RESPONSE

Ecologically Based Management: A Future for Federal Forestry in the Pacific Northwest

Jerry F. Franklin and K. Norman Johnson

In their opinion piece, DellaSala et al. (2013) (hereafter, called the “Critique”) offer a miscellany of criticisms of the peer-reviewed article in which we proposed some restoration strategies for federal forests in the Pacific Northwest (PNW) (Franklin and Johnson 2012). We respond below to aspects of their critique, primarily what they view as our major “ecological shortcomings.” Their assertions regarding potential negative impacts of our proposals on the northern spotted owl (NSO) are addressed by Henson et al. (2013).

Ecological Forestry

Ecological forestry (EF) is conceptually based on utilizing processes and conditions characteristic of natural forest ecosystems as models for forest management and is not defined by a specific silvicultural practice or management proposal, which the Critique apparently does not recognize. EF differs fundamentally from prescription forestry (PF), which is conceptually grounded on agro-economic models constrained by economic considerations (Table 1).
The hierarchical structure of EF in which specific silvicultural attributes are grounded in the general ecological attributes of forest ecosystems is illustrated in Table 1 and contrasted with practices and attributes of PF. In general, management approaches using EF principles do not attempt to optimize singular outcomes but, rather, integrate multiple ecological, economic, and cultural objectives. As such, EF provides a philosophical basis for management; management proposals can be judged as to whether or not they are philosophically consistent with EF.

Northwest Forest Plan

The Northwest Forest Plan (NWFP) is described as a “global model of ecosystem management and biodiversity [protection]” in the Critique and represented as an undeviating guide to federal forest management since its adoption in 1994. In fact the NWFP was never implemented as written and almost immediately began undergoing alterations in interpretation and agency practices (Thomas et al. 2006). Regeneration harvests of mature and old-growth forest in the Matrix, which were a foundational element of the NWFP, were litigated, eventually leading agencies to quietly adopt a “thinning only” strategy of timber harvest.

New provisions in the NSO recovery plan and critical habitat designation (USDI Fish & Wildlife Service 2011, 2012) effectively represent major revisions in the NWFP.

Hence, we view the Critique’s claim that “pressures for change in the NWFP are recent and solely in response to economic concerns” as nonsense! Essentially all of the significant changes in the NWFP have involved increasing ecological protections and restricting timber harvests, such as by greatly reducing the area actually available for sustained timber harvests. We do not judge the merits of these changes but their reality must be acknowledged in any discussions about the NWFP.

Recognizing Forest Diversity in Policy

The distinction between dry forests and moist forests of the PNW is identified as first among our ecological shortcomings in the Critique. We viewed this distinction as the critical starting point for any national policy regarding retention of old-growth forests because: (1) active management is imperative to restore and sustain old forests on many sites with natural disturbance regimes of frequent low- to mixed-severity wildfire (our dry forests, or DFs); in contrast, (2) active management is generally unnecessary and even potentially destabilizing in existing old-growth forests growing on sites characterized by infrequent high-severity wildfires (our moist forests, or MFs). Further, our proposed policy for active management of DFs is permissive, meaning that managers would be allowed (but not required) to actively restore DFs, depending on such variables as their condition and landscape context.

Of course, a “simplistic binary classification” of forests without further elaboration would be inadequate so we identified and assigned each of the several hundred, geographically relevant and scientifically documented plant associations and habitat types to MF or DF categories. This approach explicitly recognizes the diversity of forest types and conditions and the intricate landscape-level mosaics of forest, habitats, and disturbance regimes in a way that is appropriate in federal legislation and it provides managers with needed flexibility in applying the management strategy so that they can tailor it to site-specific considerations. In addition we strongly urge managers to do on-the-ground surveys to identify plant associations that are present and their distribu-

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Table 1. Conceptual basis and some exemplary elements of ecological forestry in contrast with those of production forestry.

