

Natural regeneration of conifer in managed riparian forests

Large woody debris (LWD) is a critical component of stream habitat for a host of aquatic organisms. Past disturbances, including fires, floods and logging, have resulted in an abundance of non-coniferous species in many riparian areas. The natural input of high quality LWD into streams is dependent upon the presence of large conifers along streams in the riparian zones. Mature conifers are taller, have larger diameters, and decay more slowly than non-coniferous trees.

Stand management prescriptions can significantly affect stream conditions in riparian zones in managed forests. The composition and structure of the adjacent riparian forest determine many in-channel responses. In order to provide a continuous supply of high quality LWD to the stream channel, conifers need to be able to reestablish in streamside areas.

Deciduous species such as red alder and salmonberry dominate many riparian areas and can inhibit colonization by conifers. Recent research has identified the conditions that help or hinder conifer establishment in riparian areas forested primarily by red alder.

Seed Source

Conifer regeneration rates in managed forest riparian areas are controlled primarily by the availability of shade tolerant conifer seed. Riparian areas in close proximity to mature (>60 years) forest patches containing shade tolerant species had significantly higher rates of conifer regeneration than areas without such seed sources (e.g. areas dominated by cultivated stands of Douglas-fir in the adjacent upland forest). In areas adjacent to mature seed trees, shade tolerant species including western hemlock, Sitka spruce and western red cedar were able to continually establish under a deciduous overstory.

Substrate

Provided a source of seed was present, rooting substrates and understory vegetation were found to significantly alter the patterns and rates of regeneration. Coarse woody debris and mineral soil substrates contributes to regeneration success, while seedling establishment was less successful on litter. All shade tolerant species were able to successfully establish in areas of dense herb and shrub covers, albeit at rates lower than when herbs and shrubs were absent. The results suggest that green tree retention of shade tolerant species may be a more effective, less expensive and lower maintenance management strategy than vegetation control for increasing the conifer component of riparian areas.

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