RIPARIAN PROTECTION RULES FOR OREGON FORESTS[1]

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Abstract: Forest Practice Rules under the Oregon Forest Practices Act were modified in 1987 to increase protection of riparian areas adjacent to timber harvest operations. These modifications addressed concerns about water quality protection and retaining trees as sources of large woody debris for future stream channel structure. The rule changes triggered debate about the quantity and quality of trees that should be left in riparian zones. Issues still under discussion include the silvicultural consequences of these rule modifications, and the need to better predict the costs and benefits of the rule changes.

The management of riparian forests in Oregon has changed greatly since the 1960's and 1970's. In those years, the major riparian concerns were these: removal of log jams to keep streams open for fish passage; management of logging slash to avoid deaeration or excess leaching of organics; provide shade to minimize stream temperature increases and control of sedimentation from activities adjacent to streams. The Alsea Watershed Study, begun in 1959, provided an example of water and stream quality impacts that can result from unusually intense forest harvesting and site preparation (Moring 1975, Beschta 1978, Hall and others 1987). This study influenced Oregon's Forest Practices Rules, which were the first in the United States to specifically address protection of water quality (Brown 1978). Since their adoption in 1972, these rules have been reviewed and modified in response to new research and expanded demands on forest resources.

This paper chronicles the development and implementation in 1987 of rules specifically designed to improve protection of riparian habitat for fish and wildlife.

Pre-1987 Rules and Objectives

Before 1987, the Forest Practice Rules concerning stream management zones focused on protecting water quality, specifically: temperature, dissolved oxygen, and suspended sediment. For example, the Rules (Oregon State Department of Forestry 1983, 629-24-545[1]) required timber operators to:

> Fall, buck, and limb trees so that the tree or any part of it will not fall into or across any [fish-bearing] class I stream. Remove all material that gets into such a stream as an ongoing process during harvesting operations. Place removed material above high water level.

This rule kept fresh slash out of streams to maintain dissolved oxygen levels. Other rules promoted shading of streams, protection of streambeds and streamside vegetation from disturbance, and control of sediment- carrying drainage from up-slope sites. Although the pre-1987 rules were developed to protect water quality, the language allowed for individual interpretation of what was required on each site. The rules did not specifically protect existing large organic debris in streams or manage for future recruitment of large organic debris.

Environmental groups questioned whether these rules adequately protected fish and wildlife values. To address these concerns, the State Forester appointed a technical task force to review the existing Forest Practice Rules for riparian zones. In December 1985 the task force presented a report that recommended substantial modifications to the Rules (Carleson and Wilson 1985). These modifications included new definitions describing the riparian area. They also included rules that would reduce management disturbance and retain large trees (including conifers) within the riparian zone. In April 1987, after a lengthy debate by industry and environmental groups, the Board of Forestry adopted new Forest Practice Rules effective August 1987 for operations near streams.

1987 Modifications to the Rules

The new rules identified three zones (fig. 1) near significant fish- bearing streams: aquatic area, riparian area, and riparian area of influence. The aquatic area includes the stream channel (or lake-bed or wetland) to the high water level. The riparian area is the zone next to the aquatic area, and it generally includes wet soils and water-loving plants. The riparian area of influence is the transitional zone between the riparian area and the upland vegetation. Together, the riparian area and riparian area of influence make up the riparian management area (RMA). Under the new rules, the

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width of the RMA on each side of the stream shall average three times the stream width but shall not average less than 25 feet (7.6 m) or more than 100 feet (30.5 m).

The new rules maintain some on-site management flexibility. For example, the RMA width must only average three times stream width: RMA width can vary according to terrain and management requirements. However, the new rules identified some basic requirement for RMA's. The five major "leave" requirements for RMA's are:

1. Leave 50 percent of the preoperation tree canopy within the riparian area.
2. Leave live conifer trees equaling at least an average of 9 trees per acre (22 trees/ha) and at least 10 square feet of basal area per acre (2.3 m^2/ha) within the half of the RMA closest to the stream or within 25 feet (7.6 m) (whichever is greater). [For a buffer strip 100 feet wide on each side of the stream, this rule indicates that at least 2 conifers per 100 feet of stream need to be left.]
3. Leave all downed wood in the aquatic and riparian areas and unmerchantable downed wood within the riparian area of influence.
4. Leave 75 percent of preoperation shade over the aquatic area.
5. Leave all snags that are not a safety or fire hazard in the RMA area.

Other rule changes set limits on management activities allowed in the RMA. They also added a classification of special tributary streams which influence the temperature in significant fish-bearing streams. Specific rules are being developed for these types of tributaries.

