

Teaching Environmental History: Canada in Context

DAVID BROWNSTEIN

Online multimedia for *Environmental History* 12.4, Special Issue on Canada, October 2007.



Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International Public License

Introduction

This set of eight teaching modules provides university instructors with a full set of pedagogical resources aimed at integrating Canadian themes and research into their course curriculum. All are drawn from the special Canada-focused issue of *Environmental History* (October 2007), edited by Matthew Evenden and Alan MacEachern (see their introductory editors' note). We hope the modules will inspire greater engagement with Canada's fascinating history and serve as models for instructors to develop similar teaching resources for other regions of the world.

Teaching Unit Number 1: Ecological Imperialism

This university-level teaching unit is designed to be easily scaled up or down regarding class time consumed, or difficulty, as appropriate for the individual course context. The material in this unit has a strict focus on Canada (specifically the North), though instructors in other locations are encouraged to improvise on their own, using this module as a base, to insert a comparative element and make connections to other places or themes.

Learning goals

1. Introduce the themes of ecological imperialism and the Columbian exchange
2. Contextualize the manifestation of ecological imperialism in Canada's north
3. Familiarize the student with archival sources that inform historical narratives of colonization and environmental change
4. Encourage students to connect these concepts with their own experience of the world

Resources

- 1) Liza Piper and John Sandlos, "A Broken Frontier: Ecological Imperialism in the Canadian North," *Environmental History* 12 (October 2007): 759-95.
 - a) Discussion questions
 - i) What is the dominant historical narrative of Ecological Imperialism proposed by Alfred W. Crosby? How do Piper and Sandlos question and expand this model in their case study of the Canadian North?

- ii) Piper and Sandlos suggest that disease, in and of itself, was not solely responsible for decimated populations. Instead, they posit a domino and circular effect, which began with disease and resulted in more disease and poor rates of recovery. How did disease negatively affect other aspects of Inuit and First Nations ways of life, and render those ways of life unsustainable during a period of disease?
- iii) In their case study, Piper and Sandlos challenge Lower's belief of a "new colonial frontier based on agricultural development." To what extent do they perceive the uptake of agricultural practices in the North, and where and in what context do they situate it?
- iv) Piper and Sandlos contend that Ecological Imperialism in the Canadian North was largely stymied by bio-climatic features of geography. How did the environment halt and delimit encroachment of alien species, be they flora or fauna? What were some of the agrarian interventions introduced by the newcomers? Consider their successes and failures. What impacts did they have on indigenous ways of life?
- v) What is Ecological Imperialism's legacy? Does it still remain with us today? Is it ever appropriate to introduce alien species into foreign environments? What are the potential risks and rewards?
- vi) What is meant by the term 'Virgin Soil' and why is it, at best, only partly accurate in this case?
- vii) How successful have Piper and Sandlos been here, at bringing science and the humanities together, to tell a narrative?

2) Contextual essay

In their co-authored article, Piper and Sandlos invite readers to recognize the role of alien species in attempts to colonize the Canadian arctic.

Alien species are animals, plants, fungi and micro-organisms introduced outside of their native habitat. They reproduce rapidly in their new ranges, out-competing native species for food and habitat, resulting in reduced biodiversity.

In the early 1970s American historian Alfred Crosby coined the term "The Columbian Exchange." He used it to refer to the exchange of diseases, animals, plants and human populations, between the American and Afro-Eurasian hemispheres, following the voyages of Christopher Columbus in 1492.

A related term, "ecological imperialism" is a set of biological and geographical explanations as to why Europeans were able to colonize neo-Europes with such apparent ease. The neo-Europes were temperate locations colonized by Europeans, such as Australia, North America, and southern South America.

Rather than allowing for innate European superiority, Alfred Crosby argued that the extended close proximity of European humans and domesticated animals (and their associated germs and diseases), gave rise to some level of European immunity to diseases such as measles and smallpox. When Europeans travelled to the neo-Europes, they brought a portmanteau, or suitcase, of biota with them, including diseases, plants and animals. Because the hunter-gatherer indigenous inhabitants of these Neo-Europes did

not have any historical exposure to these diseases, the resulting illnesses spread quickly among aboriginal populations, for whom they were overwhelmingly lethal. Thus weakened (or eliminated), native populations could not repel the newcomers from encroaching on their traditional territories.

Customary understandings of ecological imperialism have tended to discount the higher latitudes as having participated in the Columbian exchange. Piper and Sandlos make the case that while the Canadian north did not experience the same scale of environmental change as more temperate regions, colonization attempts here did coincide with species introductions. In their article, Piper and Sandlos explore these ideas via three case studies: disease, animal and plant introductions.

3) Primary sources with discussion questions

- a) Dawson, George M. (1849-1901). *Report on the climate and agricultural value, general geological features and minerals of economic importance of part of the northern portion of British Columbia, and of the Peace River Country*. CIHM/ICMH microfiche series; no. 02368. [S.I]: s.n, [1879?].

If assigning to students as a parallel primary source reading, only pages 107 - 121 are relevant. The remainder of the document focuses on mineral wealth

- After skimming this piece, comment on the range of sources that Dawson has compiled to inform his impressions. Pay particular attention to the role that uncertainty plays in his narrative.
- Crosby's ecological imperialism thesis seems to imply that the application of the newcomer's portmanteau of biota was a trivial procedure. Comment on this suggestion, having read Dawson's account here.
- After your reading, would you have been convinced by Dawson's conclusion, that "it would be premature to allow that the climate of the Peace River is inferior to that of region about Edmonton or Saskatchewan" (p. 119)?

4) Piper and Sandlos's article describes the introduction of reindeer to the Mackenzie Delta. Library and Archives Canada hold digitized photos of these activities in an album. Instructors can use these images to bring this episode to life for their students.

- A. E. Porsild, M. Meikle, et al. Album 32, Reindeer [graphic material]. 1922-1950. LAC, R216-1024-8-E, Vol. 14957. Item ID no. 204916. <http://central.bac-lac.gc.ca/.redirect?app=fonandcol&id=204916&lang=eng>
- Mackay Meikle. [Reindeer herd on a range and in a corral, probably Richards Island, N.W.T.] (page 27). [June 1937-September 1937]. LAC, R216-1091-1-E, Vol. 14957. Item ID no. 4326719. <http://central.bac-lac.gc.ca/.redirect?app=fonandcol&id=4326719&lang=eng>
- Mackay Meikle, J. A. Parsons & A. E. Porsild. [Reindeer meat drying on racks and being lifted on a hoist (possibly Elephant Point, Alaska and Richards Island, N.W.T.)]. [1929, 1937-1938]. LAC, R216-1096-0-E, Vol. 14957. Item ID no. 4326727. <http://central.bac-lac.gc.ca/.redirect?app=fonandcol&id=4326727&lang=eng>
- W. E. Hogan & J. A. Parsons. [Two men digging a cave in rock for reindeer meat at Reindeer Station, N.W.T. and another inspecting reindeer carcasses hanging on a

- boat from Richards Island, N.W.T.]. [1940]. LAC, R216-1101-0-E, Vol. 14957. Item ID no. 4326729. <http://central.bac-lac.gc.ca/.redirect?app=fonandcol&id=4326729&lang=eng>
- Mrs. F. McInnis. [Herd of reindeer and herders on a range, possibly in the vicinity of Tuktoyaktuk, N.W.T.]. [1941]. LAC, R216-1126-5-E, Vol. 14957. Item ID no. 4326746. <http://central.bac-lac.gc.ca/.redirect?app=fonandcol&id=4326746&lang=eng>
 - S. Mason & A. P. Parsons. [Individual reindeer in corals and reindeer herds on a range, probably Reindeer Station, N.W.T.]. [1942, 1943]. LAC, R216-1128-9-E, Vol. 14957. Item ID no. 4326748. <http://central.bac-lac.gc.ca/.redirect?app=fonandcol&id=4326748&lang=eng>
 - W. E. Hogan. Children of Reindeer Herders, Reindeer Station, N.W.T. [June 1940-September 1940]. LAC, Vol. 14957. Item ID no. 3406128. <http://central.bac-lac.gc.ca/.redirect?app=fonandcol&id=3406128&lang=eng>
 - Rosemary Gilliat Eaton. [Danny Smith] at Reindeer round-up, [Atkinson Bay] Kidluit Bay, Inuvik, N.W.T. July 24, 1956. LAC, R12438-2581-1-E, Vol. 15. Item ID no. 4324258. <http://central.bac-lac.gc.ca/.redirect?app=fonandcol&id=4324258&lang=eng>
- 5) Video resources with discussion questions
- a) These National Film Board films bring alive the narrative of northern introduced diseases, in a way that an article cannot. Whereas the article describes the consequences of disease in more distanced, academic form, these two short films provide a synthesized version of some gripping stories of epidemic at the personal level. They can be shown in class, or assuming that students have access to high-speed Internet connections at home, assigned for students to watch on their own time. One is longer, the other shorter. Both explore the same themes in two different contexts, Labrador and the Northwest Territories.
 - b) *The Last Days of Okak*, Anne Budgell & Nigel Markham (1985). 23 min 52 s. Only grass-covered ruins remain of the once-thriving town of Okak, an Inuit settlement on the northern Labrador coast. Moravian missionaries evangelized the coast and encouraged the growth of Inuit settlements, but it was also a Moravian ship that brought the deadly Spanish influenza during the world epidemic of 1919. The Inuit of the area were decimated, and Okak was abandoned. Through diaries, old photos and interviews with survivors, this film relates the story of the epidemic, with its accompanying horrors, as well as examining the relations between the natives and the missionaries.
 - i) As you watch the video, keep an accounting of introductions other than disease. Were the impacts of these introduced material/cultural features trivial or profound? [For example, the rhubarb patch, the Moravian brass band, etc.].
 - c) Or, for classes with more time, the longer and more detailed Coppermine is another excellent option. *Coppermine*, Ray Harper (1992). 56 min 7 s. The Copper Inuit of the Coronation Gulf region of Canada's Northwest Territories were among the last aboriginal groups to be contacted by people from outside, mainly during the early years of the 20th century. When Doctor R.D. Martin arrived in Coppermine in 1929, he had to deal with one of the consequences of that contact, a tuberculosis epidemic.

- i) “There can be no doubt that the Coronation Gulf Eskimo [sic] need protection, for they are today free-er from serious disease than any other people in Canada.” What do you think of Vilhjalmur Stefansson’s plea for a medical authority to regulate who could and could not enter this area of the arctic? Can you understand the protestations of contemporary missionaries, etc.?
- ii) Were there any differences between earlier epidemics, as described in Piper and Sandlos’s article, and the introduction of TB as depicted in the film?
- iii) Explore the competition for souls, as evidenced by the rivalry between the Anglican and Catholic Churches.
- iv) The film is highly critical of the Canadian federal government. Are there any elements of environmental injustice at play? If relevant for your particular class, compare with Tina Loo’s [article](#) (unit 6 in this series of teaching modules).

