CHAPTER 1

Political and Historical Ecologies

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Introduction

It is impossible to encompass "Native American Ecology" in a single essay, or even, perhaps, in a single book. This is due in part to the vastness of the available literature and in part to the vastness of the topic itself. It is also because there is no unitary or single "Native American Ecology"; given the nature of ecology; there are many Native American ecologies. I have therefore elected to focus on two themes that I think are essential to understanding the ecology of Native Americans: Political Ecology and Historical Ecology. I emphasize the former because there is no coherent political ecology of Indian people and there should be, for reasons to be developed below. I emphasize the latter because it is an intellectual approach that can be used to provide a framework for the vast literature on Native American ecology and for developing a political ecology. Some readers may anticipate a historical review and analysis of the seminal work of anthropologists (e.g., Wissler, 1926; Kroeber, 1939; Steward, 1938; Suttles, 1962), historians, geographers and others on the subject. I do not pursue that direction here. While such a history would be extremely valuable, it is an essay, even a book, in its own right and is far beyond the scope of this chapter. Ellen (1982) is an excellent beginning point for such a work. I draw my examples from western North America, primarily the Plateau and Northwest Coast, since these are the regions I know best. I turn first to Political Ecology and use that discussion to introduce that topic and secondly to develop an argument for the necessity of a coherent Historical Ecology of Native Americans.

Political Ecology

According to Greenberg and Park (1994) political ecology connects "political economy, with its insistence on the need to link the distribution of power with

productive activity[,] and ecological analysis with its broader vision of bioenvironmental relationships.'' They go on to say: ''Political ecology expands ecological concepts to . . . [include] cultural and political activity with an analysis of ecosystems that are significantly but not always socially constructed'' (Greenberg and Park, 1994: 1). While political ecology includes more than power relationships, it can minimally be understood to be the analysis of power relationships as they are mediated through economy and ecology. In Native American affairs, a straightforward political ecological analysis is virtually mandated by treaties establishing rights to resources. Indian people, in the United States at least, have different legal relationships to certain kinds of resources than do other citizens of the country (see chapters 12, 13). This relationship is structured by treaty rights and by tribal sovereignty. One recent example of this is the efforts by the Makah tribe of western Washington State to revive their traditional whale hunt. The Makah whale hunt illustrates how any consideration of Native American ecology leads to a tangle of current and historical issues of varying scales. It also directs us to two issues at the heart of any consideration of the ecology of North America and of Indian people: the so-called ''pristine myth'' and the ''ecological Indian.''

The Makah Reservation is located on the northwest corner of Washington State's Olympic Peninsula. It contains the westernmost point in the continental United States. The Makah are the southernmost members of a group of people (Nuuchahnulth, Ditidaht, and Makah) distributed along the west coast of Vancouver Island and the Olympic Peninsula for whom whale hunting was traditionally a significant economic, social, and spiritual activity (e.g., Drucker, 1951). There is archaeological evidence for whale exploitation in this broad region extending back at least two millennia (Huelsbeck, 1988; McMillan, 1999; Monks et al., 2001). During the Late Pacific Period (A.D. 500–1770) and the Modern period (A.D. 1770–present) whaling was central to the acquisition and expression of high status among these peoples (e.g., Drucker, 1951). It was also ''one of the most supernaturally charged activities and required the most elaborate ritual preparation'' (McMillan, 1999: 160). The Makah ceased whaling in the 1920s, because, they say, of a scarcity of whales along the coast of Washington (www.makah.com: 1999). In 1998, they revived the whale hunt, in the face of considerable controversy. Here is some of their reasoning: ''Many Makahs feel that our health problems result, in some degree, [from] the loss of our traditional diet of seafood and sea mammal meat. We would like to restore the meat of the whale to our diet. Many of us also believe that problems besetting our young people stem from lack of discipline and pride. We believe that the restoration of whaling will help to restore that discipline and pride'' (www.makah.com: 1999). The Makah's right to whale is secured by their 1855 treaty with the United States. This treaty was the basis upon which the U.S. government supported the Makah's recent petition to whale before the International Whaling Commission.