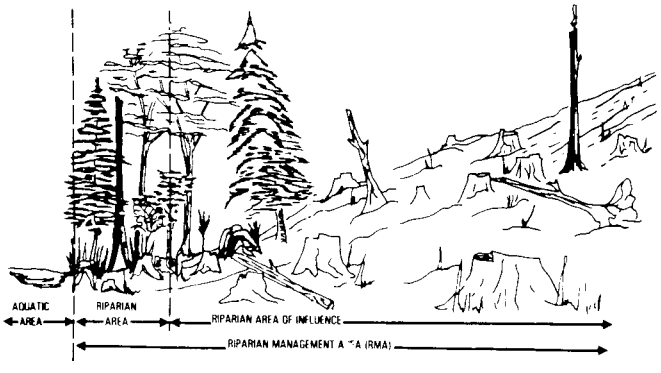

Figure 1— Classification of the Riparian Zone Under 1987 Oregon Forest Practices Rule Amendments

Concerns About Rule Modifications

During the debate about how the rules should be changed, industry, environmental groups and the Board of Forestry were hampered by the difficulty involved in quantifying benefits of different riparian management alternatives. Environmental groups supported stricter standards and greater retention of trees in the RMA. They argued that (as the technical task force reported) large organic debris is needed for stream habitat protection and that future sources (big trees) need to be retained. Environmental groups recommended that RMA's retain at least "18 conifers over 14 inches DBH per acre of riparian management area comprising at least 20 square feet basal area of conifer" (Ketcham and Houck 1987, p. 24). Half or more of these conifers were to be of merchantable quality. Andrus and Froehlich (1987) have found that some riparian forest conditions (such as terraces) probably were never heavily stocked with conifers. In part because forest stands are rarely fully stocked and these recommendations would have allowed little or no harvesting in the RMA, the Board did not adopt these recommendations (Oregon State Board of Forestry 1987).

Representatives of the forest industry argued that water quality was already being protected by the existing rules and that additional costs for providing woody debris should be compensated (Ice 1987, Wilson 1986). A tour of sites managed under the pre-1987 Rules showed that the majority of riparian zones were already meeting the proposed standards (Carleson and Wilson 1985). The forest industry was particularly distressed by the inequity of stream protection requirements for timber management when compared to other land uses (i.e. agriculture, range, urban development, etc.) Important uncertainties for industry were the quantity and quality of woody material needed by streams, the degree of management constraints that would result from the new rules and the level of reduce economic returns.

The Board of Forestry weighed both arguments, and approved new rules that promoted recruitment of some large organic debris while allowing limited harvesting and management in RMA's.

Application of the New Rules

Although the forest industry did not support the changes made in 1987, it has always had a high level of compliance with the Forest Practice Rules. Compliance is fostered by a State Forest Practices Program which emphasizes avoiding problems. A series of Forest Practice Notes is published to educate operators about the need for regulation of forest practices, and to clearly

describe management requirements (Oregon State Department of Forestry 1987a). In addition, the State Forester must be notified 15 days before forest management operations. Preoperation inspections help the operator choose the best available management practices. An average of about 70 percent of high- priority sites (those with the greatest potential for resource damage) receive one or more preoperation inspections. For areas where the risk of landslides is high, written plans must be submitted before operations begin. Since 1981, less than two percent of active operations have received forest practice citations (Oregon State Department of Forestry 1987b).

Barringer (1987) described the economic effects of the new rules on a 30-acre private timber sale on the west slope of the Cascades. Under the new rules, 13 acres would have to meet basal area and stocking level requirements for large conifers. The value of this timber was about $32,000. The low basal area and stocking levels for large conifers in this stream reach would allow little removal of timber. Operating, under the previous rules, the timberland owner was able to harvest some of the timber within the buffer strip and recover about 75% of the value from the buffer. Where stocking levels and basal areas for large conifers exceed minimum requirements, opportunities exist to select cull and low timber values to maximize economic return to the landowner while still meeting the functional requirements of the riparian area. Similarly, Olsen and others (1987) found costs to landowners increased, largely in response to restrictions on harvesting of conifers.

Wells Creek, in the central coast of Oregon, provides an excellent example of the changes in management practices for riparian zones. Wells Creek is a Class I (fish bearing) stream, which flows through an industrial tree farm. The east side of Wells Creek was logged before the new rules. The west side was harvested under the new rules. Both operations occurred within months and had preharvest inspections by Oregon Department of Forestry staff. Figure 2 shows conifers and hardwoods left. The west side of Wells Creek has about 11 live large conifers per acre (27 trees/ha) with a basal area of about 47 square feet per acre (11 m^2/ha). There are also about four times as many hardwoods as conifers, and the basal area of the hardwoods is about twice that of the conifers. On the east side there are 4 large live conifers per acre (10 trees/ha) with a basal area of 33 square feet per acre (8 m^2/ha). Hardwood basal area is less (30 square feet per acre) on the east side, but there are several thickets of smaller hardwoods that were not counted. Despite the lost revenue of leaving these trees, there was good cooperation between the landowner and Department of Forestry staff in installing this riparian management area.

