

INCEPTION & REVITALIZATION OF SASKATCHEWAN'S PRAIRIE HABITAT

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Table of Contents

Introduction.....	Page 3
Section One.....	Page 4 -5
Section Two.....	Page 6-7
Section Three.....	Page 8
Conclusion.....	Page 9
Resources.....	Page 10

Preservation of the prairie habitat is inherently connected to the longevity of all species that reside within it. Humans have a natural inclination to use more than what is viably needed, and thus we often find ourselves with large swathes of land that are no longer vital to our agricultural requirements. Instances of this condition commonly occur following the retirement of livestock range lands and water restriction programs for crop irrigation. The case studies that have been chosen for this critical commentary become fundamentally entwined due to their current and future impact on the grassland and wetland habitats within Saskatchewan [Figure 1]. This commentary will be divided into three sections which are as follows:

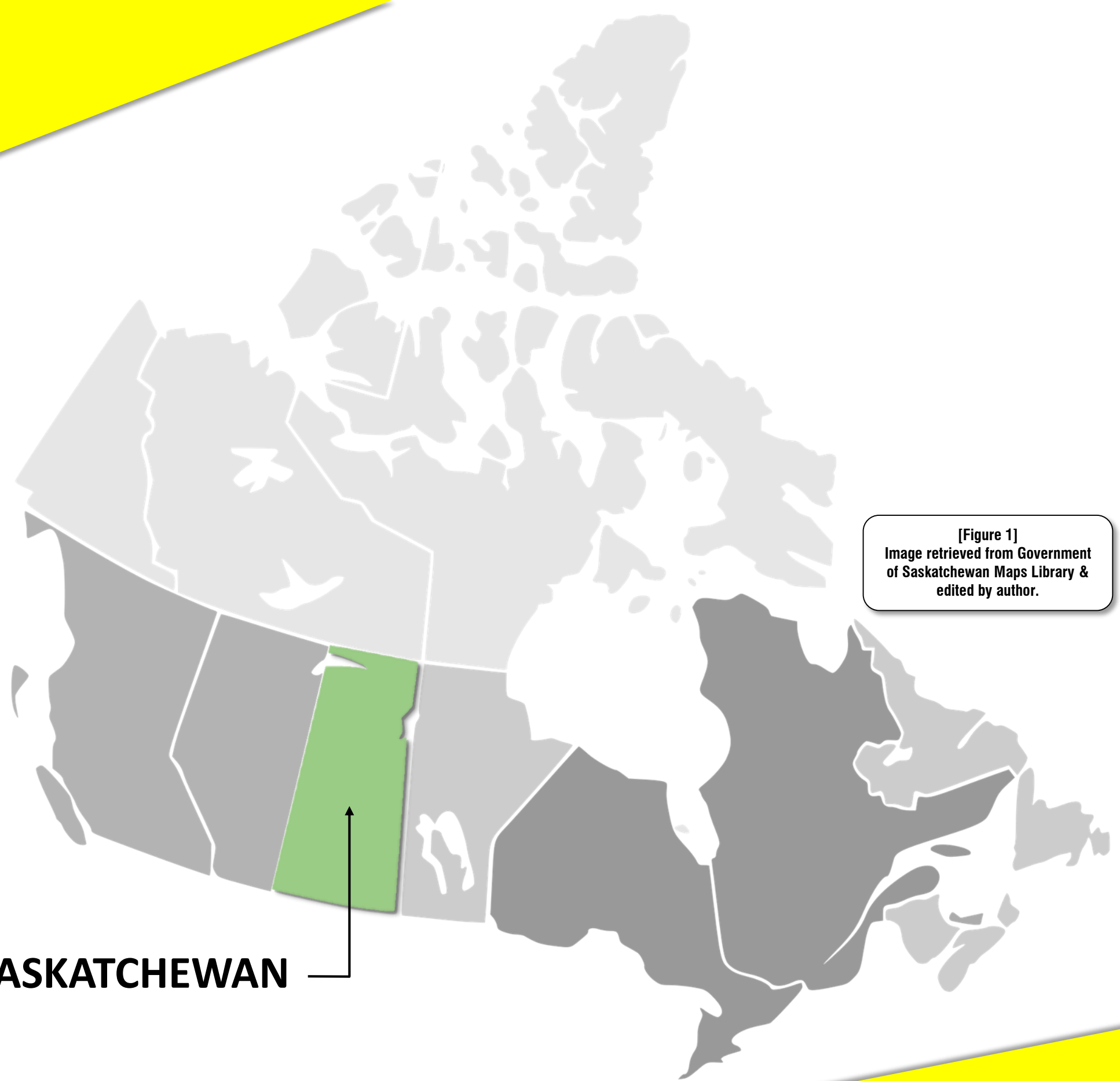
Section One will be used to introduce the case studies that have been chosen for this collection, highlighting their key elements that categorize them as being either a landscape corridor or landscape rehabilitation site.

Section Two will be used provide a sense of regional worth and identity of the chosen case studies. This will be done by focusing on their physical characteristics and their relationship to each of their respective surroundings.

Section Three will comment on the political realm for which these case studies find themselves a part of, focusing on how their relationship with longevity is mutually connected.

Saskatchewan finds itself within a unique transition of increased habitat awareness and range land rehabilitation. Utilizing the course material along with an abundance of researched information found in peer reviewed journals, newspaper articles, and interviews, this critical commentary will attempt to shed light on the key elements of the case studies presented within this paper.

