Ponderosa Pine Forest Restoration on Turnbull National Wildlife Refuge

AGENCY: U.S. Fish and Wildlife Service

INVOLVED PARTIES: Eastern Washington University, Cheney, Washington

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DATES: ***Began:*** March 1998 ***Ended:*** Ongoing

INTERNET SITE: http://www.fws.gov/turnbull/index.html

PROJECT DESCRIPTION:

The ponderosa pine and riparian aspen forests of Turnbull National Wildlife Refuge (Refuge) in northeastern Washington are in poor health and are not providing wildlife habitat at their natural potential. Under the *Habitat Management Plan*, which was completed in 1999, goals and objectives were established for the restoration of ponderosa pine forest to support native forest-dependent wildlife species and reduce hazardous fuels.

Habitat Management Plan Goals and Objectives:

Goal #3. Restore Refuge forest to a natural distribution of stand structural and successional stages to benefit forest dependent wildlife.

Objective 3A. Restore and manage Refuge ponderosa pine forest through the annual treatment of a minimum of 400 acres to improve forest health, restore diverse native understory plant communities and maintain natural tree densities and the distribution and diversity of stand conditions necessary to sustain native forest-dependent wildlife (Figure 3 and Figure 4 from the *Habitat Management Plan*).

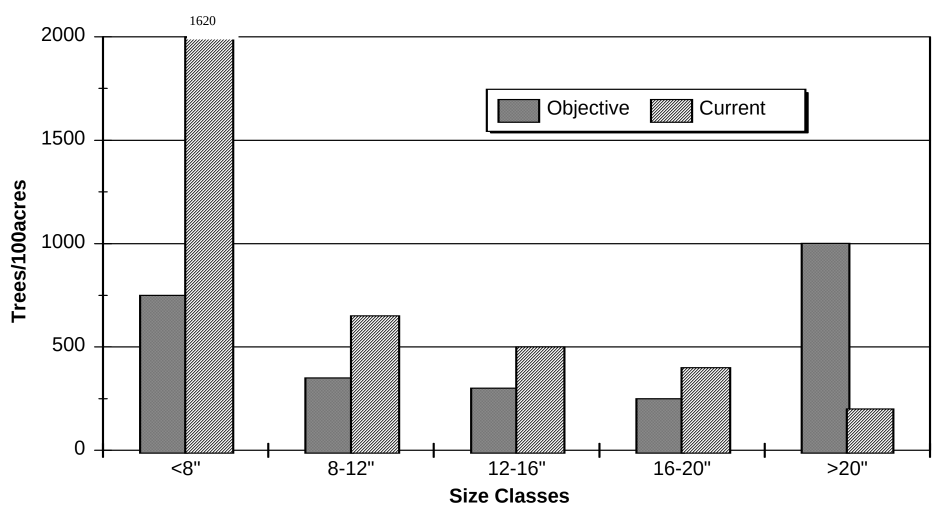

Figure 3 . Comparison of objective and current mean tree densities by size class.

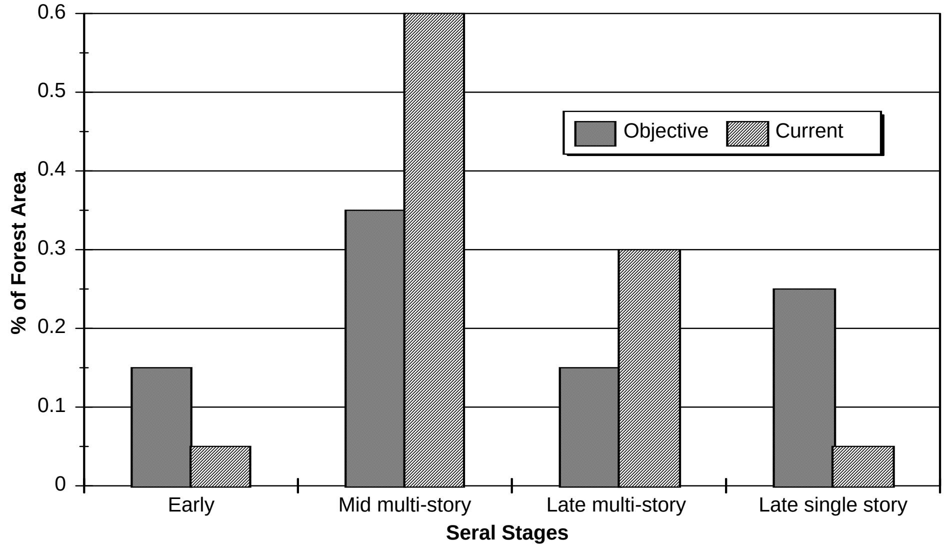

Figure 4. Comparison of objective and current distribution of forest seral stages.

Objective 3B. During annual forest treatments, provide conditions in Refuge ponderosa pine and aspen stands that result in recruitment of the density and distribution of snags necessary to sustain 40% of the maximum potential breeding populations of cavity excavating wildlife species (Table 3).

