V 1143

FORESTS - WILD AND MANAGED: DIFFERENCES AND CONSEQUENCES
January 19-20, 1990, University of British Columbia

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NEW FORESTRY - HOW WILL IT LOOK ON THE LANDSCAPE?

Abstract

The forest landscape, managed under the concepts embodied in New Forestry, will differ substantially from that managed under conventional forestry practices. The new landscapes will retain many of the physical structures (snags, large trees, down wood) and spatial conditions (patches of green trees, riparian corridors, inter-connected stands) of the primeval forest landscape. The philosophy guiding forest management under New Forestry concepts also differs from that of conventional forestry. Retention of the habitat structures and landscape patterns that supported the biological diversity that existed in the primeval forest will be a major concern. Timber harvest and management for attributes of natural forests can and should occur on the same parcels of land. Examples of stand-level and landscape implementation of New Forestry concepts are presented as the basis for continuing discussion.

My focus today is going to be on what New Forestry will actually look like on the ground, at least as best as we currently understand it. My presentation is based upon experiences in the Willamette National Forest for the most part, which is in the central part of the Cascades of Oregon.

Our understanding of the concepts and applications of New Forestry is only beginning. We certainly don't know what the landscapes will really look like under full implementation, but we do have a considerable amount of practical experience. I recognize that the practices in the National Forests of Oregon and Washington may be substantially different to those that typically occur in British Columbia: I'd like you to try to adapt what I have to say to fit your situation.

There is no single tool, single approach or single application that is critical to New Forestry. New Forestry is based upon the philosophy that we should retain as many of the features of the natural forests as possible in managed landscapes; that we need to make the co-existence of resource extraction and retention of natural forest functions work across the landscape. Otherwise, I think that you will find yourselves in the same situation as we find ourselves; mandated by legislatures in terms of the kinds of forest practices that we can apply.

New Forestry, in my mind, is really not a set of tools in particular; it's really not a specific way of doing things; it is a philosophy, it's an approach, a perspective. It's a re-examination of the goals of what we would like to see in the forest landscape; what we would like to produce. It's a re-examination of the tools appropriate to reach those goals. It's based upon a rapidly-expanding

understanding of natural forest ecosystems and how they work, and it's based on rapidly-changing social and political expectations.

But I think as much as we know about the way forest ecosystems work -- which Jerry addressed yesterday -- we have to remember that our knowledge of forest ecosystems is very new. If we look back on our knowledge and practices twenty or thirty years hence, we would find that we didn't understand a good deal of what goes on in natural forest ecosystems.

I will revisit the two broad levels of thinking about New Forestry perspectives that Jerry introduced last night; the landscape level and the stand level. The stand level is fairly easy to understand. We're used to thinking about forest stands. We often think about the structural and biological attributes of particular stands: the live trees, the snags, the downed wood, and their distribution across the landscape. Most of our silvicultural prescriptions deal directly with stand structure. One of the really different ideas in New Forestry, however, is that the landscape pattern is equally critical. The amounts, sizes, shapes and interconnectedness of forest patches is important and should be carefully managed.

Let's start, then, with the stand level. I will show you some real life examples that I hope will help you to visualize New Forestry in your landscapes.

I'd like to review very quickly some of the relevant aspects of the traditional approach to west-side Douglas-fir forestry. I recognize that there are differences in forestry for other species and other environments.

The emphases of conventional forest management have been: to control all non-commercial vegetation, to plant or establish a uniform stock of one to two species, to have the sites become as fully occupied by the desired conifer species as quickly as possible, to thin and remove hardwoods and other "undesirable" species to wind up with a stand of uniform size and structure, and to work with relatively short rotations that focus on maximizing fibre output.

Let's think about the major goals of New Forestry at the stand level. New Forestry emphasizes the importance of retaining components of the natural system, including shrubs, hardwoods, and other conifer species that we typically have removed from the stands during thinnings. It includes a mix of naturally-established seedlings to promote the retention of the local genetic stock and, in some cases, planted seedlings. It is a mixed species forestry. Even in places where we've traditionally planted all Douglas-fir or some other species, we really need to consider including a variety of conifers and hardwoods in our stand design. New Forestry also includes

patchy and uneven stand closure to allow the shrubs and herbs to persist longer into the forest rotation.

Large trees are one of the obvious and simple elements to retain. I think we're talking about retaining some large trees over more than one rotation. You have to think about what you want at the end of the rotation and plan for attrition. Some large trees will blow down. Some will die. If you want to wind up with several trees per unit area at the end of the rotation, you need to leave more at the start. In fact some of the trees will be carried through successive rotations, eventually producing a several-aged stand.

