

## **REPORT ON WILD HORSES AND ECOSYSTEM IN ROCKY MOUNTAIN FOOTHILLS EAST OF BANFF NATIONAL PARK AND WEST OF SUNDRE, ALBERTA, CANADA (Red Deer River, James River & vicinity)**

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### **Basic Message:**

My visit to the northlands this past mid-autumn turned out to be a beautiful but worrying experience. As I drove north from Carson Valley, Nevada, I observed many natural transitions among the life communities. I went from the high cold deserts at the foothills of the Sierra Nevada mountains north through the stark Great Basin desert including southeastern Oregon and passed just to the east of the mysterious Alvord Desert and the prodigious Steen Mountains. As I proceeded northwesterly on Highway 95 through western Idaho, I entered the dramatic Snake River Basin around Boise then struck due north through the picturesque Coeur-d'Alene and Nez-Perce region before passing into Canada near Yahk, B.C. From here I ventured on to Radium Hot Springs, then over the Kootenay National Park's portion of the majestic Canadian Rockies, enduring a windy and frigid snowstorm, but delighting in the heaven's white decoration of trees and rocky, jutting peaks, to which clung sparkling streams and at the base of which lay resplendent turquoise lakes. In the late afternoon of October 31<sup>st</sup>, I reached the bustling resort town of Banff, cradled in the midst of many sheer, snow-covered mountains and lying at the head of the long and broad Bow River Valley that slopes easterly toward Calgary. Here I filled the tank of my trusty all-wheel-drive vehicle before heading first east a number of miles then north on Highway 22 to the historic town of Sundre, in the Red Deer River Valley.

Sundre is a bustling center, both for tourism and for extractive industries such as logging and wood processing, natural gas drilling, cattle ranching, as well as for game hunters and fishers. It is home to the fascinating Sundre Pioneer Museum where I spend an afternoon on Sunday, November 8<sup>th</sup>. Nearing sunset, Ken McLeod met me at Tim Horton's restaurant on this town's western outskirts. Ken and I have corresponded for a number of years concerning the wild horses of Canada and the U.S.; and from a tender age, Ken has steadfastly fought the good fight to preserve his vast and amazing country's unique wild horses. His pioneer roots in Alberta confer on him a special mandate for this mission. After a coffee, we proceeded west ca. 17 miles to our encampment at 4,778' elevation a.s.l. (See Ecological Evaluation #38 in Table 1, attached as an Excel file, filename: "Table 1 Alberta Foothills W of Sundre Ecological Evaluation clearcuts wild horses nat gas wells etc".)

After passing through many a dark and foreboding forest and meadow on a long, tortuous road, we arrived late at night at a large Indian style teepee ca. 25' tall constructed of lodgepole pine poles that leaned together and were covered with plastic sheeting. Although we enjoyed a bonfire in this teepee, we mainly occupied the winterized recreation trailer Ken had towed here from his home in eastern Alberta. The cold nights, often plummeting to several degrees below freezing, made us appreciate this modern style of camping all the more.

Though I had read articles about the extensive clearcutting of Alberta's boreal forests, composed largely of spruce, lodgepole pines and other trees such as aspen, and had heard about its numerous natural gas wells and transport pipelines, the full enormity of these negative impacts had not fully dawned on me until the following morning. On this brisk, bright and sunny November 1<sup>st</sup>, Ken and I began to drive

around these Rocky Mountain foothills to observe what was left of the natural world including the specially adapted wild horses who still survive here and date from centuries past. As an ecologist, I would classify this area an “ecological sacrifice zone” because of the wholesale denuding of its forests – a ruthless war being conducted by profit-driven men with the aid of monstrous metal harvesting machines and gigantic logging trucks. Thousands of square miles have been literally mowed down in order to harvest these trees, largely lodgepole pines and spruce but also including two forms of poplars (see Appendix). Following this massacre, lodgepole pines are planted virtually everywhere, though many volunteer spruce saplings also rear their elegant heads among the sea of pines. Sporadic stands of natural forest are left here and there by the logging operations, but in the region I visited, these summed only to a small fraction when compared to the clearcuts. Interspersed among these remaining forest patches and clear cuts are hundreds of natural gas wells surrounded by broad excavations that are often several hundred meters in diameter. And connecting the wells are long aisles of denuded forest where pipelines are located. These well hubs and their interconnecting pipelines are punctuated by compressor stations that keep the gas flowing over hill and dale. All this imposition on Nature resembles a giant spider web covering thousands of square miles.

As a wildlife ecologist, I am shocked by the wholesale destruction that was so graphically presented to me during the twelve days of my investigation. And as I learned of the extensive and damaging floods of recent years (2005, 2013, etc.) while pouring over the Pioneer Museum’s photographs and written accounts, their more ultimate cause again dawned on me. My earlier investigations of the northern Andean ecosystem have made me keenly aware that when we humans destroy a forest ecosystem over such large areas particularly in mountain habitats, we destroy the “living sponge”. This includes the intertwined roots of myriad trees that retain vital soils and prevent them from washing away downslope. Soils are the foundation – the underpinnings – of healthy terrestrial life communities, but when destroyed, rains and snow melts can and do scour away these precious, life-sustaining soils. The tragic consequence of such massive erosion is a dire impoverishment of the upland ecosystem and the flooding of low-lying valleys, which also experience high levels of siltation, measured in the many millions of tons. These enormous quantities of silt are what remains of the precious top soils of higher elevations, top soils that have taken many generations – centuries or even thousands of years to create!

The above may give you some inkling of the life community where our recent ecological evaluations took place. Though not a Canadian citizen, but a Nevadan from the U.S., I am a bit familiar with the vast and splendid nation of Canada and have visited it several times over a period of decades. I therefore possess some familiarity with some of the value systems of its citizens. What is called the pioneer, or frontier, ethic still prevails among many Canadians, just as it does among many Nevadans and others throughout North America and the world, for that matter. But this is an outlook on life that has outgrown its usefulness and, in fact, actually threatens all life on Earth if it is not superseded by more enlightened views of the living world and how our species should fit into this.