Table 3

	Ponderosa Pine		Aspen	
Size Class	Objective	Current	Objective	Current
> 12 inches	309	74	144	1862

Table 3. Objective and current snag densities (snags/100 acres) in ponderosa pine and aspen stands of Turnbull National Wildlife Refuge.

Objective 3C. Within annual forest treatment units, restore the natural diversity of stand conditions and the dominance of aspen and native deciduous shrub species in riparian habitat now dominated by ponderosa pine to increase the number and size of habitat patches to support members of the tree canopy and shrub strata breeding and foraging guilds.

Objective 3D. Annual forest management activities will provide at least four downed trees per acre, 15 to 17 inches in diameter at the large end and 20 feet or more in length, to support the members of the terrestrial covered surface breeding guild requiring this habitat feature.

ADAPTIVE MANAGEMENT (AM) ELEMENTS:

What management issue was the primary driver?

Past logging, grazing, and suppression of fire have created pine stands with tree densities two to four times the presettlement condition. Large diameter at breast height trees greater than 24 inches (60 centimeters) in diameter constitute less than 10 percent of the stands, and greater than 75 percent of the Refuge ponderosa pine forest exists as closed canopy, multistoried stands with a similar age and size structure. The forest understory is dominated by decadent snowberry and a dense layer of organic debris that suppresses the growth of native bunchgrasses and forbs. Fuel loading in Refuge pine stands is five times greater than average for this forest type. Gone is the open, parklike savanna of large ponderosa pine trees with an understory of bunchgrasses and forbs typical of this forest type. Conditions are ripe for catastrophic loss due to insects, disease, and fire.

The average density of snags in Refuge forest stands is less than one per acre. Optimum conditions for cavity-nesting birds require on the average three suitable snags per acre greater than 15 inches in diameter. Past logging and suppression of fire has resulted in the loss of mature and old-growth stands that produce large diameter snags that persist over long periods of time. Existing stands are overstocked with pole and sapling-sized pines that suppress tree growth and root development. Most snags are less than 15 inches (38 centimeters) in diameter and are extremely susceptible to blow down.

What uncertainties led to an Adaptive Management approach being selected?

Previous monitoring found that use of prescribed fire alone had highly variable and often unsatisfactory results with regard to thinning ponderosa pine. Several prescribed burns resulted in insufficient removal of small-diameter stems and greater than expected losses of the larger-diameter stems desired for retention in forest stands. The loss of these large-diameter trees, even under low-intensity burning conditions, indicated a unique situation that would require an adaptive management (AM) approach to meet objectives. Review of the literature and input from subject area experts identified the use of mechanical thinning and fuels treatments in conjunction with prescribed fire as having a better overall outcome with regard to stem density reduction in the smaller-diameter classes and retention of the relict mature trees.

How are/were the monitoring and science frameworks designed to support timely management adjustments to changing resource conditions and increased certainty?

A cooperative agreement with Eastern Washington University was initiated to: (1) develop and implement a monitoring scheme for commercial and noncommercial thinning and prescribed burn treatments of Refuge ponderosa pine forest to document the effectiveness of treatments in meeting stand density and hazardous fuel reductions and improved composition and productivity of understory plant communities; (2) monitor the effects of thinning and prescribed fire treatments on nongame bird, amphibian, and small mammal populations; and (3) monitor the effect of pile burning on native plant communities and the possible invasion of these sites by exotic plant species. Treatments are ongoing; however, interim results are provided following completion of each step of the different treatment strategies. This information is made available during annual habitat management planning meetings.

Please describe the process used for involving partners/stakeholders.

Several public meetings were held in 1992 to identify important issues with regard to forest management at the Refuge. A workshop held in 1993 brought together subject area experts, local partners, and stakeholders to identify potential strategies for the restoration of Refuge ponderosa pine forest. Throughout the implementation of the project, we have provided presentations and tours to stakeholders.

Please describe the mechanism for adapting decisions based on monitoring results. Was an Environmental Management System (EMS) used?

An EMS was not used. The Refuge staff meets annually to update the annual habitat management work plans. At these meetings, the results of monitoring on recently completed projects are reviewed, and necessary changes are made in annual prescriptions to address short-term issues that were identified. Meeting forest restoration objectives is a long-term process, where results with regard to objectives are not measurable for 10-20 years.

Was the AM approach established as a result of a National Environmental Policy Act (NEPA) process (analysis and documentation supporting the decision to implement the AM)? If so, how did the NEPA process address subsequent adaptive decisions and actions?

