

people management in that environment is a clearly articulated goal (Draft EA Document). The Harris Lands, which sit amidst a rapidly urbanizing landscape, have not yet experienced the full impact of development on their borders and are just now beginning to see increased interest in both conservation and recreational opportunities. How they are managed as working forests depends on the management prerogatives of a corporate entity and its relationship with the public.

The two case studies examined here demonstrate different aspects of the working forest definition. Public and private lands of similar size are involved. The intensities of management and recreation use differ in the two cases, but in each instance the heritage of management, the landscape history, is an important factor in shaping the future management direction of these working forests.

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11 Restoration in the American National Forests: Ecological Processes and Cultural Landscapes

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Introduction

While American old-growth forests are commonly thought of as pristine, they are profoundly cultural landscapes, shaped by Indian burning, forest management, industrialization and fire exclusion. Yet, although human efforts have altered American forests in complex ways, the changes that people have brought about have rarely been the changes they had hoped for. Unintended consequences have resulted from each effort to regulate and reshape American forests. While American forests are cultural landscapes, they are also wild in important ways, for they resist the bounds of human control. Professional foresters and the timber industry persist in seeing the forests as under their control, even as environmental groups persist in seeing the same forests as pristine, wild entities best left untouched. Neither perspective is particularly accurate or helpful. If forest conservation is to be successful, both foresters and environmentalists need to recognize the ways that culture has shaped American forests, as well as the ways that wild processes have reshaped cultural landscapes.¹

American national forests are at a crisis point. Changing societal values and new understandings of ecosystem processes

have called into question decades of Forest Service management aimed at regulating the forests for increased timber production. As a result, timber harvests on the 191 million acres of national forests have dropped by 85%, from 12.7 billion board feet harvested in financial year 1987 to 1.8 billion board feet harvested in financial year 2003 (Congressional Research Service, 2000; USDA Forest Service, 2004, [www://fs.fed.us/forestmanagement/reports/sold-harvest/documents/1905-2005_Natl_Sold_Harvest_Summary.pdf](http://fs.fed.us/forestmanagement/reports/sold-harvest/documents/1905-2005_Natl_Sold_Harvest_Summary.pdf)). Decades of fire exclusion have made western forests far more susceptible to the threat of stand-replacing fires, and a public outcry against intense wildfires has led to even more confusion about correct forest policy. Changing climate regimes have increased the susceptibility of many public forests to insect epidemics, and millions of acres of forests from Alaska to Wisconsin face a forest health crisis. The national forests, in other words, are a mess.

While most people agree that something has gone badly wrong with management of America's national forests, agreeing on new policies is much more difficult. Restoration of an earlier 'natural' ecosystem is the favoured strategy for many federal agencies who feel that traditional management went badly wrong. Foresters are

expected to restore the forests back to the 'historic range of variability', or the landscape before whites arrived (Langston, 1995a). But these restoration goals make problematic assumptions about history, pristine nature, and the role of humans in nature. In this chapter, I will begin by reviewing some of the goals of American forest restoration, and then turn to a case study from the old-growth forests of eastern Oregon to argue that forest restoration should not be based on a pristine myth, but on an understanding of forests as cultural landscapes.

On Restoration and History

American restorationists work within a set of assumptions about pristine nature (Langston, 1999). Their work is ironic at heart, for it uses human labour to erase the physical evidence of human labour, attempting to return an altered landscape to something that appears pristine and free of human presence. According to one recent American textbook in the field, the goal of ecological restoration is 'to take a degraded landscape and return it to its original condition' (Bush, 1997, p. 400). The Society for Ecological Restoration (SER, the international professional society of restoration ecologists) has struggled with the definition over the last several years. In 1990, SER defined ecological restoration as 'the process of intentionally altering a site to establish a defined, indigenous, historic ecosystem. The goal of this process is to emulate the structure, function, diversity and dynamics of the specified ecosystem' (SER, www.ser.org). In 1993, the official SER definition changed to: 'Ecological Restoration is the process of re-establishing to the extent possible the structure, function, and integrity of indigenous ecosystems and the sustaining habitats that they provide'. The National Research Council (1992) focused on the idea of humans as disturbers of ecosystems, defining restoration as 'the return of an ecosystem to a close approximation of its condition prior to disturbance'.