The Makah whale hunt is opposed by a variety of environmental groups and whale-watching firms that oppose whaling generally (e.g., Sea Shepherd Conservation Society, 2002). They describe the whale hunt in at least one place as a ''holocaust'' and claim that the whale hunt is actually a front for Japanese whaling interests that want to renew and expand international whaling by undermining the International Whaling Commission that governs whaling. They further claim that the Makah intend to sell the whale meat, a charge the Makah deny. These groups also worry

that the renewal of whaling by the Makah will lead to a renewal of whaling by other Nuuchahnulth groups in Canada. The whale hunt is also opposed by eco-tourism firms that provide whale-viewing tours and by groups who are opposed to cruelty to animals and who see the hunt as cruel. These groups profess to honor Makah traditions but view the hunt as an arcane practice with no place in the modern world.

The whale hunt illustrates the complex interplay of political, economic, social, and ideological factors at play in "Indian ecology." The Makah's right to hunt has a legal basis in treaty, although that right had not until recently been exercised for almost 70 years. Despite their treaty with the United States, the hunt is not merely a national issue, but, in this case, an international one. At base, the issue here seems to be who controls the whales and the right to use the whales and to what ends, or, in other words, the issue is the politics of whaling, which is embedded in questions of traditional practices, governmental Indian policy, white–Indian relations, environmentalism, and so on. The players include, but are not limited to, the Makah (and perhaps different factions within the Makah, among whom there is not universal support for whaling), the U.S. government, Washington State government, the International Whaling Commission, environmental groups, eco-tourism firms, animal rights groups, scientists, and the media through whom much of this controversy is distilled and refracted to the general public.

The rhetoric is often fiery on both sides. This is in part a consequence of many participants having strong ideological commitments: the Makah to cultural renewal through revival of a core cultural practice and aboriginal rights; environmentalists and others to protect animals that have come to symbolize many things, including the protection of endangered species, the health of the planet, animal rights, and perhaps even a sentient "Other" being with whom we share the planet. I believe the rhetoric is also fiery for two reasons that are very deep-seated, but which color any consideration of the ecology of Native Americans or of North America.

The first has been termed "the Pristine Myth" (Deneven, 1992), the notion that North America (and the rest of the Western Hemisphere) was, at the time of contact, "primarily pristine, virgin, a wilderness nearly empty of people" (Deneven, 1992: 369). This idea has been deeply held, at least by Euro-Americans, and has been fundamental in the early growth of the discipline of ecology (e.g., Cornett, 1998) as well as to justifications for the European conquest of the continent (see chapter 12). Kay (2002) goes so far as to argue the myth is racist. There is now a great deal of scholarship that shows that most of the North American environment was anthropogenic (e.g., Kay and Simmons 2002), heavily influenced and shaped by Native Americans over generations and millennia. For some scholars, Native American manipulation of the landscape was a good thing, leading to very productive landscapes (e.g., Turner, Ignace, and Ignace, 2000), while for others it is seen as resulting in over-exploitation (e.g., Martin and Szuter, 1999).

A second procrustean idea is at the root of this debate, that of the so-called "ecological Indian" (Krech, 1999). At its heart, this is a postulate that Native American religious and subsistence practices across the continent were founded on very strong ethics about the use and conservation of resources. For Euro-Americans, this idea had perhaps its earliest clear expression in the 18th century in Jean-Jacques Rousseau's "Noble Savage." Rousseau and other romantics saw hunter-gatherers and small-scale farmers as close to nature, and therefore ennobled: that life before

civilization, before property, was the pure human condition (see chapter 18). According to this view, everything has been downhill since the invention of property and agriculture. Property led to the development of social inequality and of poverty. Agriculture led to population growth and environmental and human degradation.

There is a strong commitment both to the idea that North America was environmentally pristine and to the "ecological Indian" on the part of many in the environmental movement, and Indians are often used as symbols of ecological awareness (as in a famous anti-pollution television advertisement of the 1970s). These ideas are used to foster what Ingerson (1994) has called a sense of "environmental original sin" weighing on modern Western Civilization.

Among Indian people, who would no doubt reject Rousseau's romanticism, there is an equally strong, sincere, ethical commitment to conservation, regardless of views on the "pristineness" of North America. This commitment serves, among other things, to distinguish Indian people and cultures from the consumerism and materialism they see around them in the dominant Euro-American culture and as a basis to claim they are still the true stewards of the North American environment (see, for example, www.critfc.org).

There are sharp debates in the scholarly and popular literature over both ideas. Perhaps the most virulent language concerns the "ecological Indian" (e.g., Krech, 1999; Deloria, 2001), again, because the issues are so close to the bone in terms of how both Indian people and Euro-American peoples view themselves, each other, their role in this hemisphere, and even the moral value and quality of their respective cultures.

