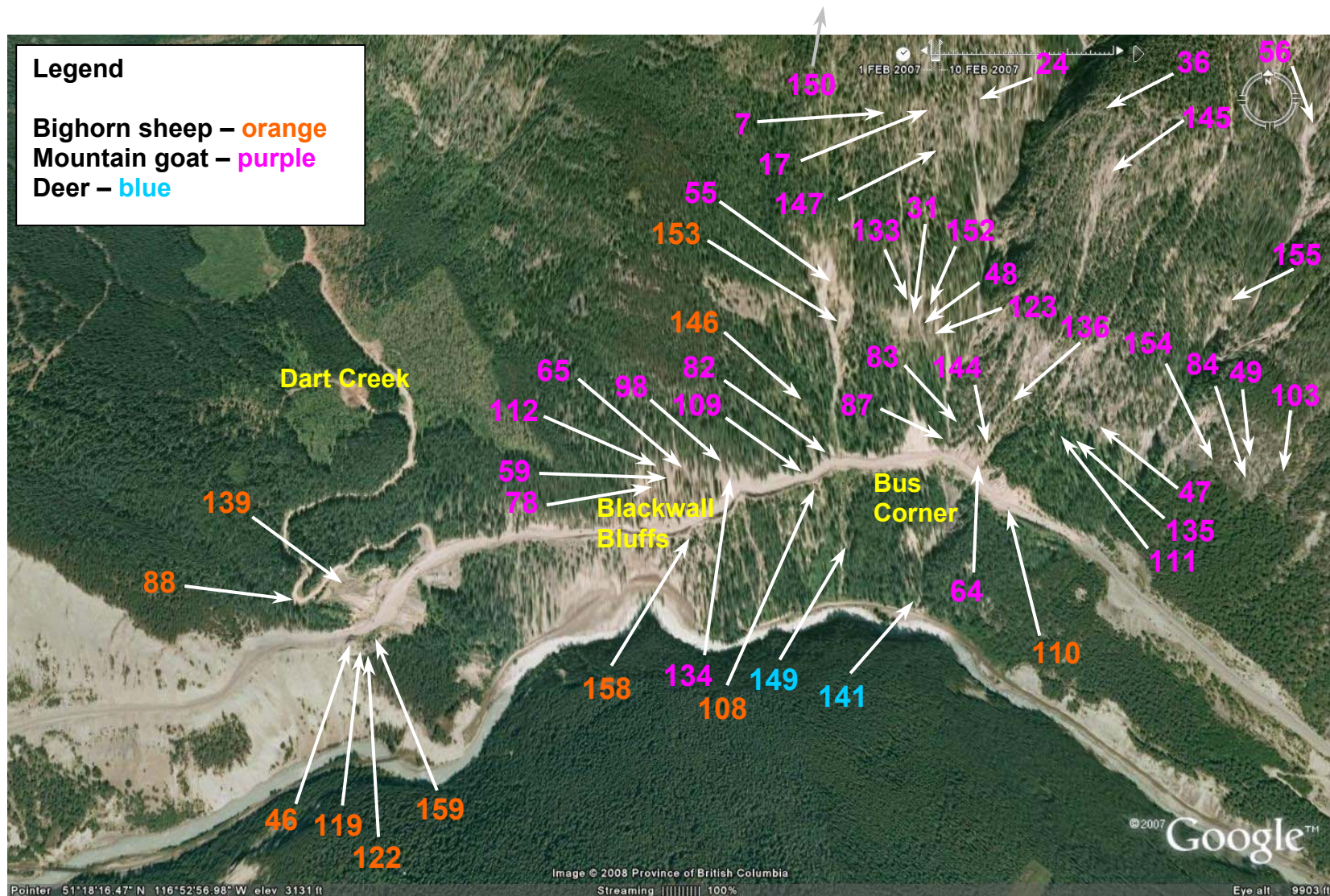


Figure 9. Bighorn sheep and mountain goat observations in the vicinity of Dart Creek and Blackwall Bluffs east of Golden, BC – April 30 to May 23, 2008.

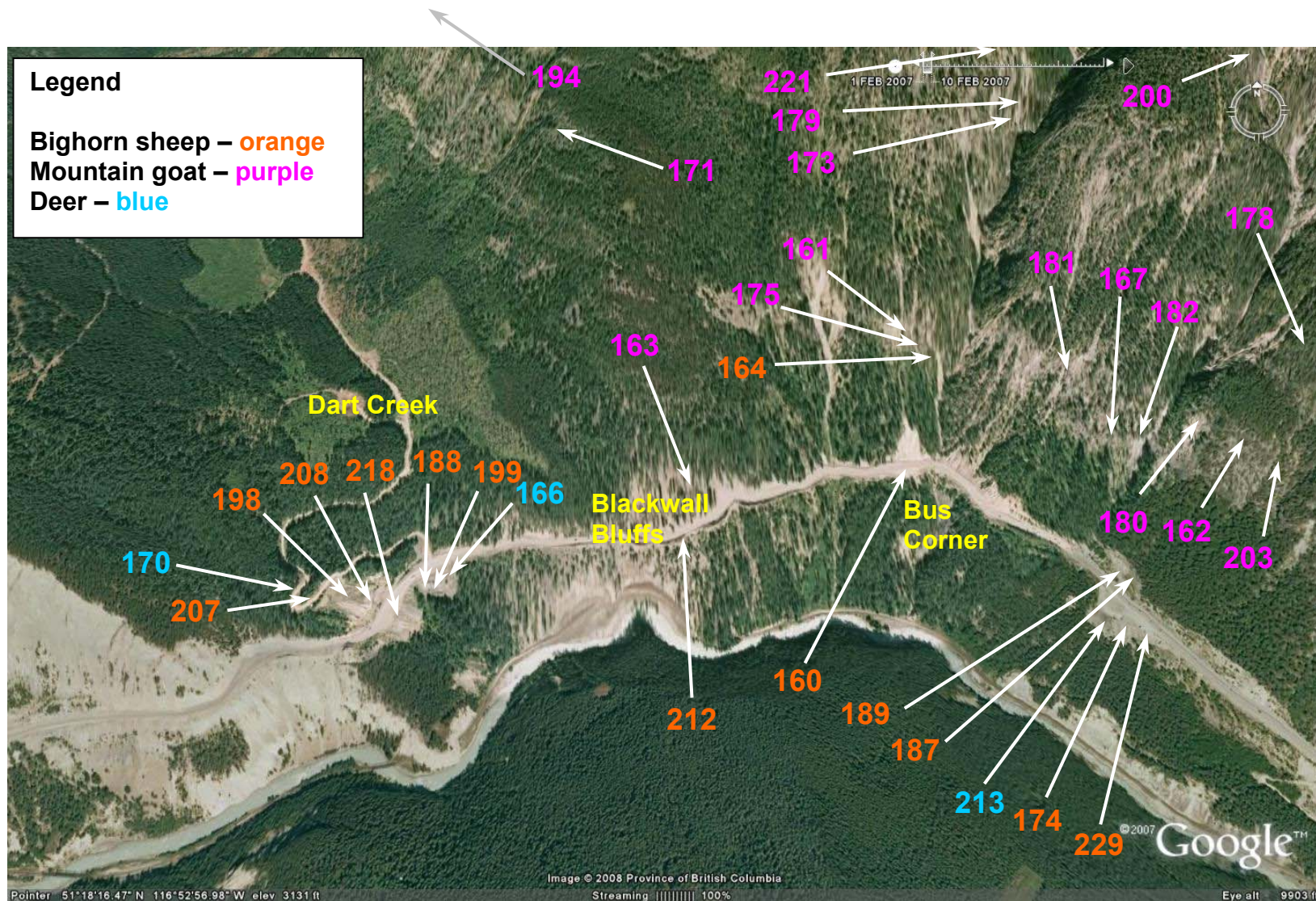


Figure 10. Bighorn sheep and mountain goat observations in the vicinity of Dart Creek and Blackwall Bluffs east of Golden, BC – May 25 to June 21, 2008.

