

CRYPTOGAMIC SOIL LOSS AND OTHER CONSEQUENCES of CATTLE GRAZING.

Keywords: cryptogamic crusts, biological soils, cattle damage, cheatgrass,

A Photo-essay in which we:

(1) **show range-cattle effects on Cryptogamic Crusts**, AKA Biological Soils or crusts, Microbiotic Soils or Cryptobiotic Soils. Cattle trampling results in loss of these soils, encourages weed spread, particularly **cheat grass** and knap weed, forest expansion into grasslands and has various other land degrading effects. Beneficial effects include maintenance of soil stability, atmospheric nitrogen fixing, infiltration, nutrient contributions and resistance to water and wind erosion. See Addendum to read more on **Cryptogamic Crusts/Soils and Cheatgrass**.

(2) **show other damaging effects by range-cattle on grasslands and vegetation**, including inhibited recovery of plant communities as a result of **overgrazing, soil compaction, time of grazing**.

While this article illustrates some of the degrading effects of range-cattle grazing, other damaging effects, particularly in riparian zones, impact water quality and quantity. These effects are the subject of several other reports on our website, documenting damage and water contamination.

See page 6: For links to these articles.



Image 1 & 2 in an area not grazed by livestock. Here the Cryptogamic crusts provide protection against weed growth and forest ingrowth.



Image 3 & 4 in areas ungrazed by livestock. Image 4 from the Oliver Osoyoos area shows the rich coloration of the Cryptogamic mosses and lichens that form a protective layer on the soil.



Image 5



Image 6

Image 5 shows spring growth in an area free of cattle-grazing, where Cryptogamic soils are still intact and helping to protect native vegetation from weeds and forest ingrowth.

Image 6 is the adjacent range cattle grazed area with picture at same time as Image 5. Although range cattle have not yet arrived in this area, **bare ground and undesirable vegetation and weeds predominate and regrowth following years of seasonal grazing is inhibited.**



Image 7
Same area as
image 5 (spring) above.

Image 7 An area not grazed by cattle and with native vegetation still intact except for foreground area where elk had bedded. Cryptogamic soils still intact and protecting against weeds and forest ingrowth.



Image 8
Same view as image 6.

Image 8 Range cattle grazed area as seen in October. High hillside location sees less cattle activity than lower elevations however Cryptogamic crusts trampled to dust and weeds predominate.



Images 7 & 8 Crown range areas with cattle grazing for many years. Cheat grass and knapweed predominate, former bunchgrasses mostly gone. Cryptogamic soils trampled to dust. Recent so called “ecological restoration plan” intended to burn this area to encourage grasslands recovery. Land managers are belatedly recognizing that burning degraded pastures can result in greater weed infestations as weed species outcompete native grasses after fire. Burn of this area was cancelled but degradation remains. Removal of the cow would be the beginning of recovery.



Images 8 and 9 taken in early June

images 8 & 9, the area of the Testalinden fire of 2015 that covered a large area from Osoyoos through Oliver. Wildfire is often touted as a benefit to wildlife however beneficial “recovery” is highly variable and in this area, fire has encouraged the growth of cheat grass and weeds at the expense of native vegetation. Past cattle grazing has encouraged cheat grass and cattle degraded areas become worse after fire. Cheat dries out early in the year, is highly flammable and increases fire risk and the length of the fire season.

Just prior to these early June pictures the area looks like a lush grassy pasture. As cheat grass turns red-brown the extent of the degraded pasture is revealed.



Images 10 & 11 Range Cattle grazed area, same pasture as closeups, 7 & 8. Cheatgrass and Knapweed predominate, former bunchgrasses mostly gone. Cryptogamic Crusts trampled to dust.



Image 12 & 13 comparison of side by side cattle grazed and ungrazed areas. To left of cattleguard a grazed area in spring prior to arrival of range cows. The area on the left has substantially less growth than the ungrazed area. Years of cattle grazing have resulted in compaction, reduction of plant variety and substantial reduction of forage values affecting wildlife and cattle. The lack of regrowth on the left extends to the surrounding grazed area and is not just a fence-line effect.

All photos by al grant except image 4 which was copied from a blog on cryptogams from Oliver Osoyoos area. Lost the source so can't give credit. If it was yours, let me know.

