Historical Wildlife Observations in the Canadian Rockies: Implications for Ecological Integrity

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American Elk *(Cervus elaphus)* are now the most abundant large mammal in the Canadian Rockies and they dominate many plant and animal communities. To determine if present populations are reflective of past conditions, or if they have changed due to European influences, we systematically recorded all observations of ungulates and other large mammals found in first-person historical accounts of exploration in the Canadian Rockies from 1792 to 1873. Those data were then tabulated for the Alberta Foothills, the main Rocky Mountains, and the Columbia Valley in three ways, game seen, game sign encountered or referenced, and game shot. In addition, we listed the number of occasions on which Native Americans were mentioned, as well as references to a lack of food or a lack of game. Between 1792 and 1872, 26 expeditions spent a total of 369 days traveling on foot or horseback in the main Canadian Rockies, yet they observed American Elk only 12 times or once every 31 party-days. Other species, such as Bighorn Sheep (*Ovis canadensis*) with 69 sightings, were observed more frequently, but there is no evidence in first-person accounts that game was historically abundant, or that ca. 1790-1880 ungulate populations were resource (food) limited, as is presently the case. Instead, we suggest that ungulate numbers were once kept at low levels by the combined action of carnivore predation and native hunting. If we measure present ecological integrity by the state and process of the ecosystem that existed before European arrival, as others have proposed, then much of the Canadian Rockies today lack ecological integrity.

Key Words: Ecological integrity, historical conditions, Banff National Park, Canadian Rockies, American Elk, *Cervus elaphus*, Bison, *Bison bison*, native people.

According to legislative directives, Canada is to manage her national parks "so as to leave them unimpaired for ... future generations [and] ... ecological integrity ... of natural resources shall be [given] first priority ...." (Woodley 1993). To comply with these legal mandates, Parks Canada implemented ecosystem-based management and began a study of the states and processes that structured the Canadian Rockies Ecosystem over the last several thousand years. For as Aldo Leopold noted, "if we are serious about restoring [or maintaining] ecosystem health and ecological integrity, then we must know what the land was like to begin with" (Covington and Moore 1994: 45).

Aspen (*Populus tremuloides*), American Elk (hereafter "Elk") (*Cervus elaphus*), Wolves (*Canis lupus*), fire, and humans were selected as key indicators because they affect both ecosystem structure and function, and because they represent the species and processes most susceptible to change during the period of European influence (Woodley 1993; Woodley et al. 1993). Parks Canada then developed a simplified model linking these elements in the Canadian Rockies (Kay and White 1995). The species and linkages in the model all have value as indicators of ecological integrity (Kay 1991a, 1991b; Woodley and Theberge 1992), and are understood, at least to some degree, from previous research and monitoring (White et al. 1994, 1998).

Elk are now the most abundant ungulate in the Canadian Rockies (Huggard 1993), but are these populations reflective of past conditions or have they changed due to European influences? What were the historical and pre-Columbian distribution and abundances of Elk and other ungulates in the Canadian Rockies? Were Elk as abundant in the past as they are today?

To address these questions, we analyzed first-person historical accounts of initial exploration. We also conducted studies on faunal remains unearthed from archaeological sites, aspen ecology, fire history — including aboriginal burning, vegetation change using repeat photographs, and Native American hunting (Kay 1994, 1995a, 1997b, 1997c, 1998; Kay et al. 1994*; Kay and White 1995; White et al. 1998). Here, we report the results of our historical analyses.

Methods and Study Area

Many people have used selected quotes from historical journals as evidence that certain species of ungulates were especially abundant during the late 1700s and early 1800s (e.g., Byrne 1968; Nelson 1969a, 1969b, 1970; Nelson et al. 1972). With selective quotations, however, there is always a question

of whether or not the authors included only those passages that supported their preconceived hypotheses. To overcome such bias, we systematically recorded all observations of ungulates and other large mammals found in first-person historical accounts of exploration in the Canadian Rockies from 1792 to 1873. This included Elk, Bison (*Bison bison*), deer — both Mule (*Odocoileus hemionus*) and White-tailed (*O. virginianus*), Moose (*Alces alces*), Bighorn Sheep (*Ovis canadensis*), Mountain Goat (*Oreamnos americanus*), Caribou (*Rangifer tarandus*), Grizzly Bear (*Ursus arctos*), Black Bear (*Ursus americanus*), Wolf, and Mountain Lion or Cougar (*Felis concolor*). We then tabulated those data in three ways (Kay 1990, 1995b; Kay and White 1995).

First, game observed. We listed the explorer, the date of his trip, the length of his trip, the size of the party, and the number of occasions on which the observer actually saw large game animals. If he reported seeing one animal, that was recorded as a single observation, and if he reported seeing ≥ 1 animal at one time, that was also recorded as a single observation. If an explorer reported killing ≥ 1 animal of a particular species at one time, that was recorded as one sighting.

Second, game sign encountered or referenced. We listed the number of occasions on which specific animal sign, usually tracks, was seen or referenced. For instance, if explorers said they were going deer hunting, that was recorded as a single reference to deer. If they said they were going deer and Elk hunting, that was recorded as a single reference to each of those species. Included in these counts are any references to hearing specific animals, such as Wolves howling or Mountain Lions screaming, as well as references to Native American artifacts. If explorers, upon meeting Native Americans, noted that those people had specific animal skins, each of those observations was recorded as a single reference to that species. We also listed the number of occasions on which Native Americans were seen or their sign, footprints, trails, and such were referenced. In addition, we included the number of references made by each party to a lack of food or lack of game. Acts such as shooting a horse for food were each considered a single reference to a food shortage.

Third, game killed. We listed the number of ungulates each explorer reported as having killed. In nearly every instance, early travelers recorded the exact number of animals that they shot. At the time, explorers were free to kill any animals that they encountered. In fact, most expeditions were on the constant lookout for game as they were, or at least attempting to, live off the land.

We used only first-person journals penned at the time of the event or edited versions written soon afterwards because later narrative accounts are less accurate (MacLaren 1984, 1985, 1994a, 1994b, 1994c; White 1991: 613–632; Shaw and Lee 1997). Even "the humblest narrative is always more than a chronological series of events" (McCullagh 1987:30). The ideological implications of most narrative historical accounts are "no different from those of the narrative form in fiction" because narratives are always influenced by prevailing cultural myths (Galloway 1991: 454; Cronon 1992; Pratt 1992; Demeritt 1994; Wishart 1997; Kearns 1998). In addition, we used standard techniques developed by historians to gauge the accuracy of all historical journals analyzed during this study (Forman and Russell 1983).

In order to draw comparisons between different environments within the Canadian Rockies, we focused upon three distinct but contiguous geographic regions — the Alberta Foothills, the main Rocky Mountains, and the Columbia Valley or Rocky Mountain Trench. While these divisions are primarily physiographic, each is also strongly identified with different biogeoclimatic zones or ecoregions. As used here, Alberta's Foothills extend from the prairies on the east to the Front Ranges on the west while the Rocky Mountain region includes the Front Ranges, Main Ranges, and Western Ranges of the mountain belt that form the Canadian Cordillera in Alberta and British Columbia. Four Canadian National Parks are found in the Rocky Mountain Cordillera. Banff (Canada's oldest, established in 1885), Yoho (established 1886), Kootenay (established 1920), and Jasper (established 1907). The Columbia Valley is bounded on the east by the Main and Western Ranges of the Rocky Mountains and on the west by the Purcell and Selkirk Ranges of British Columbia. The Canoe, Columbia, and Kootenay Rivers drain the Columbia Valley. For each region, we developed three historical wildlife sighting tables for a total of nine tables.

Known first-person records begin in 1792 and include: (1) Peter Fidler (1991) — 1792–1793; (2) David Thompson (1800–1812*) (Coues 1965; Belyea 1994) — 1800–1812; (3) Alexander Henry (Coues 1965) — 1811; (4) Gabriel Franchere (1969) — 1814; (5) George Simpson (Merk 1931) — 1824–1825; (6) David Douglas (1959) — 1827; (7) Edward Ermatinger (1912) — 1828; (8) George Simpson (1841*) — 1841; (9) Henry Warre (1845*) — 1845; (10) James Hector (Spry 1968) — 1858–1859; (11) John Palliser (Spry 1968) — 1858; (12) James Carnegie (Southesk 1969) — 1859; (13) W. B. Cheadle (1971) (Milton and Cheadle 1865) — 1863; and (14) Walter Moberly (1872*, 1873*) — 1871–1873.

