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HC 441: Columbia River Ecology

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Native American Effects on the Ecology of the Columbia River Basin

It is a popular belief that the time before European-American settlers arrived in the “new world” was idyllic, and Native Americans and wildlife lived in harmony. However, this belief is debatable. Many scientists argue that evidence shows that this was not the case, and that Native Americans were responsible for the overkill of many animal populations and the alteration of the landscape through practices such as annual burning. Other scientists contest these claims and instead believe that recent scholarship has overstated Native American impacts on the environment. While it is true that since their invasion, European settlers have had a much greater impact on nature because of increased population sizes and the increased ability to exploit the natural resources of the region, the Native Americans did the same thing on a smaller scale. This paper investigates the impact of pre-19th century Native American populations on the Columbia River Basin’s natural resources.

There is debate about when exactly Native Americans arrived in the Americas. While some believe that they arrived before the ice age, and some that they arrived afterwards, there is little scientific evidence pointing towards a large population before or during the ice age. Some scientists estimate that they arrived around 10,000 (Hunn 6) to 11,000 years ago (Schalk and Cleveland 23). According to Schalk and Cleveland, “(...) The early adaptations to the (Columbia) Plateau seem to have involved highly mobile and relatively small groups of people whose winter subsistence derived largely from the hunting of ungulates rather than stored foods”

(23). This life style is believed to have persisted for the next 7,000 to 8,000 years, with the Native Americans subsisting on many different regional resources such as fishing sites, hunting sites, plant collection, and the gathering of mussels.

Around 2,500 BP to 4,500 BP there was a general shift towards semi-sedimentary settlement. In this system, Native Americans relied heavily on food storage rather than hunting to survive the winter months. This led to more centralized and hierarchical systems due to semi-permanent winter settlements. It also led to more permanent links between different groups of people, for they could move resources to the people rather than moving the entire group in order to find resources. Thus, a large trade network grew up, with its center at the modern day city of The Dalles. A further development came with the introduction of horses in the eighteenth century. Due to harsh winters, the number of horses was limited on the Columbia Plateau; however, the horses that were available allowed for increased efficiency in hunting (Schalk and Cleveland 31-41).

It is generally agreed that the population of Native Americans that Lewis and Clark witnessed in 1804-1806 was severely decimated from the original numbers. Hunn estimates that population to have been reduced by one half at this point (27-31). The community was ravaged by a series of epidemics, such as smallpox and malaria, which were spread across the continent by Europeans. The epidemics that affected Native Americans in the Columbia Basin are believed to be brought by fur traders in 1775 and 1801. Additionally, it has been postulated that plagues swept through the "new world" in advance of Europeans. Kay ("Aboriginal" 380-381) presents scientists' arguments that native American populations were severely reduced one hundred to two hundred years before European contact. They have looked at archaeological records in the

Columbia Plateau and concluded that the population was already decimated by disease by 1550 AD, well before the arrival of Lewis and Clark and the first written observations of the area.

Thus, the population that was affected by plagues in the late 1700s and early 1800s was already significantly reduced from its original numbers. In fact, "a good argument can be made that the human presence was less visible in 1750 than it was in 1492" (Denevan 369). This is significant because Native Americans would likely have had a much larger impact on the environment if their numbers were so much greater than has been traditionally assumed.

Humans can be likened to an animal predator, for although common tendencies are to identify humans as occupying a separate category, the resulting patterns of behavior are similar to those observed among animals in nature. Because of their place at the top of the food web, it is inevitable that humans have a large impact on the ecosystem. Research shows that high numbers of predators such as wolves cannot be sustained by low numbers of prey. Thus, in order to find adequate sustenance, humans must either keep their numbers low, move to find game, or find an alternate source of food. Additionally, when humans settle in a place, they change the landscape through their methods of gathering that food, for example, by planned burning of an area in order to stimulate the growth of certain kinds of plants.

