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Silvicultural Decisions VIII - The Role of Silviculture in Meeting Riparian Objectives

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I've (Ron) spent most of my 36 years as a forester studying and applying silviculture in primarily upland situations. Although some of my earliest experiences involved cruising the great swamps of Florida's Appalachicola River and Georgia's Okeefenokee, I really never paid much attention to riparian forests in Idaho during my 30 years here until the last five years when I began to teach in our LEAP (logger education) classes which include field exercises on stream protection zones. Like the uplands I am more familiar with, it became obvious to me that succession (the change in vegetation over time) in riparian settings also accelerates when these zones are protected from disturbance. It seemed to me that many riparian plant communities today might be as unprecedented as our vast, late-succession upland forests that challenge restoration advocates. I began to formulate questions about changes in soil and water chemistry, impacts on riparian fish and wildlife, erosion and other threats to water quality and formed a generalized notion that these changes need to be recognized, studied, and considered to effectively manage riparian ecosystems. When I bounced my ideas off the fish and wildlife professionals that I occasionally encountered, it didn't seem to be an issue with them. The Forest Practices Act that governs timber harvest in Idaho, like similar laws in other states, is primarily geared towards reducing sedimentation and providing shade, and does not address species composition or tree density beyond a minimum. By this time, I thought I had formulated a revolutionary, albeit obvious, concept and that the sooner it was revealed the better. Everyone, it seemed, was focused on streams as the most critical habitat issue in the Pacific Northwest, and perhaps everywhere else.

About a year ago, a recently retired Range Ecologist, Dr. Alva H. Winward (Ph.D. UI, 1970), was to visit our University, and I took advantage of his offer to meet with interested faculty. Here, I thought, was a chance to test my riparian concepts with someone that would have some background in the subject, since most range conservationists regularly deal with riparian impacts. Dr. Winward was gentle as he vigorously supported my concepts while revealing that they were hardly novel. In fact, he discussed and later provided me a paper he wrote in 1976 (of the same title as this article) and later presented and published in 1989 at a regional silviculture workshop while he was Regional Ecologist for the Intermountain Region of the Forest Service. What follows are ***his*** wise words, with a few parenthetical comments I provided for the Northern Rockies outside the drier forest types typical of the Intermountain Region. His message is timely, important, and to many ***is*** revolutionary. It is as true and applicable today as it was in 1976.

In the USDA Forest Service Intermountain Region, approximately 20 to 30 percent of the riparian areas currently have a dominant tree canopy. Probably over 80 percent of our riparian areas potentially could support a dominant tree overstory if successional processes were allowed to proceed without some type of interference. Common riparian tree species in this region include: cottonwoods, aspen, maple, box elder, birch, alder, subalpine, grand and white fir, Engelmann and blue spruce, and in some settings lodgepole pine (and western redcedar, white pine, western and mountain hemlock in the north).

Historical records and photographs indicate that fire played an important role in riparian species composition just as it did on our upland settings. The nature of historical wildfires logically suggests that burns did not necessarily stop at the upland/riparian interfaces. Instead, they often burned through these wetter areas too, removing or reducing the woody species. Most likely, many of the original tree species in riparian settings were comprised of deciduous, resprouting species such as cottonwoods, aspen, alder, birch and

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others. Later successional, nonsprouting species such as the firs, spruce, (cedar, hemlock) and certain pines were likely spotty, temporary dominants in riparian settings.

Such is not necessarily the case now**. Our successful efforts at controlling wildfires has not only allowed a proliferation of woody species on much of our uplands but has likewise allowed a gradual yet continual build up of coniferous trees in our riparian settings.**

For those who might emphasize wood production, this move toward conifers may seem positive. But, **from an ecological standpoint, might these changes be disruptive?** Many of our riparian systems that have live, moving surface water present, i.e., those associated with creeks or rivers, often require the presence of special hydric (water adapted) understory species in order to adequately withstand the erosive forces of moving water. As succession advances toward a conifer overstory, these understory hydric species are gradually shaded and crowded out of the composition. Unless there is a high percentage of boulders and cobbles in the stream bed and on the stream banks, the conifer roots alone, without additional backup from the roots of understory hydric species, will not provide the stability necessary to allow a balance between bank building and bank breakdown processes. In these kinds of settings, we can benefit from silvicultural practices that prevent such conifer dominance. (Evidence from soil/water chemistry studies suggests dramatic changes in pH (acidity), nutrient composition and cycling with these vegetation changes, which would greatly affect riparian organisms.)

There is ample evidence of settings where dense conifer canopies exist with essentially no shrub or herbaceous understories present. In these settings, stability of banks has been critically reduced Mechanical forces of water eventually cut around root-clumps of the trees resulting in a deposition of the tree, root-clump, and soil into the stream system. While some of this is likely natural, accelerated (bank) cutting alters the stream channel too rapidly and adds abnormal amounts of sediments and woody debris into the stream.

Under presettlement conditions it appears that the presence of small patches or scattered individual trees in our riparian ecosystems was likely a normal situation. Under the more open, scattered canopies other tree, shrub, and herbaceous species provided the required stability to the system while, at the same time, allowed some "normal" amounts of woody debris to become a natural part of riparian ecosystems.

In addition to a higher degree of riparian stability with the mid-successional species, the deciduous overstory species, along with the properly adapted understory species, provides an ecological setting unmatched for diversity of plant and animal species. This is the natural setting and habitat for many of our native bird and mammal species. Scenery offered by this diversity is often favored by many of our recreating public as well.

Many advocate no timber harvesting in riparian settings. Generally, this restriction is related to the extreme damage that can take place in the wet settings during the logging operation and to the potential detrimental effects on stream habitat and water quality. However, in the interest of ecological stability in riparian settings it gradually is becoming necessary to initiate some type of management process that will restrict dominance of later successional (conifers).

Depending on the setting and on other special circumstances, the removal or thinning of these trees may be accomplished through either prescribed fire treatments or through appropriate timber harvesting practices. Any silvicultural practices will have to be done in a special and gentle way in which damage to the other vegetation and to the soil and water resources is minimized. Seldom will it involve a complete tree removal process. Instead, harvesting will have to be accomplished in a series of entries where all trees are not removed at once. Also, we will need to leave an appropriate amount of trees to live and die in the system; this apparently was nature's way. Recent studies are providing information on the need for large woody debris in riparian systems. Now, we need to develop information that provides us a better feel for how much to leave in different riparian settings. (Much of this information has been gathered and incorporated into current riparian regulations, but without regard to composition, often emphasizing conifers and overlooking pre-fire reference conditions).

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