ROCKY MOUNTAINS FOREST RESERVE

WATERSHED/FOREST PRESERVATION and LIVESTOCK GRAZING HISTORY

with special reference to

THE GHOST RIVER WATERSHED

Submitted to the

Ghost Watershed Alliance Society

By

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1.0 Watershed Preservation, Legislation and Resource Management on Crown Lands

Within the Ghost River watershed there is deeded (privately owned) land and public provincial (Crown) lands which include Don Getty Wildland Provincial Park, Ghost River Wilderness Area, Rocky Mountains Forest Reserve (RMFR) and grazing dispositions such as grazing leases (GRLs) and forest grazing licences (FGLs). Livestock grazing occurs on deeded lands, grazing dispositions and grazing allotments within the RMFR. Currently the Government of Alberta (GoA), through the Ministry of Alberta Environment and Parks (AEP), administers these public lands. However, historically this was not the case.

"On May 2, 1670, King Charles II of England granted the Governor and Company of Adventurers of England Trading into Hudson's Bay (The Hudson's Bay Company) the right to trade, as well as all the territorial rights to colonize and govern the area known as Rupert's Land. This land was located in what is today Alberta, Saskatchewan, Manitoba, Ontario, Quebec and the Northwest Territories" (Government of Alberta 2017b:1).

"From 1670 to 1870, Western Canada was administered by the Hudson's Bay Company, primarily for fur trading. The company actively discouraged colonization and land settlement as it believed the fur industry would be harmed. In 1870, the Hudson's Bay Company surrendered its land to the Dominion of Canada for a number of concessions. Subsequent to this, the prairie provinces were formed. Alberta entered the Confederation in 1905 but Canada retained administration and control over all public land and associated natural resources for government purposes until 1930" (Government of Alberta 2017b:1).

The reason for retaining the lands was threefold:

(1) to consistently promote and control immigration and railway development as a national endeavour;
(2) to complete treaties with aboriginal peoples; and
(3) to continue to generate a reasonable return (revenue) from the land.

"In lieu of the deprived revenues generated from the public land, Canada provided ample subsidies to Alberta in order to meet the conditions of an increasing population resulting from the federal immigration and land settlement policies" (Government of Alberta 2017b:1).

In 1887, the "Dominion government awoke to the necessity of forming forest reserves" (Canada, Department of the Interior 1910b:25). On June 23rd of that year, the Rocky Mountains Park Reserve (now Banff National Park) was established by Act of Parliament (Canada, Department of the Interior 1910b:25).

In the summer of 1899, the Chief Inspector of Timber and Forestry for the Dominion of Canada, E. Stewart, conducted a two month survey of the eastern slopes of the Rocky Mountains from the international boundary north to the Bow River. He recommended implementation of management plans for forest and watershed preservation. It was recognized that the Rocky Mountains headwaters could be subject to severe flooding resulting in damage to costly irrigation systems downstream if forest fires were to denude the timbered slopes. He not only recognized the commercial value of the headwaters for timber production, but also for the various benefits that forests provide with respect to the climate and physical character of a country (Canada, Department of the Interior 1900:10).

In his annual reports in the following years, 1900 through 1907, Stewart continued to discuss the timber reserves along the eastern slopes of the Rocky Mountains. He reiterated the need for establishment of reserves in order to conserve the water supply of the prairie region through protection of timber from fires (Canada, Department of the Interior 1902:4-6, 1903:6-7, 1904:4-5, 1907:3-4).

On July 13, 1906, the *Dominion Forest Reserve Act* was passed (Government of Canada 1906), but was revised on September 3, 1906 with the name change to the *Forest Reserve Act* (Government of Canada 1906: Chapter 56). The act primarily was concerned with ensuring the Crown's title to lands designated as forest reserves. The purpose of the forest reserves was to maintain and protect timber, and to maintain conditions favourable for a continuous water supply. For the next few years, the annual reports of the Forestry Superintendent, now R.H. Campbell, repeated what his predecessor had stressed regarding the importance of the eastern slopes in Alberta and watershed protection (Canada, Department of the Interior 1910c:7, 1910a:42). He also indicated the necessity of an efficient fire patrol system, timber survey and accurate maps of the whole eastern slopes. See section 2.2.

The Rocky Mountains Forest Reserve finally came into existence on May 13, 1910 by Order in Council (Government of Canada 1911c:lxxx; lxxxi). This reserve, along with the Rocky Mountains (Banff) Park, Jasper Park and the Kootenay (Waterton) Lakes Reserve, comprised an area that became the most important in the western provinces. This timbered region, extending alongside the prairie for hundreds of miles, includes the watersheds for the river systems which provide 98% of the water in the South Saskatchewan River drainage system, supplying the great plains to the east.

It soon became evident that there was confusion between the purposes of national parks versus forest reserves. In order to reduce any confusion, the *Forest Reserves and Parks Act* received assent on May 19, 1911 (Government of Canada 1911a: Chapter 10). This act superseded the *Forest Reserve Act* of 1906. Frank Oliver, the Minister of the Interior, explained that “provision

is made for placing all present forest and park reservations under the provisions of the *Forest Reserve Act* and then set apart, within these forest reservations, park reservations with regard to which the regulations look to the enjoyment by people of the natural advantages and beauties of these particular sections of the reserves" (Government of Canada 1911b:8085). However, for the forest reserves throughout Canada, the government "looked rather to the exclusion of people (i.e., tourists)" (Government of Canada 1911b:8084). With this, the "primary objective" of these reserves would be to conserve the source of water supply by the protection and production or reproduction of timber, especially in the upper watersheds. The purpose "in dealing with the forest reserves is, first, the economic utilization of the timber which is useful for commercial purposes and, next, the reproduction of timber so that there shall be a continuous supply" (Government of Canada 1911b:8610).

Certain areas of the reserve also were recognised as having greater potential as tourist attractions and were better suited to have park status. With this, additional land was annexed to be included in Waterton Lakes, Jasper and Rocky Mountains parks by Order in Council on June 8, 1911 (Government of Canada 1912:ccxxxvi) and again on June 24, 1914 (Government of Canada 1915:ccxxxii; Canada, Department of the Interior 1916b:52). In the case of Rocky Mountains Park, this included portions of the Ghost River watershed.

The actual surveying of the boundary lines took several seasons. The survey had two main purposes. The first was to create blazed or cleared lines, inserting red triangular iron posts marked by the letters "D.F.R." (Dominion Forest Reserve) and to post boundary notices to indicate the actual location of the forest reserve boundary. This was to avoid trespass through ignorance of the reserve. The second was to map the types of land and cover, particularly distinguishing grazing lands from timber lands immediately adjacent to the boundary, both inside and outside the reserve (Canada, Department of the Interior 1910b:29, 1915a:53).

Since the RMFR was so large, it was broken down into administration units and subdivided into four new reserves: the Crowsnest-Bow River, Clearwater, Brazeau and Athabasca forest reserves. Each of these had its own Forest Supervisor to plan and execute the patrol and administration work in accordance with the terms of the *Forest Reserve Act*. This included every measure to prevent forest fires and trespass. In order to accomplish this task, Forest Rangers had to be hired, trained and located throughout the forests (Canada, Department of the Interior 1913: 27).

From its inception until 1930, the federal government administered and managed the natural resources. Trails and telephone lines were constructed, connecting each forest headquarters with ranger stations, lookout towers and stop-over cabins, and roads were constructed to connect the infrastructure (Hanson 1973:6).

The boundaries of the area comprising the RMFR remained unchanged until the transfer of control and administration of natural resources to the province of Alberta on October l, 1930 (Government of Canada 1930: Chapter 3, 1931: Chapter 15). Alberta passed the *Provincial Lands Act* on March 28, 1931 for the administration of lands, minerals, forests and fisheries, and to control the drilling of gas wells. Also at that time, there were already 3,778 grazing leases held in the province covering 3,220,161 acres. In 1949, this legislation was amended to become the *Public Lands Act*. The *Public Lands Act* was created as a land allocation tool to support the orderly allocation, development and use of public land (Government of Alberta 2017b:1).

The legislation that enacted the transfer also changed the status and boundaries of portions of Banff and Jasper national parks. Some areas were recognized as unsuitable for park purposes while others were removed for industrial development (Alberta Department of Lands and Mines 1931a:11). The transfer of areas from the national parks to the Bow River Forest included all of the Kananaskis River and Ghost River drainage basins, as well as portions of the drainage basins of the Spray, Bow, Panther and Red Deer rivers. The addition of these lands was due to the "necessity for forest and game protection and better administration in the areas concerned." With the transfer came new legislation and the formation of the Alberta *Forest Reserves Act*, assented to on March 28, 1931 (Alberta, Department of Lands and Mines 1931a: Chapter 44; Alberta, Department of Lands and Mines 1931b:11, 32).

