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New Perspectives in Forestry - An Objectives Based Approach

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Abstract. Applying New Perspectives in Forestry approaches to land management requires a clear understanding of both the ecosystem to be managed and management goals. At its core, New Perspectives focuses on managing ecosystems in an ecologically and socially sensitive fashion. It would be easy to assume that New Perspectives management consists of a few standard practices, such as green tree retention. In reality, the size of the tool box for New Perspectives management is very large, including tools for management at both the stand and landscape levels. Choosing the appropriate tools depends on defining the desired future condition for the stand in it's landscape context. Examples from the Oregon Cascades used to illustrate stand and landscape management, while not defining the appropriate tools for other ecosystems, offer a starting point for thinking about ecologically sensitive management.

What is New Perspectives in Forestry? What is it's basis in science? How does it look on the land?

Scientific and Social Basis

Northwest forest ecosystems developed with large amounts of complexity such as large live trees, snags, dead wood on the forest floor and in streams. These complex pieces play important roles in the ecosystem: nutrient cycling, animal habitat, soil productivity, stream and soil stability, etc. In spite of our advances, we don't understand a great deal of the function of natural ecosystems. For example: our recent appreciation of the amount of production that goes to support the below ground system (often greater that 50% of total photosynthate fixed).

The productivity of the land is a reflection of this natural legacy. Nearly all the wood that has grown on most sites has also decomposed or been used by organisms for food the same site. Fire and natural disturbances generally consume little of the large wood.

Society's perception of the role of National Forests is changing. Human demands are huge and increasing rapidly with population growth. Demands for products are high, as are demands for recreation, aesthetic values, clean water, and clean air. We, the Forest Service, are intermediaries between the demands of humans and the natural world. *The natural world must continue to function; we are dependent upon it.* Our goal is to maintain the long-term survival of natural ecosystems *and* allow the extraction of some level of commodities (wood, etc.); to manage the ecosystem instead of just the trees.

There are two general levels to consider when thinking about New Perspectives approaches to land management: the stand level and the landscape level.

The Stand Level

This is a level we are comfortable with. We have lots of experience in manipulating stand structures - tree sizes, ages, species, etc. The major structural features of this level include: large live trees, which provide habitat, generate the energy the stand lives upon, and alter the climate under the canopy; snags, which provide cavity nester habitat and input of wood to the forest floor; down trees on land that provide wildlife habitat which is important for nutrient cycling and water reservoirs; and down trees in streams which provide habitat by generating pools that provide food for insects and increase stream stability.

Here are some examples of these structural features. Old growth trees dominate the living structure and are tremendous photosynthesis factories. The old growth tree crown is a deep and diverse canopy; whole communities exist on the branches. Shade tolerant trees provide shade, thermal cover, species diversity, and resistance to pathogens. Snags are important wildlife habitat and provide input of wood to soil. Down wood plays major roles in nutrient cycling, water storage, and wildlife habitat.

How did natural stands develop with these structures? Natural disturbances, such as catastrophic wildfire generated most of the stands we see today as old growth and mature forests. Old-growth definitions (eg. PNW-447) derive from these kinds of stands. Long time periods for structural development. There is no magic age or structural condition at which a stand suddenly becomes old growth. The characteristics slowly accumulate.

Most stands on the WNF have developed following partial burns. A great deal of complex structure

is present from the start (survivor trees, snags, down wood). Development of old growth conditions is quicker.

How can we maintain these structural features in managed stands? Let's examine some examples from existing harvest areas. Live trees: 6 to 10 or more live trees left per acre. 6 to 10 is minimal to allow for any survival of remnant trees through a 100 year period. This level should be left on most sites. Can be clumped to some extent, but not all clumped. Above this minimal level, the number of leave trees depends on objectives. Objective old growth structure - more trees. Some left to replace snags as the existing ones deteriorate. Some left through more than one rotation to become old trees. Old growth leave tree: Old growth trees, especially with broken tops, are particularly good to leave. Tend to be wind-frim and often contain decay (less economically desirable). Provide great habitat. Snags: Patches of snags and scattered snags are being left on many harvested areas. Some safety concerns, but these decrease if you give the loggers the choice of snags to leave (as long as FS criteria for number and distribution are met). Snags and down wood: Increasing amounts of large down wood pieces are being left. Getting away from yarding decayed old logs to landings to be burned. Much burning done in spring when large pieces are too moist to be consumed in slash fires.

