

Experimenting With Sustainability

The Role of Experimental Forests in Conserving Our Forests and Ourselves

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I must admit, I'm a consumer; I like stuff. It's a bold statement, I know, but as a person who describes himself as a conservationist, I feel a constant tug-of-war between the stuff I use to increase the quality of my life and what I forego in the name of doing good for the ecosystem in which I live. While the urban landscape sprawls and global connectedness grows, humans continue to attain greater speed at taking from our world the stuff we use to facilitate modern life. One of the richest sources of that stuff is the forest, and we have come to depend on forest products for our way of life. That is why sustainable forestry must include both preserving the entire ecological system that allows a forest to grow, and also finding new, more efficient methods of utilizing that forest. The places where foresters pursue that goal are forests where human accomplishment melds with old-fashioned Mother Nature to facilitate and fund research, educate our students, and provide a natural environment for recreation: experimental forests such as the 4,300 acre Pack Forest at the foot of Mt. Rainier.

We use more paper, build more houses, and find new uses for cellulose at a rate designed to keep pace with the society that needs wood fiber, not the forest that produces it. It is now common knowledge that humans are capable of taking from those forests faster than the forests are capable of regenerating; modern logging methods can cut a 60-year old acre of forest in about an hour. We have not hit the limit of human need, so the discrepancy will only get worse, and it demands resolution.

The more we understand about our world as a living system, the more we understand that no part, no function, of that system is isolated. Each part connects to other parts, they all form a functioning machine, and that machine is habitat. The resolution is to modify the system - tweak a little more horsepower from the machine so that we can harvest what we need to fuel our society while still preserving our habitat. That is the key to sustainability from an ecological perspective: we must conserve the ecological functions (and hence the interconnectedness) of the various parts of our world, our habitat. Using that key and keeping in mind a practical understanding of the importance of forest fiber resources to our society, sustainable forestry can be defined as the conservation of the traditional ecological systems of a forest while still extracting the resources we need, and since sustainable practices in our society must be financially sustainable, doing it without going broke. So what are the systems that we are trying to conserve?

The particular system that you find when you look at a portion of a forest depends on your focus. A tree contains a vascular system that brings water from roots to leaves. Focus more narrowly and you see the cellular systems that use that water to support the growth of the tree. Go a little wider and you might see the forest that is the source of the majority of Seattle's fresh water: the Cedar River Watershed. Without the water dynamics created by the interaction of forest, river, topography, etc., that system ceases to be a watershed, ceases to feed the municipal water system, and you and I get thirsty. The point is: the better the individual systems function, the better they can support the larger systems and vice versa. But how is it possible to protect any part of (for example) a watershed, when it is connected to the construction site that is the outside world? It may not be possible to protect anything completely, but perhaps we can protect enough to reach the point of sustainability.

Under the rule of interconnectedness and interdependence, a local impact has the capacity to effect changes far and wide. This is an argument that is used to advocate zero-footprint philosophies. But if you have ever hiked past a "Leave No Trace" sign in your favorite forest and understood the impossibility of that idea, you understand that everyone in our developing world will always leave a footprint. We can, however, choose to make that footprint as small as possible. The smaller the area of impact, the better the systems around it will be able to absorb and dilute its influence as that influence spreads and attenuates. Therefore, it makes sense that sustainable forestry should entail making the most out of the smallest area that can support our need for fiber (i.e., tweaking a little more horsepower from our forest). But as our understanding of the complexity of ecological interconnectedness increases, it becomes apparent that the influence of a forest is as seamless and far-reaching as the air and the oceans. What is the appropriate size of our timber-harvest footprint, how can we know the consequences of our actions on such a system, and how can we continue to get more fiber from the forest without increasing the size of our footprint? We can't know everything, but the more we do know, the better job we can do, and experimental forests are a uniquely rich source of that sort of knowledge.

Experimental forests can be likened to the petri dish that scientists use to manipulate the cells they grow; they are representative of the greater world, and they allow us to refine our knowledge and techniques of improving the quality of the entire ecological system, including humans. And since humans are the ones responsible for altering and preserving the system, the next generation must be trained and brought into the process of refining the concept and methods of sustainable forestry. Experimental forests serve as the classroom and playground that draw in that next generation. The icing on the cake is that experimental forests can do one more thing: they can generate funds for the researchers that learn from them. Try getting that from a petri dish.