Scientists describe ecosystems as either being structured from the bottom-up or the top-down: animals are either food-limited (bottom-up) or limited by predators (top-down). Observations from the early nineteenth century consistently have low counts of ungulates (grazing animals) in the west. While many believe that this is due to limited food resources, Kay makes a good argument for the top-down structure. In this case, "Native Americans were the ultimate keystone predator and the ultimate keystone species through activities such as aboriginal

burning” (“Ecosystems” 484). Thus, the population of ungulates like elk was limited by the predator rather than the food resources. Kay cites current research in Yellowstone National Park as support for this theory. The management there takes a hands off approach to limiting the numbers of ungulates, instead using food limitation to keep their numbers low. However, this does not appear to recreate the natural environment of the west before European settlement because naturally there were not high numbers of ungulates. This can be shown through estimates of population at that time and through an analysis of the food sources. During the early 1800s the Yellowstone ecosystem had many resources like berries and abundant trees and bushes, however, ungulate grazing now effectively eliminates them. Thus, Kay supports his theory that Native Americans were the limiting factor for ungulate populations before European settlement, generalizing this assertion to much of the western United States.

This theory opposes the popular belief that Native Americans were conservationists. Although this assertion is so common, there is evidence that contradicts it. Some evidence suggests that rather than being conservationists, Native Americans contributed to an effect termed aboriginal overkill (Kay “Ecosystems,” 488-490). Historical data suggests that there was a game sink in areas between warring nations. This buffer zone was a refuge for animals that could find relative safety in those areas where they were not as heavily hunted. An article by A. Laliberte and W. Ripple addresses the influence of Native American populations on wildlife along Lewis and Clark’s expedition. They liken the observed patterns to those of animal predators and their prey. For example, in areas where there are fewer predators, such as wolves, the population of prey animals will increase. Through an analysis of Lewis and Clark’s journals,

the authors come to the conclusion that there were more animals in areas that were less densely populated (994-1003).

As Kay suggests, the pattern of aboriginal overkill is what would be expected if people pursued an optimal-foraging strategy. According to this theory, ungulates or other large game animals are the highest ranked food choices. This is due to a couple of different factors. Meat and fat have more calories and thus would be more desirable than plant foods. Additionally, their hides could be used for other purposes. Archaeological evidence suggests that Native Americans followed this strategy. They appear to have killed mostly prime-age animals, which is different from the patterns followed by animal predators, which tend to prey on young and old animals. Additionally, Native Americans killed a disproportionate number of females due to the fact that they had a higher amount of fat and because their coats were of better quality than males', which tended to have more scars due to inter-species fighting ("Aboriginal" 371-375). In fact, ungulate remains are rare in archaeological sites. This would appear to suggest that they were not heavily preyed upon. However, Kay explains that due to the optimum-foraging models, high-ranked items like ungulates would actually appear in the diet less frequently due to overexploitation. Instead, one would be more likely to find the low-ranked items such as plant foods, small mammals or fish ("Ecosystems" 489).

It is precisely because humans are not limited to the hunting of ungulates that their numbers were able to increase. While wolves and other animal predators are limited in their possible food resources, humans can engage in prey-switching. Thus, Native Americans could eat plants, fish, and small mammals as well as ungulates (Kay "Ecosystems," 370). It is this flexibility

that allows for the disproportionate increase in population growth at the expense of the natural environment. Some scientists believe that the ecology of the Columbia Basin suffered severely. Schalk and Cleveland state that “it is our speculation that during the brief equestrian interval, the remaining herd mammals, elk, antelope, and bison on the Snake River Plain, became locally extinct due to the increased killing efficiency of equestrians” (40-41). Some scientists believe that Native Americans had effects on other animals as well. Additionally, some scientists suggest that Native Americans had a detrimental effect on the salmon populations in the Columbia, indicating a heavy reliance on that resource (Kay “Ecosystems,” 489).

In addition to their hunting practices, Native Americans altered their ecosystem by frequently burning areas of their environment. These frequent, low-intensity fires tended to encourage the growth of certain kinds of plants over others. Additionally, when natural fires did occur, they tended to behave in the same manner as the fires set by the Native Americans, because of the decreased fuel (Kay “Ecosystems,” 492). Thus, native peoples had an effect even on natural processes such as fire. Burning was “... one of the Indians’ most powerful tools of food production. Fire creates sunny openings in the forest, creates edges that foster the rapid spread of nutritious herbs and shrubs Such zones of increased natural productivity draw elk and deer within the hunter’s range as well” (Hunn 130).