The boundaries of the RMFR changed once again in 1947 when the Eastern Rockies Forest Conservation Board (ERFCB) was formed. This joint federal-provincial board became the custodian of the east slopes of the Rocky Mountains for a 25 year period (Government of Alberta 1947: Chapter 4; Government of Canada 1947: Chapter 59). The east slope forest districts were reorganized to reduce the area of the reserve so it included only the region where water eventually drains into the Saskatchewan River. To date, the boundaries remain the same.

The ERFCB was formed to evaluate, plan, advise, direct, supervise, manage and execute various policies and programs for the protection and preservation of the watershed within the east slopes of Alberta (Government of Canada 1947:312). Both governments recognized that, as the major source of water for the prairie provinces, the watershed was crucial from a national economic perspective. They also recognized that the coniferous forests on these slopes played a vital role in controlling water movement, and that due to inadequate fire protection and uncontrolled exploitation of the natural resources, this watershed was threatened and should be preserved (Hanson 1973:6).

Some of the accomplishments of the ERFCB over their 25 year mandate are discussed in Section 2.5 along with the transfer of responsibilities back to the Alberta government.

2.0 Livestock Grazing History

2.1 Early Equine Use

Livestock grazing has occurred within the Ghost River watershed as early as the late 1880s, as told in a 2010 interview with the late Bud Brewster (1928-2012) and his wife Annette (Feddema-Leonard 2012). Prior to the establishment of Crown lands, Bill and Jim Brewster, who operated the Kananaskis Ranch at Seebe, wintered at least 400 head of horses east of Lake Minnewanka at the headwaters of the North Ghost River and Meadow Creek. They called this location the Company Ranch. They also used an area further north, in an area known as the Ya Ha Tinda. In 1904, they applied to the Dominion of Canada to lease the Ya Ha Tinda. The lease was granted in 1905 and was registered as the Brewster Brothers Transfer Company (Feddema-Leonard 2012).

They were forced off the Ya Ha Tinda in 1917 after the annexation of a portion of the Dominion Forest Reserve into Rocky Mountains Park, but they continued to use the Company Ranch area (Feddema-Leonard 2012). To this day, Brewster Adventures at Seebe holds a preference quota[1] and associated grazing permit to utilize a portion of the North Ghost River headwaters, known as the Devil's Head Allotment, for grazing their livestock.

During the spring roundup in the early days, it was common for approximately one-third of the horse herd to evade being rounded up due to the vast area in which they freely roamed. It is possible that some of the feral horses present today in this region of the RMFR are descendants of these large herds (Feddema-Leonard 2012).

During these early days, others allowed their horses to freely graze the open range within the Ghost River watershed. George Creighton purchased the Le Sueur ranch and named it the Bar C Ranch after his brand (Johnson 1977a:105). He had approximately 650 head of horses and kept ten stallions for breeding. Periodically, some colts were not castrated and allowed to roam the range. One old stallion and his herd of females roamed in the Devil's Head camp area. Other groups roamed the Meadow Creek drainage and a couple of groups occupied the Waiparous Creek valley. Some horses roamed east to the Robinson Creek area (Johnson 1977a:106).

Creighton died in 1915. One year later, the ranch was sold to P.D. Bowlen. In 1918, when the Brewsters were forced off the Ya Ha Tinda, some of their horses were purchased by Bowlen (Johnson 1977b:318). Shortly thereafter, he gathered up most of the Bar C horses and then sold all that were saleable (Johnson 1977a:106). In 1924, the ranch was sold to Mr. Duncan and sons. They kept sheep, cattle and horses. The horses were branded quarter circle D. Some horses with

[1] "Preference quote" or "quota" means the actual number of animal unit months allowed in a calendar year with respect to a regular permit (Government of Alberta 2017b).

this brand ran wild on the forest reserve into the 1950s (Johnson 1977a:107). The Duncans sold the ranch in 1935. Between 1960 to present, there have been five different owners. According to the Alberta government stock return forms, grazing permit transfers occurred in 1960, 1967, 1973, 2001 and 2006.

In an interview with Audley and Jim Richards, as told to Wendy Vaughan, the Richards boys (Audley, Bill and Jim) had accumulated approximately 400 head of horses during the 1930s and 1940s. These horses "roamed the free range north of the Morley Reservation and west to the mountains on what was then Forest Reserve" (Vaughan 1977:128). Ever since these early days of livestock grazing within the Ghost River watershed, the issue of feral and trespass horses has been an ongoing resource management issue.

2.2 Grazing Practices (1906-1914)

At the end of the 19th century, livestock grazing occurred primarily south of the Bow River, a1ong the foothills and the major river valleys of the forest reserve. It was not until 1906 with the passing of the *Forest Reserve Act*, that grazing was strictly prohibited in the forest reserves within Canada (Government of Canada 1908:clvi). However, since the reserves had not been surveyed fully and the exact boundaries had not been delineated, nor had fences been established, there were livestock trespass issues on a regular basis.

In the Department of the Interior's annual reports between 1909 and 1914, the Superintendent and Director of Forestry supported grazing within forest reserves (Canada, Department of the Interior 1910b:26, 1911a:24, 1912:45, 1914:48-52). Before commencing a grazing system, detailed regulations were required. These were passed by Order in Council on August 8, 1913 (Government of Canada 1914:liv).

The permit system was selected over a lease system for administration of grazing in forest reserves. In establishing the regulations, the following points were considered:

- Flexibility to adapt to any changing conditions. Instead of leases for yearly terms, annual permits were issued, with a fixed charge per head of stock;

- Protection from overgrazing by fixing maximum stock numbers that may graze per district (Canada, Department of the Interior 1915b:13).

The Forestry Branch's intentions regarding administration of the grazing was advertised extensively. Primarily, Forest Reserve officers contacted the landowners adjacent to the reserves who had livestock. The officers ensured that there was agreement with the requirements of the permit.

The scheme was co-operative in nature, with the formation of grazing associations. Provisions were made for consultation between Forest Reserve officers and the associations to attain a complete understanding between both parties. This proved to be beneficial when areas were set aside for sheep grazing, minimizing conflict with cattle ranchers (Canada, Department of the Interior 1915a:67).

In the regulations, three fundamental principles were stressed (Canada, Department of the Interior 1915a:66):

(1) Conservative use of the entire available range each year with restrictions that would not involve damage to harvestable timber;

(2) Distribution of this range among a large number of small nearby resident farmers or ranchers under restrictions of maintaining maximum numbers determined by home range winter carrying capacities;

(3) Encourage mixed farming by devoting forest reserve range to summer use and advocate the wintering of stock using forage grown on farmland outside the forest reserve.

Where grazing was contemplated in the forest reserve, areas were subdivided into grazing districts (now called grazing allotments). Within most grazing districts, smaller units existed and were referred to as divisions (now called distribution units). The permitted number of animal units varied within each district.

The grazing periods in each district varied according to climatic conditions and forage development. Three classes of permits were issued: summer grazing, winter grazing and all-year permits. Summer grazing was issued for areas where the terrain was essentially level, winter grazing was issued where side-hills predominated and all-season grazing was allowed where both classes were available. In addition to terrain, assessment of the vegetation type was evaluated to ensure no damage to the forage due to early grazing in the spring or late grazing in winter. Another consideration was timing to avoid poisonous plants early in the season when they are a concern (Canada, Department of the Interior 1916a:63-67).

2.3 Grazing Administration and Management (1914-1947)

The first year that grazing was allowed as a legitimate forest land use was in 1914. Between 1914 and 1930, the Department of the Interior's Dominion Forestry Branch administered grazing. On October 1, 1930, the *Alberta Natural Resources Act* was passed transferring administration to the province of Alberta (Government of Canada 1930: Chapter 3). Alberta's Legislative Assembly subsequently passed the Alberta *Forest Reserves Act* (Government of Canada 1931: Chapter 44). This gave the Forest Service of the Department of Lands and Mines responsibility for the major forest activities, including grazing administration. The range management changed very little in the transfer. Until 1947, the Alberta Forest Service (AFS) administered the range. In 1947, the ERFCB was established and began the administration, management and monitoring of the range and range condition.

In a thesis pertaining to livestock grazing history in the RMFR, Weerstra (1986:64) wrote:

> Grazing intensities in the forest reserve varied among forests. The Crowsnest Forest had the most demand placed upon it due to its proximity to ranching country. The Bow Forest south of the Bow River also had high stocking rates as numerous valley bottoms contained suitable livestock range. These two areas were close to the settlers' home ranges and rail lines that allowed easier access to markets.
>
> North of the Bow River, the Bow River and Clearwater Forests contained suitable rangeland, however, it was much more isolated. Before 1947, roads were poor or non-existent throughout much of this area. This restricted the use of available range due to inaccessibility. Settlement adjacent to the forest reserve was sparse and ranching was not nearly as prominent as farther south.

2.4 Grazing Administration and Management (1947-1973)

In 1948, the ERFCB conducted its first summer of field operations, conducting a reconnaissance survey of the range condition of the Bow River and Crowsnest forests (ERFCB 1949:18; Hanson 1975:7). A comprehensive survey of range condition began in 1949 under the direction of the board’s Assistant Chief Forester, Mr. Wallance R. Hanson. At this time, nearly 95% of the grazing took place south of the Bow River. The purpose of the survey was to determine the extent, character and condition of forage resources, and to develop methods of use that would combine livestock management with optimum watershed conditions (ERFCB 1950:17).

