The Applegate Adaptive Management Area Ecosystem Health Assessment

Thomas Atzet[1]

Abstract.—As requested by the Applegate Partnership, the Medford District Bureau of Land Management, the Rogue River and Siskiyou National Forests, a team of six specialists (Dr. Tom Atzet, USFS ecologist, Dr. Mike Amaranthus, PNW soil scientist, Dr. Don Goheen, USFS pathologist and entomologist, Tom Sensenig, BLM silviculturist, Dr. Dave Perry, Oregon State University conservation biologist and Dr. Kevin Preister, Rogue Institute of Ecology and Economy, social anthropologist, Sue Rolle and Dr. Diane White coordinated the effort and edited the manuscript respectively) were given two weeks to assess ecosystem health of the Applegate Adaptive Management Area using existing information. The assessment sets context for provincial scale processes and *watershed analysis*. It includes historic, current and future desired ranges of conditions, research and monitoring strategies, findings and recommendations. The assessment integrates goals and objectives of the Applegate Partnership, the President's Plan and Record of Decision, the Regional Ecological Assessment Report and forest and district land use planning documents. The team found stand densities two to three times historic levels, high tree mortality rates, increasing insect and disease populations, and increasing fire hazard. This extractive report features recommendations.

INTRODUCTION

Most people were fed up. Eight years of drought brought forest health problems and frustration to a head. Insect populations, taking advantage of drought weakened trees, were increasing. Tree mortality was evident throughout the valley and spreading into the higher elevation forests. Fuels loads were accumulating, recent fires seemed to be more severe, the number of houses burned in the urban-forest interface was increasing, and public concern for safety was growing. Mills were closing, county timber receipts were decreasing, and the secondary social and economic effects were being felt throughout southwest Oregon.

The "preservation versus use" debate was becoming more polarized. Proposed actions generated law suits, were appealed, or protested. Extreme positions, consistently reported in the media, provided little new information nor contributed toward establishing common goals or solutions. Although continued debate benefited some special interest groups, it did little to provide for ecosystem health. (Here I define ecosystem health as including human effects *and* needs).

A Society of American Foresters meeting (Spring 1992) billed as an opportunity to hear both side's viewpoint, provided an unforeseen opportunity for cooperation. Jack Shipley of Headwaters and Greg Miller of the Southern Oregon Timber Industry Alliance, who quietly listened to one another before their presentations, found their vision for the Applegate ecosystem (biologically, economically, and socially) was surprisingly similar. They decided to emphasis their common goals, and combine resources to find solutions. Their discussions were the seed for the Applegate Partnership that grew into a diverse collection or citizens working together for ecosystem health.

[1]*Area Ecologist, Siskiyou, Umpqua, and Rogue River National Forests, USDA Forest Service, Grants Pass, OR.*

Today the Partnership continues to work toward common goals, build understanding and cooperation, provide the public with information and educational opportunities, and develop local solutions for ecosystem health problems. Over five projects have been planned; one has been completed. However, lawsuits, appeals, demonstrations, and protests still delay implementation of projects and obscure focus, as overall forest and ecosystem health continues to decline.

OBJECTIVES

The team's objectives were to provide a first approximation *ecological assessment of ecosystem health* within the Applegate Adaptive Management Area (AMA) and *develop a general strategy for restoring and maintaining ecosystem health.* According to the President's plan, (formally called the Pacific Northwest Forest Plan) the objectives for an AMA are: "Development and testing of forest management practices, including partial cutting, prescribed burning, and low impact approaches to forest harvest (e.g. aerial systems) that provide for a broad range of forest values, including late-successional forest and high quality riparian habitat." Recommended strategies and projects are consistent with the President's Plan.

DEFINITIONS

Each team member's definition of ecosystem health varied. Human needs and effects were the focus. While humans undeniably affect nature, there is no basis for requiring that ecosystems provide for human needs to be healthy. On the other hand, healthy ecosystems are the foundation for long-term economic health. Although we felt social and economic factors should be part of the definition, we emphasized the biological. (It is important to understand that insects, disease, wildfire, and mortality are all natural processes, and are not, in themselves, indicative of health problems. However, when population numbers, intensity of fire, or rates of mortality increase significantly, the effects are often perceived as "catastrophic" or socially negative.) Healthy ecosystems are often defined as being *diverse, resistant* to catastrophic change, *resilient* or quick to recover, and *productive.* However universal, these terms are vague, and need precise definitions to be *measurable,* a criterion necessary for evaluation and monitoring.

