An Environmental History of the Hudson's Bay Company's Fur Trade in the Pacific Northwest: A Thematic Overview

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April 2004

Introduction

From the late eighteenth to the mid-nineteenth century, the trade in fur of various North American animals produced profound change in what is now the Pacific Northwest region of the United States, altering the landscape of the Pacific Northwest in addition to the cultural patterns and relationships between Native Americans, Euroamericans, and the land. Scholars have paid considerable attention to the fur trade both in a broadly synthetic fashion and in terms of more narrowly constructed features of the trade.[1] Yet systematic study of the fur trade within the framework of environmental history is poorly reflected in the current body of literature; the correction of this omission is both timely and appropriate, given growing interest in environmental issues among scholarly specialists and the general public. An historical understanding of the significant environmental changes brought about by the fur trade is valuable not only to scholars in environmental and Western history, but also to professionals in park management. Ecosystem restoration, for example, within the realm of the national park system,

[1] The seminal work on the fur trade is Harold A. Innis *The Fur Trade in Canada: An Introduction to Canadian Economic History* (New Haven: Yale University Press, 1930). See also David J. Wishart, *The Fur Trade of the American West, 1807-1840: A Geographical Synthesis* (Lincoln: University of Nebraska Press, 1979) and E.E. Rich, *The Fur Trade and the Northwest to 1857* (Toronto: McClellan and Stewart, 1967). In terms of this project's focus on the Pacific Northwest, a very valuable work is Richard Somerset Mackie, *Trading Beyond the Mountains: The British Fur Trade on the Pacific, 1793-1843* (Vancouver, B.C.: UBC Press, 1997).

could benefit considerably from historical evidence that illuminates the modes of environmental change that followed from the fur trade.

Ultimately, an environmental history of the fur trade enhances our understanding of the significance of the fur trade in the overall history of the Pacific Northwest. An analysis of environmental change that came about as a consequence of the fur trade enriches the story of what was not only an economic, but also an imperial, adventure. This report aims to present a thematic outline for such a larger project. A study of this kind should encompass both the economic and cultural aspects of the trade and how these aspects were linked to environmental change. A good focal point is the Hudson's Bay Company (HBC).[2] In the Pacific Northwest, the HBC was the dominant Euroamerican presence from 1821 until 1846, when the Oregon Treaty between Britain and the United States fixed the border between British and American territory. The last HBC post in the United States, however, was not closed until 1871. American traders were by no means absent from the area in the nineteenth century, and comprise a valuable part of the story. Nevertheless, the HBC would function well as a centerpiece of an environmental history of the fur trade, given its highly organized structure, its strong presence in the Pacific Northwest, and the availability of considerable source material on the HBC.

Background

The Pacific Northwest (a region, for the purposes of this report, including much of the present-day states of Oregon and Washington, the province of British Columbia, and the Alaskan panhandle) was one of the last areas of North America to be investigated by Euroamerican

[2] An early general work on the history of the Hudson's Bay Company is Douglas MacKay, *The Honourable Company: A History of the Hudson's Bay Company* (London: Cassell and Company, Ltd., 1937). See also Peter Newman, *Empire of the Bay: An Illustrated History of the Hudson's Bay Company* (New York: Viking Studio, 1989).

explorers. The Spanish, moving north from Mexico, first made contact with the lands and peoples of the Northwest Coast in the mid-1770s, even trading with natives at Nootka Sound on the west coast of Vancouver Island. The Northwest became a kind of convergence zone for European exploration; the Spanish had not made public their claims to the area, so Russians approached the Northwest from the north and the British encroached from the south. Of these two explorer groups, the British would prove to be the more aggressive in attempting to establish influence over the region. The British got their first glimpse at the economic potential of the fur trade during Captain James Cook's expedition that explored the region's coast in 1778. Cook had been instructed to find and navigate the fabled Northwest Passage in order to establish stronger trading links between Britain and Asia. Cook failed to find the Northwest Passage and increasingly doubted whether it actually existed. During Cook's voyage, he stopped at Nootka Sound, at which time his crewmen loaded his ships with sea otter pelts. A subsequent stop at the port of Canton in China turned out to be highly profitable for Cook's crew, and the British were hence made aware of a new source of considerable wealth.[3]

Cook's journey opened the door for a number of subsequent trips to the Pacific Northwest by British merchants and explorers in the 1780s and 90s, including Nathaniel Portlock, John Meares, and George Vancouver. American traders, such as Robert Gray, quickly followed and sought trading opportunities in the Pacific Northwest. In the early nineteenth century, Euroamericans approached the Pacific Northwest by land. Meriwether Lewis and William Clark, journeying from St. Louis, arrived at the Pacific coast in November 1805. Their expedition was intended to establish a stronger United States presence in western North America, particularly in terms of finding accessible trade routes (though their expedition also was to

[3] See Barry M. Gough, *The Northwest Coast: British Navigation, Trade, and Discoveries to 1812* (Vancouver, B.C.: UBC Press, 1992).

provide information about the flora, fauna, and geology of the West as well as information on resident native tribes). Important as Lewis & Clark's expedition was, their journey was not the first by Euroamericans to reach the Pacific Ocean by land; Alexander Mackenzie, of the Montréal-based North West Company (NWC), made it to Bella Coola, on what is now the British Columbian coast, in 1793. Mackenzie's memoirs of that journey helped inspire Jefferson to organize the Lewis & Clark expedition in order to gain an American foothold on the Pacific coast and compete with the British there.

Founded in 1784, the NWC began to establish fur-trading posts in the Pacific Northwest in the first two decades of the nineteenth century. The NWC did so because its great rival, the HBC, had since 1670 a trade monopoly granted to it by the Crown over all lands drained by Hudson Bay. These lands included some of the lands richest in fur-bearing animals such as beaver; these territories included much of present-day Manitoba, Saskatchewan, and Alberta. The NWC was compelled to skirt the periphery of the HBC's territory as well as look for new trade opportunities outside it, though this did not mean that the NWC did not aggressively challenge the HBC's trade monopoly. The competition between the two companies proved to be a considerable drain on the resources of both and a headache for the British government, whose favor was sought by both the NWC and the HBC.

