

# STATEWIDE RIPARIAN MANAGEMENT POLICY

## MAY 2002

### PREFACE

Oregon's rivers and streams flow through areas that are devoted to many different land uses. Many—if not most—land use and land management activities can have adverse effects on stream and riparian systems. They can contribute to water quality problems and flooding, and they can affect riparian and aquatic habitat productivity and function.

Even though streams and riparian areas are common to all land uses, there is no common basis for their management. Oregon does not have a comprehensive riparian or stream corridor management policy. This policy is being developed to provide guidance to state agencies and a framework for making improvements to agency programs that affect riparian areas. It consists of a policy statement, its purpose, guidance for its implementation, and background information on a “landscape approach” to riparian area management.

Central to the policy are three ideas: First, that the condition of riparian areas must be improved in order to meet Oregon's objectives and standards for water quality and healthy, productive stream systems and watersheds. Second, collaboration with all parties and interests will be essential to its implementation. And third, state agencies will need to create and seek out every possible opportunity to work with landowners and other agencies to both achieve their objectives and protect and restore riparian functions across the landscape.

### 1. POLICY

The Policy of the State of Oregon is to promote land use policies and land management practices that sustain streamside and wetland riparian functions that support desirable water quality, native fish populations, and wildlife across the landscape.

To implement this policy consistent with the need to protect and restore water quality and aquatic habitat, state agencies will:

- ❖ Promote the protection of properly functioning riparian corridors.
- ❖ Promote the restoration of degraded riparian areas.
- ❖ Utilize education, technical assistance, financial incentives and assistance, and regulation to protect and restore riparian areas.
- ❖ Recognize, accommodate and mitigate to the extent possible existing legal uses of private and public property that prevent restoring riparian areas.
- ❖ Coordinate the implementation of agency programs that affect riparian areas, and establish regional riparian management priorities.
- ❖ Develop a landscape approach to managing streams and their associated riparian features.
- ❖ Foster understanding of the public value of riparian areas and how protecting riparian functions can benefit landowners and improve the value of private property.

This policy is not intended to supercede any state agency authorities or practices related to the protection of public health and public safety.

## **2. THE PURPOSES OF THE RIPARIAN POLICY**

### **THE NEED FOR AN OVERARCHING APPROACH**

A single overarching statement of Oregon's management objectives for riparian areas, stream, and river networks is needed because:

- ❖ Oregonians place a premium value on clean, naturally functioning rivers and abundant native fish and wildlife, but public and private land management decisions in riparian areas are having unintended cumulative impacts on these important public values.
- ❖ Land management activities in riparian zones across different land uses are subject to inconsistent standards and expectations, resulting in the degradation of many stream systems.
- ❖ Stream and riparian systems are in serious danger of being irreversibly modified by the cumulative effects of individual riparian management decisions that are made without reference to, or regard for, the effect of those decisions on the function, health, and productivity of the entire stream system. Cumulative effects are of particular concern in developed areas.
- ❖ Riparian areas connect uplands with stream corridors and other water bodies in the landscape. Both ownership and management practices have segmented the stream and riparian corridor. The connection between riparian areas and surrounding upland parts of the landscape is of critical importance, since neither uplands nor riparian areas stand alone. The use, management, and regulation of upland and riparian areas need to be integrated so that riparian functions can occur within a sustainable social and economic environment.

### **THE PURPOSES OF THE RIPARIAN POLICY ARE:**

- ❖ To emphasize the need to use state agency resources and authorities to protect healthy riparian areas and restore degraded riparian areas.
- ❖ To provide guidelines for managing riparian areas in the widely differing circumstances that are encountered across the state.
- ❖ To provide for and support the development of a landscape—or watershed-level—approach to riparian area management.
- ❖ To provide for review of state agency authorities and programs that affect riparian areas as directed in Executive Order 99-01.

### **GOALS:**

To protect and restore riparian functions in watersheds across the state of Oregon.

To achieve clean water and high quality, productive riparian and aquatic habitats to support self-sustaining populations of native fish species.

