
Much of the preservation *v*. development debate is based on deeply held convictions -- about forests and various roles played by indigenous peoples in shaping landscape patterns and processes, for example -- that are under attack on many fronts. In "*Understanding the Role the Human Dimension Has Played in Shaping America's Forest and Grassland Landscapes: Is There a Landscape Archeologist in the House*," Doug MacCleery (W01C) helps us better understand what some of these convictions are, how they came to be, and how they need to be addressed in ecosystem management planning and practice. In order to begin to develop shared vision and desired action, we need to pay much more attention to this subject. Note: This paper is a bit longer than most we discuss on Eco-Watch, but is well-worth a careful reading.
12 pages. Dave.

UNDERSTANDING THE ROLE THE HUMAN DIMENSION HAS PLAYED IN SHAPING AMERICA'S FOREST AND GRASSLAND LANDSCAPES

Is There a Landscape Archaeologist in the House?

By Doug MacCleery

In a paper featured in Ecowatch on 12/1/93, I sought to make the case that failing to act (intervene in National Forest ecosystems) can exact its price. In many areas, forest fuels continue to build up beyond levels ever before experienced in those ecosystems -- further exacerbating forest health and fire risk problems.

One person took issue with that view by asserting that the forest health and fuel build-up problems occurring in eastern Oregon are the direct result of aggressive Forest Service management actions, where "old, thick barked trees were replaced with skinny little true firs."

The twin problems of fuel build-ups and forest health and their effects on ecosystem sustainability are likely to be the single most significant environmental challenge facing us under ecosystem management. It will be challenging physically and biologically because such problems are extensive on federal forest lands (USDA/Forest Service 1993b). It will also be challenging intellectually because the solution may require us to

rethink some strongly held assumptions about the nature of forests prior to European contact and the role that natural and human induced processes played in those forests. For that reason, I'd like to explore this issue in some depth.

Fuel Build-ups, Forest "Densification," and Ecosystem Health -- Causes and Effects

Expansion of true firs in eastern Oregon is an ecological response to partial cutting silvicultural regimes, combined with reduced ecosystem fire. Even in the absence of timber harvesting, exclusion of fire would eventually have resulted in true fir forests replacing ponderosa pine forests, a transition that can clearly be seen happening in similar kinds of forests all over the West -- in Wilderness areas, in other areas that have never been logged, and in those that have.

Today, one often hears criticism of the aggressive fire suppression activities initiated by the Forest Service in the 1930s and later, which are held to be responsible for the fuel buildup and forest health problems we are now having. One hears less often that there was widespread public support for these activities at the time. And even less often is it understood that substantially reduced ecosystem fire had occurred in many areas by the late 1880s or even before. It coincided with the disintegration of the cultures of native peoples in the area, virtually all of whom actively used fire as a major land management tool (Pyne 1982; Cronon 1985; Williams 1989; Bowden 1992; Martinez 1993; Williams 1994). Reduced burning was associated with reduced Indian burning, with the settlement of western valley areas, and, especially, with increased livestock grazing, which broke up fuel continuity.

Today, many of our Wilderness areas, including the largest in the lower 48, the Bob Marshall Wilderness in Montana, have the same sorts of ecological changes going on as are occurring in eastern Oregon, and those changes began in the late 1800s. And such areas are faced with the same sorts of forest health and ecosystem sustainability implications we are struggling with in Oregon.

Graphic evidence of the profound ecological changes that have been occurring over the last century in Western forest landscapes can be seen by comparing late 19th century photographs to those recently taken from the same photo points. There is currently quite an extensive body of such repeat photography. These photos commonly record substantial increases in the understory density and overstory biomass volume of forest vegetation over the last century, and a decrease in both the aspen component and in the herbaceous understory in conifer stands (Gruell 1983). In addition, open woodlands have become closed forests, and grasslands have become woodlands. (Note: I have prepared an annotated bibliography of publications featuring repeat photography. If you would like one sent to you via e-mail, send a note to D.MACCLEERY:W01C)

The reduction in fire is not just causing forests to become more dense; many forests are also older on the average than they would have been without this change. An example is the Flathead National Forest in Montana (where the Bob Marshall Wilderness is located).