By 1821, the situation had grown so serious that a merger of the two companies was brokered in order to end the economically destructive, and sometimes outright bloody, fight. The HBC's greater resources and better transportation system made it the stronger of the two parties and the merger amounted to a takeover of the NWC by the HBC. After the merger, the HBC assessed its new position in North America, enhanced by an extension of its trade monopoly to those parts of British North America west of the Rocky Mountains. The company's

leaders, comprised of a governor and committee, considered abandoning the NWC's former territories west of the Rockies (divided into a northern district, New Caledonia, and a southern district, Columbia). The powerful new head of the HBC's Northern Department, George Simpson, argued against this move and claimed that by instituting rigorous measures of economy (such as cutting wages and imports of expensive European goods for use by employees), New Caledonia and the Columbia district could become profitable. In 1822, Simpson persuaded the HBC not to abandon the Pacific Northwest, so that he might examine the region's possibilities for profit and thence enact the same reforms he did in the Northern Department.

Simpson, more than any other individual, shaped the activities of the HBC in the Pacific Northwest. He energetically put himself to the task of reorganizing the HBC's business in the region. In 1824 –25, Simpson himself journeyed to the Columbia District (which was merged with New Caledonia to form the Columbia Department in 1827), and began formulating a new strategy for exploitation of the Columbia.[4] The HBC's center of operations on the Columbia was, at that time, Fort George, near what is now Astoria, Oregon at the mouth of the Columbia River. Fort George was originally Fort Astoria, built in 1811 and the base for John Jacob Astor's Pacific Fur Company, a subsidiary of his New York-based American Fur Company and a competitor with the NWC. The Astorians sold Astoria to the NWC in 1813, but under the peace terms that ended the War of 1812, the site was legally returned to the United States, but no American traders reoccupied it.[5] Simpson believed that Fort George was poorly suited to be a trading post, and directed the new HBC head of the Columbia Department, John McLoughlin, to

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[4] Simpson's 1824-25 journey is chronicled, along with a helpful introduction, in Frederick Merk, ed., *Fur Trade and Empire: George Simpson's Journal entitled Remarks Connected with the Fur Trade in the Course of a Voyage from York Factory to Fort George and Back to York Factory 1824-25* (Cambridge, Mass.: Belknap Press of Harvard University Press, 1968).

[5] See James P. Ronda, *Astoria & Empire* (Lincoln, Neb.: University of Nebraska Press, 1990) and Robert F. Jones, ed., *Astorian Adventure: The Journal of Alfred Seton, 1811-1815* (New York: Fordham University Press, 1993).

construct a new post (Fort Vancouver) ninety-six miles up the Columbia on the river's northern shore, where there would be more space for the post to grow both as a port, and as a farm.[6]

Simpson was also concerned with competition from American traders. In 1818, the United States and Britain agreed to joint occupancy of the Oregon Country (defined as the land west of the Rocky Mountains to the Pacific coast, north of the 42nd parallel, and south of 54°40') for ten years, though this agreement was extended indefinitely in 1828 until the Oregon Treaty of 1846. Because of this agreement, American traders and trappers could legally operate in the Oregon Country; but none of them had the resources of the HBC. Simpson decided to confront the Americans on two fronts: in the Snake River valley and on the Northwest Coast. The Snake River valley was rich in beaver (more so by the 1820s than the lower Columbia, though American traders were not aware of this), and hence was an attractive target for competition. The HBC, on Simpson's advice, decided to pursue a policy of overhunting in the Snake Country. By exhausting the supply of beaver, the HBC hoped to keep American traders from encroaching further on the Columbia Department.[7] This policy, by 1841, succeeded in driving out American competition from the Snake Country.[8]

The HBC turned its attention to another sector of the fur trade. While the major product of the land-based fur trade was beaver, the maritime (coastal) fur trade focused on the sea otter. The first of the European powers to make contact with the natives of the Northwest Coast was Russia; the Russians established a number of bases along the Northwest Coast and traded with (even enslaved in some cases) native hunters in order to obtain sea otter pelts for the Chinese market. Russian advances along the Northwest Coast went almost unchallenged until the 1780s, when British and American ships began to show up. The Americans in particular were able to

[6] Mackie, *Trading Beyond the Mountains*, 47-48. The move to Fort Vancouver was completed in April 1825.
[7] Mackie, *Trading Beyond the Mountains*, 62-65.
[8] Ibid., 110

effectively compete with the Russians, because of higher quality goods, lower prices, and access to the Chinese port of Canton; by 1800, American traders replaced the Russians as the major non-native participants in the maritime fur trade.[9]

A reinvigorated HBC sought to supplant the Americans. The HBC was less interested in sea otter pelts *per se*, but was concerned that the Americans would begin to move inland, seeking beaver from New Caledonia, the richest fur region in the Columbia Department and the core of the HBC's Pacific fur trade. The HBC took a number of actions to counter the Americans, its monopoly and greater resources providing it a distinct advantage. By 1840, the HBC had driven out any serious American competition from the coastal trade.[10] Despite this and other commercial victories, the HBC's presence in the whole of the Oregon Country did not last. Americans, mainly missionaries and settlers, took advantage of the joint occupancy agreement to follow the Oregon Trail and establish themselves permanently in the Oregon Country in the late 1830s and 1840s. The HBC had hoped that the British government would, in the 1840s, demand that the permanent border between American and British territory in the Oregon Country be drawn along the Columbia River. This would have allowed the HBC to continue to operate in the Puget Sound and keep its sizeable assets – its posts, farms, and fisheries – north of the Columbia. The American government tried to claim the whole of the Oregon Country; the British government decided that extending the 49th parallel westward would still allow for a viable British colony and end the protracted dispute with the United States. The HBC realized some years before the Oregon Treaty that such a compromise was highly likely; therefore, in 1841, Simpson decided that the center of the HBC's Columbia Department needed to be moved

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[9] See James R. Gibson, *Otter Skins, Boston Ships, and China Goods: The Maritime Fur Trade of the Northwest Coast, 1785-1841* (Seattle: University of Washington Press, 1992), ch. 1 and 3.
[10] Mackie, *Trading Beyond the Mountains*, ch. 6.

northward, to an area that would stay under British control. This decision resulted in the construction of Fort Victoria, on Vancouver Island, in 1843.[11]

