Jennifer Ott

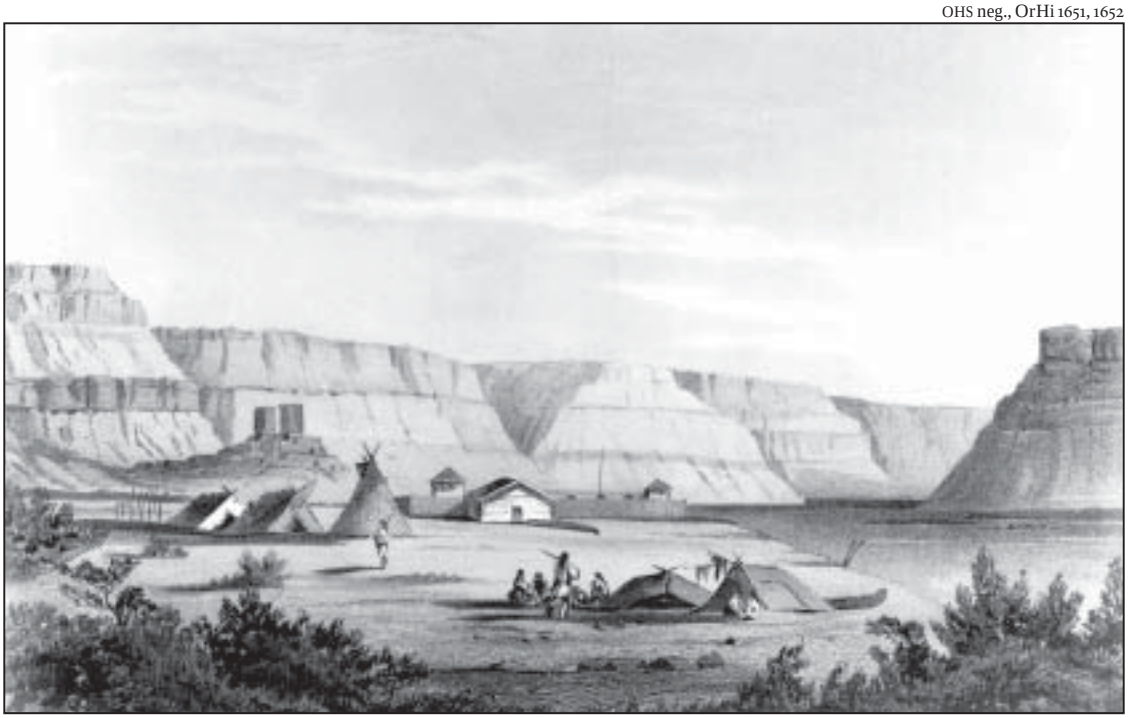
"Ruining" the Rivers in the Snake Country

The Hudson's Bay Company's Fur Desert Policy

Every year our understanding of human influences on the land and waters of the Pacific Northwest deepens, and the subtleties and complexity of the interaction between people and the landscape are teased out of scientific data and personal experiences. Currently, the web of relationships that enables a salmon smolt's successful migration from river to sea and back again draws the closest scrutiny. Scientists consider everything from hydroelectric dams to buffer zones along suburban streams as they weigh the factors influencing salmon runs. Yet, there are multitudes of human actions that have influenced how the environment in the Pacific Northwest functions but that other activities and time have obscured.

While historians have heralded and vilified the fur trade for opening the region to non-Indians, they have paid little attention to the effects of trappers on the land. Although the fur trade's role in environmental change has faded from view as farming, ranching, and population growth have affected soil and water quality and biodiversity, extracted elements help define a region as much as what remains. Beaver trapping, for example, produced fundamental changes in how humans, animals, land, and water have affected each other in the Northwest, particularly in the Snake River Basin. Between 1823 and 1841, the Hudson's Bay Company (HBC) carried out what is known as the fur desert policy — a strategy of clearing the

OHS neg., OrHi 1651, 1652



Many of the Snake Country expeditions originated from and returned to Fort Nez Perces on the Walla Walla River, shown here in a lithograph by John Mix Stanley that appeared in the reports of the Pacific Railroad surveys. From Fort Nez Perces, furs continued their trip to market by boat to Fort Vancouver and from there to London on the annual supply ship.

basin of beaver to keep encroaching Americans from coming west of the Continental Divide. Through their use of efficient Snake Country trapping brigades, the HBC nearly extirpated beaver in the region and, in the process, redefined the physical space in which people would live.

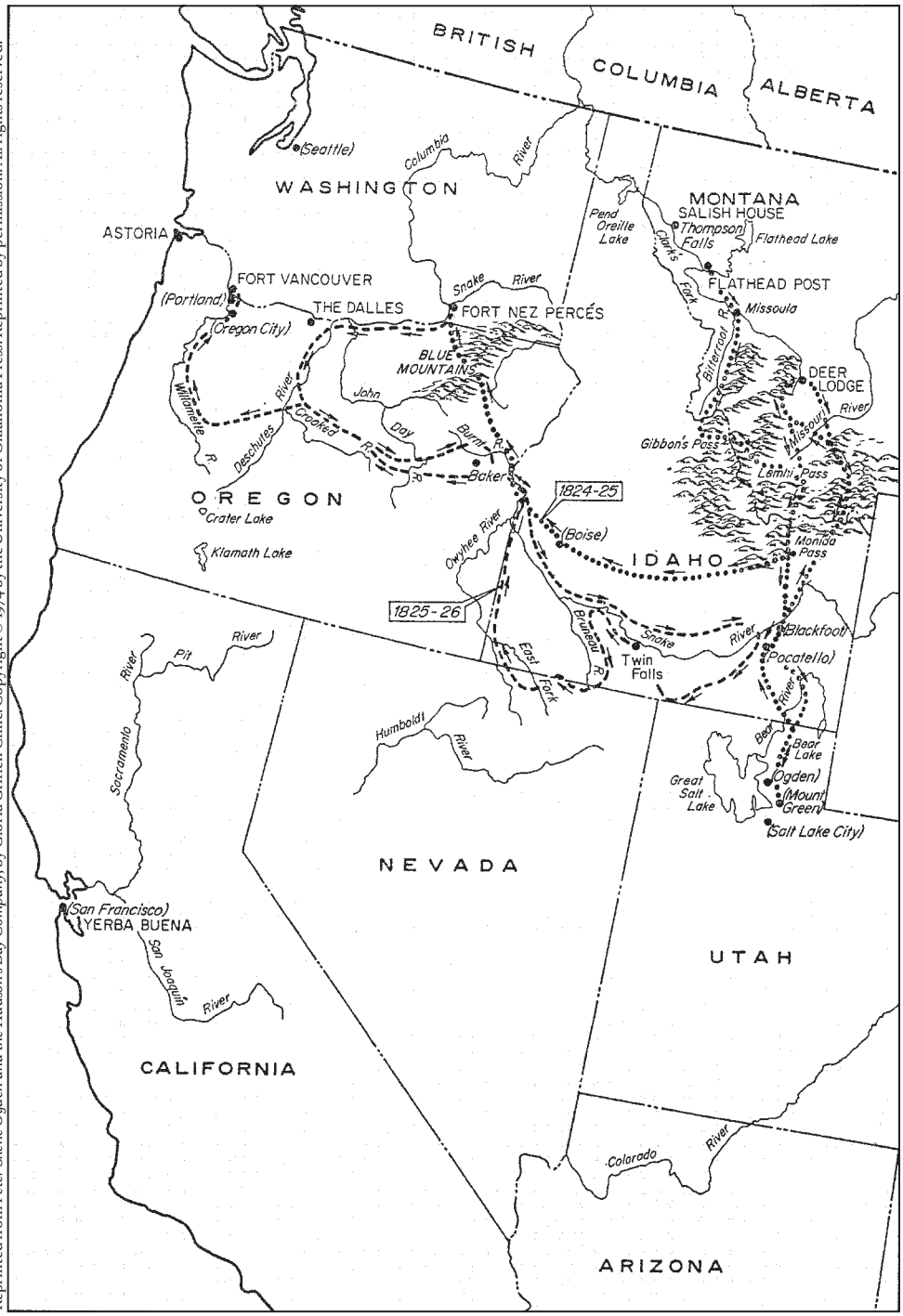
The fur desert policy began in response to a territorial dispute over the Oregon Country. The HBC accepted the inevitable loss of most of the region to the Americans and focused on retaining the area bounded by the Columbia River on the south and east, the Pacific Ocean on the west, and the forty-ninth parallel on the north, an area encompassing potential Puget Sound ports and the transportation route provided by the Columbia River.[1] The Americans sought control of the entire region. During the negotiations for the Convention of 1818, the United States and Britain agreed to postpone a final decision about what was called the Oregon Question. The article of the convention pertaining to the dispute reads:

It is agreed, that any Country that may be claimed by either Party on the North West Coast of America, Westward of the Stony Mountains, shall, together with it's [*sic*] Harbours, Bays, and Creeks, and the Navigation of all Rivers within the same, be free and open, for the term of ten years from the date of the Signature of the Present Convention, to the Vessels, Citizens, and Subject[s] of the Two Powers: it being well understood, that this Agreement is not to be construed to the Prejudice of any Claim, which either of the Two High Contracting Parties may have to any part of the said Country, nor shall it be taken to affect the Claims of any other Power or State to any part of the said Country; the only object of the High Contracting Parties, in that respect, being to prevent disputes and differences amongst Themselves.[2]