Livestock grazing records do not provide any data to determine exact animal unit months (AUMs)[2] between 1914 and 1947. The records indicate livestock class and numbers; however, movement dates onto and off the various ranges cannot be determined (Weerstra 1986: 229-236). With the establishment of the ERFCB , livestock grazing records became more accurate. The board revised each district's (allotment's) range management plan within each forest. These plans were based on systematic surveys that began in 1949 (ERFCB 1951:19). The plans included estimated carrying capacities, distribution of livestock, salting plans, range rider requirements and placement of fences if needed. A system of inspection and supervision was established in conjunction with the plans, as reduced range condition was believed to be a result of poor grazing practices rather than too many livestock.

Throughout his tenure at the ERFCB, Mr. Hanson supported grazing as a resource management tool within the multiple land use concept, provided that the focus remained on upstream watershed management (ERFCB 1951:2) and protection (Hanson 1952:29). Government policy of the day was that "watershed value has been given priority over other land uses" (Hanson 1975:10).

In order to prevent damage to the range and to protect the watershed, a delay in the grazing season was implemented. Beginning in 1950, the entry onto the range on most allotments shifted from May 15th to June 1st (ERFCB 1955:20). In 1957, AUMs were reduced once again when the opening date of some allotments was delayed to coincide with climate and vegetation responses at higher elevations in the mountains. The entry date was changed from June 1st to June 15th (ERFCB 1958:12). In 1966, most entry dates were shifted to June 15th wherever possible (ERFCB 1967:9). Generally, grazing was permitted until October 31st unless early snowfalls restricted grazing, in which case the livestock were taken off the range earlier (ERFCB 1966:8).

By 1958, range management plans were completed and put into operation on 74 of the 79 grazing allotments within the forest reserve. Watershed values were given a priority on rangelands, but it was noted that under properly managed grazing, watershed condition could be maintained (ERFCB 1959a:28). The following year, 78 allotments were being grazed in accordance with the written management plan. The proposed program of re-examining the plans every five years was revised to every eight years due to the magnitude of the work involved (ERFCB 1960:28).

In 1960, range management planning and supervision was transferred to the Management Unit of the Alberta Forest Service (AFS), Forest Management Branch (ERFCB 1961:19). The ERFCB remained in place until 1973, working closely with the new managing agency.

[2] An animal unit month is the amount of forage needed by an "animal unit" (AU) grazing for 30 days. The quantity of forage needed is based on the animal's metabolic weight. The standard AU is based on an average daily forage intake of 12 kg of dry matter, plus allowance for forage loss due to trampling (totalling 455 kg of dry matter per month). It was originally defined as one mature 1,000 lb cow with or without her suckling calf (up to 6 months age), or equivalent.

2.5 Grazing Administration and Management (1973 - present)

In 1973, the AFS was reorganized creating two sections within the Forest Land Use Branch (FLUB) that dealt with range resource management: the Technical Development Section (responsible for the Rangeland Exclosure Program and vegetation survey methodologies) and the Range Management Section (responsible for conducting range surveys, inventories and updating the range management plans). These sections were later amalgamated within the FLUB following a review of the Rangeland Exclosure Program, which was renamed the Rangeland Reference Area Program (Blackmore 1983).

In 1975, a consultant was hired to review the range management status in Alberta's forested areas. The individual was Wallace R. Hanson, who had worked for the ERFCB and was instrumental in the establishment of many projects and plans which the Alberta Forest Service took over in 1960. In his report he re-enforced the need of maintaining and applying "state of the art" range management practices under the multiple use policy which the Alberta government adopted for the Green Zone of the province, including the RMFR (Hanson 1975:10).
In 1990, the AFS began to out-source some of the summer field inventories to consulting firms. Also at this time, FLUB range management specialists were re-assigned positions from the head office in Edmonton to field offices in Blairmore, Calgary and Rocky Mountain House. This was intended to allow a closer liaison with the field staff.

From 1960 to 1997, provincial forest officers conducted a yearly “inspection” report and completed stock return forms. In 1997, this responsibility was transferred to the allotment holders or public land lessees.

In 1998, the Government of Alberta (GoA) transferred the responsibility of range inventories to the Rocky Mountain Forest Range Association (RMFRA), which is comprised of forest reserve grazing permit holders. Their mandate is to take a leadership role in the stewardship and management of grazing allotments within the RMFR. Grazing allotment holders can voluntarily become members. Currently membership requires the contribution of $1 per animal unit month (AUM) to the RMFRA. Since its inception, the association has used these funds and other funds from granting agencies for range inventory work, enhanced range stewardship, management and knowledge development (Alberta Farmer Express 2012).

The RMFRA hires consultants to conduct the range inventories. Due to inconsistencies in data collection methods among consultants, the GoA decided to oversee the inventory methodology. In 2010, they established a process requiring consultants to become certified prior to conducting any work. Consultants are required to attend a workshop and field trip, and to complete an exercise to determine competency. This certification is renewed annually prior to the commencement of work.

Also in 2010, the GoA provided a means for allotment permit holders to assist in the reporting of issues pertinent to their allotments. The Stewardship Self-Assessment Form was adopted. It is to be filed once every five years. It builds on the Grazing Lease Stewardship Code-of-Practices that the Alberta grazing disposition holders have developed as their on-going contribution as resource stewards (Alberta Environment and Parks 2015). As of 2010, a certified Range Management Form (RMF) must be submitted, whereas before it was recommended but was not mandatory. A RMF is a summary of range health and management for a specific grazing disposition. It is required when a new grazing disposition is issued and generally prior to renewing a grazing disposition. The minimum standard for grazing dispositions is one RMF every 10 years. For forest grazing allotments, RMFs must be submitted every 15 years (Alberta Sustainable Resource Development 2005).

Most of the detailed range management health and vegetation inventories are conducted through the RMFRA in conjunction with the governing agency. If a grazing allotment holder decides not to become a member of the RMFRA, then they are responsible for providing their own funds to hire a certified range consultant approved by the governing agency. At this time, the agency is Alberta Environment and Parks, South Saskatchewan Region, Operations Division, Rangeland Management.

2.6 Feral and Trespass Horses

As mentioned in Section 2.1, domestic horses have been grazing within the Ghost River watershed since the late 1800s. It is likely that some of the free ranging horses that occupy this watershed today are descendants of those original herds, over time becoming feral[3]. These animals have had an impact on the landscape and this has resulted in management challenges.

During the range surveys conducted by the ERFCB in 1950, “a significant damage to watershed conditions” was noted in some parts of the forest reserve caused by an “undesirably large number of wild and stray horses.” This resulted in “the development of a programme for substantially reducing the number of such animals” (ERFCB 1951:20). The following year, an effort was made to reduce the numbers. The annual report suggested that the new policy would continue, with efforts to enforce a stricter permit system for horses (ERFCB 1952:12). Roundups were conducted to prevent serious damage to the range and consequently to watershed conditions (ERFCB 1954:18). In the following years, the annual reports continued to mention the issue of feral horses, with special mention that these horses “continue to be a major user of the Ghost, Clearwater and Saskatchewan Ranger Districts” (ERFCB 1956:24).

[3] Feral livestock is defined as: untamed; in wild state after escape from captivity.

Further to this, in the annual report of 1965, it was noted that, "Wild horses in the Forest Reserve continue to present a problem to livestock grazing in some range allotments. Even though letters of authority are issued by the Minister of Lands and Forests for wild horse round-ups the problem is by no means solved" (ERFCB 1965:8).

In the annual Range Inspection Forms of the AFS, "wild horse" numbers were reported to be on the increase in 1967 in the Aura Cache Allotment. The 1968 report suggested that approximately 150 to 200 horses were observed. The presence of these animals prompted roundups during the winters of 1970 and 1971, conducted under a special permit. The 1978 report indicated that the horses were still a problem, causing damage by overgrazing. The 1993 report indicated that overgrazing in the Big Muskeg area within the Cache Creek drainage was a result of horses. This resulted in permits being issued in 1994 to catch horses.

Within the Ghost River Allotment, the 1973 annual Range Inspection Report noted the presence of horses in the Meadow and Johnson creek drainages. In 1975, the report indicated that horses were observed in the Four-Mile Creek and Johnson Creek areas and that control should be implemented. The following year they were observed in the Johnson Creek drainage. The 1980 report suggested that horses were present in the Ghost River Allotment but were likely escapees from the adjacent Devil's Head Allotment, where horses were permitted to graze during the winter. These were considered trespass animals, likely due to a breach in the fence between the allotments.

Lesueur [4] Creek Allotment has also been affected by feral and trespass horses. The barbed wire fence that separates this allotment from the Devil's Head Allotment to the west has periodically been broken by horses. This has been an issue for both of the permit holders, spending time and money to relocate their livestock and maintain the fence.

