

# Silviculture in the Pacific Northwest: adapting to new climate, environmental and social realities

Travel to the US National Silviculture Workshop with support from the Forest Industries Education and Provident Fund presented an opportunity for **Professor Edward Wilson** to learn about innovations in silviculture.

Reflecting on a recent study visit to coastal British Columbia (BC) and western Washington State, I was struck by the profound shifts taking place in silviculture and forest management. In a region renowned for timber production, a new paradigm of holistic, ecologically-centred forest stewardship is emerging, driven by climate change, biodiversity loss, and evolving societal expectations.

Underpinning the transformation in forestry is the concept of adaptive management. This is a “learning by doing” philosophy with continuous improvement of silvicultural practices based on scientific information and monitoring.

It was central to discussions during the biennial US Forest Service (USFS) National Silviculture Workshop, where over 300 silviculturists from across the USA gathered to share learning, research and experience.

## Mature and old-growth forests

Undoubtedly, the priority for forestry in Washington and British Columbia is the management and conservation of Mature and Old-Growth (MOG) forests. Recognised as ecologically vital, they provide critical habitat, enhance resilience, and deliver environmental services like carbon sequestration. They are also noted for their productivity, complexity and longevity.

Major forest types include the Sitka spruce that occupies the humid coastal zone, Douglas fir which is dominant further inland, and mixed conifers found in mountainous areas.

For many decades, forestry practices have been under intense public scrutiny. Clear-felling was the main silvicultural system, which replaced many old-growth forests with young plantations. Debate about old growth conservation during the 1980s and 1990s resulted in governance structures and policies that give communities, industry and indigenous peoples more equal voices in planning decisions.

However, efforts to re-balance the management of MOG forests have presented new challenges. For example, the USFS introduced a Northwest Forest Plan (NWFP) in 1994 that allocated 80% of the federal forest area to old-growth

reserves. This was successful in curtailing clear-felling, but industry often failed to secure alternative timber supply and catastrophic wildfires have destroyed more old-growth than was added since the plan was introduced.

These issues have exposed a limitation - well-intentioned conservation plans can be undermined by larger, climate-driven environmental shifts.

British Columbia also implemented moratoria on timber harvesting over millions of hectares of MOG forest. Again, challenges exist in deferring timber harvesting and dealing with large-scale forest fires.

Indigenous leadership has become a key factor in planning, protection, and resource allocation. As a result, new models are emerging to ensure equitable economic returns and integrate Indigenous land-care practices.

## Silviculture innovation

During my travels, I saw first-hand how silviculture focuses on delivering diverse objectives, including forest successional pathways, watershed protection, scenic values, ecological restoration, wildlife habitat, and sustainable wood production.

Variable-Density Thinning (VDT) in mature stands has been widely adopted >>



Forester Rachel Shanner surveying an old-growth forest block in the MASS research study

for commercial thinning. This reduces stand density and promotes structural complexity by increasing variation in tree spacing, and through “skips” and “gaps” that mimic natural disturbance patterns. VDT-treated stands generally develop richer understories, compared with traditional thinning that prioritises uniformity of timber crops.

Variable Retention Harvest (VRH) is another practice that increases structural diversity of stands while retaining elements of the existing stand for at least one full rotation; typically 10-70%. Studies show a positive correlation between retained structural elements and levels of biodiversity in a coupe, creating conditions akin to continuous old-growth forests.

Although considered a closer-to-nature system, significant planning and stand manipulation is required to achieve desired outcomes.

### **Adaptive management: A framework for continuous learning**

Adaptive management is now enshrined in forest policy and governance across the region. Major initiatives include Washington’s 1999 Adaptive Management Program and BC’s 2005 “Forests for Tomorrow” (FFT) programme that was implemented in response to large-scale wildfires and the mountain pine beetle epidemic.

In 2020, BC introduced the Silviculture Innovation Program (SIP) to enhance multi-value forest stewardship through silviculture research and extension.

Within the US Forest Service, the 2012 Planning Rule places an emphasis on the role of science in planning, monitoring and adaptive management. Silviculture is now recognised as a specialist area

of professional practice. The National Advanced Silviculture Program (NASP) provides graduate-level training for foresters who wish to progress as Certified Silviculturists.

### **Long-term research**

Both Washington State and British Columbia have invested substantially in long-term studies that support adaptive management. The complexity and scale of many of these projects often requires multi-disciplinary, multi-partner collaboration – a feature of forest research in the region.

Two large-scale research initiatives featured during my visit. Both were initiated in the 1990s to support ecologically-based guidelines for thinning and harvesting operations. In Washington’s Capitol State Forest, the Silvicultural Options Study (SOS) has generated detailed data from the impacts of silvicultural interventions on harvesting costs, regeneration, wildlife, biodiversity, and forest health.

On BC’s Vancouver Island, the Montane Alternative Silvicultural Systems (MASS) Study aims to support ecologically-sustainable silvicultural systems in MOG forests at higher elevations.

A visit to the Wildwood private woodlot was also highly informative. The former owner, Merv Wilkinson (1913-2011), practiced individual tree management in a Douglas fir old-growth forest; a rare example where clear-felling has been avoided. He kept detailed records of his interventions and never harvested more than the annual increment. Now owned by the Ecoforestry Institute of Canada, it is an inspiring reference site for future silviculture innovations.

### **Charting a resilient future**

My abiding impression from this visit is the high level of commitment to silvicultural science and evidence-based practices in managing MOG forests. The transition towards multi-value, ecologically-based forest management is underpinned by robust long-term research and comprehensive extension programmes.

Silviculturists are recognised as specialists with a distinct career pathway. Policy frameworks are evolving to prioritize mature and old-growth conservation and foster collaboration with Indigenous peoples.

Many challenges persist, including equitable implementation of old-growth deferrals for industry, achieving Indigenous co-management, and adapting to climate-driven disturbances like wildfires. Continued success hinges on sustained investment in interdisciplinary research and knowledge transfer, fostering collaborative governance, and embedding climate resilience as a core tenet of management decisions.

The journey towards sustainable and resilient Pacific Northwest forests is an ongoing, complex, and adaptive process.

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Visit to the SOS in Capitol State Forest, Washington





# FORESTRY & TIMBER NEWS

August / September 2025 Issue 130

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