A pair of ingrained traditions are closely linked with the forest destruction above described: cattle production and recreational hunting. Hunting season was full swing during the 12 days of my visit; and a large number of cattle had just been pulled from the area, though some remained. Here it should be mentioned that significant contamination has been reported due to cattle feces that washes down into creeks and rivers and on into domestic water supplies. Tests have shown that *E. coli* bacteria survive even through winter in cow manure so that when meadows thaw the spring-melt waters carry this bacteria, laden in cow feces, downslope. Also cattle have a preference for camping around water

sources, into which they defecate during all seasons of the year. (see Website link: *E. coli* in Bibliography.) Both ranching and hunting are strong political allies of the timber and natural gas industries that do such large-scale clearing of the boreal forests. For these clearances create a type of early successional ecosystem in which thrive grass, forbs, bushes and other plants that are eaten by cattle and deer, moose and elk, etc. Cattle and game animals such as these are given a major boost by forest destruction, but this comes at a terrible price – the displacement of the naturally suited and evolved forest ecosystem that has established itself here over many generations, thousands even millions of years, and whose original plants, animals, fungi, and micro-organisms are especially suited and adapted to this region and its prevailing weather, soils, etc., and, what’s more, possess the hard-gained resilience to adapt to changing conditions such as the very serious global warming that is upon us now.

As a long-term student of ecosystems both here and in other parts of the world, I appreciate many of the species found here – many of which I discovered for the first time on this trip (see Appendix). For this reason, my concern is perhaps even more intense than with many when it comes to these wonderful northland ecosystems. These are life communities that are sadly being degraded and, I predict, will soon be destroyed if present blind exploitations continue. Having met some of the friendly and hospitable locals, my concern is also for my fellow humans. I am confident that by working respectfully together we can transform our relations with the Rest of Life into a life-affirming Way of Life. Enlightened change is possible, in fact it is absolutely necessary if we are to salvage what remains of the ecosystem and realize that Bright Promise which await us just around the bend of the Future. The darkest hour comes just before the dawn ... and this certainly is my abiding hope as well as prayer.

These wild horses I just visited are quite special (see accompanying photos & video clips). They are uniquely adapted to these Rocky Mountain foothills; and many stem from nearby prairies and plains, from which they used to seasonally migrate and still do in some regions. These wonderful animals have aided humanity and adapted to their homeland in an exuberant way. And the horse species (*Equus caballus*) truly originated and evolved right here in North America (MacFadden 1992). They count among the most deeply rooted natives upon this continent. According to wild horse scholar Norma Bearcroft (Bearcroft 1974, p. 30), “[t]he Blackfoot Indians of Alberta and Saskatchewan had Spanish horses 150 years after Cortez (1700). The Plains Cree tribe ... acquired horses in 1738; the Snake Indians ... were horsed in 1730, The Assiniboines of Saskatchewan (known as Stoneys in Alberta) became mounted in 1742 ...” These were pure Spanish-mustang horses of various Indian-associated roots such as the Cayuse and including significant Pinto ponies (some of which we observed in November 2015); and their lineage, although intermingled with escaped draft horses, has been a continuous one. Among the breeds of large-bodied horses that were used by Albertans and became wild figure prominently the Percherons and Clydesdales, though Belgians and even Shires have also contributed to the special Canadian breed of wild horses. Their somewhat larger, more fully muscled physiques adapt well to colder, harsher northern climates with deeper snows and fiercer blizzards. They are returning to their truer place in the world when they revert to nature, or “rewild,” for here they play a role that is restorative to the health of the ecosystem, including in Alberta’s Rocky Mountain foothills. And there are many interrelated reasons for this.

The horse family, genus, and very species, *Equus caballus*, originated and evolved over millions of years in North America. I recommend that you read Chapter I of my book (Downer 2014a) as well as my article (Downer 2014b) on this to learn why I believe that the horse never totally disappeared from North

America. Also read Chapter II where I explain how, as post-gastric, or caecal, digesters, horses are needed to restore balance to an ecosystem in which humans have overly promoted ruminant/pre-gastric herbivores, i.e. those who chew the cud such as cattle, sheep and members of the deer family. For example, horses more greatly build healthy soils and disperse more intact seeds from a greater variety of plants when compared to the ruminants. And herein lies a great justification for their continuance in the Rocky Mountain foothills where they are sorely needed to restore the extensive clear cuts, gas drilling pads and pipelines, etc. These amazing animals will heal the wounds as only they can, naturally and according to their anciently rooted and harmonizing lifestyle – if only we humans will allow! They must not be rounded up and shipped off to a cruel slaughter, as has been done to wild horses in so many other areas, including the Ghost Forest just to the south (see Enns 2013). Rather, they should be allowed to fill their ecological niche and treated with the respect due a returned North American native species of ancient and very long-standing precedence. These are pulchritudinous animals in the fullest sense of the word. Their special form of equine beauty is synonymous with their special harmony with nature, with fellow species whether animal or plant. For there is a powerful resonance with their ancient and long-standing development here in their ancestral homeland.

We must let these magnificent beings show us the way to a better way of life. These basically kind-natured and benign animals are highly evolved and possess an extraordinary sensitivity, intelligence, wisdom, and ability to move, one acquired not in a few short lifetimes but over the very ages of their co-evolution on Earth with the Rest of Life. Indisputably, these good-natured animals have served us for many centuries in many indispensable as well as care-free ways. Today however, their right place is back in the wild, with Mother Earth and Father God. Here it is that they have their very greatest role yet to play – that of saving the very Life of this Planet! But what is required on our part is the open-mindedness, pure-heartedness – the generosity of spirit and willingness to let them be themselves and fulfill their indispensable role. In so doing, we humans will profit from their example, for we will imitate them in restoring peace and harmony – true and glorious Freedom on Earth!

#### **Analysis of 38 Ecological Evaluations:**

Following the procedures given in my technical manual (Pellant *et al.* 2005) and with the assistance of my Albertan guide, wild horse defender Ken McLeod, I conducted 38 ecological evaluations in as many diverse types of habitat as I could recognize (see Table 1, Excel attachment accompanying this report). This manual gives guidance on how to rate three major Attributes of ecological health: (a) Soil/Site Stability; (b) Hydrological (water-related) Function; and (c) Biotic Integrity (life community). These attribute ratings indicate the degree of “departure from expected levels” for each of 17 indicators on the field evaluation form and as particularly apply to each of the three attributes. These indicators were averaged/weighed in order to place each attribute into one of the following categories:

None to Slight, or N-S

Slight to Moderate, or S-M

Moderate, or M

Moderate to Extreme, or M-E

Extreme to Total, or E-T.