The idealized stand structure under the old approach emphasized garden-like stands of a single species, all of one size, all evenly spaced. Very little down wood or snags. The idealized structure under New Perspectives emphasizes retention of natural structural features in a stand of mixed species and sizes of trees. Large leave trees, snags, down wood, several sizes, species and ages of young trees, and retention of some levels of hardwoods and shrubs.

Examples of stand structures from natural fire that we may try to attain under managed conditions are:

shelterwood
young stand with burn
old growth remnants with 30 year old (approx.) stand
patchy old growth remnants with a bit older stand
early mature stand with remnants
Mature stand with remnants
Mature stand with remnants near the end of a typical rotation age (100 yrs).

Many of these structural features are specified, to minimum levels, in our new Forest Plan, but the Plan does not specify green tree retention at any level in general forest allocations. Current leave trees are for snag replacement in the first rotation and not designed for retention through a rotation. A key point is that the structure of the stand should be driven by your objectives. A certain minimum structural condition is probably called for on most lands, but above that level, the desired future structure depends on other objectives (visual, wildlife, timber, watershed, etc.). Another key point is that the appropriate minimal structure depends on the local ecosystem. For example, alder is a key component of many stands at low elevations and in the coast - it should be a major player in the structure of those stands. Likewise for cedars, hemlocks, and nitrogen fixers, depending on the ecosystem.

The Landscape Level

This is more difficult to think about, and requires considering large areas of land (sub-drainages, watersheds, tens of thousands of acres). This also requires considering patterns in the landscape for at least several decades. Natural stand distributions: the natural pattern of stands across the landscape was diverse, complex, and inter-connected. A complex mosaic of stand ages, stand sizes, and stand structures. Natural stand ages at Mount Rainier National Park.

Fires and other disturbances were generally patchy -- Shady Beach and French Pete Creek (3 Sisters Wilderness), for example. Disturbance ranges from complete elimination of live trees to scattered remnants to very little mortality of large trees. Burned and un-burned patches often interconnected along cool, moist riparian areas, north slopes, or ridge-line fire breaks.

MOM map of stands: natural patterns are being changed by human activities such as large harvested areas in some places, and small patches dispersed through the forest in others. Pieces of natural stands and old growth are being reduced in size and isolated from one another. Remaining natural stand patches are beginning to approach the same size as the cut-over patches.

As the landscape becomes 50% cut-over in a small unit such as the Lowell drainage, there is a dispersed harvest pattern, and the size of the remaining natural stands becomes the same, on average, as the size of the harvest units. A 20 acre patch of old growth is mostly "edge habitat" - influenced by light, temperature, wind, humidity, animals and plants from the openings surrounding it. Very little remains as effective interior habitat. The landscape can be 50% old growth and still have very little effective interior old growth habitat.

Cook-Quentin (CQ) existing harvest pattern: Blue River District examined the effects of pattern in a 12000 acre pair of watersheds. The existing harvest pattern was typical of much of the general forest on the WNF. Examined two patterns - typical dispersed harvest of small patches and aggregated harvest emphasizing retention of large old/mature stands for as long as possible. The same harvest level for both patterns was projected over the next 30 years.

The CQ staggered setting pattern was developed using typical harvest unit sizes, dispersed throughout the drainage.

The CQ minimum fragmentation pattern attempted to retain the large stands of mature and old growth forest, and some inter-connections between them, for as long as possible.

CQ stagger edge effects: assuming the effects of edges (light, wind, temperature, etc.) extend 400 feet into stands, many of the small strips and patches of mature and old stands in the staggered setting pattern are ineffective as interior old growth habitat.

CQ min-frag edge effects: assuming the same edge effects and harvest levels, aggregating harvest units reduces the number of small stands and stringers that are all edge. In fact, the total amount of effective interior habitat is 700 acres (10%) greater with the aggregated pattern. The total length of edge between natural and managed stands is also reduced substantially.

Pattern Does Make a Difference

There are some cautions about the minimum fragmentation model. It is not suitable for all lands because its effects on watersheds, big game habitat, visual quality, etc. may be unacceptable. It is not a solution to the old growth issue over the longer-term, since all general forest lands will still be harvested. Real landscapes will run the range from small dispersed units to aggregation, depending on objectives and resource values. *But* landscape pattern is very important and should be planned, not just allowed to evolve as a function of the road system and logging systems plans.