SASKATCHEWAN

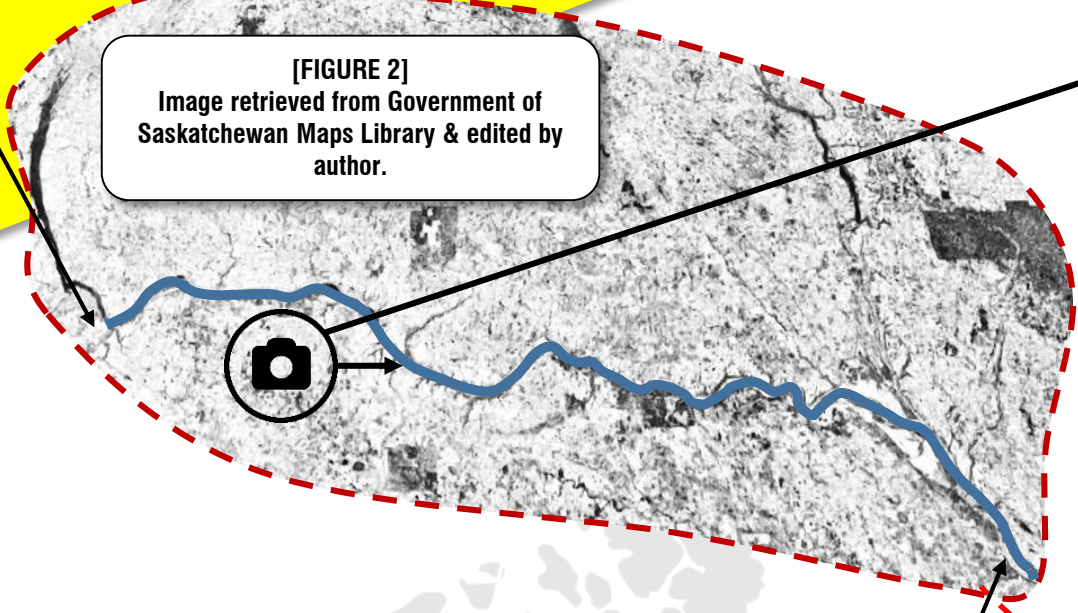


[Figure 1]
Image retrieved from Government
of Saskatchewan Maps Library &
edited by author.

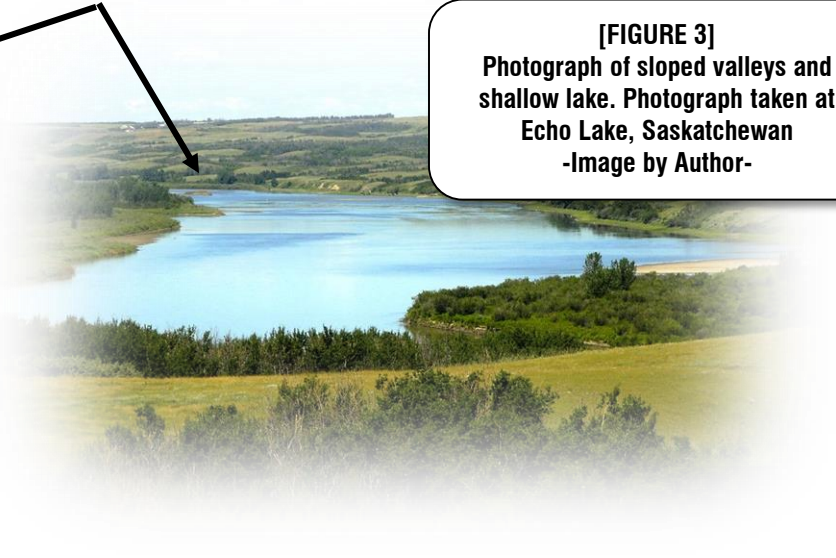
TOWN OF CRAVEN

Case study one will focus on the landscape corridor of the Lower Qu'Appelle Valley River, located in the southeastern region of Saskatchewan and spanning 320 kilometers from the Town of Craven to the Manitoba border [Figure 2]. The Qu'Appelle Valley River originated as a glacial spillway and is composed of a moderately flat bottom with steep valley slopes flanking its sides [Figure 3]. The current landscape of the Fort Qu'Appelle Valley River is composed "entirely of material that was deposited by glaciers during the last ice age" (Smith. 2009. Pp. 114). The region of lower Saskatchewan saw deposits reaching over "300 meters thick" (Smith. 2009. Pp. 17): The southern region of Saskatchewan was covered on four occasions by glaciers, and as each one advanced, it eroded the prairie surface, picking up rocks and materials, known as "erratic's" and depositing them across the prairie landscape (Thraves. 2007. Pp 21). As the climate grew warmer the glaciers progressed into meltwater, eventually carving the route for the Qu'Appelle Valley River. With each occasion of the enormous glaciers melting, the material entombed within their mass was dispersed amongst the regions surface, providing Saskatchewan's extraordinary variation of "chernozemic soil types" (Pennock. 2014. Pp. 13). Chernozemic soil is generally "high in organic matter" due the "decomposition of the roots of grasses" (Ibid). As I ventured out to photograph and sketch this region of Saskatchewan, I was drawn to the massive erratic boulders that peppered the seemingly smooth grass covered valley [Figure 4]. Upon further investigation I concluded that these were the very remnants of the receding glaciers dropping off trinkets that hailed from the rocky outcrops of the glaciers point of origin. Erratic boulders found amongst the waves of prairie grass provide a visual reminder that the landscape upon which we traverse provides a geological fingerprint.