Repeated patterns of burning would tend to select for species that are resistant to fire – species that can either survive or grow back quickly. As Schoonmaker and Foster point out, paleoecology is important because it “...can broaden the interpretation of issues that are specifically relevant to modern ecologists.” (205). In New England, the regional vegetation is

made up of fire-resistant species. Thus, “in these communities, fire is responsible for long-term stability” (Schoonmaker and Foster 225). Thus, it is likely that the recurring fires set by Native Americans in the Columbia River Basin selected-for species that were fire-resistant. Changes to the system of forest management could have very detrimental effects if they do not take these historical practices into account.

Schoonmaker and Foster assert that paleobiological data is important because it can create a baseline to compare against human-caused environmental changes (235). However, it would be difficult to return an environment to the way it was before human impact, roughly 10,000 years ago. As Kay points out, “hands off” approaches to restoration are flawed because they do not restore nature to its original state before European influence, because that would require the use of Native American management practices (“Ecosystems” 493).

There are many arguments supporting the theory that Native Americans were not conservationists, and instead exploited the environment, leading to aboriginal overkill and changes in the environment. However, many scientists believe that these hypotheses have been grossly overstated, and that in fact the Native Americans did not have as large an impact on the environment as has been suggested. In their article, Lyman and Wolverton argue that the hypothesis of the “game sink” and “war zone” is not supported by the available data (73-85). They argue against the suggestion that there was a war zone (area of less human predation and thus more game animals) in western Montana, central Idaho, and southeastern Washington as was suggested by Martin and Szuter (36-45). They suggest that the absence of game animals could be due to many factors, such as the arrival of Europeans, which could have caused differences in

patterns of Native Americans, such as diseases, horses, and firearms. Unfortunately, not enough data exists to prove that any of those factors have a causal nature.

They also show that the boundaries of the war zone and game sink are debatable, in that there is so little data, and much of the data is circumstantial. Additionally, the assumptions that ungulates should have been present in the “game sink” area are not necessarily correct. Martin and Szuter hypothesize that because of modern livestock patterns, there should have been abundant ungulates present in the game sink unless they were heavily preyed-upon (44). However, Lyman and Wolverton state that the modern abundance patterns and patterns of livestock would not necessarily translate to wild animals (79). Additionally, much of the game sink could be caused by variation due to climate change. Thus, the authors favor a multi-causal approach, citing human predation, climate, and differing natural abundance patterns as reasons for why there was a lower population of animals in the game sink (82-83).

In addition to analyzing scientific data, it is important to evaluate anthropological data. The social structure, culture, and religion of Native Americans was important in determining their view towards ecology, just as it is for humans today. In the Columbia River Plateau, Native Americans did not have a centralized state, due to low population densities, so families were nearly autonomous, politically and economically (Hunn 216). Although there was a move towards a more sedentary society, the Native Americans still tended to live in small groups. Village headmen ruled by respect, and there was a division of duties by skill and aptitude.

Thus, power – to the extent that it had to be exercised to maintain peace, health, and social and economic cooperation – was hedged about by “checks and balances” as necessary and effective in their context as the constitutional guarantees of the United States’ democracy (Hunn 217).

Trosper suggests that Native American societies in the pre-contact Pacific Northwest are examples of resilient ecological systems that should be analyzed in order to determine their fundamental characteristics. He argues that the potlatch system prevalent among Northwest Native Americans fulfills three requirements of a resilient social and ecological system: the ability to buffer, the ability to self-organize, and the ability to learn.

Potlatches were structured events, organized by the heads of houses, in which goods were redistributed through strict rules. Potlatches had the ability to buffer disturbance because they were a method of social insurance in case of variability in harvest abundance. The house system was easily adaptable to change because of the small groups' ability to self-organize. Additionally, the house system fostered social learning. This was evident from the fact that knowledge was passed down through generations. Trosper suggests that we can learn from the potlatch system in terms of cooperative decision-making, social learning, environmental ethics, contingent proprietorship, balanced reciprocity, and public accountability.

The existence of the potlatch system is indicative of the value placed on generosity in Northwest Native American society. Trosper shows that a headman's ability to lead was determined by his ability to be generous. In a similar vein, rituals for a boy's first salmon or a girls' first basket of roots and berries reinforced the value of generosity. They were required to give away their harvest, including the tools they had used in obtaining it. In return they would receive gifts from the elders (Hunn 209).