Many European ecologists have disagreed with such interpretations of restoration which stress the return to an original, pre-disturbance, indigenous ecosystem. They argue that such an attempt makes little sense in a world of extensive human manipulations, where no single point in the past can be called original (see Bowler, 1992; Baldwin *et al.*, 1994). Yet most American restorationists agree with the ecologist William Jordan III (1995, Madison, Wisconsin, personal communication) that only returning to a pre-European community can be called restoration; all the rest is mere rehabilitation.

Restoration attempts to use human labour to return damaged landscapes to some earlier point in their history, with the assumption that earlier ecosystems were more sustainable than current ones. Scientifically, this is problematic. As the ecologist John Cairns (1995) argues, stochastic variation due to historical events is critical in the development of ecological communities. This means that it is impossible to predict the endpoint of a community from any set of beginning points, and that therefore it is not possible to recreate any ecosystem from the past, nor to recreate any currently existing reference site. Since every ecosystem constantly changes, it is impossible to determine a baseline for restoration, a normative state deserving to be maintained or restored. Ecosystems are dynamic, rather than static, and disturbance processes operate even in the absence of human intervention. Assuming that all disturbances are harmful and that all human interventions damage an ecological system makes little sense given current ecological understanding of ecosystem processes (Dunwiddie, 1992).

In arguing that restoration should return a site to its 'original' condition, the implicit assumption is that before Europeans altered these landscapes nature was undisturbed by humans. Yet, as environmental historians, palaeoecologists and geographers have demonstrated, nearly all ecosystems on earth have been affected by humans over many thousands of years. Human processes have had profound

effects on landscapes that most people now think of as natural. To ignore the roles of people in shaping successional processes is to miss a critical ecological point: namely, that repeated disturbance processes, many of them anthropogenic, shaped the landscapes we wish to restore. Excluding human disturbances as 'unnatural' will ensure that restoration of those communities cannot work.

This chapter proposes a different approach to restoration, arguing that restoration will be most successful when its practitioners recognize that the forests they are trying to fix are cultural landscapes, not purely natural landscapes in need of having human presence erased. I will focus on the three national forests in the Blue Mountains of Oregon and Washington, USA, where millions of hectares have been badly damaged by over-logging, fire exclusion, insect epidemics, climate change and poor management choices. Rather than describing in detail the ecological changes in the Blue Mountains (see Langston, 1995a, for an analysis of these changes), this chapter will focus on the dilemmas of cultural and ecological restoration in the region.

The Blue Mountains

When Euro-Americans first came to the Blue Mountains of eastern Oregon and Washington in the early 19th century, they found a land of lovely open forests full of ponderosa pines five feet across. These were stately giants the settlers could trot their ponies between, forests so promising that people thought they had stumbled into paradise. But they were nothing like the humid forests to which easterners were accustomed. Most of the forest communities across the inland West were semi-arid and fire-adapted, and whites had little idea what to make of those fires.

After a century of trying to manage the forests, what had seemed like paradise was irrevocably lost. The great ponderosa pines were gone, and in their place were thickets of fir and lodgepole. The ponderosa pines had resisted most insect attacks, but the

trees that replaced them were the favoured hosts for defoliating insects such as spruce budworm and Douglas-fir tussock moth. As fir invaded the old ponderosa forests, insect epidemics swept the dry Western forests. By 1991, in the 5.5 million acres of Forest Service lands in the Blue Mountains, insects had attacked half the stands, and in some stands nearly 70% of the trees were infested (Langston, 1995a).

Even worse, in the view of foresters and many locals, was the threat of catastrophic fires. Although light fires had burnt through the open pines every 10 years or so, few exploded into infernos that killed entire stands of trees. But as fir grew underneath the pines and succumbed to insect damage, far more fuel became available to sustain major fires. Each year, the fires seemed to get worse and worse. By the beginning of the 1990s, one major fire after another swept the inland West, until it seemed as if the forests might entirely go up in smoke.