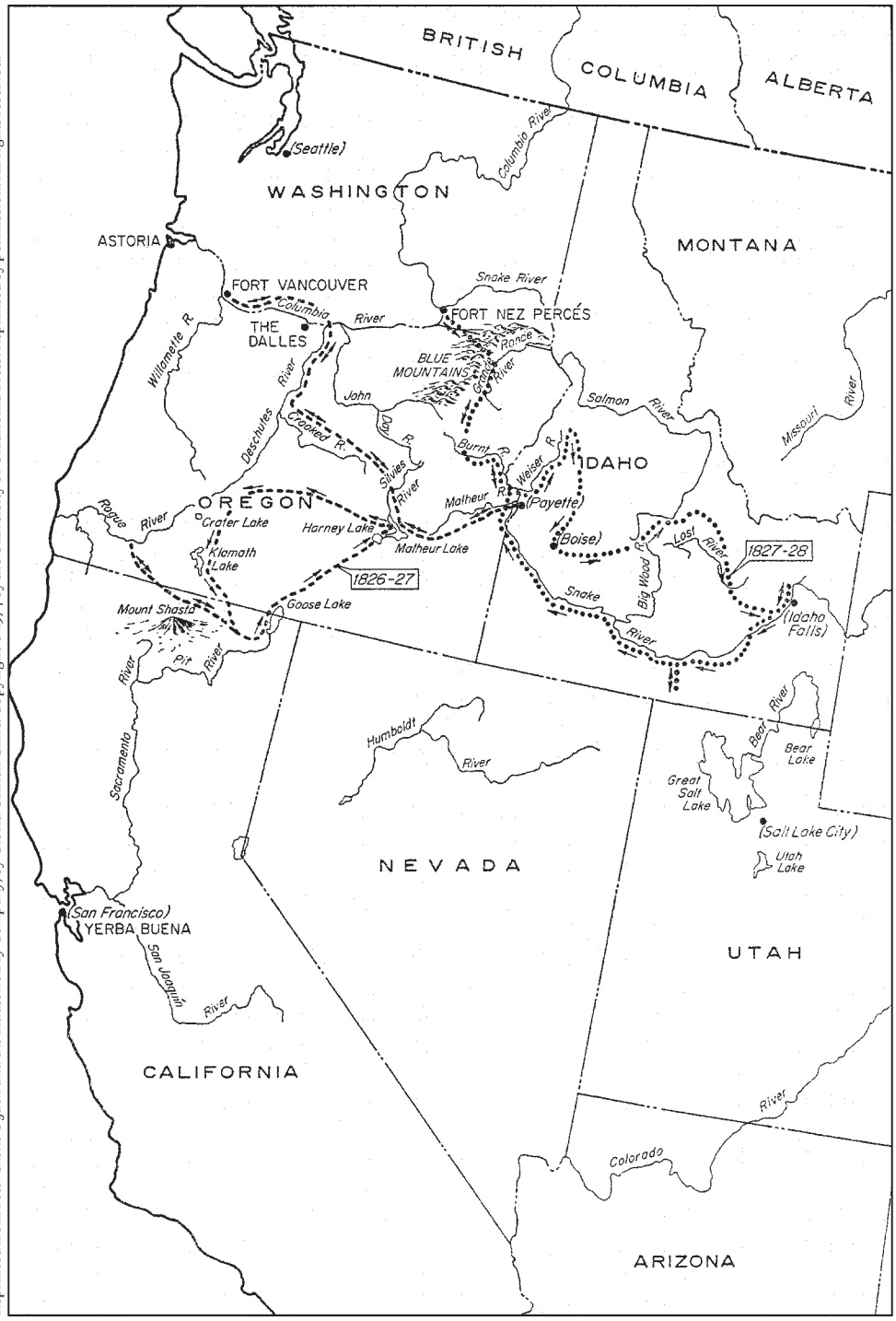
Renewed in 1827, the convention remained the region's governing document until the two nations resolved the dispute in 1846.

Native people's land rights did not enter into the debate, but the realities of the local situation in the Snake Country complicated the process and balanced the power between the British and the Americans. The HBC did not explicitly gain access to the Snake Country for pelts. For the places where the Company established posts, however, the local Indians required recognition of their control of the land and demanded compensation for the use of it. Without these posts along the Columbia River and its tributaries, the British would have been unable to carry on the fur trade. When another fur outfit, the North West Company, began to build Fort Walla Walla (later called Fort Nez Perces), the local Indians congregated at the site. They wanted payment for the trees that the North West Company had cut for construction of the fort and to make it clear that the British would not be allowed to hunt or fish in the area. Company official Donald McKenzie reached an agreement with the chiefs that allowed the bands around Fort Nez Perces to retain the land and the driftwood from the river and gave the Europeans use rights. Likewise, at Fort Colvile, the HBC made a verbal treaty with a local chief that allowed use of the land but prohibited Company employees from fishing at Kettle Falls.[3] The Governor and Committee, the governing body of the HBC, recognized the importance of assuring the people in the Columbia District of their intentions to respect local land tenure. In 1825, they instructed George Simpson, governor of the Northern Department, to make it clear to Native people "that we have no desire to posses or cultivate their lands beyond the little garden at the Trading houses." This comment is deceptive in that it neglected to mention the Company's intent to scour the land for pelts and the inevitable non-Native settlement that would follow.[4]

The Oregon Country had not become important to the HBC until 1821, when the HBC merged with the rival North West Company. At first,



The Snake Country Expeditions, 1824–1825 and 1825–1826



The Snake Country Expeditions, 1826–1827 and 1827–1828

the HBC questioned whether the Columbia District merited the effort required to keep it. The governing committee wrote George Simpson in February 1822:

> We understand that hitherto the trade of the Columbia has not been profitable, and from all that we have learnt on the Subject we are not sanguine in our expectations of being able to make it so in future. But if by any improved arrangement the loss can be reduced to a small sum, it is worth a serious consideration, whether it may not be good policy to hold possession of that country, with a view of protecting the more valuable districts to the North of it.[5]

The territory "to the North of it" consisted of New Caledonia (present-day British Columbia), a region with largely unexploited beaver populations. The HBC developed the idea of clearing the Snake River Basin of beaver in order to create a fur desert, or buffer zone, that would discourage the westward flow of American trappers who began to reach the Northern Rockies in substantial numbers in the 1820s. The Company's experiences across northern North America had taught a painful lesson: competition depleted beaver trapping grounds and, therefore, profits.[6]

The idea of making a buffer zone out of less productive regions was not unique to the Columbia District. In a February 1822 letter, the Committee wrote Simpson:

> The Russians are endeavoring to set up claims to the North West Coast of America as low as Latitude 51, and we think it desirable to extend our trading posts as far to the West and North from Fraser's River in Caledonia, as may be practicable, if there appears any reasonable prospect of doing so profitably.[7]

In the 1820s, the Ottawa River region formed a frontier that protected the interior trade of Rupert's Land (present-day Canada) from American interest and interference.[8] When faced with a situation in which their adversary refused to leave, the Company sacrificed marginal areas, such as the deserts of the Snake Country, to protect more abundant beaver populations further removed from the competition. American trappers would have had to cross a large expanse of cleared territory to reach New Caledonia, and the HBC hoped they would be discouraged from even trying by the poor returns they encountered in the fur desert.

The HBC's plan of defense consisted of improving the British claim to territory to the north of the Columbia River by building and enlarging forts, thereby increasing the British presence in the region. They would also focus trapping to the south and east, which they believed they would lose to the Americans regardless of their established posts and other claims

to sovereignty. The Committee wrote John D. Cameron, chief factor of the Columbia District, in 1824:

> It is likewise very desirable that the Post at Walla Walla should be made as respectable as possible, as well as any others on the North side of the River, and as we cannot expect to have a more Southern boundary than the Columbia in any Treaty with the Americans (altho' we are entitled to it from occupancy) it will be very desirable that the hunters should get as much out of the Snake Country as possible for the next few years.[9]

During a visit to the Columbia District to determine its usefulness to the HBC, George Simpson carried the idea one step further. He wrote in an 1824 journal entry: "If properly managed no question exists that it would yield handsome profits as we have convincing proof that the country is a rich preserve of Beaver and which for political reasons we should endeavor to destroy as fast as possible."[10] The fur desert policy had begun.

Without the circumstances created by the Convention of 1818, the rationale for the fur desert policy would not have existed. Without George Simpson, the idea of the fur desert policy most likely would not have existed. Few employees of the HBC appear to have had the initiative, a focus on profits, and the generally ruthless personalities necessary to conceive of such an effort. Simpson had entered the trade as governor of the Northern Department, an area that covered roughly the northern half of the Company's holdings in North America and the territory west of the Rockies. When the Committee began to look for a new governor after the HBC's merger with the North West Company in 1821, Andrew Wedderburn, a business partner of Simpson's uncle, recommended Simpson for the post because he believed that Simpson had the requisite business acumen and the personal fortitude to handle the post-merger economic and personnel situations.[11]

The Committee made a fortunate choice. Simpson had intelligence, vigor, and resolve, and he applied his business sense to decrease costs and increase profits. In the short time between 1822, when he was appointed, and 1825, Simpson cut the number of Company employees from 1,983 to 827 and advised the Committee to drop wages for ordinary employees by 50 percent, which they did. Some problems with employee loyalty ensued, but, with some adjustments, a cohesive union was achieved. Simpson considered HBC's operations in the Snake Country in the same way he looked at the Company's human resources and took the necessary actions to make the business more lucrative and secure. The fur desert policy follows logi-

cally from that perspective. Excluding competition entirely from New Caledonia would help to ensure the HBC's future profitability.[12]

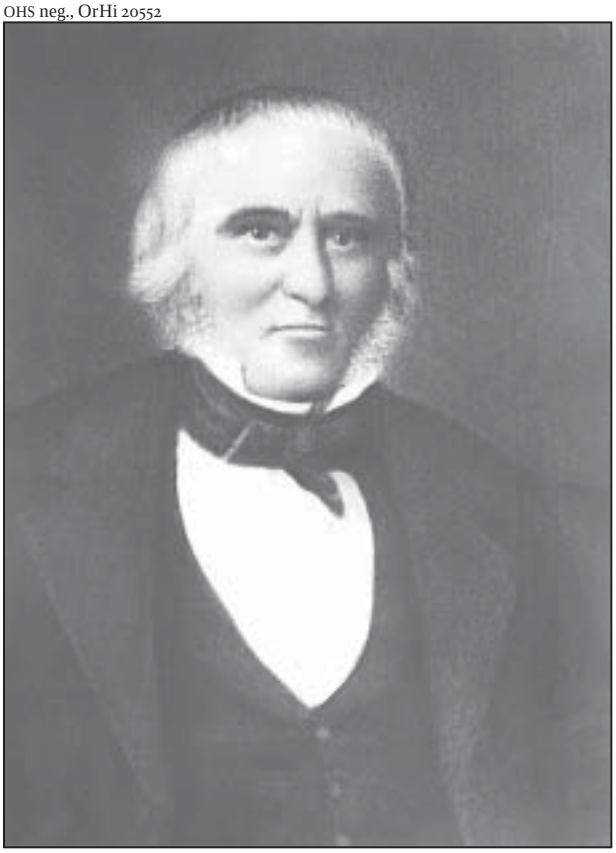
The first HBC Snake Country Expedition started out under Alexander Ross in 1823, before the fur desert policy had been fully developed. Ross, whose brigade brought in forty-five hundred pelts, merely sought to get to the beaver before the Americans did. The next expedition, led by Peter Skene Ogden, began the serious effort of clearing the country of beaver. Over the next six years, Ogden's trappers took about eighteen thousand beaver out of the area south of the Columbia, over half of the thirty-five thousand trapped during all of the HBC's Snake Country expeditions.[13]