The Next Step In Planning Landscape Patterns

Upper Falls Creek, Lowell RD is an example of planning landscapes to generate ecologically driven patterns. Done as an exercise to learn how to implement the Forest Plan in an ecologically sensitive fashion, this 20,000 acre area helped the Forest think about ecologically significant old growth (SOG).

The SOG objective: establish a framework for assessing old growth at both the stand and landscape levels. The SOG process:

1. Map and define stand conditions: natural vs. managed. Gather stand condition data (old growth structural features, etc.)

2. Delineate blocks (groups of stands) that will be evaluated.

3. Rate or evaluate each block based on several criteria relating to ecological significance. Define the groups of stands that will be treated as old growth and natural forest blocks. Assume edge effects of 400 feet. Where are the large, contiguous areas of old growth? Create a map of high, intermediate, and low significance.

Other Questions

1. What areas are already reserved under the Forest Plan?

2. How do they relate to the most significant blocks of old growth?

3. What are the minimum connections needed between the most significant blocks?

4. What is a reasonable expanded set of connections beyond the minimum?

5. Where are the next most significant stands?

We are left with areas that are the least significant to the ecological pattern across the landscape. These are the areas to think about first for harvest. Over time, harvest would proceed slowly through all the stands not in no-harvest allocations in the Forest Plan, but the most significant stands would be retained the longest, allowing future land managers options for dealing with old growth and natural forest issues.

This process would work very well with proposed spotted owl Habitat Conservation Areas, as would the rest of New Perspectives management, to develop a comprehensive strategy for managing old growth, native forests, and biological diversity while continuing some level of timber harvest.

Things to Think About

Everything has its price. Leaving green trees, snags, and down wood means lower levels of initial

timber harvest, and may slow growth of the new stand, and increase fire risk.

Simplifying stand structure and landscape patterns means loss of long-term productivity of the soils, loss of animal habitat, increased activity of pathogens, public resistance, and legislated management.

My View of the Future "New Perspectives" Management

This provides a much expanded box of tools and a modified set of goals:

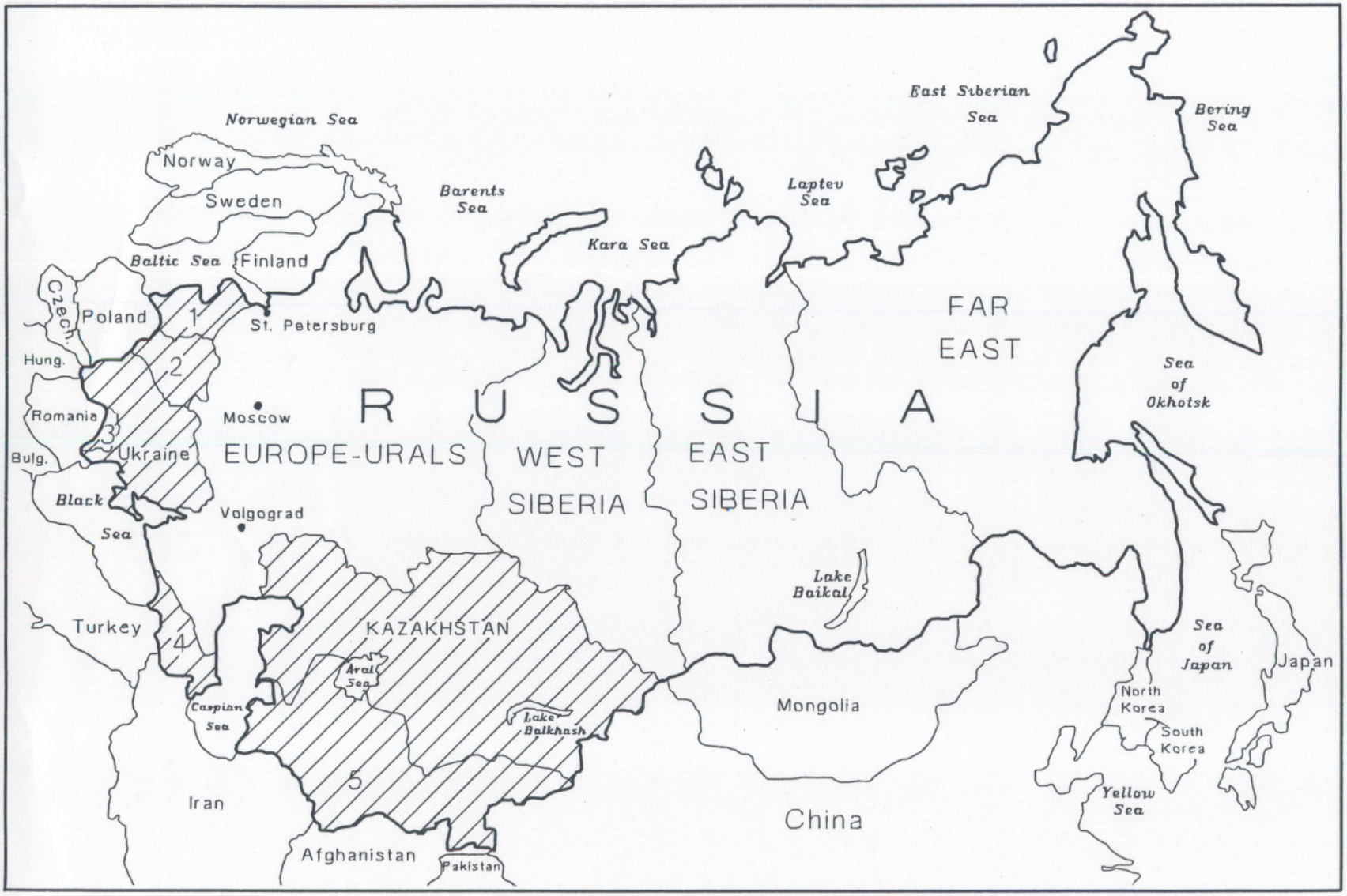
Stands which range in structure from moderate to high levels of structure (green trees, snags, down wood). Some will obviously have been harvested, some will appear nearly natural, with the complete range of intermediates.