The team chose to evaluate the *amount and distribution of seral stages,* including those effected by humans, the *level and trends of beetle caused mortality,* the *vigor or growth rates of stands* using basal area, and the *risk or probability of "catastrophic" change,* as measurable indicators of forest health. These variables are only part of a full health evaluation profile, but the information was readily available. Preister used age diversity, population change, land use patterns, private land logging, absentee ownership, work routines, employment mix, wage structure, poverty level unemployment level, balance of timber harvesting methods, rate of locally-awarded federal agency contracts, Value-added incentives to timber sales, capital access and economic multipliers for evaluating and monitoring social and economic health. However, in our assessment Kevin points out: *"This process incorporates indicators to monitor the social and economic well-being of the resident culture in the Applegate area. It is somewhat confounded by scale; for example wood extracted from the Applegate watershed density management projects may provide local economic benefits such as milling and manufacturing employment, but may not necessarily be limited to the residents of the Applegate valley. Methods of dealing with these problems need to be explored and tested."*

THE PROVINCIAL SETTING

Klamath Geological Province

The Applegate AMA is within the Klamath Geological Province (one of the most floristicly diverse areas in the United States) which straddles the Oregon-California border extending from Redding, California to Tiller, Oregon on the east edge, and from Eureka, California to Bandon, Oregon on the Coastal edge. It joins the Cascade Range with the Sierra Nevada Range on the east and the Oregon and California coast ranges on the west. This "H" configuration provides for both north-south and east-west migratory travel. The Province includes two major river basins: the Rogue and Klamath Basins. Both cut through the

Klamath Mountains to the Pacific Ocean, are important anadromous streams, provide water needs for many species, including humans, and are renowned for their recreational values. The Province has been and continues to be a sink and source for genetic diversity and main migratory pathway for the Pacific Northwest.

The Rogue River Basin

Key aquatic and riparian species are: chinook and coho salmon, rainbow and cutthroat trout, furbearing animals, and other wetland-dependent species of birds and amphibians. Declines in fish populations characterize the area. Chinook salmon are particularly dependent on low gradient segments where spawning gravels are abundant. Where this habitat has been altered, these species tend to inhabit less productive upstream reaches on National Forest or BLM land. Elevated summer stream temperatures, simplified habitat, and water withdrawals have rendered much of the low gradient habitat unusable by salmonids and other aquatic and riparian species.

Past fire regimes were dominated by frequent, low intensity fires. Consequently, forests were widely-spaced, with early seral tree species, such as Douglas-fir, Ponderosa pine and sugar pine with light understory shrub cover (fig. 1). The landscape mosaic included few areas of dense stands and late seral species. With fire suppression stand basal areas increased to two to three times greater than the site can maintain in a healthy, insect resistant state. Today the AMA has high insect populations, with at least nine species of bark beetles and wood borers, resulting in insignificant tree mortality. White pine blister rust, dwarf mistletoes, and root diseases are also significantly affecting forest health.

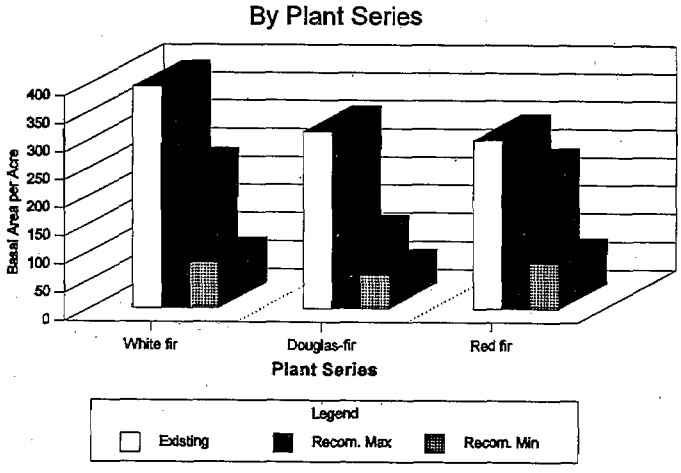

Figure 1.—Existing and recommended basal area.

The AMA supports at least 60 rare or threatened plant species. Seventeen have been identified as at risk of disappearing due to the spread of non-native species, fire suppression, and other causes. Several threatened, endangered, or protected animal species also occur, including the peregrine falcon and spotted owl. Other species, such as the Siskiyou salamander and Townsend's big-eared bat, occur in the AMA at least partially because of the presence of unique habitats.

Major social and economic changes have affected the basin in the last thirty years. Among them:

- Strong population influx and residential development;
- Dispersed settlement patterns have created widespread urban-forest interface;
- In-migration of retired people who are changing community character;
- Influx of young, educated ex-urbanites with strong environmental values and community interest;
- Shrinking of the traditional economic base (ranching, farming and timber employment);
- Strong representation and economic contribution of "lone eagles" and "global entrepreneurs" with few ties to the local economy;
- Weakening ties to the land for economic contributions and reliance on commuting to urban employment sites;
- Newcomers are less integrated in and less knowledgeable about the ecosystem and community
- An increase in a wide-range of recreation activities on public lands, creating endemic conflict between users and management challenges of incorporating different interests.