The structural and functional characteristics of the brigades strongly influenced their efficiency and effectiveness. The Company's strict hierarchy and division of labor created an efficient and focused working unit, in which each man and woman had a specific role. The division of labor made for a unified whole working toward a common goal — clearing the country of beaver — although for different reasons. Europeans held officer and engagé positions, while French Canadians, métis (people with French and Indian ancestry), and non-Europeans worked as freemen or laborers. Although different criteria established social status in the brigades, these small, nomadic communities were clearly as stratified as British society. Likewise, women were present and active in the brigades but hidden from view in official documents.

Ethnicity and education largely determined status within the brigades. Officers, such as the chief trader or clerks, were nearly always British or British Canadian and well educated. Two classes of trappers filled out the bulk of the brigades. Engagés, usually French Canadian or of European background, earned a salary for any expedition work they did, such as filling in as steersman, and for any pelts they trapped. Freemen included métis, Indians originally from eastern North America, and French Canadians. In far fewer numbers, Abenaki Indians from eastern Canada, members of other central Canadian and northern Rockies tribes, and Hawaiians (known as Owhyhees) joined the expeditions. The HBC paid them cash for any pelts they brought in over the number owed for the freemen's advance of supplies at the start of the year. This practice directly supported the objectives of the fur desert policy, although there is no evidence that supporting the policy was the goal. Freemen had every incentive to trap as many furs as possible, since the more they contributed to the brigade's returns, the more potential they had to make a profit.[14]

The Company assembled this varied group to go into the Snake Country because it could not induce enough Natives — particularly the North-

OHS neg., OrHi 20552



Peter Skene Ogden, shown here in a painting done by John Mix Stanley at Fort Vancouver in 1848, served as chief trader for the Snake Country expeditions between 1824 and 1829.

ern Shoshone — to trap in the region. It appears that practical reasons rather than cultural prohibitions precluded using local Indians as trappers in the Snake Country. Trade goods already reached the area by way of Taos in Mexico and regional trade centers such as The Dalles, and local people grew their own tobacco. Big game thrived in the area, so there was no need to pursue beaver for food. In addition, the Snake Country, particularly the upper Snake River region, was too remote from established posts on the Columbia to draw Shoshones or Bannocks in to trade or to send Indians out from the posts.[15]

A second characteristic of the brigades that contributed to their success, the leadership of the chief traders, is remarkable in light of the Company's lack of knowledge about the region and its distance from HBC headquarters. Considering that the position of chief trader lacked glamour and promised danger, the leadership provided by Alexander Ross, Peter Skene Ogden, and John Work, while not perfect, was essential to the success of the fur desert policy. Each chief trader who led the Snake Country expeditions during the most important years, from 1823 to 1841, worked under the pressure of the HBC's expectations of good pelt returns, the exclusion of Americans from the region, and the brigade's return in time to meet the annual supply ship. At the same time, chief traders faced the realities of the Snake Country, including extreme temperatures in the mountains and deserts, American trapping parties, and confrontations with groups of Indians. There were some low points. Alexander Ross, for example, led a group of Americans to Flathead House in 1824, much to the chagrin of George Simpson, who labeled

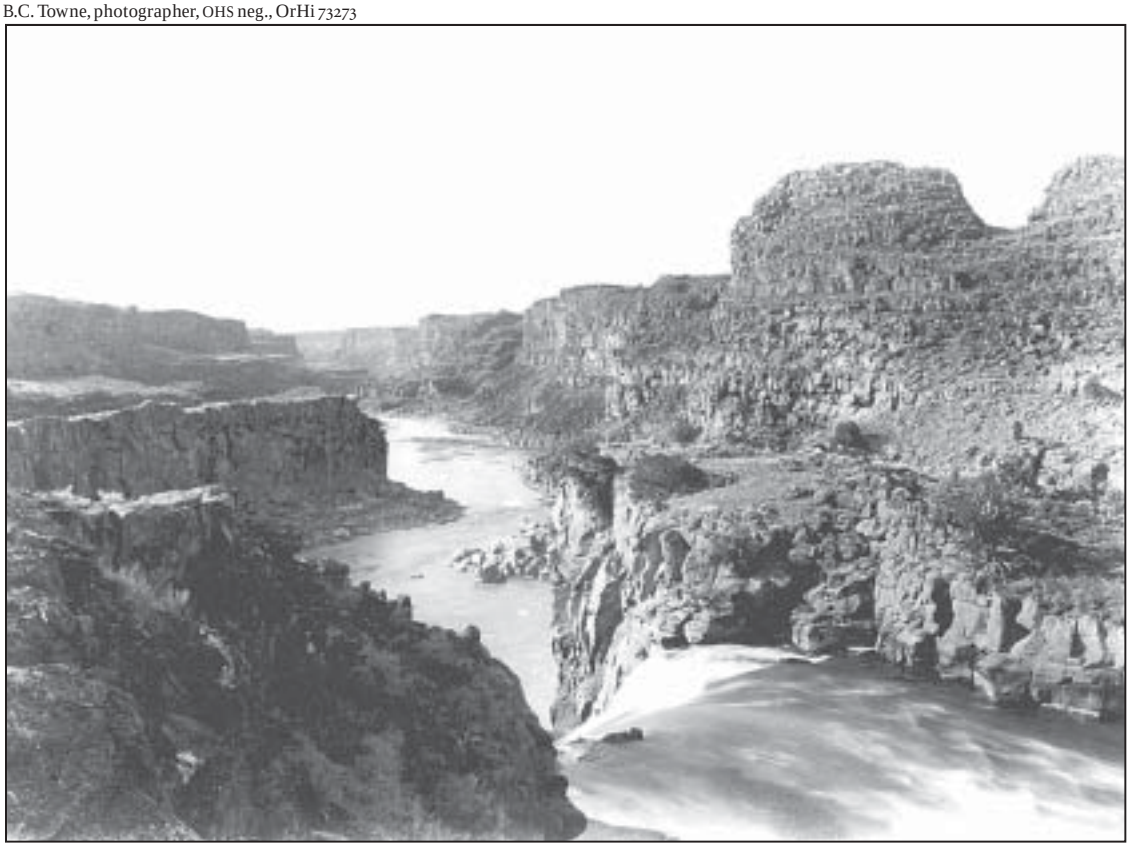
Ross "empty headed" and replaced him with Peter Skene Ogden. In 1825, Ogden had a disastrous encounter with the Americans, to whom he lost a number of men and pelts. Nonetheless, Ross brought in forty-five hundred pelts, and Ogden's six expeditions into the Snake Country established the foundation for the fur desert.[16]

When he was thirty-four years old, Ogden led his first brigade into the Snake Country, having already gained considerable experience in the fur trade. At sixteen years old, he had worked for John Jacob Astor as a clerk in the American Fur Company's Montreal operations. In 1809, he joined the North West Company as an apprentice clerk, which involved him immediately in the brutal competition between the North West Company and the HBC. At Île à la Crosse (in present-day Saskatchewan), Ogden and another North West Company employee, Samuel Black, climbed into the nearby HBC fort, hung around outside showing off their pistols and knives, and terrorized Peter Fidler, who was in charge of the fort. The next spring, as the HBC men headed toward Churchill Factory on Hudson Bay, Ogden and some North West Company trappers stayed just ahead of them for a week, intercepting trade with the Indians. In 1818, he arrived in the Pacific Northwest and worked out of Fort George and Spokane House, where he met his wife, Julia Rivet of the Nez Perce. When Ogden took charge of the Snake Country expeditions, he had only recently joined the HBC. His appointment to the Columbia District resulted from George Simpson's intervention on his behalf. Simpson sought Odgen's expertise despite his questionable behavior while with the North West Company.[17]

In 1824, Ogden set out on his first expedition for the HBC full of high expectations. When trappers caught the first beaver at the mouth of the Wild Horse River, he wrote: "This is a Commencement but I trust we shall not end ere we have Six Thous. owing to my ignorance of the Country I am bound to, with this number I shall be Contented if more they are heartily welcome."[18] The next six years he spent in the Snake Country would temper his enthusiasm and expectations. Even when he came to know the Snake Country well, he never gained six thousand beaver, and conditions tested his ability as both a leader and a fur trader.

In 1830, John Work took over as chief trader and brought to the Columbia District an immediate difference in leadership style. Work had been born in about 1792 in County Donegal, Ireland, and did not join the fur trade until he was twenty-two years old. What occupied him before 1814 remains a mystery, and it is also uncertain what circumstances led him to join the HBC. He entered the trade as a steward and worked his way up the ranks while at York Factory and in the Severn District (part of

B.C. Towne, photographer, OHS neg., OrHi 73273



This image of the Snake River offers some sense of the aridity of the region in which the fur desert policy was practiced.

present-day western Ontario). After five years of advancing up the ranks in the Columbia District, Work spent two seasons in the Snake Country keeping beaver populations low and guiding his brigade through the potential dangers the region presented to a group of trappers representing a European company.[19]

Each chief trader kept journals of his expeditions, which were turned in to the Committee in London with the year's return of pelts. The journals offer an exceptional look at how the chief traders led their brigades through the Snake River Basin and some surrounding drainages in Montana and Oregon and how they cleared the beaver in the face of tremendous hardship. Heading out from the posts each fall, they knew the problems they would face. The Americans could lure freemen and their pelts away from the brigades, and they, too, could trap anywhere they wanted under the terms of the Convention of 1818. The weather could also slow their progress.