A number of journals kept by travelers on the Athabasca Trail (Athabasca Valley and Pass), though, were not used because few wildlife observations and virtually no kills were made by people utilizing this route after 1828. By then, the Athabasca

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FIGURE 1. Route
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Trail was well established as the primary transmountain trade route and hunters no longer accompanied parties to provide food. Instead, fur trade brigades crossed the range as quickly as possible between provision stations at Jasper House in the Athabasca Valley and Boat Encampment on the

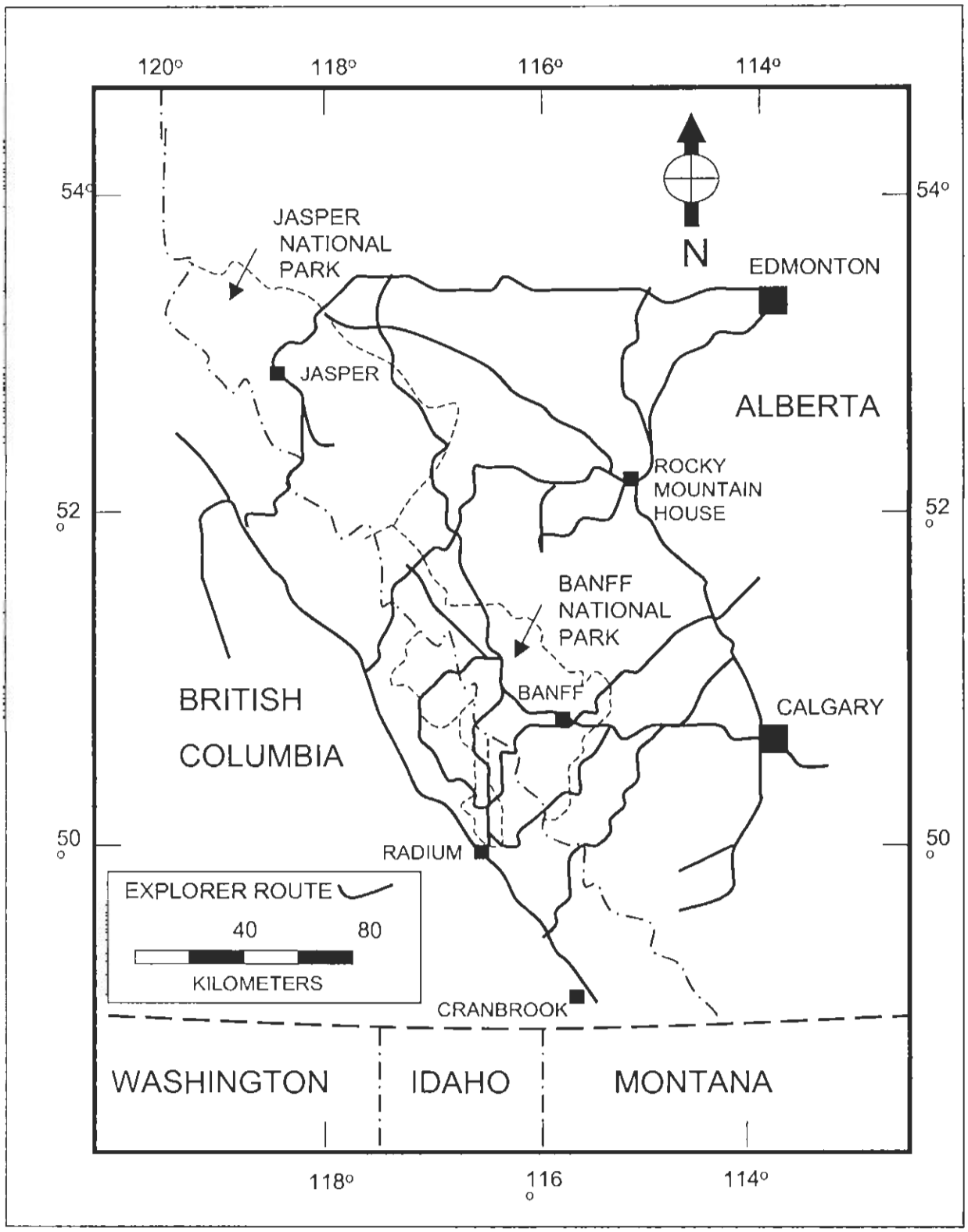

FIGURE 1. Routes of early explorers to the southern Canadian Rockies. Some routes were traveled by more than one expedition. Also shown are Banff, Jasper, Kootenay, and Yoho National Parks, as well as present cities and towns.

Columbia River. In addition, journals kept by residents or visitors at Jasper House (e.g., Michel Klyne 1828–1831, Paul Kane 1847, R. M. Rylatt 1872–1873) (Hudson's Bay Company 1828–1831*; Kane 1968; Rylatt 1991), and Kootenay House (David Thompson 1807–1808) (Coues 1965; Belyea 1994), were not included in our tabular summaries, because static observations differ in nature from those made by mobile parties (Kay et al. 1994*).

Results

Early explorers visited most parts of the Canadian Rockies although their travels were generally confined to major river drainages and established mountain passes (Figure 1). David Thompson first crossed the Canadian Rockies in 1807 by way of the North Saskatchewan River, Howse Pass, and the Blaeberry River. The Peigan, however, objected to Thompson trading with their enemies west of the divide and by 1810, the Peigan had closed the North Saskatchewan to Europeans. This forced David Thompson and the North West Company to find an alternative route further north using the Athabasca River, Whirlpool River, Athabasca Pass, and Wood River to reach the Columbia. The North Saskatchewan route passed through what is now the northern portion of Banff National Park, while the Athabasca Trail traversed today's Jasper National Park. At least two early fur-trade posts were established in what is now Jasper National Park, but none was ever built in Banff, Yoho, or Kootenay.

Only after the Peigan shifted their trade south to American posts on the Missouri River, and then lost their warriors to repeated European-introduced epidemics and other colonial processes, did explorers gain access to the central and southern Canadian Rockies (Smith 1984; Kidd 1986). As a result, the first Europeans known to have traveled Banff's Bow Valley did so only in 1841, and the area comprising Banff, Kootenay, and Yoho National Parks was not fully explored until Dr. James Hector of the Palliser Expedition arrived in 1858. By then, the fur trade was effectively over, and the region's mineral-poor rocks failed to attract the onrush of prospectors that occurred further west in British Columbia. Therefore, relatively few people visited the central Canadian Rockies until the coming of the Canadian Pacific Railroad ca. 1880. Men and supplies for British Columbia's mines arrived from Canada's west coast or from the south via the United States, not across the Canadian Rockies (Patton in press).

Alberta Foothills

Explorers recorded 29 trips in the Alberta Foothills region, traveling a total of 212 days between 1792 and 1863 (Table 1). Bison were the most commonly observed ungulate with 35 sightings. Deer were second at 32+ sightings, while Elk were third at 18. Thus, Bison were reported once every 6.1 party-days, deer once every 6.6 days, and Elk once every 11.8 days.

Explorers of the Foothills region did not make frequent reference to animal sign (Table 2). This may be because Bison, Elk, and deer were apparently being seen and killed at a far greater frequency than in the Rocky Mountains or Columbia Valley. Nevertheless, sign of Bison and Moose were each recorded on four occasions and Wolf twice. Bear sign of undetermined species was noted twice and Grizzly Bear sign once.

Data on the total number of animals killed by explorers in the Foothills (Table 3) follow the same pattern as wildlife sightings (Table 1). A total of 43 Bison were killed compared to 24+ deer and 19 Elk. Thus, one Bison was killed every 4.9 party- days, deer once every 8.8 days, and Elk once every 11.1 days. Nine Moose, five Bighorn Sheep, one Grizzly, and one Black Bear were also taken.

Rocky Mountains

Between 1792 and 1872, 26 expeditions spent a total of 369 days traveling in the Rocky Mountains. Bighorn Sheep were the most frequently observed large animal with 69 sightings, while Bison were observed on 39 occasions, Moose 27, and Mountain Goat 23 (Table 4). As for American Elk, one of the most numerous and frequently seen ungulates in the Rockies today, only 12 observations are recorded by early explorers. This is a figure equal to the total number of Grizzly and Black bear sightings. So, Bighorn Sheep were reported once every 5.4 party-days, Bison once every 9.5 days, Moose once every 13.4 days, and Elk once every 30.8 days. Other large animal observations included deer 7 times, Caribou 4, Wolf 3, and Cougar 2.

Elk sign was observed on only 11 occasions, nearly equal to Moose at 10 (Table 5). Bison sign was recorded on 19 occasions and Bighorn Sheep on 12. Although Bighorn Sheep were by far the most frequently seen and killed ungulate in the Rocky Mountains, their sign was seldom recorded. As bighorns were usually not tracked like other ungulates, it is understandable why sign of these animals would not be mentioned as frequently as one might otherwise expect.

The most revealing statistics on the relative abundance of ungulates in the Rocky Mountains, however, are found in the record of animals actually killed (Table 6). As previously indicated, Bighorn Sheep lead the tally with 113 animals. Bison were second with 34 kills, followed by Moose at 26, and Mountain Goat at 17. Elk placed a distant fifth with only 9 animals killed. Thus, one Bighorn Sheep was killed every 3.3 party-days, a Bison once every 10.8 days, a Moose once every 14.1 days, and an American Elk once every 46.1 days. Considering that on many of the 369 days these early parties were traveling through the mountains, ≥ 2 hunters were sent out

in search of food, and that much of the hunting took place in montane valleys where Elk are now the most common ungulate, the total of only eight animals killed is revealing and suggests that American Elk were not as common ca. 1800–1870 as they are today. Other animals killed by early explorers in the Rocky Mountains included six deer (both Mule and White-tailed), five Wolves, four Caribou, two Black Bear, and one Grizzly.

Early explorers also made 17 references to a general lack of game while they were in the mountains, and aside from occasional groups of Bighorn Sheep, large herds of ungulates were not encountered in the Rockies ca. 1800-1870. There certainly is no evidence that there were game animals, and especially Elk, behind every tree, as some have suggested (Byrne 1968; Nelson 1969a, 1969b, 1970; Nelson et al. 1972). Moreover, of the wildlife sightings and kills reported, a large percentage occurred in one area — Kootenay Plains on the North Saskatchewan River. Compared to the rest of the main Canadian Rockies, early explorers reported killing Elk 5.2

TABLE 1. FOOTHILLS: PART I – ANIMALS OBSERVED. Historical evidence relating to the distribution and abundance of ungulates in the Foothills region from 1792 to 1863. Number of occasions on which large animals were reported to have been seen by early explorers. To make the table more readable, dashes were used instead of zeros for species that were not reported.