Standing dead trees, snags, are also important. There are health and safety concerns at times. We find that some contractors are unwilling to work around snags. A lot of that though, I think, is based upon tradition. On the Willamette National Forest we started with the attitude that we were going to have problems retaining snags and green trees, and we're finding that as we really explore with the contractors and with the people who write the contracts and with the occupational safety folks, that it is possible to leave good numbers of snags. Snag retention that we would have not even have considered five or ten years ago are routine today.

Harvest units with these kinds of structural diversity will begin to emulate some of the characteristics of the natural stands, old-growth stands and natural, fire-regenerated second-growth stands. If you think about the kinds of structures that would exist on a site seventy to 150 years following a partial-retention harvest and then you look at the background stand in this picture which is naturally-regenerated following fire, the two would be very similar; large emergent trees, a second storey that's somewhat patchy, snags from both the previous stand and the current stand, and abundant, large downed wood.

In fact, I think we can produce the kinds of wildlife habitat and stand structure that we normally think of as only occurring after 200 to 250 years. We could begin to produce some of those structures in seventy to 150 years. In fact, if we manage for Spotted Owl habitat over very large tracts of land in the States, I think it's entirely possible that a lot of that habitat can also be managed for some timber production with partial retention to produce structurally complex stands. I think that it's inevitable that we start managing lands for both wildlife habitat and structure and for timber commodities.

I think the landscape level is one of the most interesting features of New Forestry. Landscape design is based upon the idea that the flow of organisms and materials through the landscape is beneficial and necessary to maintaining the biological diversity of the forest. We're

making the assumption that stands of complex structure that provide habitat for lots of different organisms need to be well distributed and need to be connected through the landscape.

Natural stand patterns were very patchy and diverse. If you think about natural forests, at least in the Oregon and Washington Cascades, the pattern of disturbance consisted of fairly infrequent massive fires, much more frequent partial burns, and with spatial diversity. The landscape was an interconnected mosaic of stand sizes and conditions: the old-growth stands were generally interconnected through riparian strips or through steep rocky headwall areas that didn't often burn. A natural landscape tends to be well connected.

The goals in New Forestry are: to produce networks of old-growth stands connected by riparian buffers or other kinds of corridors; to develop young stands with old-growth structural characteristics; and to make sure they all fit into a landscape network. Attention must be given to the impacts of edge on interior habitat. I expect we will use geographic information systems and some of the concepts from landscape ecology to plan at a landscape scale. We're used to planning at the scale of a single harvest unit or a single small watershed, but I'm convinced that we should plan on the scale of thousands, tens of thousands or hundreds of thousands of hectares.

And in fact, as we begin to work with those time scales a whole new world opens. Administrative boundaries may become irrelevant. You really must focus upon natural landscape boundaries: the watersheds.

To illustrate some of the effects of spatial patterns, we looked at two different methods of dispersing harvest through the landscape on the Blue River District of the Willamette Forest. On Forest Service lands in the States we've generally gone the route of dispersing small clear-cuts through the landscape; a process which tends to maximize edge. In fact, if you were trying to figure out how to generate the most edge in a landscape, small dispersed clear-cuts would be excellent.

When you begin to really look at that pattern in a 12,000-acre watershed we examined as it exists currently, you can see the beginning of the fragmentation of old-growth stands throughout the watershed.

We projected timber harvest on that large watershed through the next thirty years and looked at the impacts of dispersing the harvest in small clear-cuts versus aggregating the harvest units into larger blocks. Fig. 1 shows what a typical dispersed harvest pattern would look like over the next thirty years.

