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HC 441: Columbia River Ecology  
Clark Honors College  
Fall, 2005

## **Riparian Management Regulations within the Columbia River Basin**

### **Introduction**

The Columbia River Basin offers a case study in the importance and conflicts that arise over riparian areas. Within the Columbia Basin there are rich forests that have been the historic economic backbone of the region. In addition, there is the strong salmon industry that is the cultural and historic economic backbone for many indigenous people in the area. These two industries both claim rights to the water and the land. Riparian zones bridge these two worlds both literally and metaphorically. Timber operators want to maximize profits and by doing so they often compromise the environment. The riparian areas are no exception and timber operators lose money by having to comply with riparian protection regulations. The region depends on the forests natural resources for a strong economy. Traditional management practices are often inadequate or difficult to change (US Department of the Interior 1). It is often difficult to see how riparian areas are important when we are cutting down entire forests.

On the other hand, we in the region are fighting to save Northwest salmon and preserve what is left of the endangered salmon runs. Many feel strongly about the environment. There is a history of mandating progressive regulations (at least in Oregon). The debate over riparian zones is at the heart of this conflict. Within the last decade, the scrutiny of riparian zones has increased dramatically. The number of journal articles written by scientists has increased significantly in the last twenty years. This increase reflects the tension between economic interests in cutting forests and economic and cultural interests in protecting and restoring salmon habitat.

**Background:**

Private holdings account for 347 million acres of the nation's forestland, in comparison to 136 million acres under federal ownership (NRC 177). Much of the nation's riparian areas are privately owned and used for a variety of activities. These include building, agriculture, grazing, timber harvesting and recreation. Each of these uses merits its own study; however, this paper will concentrate on riparian areas and forestry in the Columbia Basin. Since the 1990's state and regional governments in the Northwest (Oregon, Washington, California and British Columbia) have adjusted regulations to reflect this growing concern of riparian forests. However, after more than 150 years of severe clear cutting in the Pacific northwest, many riparian zones "show signs of ecological collapse" that riparian zone management will not be able to fix in the next century (Young 131). Therefore it is of particular concern to examine the state of riparian areas within the Columbia River Basin and the regulations governing their protection. This subject is vast and the importance is only beginning to be recognized.

**Definition of Riparian**

While many studies on riparian protection areas and buffer zones do not define the very subject that they are studying, it will be helpful to clarify key terms in this paper. At its base, riparian means nothing more than the land or its inhabitants around a body of water. Historically, riparian is often used in reference to riparian rights of farmers and closely associated with water rights laws. The use of the term riparian in the sciences began in the 1970's when scientists began exploring the importance of streamside systems (NRC 3). Today riparian is often used interchangeably with stream or river corridors. In a general sense, riparian includes all the flora, fauna and chemical components existing in an ecosystem adjacent to a body of water-usually a

river or stream. However, extended definitions of riparian areas include all ecosystems near a body of water including lakes and wetlands (Wenger 9).

The US Fish and Wildlife Service defines riparian as

Plant communities contiguous to and affected by surface and subsurface hydrologic features of perennial or intermittent lotic and lentic (wetland) water bodies (rivers, streams, lakes or drainage ways). Riparian areas have one or both of the following characteristics: 1) distinctively different vegetative species than adjacent areas, and 2) species similar to adjacent areas but exhibiting more vigorous or robust growth forms. Riparian areas are usually transitional between wetland and upland. (3)