Glossary

- Arctic circle: A parallel of latitude 66° 32' N, north of which the sun does not rise during winter (perpetual darkness), and it does not set during summer (perpetual daylight). This occurs because the Earth's axis of rotation is tilted relative to the plane of its orbit around the sun.
- 60th parallel: Forms the present boundary between the southern provinces of British Columbia, Alberta, Saskatchewan and Manitoba, and the northern territories, The Yukon, The Northwest Territories, and Nunavut.
- Permafrost: Ground that remains frozen below 0°C, continuously, for at least two years.
- Far north/high arctic: Region of sparse vegetation, and the wildlife it supports is more limited because of colder summers (2-5° C warmest month), a short growing season (1.5-2.5 months), and low precipitation (100-200 mm).
- Boreal forest or Taiga: This vegetation region encircles the Northern Hemisphere between the treeless Arctic Tundra and the more southerly mid-latitude broad-leaved forest zones. The largest vegetation region in Canada, it experiences cool, short summers and long, cold winters.
- Subarctic: The northern third to half of the Taiga, which has a shorter summer and colder climate than more southerly regions. This portion of the Taiga is transitional to Arctic Tundra where trees and woody plants are almost entirely absent.
- Petit Nord: French, meaning the “little north;” the area between the Great Lakes, Lake Winnipeg, and the Hudson Bay Lowlands.
- Middle north: The boreal fringe in the northern areas of Canada’s central and western provinces.
- Great Lakes: A collection of five freshwater lakes in Northeastern North America. They drain into the Atlantic Ocean via the St. Lawrence Seaway.
- St. Lawrence River Corridor: The region that lies alongside the waters of the St. Lawrence River as it flows northeast from Lake Ontario to the Gulf of St. Lawrence.
- Prairie provinces: Specifically, Manitoba, Saskatchewan, and Alberta.
- “Half-breed” Commission: The term refers to the Métis, descendants of mixed unions between people of First Nations and European heritage. The Commissioner, Charles Mair, was writing in support of a Northern Dominion as a defense against American expansion. Charles Mair in Dictionary of Canadian Biography: http://biographi.ca/en/bio.php?id_nbr=8264

- The Canadian Shield: A physiographic region, also known as the Precambrian Shield, or the Laurentian Plateau, being a very large area of exposed igneous and metamorphic rock, the oldest part of the North American crustal plate. It was the first part of the continent to be permanently raised above sea level, and represents half of Canada, most of Greenland, and part of the northern United States. Over much of the Shield there is only a thin layer of soil, and much exposed bedrock, caused by severe repeated glaciation that flattened mountains and scraped the rock clean.
- Manqué: French, meaning failed, missed, or lost.
- Alaska Highway: Constructed by the US Army during the Second World War, this American financed road connects Alaska to the rest of the US, through the Yukon and British Columbia. It was opened to the public in 1948, the Canadian portion having been turned over to the Canadian government in 1946.
- Mortality/morbidity: Mortality refers to the number of deaths in a population, whereas morbidity describes the number of individuals who are sick.
- HBC: The Hudson's Bay Company, having been incorporated by Royal English charter in 1670, is the oldest commercial corporation in North America, and was at one time the largest landowner in the world. It operated as the de facto government in parts of North America, until those areas were relinquished to the Dominion government, or claimed and occupied by the United States. Originally a fur trading business, today "The Bay" operates retail stores in Canada and the United States. It is currently managed by the American private equity firm NRDC Equity Partners.
- Anti-scorbutic: Effective in the prevention or relief of scurvy.
- Dominion government: In the text "Dominion" refers to the federal government of Canada. Specifically alludes to autonomous polities nominally under British sovereignty. The phrase "Dominion of Canada" was employed as the country's name after 1867.
- Sami: The Sami people, also Sámi or Saami, are the indigenous people of arctic Scandinavia.
- Exogenous disease: A disease that enters a closed biological system from the external world (i.e., outside the body). However, used here to refer to a newly introduced disease from elsewhere.
- Department of Indian Affairs: The federal department responsible for policies regarding Canadian aboriginal peoples, including First Nations, Inuit, and Métis.

Teaching Unit Number 2: Wet Prairie

This university-level teaching unit is designed to be easily scaled up or down regarding class time consumed, or difficulty, as appropriate for the individual course context. The material in this unit has a strict focus on Canada (specifically Manitoba), though instructors in other locations are encouraged to improvise on their own, using this module as a base, to insert a comparative element and make connections to other places or themes.

Learning goals

1. Introduce the theme of ecological commons
2. Contextualize the emergence of the state in Canada's west, as an environmental manager in situations of uncertainty or debate.
3. Familiarize the student with archival sources that inform bureaucratic historical narratives.
4. Encourage students to connect these concepts with their own experience of the world.

Resources

1. Shannon Stunden Bower, "[Watersheds: Conceptualizing Manitoba's Drained Landscape, 1895-1950](#)," in *Environmental History*, 12 (October 2007): 796-819.
 - a. In addition to the article, the instructor might do well to consult Stunden Bower's more recent book, *Wet Prairie: People, Land, and Water in Agricultural Manitoba* (Vancouver: UBC Press, 2011).
 - b. Discussion questions
 - i. Describe the fundamental topography of southern Manitoba.
 - ii. Explore the ideas involved in substituting the word "resettlement" for "settlement".
 - iii. Contrast guiding legislation and the newcomer perceptions that informed the settlement process as it took place in Alberta and Saskatchewan to the west, with that of Manitoba.
 - iv. What is "foreign water"?
 - v. How and why was agricultural progress in the highlands seen as detrimental for the lowlanders?
 - vi. Manitoba's Drainage Act of 1895 assigned financial responsibility for drainage infrastructure to the lowlanders of the province, through the creation of drainage districts. What was the rationale behind this decision and what were its oversights?
 - vii. What is a "topographically defined community of interest"? How did agricultural flooding across the lowlands of Manitoba, transform its human geography?
 - viii. In 1921, the Sullivan Commission found that "the greatest factor causing damage from flooding is the changed conditions since the districts were first formed." What were these changed conditions and how did they inform the debate over watersheds, and the proposed reconfiguration of the drainage districts?
 - ix. Why did the model of watershed based drainage funding fail to be realized despite repeated reports that found in its favor? What role did the

Dominions Land Act play in this outcome? How did it shape provincial residents' understanding of rights and responsibilities as they pertain to individual and community interests?

- x. Why did Lyons reject a watershed based drainage system in favor of a double dyke drain, which could separate “local” and “foreign” water, and what were the associated changes in funding? How was the new policy constrained by earlier decisions?
- xi. Compare the distribution of costs and benefits in this Manitoba-based drainage scheme, with that of [the WAC Bennett dam in British Columbia](#) (explored in teaching unit 6).

c. Contextual essay

Stunden Bower’s focus is southern Manitoba at the turn of the twentieth century, specifically, the provincial government's attempts to adapt to the interplay between a mobile physical geography of excess water, and an emerging human geography of resettlement. The tension between private property and ecological commons is key to understanding how events unfolded and this theme could form the core of an associated lecture, bolstering students’ understanding of the reading. One useful progression might be to introduce students to the traditional model of common pool resources, before complicating it with the notion that private property, too, can become common, when ecological processes intervene.

Private property is often imagined to be static, placing boundaries around nature and assigning exclusive rights to its use.¹ A commons, or common property resource, refers to a space or resource over which a group of people exercises collective rights. Access is restricted to group members and strict rules govern its use.² The literature on common pool resources can be traced to William Forster Lloyd (1794-1852), professor of political economy at Oxford. Lloyd disagreed with Adam Smith’s faith in “the invisible hand,” and described market failures via a thought experiment now popularly known as “The Tragedy of the Commons.” Pursuit of individual self-interest, Lloyd proposed, could result in shared disaster whereby benefits accrue to the individual, whereas costs are born by the collective. Lloyd’s thought experiment was re-articulated by economists in the 1950s, before being popularized by Garret Hardin in his influential 1968 editorial on “overpopulation” in the journal *Science*.

Contemporary scholars have categorized goods and services as variously excludable/non-excludable, and subtractable/non-subtractable. A good or service is excludable if one can prevent others from accessing it. A good or service is subtractable if use by one person diminishes the ability of use by another. The intersection of these categories can be visualized in the following table.

¹ Mark Fiege, “Private Property and the Ecological Commons in the American West,” in *Everyday America: Cultural Landscape Studies After J.B. Jackson*, ed. Chris Wilson and Paul Groth (Berkeley: University of California Press, 2003).

² *Ibid.*

	Excludable	Non-excludable
Subtractable	Private property such as your lunch, or a private forest (in the US) or common property such as Crown Land (in Canada). I eat my lunch because it is mine, and I can prevent others from doing so.	Open access or common property resource, such as a fishery, or fresh water. It is much harder to prevent outsiders from accessing these goods or services, and use by one person diminishes the ability of another to do the same.
Non-subtractable	Club goods paid for by subscription such as cable TV or the postal service. I can access these goods by a fee or subscription, and my use of the good does not preclude your use of the good or service.	Public goods susceptible to the “free rider problem” such as the atmosphere, a lighthouse, pirated downloads, or public services such as pest/weed control, and the drainage schemes explored by Stunden Bower. Hard (or impossible) to exclude outsiders, and my use does not diminish outsider’s ability to access these goods or services.

An *ecological commons*, as expressed by American environmental historian Mark Fiege (who informed Stunden Bower’s work), is an extension of the above themes. This term refers to ecological conditions operating in the midst of private-property regimes. In doing so, ecological relationships can generate public space, where before was only private property.

As natural objects cross human-imposed property boundaries (say running water, mobile animals, or the spread of noxious weeds or diseases), they compel humans to view otherwise privatized landscapes in collective and public terms. Rather than the sum of many private parts, many (but not necessarily all) people come see the landscape as an ecological and social whole. Nature’s mobility creates a shared interest in managing the water/animals/weeds/disease. Property rights in the ecological commons must be qualified.³

³ Mark Fiege, *Irrigated Eden: The Making of an Agricultural Landscape in the American West* (Seattle: University of Washington Press, 1999), 73.

A tension is thus created between the ideal of absolute ownership and the material reality of, in this particular case, the hydrological commons.

Stunden Bower notes that scarce water in comparatively dry Alberta and Saskatchewan (to Manitoba's west) lent itself to spatially expansive management regimes. Because prospective settlers had to get both land and water for irrigation, they tended to understand the environment through the Northwest Irrigation Act rather than the Dominion Lands Act.

In southern Manitoba's moist, soupbowl-shaped topography, there emerged a human geography of highlanders (who had often paid a premium for their land), and lowlanders, who were subject to flooding. The 1872 Dominion Lands Act structured how many Manitoban settlers viewed land preemptions. The act solidified principles of private property among highlanders, which created resistance to the watershed idea of subsidizing drainage improvements, so desired by lowlanders who had often paid much less for their properties. Those less expensive properties, when drained, were more productive than the land of their highlander neighbors. This greater agricultural potential was yet another objection voiced by highlanders, to subsidies for drainage paid by highlanders. Land improvements via public drainage works would not benefit the highlanders, and it would also make them less competitive.

A second, though perhaps lesser theme that instructors may wish to pursue is the twentieth century emergence of the State in managing both nature and society. In this regard, Studen Bower's work serves to undermine Scott's critique as laid out in *Seeing Like a State*.⁴ In that book, Scott argued that central governments force legibility onto their subjects, losing local particularities in the process. Stunden Bower's narrative argues exactly the opposite. Here in Manitoba, she argues, the provincial government was well aware of the local, and intervened to reduce conflict between topographic communities.

- d. Primary sources with discussion questions
 - i. A 34-minute podcast of an interview with Stunden Bower (available in two locations).
 1. <http://archive.org/details/NaturesPastAPodcastOfTheNetworkInCanadianHistoryEnvironment-459>
 2. <http://niche-canada.org/2011/09/20/natures-past-episode-24-draining-the-wet-prairie/>
 - ii. A 13-minute video interview with the author. This episode will be particularly useful for those instructors wishing to bring this story up into the present.
 1. <http://archive.org/details/Ehtv-Episode15InTheOakHammock>

⁴James C. Scott, *Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed* (New Haven: Yale University Press, 1998).

- iii. The Red River Basin Board produced a background document that details a comparative history of water management in Manitoba and in North and South Dakota. This text will be useful for instructors wishing to highlight a comparative Canada/US theme in a lecture.
 1. https://web.archive.org/web/20170408122940/http://www.redriverbasincommission.org/Drainage_Report.PDF

- e. Primary sources with discussion questions
 - i. Floods long pre-date the era that Stunden Bower describes in her article. The Manitoba Historical Society has posted an account of the 1826 flood, documenting both the flood itself and the varied reactions of local settlers to the event once the waters had subsided. This extract is drawn from Alexander Ross' book *The River Settlement of 1856*. [The embedded photographs](#), taken in a much later period, do not correspond to the events described in the text. [The Hudson's Bay Company archives](#) provides a parallel account, by Francis Heron, of the same 1826 flood.
 1. Compare the shared experience of the 1826 flood as described by Ross and/or Heron in the two above primary sources, and the varied responses to it, with those of later floods described in the article by Stunden Bower.
 - ii. Stunden Bower extends her work from the 1960s to the turn of the century in [this short editorial](#).
 1. Compare the conflicting interests of Winnepegers and those in outlying areas, created by the Red River Floodway. Does this conflict between urbanites and farmers parallel that of an earlier era, described in the journal article, between highlanders and lowlanders? If yes, then how? If no, then what are the differences?
 - iii. Robert W. Passfield of Parks Canada also explores the floodway's construction, although in much more heroic terms, in his Manitoba Historical Society piece “Duff’s Ditch’: The Origins, Construction, and Impact of the Red River Floodway.” [This short article](#) is useful for providing an easily accessible, broad context to the issue of flooding in Manitoba.
 1. Passfield presents a positive view of the Red River Floodway. Undertake some research of your own to explore the more controversial aspects of the 1997 flood.

