Institute for Natural Resources White Paper

Protection strategies in an ecosystem dynamics framework
Recommendations from May 21, 2009 seminar

Executive summary

- For species that risk extinction absent active management (such as prescribed fire) on private lands, regulatory agencies should consider foregoing regulation that makes desired species a liability for landowners, and instead devote agency resources to educational programs and collaborative conservation partnerships with landowners.
- Animal behavior, such as wolf predation behavior, is an important ecological process that may, among other things, help improve the health of degraded aquatic systems. The effects of re-colonization of Oregon by wolves should be monitored. Monitoring results should be used to adjust the population levels and distribution of wolves envisioned by the Oregon Wolf Management Plan to achieve ecological goals. Beaver reintroduction will also benefit aquatic systems.
- "Protecting" species and habitat in reserves or protected areas will succeed only if protected areas are managed to provide for the disturbance processes that perpetuate desired habitat and associated species. For instance, on federal lands there needs to be more active management of some reserves and riparian areas in order to "protect" the species that depend on these areas.
- Conservation of forest habitat and associated species will require regional-scale planning that restores spatially complex, heterogeneous landscape patterns.

Introduction

This paper synthesizes information from a May 21, 2009 seminar convened by the Institute for Natural Resources (INR) to discuss protection of species and habitat in an ecosystem dynamics framework, as well as other research conducted by INR's team of Oregon University System (OUS) and US Forest Service (USFS) principal investigators.[1] The seminar involved 79 individuals, including the INR team, other members of the OUS community including faculty and students from a variety of fields, state and federal natural resource managers, private timberland managers, non-governmental organizations and the interested public. This was the fourth of four seminars INR has convened for the Oregon Department of Forestry (ODF) and Department of Environmental Quality (DEQ) as part of a multi-year Dynamic Ecosystems Project that is investigating the policy implications of ecosystem dynamics.[2] The seminars and resulting white papers will inform the final step in this project: a policy summit and final policy paper.

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[1] The team consists of John Bailey (OSU), Barbara Bond (OSU), Sally Duncan (INR), David Hulse (UO), James Johnston (INR), Gordon Reeves (USFS), Brent Steel (OSU), and Fred Swanson (USFS). Presenters at the Seminar were Jerry Franklin (UW), Paul Hessberg (USFS), Norm Johnson (OSU), Adam Novick (UO), Bill Ripple (OSU), and Tom Spies (USFS).

[2] A description of the Ecosystem Dynamics Project and INR's 2008 synthesis paper can be found at http://www.oregon.gov/ODF/STATE_FORESTS/FRP/RP_Home.shtml#Dynamic_Forest_Ecosystems.

Globally, there is enormous anthropogenic stress on natural resources. Hundreds of thousands of species have gone extinct, most often as a result of habitat loss. There is strong public support in Oregon for protecting forests and other ecological communities from actions that diminish the services they provide such as habitat for iconic species like salmon and spotted owls. These services, however, are themselves a function of change—often dramatic change—in response to disturbance processes. Protecting forests and other ecological communities from extractive activities and placing them in reserves or protected areas is frequently cited as a way to protect biodiversity, but this strategy will only succeed if the *processes* that drive the desired forest structure, composition and function are maintained. In many cases, maintaining processes will require active management.

Managing maintenance-dependent species

"Historically, society has indiscriminately equated conservation with limiting human disturbance of land."
—Adam Novick

Many of the best-known threatened and endangered species are put at risk by specific management actions. Wolves, for instance, are threatened primarily by animal control efforts. Other species risk extinction from a lack of specific management actions. For instance, many Willamette Valley prairie species such as Fender's blue butterfly, Kincaid's lupine and Willamette Daisy depend on early seral habitats that were historically maintained by frequent anthropogenic fire. Today, these species are at risk from a lack of management action, i.e., fire to maintain savannah habitat, as well as from invasion of exotic vegetation (USFWS 2006).

The current policy framework, which includes Oregon's Statewide Planning Goal 5 and the Endangered Species Act, is designed primarily to halt degradation of habitat by human action, and is not necessarily well suited for promoting the land management actions required for perpetuating these "maintenance-dependent" species. Engaging landowners in learning forums about conservation of maintenance-dependent species habitat is likely to be more effective than regulation that makes these species a liability for landowners. Research indicates that there is often a lack of knowledge of the importance and value of Willamette Valley prairie conservation, and that the threat of regulation may discourage landowner participation in collaborative programs and from making use of technical assistance from agencies (Fischer 2006; Fischer and Bliss 2008).

Where species are at risk of extinction by lack of management activity on private lands, regulatory agencies should consider foregoing regulatory actions that would turn these species into a liability for landowners, and instead devote agency resources to educational programs and collaborative conservation partnerships with landowners. Expanding Safe Harbor Agreements and Candidate Conservation Agreement programs under the ESA section 10(a)(1)(A) may accomplish this aim.

Animal behavior as an ecological process

"The risk of predation is a huge driver of biodiversity."
—Bill Ripple

INR's work on the Dynamic Ecosystems Project has emphasized management that perpetuates desired ecological processes, such as disturbance processes like fire. One important ecological process that maintains ecosystem services like aquatic habitat is wolf predation behavior. Wolves are responsible for "trophic cascades" that have significant and unexpected ecological impacts. For instance, wolves exert a strong top-down control over the behavior of browsing animals like elk, discouraging them from loitering in riparian areas and removing riparian vegetation like willows. Research has shown wolf reintroduction to help reverse degradation of stream systems by re-establishing riparian vegetation (Halofsky *et al.* 2008).