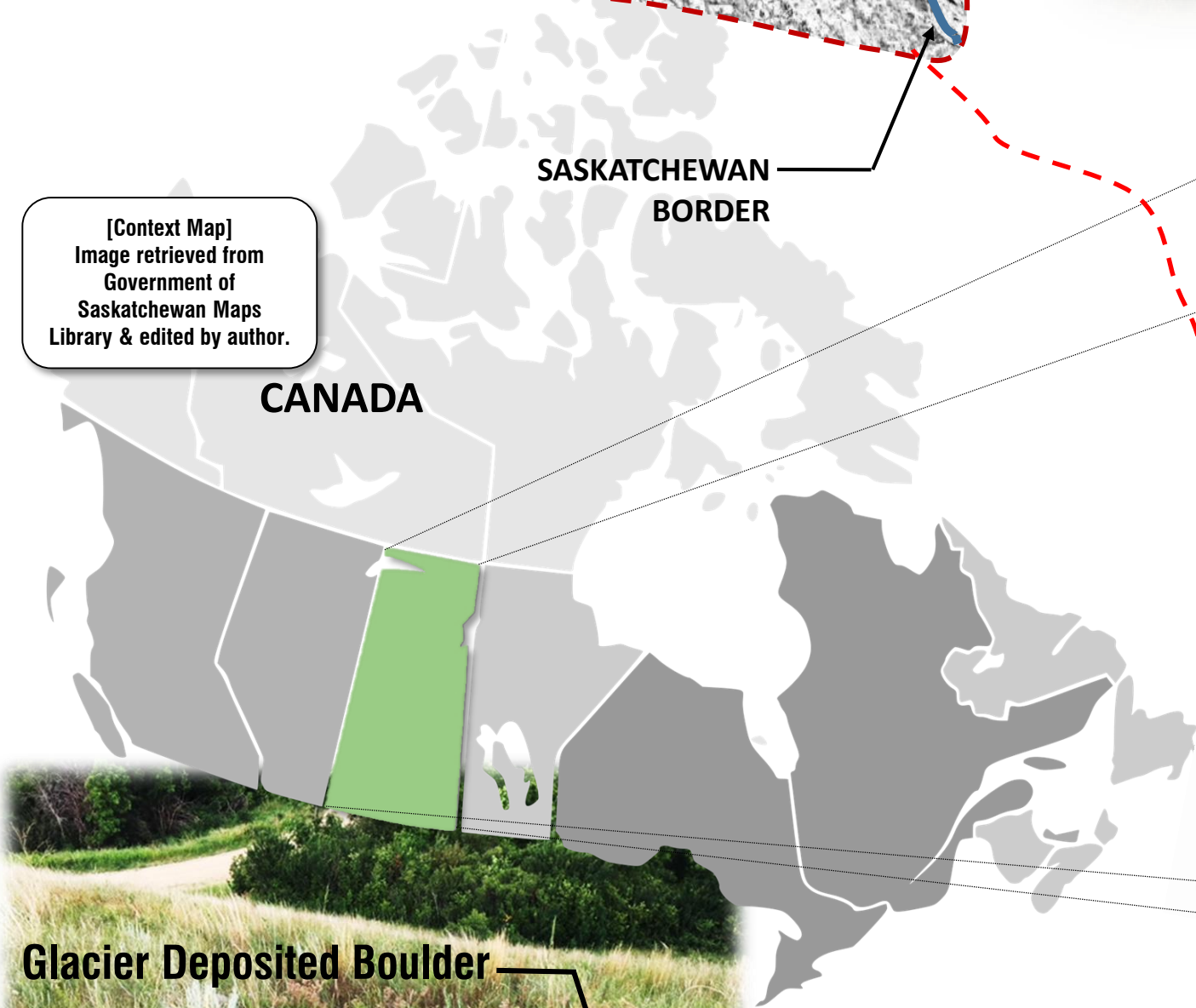
[FIGURE 2]
Image retrieved from Government of Saskatchewan Maps Library & edited by author.



[FIGURE 3]
Photograph of sloped valleys and shallow lake. Photograph taken at Echo Lake, Saskatchewan
-Image by Author-



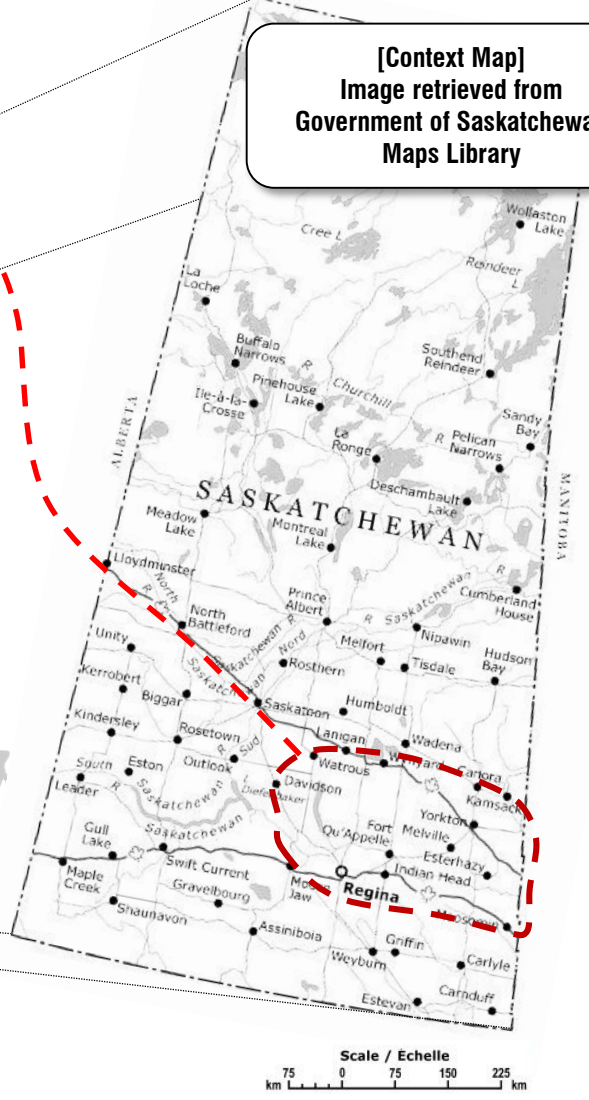
[Context Map]
Image retrieved from Government of Saskatchewan Maps Library & edited by author.



SASKATCHEWAN
BORDER

CANADA

[Context Map]
Image retrieved from Government of Saskatchewan Maps Library



Glacier Deposited Boulder



[FIGURE 4]
My Daughter Lennon Playing on an erratic boulder.
-Image By Author-

Case study two focuses on the restoration of Saskatchewan's Agricultural Crown Rangelands. This case study vastly differentiates itself from the previous case study on the Qu'Appelle Valley River, as it is a reversal of human interference on a habitat, rather than naturally occurring phenomenon of inception that disperses soil and rocks across a glacial spillway.