While I chose certain relatively healthy areas in which to conduct these ecological evaluations, the majority of the study area is being heavily impacted by human activities, i.e. is suffering severe

disruption of its ecosystem. Table 2 indicates the number of evaluations falling into each of the five rating categories (side headings with corresponding rows) and for each of the three attributes (top headings with corresponding columns) concerned with soils, water, and the life community. (See Table 2 attached as Excel: "Table 2 38 Ecological Evaluations Rocky Mountain foothills west of Sundre, Alberta".)

My estimations of ecological disturbances/departures from expected are not meant to be absolute but to serve as indicators based on a partial grasp of what is happening to the ecosystem. The choices of the 38 areas in which to perform these transects were arrived at by my aim to include as wide a variety of habitat components as possible in this limited study. Hence, these do not represent the average condition. None-the-less, some encouragement can be gained from the considerable number of evaluations in the N-S (14) and S-M (50) rating categories, which outweigh those in the M-E (21) and E-T (8) rating categories. This encouragement is due in large part to the resiliency of the boreal forest ecosystem, its ability to preserve and restore itself in spite of very massive and violent attacks against it. However, as an ecologist and nature conservationist, I must warn both Canadians and world citizens about imminent future consequences of ongoing exploitations. This natural region has its limits and if not allowed to recover from repeated clear cuts, cattle over-grazing and trampling, natural gas well and pipeline clearances and compaction of soils by heavy equipment, herbicide spraying, etc., the results will be even more catastrophic than they already are. With its delightful meadows, muskegs, rivers and streams, this boreal forest could easily collapse ... become a place of sterile or denuded top soils, deep gully erosion, degraded and dysfunctional water systems with sterile ponds and lakes and pathetic, dying forests and meadows. In short, an area shorn of its natural species diversity, dis-equilibrated, and turned into a wasteland.

My most urgent recommendation for natural resource officials both in Alberta and nationally is to find a way or ways that will allow these and other similar areas to naturally recover rather than to continue manipulating these ecosystems for maximum production of lodgepole pines, natural gas, game animal harvest, cattle production, etc. And it is my specific recommendation that the wild horses who have adapted over the generations here be allowed to fill their ecological niche and play their natural role. If so allowed they will greatly aid in the healing process of soils and site stability, of waters and hydrological function, and in restoring the biotic integrity and ecosystem well-functioning at all levels. As indicated earlier, the horse is a deeply rooted, native species in North America, one which balances an ecosystem that presently has a lopsided prevalence of ruminant species due to human interference with the ecosystem, including the indiscriminate persecution of natural predators, such as grey wolves, mountain lions, and grizzly bears. The reasons for valuing the wild horses of Alberta's Rocky Mountain foothills and respecting their natural place here are more fully explained below.

#### **Summation of Impact Intensities, Wild Horse vs Human with Discussion:**

**The summation of wild horse impact intensities from Table 1 (attached) is 95 with each of the 38 transect sites being evaluated on a scale of 1 to 10. This works out to an average impact intensity of 2.5 for the wild horses.** Please bear in mind that nearly all of these wild horse impacts are positive contributions to the ecosystem. For examples, their feces constitute a significant contribution to the fertility of soils, building their humus content; and their feces also disperse a great variety of intact seeds from diverse plant species, many of which go on to germinate in the fertile soils that horse droppings have enriched. Also, the horses move around to a great degree. This is their nature, and in so doing they restore degraded ecosystems over a broad area. They are also a natural prey species for the grey wolves, brown and to a lesser extent black bears, and particularly mountain lions, a.k.a. cougars, puma. I

observed the tracks and droppings of all these predator species during my two-week study. – It was thrilling to observe a pair of grey wolves running one after the other in a zig-zag fashion up a natural gas pipeline one cold morning, perhaps to scare up prey such as the Snowshoe Hare (*Lepus americanus*).

**The summation for human impact intensities from Table 1 is 288 for all 38 transects, yielding an average of 7.6.** This is over three times the impact intensity of the wild horses; and the significant difference between these is that the human impact to the ecosystem is almost always negative, or disruptive, in nature whereas that of the wild horses is almost invariably positive, or restorative and harmonious in nature. These manipulations of the ecosystem are disrupting soil regeneration and water cycles and simplifying the life community, i.e. making for fewer and fewer species instead of the natural biodiversity of the boreal forest ecosystem that has evolved over thousands of years. This makes for a less stable life community, one that is less resilient, less capable of adapting to extremes of weather, truly harmful species, global climate change, etc. This is done to extract favoured resources such as timber, firewood, natural gas, hunted deer, elk, moose, etc., and to graze cattle, which are imposed upon the ecosystem to harvest the grass that is more abundant due to the extensive clearcutting aimed primarily at promoting large-scale timber harvest with its attendant spraying of herbicides designed to kill deciduous trees such as the white poplars and the black poplars, a.k.a. aspens. Though the latter provide important habitat for many native species and lend greater balance to an ecosystem with a preponderance of conifer species such as the pines and spruces.

The natural gas well platforms and associated pipeline clearings go hand-in-hand with the timber and livestock monopolies on the Crown as well as lands of other jurisdictions, including private. Modern-day human activities greatly reduce the extensive boreal forests that have been here since the last Ice Age around 12,000 years ago. In so doing, these activities create extensive primary and mid-successional, more open habitats, or *seres*, that produce much more grass as well as certain forb and brush species. The latter support larger numbers of herbivore species such as ruminant white-tailed deer, as well as post-gastric digesting wild horses. These horses lend balance to this recovering ecosystem; their impact is a positive one that regenerates denuded soils and restores a greater variety of grasses, forbs, and bushes by dint of seed dispersal via feces, and other activities (see Downer 2005, 2014 a, b). It would be unwise to greatly reduce or eliminate these animals. This would be both cruel to the horses and harmful to the ecosystem, as I explain later in the present paper.

#### **Reserve Design:**

Urgently needed today is a well-planned Reserve Design strategy for this region that will provide for the long-term viability of the wild horse population as well as its natural self-stabilization (Downer 2010, 2014 a, b). This works as follows:

Wild horses form tight-knit stallion- and elder-mare-governed bands. Over time, each band searches out and establishes its own home range, adjusted to meet its survival needs and related to the productivity of the land. The ecological mosaic that results among all such particular band home ranges in a given area prevents over-crowding and over-grazing. Once available habitat is filled, as a climax species, the horse limits its own population as density-dependent controls are triggered.