Glossary

- **Dominion:** This is an older term, often used as a synonym for federation. In the text “Dominion” refers to the federal government of Canada. Specifically, it alludes to autonomous polities nominally under British sovereignty. The phrase “Dominion of Canada” was employed as the country's name after 1867. The fathers of Confederation had originally wanted to use the term “Kingdom of Canada” but the British Government feared the phrase would offend the Americans in the wake of their Civil War. Dominion was intended to give dignity to the federation and pay tribute to the monarchical principle.

- **Dominion Land Survey:** This method was used to divide much of Western Canada into square mile sections (2.6 km²). It was adapted from the American Public Lands Survey System, but differed in that individual sections included allowances for public roads. Begun in 1871, the Dominion land survey was an assertion of Canadian sovereignty at a time when the United States was undergoing massive expansion. Paired with the construction of railroads, these surveys were meant to discourage American encroachment. <http://data2.collectionscanada.gc.ca/nmc/n0043265.pdf>
- **1872 Dominion Lands Act:** The short form of “An Act Respecting the Public Lands of the Dominion,” this was a Canadian law that applied to all western lands that the federal government acquired from the Hudson’s Bay Company in 1870. It set out rules to encourage, and govern, the orderly settlement of the prairie provinces and thus prevent American encroachment. This nationalistic policy invited European and American settlers to populate an agrarian western region that would sustain an urbanized central Canada (Ontario and Québec). The two regions were to be linked by a railway, paid for in part by public subsidies. <https://www.thecanadianencyclopedia.ca/en/article/dominion-lands-policy>
- **Manitoba:** Located in the center of Canada, it was a small province created in 1870. Through federal provincial negotiations, the boundaries were extended in 1881 and 1884 before finally being set in 1912.
- **Manitoba escarpment (known in the United States as the Pembina escarpment):** A long steep, slope or cliff found in Manitoba and the Dakotas that marks the historical boundary of glacial lake Agassiz.
- **Lake Agassiz/Red River lowlands:** An immense glacial lake located in the center of North America. Greater in extent than all of the Great Lakes of today, it formed about 13,000 years ago from meltwater derived from the retreating continental glaciers.
- **Precambrian Shield:** A physiographic region, also known as the Canadian Shield, or the Laurentian Plateau, being a very large area of exposed igneous and metamorphic rock, the oldest part of the North American crustal plate. It was the first part of the continent to be permanently raised above sea level, and represents half of Canada, most of Greenland, and part of the northern United States. Over much of the Shield there is only a thin layer of soil, and much exposed bedrock, caused by severe repeated glaciation that flattened mountains and scraped the rock clean.

Teaching Unit Number 3: Extreme Events

This university-level teaching unit is designed to be easily scaled up or down regarding class time consumed, or difficulty, as appropriate for the individual course context. The material in this unit has a strict focus on Canada (specifically Québec), though instructors in other locations are encouraged to improvise on their own, using this module as a base, to insert a comparative element and make connections to other places or themes.

Learning goals

1. Introduce the theme of natural hazards perception, and how these perceptions may change through time.
2. Contextualize the emergence of state funded river management.
3. Familiarize the student with archival sources that inform narratives of
 - a. environmental change.
4. Encourage students to connect these concepts with their own experience of the world.

Resources

- 1) Stéphane Castonguay, [“The Production of flood as natural catastrophe: Extreme events and the construction of vulnerability in the drainage basin of the St. Francis River \(Québec\), mid-nineteenth century to mid-twentieth century.”](#) *Environmental History*, 12 (October 2007): 820-844.
 - a) Discussion Questions
 - i) Before having read this piece, have you encountered the term "nature/culture" boundary? Castonguay does not invoke this term, but it is fundamental to his argument. How so?
 - ii) What does Castonguay mean when he speaks of the "social production" of natural catastrophes? How is the social production of a disaster different than the actual event of flooding? Who are its authors, and what motivates its production and perpetuation? Cite and explain with examples from the St. Francis River region.
 - iii) What was the "positive corollary to the non-navigability of the Eastern Townships rivers"?
 - iv) How did industry driven modifications to the St. Francis River render the riverine populations vulnerable? Consider changing perceptions toward flood and drought risks, responsibility for risk management, ability to respond, and liability for damages in your response.
 - v) Why was the construction of large dams to regulate water flow, and the erection of retaining walls, not a successful approach in the prevention of flooding in the St. Francis River drainage basin? By contrast, why was a more holistic approach, which would have employed more control dams, rejected? How did the earlier decisions constrain the later ones?
 - vi) Compare the effects of industry on the environment of the riverine population with the environmental and human impact of industry from one of the other articles in [“Teaching EH: Canada” series](#). Consider the similarities and differences. What are some of the recurrent themes?

- vii) Castonguay primarily treats industry and the economic class as a privileged population distinct from the riverine residents, suggesting each to have a discrete set of interests. However, local industries necessarily would have employed local employees, and local energy producers would have supplied local consumers. Is the relationship between these populations and their views on flood management, more complex than Castonguay acknowledges? Consider a broader spectrum of views on the flooding situation, and why these positions may have been embraced.

2) Contextual essay

Castonguay explores the perceptions of flood events on the St. Francis River, Québec, and how over the course of the latter nineteenth and twentieth centuries, popular adjustments to floods came to be replaced by increased vulnerability to events then perceived as catastrophic. In this way, Castonguay's historical narrative is “yet another instance of the social production of natural catastrophe” inspired by the pioneering work of American Geographer, Gilbert F. White (1911-2006).

White's work can be summarized by the phrase “Floods are 'the acts of God,' but flood losses are largely the acts of man.”¹ White came to this conclusion through his study of increasingly expensive, but decreasingly effective large-scale American flood control works. Americans had suffered through significant environmental extremes through the 1920s and 1930s.² The American federal government adopted an interventionist stance, funding large-scale Depression-era public works projects that sought to minimize flood catastrophe and the subsequent human hardship. White's 1945 doctoral dissertation, “Human Adjustment to Floods” detailed the breadth of choices available to people when confronted with flood hazards and uncertainty. Government policy was then focused on a limited repertoire of flood abatement engineering works and managing upstream land uses, certain types of emergency measures, and public relief. White concluded that public policy needed to change to encompass a much wider array of adjustments. He did so based on observations that investment in engineering works created overconfidence, leading to a false sense of security, particularly when flood waters ultimately breached those heightened defenses, resulting in even greater losses. “In the light of meager evidence, it seems possible that reservoirs and channel improvements, unless supplemented by land-use measures, may induce or promote further encroachment upon a flood plain, and so may increase rather than decrease mean annual losses.”³

When applied to the St. Francis River, Québec, Castonguay explores the local experience of a more general pattern shared quite widely. He locates himself in the broader literature by identifying three descriptive trends: that academics have understood natural catastrophes as being the product of social structures (in which the poor or minorities are inordinately

¹ G.F.White, “Human Adjustment to Floods,” Research Paper 29 (Department of Geography, University of Chicago, 1945), 2.

² N.Macdonald, D.Chester, H.Sangster, B.Todd, and J.Hooke, “The significance of Gilbert F. White's 1945 paper 'Human adjustment to floods' in the development of risk and hazard management,” *Progress in Physical Geography*, 36 (2012): 125-133.

³ White, 206.

affected), human action (in which flooding is an unanticipated by-product of attempts to harness nature) or elite discourse (in which ruling elites attempt to hide the role of human interventions in creating natural disasters, legitimating the disproportionate distribution of risks).

Traditionally, local St. Francis riverine populations tolerated fluctuations in river flow—indeed, they expected it, and behaved accordingly. Unlike the local population, emerging captains of industry could not tolerate flow irregularities. This connection between industry and the river superseded the relationship between local riverine populations and the river.

Previously, industrialists had not been vocal in times of flooding, except when they were forced to defend themselves against accusations that their activities had contributed to, or worse, created, a flood event. With increased industrialization via damming and hydro-generation, industrialists came to view flooding as waste; as potential power not generated. Municipal leaders saw hydropower as central to their strategies for economic development. The irregular river flows affected all local industrial activities including logging, sawmills and paper mills, textile mills, etc. Construction of dam reservoirs at the St. Francis headwaters would enable the storage of water (future potential energy) otherwise lost by the power plants downstream. The flood of 1913 mobilized economic and political authorities to also address the problem of low water. By funneling excess spring water into storage, it could be saved for times of subsequent drought. Droughts, Castonguay argues, contributed to changing perceptions of these extreme events; they were crucial to the production of flooding as a “natural catastrophe.”

By the 1940s inhabitants of the St. Francis River valley had become unaccustomed to floods and attitudes to erratic flows generated even greater demands for public safety. Citizens no longer kept a vigilant eye on the river, searching for cues that flood danger was immanent. Instead they devoted their energies to pursuing claims for protection and subsequent government reparations after flood events. In time, citizens lost faith in engineering solutions to flood damage, and they grew suspicious of any modifications to the landscape that might disturb the river's flow. Responsibility was passed up levels of government until it extended beyond the flood area proper. Eventually responsibility, and expertise, left the area entirely. Governments began to manage river flow separately from the river's ability to generate electricity, since that center of gravity had by then moved north of the St. Lawrence River. Castonguay concludes by observing that while riverine inhabitants had lost their previous local methods of coping with floods, they acquired an understanding of the fallibility of flood management schemes. This latter point extends Gilbert White's seminal work, by recognizing the dangers in becoming overly reliant upon the state for flood protection and subsequent restitution.

3) Primary sources

- a) Gilbert Fowler White. *Human Adjustment to Floods*. Chicago: University of Chicago Department of Geography, Research Paper No. 29, 1942, published 1945.
- b) [View in the Eastern Townships, Lower Canada on the River St. Francis](#). Attributed to Joseph Bouchette, ca 1836.
- c) [Richmond, St. Francis River, Que.](#) Photo by C Rinfret, Canada. Dept. of Mines and Technical Surveys, 1924.

- d) [Bridge at Pierreville on the St. Francis River](#), Canadian Illustrated News, 1871.
- e) [Old Bridge over the St. Francis River, Sherbrooke, Que.; New Bridge over St. Francis River, Sherbrooke, Que.](#), postcard 190?
- f) [St. Francis River, Abenakis Springs, P. Que.](#) Canada, The Abenakis Springs Hotel Co, postcard, early twentieth century.
- g) [Scene on the river St. Francis near Sherbrooke](#), by W.H. Bartlett, 1840.
- h) [Map of a part of the River St. Francis shewing the depth of water from the mouth to one mile above Pierreville village.](#) 1874.
- i) [Sketch shewing position of posts, booms & path in connection with Abenakis Reserve, River St. Francis, Prov. of Quebec, 1883](#) [cartographic material].
- j) [St. Francis River](#), as photographed by William James Topley, 1912.

Glossary

- Eastern Townships: A region located in south-central Québec, between Montréal and Québec City. The northern boundary is roughly the geological boundary between the St Lawrence lowlands and the Appalachian Mountains (look for Drummondville on a map). The southern boundary is represented by the Canada – US border (Vermont, New Hampshire and Maine). Originally inhabited by the Abenaki First Nations, the American Revolution saw English-speaking loyalists leave the US for this area (among others).
- After 1840 the region experienced significant French colonization, and by the 1880s Francophones had become the majority population.
- Floodplain: A relatively flat surface alongside the channel of most rivers, it extends outwards from the river itself to the base of the river valley walls. It is so called because the plain is periodically inundated during flood events. Gilbert White defined the floodplain as “that land outside of a stream channel described by the perimeter of the probable limiting flood. It is land which is not covered by the stream at low flow or average flow, but which has been flooded in the past or may be flooded in the future. It has no other essential feature; it may be broad or narrow, frequently flooded or rarely flooded. In this sense, every stream which has floods also has a flood plain” (p 44).
- Lower Canada (as opposed to Upper Canada): In present day understanding, this should be read as a synonym for “Québec.” Historically, it was the southern portion of present-day Québec, having been created in 1791. Lower Canada was abolished in 1841, upon amalgamation with adjacent Upper Canada (present day Southern Ontario) to form the united Province of Canada. The upper and lower refer to the relative distance away from the headwaters of the St. Lawrence River.
- Portage: A term from when most long-distance travel in Canada took place by canoes on water, rather than overland. Portage refers to either the place, or the practice of carrying a canoe and goods over land between navigable stretches of water. This might be necessary to get around an interruption, such as a waterfall or rapids, or when two adjacent lakes are not connected.
- Riparian: Of, relating to, or situated on, the banks of a river; riverine. Frequently with reference to the rights of ownership of a riverbank, or when used in an ecological sense, meaning the transitional zone between dry land and running water.
- Hydrography: The scientific description of water on the earth's surface, including the mapping of seas, lakes and rivers.

