CASE STUDY

The Pilot Joe Project: Dry Forest Restoration in Southwestern Oregon

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The US Department of the Interior (USDI) Bureau of Land Management (BLM) has recently begun to develop new resource management plans (RMPs) for western Oregon.[1] In doing so, the BLM has specifically sought out a range of viewpoints and suggestions on new and innovative approaches to the management of their timberlands in western Oregon. One aspect of management being considered is the ecological forestry approach of Franklin and Johnson (this volume). The Pilot Joe Project, planned in 2011 and implemented in 2012, was designed under the conceptual framework of Franklin and Johnson's Dry Forest restoration strategy. This demonstration project integrates ecosystem restoration, conservation of northern spotted owl (NSO) habitat, and commodity production over portions of the Middle Applegate watershed, an 80,000-ac landscape that is approximately 62% under control of USDI BLM. The rugged Middle Applegate landscape has cool, moist winters and hot, dry summers. Annual precipitation is 25–35 in. (varying with elevation), with less than 10% occurring from June through September. Because of these moisture limitations, slight changes in aspect and soil type dramatically affect forest productivity—cooler, moister north-facing slopes are typically covered by dense coniferous forest, while hot, dry south-facing slopes are usually dominated by hardwoods, shrubs, and grass. In the past, fire was the major disturbance agent affecting these plant communities. Alteration of historic fire regimes has allowed the proportion of Douglas-fir and dense closed-canopy forests to significantly increase, threatening old trees and increasing the possibility of crown fire. Hence, specific goals of this project included increasing the resistance and resilience of forests to wildfire, drought, and insects by reducing stand densities and ladder fuels; shifting species composition from the current dominance of Douglas-fir (*Pseudotsuga menziesii*) to include more ponderosa pine (*Pinus ponderosa*), sugar pine (*Pinus lambertiana*), California black oak (*Quercus kelloggii*), and Pacific madrone (*Arbutus menziesii*); and conserving and improving the survivability of older trees (more than 150 years).

The Pilot Joe Project is the first "learning" and demonstration phase of a multiyear effort by BLM to apply the Franklin–Johnson approach within the Middle Applegate watershed. Fundamental to the success of this project was the ability to move forward on the treatments in a timely fashion. The relatively small size (890 ac) of Pilot Joe allowed it to be implemented more rapidly than a larger project that would take several years to plan and deploy—it was brought from public scoping to a sold timber sale in 8 months. Building stakeholder confidence was also needed to facilitate the process, so transparency was key—the BLM created and maintains a website[2] for the Middle Applegate to post all meeting notes, official reports, National Environmental Policy Act of 1969 documents, and other related material for rapid, easy access to any interested party.

Public participation was also critical to its success—extensive involvement occurred during the planning and development of Pilot Joe. More than a dozen field trips and public meetings were held to discuss, evaluate, and prioritize sites and conditions for treatment (Figure 1). Two in-depth meetings were held with the general public to specifically discuss the pilot goals and solicit criteria to be used for selection of forest stands to show the Franklin–Johnson restoration approach. Majority support existed for prioritizing treatment units most at risk to loss from wildfire, insects, or disease, especially those stands that could be accessed via the existing road network.

Although there was general support for restoration forestry, there were many concerns. For example, some participants were very concerned about new road construction and skeptical that commercial harvest could be done while protecting residual stand characteristics such as large oak trees. Others felt restoration forestry does not provide high enough economic return. Developing partnerships outside of the agencies helped considerably. In the case of the Pilot Joe Project, the Apple-

Figure 1. One of numerous meetings with the public on the Pilot Joe Project including a field trip to evaluate the pretreatment forest conditions to be modified. (Photograph courtesy of Gary Gnauck.)