In the immediate future, true wild-horse-containing nature sanctuaries need to be established. Here nature-exploiting activities would be checked so that the wild horses are allowed to establish long-term viable populations in the thousands of interbreeding individuals (2500 intact individual horses is

recommended for the viability of a wild horse population by the IUCN Species Survival Commission's Equid Specialist Group [Duncan 1992]). These sanctuaries will preserve the vigor of the horses they were designed to conserve.

Here are some important guides to achieving a successful Reserve Design:

- (a) Allow the wild horse herd to fill its ecological niche space within an ample and complete habitat bounded by natural or where necessary artificial barriers, and/or by buffer zones. Then allow each specific herd to self-stabilize, or auto-regulate, its population within this area. Such auto-regulation can happen if we humans allow. Equids are "climax species," which is to say, members of the "climax successional sere," or stage, and do not expand out of control to destroy their habitat and ultimately themselves, as their detractors contend. Each band within a herd population is governed by a lead stallion (*patron*) who watches out for and defends the band and does most of the breeding. A usually older, lead mare also leads the band. This mare is very wise as to the location of the best foraging, watering, mineral procurement, sheltering areas, etc. And she often leads her band along paths uniting these habitat components. These paths include longer seasonal migratory routes between higher summering and lower wintering habitats. Both patron and lead mare socially inhibit reproduction among younger members of their band. As resources become limiting, both social as well as physiological responses result in decreased reproduction in any given band or herd (Rogovin and Moshkin 2007, Sussman 2008).
- (b) Employ natural barriers where possible, or, where such do not exist, semi-permeable, artificial barriers, where necessary, in designing each wild horse sanctuary.
- (c) Design and employ buffer zones around the wild-horse-containing nature sanctuaries. Here a gradual tapering off of wild horse presence would occur through the implementation of discouragements to their transiting into areas where danger exists for them, such as in farms or cities. This may involve the use of what wildlife managers term "adverse conditioning" as well as "positive reinforcement". Also employ underpasses or preferably overpasses where roads, pipelines, etc., impede the natural movements of the wild horses.
- (d) In order to realize healthy, balanced wild-horse-containing ecosystems, as full a complement of plant and animal species as possible should be allowed. Wherever possible, this should include large carnivores/omnivores native to the region in question, such as the puma, or mountain lion, and the grey wolf as well as the two bear species found here, i.e. Brown/Grizzly and Black. These will provide an additional limitation on wild horse populations, one that will act through natural selection to make any given population more fit for survival in the wild and more harmoniously adapted to its particular ecosystem as well as permitting a check on ruminant herbivores such as deer and a toning of their populations.

#### **Ecology of Wild Horses** (Downer 2014 a, b):

Wild horses complement an ecosystem in many direct and obvious as well as more subtle ways when permitted their natural freedom to move and interrelate over a sufficiently extensive and intact habitat and time period.

Like rhinos and tapirs, equids possess a caecal, or post-gastric, digestive system. This enables them to take advantage of coarser, drier vegetation through symbiotic microbial activity in their gut that breaks down cellulose cell walls to derive sufficient nutrients, including vital proteins, from the inner cell

without overtaxing their metabolism – more often the case with ruminants. (See Bell 1970, Grzimek 2004, MacDonald 2001.)

Consumption by equids of coarser, drier vegetation can greatly benefit sympatric, pre-gastric (ruminant) herbivores, and energize and enrich the ecosystem as a whole. By recycling chiefly the coarse, dry grasses as well as other dry, withered herbs, forbs and bush foliage, horses, burros, and zebras expose the seedlings of many diverse species to more sun, water and air, thus permitting them to flourish. The latter can then be consumed by ruminants (Bell 1970; Odadi and Rubenstein 2011).

Of great importance is the contribution by wild equids of significant quantities of partially degraded vegetation in the form of feces deposited on the land. These droppings provide fodder for myriad soil microorganisms; the resulting fecal decomposition builds the humus component of soils, lending ecologically valuable texture and cohesiveness. As feces slowly decompose, they gradually release their nutrients over all seasons and, thus, feed the fungal garden that exists in soils, thereby increasing the soil's absorption of water – a vital limiting factor in many regions.

Equid feces lend more sustenance to decomposers and food chains/webs that involve mutually sustaining exchanges among all classes of organisms. The latter include many diverse insects, birds, rodents, reptiles, etc. This helps bolster many native species in Alberta's Rocky Mountain foothills.

Less digestively degraded equid feces contain many more seeds that are intact and capable of germination and from many more types/species of plants when compared with ruminant grazers. Thus, the horses' wide-ranging life styles can greatly assist many plants, including Canadian natives, in dispersing far and wide and, so, in filling their respective ecological niches. This enriches the food chain/web and allows a greater diversity of animal species, including Canadian natives.

Horses aid myriad plant and animal species by their physical actions. As an example, breaking of ice with their hooves during winter freezes allows other animals to access forage and water. Many of these would otherwise perish. Similarly, they open trails in heavy snow or through heavy brush, allowing smaller animals to move about in search of food, water, mineral salts, shelter, warmer areas, mates, etc.

Wild horses are natural prey of certain carnivores and omnivores including for Canada's mountain lions, grey wolves, and bears (cf. Turner *et al.*, 2001).

Through a hammer-like hoof action upon the ground, wild equids can aid vegetation by pushing seeds firmly into the soil where they may successfully germinate. Their feces also provide a fertile bed for the germination of seeds.

Equids' post-gastric digestive system does not emit as much gas as is the case with pre-gastric ruminant grazers. This same system permits them to greatly reduce dry, fire-prone vegetation over vast areas without overtaxing their metabolism. Thus, they help to prevent catastrophic fires that Global Warming, or more to the point, human civilization's pollution of the atmosphere, is causing (deHaan *et al.*, 2006). And catastrophic wildfire is a growing concern in much of Canada, particularly the drier western region including the area of the present study in Alberta's Rocky Mountain foothills.

By drying out vegetation and provoking catastrophic fires—rampant in western and southern North America, Australia, and much of the world – the catchall “global climate change” threatens planetary life as we know it. This will especially be the case if global ocean currents stop circulating due to glacial and

ice cap melting, etc. Wild equids can greatly help to save the day if allowed to play their own special role in reducing flammable vegetation, in building soils, in seed dispersal, in preventing catastrophic, soil-sterilizing fires, etc. They stand ready to counter imbalances brought on by human civilization and its contamination of the atmosphere, much of which is caused by hordes of domestic livestock (de Haan et al. 2006).

