Applying Restoration Principles on the BLM O&C Forests in Southwest Oregon

FINAL

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For any policy to be sustainable, it must be socially acceptable.

Preface

When we initially developed our proposals for a restoration strategy for the forests of the Pacific Northwest we considered it important to take certain intractable issues, such as old growth forests and road-less areas, "off of the table." This was necessary so that -- rather than continuing policy debates over these contentious topics -- society could move forward on important activities for which there was general support, such as restoration of forests and waters, which would achieve both environmental and economic good. While some critical societal decisions were still required, such as selecting an age at which forests and trees on federal lands would be reserved, the Northwest Forest Plan provided a basic starting point for our policy proposals. The emergence of the draft Recovery Plan for the Northern Spotted Owl (NSO) has created a major new element that must be addressed in any restoration proposals and additional uncertainty about what can be accomplished in the near term; resolving the uncertainty about critical habitat as quickly as possible is an important need. However, the re-emergence of NSO conservation issues has not changed the fundamental premise of our original analysis, which is the need to focus on activities that achieve environmental, economic and social benefits by improving ecosystem diversity and functionality and increasing societal options on federal forest lands as well as improving ecosystem resilience and sustainability in the face of environmental change. We do find it ironic that – 20 years after Judge Dwyer's injunction on the harvest of NSO habitat that led to the Northwest Forest Plan – society finds itself once again engaged in a process of balancing concerns about a single species with concerns about entire ecosystems and the communities that depend on them.

Introduction

An active management program is needed on federal lands in the Pacific Northwest to restore ecological values and contribute to sustainable local communities. We believe that there is broad societal support for such a program. New policies are needed that focus on:

- Restoring more functional and sustainable ecological conditions in federal forests;
- Conserving old-growth forests and trees;
- Recovering threatened species, such as the NSO;
- Sustaining local communities; and.

- Maintaining a highly skilled workforce and milling infrastructure needed for restoration activities.

We propose to assist the Department of Interior in applying the restoration strategy described in Johnson and Franklin (2009) to landscapes managed by the Bureau of Land Management in southwest Oregon. This work has two purposes:

1) To provide a landscape demonstration of an approach that integrates ecosystem restoration and conservation of NSO habitat. We believe that this demonstration will provide useful concepts and strategies for upcoming planning for the O&C lands.

2) To provide examples of ecosystem restoration approaches that can be tracked over time to enrich our understanding of the short-term and long-term implications of implementing such an approach.

Thus, we believe the pilots can serve two purposes: 1) enable us to think through useful approaches for the long-term plan for BLM lands that will be developed in the next few years; 2) serve as a continuing source of information to help modify management strategies in the future.

Elements of a Restoration Strategy

Focusing on Ecosystem Restoration

The focus of the proposed program is restoring forest ecosystems to more functional and sustainable conditions in contrast to management programs that focus on singular objectives, such as fuel treatment, fire suppression, wood production, or provision of habitat for NSOs. Programs that seek to optimize singular goals invariably marginalize other aspects of ecosystem composition, structure, and function – aspects important to stakeholders and to the long-term sustainability and functionality of these ecosystems.

Forest restoration has many facets. While we concentrate on the conifer forests of the Northwest, we recognize the importance of the forest to watershed restoration and functioning of riparian and aquatic systems. Further, we recognize that there are tensions among the elements of a comprehensive restoration program on the federal forests, such as between providing suitable habitat in Dry Forest landscapes for NSOs (e.g., denser forests) and the significant risk of losing such habitat to stand-replacement wildfires or insect outbreaks**.**

Restoration activities will yield a variety of outputs, outcomes, and effects. Developing credible estimates of them will be an important part of the analysis.

Necessity to Recognize Moist and Dry Forests

Division of federal forests into Moist and Dry is the initial step in the development of our proposed forest restoration strategy. Plant associations provide the basis for assigning sites into these categories; these plant associations reflect their contrasting composition, growth conditions, and historic disturbance regimes. We recognize that there is a broad gradient in fire behavior in Pacific Northwest forests considering variability both in site and landscape conditions. "Dry Forests" often grow on sites that have predominantly low- and mixed-severity fire regimes while "Moist Forests" often grow on sites that have fire regimes that include high-severity fire behavior. We included plant associations often subject to mixed-severity disturbance regimes (such as moist Grand Fir and moist White Fir plant

associations) in the Dry Forest category because they are expected to shift toward more frequent and severe wildfires on these sites with climate change. While shifts will occur in plant associations with climate change, we expect that they will continue to be valuable ecological reference points. Identification of plant associations at the project level is done by on-the-ground evaluation and not from maps.