Movement of free-roaming feral horses between allotments continues to be a concern with respect to proper range and forest resource management within the Ghost River watershed (Alberta Environment and Parks 2015).

[4] The name of Lesueur Creek Allotment originated from the name of the Payn Le Sueur family, who homesteaded in the area and were the first owners of the Bar C Ranch (Karamitsanis 1992). The name Lesueur is often misspelled as Lesieur in GoA documents and on some of their maps.

2.7 Range Management Plans, Grazing Practices and Other Land Uses

Within the Ghost River watershed, four grazing allotments were created to manage sub-basins (Figure 1). These included the Aura Cache, Devil's Head, Ghost River and Lesueur Creek allotments. These allotments are approximately 7,164 ha (17,702 ac), 7,760 ha (19,174 ac), 17,422 ha (43,048 ac) and 3,418 ha (8,445 ac) in size, respectively, totalling 35,992 ha (88,935 ac). In addition, numerous agricultural (grazing) dispositions occur within the watershed (Figure 2).

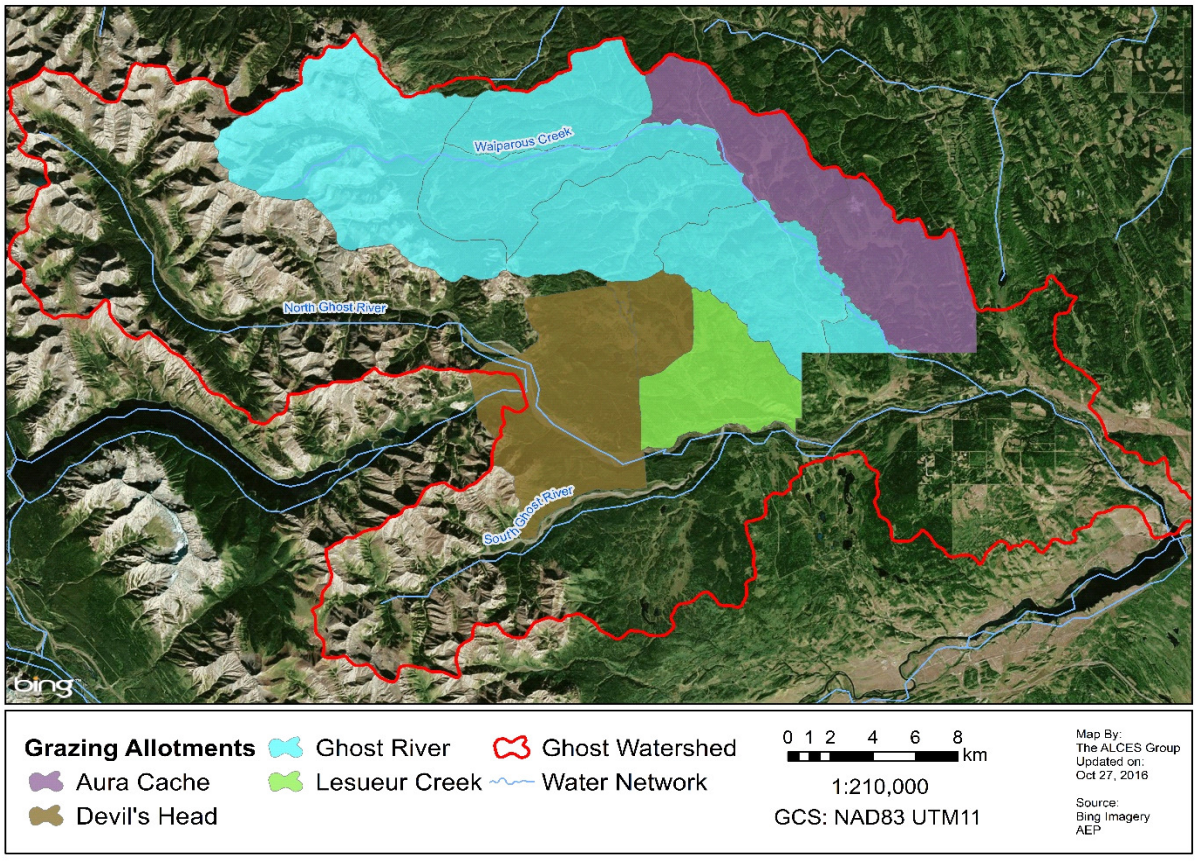

Figure 1. Current grazing allotments within the Ghost River watershed. (Source: Ghost River State of the Watershed Report 2018)

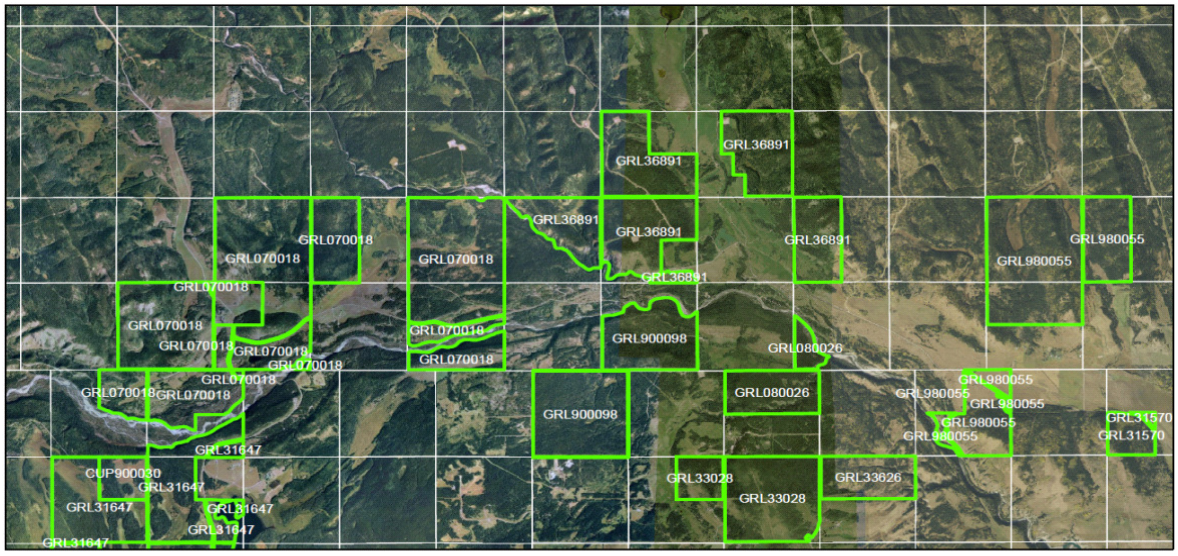

Figure 2. Agricultural (grazing) dispositions. (Source: Ghost River State of the Watershed Report 2018)

The dominant vegetation cover types occurring within the watershed vary depending on their position within the heterogeneous landscape (Figure 3). The approximate vegetation ground cover within each of the four allotments is presented in Table 1.

Table 1. Approximate area in ha (acres) of vegetation types within the grazing allotments.

	Aura Cache		Devil's Head		Ghost River		Lesueur Creek	
Vegetation Type	**Ha**	**Acres**	**Ha**	**Acres**	**Ha**	**Acres**	**Ha**	**Acres**
Lodgepole pine	4067	10049	3063	7569	10892	26914	1708	4220
White spruce	399	986	173	427	3115	7697	147	363
Other coniferous	426	1053	1016	2,511	547	1352	430	1,063
Mixed forest	419	1035	326	806	782	1932	461	1139
Deciduous	609	1505	189	467	953	2355	187	462
Shrubland	392	969	0	0	496	1226	64	158
Grassland	134	331	911	2,251	390	964	148	366
Yellow mountain avens	1	2	0	0	6	15	2	5
Wetland	668	1651	1128	2,787	1575	3892	311	768
Subalpine meadow	0	0	520	1,285	5062	12508	0	0
Non-vegetated	118	292	29	72	103	255	1	2

Source: Ghost River State of the Watershed Report 2018.