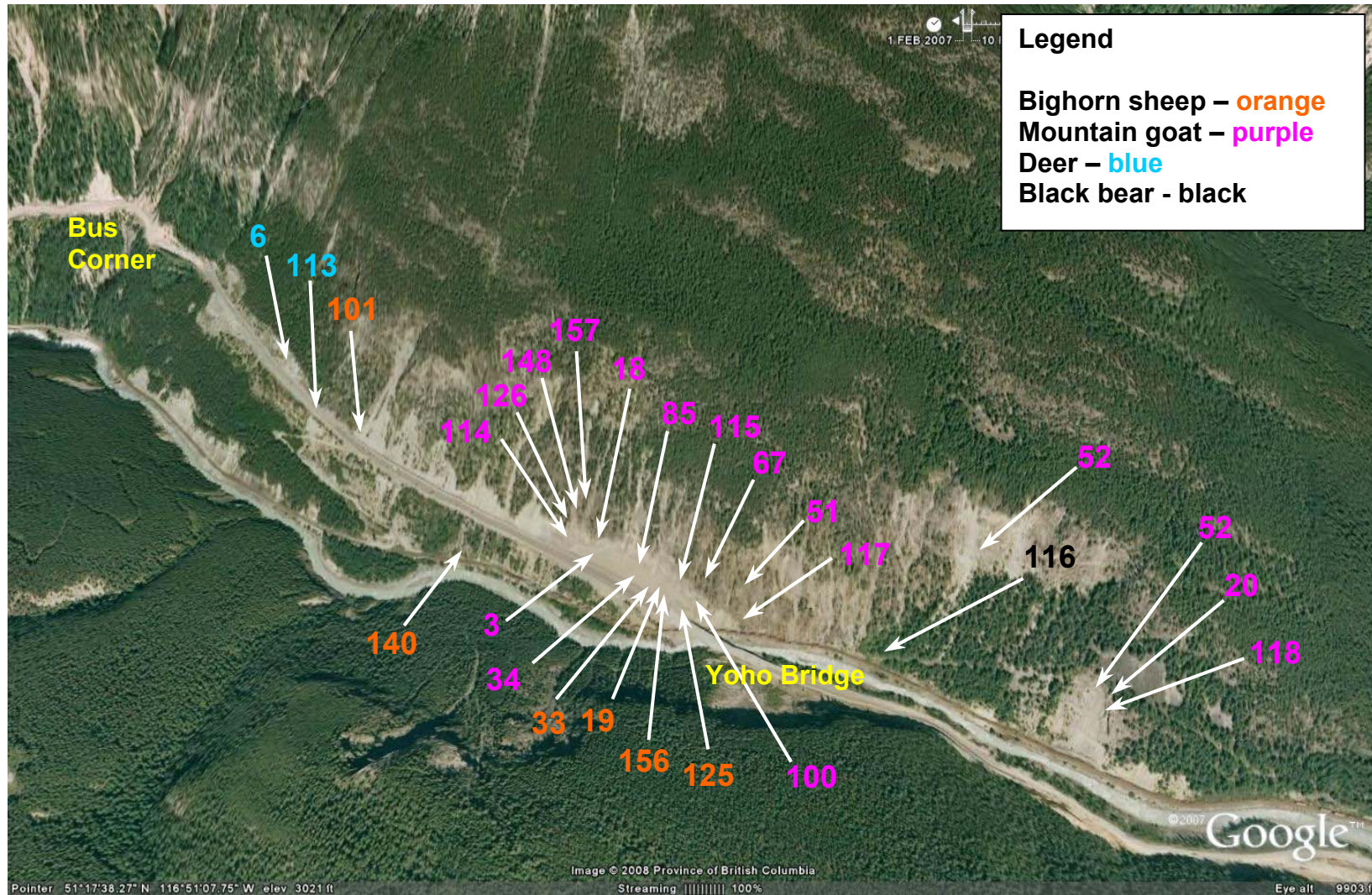


Figure 11. Bighorn sheep and mountain goat observations in the vicinity of Yoho Bridge east of Golden, BC – April 30 to May 23, 2008.

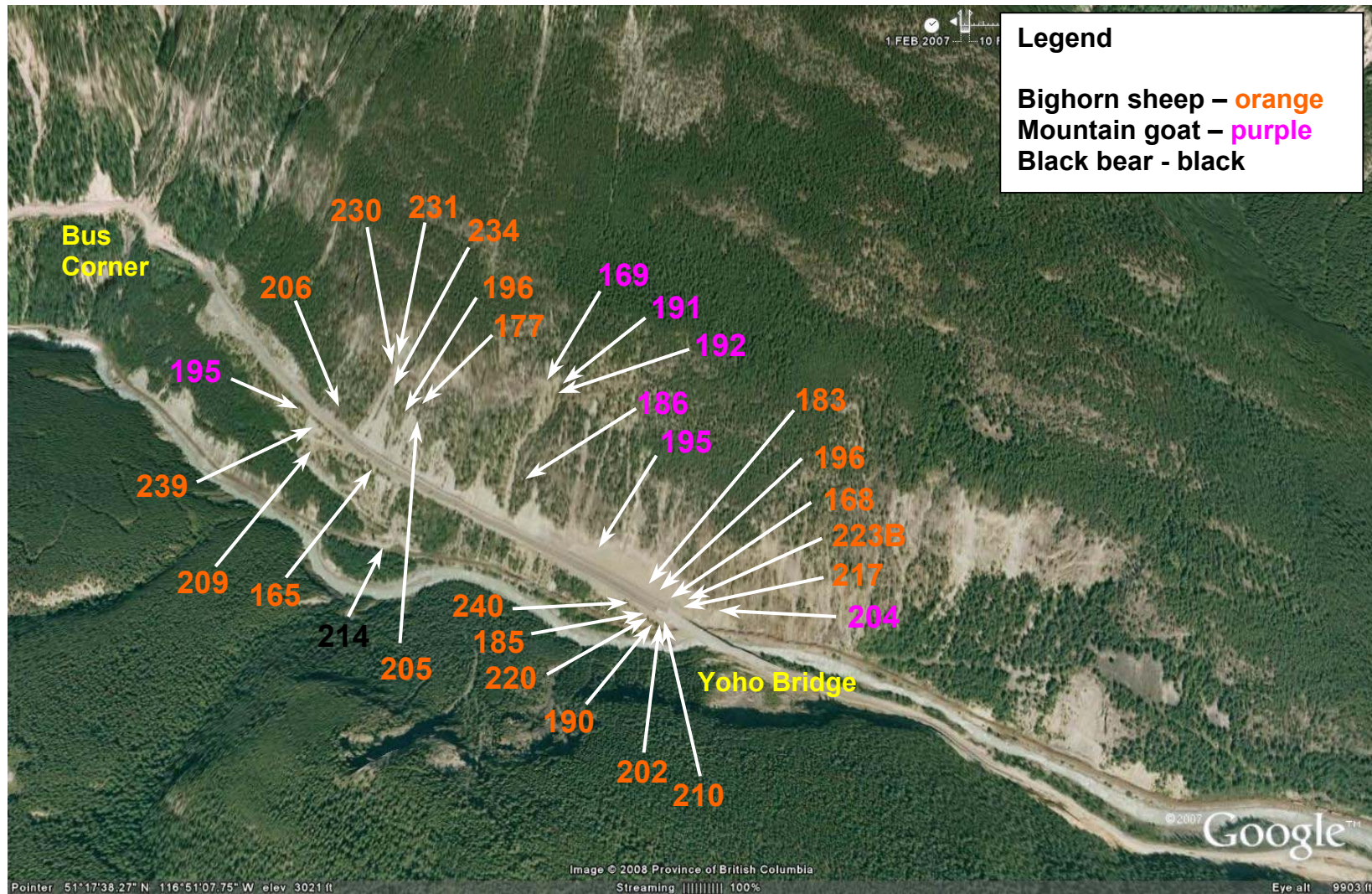


Figure 12. Bighorn sheep and mountain goat observations in the vicinity of Yoho Bridge east of Golden, BC– May 25 to July 26, 2008.