Forest change comes about not just because people cut down trees, but because they cut down trees in a world where nature and culture, ideas and markets, tangle together in complex ways. On one level, the landscape changes resulted from a series of ecological changes. Heavy grazing removed the grasses that earlier had suppressed tree germination, allowing dense thickets of young trees to spring up beneath the older trees. When the federal foresters suppressed fires, the young fir grew faster than pines in the resultant shade, soon coming to dominate the forest understorey. High grading – removal of the valuable ponderosa pine from a mixed-conifer forest – helped change species composition as well. But the story is much more complex than this. Changes in the land are never just ecological changes: people made the decisions that led to ecological changes, and they made those decisions for a complex set of motives.

The story of these drastic landscape changes is, in the simplest version, a story of the land's transformation into a set of commodities that could be removed out of one landscape and moved to another. Indians

had certainly altered the landscapes, but when whites showed up they set into motion changes that far outpaced the previous changes. The critical difference was that the Blues finally became a source of resources – timber, gold, meat and wool – to feed the engines of market capitalism.

Before whites came, the Blues were certainly connected to markets outside the region. Local tribes had an extensive set of ties to trading networks that spread west to the Pacific Ocean and east to the Great Plains (Meinig, 1968). Indians did extract elements from the local ecosystem, and in the process, they changed the local ecology to meet their needs, largely through burning. However, their needs did not include removing large quantities of wood fibre for fuel, fertilizer or construction. Indian land use was not necessarily sustainable, nor was it in any kind of inherent balance with the land's limits. Yet it was still fundamentally different from the land use that whites instituted, for it did not include the wholesale extraction of resources and their export elsewhere. Indians who made the Blues their home did not see the land as a set of distinct, extractable resources, as most whites would come to see it even when they had strong emotional connections to the place.

Euro-American settlement in the Blues, as in the West at large, had been driven by a vision of limitless abundance. The forests seemed endless; the land in need of improvement; the world available for the taking; but as the timber industry reached the Pacific, people began to fear that there might be an end in sight. Many worried that if the nation continued to deplete its forests without thought of the future, it might one day find itself without the timber upon which civilization depended. Federal scientists in particular were certain that, because of wasteful industrial logging practices, a timber famine was about to devastate America. By the last decade of the 19th century, the Blues seemed to be in serious trouble. The bunchgrass was largely gone, depleted by intense grazing. Wars between small cattle ranchers, itinerant sheepherders and large cattle operations from

California had left thousands of sheep and several sheep-herders dead. Timber locators and speculators were taking up the best timber land; small mills and miners were illegally cutting throughout the watersheds; irrigators feared that their investments in water projects would be lost (Langston, 1995a). It was in this context that federal foresters came west in 1902 – to save the Blues from unrestricted abuse fostered by the desire for short-term profits.

To restore and protect ponderosa pine forests, early foresters felt they needed to keep out fire, encourage the growth of young trees and replace old trees with young ones. Old growth seemed to threaten the future by taking up the space that young trees needed to grow, and fire seemed even worse, for it actually killed young trees. Since foresters were certain that young trees were the future of the forest, fire and old growth seemed clearly the enemy. To understand these decisions to suppress fire and remove old growth, we need to understand their scientific, cultural and economic contexts. In 1906, the basic premise of the new Forest Service was simple: if the USA was running out of timber, the best way to meet future demands was to grow more timber. More than 70% of the Western forests were old-growth stands – what foresters called 'decadent and over-mature', which meant forests that were losing as much wood to death and decay as they were gaining from growth. Because young forests put on more volume per acre faster than old forests, foresters believed that old-growth forests needed to be cut down so that regulated forests could be grown instead. Regulated forests were young, still growing quickly, so that they added more volume in a year than they lost to death and decay. The annual net growth could be harvested each year, without ever depleting the growing stock.

Scientific forestry seemed impossible until the old growth had been replaced with a regulated forest. For example, in 1911, C. S. Judd, the assistant forester for the Northwest region, told the incoming class of forestry students at the University of Washington that a timber famine was on its way

unless the Forest Service did something quickly. Since the forest was running out of trees, the way to fix the problem was to get National Forest land to grow trees faster. As Judd put it, 'the good of the forest ... demands that the ripe timber on the National Forests and above all, the dead, defective, and diseased timber, be removed.' The way to accomplish this was to 'enter the timber sale business' and heavily promote sales. This would get rid of the old growth, freeing up land to 'start new crops of timber for a future supply' (Judd, 1911, unpagued document). Foresters saw old growth not as a great resource, but as a parasite, taking up land that should be growing trees.