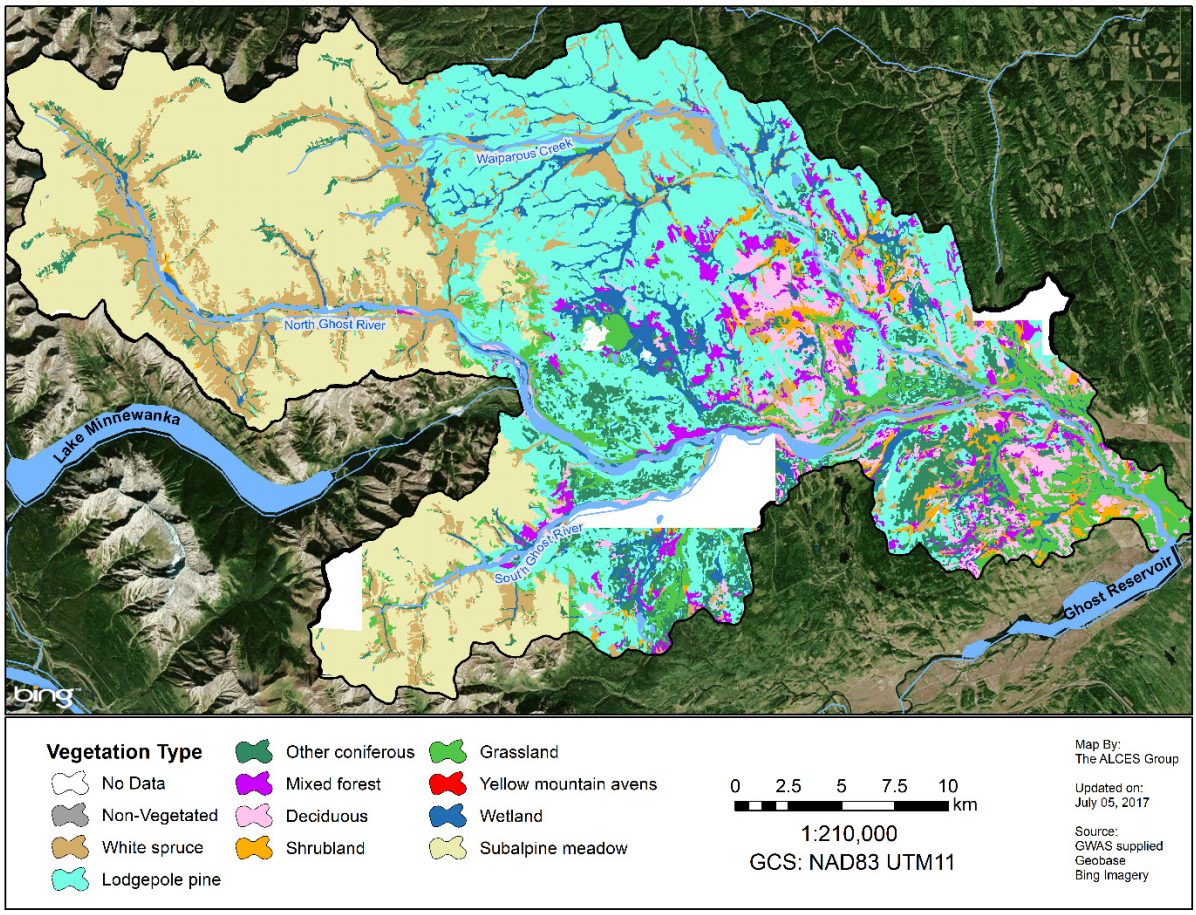

Figure 3. Vegetation cover types in the Ghost River watershed. Note: Cover types adapted from Derived Ecosite Phase (DEP) data via Alberta government open data https://open.alberta.ca/opendata/derived-ecosite-phase. (Source: Ghost River State of the Watershed Report 2018)

With increased knowledge and understanding of ecological principles, range inventory methodology has been refined and the management plans have evolved over the last few years. They now describe the extent of each plant community type, including a discussion of range and riparian health. In addition, there has been a change in the calculation and evaluation of livestock numbers. Animal Unit Month (AUM) was originally adopted as it was considered to be more representative than actual numbers of animals. An animal unit was a standard used in calculating the impact of various types of grazing animals. One AUM was “the grazing required to supply a 1,000 lb cow and calf for one month” (ERFCB 1959a:14). More recently, animal unit equivalents

(AUE)[5] are used and applied to different classes of livestock based on their metabolic weight (Wroe et al. 1988; Alberta Forestry, Lands and Wildlife 1990).

In 1977, the Alberta government published a document entitled *A Policy for Resource Management of the Eastern Slopes* (Alberta Energy and Natural Resources 1977a). It was later revised (Alberta Energy and Natural Resources 1984). Part of the policy was "to ensure the continued viability of existing livestock operations by sustaining 1977 levels of livestock numbers through the use of public lands" (Alberta Energy and Natural Resources 1984:9). This is referred to as the 1977 preference quota (Table 2). The management strategies were:

- To maintain rangelands in good condition through sound range management practices;
- To restore rangelands on which forage productivity has declined from the encroachment of unproductive brush species;
- To improve rangeland capability through more intensive range management.

Table 2. Ghost River watershed grazing allotment 1977 preference quotas.

Grazing Allotment	Preference Quota (AUMs)*
Aura Cache [a]	650
Devil's Head [b]	820
Ghost River [c]	1,559
Lesueur Creek [d]	384
Total	3,413

* Source: the range management plans

a Alberta Environment and Parks (2015)
b Alberta Forestry, Lands and Wildlife (1989a, 1992)
c Alberta Forestry, Lands and Wildlife (1989b)
d Government of Alberta (2005)

[5] Since average animal weights have increased over time, a cow animal unit equivalent (AUE) is calculated based on a 1,250 lb cow and the use of a metabolic weight formula. A cow with or without her suckling calf is now 1.18 AUs. Other types or sizes of livestock are assigned AUEs based on metabolic requirements, e.g., a mature bull is the equivalent of 1.70 AU, a yearling steer or heifer is 0.78 AU, a mature horse is 1.70 and a mature sheep is 0.2 AU.

2.7.1 Aura Cache Allotment

The first written records indicating use of the Aura Cache Allotment was in 1947. At this time the allotment consisted only of the Cache Creek Distribution Unit (DU). The grazing period was from June 1st to October 31st, and the carrying capacity was set at 560 AUMs (Alberta Environment and Parks 2015). However, that year the actual stock return forms indicated that there were 150 mature animals, equivalent to 900 AUMs.

Although a partial management plan was produced in 1954, it lacked a proper management program as the establishment of the allotment was "incomplete" (Alberta Environment and Parks 2015). Reports indicate that the forest ranger had insufficient time to deal with range management of the allotment. Therefore, the allotment permit holder was allowed to devise his own livestock grazing regime as long as it produced the desired outcomes (Alberta Environment and Parks 2015).

In 1959, the ERFCB completed and implemented a range management plan (ERFCB 1959b). The allotment was expanded to include the Horse Creek DU. The estimated carrying capacity was 1,150 AUMs, however, due to the poor range condition resulting from overgrazing, the AUMs were set at 1,000 AUMs (Alberta Environment and Parks 2015). Actual use that year was recorded to be 824 AUMs, consisting of 38 yearlings and 164 mature cattle.

In 1978, the plan was revised to reduce overuse of the primary range along Waiparous Creek and to encourage more use within upper tributary creek drainages. The carrying capacity was calculated to be 800 AUMs. To improve range health, the stocking rate or preference quota was reduced to 650 AUMs. To accomplish this, the grazing season was reduced by one month, with a delayed entry of June 15th and an early exit of October 15th. A rotational grazing system was proposed, alternating yearly between the distribution units. However, due to an abundance of larkspur (a plant that is poisonous in the spring) in the Robinson Creek area, the rotational system was not implemented (Alberta Environment and Parks 2015).

Historically, the Aura Cache Allotment has been managed with a seasonally repeated rotational grazing system. Between 1959 and 1991, entry dates have varied from June 15th to July 31st depending on range condition. Cattle entered the Cache Creek DU, then were slowly pushed north to enter the Horse Creek DU for mid-season grazing. The herd then returned back south to the Cache Creek DU for the last month of grazing. In 1992, the entry date was shifted to mid-July with the same pattern of use. In recent years, entry has been earlier (July 5th and 10th) due to the establishment of tame forages (Alberta Environment and Parks 2015). Annual stock return forms indicate that actual use by a cow/calf breeding herd has varied. The numbers have ranged from 129 to 170 head, including three to ten bulls. This equates to a stocking rate of 386 to 823 AUMs.

The most recent inventory and assessment was conducted in the summer of 2006 by a GoA certified rangeland consultant hired through the Rocky Mountain Forest Grazing Association (RMFGA). The information and data collected were more detailed and descriptive than that collected previously, and were used to produce the latest version of the draft management plan. This plan provides a wealth of information, including the history, objectives, revised range inventory methodology, landscape features of the DUs, the tools that could be used to improve rangeland management and livestock distribution, and the interaction with other and often competing land uses (i.e., wildlife habitat, trapping, timber harvesting, fossil fuel exploration and development, feral horses, recreation, and a major transportation corridor). It also provides recommendations (Alberta Environment and Parks 2015).

In 2008, the provincial range agrologist for the region conducted a range heath assessment[6] of the allotment (Guedo 2008a). Twenty pre-selected sites were assessed in upland range areas and two were assessed in riparian areas. Of the rangeland sites, fifteen were classified as *healthy*, three were *healthy with problems* and two were *unhealthy*. Both of the riparian sites were classified as *healthy*. The lower health scores were attributed to introduction of tame forages and localized degradation resulting from past heavy grazing, random camping, OHV recreational use and feral horse use.

There has been an increase in oil and gas industry activity in the allotment since 1967, resulting in the establishment of tame forages along seismic lines, access roads, pipelines, and on both active and inactive well sites. This has modified the grazing pattern. The tame forages need to be grazed early in the season, so cattle now enter the southeast corner first, then move along the eastern side to the northwest corner up to Cow Lake and Lunch Creek. Once that area has been utilized, the cattle drift back south along the western portion of the allotment (Alberta Environment and Parks 2015).