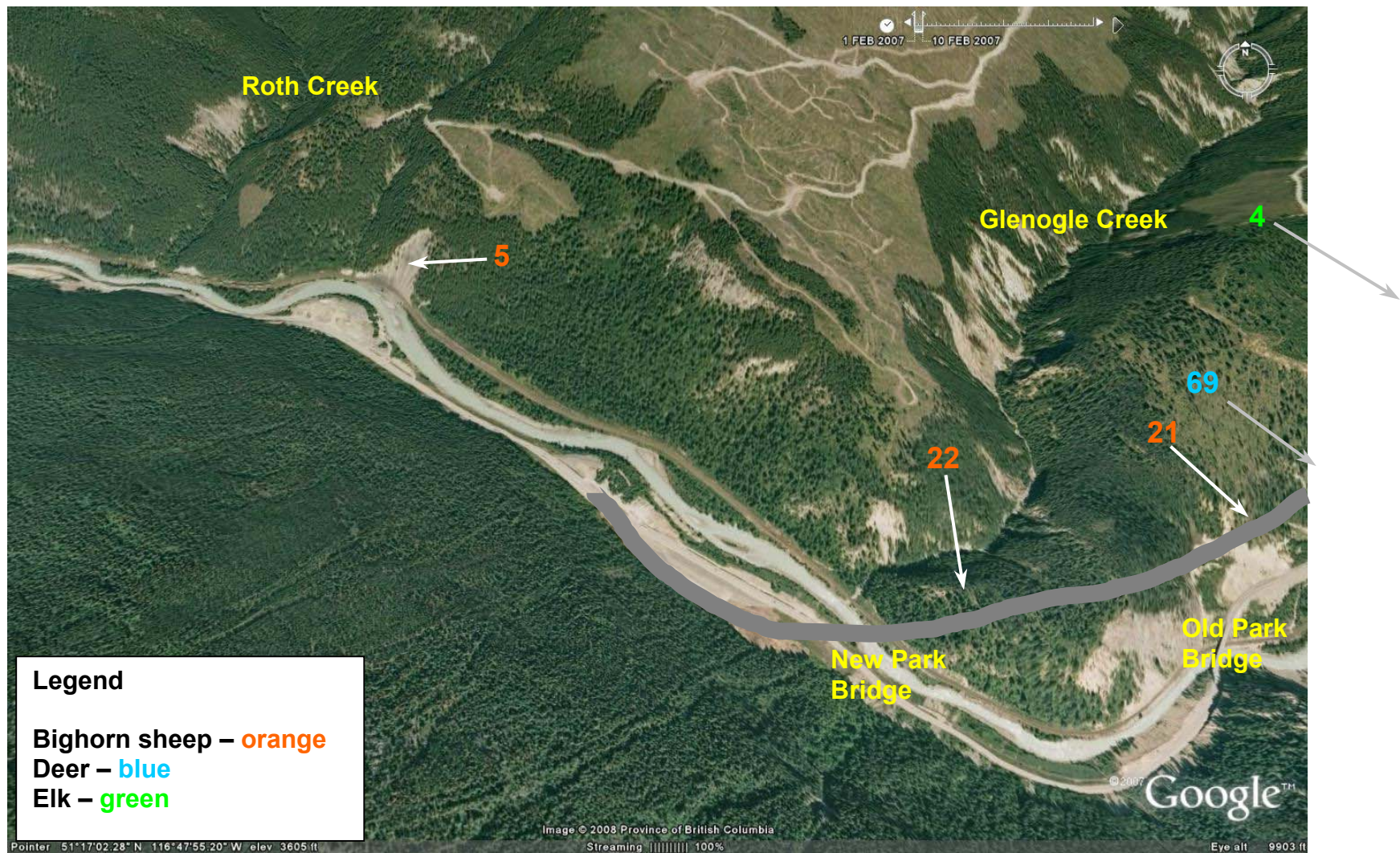


Table 2. Detailed wildlife observation data collected during the early post-natal survey of bighorn sheep and mountain goats (see Fig 5-13).

Ref # - see figs 5-13	Date dd:mm:yy	Time Begin hh:mm	Activity (f/b/t)	Species	Adult Female	Adult Male	Adult - sex unknown	Yearling	Lambs or kids born this year	Age-Sex Unknown	Total Number Observed	Comments - behaviour
	27/04/08	9:00									0	
	28/04/08	9:15									0	
1	30/04/08	9:00	b/f	S	7	1	0	7	0	0	15	Golden View Rd, HUA not concerned with people
2	30/04/08	9:35	0	O	0	0	0	0	0	0	0	Chain up area, top of Yoho hill
3	30/04/08	9:49	f	g	2	1	0	1	0	0	4	Yoho Bluffs, Nannys/kid feeding in cliffs above while Billy fed along hiway reveg.
4	30/04/08	10:10	f/t	e	8	0	0	0	0	0	8	Grazing on fill slope on top of hill past park bridge
5	30/04/08	10:23	t	s	0	2	0	0	0	0	2	2 young Rams, across river from KH rest area
6	30/04/08	10:51	f	md	1	0	0	0	0	0	1	Drove past, on Yoho hill.
7	30/04/08	10:58	b/f	g	0	0	1	0	0	0	1	Above bus corner (From Dart Ck fsr)
8	30/04/08	11:44	b\f\t	s	1	0	0	1	0	0	2	Low side TCH, Frenchmans Ridge, Ewe Bed while yearling fed.
9	30/04/08	13:05	0	O	0	0	0	0	0	0	0	Mt 7 side of KHR, Avi gates
10	30/04/08	13:15	0	O	0	0	0	0	0	0	0	Avi gate to Frenchmans view
11	30/04/08	13:33	0	O	0	0	0	0	0	0	0	On mtb trail
12	30/04/08	14:13	f	s	1	0	0	0	0	0	1	top side of TCH (from mtb trail)
13	30/04/08	14:45	0	O	0	0	0	0	0	0	0	Winter feed area view.
14	02/05/08	8:05	f/b	s	0	8	0	0	0	0	8	upper Donald/golden view/tch jct, eating grasses
15	02/05/08	8:28	f/b	s	3	0	0	3	0	0	6	golden view/ tch Jct
16	02/05/08	8:40	b	s	0	1	0	0	0	0	1	above tch, west frenchmans ridge(sheep feed bluff)
17	02/05/08	8:54	f/b	g	1	0	0	1	0	0	2	High cliffs above bus corner
18	02/05/08	9:21	b	g	0	0	1	0	0	0	1	laying on ledge above Yoho Bridge

Species: s = sheep, g = goat, e = elk, md = mule deer, wt = white-tailed deer, bb = black bear, 0 = no observations.

Activity: f = feeding, b = bedded, t= traveling, 0 = no data.

Sheep & Goat Natality Survey

19	02/05/08	9:21	b	s	2	0	0	0	0	0	2	bedding at base of cliffs
20	02/05/08	9:40	f	g	0	1	0	0	0	0	1	feeding on bluffs
21	02/05/08	10:02	b	s	0	1	0	0	0	0	1	Bed on top of Rock cut close to Glenogle fsr
22	02/05/08	10:16	f	s	0	1	0	0	0	0	1	Feeding on runaway lane past park bridge
23	02/05/08	10:22	0	0	0	0	0	0	0	0	0	KH rest area , no obs
24	02/05/08	10:42	b	g	0	0	1	0	0	0	1	Bus corner, high cliffs
25	02/05/08	11:03	b	s	1	0	0	2	0	0	3	ram from earlier Now w/ 2 ewes
26	02/05/08	12:04	0	0	0	0	0	0	0	0	0	
27	02/05/08	13:25	0	0	0	0	0	0	0	0	0	
28	02/05/08	13:45	0	0	0	0	0	0	0	0	0	
29	02/05/08	15:07	f	s	2	0	0	3	0	0	5	Feeding above tch, Same group as #15 1 less ewe
30	04/05/08	8:08	b	s	2	0	0	0	0	0	2	Bedding at Avi gates
31	04/05/08	8:26	b	g	0	0	1	0	0	0	1	Bed, low cliffs, bus corner
32	04/05/08	8:45	0	0	0	0	0	0	0	0	0	Lower canyon rafters put in road
33	04/05/08	8:51	b	s	7	0	0	2	0	0	9	bed base of cliffs/top of re-veg, yoho bridge.
34	04/05/08	8:51	b	g	2	0	0	1	0	0	3	
35	04/05/08	9:23	0	0	0	0	0	0	0	0	0	KH rest area , no obs
36	04/05/08	9:44	t	g	0	0	0	0	0	1	1	
37	04/05/08	10:11	f	md	2	0	0	0	0	0	2	
38	04/05/08	10:23	b	s	5	1	0	0	0	0	6	purcell helli ski lawn
39	04/05/08	11:44	0	0	0	0	0	0	0	0	0	Mt 7 low
40	04/05/08	12:01	0	0	0	0	0	0	0	0	0	Mt 7 low
41	04/05/08	12:47	0	0	0	0	0	0	0	0	0	Mt 7 low
42	04/05/08	13:20	0	0	0	0	0	0	0	0	0	Mt 7 low
43	04/05/08	14:08	f	wt	2	0	0	0	0	0	2	bench above KH river
44	06/05/08	7:44	f	s	0	6	0	0	0	0	6	Grazing@ campground Golden View Road
45	06/05/08	8:00	b	s	7	0	0	0	0	0	7	Laying off tch

Species: s = sheep, g = goat, e = elk, md = mule deer, wt = white-tailed deer, bb = black bear, 0 = no observations.

Activity: f = feeding, b = bedded, t= traveling, 0 = no data.

Sheep & Goat Natality Survey

46	06/05/08	8:12	b/f	s	7	0	0	2	0	0	9	Eating grasses/bedding below tch
47	06/05/08	8:36	f	g	0	0	2	0	0	0	2	low cliffs, bus corner, east side
48	06/05/08	8:26	t/f	g	1	0	0	1	0	0	2	west side bus corner, top of low cliffs
49	06/05/08	9:00	b	g	0	0	1	0	0	0	1	lower cliffs
50	06/05/08	9:10	0	0	0	0	0	0	0	0	0	lower canyon put in road
51	06/05/08	9:16	b	g	0	0	1	0	0	0	1	yoho bluffs, on ledge above tch
52	06/05/08	9:27	f	g	0	0	2	0	0	0	2	1 lower bluffs, 1 high bluffs
53	06/05/08	9:45	f	s	0	2	0	0	0	0	2	Class 2 rams in park bridge re-veg
54	06/05/08	9:58	0	0	0	0	0	0	0	0	0	KH rest area , no obs
55	06/05/08	10:10	b	g	0	0	1	0	0	0	1	above tch west side bus corner
56	06/05/08	10:30	b	g	0		1	0	0	0	1	v. high cliffs, east bus corner
57	06/05/08	11:48	0	0	0	0	0	0	0	0	0	low mt 7, no obs
58	06/05/08	12:43	f	md	0		4	0	0	0	4	lower cliffs above sheep feed
59	06/05/08	13:35	f	g	0		1	0	0	2	3	1, black wall, 2 west bus corner
60	06/05/08	14:15	f	s	7		0	0	0	0	7	possibly same as # 45
61	06/05/08	14:15	f	wt	0		4	0	0	0	4	in yard
62	08/05/08	7:05	f	s	6		0	2	0	0	8	feeding in yard on Lafontaine Rd, Light Rain
62	08/05/09	7:05	f	wt	1		0	0	0	0	1	With sheep
63	08/05/10	7:30	f/b	s	6		0	3	0	0	9	off edge of tch, ewe bed, yearlings feed
64	08/05/12	8:12	f	g	0		1	0	0	0	1	above bus corner
65	08/05/13	8:30	f/b	g	0		2	0	0	0	2	above black wall, low visibility , cant see high cliffs
66	08/05/08	9:02	0	0	0	0	0	0	0	0	0	Lower put in road, Snow
67	08/05/08	9:15	b	g	0	0	1	0	0	0	1	hard rain, bed above yoho bridge
68	08/05/08	9:37	0	0	0	0	0	0	0	0	0	west yoho bluffs. Rain
69	08/05/08	9:51	f	md	4	0	0	0	0	0	4	feeding in re-veg past park bridge. Rain
70	08/05/08	10:08	0	0	0	0	0	0	0	0	0	low visibility, dart creek. Rain
71	08/05/08	10:29	f/b	s	1	0	0	0	0	0	1	feed on hillside, then bed. Rain