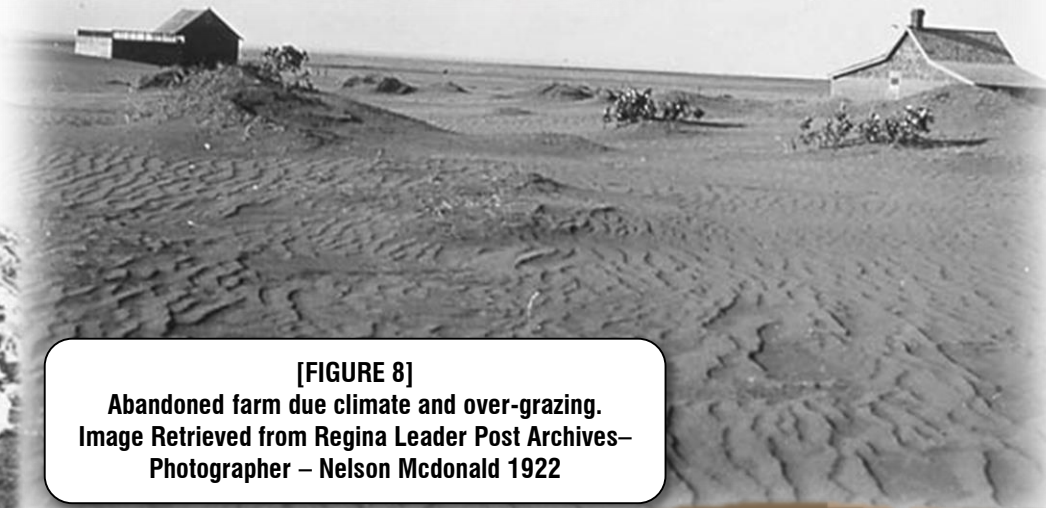
Prior to settlement by Europeans, the First Nation's inhabitants had subsisted by drawing upon the abundance of buffalo herds [Figure 5] that "painted the prairies black" (Bryan, 2011. Pp. 73). The First Nations pursued their source of sustenance amid the seasonal cycles - from the "arid plains in summer", to the "shelter under the white birch tree forests in the Qu'Appelle Valley" during the winter (Hall. 2015. Pp. 67). The late 19th century issued in a significant change to the Saskatchewan prairies due to an increase in precipitation levels and over-hunting of the buffalo population by European settlers [Figure 6]. This act of over-hunting allowed for the rangelands to flourish under minimal grazing. However, the increased needs of the European settlers contributed to an increased demand for livestock products. The cattle production pressure on the West's immense territory of grasslands shifted from a few wild animals to the commercialization of cattle production that would give rise to Saskatchewan's ranch farming industry, encompassing a third of the province [Figure 7]. A significant issue that was a direct result of the increase in livestock numbers was "lease desertions on depleted land" by ranch owners [Figure 8] (Ardell. 1998. Pp. 26). Lease desertion occurred when a rancher's livestock overgrazed an area and rehabilitation became far more expensive than desertion and relocation. The issue of lease desertion resulted in swathes of unusable land, a daunting clue of how Saskatchewan might appear if ranching practices weren't managed properly [Figure 8]. Remediation by the Government of Canada for this common problem came in the form of agricultural revitalization experiments in 1927 that looked at "rotational and deferred" grazing systems, development of "stock watering facilities", and "reseeding" using native species of plants (Schell, E. 1994. Pp. 11). This case study that focuses on the act of rehabilitating scorned land was very intriguing due to the reseeding process being far more labour intensive than it might appear because the act of refurbishing regions meant they must be returned back to the state they were in prior to European settlement. Such a task meant that revitalized lands could return to the thriving ecosystems that they once were, similar to the Qu'Appelle Valley River System.



[FIGURE 5]
Buffalo hunt on the prairies.
 Image Retrieved from Regina Public Museum
 – Indigenous Art Collection
 Image Painted by Artist Perry Bighead 1972.



[FIGURE 6]
Results of European Settlers Over-hunting.
 Image Retrieved from Regina Public Museum – European Settler Exhibit
 Photographer - Unknown



[FIGURE 8]
Abandoned farm due climate and over-grazing.
 Image Retrieved from Regina Leader Post Archives–
 Photographer – Nelson Mcdonald 1922



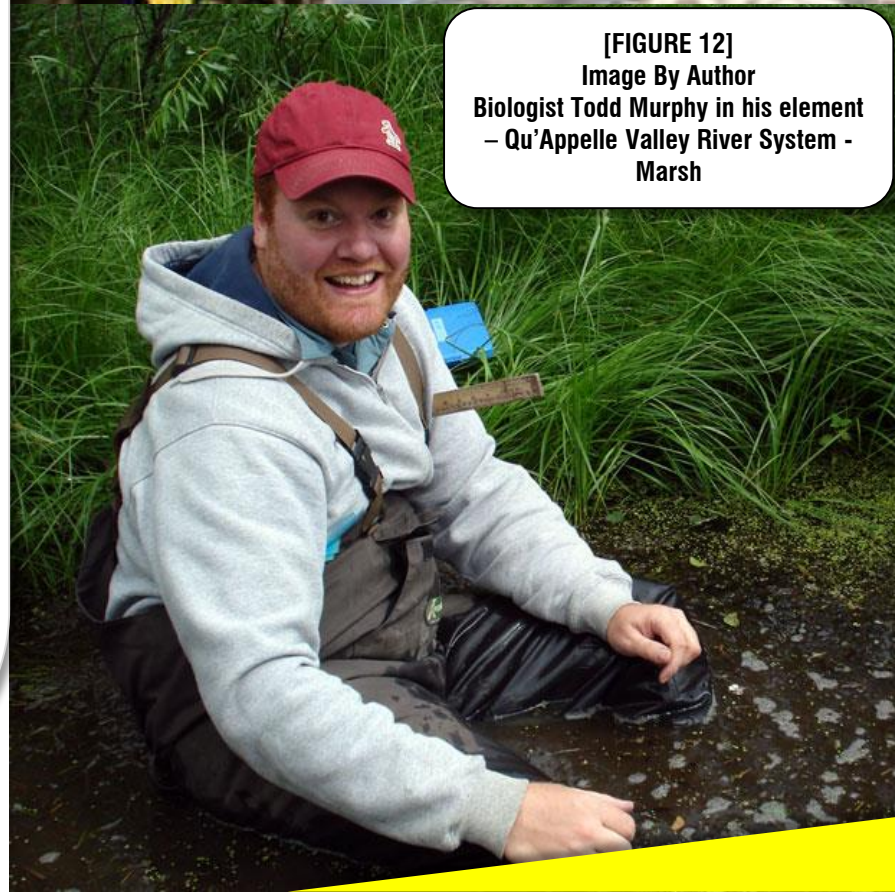
[FIGURE 7]
Cattle Commercialization on the Saskatchewan Parries
 Image by Author
 Silver screen Layering Technique