The HBC had rights to continue trade in the Oregon Country south of the 49th parallel until 1859, but the HBC did not close its last post in United States territory until 1871; in the years between 1846 and 1871, the HBC was entangled with the U.S. government over its property rights in the face of a growing influx of American homesteaders.[12] Despite this slow withdrawal, the HBC recognized in the 1840s that the fur trade was in serious decline, due both to decreasing populations of fur-bearing animals and to changing tastes in European fashion (notably the shift from beaver hats to silk hats). This compelled the HBC to emphasize continued diversification of the Pacific trading economy beyond the export of beaver furs. The HBC, through Simpson, had developed such an economy over a number of years and this took on increasing importance after 1846, when fur supplies were dwindling, and the HBC's territory in the Pacific Northwest shrunk in the wake of the Oregon Treaty.[13]

Environmental Change

The fur trade was, by its very nature, directly dependent on resource extraction. From the standpoint of environmental history, the fur trade can be accurately framed as a system of commodification of nature.[14] This commodification, in turn, fit into a larger system of developing global capitalism. The North American fur trade relied on demand for furs in European, and to a lesser extent, Asian markets; in turn, fur harvests depended on the demand

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[11] Ibid., 257-259.
[12] See John S. Galbraith, *The Hudson's Bay Company as an Imperial Factor, 1821-1869* (Berkeley: University of California Press, 1957), ch. 13.
[13] Mackie, *Trading Beyond the Mountains*, ch. 10.
[14] Pertinent discussion of the commodification of nature and its environmental consequences can be found in William Cronon, *Changes in the Land: Indians, Colonists, and the Ecology of New England* (New York: Hill and Wang, 1983).

natives (who were the backbone of the fur trade's workforce) had for goods from Europe. Though the HBC's locally-produced provisions (which were often exotic species, like wheat and potatoes) were intended primarily to supply the fur traders, surplus agricultural, fishing, and timber products became valuable exports in a regional North Pacific economy linked to the transportation and financial structures that were themselves part of the globe-spanning trade in animal pelts. The fur trade, therefore, created the initial conditions necessary for bringing the Pacific Northwest into a global economic network, resulting in profound ecological and cultural changes that affected natives and non-natives alike.

Populations of fur-bearing animals

A good starting point for an environmental history of the fur trade concerns the effect of trapping on its major target animals: beaver, sea otters, muskrat, etc. From the standpoint of land-based fur traders, the beaver was the most valuable animal, not for its thick outer fur, but for the fine underhairs that were pounded into felt and thence shaped into hats. Trapping activity was usually concentrated in the fall and spring; in winter, ice-covered streams made finding beaver rather difficult and beaver fur in the summer was thin and considered worthless. The workforce for trapping and processing beaver pelts for export consisted primarily of natives, though there were exceptions: the Snake Country expedition committed to exterminating beaver populations had a significant non-native contingent, and certain native tribes, like the Nez Perces, refused to trap beaver.[15]

Beaver harvests were constrained by the animal's ecology. The beaver is not especially fecund; it is a strict monogamist, mating once in February and producing two to four cubs by May or June. The beaver does not reach maturity until about two and a half years after birth,

[15] Wishart, *Fur Trade of the American West*, 21-22, 27; Mackie, *Trading Beyond the Mountains*, 88, 104.

reaching a weight of anywhere from thirty to sixty pounds. The beaver's preferred habitat consists, generally, of the banks of sluggish streams and small lakes. Steep gradients are avoided; streams that run through relatively flat or rolling land and whose banks are well wooded form ideal beaver habitat. This explains why, in the HBC's Columbia Department, New Caledonia had the best beaver hunting grounds. New Caledonia was further inland, and its climatic conditions favored a greater variety of trees (beaver use conifers for building, but prefer trees like aspen for food). Furthermore, New Caledonia had numerous rivers and lakes, and its colder winters meant its beaver population grew thicker pelts.[16]

Beaver were, however, vulnerable to depletion. One reason for this is the beaver's sedentary life. Its lack of mobility led to overtrapping, and technological improvements such as the steel trap made excessive trapping even easier. This man-made pressure on beaver populations combined with other pressures, such as periodic epizootics (wildlife epidemics) and temporary increases in the population of non-human beaver predators. Neither native peoples nor Euroamerican traders could increase beaver populations above the maximum allowable due to other environmental constraints. The HBC also had to deal with geographical limits; by the 1830s, the HBC could not expand its fur-trapping territory because harsh environmental conditions along the northern periphery of its lands did not support beaver and the Pacific Ocean to the west blocked further expansion in that direction. Since sustained beaver harvests depended on moving to new hunting grounds once older ones had been depleted, geographical obstacles coupled with overtrapping virtually ensured a continual decline in available beaver.[17]

The maritime fur trade also went into a similar decline for similar reasons. The sea otter has an even lower reproductive rate than beaver: female sea otters (dams) typically bear one

[16] Innis, *Fur Trade in Canada*, 4; Wishart, *Fur Trade of the American West*, 27; Mackie, *Trading Beyond the Mountains*, 72, 86.
[17] Wishart, *Fur Trade of the American West*, 30-31; Mackie, *Trading Beyond the Mountains*, 247.

offspring per year (unlike two to four in the case of the beaver). Dams refuse to leave their young under any circumstances, resulting in both mothers and young being caught together. This situation was made even worse by the fact that the dam's pelt was worth more than the male's, making dams the preferred target of otter hunts. Unlike other mammals in colder climates, sea otters do not have a layer of insulating fat; they depend upon a thick coat of fur to keep warm that does not thin out during the warmer months of the year. Because of this, sea otter were hunted year-round, in contrast to the land-based fur trade in which most furs were taken in the fall or spring. These ecological factors, coupled with aggressive hunting, meant that by the 1810s, the American traders who dominated the scene noticed that sea otter harvests were becoming increasingly scarce.[18]

Conservation

The depopulation of fur-bearing animals is one of the most visible aspects of the commodification of nature brought about by the fur trade. The HBC was aware of this problem and in some cases tried to employ conservation schemes in order to maintain a long-term sustainable yield of furs, particularly beaver. These measures, however, were undermined by a number of factors. First, such conservation could only be employed in areas where the HBC had firm monopoly control, a difficult task given the vast lands in which the HBC operated. Where the HBC faced competition, it employed the opposite strategy, as seen in its efforts to make the Snake Country a "fur desert" to keep out American competition. Hence, the HBC's vision of conservation was constrained by its business strategy. The HBC's reliance on native workers also made conservation a more challenging task. Not only was the great demand for European goods from natives a powerful incentive to trap as many furs as possible, but some native

[18] Gibson, *Otter Skins, Boston Ships, and China Goods*, 178.

cultures had no tradition of subsistence hunting. Without an awareness of the effects of overhunting brought about by the cultural experience of hunting, some native hunters and trappers accelerated the decline of fur-bearing animal populations in some areas of the Pacific Northwest. The problem of animal depopulation can, therefore, illustrate the mechanisms of the fur trade as well as cultural shifts.