The AM concept was stipulated in the *Habitat Management Plan* and the associated environmental assessment (EA). It prescribed monitoring management actions to determine their success in meeting objectives. The AM approach is incorporated into the proposed action. The proposed action included establishing objectives, identifying a range of strategies that are expected to meet the objectives, and initiating monitoring of the results of these strategies in relation to the objectives to assess their success. This assessment will establish which strategy was most effective and could be applied on a larger scale or whether any changes to the strategies are necessary. The AM approach entails the use of monitoring results as a means to make adjustments in management strategies. This was a selling point with stakeholders and has allowed us to make interim changes to the plan as monitoring results became available. The changes that we have made to the forest restoration strategies employed are to meet habitat objectives better. The objectives themselves have not been altered. Using the AM technique required no modification to the NEPA process. All proposed strategies were assessed in the EA. As long as the objectives are not changed or a new previously evaluated strategy is not proposed, then the existing NEPA review would stand. If we were to change these objectives, i.e., to identify a new end point, then we would need to initiate a new NEPA process.

Has the AM approach been evaluated in a subsequent NEPA process? If so, what has AM contributed to the NEPA process?

No, it has not been necessary to evaluate the approach in a subsequent NEPA process since the AM process stipulated in the original EA allows us, within limits, to adjust management actions as necessary to reach the stated objectives. Because we have not made changes to objectives, significantly altered management actions, or otherwise taken actions that would have required a new effects analysis, we are still working under the original NEPA document. AM is a very new strategy and has yet to be implemented and evaluated fully in its use in conjunction with NEPA practices. Taking this approach will allow us to develop a sound strategy without fully committing to a single strategy that may prove to be ineffective and even damaging if our assumptions prove to be wrong. Public acceptance of an AM approach is essential, especially for actions that are thought to be controversial. If, from the outset, we stipulate that we will monitor our efforts and make changes when assumptions prove to be in error, then the public is likely to be more willing to accept a particular proposed action. AM allows the flexibility to reach objectives without the necessity to reenter the NEPA process.

RESULTS:

Benefits provided by AM to date (i.e., reduced uncertainty, improved project efficiency and efficacy compared with other management options):

Our AM project has helped us refine our restoration strategy and gain a lot of support for forest management on the Refuge from stakeholders that were originally skeptical about silviculture practices on a wildlife refuge. Although much of the success of Turnbull's AM project to restore old-growth ponderosa pine forest will not be discernible for several years, there have been some near-term indicators of the success, both in terms of ecosystem response and the positive influence it has had on Refuge stakeholders and both private and public forest land managers. The Refuge has been monitoring both habitat and wildlife attributes of the treatment units and controls for 2 years pretreatment, during treatment, and for 2 years post-treatment. Point-Count Surveys of land bird populations have indicated that although species diversity of treatment units have not changed significantly before and after treatment, some individual species have increased in treatment units. Stand occupancy of one species in particular, the western bluebird (a sensitive species), has more than doubled in the treatment units. This species is an indicator of healthy ponderosa pine stands. Preliminary analysis of habitat variables indicate that tree densities are within objective range for represented size classes, excessive fuel accumulations have been reduced, and understory plant community diversity, as well as the cover of native grass and forb species, has increased.

Limitations of using AM:

High operational costs and rigidity of sampling design slows down the restoration process.

Financial cost of implementing AM:

The annual operational cost of this program, which monitors conditions on approximately 5,000 acres annually, is approximately $30,000.

How did the AM approach affect the timeline for managing the system?

In some cases, AM slowed the process down, but overall, it has allowed us to implement a stronger program. When we try to speed up the restoration process, we run the risk of moving ahead without knowing the results of our monitoring efforts. Because many of the changes expected with the strategies we are employing are not measurable for several years post-treatment, moving too quickly may mean implementing a strategy that may prove to be ineffectual in meeting objectives and could set back restoration efforts.

Degree of stakeholder buy-in:

We have had a lot of very positive feedback from both the forest management community and local stakeholders. Since the implementation of restoration activities on the Refuge, several organizations involved in forestry issues have sought out the Refuge as a showcase of restoration in the ponderosa pine ecosystem. The Refuge has provided tours for the Society of American Foresters, the Wildlife Society, Public Lands Council, Pacific Northwest Interagency Fuels Group, Washington State Department of Natural Resources Fire Prevention Team, the University of Washington Rural Technology Initiative, and several university forestry and wildlife management classes. The feedback from all of these groups has been very positive. The Refuge forest management program has been highlighted in the local and national media. Probably the most important indicator of the success of this program is the influence it has had on forest landowners in the vicinity of the Refuge. Several landowners have sought out the Refuge for advice on how they can better manage their forest. Our program has also been an excellent outreach tool for efforts to reduce fire hazards in the Wildland/Urban Interface.

CHALLENGES:

What impediments, constraints, and/or challenges were overcome? How?

Operational funds and personnel to continue necessary level of monitoring. The use of university students in conjunction with various undergraduate natural resources classes, graduate students, volunteers, and the AmeriCorps program.

What aspects of the project need improvement?

Data management and reporting is sometimes difficult to complete in a timely manner as a result of work load and personnel shortages.

How and when will the need for improvement be addressed, if at all?

Continue to work through the university to provide students and also through the AmeriCorps program. Increased Refuge staffing to provide consistency and reduce training requirements would be the best remedy.

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