Dry Forests are defined here as forests that belong to the Oregon White Oak, Ponderosa Pine, Jeffrey Pine, Douglas-Fir, and dry White Fir and Grand Fir plant series as have been described and defined by plant ecologists. Dry Forest landscapes are dominated by one or more of these plant series. In southwest Oregon, they are concentrated in the interior valleys between Roseburg and Medford. Moist Forests are defined as Western Hemlock, Tanoak, Red Fir, Mountain Hemlock, and moist White Fir and Grand Fir plant series.

Characteristics of Moist and Dry Forests

Moist Forest ecosystems evolved with infrequent but severe, stand-replacement disturbance events, such as intense wildfires and windstorms. The composition and structure of intact existing older forests in Moist Forests have not been significantly affected by human activities. Generally, silvicultural treatments are not needed to maintain existing older forests on Moist Forest sites and can actually contribute to degradation of such forests. Silviculture can, however, be used on Moist Forest sites to accelerate development of ecological diversity in plantations and other young stands. Silviculture – in the form of variable retention regeneration harvesting – can also be used on Moist Forest sites to create early successional communities.

Dry Forest ecosystems have evolved primarily with low- and mixed-severity disturbances, including wildfire and localized insect outbreaks. On Dry Forest sites, the composition and structure of existing old-growth forests typically have been significantly altered by modern human activities, resulting in increases in stand density and compositional shifts toward less fire- and drought-tolerant tree species. Due to fire exclusion, the ecological processes that create openings allowing the development and retention of large fire resilient trees are no longer present. Dense forests with extremely slow tree growth will likely be delayed in developing into structurally complex older forest. In addition, the abundance of dense forest has led to a significant reduction in the amount and diversity of hardwoods, shrubs and herbaceous species. Active management of older forests on Dry Forest sites is often needed to reduce the potential for uncharacteristic and ecologically damaging wildfire and insect outbreaks. Many – but not all -- of these forests that require restoration have existing populations of older trees.

Utilizing Ecological Forestry to Guide Actions

We base our silvicultural proposals on an approach known as “ecological forestry” (Seymour and Hunter 1999, Franklin, Mitchell and Palik 2007, North and Keeton 2008, Bunnell and Dunsworth 2009). Ecological forestry utilizes principles of natural forest stand development, including the role of natural disturbances in the initiation, development, and maintenance of forest stands and landscapes, and operates on temporal scales consistent with recovery of desired structures and processes. Key elements of this approach include:

> Planning management activities at landscape scales so as to insure that the appropriate mix of conditions are present. The planning incorporates knowledge developed from the study of pattern and ecological function in natural landscapes, and gives special consideration to landscape components that have special ecological roles, such as essentially all aquatic and semi-aquatic features and specialized habitats (Lindenmayer and Franklin 2002);

Restoring spatial heterogeneity at multiple spatial scales, including forest stands. Non-uniform or heterogeneous distribution of forest structural elements, such as trees, snags, and canopy density is characteristic of older forest stands and landscapes on both Moist and Dry Forest sites; and

As noted above, on Moist Forest sites subject to regeneration harvests, retaining significant structural elements (biological legacies) from the harvested stand and recognizing and nurturing the diverse early successional communities that follow harvest.

According to Seymour and Hunter (1999), a ". . . central axiom of ecological forestry is that the manipulation of a forest ecosystem should work within the limits established by natural disturbance patterns prior to extensive human alteration of the landscape."

Conserving Older Stands and Trees

Conservation of older stands and trees anchors our proposed restoration strategy because of their ecological and cultural significance. Such forests and trees are currently present at levels far below historical levels, despite their importance for many biota and ecological processes. Societal interest in retaining older forests and trees is obvious based upon the continual legal battles over these stands and trees. These legal battles have preoccupied stakeholders and managers, perpetuating distrust and diverting attention from restoration activities on which there is significant social consensus (Thomas, et al. 2007, Spies and Duncan 2009).