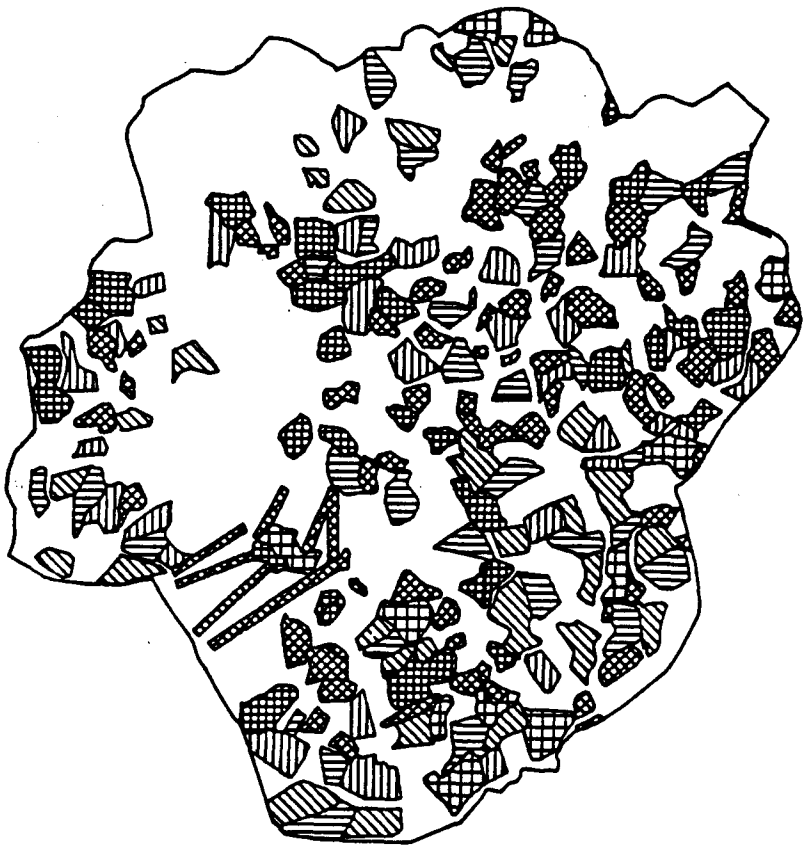

Figure 1.

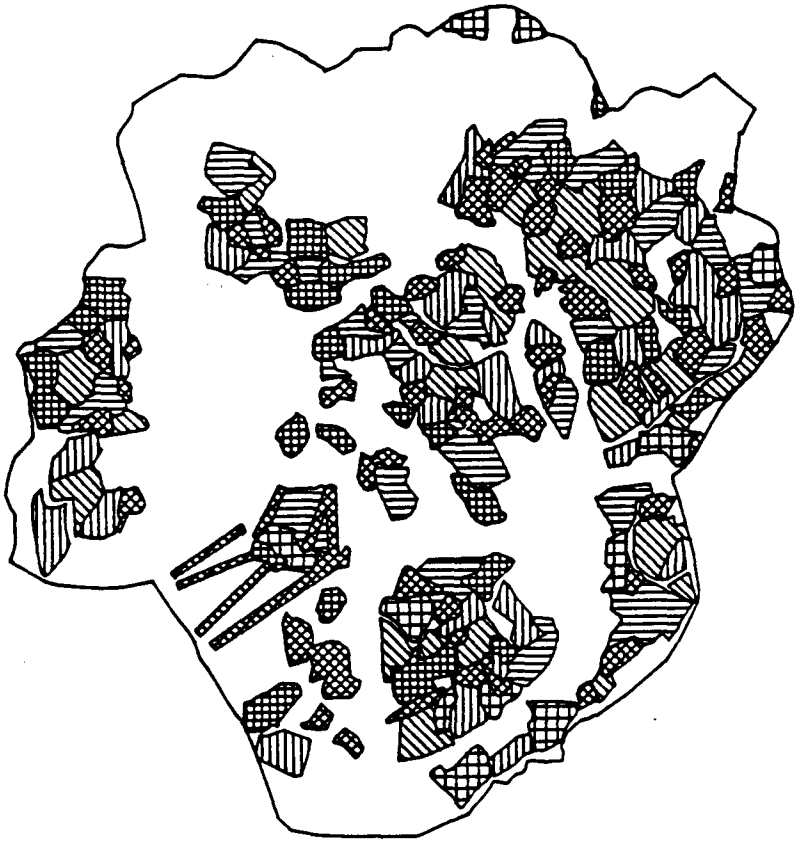

Figure 2.

Alternatively, aggregating the units together to try to minimize the generation of edge produces a pattern that looks something like Fig. 2. If you analyze edge effects generated by those two harvest patterns, you can see some dramatic differences. In the dispersed small harvest unit mode, edge effects, which extend approximately two to three tree lengths into the stand from openings, eat up a lot of what is left behind as effective interior habitat. And in fact, in spite of cutting the same amount of timber, the aggregate pattern retains about ten percent more effective interior habitat.

I think the message relevant to your lands which may be managed on a different sort of pattern, is still consideration of edge and pattern. If you begin to leave streamside corridors or habitat areas of varying sizes, they have to be a certain size and shape in order to be effective A ten to twenty-acre patch is really not going to do anything in terms of providing interior old-growth habitat.