Going over Lost Trail Pass in January 1825, for example, Ogden bemoaned their slow pace due to snow and cold. Otherwise, "2 or 300 Beaver Could be Collected in this quarter."[20] The Blackfeet caused them the most fear and apprehension. At one point, near the Clark Fork River in present-day western Montana, the freemen resisted going any farther because they feared Piegan bands in the area. They lost many horses to raids by any of a number of parties in the vicinity of their camps.[21]

By the 1830s, the Snake Country had developed quite a reputation for the difficulties it posed to the brigades. In an 1833 letter to a friend, for example, Archibald McDonald wrote: "Poor [John] Work still continues wandering among the *serpents* [probably the Snake, or Shoshone, Indians] and independent of the venom, I believe he has no enviable task of it."[22] During Work's 1831–1832 expedition, a man was shot in late January during a skirmish with the Blackfeet at Birch Creek in present-day Montana. He died about six weeks later on the Salmon River after immense suffering. Work described his death: "William Raymond, our unfortunate man who was wounded on the 30 Jany, died this afternoon. He was reduced to a mere skeleton; he had taken scarcely any nourishment since he was wounded. The wound was mortified."[23] Even so, the profits brought in and the buffer zone created by the fur desert policy ensured the expeditions' continuation until the Oregon Question was settled.

A third factor that enhanced the brigades' effectiveness is the decision to include women as unofficial members. Expedition journals and documents do not include the full details of the women's presence, but some information can be gleaned from the texts and from other histories of the fur trade. While nearly all of the men married Indian or métis women, it is not entirely clear how many wives accompanied the expeditions. Peter Skene Ogden never mentions his wife, Julia Rivet, in his journals. Work's métis wife, Josette Legacé, joined his brigade, although his journals are not specific about her presence or her activities. Some of the engagés and freemen also brought their wives. The issue is muddied further by official documents indicating that women were not allowed on the expeditions. In 1825, Ogden observed women digging camas root on the Snake River Plain and wondered why Native women did not do the same. The women he mentioned must have been the wives of the trappers.[24]

Throughout the fur trade period, women made moccasins, snowshoes, and pemmican, pitched tents, dried meat, collected berries, and helped carry supplies and pelts. In the Columbia District, women also dressed

pelts, caught and dried salmon, and collected "wappitoo root."[25] Ogden's journals only recognized dressing furs, their most economically important task. He wrote: "it is a pleasure to observe the Ladys [*sic*] of the Camp vieing [*sic*] with each other who will produce on their return to Fort Vancouver the cleanest and best dress'd Beaver."[26] Milan Novak, a furbearer manager for the Ontario Bureau of Natural Resources, wrote that his experience told him that the fastest someone could skin, clean, and stretch a beaver pelt was one-half hour. If he was correct, for the women on the Snake Country expeditions, that meant if the traps brought in fifty-two beaver — as they did on May 12, 1825, on the Little Bear River — it would have taken at least twenty-six hours of labor to process the pelts before the next day's catch arrived in camp.[27]

Women most likely influenced the efficiency and effectiveness of the expeditions by increasing the amount of land the brigades covered each year. Considering the variety of time-consuming tasks they fulfilled, an absence of women would have slowed the brigades' pace and limited the overall distance they could travel. Ogden's brigade probably would not have reached present-day Ogden, Utah, had the pace been slowed by the triple burden of trapping, dressing furs, and performing daily tasks that would have been placed on the trappers in the absence of women. Furthermore, a slower pace and reduced efficiency would have allowed trapped areas more time to recover, and the impact of the fur desert would be a distinctly different story.

A fourth characteristic of the brigades that contributed to their success is how they moved in the country. Each year, Ogden or Work planned a circuit by which they could cover a tremendous amount of territory and end up back at the posts in time to put their bales of beaver pelts on the annual ship to London. Each fall, the expeditions set out from Flathead Post or Fort Nez Perces to make a circular route through the territory to the south and west of the Columbia River. Ogden explored large parts of the West for the HBC as he led his parties through what are now Idaho, western Montana, Oregon, northern Nevada, and northwestern Utah.[28] At the same time, the Southern Party pursued beaver directly south of Fort Vancouver into California in anticipation of American encroachment from that direction. The opposition never materialized in large numbers, however, and the trapping to the south does not seem to have matched the Snake Country expeditions' intensity of effort or interest by the Governor and Committee or George Simpson.[29]

To read the journals from the Snake Country expeditions is to read a story of creating scarcity. From the start, there is a sense that trapping

exceeded the resilience of the local beaver population. As time passed, the ransacking done by the trappers produced a widespread effect. The effects of American and Indian trapping also contributed to the success of the fur desert policy. During the critical years when the policy was in place, the HBC took approximately 35,000 beaver out of the region. The 1823–1824 brigade alone yielded 4,500 beaver. By 1834, the average annual yield was down to 665 beaver. Even when the population rebounded slightly in the late 1830s, the numbers remained low, never again reaching 4,000. The evidence of this decline appears throughout the journals.[30]

By just the second year of concentrated trapping in the Snake Country, in 1824–1825, the trappers noticed the effects on the streams. On the Bitterroot River in September 1824, Ogden wrote that "this part of the Country tho' once abounding in Beaver is entirely ruined."[31] The same judgment was repeated for other streams and rivers in the late 1820s and early 1830s. At the junction of Emigrant Creek and Sylvies River in what is now northeastern Oregon, for example, Ogden recorded in 1826: "We have onely [*sic*] one Beaver altho upwards of fifty Traps — the Trappers certainly appear to have clean'd the river well."[32] In 1831, Chief Factor John McLoughlin wrote George Simpson questioning the viability of another trapping party because the region was too exhausted to enable a group of sufficient defensive strength to trap enough beaver to make it worthwhile.[33]

John Work's journals from the 1830–1831 and 1831–1832 expeditions indicate how successful Ogden's brigades had been. Exceedingly hot and cold weather, Blackfeet raids, and querulous freemen still presented problems, but the American threat and the territory had become more manageable. Work's outfits to Snake Country moved at a considerable pace and covered immense territory, but they did not bring in substantial numbers of pelts. During the 1830–1831 expedition, from October 28, 1830, to April 4, 1831, Work did not record a single beaver trapped. Unlike Ogden, who worried if only ten beaver met their fate during the night, Work did not record a hint of concern.[34]

If there remained any doubt that the trappers intended to "ruin" the rivers and streams, the journals clarify their goal for the area. At the Owhyhee River in 1826, Ogden added this comment to the end of his daily entry: "This day 11 Beaver 1 Otter we have now ruined this quarter we may prepare to Start."[35] Two weeks later, at the Burnt River, Ogden wrote George Simpson: "the South side of the South branch of the Columbia [the Snake River] has been examined and now ascertained to be destitute of Beaver."[36] Even in 1841 the HBC remained

unwilling to take any rehabilitative measures in the Columbia District because, according to Simpson, "in the present unsettled state of the boundary line it would be impolitic to make any attempt to preserve or recruit this once valuable country, as it would attract the attention of the American trappers."[37]

During the 1830s, loose ends remained in the Columbia District, including American trading ships on the coast, scattered American trappers in the Snake Country, and some attempted American ventures in the region. By 1839, Simpson reported to the Governor and Committee: "The Trade of the north west coast, North of the Columbia, is still, I am happy to say, undisturbed by opposition."[38] A couple of years later, the continued decimated state of the region's beaver populations bolstered Simpson's confidence in the Company's dominance of the Snake Country as he wrote to the Governor and Committee: "the want of success that has attended their [the Americans'] endeavors of late years, will I trust deter others from risquing [*sic*] their lives & property in so hopeless an undertaking as competition in the Fur Trade would at present be in that quarter."[39] Through the early 1840s, no American posts succeeded in the Columbia District, and the majority of American trapping efforts remained east and south of the Snake River.

Unfortunately for the HBC, American settlers did not require established American fur outfits to precede them in the Oregon Country. Missionaries arriving in the 1830s failed to deceive the HBC regarding their dual motives. The Governor and Committee wrote James Douglas at Fort Vancouver in 1837 with their assessment of the situation:

> Were we satisfied that the sole objects of those Missionaries were the civilization of the Natives and the diffusion of moral and religious instruction, we should be happy to render them our most cordial support and assistance, but we have all along forseen [*sic*] that the purpose of their visit was not confined to those objects, but that the formation of a Colony of United States Citizens on the Banks of the Columbia was the main or fundamental part of their plan.[40]

The Americans succeeded, of course, and the decline of the HBC's presence in the Oregon Country began. Still, the Company reaped significant benefits from the region for several decades and essentially protected New Caledonia to the north from American encroachment. They achieved half of their goals and made a substantial sum of money in the process.

The Snake Country expeditions capitalized on what they knew about beaver behavior and biology in their success with the fur desert policy. The lodges that beaver inhabited and the dams they built made them easy to

find. Also, once the trapper placed a trap baited with castoreum — a substance secreted by the glands of beaver with a scent that is individually unique — the beaver, who are extremely territorial, would have to overcome their instincts to resist the attraction. Only the most shy, or what Ogden called "wild," animals resisted the trap's scent, which most likely led to the situation Ogden found in 1827 south of present-day Ola, Idaho, when he remarked, "The trappers complain the few beaver there are, are very wild."[41] By inadvertently selecting out the boldest beaver with their traps, the trappers left a remnant population of less-aggressive beaver, saving the population from complete extirpation in the area.