RECOMMENDATIONS

Provincial Scale

- Provide suitable, *connected, dispersal and migration habitat* associated with Late Seral Reserves, Riparian Areas, and other "protected" land designations.
- Establish and maintain a *mix of quality habitats* for indigenous species. Quality habitat provides food and shelter, is relatively stable against catastrophic disturbance, and is secure against excessive predation.
- Identify, protect or restore special and rare habitats such as wetlands, meadows, etc.
- Encourage the development of value-added industry that uses small wood, and inexpensive approaches to aerial lift. Assist communities in securing low interest loans.

Landscape Scale

- *Burn* (Reintroduce fire, limit the proportion of high severity fire by plant series).
- *Grow* forested landscapes dominated by larger, older trees, particularly shade intolerant species such as Ponderosa pine, sugar pine and Douglas-fir.
- *Blend* seral stages across the landscape over time. Riparian zones, northerly aspects and various plant associations can carry more late seral habitat longer.
- Avoid building new roads.
- Secure money for preventive measures.

Implementation. Identify landscapes with the highest priority for restoration activities. These include: the forest-urban interface; forests rated at highest risk of catastrophic loss to insects and/or fire; high risk forests bordering special habitats (treatment should not compromise habitat); and high risk forests in accessible areas. *Prevention and/or maintenance* cost less than restoration and should be given preference where other considerations are equal. Density management in riparian zones should be conducted to preserve or enhance the unique functional roles (e.g. shading, stabilizing banks, providing large dead wood for in-stream structure).

Money is available for correction or restoration after catastrophic fire or epidemics. But securing funding for prevention (a less costly and more effective strategy) is difficult. Awareness of potential savings in fire suppression and pest suppression funds is increasing. In 1994, for example, on the Applegate District, 31 lightning fires burned 175 acres. Nine hundred and eighty four thousand dollars ($984,000) were spent on suppression (over $5600 per acre).

Stand Scale

- Use density treatments that emulate historic disturbance intensity, frequency and extent as a reference point, if specific desired condition or acceptable ranges are not known.
- Integrate with other disciplines, particularly wildlife biologists, for structural needs.
- Thin from below so that mean diameter of the residual trees exceeds mean tree diameter prior to treatment.
- Reduce density to below 120 square feet of basal area per acre (Insect threshold). A higher upper threshold of 140 square feet per acre is suggested for riparian areas.

Implementation. Space pine leave-trees to avoid the likelihood of beetle infestation. Clear all small trees and shrubs from within the drip line. Do not leave pines, especially large pines, in clumps unless they are slated to serve as replacement snags. Some large trees must be removed if the pine component is to be beetle-resistant. Historic pine stands with large tree components had few trees per acre. Densities should be maintained well below the insect susceptibility thresholds for the plant association (general levels given above). Leave trees in order of preference for the Douglas-fir and White fir Series include: Pines, incense cedar, Douglas-fir, and true firs.

Species Scale

- Spotted owls. Forests that currently serve as nesting habitat should not be harvested. The ROD provides specific direction for protection of mapped and unmapped late successional reserves. Some late successional reserve areas

may be extremely vulnerable to loss by wildfire, insects, or disease. Consider an extremely low intensity treatment aimed solely at removing understory fire ladders. In this case, underburning may be preferable to thinning, depending on fuel conditions.

- Goshawks. Goshawk nest sites should be identified within any project area, and the core nest and needed habitat protected based on the wildlife biologist's recommendations.
- Salamanders. Salamanders require special habitat; most do not have lungs, therefore must have moist environments that allow breathing through the skin. Of particular concern is the Siskiyou Mountains Salamander, which occurs only in Jackson, Josephine, and Siskiyou counties; eighty percent of the population is within the Applegate basin. We are uncertain what management these species can tolerate.
- Other species of particular concern are the great gray owl, fisher, lady slipper, and neotropical migrant birds, especially the bandtailed pigeon (a candidate for listing under the ESA). Neotropical migrants and fishers require a hardwood component across the landscape. Bandtailed pigeon numbers may be related to the abundance of dewberry.
- White pine blister rust, dwarf mistletoes, and root diseases (the two most common are Armillaria root disease, caused by Armillaria ostoyae, and annosus root disease, caused by Heterobasidion annosum S-strain). Pathogens play integral ecosystem roles and effects on tree populations tend to be gradual. Both thinning and burning can help keep populations at endemic levels.
- Bark beetles and wood borers. Bark beetle and wood borer populations are somewhat density dependent and tend to remain at endemic levels in low density, healthy stands.

MONITORING

- Encourage stand-level research, particularly spacing required by large trees.
- Design treatments to simplify subsequent monitoring.
- Implement a monitoring program as part of each prescription.
- Use information gained from early stand treatments to improve future prescriptions.
- Use treated stands as demonstration areas.
- Take all opportunities to use results for educational purposes.