The unregulated forest was something to be altered as quickly as possible for moral reasons, to alleviate what one forester, Thorton Munger, termed 'the idleness of the great areas of stagnant virgin forest land that are getting no selective cutting treatment whatsoever' (Munger, 1936, unpagued document). The problem was not just with old growth or dying timber; the problem was with a forest that did not produce precisely what people wanted – a recalcitrant, complex nature marked by disorder and what the forester George Bright called 'the general riot of the natural forest' (Bright, 1913, unpagued document).

This logic shaped a Forest Service that, in order to protect the forest, believed it necessary to first cut it down. Beginning in 1902, across the 5.5 million acres of public forests of the Blue Mountains, federal foresters focused on liquidating old-growth pine to make a better nature. By replacing slow-growing 'decadent' forests with rapidly growing young trees, the Forest Service hoped that the human community and the forest itself would become stable and predictable. Foresters believed that disease, dead wood, old growth and fire all detracted from efficient timber production. In other words, they were assuming that the role of the forest was to grow trees as fast as it could, and any element that was not directly contributing to that goal was bad. Whatever was not producing timber competed with trees that could be producing

timber, foresters believed. Any space that a dead tree took up, any light that a fir tree used, any nutrients that an insect chewed up – those were stolen from productive trees. If timber trees did not use all the available water, that water was wasted. If young, vigorous pine did not get all the sun, that sun was lost forever. These assumptions made it difficult for foresters to imagine that insects, waste, disease and decadence might be essential for forest communities; indeed, that the productive part of the forest might *depend* on the unproductive part of the forest.

Liquidating Old Growth

Cultural ideals alone are not enough to transform forests: technology, markets and political conditions all play important roles as well. Until World War I, for all the foresters' desire to cut old growth, the Forest Service sold little timber in the Blue Mountains (Langston, 1995a; see also Skovlin, 1991). Forest Service timber was inaccessible, prices were set so high that few contractors were willing to invest, and the industry still had enough private stock to make sales of federal timber unattractive. After the war, however, markets for public ponderosa pine opened up, since there were few remaining accessible stocks on private land, and the Forest Service began to heavily push sales of ponderosa pine in the Blues. This in turn enabled them to seriously begin the campaign to regulate the forests by liquidating old growth.

The Forest Service believed that to ensure local prosperity, old-growth forests needed to be converted to regulated forests that could produce harvests forever; but to regulate the forests, planners needed markets for that timber, and they needed railroads to get the timber out to the markets. Railroads were extraordinarily expensive, particularly after World War I. Financing them required capital, which often meant attracting investment from midwestern lumber companies. These companies were only going to be interested in spending money on railroads if they were promised

sales large enough and rapid enough to cover their investments. The results in the Blues, as across the West, often damaged both the land and the local communities that depended on that land.

Throughout the Blue Mountains in the 1920s, Forest Service planners encouraged the construction of mills which had annual milling capacities well above what the Forest Service could supply on a sustained-yield basis. On the Malheur National Forest alone, for example, two large sales during the 1920s offered over 2 billion board feet of pine, out of only 7 billion in the entire forest. Two mills followed – one capable of processing 60 million board feet a year, and another that could process 70 to 75 million board feet each year. With mill capacities reaching 135 million board feet a year, it would take only 15 years – not the 60 years of the cutting cycle – to process the two billion board feet in these sales, and only 52 years to process all the ponderosa in the entire forest.

Even though the Forest Service sales programme started out conservatively, it quickly gained a momentum that seemed to overwhelm the good sense of foresters. Throughout the 1920s, foresters set up plans knowing that harvests would drop by at least 40%, leading to probable mill closures in the 1980s (Langston, 1995a). This, unfortunately, is exactly what happened. Harvests collapsed at the beginning of the 1990s – not because of environmentalists or spruce budworm, but because planners set it up that way in the 1920s, figuring it was a reasonable price to pay for getting forests regulated as fast as possible.