As mentioned above, feral horses have caused many issues compromising proper range management. They have been documented since 1962 occupying the Horse Creek DU throughout the year. Although their numbers have been reduced periodically, they have caused overgrazing, a reduction of litter, erosion, a shift in the natural plant community to one comprised of less desirable invader species and degradation of riparian health (Alberta Environment and Parks 2015).

[6] The concept of range health has been adopted for management of grassland, forest and tame pastures to denote changes in vegetation composition, productivity and land stability. Indicators are: integrity and ecological status, community structure, hydrologic function and nutrient cycling, site stability, and presence of noxious weeds (Adams et al. 2009). The three categories of health are: *healthy* (score > 75%), *healthy with problems* (score between 50-74%) and *unhealthy* (score<50%).

Roadways in this allotment influence livestock distribution. Highway 40 (Forestry Trunk Road) dissects the allotment. The Waiparous Valley Road parallels the southwest boundary following Waiparous Creek. These provide easy access through the area to the North Ghost, Waiparous Creek and South Ghost recreational areas (Alberta Environment and Parks 2015).

The allotment is within the Ghost Public Land Use Zone (PLUZ), established in 2006 for recreational activities such as off-highway vehicle (OHV) use on designated trails. Users regularly disregard the regulations and go off these trails, create new undesignated trails and go into areas where trails do not exist. This activity, coupled with random camping, has had a major negative impact on range resources, slopes, creeks and other waterbodies. It also has a major impact on livestock distribution and potentially livestock health (Alberta Environment and Parks 2015).

Although the fences surrounding the allotment are maintained by the permit holder, the barbed wire is regularly cut and gates are left open as a result of recreational activity, especially OHV use. This behaviour has been reported regularly in the Annual Range Report and the newer Stewardship Self-Assessment Form (SSAF) (Alberta Environment and Parks 2015).

Recently, logging by Spray Lake Sawmills (SLS) has occurred within the allotment. This has changed some of the land use practices. It has influenced livestock grazing and increased recreational access for random camping and OHV use.

2.7.2 Devil's Head Allotment

As mentioned in Section 2.1, the Devil's Head Allotment has been used for livestock grazing since the late 1880s. Historically, the allotment has been a horse winter grazing area which continues to this date. Stocking rate records indicate that in 1947, 300 head of horses grazed the allotment, totalling 1,800 AUMs. Between then and 1977, the number of horses utilizing the allotment varied from 30 (240 AUMs) to 290 head for various lengths of time. Therefore, the number of AUMs also varied yearly, with a maximum of 2,184 AUMs in 1958. In 1977, the preference quota was set at 820 AUMs, and since then the AUMs generally have been below this number (Alberta Forestry, Lands and Wildlife 1992).

The first range management plan was written and implemented in 1959 (ERFCB 1959c). At this time the allotment consisted of three distribution units (South Field, East Field and West Field) and four holding pastures (# 1 to 4) on the north side. The carrying capacity was set at 2,625 AUMs with a grazing season from October 15th to May 15th, and an allowance to graze the West Field DU during the summer. In 1961, a portion of the South Field DU was removed from the allotment and transferred to the Stoney Nakoda Nation (Stoney Indian Reserve). With the loss of

this land and the poor condition of the West Field DU, the carrying capacity was reduced to 2,100 AUMs and summer use was terminated. A small group of horses grazed this area for the entire season until 1982. At this time, the fence was in poor condition and was removed by the AFS. In 1990, the South Field DU was amalgamated back into the allotment. New fencing material was provided by the AFS and the fence was reconstructed by the allotment permittee.

Currently, the horses enter the West Field DU on October 1st and are moved onto the East Field DU on November 30th where they stay until March 1st. This departure date varies depending on snow cover and timing of the spring thaw. If chinook conditions prevail causing the thawing of the ice, the horses are moved back into the West Field DU until the area re-freezes. In March, the gates between these two DUs remain open to allow movement of the horses between them. The horses are herded into the pastures to the north in March and removed from the allotment by April 30th (Alberta Forestry, Lands and Wildlife 1992).

To ensure proper livestock distribution, a range rider is employed to move the horses to salting areas and the secondary ranges that would otherwise receive less use. A Commercial Trail Riding Permit applies to the House Yard DU, which is a small DU (48 ha) surrounding the range rider's cabin. Horses are allowed to use this pasture as long as supplemental feed is supplied (Alberta Forestry, Lands and Wildlife 1992).

Free roaming feral horses frequently graze in the South Field DU. They compete with wildlife and the permitted horses, contributing to forage depletion (Alberta Forestry, Lands and Wildlife 1992).

The range management plan was updated and revised in 1989, and subsequently expanded in 1992 to include more information (Alberta Forestry, Lands and Wildlife 1989a, 1992). The plan stipulates that this area is managed under a multiple-use strategy, including recreation, timber resources and critical wildlife habitat. Co-ordination among various government management agencies, the private industrial sector and the public is required.

Both of these plans indicate that this allotment occurs within the eastern slopes critical wildlife zone and that livestock grazing is to be managed with the objective of protecting ranges or habitats that are critical to the maintenance of specific fish and wildlife populations. This is a requirement of *A Policy for Resource Management of the Eastern Slopes* (Alberta Energy and Natural Resources 1977a, 1984) and the *Ghost River Sub-Regional Integrated Resource Plan* (Alberta Forestry, Lands and Wildlife 1988). The plans also indicate that management will attempt to accommodate industrial and recreational opportunities.

To enhance forage availability for the permitted horses, a prescribed burn of bog birch brushland was proposed in 1989. The proposal recommended two follow-up burns, the first in 1993 and the second in 1996. In the spring of 1990, 97 ha (240 ac) was burned. At the same time, areas of willow were mowed under the direction of the Fish and Wildlife Division. This was to stimulate re-growth for wildlife browse (Alberta Forestry, Lands and Wildlife 1992). The subsequent burns did not take place. The bog birch was not killed, but rather re-sprouted from the root caudex. In 2001, an application to conduct a brush gyro-mowing project was submitted, however, it was withdrawn due to the costs (Alberta Forestry, Lands and Wildlife 2001).

In 2008, the provincial range agrologist for the region conducted a range heath assessment of the allotment (Guedo 2008b). Twenty-three pre-selected sites were assessed in upland range areas and three were assessed in riparian areas. Of the rangeland sites, seventeen were classified as *healthy*, five were *healthy with problems* and one was *unhealthy*. Of the three riparian sites, two were classified as *healthy* and one was *healthy with problems*. Overall, the allotment was healthy, with the rangelands exhibiting native species biodiversity and habitat, soil stability and fertility, and watershed protection. The lower health scores were partially attributed to the presence of introduced tame forages. Stressors included past localized heavy grazing, and degradation resulting from random camping and OHV recreational use.

The allotment is situated within the Ghost PLUZ which allows for random camping and OHV use on designated trails. These activities have affected the grazing permit holder. It has been reported numerous times on the annual range inspection forms that gates are repeatedly left open and fences have been cut. Horses then escape into adjacent allotments. Vandalism and littering is also a concern. This adds extra time and expense for the permittee.

As in other allotments in the watershed, SLS has logged portions of the allotment. They have developed access roads to the cut-blocks. This has influenced livestock grazing patterns, random camping opportunities and OHV use.

The most recent inventory and assessment was conducted in the summer of 2013. The grazing allotment permittee hired a private, certified rangeland consultant approved by the GoA. Writing of the report is currently in the final stages. When approval by the GoA, the information and data provided will be used to produce an updated range management plan (C. Boulton, pers. comm.).

2.7.3 Ghost River Allotment

As indicated in section 2.1, the first known use of the allotment lands was in the early 1900s when it was grazed by horses from the Bar C Ranch (Johnson 1977a:105, 106). Between 1924 and 1935, portions were grazed by sheep, cattle and horses (Johnson 1977a:107; Alberta Energy and Natural Resources 1977b).

The first livestock grazing records are from 1947, when 117 mature animals used the allotment. Between then and 1958, the stocking rate records only indicate that the livestock type was mature animals. The numbers fluctuated from 110 to 400, with the calculated AUMs ranging from 550 to 2400. After 1958, the records indicate that yearling cattle, cow/calf pairs and bulls used the allotment.

The first range management plan was not written until 1959 (ERFCB 1959d). The annual stock return documents became more accurate. They described entry/exit dates and livestock types, and included notes on management issues. Since then, the number of yearlings has fluctuated each year from 33 to 284, cow/calf pairs have fluctuated from 168 to 435, and bulls from 6 to 14 depending on the size of the breeding herd. The calculated AUMs have fluctuated from 698 to 2,035.

In 1959, the carrying capacity was set at 1,950 AUMs with a season of use from June 1st to October 31st. The allotment was separated into five DUs (Four Mile, Johnson Creek, Lookout, Meadow Creek and Holding Field). The Holding Field DU had limited forage, therefore, it was only used to hold cattle entering and leaving the allotment (Alberta Forestry, Lands and Wildlife 1989b).