				Number of ungulates and other large animals observed											
Observer[1]	Date	Trip Length (days)	Size of party	Elk	Bison	Deer	Goat	Bighorn Sheep	Moose	Caribou	Wolf	Cougar	Grizzly Bear	Black Bear	Bear[2]
1. Peter Fidler															
12/30-1/2	1792-93	4	30-50	-	1	-	-	-	-	-	-	-	-	-	-
2. David Thompson															
a. 10/11-10/14	1800[3]	4	8	-	1	-	-	-	-	-	-	-	-	-	-
b. 11/29-12/1	1800	4	3+	-	-	-	-	1	-	-	-	-	-	-	-
c. 6/6-6/11	1801	6	11	1	4	-	-	1	2	-	-	-	-	-	-
d. 5/10-5/16	1807	7	9+	3	4	-	-	-	-	-	-	-	-	-	-
e. 6/24-6/26	1808	3	6+	1	2	-	-	-	-	-	-	-	-	-	-
f. 10/4-10/20	1808	19	6+	4	3	1	-	-	-	-	-	-	-	-	-
g. 6/22-6/23	1809	2	6+	1	-	-	-	-	-	-	-	-	-	-	-
h. 7/22-7/30	1809	9	6+	1	3	3	-	-	-	-	-	-	-	-	-
i. 6/20-6/22	1810	3	8-11	2	1	1	-	1	-	-	-	-	-	-	-
j. 10/29-12/29	1810	62	24	2	14	1	-	1	1	-	-	-	1	-	-
k. 5/14-5/16	1812	3	4	1	-	-	-	-	-	-	-	-	-	-	-
3. Alexander Henry															
a. 2/3-2/4	1811	2	8	-	-	1	-	-	-	-	-	-	-	-	-
b. 2/12-2/13	1811	2	8	-	-	-	-	-	-	-	-	-	-	-	-
4. Gabriel Franchère															
5/25-5/28	1814	4	10	1	-	-	-	-	1	-	-	-	-	-	-
5. George Simpson															
a. 4/28-4/29	1825	2	12+	1	-	-	-	-	1[4]	-	-	-	-	-	-
b. 7/31-8/1	1841	2	12+	-	1	-	-	-	-	-	-	-	-	-	-
6. David Douglas															
5/5-5/7	1827	3	9+	-	-	-	-	-	1	-	-	-	-	-	-
7. Edward Ermatinger															
9/23-10/1	1828	9	49	-	-	-	-	-	-	-	-	-	-	-	-
8. James Hector															
a. 8/6-8/7	1858	2	5	-	-	1	-	-	-	-	-	-	-	1	-
b. 9/28-10/2	1858	5	5	-	-	-	-	-	-	-	-	-	-	-	-
c. 12/10-12/14	1858	5	4	-	1	2+[5]	-	-	-	-	-	-	-	-	-
d. 1/21-1/30	1859	10	4	-	-	-	-	-	-	-	-	-	-	-	-
e. 2/20-2/25	1859	6	4	-	-	-	-	-	-	-	-	-	-	-	-
f. 8/15-8/16	1859	2	9	-	-	1	-	-	-	-	-	-	-	-	-
9. John Palliser															
8/10-8/17	1858	8	6	1	-	2	-	-	-	-	-	-	-	-	-
10. James Carnegie															
a. 8/25-9/1	1859	7	11	-	-	-	-	-	1	-	-	-	-	-	-
b. 10/1-10/5	1859	5	11	-	-	19	-	-	-	-	1	-	-	-	-
11. W.B. Cheadle															
6/17-6/28	1863	12	6	-	-	-	-	-	1	-	-	-	-	-	-
Total	1792-1863	212	Varied	19	35	32+	-	4	8	-	1	-	1	1	-

[1]See Table 3 for citations.
[2]Species not reported in original journals.
[3]Thompson wrote: "Buffalo, Red Deer, Moose & small Deer are also Plenty and Grisled Bears but too many."
[4]On April 29 Simpson wrote: "Saw about 50 Moose & Red Deer, but time was too valuable to amuse ourselves in hunting..."
[5]On December 11 Hector stated that "The Virginian (white-tailed) deer is very abundant in this district, and we are continually starting them..." and again on December 13 he noted that "we started band after band of deer, just as if we were passing through a deer park. This is the only time I have ever seen game in such plenty in the country, excepting of course buffalo herds."

times more frequently once they reached Kootenay Plains — one Elk killed per 56.2 days in other areas of the mountains versus one Elk killed per 10.7 days on Kootenay Plains. Bison were killed 2.3 times more frequently on Kootenay Plains (12.0 vs. 5.3 days per kill), while Bighorn Sheep were killed 4.2 times more frequently (4.2 vs. 1.0 days per kill).

Jasper House post journals also indicate that ungulates, and especially Elk, were not abundant even

TABLE 2. FOOTHILLS: PART II – ANIMAL SIGN. Historical evidence relating to the distribution and abundance of ungulates in the Foothills region from 1792 to 1863. Number of occasions on which animal sign was reported to have been seen, heard or referenced by early explorers. To make the table more readable, dashes were used instead of zeros for species that were not reported.

		Number of occasions on which animal sign was seen, heard or referenced												Number of occasions on which Natives were seen or sign observed or referenced		
Observer[1]	Date	Elk	Bison	Deer	Goat	Bighorn Sheep	Moose	Caribou	Wolf	Cougar	Grizzly Bear	Black Bear	Bear[2]	Seen	Sign	Reference to lack of game or lack of food.
1. Peter Fidler																
12/30-1/2	1792-93	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2. David Thompson																
a. 10/11-10/14	1800	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-
b. 11/29-12/1	1800	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
c. 6/6-6/11	1801	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-
d. 5/10-5/16	1807	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-
e. 6/24-6/26	1808	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
f. 10/4-10/20	1808	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
g. 6/22-6/23	1809	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
h. 7/22-7/30	1809	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
i. 6/20-6/22	1810	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
j. 10/29-12/29	1810	-	1	-	-	-	1	-	-	-	-	-	-	1	-	-
k. 5/14-5/16	1812	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3. Alexander Henry																
a. 2/3-2/4	1811	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-
b. 2/12-2/13	1811	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-
4. Gabriel Franchère																
5/25-5/28	1814	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5. George Simpson																
a. 4/28-4/29	1825	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
b. 7/31-8/1	1841	-	1	-	-	-	-	-	-	-	-	-	-	-	1	-
6. David Douglas																
5/5-5/7	1827	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7. Edward Ermatinger																
9/23-10/1	1828	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-
8. James Hector																
a. 8/6-8/7	1858	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-
b. 9/28-10/2	1858	1	-	-	-	-	-	-	-	-	-	-	-	-	1	-
c. 12/10-12/14	1858	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
d. 1/21-1/30	1859	-	-	-	-	-	-	-	-	-	-	-	-	1	2	-
e. 2/20-2/25	1859	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
f. 8/15-8/16	1859	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9. John Palliser																
8/10-8/17	1858	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-
10. James Carnegie																
a. 8/25-9/1	1859	-	-	-	-	-	1	-	-	-	-	-	-	-	1+	-
b. 10/1-10/5	1859	-	1	-	-	-	-	-	-	-	-	-	-	1	-	-
11. W.B. Cheadle																
6/17-6/28	1863	-	-	-	-	-	2	-	-	-	-	-	2	-	-	-
Total	1792-1863	1	4	-	-	-	4	-	2	-	1	-	2	10	6+	-

[1]See Table 3 for citations.
[2]Species not reported in original journals.

TABLE 3. FOOTHILLS: PART III – ANIMALS KILLED. Historical evidence relating to the distribution and abundance of ungulates in the Foothills region from 1792 to 1863. Number of ungulates and other large animals reported to have been killed by early explorers. To make the table more readable, dashes were used instead of zeros for species that were not reported.

	Number of ungulates and other large animals killed															
															Bighorn	Grizzly	Black

TABLE 3. FOOTHILLS: PART III – ANIMALS KILLED. Historical evidence relating to the distribution and abundance of ungulates in the Foothills region from 1792 to 1863. Number of ungulates and other large animals reported to have been killed by early explorers. To make the table more readable, dashes were used instead of zeros for species that were not reported.

		Number of ungulates and other large animals killed												
Observer	Date	Elk	Bison	Deer	Goat	Bighorn Sheep	Moose	Caribou	Wolf	Cougar	Grizzly Bear	Black Bear	Bear[1]	Reference
1. Peter Fidler														
12/30-1/2	1792-93	-	1	-	-	-	-	-	-	-	-	-	-	Fidler 1991: 42-54
2. David Thompson														
a. 10/11-10/14	1800	-	1	-	-	-	-	-	-	-	-	-	-	Thompson 1800
b. 11/29-12/1	1800	-	-	-	-	4	-	-	-	-	-	-	-	Thompson 1800
c. 6/6-6/11	1801	-	6	-	-	-	3	-	-	-	-	-	-	Dempsey 1965:3-6
d. 5/10-5/16	1807	2	4	-	-	-	-	-	-	-	-	-	-	Thompson 1807
e. 6/24-6/26	1808	-	1	-	-	-	-	-	-	-	-	-	-	Thompson 1808
f. 10/4-10/20	1808	10	8	1	-	-	-	-	-	-	-	-	-	Thompson 1808
g. 6/22-6/23	1809	1	-	-	-	-	-	-	-	-	-	-	-	Thompson 1809
h. 7/22-7/30	1809	-	1	2	-	-	-	-	-	-	-	-	-	Thompson 1809
i. 6/20-6/22	1810	2	1	-	-	-	-	-	-	-	-	-	-	Thompson 1810
j. 10/29-12/29	1810	3	18	1	-	1	2	-	-	-	1	-	-	Thompson 1810
k. 5/14-5/16	1812	-	-	-	-	-	-	-	-	-	-	-	-	Thompson 1812
3. Alexander Henry														
a. 2/3-2/4	1811	-	-	-	-	-	-	-	-	-	-	-	-	Coues 1965: 676-678
b. 2/12-2/13	1811	-	-	-	-	-	-	-	-	-	-	-	-	Coues 1965: 698-699
4. Gabriel Franchère														
5/25-5/28	1814	1	-	-	-	-	2	-	-	-	-	-	-	Franchère 1969: 163-165
5. George Simpson														
a. 4/28-4/29	1825	-	-	-	-	-	1	-	-	-	-	-	-	Merk 1931:148
b. 7/31-8/1	1841	-	-	-	-	-	-	-	-	-	-	-	-	Simpson 1841
6. David Douglas														
5/5-5/7	1827	-	-	-	-	-	-	-	-	-	-	-	-	Douglas 1959: 262-263
7. Edward Ermatinger														
9/23-10/1	1828	-	-	-	-	-	-	-	-	-	-	-	-	Ermatinger 1912: 106-108
8. James Hector														
a. 8/6-8/7	1858	-	-	-	-	-	-	-	-	-	-	1	-	Spry 1968: 287-289
b. 9/28-10/2	1858	-	-	-	-	-	-	-	-	-	-	-	-	Spry 1968: 336-337
c. 12/10-12/14	1858	-	2	1+[2]	-	-	-	-	-	-	-	-	-	Spry 1968: 354-357
d. 1/21-1/30	1859	-	-	-	-	-	-	-	-	-	-	-	-	Spry 1968: 334-368
e. 2/20-2/25	1859	-	-	-	-	-	-	-	-	-	-	-	-	Spry 1968: 382-384
f. 8/15-8/16	1859	-	-	-	-	-	-	-	-	-	-	-	-	Spry 1968: 433-435
9. John Palliser														
8/10-8/17	1858	-	-	2	-	-	-	-	-	-	-	-	-	Spry 1968: 264-268
10. James Carnegie														
a. 8/25-9/1	1859	-	-	-	-	-	1	-	-	-	-	-	-	Southesk 1969: 175-190
b. 10/1-10/5	1859	-	-	17	-	-	-	-	-	-	-	-	-	Southesk 1969: 254-264
11. W.B. Cheadle														
6/17-6/28	1863	-	-	-	-	-	-	-	-	-	-	-	-	Cheadle 1971: 153-160
Total	1792-1863	19	43	24+	-	5	9	-	-	-	1	1	-	