It is, however, a debate that is in many ways irresolvable, because, at its deepest, it is a debate about matters of faith. It is not my intention to either join or attempt to resolve the debate here. However, it is my contention that one cannot discuss Native American ecology and pretend these debates and issues do not exist as an inescapable social context in which scholarship must take place. This will become clear in the section that follows on historical ecology.

A third "big" issue central to a Native American political ecology is demography. While it is generally accepted that Native Americans suffered one of the world's major demographic disasters as a consequence of the European conquest of the Americas (see chapter 2), the full scope of that disaster (or series of disasters) is an area of controversy, sometimes with a remarkable virulence of its own (e.g., Henige, 1998). The controversy centers on estimates of the population of North America at or prior to contact. However that controversy is resolved (see below), it may be masking a key aspect of modern Native American ecology, their current demography.

Greenberg and Park argue for a "Political ecology [that] expands ecological concepts to [include] cultural and political activity with an analysis of ecosystems that are significantly but not always socially constructed" (1994: 1). The term "landscape" may be more appropriate here than "ecosystem". Crumley defines landscape as the "material manifestation of the relationship between humans and the environment" (Crumley, 1994: 6; see also Schama, 1995). These relationships are socially constructed. From this stance, reservations can be analyzed as landscapes or parts of landscapes. A political ecology would be interested in the distribution of

power across a landscape and the forms that power takes. Key factors to understanding the spatial distribution of power would be demography and health.

The demography, or population ecology, of any population of organisms is central to understanding their ecology. Death rates, birth rates, morbidity, and population distributions in time and space are basic dimensions of demography. The health and medical problems faced by Indian peoples are well known, from the demographic catastrophe that befell them with the introduction of epidemic diseases such as smallpox, to levels of suicide and short life expectancies on modern reservations. While these are often thought of as public health issues, they are rarely seen as elements of the ecology of populations of Indian people. I would maintain that they are, particularly when seen in comparison with other segments of the national population.

Trafzer (1997) conducted a historical study of death rates and causes of death on the Yakama Indian Reservation using death certificates issued between 1888 and 1964. He found consistent and pervasive differences in death rates and causes of death during that span. Generally Yakama death rates were higher from all causes than those of non-Native Americans, with the exception of cancer. Taking a single example, infant death rates between 1920 and 1964 ranged between 276 percent and as high as 764 percent of infant death rates among Euro-Americans in the United States (calculated from Trafzer, 1997, figure 4.11, p. 237). Trafzer attributes these historically high death rates to nutritional and epidemiological changes, including the loss of the traditional Yakama diet.

The situation has improved markedly since 1964 and overall health on the reservation is much better, despite increases in the rates of deaths from homicide, suicide, and the incidence of diabetes. This latter appears to be a consequence of increased reliance on processed foods and the interplay between that diet and the genetics of Indian people – a classic example of the interplay between culture, human biology, and the environment. The changing diet is a consequence of many changes in North American ecology that, for Indian people, includes the reservation system. The causes for the increased rates of homicide and suicide are not clear. A developing political ecology would seek those causes, while a historical ecology would provide time depth for understanding the evolution of landscapes before and after the institution of reservations.

Historical Ecology

Crumley defines historical ecology as landscape history, the study of "the ongoing dialectical relationships between human acts and acts of nature, made manifest in the landscape" (Crumley, 1994: 9). Historical ecology is multidisciplinary, drawing on evidence ranging from reconstructions of ancient climates, through ethnohistory, and archaeology to geography and philosophy. She sees it as essential to framing effective environmental policies. I suggest that it is also essential to understanding modern Native Americans (and everyone else living in North America).

A significant, recent development in the historical ecology of North America has been an increasing interest among researchers in the degree to which North American environments are anthropogenic. This interest stems from the realization that

modern environmental management decisions are often woefully uninformed by the historical record of ecological changes at local and regional levels. Because of the "Pristine Myth" and its wide currency among even well-trained ecologists and wildlife managers, the role of humans in ecological change on the continent has been often ignored. As pointed out above, anthropologists, archaeologists, geographers, and others have known for a long time that the North American landscape was the result of long-term interplay and interaction between humans and other North American organisms. Presumably, this interplay led to the North American landscape becoming increasingly anthropogenic, or increasingly human. However, the course of this process is poorly understood.