Enveloped by the Saskatchewan farming industry and Crown Rangelands, the Qu'Appelle Valley River serves as the essential artery to a variation of habitats. The "black loamy soils" upon which the topographical arrangement sits on consists of "slope forests" that are abundantly populated with trembling aspen, green ash grasslands on south facing slopes [Figure 9] that spill into a rich variety of wetlands and "riparian vegetation" (Padbury, G. & Acton, D.F. 1998. Pp. 138). Due to the close proximity that the slope forest has with the river, there appears to be a richly diverse population of fish, birds and mammals cohabitating this diverse system. Upon venturing into the area, the following species of fish, mammals and birds were abundantly present: northern pike, walleye, pelicans, crows, magpies, red-bellied woodpeckers [Figure 10], squirrels, white-tailed deer, beaver and muskrats. The Qu'Appelle Valley River, with its river and lake systems, is a seasonal oasis for cottage dwellers looking to escape the confines of industrialized city life. The area's beauty appears to function flawlessly and effortlessly as it transitions into spring with blooming tree buds, returning Canadian geese, and an eruption of vegetation as each winter comes to pass. Although an unformed visitor might see this area as functioning effortlessly, citizens and politicians have staked their claim to maintaining the protection of this habitat from careless development and biological contamination. Due to the valley's natural slope, runoff stemming from the surrounding crop farms [Figure 11], and unchecked sewage containers have posed a significant risk to this fragile habitat. Bylaws restricting controlled floodways, and septic tank maintenance, are just a few ways that concerned citizens have attempted to preserve this area's habitat. The issue has become so dire that Biologist Todd Murphy [Figure 12] noted within our interview that "fishing within the Qu'Appelle Valley River system" should only be "catch and release" and he wouldn't recommend consuming them due to the high levels of contaminants relating to mercury and agricultural pesticide runoff. As lead biologist at the Provincial Fish Hatchery, Mr. Murphy has repeatedly called upon the "provincial government" and "local politicians" to engage in a process of "revitalization and decontamination" of the precious ecosystem, not unlike that done on the revitalization of Saskatchewan's Crown Rangelands (Murphy, Personal Communication, July 14th, 2018).

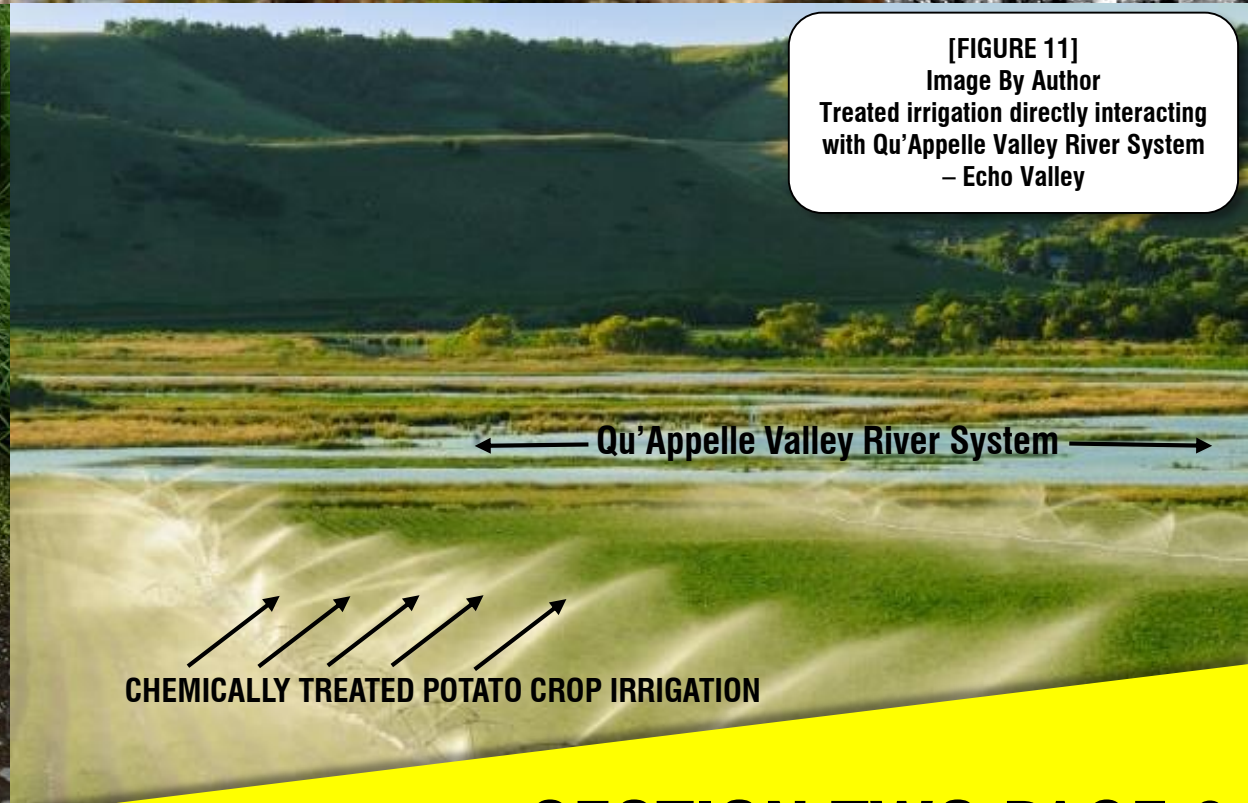


[FIGURE 9]
Image by Author
Site Reconnaissance Photography –
Katepwa Lake and its riparian
vegetation. (Qu'Appelle Valley River
System)

[FIGURE 9]



[FIGURE 12]
Image By Author
Biologist Todd Murphy in his element
– Qu'Appelle Valley River System -
Marsh



[FIGURE 10]
Image By Author
Charcoal on Heavy Paper – Using a
Photograph by Author for Inspiration

[FIGURE 11]
Image By Author
Treated irrigation directly interacting
with Qu'Appelle Valley River System
– Echo Valley