[1] Species not reported in original journals.

[2] Hector stated that "Virginian deer is very abundant in this district..." and "...there is one killed nearly every day by some of us."

TABLE 4. ROCKY MOUNTAINS: PART I – ANIMALS OBSERVED. Historical evidence relating to the distribution and abundance of ungulates in the Rocky Mountain region from 1792 to 1863. Number of occasions on which large animals were reported to have been seen by early explorers. To make the table more readable, dashes were used instead of zeros for species that were not reported.

				Number of ungulates and other large animals observed											
Observer[1]	Date	Trip Length (days)	Size of party	Elk	Bison	Deer	Goat	Bighorn Sheep	Moose	Caribou	Wolf	Cougar	Grizzly Bear	Black Bear	Bear[2]
1. Peter Fidler															
12/31-1/1	1792-93	1	43+	-	-	-	-	-	-	-	-	-	-	-	-
2. David Thompson															
a. 6/12-6/14	1801	3	11	-	1	-	-	1[3]	-	-	-	-	-	-	-
b. 5/17-6/30	1807	45	9+	2	13	-	1	3	-	-	-	-	-	2	-
c. 6/18-6/23	1808	5	6+	2	-	-	-	2	-	-	-	-	-	1	-
d. 10/21-10/31	1808	9	6+	-	5	-	2	1	-	-	-	-	-	-	-
e. 6/10-6/21	1809	12	6+	2	2	-	-	3	-	-	-	-	-	-	-
f. 7/31-8/13	1809	11	6+	-	3	-	-	3	-	-	-	-	-	-	-
g. 6/17-6-19	1810	3	8-11	-	1	-	-	-	-	-	-	-	-	-	-
h. 12/30-1/19	1810-11	21	13	-	3	-	-	2	3	-	-	-	-	-	-
i. 5/6-5/13	1812	8	3	-	1	-	-	2	-	-	-	-	-	-	-
3. Alexander Henry															
2/5-2/12	1811	8	8	-	8	-	2	10	-	-	2	-	-	-	-
4. Gabriel Franchère															
5/12-5/24	1814	13	10	-	1	-	-	-	-	-	-	-	-	-	-
5. George Simpson															
a. 10/10-10/19	1824	10	12	-	-	-	1	1	-	-	-	-	-	-	-
b. 4/22-4/28	1825	7	12+	-	-	-	-	-	-	-	-	-	-	-	-
c. 8/2-8/7	1841	6	12+	1	-	-	1	1	-	-	-	-	-	-	-
6. David Douglas															
4/28-5/5	1827	8	9	-	-	-	-	2	-	-	-	-	-	-	-
7. Edward Ermatinger															
9/23-10/1	1828	10	49	-	-	-	-	-	2	-	-	-	1	-	-
8. Henry J. Warre															
7/24-7/30	1845	7	16	-	1	-	1	-	1	-	-	-	1	-	-
9. James Hector															
a. 8/11-9/27	1858	48	5	3	-	2	4	10	14	-	-	2	-	1	1
b. 1/31-2/19	1859	20	4	-	-	-	1	4	-	1	1	-	-	-	-
c. 8/17-9/16	1859	31	9	1	-	3	3	6	5	-	-	-	-	1	-
10. John Palliser															
8/18-8/28	1858	11	1	1	-	2	1	-	-	-	-	-	1	-	-
11. James Carnegie															
9/2-9/30	1859	29	11	-	-	-	5	16	2	-	-	-	2	-	-
12. W.B. Cheadle															
6/29-7/17	1863	19	6	-	-	-	1	2	-	-	-	-	-	-	-
13. Walter Moberly															
a. 10/10-10/23	1871	14	4+	-	-	-	-	-	-	-	-	-	-	-	-
b. 8/28-9/6	1872	10	4	-	-	-	-	-	-	3	-	-	1	-	-
Total	1792-1872	369	Varied	12	39	7	23	69	27	4	3	2	6	5	1

[1]See Table 6 for citations.
[2]Species not reported in original journals.
[3]Thompson referred to sheep as goats, so it is likely that "three Mountain Goats" killed were sheep. After 1807, however, he referred to these animals by their correct names.

during winter as reports of people starving were common (Hudson's Bay company 1828–1831*; Kane 1968; Rylatt 1991). Moreover, recent excavations at Jasper House (Pickard and D'Amour 1987*) permit comparison of historical accounts with unearthed faunal remains. Not only were Elk seldom reported in first-person documents, but the species ranked third in recovered faunal remains behind Bighorn Sheep and Moose, which together accounted for nearly 80% of the total.

TABLE 5. ROCKY MOUNTAINS: PART II – ANIMAL SIGN. Historical evidence relating to the distribution and abundance of ungulates in the Rocky Mountain region from 1792 to 1863. Number of occasions on which animal sign was reported to have been seen, heard or referenced by early explorers. To make the table more readable, dashes were used instead of zeros for species that were not reported.

				Number of occasions on which animal sign was seen, heard or referenced											Number of

[illegible]	1792-1872	369	Varied	12	39	7	23	69	27	4	3	2	6	5	1	

[1]See Table 6 for citations.
[2]Species not reported in original journals.
[3]Thompson referred to sheep as goats, so it is likely that "three Mountain Goats" killed were sheep. After 1807, however, he referred to these animals by their correct names.

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, but the species
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ogether account-

TABLE 5. ROCKY MOUNTAINS: PART II -- ANIMAL SIGN. Historical evidence relating to the distribution and abundance of ungulates in the Rocky Mountain region from 1792 to 1863. Number of occasions on which animal sign was reported to have been seen, heard or referenced by early explorers. To make the table more readable, dashes were used instead of zeros for species that were not reported.

		Number of occasions on which animal sign was seen, heard or referenced												Number of occasions on which Natives were seen or sign observed or referenced		
Observer[1]	Date	Elk	Bison	Deer	Goat	Bighorn Sheep	Moose	Caribou	Wolf	Cougar	Grizzly Bear	Black Bear	Bear[2]	Seen	Sign	Reference to lack of game or lack of food
1. Peter Fidler																
12/31-1/1	1792-93	-	-	-	-	1	-	-	-	-	-	-	-	1	-	-
2. David Thompson																
a. 6/12-6/14	1801	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
b. 5/17-6/30	1807	1	1	-	-	-	2	-	-	-	-	-	-	-	1	5
c. 6/18-6/23	1808	-	1	-	-	-	-	-	-	-	-	-	-	-	-	1
d. 10/21-10/31	1808	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-
e. 6/10-6/21	1809	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
f. 7/31-8/13	1809	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
g. 6/17-6-19	1810	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
h. 12/30-1/19	1810-11	1	3	-	-	1	1	-	-	-	1	-	-	-	-	-
i. 5/6-5/13	1812	-	-	-	-	-	1	-	-	-	1	-	-	-	-	-
3. Alexander Henry																
2/5-2/12	1811	-	6	-	1	3	-	-	1	-	-	-	-	-	1	1
4. Gabriel Franchère																
5/25-5/28	1814	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
5. George Simpson																
a. 10/10-10/19	1824	-	1	1	1	1	-	-	-	-	-	-	-	-	-	.[3]
b. 4/22-4/28	1825	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1
c. 8/2-8/7	1841	1	1	-	2	2	1	-	1	-	-	-	1	-	-	3
6. David Douglas																
4/28-5/5	1827	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7. Edward Ermatinger																
9/23-10/1	1828	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8. Henry J. Warre																
7/24-7/30	1845	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-
9. James Hector																
a. 8/11-9/27	1858	3	1	2	2	1	2	-	-	1	-	-	1	1	2	2
b. 1/31-2/19	1859	-	-	-	-	-	-	1	1	-	-	-	-	-	-	1
c. 8/17-9/16	1859	2	1	2	-	-	2	-	-	1	-	-	3	-	-	-
10. John Palliser																
8/18-8/28	1858	-	-	-	-	-	-	-	-	-	1	-	-	-	2	-
11. James Carnegie																
9/2-9/30	1859	-	-	-	-	-	1	-	-	-	-	-	2	1	-	-
12. W.B. Cheadle																
6/29-7/17	1863	-	-	-	-	1	-	-	-	-	-	-	-	1	2	-
13. Walter Moberly																
a. 10/10-10/23	1871	3	2[4]	1	-	1	-	2	-	-	1	-	1	-	1	-
b. 8/28-9/6	1872	-	-	-	-	-	-	3	-	-	1	-	-	-	1	-
Total	1792-1872	11	19	6	7	12	10	6	3	2	5	-	8	5	10	17

[1]See Table 6 for citations.
[2]Species not reported in original journals.
[3]Simpson commented that, after crossing the Miette River, "The country...appears well stocked with animals."
[4]Moberly noted that all bison sign was old: "In bye gone years these animals must have been plentiful here as I saw many of their skulls & innumerable places they had hollowed out in the soft ground to lie in."