The HBC formulated, under the guidance of Simpson, a policy of resource conservation that it attempted to enact in various areas of its domain. As mentioned previously, by the time of the HBC-NWC merger, considerable portions of fur trade territory had been seriously depleted of fur-bearing animals. In addition, in certain districts of the Northern Department, game animal populations suffered as native peoples attempted to satisfy the increased demand for food fomented by the intense competition between the HBC and its rivals in the years between 1763 and 1821. The HBC, thus, attempted to stem the losses of beaver in areas where they were most threatened with extinction.

This conservation program encompassed several aspects. The most ambitious was Simpson's move to curtail trapping in districts that exhibited the most severe drops in beaver population. The first districts to which Simpson applied this policy lied in Northern Department districts south of the Churchill River (in the present-day Canadian province of Manitoba); Simpson discouraged trapping by closing posts in these districts and building new ones in areas where beaver were more plentiful, thus encouraging native trappers to move out of overhunted territory. In addition, the HBC encouraged natives to hunt other fur-bearing animals, especially muskrat. A third strategy was to try to prevent summer trapping (when beaver pelts were of less value) by refusing to trade with natives who brought summer beaver to HBC posts.[19]

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[19] Arthur J. Ray, "Some Conservation Schemes of the Hudson's Bay Company, 1821-1850: An Examination of the Problems of Resource Management in the Fur Trade," *Journal of Historical Geography*1 (1975): 48-57.

This early program met with considerable opposition that severely hindered its effectiveness. First, the HBC could not enforce its monopoly in areas near the border with the United States. If HBC traders refused to trade with natives, the natives could go to independent American or Métis traders who were more than willing to do business with them. Second, the HBC's program would have required a sweeping change in native cultural and economic attitudes. Many natives in the Northern Department pursued a mobile life; because of this, it made little sense to natives to stockpile large quantities of supplies and furs when they lacked the storage and transportation capabilities to do so. Indians in the Northern Department, furthermore, tended to believe that humans could not control the fate of the beaver. Instead, they believed that the beaver, indeed all of the natural world, was in the hands of spirit-beings (called *manitous*), whose wishes had to be followed. The beaver's destruction, for example, was the will of the manitous as punishment for earlier transgressions on the part of ancient beings that had been transformed into beaver. Third, resource management required defined territorial boundaries and the ability to enforce those boundaries. Northern Department Indians did not conceive of land ownership in the same fashion as did the HBC. To natives, land was a free good, to be exploited on a "first come" basis. Though native bands tended to return to the same areas every year in accordance with the seasons, their conceptions of land boundaries were rather loose, and bands could take advantage of land not occupied by another band, even if that other band had used the land in previous years.[20]

In response to these difficulties, the HBC modified its Northern Department conservation program, enacting stringent quotas, offering higher prices for non-beaver furs, and punishing more severely traders who violated company policy. With respect to this study, it is worth examining whether the HBC's Northern Department policy served as a prelude to actions the

[20] Ibid, 57-61.

company took in the 1840s in the Pacific Northwest. The demand for profit meant that whenever the company decreased its trapping in one area, it had to find new places to trap elsewhere. This was one reason why the extension of the HBC's monopoly to the lands west of the Rocky Mountains proved so valuable: the HBC gained new fur trade territory, of which New Caledonia was the most valuable. Columbia Department returns peaked in the early 1830s, then, as in other departments, fur harvests declined, as illustrated in the lower than expected Columbia Department profits of 1840 and 1841. In response to this crisis, HBC official Archibald McDonald proposed a nature preserve to be located west of Puget Sound (much of present-day Olympic National Park covers the same territory) in order to allow beaver populations to rebound. This plan, apparently, never came to fruition because the land in McDonald's proposal was ceded to the Puget's Sound Agricultural Company, possibly because Simpson tried a similar plan in 1832 near Oxford House in the Northern Department, and that plan had met with failure. McDonald's plan and other conservation measures on the part of the HBC as applied to the Columbia Department remain somewhat understudied, yet the precedent of the policies in the Northern Department implies that similar ones were attempted in the Pacific Northwest.[21]

Farming, fishing, and logging

The problem of supplying fur trappers and traders loomed large in the minds of the managers of fur trading companies. NWC traders had adopted the practice of living off of the land when possible, but this was rather difficult in some of the more desolate places in the interior of North America. Both the NWC and the HBC also relied upon supplies imported from Britain, but this practice was very expensive. When, after 1821, the HBC's trade monopoly was extended to lands west of the Rockies, the Company considered abandoning the lower Columbia on the

[21] Ibid., 64-67.

grounds that high transport costs, exacerbated by reliance on imported supplies, made the fur trade there unprofitable. George Simpson was able to dissuade the Company from this course of action, citing reports that fur receipts were on the increase and that enactment of cost-cutting measures would make the Columbia region profitable.[22]

One reform Simpson instituted was the establishment of farms near HBC posts deemed to be suited for agriculture. Locally produced provisions reduced dependency on expensive importation of foodstuffs. In keeping with this idea, Simpson directed that the HBC's major post on the lower Columbia, Fort George, be replaced by another post to be built ninety-six miles upstream. The new post, named Fort Vancouver, was completed in 1825; it was located near "plains of deep fertile alluvial deposit covered with a rich sward of grass and a profusion of flowering plants."[23] Simpson's hope was that Fort Vancouver's farm would "raise all the Corn [wheat] required for the Coasting trade."[24] Simpson also noted, at least in other areas along the Columbia, that abundant supplies of fish and game were available and that potatoes were easily grown.[25] Accordingly, Simpson aggressively promoted agriculture, which had significant environmental consequences. Simpson's agricultural program meant the importation and spread of plant and animal species – such as potatoes, wheat, and cattle – that were not native to the Pacific Northwest.[26]

The HBC farm at Fort Vancouver proved enormously successful in providing food for the HBC's workforce in the Columbia Department. This was due not only to the fertile soil surrounding the post, but also to the longer growing season in comparison to most of the