Species: s = sheep, g = goat, e = elk, md = mule deer, wt = white-tailed deer, bb = black bear, 0 = no observations.

Activity: f = feeding, b = bedded, t= traveling, 0 = no data.

Sheep & Goat Natality Survey

72	08/05/08	10:40	f	wt	1	0	0	1	0	0	2	feed top hill above sheepfeed. Rain
73	08/05/08	11:12	f	md	1	0	0	0	0	0	1	browsing above sheep feed. Rain
74	08/05/08	11:28	f	s	6	1	0	5	0	0	13	purcell helli ski lawn. Rain stop
75	08/05/08	12:24	0	0	0	0	0	0	0	0	0	lower mt 7, before trail
76	08/05/08	13:01	f	wt	2	0	0	0	0	0	2	feeding on bench below tch. From trail (Mt7)
77	08/05/08	13:01	b	s	1	0	0	0	0	0	1	same as #71
78	08/05/08	13:30	f	g	0	0	2	0	0	0	2	top black wall(low mt 7)
79	08/05/08	14:08	f	g	0	0	2	0	0	0	2	top black wall mt7 (snow)
80	08/05/08	14:22	f	s	1	0	0	0	0	0	1	top sheep feed bluffs
81	09/05/08	7:15	f/t	s	4	0	0	1	0	0	5	above tch sheep feed bluffs
82	09/05/08	7:45	f	g	0	0	2	0	0	0	2	black wall
83	09/05/08	7:45	f	g	1	0	0	1	0	0	2	above bus corner
84	09/05/08	8:02	b/f	g	1	0	0	1	0	0	2	above chain up
85	09/05/08	8:28	b	g	0	0	1	0	0	0	1	yoho bridge
86	09/05/08	8:40	0	0	0	0	0	0	0	0	0	west yoho bluffs, no obs
87	09/05/08	9:00	f	g	2	0	0	1	0	0	3	bus corner, 2 same as 83, browsing on fresh buds
88	09/05/08	9:28	f	s	1	0	0	0	0	0	1	dart ck, fr, feeding on grass along rd
89	09/05/08	9:50	f	s	5	0	0	3	0	0	8	same as 81
90	09/05/08	10:06	f	s	0	7	0	0	0	0	7	feed on grass
91	09/05/08	11:09	f	g	2	0	0	1	0	0	3	black wall same as, 81, 89, mt 7
92	09/05/08	11:09	0	0	0	0	0	0	0	0	0	frenchmans ridge, no obs
93	09/05/08	13:00	0	0	0	0	0	0	0	0	0	low mt 7. before trail no obs
94	09/05/08	13:21	b	s	9	0	0	5	0	0	14	low mt 7 from trail
95	09/05/08	13:40	0	0	0	0	0	0	0	0	0	mt 7 trail
96	12/05/08	7:00	f	s	0	1	0	0	0	0	1	single ram, low valley fog
97	12/05/08	7:10	f	s	2	0	0	0	0	0	2	feed on grass, above tch, sheep feed
98	12/05/08	7:36	b	g	0	0	2	0	0	0	2	top black wall, low visibility

Species: s = sheep, g = goat, e = elk, md = mule deer, wt = white-tailed deer, bb = black bear, 0 = no observations.

Activity: f = feeding, b = bedded, t= traveling, 0 = no data.

Sheep & Goat Natality Survey

99	12/05/08	8:03	b	g	0	0	1	0	0	0	1	rafters lower put in
100	12/05/08	8:23	b	g	1	0	0	1	0	0	2	stand on ledge/ bed, yoho bluffs
98	12/05/08	8:32	t	g	0	0	2	0	0	0	2	b;ack wall goats move to upper rocks
99	12/05/08	8:57	f	g	1	0	0	0	0	0	1	
101	12/05/08	9:05	f/b	s	9	0	0	4	0	0	13	top end of cement wall, cross tch, cause vehicles to brake. Bed below tch
99	12/05/08	9:28	f/t	g	1	0	0	0	0	0	1	
102	12/05/08	10:03	0	0	0	0	0	0	0	0	0	kh rest stop
103	12/05/08	10:21	f	g	0	0	1	0	0	0	1	(dart creek),goat above chain up
98	12/05/08	11:55	b	g	0	0	2	0	0	0	2	black wall goats, upper mt7, no obs frenchmans ridge
96	12/05/08	13:26	b	s	0	1	0	0	0	0	1	same ram as in am
104	12/05/08	14:06	f	s	3	0	0	0	0	0	3	feed above sheep feed, bed under trees
105	12/05/08	15:03	f/t	wt	1	0	0	2	0	0	3	above sheep feed, walk in to opening to feed, keep walking
106	14/05/08	7:03	f/b	s	3	0	0	1	0	0	4	lower frenchmans
107	14/05/08	7:49	t	s	0	0	0	2	0	0	2	walking along tch
108	14/05/08	8:02	f	s	1	0	0	0	0	0	1	below tch
109	14/05/08	8:06	f	g	1	0	0	0	0	0	1	above tch
110	14/05/08	8:25	b	s	3	0	0	0	0	0	3	below tch bed on small flat
111	14/05/08	8:27	b	g	0	0	1	0	0	0	1	bed above chain up area
112	14/05/08	8:56	b	g	0	0	1	0	0	0	1	bed top black wall
113	14/05/08	10:19	t	md	1	1	0	0	0	0	2	ran across tch
114	14/05/08	10:40	f	g	0	0	1	0	0	0	1	h.u.a when approached , 50m above yoho bridge
115	14/05/08	10:50	b	g	0	0	1	0	0	0	1	100m above tch
116	14/05/08	10:55	f	bb	0	0	1	0	0	0	1	feeding along rail tracks
117	14/05/08	11:00	b	g	0	0	1	0	0	0	1	bed 50m above yo ho bridge, no reaction
118	14/05/08	11:37	b	g	0	0	1	0	0	0	1	bed on ledge
119	14/05/08	12:00	b	s	1	1	0	2	0	0	4	bed on rock knob beside tch, class 2 ram

Species: s = sheep, g = goat, e = elk, md = mule deer, wt = white-tailed deer, bb = black bear, 0 = no observations.

Activity: f = feeding, b = bedded, t= traveling, 0 = no data.

Sheep & Goat Natality Survey

120	14/05/08	12:22	b	s	0	11	0	0	0	0	11	purcell helli lawn
119	14/05/08	13:13	f	s	1	1	0	2	0	0	4	(mt. 7) feed below tch
0	14/05/08	14:20	0	0	0	0	0	0	0	0	0	no obs, lower mt7 sites
121	15/05/08	6:58	f	s	0	3	0	0	0	0	3	golden view rd, h.u.a
122	15/05/08	7:20	f	s	2	0	0	2	0	0	4	hua, then continue feeding
123	15/05/08	7:47	f	g	0	0	1	0	0	0	1	bus corner, feeding around cave(cu)
124	15/05/08	8:20	f	md	0	1	0	0	0	0	1	feeding in cutblock,(cu)
125	15/05/08	8:40	f/b/t	s	6	0	0	0	0	0	6	feed/bed yoho bridge re-veg, climb up bluffs and out of view
126	15/05/08	9:00	b	g	1	0	1	0	0	0	2	100m above tch on ledge, watch me walk by
127	15/05/08	9:16	b	g	0	0	1	0	0	0	1	70m above bridge
128	15/05/08	9:00	f	s	0	9	0	0	0	0	9	upper donald rd 2 on south side rd, 2 class2, 4 class3 , 3class4
129	15/05/08	9:20	t	s	3	0	0	0	0	0	3	heading East low side tch
130	15/05/08	11:00	f	s	0	2	0	0	0	0	2	feeding on dandelions/ grass(same as 121)
131	15/05/08	14:20	b	g	0		1	0	0	0	1	dart creek bluffs(mt7)no obs frenchmans ridge
132	16/05/08	6:57	b/f	s	1	2	0	0	0	0	3	1-class4 1-class 3
133	16/05/08	7:12	f	g	0	0	1	0	0	0	1	feeding above bus corner(cu)
134	16/05/08	7:20	b	g	0	0	1	0	0	0	1	black wall on small ledge
135	16/05/08	7:45	f	g	0	0	1	0	0	0	1	above chain up
136	16/05/08	7:47	f	g	0	0	1	0	0	0	2	above east bus corner
137	16/05/08	8:20	b	g	1	0	0	0	0	0	1	ledge 75m above yoho bridge, hua
138	16/05/08	11:25	t/b	s	1	0	0	0	0	0	1	stand/ moving v. slow along tch, bed beside road
139	16/05/08	12:08	f	s	4	0	0	0	0	0	4	feed along dart creek fsr
140	16/05/08	16:45	f	s	1	0	0	0	0	0	1	feed along tracks , from kayak in river
141	16/05/08	17:15	f	wt	1	0	0	2	0	0	3	feeding by river, kayak
142	19/05/08	7:05	f/b	s	0	11	0	0	0	0	11	2-class2, 5 class3 ,4 class4 bed at avi gates
143	19/05/08	7:30	b	s	2	0	0	0	0	0	2	bed frenchmans