To reiterate: Equid feces build the humus content of soils to a substantial degree. This humus allows soil to gain more texture and retain more water, which dampens out fires; humus promotes more productive and bio-diverse plant and animal communities. Because their feces are not as thoroughly degraded in the gut as those of ruminant grazers, they contribute more to food chains/webs, e.g., dung beetles to birds and lizards to higher trophic predators such as cats and eagles, etc.

Equine feces aid the watershed by creating damper conditions, because the soil particles to which they reduce (*micelles*) retain more moisture, i.e., more water adheres to the surface area of these particles (Ricklefs 1979). Hence ground water tables are replenished, feeding more seeps and springs more continuously. And upon these springs and seeps, many species of plants and animals depend. Some fire is of benefit to an ecosystem, but fires that over-consume, over-extend, and over-intensify can set the evolution of a terrestrial life community way back and result in a very sterile environment that could take thousands of years of “peace” to recover.

Equids possess both upper & lower incisors that permit them to selectively nip pieces of vegetation such as grass or the leaves of bushes or trees. Major ruminant grazers such as cattle and sheep do not have upper incisors and consequently can and do rip up plants by their roots more frequently with the action of their lower teeth and tongue against their hard upper palates. This often exposes soils to destructive wind and rain erosion, especially when too many of the ruminants are placed upon any given area of land. And wild horses are much more mobile in their daily and seasonal feeding rounds than are cattle.

Equid species diversify and strengthen the community they inhabit in a variety of ways when allowed to achieve population stability over time and when not over-imposed upon by humanity (Donlow *et al.*, 2005; Martin 2005; Odadi and Rubenstein 2011). The process of natural selection must be allowed to operate sufficiently long for this to be the case. Then these equids can and do create a greater variety of environmental conditions that make possible a greater variety of niches that can be occupied by coevolving species. Being large, powerful animals, equids can push their way through thickets of brush to form trails. Specifically, they open thick vegetative understories to light and air, and the more diverse exposures resulting from equine activities create conditions intermediary to the extremes of wind, temperature, and various soil conditions. This physically defines a greater variety of niches fillable by a more diverse array of species.

When allowed to integrate into wilderness, the individual life histories of wild equids come to reflect natural oscillations, such as annual seasons and more long-term cycles. This they do along with the plants and animals that share their habitat. They harmoniously blend over time. As large animals that eat relatively large quantities, especially of fibrous vegetation, and disperse their grazing and browsing activity over broad areas as semi-nomads, equids can become the harvesters and the renewers over vast ecosystems, true to their *keystone* role (Duncan 1992, Grzimek 2004, MacDonald 2001). Their cropping of vegetation, often dry and coarse, reduces the possibility for major, soil-sterilizing fires. This cropping sparks vegetative renewal, the re-budding of new and tender shoots of greater nutritional value, especially to ruminants whose digestive and metabolic systems are over-taxed by the coarse, dry

vegetation that equids can better handle. And thus the overall productivity of the land is annually increased, as studies prove (Fahnestock and Detling 1999; Janis 1976, Odadi and Rubenstein 2011).

#### **Important Points concerning Region of Study:**

Recently, the Ghost Forest east of Calgary and just south of the present study area had nearly all of its wild horses removed. Other that occupying a slightly more southern latitude, this area is ecologically very similar to our study area. It has been observed that in the absence of the wild horses, increased runoff of water and erosion of soils are occurring to the surface area here. Albertan naturalist Maureen Enns (2012) recently conducted a six-year natural history study and attests to the positive contributions made by the wild horses in the Ghost Forest ecosystem. She relates how they communicate with their natural companions: deer, ravens, and wolves, and does not go along with their labeling as “feral” horses with no place here or elsewhere in North America. This feral label ignores the true origin and long-standing evolution of the horse in North America, much of the evidence for which comes from Canadian lands (Alison 2000, Forsten 1992, Vila et al 2001, MacFadden 1992, Klingel 1979, Kirkpatrick & Fazio 2005, Illinois State Museum 2004, Henderson 1991, Haile *et al.* 2009, see also Whitaker 1999 re: feral label). It is surprising that Enn’s book: Wild Horses, Wild Wolves (2012) did not result in more official recognition of Ghost Forest’s and all of Alberta’s beautiful and ecologically beneficial wild horses, as well as their historical heritage and ecotourism associated values. Their aesthetic value is truly great.

Studies by Salter and Hudson (1980) and by Girard *et al.* (2013) concern Alberta’s wild horses and their ecological relationships with other herbivores including deer and cattle as well as their seasonal variations. Their findings indicate that the horses’ use of available forage is not excessive and that clear cut forest areas are favoured during winter months. True to their mobile nature, horses were also seen to disperse their foraging pressure over large areas, and to warm themselves by seeking sunny slopes facing south, particularly during the cold seasons. As well as standing close together, moving about and contracting their muscles is another important way for them to keep warm, as long as this does not deplete their energy reserves. Though the cold season generally requires more energy conservation and less activity due to the high energy demand of keeping warm, especially where high caloric food supply is limited. Chasing and harassing wild horses can prove fatal to them, particularly the young.

Generally, wild horses seek lower elevations that produce greater quantities of grass, especially during colder times of the year. They tend to migrate to higher elevations during warmer seasons, which also helps them to escape biting insects such as flies and mosquitoes.

During the present study I observed that standing forest remnants in the clearcut-dominated study area were being used by the wild horses for concealment from humans, similarly to hunted deer, moose and elk. Grassland and shrubland habitat is considered critical for wild horses by Girard *et al.* (2013) as such provides the great majority of their food.

Salter and Hudson (1980) noted an ecological separation between horses on the one hand and deer and moose on the other, and minimal competition for forage between horses and elk. Little spatial overlap between horses and cattle was also noted in this study, though their summer diets showed 66% overlap.

#### **Conclusion**

The claim that the wild horses of Alberta are overpopulated is not supported by objective, scientific studies. My present assessment indicates that these animals are underpopulated and in the process of filling their ecological niche in their available habitat that has been increased by boreal forest clearing.