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[22] Mackie, *Trading Beyond the Mountains*, 45-46.
[23] David Douglas, quoted in Mackie, *Trading Beyond the Mountains*, 48.
[24] George Simpson, quoted in Mackie, *Trading Beyond the Mountains*, 48.
[25] Ibid., 47.
[26] See James R. Gibson, *Farming the Frontier: The Agricultural Opening of the Oregon Country, 1786-1846* (Seattle: University of Washington Press, 1985), 16.

territories within the HBC's purview. By 1829, Fort Vancouver was completely independent of imports of food from either Britain or Hawaii (the latter was a major source of preserved meats for the NWC and maritime fur traders). By 1832, the post's farm produced 3,000 bushels of wheat and 6,000 bushels of potatoes; in addition, by 1834, the farm had a herd of somewhere between 400 and 450 head of cattle.. The farm's surplus production allowed it, beginning in the late 1820s, to provide food for many of the Company's operations throughout the Columbia Department. Fort Vancouver also help support other HBC posts when those posts ran low on food; in 1829, Kamloops sent seven men to stay the winter at Fort Vancouver because of a shortage of salmon.[27]

Once the Columbia Department achieved self-sufficiency in foodstuffs, Simpson sought to expand the HBC's trade by exporting Fort Vancouver's produce: namely, salmon, timber, and flour. In the 1830s, Hawaii, Mexican settlements in California, and the Russian-American Company's post at Sitka, Alaska all became important markets for Columbia produce. Simpson had hoped to link this trade with direct shipment of Columbia furs to markets in China, but later abandoned that idea. The HBC's main Pacific market thus became Hawaii. The islands represented a very good commercial opportunity for the HBC because there was a substantial native population (107,954 in 1835-36) and because the Hawaiian Islands were a major supply and repair stop for ships of various nationalities, especially whaling vessels. In California, the HBC established a post at Yerba Buena (near present-day San Francisco) in 1841 to exchange Columbia produce for hides and tallow, though Simpson ordered the post closed in 1846. In 1839, Simpson negotiated an agreement with the Russian-American Company; the HBC supplied food, sea otter furs, and beaver furs in exchange for coastal leasing rights.[28]

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[27] Ibid., 151-153.
[28] Ibid., 156, 176, 181-182.

The Russian contract was linked with another HBC venture intended to make the most of the agricultural potential of the Columbia Department. In 1833, the HBC established, at the southern end of Puget Sound, Fort Nisqually as a company farm in part to prevent an overstretch of Fort Vancouver's resources. Nisqually was not well suited for the cultivation of grain, but it afforded good pastureland and so developed into a center for raising livestock (cattle for beef and tallow and sheep for wool). The year before, Chief Factor McLoughlin drew up a plan for a separate company he called "The Oragon Beef & Tallow Company"; thus his plan along with the establishment of Fort Nisqually laid the groundwork for a new company that focused solely on agricultural products. In 1839, Simpson appropriated McLoughlin's scheme and formed the Puget's Sound Agricultural Company. By 1840, this company operated both Fort Nisqually and Cowlitz Farm, founded in 1838 along the Cowlitz River 30 miles north of the mouth of the Columbia. These two farms enabled the HBC to meet the terms of the Russian contract and produce greater numbers of commodities for export to Hawaii and London.[29]

The expansion of the HBC's business to encompass agricultural and other produce aside from furs illustrates more strongly its commodification of nature. Simpson and the HBC self-consciously sought not only to raise provisions in support of the fur trade, but also to create market opportunities besides the fur trade. This became particularly important when the HBC noted a decline in beaver returns from the Columbia Department (down from a peak of 21,746 in 1831 to 12,958 in 1846) and a decline in demand for beaver in the London market.[30] The fur trade provided the initial profits for the HBC, but the diversification of its interests enabled it to maintain a presence in the Pacific Northwest despite the decline of its primary product. This diversification required a further reshaping of the land of the Columbia Department; not only did

[29] Ibid., 234-240.
[30] Ibid., 244-245; see also Gibson, *Farming the Frontier*, ch. 4-6.

the HBC import exotic species, but it also imposed European patterns of land use. The HBC's desire to maintain profit meant that the company's impact on the land and its people would increase in the years between 1821 and 1846 and beyond as the stage was set for increased Euroamerican settlement of the Pacific Northwest.

Tools and techniques

The Pacific Northwest fur trade, and the North American fur trade generally, incorporated the use of particular tools and practices designed to maximize yield and efficiency. At the same time, however, fur trade officials like George Simpson were acutely aware of the potential of overhunting to cause a decline in profits over the long term, and thus they sought to take action to put fur harvests on a sustained-yield basis. Ultimately, the HBC was unable to reverse the decline in the fur trade by the mid-1840s. A discussion of the technologies and techniques employed by the HBC is valuable in demonstrating the rationalization of the fur trade. These tools and techniques also had significant impact beyond that of their immediate use.

One of the most important technologies of the fur trade was the steel trap, which was often baited with castoreum, a substance secreted by a gland in the anal region of beavers of both sexes. The steel trap came into use in the North American fur trade in the 1790s; Simpson, noting the decimation of beaver populations in the HBC's Northern Department resulting from years of fierce competition with the NWC, noted in 1822 that:

> The use of Beaver Traps should have been prohibited long ago, they are the scourge of the Country and none will, in the future, be given out except for new Districts exposed to opposition and frontier establishments.[31]

Though Simpson's statement does not make it fully clear, his caveat to a complete ban on the steel trap in the Northern Department suggests that its use was permitted, at least for a time, in

[31] Ray, "Conservation Schemes," 55; see also Innis, *Fur Trade in Canada*, 263.

the Pacific Northwest. The HBC's aforementioned policy in the Columbia Department was to exterminate beaver in areas where its monopoly was most vigorously contested, especially in the Snake Country. Given the recognition on the part of the HBC that the steel trap was effective to the point of endangering the stability of beaver populations, it stands to reason that the steel trap was used by the HBC in the Snake Country; it may have also been used in areas of the Columbia Department that the HBC valued more highly, such as New Caledonia. In any case, the impact of the steel trap is worthy of investigation.