### **MANAGEMENT OBJECTIVES:**

The objectives of this policy are for state agencies to work collaboratively with each other and with interested and affected parties to accomplish the following:

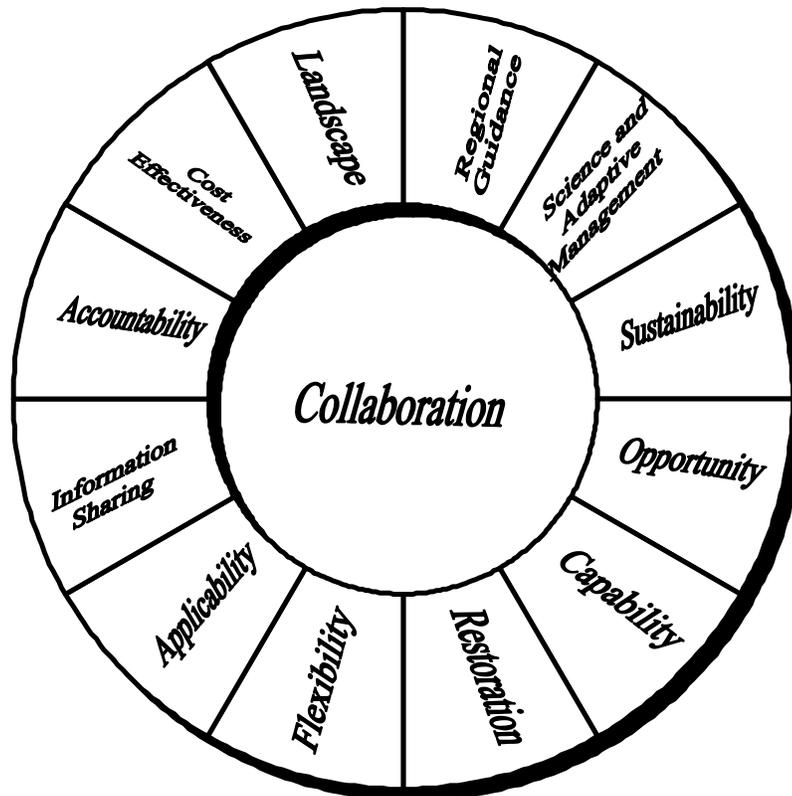
- ❖ Review the effectiveness of state agency programs affecting riparian areas as directed in Executive Order 99-01.
- ❖ Develop or revise state agency programs to protect and restore riparian functions to achieve water quality standards and healthy aquatic habitat, considering the capability of a site to provide needed riparian functions.
- ❖ Provide guidance for the practical implementation of the policy, considering the varied riparian areas and the broad range of land uses that affect riparian areas across the state.
- ❖ Develop a landscape approach—a comprehensive, integrated basin-level approach—to managing riparian areas. A landscape approach will need to develop common terms and definitions, integrate databases, and shared responsibilities for inventory, research, monitoring, and assessment.
- ❖ Develop methodologies to evaluate and assess the capability of a site to provide needed riparian functions, considering site potential; disturbance regime; past land use practices, commitments, and investments; and the value of recovered function compared to the cost of its restoration.
- ❖ Create and act on opportunities for riparian function protection and restoration on state owned and private lands.
- ❖ Provide opportunities to assist willing landowners to protect or restore riparian functions, through such tools as education, financial incentives, and technical assistance.
- ❖ Work cooperatively with federal, state, and local agencies, tribes, and private landowners to protect and restore riparian functions across the state.
- ❖ Provide a foundation for monitoring riparian area improvement, and for changing policies and programs where they do not achieve the goals of this policy.
- ❖ Ensure that land use and land management policies and practices anticipate and plan for more dynamic stream systems that could result from implementation of a landscape approach to managing stream and riparian systems.

### **3. GUIDING PRINCIPLES FOR IMPLEMENTATION**

As discussed below, a landscape approach to riparian area management means that decisions on how to use or manage a riparian *site* must be made in consideration of how activities on that site affect the hydrologic and ecological functions of the stream. Since a landscape approach to riparian management reflects an evolution in how state agency programs affect landowner activities, implementation of a landscape approach to riparian management will be based on several values and principles. The principles for implementation of the riparian policy outlined below are based in part on the *Enlibra Principles* developed by the Western Governor’s Association in 1998. The term *enlibra* is a hybridized Latin term meaning “to move towards balance.” (See Western Governors’ Association, 1998.) This list of principles is not meant to convey any relative level of importance. They all are needed and important, although in any given situation one principle may be more useful or important than another in order to achieve the objectives of the policy. One principle—*collaboration*—may rank somewhat higher than the others, if only because of the consistency with which it will be used. Collaboration will be the key to achieving the objectives of the riparian policy.