Columbia Valley or Rocky Mountain Trench

The Columbia Valley recorded the fewest number of expeditions and explorer- days of the three regions analyzed in this study. Our survey uncovered journals of only 11 parties who spent a total of 161 days in the Trench. These journals encompass a period starting in 1807 and ending in 1859. The large mammal most frequently seen in the Columbia was deer with 14 observations (Table 7). Elk was the second with 7. Thus, deer were reported once every 11.5 days while Elk were seen once every 23 days. The remainder of sightings were

TABLE 6. ROCKY MOUNTAINS: PART III – ANIMALS KILLED. Historical evidence relating to the distribution and abundance of ungulates in the Rocky Mountain region from 1792 to 1863. Number of ungulates and other large animals reported to have been killed by early explorers. To make the table more readable, dashes were used instead of zeros for species that were not reported.

		Number of ungulates and other large animals killed												
Observer	Date	Elk	Bison	Deer	Goat	Bighorn Sheep	Moose	Caribou	Wolf	Cougar	Grizzly Bear	Black Bear	Bear[1]	Reference
1. Peter Fidler														
12/30-1/2	1792-93	-	-	-	-	-	-	-	-	-	-	-	-	Fidler 1991: 44-53
2. David Thompson														
a. 6/12-6/14	1801	-	-	-	-	3[2]	-	-	-	-	-	-	-	Thompson 1801
b. 5/17-6/30	1807	2	12	-	-	2	-	-	-	-	-	2	-	Thompson 1807
c. 6/18-6/23	1808	-	-	-	-	1	-	-	-	-	-	-	-	Thompson 1808
d. 10/21-10/31	1808	-	4	-	3	1	-	-	-	-	-	-	-	Thompson 1808
e. 6/10-6/21	1809	2	3	-	-	14	-	-	-	-	-	-	-	Thompson 1809
f. 7/31-8/13	1809	-	2	-	-	2	-	-	-	-	-	-	-	Thompson 1809
g. 6/17-6/19	1810	-	1	-	-	-	-	-	-	-	-	-	-	Thompson 1810
h. 12/30-1/19	1810-11	-	3	-	-	3	4	-	-	-	-	-	-	Thompson 1810-11
i. 5/6-5/13	1812	-	-	-	-	4	-	-	-	-	-	-	-	Thompson 1812
3. Alexander Henry														
2/5-2/12	1811	-	8	-	-	7	-	-	1	-	-	-	-	Coues 1965: 679-698
4. Gabriel Franchère														
5/12-5/24	1814	-	-	-	-	-	-	-	-	-	-	-	-	Franchère 1969: 158-163
5. George Simpson														
a. 10/10-10/19	1824	-	-	-	2	2	-	-	-	-	-	-	-	Merk 1931: 29-36
b. 4/22-4/28	1825	-	-	-	-	-	-	-	-	-	-	-	-	Merk 1931: 143-148
c. 8/2-8/7	1841	1	-	-	-	-	-	-	-	-	-	-	-	Simpson 1841
6. David Douglas														
4/28-5/5	1827	-	-	-	-	2	-	-	-	-	-	-	-	Douglas 1959: 255-262
7. Edward Ermatinger														
10/1-10/10	1828	-	-	-	-	-	3	-	-	-	1	-	-	Ermatinger 1912: 108-110
8. Henry J. Warre														
7/24-7/30	1845	-	1	-	-	-	1	-	-	-	-	-	-	Warre 1845
9. James Hector														
a. 8/11-9/27	1858	1	-	1	2	20	13	-	-	-	-	-	-	Spry 1968: 289-335
b. 1/31-2/19	1859	-	-	-	-	3	-	-	4[3]	-	-	-	-	Spry 1968: 368-382
c. 8/17-9/16	1859	1	-	3	6	7	2	-	-	-	-	-	-	Spry 1968: 435-453
10. John Palliser														
8/18-8/28	1858	2	-	2	-	-	-	-	-	-	-	-	-	Spry 1968: 269-279
11. James Carnegie														
9/2-9/30	1859	-	-	-	2	32	3	-	-	-	-	-	-	Southesk 1969: 190-251
12. W.B. Cheadle														
6/29-7/17	1863	-	-	-	2	10	-	-	-	-	-	-	-	Cheadle 1971: 160-181
13. Walter Moberly														
a. 10/10-10/23	1871	-	-	-	-	-	-	-	-	-	-	-	-	Moberly 1871
b. 8/28-9/6	1872	-	-	-	-	-	-	4	-	-	-	-	-	Moberly 1872
Total	1792-1872	9	34	6	17	113	26	4	5	-	1	2	-	

[1]Species not reported in original journals.
[2]Thompson referred to sheep as goats the previous autumn, so it is likely that "three Mountain Goats" killed were sheep. After 1807, however, he referred to these animals by their correct names.
[3]Hector wrote that the Jasper House factor baited and killed four Wolves with strychnine.

divided among Bighorn Sheep 2, Moose 2, Mountain Goat 1, Wolf 1, and Black Bear 1. Tracks and other sign of large animals were also seldom reported in the Columbia Valley (Table 8). Sign of deer was noted on six occasions: Moose 4, Elk 4, and Bear once. The only Elk sign recorded after 1811 w of antlers on

Valley (Table 8). asions: Moose 4, lk sign recorded

			54	8	17	113	26	4	5	-	1	2	-			

[1]Species not reported in original journals.
[2]Thompson referred to sheep as goats the previous autumn, so it is likely that "three Mountain Goats" killed were sheep. After 1807, however, he referred to these animals by their correct names.
[3]Hector wrote that the Jasper House factor baited and killed four Wolves with strychnine.

after 1811 was by James Hector who passed a pile of antlers on his way south from the mouth of the Blaeberry River in 1859. He suggested antlers had been stacked there for many years and noted that

TABLE 7. COLUMBIA VALLEY: PART 1 – ANIMALS OBSERVED. Historical evidence relating to the distribution and abundance of ungulates in the Columbia Valley from 1807 to 1859. Number of occasions on which large animals were reported to have been seen by early explorers. To make the table more readable, dashes were used instead of zeros for species that were not reported.

				Number of ungulates and other large animals observed											
Observer[1]	Date	Length of trip (days)	Size of party	Elk	Bison	Deer	Goat	Bighorn Sheep	Moose	Caribou	Wolf	Cougar	Grizzly Bear	Black Bear	Bear[2]
1. David Thompson															
a. 7/1-7/19	1807	19	9+	1	-	8	-	-	-	-	-	-	-	-	-
b. 6/5-6/17	1808	13	6+	1	-	1	-	-	-	-	-	-	-	-	-
c. 11/1-11/13	1808	13	6+	-	-	-	-	-	-	-	-	-	-	-	-
d. 4/27-6/9	1809	44	8+	2	-	3	1	-	-	-	1	-	-	-	-
e. 8/14-8/20	1809	7	8+	1	-	1	-	1	-	-	-	-	-	-	-
f. 6/8-6/16	1810	9	8-11+	-	-	-	-	-	-	-	-	-	-	-	-
g. 4/17-5/14	1811	28	4	2	-	1	-	-	-	-	-	-	-	-	-
h. 9/18-9/23	1811	6	8	-	-	-	-	-	2	-	-	-	-	-	-
2. George Simpson 8/7-8/9	1841	3	12+	-	-	-	-	-	-	-	-	-	-	-	-
3. Henry J. Warre 7/30-8/1	1845	3	16	-	-	-	-	1	-	-	-	-	-	-	-
4. James Hector 9/17-10/2	1859	16	9	-	-	-	-	-	-	-	-	-	-	1	-
Total	1807-1859	161	Varied	7	-	14	1	2	2	-	1	-	-	1	-

[1]See Table 9 for citations.
[2]Species not reported in original journals.

TABLE 8. COLUMBIA VALLEY: PART II – ANIMAL SIGN. Historical evidence relating to the distribution and abundance of ungulates in the Columbia Valley from 1807 to 1859. Number of occasions on which animal sign was reported to have been seen, heard or referenced by early explorers. To make the table more readable, dashes were used instead of zeros for species that were not reported.