The nature of beaver mating behavior and reproduction also helped the Company clear the Snake Country of beaver. By taking all the beaver they could entice into their traps during the winter and spring, the trappers created an entirely different situation than the one in which the beaver had evolved. In the absence of trappers, losses of kits in their first winter and older adults due to excessive cold or reduced food availability and predation posed the greatest risks to beaver populations. To survive, beaver had adopted a number of behaviors that kept those losses to a minimum. For colonies that built dams, ponds provided protection, especially during the winter mating season when a layer of ice covered the pond. The water and ice prevented most predators from reaching the lodge, and the occasional intruding otter could be repelled with the beaver's magnificent teeth. Furthermore, an underwater lodge entrance allowed kits to learn to dive and swim without being exposed to predators. The success of those behaviors in protecting the young led to a low reproduction rate in adults. Finally, spring and summer, the seasons during which adult males spent the most time out of the lodge and pond gathering forage and building materials, were also the times when males could most easily be replaced. Subadult beaver left their parents' lodges at this time and sought new colonies or established their own lodges. Females established and maintained colonies so new males easily joined an existing colony.[42]

Trapping beaver in the winter and spring, when pelts were at their thickest, undermined the patterns evolved by the beaver for their protection. When some females survived the trappers, there were no dispersing subadults to join the colony until the following spring or summer, leaving them on their own to survive the winter. Further, fewer surviving subadults made the repopulation of colonies less likely, reducing overall reproductive rates. Already low reproduction rates made them easier to

extirpate and slower to rebound.[43] Ogden noticed the devastating effect their timing had on the populations in May 1829 at Bull Run Creek near Bull Run and the Tuscarora Mountains:

> It is scarcely credible what a destruction of beaver by trapping this season, within the last few days upwards of fifty females have been taken and on an average each with four young ready to litter. Did not we hold this country by so slight a tenure it would be most to our interest to trap only in the fall, and by this mode it would take many years to ruin it.[44]

In addition to the immediate effects on pregnant females, there were also long-term effects. Many of the mature females trapped between May and July would have left kits that still relied on their mothers for nourishment. Further, while the young stay with the colony for two to three years, it appears that they experiment with ways to repair dams and gather building materials. This learning may not be essential for survival, but it may make survival more likely. By denying the kits and subadults this time with mature adults, the trappers probably affected the future survival rates of those few beaver they left in the lodges.[45]

Other factors also may have contributed to the fur desert policy's success. Reconstructions of historical climate trends using tree-ring data and pollen evidence indicate that the Snake River Basin generally began to experience lower rainfall and higher temperatures in the 1820s and 1830s. The effects of these changes on beaver went unrecorded, but we can speculate that lower precipitation would have meant less water for vegetation and ponding behind dams. As temperatures warmed and precipitation decreased, more stress may have been placed on beaver, thus reducing their ability to rebound from the overtrapping and prolonging their absence from the streams and rivers. Disease or fire might have further reduced beaver numbers in the Snake Country. In low water, higher concentrations of tularemia, a native disease that is always present in beaver ponds, increased the chances of beaver contracting it. Fires burn the beaver's food supply and building materials and leave them unable to survive the winter. The chief traders' journals give no indication of droughts, which would encourage both epizootics — that is, outbreaks of diseases that can decimate animal populations — and fire resulting from a lack of water.[46] While trapping in eastern Oregon, however, Ogden came upon a scene indicating that something caused problems for beaver populations. According to John McLoughlin, on the Crooked River near Beaver Creek, Ogden "travelled several days among remains of Beaver dams and lodges now mostly destroyed by fire, but whether fire destroyed the

Courtesy of Oregon Department of Fish and Wildlife

Beaver either build dams in waterways that then create beaver ponds or they live in burrows dug into the banks of rivers or lakes.

Beaver or disease he cannot say."[47] It appears that epizootics and fire were not widespread enough to be a regional factor in creating the fur desert, but they certainly contributed to localized scarcity. Furthermore, the fur desert would have amplified the effects of disease and fire by removing nearby colonies, thereby removing any populations that may have migrated into those disease- or fire-destroyed colonies. Recolonizers would not get to the emptied lodges and burrows until repopulation had advanced sufficiently.

The Americans also helped the British create the fur desert. In the eastern reaches of the Snake Country, particularly in what is now eastern Idaho, the Americans actively pursued every last beaver, just as the British did. They acted not according to a Company policy but in self-interest. Ogden continually saw the effects of the American parties on the beaver population. When Ogden sent some of his trappers to the source of the Blackfoot River in

present-day Idaho in 1825, hoping to find abundant beaver, he remarked upon their lack of success: "it appears that quarter had been trapped by the Americans last year."[48] Six years later, on the 1831–1832 expedition, John Work assumed Americans had trapped out the upper reaches of a creek he passed.[49]

Across the Snake Country, from the Big Lost River in present-day Idaho to the Little Applegate River in what is now southwestern Oregon, Native people also exerted pressure on beaver populations. Ogden blamed the Piegan Indians for ruining a small stream near what is now Camas Creek in Idaho.[50] Later, on the Crooked River, Ogden estimated: "If this River had not been visited by the Fort Nez Percee [*sic*] Indians it would have yielded from 4 to 500 Beaver."[51] When the 1826–1827 Snake Country Expedition to the Klamath Lake region arrived, the local people had already trapped out the Little Applegate River.[52] The Indians did not record how many beaver they trapped, but it can be assumed that the HBC's numbers were much higher. None of the region's tribes relied on beaver for subsistence, and the Company could not induce most of them to trap for trade. Their trapping for intertribal trade and personal use, however, as well as some for trade with Europeans, contributed to the overall effect of the fur desert policy.[53] Finally, the HBC succeeded at creating a fur desert in part because some areas simply did not support beaver colonies, as Ogden found out on the southern side of the Snake River in 1826. By trapping out the areas between these "bare" spots, the buffer zone slowly grew to encompass the entire region that now includes southern Idaho, southwestern Washington, eastern Oregon, parts of western Montana, and the northern reaches of Utah and Nevada.

Surprisingly, the Americans, for all their discussion of the Oregon Question, never seemed to grasp fully what the HBC intended to do with the region. Trappers in the Northern Rockies certainly realized the Company had taken nearly all the beaver. Nathaniel Wyeth, trying to establish fur trade operations in 1832, wrote in his journal: "We moved in a W. by S. direction about 15 miles to a creek putting into Lewis [Snake] River on which we found no beaver of consequence having been traped [sic] out by the H. B. Co. some years before."[54] In 1827, William Ashley wrote to Thomas Hart Benton, an important congressional supporter of the American claim to Oregon, about the rivers and streams of what is now southern Idaho and western Montana. He complained: "That the same water courses did, when first trapped, furnish double the quantity of furs in the same time, with the same labor, I have not the least doubt."[55] With their focus on diplomatic disputes and potential agricultural development, the Ameri-

cans in the eastern United States hardly noticed what the HBC intended to do in the Snake Country, but the fur desert policy would profoundly influence the land they wanted so badly. The removal of the beaver had subtle but far-reaching consequences.

The history of the fur trade has always been more about the mountain men, the HBC, and the forts than the beaver that surrendered their pelts to fashion. A mix of rugged men, their Native wives peeking out between the lines of the stories, and embellished tales of conflicts with Crows, Blackfeet, and other trappers dominate the storytelling and analysis of what the fur trade meant for the West and the United States as a whole. The trade is the prelude to settlement, the free life of the expectant-capitalist mountain men, the battle between the monopolistic HBC and free trade outfits out of St. Louis, the first phase of extractive industries in the West. But the fur trade in the Snake River Basin also has everything to do with beaver and the effects of their removal from the landscape. The area that the HBC called the Snake Country is largely an arid environment, and beaver ponds retain water. Their presence in an ecosystem affects the water table, vegetation patterns, erosion rates, evaporation rates, sedimentation, and wildlife populations.

It most likely took several decades after the demand on the European markets for pelts for beaver to repopulate the trapped-out areas. On Isle Royale, a national park on Lake Superior with no pressure from trapping, the beaver population increased from "very scarce" to about eleven hundred beaver in forty years. That is a substantial amount of time for the plants and animals that rely on the beaver's activities for water, food, and habitat. While the complete picture of environmental change following European contact involves a variety of activities and processes, a look at the beaver's role in ecosystems reveals the probable consequences of trapping them to near extirpation. The beaver is a keystone species, one of those critical animals that determines community structure.[56] One study found that beaver influence the "biogeochemical cycles, nutrient retention, geomorphology, biodiversity, community dynamics, and structural complexity" of their ecosystems.[57] Although they do not directly affect other animal species through predation, they do affect which animal and plant species can live in an area through their impact on the physical and biological structures of riparian zones.

Beaver dam-building and foraging had far-reaching consequences for the Snake Country. The very streambanks the Hudson's Bay men followed as they traversed the region would not be the same after the local beaver

Courtesy of Oregon Department of Fish and Wildlife

Beaver inhabited streams, rivers, and lakes all across the Pacific Northwest prior to the arrival of fur trappers. Today their dispersal is affected more by development, agriculture, and logging than by trapping.

fell for the ever-effective castoreum bait. The most basic effect beaver can have on a stream is impoundment. Dams affect two separate processes that involve the soil on the sides of the stream and in the water. The first, reducing erosion, results from the alteration of the stream channel. Dams create ponds behind them, and a series of dams — built by the same or several colonies — results in a more gradual stream slope. While the actual channel remains the same, the way the water moves over it changes. Instead of a headlong rush to the ocean, the ponds force the water to dawdle. This "stair-step profile" reduces velocity and, therefore, the water's ability to erode the sides and bottom of the stream channel. In the years since the fur desert policy ended, the grazing pressure and the reduced number of beaver dams have caused high rates of erosion to continue.[58]

Beaver dam breaks can cause disturbances that bring temporarily higher erosion and can kill fish eggs and the small organisms on stream bottoms. Dam failures also open up streams to fish migration. Channel scour caused

by the rush of pond water creates bare areas, preparing them for plants requiring recently disturbed ground, such as certain species of willow. These events, however, are relatively isolated and infrequent. Beaver dams so effectively reduce erosion in streambanks that ranchers and wildlife managers have begun to use them to repair riparian areas damaged by grazing.[59]