The balancing role of horses vis-à-vis ruminants and their positive contributions in restoring a negatively impacted ecosystem should be given its due recognition and further investigated in future studies.

### Final Words

The commanding presence, natural vitality, and sheer beauty of the wild horses I recently observed in the Rocky Mountain eastern foothills (see photos, videos) should not be taken for granted. Our perception of such beauty and the manifestation of such beauty itself reveal a harmony with natural laws that constitutes a transcending success in life. We people ignore, persecute, torture, and destroy such living exemplars of beauty and harmony only to our own detriment.

I warn against repeating the mistake that was recently made in the Ghost Forest by removing its wild horses. Those wild horses who remain should be allowed to realize their own place and special relation among the species present – not become mere ghosts! These vibrant, highly evolved, ancient, and unique beings are healers of this unique land nestled at the eastern foot of the Rockies. Furthermore, they are living exemplars of Freedom and bearers of Beauty. And what could be more important than this? For life in our world would be incomplete – so lacking without them!

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**Appendix: A Partial List of Species of Plants, Animals, and Fungi occurring in Study Area indicating those observed by author and assistant shown by "obs", if photographed, etc. Major guide: Wernert (in Bibliography) plus Peterson as well as Audubon field identification guides, various years.**

**KINGDOM ANIMALS:**

**CLASS MAMMALS:**

**RODENTS:**

Muskrat, obs

Beaver, obs, photo of dam

Red Squirrel, obs, photos

Porcupine, obs

Meadow Vole

Gapper's Red-backed Mouse

Western Jumping Mouse

Bushy-tailed Woodrat

Masked Shrew

Deer Mouse

Golden-mantled Ground Squirrel

Mountain Phenacomys, obs, photos

Bushy-tailed Woodrat

Northern Flying Squirrel

Least Chipmunk

Yellow-bellied Marmot

**RABBIT FAMILY:**

Snowshoe Hare

**CANIDS:**

Gray Wolf, obs pair  
Coyote, obs  
Red Fox, obs

**BEAR FAMILY:**

Black Bear, obs spoor, white, or “spirit” black bear recently observed by guide, wife in study area photos

**FELIDS:**

Lynx, obs, spoor  
Mountain Lion/Puma/Cougar, obs tracks

**WEASEL FAMILY:**

Mink, obs  
Striped Skunk, obs  
Wolverine  
Marten  
Ermine  
Long-tailed Weasel  
River Otter

**DEER FAMILY:**

Moose, obs pair  
Wapiti (Elk), obs, spoor  
White-tailed Deer, obs, photos  
Mule Deer  
Woodland Caribou

**SHEEP FAMILY:**

Mountain Sheep

**BATS:**

Little Brown Bat  
Big Brown Bat  
Silver-haired Bat

**CLASS BIRDS:**

**SHOREBIRDS, TERNS & GULLS:**

Spotted Sandpiper  
Upland Sandpiper  
Ring-billed Gull  
Bonaparte’s Gull  
Black Tern

**RAPTORS:**

Prairie Falcon, obs  
Rough-winged Hawk, obs, photos

Golden Eagle, obs  
Osprey  
Bald Eagle, obs  
Northern Harrier  
American Kestrel  
Sharp-shinned Hawk  
Red-tailed Hawk  
Swainson's Hawk

**OWLS:**

Great Gray Owl, obs, photos  
Pygmy Owl  
Snowy Owl  
Great Horned Owl  
Short-eared Owl

**NIGHTHAWKS:**

Common Nighthawk

**GROUSE & PTARMIGAN:**

White-tailed Ptarmigan  
Spruce Grouse, obs, photos  
Blue Grouse  
Sharp-tailed Grouse

**JAY FAMILY:**

Gray Jay, or Whiskey Jack, a.k.a. Camp Robber, obs close up, photos  
Common Raven, obs many, photos  
Black-billed Magpie, obs  
American Crow

**KINGFISHERS:**

Belted Kingfisher

**SNIPES:**

Common Snipe

**SWALLOWS:**

Tree Swallow  
Cliff Swallow  
Barn Swallow

**WOODPECKERS & ALLIES:**

Pileated Woodpecker, obs  
Northern Flicker, obs  
Downy Woodpecker, obs

Three-toed Woodpecker  
Red-breasted Sapsucker

**SPARROWS & FINCHES:**

Sandwich Sparrow  
American Tree Sparrow  
House Sparrow, obs  
White-crowned Sparrow, obs  
Chipping Sparrow  
Brewer's Sparrow  
Song Sparrow  
Fox Sparrow  
Savannah Sparrow  
Sharp-tailed Sparrow  
Dark-eyed Junco , obs  
Common Redpoll  
Water Pipit

**CHICKADEES:**

Mountain Chickadee, obs  
Boreal Chickadee

**WARBLERS:**

Common Yellowthroat  
Magnolia Warbler  
Yellow-rumped Warbler  
Yellow Warbler  
Blackpole Warbler  
American Redstart

**KINGLETS:**

Golden-crowned Kinglet  
Ruby-crowned Kinglet

**CREEPERS & NUTHATCHES**

Red-breasted Nuthatch, obs  
Brown Creeper

**FLYCATCHERS:**

Say's Phoebe  
Least Flycatcher, obs  
Olive-sided Flycatcher

**THRUSHES:**

American Robin, obs  
Hermit Thrush  
Mountain Bluebird

**LARKS:**

Horned Lark, obs

**VIREOS:**

Red-eyed Vireo

Warbling Vireo

**OVENBIRDS:**

Ovenbird

Northern Waterthrush

**WRENS:**

Winter Wren

**WAXWINGS:**

Cedar Waxwing

**BLACKBIRD FAMILY:**

Red-winged Blackbird, obs

Brown-headed Cowbird, obs in assoc. with wild horses

Brewer's Blackbird

Western Meadowlark

**TANAGERS:**

Western Tanager

**GROSBEAKS:**

Evening Grosbeak

Rose-breasted Grosbeak, obs

Pine Grosbeak

**CROSSBILLS:**

Red Crossbill, obs in pine-spruce forest

**BUNTINGS, SNOW BIRDS:**

Snow Bunting, commonly obs in large, rapidly flying flocks, photos.