- Hydrology: The science that examines water, its properties and laws, its distribution over the earth's surface, etc.
- Vernacular: Can refer to the indigenous language of an area, or it can imply the ordinary and domestic.

Teaching Unit Number 4: Downwind, Downstream, Downtown: Ecological Footprint Analysis

This university-level teaching unit is designed to be easily scaled up or down regarding class time consumed, or difficulty, as appropriate for the individual course context. The material in this unit has a comparative focus on Canada and the United States (specifically Montréal and Baltimore), though instructors in other locations are encouraged to improvise on their own, using this module as a base, to extend the comparative element or to make connections to other places or themes.

Learning goals

1. Introduce the theme of ecological footprint analysis as a means to structure historical narrative.
2. Contextualize the production of urban waste.
3. Familiarize the student with archival sources that inform urban historical geography.
4. Encourage students to connect these concepts with their own experience of the world.

Resources

1. Sherry Olson, "[Downwind, Downstream, Downtown: The Environmental Legacy in Baltimore and Montreal](#)," *Environmental History*, 12 (October 2007): 845-66.
2. Discussion Questions
 - a. What is the "urban funnel," and how does it relate to material flows? Look to the Montreal and Baltimore case studies to illustrate your response. Consider the evolution of its shape over time.
 - b. Why does Olson argue the importance of monitoring the scale and speed of urban growth? How might her research focus be useful to city planners?
 - c. What is path dependence? While Olson understands Montreal and Baltimore to have undergone similar construction trends, she emphasizes how the cities' decisions necessarily diverged in cases of ecological difference. What are some of the positive and negative ways in which these unique aspects of the cities influenced their respective growth? Could the outcomes have been otherwise?
 - d. Olson scrutinizes industry for its potential to affect far greater material flows than any other actor, and hence, to introduce far greater contaminants into public space. She suggests that government has the power to intervene in industrial practices, and to curtail environmental damage. Knowing what you do now, what policy recommendations would you propose to regulate dumping by industry in your home jurisdiction?
 - e. Olson contests the validity of data collected on the ecological footprints of cities. On what grounds does she challenge the accuracy, and what other sorts of considerations does she propose must be taken into account?
 - f. Olson presents an unpleasant side to construction booms, acknowledging that "surges of construction" are also "surges of discard." What are the environmental costs of construction and industry? Who assumes this burden, and who reaps the rewards? Discuss this question as it pertains to the idea of environmental justice.
3. Contextual essay

In her article, historical geographer Sherry Olson constructs a comparative study of Montréal and Baltimore, using diverse quantitative sources. In forging her case, Olson makes heavy use of several distinct themes within the broad ecological economics literature. Specifically, she draws upon the ideas of ecological footprint analysis, ecological services and path dependence. Olson argues that urban infrastructural decisions have significant environmental implications long after first implementation.

Students must understand these theoretical underpinnings of Olson's article to truly appreciate the argument. While many will already be familiar with the general shape of Ecological Footprint analysis, fewer will have encountered ecological services or path dependence. Instructors may want to use the following information in a lecture as a way to make the reading more meaningful for students.

“Over-population”

For several centuries, concerns about population, or more precisely overpopulation, drove debates about how states and societies ought to intervene in the lives of private persons. For instance, did the state have an obligation to look after the poor? What was the relationship between poverty and population numbers? Significant personalities to include in a lecture might be Reverend Thomas Robert Malthus (1766-1834) and a long possible list of more contemporary neo-Malthusians such as Paul and Anne Ehrlich (authors of *The Population Bomb*), Garret Hardin (modern popularizer of the “Tragedy of the Commons”), the Club of Rome, and Lester Brown (president of the Worldwatch Institute). Much of this twentieth century literature aimed to predict when exponential population growth would result in famine and resource scarcity (and, more importantly, the resulting social chaos). However, despite best attempts in their formulation, none of these predicted apocalypses ever came to pass. This begged the question, were the predictions unfounded, or were those making them simply wrong about their timing?

Ecological Footprint Analysis

Through the 1970s and 1980s, environmentally minded scholars and pundits became increasingly receptive to viewing poverty as a cause of high population growth rates and environmental destruction. The 1987 Brundtland Commission report *Our Common Future* is the culmination of these ideas. The report highlighted the needs of the world's poor with respect to environmental sustainability. In the years since the early 1990s, the prior fixation with absolute population numbers as a cause for theorized resource exhaustion, has given way to a different driving force: the unequal distribution of consumption and wastes. Put in another way, a very few rich individuals wreck the greatest environmental destruction, while the overwhelming majority of the world's poor lead much more environmentally benign lives. The most well known manifestation of this per capita mode of understanding inequity and differential environmental impacts is Ecological Footprint analysis.

Scholarly experience indicated that it was impossible to determine when food and resource scarcity would instigate global mass death and chaos. It was surely much more

productive to flip that equation upside-down. University of British Columbia planner and ecological economist William Rees and his PhD student Mathis Wackernagel developed a method to estimate how large an area of productive land was required to support the existing inhabitants of a single city. They did this using a thought experiment to illustrate that the geographic locations of cities no longer coincide with their ecological locations.

Imagine a city with a large dome over it, impermeable but elastic; how large would that dome have to be to support the urban inhabitants with resources and the assimilative capacity to absorb their wastes? This idea can be further expanded to include all cities. How many earths would be required to satisfy particular rates of consumption over the long term? This is a significant shift in outlook with a profound impact on the shape of subsequent historical narratives. Olson's article is one such example of what might be done using ecological footprint analysis as an historical organizing tool.

Ecosystem Services

In writing her article, Olson also enlists ideas from the "ecosystem services" literature, a second parallel sub-body of the broader field of ecological economics. The term "ecosystem services" focuses on links between non-human ecosystems and the human economy. It is premised on the idea that current rates of resource harvesting and waste generation deplete nature faster than it can regenerate. This literature originated in the late 1970s and 1980s as a way to encourage the lay public to view the beneficial functions of ecosystems in a new utilitarian light, and thus increase support for biodiversity conservation.

One slightly later definition comes from Costanza et al.:

Ecosystem functions refer variously to the habitat, biological or system properties or processes of ecosystems. Ecosystem goods (such as food) and services (such as waste assimilation) represent the benefits human populations derive, directly or indirectly, from ecosystem functions. For simplicity, we will refer to ecosystem goods and services together as ecosystem services.¹

A second oft-cited definition comes from Gretchen Dailey:

Ecosystem services are the conditions and processes through which natural ecosystems, and the species that make them up, sustain and fulfill human life. They maintain biodiversity and the production of ecosystem goods, such as seafood, forage, timber, biomass fuels, natural fiber, and many pharmaceuticals, industrial products, and their precursors. The harvest and trade of these goods represent an important and familiar part of the human economy. In addition to the production of goods, ecosystem services are the actual life-support functions, such as cleansing, recycling, and renewal, and they confer many intangible aesthetic and cultural benefits as well.²

¹ Robert Costanza, Ralph d'Arge, Rudolf de Groot, Stephen Farber, Monica Grasso, Bruce Hannon, Karin Limburg, Shahid Naeem, Robert V. O'Neill, Jose Paruelo, Robert G. Raskin, Paul Sutton, and Marjan van den Belt, "The value of the world's ecosystem services and natural capital," *Nature* 387 (May 15, 1997): 253-260.

² Gretchen C. Dailey, "Introduction: What Are Ecosystem Services?" in *Nature's Services: Societal Dependence on Natural Ecosystems*, ed. Gretchen C. Dailey, (Island Press, Washington, DC: 1997).

This interpretation of ecosystems as service providers entered the mainstream literature in the 1990s when Costanza et al explored ways of assigning dollar values to ecological functions. This concept was further popularized by the Millennium Ecosystem Assessment (MA) in the early 2000s, which launched these ideas into public policy practice.

Despite any nuances, all definitions of ecosystem services highlight their characteristics as public goods and how they can support the creation of private goods. The current interest in the protection of ecosystems and their services reflects the belief among many people that ecosystems are being overexploited in the production of private goods and that these private goods should be produced in such a way as to maintain the existing stock of ecosystem capital.³

Path Dependence

Prior decisions constrain future ones, even if the original circumstances are no longer relevant. Path dependence is a term popularized in the mid 1980s by economic historian Paul A. David. Path dependence is a property of a system such that the outcome over a period of time is not determined by any particular set of initial conditions. Rather, a system that exhibits path dependency is one in which outcomes are related stochastically [or randomly] to initial conditions, and the particular outcome that obtains in any given 'run' of the system depends on the choices or outcomes of intermediate events between the initial conditions and the outcome.⁴

Given the nuanced complexities involved, an example will be helpful. The classic illustration of path dependent system is that of a Polya urn experiment.

“Imagine an urn with four balls in it—one red, one yellow, one white, and one black. The object is to fill the urn by selecting one ball and then replacing it along with two more balls of whichever color is chosen. Which color will dominate the full urn’s contents? Note that whichever ball is drawn first—red, yellow, white, or black--will gain an advantage in future rounds, for there will then be three of that color, and only one of each of the others. Therefore, 50% of the time, the first color chosen then will also be chosen second, thus receiving an even larger advantage. Nonetheless, this does not mean that the first color drawn will always fill the urn. There is a 50% chance that another color will be drawn on the second round, thus restoring parity between at least two colors, and leaving it to later choice to tip the balance in any one color’s favor. The study of this class of problems has shown that there is no determinate outcome; rather the final pattern

³ Neal Allan MacDougall, “The Tradeoff between Ecosystem Services and Location of Production: The Case of Shrimp Aquaculture in an Ecuadorian Mangrove Ecosystem” (University of California, Berkeley: PhD Dissertation, 1999).

⁴ Goldstone quoting Paul A David. Or, in full, tracing a given outcome back to a particular set of historical events, and showing how those events are themselves contingent occurrences that cannot be explained on the basis of prior historical conditions. Extended definition from Jack A. Goldstone, “Initial Conditions, General Laws, Path Dependence, and Explanation in Historical Sociology,” *American Journal of Sociology*, 104 (1998), 843. See also James Mahoney, “Path dependence in Historical Sociology,” *Theory and Society*, 29 (2000): 507-548.

depends on the particular choices that happen to be made in the sequence of filling the urn.”⁵

Of course human decisions through time are not random. The experiment example is useful to highlight the cumulative importance of even seemingly small decisions on later outcomes.

The themes as united in the article.

The urban funnel model describes a way of thinking about resource appropriation and waste disposal, by the city, that is sensitive to the spatial distribution of these activities.⁶

As described in the article, initially most bulky commodities were acquired close to home, with only very high value goods coming from afar. With time came decreased shipping costs, allowing for longer journeys of lower value goods. Throughout the period, however, waste disposal continued in situ. Each surge in urban growth in the two cities produced a corresponding leap in size and complexity of the urban funnel; each surge also established a future stream of demands for ecosystem services.

4. Primary source(s)

a. Montreal

i. Transportation

1. Wm. Notman & Son. [Unloading S.S "Durham City", Montreal, QC, 1896](#). McCord Stewart Museum, Object no. II-116749.
2. Wm. Notman & Son. [Harbour from examining warehouse, Montreal, QC, about 1890](#). McCord Stewart Museum, Object no. VIEW-2230.
3. Jean-Louis Frund. [Mayor Jean Drapeau and Lucien Saulnier, as the first Metro train passes. 1966](#). McCord Stewart Museum, Object no. MP-1994.1.2.1061.

ii. Energy

1. Wm. Notman & Son. [Coal towers, Montreal harbour, QC, about 1912](#). McCord Stewart Museum, Object no. VIEW-4941.1.
2. The Canadian Encyclopedia entry for [Hydro-Québec](#).

iii. Sewage/Waste

1. [The Hochelaga Cotton Factory. 1874](#). McCord Stewart Museum, Object no. M979.87.360.
2. Wm. Notman & Son. [Montreal from Street Railway Power House chimney, QC, 1896](#). McCord Stewart Museum, Object no. VIEW-2943.
3. Andrew Emond. [“Montreal’s Wastewater Treatment, Part I – A History of Problems: Out of sight, out of mind. Montreal’s long and troubled history.”](#) Spacing. Issue 10.

iv. Construction/Deconstruction

⁵ Goldstone, 834.