Sedimentation, the second soil process affected by beaver dams, also relates to how dams reduce stream velocity. Lowering velocity reduces the stream's sediment-carrying power. As the waterflow slows in the pond, the sediments drop to the pond bottom and accumulate over time. When the beaver move on to establish a new colony, usually because they have exhausted local food resources, the pond eventually drains when the untended dam weakens and leaks or breaks. The exposed sediment is then available to terrestrial plant life. One group of researchers studying beaver in a boreal forest in Minnesota found that ponds and the meadows that result from them are "patches of high standing stocks of ions and nutrients in surface organic profiles and, for nitrogen, in plant-available forms."[60] Over sixty-one years, at a pond studied in Minnesota, nutrients such as nitrates, calcium, and magnesium increased dramatically in the soil. The presence of the nutrients was not a direct result of the beaver's actions but of the way the animals moved nutrients into ponds by decreasing water velocity and plant decomposition, how the nutrients accumulated over the lives of the ponds, and then how the nutrients were made available to the plants when the pond drained and the rich soil was exposed. The grasses and shrubs that benefited from the sedimentation completed the process as their roots reduced erosion.[61]

Water quality also changes as the water stands in beaver ponds and passes through dams. Larger rivers, such as the Clearwater and the Snake, had better water quality because streambanks protected by beaver dams lost little silt. Studies on forest streams showed that acidity and dissolved oxygen declined after the water passed through a beaver dam while the acid-neutralizing capacity and the dissolved organic carbon increased. In a stream study in Oregon, ponded areas had higher concentrations of nutrients. All of these conditions improve the stream as habitat for insect larvae and other microorganisms. This habitat diversity demonstrates how important beaver ponds can be for structural diversity in an ecosystem dominated by one vegetation community, such as the sagebrush steppe of southern Idaho.[62]

Most importantly for the semi-arid Snake Country, with beaver in place snowmelt stayed longer before sliding off through valleys and can-

Courtesy of Oregon Department of Fish and Wildlife

Arid land filled much of the area affected by the fur desert policy. The green vegetation of riparian zones contrasted sharply with the surrounding sagebrush-dominated landscape, as shown here in an image of an area along Oregon's Trask River.

yons to the Columbia River and the Pacific Ocean. The ponds kept the runoff at higher elevations longer, and the volume of water released to lower elevations was more evenly distributed over the course of a year. This complemented the already reduced levels of erosion. The amount of retained water directly depended on how many beaver were building dams. Over time, as the number of colonies declined in the Snake Country, beaver built and maintained fewer ponds to hold the water in the region. In the spring of 1831, streams ran unusually high. John Work's expedition came across streams where Ogden had found only dry beds. A direct connection among trapping, beaver dam failures, and higher water at lower elevations cannot be clearly drawn, but overtrapping most likely contributed to the situation Work observed. The Snake Country Expedition fol-

lowed much of the same circuit in 1830–1831 as Ogden had in 1827–1828. Where Ogden had trapped 3,093 beaver, Work could bring in only 866.[63]

Retained water did not only stay in the pond or streambed. Some soaked into the streambanks and raised the overall amount of surface water available to plants. Water retention was crucial in a region where annual evapotranspiration averaged between 24 and 36 inches, evaporation rates varied from 28 to 42 inches, and precipitation could be as low as 10 inches per year and only as high as 60 inches in the mountains. Though the ponds increased surface evaporation, the decreased loss to runoff outweighed that disadvantage. The dams' affect on surface water is significant, contributing to the development of different vegetation community types, This habitat diversity demonstrates how important beaver ponds can be for structural diversity within an ecosystem.[64]

Beaver foraging and dam-building influenced which trees survived in the stands that surrounded their ponds. In 1954, a study on Hagenbarth Pond in eastern Clark County, Idaho, found that over three years at a colony with a maximum of five beaver at any one time, beaver cut a total of 807 aspens, opening up areas for new growth. Each beaver used about eighty-eight hundred pounds of timber, with bark, per year. They cut these trees in groups, which further influenced the forest composition by promoting the growth of softwood trees, such as firs, that need sunlight. Beaver promoted new growth in willows by selecting larger, older stems for their dams, and they may have inadvertently planted willow shoots, further determining which plants would eventually grow around their ponds.[65]

Beaver activity in the early nineteenth century affected not only soil, water, and vegetation but also the animals that lived in Snake Country. Vast portions of the region, even those with some tree growth, fall into the semiarid category. Water that beaver impounded would have made a relatively small percentage of land lush and green. In the semiarid climate, these riparian areas would have stood out in sharp contrast to the surroundings. To animals, the strips of vegetation along streams signaled that water, food, and habitat could be found there. Ogden and Work worried that they would not find forage for their horses whenever they had to leave the streambanks for open country. For herbivores such as deer, elk, and antelope, the riparian areas provided sure sources of forage as they moved between summer and winter feeding areas or onto new ranges. Willows, grasses, sedges, and

forbs grew in the riparian areas and were excellent forage, and insect-eating birds enjoyed the abundance of hatches from the ponds.[66]

The beaver-supported vegetation that animals foraged also served as habitat. Structural diversity, so important in providing habitat for a wide range of species, increased as riparian areas developed. Also, the diversity of vegetation types in riparian zones allowed for an increase in types of nesting sites and feeding activities, especially if the riparian area was in a coniferous forest. When a pond filled in behind a beaver dam, other new habitats developed. Tree swallows and woodpeckers made their homes in drowned trees. Frogs, salamanders, and some fish took advantage of the slower, deeper water in the pond.[67]

Climatic conditions in the riparian zones also drew animals. The vegetation that grew in these areas because of the water created a microclimate that had higher humidity, transpiration, shade, and air movement. Of the 378 terrestrial species that live in the Blue Mountains in the western portion of the fur desert, for example, 285 need riparian areas to survive or they rely on them significantly. Some animals do not establish residence in the riparian zones but linger there for a significant amount of time.[68] One researcher found that "elk on a Blue Mountain summer range spent 40 percent of their time in riparian zones, which made up only 7 percent of the area."[69]

At the outset of the fur desert policy, the waterways of the Snake Country would have had conditions similar to those found in healthy riparian areas today. Although beaver did not create or maintain all the riparian areas in the Snake Country, they played a significant role in sustaining and enhancing them. When trappers removed the beaver, they most likely caused a series of events. First, untended dams eventually failed, causing some initial benefits for vegetation, such as scour, pond-bottom exposure, and fewer drowned trees. Over time, however, a lowered water table, lost surface water, and increased erosion resulted from the reduced number of beaver colonies. The consequences went beyond the vegetation to the animals that relied on riparian areas for water, food, and habitat. Figuring an average of six beaver per colony, the thirty-five thousand taken out by the HBC represents the equivalent of nearly six thousand beaver ponds, given that some would have had bank burrows and others would have built more than one dam. Human activities such as agriculture, ranching, and logging would later amplify the problem by continued suppression of beaver populations and habitat removal. The environment, and therefore the people in the Snake Country, would have had to adapt to the lack of beaver.[70]

It is hard to say definitively how much environmental change or adjustment can be attributed to the fur desert policy. Beaver dams would not have failed all at once, and beaver populations probably rebounded in areas not immediately settled by Euro-Americans. And, of course, no one left a record of how the land changed between 1823 and 1840. As our understanding of the Northwest becomes more complex, however, we are beginning to realize that ecosystem relationships should be understood in terms of what is missing. Nancy Langston, in *Forest Dreams, Forest Nightmares: The Paradox of Old Growth in the Inland West,* identifies beaver removal as a possible link in the story of the Blue Mountains' forest health. Mark Fiege, in *Irrigated Eden: The Making of an Agricultural Landscape in the American West,* includes the HBC's trapping as one of the activities that influenced the land. Removing a species, especially one with such tremendous geomorphic influence as beaver, changes how the environment works. The severity and duration of these changes depended on a number of factors then and since. After the fur desert, however, the water ran differently, large mammal forage was sustained differently, water tables were maintained differently, and creatures that lived in beaver ponds had to find new bodies of water to call home.[71]

To lament the ecological insensitivity of the fur trade companies is an old story. While the fur desert policy stands as a fairly unique circumstance in the history of the fur trade, it is still the familiar story of consuming a natural resource for profit. What is interesting about the fur desert policy, beyond the impressive fact that it was achieved over an immense area, is that it is a layer in the history of the Northwest as a place. The role of the fur desert policy in shaping the environment has been buried under the other layers of more visible activities — settlement by Euro-Americans, changes in Indian cultures, urbanization, and climate change. The fur desert policy is not *the* story of the Snake River Basin but is one part of a larger history that includes innumerable human–nature interactions that have shaped and reshaped the place in which people live.

The Grande Ronde is not the same valley as it was to the Nez Perce in 1804 when Lewis and Clark came through. Fort Vancouver is a different place today, with 160 years of history layered on top of it since the Company pulled up stakes and moved to Victoria. These places have fundamentally changed as a result of human activities. The fur desert policy played an important role in this change because it involved the near-complete removal of a part of the ecosystem and signaled the arrival of a new land ethic and a shift in the economic and political context in which decisions would be made and people would live.

Notes

1. James P. Ronda, *Astoria and Empire* (Lincoln: University of Nebraska Press, 1990), 85; E.E. Rich, *The History of the Hudson's Bay Company, 1670–1870* (London: Hudson's Bay Record Society, 1959), 1:608.

2. U.S. Department of State, "Fisheries, Boundaries, and Restoration of Slaves," October 20, 1818, in *Treaties and Other International Agreements of the United States of America, 1776–1949*, 13 vols. (Washington, D.C.: GPO, 1968–76), 12:58–9.

3. Theodore Stern, *Chiefs and Chief Traders: Indian Relations at Fort Nez Percés, 1818–1855* (Corvallis: Oregon State University Press, 1993), 11, 129; David H. Chance, *Influences of the Hudson's Bay Company on the Native Cultures of the Colvile District*, Northwest Anthropological Research Notes, vol. 7, no. 1, pt. 2 (Moscow: University of Idaho, 1973), 27.

4. Governor and Committee, London, to Governor George Simpson, March 11, 1825, quoted in Chance, *Influences*, 31.

5. R. Harvey Fleming, ed., *Minutes of Council, Northern Department of Rupert Land, 1821–1831* (Toronto: Champlain Society, 1940), 302.