**CLASS REPTILES:**

Western Terrestrial Garter Snake

**CLASS AMPHIBIANS:**

Northern Leopard Frog, obs, photos, doomed tadpoles in clear cut forest, still alive beneath ice

Wood Frog

**CLASS FISH:**

Trout-Perches  
Rainbow Trout  
Lake Whitefish  
Carp

**PHYLUM MOLLUSCS:**

Three-whorled Ram's Horn (snail)

**PHYLUM ARTHROPODA**

**CLASS INSECTS:**

**BUTTERFLIES & MOTHS:**

Pearl Crescent (butterfly)  
Red Admiral  
Painted Lady  
Mourning Cloak  
Viceroy  
Red-spotted Purple  
Wood Nymph  
Spring Azure  
Gray hairstreak  
American Copper  
Clouded Sulphur  
European Cabbage Butterfly  
Phoebus  
Tiger Swallowtail

**BEES:**

Common Bumblebee  
Honeybee

**BETLES:**

Black Whirligig Beetle

**FRESHWATER INSECTS:**

Water Boatman

**CLASS ARACHNIDA, SPIDERS:**

Black and Yellow Garden Spider

**KINGDOM PLANTS:**

**UMBRELLA SEDGES**

Chufa

**COTTONGRASSES**

Cottongrass

**SEDGES**

Porcupine Sedge, obs

Other Sedges, possibly Bear Sedge and Russet Sedge

**RUSHES**

Great Bulrush, obs

Soft Rush

**SPIKERUSHES**

Spikerush

**GRASSES**

Kentucky Bluegrass

Common Rye

Wheat

Porcupine Grass, obs, one of the Needlegrasses, *Stipa* genus

**INDIAN GRASSES**

Yellow Indian Grass

**CONIFER TREES:****JUNIPERS**

Common Juniper, obs

**PINES**

Jack Pine

Lodgepole Pine, obs, abundant, planted but are native, photos

**SPRUCES**

Black Spruce, obs, photos

White Spruce, obs

Engelmann Spruce, obs

**LARCHES** (genus *Larix*, needles turn yellow and are shed in autumn, but not their cones)

Tamarack / Eastern Larch, obs

**HEMLOCKS** (genus *Tsuga*)

Western Hemlock

**BROAD-LEAFED TREES & BUSHES, MOSTLY DECIDUOUS:****WILLOWS**

Willow, *Salix* sp., obs, photo

Peachleaf Willow

**BIRCHES** (Genus *Betula*)

Paper Birch, obs

**POPLARS** (*Populus* genus)

Balsam Poplar

Quaking Aspen, obs

White Poplar, obs, photos

Black Poplar, obs, photos

(Note: White and Black Poplars may be forms of the Quaking Aspen.)

**CHERRIES AND PLUMS**

Chokecherry, obs

**HAZELS**

Beaked Hazel/Filbert

**LEATHERLEAFS**

Leatherleaf

**DOGWOODS**

Red-osier Dogwood, a tree

Bunchberry, obs., common in forest. A low-lying ground plant.