Very few of what we would consider traditional clearcuts; with most stands consisting of at least two age classes of trees and several tree species (including hardwoods).

A basic pattern or framework of old growth and natural stand conditions, carefully designed and interconnected. A system of evaluating ecological significance and managing based upon it.

Much increased public participation in the design and implementation of Forest management. *This aspect of New Perspectives is as important to public land management as the technical aspect.*

The bottom line is that New Perspectives management is an expanded set of tools and goals that focus on the retention of functional forest ecosystems. The ecosystem has given us the forests we manage. We must allow it to continue. We do not fully understand how natural forest ecosystems work and probably never will. We do have an expanding base of knowledge. We should proceed with humility, emulating natural processes and patterns as best we can in a landscape which includes humans.



Republics of the former USSR excluding Russia

1. BALTIC REPUBLICS
   - ESTONIA
   - LATVIA
   - LITHUANIA
2. BELORUSSIA
3. MOLDOVA
4. TRANSCAUCASIAN REPUBLICS
   - GEORGIA
   - ARMENIA
   - AZERBAIJAN
5. CENTRAL ASIA
   - UZBEKISTAN
   - TURKMENISTAN
   - TAJIKISTAN

SCALE

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0 400 800 Miles

Swanson

The Alaska Region

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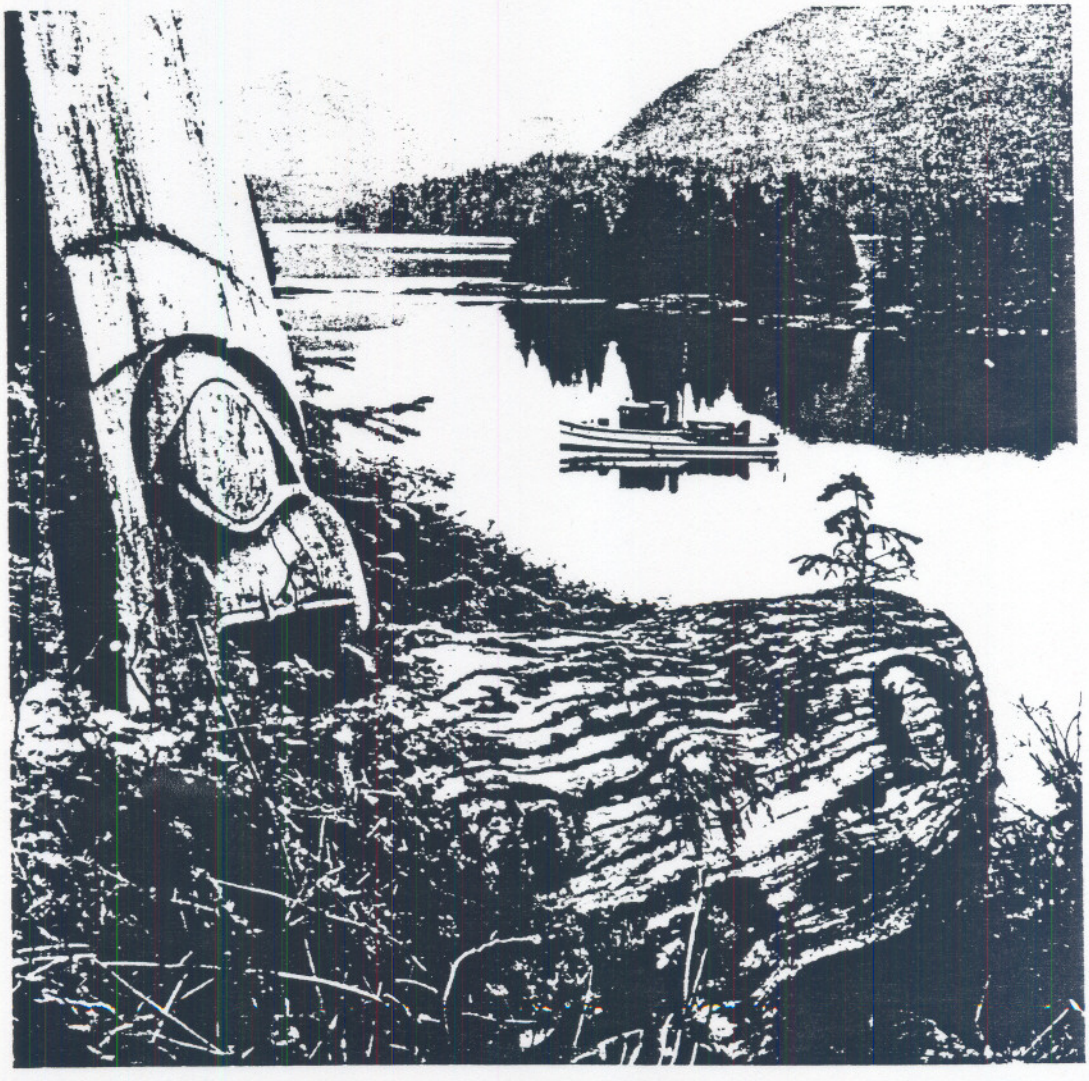

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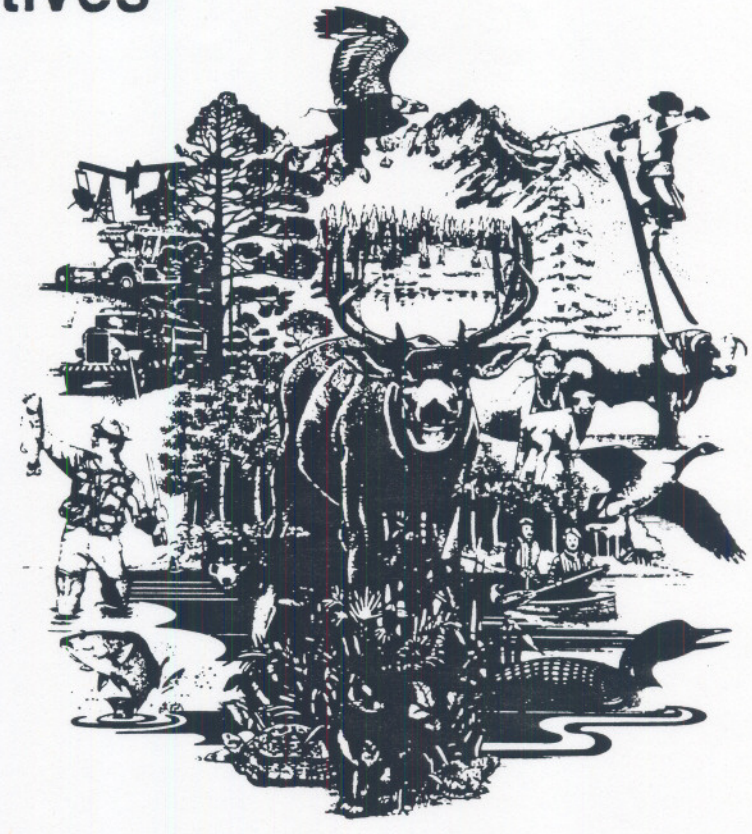

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