6. Arthur J. Ray, "Some Conservation Schemes of the Hudson's Bay Company, 1821–50: An Examination of the Problems of Resource Management in the Fur Trade," *Journal of Historical Geography* 1:1 (1975): 50; Harold A. Innis, *The Fur Trade in Canada: An Introduction to Canadian Economic History*, prepared by S.D. Clark and W.T. Easterbrook based on the revised edition (New Haven, Conn.: Yale University Press, 1962), 264, 268.

7. Governor and Committee, London, to George Simpson, February 22, 1822, quoted in Frederick Merk, ed., *Fur Trade and Empire: George Simpson's Journal* (Cambridge, Mass.: Harvard University Press, 1931), 175.

8. John S. Galbraith, *The Hudson's Bay Company as an Imperial Factor, 1821–1869* (Berkeley: University of California Press, 1957), 31.

9. Governor and Committee, London, to John D. Cameron, July 22, 1824, quoted in Merk, ed., *Fur Trade and Empire*, 242.

10. Journal entry, October 28, 1825, in ibid., 46.

11. Andrew Wedderburn later changed his name to Andrew Colvile. See John S. Galbraith, *The Little Emperor: Governor Simpson of the Hudson's Bay Company* (Toronto: Macmillan of Canada, 1976), 16–17, 29.

12. Ibid., 60.

13. Fort Vancouver, "Fur trade returns for Columbia and New Caledonia districts. 1825–1857. In the handwriting of James Douglas," A/B/20/V3, British Columbia Archives, Victoria, B.C.; Merk, *Fur Trade and Empire*, 44, 280; Peter Skene Ogden, *Snake Country Journals, 1824–25 and 1825–26*, ed. E.E. Rich, assisted by A.M. Johnson (London: Hudson's Bay Record Society, 1950), 256; Gloria Griffen Cline, *Peter Skene Ogden and the Hudson's Bay Company* (Norman: University of Oklahoma Press, 1974), 85; Journal entry, April 22, 1827, near Klamath Lake, in Peter Skene Ogden, *Snake Country Journal, 1826–27*, ed. K.G. Davies, assisted by A.M. Johnson (London: Hudson's Bay Record Society, 1961), 109. Ogden indicated that they had 2,230 beaver and otters at that point; no other total was recorded in the journal or in James Douglas's record book.

14. Merk, ed., *Fur Trade and Empire*, xiii, 56; Alexander Ross, *The Fur Hunters of the Far West*, ed. Kenneth A. Spaulding (Norman: University of Oklahoma Press, 1956), 208–9; Innis, *Fur Trade in Canada*, 264.

15. Merle W. Wells, introduction to Brigham D. Madsen, *The Northern Shoshoni* (Caldwell, Idaho: Caxton Printers, 1980), 23; Charles E. Simpson, "The Snake Country Freemen, British Free Trappers in Idaho" (M.A. thesis, University of Idaho, 1990), 34; Stern, *Chiefs and Chief Traders*, 89; Keith Lawrence, letter to the author, July 21, 1997.

16. Merk, *Fur Trade and Empire*, 44, 46; Journal entry, May 25, 1825, near Ogden River, in Odgen, *Snake Country Journals, 1824–25 and 1825–26*, 54.

17. Archie Binns, *Peter Skene Ogden: Fur Trader* (Portland, Ore.: Binfords and Mort, 1967), 19–20; Cline, *Peter Skene Ogden*, 13–15 , 33, 37, 39; Francess G. Halpenny, ed., *Dictionary of Canadian Biography*, s.v. "Odgen, Peter Skene."

18. Journal entry, September 26, 1824, at Wild Horse River, in Odgen, *Snake Country Journals, 1824–25 and 1825–26*, 7.

19. Francis D. Haines, Jr., ed., *The Snake Country Expedition of 1830–31: John Work's Field Journal* (Norman: University of Oklahoma Press, 1971), xx–xxi, 31–2, 55, 62; Halpenny, ed., *Dictionary of Canadian Biography*, s.v. "Work, John."

20. Journal entry, January 16, 1825, near Lost Trail Pass, in Odgen, *Snake Country Journals, 1824–25 and 1825–26*, 15.

21. Journal entry, August 16, 1825, confluence of Flint Creek and Clark Fork River, in Odgen, *Snake Country Journals, 1824–25 and 1825–26*, 73–4.

22. Archibald McDonald, Fort Langely, to Edward Ermatinger, February 20, 1833, Box 1/3, Edmond S. Meany Papers, Acc. 1949, University of Washington Libraries, Seattle. Typescript of original in British Columbia Archives, Victoria.

23. Journal entries, January 30, 1832, at Birch Creek, and March 14, 1832, on the Salmon River, in John Work, *The Journal of John Work: A Chief Trader of the Hudson's Bay Company during His Expedition from Vancouver to the Flatheads and Blackfeet of the Pacific Northwest*, ed. William S. Lewis and Paul C. Phillips (Cleveland, Ohio: Arthur H. Clarke, 1923), 127, 137.

24. Cline, *Peter Skene Ogden*, 29; Sylvia Van Kirk, "*Many Tender Ties": Women in Fur Trade Society, 1670–1870* (Winnipeg, Manitoba: Watson and Dwyer, 1980), 134; Ross, *Fur Hunters of the Far West*, 209; journal entry, June 14, 1826, near Blue Creek, in Odgen, *Snake Country Journals, 1824–25 and 1825–26*, 186.

25. Van Kirk, "*Many Tender Ties*," 54–8, 61; Odgen, *Snake Country Journals, 1824–25 and 1825–26*, xl.

26. Journal entry, February 13, 1827, at Little Applegate River, in Ogden, *Snake Country Journal, 1826–27*, 76.

27. Journal entry, May 12, 1825, at the Little Bear River, in Odgen, *Snake Country Journals, 1824–25 and 1825–26*, 46; Milan Novak, *The Beaver in Ontario* (Ontario: Ministry of Natural Resources, 1972), 16.

28. During the 1826–1827 expedition, Ogden dipped into what is now Northern California; and in 1829–1830, he spent a substantial part of the expedition venturing far to the south, into what was then Spanish territory and is now California. The trappers found few beaver during these forays, and the bulk of the brigades' efforts remained focused on the Snake River Basin and neighboring drainages. For information on these expeditions, see Ogden, *Snake Country Journal, 1826–27;* and Cline, *Peter Skene Ogden*. Ogden's journal from the 1829–1830 expedition was lost in a river accident during their return trip.

29. Letters among George Simpson, the Governor and Committee, and chief factors and chief traders of the Columbia District discuss the Southern, or Bonaventura, Party but never in terms of clearing the country nor with the sense of urgency seen in their discussions and comments regarding the Snake Country. See Alexander Roderick McLeod, Umpqua River, to John McLoughlin, December 18, 1826, B.223/b/2, Hudson's Bay Company Archives, Winnipeg, Manitoba [hereafter HBCA]; Governor and Committee, London, to John McLoughlin, December 8, 1835, B.223/c/1, HBCA; James Douglas, Fort Vancouver, to Chief Factors and Chief Traders, Northern Department, September 1, 1838, D.5/5, HBCA. For a discussion of the Southern Party, see Richard S. Mackie, *Trading Beyond the Mountains: The British Fur Trade on the Pacific, 1793–1843* (Vancouver: University of British Columbia Press, 1997), 113–22.

30. Fort Vancouver, "Fur trade returns for Columbia and New Caledonia districts"; Merk, *Fur Trade and Empire*, 44, 280; Odgen, *Snake Country Journals, 1824–25 and 1825–26*, 256; Cline, *Peter Skene Ogden*, 85; journal entry, April 22, 1827, near Klamath Lake, in Ogden, *Snake Country Journal, 1826–27*, 109. Ogden indicated they had 2,230 beaver and otters at that point; no other total was recorded in the journal or in James Douglas's record book.

31. Journal entry, September 28, 1824, at Bitterroot River, in Odgen, *Snake Country Journals, 1824–25 and 1825–26*, 9.

32. Journal entry, October 21, 1826, at Emigrant Creek, in Ogden, *Snake Country Journal, 1826–27*, 16.

33. John McLoughlin, Fort Vancouver, to George Simpson, Rupert's Land, March 20, 1831, in *Letters of Dr. John McLoughlin: Written at Fort Vancouver, 1829–1832*, ed. Burt Brown Barker (Portland, Ore.: Binfords and Mort for the Oregon Historical Society, 1948), 185.

34. Haines, *Snake Country Expedition*, 94–143.

35. Journal entry, June 13, 1826, at Owhyhee River, in Odgen, *Snake Country Journals, 1824–25 and 1825–26*, 184.

36. Peter Skene Ogden, Burnt River, to George Simpson, July 1, 1826, quoted in Merk, ed., *Fur Trade and Empire*, 274.

37. George Simpson, Fort Vancouver, to Governor and Committee, November 25, 1841, in Joseph Schafer, "The Letters of Sir George Simpson, 1841–1843," *American Historical Review* 14 (October 1908): 73.

38. George Simpson, Red River Settlement, to Governor and Committee, July 8, 1839, D.4/106, HBCA.

39. George Simpson, Red River Settlement, to Governor and Committee, June 20, 1841, D.4/109, HBCA.

40. Governor and Committee, London, to James Douglas, November 15, 1837, B.223/c/1, HBCA.

41. Journal entry, October 3, 1827, near Payette River, in Peter Skene Ogden, *Peter Skene Ogden's Snake Country Journals, 1827–28 and 1828–29*, ed. Glyndwr Williams (London: Hudson's Bay Record Society, 1971), 13.