Traditional ecological knowledge is playing an increasing role in this development. Anthropologists and others long eschewed using native knowledge. However, it is becoming increasingly important not only in academic research, but also in resource management. For example, a plan for sustainable forestry practices in Clayoquot Sound on the west coast of Vancouver Island includes not only forestry science, but also traditional knowledge held by the Nuuchahnulth peoples living in the sound (e.g., Clayoquot Sound Scientific Panel, 1994).

The focus of the interest in anthropogenic environments and traditional knowledge is on the ecological history of North America. This cannot be fully understood apart from the ecological history of North Americans over the past many millennia. Further, the biology and cultures of modern Native Americans cannot be fully understood apart from that history. The rest of this section will briefly review some lines that this development is giving rise to.

Population Ecology

As demography is central to a political ecology, it is equally central to historical ecology. Population ecology includes such parameters as population size, patterns of growth and decline, distribution across the landscape, and health and nutritional status. Central to the latter is understanding the long-term effects of disease and stress, including changes in diet and the consequences of poor diet.

It is widely recognized and accepted that Native American populations suffered catastrophically as a consequence of introduced diseases such as smallpox, measles, chickenpox, malaria, and others. However, there remains great controversy over the numbers of people who lived in North America prior to contact, and therefore the extent of the subsequent catastrophe. There is also controversy over the timing of some early pandemics. Ramenofsky (1988), for example, has suggested that some portions of North America suffered smallpox pandemics as early as 1520. In the Northwest, Campbell (1989) sought indirect evidence for such an epidemic in the archaeological record of the Columbia Plateau, and while her results were not definitive, they raised the possibility of such an early pandemic.

Estimates for the population of North America at contact range from as low as 3,000,000 (Kroeber, 1939) to as high as 18,000,000 to 30,000,000 (Dobyns, 1983; and see chapter 2 below). For a time in the 1980s and 1990s a consensus may have been developing that tended toward the higher numbers, although perhaps not the highest. More recently, however, the high numbers and the methods used to

develop them have been ruthlessly critiqued by Henige (1998). These methods rely heavily on figures in early travelers' accounts and in early census data. As difficult as it is to use these data to develop population estimates, this difficulty pales before the problems inherent in estimating populations prior to contact.

Evidence for long-term population growth and decline is notoriously difficult to attain with archaeological techniques (e.g., Hassan, 1981), although for much of the past, archaeology is the only source of such data. Archaeologists cannot measure population sizes directly and so must use proxy measures. These include the numbers of archaeological sites through time, changes in site sizes (larger sites presumably indicate more people), changing frequencies of radiocarbon dates (or radiometrically dated sites) through time, changes in the numbers of burials, and so on. None of these can do more than provide the basis for relative statements (''populations grew significantly during this period,'' ''the numbers of people fluctuated during this time''). Recent work by Chatters, Hess, and Ames provide examples.

Ames (1991, 2000), Chatters (1995), and Hess (1997) have modeled changing population sizes on the Columbia Plateau of northwestern North America using a sample of radiocarbon dates. Archaeologists make the working assumption that there is a general correlation between the amount of cultural carbon in the landscape and the number of people. Cultural carbon would be burned organic material produced by human activity. Non-cultural carbon would be produced by natural fires, for example. A conservative reading of these data indicate that human numbers on the Columbia Plateau were extremely low until c. 2400 B.C. when they began to grow, reaching a peak around A.D. 900–1200. If numbers of radiocarbon dates do reflect human numbers, even indirectly, then populations on the Columbia Plateau began to decline after A.D. 1200, some 300 years prior to the arrival of Europeans on the continent. A less conservative reading (e.g., Chatters, 1995; Hess, 1997) suggests that populations may have declined sometime prior to 3000 B.C., then risen sharply around 2400 B.C., fallen again, and then risen sharply after 500 B.C., again peaking around A.D. 1000. There is no settled explanation for these changes. Chatters (1995) explains them as consequences of changes in environmental productivity that were, in their turn, the results of climatic changes. However, as we saw with the Yakama study described above, demography is also affected by economic and social factors (which are in turn affected by demographic changes) and there are social and economic changes accompanying these demographic shifts. Describing those is beyond the scope of this essay. However, continuing the theme raised in the discussion of the Yakama, these ancient demographic and social changes probably affected health, longevity, and other aspects of the lives of individuals, including (as we saw in the Yakama study) violence. These linkages cannot presently be demonstrated using evidence from the Columbia Plateau but they can be in southern California.