		Number of occasions on which animal sign was seen, heard or referenced												Number of occasions on which Natives were seen or sign observed or referenced		Reference to lack of game or lack of food
Observer[1]	Date	Elk	Bison	Deer	Goat	Bighorn Sheep	Moose	Caribou	Wolf	Cougar	Grizzly Bear	Black Bear	Bear[2]	Seen	Sign	
1. David Thompson																
a. 7/1-7/19	1807	1	-	2	-	-	-	-	-	-	-	-	-	2	-	2
b. 6/5-6/17	1808	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
c. 11/1-11/13	1808	-	-	1	-	-	-	-	-	-	-	-	-	-	-	2
d. 4/27-6/9	1809	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
e. 8/14-8/20	1809	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
f. 6/8-6/16	1810	1	-	1	-	-	-	-	-	-	-	-	-	-	1	2
g. 4/17-5/14	1811	2	-	-	-	-	-	-	-	-	-	-	-	1	-	1
h. 9/18-9/23	1811	-	-	-	-	-	3	-	-	-	-	-	-	-	-	- [3]
2. George Simpson																
8/7-8/9	1841	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-
3. Henry J. Warre																
7/30-8/1	1845	-	-	1	-	-	1	-	-	-	-	-	1	-	1	-
4. James Hector																
9/17-10/2	1859	1 [4]	-	1	-	-	-	-	-	-	-	-	-	3	1	-
Total	1807-1859	5	-	6	-	-	4	-	-	-	-	-	1	7	3	9

[1]See Table 9 for citations.
[2]Species not reported in original journals.
[3]An exploration of the Canoe River following the Rocky Mountain Trench north 50 miles from the Big Bend of the Columbia River. Thompson wrote in his *Narrative* (Glover, page. 324) that "Moose Deer and Beaver were plentiful" in this valley.
[4]Hector indicated that this was old sign, writing that: "Elk or wapiti must at one time have been very numerous in this district, as we saw a great many antlers lying on the ground, and sometimes the Indians had piled them in heaps of 50 or 60 together... We have not seen a single track of elk yet in the valley, and but only a few of the smaller deer."

TABLE 9. COLUMBIA VALLEY: PART III – ANIMALS KILLED. Historical evidence relating to the distribution and abundance of ungulates in the Columbia Valley from 1807 to 1859. Number of ungulates and other large animals reported to have been killed by early explorers. To make the table more readable, dashes were used instead of zeros for species that were not reported.

		Number of ungulates and other large animals killed												
Observer	Date	Elk	Bison	Deer	Goat	Bighorn Sheep	Moose	Caribou	Wolf	Cougar	Grizzly Bear	Black Bear	Bear[1]	Reference
1. David Thompson														
a. 7/1-7/19	1807	1	-	7	-	-	-	-	-	-	-	-	-	Thompson 1807
b. 6/5-6/17	1808	1	-	1	-	-	-	-	-	-	-	-	-	Thompson 1808
c. 11/1-11/13	1808	-	-	-	-	-	-	-	-	-	-	-	-	Thompson 1808
d. 4/27-6/9	1809	1	-	3	2	-	-	-	1	-	-	-	-	Thompson 1809
e. 8/14-8/20	1809	1	-	1	-	3	-	-	-	-	-	-	-	Thompson 1809
f. 6/8-6/16	1810	-	-	-	-	-	-	-	-	-	-	-	-	Thompson 1810
g. 4/17-5/14	1811	3	-	1	-	-	-	-	-	-	-	-	-	White 1950: 139-165
h. 9/18-9/23	1811	-	-	-	-	-	1	-	-	-	-	-	-	Thompson 1811
2. George Simpson 8/7-8/9	1841	-	-	-	-	-	-	-	-	-	-	-	-	Simpson 1841
3. Henry J. Warre 7/30-8/1	1845	-	-	-	-	-	-	-	-	-	-	-	-	Warre 1845
4. James Hector 9/17-10/2	1859	-	-	-	-	-	-	-	-	-	-	1	-	Spry 1968: 453-461
Total	1807-1859	7	-	13	2	3	1	-	1	-	-	1	-	

[1]Species not reported in original journals.

none were from recent kills. References to a general lack of game were made on nine occasions, a rate which is 21% higher per expedition-day than that recorded in the Rocky Mountains.

Deer were the most frequently killed animal with a total of 13 (Table 9), all taken by David Thompson south of the mouth of the Blaeberry River between 1807 and 1811. Elk kills totaled seven, again all by David Thompson and his men prior to 1812. Thus, a deer was killed once every 12.4 days while an Elk was killed once every 23 days. Other recorded kills include 3 Bighorn Sheep, 2 Mountain Goats, 1 Moose, 1 Wolf, and 1 Black Bear. It should be noted that all Moose observations and kills were recorded in the Canoe Valley north of the Big Bend on the Columbia.

During the fall and winter of 1807–1808, David Thompson (1800–1812*) established Kootenay House on Lake Windermere in the Columbia Valley. At first, Thompson and his party suffered near starvation, but by late autumn natives began arriving with Elk and deer to trade. Thompson's journal entries for the winter of 1808-1809 indicated a similar pattern, but then chronicled a shortage of game. Except for this brief period, Thompson generally reported a lack of food and a near absence of game in the Columbia Valley, as well as in other areas west of the Continental Divide (White 1950; Belyea 1994).

Discussion

Judging the Validity of Early Reports

Most ecologists who have used written records to estimate the early abundance of wildlife have made little or no attempt to judge the validity of their historical source materials (e.g., Murie 1940; Byrne 1968; Nelson 1969a, 1969b, 1970; Gruell 1973; Houston 1982; Schullery and Whittlesey 1992; Morgantini 1995). But as Forman and Russell (1983: 5) asked, "If we read something written today, do we automatically believe it? If we read something written a long time ago ... do we believe it?" They noted that "Too often the answer to the last questions is 'yes', *simply because information is scarce and the statement is old* [emphasis in original]." Historians, however, have developed standard source-evaluation techniques that can be used to gauge the validity of historical statements regarding the 1792–1872 distribution and abundance of ungulates in the Canadian Rockies (Rusco 1976; Price 1980; Forman and Russell 1983; Black-Rogers 1986). These include (1) first- or second-hand observations and the credibility of the observer, (2) purpose or possible bias of the statements, (3) author's knowledge of the subject, and (4) context of the statement including negative information.

(1) First- or second-hand observations. Did the author personally make the observation reported, or was it learned second- or third-hand? Was it written at the time of the event or was it written long after the fact based solely on memory? Was the observer credible? And do the statements appear to be within reason?

As explained earlier, we relied primarily on first-person historical accounts, and to the best of our knowledge, other first-person journals of comparable quality are not known to exist for the Canadian Rockies. There are other narrative accounts of early exploration, but these were not included in our analysis because historians have determined that narrative accounts are not as accurate as first-person journals written at the time of the event (MacLaren 1984, 1985, 1994a, 1994b, 1994c). White (1991: 618) noted that daily journals kept by early western travelers often differ from their later narrative accounts because the narratives were written to conform with accepted social myths. Unlike journals, which were usually written for personal use, narratives were written for publication and had to conform to accepted social traditions if they were to be widely read and financially successful (Cronon 1992; Pratt 1992; Demeritt 1994; Wishart 1997; Kearns 1998). During the 1800s, the myth that the West was a "Garden of Eden" teeming with wildlife but overrun with hostile "savages" colored most narratives (White 1991: 613–632).

All historical accounts reported here appear to have been written by the observer at the time of the event or shortly thereafter. Several, however, do contain some second-hand information relating to the early abundance of Elk and other ungulates. When Hector (Spry 1968) was camped near the head of the Pipestone River, for instance, he included a description of how two years earlier one of his native hunters had killed Bison in that location. This and comparable accounts are clearly second-hand information and are not as reliable as if the writers had actually seen the animals themselves.

Of the more than 20 historical accounts we summarized, all appear to have been written by credible observers, and none appear to have exaggerated what they saw or how many animals they found, except perhaps Simpson (see below). We did not encounter instances of wild exaggeration in these journals as has been reported in other studies (Kay 1990: 277–278, 1995b).

(2) Purpose or possible bias of the statement. "Did the author of the statement have a special interest or bias which may have colored the statement?" (Forman and Russell 1983: 6). Or did the author color his entire journal?

Since most of the journals we used were not written with an intent to publish, and many have not been published to this day, there appears to have been little reason for these people to have biased their chronicles as regards wildlife, though, other types of cultural biases are found in all European

accounts (Cronon 1992; Pratt 1992; Demeritt 1994; Wishart 1997; Kearns 1998). Only George Simpson (1841*; Merk 1931) may have had a reason to be overly optimistic about how much game his fur brigades could expect to find in the Canadian Rockies. He was in the business of promoting the fur trade, and local food supplies were exceedingly important for they lowered costs and increased profits. During the height of the fur trade, the Hudson's Bay Company maintained posts on the Canadian prairies whose primary purpose was to secure dried meat and pemmican to provision posts farther north and west where game was not abundant.

There is another source of bias in these journals, however, which is much more difficult to address. The procedures we used to compile our summary tables assume that animals were seen, killed, and recorded in proportion to their historical abundance. This may or may not be an appropriate assumption. Rare animals or highly prized game animals, such as Elk, may have been recorded more consistently than common species. It is well known that people have a tendency to more frequently write down events which are of importance or interest to them (Rusco 1976). Thus, we suspect that a higher proportion of Elk sightings, sign, and kills were recorded by early visitors to the Canadian Rockies than were similar data on other animals, because Elk were probably more important to them than were the smaller ungulates. There certainly is no indication that Elk would have gone under-reported or unreported if they had actually been encountered by early explorers (Keigley and Wagner 1998).

(3) Author's knowledge of the subject. Although few early explorers of the Canadian Rockies had any formal zoological training, we assumed they could tell the various ungulate species apart on sight. It would, though, be more difficult to distinguish between their sign. Could early explorers, for instance, tell deer tracks from Bighorn Sheep tracks, or Black Bear from Grizzly Bear tracks, or Wolf, Coyote, and Mountain Lion tracks apart? There simply is no way to tell. It would even be more difficult to identify animal calls, such as the howls of Wolves and Coyotes or the screams of Mountain Lions.