42. N.F. Payne, "Population Dynamics of Beaver in North America," *Acta Zoologica Fennica* 172 (1983): 265.

43. Adrian Forsyth, *Mammals of the American North* (Camden East, Ontario: Camden House, 1985), 233.

44. Journal entry, May 28, 1829, at Bull Run Creek, in Ogden, *Snake Country Journals, 1827–28 and 1828–29*, 145.

45. Novak, *Beaver in Ontario*, 6, 8; Heather M. Ingle-Sidorowicz, "Beaver Increase in Ontario: Result of a Changing Environment," *Mammalia* 46:2 (1982): 170; Mark S. Boyce, "Beaver Life-History Response to Exploitation," *Journal of Applied Ecology* 18 (1981): 751–2; John Bisher, Robert A. Lancia, and Harry Hogdon, "Beaver Family Organization: Its Implications for Family Size," in *Investigations on Beavers*, ed. G. Pilleri (Berne, Switzerland: Brain Anatomy Institute, 1985), 1:105; Hope Ryden, *Lily Pond: Four Years with a Family of Beavers* (New York: William Morrow, 1989), 133–4, 136; Forsyth, *Mammals of the American North*, 233; Hope Ryden, "This Beaver Is One Smart Rat," *Audubon* (September 1988): 102–3.

46. Peter J. Mehringer, Jr., "Prehistoric Environments," in *Handbook of North American Indians*, vol. 11, *Great Basin*, ed. Warren L. d'Azevedo (Washington, D.C.: Smithsonian Institution, 1986), 47. H.C. Fritts and X.M. Shao, "Mapping Climate Using Tree-Rings from Western North America," in *Climate since A.D. 1500*, rev. ed., ed. Raymond S. Bradley and Phillip D. Jones (New York: Routledge, 1995), 283; Wells, introduction, 18; David J. Wishart, *The Fur Trade of the American West, 1807–1840: A Geographical Synthesis* (Lincoln: University of Nebraska Press, 1979), 30–1; 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), 119–20; Ray, "Some Conservation Schemes," 50.

47. John McLoughlin, Fort Vancouver, to George Simpson, March 20, 1828, in Ogden, *Snake Country Journal, 1826–27*, 134n1.

48. Journal entry, April 27, 1825, Bear River, Idaho, in Odgen, *Snake Country Journals, 1824–25 and 1825–26*, 40–1.

49. Journal entry, October 29, 1831, at Monteur Creek, in Work, *Journal*, 95.

50. Journal entry, June 28, 1825, at Camas Creek, in Odgen, *Snake Country Journals, 1824–25 and 1825–26*, 64.

51. Journal entry, December 20, 1825, at Crooked River, in ibid., 106.

52. Journal entry, February 8, 1827, at Little Applegate River, in Ogden, *Snake Country Journal, 1826–27*, 69.

53. Stern, *Chiefs and Chief Traders*, 89; Lawrence, letter to the author, July 21, 1997; Alvin Josephy, *The Nez Perce Indians and the Opening of the Northwest* (New Haven: Yale University Press, 1965): 48, 71; Ake Hultkrantz, "The Shoshones in the Rocky Mountain Area," in *American Indian Ethnohistory: California and Basin Plateau Indians*, ed. David Agee Horr (New York: Garland, 1974): 187, 189; Robert F. Murphy and Yolanda Murphy, "Northern Shoshone and Bannock," in *Handbook of North American Indians*, 11:293, 295; Richard E. Hughes and James A. Bennyhoff, "Early Trade," in ibid., 11:242; Catherine S. Fowler and Sven Liljeblad, "Northern Paiute," in ibid., 11:438–41; Keith Lawrence, letter to the author, July 21, 1997.

54. Journal entry, August 17, 1832, on Snake River, in Nathaniel J. Wyeth, *The Correspondence and Journals of Captain Nathaniel J. Wyeth, 1831–6*, ed. F.G. Young, Sources of the History of Oregon, vol. 1, pts. 3–6 (Eugene, Ore.: University Press, 1899), 163.

55. William H. Ashley, St. Louis, to Thomas Hart Benton, November 12, 1827, in *The West of William H. Ashley: The International Struggle for the Fur Trade of the Missouri, the Rocky Mountains, and the Columbia Recorded in the Diaries and Letters of William H. Ashley and his Contemporaries, 1822–1838*, ed. Dale L. Morgan (Denver: Old West, 1964), 178.

56. P.C. Shelton and R.O. Peterson, "Beaver, Wolf and Moose Interactions in Isle Royale National Park, USA," *Acta Zoologica Fennica* 174 (1983): 265–66; David R. Butler, *Zoogeomorphology* (Cambridge: Cambridge University Press, 1995), 183.

57. Michael M. Pollock et al., "Beavers as Engineers: Influences on Biotic and Abiotic Characteristics of Drainage Basins," in *Linking Species and Ecosystems*, ed. Clive G. Jones and John H. Lawton (New York: Chapman & Hall, 1995), 117.

58. Robert J. Naiman, Carol A. Johnston, and James C. Kelley, "Alteration of North American Streams by Beaver," *Bioscience* 38 (December 1988): 754; Larry J. Apple et al., "The Use of Beavers for Riparian/Aquatic Habitat Restoration of Cold Desert, Gully-Cut Stream Systems in Southwestern Wyoming," in *Investigations on Beavers*, ed. G. Pilleri (Berne, Switzerland: Brain Anatomy Institute, 1985), 2:128; Lew Pence, telephone interview by author, August 26, 1997, Gooding, Idaho (handwritten notes in possession of the author); Clifford N. Dahm, Eleonora H. Trotter, and James R. Sedell, "Role of Anaerobic Zones and Processes in Stream Ecosystem Productivity," in *Chemical Quality of Water and the Hydrologic Cycle*, ed.

Robert C. Averett and Diane M. McKnight (Chelsea, Mich.: Lewis Publishers, 1987), 159.

59. Butler, *Zoogeomorphology*, 183; Bernard L. Kovalchik et al., "Major Indicator Shrubs and Herbs in Riparian Zones on National Forests of Central Oregon," tech. paper, R6-ECOL-TP-005–88 (Portland, Ore: U.S. Department of Agriculture, Forest Service, Pacific Northwest Region, 1988); Michael Parker et al., "Erosional Downcutting in Lower Order Riparian Ecosystems: Have Historical Changes Been Caused by Beaver Removal?" in *Riparian Ecosystems and Their Management: Reconciling Conflicting Uses*, tech ed. R. Roy Johnson et al., General Technical Report RM-120 (Fort Collins, Colo.: U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station, 1985), 35–8.

60. Robert J. Naiman et al., "Beaver Influences on the Long-Term Biogeochemical Characteristics of Boreal Forest Drainage Networks," *Ecology* 75 (June 1994): 917–18.

61. Ibid., 920; Butler, *Zoogeomorphology*, 170.

62. Forsyth, *Mammals of the American North*, 234; Michael E. Smith et al., "Modification of Stream Ecosystem Structure and Function by Beaver (*Castor canadensis*) in the Adirondack Mountains, New York," *Canadian Journal of Zoology* 69:1 (1991): 59; Dahm et al., "Role of Anaerobic Zones," 170–1.

63. Parker et al., "Erosional Downcutting," 38; Butler, *Zoogeomorphology*, 158; Naiman et al., "Alteration of North American Streams," 754; Haines, *Snake Country Expedition*, 119*n*35; Cline, *Peter Skene Ogden*, 85.

64. Naiman et al., "Alteration of North American Streams," 754; Butler, *Zoogeomorphology*, 158; James J. Geraghty et al., *Water Atlas of the United States* (Port Washington, N.Y.: Water Information Center, 1973), plates 2, 12, 13; Frederic J. Athearn, *Habitat in the Past: Historical Preferences of Riparian Zones on the White River*, Cultural Resources Series, no. 23 (Denver: Bureau of Land Management, Colorado State Office, 1988), 13; Apple et al., "Use of Beavers," 126, 128; Dean E. Medin and Warren P. Clary, "Small Mammals of a Beaver Pond Ecosystem and Adjacent Riparian Habitat in Idaho," Research Paper INT-445 (Ogden, Utah: U.S. Department of Agriculture, Forest Service, Intermountain Research Station, 1991), 1.

65. Idaho Fish and Game Department, "Food Utilization Study, Hagenbarth Pond, [1954–1955]," prepared by Roger M. Williams (Boise: Idaho Fish and Game Department, 1955), 63; *Grzimek's Encyclopedia of Mammals* (New York: McGraw-Hill, 1990), s.v. "Beavers"; Pence interview.; Medin and Clary, "Small Mammals of a Beaver Pond Ecosystem," 1.

66. Jack Ward Thomas et al., "Riparian Zones," in *Wildlife Habitats in Managed Forests: The Blue Mountains of Oregon and Washington*, tech ed. Jack Ward Thomas, Agriculture Handbook no. 553 (Portland, Ore.: U.S. Department of Agriculture, Forest Service, 1979), 43–4; Sherel Goodrich, "Summary Flora of Riparian Shrub Communities of the Intermountain Region with Emphasis on Willows," in *Proceedings — Symposium on Ecology and Management of Riparian Shrub Communities*, comp. Warren P. Clary et al., Gen. Tech. Rep. INT-289 (Ogden, Utah: U.S. Department of Agriculture, Forest Service, 1992), 63; Dean E. Medin and Warren P. Clary, "Bird and Small Mammal Populations in a Grazed and Ungrazed Riparian Habitat in Idaho," Research Paper INT-425 (Ogden, Utah: U.S. Department of Agriculture, Forest Service, Intermountain Research Station, 1990), 3; Novak, *Beaver in Ontario*, 13.

67. Thomas et al., "Riparian Zones," 42–3; Leonard Lee Rue III, *The World of the Beaver* (New York: J.B. Lippincott, 1964), 146; Forsyth, *Mammals of the American North*, 234; Medin and Clary, "Small Mammals of a Beaver Pond Ecosystem," 2.

68. Thomas et al., "Riparian Zones," 41, 45; Rue, *World of the Beaver*, 146.

69. Thomas, Maser, and Rodiek, "Riparian Zones," 43.

70. John Heimer, "Beavers at Work: When It Comes to Habitat Improvement, Just Leave It to Beavers," *Idaho Wildlife* 14:5 (June 1994): 20–1.

71. Nancy Langston, *Forest Dreams, Forest Nightmares: The Paradox of Old Growth in the Inland West* (Seattle: University of Washington Press, 1995), 227; Mark Fiege, *Irrigated Eden: The Making of an Agricultural Landscape in the American West* (Seattle: University of Washington Press, 1999), 43–4.