University of Idaho
Cooperative Extension System

Forest Management No. 34

UI Extension Forestry Information Series

Forest Habitat Types: A Plant-Based Clue to Better Forestry

Chris Schnepf

Occasionally, you may hear foresters use the term "habitat type" while describing a piece of ground and strategizing how to manage it. This term does not refer to wildlife habitat, though the system can be used to describe wildlife habitat. Habitat types are a land classification system based on the patterns and trends of how trees and other plants grow on the landscape.

Site classification based on succession. Habitat types are intimately tied to the concept of succession - the changes in the mix of plant, animal, and fungi species over time, barring disturbance. Forest succession starts after a major disturbance, after which shade intolerant species such as pines or larch dominate the site. Over time, shade tolerant species become more prominent. This process culminates (barring more disturbance) with a climax forest, dominated in the overstory and the understory by the most shade tolerant species capable of growing on the site.

The climax plants and trees reveal the site. Succession follows different paths, depending on a site's moisture, soil, and other factors. Habitat types are based on the idea that on a given site, the same successional patterns will repeat after disturbances and that the climax forest plants and trees are a meaningful index of soils, topography, precipitation, and other factors affecting the growth of trees and other organisms there.

In some regions, similar site classification systems are also known as "plant associations", though there are some differences between systems (e.g., some systems integrate topography, soils, and other features more directly). In northern Idaho, eastern Washington, and western Montana, habitat types are the rule.

Habitat type organization. Habitat types have three basic levels; the series, the habitat type, and the phase. The *series* is identified by the climax tree species, usually the most shade tolerant tree capable of growing on the site. For example, there is a grand fir series of habitat types, a hemlock series of habitat types, etc. Each series is further subdivided into *habitat types,* identified by an understory plant that is dominant or characteristic for the type. For example, the grand fir series has eight habitat types. Some habitat types are further subdivided into *phases*, which are identified by a second common understory plant. For example, in the grand fir/beargrass habitat type there are two phases: western goldthread and blue huckleberry.

You may see eight letter codes that identify habitat types. The codes refer to the first two letters in the genus and species names for the type. For example, the grand fir/wild ginger habitat type = *Abies grandis*/*Asarum casudatum* h.t. = ABGR/ASCA.

Identifying habitat types. You tend to get climax species that are progressively more shade tolerant on sites that are more moist - so most habitat types change with available moisture. Since moisture tends to increase with elevation, habitat types tend to reflect that (hemlock habitat types higher up a mountain, ponderosa pine types down low - see chart). But habitat types also reflect *effective* moisture (moisture available for plants), so you get wetter types on northern aspects vs. southern aspects, different types of soils (e.g. a soil with a deep ash layer), etc. Frost pockets and similar phenomena can also affect climax vegetation.

Identifying the series level of a habitat type can be comparatively simple. Look for the most shade

CONTINUED ON PAGE 2

tolerant species in the understory. If you can find 10 or more hemlock in the understory per acre, you are in a hemlock habitat series. If Douglas-fir is the most shade tolerant tree you can find there, you are likely in a Douglas-fir series. In some cases, extensive repeated burns have eliminated seed sources for climax tree species. However, because of historical fire exclusion and partial harvesting of early successional species (e.g. pines and larch), most private landowners in Idaho usually have some of the most shade tolerant species capable of growing on their property.

Getting to the habitat type or phase level is more difficult, in part because it requires identification of a variety of understory plants. Essentially, you evaluate the presence and abundance of key "indicator" plants. That appraisal is used with a diagnostic key (see INT 180 below) to determine the habitat type or phase. One of the geniuses of this system is that climax forest conditions do not have to be present to apply this system. Succession is often more rapid for understory plants than trees, so the mix of key understory indicator plants found on the site can help you predict the ultimate climax forest.

How can habitat types be used. Habitat types can help you understand successional pathways on your property and make forestry decisions. Knowing the habitat type gives you some clues as to which species to favor. For example, white pine probably occurred on a hemlock habitat type historically, even if you can't find any white pine on the site. By contrast, western red cedar probably never occurred on a site with a Douglas-fir habitat type in the last few thousand years.