The fur trade throughout North America faced a significant challenge in transporting furs to their markets in Europe and China as well as bringing trade goods to North America to exchange for furs. In the Pacific Northwest, the NWC first grappled with this problem in the 1810s. After establishing several posts in the Pacific Northwest, the NWC hoped to use the Fraser and Columbia Rivers to transport furs harvested in New Caledonia and the lower Columbia, respectively, to the coast. From coastal posts such as Fort George, the NWC planned to ship furs directly to China. The Fraser proved too dangerous for transport to the sea; the NWC transported New Caledonia furs eastward via the Peace River to its depot at Fort William on the western end of Lake Superior. Furs harvested from the lower Columbia region were taken to the coast along the Columbia River. After the NWC bought out Astoria (the Pacific Northwest post of the Pacific Fur Company, a subsidiary of John Jacob Astor's American Fur Company), it attempted to send furs from New Caledonia and the lower Columbia using a combined Fraser-Columbia River brigade system directly to the Pacific Ocean. After 1814, however, the NWC reverted to its older system of separate routes for its two Pacific Northwest districts because traders had difficulty returning to New Caledonia to distribute trade goods among New Caledonia's posts before the district's waterways began to freeze. This meant that fewer goods

were on hand to trade for furs before the onset of winter, when fur trapping and trading paused until the following spring.[32]

After the HBC and the NWC merged, the HBC continued the NWC's practice of sending New Caledonia's fur returns eastward (this time to York Factory on Hudson Bay), but discontinued the Columbia supply line to New Caledonia. Instead, beginning in early 1822, the HBC supplied New Caledonia along the same route (the Peace River) it used to take furs to York Factory. HBC officials serving in New Caledonia, such as chief factor John Stuart, urged the company to revive the NWC's short-lived Fraser-Columbia brigade for both returns and supplies, a conversion the HBC made in 1825. The linking of New Caledonia and the Columbia District was solidified when the HBC merged the two administrative regions in 1827. The HBC succeeded in doing what the NWC had not – a reorganization of the transportation network in the most remote corner of its domain. This connected the richest fur ground in North America, New Caledonia, to the Columbia District's best asset, the Columbia River, and this considerably reduced costs in comparison to the older route of sending fur returns to the east. The HBC, through the use of the Fraser-Columbia brigade and by the creation of the Columbia Department, also brought together the both the coastal and interior fur trade west of the Rocky Mountains.[33]

Because transportation of furs incurred considerable cost on the HBC, Simpson sought ways to reduce expenses in that realm, just as he did in many other areas of the fur trade. One method was to replace canoes with boats wherever feasible. Simpson recommended this move in 1822 and by 1824, boats were in regular use throughout most of the HBC's lands, with the exception of New Caledonia, where canoes were still needed because of the relatively shallow waters there. Boats could carry more cargo than canoes (four boats held as many "pieces" as did ten canoes),

[32] James R. Gibson, *The Lifeline of the Oregon Country: The Fraser-Columbia Brigade System, 1811-47* (Vancouver, B.C.: UBC Press, 1997), 1-11.
[33] Ibid., 16-18.

with a crew of only six to seven per boat; hence the total number of crew required on each brigade was reduced. Most of the boats the HBC used on inland waters were called "York boats"; they were approximately thirty feet long, seven to eight feet wide, and carried seventy pieces of cargo. On the Columbia River, the HBC used a slightly different form of boat, called a "Columbia boat" or more commonly, a "bateau." Bateaux were similar to York boats, but they were flat-bottomed, narrower in beam (about five and one-half feet), and carried fewer pieces (fifty instead of seventy). The smaller and lighter bateaux were better suited to the Pacific Northwest's longer and steeper portages – points on the brigade route when cargo and boats had to be carried overland from one body of water to the next. York boats and bateaux both were propelled by either oars or paddles, but York boats also employed sails and towlines when appropriate.

As with other facets of the fur trade, an environmental analysis of the tools and techniques employed by the HBC would not be complete without an examination of the role of native peoples. Put simply, native labor underpinned the HBC's operations, both directly and indirectly. Natives hunted, fished, farmed, logged, and trapped all on behalf of the company. Natives would certainly have had access to tools such as the steel trap and castoreum bait, as they were the primary trappers of fur-bearing animals. As early as 1800, natives in the HBC's Northern Department were aware of the decimation of beaver populations resulting from the introduction of the steel trap. In the Pacific Northwest, the lack of subsistence hunting traditions among many native peoples of the region may have made them less sensitive to the risk of overhunting. With respect to transportation, natives served as crew on company boats; the HBC also took advantage of natives' own transportation networks in performing such tasks as sending messages between posts. The messages were simply carried from tribe to tribe during until they

reached their destinations. The HBC, therefore, created its own transportation network, but also connected it to aboriginal trade and transport routes. Indeed, given the disparity in numbers between the Euroamerican HBC workers and native peoples, the HBC *depended* on native networks because it did not have sufficient staff to use its own routes independently of those of native peoples.

Native labor rarely entailed full-time employment. As late as 1839, only ten natives held permanent employment out of a total Columbia Department workforce of 550. Usually, the HBC hired natives on a part-time, seasonal or task-specific (such as guiding HBC parties) basis. Native workers were cheaper than Euroamericans and HBC managers reported that natives were less "trouble" than English and especially French Canadian workers. The HBC preferred its relationship with natives peoples to be based fundamentally on trading relationships rather than on employment, so it suited the HBC to be able to dismiss native workers when they were no longer needed. The HBC also made use of slave labor. Slavery was common in native cultures of the Pacific Northwest; the HBC did not press natives into slavery but bargained for the services of slaves from their native owners. The company disapproved of slavery in accordance with the Imperial Emancipation Act of 1833, but sometimes had little choice but to use slaves when potential native workers considered the tasks the company wanted to be done as beneath their dignity.

It should be noted that different native people often played different roles along gender and cultural lines. The Nez Perces people (particularly men) tended to refuse to hunt beaver, as they saw such work as beneath them, but they still were important as guides and provisioners. During the early years of the HBC's presence in the Pacific Northwest, the Chinooks of the lower Columbia and Puget Sound also resisted working directly for the HBC, preferring to function as

middlemen and provisioners. By the 1830s, however, the HBC had managed to persuade the Chinook to work in various roles for pay at HBC posts. In addition, the HBC sometimes brought native people from other areas to the Pacific Northwest; these included Iroquois and Hawaiians (referred to as "Kanakas" or "Sandwich Islanders" during this period) who worked as trappers, hunters, and fishermen. Finally, while trapping and hunting were male occupations, native women performed such duties as the gathering of camas (a local root mostly replaced by potatoes) and crafts like hat making.[34]

The methods and instruments employed by the HBC in rationalizing its business in the Pacific Northwest imposed upon the local environment a new sense of order that the company saw as essential in maximizing its profits. The company attempted throughout its domains in North America to manage the beaver population so that it could maintain a steady, predictable income, although its attempts to do so were countered both by human and non-human factors. The company's transportation networks and equipment represented an attempt, largely successful, to harness the local environment and facilitate the efficient movement of goods; as with its resource management policies, there were certain natural factors that the HBC could not avoid or overcome. In using both paid and unpaid native labor, the HBC exploited another local natural resource, the native population, in order to cut its labor costs. Native people still exercised more control over the region's resources well into the nineteenth century, but in seeking to gain their own advantages from trade with the HBC, they became part of the company's effort to impose its own natural order on the Pacific Northwest.