In the four large DUs, a rotational grazing system was implemented using two separate herds. A mature cow/calf herd was placed in Four Mile DU for three months, then moved to Meadow Creek DU for three months until the end of the season. The yearling herd first entered Johnson Creek DU and later moved to Lookout DU. Each DU was grazed for two months. The following year, the mature herd was initially placed in Meadow DU and the yearling herd in Lookout DU (Alberta Forestry, Lands and Wildlife 1989b).

In 1966, there was a change in ownership of the ranch that held the Forest Reserve Grazing Permit. A rotational grazing system was adopted and used until 1973. However, rather than running two herds, the yearlings and cow/calf pairs were amalgamated into one herd. The number of yearlings differed each year. This change resulted in the same DUs being used at the same time each year. The lease owner's rationale was that since the allotment was so large, it was impractical to use the former rotational system because his private land base (Bar C Ranch) was

far south of the northernmost DUs. Access and distance created difficulties (Alberta Forestry, Lands and Wildlife 1989b). Although convenient for the permittee, it was not a good range management practice.

After leaving the Holding Field DU early in the grazing season, the cattle tended to use the Green Trail and either side of Highway 40 since they contained tame forage species which are more palatable in the spring. The brushland areas tended to be avoided. At the end of July, the herd was moved into Meadow Creek DU where extensive range riding was essential to disperse the herd for proper distribution. At the end of August, the herd was moved up the Eau Claire Trail to Johnson Creek DU for approximately one month. They used Lookout DU during the last portion of the season where the forage base was low. Subsequently, the herd slowly drifted back south through Johnson Creek, Meadow Creek and Four Mile DUs to the Holding Field. They were removed from the forest reserve on October 31st (Alberta Forestry, Lands and Wildlife 1989b).

To promote watershed protection, headwater areas of the Ghost River were restricted from grazing by domestic livestock. These included upper areas of Waiparous Creek and the entire Ghost River Wilderness Area (ERFCB 1970:17).

In 1977, the preference quota was set at 1,559 AUMs (Alberta Forestry, Lands and Wildlife 1989b). At the time, actual use was 82 yearlings and 212 cow/calf pairs, totalling 1,089 AUMs. Since then, based on the actual stock forms, the AUMs have varied from a low of 698 to a high of 1,624. However, in most years the stocking rate was below the preference quota.

Feral horses have grazed this allotment for many decades (see sections 1.2 and 1.6). However, it was not until1973 that they were mentioned in the range inspection reports which indicated their use of Meadow and Johnson creek drainages. They were mentioned again in the 1975 and 1976 reports. In 1980, horses from the adjacent Devils's Head Allotment were observed. Free-roaming feral horses continue to be observed throughout the allotment.

The range management plan was updated and completely revised in 1989 (Alberta Forestry, Lands and Wildlife 1989b). It proposed a different grazing system to allow better distribution and range utilization. However, this management strategy was not adopted. Ownership of the Bar C Ranch changed in 2001 and again in 2006.

In 2007, the provincial range agrologist for the region conducted a range heath assessment of the allotment (Guedo 2007). Thirty-five pre-selected sites were assessed in upland range areas. Of these sites, fifteen were classified as *healthy*, eleven were *healthy with problems* and nine were *unhealthy*. At the time of the assessment, the rangeland functioning was being impaired at the

majority of the sites assessed. There was a reduction in biodiversity, habitat, soil stability and fertility, and water quality and quantity. The lower health scores were partially attributed to the presence of introduced tame forages and in some areas the presence of noxious weed species. Stressors included high grazing use and degradation resulting from random camping, OHV recreational use and feral horse use. Although riparian areas were not assessed, the report noted that recreational use within these areas was having a negative impact. It also noted that there was much evidence of OHVs not staying on the trails.

The most recent inventory and assessment took place in the summer of 2015. A GoA certified rangeland consultant conducted this work under contract with the RMFGA. The report is currently being written. When approved by the GoA, the information and data provided will be used to write an updated range management plan.

The headwater regions of this allotment are similar to the Devil's Head Allotment, where some of the primary and secondary ranges are within the eastern slopes critical wildlife zone (Alberta Energy and Natural Resources 1977a, 1984). As with the other allotments in the watershed, it is located within the Ghost PLUZ and has multiple land-use issues that make resource management a challenge. These include random camping, OHV use and timber harvesting.

2.7.4 Lesueur Creek Allotment

As with the Ghost River Allotment region, the first known use of the current Lesueur Creek Allotment was in the early 1900s when horses from the Bar C Ranch roamed free. It is also possible that it was grazed by sheep, cattle and horses between 1924 and 1935 (Johnson 1977a:107). The Alberta government records indicate that in 1930, sheep grazed this allotment (Alberta Energy and Natural Resources 1977b). However, there are no details pertaining to this, as written documentation in government files are unavailable. Although domestic livestock use was first recorded with the establishment of the ERFCB, actual data indicating the stocking rate are unavailable (Alberta Energy and Natural Resources 1977b).

In 1959, to enhance management of the rangeland resource, the Ghost River Allotment was split to form an additional allotment, the Lesueur Creek Allotment. The name has been misspelled as "Lesieur" in the 1959 and 1977 range management plans and on the corresponding maps.

The first range management plan was written in 1959 (ERFCB 1959e). In this plan, it was noted that continuous grazing had occurred for many years previously. The stocking rated varied and the entire allotment was grazed as one large area similar to the Ghost River Allotment. The range was in poor condition and better management was needed. The plan recommended that two or more distribution units be created for better resource management. It also recommended that the

higher elevation ranges that had previously been burned should be grazed early in the season. Salt was to be situated on rocky ridges within open timbered areas or on brush sites to attract livestock away from areas where they would normally congregate, achieving better distribution across the range. For the same reason, salt locations were prohibited within 500 yards of water, along creek bottoms, in meadows, on saddles where there were trails, within 400 yards of main trails and roads, and near gates and boundary fences. The plan also indicated that a fence on the north side should be constructed to keep livestock from entering the Ghost River Allotment. User responsibilities included sufficient riding to manage the herd, placing salt according to the rules, building drift fences, watching for overgrazing and keeping the ranger informed of management practices.

The calculated carrying capacity was 750 AUMs using either a 150 cow/calf herd or a herd of 225 yearlings over a five month grazing season. The suggested stocking rate was 625 AUMs. However, the actual use in 1958 was 440 AUMs. The season of use was between June 1st and October 31st.

Within the allotment, domestic livestock grazing with a cow/calf herd and four bulls was considered a legitimate land use. From 1960 to 1967, the allotment was considered to be under-utilised (ranging from 249 to 580 AUMs) due to a delayed entry date of June 15th. Between 1968 and 1975, the actual use varied (578-648 AUMs) and exceeded the calculated carrying capacity due to an increase in animal numbers, from 125 to 140 (Alberta Energy and Natural Resources 1977b).

The allotment is naturally divided into two areas as a result of a north-south oriented timbered ridge. It separates an area to the east, known as “Bum Coulee”, from the western side, the valley of Lesueur Creek. The use of these two areas alternated between years. One year, early season grazing (July 1st to August 21st) would occur within “Bum Coulee” and the lower half of the Lesueur Creek drainage. Then the herd was moved to the upper two-thirds of the Lesueur drainage (August 22nd to October 15th). The following year, the order was reversed. This management strategy allowed grazing at different times of the season, reducing the effects of early season utilization.

During the summer of 1976, a reconnaissance and transect survey was conducted to evaluate the range and watershed condition within the allotment (Alberta Energy and Natural Resources 1977b). This resulted in the recommendation to reduce the stocking rate to 384 AUMs between July 1st and October 15th. However, between 1977 and 2005, actual stocking rates fluctuated between 421 and 453 AUMs.

In 2006, an updated Operational Rangeland Management Plan indicated that the permitted use of the allotment would be based on the 2005 permit, i.e., a preference quota of 453 AUMs. The rationale for increasing the stocking rate was based on using an animal unit equivalence calculation based on the metabolic weight of the animals (Government of Alberta 2005).

Between 1960 and 1997, annual range reports were conducted by the AFS. The 1962 report indicated gully erosion on the steep portions of the seismic lines. The earliest mention of OHV use was in 1983 when erosion was evident in areas where seismic lines crossed wet areas, including Lesueur Creek. The annual report indicated that erosion was evident and gates were left open. In 1984, a cattle guard was installed, replacing the wire gate at the entrance to the allotment on the TransAlta Road. Subsequently, most annual reports indicate escalating issues of random camping and OHV use causing compaction and degradation of the open grassland and meadows. In 1997, the Forest Reserve Allotment Self-Inspection Form was made available for use by the permittee.

In 2008, the provincial range agrologist for the region conducted a heath assessment of the allotment (Guedo 2008c). Eleven pre-selected sites were assessed in upland range areas and five were assessed in riparian areas. Of the rangeland sites, six were classified as *healthy*, two were *healthy with problems* and three were *unhealthy*. Of the five riparian sites, three were classified as *healthy* and two were *healthy with problems*. The lower health scores were attributed to past localized heavy grazing, degradation resulting from random camping, OHV recreational use and grazing by feral horses.