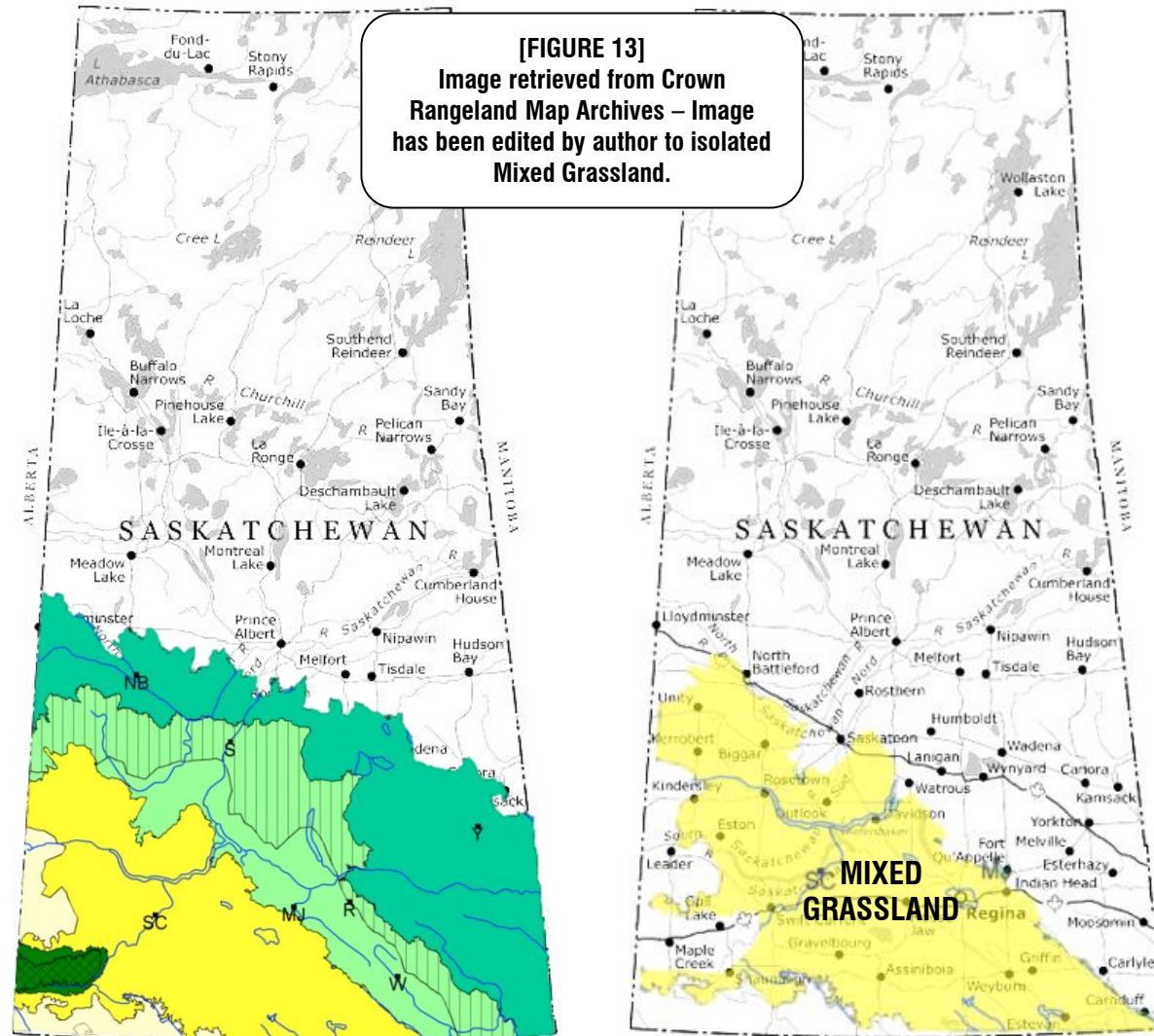
← Qu'Appelle Valley River System →

↑ ↑ ↑ ↑ ↑

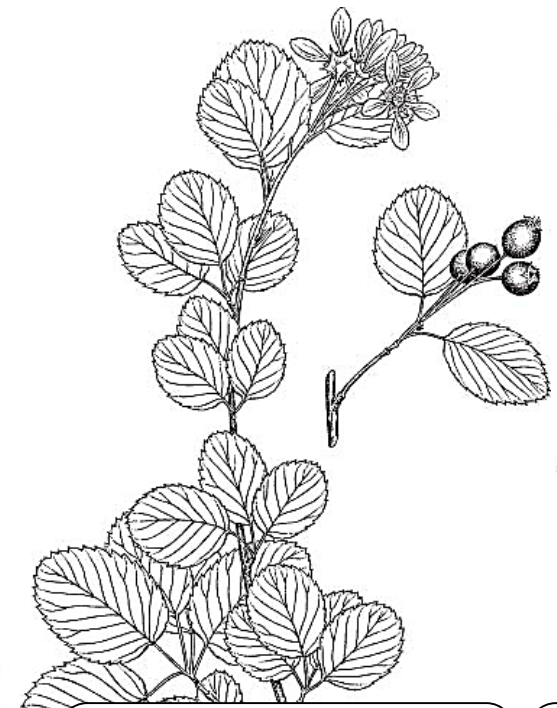
CHEMICALLY TREATED POTATO CROP IRRIGATION

Saskatchewan's agricultural Crown rangelands can be divided into their own prospective ecological regions. Each ecological region can appear vastly different due to the variations of climates and precipitation present in Saskatchewan. For the sake of brevity I have focused on the mixed grasslands region [Figure 13], an area that is both familiar and accessible from my current location in Regina, SK. Upon contacting the Crown Rangeland Authorities of Saskatchewan I was provided the coordinates of a remediated site that transitioned from a point of despair into a flourishing habitat for plant and animal species alike. The site I visited was a one hour drive north of Regina, Saskatchewan and categorized as "mixed grassland". The categorization of a mixed grassland means that it is composed of a multitude of plant species due to the growing conditions and variations in site features such as: "soil type, moisture levels, topography and salinity" (Abell, R.A. 2000. Pp. 235-248.). Upon conducting a site walk to obtain photographs of this area, it soon became evident that there is not one specific place where everything grows, rather each condition of the land and soil produce their own pedigree of plant species. A visibly occurring instance of this seemed to be due to the topography in the mixed grasslands that was composed of gradually rising hills [Figure 14] that are well drained and filled with "western porcupine grass" [Figure 15], while the small indents in the land that retain more moisture, supporting "marsh hedge-nettles" and "water smartweed", along with multiple species of fruit bearing shrubs such as Saskatoon berries [Figure 16] (Colberg, T. 2016. Pp. 19). Remediation of this site was critical as it is found within one of the windiest corridors of Saskatchewan, meaning that without a stable root system, all viable soil would eventually be dispersed and lost, further rendering the area useless. The visible remediation of this site introduced a variety of plant specimens that would address the heritage importance of this territory.

Rangeland Ecoregions of Saskatchewan



[FIGURE 14]
Image By Author
Revitalized Rangeland – 30 km North of Regina, Saskatchewan.