(4) Negative information and the context of early statements. When early explorers reported little or no game does that mean they actually saw few animals, or that they simply did not bother to write down a description of all the animals which were seen? Is negative information data? Murie (1940: 2) contended that "negative evidence must yield to positive evidence because failure to report game does not disprove its abundance," while Gruell (1973: 10) claimed that "the failure to mention sightings of Elk in early reports was not in itself positive evidence that they were not plentiful in the mountains." Morgantini (1995*: 27) also argued that "when ... reports fail to mention the presence of Elk or when they indicate a general scarcity of game animals, no clear conclusion can be made." Although positive statements are preferable to silence, we submit that negative information can be just as important. We also maintain that what people do not say is, at times, even more important than what they record. For instance, negative information avoids the problems of exaggerations and misleading statements discussed above (Price 1980).

There are two ways to check the validity of the negative information contained in the historical source materials for the Canadian Rockies. First, if people recorded wildlife sightings or kills before entering the mountains, but not while they were in the Rockies, that strongly suggests they were careful observers whose lack of record really means they saw little game (Kay 1990, 1995b). This certainly is true of the journals used in this study. While David Thompson, for instance, recorded relatively little game in the Rockies, his journals contain numerous accounts regarding the abundance of game on the Canadian prairies (Tyrrell 1916; Coues 1965). The same is true of other explorers. Accounts of seeing and killing game on the prairies were common but those entries declined precipitously when parties entered the mountains or passed into the Columbia Valley (Thompson 1800–1812*).

Second, the majority of early journals exhibit the same general pattern. That their writers were removed in time and space, yet reported similar ungulate sighting and kill rates, would imply that those were valid patterns, not aberrant occurrences (Kay 1990, 1995b; Keigley and Wagner 1998). For instance, Canada's early explorers generally reported more Bison, Elk, and deer in the Foothills than in the Rockies, and without exception, all parties who visited Kootenay Plains reported more game there than at any other place in the mountains.

Why Did Early Explorers See So Little Game?

At least six reasons, other than an out-right scarcity of animals, have been advanced to explain why early explorers saw relatively little game and so few Elk in the Canadian Rockies. These include: (1) Large, noisy parties chased all the game out of the country or drove the animals into hiding, in advance of their passing; (2) Game in summer was primarily at higher elevations away from the most frequently traveled routes. That is to say, people traveling through winter ranges in summer would not be expected to see game; (3) Hunting drove game away from established trails and posts such as Jasper House; (4) It was more difficult to see and kill game in the heavily wooded mountains than on the plains where reports of game were common; (5) Fur brigades traveled fast and light and did not have time to hunt; and (6) Fire and disease decimated game populations ca. 1850.

(1) Some early visitors to the Canadian Rockies suggested that their large, noisy parties scared off game before it could be seen. While this no doubt was true to some degree, we do not believe that it can be cited as a major reason so little game was seen or killed in the mountains. First, if anything, parties on the plains were larger than those in the Rockies, and as noted, parties on the prairie had little trouble procuring game (Thompson 1800–1812*). Second, many parties split into smaller groups to explore the mountains and several sent out hunters ahead of their line of march. Most of those smaller groups were no more successful at seeing or killing game than were the larger parties (Thompson 1800–1812*). Many hunters searched diligently for days yet saw and killed very little. Finally, although Elk are very sensitive to hunting disturbance associated with motor vehicles and modern high-powered rifles (Lyon 1979a, 1979b, 1983; Edge et al. 1985a, 1985b), there is little evidence that Elk simply hid from early explorers, or that if they had, they would have been successful. Besides, of the ungulate species found in the Canadian Rockies ca. 1800–1870, Elk were one of the easiest to hunt (Frison 1991). That is to say, if Elk were as common in the past as they are today, there is no logical reason why early explorers would not have seen and killed a great many Elk (Keigley and Wagner 1998).

(2) The argument that early explorers saw little game in the Canadian Rockies because all the animals summered at higher elevations away from traveled routes is based on the assumption that even in the absence of human disturbance, Elk would summer there to secure better forage or to avoid insects. This assumption, though, appears to be without merit. When Wyoming's Grand Teton National Park was expanded to its present size during the 1950s, no Elk summered on the valley floor. Since then, a summering herd of 3000 to 4000 Elk has built up in that area (Boyce 1989). A summer Elk herd has also become established ou the National Elk Refuge at even lower elevation in Wyoming's Jackson Hole (Boyce 1989). That herd would have continued to grow except Wyoming Game and Fish set special hunting seasons to eliminate those animals because they did not want Elk summering on the winter range (Boyce 1989).

Summering Elk herds have also become established on Yellowstone National Park's northern winter range. Several hundred Elk now summer on Mt. Everts, Brunsen Peak, and around Mammoth (Kay 1990). In Montana, summering Elk herds have become established on several winter ranges owned by the Montana Department of Fish, Wildlife and Parks. Those herds would also have expanded beyond their present numbers, except that Montana set special hunting seasons to eliminate them because the state does not want Elk summering on its winter ranges (Kay 1990). The same is true in the Canadian Rockies. Today, several hundred Elk summer in Banff's Bow Valley (Woods 1991; White et al. 1998), on the Ya Ha Tinda (Morgantini 1995*), and in Jasper's Athabasca Valley (Dekker 1985).

In addition, Elk do not need to forage at higher elevations to meet their nutritional requirements. Lewis and Clark (1893), Maximillian (1966), and other early explorers repeatedly saw and killed large numbers of Elk on the Great Plains, as did Palliser (1969), David Thompson (Tyrrell 1916), and others on the Canadian prairies. In the hottest, driest part of Washington State's Columbia Basin, a resident Elk herd not only increased at near the theoretical maximum rate for that species, but bulls grew large antlers indicative of excellent nutritional conditions (McCorquodale et al. 1988, 1989; McCorquodale 1993). This herd occupies a grass-sagebrush (*Artemisia* spp.) range with no tree cover except for a few small riparian areas. If Elk can summer there, they surely could summer on any winter range in the Canadian Rockies.

Furthermore, several parties traveled through the Athabasca Valley in late fall or early winter when snow and cold temperatures would have forced ungulates onto low-elevation ranges, yet they still failed to observe any Elk. So even when early explorers traversed what are now major Elk wintering areas during winter, they did not report seeing the concentrations of animals that are common today. On many of these winter crossings, the explorers also complained of a lack of food, making it doubtful that they would have failed to report or somehow have overlooked Elk if the latter had been present in any numbers. Moreover as noted above, people who wintered at Jasper House killed few Elk or other animals and, in general, were short of food.

(3) Some have suggested that early visitors to the Canadian Rockies saw relatively little game because fur-trade associated hunting had killed off all the animals or at least had driven them away from the most traveled routes. First, since explorers killed relatively few ungulates, other than Bighorn Sheep, it appears doubtful that this could have had a major influence on ungulate distribution or abundance. It is clear, however, that David Thompson, the first European known to have traversed the North Saskatchewan, Athabasca, and the Columbia Valleys, reported seeing and killing more ungulates, and especially Bison, than later parties. Similarly, it is apparent that the establishment of posts, such as Jasper and Kootenay House, placed additional pressure on game resources. Nevertheless, we do not believe there was enough fur-trade hunting pressure, in and of itself, to have killed out Elk and other ungulates.

Moreover, there was more ungulate winter range in the Canadian Rockies ca. 1800 than there is today due to a high frequency of low-intensity fires that

maintained open grassland communities at the expense of forests (Van Egmond 1990; Kay et al. 1994*; Kay and White 1995; White et al. 1998). The frequent burning also enhanced forage production and quality (Bailey 1986). Therefore, if food was the only thing that limited herbivore numbers, ungulate populations ca. 1800 should have been 2–3 times higher than what they were in the 1950s–1960s when Wolves were absent (Peck 1980, 1988; Van Egmond 1990; Peck and Peek 1991). That is to say, in our estimation the major winter ranges in the Bow, Athabasca, and North Saskatchewan valleys could each have supported around 10 000 ungulates and that on the Columbia perhaps another 100 000. Since even the earliest explorers did not report anywhere near these numbers of animals, some factor other than food must have limited those populations (White et al. 1998). Thus, while fur-trade-induced hunting may have contributed to declining ungulate populations, there is no evidence that it alone killed off all the game and especially not Elk. Besides, there is no evidence that the fur trade had any significant impact on Banff's Bow Valley, and game populations and Elk numbers were just as low there ca. 1840 as they were in other, more traveled, areas of the main Canadian Rockies. Moreover, despite repeated hunting and kills on Kootenay Plains, that is the one area in the mountains where all parties continued to report game throughout the 1800s.

(4) It has also been postulated that early explorers reported more game on the plains than in the Canadian Rockies because game was easier to see and kill where there was no forest cover. While ungulates certainly are more visible in the open than in the timber, two lines of evidence suggest that this was probably not an overriding consideration. First, even in the mountains most ungulates feed in openings where they can be easily seen from opposing hillsides or mountain tops, especially using binoculars or telescopes that were often carried by early explorers. Second, repeat photographs show that forests in the Canadian Rockies have both grown up and thickened up since the late 1800s due to modern fire suppression and the elimination of aboriginal burning (Kay 1995a; White et al. 1998). In reviewing early photographs (Kay et al. 1994*; Kay and White 1995), one is struck by how open much of the country was when the Canadian Rockies were first explored, especially lower montane valleys where most parties traveled. Thus, animals hidden from view by dense forests would be a greater concern today than in the past (Andison 1998). It must also be remembered that early explorers traveled by foot or on horseback which allowed them ample opportunities to look for game. They did not speed by at 100 km per hour as most people do today. Since early explorers were living off the land, or at least tried to, they also had more incentive to locate game.