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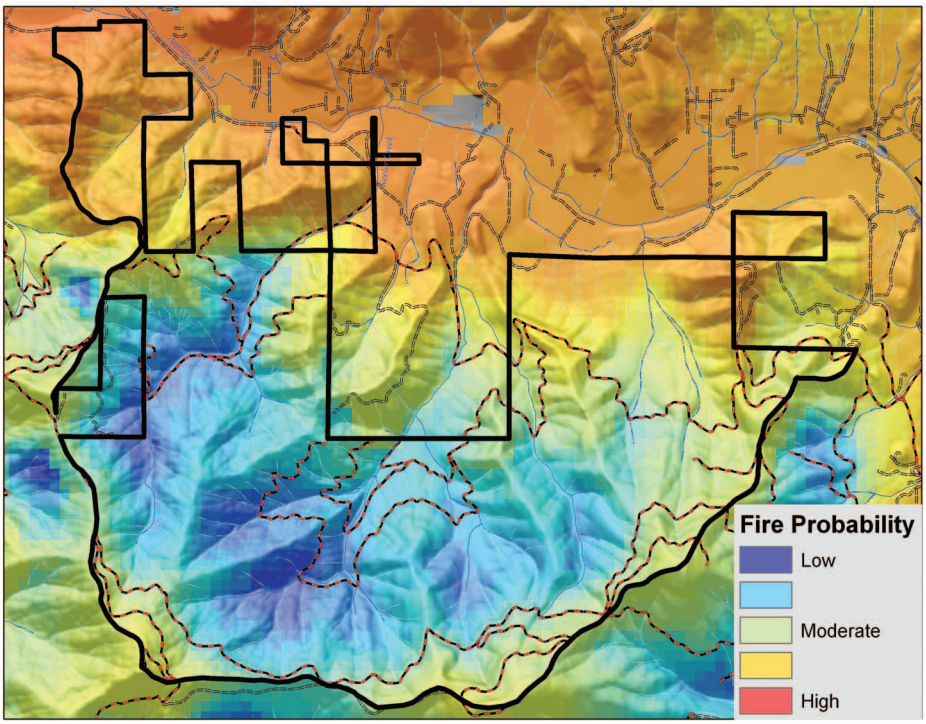

Figure 2. Predicting the relative probability of fire across the Pilot Joe landscape, with areas more likely to receive fire in yellows to oranges, and areas more likely to be free of fire in blues. Forest cover in the blue areas are more likely to persist long term on the landscape. This map influenced the areas selected for retention of important NSO habitat and the choice of restoration units where treatment would reduce fire threat to this habitat (Figure 3).

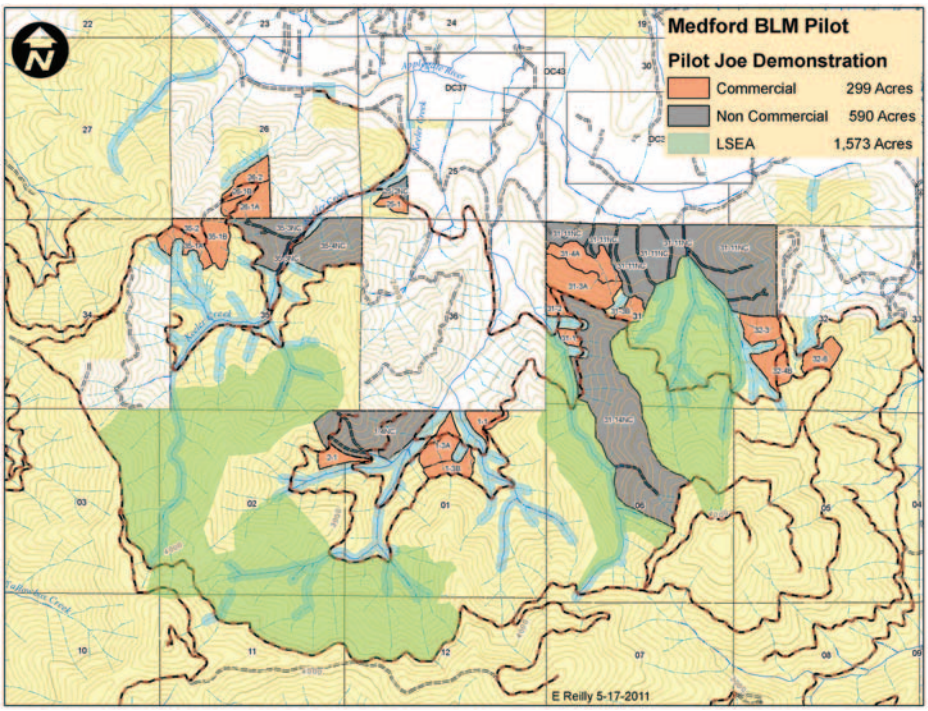

Figure 3. An overview of the areas selected for demonstration of the ecological restoration work in the Pilot Joe Project. The LSEA provide large blocks of dense, older forest cover for species such as NSO. The majority of the restoration thinning is located strategically downslope and adjacent to the LSEAs.