Species: s = sheep, g = goat, e = elk, md = mule deer, wt = white-tailed deer, bb = black bear, 0 = no observations.

Activity: f = feeding, b = bedded, t= traveling, 0 = no data.

Sheep & Goat Natality Survey

144	19/05/08	7:50	b	g	0	0	1	0	0	0	1	bus corner (cu)
145	19/05/08	7:55	f	g	0	0	0	1	0	0	1	high above bus corner(cu)
146	19/05/08	8:10	f	s	1	0	0	0	0	0	1	feed west bus corner, (cu)
147	19/05/08	8:22	f	g	0	0	1	0	0	0	1	high above bus corner west(cu)
148	19/05/08	9:09	b	g	0	1	0	0	0	0	2	70m above bridge, yoho
149	19/05/08	14:40	f	md	0	1	0	0	0	0	1	below bus corner west side(upper mt7), lots of traffic on tch
150	19/05/08	15:25	f	g	0	1	0	0	0	0	1	no obs, lower mt7 sites, or frenchmans ridge, top of Table mtn, off map sheet
0	21/05/08	7:00	0	0	0		0	0	0	0	0	heavy rain, low visibility (no obs, tch)
0	21/05/08	11:45	0	0	0		0	0	0	0	0	mt. 7light rain, mod visibility(no obs)
151	23/05/08	7:26	b/f	s	0	9	0	0	0	0	9	4 class4, 3 class 3, 2 class 2
152	23/05/08	7:47	f	g	0	0	1	0	0	0	1	by cave , bus corner
153	23/05/08	8:04	b	s	2	0	0	0	2	0	4	on ledge 200m above bus corner , lambs nursing
154	23/05/08	8:17	f	g	0	0	1	0	0	0	1	above chain up
155	23/05/08	8:33	f	g	0	0	0	1	0	0	1	high cliffs bus corner
156	23/05/08	9:15	b	s	3	0	0	0	0	0	3	Yoho bridge re-veg
157	23/05/08	9:36	b	g	0	0	1	0	0	0	1	view from lower put -in, 200m above tch
158	23/05/08	10:15	b	s	0	0	0	1	0	0	1	side of tch black wall, drive by
159	23/05/08	10:22	b	s	0	1	0	0	0	0	1	class2 bed on hill below Dart Creek fsr, stand up when approached
160	25/05/08	7:39	f	s	3	0	0	2	0	0	5	hua, then continue feeding/walking
161	25/05/08	7:39	t	g	0	0	1	0	0	0	1	above west bus corner
162	25/05/08	7:43	b	g	0	0	1	0	0	0	1	above chain up
163	25/05/08	7:51	b	g	0	0	1	0	0	0	1	Black wall
164	25/05/08	7:58	f	s	2	0	0	1	0	0	3	total said 4 ****cave, bus corner, lamb follow ewe while feeding
165	25/05/08	9:20	f	s	1	0	0	0	0	0	1	lower put in road, along tch
166	25/05/08	10:42	t	md	1	0	0	0	0	0	1	crossed tch , dart creek (no obs mt7 sites)

Species: s = sheep, g = goat, e = elk, md = mule deer, wt = white-tailed deer, bb = black bear, 0 = no observations.

Activity: f = feeding, b = bedded, t= traveling, 0 = no data.

Sheep & Goat Natality Survey

167	27/05/08	7:27	f	g	0	0	2	0	0	0	2	(cu) in band of trees
168	27/05/08	10:22	b	s	3	0	0	0	0	0	3	Yoho bridge re-veg(hua)
169	27/05/08	10:37	f	g	0	0	1	0	0	0	1	lower put in road
170	27/05/08	11:45	f/t	md	1	0	0	1	0	0	2	dart creek fsr
171	27/05/08	14:23	b	g	0	0	1	0	0	0	1	dart bluffs(mt7)
172	29/05/08	8:16	b	s	0	10	0	0	0	0	10	2-class2, 5class3 3 class 4 purcell lawn, lower mt7
173	29/05/08	10:45	t	g	1	0	0		1	0	2	Nanny/kid, high cliffs, bus corner, frequent nursing, (high mt 7),
174	29/05/08	18:23	f	s	3	0	0	5	0	0	8	young ewes , low side C.U
175	29/05/08	18:30	f	g	0	0	1	0	0	0	1	cave, bus corner (cu)
176	29/05/08	19:19	f	s	2	0	0	1	0	0	3	yoho re-veg, cross tch
177	29/05/08	20:00	f	s	6	0	0	0	5	0	11	lower put in road, ewes butting heads lambs play, little nursing
178	29/05/08	20:40	f	g	0	0	1	0	0	0	1	above chain up(dart fsr)
179	31/05/08	7:50	t	g	1	0	0	0	1	0	2	high above bus corner, nanny/kid, walk along ledge
180	31/05/08	12:15	b	g	0	0	1	0	0	0	1	haze/sun glare, mt7 in am, above cu
181	31/05/08	12:50	f	g	1	0	0	1	0	0	2	above east bus corner, cu
182	31/05/08	12:58	f	g	0	0	1	0	0	0	1	above east bus corner, cu
183	31/05/08	13:30	f	s	5	0	0	3	4	0	12	yoho bridge re-veg, lambs grazing, alfalfa
184	2/6/2008	9:12	b	s	0	9	0	0	0	0	9	frenchmans, (2-class2, 4class3, 3 class4)
0	2/6/2008	0:00	0	0	0	0	0	0	0	0	0	no obs, bus corner, (cu)
185	2/6/2008	10:30	f	s	0	0	0	2	0	0	2	yoho bridge
186	2/6/2008	10:55	t	g	0	0	1	0	0	0	1	lower put in
187	2/6/2008	14:20	b	s	0	7	0	3	0	0	10	frenchmans, (2-class2, 2class3, 3 class4) light rain
188	4/6/2008	7:14	f	s	0	11	0	0	0	0	11	3class2,4class3, 4class4, dart creek, smallest has broken leg
189	4/6/2008	8:00	f/b	s	0	1	0	1	0	0	2	In rocky treed slopes, young ram, (cu)no goats, poor visibility
190	4/6/2008	9:32	f/b	s	8	0	3	5	0	0	16	Lambs playing alone(butting heads)

Species: s = sheep, g = goat, e = elk, md = mule deer, wt = white-tailed deer, bb = black bear, 0 = no observations.

Activity: f = feeding, b = bedded, t= traveling, 0 = no data.