<table>
<thead>
<tr>
<th>Ecological forestry</th>
<th>Production forestry</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Conceptual basis</strong></td>
<td><strong>Conceptual basis</strong></td>
</tr>
<tr>
<td>Utilizes ecological models from natural forest systems as basis for managing forests</td>
<td>Utilizes agronomic models combined with economic models as basis for managing forests</td>
</tr>
<tr>
<td><strong>Exemplary philosophical contrasts</strong></td>
<td><strong>Exemplary philosophical contrasts</strong></td>
</tr>
<tr>
<td>Maintains full array of ecosystem structures, functions, and biota at larger spatial scales</td>
<td>Maintains limited set of ecosystem structures, functions, and biota consistent with economic goals except where legally required to do more</td>
</tr>
<tr>
<td>Tends to increase management and societal options</td>
<td>Purposely limits management and societal options in pursuit of high economic returns</td>
</tr>
<tr>
<td>Values complexity and heterogeneity</td>
<td>Values simplicity and homogeneity</td>
</tr>
<tr>
<td><strong>Exemplary definitional elements of ecological forestry</strong></td>
<td><strong>Exemplary definitional elements of ecological forestry</strong></td>
</tr>
<tr>
<td>Provides for continuity in structure, function, and biota between forest generations</td>
<td>Creates discontinuity in structure, function, and biota between forest generations</td>
</tr>
<tr>
<td>Utilizes natural stand development models, including effects of disturbances, in developing silvicultural prescriptions</td>
<td>Utilizes agronomic models in developing silvicultural prescriptions</td>
</tr>
<tr>
<td>Spatial heterogeneity at stand and landscape levels is typically a goal</td>
<td>Spatial uniformity at stand and landscape levels is goal</td>
</tr>
<tr>
<td>Considers and incorporates impacts of natural disturbances</td>
<td>Attempts to eliminate or evade potential for natural disturbances</td>
</tr>
<tr>
<td><strong>Exemplary attributes of silvicultural systems and prescriptions</strong></td>
<td><strong>Exemplary attributes of silvicultural systems and prescriptions</strong></td>
</tr>
<tr>
<td>Multi- or uneven-aged management regimes</td>
<td>Even-aged management regimes or economic selection on low-production sites</td>
</tr>
<tr>
<td>Incorporates biological legacies into all regeneration harvest treatments</td>
<td>Does not incorporate concept of biological legacies except as legally required</td>
</tr>
<tr>
<td>Variable-density thinning practices</td>
<td>Uniform density thinning practices</td>
</tr>
<tr>
<td>Retains woody debris and defective trees and structures</td>
<td>Eliminates coarse wood and defective trees and structures</td>
</tr>
</tbody>
</table>

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Thomas et al. 2006. Regeneration harvests of mature and old-growth forest in the Matrix, which were a foundational element of the NWFP, were litigated, eventually leading agencies to quietly adopt a “thinning only” strategy of timber harvest.
tion rather than depending on generalized maps.

Defining Old Forests

Policy decisions about federal forests are ultimately social decisions, including decisions about which forests should be reserved from timber harvest. Goals in a policy analysis are to analyze an array of possible alternatives without prejudice. Hence, we used three different ages at which MFs might be declared “old” and reserved from harvest. All three ages—80, 120, and 160 years—have been part of the social dialogue (Johnson et al. 1991, Johnson and Franklin 2009, Johnson and Franklin 2012) and their disposition on NWFP land allocations available for harvest (Matrix and Adaptive Management Areas) intensely debated. We were members of a congressionallychartered committee (Johnson et al. 1991) that first identified 80 years as the age when forests began to exhibit some “late successional attributes” and documented that mature forests (80–200 years old) are relatively common on federal lands in the PNW. Large areas of such forests are incorporated into the Late Successional Reserves of the NWFP. Further, Recovery Actions 10 and 32 in the recovery plan for the NSO (USDI Fish & Wildlife Service 2011) are likely to result in retention of many forests in the 80–160 year age range. Given all of these circumstances, we suggested that MF variable-retention regeneration harvests focus primarily on younger forests, with retention of any trees 150 years when they occur in younger stands subject to harvest. In any case, we reiterate that the disposition of these mature forests is a social decision.

We certainly do propose restoration treatments of DF stands that have individual trees >150 years and, indeed, often argue that stands containing these older trees should be high priorities for restoration since the old trees in these stands are often at high risk of accelerated mortality (Franklin et al. 2013). Our DF strategy is a landscape-level approach in which approximately one-third of the landscape is retained in denser patches and all older trees in the remaining two-thirds are not only retained but nurtured (by reductions of fuels and competition) to increase their longevity. Our proposals are largely consistent with the DF strategy adopted in the NSO recovery plan (USDI Fish & Wildlife Service 2011).

Impacts to Aquatic Ecosystems

The Critique charges that our proposed timber harvesting program will “. . . create a need to maintain or expand the already extensive road system,” which would presumably have undesirable impacts on aquatic ecosystems. In fact, resumption of regeneration harvests would almost certainly result in less road-related impacts than the extensive thinning programs apparently favored by authors of the Critique (e.g., proposals of Kerr 2012). Thinning programs not only require a much greater mileage of road per unit of wood harvest but also produce much lower stumpage returns, resulting in fewer dollars being available for maintenance or closure of roads.

Baselines for Dry Forests

The Critique appears to lump all DFs into the category of “mixed severity fire regions.” Our restoration strategy for the DF landscapes in eastern Oregon is detailed in Franklin et al. (2013). Included in the DF category are ponderosa pine, dry mixed-conifer, and moist mixed-conifer forest types with more detailed specification by specific plant associations. We again note that active management of such forests is optional and not mandatory under our proposals, providing managers the flexibility to respond as appropriate to individual plant associations, stand conditions, landscape contexts, and management goals.