In July 2011, the Ghost Watershed Alliance Society (GWAS) contracted staff from the Alberta Riparian Habitat Management Program to conduct a riparian health assessment within the allotment (Cows and Fish 2012). In 2013, a comprehensive vegetation inventory and assessment was compiled by a GoA certified rangeland consultant hired through the RMFGA. In addition, the riparian health sites of Cows and Fish (2012) were reassessed along with five additional sites. A report was written providing information on the history, revised range inventory methodology, landscape features of the DUs, distribution and extent of vegetation communities, livestock distribution and range use, and other land uses (i.e., wildlife habitat, timber harvesting, fossil fuel exploration and development, feral horses, and recreation). It also provided recommendations.

As in other allotments in the watershed, SLS has recently logged portions of this allotment and developed access roads to the cut-blocks. This has influenced OHV use and ultimately affected livestock grazing management.

2.7.5 South Ghost Allotment

As indicated in section 2.1, it is possible that this region was grazed by horses owned by the Richards brothers during the 1930s and 1940s (Vaughan 1977:128). A 1959 range management plan exists for what was known as the South Ghost Allotment (ERFCB 1959f). The allotment was described vaguely as being located on the south side of the Ghost River, east of the Devil's Head Ranch and west of the forest reserve. It was adjacent to deeded land and grazed as an "on" and "off" use (part-time use inside and part-time use outside) with 40 head of cattle between June 1st and October 31st. This allotment no longer exists.

3.0 Forest Protection and Government Infrastructure

3.1 Wildfire History and Prevention

Wildfire history can be mapped using tree age and the location of fire scars on tree trunks. Although forest age class distribution in the Ghost watershed may have been determined by the Alberta government and Spray Lake Sawmills (SLS), this information has not been made available. However, three wildfires that threatened the Bar C Ranch have been described by Johnson (1977a:107).

> In 1910 a fire came from the south, jumped the Ghost River, Waiparous Creek and the Little Red Deer River and burned the Greasy Plains and beyond.
>
> In 1914 a fire was started by lightning up Waiparous Creek. George Creighton, Boney Thompson, Jerry Fuller and his son, Jack, fought this fire and almost had it under control when the wind changed and took it west to Black Rock and south to the Bar C hay meadows.
>
> In 1919 a fire started in the Broken Leg Lake country, jumped the Ghost River, where the gravel flats are a quarter of a mile wide, and came so close to the Bar C buildings that P.D. Bowlen took everything out of the house and stacked it in a pile in the big paddock.

Aeroplanes were first used to protect the forests of the RMFR in 1920. Their use solved the problem of a poor communication network in the region. It was not until September 7th that the first patrol was made. For the remainder of that year, no new fires occurred in the areas patrolled. However, at the time, a large fire was burning in the upper Red Deer River and the planes were used to make daily reconnaissance of the fire fighting operations. This took half of a day versus a week using saddle and pack-horses (Canada, Department of the Interior 1921:34).

In 1921, a temporary aerodrome was established at Morley for air patrol over the Bow River and Crowsnest forests in co-operation with the Air Board. However, due to severe winds that raised safety concerns and the soil being too gravelly to level for a runway, four new aerodromes were established at High River. Two patrols were carried out almost daily during the summer, one going south to the international boundary and one going north to the divide between the Red Deer and Clearwater rivers (Canada, Department of the Interior 1922:33, 34).

Reports of fires were sent wirelessly from the planes to the air station and from there by telephone to the appropriate forest rangers. Forest officers also used planes for reconnaissance of fires and fire-fighting operations. Leaflets warning the public concerning the danger of forest fires were dropped over towns during fair and sport days (Canada, Department of the Interior 1922:34).

With the transfer of administration in 1930, the AFS made no further use of aircraft from the Royal Canadian Air Force in forest protection. Instead, a permanent lookout system was established (Alberta Department of Lands and Mines 1934:112).

Following the development of the Forestry Trunk Road and establishment of ranger stations by the ERFCB, airstrips were built as time and infrastructure funds became available. In 1963, an airstrip adjacent to the Ghost Ranger Station was partially constructed (ERFCB 1964:29). The following year it was enlarged to "a standard mud bombing strip" (ERFCB 1965:17). In 1965, the airstrip was fenced and seeded to grass (ERFCB 1966:18). In 1968, two 12,000 gallon water storage tanks for water bombing were installed (ERFCB 1969:14).

3.2 Aura Ranger Station

3.2.1 Department of the Interior, Department of Forestry

In 1915, two main trails were constructed from Morley, one southward and one northward for 66 miles to the Red Deer Ranger Station. The trail created a direct communication route between the Aura and Red Deer ranger stations, traversing country that previously had only inferior and lengthy, indirect trails (Canada, Department of the Interior 1917:49).

In his 1917 annual report, the District Inspector of Forest Reserves for Alberta, E.H. Finlayson, stated "the most important building project on the reserve was the construction of the Aura ranger station house, which, in part by location, construction and cost, is one of the most satisfying buildings in the district. At the same station, a good-sized barn was erected with a stabling capacity for about ten head of horses or cattle" (Canada, Department of the Interior 1917:49).

Figure 3. Aura Ranger Station, Bow River Forest, showing aerial patrol sign. (Source: Alberta Forest History Photographic Collection[7])

3.2.2 Alberta Forest Service

Over time the structures at the Aura Ranger Station deteriorated. During the summer of 1941, a substantial start was made on a new ranger station in the Aura Creek area. The work done included the cutting and hauling of logs to the site (Alberta Department of Lands and Mines 1943:49). In 1942, the basement was dug, a cement foundation was created, and the first floor was built (Alberta Department of Lands and Mines 1944:51). The building was completed in 1943. Photographs of the structure under construction can be viewed in the annual report (Alberta Department of Lands and Mines 1945:43). In 1944, corrals were added to the site (Alberta Department of Lands and Mines 1946:69). In 1945, a communication radio was installed and an antenna tower was established (Alberta Department of Lands and Mines 1947:55). Development of the site expanded with the addition of a bunkhouse in 1947 (Alberta Department of Lands and Mines 1949:49) and the initial construction of a cottage in 1948

[7] The original photograph of the Aura Ranger Station (black and white) was published in "Report of the Director of Forestry, Department of the Interior, Canada. 1922. For the fiscal year ending March 31" Appendix No. 4, page 33. The caption indicated "Forestry Branch Photograph No. 15999". The colour rendition was provided courtesy of Bruce Mayer, Assistant Deputy Minister, Alberta Agriculture and Forestry, Forest Division from the Alberta Forest History Photographic Collection.

(Alberta Department of Lands and Mines 1950:45). It was finished the following season along with a storehouse and a power system (Alberta Department of Lands and Mines 1951:55).

In 1952, "the Trunk road connecting the Bow Valley with the Red Deer Valley – 42 miles – was completed" (ERFCB 1953:4-5). Construction of the portion of this essential road that fell within the watershed included a substantial bridge over Waiparous Creek. Still used today, the Forestry Trunk Road (Highway 40) passes through the mid-range of the Ghost watershed and crosses Waiparous Creek very close to its confluence with the Ghost River.

3.2.3 Ghost Ranger Station

The Forestry Trunk Road offered many advantages to the forest service. With increased traffic into the area and the need to control access, a ranger's house was built along it in 1953. Gates were placed across the trunk road, and Alberta Forest Service staff registered those who entered the Forest Reserve. They recorded names, vehicle type, and purpose of visit. Upon returning, the visitors were checked out. The intent of this system was to monitor and protect the forest, as well as to provide a mechanism for public safety. This became the location of the new Ghost Ranger Station (ERFCB 1954:14). A barn was added in 1956 (ERFCB 1957:27). The Aura Ranger Station was abandoned, and in the late 1960s it was burnt down, a common practice of the day (C. Hill, pers. comm.). A single log garage survived this phase and stands among more recent buildings.

Staff at the Ghost Ranger Station collected climate data, monitored grazing, built and maintained trails, and supervised land use in the area. Rangers were "peace officers with authority to carry a gun and enforce regulations" (Pharis 2009:28).

The buildings at this site were removed after construction of a new facility further south, which was the original site of the Aura Ranger Station. Several forces converged to end the existence of this ranger station as operated by the Alberta Forest Service. Provincial budget cuts coincided with the federal decision to remove the cadet camp in Banff National Park. In 1996, the Ghost Ranger Station was closed, ending the formal governance program in the Ghost watershed, but the remaining buildings are still used as a fire base with a helicopter pad and fuel storage. By 1998, "staffing decreased from 28 full time seasonal personnel to none with the closing of the ranger station" (MD of Bighorn 1999:8). The site was leased to the Rocky Mountain National Army Cadet Summer Training Centre in 1996.

While a ranger station no longer exists today, forest management and forest fire prevention continue to protect, conserve and manage the forests of the Bow Valley and area, including the Ghost watershed.

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