❖ COLLABORATION

State agencies should collaborate with each other, with federal agencies and tribes, and with local governments and private landowners to protect and restore riparian functions to achieve water quality standards and self-sustaining populations of native anadromous salmonids.



❖ SUSTAINABILITY

Riparian management programs and practices should be based on the principles of managing for sustainable environmental and economic productivity.

❖ OPPORTUNITY

State agencies shall pursue resources and create opportunities to implement this policy to achieve greater riparian area function and value. Public resources may be used to improve riparian functions on private lands where there are opportunities to work with private landowners who are willing to provide substantial commitment to achieve broader objectives related to watershed health.

❖ CAPABILITY

Measures to restore riparian functions on a site should be based on an assessment of the capability of the site to provide desired riparian functions. Determination of site capability

should consider site potential, current use, disturbance regime, site conditions, past development, the cost effectiveness of measures to restore functions, and potential conflicts between anticipated future uses and achieving desired riparian function on the site. State agencies shall coordinate the development of methodologies to assess site capability.

❖ RESTORATION

In this policy, the term “restoration” includes everything from a slight improvement of the structural or functional attributes of a site to the complete return to a pre-disturbance state, as well as the creation of a new ecosystem function that did not previously exist at the site. The range of possible approaches is commonly referred to by the terms enhancement, rehabilitation, restoration, and creation. Restoration decisions need to be made within the landscape context.

❖ FLEXIBILITY

The riparian policy shall be implemented by using all available tools, ranging from education, encouraging and supporting voluntary efforts, through the enforcement of existing legal requirements, and shall be based on an assessment of the particular circumstances that occur on a given project site.

❖ APPLICABILITY

This policy applies where riparian functions now support clean water and contribute to quality aquatic habitat, and where riparian sites are capable of being restored to provide natural riparian functions that are necessary to improve water quality and aquatic habitat, without resulting in a significant loss of private or public investment.

❖ INFORMATION SHARING

The efforts of landowners, individuals, and groups to implement the riparian policy should be clearly acknowledged. State agencies should develop a forum for exchanging information with other agencies and the public on successful approaches to implementing riparian restoration projects. To facilitate its implementation across the entire state, the forum should highlight success stories at all levels, by landowners, interest groups, watershed councils, soil and water conservation districts, local governments, and state and federal agencies.

❖ ACCOUNTABILITY

State agency boards and commissions shall evaluate their statutes, rules, and technical and financial assistance programs that affect riparian areas to determine if they are sufficient to achieve water quality standards and protect and restore aquatic habitat. By October 31, 2002, agencies shall provide a report to the Governor on the results of the evaluation, and on what authorities and financial resources are needed to fully implement the Riparian Policy.

❖ COST EFFECTIVENESS

In refining and administering programs that affect riparian areas, agencies should strive to identify the greatest opportunities to protect and restore riparian values and functions, considering such things as cost effectiveness; site capability; and the ability of partners to achieve the management objectives of the Riparian Policy.

❖ LANDSCAPE

Measures to protect and restore riparian functions, and to assess site capability, should be developed and implemented in consideration of available information about the relationship of the particular site to the entire stream network; an assessment of the potential functions it

can provide; and any available assessments of watershed conditions and the factors limiting the ability to achieve water quality standards and self-supporting native salmonid populations.

❖ REGIONAL PRIORITIES AND GUIDANCE

State agencies, in consultation with federal agencies, local governments, watershed councils, soil and water conservation districts, and other affected organizations, shall develop regional priorities and strategies to protect and restore riparian functions on state-owned lands and on private lands where opportunities occur. OWEB Regional Review Teams (or similar working groups) shall coordinate with local and federal agencies in the development of region or watershed-based work plans to implement this policy.

❖ SCIENCE AND ADAPTIVE MANAGEMENT

The best available science on riparian areas shall be used and applied in program and project-level decisions. Monitoring, assessment, and the principles of adaptive management shall guide the revision of riparian management programs.