Sheep & Goat Natality Survey

191	4/6/2008	10:00	f	g	0	1	0	0	0	0	1	walking along cliffs, (lower put in)
192	4/6/2008	10:20	f	g	0	0	1	0	0	0	1	behind brush
193	4/6/2008	11:10	t	md	0	8	0	0	0	0	8	Dart crk FSR, all young bucks
194	4/6/2008	14:00	f	g	0	1	1	0	0	0	1	Table Mtn,(upper mt7) Rain
0	6/6/2008	7:15	0	0		0	0	0	0	0	0	no visibility, bus corner(cu)
195	6/6/2008	8:00	f	g	1	0	1	0	0	0	2	yoho bluffs
196	6/6/2008	8:11	f	s	6	1	0	3	0	0	10	lowside tch, walk along tch to yoho, (LP)
196	6/6/2008	8:12	f	s	2	0	0	0	4	0	6	Above wall, Lambs in rocks, Ewes browse(lp)
0	6/6/2008	9:12	0	0	0	0	0	0	0	0	0	no obs , bus corner
197	6/6/2008	10:09	t	s	1	0	0	0	1	0	2	spooked down tch by tourists
198	6/6/2008	10:27	b	s	10	0	0	0	0	0	10	2-class2,4class4, 4class3, Lame Ram not around
199	6/6/2008	10:49	f	s	0	0	0	1	0	0	1	crossed tch , dart creek (no obs mt7 sites), snow on high peaks
200	8/6/2008	8:00	b	g	1	0	0	0	1	0	2	high up Table mtn above bus corner(mt7)
201	8/6/2008	8:46	b/f	s	0	9	0	0	0	0	9	3-class2, 3class3, 3class4, lame ram lay alone, Frenchmans Ridge,no obs lower Mt7
0	8/6/2008	11:45	0	0	0	0	0	0	0	0	0	heavy rain poor visibility
202	8/6/2008	11:52	f	s	2	0	0	1	0	0	3	yoho bridge, cross tch, climb rocks
203	8/6/2008	13:32	b	g	1	0	0	0	0	0	1	lay on ledge, (CU)
204	8/6/2008	14:23	f	g	0	0	1	0	0	0	1	yoho bluffs(tch)
0	10/6/2008	7:20	0	0	0	0	0	0	0	0	0	no obs, patchy fog, light rain, fresh snow on peaks. (cu)
205	10/6/2008	8:37	f	s	4	0	0	0	6	0	10	lambs nursing, behind rocks
206	10/6/2008	8:45	f	s	1	0	0	0	0	0	1	beside tch, joined others in rocks
205	10/6/2008	9:35	f	s	3	0	0	0	0	0	3	were bedding, stood up into view
207	10/6/2008	10:45	f	s	0	10	0	0	0	0	10	2-class2, 4-class3, 4-class4, Dart Creek,No obs mt7 sites
0	12/6/2008	7:20	0	0	0	0	0	0	0	0	0	No obs, upper mt7, nice sunny morning, haze bus corner

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Activity: f = feeding, b = bedded, t= traveling, 0 = no data.

Sheep & Goat Natality Survey

	8											
0	12/6/2008	9:00	0	O	0	0	0	0	0	0	0	no obs lower mt 7
208	12/6/2008	14:25	b	s	0	1	0	0	0	0	1	class2, injured ram, limped away. Dart creek
209	12/6/2008	15:45	b	s	0	1	0	0	0	0	1	lower put in road, class3, light rain, no obs bus corner
210	12/6/2008	15:53	f	s	2	0	0	0	2	0	4	Yoho bridge, lambs slightly taller than Ewes belly
211	13/06/08	6:37	f	s	0	3	0	0	0	0	3	1-class3, 2class4, golden view rd/tch jct.
212	13/06/08	6:54	f	s	0	1	0	0	0	0	1	feeding, low side tch, black wall, injured ram
213	13/06/08	6:56	t	md	1	0	0	0	0	0	1	cross tch, over bank when I pull in(cu)
0	13/06/08	7:00	0	O	0	0	0	0	0	0	0	some fog, light rain, (CU)
214	13/06/08	8:00	f	bb	1	0	0	0	0	0	1	Lower put in road, along tracks
0	13/06/08	8:15	0	O	0	0	0	0	0	0	0	dart fsr, light rain, poor vis, bus corner
215	21/06/08	7:30	f	s	0	2	0	0	0	0	2	Class 2 , feeding
216	21/06/08	7:50	b	s	0	3	0	0	0	0	3	3-class3, bed purcell heli lawn
217	21/06/08	9:02	f	s	8	0	0	2	0	0	10	yoho bridge,
218	21/06/08	10:28	f	s	1	0	0	0	0	0	1	low side tch, dart creek
219	24/06/08	18:30	f	s	0	5	0	0	0	0	5	3-class3, 2class4, playing and feeding
220	24/06/08	19:00	f	s	9	1	0	5	5	0	20	grazing, yoho bridge, lambs nursing, Injured class2 ram
221	24/06/08	19:55	f	g	0	0	1	0	0	0	1	bus corner high cliffs (cu)
222	28/06/08	7:00	b	s	0	3	0	0	0	0	3	3 class 4, avi gates, edge of tch
223	28/06/08	7:05	t	s	0	1	0	0	0	0	1	calss3 walk along edge of tch w/ Md
224	28/06/08	7:05	t	md	1	0	0	0	0	0	1	walk w/ ram
225	28/06/08	7:09	f	s	5	0	0	2	0	0	7	Frenchmans, side of tch
226	28/06/08	7:15	f	s	0	0	0	0	5	0	5	Frenchmans Ridge, up in rocks alone
222	28/06/08	8:50	f	s	0	5	0	0	0	0	5	3-class 3, 2 class4
0	30/06/08	7:00	0	O	0	0	0	0	0	0	0	no obs bus corner

Species: s = sheep, g = goat, e = elk, md = mule deer, wt = white-tailed deer, bb = black bear, 0 = no observations.
 Activity: f = feeding, b = bedded, t= traveling, 0 = no data.

Sheep & Goat Natality Survey

223 b	30/06/08	8:08	f/b	s	8	1	0	4	4	0	17	lambs w/ 2 Ewes on ledge 80m above Yoho bridge, injured class 2 ram
224 b	30/06/08	9:35	f	s	0	7	0	0	0	0	7	2-class2, 3class 3 2 class4, purcell heli lawn
227	5/7/2008	7:15	b	s	0	1	0	0	0	0	1	Class4 Biggest ram
228	5/7/2008	7:22	b	s	0	4	0	0	0	0	4	2 class3, 2 class 2
229	5/7/2008	7:54	f	s	10	0	0	4	0	0	14	cross tch, walk towards yoho(no visibility bus corner)
230	5/7/2008	8:28	f	s	1	0	0	0	0	0	1	high in rocks (LP)
231	5/7/2008	8:37	f/b	s	5	0	0	0	8	0	13	Nursery Group, Wees may double count W/229, 230
232	5/7/2008	9:37	b	s	0	5	0	0	0	0	5	2 class4, 2 class 3, 1 class2 , same ram as 227
234	15/7/08	19:30	t	s	0	1	0	0	0	0	1	class3, (LP)
235	19/7/08	7:40	f	s	0	4	0	0	0	0	4	2class4, 2 class3, sheep feed bluffs
0	19/7/08	7:50	0	0	0	0	0	0	0	0	0	frenchmans ridge, no obs
0	19/7/08	8:10	0	0	0	0	0	0	0	0	0	bus corner, no obs
0	19/7/08	8:41	0	0	0	0	0	0	0	0	0	LP, no obs
236	19/7/08	9:10	f	md	1	0	0	0	0	0	1	past park bridge
237	19/7/08	10:02	b	s	0	1	0	0	0	0	1	frenchmans class3, no obs dart creek
238	19/7/08	10:23	f/t	s	0	4	0	0	0	0	4	2class2, 1 class3, 1 class4
0	26/7/08	7:20	0	0	0	0	0	0	0	0	0	no obs frenchmans
0	26/7/08	7:47	0	0	0	0	0	0	0	0	0	bus corner, no obs
239	26/7/08	8:29	f	s	3	0	0	1	1	0	5	standing on tch, no reaction to tourists, cross rd above wall
240	26/7/08	8:34	f/b	s	5	0	0	0	0	0	5	yoho bridge
0	26/7/08	9:45	0	0	0	0	0	0	0	0	0	dart crk no obs
241	26/7/08	10:12	b	s	0	7	0	0	0	0	7	2 class2, 2 class3, 3 class4

Species: s = sheep, g = goat, e = elk, md = mule deer, wt = white-tailed deer, bb = black bear, 0 = no observations.
 Activity: f = feeding, b = bedded, t= traveling, 0 = no data.

Table 3. Weather during wildlife observations.

Ref #	Date (dd:mmm:yy)	Time Begin (hh:mm)	Time End (hh:mm)	Total Obs Time in Minutes	Temp (Celcius)	Wind	CC	C Type	Ceiling
1	30/04/08	9:00	9:27	27	3	0	3 AC	vh	
2	30/04/08	9:35	9:45	10	4	0	3 AC	vh	
3	30/04/08	9:49	10:03	13	3	1	3 AC	vh	
4	30/04/08	10:10	10:15	5	4	1	3 AC	vh	
5	30/04/08	10:23	10:45	23	4	1	3 AC	vh	
6	30/04/08	10:51	10:52	1	5	1	3 AC	vh	
7	30/04/08	10:58	11:40	42	6	1	3 AC	vh	
8	30/04/08	11:44	11:54	10	5	1	3 AC	vh	
9	30/04/08	13:05	13:15	10	5	1	3 AC	vh	
10	30/04/08	13:15	13:33	17	5	1	3 AC	vh	
11	30/04/08	13:33	13:52	19	4	1	3 AC	vh	
12	30/04/08	14:13	14:30	17	4	1	3 AC	vh	
13	30/04/08	14:45	15:00	15	4	1	3 AC	vh	
14	02/05/08	8:05	8:23	18	4	1	1 n	vh	
15	02/05/08	8:28	8:38	10	4	1	1 n	vh	
16	02/05/08	8:40	8:48	8	4	1	1 n	vh	
17	02/05/08	8:54	9:18	24	4	0	1 n	vh	
18	02/05/08	9:21	9:38	17	4	1	1 n	vh	
19	02/05/08	9:21	9:38	17	4	1	1 n	vh	
20	02/05/08	9:40	9:55	15	4	1	1 n	vh	
21	02/05/08	10:02	10:07	5	4	1	1 n	vh	
22	02/05/08	10:16	10:18	2	4	1	1 n	vh	
23	02/05/08	10:22	10:33	11	10	1	1 n	vh	
24	02/05/08	10:42	10:57	15	11	1	1 n	vh	
25	02/05/08	11:03	11:11	8	11	1	1 n	vh	
26	02/05/08	12:04	12:24	20	11	1	2 ac	vh	
27	02/05/08	13:25	13:33	8	16	1	2 ac	vh	
28	02/05/08	13:45	14:10	25	13	1	2 ac	vh	
29	02/05/08	15:07	15:19	12	15	1	2 ac	vh	
30	04/05/08	8:08	8:16	8	6	0	1 n	vh	
31	04/05/08	8:26	8:44	18	6	0	1 n	vh	