Most of the examples are in the Boundary Area however similar comparisons can be found throughout the Boundary and Okanagan. Many younger Land Managers and Consultants, have likely seen few if any examples of surviving Cryptogamic Soils on Public Lands. Perhaps they choose to ignore the loss, as acknowledgement would mean recognizing the cow as the degradation agent. Instead we see the absurdity of so called "Ecological Restoration" projects that fail to acknowledge that Cryptogamic soils ever existed. Only the removal of the cow from public land would result in their return.

For more on the broader issues we recommend various articles on our website:

Cattle Issues Page: www.boundaryalliance.org/ba_008.htm

Or to some of our reports:

The Problem with Range Cattle www.boundaryalliance.org/the_problem_with_range_cattle.pdf

Cattle Impacts, Global & Local www.boundaryalliance.org/cattle_impacts.pdf

Cattle as an Invasive Species www.boundaryalliance.org/invasives.pdf

Patterns of E.coli Contamination of Public Land Streams www.boundaryalliance.org/e.coli_report2013.pdf

E.coli counts in Dryland Streams www.boundaryalliance.org/ecolireport2009.pdf

If Your Water Supply is Downstream of Rangeland www.boundaryalliance.org/ba_009.htm

DISCUSSION

It is an unfortunate reality that land managers, those responsible for weed prevention and ecological restorations, range management and consultants hired to advise and plan in these areas, rarely if ever acknowledge the loss of Cryptogamic Soils or plan for any recovery. Acknowledging the loss means acknowledging the primary degradation agent, the cow.

If we give these land managers the benefit of the doubt, along with their relatively short years on the job, we might think that they have succumbed to UBC Prof Daniel Pauly's *Shrinking Baseline Syndrome*.

“The phrase describes an incremental lowering of standards that results with each new generation lacking knowledge of the historical, and presumably more natural, condition of the environment. Therefore, each generation defines what is ‘natural’ or ‘normal’ according to current conditions and their personal experiences. With each new generation, the expectations of various ecological conditions shifts. The result is that our standards are lowered almost imperceptibly”. www.remotefootprints.org

For this writer/observer, something more concerning is the cause of the wide unwillingness to acknowledge root causes. It is the sacred cow status of “range cattle grazing” and the unwillingness of all including politicians to acknowledge the economic and environmental absurdity of range cattle use. Our articles listed and linked on page 6 expand on this concern

APPENDIX A, B, & C follow

APPENDIX A CRYPTOGAMIC CRUSTS/SOILS

Biological soils are mostly found in semiarid and arid locations in North America and similar locations worldwide. The crusts are formed by living organisms and their byproducts, creating a crust of soil particles bound together by organic materials, a highly specialized community of cyanobacteria, mosses and lichens and algae. USGS www.soilcrust.org

Nutrient increase in the presence of crusts provides benefits to native plants while the crusts provide a barrier to many weed species, including cheatgrass and a barrier to forest ingrowth into grasslands.

Damage to the soils can increase soil loss due to wind and water erosion.

Fire can cause damage that is severe depending on fire intensity.

Recovery of the soils from disturbance is a very slow process and does not occur at all in the presence of annual grazing. We have noted locally that it takes about 10 years for some recovery of mosses and lichens in disturbed areas, provided the areas remain free of range cattle. Recovering beneficial crust thickness may take 50 years or more.

In the Boundary and Okanagan, biological soils have largely been trampled to dust where exposed regularly to cattle grazing. Degradation of formerly productive grasslands has occurred following the loss of these protective and soil enhancing crusts.

We have further comment on the failure of authorities to recognize or halt such damage, in Page 6

DISCUSSION

APPENDIX B CHEATGRASS

Cheatgrass (downy brome) is a noxious weed that displaces native plants and thrives in disturbed areas.

A wealth of studies are available online however we will point to a few of the problems.

A Eurasian annual that arrived in North America by various routes but one that was initially encouraged by ranchers as an early growing grass with potential to increase the grazing season.

Cheatgrass eventually came to be the dominant species in many lower elevation areas, outcompeting native grasses for nutrients, water and light.

Cheatgrass establishes and spreads in disturbed areas, particularly areas disturbed and degraded by cattle. Loafing used by cattle often show concentrations of cheatgrass which can then be spread through manure deposition or coat.

Weed is prolific and can produce more than 10,000 plants per square meter. When conditions are suitable it can have two seeding periods per year. Has low nutritive value.