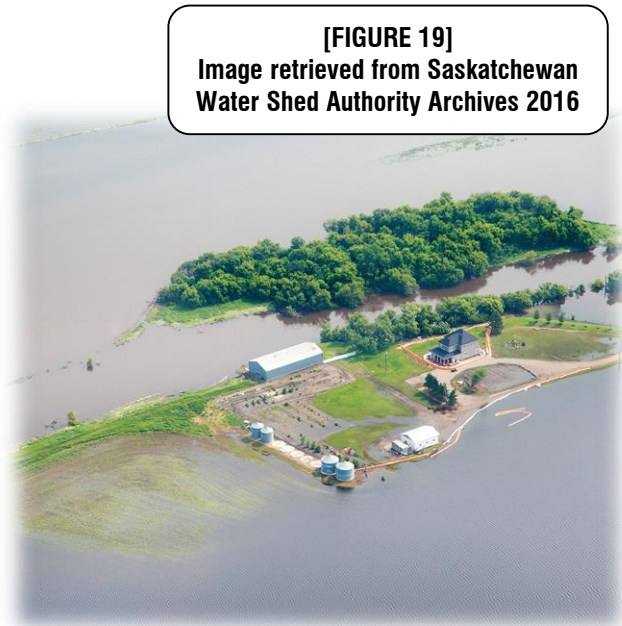


[FIGURE 16]
Image by Author
Black pen on paper, using a photograph by author for inspiration.

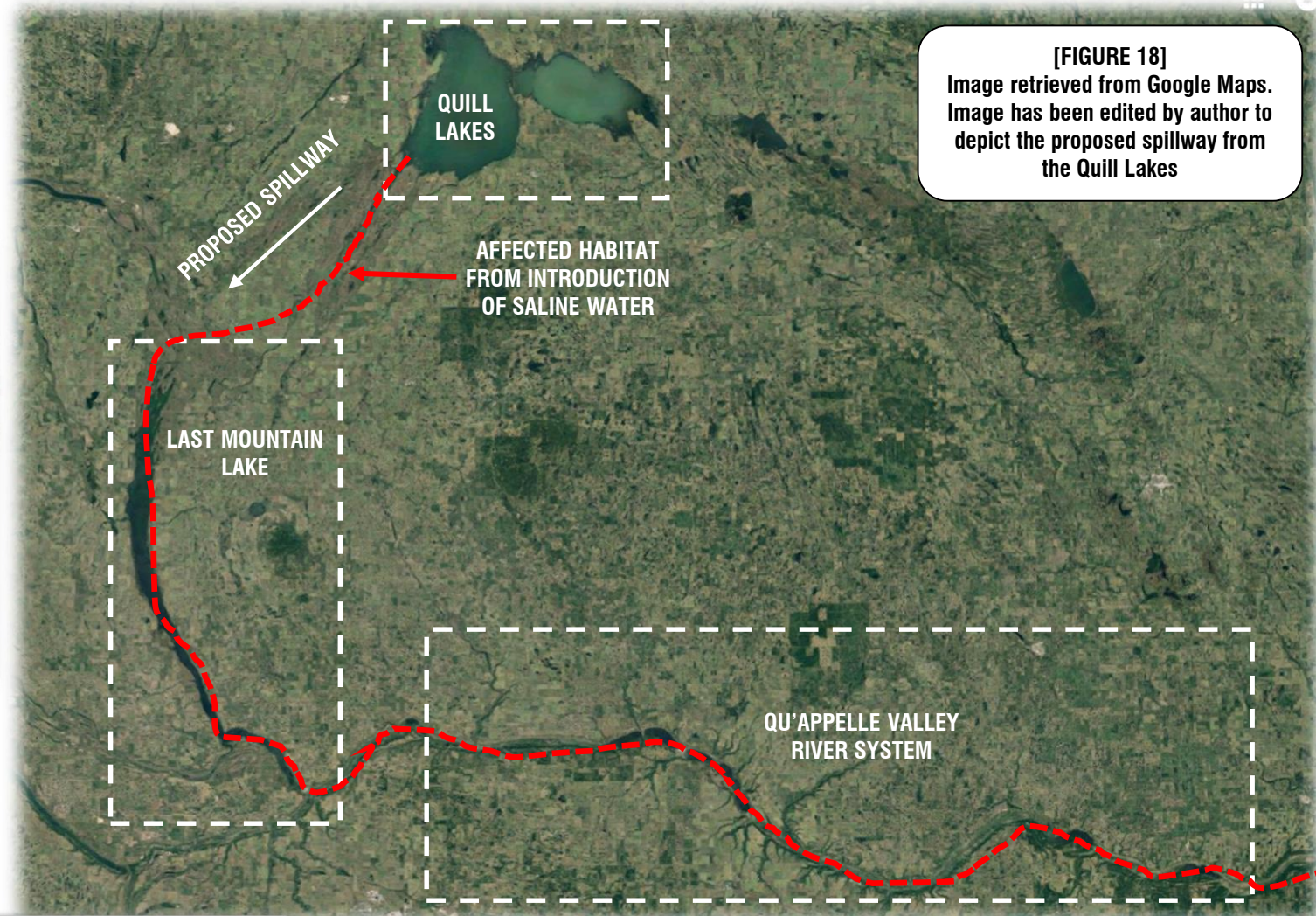


[FIGURE 13]
Image by Author
Black pen on paper, using a photograph by author for inspiration.

As mentioned at the onset of this critical commentary, the Lower Fort Qu'Appelle Valley River and Saskatchewan's Agricultural Crown Rangelands are separate entities, but biologically they are entwined. This has been noted due to a specific incident in Saskatchewan that had periodically made media headlines for the past two years. The incident in question refers to the rangeland flooding on the properties surrounding the Quill Lakes [Figure 18]. The Quill Lakes are a saline rich (salt heavy) standalone body of water that is primarily composed of rain and irrigation run off. As the lake reaches its carrying capacity, the surrounding rangelands become flooded due to their flat plane topography [Figure 19]. As a result of this flooding, a motion was put in place to allow for the creation of a spillway into the Qu'Appelle Valley River system, bringing the Quill Lakes back to a manageable water level that did not impede the adjacent farms and rangeland. Upon hearing of this non-vote motion, there was severe backlash in the form of protests from the concerned citizens, politicians and the Provincial Fish Hatchery. Their anger stemmed from the salt content within the Quill Lakes and how it would hinder the fresh water ecosystem found within the Qu'Appelle Valley River [Figure 20]. When posed with the question: will the restoration of flooded rangeland remediate the area permanently? Susan Keith responded: this type of rangeland remediation is very one sided and it comes at the cost of potentially decimating numerous river ecosystems across Saskatchewan, there has to be a better solution and we will hold the government of Saskatchewan accountable" (Keith, Personal Communication. July 10th 2018). Although this particular incident has not yet been concluded, I found it very relevant to this critical commentary to portray the interconnectedness between two seemingly separate entities that inhabit the same region and ecosystem.