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32	04/05/08	8:45	8:50	5	6	0	1 n	vh
33	04/05/08	8:51	9:08	17	6	0	1 n	vh
34	04/05/08	8:51	9:08	17	6	0	1 n	vh
35	04/05/08	9:23	9:33	10	13	0	1 n	vh
36	04/05/08	9:44	10:04	20	13	1	2AC	vh
37	04/05/08	10:11	10:17	6	13	1	2AC	vh
38	04/05/08	10:23	10:40	17	13	1	3AC	vh
39	04/05/08	11:44	11:55	11	13	1	3AC	vh
40	04/05/08	12:01	12:21	20	13	1	2AC	vh
41	04/05/08	12:47	13:00	13	13	1	2AC	vh
42	04/05/08	13:20	13:31	11	13	1	2AC	vh
43	04/05/08	14:08	14:33	25	13	1	2AC	vh
44	06/05/08	7:44	7:54	10	6	0	2cc	vh
45	06/05/08	8:00	8:10	10	6	0	2cc	vh
46	06/05/08	8:12	8:32	20	7	1	2cc	vh
47	06/05/08	8:36	9:07	31	6	1	2cc	vh
48	06/05/08	8:26	8:52	16	6	1	2cc	vh
49	06/05/08	9:00	9:08	8	6	0	3AC	vh
50	06/05/08	9:10	9:15	5	6	0	3AC	vh
51	06/05/08	9:16	9:26	10	6	0	3AC	vh
52	06/05/08	9:27	9:40	13	6	0	3AC	vh
53	06/05/08	9:45	9:55	10	7	0	3AC	vh
54	06/05/08	9:58	10:05	7	7	0	3AC	vh
55	06/05/08	10:10	10:25	15	7	1	3AC	vh
56	06/05/08	10:30	10:50	20	8	1	3AC	vh
57	06/05/08	11:48	12:15	27	12	1	3AC	vh
58	06/05/08	12:43	12:58	15	12	1	3AC	vh
59	06/05/08	13:35	14:06	31	14	1	3AC	vh
60	06/05/08	14:15	14:30	15	15	1	3AC	vh
61	06/05/08	14:15	14:30	15	15	1	3AC	vh
62	08/05/08	7:05	7:25	20	4	1	4NS	AR
62	08/05/09	7:05	7:25	20	4	1	4NS	AR
63	08/05/10	7:30	8:05	35	4	1	4NS	AR
64	08/05/12	8:12	8:28	16	4	1	4NS	AR
65	08/05/13	8:30	9:00	30	4	1	4NS	AR
66	08/05/08	9:02	9:12	10	3	2	4NS	br
67	08/05/08	9:15	9:35	20	3	2	4NS	br
68	08/05/08	9:37	9:47	10	3	2	4NS	br
69	08/05/08	9:51	9:58	7	3	3	4NS	br
70	08/05/08	10:08	10:18	10	3	3	4NS	br

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71	08/05/08	10:29	11:25	54	5	2	4NS	br
72	08/05/08	10:40	10:57	17	5	2	4NS	br
73	08/05/08	11:12	11:22	10	5	2	4NS	br
74	08/05/08	11:28	11:38	10	5	1	4NS	br
75	08/05/08	12:24	12:54	30	7	2	4st	br
76	08/05/08	13:01	13:16	15	7	1	4st	br
77	08/05/08	13:01	13:40	39	7	1	4st	br
78	08/05/08	13:30	13:40	10	7	1	4st	br
79	08/05/08	14:08	15:00	42	5	1	4ns	br
80	08/05/08	14:22	15:10	48	5	1	4ns	br
81	09/05/08	7:15	7:37	22	-1	0	0	0vh
82	09/05/08	7:45	8:25	40	-1	0	0	0vh
83	09/05/08	7:45	8:00	15	-1	0	0	0vh
84	09/05/08	8:02	8:25	23	-1	0	1	0vh
85	09/05/08	8:28	8:38	10	-1	0	1	0vh
86	09/05/08	8:40	8:50	10	1	0	1	0vh
87	09/05/08	9:00	9:25	25	1	0	1	0vh
88	09/05/08	9:28	9:44	16	2	0	1	0vh
89	09/05/08	9:50	10:02	12	2	0	1	0vh
90	09/05/08	10:06	10:16	10	2	0	1	0vh
91	09/05/08	11:09	11:35	24	9	1	2cc	vh
92	09/05/08	11:09	12:30	81	9	1	2cc	vh
93	09/05/08	13:00	13:20	20	7	1	2cc	vh
94	09/05/08	13:21	13:38	17	7	1	2cc	vh
95	09/05/08	13:40	15:00	40	7	1	2cc	vh
96	12/05/08	7:00	7:05	5	3	0	3ac	bt
97	12/05/08	7:10	7:30	20	3	0	3ac	bt
98	12/05/08	7:36	8:00	24	3	1	3ac	at
99	12/05/08	8:03	8:13	10	4	1	3ac	at
100	12/05/08	8:23	8:45	22	4	1	3ac	at
98	12/05/08	8:32	8:50	18	4	1	3ac	at
99	12/05/08	8:57	9:03	6	5	2	3ac	br
101	12/05/08	9:05	9:50	45	5	2	3ac	br
99	12/05/08	9:28	9:44	16	5	2	3ac	br
102	12/05/08	10:03	10:10	7	6	2	3ac	br
103	12/05/08	10:21	10:42	21	7	2	3ac	br
98	12/05/08	11:55	13:00	65	12	1	2ac	ar
96	12/05/08	13:26	13:45	19	12	2	3ac	vh
104	12/05/08	14:06	15:10	76	12	1	3sc	vh
105	12/05/08	15:03	15:10	7	11	1	3sc	vh

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106	14/05/08	7:03	7:45	42	5	0	3 as	br
107	14/05/08	7:49	7:59	10	5	0	3 as	br
108	14/05/08	8:02	8:25	23	5	0	3 as	br
109	14/05/08	8:06	9:38	92	5	0	3 cs	br
110	14/05/08	8:25	8:48	23	5	0	3 cs	br
111	14/05/08	8:27	10:00	87	5	0	3 cs	br
112	14/05/08	8:56	9:38	42	6	0	3 cs	br
113	14/05/08	10:19	10:20	1	6	0	3 cs	ar
114	14/05/08	10:40	11:27	41	8	0	3 cs	ar
115	14/05/08	10:50	11:00	10	8	0	3 as	ar
116	14/05/08	10:55	11:00	5	10	0	3 as	vh
117	14/05/08	11:00	11:20	20	10	0	3 as	vh
118	14/05/08	11:37	11:53	16	10	0	3 as	vh
119	14/05/08	12:00	12:15	15	12	1	3 as	vh
120	14/05/08	12:22	12:27	5	12	1	3 as	vh
119	14/05/08	13:13	14:00	47	13	1	3 as	vh
0	14/05/08	14:20	15:20	60	13	1	3 as	vh
121	15/05/08	6:58	7:13	15	3	1	0 n	vh
122	15/05/08	7:20	7:40	20	3	1	0 n	vh
123	15/05/08	7:47	8:30	43	3	1	0 n	vh
124	15/05/08	8:20	8:30	10	3	1	0 n	vh
125	15/05/08	8:40	10:00	80	12	1	0 n	vh
126	15/05/08	9:00	10:00	60	12	1	0 n	vh
127	15/05/08	9:16	10:00	44	12	1	0 n	vh
128	15/05/08	9:00	9:15	15	12	1	0 n	vh
129	15/05/08	9:20	9:21	1	12	1	0 n	vh
130	15/05/08	11:00	11:10	10	14	1	0 n	vh
131	15/05/08	14:20	15:00	40	21	0	0 n	vh
132	16/05/08	6:57	7:05	8	7	2	2 cl	vh
133	16/05/08	7:12	8:05	53	7	2	2 cl	vh
134	16/05/08	7:20	8:05	45	7	2	2 cl	vh
135	16/05/08	7:45	8:01	16	7	1	2 cl	vh
136	16/05/08	7:47	8:00	13	7	1	2 cl	vh
137	16/05/08	8:20	8:50	30	7	3	2 cl	vh
138	16/05/08	11:25	1300	96	15	1	2 cc	vh
139	16/05/08	12:08	13:00	52	16	1	2 cc	vh
140	16/05/08	16:45	17:00	15	15	1	2 cc	vh
141	16/05/08	17:15	17:16	1	15	1	2 cc	vh
142	19/05/08	7:05	7:25	20	8	1	2 cs	vh
143	19/05/08	7:30	7:45	13	8	1	2 cs	vh
144	19/05/08	7:50	8:32	42	8	1	2 cs	vh