Lambert (1994), in a longitudinal study of stress and violence in southern California that spanned the period from c. 6000 B.C. until the early 1800s, measured population growth using the numbers of radiometrically dated sites and the numbers of human burials through time. Her data suggest a basic pattern of slow population growth (with some fluctuation) from c. 6000 B.C. until c. A.D. 600, after which populations grew rapidly. This pattern seems replicated, at least at its broadest, in northwestern North America (e.g., Ames, 1991, 2000; Chatters, 1995; Hess, 1997; Maschner, 1991; Ames and Maschner, 1999). As part of her study, Lambert looked at

the skeletal remains of over 1,000 individuals from burials in the Santa Barbara region of southern California. She examined several key indicators of health and stress, including diet stress, to try and establish a link between stress and violence between 6000 B.C. and A.D. 1800. Her data indicated heightened levels of stress, as indicated by poor health, after 1400 B.C. and persisting until contact. This trend reached its peak between A.D. 500 and A.D. 1200, at a time when population was also at its peak. This was a period, in this area, marked by a relatively arid, unstable climate. Lambert attributes the relatively high levels of stress and poor health to population increases and this climate. The high levels of stress also occur in a period marked by increased levels of interpersonal violence, as indicated by pre-mortem violence-caused trauma on the skeletons.

In a contrasting study, Cybulski (1994) examined a sample of several hundred skeletons from coastal British Columbia, and found no indications of declines in health or nutritional status over the past 5,000 years, despite clear evidence for changing subsistence patterns, and markedly high levels of warfare, particularly after A.D. 500. Thus increased warfare on the southern California coast and the Northwest Coast are coincident in time, but there are marked differences in health status. There is also evidence for increased warfare on the Columbia Plateau at that time, although we have no evidence about health. In any case, the reasons for the contrasts between southern California and the Northwest Coast are unknown but suggest important differences in the historical ecology of these regions, despite some broad similarities.

Subsistence and Environmental Management

The "Pristine Myth" posits that despite millennia of human occupation, North America was essentially a pristine wilderness. This also further implies that Native Americans had little or no impact on the environment. This, of course, is patently incorrect. Much of southern North America (the southern U.S. and most of Mexico) was occupied at contact by farmers, people who had been farmers for 2,000–3,000 years with varying degrees of intensity. In what is now Arizona, the Hohokam people constructed extensive irrigation canals while people in New England practiced swidden agriculture. However, the canals had been abandoned and the swidden farmers decimated before 1800. In addition, many of the peoples of North America were hunter-gatherers who have generally been assumed to have had little impact on their environment. Evidence being developed in the Northwest, as well as elsewhere, clearly shows that to be wrong. Scholars in the Northwest are rethinking the notion of hunter-gatherers, and are also directly examining the impact of Indian people on past environments, particularly through burning.

These studies are part of a broader global inquiry into the long-term ecological impacts of small-scale societies, essentially non-industrial, non-state societies, worldwide (e.g., Smith and Wishnie, 2000). It has long been assumed that civilizations have significant ecological effects, but that the effects of small-scale societies are far less. However, over centuries and perhaps even shorter periods, even small societies can have significant cumulative impacts on their environments. The analysis of these impacts has also led to research on the degree to which such small-scale societies

practice conservation and/or sustainable subsistence methods (e.g., Smith and Wishnie, 2000). The focus of these studies is not on North America or on the "ecological Indian," but on looking comparatively at the impacts of small-scale societies on their environments.

The increasing use of traditional ecological knowledge is making important contributions here. Turner (Turner and Peacock, 1997; Turner et al., 2000), for example, has developed a model of plant management by native peoples that emphasizes management of perennials, rather than annuals, as in much of western agriculture. Her model is based in part on long-term research with First Nation peoples of British Columbia. I will return to this below.

Rethinking Subsistence

Northwest peoples did not farm prior to the arrival of Europeans. There are early travelers' reports of peoples on the Northwest Coast growing tobacco, but anthropologists and others have generally regarded them as hunter-gatherers. The environment of the Northwest was viewed as typically a rich one, particularly because of the extraordinarily productive salmon fisheries. Salmon are anadramous; they are born in fresh water, migrate downstream to the sea where they grow to adulthood, and then return to their natal freshwater stream to spawn – to lay and fertilize their eggs. Pacific salmon, unlike Atlantic salmon, die upon spawning. The return trips are called "runs" and salmon ran up the Northwest's rivers in millions. It has been widely assumed that this resource was so rich that it sustained large human populations virtually alone (e.g., Drucker and Heizer, 1967).