⁶ Luck et al, “The Urban Funnel Model and the Spatially Heterogeneous Ecological Footprint,” *Ecosystems*, 4: 782-96.

1. [Group of workmen, demolition of buildings on University Street, Montreal, QC, about 1910](#). McCord Stewart Museum, Object no. MP-0000.1297.1.
- v. Maps
1. Jacques Nicolas Bellin. [Carte de l'Isle de Montréal et de ses environs / dressée sur les manuscrits... par N. Bellin ; Dheulland sculp. \[Paris: s.n.\], 1744](#). Map of Montreal and area, 1744. BANQ, Bibliographic entry no: 0002663676.
 2. A. W. Morris & Bro. [City of Montreal, 1888](#). McCord Stewart Museum, Object no. M4824.
- b. Baltimore
- i. The Baltimore County Public Library has [a searchable collection of digitized archival photographs](#). The URLs it produces are temporary, but here are a few image suggestions.
 1. Streetcar from Baltimore, Pimlico and Pikesville line of Baltimore Traction Company, 1890s.
 2. Pratt and Light Streets, Baltimore, 1904
 3. A Baltimore Gas & Electric Company excavator is digging a trench for the laying of gas pipe in the Lansdowne area, 1928.
 4. Hollingworth's Dam over the Jones Falls, year unknown.
 - ii. Transportation
 1. [Maryland Department of Transportation](#). While not organized chronologically, this webpage gives a good summary of related events for this district.
 - iii. Energy
 1. [Baltimore General Electric 200th Anniversary Book](#).
 - iv. Waste
 1. [Conservation. Scrap iron and steel, Baltimore, 1941](#).
 2. [Baltimore, Md., from Federal Hall \[i.e. Hill\], 1900](#).
 3. [History of the Baltimore Sewer System](#).
 - v. Maps
 1. Baltimore. Department of Public Works. [Historical Growth Map of City of Baltimore. 1977](#).
 2. Baltimore City Archives. [The Geography of Baltimore City: Sources](#).

Glossary

- **Kuznets cycles:** A theoretical trend of repeated urban infrastructural growth booms separated by 15 to 25 years of lesser activity. Named after Simon Kuznet, a Belarusian-American economic historian who first identified this pattern in 1930. Kuznet looked at American economic data from the 1860s to 1925. He associated investment booms in construction and housing as having a relationship with demographic patterns, particularly waves of immigration. More information can be found in the quite detailed overview: Moses Abramovitz, “The Nature and Significance of Kuznets Cycles,” in “Essays in the Quantitative Study of Economic Growth, Presented to Simon Kuznets on the Occasion

of His Sixtieth Birthday, April 30, 1961, by His Students and Friends” *Economic Development and Cultural Change* 9 (April 1961): 225-248.

- The “treadmill of destruction” (p. 860): This is an example of scholarly wordplay. In a short, compact phrase, Olson is communicating a very complex set of ideas. Here, she plays off the phrase “the treadmill of production” coined by Allan Schnaiberg in his book from 1980, *The Environment: From Surplus to Scarcity*. Much more recently Hooks and Smith used the phrase to describe the inflexible and unyielding expansion of capitalism and the negative consequences of this expansion for the environment (Hooks and Smith, 2005, “Treadmills of Production and Destruction: Threats to the Environment Posed by Militarism”). However, Hooks and Smith extend Schnaiberg’s original idea, in that they also argue that there is a *second* treadmill. The “treadmill of destruction” draws attention to a distinct expansionary dynamic that also generates additions to and withdrawals from the environment. However, the treadmill of destruction refers specifically to expansionary dynamics associated with war and militarism: geo-political competition and arms races. This is the sense that Olson uses the phrase in our current reading. City expansion (and thus the environmental effects of city-building) may have slowed down in both Montreal and Baltimore during the Second World War. Olson is making the point that environmental destruction was redirected away from the city and into the war effort.

Teaching Unit Number 5: Science and Spaces

This university-level teaching unit is designed to be easily scaled up or down regarding class time consumed, or difficulty, as appropriate for the individual course context. The material in this unit has a strict focus on Canada (specifically the north), though instructors in other locations are encouraged to improvise on their own, using this module as a base, to insert a comparative element and make connections to other places or themes.

Learning outcomes

1. Introduce the theme of science in context.
2. Contextualize changing impressions of the Canadian north.
3. Familiarize the student with archival sources that inform knowledge production in the north.
4. Encourage students to connect these concepts with their own experience of the world.

Resources

1. Open source journal article: Stephen Bocking, "[Science and Spaces in the Northern Environment](#)," *Environmental History*, 12, (October 2007): 867-94.
2. Discussion Questions
 - a. What is scientific knowledge? What is related local knowledge? What are the virtues of each, and the relationship between them? How might one distinguish between the two?
 - b. How do theories of local and global knowledge collide in their conceptions of the Canadian North? Must place specific research methods and theories be developed to best understand an environment, or can they be imported as a general rule from elsewhere? How do these tensions present in the article?
 - c. How has the environment of the Canadian North influenced the development of scientific practice?
 - d. Bocking looks at the spatialization of disciplines in the Canadian North, charting their growth and contraction over time. How have these changes been historically connected to the agendas of industry and government? What role does policy and funding play in the production of science?
 - e. Is science neutral? How is scientific authority generated and sustained? Why does social context matter when looking at facts? What is the relationship between scientific knowledge and authority?
 - f. Why does Bocking encourage building connections between environmental history and the history of science? What information does he perceive to be generally omitted from a traditional, or pure environmental history approach?
 - g. How has the narrative of the Canadian North been conceived over time, and how does this narrative connect to changing views regarding wildlife population cycles, the diversity/stability hypothesis, environmental management, etc.? What motivates these stories? Consider the relationship

between environmental narrative, political policy, and the economy in your answer.

- h. Is science meaningfully different, when commissioned by a government department, a university department, or a consulting firm?
 - i. Do northern spaces demand special scientific approaches, or could those developed elsewhere be applied there? Why might Canadian scientists be inclined to argue for the distinctive nature of the north?
3. Contextual essay

Stephen Bocking's article is a good classroom resource to illustrate issues surrounding the production of scientific knowledge. Indeed, it is an example of the convergence of interests shared by environmental historians and historians of science. Questions that unite these two intersecting groups include how we acquire reliable knowledge; the differences between scientific knowledge and other bodies of expertise (the demarcation problem); the unity or disunity of science; the relationship between science and the wider social system; and more particularly, who we should trust to inform public decisions and why.

The popular perception of scientific knowledge is that it is true and objective independent of place or time. However, while science informs our understanding of the environment, it too has a history of its own, a context, and is subject to change. In this way the category of "science" is like that of "nature" or "culture." Scientific explanations and social contexts are hopelessly entangled. Science has both a history and perhaps more startlingly, a geography.

In the last thirty years, social scientists and humanists have favored local explanations over universal grand theories. These micro-history case studies detail how knowledge stabilizes to the point where a result seems secure, and then this local knowledge becomes global knowledge through the exercise of power. As Bocking explains, to be successful, scientists' efforts to assert the authority of their knowledge across wider spaces must be invisible, permitting the claim that scientific knowledge represents merely a factual and objective description of nature (rather than a tenuous set of limited local observations).

In his article, Bocking traces two fundamental shifts between the 1940s and 1970s. These include that of the environment of northern Canada that was transformed physically (via industrialization and resource development) and politically (via the formation of an administrative regime).

The first episode saw its height in the 1950s. Bocking contends that northern Canada attracted the attention of ecologists debating the existence and significance of cycles in animal populations. Apart from being ecologically interesting, they also held practical interest for a region economically dependent on the fur trade.

The second episode occurred in the 1960s and 1970s. Notions of ecological fragility drew ecologists to the North, within a political culture newly sensitive to impacts on the environment. In time, the north's unique fragility was replaced by the assumption that the potentially harmful impacts of industrialization could be managed by the

same tools employed elsewhere. Bolstering this change, northern Native peoples gained a stronger political voice, such that their view of the Arctic as a cultural landscape with an intrinsic human presence weakened attempts to describe the north as a “pristine wilderness.”

Through both episodes, several themes are evident. First is the value of understanding the practical work of scientists in the field (how they gather knowledge and assert its relevance and authority). The second is a consideration of how scientists conceived of the northern environment. Either defining it as unique (and requiring special ideas and techniques) or as a place like all others, except perhaps colder or less productive (and thus being entirely accessible via universal ideas and approaches developed elsewhere). Third, these interpretations defined appropriate questions that scientists ought to pursue, how their studies were financed, and indeed the appropriate venues in which their knowledge was produced (universities, government departments, or private consulting firms).

Bocking concludes his article with the concept of “disciplinary space” to understand the role of science in environmental history narratives. He defines this term as “the territory in which the concepts and methods particular to a discipline are considered authoritative and relevant” (p. 886). So, scientists’ attempts to argue that their methods and insights have relevance for a given region can thus be mapped (both cognitively and socially), implying that there is a geography of disciplines. Disciplinary spaces are dynamic in that they expand, contract and shift as the ideas of a discipline become more or less plausible or useful within a region. Bocking is drawing on a now significant literature to inform his analysis. Instructors seeking an entry into that realm would do well to consult some of the supporting resources listed below.

Additional supporting resources

- Bocking, Stephen. *Nature’s Experts: Science, Politics, and the Environment* (Rutgers, NJ: Rutgers University Press, 2004), particularly pp. 16-44.
- Bocking, Stephen. "[Sketching a Political and Environmental History of Science in Northern Canada.](#)" Northern Environmental History Workshop. 13 June 2009.
- Livingstone, David. *Putting Science in its Place: Geographies of Scientific Knowledge* (Chicago: University of Chicago Press, 2003).

4) Primary sources

In his article, Bocking explores how economic needs helped to inform scientific models and approaches. In this case, predicting animal population cycles for the fur trade. Here are two primary sources, upon which Bocking draws in his analysis. These are good sources for students who wish to engage with these cases in greater depth.

- a) Ernest Thompson Seton, *The Arctic Prairies*. See especially pp. 95-112 for a section on population cycles entitled “Rabbits and Lynxes in the North-West.”
 - i) This text extract is especially rich and useful to illustrate the population cycle. Instructors seeking an additional supplemental reading might assign it to a class, or absorb it oneself to support a lecture. This extract is particularly insightful with respect to the fur trade economy that gave rise to scientific questions regarding predicting these cycles.

- b) C. Gordon Hewitt, *The Conservation of Wildlife of Canada*. See especially pp. 213-234 for a section on population cycles entitled “The Periodic Fluctuations of our Fur Bearing Animals.”
- i) Like that above, this text examines population cycles using Hudson’s Bay Company records. It concludes with a call for further research stating “It is hoped that such studies, extending over a number of years, may be undertaken by competent investigators in the future, as such a knowledge of the causes of these fluctuations is essential to an adequate understanding of a subject having economic possibilities of a very high order.”
- 5) Video resources with discussion questions
- a) *High Arctic: Life on the Land* (1958). 21 min 23 s. From the NFB’s synopsis: “An ecological study of plant and animal life on the Queen Elizabeth Islands in the Canadian Arctic. The film includes profiles of animals such as musk-oxen, lemmings, arctic hares and various forms of plant life.”
- b) Instructors who seek a more experiential element in their session might do well to include the following brief National Film Board film. It illustrates, after the fashion of the time, the ecology described in Bocking’s article. The instructor may want withhold the date of production (assuming that no students are fast enough to decipher the roman numeral date at the end). Before viewing in class, share the following questions:
- i) While watching the film, be attentive to clues that you can use to date it, using Bocking’s analysis from his article to inform your approach. What clues can you identify to estimate the film’s creation date?
- ii) What general image of the north does the film convey? How does this support or negate Bocking’s analysis in the article?
- iii) The film does not depict any human beings. What do you make of this?