gate Partnership and the Southern Oregon Forest Restoration Collaborative were strong participants.[3] These local groups, with membership from industry, environmental, and other community interests, were supportive of the projects goals. In fact, they were instrumental to the success of the project development and public review process—e.g., the Partnership and Collaborative organized and facilitated meetings side-by-side with the BLM. Having local community members make presentations and facilitate meetings provided a different tone to the proceedings than the usual meetings run solely be federal agency staff.

Once the public scoping of the Pilot Joe Project was conducted, the treatments needed to be designed, planned, and implemented in the field. One of the first steps in landscape planning involved the identification of that part of the landscape to be retained as denser forest patches needed by some biota, particularly the NSO and its prey species. With the assistance of the US Fish and Wildlife Service (USFWS), a predictive mapping effort for relative habitat suitability[4] identified areas that may be expected to support high-quality mature and late-successional NSO habitat well into the future. Fire probability modeling suggested areas where important habitat would be less likely to be lost in wildfire and strategically placed thinning and fuels reduction efforts would reduce or slow fire spread (Figure 2). With the addition of historical NSO patterns of use, contiguous patches of 300–500 ac were identified and selected as "Late Successional Emphasis Areas" (LSEA). The restoration thinning areas targeted stands to reduce the threat of fire spreading uphill into the LSEAs (Figure 3).

Before any ground-disturbing action, federal agencies are required to consult on the potential effects to Endangered Species Act listed species. After review of the Pilot Joe Project design, USFWS issued a biological opinion for the project supporting a strategy that protects important NSO habitat in landscape positions likely to be maintained over the long term even though this meant degrading some existing NSO habitat in areas with density reduction thinnings.[5] This opinion recognized that the long-term benefits of restoration (e.g., enhancing growth and vigor, reducing fire threats, and shifting to more desirable species mix) exceeded the short-term negative impacts of modifying some owl habitat.

The silvicultural prescriptions for the project were designed to move the current crowded, uniform forests (Figure 4) to conditions that are more open and spatially heterogeneous (clumpy) in nature, with a diversity of age classes and species (Figure 5). Stands with both sawlog-sized material to be removed as well as younger stands and stands with noncommercial species were identified for treatment. Prescriptions typically removed 5–10 mbf/ac, depending on site productivity and tree size.[6] Most trees removed were from 8 to 24 in. dbh, with the majority at the lower end of this size range. Mapping of plant associations was done to establish appropriate basal area retention targets matched to individual site productivity. Thinning prescriptions for Douglas-fir–dominated stands generally reduced basal areas to around 100–120 ft^2/ac from pretreatment levels that often exceeded 200 ft^2/ac. Gaps of 0.5–2 ac were created to provide sites for establishing pine regeneration and other understory components. These gaps are not complete openings but rather were heavily thinned (down to 20–30% canopy cover) to provide sufficient light and moisture for regeneration of sun-loving species.

Harvest operations primarily used a 50-ft tower cable system and whole tree yarding, leaving tops attached. A stroker/delimber with a processing head removed branches and cut whole trees to mill specified lengths. Approximately 15% of the acreage within harvest units was designated as untreated "skips" to provide denser forest patches for shadier and moister microenvironments, hiding cover, visual barriers, and undisturbed soil areas. Ecologically significant features, such as seeps, rock outcrops, snag patches, large down wood, and hardwood groves were used to help identify skips, which were marked with flagging to exclude logging equipment and yarding activities. Careful coordination was needed to locate skips in places that would not impede harvest operations—the timber sale administrator, wildlife biologist, and silviculturist worked together to locate skips and integrate needs of the three disciplines. Although the early designation of skips generally worked well, there were places where the harvest operations could not completely reach trees to be removed without impacting a skip. In those cases, modification of the skip was required during harvest operations.[7]

In addition to the timber harvest, thinning of younger, noncommercial-size trees within harvest units was performed to achieve desired species mix and stand densities in all age classes. A silviculturist and fuels specialist worked together to design treatment prescriptions and develop contract language to achieve the desired goal. In all treatments, thinning was performed to variable densities and not to a uniform spacing. Young tree thinning material along with tops and limbs still remaining after harvest

Figure 4. A uniform stand of Douglas-fir encroaching on an old black oak. (Photograph courtesy of Ed Reilly.)