One crucial trend since the 1960s has been the increasing recognition that there is no "typical" Northwest Coast environment; there is not a single "environment" but a complex web of habitats or patches which are the result of the interplay among what we might label the "environment" and human social and economic organization. Key to this trend has been the realization that environmental variation in time and space is more important than the idea of the "typical" or "average" environment. On the Northwest Coast, this trend began with the pioneering cultural-ecological work of Wayne Suttles (1962, 1968), who documented environmental variation along the coast and described how Northwest Coast social arrangements might be ways of coping with this variation. Schalk (1977), in a seminal paper, described in detail how salmon abundance varied along the coast. Schalk also demonstrated that the relative economic importance of terrestrial and marine resources along the coast (marine resources become more important as one moves north from northern California to southeastern Alaska) was a function of terrestrial productivity, not the productivity of marine environments. Donald and Mitchell have followed Suttles' direction and explored in detail the relationships among resource abundance, group territories, and status systems (Donald and Mitchell, 1975, 1994). They have shown (Donald and Mitchell, 1994) that territory boundaries among Kwakwa'kwakw and Nuuchah-nulth groups living along the west side of Vancouver Island strongly affect the productivity of the environment of these groups. Their study focused on salmon runs. Variation in the numbers of salmon among different groups' territories was so extreme that some groups probably faced regular failure of their poor salmon runs

while other groups possessed salmon resources so rich that the available fishing technology could not fully harvest them. Social groups with poor territories were more likely to join confederacies and participate in feasting circles, apparently to mitigate the effects of their territory's poor resources, as well as to get access to a wider area, and to the resources in that area.

A second trend since the 1980s has been an examination of the role of plant foods and of environmental manipulation on the coast and adjacent areas of the Northwest. It has become clear that plant foods, among other resources, played central roles in Northwestern economies. It has also become evident that the techniques used by Indian people went well beyond passively collecting what bounty nature provided. The Nez Perce of Idaho and the Kwakwa'kwakw of Vancouver Island illustrate this well.

The pre-reservation territories of the Nez Perce centered on the Clearwater River of central Idaho, on the western slope of the northern Rocky Mountains (Josephy, 1965). The traditional Nez Perce economy focused on salmon, primarily for winter stores, and on elk or deer, and a range of roots, including camas (*Camassia quamash*), among others. After the arrival of the horse around 1720, they also began hunting bison on the plains of Montana, to the east of their homeland. As with virtually all people on the Columbia Plateau, roots were fundamental to the economic, social, and spiritual lives of Nez Perce people (e.g., Marshall, 1977). Key winter stores were dried salmon and baked roots or root flour; roots were among the first fresh spring resources, annual root feasts are significant events across the Plateau, and roots were among the resources widely traded across the Plateau (Anastasio, 1975).

Archaeological research on the Plateau and elsewhere in the Northwest has attempted to document the history of root exploitation (Thoms, 1989; Peacock, 1998), principally through the location, excavation, and dating of the earth ovens in which camas and other roots were baked. It is clear from this that while roots have been used (and baked) for 11,000 years (Connolly et al., 1997), they began to play a significant economic role only in the last 4,000 years. However, use of camas grounds has fluctuated greatly over the past 4,000 years, for reasons not presently understood.

Beyond documenting the history of root harvesting and processing, investigators have become increasingly interested in the environmental effects of root collecting, particularly techniques deliberately used to increase productivity, or which had that effect. Marshall lists three in reference to roots: (1) digging and turning the soil (the plants he discussed thrive under "disturbed" conditions); (2) replanting roots or corms and reseeding (according to Marshall [1999], roots were replanted when they were too small, of the wrong "sex," or blemished, among other reasons; some root plants were collected only when their seed was mature and ripe, and the seeds scattered across the meadow); and (3) deliberate burning of meadows. Burning was used more widely than for roots, and we will return to it below. His analysis leads Marshall to conclude that the Nez Perce were not, in fact, hunter-gatherers, but horticulturalists. While many may not agree with the label, it is clear that the simple distinction "farmer/hunter-gatherer" vastly oversimplifies the range of native economies present in North America and the world until the last century or so. This is the case even for the peoples of the Northwest Coast, who have long been considered classic hunter-gatherers.