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145	19/05/08	7:55	8:32	47	8	1	2 cs	vh
146	19/05/08	8:10	8:32	22	8	1	2 cs	vh
147	19/05/08	8:22	8:32	10	8	1	2 cs	vh
148	19/05/08	9:09	9:33	24	10	2	3 cs	vh
149	19/05/08	14:40	14:54	14	11	3	4 as	vh
150	19/05/08	15:25	16:00	35	10	1	4 as	vh
0	21/05/08	7:00	11:00	240	9	1	4 ns	at
0	21/05/08	11:45	13:30	105	7	2	4 ns	br
151	23/05/08	7:26	7:40	14	7	2	4 sc	vh
152	23/05/08	7:47	9:00	73	7	2	4 sc	vh
153	23/05/08	8:04	9:10	66	8	1	3 as	vh
154	23/05/08	8:17	8:50	33	8	1	3 as	vh
155	23/05/08	8:33	8:47	14	8	1	3 as	vh
156	23/05/08	9:15	9:30	15	9	1	3 as	vh
157	23/05/08	9:36	10:00	24	9	1	3 as	vh
158	23/05/08	10:15	10:16	1	9	1	3 as	vh
159	23/05/08	10:22	10:30	8	9	1	3 as	vh
160	25/05/08	7:39	7:41	2	8	1	3 s	vh
161	25/05/08	7:39	9:00	81	8	1	3 s	vh
162	25/05/08	7:43	8:05	22	8	1	3 s	vh
163	25/05/08	7:51	9:00	69	8	1	3 s	vh
164	25/05/08	7:58	8:45	47	8	1	3 s	vh
165	25/05/08	9:20	9:35	15	8	1	3 s	vh
166	25/05/08	10:42	10:43	1	8	1	3 n	vh
167	27/05/08	7:27	7:40	13	6	2	1 n	vh
168	27/05/08	10:22	10:35	13	17	2	1 n	vh
169	27/05/08	10:37	10:43	7	17	2	1 n	vh
170	27/05/08	11:45	11:50	5	19	2	1 n	vh
171	27/05/08	14:23	15:33	70	17	3	2 cc	vh
172	29/05/08	8:16	8:45	14	17	1	2 ac	vh
173	29/05/08	10:45	11:00	15	15	1	3 ac	vh
174	29/05/08	18:23	19:15	52	17	2	3 ac	vh
175	29/05/08	18:30	19:15	45	17	2	3 ac	vh
176	29/05/08	19:19	19:40	21	16	2	3 ac	vh
177	29/05/08	20:00	20:30	30	15	2	3 ac	vh
178	29/05/08	20:40	20:45	5	15	2	3 ac	vh
179	31/05/08	7:50	8:02	12	9	1	2 ac	vh

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180	31/05/08	12:15	13:20	65	20	1	2 ac	vh
181	31/05/08	12:50	13:20	30	20	1	2 ac	vh
182	31/05/08	12:58	13:20	22	20	1	2 ac	vh
183	31/05/08	13:30	14:00	30	20	1	2 ac	vh
184	2/6/2008	9:12	9:30	18	10	1	4 ns	br
0	2/6/2008	0:00	0:00	0	10	1	4 ns	br
185	2/6/2008	10:30	10:43	13	10	1	4 ns	br
186	2/6/2008	10:55	11:02	7	10	1	4 ns	br
187	2/6/2008	14:20	15:15	55	10	1	4 ns	br
188	4/6/2008	7:14	7:50	36	10	1	4 ns	br
189	4/6/2008	8:00	9:30	90	8	1	4 ns	ar
190	4/6/2008	9:32	9:55	23	9	1	3 as	br
191	4/6/2008	10:00	10:30	30	10	2	3 as	ar
192	4/6/2008	10:20	10:30	10	11	1	3 as	ar
193	4/6/2008	11:10	11:16	6	11	1	3 as	ar
194	4/6/2008	14:00	14:16	16	11	1	3 ns	ar
0	6/6/2008	7:15	7:40	25	7	0	4 ns	bt
195	6/6/2008	8:00	8:10	10	7	0	4 ns	at
196	6/6/2008	8:11	9:10	59	7	1	4 s	at
196	6/6/2008	8:12	9:10	58	7	1	4 s	at
0	6/6/2008	9:12	10:05	53	7	1	4 s	at
197	6/6/2008	10:09	10:11	2	7	1	4 s	at
198	6/6/2008	10:27	11:00	33	8	1	4 s	br
199	6/6/2008	10:49	11:00	11	8	1	4 s	br
200	8/6/2008	8:00	8:12	12	8	1	3 as	vh
201	8/6/2008	8:46	9:06	20	6	1	2 cs	vh
0	8/6/2008	11:45	11:50	5	8	3	4 ns	br
202	8/6/2008	11:52	12:05	13	8	3	4 ns	at
203	8/6/2008	13:32	14:16	44	13	1	3 as	br
204	8/6/2008	14:23	14:26	3	13	1	3 as	ar
0	10/6/2008	7:20	8:30	70	6	0	4 ns	bt
205	10/6/2008	8:37	9:15	38	7	1	4 ns	at
206	10/6/2008	8:45	9:15	30	7	1	4 ns	at
205	10/6/2008	9:35	9:45	10	7	1	4 ns	at
207	10/6/2008	10:45	11:15	30	7	2	3 ns	at
0	12/6/2008	7:20	8:45	85	9	3	3 ac	vh
0	12/6/2008	9:00	11:00	120	12	2	2 ac	vh
208	12/6/2008	14:25	15:00	35	16	2	3 ac	vh
209	12/6/2008	15:45	15:50	5	15	1	4 s	vh

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210	12/6/2008	15:53	15:00	7	15	1	4 s	vh
211	13/06/08	6:37	6:47	10	8	1	3 s	br
212	13/06/08	6:54	7:15	24	8	1	3 s	br
213	13/06/08	6:56	6:59	3	8	1	3 s	br
0	13/06/08	7:00	7:45	45	8	1	3 s	br
214	13/06/08	8:00	8:02	1	8	1	4 s	br
0	13/06/08	8:15	9:00	45	8	1	3 s	br
215	21/06/08	7:30	7:48	10	8	0	2 cc	vh
216	21/06/08	7:50	8:00	10	8	0	2 cc	vh
217	21/06/08	9:02	9:30	28	9	4	2 cc	vh
218	21/06/08	10:28	11:00	32	13	3	2 c	vh
219	24/06/08	18:30	18:45	15	19	2	2 ac	vh
220	24/06/08	19:00	19:40	40	19	2	2 ac	vh
221	24/06/08	19:55	20:10	15	19	2	2 ac	vh
222	28/06/08	7:00	7:05	5	7	1	1 n	vh
223	28/06/08	7:05	7:08	3	7	1	1 n	vh
224	28/06/08	7:05	7:08	3	7	1	1 n	vh
225	28/06/08	7:09	7:40	31	7	1	1 n	vh
226	28/06/08	7:15	7:40	27	7	1	1 n	vh
222	28/06/08	8:50	9:00	10	10	1	1 n	vh
0	30/06/08	7:00	8:00	60	10	2	2 cc	vh
223b	30/06/08	8:08	8:48	40	10	3	2 cc	vh
224b	30/06/08	9:35	9:45	10	14	1	3 ac	vh
227	5/7/2008	7:15	7:20	5	12	1	3 sc	br
228	5/7/2008	7:22	7:50	28	12	1	3 sc	br
229	5/7/2008	7:54	8:24	30	12	1	3 sc	br
230	5/7/2008	8:28	8:30	2	12	1	3 sc	br
231	5/7/2008	8:37	9:30	53	13	1	3 sc	br
232	5/7/2008	9:37	9:47	10	14	1	2 ac	br
233	12/7/2008	10:45	10:50	5	18	2	1 n	vh
234	15/7/08	19:30	19:36	6	19	3	1 ac	vh
235	19/7/08	7:40	7:45	5	14	1	0	0vh
0	19/7/08	7:50	8:05	15	14	3	0	0vh
0	19/7/08	8:10	8:40	30	13	1	0	0vh
0	19/7/08	8:41	9:01	20	13	1	0	0vh
236	19/7/08	9:10	9:13	3	16	1	0	0vh
237	19/7/08	10:02	10:17	15	18	1	0	0vh
238	19/7/08	10:23	10:30	7	20	1	0	0vh
0	26/7/08	7:20	7:45	25	14	3	1 c	vh
0	26/7/08	7:47	8:27	40	14	3	1 c	vh

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239	26/7/08	8:29	9:00	31	14	3	1 c	vh
240	26/7/08	8:34	9:14	40	14	3	1 c	vh
0	26/7/08	9:45	10:00	15	14	3	2 cs	vh
241	26/7/08	10:12	10:17	5	16	2	2 cs	vh