An early season grower that can become tall and abundant before native species emerge, it matures earlier than other grasses therefore extending fire season risk.

Vigorous growth and early maturity can result in fast traveling fires and ability of fire to act as ladder fuels that can ignite other vegetation

Cheatgrass has increased the frequency of wildfire in areas that might have seen natural fires of much reduced intensity every 30 to 100 years and created fire frequency of 3 to 5 years.

For an expanded look at Cheat and other degrading cattle related effects on public lands in the West, we recommend Chapter 10 of a book written by B. C. Biologists John and Mary Theberge, *The Ptarmigan's Dilemma: An Exploration of how Life Organizes and Supports Itself*. See also an article by the Oliver area biologists that comments on the possible Okanagan National Park and the reasons why cows should not be in it.

www.boundaryalliance.org/nationalpark.pdf

see also our own comment in **Addendum C**
Cannings and Cows: An open letter to M.P. Cannings

APPENDIX C CANNINGS & COWS: An Open Letter to MP Cannings

The following letter was sent to MP Cannings in January 2018.

We have received no acknowledgement or reply.

To MP Richard Cannings

Jan 2018

From Boundary Alliance Org

Greatly disappointed by part of your recent opinion piece in the Grand Forks Gazette, "Park in Okanagan a legacy".

boundaryalliance.org has long been a supporter of the National Park proposal and has published articles of support:

<http://www.boundaryalliance.org/nationalpark.pdf>

http://www.boundaryalliance.org/scientists_parkdeclaration.pdf

Our support has been contingent on removal of cattle grazing in the Park, whether by outright purchase of lands, including crown grazing permits or by negotiated phase out.

Your support for continued cattle grazing, and the precedent that would be established in a National Park is an unfortunate proposal that fails to promote willing seller, willing buyer discussions that would result in removal of the cow. More significant is that your support for continued cattle grazing ignores the role of cattle as "degradation agents" whose presence has greatly damaged grasslands and habitat, and continues to do so.

We might have expected, given your environmental interests, you would be well aware of the economic and environmental absurdity of cattle grazing on public land.

We were aware however of a cautionary note when we saw/heard your reported comment, prior to your election, that cattle grazing in the Okanagan benefitted some birds. In enquiring (to people better acquainted with your work) as to whether this might mean that you would support continued cattle grazing in a Park, respondents thought good sense would prevail, not cows.

It seems clear that desired habitat for some nesting bird is of more concern to you than the wide-ranging damage occurring, thanks to cattle grazing.

Some comment on the bird in question may be useful.

To quote from your own book, "Lark Sparrow, associated with bare earth between grass clumps and shrubs in grasslands, so may actually benefit from cattle grazing".

interestingly, the Audubon Society, perhaps better aware of cattle damage, describe the Lark Sparrow as "fairly common and widespread in the West....nesting in open country, bare ground, overgrazed pastures"

The "bare earth" preferred by the Lark Sparrow is frequently the direct result of cattle presence and the destruction of ecologically beneficial Cryptogamic soils and duff, reduced to dust by cattle. Our upcoming photo essay on biological soils, cattle effects on regrowth, will be published soon on our website.

Various Species at Risk guidelines in grasslands rightly call for improving the condition-of rangeland to provide tall healthy bunch-grasses to provide habitat for a wide variety of species, including the Lark Sparrow. This will not happen with cattle grazing.

A partial list of problems associated with cattle grazing:

grassland and riparian degradation

absurd water consumption raising low value crops

water contamination

cattle contribution to weed spread, cheat grass and other invasives.

public fencing costs

ecological-restoration costs (millions in public funds spent to repair damage, without removing the root cause, cattle)

lost opportunity costs

forest regrowth damage

conflicts with wildlife, habitat, food

growing awareness of cattle contribution to global warming.

All of these problems and more, have been included in numerous articles on our website. We provide direct links to several articles and recommend your attention to the other cattle related, water contamination articles on the site including articles/videos of specific cattle caused damage in the Boundary.

CATTLE IMPACTS, GLOBAL AND LOCAL.

http://www.boundaryalliance.org/cattle_impacts.pdf

THE PROBLEM WITH RANGE CATTLE

Why Government and Public support for cattle range use on Public Lands, should cease.