In 1899 about 18 percent of the forest area of the Flathead was in a mature forest condition, and 6 percent was old-growth; but by 1990 the area of mature forest had increased to 33 percent, and the area of old-growth to 20 percent (USDA/Forest Service 1992).

Independent confirmation of the substantial changes in forest vegetation in the West and of the loss of the aspen component comes from forest inventory data. A recent study of forests in the Southwest, which was based on such data, found that between 1962 and 1986, the area of aspen forest had dropped by 46 percent. If these trends continue, in less than three decades aspen will cease to exist as a distinct forest type in the Southwestern region (USDA/Forest Service 1993a). This same study found that the area of the forest type that is the beneficiary of reduced fire occurrence, the mixed conifer type, increased by a whopping 81 percent.

Modern Day Images of the Past -- Are They Valid?

Today, we have some strongly held popular images of what pre-European contact forests were like. One of these is the image of the "forest primeval," the idea that pre-European contact forests were dominated by a "blanket of ancient forest." This image is one of continuous, closed-canopy, structurally complex, all-aged forests which nature maintained for long periods in a steady-state, equilibrium balance with the environment. We have a corollary image of a pre-Contact native peoples who lived in the forests and on the plains, but really didn't do very much to change either. There is overwhelming evidence that both of these images are in need of thorough reexamination.

In **Discordant Harmonies** (1990), Daniel Botkin asserts that the norm in nature is not constancy or equilibrium, but dynamic change -- that the so-called "balance of nature" is a concept that must be reexamined. He cites the dynamic nature of American forests due to natural disturbances -- fire, insects, wind, and disease -- and challenges assumptions about the predominance of "climax" forests in the presettlement North American landscape. In addition, he discusses the history of climate change and its effect on tree species migration and distribution in North America. He challenges the theory that predators and prey regulate each other in some rough mutually beneficial balance, and provides a variety of other examples of the natural chaos and "disharmonies" that inflict nature, even absent human influence.

But humans were definitely not absent in pre-Contact American forests, which leads to the second popular image -- that of the ecologically invisible American Indian. There is no question that enormous areas of the forests and grasslands we inherited (or invaded and stole, if you wish) were very much cultural landscapes, shaped profoundly by human action.

Native Peoples' Influence on American Forests

At the time of European contact, many Indians were horticulturalists. In the East and Southwest they were mostly farmers. Agriculture -- maize, beans, pumpkins, squash --

provided at least half their subsistence (Smith 1989). Agriculture originated in North America about 10,000 years ago; about the same time it had in the Middle East (Smith 1989). By 1500, tens of millions of acres were cleared for crops. Native peoples everywhere in North America also set fire to hundreds of millions of acres on a regular basis to improve game habitat, facilitate travel, reduce insect pests, remove cover for potential enemies, enhance conditions for berries, drive game, and for other purposes.

Vast areas of the North American forest landscape in both the West and East were, at the time of European contact, open, park-like stands shaped by short-interval, low intensity fires, often set purposely by humans. In New England, Indians burned the woods twice a year, in the spring and fall. Roger Williams wrote that "this burning of the Wood to them they count a Benefit, both for destroying of vermin, and keeping downe the Weeds and thickets" (Cronon 1985). John Smith commented that in the forests around Jamestown in Virginia "a man may gallop a horse amonst these woods any waie, but where the creeks and Rivers shall hinder" (Williams 1989). Andrew White, on an expedition along the Potomac in 1633, observed that the forest "is not choked with an undergrowth of brambles and bushes, but as if layed out in a manner so open, that you might freely drive a four horse chariot in the midst of the trees" (Williams 1989). These observations of the open nature of North American forests are typical of those of most other early observers, both in the East and West, who commonly spoke of the ease of riding a horse or driving a wagon under the forest canopy and reported the practice of frequent Indian burning.