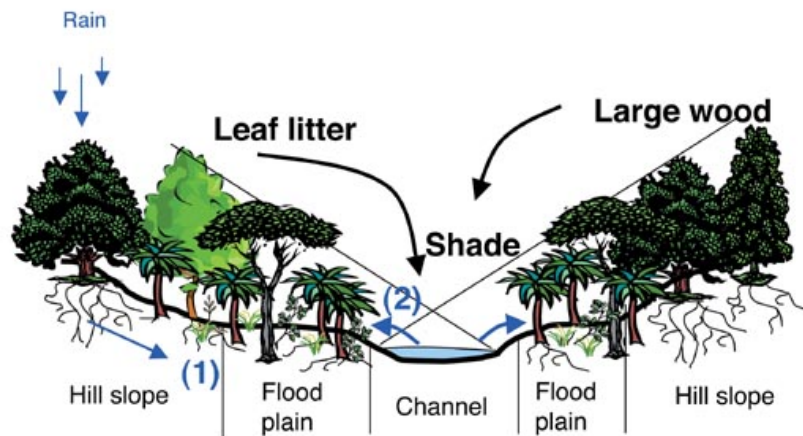
Different authors also employ different terms for assessing, protecting or utilizing the areas around bodies of water for conservation, scientific or economical purposes. Riparian buffers, riparian zones, riparian areas, riparian management, riparian protection, protected stream corridor are used interchangeably. Riparian buffer and its counterparts mean the areas surrounding the body of water that protected to some extent from human activity (Wenger 9). However, these terms also act as a blanket term for conservation efforts along streams and rivers.

### **Importance and Function of Riparian Buffer Zones**

Riparian buffers are key components to maintaining or restoring ecological integrity in both stream and riparian ecosystems. Riparian zones are unique in that they usually comprise a diversity of flora and fauna unlike those found in the surrounding forest or upland system. They serve as chemical, biological and physical boundaries between streams and rivers and the watersheds they drain (Young 1). The structure of riparian areas consists of parts of the stream channel system including gravel bars or wood debris, the area along the channel usually filled with vegetation, and a transitional gradient between the stream and the uplands (NRC 5). In addition, riparian areas serve as ways to connect headwaters with lowlands and provide the gradient through which nutrients, sediments, chemicals, particulate matter and organisms move

and cycle. This movement of chemical and biological matter occurs both laterally as well as downstream (US Department of the Interior 1).

Riparian areas can often extend far beyond what is traditionally thought of in riparian management zone policy. The term “riparian buffer zone” even brings a connotation of a specific geographic boundary. Yet this boundary is not sudden but rather a series of sharp gradients in microclimatic and ecological processes (Gregory 70). They are often large gradients. Riparian size and makeup is directly related to the amount of water coming through the watershed as groundwater or precipitation (NRC 52). The value of a healthy and functioning riparian zone is not well understood.



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### **Riparian Buffers in the Columbia Basin**

Riparian management and policy governing the areas becomes very complicated in any state. However, the Columbia Basin riparian areas are of extreme importance because of their diversity, ownership and importance to water quality and salmon use. The Columbia Basin runs through two countries, as well as four states (with three others minimally involved). The Columbia watershed is primarily a snowmelt watershed that passes through a variety of lands

that include many arid areas as well as densely populated forests (Todd). Currently the basin has hundreds of major dams that were constructed beginning in the 1930's in a drive to create jobs and make land as productive as possible. These dams have altered the seasonal flow of water through the basin and greatly influenced the size and flow rate of streams. This in turn influences the riparian productivity and protection. The Columbia River Basin contains 74 separate federal land units, 35 national forests, 17 Bureau of Land Management districts as well as significant private, state and tribal holdings (NRC 226).

Forests, privately, state and federally owned, make up a significant percentage of the Columbia Basin. Although statistics on just how much of the Columbia Basin is forested are vague, over 75 million acres are managed under the Forest Service. In eastern Oregon, 35 percent of the land is forested and actively harvested for timber (Campbell, Azuma, and Weyermann 5). Timber has become an integral part of the Columbia Basin economy and comes from an active history of deforestation. Heavy cutting in the basin began in earnest in the 1850's and has since become a mainstay in the northwestern economy. As a result, much of the virgin timber is located in largely inaccessible areas and commercial timber companies must attain lumber from second-growth forests. The quality of wood harvested from the basin began decreasing in the 1950's but resulted in little or no change in forest management (USDA 35).

Riparian areas in the basin contribute to salmon survival that is also of economic and social importance to the basin populations. Many of the endangered salmon runs are affected by the loss of riparian areas from deforestation, grazing or agriculture. Spring and summer Chinook salmon are particularly vulnerable to habitat destruction and degradation. Timber harvesting in the early 20<sup>th</sup> century stripped away vegetation and dried important wetlands that have

fragmented Chinook salmon populations. Loss of riparian cover led to “thermal and physical barriers and caused a significant loss of [salmon] productivity (Lichatowich and Mogrand x).