<http://www.boundaryalliance.org/rangecattleproblem.pdf>

E. coli in Public Land Streams, Patterns related to Presence of Range Cattle. 2016

<http://www.boundaryalliance.org/e.colireport2016.pdf>

Cattle as an Invasive Species

<http://www.boundaryalliance.org/invasives.pdf>

Other recommended reading or viewing: Most problems also occur in BC.

Book. Waste of the West: Public Lands Ranching by Lynn Jacobs

<http://wasteofthewest.info> where individual chapters are available as pdf files.

Book. Welfare Ranching: The Subsidized Destruction of the American West

a coffee table sized book, big pictures showing damage.

Book available from Amazon or <http://www.publiclandsranching.org>

At the website (see link 'Welfare Ranching') for individual chapters available as pdf files.

Various other articles on economic costs and environmental costs.

Cowspiracy video on netflix. Film covers many issues including the absurd ecological and economic costs of cattle industry.

other info at cowspiracy.com includes an extensive list of sources used in the film. While film has been produced by those with a vegetarian bent, sources seem mostly credible.

Available at <http://www.cowspiracy.com/facts>

Re condos vs ranching and other myths, see:

Waste of the West, Chapter 11, Justifications & Myths

Welfare Ranching, Part 1, Ranching Myths, includes: "Its Either Ranching or Subdivisions"

Other resources include:

Our youtube HD drone videos in the Okanagan which include Mount Kobau & Testalinden, Osoyoos Oxbows, Okanagan River: What remains.

Okanagan Collection

<http://www.youtube.com/playlist?list=PLQYnXXOuH2qcIQRDq2MyNoa7nKabNSO9Q>

Kettle River Collection

<http://www.youtube.com/playlist?list=PLQYnXXOuH2gfEz89h6nPxEzmqhKQo3E>

Boundary Alliance Collection

Includes all www.boundaryalliance.org videos including Collections above

<http://www.youtube.com/playlist?list=PLQYnXXOuH2gdnIbolQeHk0q3R6-AwxB5x>

We would add that the Kobau video does not include many details on the extent to which cattle grazing has affected this area, particularly near the limited water sources. We also sampled water for E.coli at a seep heavily used by cattle, and found the sample so contaminated that it was “too high to count”. Such a result would indicate probable E.coli counts beyond 30,000 CFU per 100ml.

Our report on that issue is still to come, in a 2017 update to our other E.coli articles together with reports of cattle contaminated streams in two Provincial Parks, Johnstone Creek and Gilpin Grasslands, and in Ingram Creek. At all of these locations public funds have provided various structures to address contamination issues, to no good end.

We note your presence as the sponsor of petitions both for and against the National Park. We do not buy your explanation for this as “being MP for everyone” Oliver Chronicle Dec 2017.

If you are as you state, in favor of the National Park, you are under no obligation to sponsor and therefore seemingly endorse, the misleading claims of the NO side. They have options of seeking sponsorship from some other MP or posting their petition on any of the various (free) petition platform providers.

We will close with comments from a UN Report on cattle costs and consequences. See more in our web article [Cattle Impacts, Global & Local](#)

http://www.boundaryalliance.org/cattle_impacts.pdf

“Livestock’s (primarily cattle’s) contribution to environmental problems is on a massive scale. The impact is so significant that it needs to be addressed with urgency.

- The environmental impact per unit of livestock production must be cut in half, just to avoid increasing the level of damage beyond its present level.*
- About 73% of rangelands in dry areas, have been degraded to some extent, mostly through overgrazing, compaction and erosion created by livestock action.*
- Livestock sector is responsible for 18% of greenhouse gas emissions measured in CO2 equivalent. This is a higher share than transport.*
- Livestock now account for about 20% of the total terrestrial animal biomass, and the 30% of the earth's land surface that they now pre-empt was once habitat for wildlife.*
- While regulating scale, inputs, wastes and so on can help, a crucial element is the correct pricing of natural resources such as land, water and use of waste sinks. Most frequently natural resources are free or underpriced. which leads to overexploitation and pollution.*
- A top priority is to achieve prices and fees that fully reflect the full economic and environmental costs, including all externalities. This list from: Report by Food & Agriculture Organization of the U.N. Livestock’s Long Shadow.”*

We look forward to hearing from you on this issue and we also extend an invitation to join us in a tour of some of the damage later this year.

With thanks, Al Grant for www.boundaryalliance.org

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