Glossary

- Tundra: Large portion of the northern hemisphere lacking trees and possessing abundant rock outcrops.
- Permafrost: Ground remaining at or below 0°C continuously for at least 2 years. Polynyas (p. 869): Areas of ocean that remain open when all else is frozen.
- Thermokarst (p. 878): Thawing of the permafrost (defined above) often results in subsidence where ice was present; and in the formation of thaw lakes or hummocky terrain. This terrain, called thermokarst, can be induced by human activities or by climactic change.
- Archipelago (p .878): A body of water in which there are many islands, or a grouping of islands.
- Inuit: Inuktitut for “the people.” An Aboriginal people, the majority of whom inhabit the northern regions of Canada. An Inuit person is known as an Inuk. The Inuit homeland is known as Inuit Nunangat, which refers to the land, water, and ice contained in the Arctic region.
- Eskimo: The name "Eskimo" comes from one of the Algonquian languages, most likely Montagnais or Naskapi. In Canada and Greenland, the term "Eskimo" has fallen out of favor as it is considered by some to be pejorative. The Eskimo of arctic Canada call themselves Inuit, meaning "people."

- Queen Elizabeth Islands: The northern-most cluster of islands in the arctic archipelago, comprising islands from both Nunavut and the Northwest territories. Formerly the Perry Islands, they were renamed in 1953 in honor of Elizabeth II's coronation as Queen of Canada.

Teaching Unit Number 6: Environmental Justice

This university-level teaching unit is designed to be easily scaled up or down regarding class time consumed, or difficulty, as appropriate for the individual course context. The material in this unit has a strict focus on Canada (British Columbia), though instructors in other locations are encouraged to improvise, using this module as a foundation, to insert a comparative element and make connections to other places or themes.

Learning goals

- Introduce the concepts of hazard, risk, risk society, and environmental justice.
- Contextualize the concept of environmental injustice in Canada.
- Familiarize the student with archival sources that inform historical narratives of environmental injustice.
- Encourage students to connect these concepts with their own experience of the world.

Resources

- 1) Tina Loo, "[Disturbing the Peace: Change and the Scales of Justice on a Northern River](#)," *Environmental History* 12 (October 2007): 895- 919.
- 2) Discussion Questions
 - a) When former Premier W.A.C. Bennett looked at the Peace River, he saw a means to power a modern industrial society. Nature held utility as a resource, which he would harness through the construction of a dam. His project, however, would interrupt pre-existing relationships between local residents and the river, and neglect the role of the river within a broader ecosystem. What were some of the negative and positive consequences of constructing the WAC Bennett Dam on the Peace River? How were they geographically distributed? Were the rewards worth the damages?
 - b) The Peace-Athabasca Delta project group would, in future years, attempt to remedy some of the environmental effects of the dam. They intervened in an environmental management capacity by building more dams to try to counteract water level problems. Area residents were not satisfied by this intervention, as it did not extend to their human experience of the environmental impact. Environmental justice was partially served at one spatial extent, but not another. Tina Loo calls this “scales of environmental justice.” What does she mean by the phrase "scales of environmental justice" and why is this multi-level approach important in understanding the broader environmental and social impacts?
 - c) Loo underlines the importance of not only examining environmental justice within spatial terms, but also within historic ones. Her sense of history encompasses both human history and the deep history of the environment. Why is it important to have an historical understanding of present issues, as well as a sensitivity to geographical distributions? How does Loo understand these issues as related to the WAC Bennett Dam?
 - d) Do some research of your own to see if there are any controversial, currently proposed megaprojects in British Columbia. Based on Loo's analysis of the WAC Bennett Dam's environmental consequences and her concept of scales of

environmental justice, what would you advise the reviewing bodies of these projects to consider? Should the project proceed and, if so, on what terms?

e) What role does history play in your understanding of the word “justice”?

3) Contextual essay

What one understands as just is in part defined by the historical narratives that one chooses to tell. Told one way, from one point of view, and at a particular scale, a sequence of events might seem benign or innocuous. Told another way, from a different vantage point, those same events can acquire an entirely different meaning. Tina Loo's article, and in a more subtle way Magnus Isacsson's much earlier NFB documentary, both highlight the unequal or unjust distribution of risks across society.

Loo and Isacsson's shared point is that those who benefit the most from modernity inevitably bear the lightest risk burden. Others, who bear the greatest risks, benefit the least. In the article this uneven distribution is exemplified by the construction of a hydro dam, and in the NFB film, by uranium mining. To fully appreciate these cases, students need a good understanding of risk and society and of how these categories have changed in relation to each other through time.

As defined by the role of hazards and risk in daily life, influential German sociologist Ulrich Beck understands humanity to have passed through three distinct historical epochs.

First, in the pre-modern era, non-human hazards predominated. A hazard is a situation, such as an environmental extreme (flood, drought, tornado, earthquake, etc.) or an epidemic that can cause harm. Such dangerous situations are omnipresent, and do not necessarily strike particular individuals or groups within society. Further, the hazard's causes are external to society, finding genesis in fortune, fate, Nature, God's will or in an even earlier time, the gods. As such, no person can be held responsible for the calamity. Narratives about these events only include the concept of justice when deities are concerned.

Second, in the modern, or classical urbanized industrial society, human attempts to solve basic material needs by intervening in nature give rise to unintended human-made-risks. An example would be the risk of a traffic accident, arising from the modern convenience of automobiles. Risk is the exposure of something of value to loss via a hazard. The concept is a combination of a numerical probability that a harmful event will take place, and the magnitude of the resulting loss. Since these risks were particular problems that affected specific demographic groups in specific places and times (say, in this case drivers or pedestrians), people could act to alleviate these risks. In theory, knowledge of the probability of risky events and the likely consequences allowed people to insulate themselves from identified risks via private insurance initiatives, or via the state through public insurance and regulations.

The emergence of a third epoch (the *Risk Society, or the second modernity*) is in Ulrich Beck's view associated with exposure to invisible risks produced by modernization itself. Despite living longer, safer lives than any previous time in human history, we are increasingly concerned about risks that are larger, more complex and more

uncertain than those experienced in the past. The obvious example is climate change. Contemporary risks are less and less able to be mitigated by nineteenth-century institutions like insurance or state regulation.

Much like earlier understandings of economic output (wealth), risk is not evenly distributed through society. Inhabitants of the Risk Society's over-riding concern is not so much with the distribution of “goods,” such as wealth, but “bad” or “ilth” (the opposite of wealth) such as risk. In earlier eras a driving force of society could be summarized by the phrase “I am hungry!” In the Risk Society, the commonality of anxiety takes the place of the commonality of need: “I am afraid!” The wealth-oriented logic of distribution is replaced by a focus on avoiding risk.

Beck was putting the finishing touches on his book *The Risk Society* in 1986, the same year as the Soviet Chernobyl nuclear disaster. The magnitude of the inescapable spreading radioactive cloud prompted Beck to make the observation that “poverty is hierarchic, smog is democratic.” By this he meant that a new set of human-made disasters rendered previously significant social divisions less meaningful. In subsequent writings he has modified his view that new global risks affect us all equally. Beck's more recent, more nuanced position is that the new risks must be seen as both hierarchical and democratic. Hierarchical, since the poor cannot protect themselves against exposure as well as the rich. And democratic, since we are all, regardless of status, influenced by these global risks.

Assuming Beck's characterization of time, Tina Loo's article analyzes a classical industrial society, from the point of view of one writing in a Risk Society. Her narrative traces the consequences stemming from a state-sponsored megaproject. BC Hydro constructed the WAC Bennett dam on the Peace River to bring imagined progress to thousands of BC households. The project was an example of high modernism, a form of modernity characterized by an unfaltering confidence in science and technology as means to reorder the social and natural world. Not unique to British Columbia, such projects were particularly prevalent in the mid to latter twentieth-century.¹

Using the global debate over climate change as her starting point, Loo points out that scholars have been exploring the link between politics and the environment for some time. The environmental justice literature “charts the unequal effects of urbanization and industrialization, and in the process argued that the risks associated with these changes were borne unequally.” Loo's goal, however, is to understand what is involved in rectifying environmental and social inequalities. She emphasizes the importance of temporal and spatial framings and the way that different ways of living with the river constructed the scales at which environmental change and inequality were perceived.

¹ James C. Scott, *Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed* (New Haven: Yale University Press, 1998), 4.

Supported Source: <http://archive.org/details/LooSiteC>

Additional sources

- Arnoldi, Jakob. *Risk: An introduction*. London: Polity Press, 2009.
- Brown, James D. and Sarah L. Damery. "Uncertainty and Risk." In *A Companion to Environmental Geography*, ed. Noel Castree, David Demeritt, Diana Liverman and Bruce Rhoads. London: Wiley-Blackwell, 2009.
- Mustafa, Daanish. "Natural Hazards." In *A Companion to Environmental Geography*, ed. Noel Castree, David Demeritt, Diana Liverman and Bruce Rhoads. London: Wiley-Blackwell, 2009.
- Sørensen, Mads P. and Allan Christiansen. *Ulrich Beck: An Introduction to the Theory of Second Modernity and the Risk Society*. London: Routledge, 2013.

4) Primary sources

- Unfortunately the BC Archives does not have permanent links to the pages that also contain metadata for the images, so we have provided the Call Numbers for each specific image suggested to ease the search.
- British Columbia Ministry of the Provincial Secretary and Travel Industry. Film and Photographic Branch. [Peace River Dam Construction. 1966](#). BCA, GR-3425, Reference code I-28751.
- British Columbia Ministry of the Provincial Secretary and Travel Industry. Film and Photographic Branch. [Peace River Dam Construction. 1966](#). BCA, GR-3425, Reference code I-28758.
- British Columbia Ministry of the Provincial Secretary and Travel Industry. Film and Photographic Branch. [Peace River Dam Aerial. 1966](#). BCA, GR-3425, Reference code I-28763.
- British Columbia. Special Services Branch. [Peace River Dam aerial shows dam and the Peace River where the reservoir will fill. Sep 1966](#). BCA, GR-3265, Reference code I-68495.
- British Columbia Ministry of the Provincial Secretary and Travel Industry. [Film and Photographic Branch. Peace River Dam tourist lookout. 1967](#). BCA, GR-3425, Reference code I-28820.

5) Video resources with discussion questions

- a) [Uranium, Magnus Isacson \(1990\)](#). Produced by the National Film Board, 47 min 59 s. From the NFB description: This documentary looks at the hazards of uranium mining in Canada. Toxic and radioactive waste pose environmental threats while the traditional economic and spiritual lives of the Aboriginal people who occupy this land have been violated. Given our limited knowledge of the associated risks, this film questions the validity of continuing the mining operations.
- Explore the possible tensions between the terms 'modernity' and 'First Nation'.
 - Compare the voluntary risks shown in the film (smoking a cigarette while discussing the bioaccumulation of radio-nucleotides, and, a medical doctor cycling while not wearing a bicycle helmet) with the involuntary risks associated with uranium mining or dam construction.

- Both hydro and nuclear power are often suggested as an antidote to climate change. Knowing what you do now, from the article and the film, discuss the risks inherent in these solutions.
- b) For classes with less time, there is also the shorter 11-minute film [*Clearing the Peace*](#), produced by the BC Forest Service in 1970.

Glossary

- **Ottawa:** Located in eastern Ontario, this city is the capital of Canada.
- **Confederation:** The term as it appears in the text refers to the relationships between the provincial and federal governments. More broadly, it refers to the process by which the federal Dominion of Canada was formed on July 1, 1867. The four provinces of Ontario, Québec, New Brunswick, and Nova Scotia comprised the initial federation, to be joined by other provinces and territories in later years. The term is also used to divide Canadian history into the pre-1867 (pre-Confederation) and post-Confederation periods.
- **BC Hydro:** A Crown Corporation (in this particular case a provincially-owned electrical utility) responsible for providing "reliable power, at low cost, for generations." The electricity produced in British Columbia is generated overwhelmingly by hydropower.
- **Columbia River Treaty:** A 1964 agreement between Canada and the United States regarding power generation and flood control on the Columbia River.
- **First Nations:** The Aboriginal people of Canada who are neither Inuit nor Métis (of mixed First Nations and European heritage).

Teaching Unit Number 7: Cold War on Canadian Soil

This university-level teaching unit is designed to be easily scaled up or down regarding class time consumed, or difficulty, as appropriate for the individual course context. The material in this unit has a strict focus on Canada (specifically the north), though instructors in other locations are encouraged to improvise on their own, using this module as a base, to insert a comparative element and make connections to other places or themes.

Learning goals

- Introduce the theme of high modernist militarism.
- Contextualize shifting Canada/US relations, the militarization of Canada's north, and its attendant environmental impacts.
- Familiarize the student with archival sources that inform militarization narratives.
- Encourage students to connect these concepts with their own experience of the world.