The training of early foresters was heavily influenced by European silviculture, which had as its ideal a waste-free, productive stand: nature perfected by human efficiency. Early Blue Mountains foresters believed that to make the forests sustainable they needed first to transform decadent old growth into vigorous, regulated stands. Yet until World War I they never tried to implement these ideals, largely because there were few markets for the trees. It was neither economically nor technologically feasible to cut the forests

heavily enough to bring about intensive sustained-yield forestry. After World War I, however, the Forest Service established extremely high rates of ponderosa pine harvests, creating the ecological and economic conditions that directly led to the forest health crisis of the 1990s. Why did the Forest Service promote such high harvests? Desire for profit, power struggles, bureaucratic empire building – all of these played an institutional role, but none of them can explain the motivations of individual foresters. To make sense of their decisions, we need to examine the links between ideals and material reality in American forestry. Federal foresters shaped the western landscapes according to a complex set of ideals about what the perfect forest ought to be. In turn, these visions were shaped by available logging technology, developing markets for forest products, the costs of silvicultural practices, and what the historian Rich Harmon (1995, E-6) has called 'the unrelenting pressures...aimed at government officials to make public resources available for private profit.'

After World War II, managers became ever more enamoured of intensive forestry. No-one had yet proven any of the claims of intensive forestry; no-one had managed to regulate a western old-growth forest, but the Forest Service was optimistic all the same – surely, someday soon, with the help of loggers, silviculturists would be able to transform all the western forests into vigorous young stands growing at top speed (Hirt, 1994). When that day finally came, the Forest Service estimated that loggers could harvest 20 billion board feet a year forever (Wilkinson, 1992). There hardly seemed to be an end in sight to what managers thought forests could eventually produce.

The forest health crisis changed all this. Just before the Forest Service published the 1991 Forest Health report, loggers had harvested over 860 million board feet a year of timber from the Blues – nearly 600 million of this from federal lands. By 1993, however, harvests had slowed to a trickle. A lot of money, a lot of timber and a lot of jobs were at stake. In an unusual

admission of guilt and confusion, the Forest Service stated that this crisis was caused by its own forest management practices – yet no-one could agree exactly which practices caused the problems, much less how to restore the forests.

Restoration and Cultural Landscapes in the Blue Mountains

Most people now agree that a forest health crisis threatens the Blues, but few people agree on the solution. Many environmentalists argue that the best way to restore the forest is to leave the land alone, stop logging and let nature heal itself. Natural processes, they say, will heal the forests better than human intervention ever could. Yet this perspective overlooks the fact that these are no longer natural forests. Logging, road building, fire suppression and grazing have degraded the soil- and water-holding capacities of these forests and increased fuel loads dramatically – and the result is a forest much less resilient to disturbance (Perry, 1994). If we simply removed ourselves from these forests at this point, letting the forests burn might prevent the re-establishment of ponderosa pine forests for centuries (Agee, 1994). Leaving these forests alone may seem like the most natural thing to do, but, ironically, it would lead to highly unnatural effects, since we have so radically altered the forest communities.

For many foresters, restoration means intensive management, not an end to management. Their ideal past is one of wide open stands, with few trees per acre – a past they hope to return to with the help of heavy salvage logging. Because many pre-settlement mixed-conifer communities used to be open and park-like, proponents of salvage logging have argued that we should log out the dense under-storey now present in these forests. After the catastrophic wildfires of 2002 and 2003, Congress passed the Bush Administration's 'Healthy Forests Initiative' (H.R. 1904), which hoped to save the forests from fire by using intensive logging to restore pre-settlement forest structure.

Definitions of forest health are at the root of these justifications for salvage logging, and these definitions reflect long-held cultural ideals of what a virtuous forest should look like. According to the Idaho Policy Planning Team, the best measure of forest health is when mortality is 18.3% of gross annual growth – the definition offered by the Society of American Foresters (O'Laughlin *et al.*, 1993). By this definition, intensively managed industrial forests in Idaho are in a much healthier condition than non-industrial forests, and old growth is in the worst condition of all, since mortality and growth are nearly equal. Therefore, the Idaho report concludes, intensive, industrial management is what keeps forests healthy. Early foresters justified liquidating old-growth pine forests for exactly this reason – so young, healthy, rapidly growing forests could take their place.