These findings have important policy implications. The lack of large predators may have significantly altered successional patterns of vegetation, caused vegetation regime shifts, led to the loss of biodiversity, and negatively impacted salmon habitat (Beschta and Ripple 2008). Reintroduction of wolves may facilitate restoration of critical habitat components.

The Oregon Wolf Conservation and Management Plan calls for restoration of at least four breeding pairs of wolves each in eastern Oregon (defined as east of Hwy. 97) and western Oregon. The Oregon Department of Fish and Wildlife, the Oregon Department of Forestry, and the Department of Environmental Quality should launch a joint monitoring program that characterizes the response of different ecological systems, including stream systems, to the presence of wolves and adjust the population levels and distribution of wolves in response to monitoring results.

Wolves are not the only species that exerts a strong influence over the habitat that native assemblages of species depend. Beaver have been found to reduce water velocity in streams, improve stream flow in dry periods, lower summer stream temperatures, capture sediment, and increase salmonid production from streams (NOAA Fisheries 2007 and Leidholt-Bruner *et al.* 1992). The Department of Agriculture currently classifies beaver as a predator and allows them to be killed without a permit. This policy should be revisited, and large-scale re-introduction efforts undertaken.

Old growth, the future of reserves, forest patterns and processes

"Every sweeping forest policy has unintended consequences."
—Tom Spies

The Northwest Forest Plan (NWFP), the primary federal land management strategy for conserving old growth and old growth dependent species in western Oregon, serves as an example of both the successes and failures of reserve strategies in an ecosystem dynamics context. In moist forest types, a dominant disturbance process is long-interval stand

replacing wildfire. The network of Late Successional Reserves (LSRs) established by the Plan are well configured to accommodate these types of stochastic events and maintain desired old forest conditions over any foreseeable temporal and spatial scale, because 1) the size of individual reserves are large or larger than typical stand replacing fire events; 2) reserves are well distributed over a very large geographic area (including 10 degrees of latitude and 14,000 feet of elevation); 3) the reserves are connected via a riparian reserve network, and, 4) the plan provides direction to maintain legacy features during timber harvest in non-reserved areas, providing further connection between reserves.[3]

More frequent and mixed severity fire dominates the drier forest types most prevalent in the southern and eastern portions of the NWFP area. Older forest conditions are unlikely to persist at desired levels absent significant active management of reserves to reduce fuel accumulation that is skewing disturbance patterns in these forests towards larger stand replacing fire events. Although management direction allows thinning to reduce fuels in LSRs, federal managers have so far declined to accomplish the amount of thinning that is necessary for dry forest LSRs to perform their intended function on the landscape. This work may require subsidies in order to be completed in a timely manner. Tools and methodologies for balancing species conservation and fuel reduction objectives are described in INR's white paper about fire and fuel management (INR 2009b).

Moist forest reserves can also benefit substantially from active management, particularly thinning in young forest plantations to accelerate development of late successional conditions and enhance landscape level diversity (Davis *et al.* 2007). A range of forest structure throughout the NWFP area—including post-fire early seral structure—should be a goal of management.

An important failure of NWFP implementation is a blanket hands-off approach to managing riparian areas. Riparian areas were historically diverse in structure and composition in response to disturbance, and a failure to manage homogenous young riparian areas may undermine the functionality of riparian reserve networks (INR 2009a). Active management to achieve the ecological objectives of riparian areas, including thinning in young forest to speed recruitment of large wood, was a goal of the NWPF, but this work has been accomplished in very few cases.

"Protecting" species and their habitats requires consideration of landscape scale ecological processes and the patterns of forest structure and composition that result from these processes. In eastern Oregon, topography created "fences and corridors" that historically controlled the pattern of disturbance, leaving a complex, spatially heterogeneous mosaic of forest structure. Past and current forest management, including harvest of old, fire resistant trees, fire suppression, and livestock grazing, are removing these fences and corridors, creating large areas of high mortality after fire and a more homogenous landscape pattern.

[3] Including Congressional designated wilderness, riparian areas, administratively withdrawn areas, more than 80% of the Northwest Forest Plan area is dedicated to conservation purposes.

Reversing these trends will require a robust program of active management built around mechanical thinning and prescribed fire to reduce forest density. These efforts need to be informed by regional planning and analysis.[4] Performance evaluations of federal land management agencies need to be based on accomplishment of ecological objectives.

Current management of eastside forests is focused on reducing fuels in the wildland urban interface and is constrained by diameter limits. INR's fire and fuel management white paper discussed appropriate methodologies for restoring desired ecological processes via thinning and fire in dry forest types (INR 2009b). In summary, practices that re-establish desirable processes like fire are necessary to protect species and habitat over time. Diverse landscape patterns are likely to best protect the largest range of species over time, particularly in the face of climate change (Haeussler and Kneeshaw 2003, Hobbs 2004, and Wallington 2005).

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[4] See http://www.icbemp.gov/

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