The Kwakwa'kwakw (formerly Kwakiutl) occupied the northern third of Vancouver Island and adjacent portions of the British Columbia mainland. They are famous in world ethnography because of Franz Boas's ongoing research between c. 1885 and 1935 and voluminous publications. In some ways, then, they are the classic example of Northwest Coast societies, with potlatching, a permanent elite based on inherited rank, and an economy very heavily dependent on marine and terrestrial animals. Anthropologists have long regarded the Northwest Coast's peoples as the world's primary exception to the rule that social stratification requires agriculture. Social stratification on the coast was due, it has been argued (e.g., Drucker and Heizer, 1967), to an extraordinarily abundant natural environment, particularly the salmon runs. However, it is becoming quite clear that Northwest Coast peoples manipulated their environment, a point pursued below. Some also maintained root gardens.

Douglas Deur (2000), pursuing information collected by Boas (e.g., 1909) and others, has shown that Kwakwa'kwakw peoples maintained gardens for Springbank clover (*Trifolium wormskjoldii*) and the Pacific Silverweed (*Potentilla answerina* ssp. *Pacifica*). These plants produced starchy rhizomes, or roots, which were harvested in apparently large numbers by people on Vancouver Island and adjacent portions of the coast. According to Deur, these gardens required considerable effort. People modified natural plots by clearing rocks and boulders that were used to build walls around the plots. In the absence of rocks, wooden stakes, boards, and other materials were used to fence these plots. The plots were located on tidal flats where coastal streams entered bays and estuaries, forming marshes. Deur suggests the walls were built to capture and hold nutrients brought in by high tides – that the plots were, in fact, designed to take advantage of the ecologically very productive tidal environment. As with the Nez Perce, the plots were weeded; rhizomes from both plants were transplanted into the gardens, some of which were as much as two acres in size. In most areas families and lineages owned the plots. The key point here is not that Kwakwa'kwakw and other Northwest Coast people had garden plots; rather, that these required considerable labor and knowledge of the environment in which they were placed.

The kinds of practices employed in the Northwest were not limited to those described by Marshall and Deur. These practices include tilling (digging, turning over sod, aerating soil); replanting and transplanting, weeding, fertilizing (on the coast with seaweed); pruning and coppicing; and burning (Turner and Peacock, 1997). People's impact on the environment was not limited to these practices. For example, red cedar trees (*Thuja plicata*) were extremely important to Northwest Coast life, providing lumber for houses, canoes, storage boxes, bark for fiber, and so on. As a consequence demand for red cedar was high. Logs and finished canoes were important trade items for the people living on the west coast of Vancouver Island, which was rich in red cedar. For example, they exchanged these items for whale oil produced by the Makah on the Olympic peninsula, who lived in a region poor in red cedar. I have estimated that one red cedar structure near Portland, Oregon, dating to c. A.D. 1450, required a minimum of 55,000 board of feet lumber and at least 500,000 board feet over its use life of 500 years (Ames, 1996). (By comparison, a modern house requires 10,000–15,000 board feet.) That structure was home to 40 to 80 people. The immediate region had a minimum population of around 3,000 people, who would have required perhaps 50 to 100 such structures at any one time.

These structures were in use on the coast for at least 3,500 years. Given their lumber requirements, their construction had to have had an environmental impact. In any case, this range of practices and activities produced over time what Turner and Peacock term "anthropogenic plant communities." They identify eight of these, including low elevation meadows, rain shadow forest (relatively dry), coastal rainforest, montane forests, freshwater marshes and swamps, freshwater bogs and fens, tidal wetlands (see above), and human occupation sites.

Burning

The topic of burning runs through all of the previous discussion. The aboriginal use of fire to create and manage desired environments is well documented in a voluminous literature. For example, Williams (2002) developed a bibliography of "Indian Use of Fire in Ecosystems" that is 33 single-spaced pages in length. Williams identifies 11 major reasons why fires were set. Oregon's Willamette Valley is perhaps an epitome of the significance of native burning for the development and maintenance of a distinctive landscape.

The Willamette Valley is in western Oregon, between the Cascades and the Coast Range. It is drained by the Willamette River that flows north through the valley to its confluence with the Columbia River at present-day Portland, Oregon. The valley is the traditional territory of Kalapuyan speakers who may have numbered as many as 15,000 at the beginning of the 19th century (Boyd, 1999). At the time, the valley's dominant vegetation was a lush grassland with scatterings of oaks. The oaks occurred singly and in groves. This habitat is generally termed an oak savanna (Boyd, 1999). This savanna is what attracted Euro-American settlers to cross North America on the Oregon Trail in the 1840s and 1850s. They described and envisioned the valley as a "sweet Arcadian garden" (Bunting, 1997: 72).