On Moist Forest sites, our restoration strategy provides for *retention of older stands.* In calculating potential timber harvests we analyzed consequences of using three different ages proposed and discussed by stakeholders to define "older stands": 80 years, 120 years and 160 years. This range goes from including essentially all mature and old growth forests (at threshold age 80 years) to including most mature and all old growth forests (at threshold age 120) to including the most structurally advanced mature and all of the old growth forests (at threshold age 160 years). We have also applied the same any age threshold to individual or small clusters of older trees (greater than 80, 120, or 160 years of age) that occur within younger stands.

On Dry Forest sites, we focus on *retention of older trees*, defining them as trees greater than 150 years of age. We recognize that many forests can be found on Dry Forest sites that include significant numbers of old trees; however, conserving the older trees will typically require active management of the stands to reduce the risk that these trees will be subject to intense wildfire or competition, the latter ultimately resulting in accelerated loss of these trees to insect attack. The 150-year age was chosen because: 1) trees in Dry Forests begin to exhibit characteristics of old trees at these ages; and 2) fire exclusion--through suppression of natural and aboriginal fires and introduction of large herds of domestic livestock into these forests began about 150 years ago. We realize that this is a societal decision but find 150 years a good point of demarcation for our work.

Concern has often expressed about our ability to identify these "older stands" and "older trees." While we have been successful this year in identifying older ponderosa pine and older Douglas-fir using the keys of Van Pelt (2007), additional calibration and review will undoubtedly be needed during implementation.

Integrating the Restoration Strategy within Spotted Owl Recovery Planning

The recent release by the US Fish and Wildlife Service (USFWS) of a draft recovery plan for the Northern Spotted Owl (NSO) has re-established a major focus on the owl and its habitat as a key element of restoration activities creating both opportunities and difficulties. The draft recovery plan does not identify a habitat conservation (reserve) system or critical habitat for the NSO; rather the USFWS is intending to identify critical habitat following additional model development and utilization. Much creative work has been and is continuing as USFWS develops new methods for assessing NSO habitat quality across the landscape. In the interim between the adoption of the plan and definition of critical habitat, the USFWS has advised that all high-quality NSO habitat and occupied habitat should be maintained.

Consequently, there is great uncertainty about activities that can be undertaken during the interim. The uncertainty created by the draft NSO recovery plan affects what might potentially be accomplished as a part of any pilot projects given the abundance of owls in the Roseburg and Medford Districts, as will be noted below. In the Medford District where O&C forestlands are contiguous there may be some good opportunities for BLM and USFWS to collaborate in developing integrated approaches to restoration and protection of NSO habitat, using some of the new owl habitat assessment tools. On other hand, in the Roseburg District, much of the Dry Forest is in alternate sections of a checkerboard ownership pattern. Since the federal sections provide essentially all secure NSO habitat in these landscapes, implementing restoration activities that alter NSO habitat in the short term may be difficult. *In our judgment the fact that many of these sections are designated as Matrix under the NWFP, the designated source of regularly scheduled timber harvest, has little relevance under the interim guidance of the draft NSO recovery plan.*

We propose to work with BLM and USFWS to develop the pilot projects. The landscape and stand models developed by USFWS as part of the recovery plan and critical habitat identification can be merged with information of the BLM to help explore how possible restoration strategies can be integrated with improving and sustaining critical habitat for NSO. The insights learned here could assist in shaping the role for active management and ecological restoration that has been recognized in the NSO Recovery Plan. Pursuing a restoration strategy, such as we have proposed, independently of the NSO recovery plan could lead to serious conflict. Thus, there is reciprocal importance in integrating principles of ecological restoration and NSO habitat conservation.

Restoration of Riparian and Aquatic Ecosystems

While we have focused primarily on terrestrial elements of the federal forest estate, equal attention needs to be given to restoration of the aquatic and semi-aquatic ecosystems. This will come about partially in the context of restoring forested riparian habitats such as thinning to increase structural diversity and accelerating the development of large trees. Also major attention needs to be given to components of aquatic networks that are significant habitat for biological diversity, such as hardwood/meadow complexes. Modification of existing road systems as they interact with the stream networks is also critical.