Native peoples

[34] Mackie, *Trading Beyond the Mountains*, 20, 88, 293-294.

In an analysis of the relationship between the fur trade and environmental change, it is important not to overlook the broader impact of the trade on what one might term the "human landscape"; that is, the various cultures present in the region during this period, their relationship to the land and to each other. During the years of the HBC's predominance in the Pacific Northwest fur trade, the human landscape experienced change every bit as dramatic, if not more so, as did the nonhuman elements of nature.

The Pacific Northwest fur trade fomented or accelerated a great demographic shift in the region, this shift being the depopulation of natives and the subsequent increase in the population of Euroamericans. Though Euroamericans had maintained a presence in the Pacific Northwest since at least the 1810s (longer, if one wishes to include the exploratory voyages of the late eighteenth century), they were for much of this period considerably outnumbered by natives. The introduction of new diseases, however, exacted a frightful toll on native peoples. In the first century of contact, beginning with the Hezeta expedition of 1775, native populations declined by an average of 80% throughout the Pacific Northwest and coastal British Columbia, though losses varied by location and by tribe. Indians along the coast of British Columbia experienced a decline of about 66% in the years 1836-80. Along the lower Columbia, in the years 1805-1855, native populations declined by as much as 90%.[35]

The first significant epidemic was that of smallpox in the 1770s. Subsequent epidemics ravaged Pacific Northwest natives: along the Columbia in 1801-02 and probably again in 1824-25. Smallpox struck the northern parts of the Pacific Northwest and the British Columbia coast

[35] Robert Boyd, *The Coming of the Spirit of Pestilence: Introduced Infectious Diseases and Population Decline among Northwest Coast Indians, 1774-1874* (Vancouver, B.C.: UBC Press, 1999), 262-263.

in 1836-37. The central coast (mainly Oregon and southwestern Washington) was struck in 1853. Yet another epidemic afflicted the north coast (mainly British Columbia) in 1862.[36]

Though the bulk of native deaths came likely from smallpox, numerous other diseases appeared in the Pacific Northwest after European contact. One of the most notable was "fever and ague," which was probably malaria. The disease arrived along the lower Columbia and Willamette valleys in 1830. This area became an endemic focus of the disease, since the physical attributes of these locations (low-lying land with considerable standing water) were good for the breeding of the disease's primary vector, mosquitoes of the genus *Anopheles*. The disease reappeared regularly in several subsequent years; it also spread south to California with the HBC's southern trading parties.[37] Another devastating epidemic came in 1847-48 in the form of measles. Unlike other diseases that tended to strike coastal and riverside populations first, measles first appeared in the interior plateau area of the Pacific Northwest (mainly eastern Washington) via California. It then spread along the Columbia, then north to Puget Sound, and finally along the British Columbia coast.[38]

There are multiple reasons for the very high mortality rates among Pacific Northwest Indians. In the case of smallpox, one observes a good example of a "virgin soil" epidemic; that is, an outbreak of a disease among a population that has never before experienced it. Because of this, "virgin soil" populations have no immunity (inherited or acquired) to the disease. Furthermore, these populations tend to lack the social and cultural apparatus to deal with the disease effectively. Thus, native responses to new diseases contributed to increased mortality beyond what would be expected. One common response was to flee an area experiencing an epidemic to a place where one might find refuge. This proved very dangerous with respect to viral diseases

[36] Ibid., ch. 2,5,6,7.
[37] Ibid., ch. 4.
[38] Ibid., ch 6.

spread by droplets and that had a latency period, such as smallpox and measles because such diseases spread very quickly and were transmitted before those infected showed symptoms. In addition, native modes of treatment of disease were not suited to treating the new afflictions. Gathering around an infected person, for example, brought susceptible people in close contact with infected individuals, facilitating the spread of disease. Sweat bathing, followed by immersion in cold water, became deadly, especially when employed to treat febrile diseases such as malaria.[39]

The inability of natives to treat the newly introduced diseases created a ripple effect. As more and more people became infected, greater pressure was exerted on native healers. Unable to treat growing numbers of sick people, natives could not always provide for those who may have survived with even minimal care. As more people became ill, fewer were available to perform essential tasks, such as the procurement of food. This not only weakened the ill, but also the very young and very old, who were unable to provide for themselves.[40]

The origins of the epidemics can be pinpointed with varying degrees of certainty. In the case of the smallpox epidemic of the 1770s, one possible agent of introduction was the Spanish expedition of 1775 under Hezeta and de la Bodega.[41] The first outbreak of malaria coincided with the departure of an American trading ship (the *Owyhee*), a crewmember of which spent several months at Fort Vancouver recovering from an unspecified illness.[42] Measles arrived in the Pacific Northwest from the HBC's California trapping party; how it came to California in the first place is not yet known.[43]

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[39] Ibid., 17-19.
[40] Ibid., 19-20.
[41] Ibid., 36.
[42] Ibid., 85. It should be noted, however, that the role of the Spanish and the Americans in bring smallpox and malaria is still uncertain.
[43] Ibid., 146-147.

The primary consequence of the new diseases – Indian depopulation – had secondary effects. Though natives still outnumbered Euroamericans during the fur trade era, one can attribute this in part to the HBC's anti-homesteading policy. When the HBC calculated, correctly, that the British government would not press its claims to the Oregon Country south of the Columbia River, the company consolidated its presence north of the Columbia and encouraged those interested in permanent settlement in the Oregon Country to establish homesteads south of the Columbia. The Willamette River valley, because of the climate and rich soil, proved especially attractive to Euroamerican settlers in the 1830s and 1840s. This land was available not only because the HBC pushed settlers toward it, but also because the valley was practically vacant, since most of the area's indigenous inhabitants had died off.