Habitat types can also provide management insights, depending on how much data has been collected for the type. For example, if you are likely to get a heavy stand of brush species after disturbance for a given habitat type, it may be worth buying larger seedlings that will beat the brush to occupying the site. You can also get site productivity information, whether you are looking for board feet, animal unit months, or huckleberries. One recent forestry shortcourse participant decided she wanted to buy forest property in a hemlock habitat type because of their relatively high productivity.

Perhaps the chief benefit of learning about habitat types is how it affects the way you think about your forest. If you endeavor to do as Aldo Leopold suggested and "think like a mountain", a good understanding of habitat types provides a valuable part of the vocabulary for that effort, and will provide many insights along way.

Additional Points. *What if I don't have any trees on the site?* Habitat typing should be done on closed canopy stands that are at least pole mature (trees > 4" DBH). On an agricultural field, a brush field, or very open stand, habitat type is best determined from the nearest relatively undisturbed stand with similar slope, aspect, elevation, and soils.

Do plant communities have neat boundaries? Plant ecologists have debated whether plant communities are "distinct" or "continuous". Even advocates of the "distinct" school acknowledge transitional areas (ecotones) that cannot be delineated as one type or another. You may also find small areas of different habitat types (often closely related) within a given management unit (inclusions). Generally, in Idaho's rugged terrain, habitat types are often distinct enough to be used for management decisions and the system works pretty well.

Forest cover types are not equal to habitat types! Forest cover types are based on the current tree cover - they change over time, depending on the type and extent of disturbance or forest management. For example, Idaho has much less ponderosa pine forest cover type now than it did historically. By contrast, we have nearly the same amount of land in the ponderosa pine habitat types that we had 150 years ago. Habitat types are based on potential climax vegetation. That potential remains the same, barring major geological events or climatic trends.

You could have two forests with a 90% cover of ponderosa pine. They would be the same forest cover type, but could easily be different habitat types. One could be a dry, low elevation ponderosa pine habitat type, the other could be a Douglas-fir or grand fir habitat type at an earlier stage of succession.

CONTINUED ON PAGE 3

Shouldn't forests be allowed to reach their climax? Sometimes people believe that climax forests are desirable (shouldn't everything be allowed to reach its full potential?). Historically, many Inland Northwest forests never reached the climax stage. Ground fires killed shade tolerant species coming up in the understory and stand replacement fires came in and started the process of succession all over again. In that sense, climax forests are not "natural", at least not across Idaho's entire landscape.

Actually, the climax species the habitat type is named for typically gives you a clue on what not to manage for. In the Inland Northwest, climax tree species for a given site tend to be more vulnerable to drought, fire, insects, and disease. Most foresters prefer species that are *seral* (seral = plants and plant communities that occur before climax) for a given habitat type. For example, on a Douglas-fir habitat type, ponderosa pine is often favored. On grand fir habitat types, ponderosa pine, larch, and similar seral species would typically be preferred. On wetter types, such as the western hemlock series, grand fir is a more viable option.

Getting Help. Accurately identifying habitat types can be challenging. A good plant identification booklet and field courses will help. The U.S. Forest Service plant identification guide listed below is intimately tied to habitat typing and can be very useful. For color photographs, many native plant identification books are available, (e.g., Plants of Southern Interior B.C. - see citation below). Flowers really help you identify understory plants, so identifying habitat types in the late spring or early summer may be easier. You may also want to ask a forester for help.

References.

- *Forest Habitat Types of Northern Idaho: A second approximation.* Cooper, Neiman, & Roberts. U.S. Forest Service General Technical Report INT-236. 413 pp.
- *Field Guide to Forest Plants of Northern Idaho.* 1985. U.S. Forest Service General Technical Report. INT-180. 246 pp.
- *Plants of Southern Interior British Columbia.* 1996. Parish, Coupe, & Lloyd. Lone Pine publishing, Redmond, WA. 463 pp.

Special thanks to Art Zack and Steve Brunsfeld for additional review.

This information first appeared in Woodland NOTES, Vol. 13, No. 1,

About the Author: *Chris Schnepf* is an Area Extension Educator - Forestry and Professor at the University of Idaho.