We also found with this example in the geographic information system analysis that changing dispersion patterns alters the amount of edge. The staggered setting mode produced thirty percent more linear edge distance than did the aggregate harvest pattern. Whether edge is beneficial or detrimental depends on what wildlife species or ecosystem function is of interest. If, for example, in a particular place you want to focus on edge species, (deer, elk, big game, some kinds of birds) you may want to generate a lot of edge. In the past we've managed for that kind of habitat by default to a large extent.

The vision that I have for implementing New Forestry practices on a landscape scale includes planning at a large scale, tens to hundreds of thousands of hectares. It incorporates a basic network of no-harvest focal points (reserved lands, unsuitable soils lands, steep and erodible soils, special habitat areas for particular kinds of animals like the Spotted Owl) tied together in a network by riparian corridors and other kinds of connectors. The landscape will be supplemented by long rotation forestry in some areas to produce old-growth-like habitats while still extracting some timber. Most or all of the landscape would retain some of the structural characteristics of the old forest: green trees, snags and logs. I think at least on the federal lands in the States we have to plan for retention of those structures everywhere.

It may be true that the live trees will blow down in some situations. We need to try to plan for that circumstance. In fact, we had a recent windstorm down on the Blue River District and found that the big old-growth Douglas-firs, those with broken tops and incomplete canopies, stood during the windstorm. The young, vigorous, fully-crowned Douglas-firs blew down. In areas where

you might traditionally wonder whether leave trees will stand, if you pick the right kind of tree, more will survive than you might guess.

Another concept to remember is the fact that all of the wood produced on a site, with some small exceptions, over the past thousands of years, has fallen to the ground and been respired or been incorporated in the forest soils. We really need to plan for inclusion of that kind of soil organic matter throughout our management in the future. To me that means that even on lands where we might be going into fairly short-term, intensive timber management, we should consider rest rotations, or leaving a lot of alder or other early seral species to persist. The rest rotation concept should work fairly well on many sites.

Everything has its price. It certainly is true that leaving large green trees, snags and downed wood, and managing on long rotations, reduces the amount of timber you can harvest in the short term. It certainly is true that managing for a network of old-growth on the landscape constrains the location and timing of harvest.

It is true that trying to minimize fragmentation may have unacceptable hydrologic impacts. Big areas that are harvested all at once tend to have more sedimentation problems, more soil erosion problems.

Short-rotation, maximum-fibre forestry, on the other hand, also has its costs. We're burying a lot of those in the long-term. The short-term product, timber, is obviously maximized, but the long-term costs may be ones that are really unacceptable; the decline in long-term site productivity, the potential for disease and pests in monoculture forests, the loss of biological diversity (the real utility and influence of which we don't really understand) and last, but certainly not least, the loss of public support and freedom to practice forestry on the public lands.

So, to sum up where we are on the federal lands in the States, we have come up against the first legal constraints (the Northwest Compromise) that really require us to look at the landscape pattern, the first official policy statements that old-growth has a value in and of itself, and continually intensifying legal battles over resource management. A lot of Districts on the Willamette Forest are automatically looking at landscape dispersion and automatically leaving stand structures in all harvest units. The rate of change in our management practices and our management concepts and philosophies, is extremely rapid, leaving a lot of people feeling very uncomfortable. Folks who practiced a particular kind of forestry for decades are feeling real discomfort.

And I think we're finally starting to get to the notion and fact of Federal lands managed for multiple use, where instead of the harvest quantity driving all of the other resource values, the reverse may actually happen. You take care of all of the resources first, and what comes out the bottom of that sieve is acceptable for harvest. I'd like to think that we'll get there.

If I leave you with nothing else, I'd like to leave you with the idea that there's no one solution, no one right answer. New Forestry is a set of concepts. It's a new paradigm for managing the forests. It's a re-examination of goals. I think it's paramount that the forestry profession regain the leadership in land management, in stewardship. Otherwise, the legislature is going to dictate what we can do. And perhaps that's the way it should be, if we don't follow the desires of the people as we manage their forests.

The bottom line is that we have to begin to soften the blow, soften the impacts of extractive timber management on the natural world because we ourselves are the beneficiaries of the natural world. We cannot continue to function as a society, extracting natural resources as we've become accustomed, without starting to take care of the natural world. Humans pay the price in the end, along with the rest of the biosphere.