But frequent forest burning did more than reduce the undergrowth and improve the habitat for preferred species. In many cases it created grasslands in areas where forests otherwise would have existed. Prairies extended into Ohio, western Pennsylvania, and western New York (Anderson 1990; Pyne 1982). In Virginia, the Shenandoah Valley -- the area between the Blue Ridge Mountains and the Alleganies -- was one vast grass prairie. Native Americans burned the area annually (Van Lear 1989). Anderson (1990) writes that the eastern prairies and grasslands "would mostly have disappeared if it had not been for the nearly annual burning of these grasslands by the North American Indians." In the West, as well, Indian burning also greatly extended the area of grasslands and reduced the area of forest (Gruell 1983; Boyd 1986).

The prolific numbers of white-tailed deer, wild turkeys, ruffed grouse, and other species common to forest edges and openings that were reported by early observers indicates a forest in which natural or human-induced disturbances were common. Even bison, normally associated with the western prairies, were common east of the Mississippi. In the early 1600s, bison were found in the South and as far east as Massachusetts -- indicating numerous openings and prairies with abundant grass and forbs that, in this humid forest region, could only have been created by human activities (Williams 1989).

Indian use of fire as a management tool changed in profound ways the entire ecology of the forest and the plant and animal communities associated with it. Burning extended the range of forest types that flourish under a frequent fire regime, such as pines and oaks. Much of the extensive southern longleaf pine forest that greeted European settlers in the South was an anthropogenic landscape created over hundreds, perhaps thousands, of

years of native burning (Pyne 1882). Absent human-set fires, much of this area would likely have been a dense hardwood forest. In the West, burning greatly increased the area of aspen forests, and created vast areas of open ponderosa pine forests (Gruell 1983).

The wildlife communities that characterized these cultural landscapes, such as the red-cockaded woodpecker/gopher tortoise community in the South, were in large measure products of thousands of years of human intervention. And it will take continued human intervention to maintain them.

Some of the coastal forests of the Pacific Northwest and elsewhere were shaped profoundly by long interval, stand replacing fires which created a mosaic of forest stands of various ages and conditions. A BLM study estimated that in 1850 only about 40 percent of the forests of the Coast Range of Oregon were more than 200 years old, generally considered the minimum age for old-growth. The rest were in younger ages resulting from stand replacing events, mostly fire (Teensma 1991). This study hypothesized that "human-caused fires dominated the fire occurrence pattern of the Coast Range, both before and after European settlement." There was no "blanket of old-growth," even in the coastal PNW.

But even in coastal PNW forests, low intensity ground fires set by humans, were much more common than is often realized, particularly in southern Oregon (Boyd 1986; Martinez 1993; Williams 1994). Such fires led to the creation of open prairie ecosystems, glades, and savannas, many of which have, or are now, rapidly disappearing, due to encroachment by Douglas fir (Johannessen 1970).

In fire-prone ecosystems in the West, Indian burning created an element of ecosystem stability that would not have existed without it. Frequent, low intensity, human-caused fires substantially reduced the numbers and area of less frequent, but high intensity, stand replacing holocausts that otherwise would have occurred (Thomas 1993).

Across North America, as Indian burning stopped, the change in forest ecology was rapid -- prairies became woodlands, savannas became dense forests, and open forests were invaded by dense undergrowth (Thompson 1970; Johannessen 1970; Williams 1989).

There is an extensive and growing body of literature documenting the profound role that humans played in pre-Contact landscapes. One of the latest is the September 1992 issue of the Annals of the Association of American Geographers, "The America's Before and After 1492: Current Geographical Research," (223 pp.), which is entirely devoted to essays on this subject. AAG's address is 1710 16th St., N.W., Wash., D.C. 20009; tel.(202)234-1450.

Dr. Gerald Williams, Region 6 sociologist and historian, has compiled an extensive bibliography of over 150 individual references on the American Indian use of fire in ecosystems. It is available via e-mail and Gerry has indicated his willingness to send it to those who send him a note- (J.WILLIAMS:R06A).

The "Natural" Forest Paradox

So we have this paradox: The fuel build-ups now rapidly going on in the West are the result of human intervention in the form of fire control; but the open, park-like stands encountered by Euro-American settlers, which many of us perceive as the "natural" forest, were themselves, to a significant extent, a product of human intervention, as well.