Salvage logging tries to restore the forests by focusing on just one element, the ecological changes in tree structure, ignoring the policies and the cultural ideals that led to the changes. It ignores the ideological basis of forest health problems, and so it ends up with a proposal that repeats the same errors that created the changes. Salvage logging ignores the political forces that led to forest devastation: namely, an economic and political system which made forests into storehouses of commodities to feed distant markets and fill distant pockets. It also gets the ecology wrong, since it does not realize that ideology and politics shape the ways one sees ecology. For example, at the heart of the desire to save the forests with intensive management is the belief that by making current forest overstoreys look like they used to look, we will make fires behave as they used to behave. One hundred years ago, when light fires burnt frequently in some mixed-conifer forests, those forests were open, with minimal fuel loads, little organic matter on the ground, and few firs in the under-storey; but after years of fire suppression and intensive management, the forest is a different place, a landscape that is as much cultural as natural. Even light fires may now have surprising effects. After decades without fire,

increased litter has led to cooler microclimates near the forest floor and increased soil moisture. Root structures have changed in response, with more roots clustering close to the surface. In those conditions, even a very light fire may singe tree roots, killing old ponderosas if the soil moisture is low (Harrington and Sackett, 1992). The important point here is that history matters: the world has changed, so that simply rearranging the trees will not return a forest to its earlier condition.

What we need to restore forest health is a new vision of restoration and its relation to history. The goal of restoration should be not to bring humans back to the pristine, wild past, but instead to do the opposite: to restore elements of the wild back into cultural, managed landscapes. This may sound quixotic, but several private foresters in the region are trying to do just this. Bob Jackson and Leo Goebel work a forest site that lies on a moist north slope near the town of Joseph in the Willowa Mountains of eastern Oregon. Over the past 40 years, after working for the Forest Service and Boise Cascade and growing disgusted with them both, Jackson and Goebel have developed an alternative vision of good forestry built out of their experience working in the woods and out of their passion for a particular place (Langston, 1995b).

On their land, the most valuable species were high-graded off about 70 years ago and soil organic matter was badly depleted by clear-cutting. Jackson and Goebel's primary goals have been to restore the soil fertility by nurturing dead wood, and to restore a variety of species native to the site – ponderosa pine, larch, grand fir, and Douglas fir. Growing soil means growing diversity, they argue, not just in trees, but in insects, birds and spiders, and microbes and dead wood. When they are in the woods, one of their primary concerns is counting spiders, since they think many of the spider species only return when the soil is in better condition. They hate clear-cutting, feeling that while it might bring in more money all at once, short-term profit comes at the cost of soil, young trees and organic matter. Instead, they selectively

harvest, waiting until each tree is at least 18 inches in diameter. To increase growth rates, they thin young trees by hand, opening up space and light for the trees they leave behind. To get the long, knot-free lengths that bring in the best money, they do what is called 'limbing', which is a labour-intensive effort that involves cutting off low branches while the tree is still growing. To control insect damage, Jackson and Goebel grow as many different tree species as possible and keep the dead wood thick on the ground. By doing their own work, they can keep skid trails, yarding sites and roads down to about 5% of each harvest area, reducing soil compaction. In the Forest Service that figure is 20%. All these practices require a great deal of careful hand labour, and extensive knowledge about the forest itself. Few contractors could afford to pay people to take this much care for the land; Jackson and Goebel do it because they have a great deal of attachment to both the place and to their craft. Although they work the land intensively, the forest looks much like old growth – multi-layered, multi-aged, with numerous trees over 18 inches in diameter, a rich soil, abundant snags and a forest floor thick with dead wood. Trees do not grow in rows and there is nothing neat or tidy about the place, but it is a productive working forest all the same.

Jackson and Goebel's sustainable forestry work has managed to bring together political factions in the area who normally refuse to speak to each other. In 1994, a leader of an environmental group was burned in effigy by representatives of the local county movement, yet both these groups now agree that what Jackson and Goebel are trying to do is the best hope for the region's troubled forests. Groups in the area with very different political goals – from the Indian tribes to ranching and timber industry groups, and environmentalists – have managed to collaborate on a watershed plan proposing that Jackson and Goebel's sustainable forestry practices be applied to small private forests throughout the county (Willowa County Commissioners, 1995).

Jackson and Goebel's decision to restore forest productivity by suppressing fire, increasing soil organic matter and managing for a mixed-age, mixed-species forest makes sense for their particular place, given their specific goals of making a living here without destroying the forest's ability to persist. Many details of the Jackson and Goebel model would be different in other, much drier inland forests, where fire suppression is not a viable option. Yet the basic framework of the Jackson and Goebel model does apply to other forests. Theirs is one example of a general principle that can be adapted to other forest communities on many different, particular sites. They have turned the industrial forestry model on its head: instead of transforming decadent old forests into young intensively growing forests, they have turned cutover forests into something much more like old growth – and made a living out of it as well.