Our baseline includes analyses of historical timber cruises of the Klamath and Warm Springs Reservations (Hagmann et al. 2013, Hagmann 2013). It is clear from this revealed historical baseline that pine and dry and moist mixed-conifer forests were low-density stands dominated by large diameter ponderosa pine. It is also clear from the historical cruises that Baker’s (2012) attempted reconstructions in these two locations grossly overestimate historical stand densities.

We agree with the Critique that there is high forest diversity in southwestern (SW) Oregon, including Oregon’s portion of the Klamath–Siskiyou (KS) region but in subsequent discussions the Critique largely treats SW Oregon as a singularity (i.e., a region of mixed-severity wildfire). In fact, conditions vary from coastal areas, which are clearly MF with infrequent severe wildfire regimes, to dry interior river valleys, where natural frequent wildfire regimes dominated (DF).

Great care is, therefore, required in characterizing conditions in SW Oregon on both local and larger scales. The Critique cites several studies from the Klamath National Forest, which is in moistier portions of the KS region, and not applicable to interior valleys in SW Oregon. A cited study of lake sedimentation (Colombaroli and Gavin 2010), which is used to infer widespread occurrence of mixed-severity wildfires, lies in a watershed that is dominantly MF, where such fires would be expected. After visiting more than 50 locations, we have found that many DF sites in the interior valleys of SW Oregon are occupied by maturing (<150 year old) Douglas-fir forests, which appear to be the first generation of closed-canopy conifer forests on these sites. This interpretation is consistent with recent fire history studies in the Applegate River drainage.2

As before, we conclude that research and management in SW Oregon requires close attention to local environmental conditions and a highly adaptive approach so as to create and incorporate additional understanding of this complex region.

High-Quality Early Seral Ecosystems

The Critique charges that we failed to recognize natural pathways to “complex early seral forests.” First, we need to clarify that the issue is about high-quality early seral ecosystems (ESEs), not “complex early seral forests;” the ESEs that characterize the initial period following a disturbance are not forests (ecosystems dominated by trees) but ecosystems dominated by diverse plant life forms—cryptogams, herbs, shrubs, and individual trees. Second, while we agree that ecological forestry can provide conceptual approaches to producing “. . . timber volume while creating early seral habitat,” such a goal is certainly not a “tenet of ecological forestry”!

Cessation of postfire logging could provide high-quality ESEs as noted in the Critique and we have opposed salvage logging on MF sites where primary management goals are ecological, such as on much federal land (e.g., see Lindenmayer et al. 2008). ESEs are the ecologically critical first stage in the multcentury successional sequences or seres that develop on MF sites in the PNW. The ESEs arguably sustain the highest biodiversity of any stage in the sere
by a variety of measures; this biodiversity includes many ESE habitat specialists as well as ecosystem processes weakly represented elsewhere in the sere (e.g., accretion of nitrogen stocks) (Swanson et al. 2011). Consequently, ESEs need to be predictably and adequately represented in time and space, and, just as with old-growth forests, the only landownership on which high-quality examples of such ecosystems can reliably be provided are federal lands. Hence, we argue that provision of ESEs is a goal that needs to be incorporated into federal management plans and suggest achieving this by a program of variable retention regeneration harvests with adjustments periodically made for ESEs created by natural disturbances.

The Critique’s assertion that ESEs were “ephemeral” is inaccurate. ESEs typically persisted for several decades. For example, the duration of Douglas-fir establishment in natural stands throughout the Douglas-fir region—a useful index to persistence of ESE conditions—averaged 50–60 years in two independent studies of natural Douglas-fir-dominated stand establishment (Tepley 2010, Freund 2013).

Conclusion

Our proposals are motivated by ecological goals and the desire to see that all management of federal lands is ultimately based on ecological principles. However, we admit to seeking solutions that provide economic as well as ecological benefits in the belief that such approaches represent the only viable future for federal forest lands. We also admit to raising the issue of whether society wishes for forestry to have a continuing and active role in management of the federal forests of the PNW. If so, we have suggested some ways for forestry to play that role that integrate ecological, economic, and social values. If raising these issues increases tensions over management of federal lands, so be it; the time for this discussion is long past!

Endnotes

1. Moist forest plant associations as modeled in Johnson and Franklin (2009 and 2012).
2. Comfort, E., C.J. Dunn, J.D. Bailey, J.F. Franklin, and K.N. Johnson. (Manuscript in development). Disturbance history and ecological change in a coupled human-ecological system of southwest Oregon, USA.

Literature Cited