However, the oak savanna appears to have been what ecologists term a "seral" stage in the life-cycle of a forest. Seral stages are the stages in plant succession. For example, after a plot of ground is cleared, rapidly growing, sun-tolerant plants may grow first, to be replaced later by brushy plants and eventually, under the right circumstances, by trees. The phases before the appearance of trees are "seral" stages. Most burning strategies are aimed at producing and maintaining seral stages because seral plants are most likely to be those that produce nuts, seeds, berries, and roots that people and other mammals eat. The plants are available to gather and to draw game such as deer and elk to be hunted.

The oak savanna probably developed initially as a consequence of a major warm dry period in North America before 6,000 years ago (Hebda and Whitlock, 1997). By 6,000 years, oak trees had spread as far north as southern Vancouver Island, a place now too cool and wet for them. The climate became cooler and wetter after 4,000 years ago, but the savanna persisted in Oregon. Boyd (1999) argues that the climate was too wet and cool for oaks; that only aboriginal fires could have maintained the savanna for that long. Recently, Whitlock and Knox (2002) have disputed Boyd's claims, insisting that the evidence for aboriginal burning is weak, and that the oak savanna was climatically sustained. However, the available ethnohistoric evidence supports Boyd's basic claim.

Kalapuya people clearly burned the Willamette Valley floor regularly. They burned to drive deer, and to facilitate collection of seeds, insects, and nuts. Oaks benefit when the ground around them is fired (Shipek, 1989) and burning underbrush makes it easier to collect the nuts. By doing this they engendered what can be called a "domesticated landscape" (Yen, 1989). This environment differs from domesticated plants and farming. In the latter, people interfere with or control plant reproduction. With burning, they interfere with and manipulate ecological processes (and as a result, favor some plants over others) generally. Burning also may have increased environmental diversity rather than reducing it, as farming does. Fire was used to create and maintain favored habitats within broader ecozones. As a result, it increased what ecologists call the "patchiness" of the environment. In other words, burning increased the number and variety of habitats available for humans and other animals to exploit. It also increased the numbers of ecotones, or edges between habitats. The boundaries, or edges, of patches are particularly diverse places. They are inhabited by the organisms that live in each of the adjacent patches, but also by organisms that occupy the boundary itself. The boundary is a distinct resource patch. Where two patches or habitats come together, there aren't two habitats; there are three, counting the boundary.

While burning was widespread, it may not have had the same impact everywhere in the Northwest as it did in the Willamette Valley. Farther north, it was used to create and maintain grassy openings, or prairies, in the forests; but burning did not replace the forests. At higher elevations it was used to create and maintain berry-gathering grounds (e.g., Lepofsky, 2002; Mack and McClure, 2002). These, however, were much smaller in area than the valley floor. However, even these smaller areas increased the patchiness of the environment and raised its productivity.

However, a significant problem is documenting the history of these practices and the evolution of anthropic landscapes such as the Willamette Valley (see also papers in Vale, 2002). This in part reflects a lack of research specifically aimed at this issue (Lepofsky, 2002; but see Mack and McClure, 2002). Additionally, both natural and human activities can produce the same result, and it can be difficult to separate the two. For instance, an increase in lodge pole pine in forests in northern British Columbia after 2,200 years ago may be due to increased burning, or to a warmer drier climate (Lepofsky, 2002). Such research, as difficult as it may be to accomplish, will be central to any understanding of the evolution of North American landscapes.

Summary and Conclusions

When I undertook writing this chapter, I expected to encounter a lively literature on Indian political ecology. I did not find it. There is a vast literature on the historical ecology of Indian people, although the term 'historical ecology' is not usually applied. Political and historical ecology are about landscapes, about the distribution of resources and people across landscapes, and how these landscapes evolved. Political ecology also is about the distribution of power relationships across human landscapes. Power distributions can be evident in many kinds of relationships, including health. For Indian people, treaty rights and reservations are critical elements of the landscape they occupy and therefore to their ecology. Population ecology and subsistence

practices are central factors in the long-term evolution of those landscapes and to structuring the relationships that existed when Euro-Americans arrived in regions. One of the great ironies of Indian ecological history is that their subsistence practices were central in creating the landscapes that attracted Euro-American settlement and colonization.

Building political and historical ecologies of Native Americans is inescapably enmeshed with the common notions of a pristine North America and of the ecological Indian. Conflicting versions of these ideas are deeply held in many different communities and add combustibility to these topics. This combustibility may be why the political ecology I looked for doesn't appear to exist.

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