Resources

- 1) P. Whitney Lackenbauer and Matthew Farish, "[The Cold War on Canadian Soil: Militarizing a Northern Environment](#)," *Environmental History* 12 (October 2007): 920-50.
- 2) Discussion Questions
 - a. How did the threat to the Canadian North, and the notion of security, change over time? How has the valuation of this land mass changed?
 - b. What is meant by the title "The Cold War on Canadian Soil"? How did Canada's international policy play out within a national stage and in what ways did military, environmental, and cultural interests diverge?
 - c. In the initial Cold War period, the Canadian North is characterized as a hostile environment that must be overcome. Later, it is described as a terrain that must be protected. Why does this change in representation occur? How does it relate to concepts of high modernism, environmentalism, militarism, and nationalism?
 - d. Lackenbauer and Farish argue that in the research of military geography, little has been written outside of the scope of "terrain and tactics." In what ways do they expand the parameters of research by considering the interconnections between military and environmental history? What sorts of information would be overlooked in a more traditional approach?
 - e. According to Lackenbauer and Farish, both the Canadian government and the aboriginal peoples of the North invoked the protection of the environment to justify their respective positions and policies on the region. This environmental messaging was put forth in different ways, for different reasons, to different ends. Compare and contrast the two narratives.
 - f. Lackenbauer and Farish draw upon James C. Scott's seminal work *Seeing Like a State* to suggest that the Canadian state's high modernist stance created a blind spot with regard to local knowledge in the Canadian North. In what ways do they understand this conflict to play out, and how might the theory explain different assessments of environmental health?

- g. What is Arctic Sovereignty and how is it asserted by the Canadian government today? Consider the use of both tangible and symbolic demarcations of the land and modes of defense.
 - h. Compare the shifting impressions of the north described in this article with those described by Stephen Bocking in his piece, “Science and spaces in the northern environment” (see Teaching Unit Number 5, in “Teaching EH: Canada” at environmentalhistory.net/teaching-eh/nr-5-science-and-spaces). What are the points of agreement? Where do they diverge?
- 3) Contextual essay
- Lackenbauer and Farish’s article traces shifting military understandings of the Canadian North. The authors argue that Cold War Canadian (and perhaps American) military minds treated the north both as an opponent and a resource to be used, possibly to advantage, with the correct knowledge and training.

To achieve their goal of linking Canadian environmental history with military and diplomatic history, the authors draw together material from three distinct literatures: that of the military in the Canadian North, the literature on militarization and the environment, and that of military modernization. In the process they provide an analysis of four interwoven themes: military perceptions of the north, Canadian national interests in the north, northern environmental impacts, and, by extension, they provide a muted commentary on Canada/US relations.

Foundational to their piece is James C Scott’s 1998 *Seeing Like a State*.¹ Students not already familiar with the principles of modernity and modernization theory will benefit from an introductory lecture on these topics, before reading the article.

As a reminder for the instructor, Scott argues that the most tragic episodes of twentieth-century state-sponsored social engineering originate in a combination of four elements. These are:

- 1) An administrative ordering of nature and society;
- 2) A high modernist ideology. Scott elaborates on this element to include a strong self-confidence about scientific and technical progress; expansion of production; growing satisfaction of human needs; mastery of nature (including human nature); and the rational design of social order commensurate with the scientific understanding of natural laws. Scott cautions that a high modernist ideology ought not to be confused for scientific practice, but that the former borrowed the legitimacy of science and technology;
- 3) An authoritarian state, willing to use coercive power to bring high modernist plans into being (typically exercised in times of war);
- 4) A prostrate civil society lacking the ability to resist these plans.²

¹ James C. Scott, *Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed* (New Haven: Yale University Press, 1998).

² *Ibid.*, 4.

Scott's template provides a good fit for the current case, which was an application of state-sponsored science and technology, during a time of cold war, over the protestations of colonized Native peoples subsisting in a fur-based economy.

Military perceptions of the north

At the beginning of the period, the north was an environment to be survived, an exposed flank rather than something to be protected in and of itself. By the late 1960s the north ceased to be a hostile environment, but became something to be engineered for strategic purposes. By the 1970s, it had become a place demanding protection from environmental and jurisdictional threats. The popular impression that Native people might need protection from the military itself came to the fore in the debates over low-level flight training and cruise missile testing in the early 1980s.

In Lackenbauer and Farish's application of Scott's ideas, the state (or in this case two states, Canada and the US) work to simplify the northern landscape and make it legible, thus enrolling it more effectively into militarization. The two countries accomplished this through projects backed by the authority of reason and the latest technologies, designed at a distance and implemented without sufficient attention to local conditions.

The authors note that historians of modernization theory have demonstrated how its claims to objectivity were compromised by its Cold War origins and applications. "The immediacy of geopolitical conflict meant that grandiose theories of democratization and economic liberalization often ran counter to seemingly necessary military incursions." In practical terms, Native peoples were asked to sacrifice their livelihoods and security for the security of distant Southerners.

National Interests in the North

Before the Second World War, the Canadian government used the military as a tool to support national development programs in the North, with a resulting insubstantial military presence. Through the Second World War, the Canadian military supported American interests in securing reliable access to Alaska (through Canada via the Alaska Highway), and in the air via the Northwest Airway and the Northwest Staging Route. Canada came under much pressure to share information with the US, as well as space for military exercises. By the late 1950s, new technologies, particularly intercontinental ballistic missiles, redirected attention away from the region and Canadian military activities declined sharply.

Pierre Trudeau's election in 1968 signaled a new era. Uncomfortable with Canada's "helpful fixer" role abroad, the new Prime Minister scaled back NATO commitments and reshuffled military priorities to highlight sovereignty protection and continental defense. He was interested in northern development and rediscovered a role for the Canadian Forces in protecting Arctic sovereignty. Not from Soviet invasion, but from the challenge to Canadian claims by the US. A *delicate* arctic thus became a convenient pretext to extend Canadian jurisdiction northward, and the government took direct action to securitize the region [note that this notion of increased ecological fragility is in direct contrast to Bocking's portrayal (see Teaching Unit Number 5), that after the 1970s,

the north *lost* its aura of a fragile ecology, and assumed the role of capable resource hinterland if managed properly by modern methods].

American forays across the northwest passage precipitated heightened Canadian interest in the north; however, the collapse of the Soviet bloc in 1989 meant that Canadian military interest again shifted elsewhere, in a time when human security and environmental security became inseparable.

Environmental Impacts in the North

Construction of the Distant Early Warning radar line (the DEW line) in the late 1950s altered Northerners' lives more than any other initiative. It was an enormous engineering undertaking. The DEW Line's construction drew the Inuit into closer contact with the south, for both better and worse. In Alberta, bombing ranges and low level flight training had deleterious effects on trapping. Overall, the effects of vehicles, sewage, the disruption of local social orders, over-hunting by military personnel, and aircraft buzzing caribou all characterize the period. By 1964 however, half of the DEW line radar stations were decommissioned, transferring the infrastructure (and environmental liability) away from the military and over to the Department of Indian and Northern Affairs.

By the 1980s, low-level flight testing threatened aboriginal identities, the health of their communities, and their traditional territory. However, with the collapse of the Soviet bloc in 1989, Canadian priorities shifted away from the eastern sub-Arctic.

The bill for mitigating Cold War military impacts since the 1990s has been staggering, including problems at the Goose Bay airbase and scattered DEW Line sites. Since the mess was a product of bilateral continental defense schemes, the Canadian government hoped that the US would pay for most of it; this was disallowed by a concerned US Congress fearful of the precedent it might set. Since the 1990s, military activity has been devoted to dealing with its environmental history, constraining budgets for contemporary operations.

Additional sources

- Lajeunesse, Adam. "[The Distant Early Warning Line and the Canadian Battle for Public Perception](#)." *Canadian Military Journal* (Summer 2007): 51-59.
- LaJeunesse, Adam. "[Sovereignty by Other Means: The Voyage of the Manhattan and the Arctic Waters Pollution Prevention Act](#)." Northern Environmental History Workshop. 12 June 2009.
- Mychajlyszyn, Natalie. "[The Arctic: Canadian Security and Defence](#)." Library of Parliament InfoSeries, 24 October 2008.

4) Primary sources

- Archival Photos from the Northwest Territories Archives, and the Nunavut Archives. These repositories holds many digitized primary sources that can support a lecture on the DEW Line. Relevant collections include the Henry Busse fonds and the Northwest Territories. Dept. of Public Works and Services fonds

(NWT) or the Douglas Wilkinson fonds (in the Nunavut Archives). Below are some examples, though each instructor might wish to use others.

- Henry Busse. [\[DEW line site\]. 1957](#). Northwest Territories Archives, Fonds 41, Reference code N-1979-052: 0771.
- Tessa Macintosh, Northwest Territories. Department of Public Works and Services. Systems and Communications division. [\[Cambridge Bay\]. 1983](#). Northwest Territories Archives, Fonds 310, Reference code G-1995-001: 0331.
- Tessa Macintosh, Northwest Territories. Department of Public Works and Services. Systems and Communications division. [\[Cambridge Bay\]. 1984](#). Northwest Territories Archives, Fonds 310, Reference code G-1995-001: 2902.
- Tessa Macintosh, Northwest Territories. Department of Public Works and Services. Systems and Communications division. [\[Tuktoyaktuk\]. 1987](#). Fonds 310, Reference code G-1995-001: 4463.
- DND, Northwest Territories. Department of Public Works and Services. Systems and Communications division. [\[Kugaaruk\]. 1984](#). Northwest Territories Archives, Fonds 310, Reference code G-1995-001: 3416.
- Tessa Macintosh, Northwest Territories. Department of Public Works and Services. Systems and Communications division. [\[Tuktoyaktuk\]. 1987](#). Northwest Territories Archives, Fonds 310, Reference code G-1995-001: 4417.
- Tessa Macintosh, Northwest Territories. Department of Public Works and Services. Systems and Communications division. [\[Tuktoyaktuk\]. 1992](#). Northwest Territories Archives, Fonds 310, Reference code G-1995-001: 7893.
- Lorne Smith, Northwest Territories. Department of Public Works and Services. Systems and Communications division. [\[Coral Harbour\]. \[1990?\]](#). Northwest Territories Archives, Fonds 310, Reference code G-1995-001: 1004.
- Tessa Macintosh, Northwest Territories. Department of Public Works and Services. Systems and Communications division. [\[Arviat\]. 1988](#). Northwest Territories Archives, Fonds 310, Reference code G-1995-001: 1316.

5) Video resources

- a. [“Norad’s goals: deter, detect, defend.”](#) (1957). 3 min. 47 s.
- b. [“Cruise missile testing coming to Canada”](#) (1983). 3 min 10 s. (Also available at <http://www.youtube.com/watch?v=B3KhWuYiWRs>)
- c. [“Flying F-16 in 1984: Low level Goose Bay & Aerial Refueling.”](#) 8MM footage.
- d. [“DEW Line: Canada is cleaning up pollution caused by Cold War radar stations in the Arctic”](#) (2012). Text and multiple videos.
- e. [“DEW Line Story”](#)(1958). 27 min 32 s. An American video, which might be a nice supplement to the above photos that gives a very clear idea of the large quantity of material transported to the north, and why it left a toxic legacy.

Glossary

- Permafrost: Permafrost is ground remaining at or below 0°C continuously for at least 2 years.
- Sheshatshit (pronounced sheshashiu): An Innu federal reserve (likely known to Americans as a reservation) in the province of Newfoundland and Labrador. It is located outside the community of Goose Bay.
- Meech Lake Constitutional Accord: The Canadian constitution was patriated from Britain in 1982. At the time, the Québec government refused to sign the constitution (though in practice it is adhered to). This phrase “Meech Lake accord” refers to a failed attempt by Brian Mulroney’s conservative federal government, in 1987, to entice Québec to sign the constitution.
- Oka conflict: A three-month standoff at Oka, Québec, in 1990, between Mohawk protestors, police and the Canadian army. At the heart of the crisis was the proposed expansion of a golf course and development of condominiums on disputed land that included a Mohawk burial ground.
- DIAND: Department of Indian Affairs and Northern Development. DND: The Canadian Department of National Defence.

Teaching Unit Number 8: Schwartz Gallery

This university-level teaching unit is designed to be easily scaled up or down regarding class time consumed, or difficulty, as appropriate for the individual course context. The material in this unit has a strict focus on Canada (specifically Canadian Photographs as primary sources), though instructors in other locations are encouraged to improvise on their own, using this module as a base, to insert a comparative element and make connections to other places or themes.

