

A close-up photograph of a forest fire, showing bright orange and yellow flames consuming dry pine needles and twigs. The fire is intense and appears to be spreading through the forest floor.

Restoring Ponderosa Pine Forests of the Intermountain West: An Overview and Frequently Asked Questions

May 2019

Introduction

The dry, frequent-fire forest ecosystems of the American West, especially those once dominated by open stands of ponderosa pine, need ecologically based restoration. Forests have grown crowded with thickets of weak, spindly trees that compete for resources. These unnaturally thick forests burn hotter and typically result in high-intensity, catastrophic fires that devastate natural resources, local communities, and state economies.

A Drastic Decline in Forest Health

With settlement of the West in the late 1800s came federal fire suppression policies, intense livestock grazing, and other disruptive land management activities. As a consequence, forest ecosystem health plummeted at an alarming rate. The results are evident in the increasing threat of destructive, large wildfires, known today as “megafires,” and other ecosystem changes such as:

- Decreased numbers of large, old trees
- Decreased cover of grasses and wildflowers
- Decreased wildlife diversity
- Increased densities of small, stunted trees
- Increased threats of insect infestation and disease
- Increased threats to property, infrastructure, and human lives

Benefits of Ecological Restoration

Ecological restoration brings people together to identify common values and goals, and solve problems. Scientists, environmentalists, public land managers, and decision-makers agree that restoration of ponderosa pine forests of the Intermountain West is critical. Forests that have been restored to more natural conditions provide many ecosystem service benefits, including:

- Increased resilience
- Enhanced self-regulatory processes
- Reduced fire risk
- Secure water supplies
- Strong economies
- Safer communities and neighborhoods
- Improved surface water quality
- Groundwater recharge
- Recreational opportunities
- Enhanced qualities of life
- Wildlife habitat
- Increased carbon storage in trees
- Protection against drought, disease, and insect infestation

Frequently Asked Questions



What is forest restoration?

Evidence-based ecological restoration uses best available science to inform approaches to restore frequent-fire forests of the Intermountain West to natural conditions consistent with their evolutionary environments. Research shows restoration is effective at reducing wildfire risk while increasing forest resiliency and protecting human communities. Forest restoration improves wildland health by returning overgrown forests to a less dense, functional, and diverse condition through specific treatments, such as:

- Mechanically thinning and removing excess small trees.
- Reintroducing low-severity, more natural fire and/or prescribed burns.

Why can't we just let nature take its course?

More than a century of severe ecosystem alteration has changed our forests. The catastrophic crown fires that have become prevalent in modern times don't maintain ponderosa pine forests, but rather they can destroy them, leaving few living trees and threatening human lives and property. Such fires degrade wildlife habitat, alter soil composition, and cause soil erosion and flooding that damages community water supplies. Without restoration, we can expect larger and more devastating forest fires.

Do mechanical treatments remove large, old-growth trees?

No. One of the goals of ecologically-based mechanical treatments is to protect and restore vigor to large, old-growth trees. Research shows that large, old trees are dying at an unprecedented rate. Competition from small trees is a principal contributing factor. Drought is also placing stress on large, old trees throughout the West. The treatment explicitly protects all old growth trees. No trees established prior to European settlement are removed.

Is this commercial logging?

The restoration treatment is designed first and foremost to restore the ecological integrity of the forest. Commercial or industrial forestry interests do not motivate it. However, there may be appropriate commercial uses for restoration byproducts such as small-diameter trees and biomass (thinning slash) utilization.

Aren't more trees better than fewer trees?

No. In the southwestern ponderosa pine forest research shows there were, on average, between 20 and 60 trees per acre. Today there are 300–1,500 trees per acre—an increase of 10–50 times more trees. Trees must be sufficiently thinned and spaced to allow reestablishment of native grasses and periodic low-intensity fires. Fewer trees allow grasses, wildflowers, and shrubs to become reestablished and provide habitat for wildlife. It is the wide variety of plant life that existed in the pre-European settlement forest that will contribute to increases in the number and diversity of insects, mammals, birds, reptiles, and amphibians. Fewer trees also reduces competition, allowing for larger trees to thrive, which positions forests to be more resilient to changes in climate. Research has shown that there is a negative exponential relationship between tree density and herbaceous vegetation production; therefore, leaving excess trees can greatly decrease herbaceous production. In addition, inadequate thinning has the potential to increase the intensity of wildfire and undermine the goal of reintroducing low-intensity fires.

“(I) recognize there’s a need for us to expand the level, pace and scale of the restoration of our forests and grasslands in this country. We’re making good progress, but there’s work that needs to be done.” — **U.S. Forest Service Chief Thomas Tidwell**, *Ravalli Republic*, March 6, 2015



“Just like in human medicine, a person has the best chance to fight off and recover from an illness when they are healthy. It is important to make sure our forests are in their most natural, healthy condition so they, too, are able to endure disturbances like fire, insects, disease and climate change.” —
Dr. Wally Covington, Executive Director of the Ecological Restoration Institute, *LiveScience*, August 2014

Is this a single treatment that will work everywhere?

No. At each location, site-specific treatments are developed to: 1. Approximate the range of conditions that existed at that particular site prior to European settlement (the best evidence for conditions consistent with the evolutionary environment); 2. Accommodate habitat requirements for endangered, threatened and sensitive species; 3. Accommodate for other wildlife habitat needs; 4. Minimize risk of introducing exotic species; 5. Accommodate for a modern context (e.g., roads, recreation, and social factors).

Is wildlife considered?

One of the goals of ecologically based restoration is to restore the full suite of processes, functions, and plant and wildlife species to within its natural range of variability. The needs of endangered, threatened, and sensitive species are especially important. Research demonstrates that ecologically based restoration treatments increase both the numbers of and diversity of plant and wildlife species. Biodiversity continues to decline in the degraded, modern-day ponderosa pine forest. Ecologically based restoration offers a comprehensive approach to conserving and restoring species.

Does the treatment evolve?

Yes. Ecological restoration treatments developed by the Ecological Restoration Institute exemplify the adaptive management process by incorporating new scientific research, practical experience, and monitoring in the design of each prescription. The Ecological Restoration Institute is committed to constantly adapting and refining treatments to reflect new knowledge. In addition, the ERI is committed to conducting new research to analyze the effects of restoration at larger scales.

How do ecologically based restoration treatments reduce the threat of catastrophic wildfire?

Treated forests have the potential to reduce the intensity of crown fires. The treatments restore the forest to a structure that will stop fire from moving through tree crowns and allow it to drop to the ground—seen during the Wallow Fire in 2011 and the Slide and San Juan fires in 2014. Once landscape-level restoration has been implemented, forest communities will enjoy the dual benefits of protection from crown fire as well as the reestablishment of diverse, resilient forests.

Are restoration treatments aesthetically pleasing?

Not initially. Forest thinning and burning leads to disturbance and tree stumps in the forest. However, research in aesthetic perception by Dr. Terry Daniel has shown that aesthetic values actually increase after prescribed burning once herbaceous production increases and covers low-cut stumps. Further, research by Dr. Daniel indicated that scenic beauty evaluations were highest for open, park-like forests similar to the natural forest conditions that evolved with fire for 150 million years. But the real issue is what type of forest should be left for future generations. The answer is a forest that is ecologically healthy, biologically rich, and fully functioning. It is important we leave future generations with forests and ecosystems that are not liabilities but assets—the kinds of forests Native Americans and early settlers enjoyed and benefited from.