(5) Many explorers traveled relatively quickly (for that day and age, but not by modern standards) which could possibly explain why they saw few Elk or other ungulates. We believe, however, that rapid travel itineraries were often mandated by a lack of game, not the cause of reduced wildlife sightings. It is clear from journal entries that many parties would have stopped to rest except that a lack of food forced them to continue (Thompson 1800-1812*). After a section of country was known to hold little game, and therefore offered little chance of subsistence, then it was logical for fur brigades to push on as rapidly as possible to reach the next supply point, such as Kootenay Plains or Jasper House or even Fort Edmonton. Moreover, exploring parties did not report more game than faster traveling fur brigades. Both Hector and Southesk, for instance, clambered up and down mountain peaks and travelled at a leisurely pace accompanied by experienced native and Metis hunters, yet neither party saw an Elk east of the continental divide.

(6) Hector (Spry 1968: 326) suggested that a combination of large forest fires and disease decimated game herds in the Rocky Mountains ca. 1850. While this is an interesting explanation for a supposed decline in ungulates (Morgantini 1995*: 25), there is no indication from Hector's account that, with the exception of Bison, numbers of animals were any lower than what travelers had found in the early part of the century. For instance, on 15 September 1858 Hector descended the North Saskatchewan to Kootenay Plains where large numbers of Bighorn Sheep were seen, including "a flock of at least a hundred rams [which] rushed close past me, so close, indeed, that I hit them with stones" (Spry 1968: 328). During the fall of 1859, Hector again reported "several hundred" Bighorn Sheep near Kootenay Plains (Spry 1968: 443). Thus in 1858–1859, Bighorn Sheep appeared to have been every bit as numerous on Kootenay Plains as they were earlier in the 1800s, which does not support the hypothesis that some unknown disease ravaged game animals ca. 1850. Moreover, there is no evidence that diseases decimated ungulate populations anywhere in western North America ca. 1800–1870 (Kistner 1982). Even if European-introduced livestock diseases, such as anthrax or hoof-and-mouth, were somehow transmitted to wildlife, it is doubtful that they would have completely decimated game populations (Carbyn et al. 1993). Finally, burning of the forest would have created feeding areas and favored game populations, not contributed to their decline (Van Egmond 1990).

Summary and Conclusions

Despite the difficulties of dealing objectively with written historical materials, we believe that continuous-time analyses of early first-person journals

support the following general conclusions relating to the ca. 1800-1870 distribution and abundance of ungulates in the Canadian Rockies.

(1) Bighorn Sheep were the most frequently seen and killed ungulate in the main Canadian Rockies. Bison were next, followed by Moose, Mountain Goats, Elk, and deer. Elk did not dominate the ungulate community in the past as they do today.

(2) The earliest explorers who visited the Athabasca and North Saskatchewan Valleys generally saw and killed Bison, or at least observed recent sign. Later parties reported old buffalo skulls, but few actually saw Bison or fresh sign. Today, free-ranging Bison have been absent for over 100 years (Kopjar 1987*).

(3) Bison, Elk, and deer were more frequently observed in the Foothills than in the main Rockies. There is evidence that Bison moved from the Canadian prairies to the Foothills and probably into the mountains, as well (Moodie and Ray 1976; Morgan 1980; Langemann 2000).

(4) Within the mountains, game was more frequently seen and killed on Kootenay Plains than in any other area. The reason for this is unclear, but the area may have been a tribal territory boundary or buffer zone (Millar 1915: 35) where native hunting was limited which, in turn, permitted higher ungulate densities (Hickerson 1965; Steffian 1991; Kay 1994, 1997a, 1998; Martin and Szuter 1999). Historical accounts indicate that no native group occupied Kootenay Plains ca. 1800–1840. After ca. 1850, the Stoney began visiting Kootenay Plains and they may have been responsible for killing-off the last of the Bison by ca. 1860.

(5) The first explorers who visited an area in the mountains usually reported more animals, and especially Bison, than parties that followed.

(6) Even the earliest game populations, however, were not what would have been expected if food bad been the major factor limiting ungulate numbers. Except for a few flocks of more than 100 Bighorn Sheep, no one encountered large herds of game. The other possible limiting factors, carnivore predation and aboriginal hunting, are discussed elsewhere (Kay 1994, 1995a, 1997a, 1997b, 1997c, 1998; Kay and White 1995; White et al. 1998).

(7) The earliest explorers encountered few Native Americans or signs of native people. Despite a presence in the Canadian Rockies dating back over 10 000 years (Fedje et al. 1995), apparently there was little year-round or seasonal use of the mountains by aboriginal groups ca. 1800. This may have been the result of European disease epidemics that reduced native populations or it could have been caused by intertribal warfare (Dobyns 1983; Smith 1984; Kidd 1986; Ramenofsky 1986; Campbell 1990). While Peter Fidler noted that Peigan and Kootenay traded horses on the Oldman River during the winter of 1792–1793, David Thompson's journals make it clear that during the early 1800s, the Peigan were keeping the Kootenay west of the Rockies by force of arms (Dempsey 1965; Belyea 1994). Prior to expansion of Peigan influence during the 1700s, the Kootenay may have permanently occupied the main Canadian Rockies and even the Alberta Foothills (Smith 1984).

(8) Later parties, however, generally observed more native peoples though encounter rates were still low. Apparently, various native groups moved into the Athabasca Valley to service the fur trade or to be near trading posts, such as Jasper House and La Rocque's Mountain House. Moreover, the Stoney moved into the Rockies from the north after the 1837–1838 smallpox epidemic decimated the Peigan and other members of the Blackfoot confederation.

(9) Hunting to supply fur-trade posts may have contributed to the decline and suppression of ungulate populations in the Athabasca Valley. This could not have been an important factor in the Bow Valley, however, because Europeans first entered that area in 1841, and because fur posts were never established in what is now Banff National Park, nor in Kootenay or Yoho.

(10) Wolves and other predators were encountered in the Canadian Rockies, and they too preyed on ungulates. There are several accounts of Wolves attacking domestic horses during winter in the Athabasca Valley.

(11) There is no evidence that Elk were common anywhere in the main Canadian Rockies or the Columbia Valley ca. 1800-1870. Even the earliest explorers, such as David Thompson, did not encounter large herds of Elk. Between 1792 and 1872, 26 expeditions spent 369 party-days in the mountains, yet they only saw Elk 12 times and only 8 animals were killed. There can be little doubt that Elk numbers during the 1800s were much lower than they are today. There is no historical evidence that large herds of Elk occupied the Bow and Athabasca Valleys until the mid-1900s. The idea that the Canadian Rockies originally teemed with ungulates or that those populations were resource limited (Woods 1991) is not supported by historical data.

Management Implications

The unbrowsed condition of vegetation in the earliest historical photographs and aspen ecology data also suggest that Elk populations were low ca. 1800-1870, while archaeological evidence suggests that ungulates were also rare in pre-Columbian times (Kay 1990, 1997b, 1997c; Kay and Wagner 1994; Kay et al. 1994*; Kay and White 1995). This raises the question of what limited ungulate communities in the past. As discussed elsewhere, we believe that a combination of carnivore predation and native hunting once kept ungulate numbers low except where

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prey had refugia, such as on the prairies (Kay 1994, 1995a, 1995b, 1996, 1997a, 1998; White et al. 1998). Thus, the dramatic impact Elk are having on plant and animal communities in Banff, Yoho, Kootenay, and Jasper National Parks is not within the range of historical variability (Kay 1997c). If we measure present ecological integrity by the state and processes of the ecosystem that existed before European arrival, as others have proposed (Kay 1991a, 1991b; Woodley and Theberge 1992; Woodley 1993; Woodley et al. 1993; Wagner et al. 1995), then Banff's Bow Valley and much of the Canadian Rockies today lack ecological integrity (White et al. 1998).

Throughout North America, most national parks, wilderness areas, and nature reserves are managed to represent the conditions that existed in pre-Columbian times; i.e., so-called natural or pristine conditions. But what is natural? If Native Americans repeatedly fired the vegetation and in combination with other predators limited ungulate numbers, which, in turn, determined the structure of entire plant and animal communities, that is a completely different situation than letting nature take its course today (Wagner and Kay 1993; Kay 1995a; Wagner et al. 1995). Moreover, Canada, like many countries, has chosen to use her national parks as baseline reference areas from which to judge the health of other, more exploited ecosystems (Henry et al. 1995). But again, what is natural? If ecological conditions in Canada's national parks are changing due to reduced predation on ungulates and lack of aboriginal burning, as we have argued (Kay and White 1995; White et al. 1998), then are those parks the proper standard with which to measure ecosystem health and ecological integrity in the other areas?

Clearly, the only hope in answering these and similar questions rests with studies that focus on historical ecology and how ecosystem states and processes have changed over time (Wagner et al. 1995; White et al. 1998). Two things, though, are clear. Second-hand or narrative accounts should not be used to infer past wildlife populations nor should only selected quotes be used from first-person materials (Keigley and Wagner 1998).

Finally, if smallpox or other European diseases decimated native populations ca. 1600 A.D. as postulated by Dobyns (1983), Ramenofsky (1987), and Campbell (1990), then even the first European descriptions of the Canadian Rockies do not adequately convey the effect that much larger pre-Columbian aboriginal populations had on their environment (Geist 1996). That is to say, if Native Americans limited ungulate populations as has been proposed (Kay 1994, 1995a, 1997a, 1998), and if smallpox decimated aboriginal populations 500 years ago, then wildlife numbers would have increased before the first European explorers arrived (Preston 1997). Thus, journal accounts may suggest higher ungulate populations than what existed in pre-Columbian times. This pattern, in fact, is reflected in the archaeological record. Easily overexploited ungulates such as Elk and Moose first appear in archaeological sites in any numbers only 500 years ago (Yesner 1989; Frison 1991; Kay 1994, 1997a). Before then, native hunting was so intense and ungulate populations so low, that few animals were actually killed. Of over 60 000 ungulate faunal remains unearthed at more than 300 archaeological sites in the U.S. and Canadian Rockies, only 3% were Elk and less than 1% were Moose (Kay 1994, 1997c, 1998; Kay et al. 1994*).

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