The question as to what is the "natural" condition of American forests is a problematic one which we have been struggling with under EM. Are the dense forests resulting from a century of reduced ecosystem fire less "natural" than the more open, yet still anthropogenic, forests they are replacing? Are "natural" forests only those in which humans have played no significant role? Under that definition, there would have been few natural forests, even in 1500 -- for humans have occupied and influenced America's forests since the time these forests migrated northward behind the retreating continental glaciers more than 8000 years ago.

The ecological effects of reduced burning depend on the nature of the forest. In warm, dry forest ecosystems which historically were characterized by frequent, low-intensity fires, elimination of burning rapidly leads to the development of a dense, multi-storied forest structure -- subject to increasing mortality from drought, other forest health problems, and stand-replacing conflagrations, which seldom occurred in the past (USDA/Forest Service 1993b). As compared to warm, dry, short-interval fire adapted ecosystems, the ecology of cooler, moister forests has perhaps been less affected by the reduction in fire, at least over the short term. Many cool, moist forest ecosystems were historically subject to infrequent, stand-replacing fires. But even in these forests, reduction in historic fire has had the effect of creating forests with stands that are older on-the-average than historically -- and so are subject to increased insect epidemics and larger and more intense stand-replacing conflagrations than typically would have occurred in the past. Of course, there are many gradations between warm/dry and cool/moist forest ecosystems.

Today's older and more "densified" forests function much differently ecologically than they did a century ago. In some forests a type conversion is going on from fire resistant species to fire susceptible ones. Due to both forest density and to the kinds of tree and other plant species that are emerging to replace the existing forest overstory, they will be forests which are decidedly more unstable than the ones they are replacing, ie. more susceptible to insects, disease, drought, and catastrophic fire. When fires do occur in such forests (as they inevitably will), they will be intense, stand replacing, soil damaging fires, beyond that which would have been typical in pre-European forests.

Whether the forests of 1800 were more "natural" than the forests of today is a philosophical question for which there is no definitive answer. But one thing is clear: If we don't like the kind of forests we see developing, we are going to have to do more than just watch -- we will need to do something to change the direction in which things are going.

Challenges and Barriers to Ecosystem Management

Ecosystem management is using the concept of "range of natural variation" to deal with this situation. It is clear that many of today's forests are considerably outside the range of natural variation, now often called the "range of historic variation" to recognize the influence of native peoples.

But the task of bringing these forests back within this historic range (or any range that is likely to be considered desirable) is a daunting one, to say the least. Doing so will require reintroducing natural and prescribed fire. But because of past fuel buildups, as well as smoke management guidelines, in many cases it will also necessitate mechanical treatment in advance of introduction of fire. And dealing with existing smoke management guidelines will be a major challenge, as well, even with pretreatment. A paper addressing these problems was prepared last year by the Fire and Aviation Staff in the Washington Office (USDA/Forest Service 1993b).

But the biggest barrier is not operational in nature. To corrupt a passage from **Julius Caesar**: "The fault, dear Brutus, is not in our **selves**, but in our **images**." The image of the forest primeval is so powerful that it causes some otherwise well-informed people, in the interest of maintaining forests in their "natural" condition, to propose systems of inviolate preserves, where human intervention is prohibited. We see such proposals, even in fire-prone forest ecosystems, where such an approach has virtually no chance of sustaining over the long-term (or even over the mid-term) the values and purposes for which those reserves are established. In most fire-prone forest ecosystems, human action will be essential to have any chance of maintaining them, and their associated plant and animal communities, in a pre-European ("natural") condition.

Indeed, in the face of the profound ecological changes now occurring in many forests, human action is likely to be necessary to achieve over the long term whatever "desired future condition" is likely to come out of forest planning.

Origins of the Image of the Forest Primeval

In **The Pristine Myth: The Landscape of the America's in 1492** (1992), W.M. Denevan writes that:

> The myth persists that in 1492 the America's were a sparsely populated wilderness, "a world of barely perceptible human disturbance." There is substantial evidence, however, that the Native American landscape of the early sixteenth century was a humanized landscape almost everywhere. Populations were large. Forest composition had been modified, grasslands had been created, wildlife disrupted, and erosion was severe in places. Earthworks, roads, fields, and settlements were ubiquitous.

