

Experimental Forests as a Gateway

Protection of Ecosystem Services through Sustainable Forest Management

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Individuals around the globe are joining the initiative to keep a “green space.” By keeping an area growing with plant life, photosynthesis and all the marvelous components associated help to better the environment through temperature regulation, conversion of carbon dioxide to oxygen, sequestration of carbon, and in some cases, erosion control. The idea is to not only help offset the carbon foot print we ‘stomp’ on the earth as continuous consumers, but to provide benefits that are reduced as we increasingly impact and change the surrounding landscape. We will feel the unmitigated effects of global climate change as deforestation continues and ‘city trees’ disappear because we are less protected without our living filters.

Eventually, I and others hope that the small “green spaces” will combine into a further reaching effect. However, if larger areas are not maintained sustainably, it will not make a difference if the small “green spaces” keep going; we will already be at too large of a loss. Realistically, real change begins in the field through the smart application of sustainable forest management. Experimental forests, like Pack forest, often act as the gateway for the application of sustainable methods. To understand the importance of sustainable forest management, I will examine the importance of ecosystem services and the preservation of them through sustainable forest management in experimental forests.

Humans, me included, associate every aspect of the world with consumption. In this light, forests are simply for production. However, ecosystems provide natural assets called ecosystem services, which human populations depend upon. Ecosystem services sustain your life and mine directly and indirectly, through benefits ranging from clean air and water to recreation. To better understand ecosystem services, they have been classified into four major categories by function: provisioning, regulating, supporting, and cultural.

Provisioning services are those that sustain people directly, like food and water, a simple connection to make. However, regulation of climate and purification of water are examples of regulating ecosystem services, which are harder to connect to ourselves directly. But, at the same time, imagine what life would be like if we didn't have a network of natural filters, like those present in the Cedar River Watershed, to filter our water. What would happen then? Nutrient cycling and soil formation are essential supporting services that allow us to reap benefits from the earth, like food. Cultural services like recreation and education provide invaluable human experiences, connecting us to our ecosystems. I don't know anyone who could say that they haven't felt a connection to the area they live. Forests and other organisms within ecosystems provide that feeling of home, our feeling of connectivity with the natural world. For example, I feel connected to Pack Forest, as I began my education in sustainable forest management there.

Without all of the types of ecosystem services, our lives would be drastically altered. Even a decrease in the degree of one service can make a rippling negative effect through our lives. Most of us have already felt that ripple before. For example, the decrease in salmon runs in the Pacific Northwest. The question we must all ask ourselves now becomes how are ecosystem services disrupted and how can we preserve them?

Ecosystem services can be disrupted naturally, and in many ways, the disruption is a cyclical event in the ecosystem's history, often referred to as a disturbance. Natural disturbances maintain a delicately held balance within an ecosystem. Examples of natural disturbances that affect forests include events such as wind storms and wild fires. It is hard to believe that such events, in their unaltered form, serve a purpose. However, the real problems start when disturbances are altered by outside influences, like

humans. The effects of *our* alterations can completely throw a system off its natural course. For me, a particularly interesting example of this is the interaction of fire and ponderosa pine forests. Fire eliminates underbrush and keeps tree density low in the forests. Our interactions with the landscape have suppressed fire, letting the underbrush grow uncontrolled and tree density to increase. As we encroach on areas that are still forested, problems like these arise more and more. Our proximity causes disruptions within the ecosystems we occupy. Now, a problem that most areas with ponderosa pine face is when a fire occurs, it is even more destructive and devastating than ever before. The resulting damage from such fires is immense, and greatly decreases ecosystem services like erosion prevention and air filtration, not to mention the economic and cultural losses faced by residents. Fortunately, we learn from our mistakes. As consumers, we want the best deal, and that includes a healthy forest.

Today, scientists and researchers search for the best deal, the best balance between our influence of ecosystem disturbances and the result of those influences with regard to ecosystem services. How? Through research, experiments that help us prioritize ecosystem services and ways to impact them. Research is currently underway to determine the effects of prescribed burning on ponderosa pine forests, so that we can help secure a healthy fire regime, in order to prevent further ecosystem service losses through uncontrolled fires. In this way, prescribed burns are a form of sustainable forest management, made possible through the efforts of experimental forests, like Pack Forest.

I like to think of Pack Forest as the University of Washington's "green space." As a community of researchers, teachers, and students, we are able to come together to discover and implement sustainable methods of forestry. As an experimental forest, Pack Forest provides many insights into the workings of ecosystem services.

For example, one research project at Pack Forest examines the effects of additional fertilization of forest stands in terms of nutrient pooling. Nutrients, like nitrogen, sometimes collect to form a sort of reservoir in the soil. Fertilization is a common method employed in forest management because it can increase growth of trees, thereby increasing wood product, just like in our “green spaces.” This can also increase the ecosystem services, provided by the accelerated growth of trees. However, it is important to note that too much of a good thing can be bad. Thus, too much nitrogen can be a pollutant, making it even more important to know the correct quantities to apply, how often, and how long nitrogen is held in the ecosystem.

There are many components of sustainable forest management, and all of them touch on an aspect of ecosystem services. Without experimental forests, there are few ways for sustainable forestry to be demonstrated, managed and improved upon. Experimental forests are the gateway for providing sustainable methods for forest management on a large scale.