Views on the Native American belief system vary widely. Some claim that Native Americans' religious beliefs actually may have contributed to aboriginal overkill: "Native

Americans tended to view wildlife as their spiritual kin where success in the hunt was obtained by following prescribed rituals and atonement after the kill” (Kay “Ecosystems,” 488-9). In this view, animals were not viewed in an ecological manner, but in terms of a religious gift. Thus, it is suggested that because Native Americans did not see a connection between their hunting practices and the amount of game, their religious beliefs actually led to overkill. However, Trospen offers a different analysis of the religious beliefs of the Northwest Native Americans. They believed that human and animal souls were both involved in reincarnation, and that the failure to distribute wealth through the potlatch system would interfere with that cycle. It is important to note that Kay’s article makes broad generalizations about North American populations in North America, while Trospen’s is focused specifically on groups in the Pacific Northwest.

Research on the topic of Native American effects on the environment relies heavily on a few historical sources. Lewis and Clark’s journals are the primary resource for much of this research. They cover a short amount of time and necessarily have inconsistencies due to the demands of the expedition. During times when they focused heavily on hunting they were likely to come across more animals than when they simply saw animals along their route. While the journals are an important source, they need to be backed up with more sources, such as archaeological data.

More research needs to be done specifically within the area of the Columbia River Basin. Much of the research on aboriginal overkill and Native American effects on the environment tends to generalize across the whole of the Americas. This is dangerous, however,

because the loosely-structured hunter-gatherer society of Northwest Native Americans was very different from Central and South American societies which were much more densely populated and highly centralized.

As evidence for Native American impacts to the ecology of the Columbia River Basin is varied and controversial, there are no possible absolute conclusions about the impact they have had. They were a part of the ecosystem, just as we are today, so they naturally had a large impact on that ecosystem. Additionally, they were at the top of the food chain, so they had a large impact on the animals and plants in the area. However, it is impossible to know without more evidence what the sum of their influence was.

Bibliography

- Denevan, W. "The Pristine Myth - The Landscape of America in 1492." *Annals of the Association of American Geographers* 82.3 (Sep 1992): 369-385.
- Hunn, Eugene S. *Nch'i-Wana "The Big River": Mid-Columbia Indians and Their Land*. Seattle and London: University of Washington Press, 1990.
- Kay, C. "Aboriginal Overkill - The Role of Native Americans in Structuring Western Ecosystems." *Human Nature - An Interdisciplinary Biosocial Perspective* 5.4 (1994): 359-398.
- C. "Are Ecosystems Structured from the Top-Down or the Bottom-Up: A New Look at an Old Debate." *Wildlife Society Bulletin* 26.3 (1998): 484-498.
- Laliberte, A. S. And Ripple, W. J. "Wildlife Encounters by Lewis and Clark: A Spatial Analysis of Interactions between Native Americans and Wildlife." *Bioscience* 10 (Oct 2003): 994-1003.
- Lyman, R. and S. Wolverton. "The Late Prehistoric-Early Historic Game Sink in the Northwestern United States." *Conservation Biology* 16.1 (Feb 2002): 73-85.
- Martin, P. S. And Szuter, C. R. "War Zones and Game Sinks in Lewis and Clark's West." *Conservation Biology* 13 (1999): 36-45

Schalk, Randall and Cleveland, Gregory. "A Chronological Perspective on Hunter-Gatherer Land Use Strategies in the Columbia Plateau." Schalk, Randall F., ed. *Project Report Number 8: Cultural Resource Investigations for the Lyons Ferry Fish Hatchery Project, near Lyons Ferry, Washington*. Pullman: Laboratory of Archaeology and History, Washington State University, 1983, pp 11-56.

Schoonmaker, Peter K. And Foster, David R. "Some Implications of Paleoecology for Contemporary Ecology." *The Botanical Review* 57.3 (July-Sep 1991): 204-245.

Trosper, R. "Northwest Coast Indigenous Institutions that Supported Resilience and Sustainability." *Ecological Economics* 41.2 (May 2002): 329-344.