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Variable Retention Harvesting?

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A relatively new silviculture term is popping up with increasingly regularity. At first blush, the term *variable retention harvesting* strikes many as a fancy new term to replace *logging selectively*. While variable retention (VR) does fit into the broad array of silvicultural practices that could be called selection, it goes a step beyond traditional silvicultural systems.

A brief history of clearcutting in the Pacific Northwest.

Historically, some foresters held it as an article of faith that the objective in managing old growth forests (outside wilderness areas, parks, or other formal preserves) was to convert them to young forests – with primary emphasis on wood yield. For many years, the preferred stand regeneration method in many Pacific Northwest coastal forests has been to clearcut and plant. In these high-rainfall, very productive forests, this approach usually yields young stands of fast growing Douglas-fir.

As with any silvicultural treatment, clearcuts have potential positive and negative ecological outcomes. But the public reaction to clearcuts is unenthusiastic, especially when clearcuts are repeated across a landscape. Rightly or wrongly, the term clearcut has become shorthand for exploitive timber harvesting to many, even where these sites are quickly reforested in ways that mimic natural regeneration of sites burned in stand replacing fires. This sentiment is captured by variations of the often repeated phrase: "a tree-farm isn't a forest".

Concern about clearcuts came to a head when the spotted owl was listed under the federal endangered species act and wildlife biologists said spotted owl required old growth characteristics. Many forest ecologists spoke to the other functions that old growth forests contributed to forest ecological structure and function across the landscape.

Variable Retention Harvesting (VR).

Forest ecology has always been a key part of foresters' training, research, and practice. But, in response to concerns about the social acceptability and the ecological sustainability of widespread clearcutting, some scientists began experimenting with silvicultural practices that retained more of the structures and functions of old growth forests. These efforts gained national attention in the early 1990s, when the media labeled such efforts "New Forestry".

That research and experimentation has continued, and is now described as *variable retention* (VR) harvesting, which can be defined[1] as: "an approach to harvesting based on the retention of structural elements or biological legacies (trees, snags, logs, etc.) from the harvested stand for integration into the new stand to achieve various ecological objectives ...". Some common themes to VR harvests include:

Biological legacies. A *biological legacy*[1] is "an organism, a reproductive portion of an organism, or a biologically derived structure or pattern inherited from a previous ecosystem. Biological legacies often include large trees, snags, and down logs left after harvesting to provide refugia and to structurally enrich the new stand".

The shelterwood silvicultural system leaves green trees after the harvest, so isn't it VR? Maybe. Normally a shelterwood system would remove seed trees after regeneration is established. It could only be classified as VR if you left the seed trees through the next rotation or longer. VR also emphasizes leaving other

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legacies of the previous forest intact, such as snags, logs on the ground, and undisturbed forest floor.

Aggregated versus dispersed retention. Retained green trees often get the most attention in discussions of VR. Two general types of retention are discussed and they are frequently combined in the same harvest unit. *Dispersed retention*[1] is the "retention of structures or biological legacies in a dispersed or uniform pattern". It would be superficially similar to a shelterwood harvest.

Aggregated retention[1] is "the retention of structures or biological legacies as (typically) small, intact forest patches within the harvest unit". Aggregates are usually smaller than 2.5 acres in size. Aggregated retention has a number of advantages including leaving portions of the forest floor intact, leaving soft snags in a way that does not threaten logger safety, and allowing more light into the unit for shade intolerant species.

Substantial area influenced by green trees. Some foresters look at VR harvesting concepts and immediately look to apply them on a landscape scale - that is, retaining stands of trees across the landscape. Retaining different stand structures across a forested landscape is frequently discussed in the context of VR, but VR is fundamentally about ***leaving green trees within the area being harvested***. This is usually phrased in terms of area influenced by green trees. For example, a Canadian author specifies that VR harvests must " ... leave more than half the total area of the cutblock within one tree height from the base of a tree or group of trees, whether or not the tree or group of trees is inside the cutblock"[3] In other words, at least half of the harvest area must be within 100-200 feet (the height of a dominant mature tree for that site) of a tree.

VR for Inland Northwest Forests.

Did Inland disturbances leave as many green trees as coastal disturbances? Variable retention proponents point to the number of green trees left scattered through coastal forests after stand replacing fires. While we share many of the same species as coastal forests, Inland Northwest precipitation and disturbance patterns are different. Moist forests in the Inland Northwest burned in a mosaic pattern, but green trees left after these fires were distributed differently. In most Inland Northwest mixed fire events, there would have been many 5 acre or larger (sometimes much larger) patches in the landscape with no green trees left. To the extent VR's goal is to mimic historical disturbance patterns, we may need to leave some areas that do not fully meet the green tree influence standards commonly discussed in coastal applications of VR.

