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# Future Concepts in Uneven-Aged Silviculture for a Changing World

*Report from the 9th IUFRO Conference on Uneven-aged Silviculture by Jim Guldin, Southern Research Station, USDA Forest Service, and Gary Kerr, UK Forestry Commission, Coordinator of IUFRO Research Group 1.05.00*

*Interest and application in the subject of management of forests using uneven-aged silviculture is gaining importance worldwide. It is now recognized that this approach to management is possible with many species, on a wide range of sites wherever forests exist. The origin of uneven-aged silviculture was what we now regard as the classical examples from central Europe. This type of silviculture has evolved and developed throughout the world and there is now a dazzling array of different methods of application all of which stay true to the basic principle of sustainability. In a politically, economically and climatically changing world, uneven-aged silviculture is now confronted with new challenges and questions.*

This was the background to the **9th IUFRO International Conference on Uneven-aged Silviculture** held on 17-19 June, 2014, at the Swiss Federal Institute for Forest, Snow, and Landscape Research WSL in Birmensdorf, Switzerland (*conference website*). The conference was superbly organized by Andreas Zingg and his research team at WSL and featured 18 hours of presentations, an interactive poster session and a 12-hour field trip. For 20 lucky people there was a sublime 5 day post conference field trip. Rather than take a narrative approach to summarize the meeting we have tried to distill the conference into five key issues.

**Discussion of the European concept of "Close-to-Nature" management in a global context.** The "Close to Nature" philosophy of forest management is in vogue in Europe, and represents an approach that provides an array of ecosystem benefits using silvicultural techniques that resembles natural disturbance events and naturally-occurring ecological patterns of stand development. The iconic silvicultural system by which close-to-nature philosophy is implemented in Europe is the plenter system. Given that the prevailing natural disturbance events in large areas of Europe often create single-tree or small group openings in stands dominated either by mixed conifers or by broadleaved forests, there is a certain degree of logic to this association of the plenter system with close-to-nature principles. However, there is some question about whether the close-to-nature principles translate well in other parts of the world. This is especially the case in North America, where the actions of natural disturbance can be far more varied especially at larger spatial scales.

**The role of ProSilva principles in defining and implementing uneven-aged silviculture.** Related to the concept of the "Close-to-Nature" is the ProSilva movement, a European federation of foresters who advocate the application of silvicultural practices in ways that optimize the maintenance, conservation, and utilization of forest ecosystems in an ecological and socio-economic manner that is profitable and sustainable. The fundamental question

*Uneven-aged silviculture is used to manage 'les forêts de la Montagne de Boudry'. IUFRO delegates inspect a 'martelosocpe' which is used for training forest managers to implement uneven-aged silviculture. (Photo by Gary Kerr)*

is whether the ProSilva principles are set in stone or whether they are flexible enough to allow silviculturists to apply innovative practices in the context of changing climatic conditions or ownership objectives. One example that was mentioned was whether underplanting native species not found on a given site, or perhaps even planting exotic species like Douglas-fir, would be consistent with the ProSilva principles if that planting was done to reduce risks of a changing climate. There was a lively debate about the wisdom of creating situations where a forester's choice of silvicultural practices might be unduly constrained because of pre-existing standards and guides, especially in the context of an uncertain future.

**The role of uneven-aged silviculture in the context of changing climate.** A number of presentations provided excellent insight on the role of uneven-aged systems in the maintenance and enhancement of stand- and landscape-scale heterogeneity in species composition and stand structure, and the values that heterogeneity brings in a period where climatic changes are forecast. Several speakers presented concepts that suggested variations of classic plenter approaches might be useful. Examples included creating larger openings such as group selection to encourage development of species intolerant of shade, enhancing species composition of natural regeneration, using a larger range of varied cutting patterns to promote heterogeneous conditions on the landscape, managing forests to promote mixtures of species and structure, increasing reliance on minor species that are currently not widely represented in forest stands but that might in the

future, and the application of non-native seed sources or species provenances if indications are that these might be robust in the climate expected in the future.

**Potential of uneven-aged silviculture in light of an expanding disturbance effects upon stands and landscapes.** Several speakers raised an issue that had not been widely raised at the meeting, specifically the question of the threat of disturbance in a changing climate. One speaker raised an issue that has had some attention outside of Europe as well, which is that the likely manifestation of changing climatic conditions will not be by sudden effects from temperature change but rather by an increased occurrence of endogenous or exogenous disturbance events to which foresters will be asked to respond. As a concrete example, another speaker pointed to the increasing pace of insect and disease attacks over the past two decades in Great Britain, amid expectations that the climate of southern Britain in 2080 could resemble that of parts of southern Italy. Silviculturists will have their hands full in efforts to adapt forests in ways that increase resilience to biotic threats and climate change whilst maintaining productivity.

**Promoting heterogeneous forest conditions around the world.** Presentations falling under this issue aligned under two different concepts. Some papers described and quantified progress in converting homogeneous even-aged plantations into increasingly heterogeneous structure by establishing new age cohorts and enhanced variation in canopy heterogeneity. Examples included work in northeast China, the island of Hokkaido in Japan, and Sitka spruce plantations in southeast Alaska and in Great Britain. Others studied old-growth conditions, in and of themselves or in comparison with managed stands, to provide insights into quantifiable aspects of stand- and landscape-scale heterogeneity, with examples drawn from the old-growth beech forests in Ukraine, managed and old-growth stands in Bosnia-Herzegovina, angiosperm podocarp forests in New Zealand, and Canadian boreal mixed woods forests.

This was an excellent conference and we are already planning our 10th Meeting in Arkansas, USA in 2016.

*WSL Research Plot 01-051 at Gutschwald, Höhronen. A stand of European silver fir, Norway spruce and beech managed using 'plentering'; data has been collected since 1983. (Photo by Gary Kerr)*