So why, in the light of all this evidence, do we continue to cling to the image of the forest primeval? This is an interesting topic in itself, which has been explored over the years by a number of scholars (Thompson 1970; Pyne 1982; Williams 1989; Anderson 1990).

While many have written on the subject, there was a particularly insightful essay on this subject by M.J. Bowden (1992).

Bowden writes that popular images are created and perpetuated because they serve the ends of particular groups and opinion leaders. The image of the pristine forest has endured for 300 years or more because it has been useful to a variety of opinion leaders -- from the Pilgrim Fathers of 17th century New England to the modern environmental movement.

Bowden writes that:

> The grand invented tradition of American nature as a whole is the pristine wilderness, a succession of imagined environments which have been conceived as far more difficult for settlers to conquer than they were in reality....The ignoble savage, non-agricultural and barely human, was invented to justify dispossession...and to prove that the Indian had no part in transforming America from Wilderness to Garden.

Two hundred years later, a reaction to U.S. industrialization fostered a "back to nature" movement which continues today. Writers like James Fenmore Cooper, Henry David Thoreau, and Longfellow, as well as artists, such as George Catlin and the "Hudson River School" landscape artists, sought to glorify pre-Contact America and its inhabitants (Nash 1967; Denevan 1992).

The concept of an interventionist indigenous people had no place in the image of The Forest Primeval that this movement sought to portray. Therefore, the invented image of the ecologically invisible Indian was perpetuated. Bowden writes that this movement sought to portray:

> Indians who lived, so the tradition goes, in harmony with nature, making no irremediable changes in the environment, and handing over to Europeans a virgin land. Whether denigrated as ignoble savages or idealized as native Americans living in perfect equilibrium and harmony with the the environment, the Indians are given no credit for opening up the Eastern Woodlands, for creating much of America's grassland, and for transforming hardwoods to piney woods with their "woods-burning habit."

The tradition of the ecologically invisible Indian has been maintained by popular writers over the years. In his best-selling book, **Conquest of Paradise** (1990), Kirpatrick Sale is only the latest popular writer to perpetuate the idea that Indians left the American landscape virtually unchanged.

But there is more to this story than just American myth-making. There was one significant factor not mentioned by Bowden which affected European perceptions as to the low ecological influence of native peoples. That was the devastating effects of Old World diseases. By the early 1500s, such diseases were introduced on both coasts, as well

as the interior. Dobyns (1983) estimates that native populations collapsed from perhaps 18 millions in 1500 to less than 1 million in 1800, when the first waves of European expansion finally moved west of the Appalachians.

In 1500, significant portions of the Midwest, Southeast and Atlantic coastal areas were home to highly structured, agricultural societies having high population densities and landscapes which were heavily cleared for cropland (Dobyns 1983; Denevan 1992). In the Midwest and Southeast, these people constructed extensive earthworks, mounds, large earthen pyramids, temples, and extensive areas of ridged agricultural fields (Doolittle 1992). They had a hierarchical social structure similar to that of the Aztecs and Incas.

While we will never know fully the extent of forest clearing by these people, some indication can be gained from the writings of a Spanish chronicler on the 1539-43 de Soto expedition. For four years, de Soto and his men pillaged, plundered, and inadvertently spread diseases from Florida north across the Appalachians, west to the Mississippi, thence down to the Gulf of Mexico (Thomas 1993). Of Indian agricultural fields in Florida, he wrote that they:

> marched on through some great fields of corn, beans, and squash and other vegetables which had been sown on both sides of the road and were spread out as far as the eye could see across two leagues of plain (Doolittle 1992).

Dobyns (1983) has estimated that this single field covered about 16 square miles. These were no small family garden plots!

The first waves of native depopulation from smallpox occurred shortly after 1500, even before de Soto, and were followed by successive waves as new diseases were introduced and took their horrible toll. This holocaust, which encompassed all of the Americas, took place largely out of sight of Europeans. By 1800, native populations were a shadow of their former numbers, and their social structure had been substantially disrupted (Dobyns 1983; Cronon 1985; Thomas 1993). Landscapes cleared for agriculture had 2-3 centuries to reforest before the first waves of permanent European/American emigrants poured through the Appalachian "gaps" to find landscapes that were more "pristine" than they had been in more than a thousand years (Denevan 1992).