**BLACKBERRIES/BRAMBLES**

*Rubus sp.*, obs, common, photos

**WILDFLOWERS:**

**PIPSISSEWAS**

Pipsissewa, obs

**STARFLOWERS**

Starflower

**LEDUMS**

Labrador Tea

**BUTTERWORTS**

Butterwort

**BLACKBERRIES/BRAMBLES**

*Rubus sp.*, obs, common, photos

**EVENING PRIMROSES**

Common Evening Primrose

**STONECROPS**

Roseroot

Wall Pepper

**YELLOW RATTLES**

Rattlebox

**LOUSEWORTS**

Elephant Heads

**DEATH CAMASES**

Alkali Grass

**GUMWEEDS**

Common Gumweed, obs

**RAGWEEDS**

Common Ragweed

**WILD GINGERS**

Wild Ginger

**PONDLILIES**

Yellow Pondlily

**MARSH MARIGOLDS**

Marsh Marigold

**GOLDENSEALS**

Goldenseal, valued medicine

**MEADOWRUES**

Purple Meadow Rue, obs

**GOLDTHREADS**

Goldthread

**HEPATICAS**

Round-lobed Hepatica

**MONKSHOODS**

Blue Monkshood

**COLUMBINES**

Longspur Columbine

Yellow Columbine  
Longspur Columbine

**BANEERRIES**

Red Baneberry

**LARKSPURS, or DELPHINIUMS**

Western Larkspur

**BUTTERCUPS**

Tall Buttercup

Water Crowfoot

**ANEMONES**

Pasqueflower

Wood Anemone

**CORYDALISES**

Pale Corydalis, obs

**NETTLES**

Stinging Nettle, obs

**SAND VERBENAS**

Heart's Delight

**SANDWORTS**

Rock Sandwort

**CHICKWEEDS**

Common Chickweed, important for winter food, stays green below snow

**CATCHFLIES**

Starry Campion

Bladder Campion

**GOOSEFOOTS** (vitamin-rich leaves)

Lamb's Quarters, obs

**SPRING BEAUTIES**

Spring Beauty

**PURSLANES**

Common Purslane

**MONTIAS** (edible leaf)

Miner's Lettuce

**PUSSY PAWS**

Pussy Paws

**DOCKS** (important food of Native Americans)

Curly Dock

**SAINT JOHNSWORTS**

St. Johnswort

**PEONIES**

Western Peony, obs

**MUSK MALLOW**

Musk Mallow

**GLOBE MALLOW**

Scarlet Globe Mallow, obs

**SUNDEWS**

Roundleaf Sundew

**VIOLETS**

Common Blue Violet, obs

Canada Violet, obs

**SPIDERFLOWERS**

Rocky Mountain Bee Plant

**MUSTARDS**

Black Mustard, obs

**WALLFLOWERS**

Western Wallflower

**WATERCRESSES**

Watercress, obs

**MANZANITAS**

Bearberry, obs, photos

**SHINLEAF**

One-sided Pyrola

**INDIAN PIPES**

Indian Pipe

Pinesap

**SHOOTING STARS**

Shooting Star

**LOOSESTRIFE**

Tufted Loosestrife

**GRASSES OF PARNASSUS**

Grass of Parnassus

**VETCHES**

Cow Vetch

**LOCOWEEDS** (genus *Oxytropis*)

Showy Locoweed

**MILK VETCHES** (genus *Astragalus*)

Locoweed, obs

Milk Vetch

**LUPINES**

Blue Lupine

**CLOWERS**

Red Clover, obs

White Clover, obs

**MISTLETOES**

Mistletoe, obs

**POISON SUMACS**

Poison Ivy, obs

**GERANIUMS**

Wild Geranium, obs

**TOUCH-ME-NOTS** (disperse seeds explosively)

Jewelweed

**WOOD SORRELS**

Yellow Wood Sorrel, obs

**ARALIAS**

Wild Sarsaparilla, obs

**GINSENGS**

American Ginseng

**CARROTS**

Queen Anne's Lace, obs

**COW PARSNIPS**

Cow Parsnip, obs

**POISON HEMLOCKS**

Poison Hemlock

**GENTIANS**

Fringed Gentian

**CUMBOES**

Deertongue

**BUCKBEANS**

Buckbean

**PERIWINKLES**

Running Myrtle

**MILKWEEDS (essential food for endangered Monarch butterfly)**

Butterfly Weed

Swamp Milkweed

**NIGHTSHADES**

Bittersweet Nightshade

**PHLOX**

Blue Phlox

**JACOB'S LADDERS**

Greek Valerian

**FORGET-ME-NOTS**

Forget-me-not

### **PLANTAINS**

Common Plantain, obs, photos, edible and nutrient-rich leaves

### **MINTS**

Spearmint

Peppermint

Field Mint, obs

### **SELF-HEALS**

Heal-all

### **GERMANDERS**

American Germander

### **WOUNDWORT**

Woundwort

### **HOREHOUNDS**

Common Horehound, obs

### **SAGES**

Blue Sage

### **INDIAN PAINTBRUSHES**

Giant Red Paintbrush, obs

### **TURTLEHEADS**

White Turtlehead

### **MULLEINS**

Common Mullein, obs

Moth Mullein

### **BROOMRAPES**

Naked Broomrape

### **VENUS LOOKING GLASSES**

Venus' Looking Glass

### **LOBELIAS**

Indian Tobacco

### **BEDSTRAWS**

Cleavers, obs

**TWINFLOWERS**

Twinflower, obs

**BONESETS**

Thoroughwort

White Snakeroot

**FLEABANES**

Daisy Fleabane, obs

**ASTERS**

Blue Wood Aster, obs

**EVERLASTINGS**

Pearly Everlasting

**COCKLEBURS**

Cocklebur, obs

**CONEFLOWERS**

Black-eyed Susan, obs

**MOUNTAIN SUNFLOWERS**

Mountain Sunflower, obs

**YARROWS**

Common Yarrow, obs

**THISTLES**

Bull Thistle, obs

**DANDELIONS**

Dandelion, obs

**LETTUCES**

Wild Lettuce

**CHICORIES**

Common Chicory

**GOATSBEARDS**

Goatsbeard

**ARROWHEADS (excellent indigenous food)**

Wapato

**WATER PLANTAINS**

Water Plantain

**ELODEAS**

Waterweed

**SEDGES**

Porcupine Sedge, obs

Other Sedges, possibly Bear Sedge and Russet Sedge

**RUSHES**

Great Bulrush, obs

Soft Rush

**SPIKERUSHES**

Spikerush

**SWEET FLAGS**

Calamus

**PICKERELWEEDS**

Pickerelweed

**SOLOMON'S SEALS**

Solomon's Seal

**MANDARINS**

White Mandarin

**LILIES**

Sand Lily

Solomon's Zigzag

Wood Lily

Trout Lily

**ONIONS**

Prairie Onion

**FALSE HELLEBORES**

Indian Poke, obs,

**GLOBEFLOWERS**

American Globeflower, obs

**IRIS**

Rocky Mountain Iris, obs

**ORCHIDS**

Showy Lady's Slipper  
Yellow Lady's Slipper  
Stream Orchid, obs

**FERNS**

Northern MaidenHair, obs  
Maldenhair Spleenwort  
Rocky Mountain Woodsia  
Fragile Fern/Brittle Fern  
Ostrich Fern  
Oak Fern

**CLUBMOSES**

Ground Pine (a clubmoss), obs

**QUILLWORTS**

Spiny-spored Quillwort

**HORSETAILS**

Field Horsetail, obs  
Scouring Rush (a horsetail)  
Water Horsetail/Pipes

**MOSSES**

Red Spoonleaf Peat Moss  
Burned Ground Moss/Purple Moss  
Cord Moss  
Broom Moss  
Rock Moss  
Silver Moss  
Tree Moss  
Woodsy Mnium/Star Moss  
Haircap Moss/Goldilocks  
Four-tooth Moss  
Sphagnum, obs, photos

**LIVERWORTS**

Common Liverwort, obs

**KINGDOM: FUNGI****LICHENS:**

Dog Lichen, obs  
Map Lichen  
Reindeer Lichen

Cracked Shield Lichen, obs  
Flabby Lichen, grows on trunks of conifers  
Pyxie Cups

**MUSHROOMS:**

Fly Agaric (a poisonous mushroom)  
Grisette, obs  
Cone-shaped Hygrophorus, obs  
Vermillion Hygrophorus  
Delicious Lactarius  
Pungent Russula  
Short-stemmed Russula  
Scaly Lentinus, obs  
Split-gilled Mushroom, obs (decomposes fallen logs)  
Maroon Tricholoma (on stumps and downed conifer logs)  
Golden Trumpets (on stumps and conifer logs)  
Oyster Mushroom (on logs and stumps of broad-leaved trees)  
Honey Mushroom (on logs and stumps, at base of trees)  
Wood Blewit  
Club-footed Clitocybe  
False Chanterelle  
Clean Mycena  
Waxy Laccaria  
Greenish-Yellow Tricholoma  
Russet-scaly Tricholoma  
Slimy Gomphidius  
Glistening Inky Cap  
Brownie Cap  
Cinnamon Cortinarius  
Red-gilled Cortinarius  
Chanterelle  
Shaggy Chanterelle  
Gray Coral (a Coral Fungi)  
King Bolette  
Many-colored Polypore (on dead wood esp. broad-leaved trees, occas. on conifers)  
Sulphur Polypore  
Chocolate Lenzites  
Red Belt Fungus  
Bracket Fomes  
Spreading Hedgehog Mushroom  
Striate Bird's Nest Fungus  
Witches' Butter  
Red Pimple Fungus  
Orange Peel (a cup fungi)

Orange Fairy Cup  
Yellow Cup Fungus  
Blue-green Cup Fungus  
Yellow Leotia  
False Morel  
Bay Gyromitra