Learning goals

- Introduce the theme of photographs as primary sources.
- Familiarize the student with methods by which they can inform and enrich historical narrative in new ways.
- Encourage students to connect these concepts with their own experience of the world.

Resources

- Joan M. Schwartz, "[Photographic Reflections: Nature, Landscape, and Environment](#)," *Environmental History* 12 (October 2007): 966-93.
- Article discussion questions
 - a. What is the difference between environment and landscape? How does Schwartz understand photography to reflect and participate in the cultural construction of landscape?
 - b. Schwartz offers us two historically disparate sets of photographs, through which she seeks to illustrate methodological approaches of constructing landscape rather than chronological change. Identify some of these approaches and how they intersect with other period narratives such as technological progress, colonial expansion, environmental awareness, etc. Compare and contrast the early images with the later ones.
 - c. How does a photograph convey a point of view about the environment? Look to Schwartz's gallery and consider the photographers' choices in subject matter and presentation (framing, perspective, style, etc.). Why are people included in some images, but not in others? How does their presence or absence, their position, and relative scale within the landscape, shape how we perceive it? What role do titles, or other forms of written accompaniment, play in producing a photograph's meaning?
 - d. Schwartz suggests that a photograph's exhibition venue or site of publication frames how it is understood. In other words, it accrues a contextual bias, foregrounding certain features in one situation, and different ones in another. What does Schwartz emphasize by including these images in an environmental history journal? How is the meaning of one image shaped in relation to another? Are there alternative ways to understand these landscapes?
 - e. According to Schwartz, the only "fixed and stable" aspect of a photograph is its visual content. What does she mean by this? How does meaning evolve over time?
 - f. Consider the staged studio photographs of nature in comparison to photographs of outdoor environments. What differences do you perceive? Are the images of actual outdoor environments more "truthful," or do they simply appear so

because they naturalize the photographer's point of view? Can documentary photographs be “imagined geographies”?

- g. Schwartz argues that when looking at a photograph, we must look beyond the appearance of a neutral set of facts. Instead, she proposes that we consider what the maker sought to convey, how the image was perceived over time, what events preceded and followed the photograph's creation, and what was excluded from the image. Select a random photograph of a landscape and apply Schwartz's proposed method of examination. What kind of information does this mode of enquiry yield? What sorts of resources must you consult to substantiate your suppositions?
- Contextual essay
Schwartz's Gallery piece is a wonderful lesson in method. The less sophisticated researcher might be tempted to treat photographs as illustrations or “surrogates for firsthand seeing.” Often, after devoting considerable time to locating textual primary sources, the researcher will attempt to find illustrations in a rushed manner, for their aesthetic appeal rather than the historical evidence they may convey, almost as an afterthought: visual oases in a desert of text. As Roy and Thompson note, this tendency is exacerbated by the problem that in any archive, only a small percentage of images are catalogued.¹

Schwartz guides the reader, via a series of figures and paired commentary, through a more nuanced approach. She urges us to be more imaginative about the questions that we pose to photographs and more receptive to the questions that they pose to us. The student will do well to incorporate these subtleties in their own work.

Through a discussion of the reading, the instructor can prepare their students to undertake the video assignment detailed further below. In class, prompt the student to explore the context of the image's creation, its original intended message to particular audiences, and how this may have shifted when it is consumed by wider populations in space and time.

We encounter the phrase “imaginative geography of Canada” on page 977. Elsewhere, Schwartz tells us that this refers to the way in which photographs shape our perceptions of place and sustain individual and collective notions of landscape and identity. It is the mechanism by which people come to know the world and situate themselves in space and time. A proper concern with the role of photography in making imaginative geographies, therefore examines the blurred distinction between the real and the imagined.²

- Primary sources
 - a. Digital images and biographies for photographers represented in Schwartz's gallery can be found in a variety of places online, and may be used to support a lecture.

¹ Joan M. Schwartz, “The Past in Focus: Photography and British Columbia, 1858- 1914,” *BC Studies* 52 (1981): 5-15; J. Robert Davidson, “Turning a Blind Eye: The Historian's Use of Photographs,” *BC Studies* 52 (1981): 16-38; Patricia E. Roy and John Herd Thompson, *British Columbia: Land of Promises* (Toronto: Oxford University Press, 2005): 2-3.

² Joan M. Schwartz and James R Ryan, “Introduction: Photography and the Geographical Imagination,” in *Picturing Place: Photography and the Geographical Imagination* (London: I.B. Taurus, 2003), 1-18.

- b. [William Notman](#).
 - i. William Notman. "[Young Canada](#)", [William McF. Notman, Montreal, QC, 1867](#). McCord Stewart Museum, Object no. I-24434.
 - ii. William Notman Studio. [The chance shot, Col. William Rhodes and Octave the guide, Caribou hunting series, Montreal, 1866](#). McCord Stewart Museum, Object no. N-0000.57.6.
 - iii. Additional information about Notman from the McCord Museum is available [here](#).
 - c. [Humphrey Lloyd Hime](#).
 - i. H. L. Hime. [The Prairie, on the Banks of Red River, looking south, 1858](#). LAC, R3859-0-X-E, MG24-H87, Item no. 20. Item ID no. 3243345.
 - ii. Other images by Hime are available from [the McCord Museum](#).
 - d. [William England](#).
 - i. "[The Railway Suspension Bridge from the 'Maid of the Mist' Dock, Niagara, 1859](#)."
 - e. [Alexander Henderson](#).
 - i. "[Spring Inundation](#)."
 - ii. Additional information and images are available from [the McCord Museum](#).
 - f. [John Dillwyn Llewelyn](#).
 - i. John Llewelyn. "[North American Wigwam](#)". ca. 1855. LAC, Accession no. 1988-060 NPC, Box 55094. Item ID no. 3241733.
 - g. [William James Topley](#).
 - i. William James Topley. [Harriot Georgina, Countess of Dufferin, with members of her family, photographed in a winter studio setting with a toboggan, a sleigh, and snowshoes](#). 1873. LAC, Accession no. 1952-010 NPC. Item ID no. 3194719.
 - h. [Paul-Emil Miot](#).
 - i. Additional information and images available [here](#).
 - ii. Paul-Émile Miot. [Préparation de la morue](#). [entre 1857-1859]. LAC, BAN no. 1998-00082-6. Item ID no. 3622955.
 - i. [Marlene Creates](#).
 - i. "[Our Coastline is Natural & Scenic](#)."
 - j. [Frederick Dally](#).
 - i. Frederick Dally. Hydraulicling. [The six toed Pete claim, Williams Creek, Cariboo](#). [ca. 1868]. BCA, PR-1380, MS-3100.2, Reference code: C-09570.
 - ii. Frederick Dally. "[Goldmining Asturias Claim 1867 or 1868](#)". 1867-1868. LAC, Accession no. 1971-109 NPC. Item ID no. 3358029.
 - k. [Lorraine Gilbert](#).
 - l. [Robert del Tredici](#).
 - i. Additional information and images available [here](#).
 - 1. The Canadian Coalition for Nuclear Responsibility hosts [a number](#) of del Tredici's images.
 - m. [Edward Burtynsky](#).
 - i. Additional information and images available [here](#).
- Video assignment— Heritage Minute videos

- This example assignment should be customized by the instructor. Examples of student heritage minute videos (as guided by the below assignment) are available on [YouTube](#). There is a range of abilities represented, and some might be shared with a class as examples of things to avoid in a video (speaking too fast, too much motion, sound problems, failure to include a proper archival citation, etc.)
- In the past it was necessary to provide technical instruction to students in digital sound and video editing. These tools have now become ubiquitous. Even when students have not used these tools before, they learn very quickly, particularly when paired with a peer who is more comfortable with the technology.
- Group work and marks (grade) can be a dangerous combination. The running diary is an insurance policy so that in rare cases when a pair of students is unable to complete a video because of conflict, or disinterest on the part of one student, the other need not be punished unnecessarily.
- When pointing students to an archive for choosing photographs to feature, it is crucial that the instructor set boundaries regarding acceptable images for the assignment. Similarly, it is up to the instructor to ensure that copyright laws are respected.
- The “Heritage Minute” video assignment
 - a. This heritage minute assignment is to be completed in pairs, with both team members doing equal work in all phases of the project. The final product is due for screening in class on [insert date here]. However, please submit your completed video to the course instructor by [earlier date], to upload to YouTube. This assignment is worth X% of your final grade.
 - b. Goals
 - i. Perform some basic manipulations using digital sound and video editing software.
 - ii. Divide a large project into separate tasks and negotiate the distribution of work.
 - iii. Use multiple sources to craft a short historical narrative.
 - iv. Your ultimate goal is to produce a 60 second “heritage minute” style video on the topic of your choice. Video is perhaps a misleading term. Your video is actually composed of a still photograph and audio overlay. You can pan around your image, or zoom in to focus on particular details, but no moving pictures or animation is required. All of your effort will be devoted to constructing your narrative, recording it, and spicing it up with appropriate sound effects if you feel so moved.
 - v. Since this is group work, you will be keeping an individual diary of your group's successes and identifying things that could have gone better.
 - c. Getting started
 - i. As individuals, select your favorite archival photos from one of the following collections:
 1. [Library and Archives Canada](#).
 2. [McCord Museum](#).
 - ii. Meet or correspond with your partner and select the one photograph you want to use and another one as a backup. For copyright purposes, the image must have been taken before 1949. Write to your instructor, with a proper archival reference (not a temporary URL), so she or he can take a

- look at your image and approve its use. Include some details as to the approach you want to take.
- iii. Discuss who your target audience is and what you want to communicate. What should your heritage minute achieve and how? Specify how you will evaluate your success upon completion.
- d. Research
 - i. Partners should seek as many sources as possible to contextualize the photograph. Who took it? When? Where? For what purpose? What does the image show? Perhaps more importantly, what doesn't it show? Keep a very careful record of your research in your project diary. Use the results of your research to inform the story you want to tell. Draft a script. Read it aloud to check your timing.
 - e. Production
 - i. You already have a digital copy of your photo, now you need to make some noise. [Individual instructors will want to include guidance regarding digital voice recorders that may be available for loan via their department or institution].
 - ii. Next you will need to choose both audio and video editing programs. The specifics are up to you. I use the open source program "Audacity" for my audio editing, and a very old version of iMovie for video. Whatever you use, make sure that they are compatible. [Instructors will also want to point students to video editing resources available to students on your campus].
 - iii. While the initial audience will be your instructor and peers, we will upload our videos to a class YouTube account. For this reason, all material you use must be original and created by your group. This is to say, you cannot use a commercial recording as a soundtrack, and you cannot splice in copyrighted video from some other source. You can use open source audio content, but it must be credited.
 - f. Final Products
 - i. Your 'video': we will begin the first few seconds with a common jpeg advertising this as a class project. Next is your 60 seconds of content, followed by credits (not included in your 60 seconds). [Will probably want to select a hashtag, or key word, to include in all videos, so that disparate students and instructors can view the work of others].
 - g. Your diary
 - i. Each individual should keep a private, running diary of your experiences and research, to be handed in with your group's final product (this should be a document of, at minimum, five pages). The diary should not be written in one sitting at the very end, but rather as appropriate throughout the process! As the project progresses, detail how your team managed the work. What was done by each team member? Did you work effectively as a team? How did you ensure tasks could be done in parallel?
 - h. Marking (Grading) Rubric
 - i. There will be a prize for the best Heritage Minute, as voted by your peers. Your instructor will evaluate your group's work based upon:
 1. Fulfillment of the requirements

2. Depth of research
 3. Clarity, accuracy, and finesse of your narrative
 4. Innovative use of the medium
- ii. Project Diary, including group proposal, research, and account of the process (X%) and Completed Video (Y%), giving a total mark of (Z%) of your final grade.

Glossary

- Governor General: The Monarch's representative, performing the ceremonial and constitutional functions of a Head of State. The Governor General of Canada is appointed by the Queen of Canada on the advice of the Canadian Prime Minister. The office has developed with Canada's evolution from colony to nation.

Many special thanks to:

- Dr. David Brownstein, Klahanie Research Ltd. (<http://www.klahanieresearch.ca/>)
- NiCHE (<http://niche-canada.org/>)
- Oxford University Press (oup.com)
- National Film Board of Canada (<https://www.nfb.ca/>)
- American Society for Environmental History (aseh.org)
- Forest History Society (foresthistory.org)