Our guide here is the Aquatic Conservation Strategy (ACS) for the Northwest Forest Plan--- a comprehensive conservation and restoration strategy for aquatic systems with four components: riparian reserves, key watersheds, watershed analysis, and watershed restoration (Reeves, et al. 2006). Our proposals will conform to its goals and requirements while using the latest information and modeling processes available. The forest restoration strategy suggested here does intersect with and

complement the ACS. It intersects the ACS in that some of the restoration thinning occurs within riparian reserves and the watershed analysis helps direct and limit activities. It complements the ACS in being a comprehensive restoration strategy for terrestrial systems.

The Pilot Areas and Their Characteristics

We have been asked to apply the restoration strategy to two landscapes: 1) Middle Applegate Watershed, which occurs as two largely contiguous blocks of Dry Forest on either side of the Applegate River (Medford District); and 2) Myrtle Creek Watershed (Roseburg District) which has Dry Forest in the classic checkerboard pattern in the lower watershed and a large contiguous area of Moist Forest in the upper watershed. We have spent a few days in each proposed pilot area and our observations come from that effort.

The Medford Pilot area is generally under the "Adaptive Management Area" allocation of the Northwest Forest Plan, where innovative management strategies were to be tested, while the Roseburg Pilot area is generally under the "Matrix" or "Connectivity" allocations. These three allocations were expected to produce a regularly scheduled timber harvest under the NWFP, excepting the Riparian Reserves on streams that run through areas.

An Ecosystem Restoration Strategy for the Medford District Pilot

The Medford District pilot in the Middle Applegate Watershed contains mostly Dry Forest by our definition. Our approach calls for:

- An active management program to restore more ecologically desirable and sustainable conditions in forests and landscapes. Existing Dry Forest landscapes in the Middle Applegate Watershed are characterized by dense maturing forests with relatively simple structure and low tree species diversity; landscape heterogeneity is low and critical Northern Spotted Owl habitat is at significant risk. Functionality, diversity, and sustainability of these forests and landscapes can be improved with management that structurally and compositionally enriches these forests and reduces their vulnerability to wildfire, insects, and other disturbances. Ecosystem restoration -- planned and implemented at the landscape scale -- is needed rather than actions focused primarily upon fire or any other singular objective.

- Landscape-level planning to insure that desirable and sustainable mixtures of forest and non-forest conditions are maintained on the landscape. These efforts can guide restoration of landscapes to desired and heterogeneous conditions, from their current largely homogeneous and high risk state. The desired condition includes retention of denser forest patches needed to provide critical habitat for many organisms, such as the NSO and some of its prey species; these dense, multi-layer patches are best maintained by embedding them in a forest matrix that resists, rather than facilitates, the spread of insect epidemics and stand-replacement wildfire.

- Stand-level ecological restoration including:
    1) Retention of older (>150-year-old) trees and other ecologically important features, such as large hardwood trees, and eliminating competing younger trees and ground and ladder fuels from their vicinity;

2) Provision of "skips" where no thinning is done so as to protect important features (e.g., riparian habitats) and provide hiding cover and heavily shaded habitat niches;
3) Thinning the remaining stand to a) reduce overall stand densities to a more sustainable level (based upon the plant association), b) shift stand composition toward greater diversity, including a greater proportion of more fire- and drought-tolerant species, and c) increase average stand diameter; and
4) Creating "gaps" of small to moderate size (e.g., ¼ to 2 acres) to provide opportunities for regeneration of sun-loving trees, such as ponderosa pine and Jeffrey pine.

An Ecosystem Restoration Strategy for the Roseburg District Pilot

The Roseburg BLM has proposed the Myrtle Creek Watershed as the pilot area for this effort. The upper reaches of the watershed contain Moist Forest in largely contiguous BLM ownership. A Late-Successional Reserve sits just south of the watershed.

While the general approach to forest restoration in the Dry Forests of the lower Myrtle Creek Watershed would presumably be similar to that described above for the Dry Forests of the Applegate, the situation here is complicated by its occurrence in an ownership checkerboard, with the BLM owning a relatively small portion of the lower watershed. Sections of federal land are often mixtures of mature and immature forest surrounded by privately owned sections. Many privately owned sections are intensely managed for wood production by the forest industry, make minimal contributions to owl habitat, and have significant potential impacts on conditions and fire risk on the federal lands. Restoration activities on these federal lands have to recognize their important role as providers of terrestrial and aquatic habitat values in these landscapes. Here, especially, the uncertainties surrounding the recovery strategy for the Northern Spotted Owl make near-term activities difficult. The checkerboard Dry Forests of lower Myrtle Creek represent the greatest learning challenge of the proposed pilot projects.