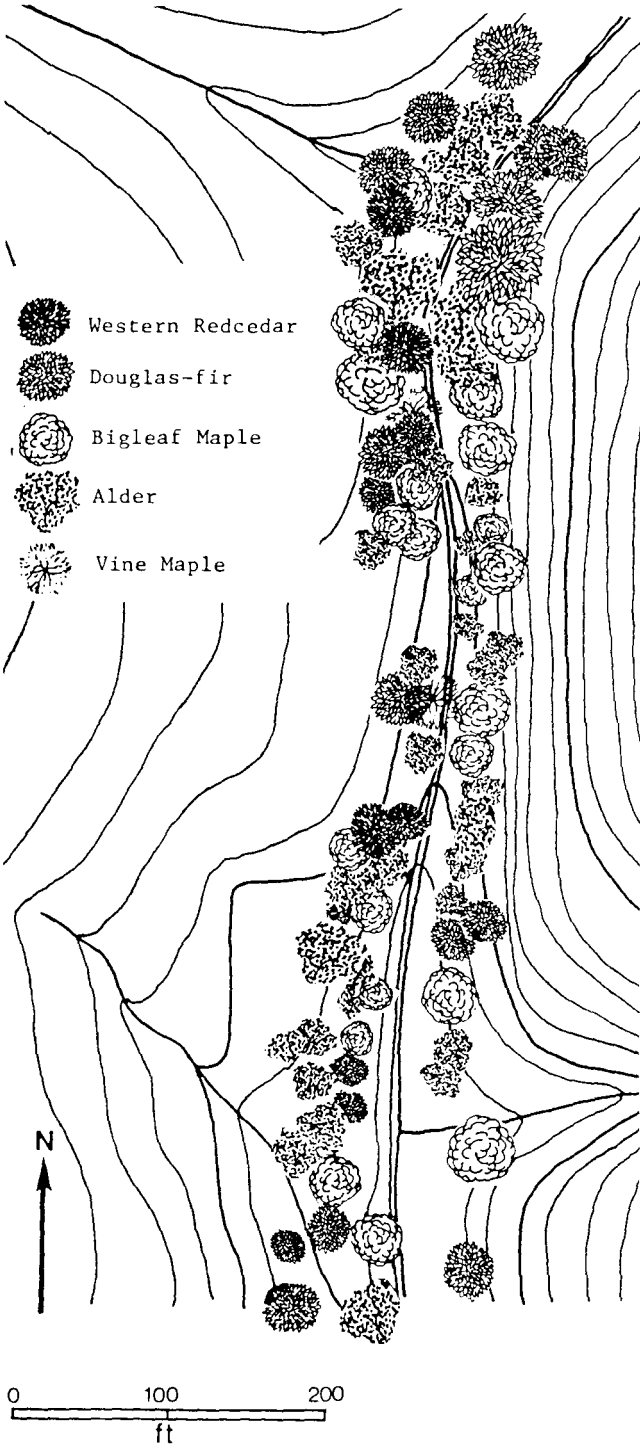

Figure 2— The Wells Creek Stream Management Zone Showing Trees Left Under New (West) and Prior (East) Forest Practice Rules

Issues Remaining

No one was completely satisfied with the final Rules. There is continuing concern about whether enough large organic debris will be available for streams to maintain or enhance channel structure and fish habitat. Quantitative data is lacking on the amount of woody debris necessary or optimum for wildlife habitat in riparian zones and up-slope areas.

Environmental groups continue to be concerned that the RMA is not wide enough to protect water quality. Forest managers question who is going to be held liable when trees are blown down into the stream and divert flow or cause other damage. For example, when trees left adjacent to streams blow down and disturb the channel that can cause short-term increases in suspended sediment for domestic water supplies (Oregonian 1987).

Silviculturally, some riparian areas could develop stable shrub communities that will contain no large trees. Hibbs (1987 p. 61) indicates that "...side light will allow the development of a shrub understory. As existing trees senesce, a gradual succession to a shrub community will probably occur. No tree regeneration is likely in the absence of deliberate efforts to secure it." If so, an improved understanding of how conifers regenerate in riparian areas is needed.

The economics of who pays for stream protection or stream enhancement—and how much it will cost—is still open to debate. Although much of the land and timber affected by riparian management guidelines is in private ownership, other values such as water quality, wildlife and fisheries are generally considered to be in the public domain. Thus the Oregon Forest Practices Rules will continue to be reviewed and modified as they have for the last 15 years, as new research is completed and new resource demands arise.

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