[FIGURE 19]
Image retrieved from Saskatchewan Water Shed Authority Archives 2016



[FIGURE 18]
Image retrieved from Google Maps. Image has been edited by author to depict the proposed spillway from the Quill Lakes



[FIGURE 17]
Image retrieved from Leaderpost.com 2018

Water agency slammed for handling of unapproved Quill Lakes-area drainage

Network" approach now being used in attempt to manage drainage, agency says

BY DANNOON HADNER REGINA LEADER-POST | Updated: January 26, 2018



[FIGURE 20]
Image by Author

With that, this paper has critically commented on two case studies (Lower Qu'Appelle Valley River and Saskatchewan's Agricultural Crown Rangelands [Figure 21]) for the purpose of fulfilling the recommended parameters of this collection:

1. A landscape corridor that serves to structure the form and development of a region.
2. A revitalized landscape that reflects a conscious design solution to the ongoing use of a previously impacted site.

The process of writing this paper provided a significant amount of insight into the region for which I call home. By gaining a greater perspective on the river systems that flows through this province and feeds various ecosystems, it has become truly evident that preserving them is a monumental task that our generation must uphold. I equate this importance to the same need that was felt in the early 1900's to convert overgrazed and abandoned rangeland back to habitable ecosystems [Figure 21]. By utilizing the Regina public library, first hand account interviews, site walks and finally site photography, I was able to gain a much more rounded understanding of the remediation and protection of each of the aforementioned case studies.



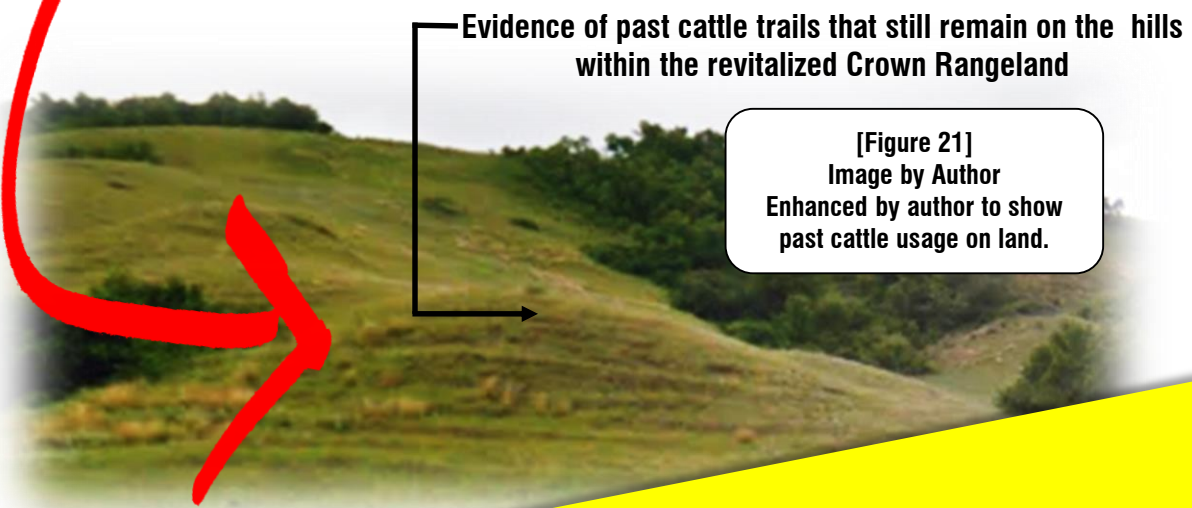
[Context Map]
Image retrieved from
Government of Saskatchewan
Maps Library



Revitalized Crown Rangeland

[Figure 21]
Image by Author
Qu'Appelle Valley roadway dividing remediated Crown Rangeland & Katepwa Lake

Qu'Appelle Valley River System



Evidence of past cattle trails that still remain on the hills within the revitalized Crown Rangeland

[Figure 21]
Image by Author
Enhanced by author to show past cattle usage on land.

Bibliography / Work Cited

- [Source 1]** Arbates, N. (1998). *A Practical Guide to Planning for Management and Improvement of Saskatchewan Rangeland: Range Plan Development*. University of Saskatchewan. 1998. Pp. 9-33.
- [Source 2]** Abell, R.A. (2000). *Ecoregions of North America, A Conservation Assessment*. Covelo, California. Island Press. 2000. Pp. 235-248.
- [Source 3]** Bryan, L. 2011. *Stone by Stone: Exploring Ancient Sites on the Canadian Plains*. Heritage House Publishing Co. 2011 pp. 61 – 78
- [Source 4]** Colberg, T. (2016). *Field guide: Identification of Common Riparian Plants of Saskatchewan*. Regina, Saskatchewan. University of Regina Press. 2016. Pp. 17-22)
- [Source 5]** Padbury, G. & Acton, D.F. (1998). *Ecoregions of Saskatchewan*. University of Regina Press. 1998. Pp. 138-43
- [Source 6]** Schell, E. (1994). *Grazing Systems for Rangelands of Southern Saskatchewan*. Journal of Agricultural Practice. University of Saskatchewan. 1994. Pp. 11-13
- [Source 7]** Smith, N. (2009). *Fluvial Sedimentology VI*. Journal of International Association of Sedimentologists Journal 17. Vol. 26 Journal. John Wiley & Sons, 2009. Pp. 108-120.
- [Source 8]** Thraves, B. (2007). *Saskatchewan: Geographic Perspectives*. Regina, Saskatchewan. University of Regina Press. 2007. Pp. 15-22
- [Source 9]** Dr. Pennock, D. (2014). *Agriculture and Bioresources: Soils of Saskatchewan*. Saskatoon, Saskatchewan. University of Saskatchewan Press. 2014. Pp. 10-17.
- [Source 10]** Murphy, T. (2018, July 14th). Personal Interview.
- [Source 11]** Keith, S. (2018, July 10th). Personal Interview.