Deadwood. One disturbance characteristic Inland Northwest forests share with coastal forests is deadwood. Fire events here left many more snags and more coarse woody debris on the ground than is customarily left after a timber harvest. To the extent a forest owner wants to provide a lifeboat for a wider variety of ecosystem functions, leaving more snags and coarse woody debris will move the forest towards that goal. Remember, Idaho slash hazard laws do not consider woody material larger than 3 inches in diameter to be a fire hazard that must be removed. For more for on coarse woody debris, search the publications section of the UI Extension Forestry web site and look under "Snags and Forest Organic Debris"

VR: an excellent recipe to grow grand fir. Retained trees will influence the trees coming up in the understory. One of their larger influences will be shade – and for a many more years than under seed tree or shelterwood systems, where overstory trees are removed after regeneration is established. More shade gives an edge to shade tolerant species such as grand fir and Douglas-fir – "species-non-grata" to most Inland Northwest foresters, because they host a broad array of tree-killing insects and diseases. Retained trees will also slow the growth of regeneration to some degree.

Some of this may be countered by aggregating retention and aggressively pre-commercial thinning against shade tolerant species, but there may be limits to how much you can compensate, especially on shadier north slopes. Advocates of VR emphasize its flexibility for different contexts. For growing shade intolerant species such as larch, that may require opening stands

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up more than typical VR prescriptions for coastal forests.

Is VR another way to highgrade? One can leave some small trees to meet VR standards, but advocates emphasize that VR is not highgrading. The emphasis is on leaving dominant trees as biological legacies – not only for genetics, but also for what they contribute to forest function as they age, die, become snags, then eventually fall to the ground and provide large pieces of coarse woody debris.

"Use the forest Luke". Many Idaho forest owners are already practicing some degree of VR if they have a stream going through their property. Idaho forest practice laws require leaving some green trees along streams to sustain riparian function. This points to a key VR theme: locating the most strategic places to retain trees, sometimes referred to as *control points* or *anchor points*. For example:

- Which areas of the site are wetter and can better support shade tolerant regeneration?
- Which areas are challenging to plant, or have wildlife habitat features to keep (more snags, talus slopes, or other habitats)?
- Where would retained trees fit best with the most efficient and least damaging paths to remove logs?
- Are there areas with unique plant habitats that you want to protect (e.g., bogs).

VR is worth a look.

The public aversion to clearcuts is so culturally ingrained that some believe keeping a "social license" to practice forestry requires leaving more green trees in stand regeneration harvests, even to the extent that form of disturbance departs from local historical ecological disturbance patterns. VR may not fit with all owners' objectives, but elements of VR are appealing to family forest owners who do not like clearcuts. Many family forest owners like having some large legacy trees on the property simply for their testimony to the grandeur of nature.

Since VR is a relatively new practice there isn't a lot of research on it yet, especially on Inland Northwest forests. For more detailed information on VR, see citations listed at the end of this article.

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[1] Dictionary of Forestry, Society of American Foresters

[2] Franklin, J.F., D.R. Berg, D.A. Thornburg, J.C. Tappeiner. 1997. **Alternative silvicultural approaches to timber harvesting: variable retention harvest systems.** In: Kohm, K.A. and J.F. Franklin (Eds.) 1997. Creating a Forestry for the 21st Century. Island Press, Washington, DC, pp. 111-140

[3] Mitchel, S.J. and W.J. Beese. 2002. **The retention system: reconciling variable retention with the principles of silvicultural systems.** The Forestry Chronicle 78(3): 397-403

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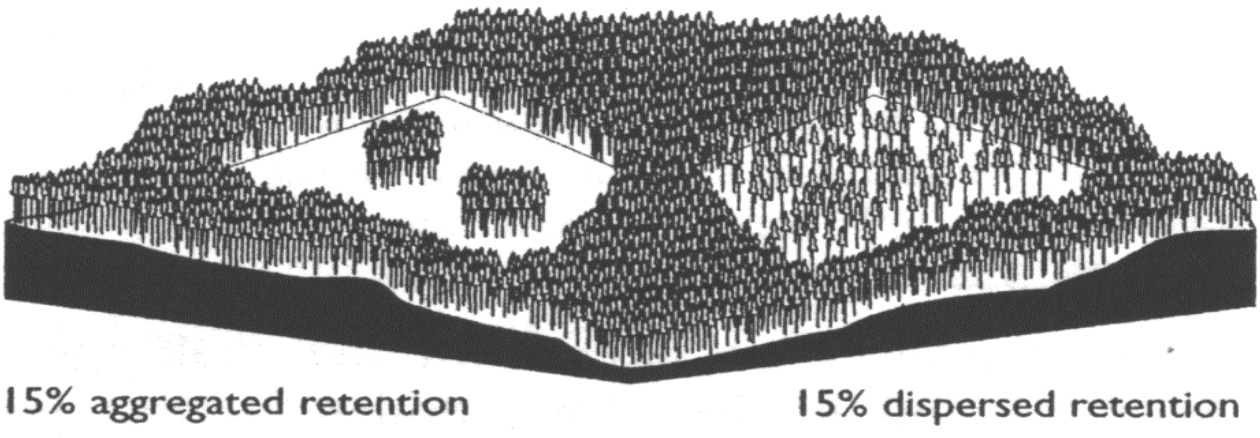

Aggregated vs. Dispersed Retention (from Franklin et al, 1997[2])