We can, therefore, think of environmental change in this case as occurring on three levels. First, native depopulation and subsequent replacement (which was not, by any means, total) by white settlers is an example of environmental change, if we regard human populations as part of nature rather than outside of it. On another level, the increase in population of a people whose relationship to the land was different engendered a parallel environmental change. In regard to such practices as farming and logging, white settlers practiced more intensive exploitation of the natural resources of the Pacific Northwest than did indigenous peoples.[44] A third, related, change entails the marital relationships formed between Euroamerican fur traders and native women. In the short term, these marriages provided companionship for fur traders and

[44] Native exploitation of the land of the Pacific Northwest, especially prior to Euroamerican contact, is examined in Douglas Deur, "Salmon, Sedentism, and Cultivation: Toward an Environmental Prehistory of the Northwest Coast"; Eugene S. Hunn, " Mobility as a Factor in Limiting Resource Use on the Columbia Plateau"; Alan G. Marshall, "Unusual Gardens: The Nez Perce and Wild Horticulture on the Eastern Columbia Plateau"; and Paul S. Martin and Christine R. Szuter, "Megafauna of the Columbia Basin, 1800-1840: Lewis & Clark in a Game Sink", in Dale D. Goble and Paul W. Hirt, eds., *Northwest Lands, Northwest Peoples: Readings in Environmental History* (Seattle, Wash.: University of Washington Press, 1999). In the case of the Willamette Valley, white settlers established themselves in an area that, prior to their arrival, had been modified by native land management practices, such as the burning of underbrush in forests and meadows. This no doubt made the land appear as if it were "naturally" suited for white agriculture.

solidified, by forging kinship ties, trading relations between Euroamericans and natives. In the long term, white-Indian marriages changed the human landscape via the production of mixed-blood (*métis*) children.[45]

The fur trade contained within itself considerable cultural change that was intimately linked to the land. The HBC made the Pacific Northwest a link in the growing capitalist network of the British Empire. Trade with faraway peoples was not new to Pacific Northwest natives; the HBC was able to take advantage of the extensive trading relationships that native peoples had established themselves. The HBC had long experience, since the late seventeenth century, with trade with natives on the eastern half of the North American continent. As historians of the fur trade in this earlier period point out, European goods exchanged for furs had a dramatic effect on Indian cultures. Firearms, for example, enabled Indians not only to hunt game animals more effectively (thus putting additional pressure on those animals), but also to make war more effectively on their enemies. Eventually, Indian demand for European goods created a dependency upon Euroamerican traders; natives let older ways of making a living (and the cultural practices related to those older ways) fall into decline as their material culture was changed by the introduction of new goods. The pull of Indian demand fomented the push of the fur trade farther and farther into the interior of the continent, as Indians' livelihoods were increasingly tied to the supply of furs, which had, of course, commensurate environmental effects.[46] As in the case of the HBC's conservation programs, there exists relatively little literature directly addressing the relationship between the fur trade and environmental change as an effect linked to native cultural, social, and economic changes. The literature addressing these

[45] See Sylvia Van Kirk, *Many Tender Ties: Women in Fur Trade Society, 1670-1870* (Norman, Okla.: University of Oklahoma Press, 1980).
[46] Innis, *Fur Trade in Canada*, 15-18; Arthur J. Ray, *Indians in the Fur Trade: Their Role as Trappers, Hunters, and Middlemen in the Lands Southwest of Hudson Bay, 1660-1870* (Toronto: University of Toronto Press, 1974), ch. 8.

issues with respect to other times and places, however, provides a glimpse as to what one might find in a more thorough investigation of the fur trade in the Pacific Northwest.

Conclusion

An environmental history of the fur trade, even when confined to a specific region such as the Pacific Northwest, contains within it the potential to synthesize a very broad range of scholarship. Though this report attempts to highlight some of the more significant issues to be taken up in a longer study, those enumerated here are by no means intended to exclude other themes. The literature on the fur trade is as vast as the scale of the trade itself. Most of this literature, however, tends not to focus on the environmental aspects of the fur trade, but rather economic and social ones. Given that the fur trade was predicated on the notion of beaver as an extractable resource, and one that was particularly difficult to manage, this neglect of the history of the fur trade *qua* environmental history calls for a remedy. A broad definition of environmental history that allows for an analysis of the effects on nonhuman nature as well as the relationship of human economic, social, and cultural practices to that nature enables us to develop new historical insights while at the same time, drawing upon the considerable historical resources available to us.

The Pacific Northwest serves as an especially good case study. The Hudson's Bay Company's provides a ready-made structure because it dominated the region's fur trade for a period of 25 years. Considering the vast distances its domain encompassed, the HBC was rather highly organized and coordinated; furthermore, there exists a considerable store of company records that can provide a wealth of information. The company virtually embodied the notion of the commodification of nature. Probably the most obvious manifestation of this is the fact that

the HBC was granted monopoly trading rights over millions of square miles of the North American continent. This monopoly was contested, to be sure, but the HBC considered "its" lands as a private trading domain and enacted policies to maintain these lands as a source of profit and not as a place for future, permanent settlement. We see this view bolstered further in George Simpson's complaint, during his visit to the Pacific Northwest, that "[e]verything appears to me on the Columbia on too extended a scale *except the Trade*," as well as his opinion that "I consider every pursuit [farming] tending to leighten the Expence of the Trade is a branch thereof..."[47] In fact, Simpson's view of the Pacific Northwest as a major source of new profit for the HBC suggests that it, as a region, may even be a better model for the commodification of nature than the New England of William Cronon's *Changes in the Land*. Though fur traders in seventeenth-century New England certainly did not shy away from the idea of nature as a source of profit, permanent settlement appears to have paralleled the fur trade in New England. Indeed, settlement of New England brought about the end of the fur trade there. By contrast, the HBC was successful (for a time) in keeping out permanent white settlement in order to protect its profitability in the Pacific Northwest.

The applicability of an environmental history of the fur trade is varied. It can serve an obvious educational purpose by adding another component to the material already available at National Park Service sites. It can tell us something about the patterns of settlement in the Pacific Northwest, since fur trading posts served as nodal points around which white settlement coalesced once the HBC began its withdrawal from the Pacific Northwest. Ecosystem restoration can also benefit from an environmental history; by telling us something about the kind, scale, and mode of environmental change brought about by the fur trade, we gain a better understanding of the possibilities and methods of such restoration. These are but a few ideas;

[47] George Simpson, quoted in Gibson, *Farming the Frontier*, 16, 17.

certainly a full historical study could illustrate even more desirable applications of this kind of research.

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