What matters for forest persistence in the inland West may be exactly what large-scale forestry has tried to remove, and what Jackson and Goebel have encouraged – death and decay, the dark stinky unnerving heart of the wild forest. They have shown that you do not need to trade off this wild core for a living. The choice is not necessarily between untouched forests and industrial monocultures; nor is the choice between keeping people out and the kind of boom and bust economy that industrial logging has fostered in the Blue Mountains ever since the first mill went up. The Forest Service thought science would let its foresters leap past the constraints of a local place – in this case, a cold, high land with fragile soils, fires and floods, insects and droughts, a place of extremes. Jackson and Goebel have done well not by trying to eliminate those constraints, but by restoring them, blending human culture and care with wildness.

But what can wildness mean in this intensively humanized context? What makes their forest different from industrial tree farms? The critical difference is the presence of functioning communities, where ecological processes function with some autonomy. In contrast, many industrial forests are designed so that ecological

interrelationships are fragmented to the point that they do not function without extensive inputs of petrochemicals. Trees exist in isolation, each one cut off from potentially competing plants by herbicides. Managers line these trees up in rows and begin to think that nature is just a collection of parts. From these machine-like forests, one learns a kind of contempt for nature; one starts believing that people can actually control both the trees and the forest.

Functioning communities do something else: they teach us the limits to human control and omniscience. A restored forest, while not entirely wild, can tell two major interconnected stories, one about change, and another about the links between people and the land. Restorations at their best do not erase human history, but instead they point out the different ways people have altered the landscape, while also showing the ways the land has affected people by setting ecological constraints. What you learn when you walk in the woods with Jackson and Goebel is that all the cultures who have depended on the Blues forests have changed them in different ways, reshaping them to fit their own needs and desires; but for all the stories they wrote upon the land, none of them ever controlled the forest. People can study ecological communities, change them, pull them apart and try to restore them, but they never have full control over ecological processes. These are lessons that both restorations and environmental histories can teach – lessons about the limits to human control that we badly need to learn.

Managers have always hoped that they can engineer the forest to produce what people desire, but the forest is far too complex for this. No matter how many facts we accumulate and how many theories we test, we will never have the knowledge to manipulate natural systems without causing unanticipated changes. When we manage ecosystems, all we are really doing is tinkering with processes we are just beginning to understand. There is no doubt that we can push succession in different directions – but rarely are those directions the ones we intended. The more managers

alter a forest, the less they can predict the paths that succession will take. Each road we build, each stand we cut and replant with another species, each application of herbicide and pesticide adds another confounding layer of possibility. This is startling, since the changes managers have made in the forest have been aimed at making succession *more* predictable, not less – making more of what we want, and less of what we do not want.

Conclusions

Much as we try, we cannot actually substitute our version of nature for the nature out there – instead, we can only play around with it a bit, tugging on this process, pushing a little at that other process, adding our own agents of mortality (loggers) on to the agents of mortality that are always going to be out there – decay, insects, fire and wind. Given the limits of our present understanding of forest complexity, health problems cannot become the justification for wholesale applications of thinning, burning and salvage. We know little about how these

forests function now, much less how they functioned in the past, so we need to recognize the limits to our knowledge and control.

Across the West, the places where we should be considering restoration are not the wilderness areas or roadless areas – places where many managers now call for intensive logging in the name of forest health. Instead, we should focus on the places that have already been intensively transformed to fit human ideas of what a civilized forest should be. Those are the areas most in need of restoration. Rather than trying to return landscape to an imagined original condition, restoration does best when it offers a way of working with the continuum of humanized cultural landscapes that occupy much of the planet – from reserves that have been minimally influenced by industrial society, to urban landscapes where trees grow inside metal cages in the sidewalk. Restoration can return elements of wildness to all these managed landscapes, without attempting to hide the fact that they are cultural landscapes that may benefit from continued human intervention.

Note

1. This chapter is based in part on Langston, 1995a and Langston, 1999.

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