Another study examined how riparian management areas affected Chinook parr. From 1992-1998 chinook parr reared in intensely managed timber lands had the lowest survival rates among parr populations studied. Conversely, parr raised in areas of low road density, suggesting low human influence has significantly higher survival rates than in areas of high road density. The study concludes that land-use management plays a key role in the survival of Chinook salmon parrs during the last 6-9 months of their freshwater residence (Paulson and Fisher).

### **Current Regulations Governing Riparian Buffers**

States began to recognize the importance of regulating deforestation practices in riparian areas in the 1970's. Scientists, constituents, and policymakers agreed that historical forest practices dumped sediment into streams and destroyed important riparian vegetation. This trend has been particularly strong in the Northwest where forestry, interest in the environment, and love for the salmon industry are all key issues. This resulted in a flux of guidelines of “best management practices,” incentives and new laws governing privately owned land within the Columbia Basin.

While many states have agreed to implement riparian regulations, there has been little pressure at the Federal level to give attention to riparian regulations. “Few, if any, federal statutes refer expressly to riparian area values and as a consequence generally do not require or ensure protection of riparian areas”(NRC 16). The National Wild and Scenic Rivers Act does not call for riparian buffer nor does it consider stream corridors as special systems in need of special attention and protection. In addition, the federal government has not created a precedent in which riparian zones are given priority when land use conflicts arise (16).

Riparian buffer regulations vary on how land is used. States, particularly in the Northwest, are willing to regulate deforestation and riparian protection areas on private land. However, there is not the same willingness to restrict activity in the agricultural, grazing or urban development domains (NRC 15). Timber practices are given stiff regulations, whereas farmers are offered incentive programs and in some cases buying out farmers to not use land (15). Examination of riparian buffer regulations reveal that Canada is overall more progressive than its US counterparts. Mean buffer width regulations for the US and Canada varied from 15.1 to 29.0 meters depending on water body type. Canada has statistically higher buffer widths than the US but this is associated with Canada's larger boreal regions. (Lee 165). Examining the key states and countries within the Columbia Basin will reveal the varying value placed on riparian areas.

### **Oregon**

Oregon has enjoyed a long history of environmental activism and the regulations over riparian areas are the strictest within the US. Oregon was the first state to pass legislation concerning private forest practices in 1972 (NRC 235). The Department of Forestry recognizes three types of streams and three sizes. Type F streams include streams that have fish use and domestic water use. Type D streams are used for domestic use and, finally, type N streams are all the other streams that are not used by fish or human populations. However, a bylaw indicates that F streams will be considered to have fish if at any time of the year there are anadromous or game fish or endangered species fish in those waters. In addition, streams are classified as small, medium or large. Oddly, stream size classification depends on what type of stream it is. For example, Type F streams must be 100 feet wide to classify as a large stream but only 70 feet wide for a D stream. In addition, it is unclear how streams smaller than 20 feet wide are regulated and if they require riparian management areas. (Oregon Department of Forestry)

## **Washington**

Washington's jurisdiction over riparian buffers is established in the Washington Forest Practice Rules. Washington classifies streams into five categories and corresponding regulations according to areas of the states east and west of the Cascade mountain range. "None of the five stream types are protected by a no-harvest zone adjacent to the channel" (Young 135). In all Washington Riparian Management Zones timber harvesting operators must leave "an average of five of the largest trees per acre undisturbed...at least two of which must be alive" in some cases (135). In the largest fish bearing streams, Washington requires operators to maintain a 100-foot riparian management area where 50 percent of the trees are to remain standing. However, in type 4 streams, the smallest category, no trees are required to remain standing (Gregory 73).