Our approach for the Moist Forests in the upper Myrtle Watershed calls for:

- Reserving existing older forests and individual old trees found in younger stands using a threshold age;
- Continued ecologically-based thinning and other activities in plantations to accelerate the development of compositional and structural diversity. Variable density thinning is expected to be one of the most important tools along with creation of coarse woody debris and wildlife habitat features.
- Initiating regeneration harvests in plantations and other younger forest stands utilizing variable retention silvicultural prescriptions to provide for structurally, functionally, and compositionally diverse early successional communities on forested habitats. The early successional communities, which exist between a stand-replacement disturbance and re-establishment of closed forest canopies, are important for plant and animal early successional habitat specialists. Such communities cannot be fully developed as small openings in existing forests or the larger openings provided by clearcutting and intensive reforestation practices.

Elements of a silvicultural prescription for regeneration harvests in Moist Forests to provide diverse early successional habitat and regeneration of shade-intolerant tree species:

- Retention of significant "biological legacies" (structural and compositional) from the harvested stand for incorporation into the post-harvest stand, e.g.:
    - Old-growth trees and other trees of interest (e.g., hardwoods);
    - Snags and downed wood;
    - Representative patches of the harvested forest -- thereby providing areas with undisturbed understories and forest floors;
    - Examples of other distinctive conditions, such as hardwood groves, or physical conditions, such as seeps or rock outcrops.
- Retention should include scattered individual structural features as well as habitat islands or patches – i.e., both ***dispersed*** and ***aggregated*** retention;
- The target level of retention would approximate that used in the demonstration (20% of the harvest area as aggregated retention and 10% of the remaining trees as dispersed retention for a total of ~ 30% retention);
- Regeneration of trees will be primarily by natural regeneration.

An Adaptive Management Approach

"Trust, but verify." President Ronald Reagan

All proposed strategies for management of the O&C Forests, whether forest restoration or Spotted Owl recovery, contain hypotheses that need testing. Also, across public agencies, we sense that confidence and trust in forest managers is not high among some members of the public. We have experienced it ourselves.

Given the uncertainties that we face in forest restoration, keeping track of the state of the forests and the effects of actions is a first principle of forest management. Monitoring is necessary but not sufficient; people are increasingly skeptical of agencies keeping score on the effectiveness of their own actions.

Consequently, to learn quickly whether restoration actions need modification and to gain the trust needed for management discretion, we recommend paneling an independent review team to (1) assess whether the projects undertaken reflect the goals stated for them and (2) assess the results of the monitoring program, which would be undertaken to determine whether the management program is moving the forests and landscapes toward stated restoration goals.

We view third-party review as essential to gain and retain broad public acceptance. We need mechanisms that provide trusted evaluations of the linkage between actions and goals along with the ability to suggest change as needed. Creation of third-party oversight as a regular part of forest restoration would go a long way toward this goal.

Our Participation in the Pilot Effort

We envision four parts to our participation in the pilot effort in addition to helping plan and participating in the Secretary of Interior's meeting on December 8, 2010:

1) Assist in evaluating proposed pilot areas that will provide a landscape-level demonstration of ecological restoration in southwest Oregon within the context of NSO recovery and other relevant issues. At least one of these areas should also provide the opportunity to explore activities in Moist Forest;
2) Assist in the landscape design of restoration treatments to apply to the pilot areas, working cooperatively to develop criteria for determining which stands to treat and which to leave

untreated, including considerations related to NSOs; and using the criteria to help develop alternative landscape designs for treated and untreated stands within each pilot landscape;

3) Assist in identifying high priority stands for restoration treatments in each pilot area in the context of the landscape designs, suggesting marking guidelines for representative plant associations and stand structures, including trees for retention and removal, and describing the effects of treatments; and
4) Assist in developing an adaptive management plan for the pilot areas, including monitoring parameters and a review process for determining the success of treatments.

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