Figure 5. The immediate postharvest result at the Pilot Joe Project, with mature sugar pine, black oak, and madrone "legacies" retained and most young Douglas-fir removed. The hand-piled logging slash in a prescribed gap will be burned in the wet season. (Photograph courtesy of Ed Reilly.)

were hand piled and will be burned in the wet season. Follow-up maintenance underburning will be performed in the near future in areas where it can be achieved safely.

Postharvest monitoring is an important component of this project (Figure 6). Numerous issues and concerns brought up in public meetings are being evaluated through a rigorous multiparty monitoring effort that includes field sampling as well as interviews with key stakeholders, agency personnel, and local community members. A set of indicators including ecological factors across multiple scales, economic and contracting efficiencies, and public understanding and acceptance of the project goals and outcomes are currently being measured.[8] Detailed pre- and posttreatment plots have been installed with numerous repeat photo points. A case study of logging systems, layout, and contracting is planned after final timber sale contract completion.

Pilot Joe represents a step forward in the implementation of larger landscape restoration efforts in the dry forest, with the lessons of this effort helping to influence additional larger dry forest projects across the region. The second phase (Pilot Thompson) of the larger Middle Applegate Project is currently under development and is expected to produce an Environmental Assessment in late 2012 and a timber sale in 2013. Not surprisingly, there continues to be skepticism from certain interest groups as to the value of this approach. Some in the timber industry feel there should be more emphasis on production forestry while conservation interests question the use of "high impact" logging methods and heavy equipment. Given that it sold for $152/mbf, economically restoring the dry forests of the Middle Applegate is not without challenges. Logging and transportation costs for stands with the majority of the material in the 8- to 14-inch size and long-reach cable yarding can exceed the value of the sawlogs removed. Finish work to reduce harvest slash, thin younger residual trees, reduce fuel ladders, and pile and burn the material can approach $600–900 an acre. Significant investment is needed in stands with no commercial-size trees or species to create conditions that will allow development of desired species mix and accelerate growth and reduce fire threat. However, I believe that the Pilot Joe Project achieved a good balance between restoring forest densities and species mix, reducing threat of destructive wildfire, providing local jobs, and 1.5 million bd ft of wood products, while also addressing the conservation needs of the NSO and other species.

Figure 6. The visual characteristics of postharvest landscape at the Pilot Joe Project. Note that the steep terrain and limited road access required long yarding corridors (up to 1600 ft). (Photograph courtesy of Ed Reilly.)

Endnotes

1. RMPs for Western Oregon webpage: www.blm.gov/or/plans/rmpswesternoregon/index.php.
2. www.blm.gov/or/districts/medford/forestrypilot/.
3. More information on the Applegate Partnership (www.applegatepartnership.org/) and the Southern Oregon Forest Restoration Collaborative (www.pacrimrcd.org/Page.asp?NavID=313) can be found online.
4. See Appendix C of the 2011 Revised NSO Recovery Plan: www.fws.gov/oregonfwo/Species/Data/northern spotted owl/Recovery/Library/Documents/NSORPDraftAppendixC.pdf.
5. The USFWS Recovery Plan for the NSO (www.fws.gov/oregonfwo/Species/Data/northern spotted owl/Recovery/) recognizes that broad ecosystem health is important for a variety of species and active management is needed to restore and maintain forests within the range of the owl.
6. Minimum merchantable tree size is 8 in. dbh. An average of 8 mbf/ac was cut in the Pilot Joe timber sale.
7. BLM timber sale contracts require the sale administrator to approve all operator cable corridors in advance. In future contracts, it may be advantageous to use a similar approach and have the contract logger work in partnership with the BLM sale administrator to locate skips during cable corridor designation.
8. A complete list of indicators can be found at www.blm.gov/or/districts/medford/forestrypilot/files/pijo_moco_obj_indic_91211.pdf.