I don't believe there has ever been a forester who has set out with the intention to ruin the habitat in which he or she worked, but nonetheless that ruination has happened. It has happened because people needed timber to create our own habitat within the ecosystem: the development that creates cities, neighborhoods, and houses. We can no longer live any other way, but the pursuit of timber can be harmful if people do not understand the implications of their actions. The causal relationships of harvesting timber, then, are key to preserving our forests and our way of life. Knowledge of cause and effect in such an amazingly complex system is only realistic with practice.

Foresters need to be able to control variables and see empirical results; they need to use different treatments, fertilizer regimes for example, and record the results. That is one role that an experimental forest plays in the search for sustainable practices. If we find less than pleasing results from fertilizer A on 100 acres of experimental forest, we can avoid the sort of farther-reaching effects that would occur in a less-controlled environment. Our footprint was small, and we know not to use fertilizer A on a large scale. Even better, when hundreds of different treatments are explored, we are apt to find some that can replace the current state of the art. We can do a better job of protecting our

habitat and alleviating the mistakes of the past by using silviculture techniques that allow for more fiber from less land.

An experimental forest is primarily a laboratory and its product is knowledge. But the experiments themselves also produce an important by-product: saleable timber. The inspiration for this essay, the Pack Forest, yields enough saleable timber that only 4% of its budget comes from state sources. All of this, however, does not a successful venture make. Innovation must be constantly fed, and it needs the attention of the next generation to sustain it. That is the other role of an experimental forest: to recruit new people into learning the why and how of our habitat so that they are willing and able to carry on the search for sustainability.

The most obvious method of cultivating the next generation to become more sophisticated stewards of our natural resources is direct, experiential education. An experimental forest can be a living classroom. A child may begin his or her natural science education on a field trip that exposes a young class to the diversity of the forest. Children who grow up in highly urbanized areas might go their entire childhood without experiencing an environment sans concrete if they are not brought there as part of an organized school event. With access and educational infrastructure already in place, the experimental forest can accommodate field trips in a way that few truly forested places can. Beyond that first experience of nature, the forest can offer a place for a child's first attempt at taking an active, influential role in the natural world. It can be a place for youth groups to plant trees, dig a soil pit and learn that the ground under our feet is alive, and explore the cause and effect of human interaction with wildlife. Continuing along the path that young people take in search of education, the forest can be a place for middle and high school students to refine their personal path with volunteer work or more specialized classes.

Finally, the experimental forest offers a place for college students who are pursuing a career in natural science to learn their profession in the real world. There are no forests in the laboratory, so a laboratory in the forest is an essential component of higher natural science education. All of these benefits to students are also beneficial to the cause of sustainability – the conservation of forests and their fiber depends on the sophistication of the people who will use them next. Sometimes, though, people aren't looking for timber or education; sometimes people just want to relax.

An experimental forest is a working forest, but it is a place of recreation as well. Even before we understood the far-reaching effects of serious alterations to forest ecosystems, people created a debate to push for moderation and conservation. Those people were the voice of a common fascination for the forest and the feelings of well-being and awe that it can engender. People go there to simply be, and the effect of being there does not necessarily end when the person leaves. A person who enjoys a forest just because they like to be there will want to see that forest remain a healthy one. This is another method, an indirect one, of integrating the next generation into the process of sustainable forestry.

After all the discussion of education and recreation, it can be easy to forget the heart of the experimental forest: the science that is possible no place else. That heart is the genesis of the experimental forest; the forest as an experiment would not have come into being but for the need for the science. Furthermore, it could not fund itself but for the need for the fiber that spurred the science. Seemingly oppositional interests, forest conservation and forest harvesting, have become integral to each other in our society because we have built a system that depends on the function of both. Sustainable practices must allow for both to function. Forestry is an essential cog in the system of sustainability, and the experimental forest works to enhance the functionality of that cog.