But even at the much reduced population levels of the early 1800s, native peoples continued to have a substantial influence on the forest through repeated burning, which created and maintained huge areas as permanent prairies and oak and pine savannahs.

Is There a Landscape Archaeologist in the House?

If language is a looking glass into a people's culture and images, then today's common usage of the term "presettlement" to refer to pre-European settlement, reflects either an ignorance of history or a cultural arrogance -- perhaps some of both. We have the power to change that.

As we move into EM, it will be particularly important in the next round of national forest planning for us to seek to more fully understand the role that humans have played in the landscapes we oversee. Perhaps we need a cadre of "landscape archaeologists" to help us. I don't know whether such a discipline even exists. Archaeologists have traditionally looked at sites, rather than landscapes. We must devote more attention to understanding how humans, both indigenous peoples and Euro/Americans, have shaped our forest and grassland landscapes. Maybe the proper discipline is that of a landscape anthropologist or geographer.

Lately there has been a lot of discussion about "ecosystem restoration," for example, of the forests of eastern Oregon. It is not always clear from that discussion what people mean by it, eg. what condition will those ecosystems be restored to? That is not a trivial question. Will we seek to bring them back to pre-World War II conditions, before logging really got going? To conditions pre-fire control? To pre-Euro/American settler conditions? If to pre-Euro/American settler conditions, should it be before or after the holocaust of Old World diseases decimated native peoples? It's really not an option to go back to conditions as they were before there were people here in North America, because it might be tough to get the continental glaciers to come back.

Just asking these questions will require us to seek a better understanding of the human dimension in our natural landscapes. Seeking that better understanding has the potential to both unify and integrate currently conflicting views as to where we are, how we got there, and where we should be heading. All human history has a natural context. We shape the land and the land shapes us. What binds us together is a relationship with the land that is in many ways common for all peoples. This has been true for millennia, even here in North America, where there exists "a pre-European cultural landscape, one that represented trial and error as well as the accomplishment of countless human generations. It is upon this imprint that the more familiar Euro-American landscape was grafted, rather than created anew" (Butzer 1990).

There is something comforting in this knowledge. The Indian legacy lives on today in our forest and grassland landscapes, if only we have the eyes to see it. It lives on in other ways as well -- in the art, culture, and genes of many of our citizens; which enriches us all. This legacy lives on also in our own bodies that are sustained by the myriad of plants originally domesticated here in North America. Mostly they were domesticated by women. Today, 60 percent of U.S. crop production, on a value basis, comes from crops originally domesticated by native Americans (Fedkiw 1989). And these plants also sustain countless millions in other lands.

We should seek to understand these things, for they are part of the human experience. We are linked as human communities to the human communities that went before us, and to those which will follow. These communities left their own marks upon the land. We are linked to the land just as they were for our own sustenance and spiritual renewal. A better understanding of these linkages can both enrich us personally and help us become better stewards of the earth.

Summary and Conclusions

The subject of this paper is of more than academic interest. All societies view nature through the lens of their culture and mythology. We are no different. Humans have made their homes in and influenced American forests from the time there were forests. Yet a cultural blind spot causes us to retain a powerful popular mythology that essentially denies peoples' influence on these forests until the time of European settlement. We also cling to the idea of a stable and static nature, seeking to achieve balance. Daniel Botkin's thesis is that if we are interested in a certain future occurring we will need to plan for it and manage it within the context of science, rather than popular images about what we think nature should be. I certainly agree.

History demonstrates that both nature and human culture are dynamic. Culture and tradition can and do change in response to an evolving understanding of nature, and of our role in it. Because of this, we should seek to understand the basis for our traditional images of nature and be willing to modify them when they are not supported by the evidence.

We must not lose the environmental impulse. We must seek to be good stewards of the earth. But if we ignore how both human intervention and natural events have shaped the forests of today, we are liable to make some big mistakes. In our desire to "save" the forest, and its associated plant and animal communities, to conform to a particular image (while at the same time we restrict the tools available to achieve that objective), we may be setting up for ourselves a goal that is impossible to achieve.

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