## **Canada**

In British Columbia streams are classified into six classes. Classification is based on stream width and fish use. Riparian Management Areas (RMA) consists of Management Zones where timber harvests are limited and Reserve Zones where timber harvest is prohibited. Most isolated small streams that neither support fish nor are used for households do not fall under the mandatory no-harvest zones. No-harvest zones are implemented in larger fish bearing streams with larger streams allocated larger riparian buffers for up to 50 meters of no-harvest zones for the largest streams. In addition, within management zones, while harvest restrictions are not imposed, the government recommends "best management practices." These include leaving a percentage of trees uncut in RMAs. While British Columbia's approach to riparian buffers is unique, BC has shown a commitment to riparian ecological integrity. The protection of large and medium-sized fish bearing streams with no-harvest regulations offers a wider riparian buffer than other states within the Columbia Basin (Young 137-8).

**Idaho**

While Idaho does not strictly enforce their legislation concerning riparian buffers or stream protection zones, they encourage a minimum 75-foot buffer on each side of large Class 1 streams. SMZ (Stream management zones) are classified as having certain ecological value and while the buffer is not a no-harvest zone, timber operators should attempt to maintain the integrity of the site. Operators may do this by leaving 75 percent of the shade adjacent to streams and encourages operators to leave “unmerchantable conifers and shrubs” (Idaho 19). Operators will maintain sufficient groundcover to trap sediment. However, only the percentage of shade determined by the classification of the stream is enforced through the Idaho Forest Practices Act.

**Montana**

Montana passed the Streamside Management Zone law in 1997. The legislation language is the clearest among the Columbia Basin governments. Montana defines streamside management areas as the 50 feet on either side of a lake, river, stream, wetlands or any other body of water. The management zone must extend beyond 50 feet if necessary to include all wetlands. While the law prohibits clearcutting and many of the most harmful timber harvest practices in the SMZs, there are no regulations concerning how many trees or cover should be left within the management area. In addition, the state does not penalize timber operators for not adhering to the legislation. Without strict guidelines to follow, it would be nearly impossible for the state to penalize violators (Montana).

**Problems with Current Regulations**

Despite measures taken in each jurisdiction, none of the regulations are acceptable from an ecological standpoint. It is widely acknowledged that riparian zone management is a keystone in protecting the environmental integrity of fish and forest ecosystems; there is no commonality

among the five approaches to riparian management. Each jurisdiction has its own system of classification of stream size and use as well as what trees may be cut in riparian areas. Despite measures taken in each jurisdiction, none of the regulations are acceptable from an ecological standpoint. Studies conclude “no-harvest zones of 45 m were required to maintain natural microclimatic patterns near small streams in western Washington” (Young 139). Additional studies that have assessed the full complexity of natural riparian stream systems suggest that no-harvest zones of 70-90 m would be adequate. Currently, only Oregon and BC mandate no-harvest zones in any way. Oregon requires 6 meters of no-harvest area for fish and non-fish streams. British Columbia protects 20 m of no-harvest zones. Obviously, the regulations do little to sustain natural levels of riparian and stream ecosystems. One of the biggest risks to riparian zones is the removal of large conifers and lack of diversity within the riparian ecosystems.

State regulations often do not take “individual site characteristics” into account. As a result, many scientists disagree with requiring a fixed buffer width. (Brosofske et al. 188). The difficulties encountered in trying to reach an ideal riparian buffer zone width to please all parties may not be realistic.

### **Proposed Solutions**

It is clear that allowing each state to regulate riparian buffer zones creates a patchwork of hit-or-miss legislation. The Columbia River Basin is vast and encompasses many states and differing environmental views among constituents. As a result, “Significant protection and restoration of forested riparian areas across the United States are unlikely until a common framework is developed” (NRC 226). It would be equally optimistic to assume that a federation of Columbia River Basin states and Canada could work cooperatively to assess and implement consistent riparian regulations. A realistic solution to the riparian conflict would be a strong

federal regulation that laid the groundwork for riparian management regulations. Such regulations could be a defined minimum of 20 m of no-harvest zones on all fish-bearing and water-use streams of all sizes. While many scientists are moving away from blanket regulations, perhaps a simple federal mandate could set a precedent for larger riparian protection models in the future.

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