#### **4. THE CURRENT STATE OF RIPARIAN AREAS**

Streams and riparian areas have been used for centuries for a variety of important economic and cultural purposes, including settlements, travel corridors, food production, water supply, wildlife habitat, and aesthetic inspiration. Especially over the last two centuries, these areas have been modified to provide for intensive production of food and fiber, and for cities and towns. Common modifications include diking, revetments, filling, channel simplification, vegetation removal, and disconnection of streams from their floodplains. In general, rivers and streams have been viewed as conduits to move water off the land during times of high water, and as conduits for moving water onto land during times of low water. Streamflow has a significant effect on riparian areas and is influenced by climatic conditions such as floods and droughts, water diversion for out of stream use, and water storage releases. Activities in riparian areas—in particular in lowland areas where streams are normally closely associated with their floodplains—have restricted and simplified the connections between a stream and its riparian areas and floodplain.

Attempts to contain rivers and streams—to limit their movement across the landscape—have been expensive and have produced unexpected results. Rivers may appear constant and unchanging but they are in fact constantly changing and reforming themselves. Contrary to human expectations of a static riverbank, meandering channels need ample room for future channel movements. At many locations, a river or stream has been “fixed” in place by revetments or other structures. Due to the economic value of agricultural activities and development on the floodplain in both urban and rural settings, “undoing” such channelization may be both economically infeasible and undesirable to those who would be affected and to the community at large. On degraded floodplains in urban and rural environments, where mitigation is considered a suitable alternative to restoration, enhancement on tributaries or other locations in the watershed may be a viable option. Identifying suitable sites within a landscape context to mitigate for past development and land use practices and investments will be a challenge for state agency programs and collaborating partners.

There is no statewide measurement of riparian vegetation or condition in Oregon. However, the State of the Environment Report’s “Report Card” on the current status and health of Oregon’s riparian areas contained the following conclusions:

- ❖ “Riparian areas make up about fifteen percent of the total area of Oregon.
- ❖ Trends in riparian condition along the upper mainstem Willamette River have shown a loss of more than half of the historical channel complexity and reduction of more than 85 percent of the total riparian forest since the 1850s.
- ❖ Riparian areas in eastern and southern Oregon have been altered extensively as a result of livestock grazing, agricultural activities, and associated water diversion projects.
- ❖ Urbanization and residential development impact a much smaller portion of Oregon’s land base—less than ten percent—but reduce riparian functions to a much greater degree with little potential for recovery.
- ❖ Non-native plants make up more than half of the riparian species along the mainstem Willamette River” (Oregon Progress Board, 2000).

In addition, in its discussion about water quality, the report observed that “...instances of good or excellent water quality occur most often in the forested uplands of Oregon. Both forest practice rules on public and private forest lands and lack of development help explain this result. On the other hand, instances of poor or very poor water quality occur most often in the nonforested lowlands where intensive land uses have occurred” (p. 19-20). Upland areas that can affect water quality also include grasslands, meadows, and shrublands in addition to forestlands.

## **5. BACKGROUND: A FRAMEWORK FOR RIPARIAN MANAGEMENT PROGRAMS**

### **RIPARIAN AREAS ARE THE CONNECTION BETWEEN WATER AND LAND**

All landscapes reflect, and are changed by, the force of moving water. Most of the time, the effect of moving water on the landscape is unnoticeable, because the changes occur gradually, over time, and they usually occur at very small spatial scales. But during large storm events, large and sudden changes also occur that can fundamentally change a river or landscape. The relationship between rivers and land is a consistent pattern of erosion, transport, and deposition. Rivers everywhere have the same function; they are highly dynamic systems that constantly move sediments and organic material downstream and from higher to lower elevations. This water, sediment, and organic materials contribute to lowland floodplain complexes that are critically important for continued ecological productivity of stream systems.

The path of precipitation from the ridge tops, to the ocean and back into the atmosphere is called the hydrologic cycle. Once it falls, precipitation can take several pathways through the landscape. In temperate climates, a significant portion of the precipitation is intercepted by vegetation and evaporates or is released to the atmosphere by the vegetation before it reaches the soil. The remaining water either infiltrates through the soil to become groundwater or becomes surface runoff in the form of streams and rivers. While streams and rivers represent surface runoff in the hydrologic cycle, they are also tightly connected to ground water. Groundwater occurs in most areas throughout Oregon. It may be close to the surface and occur as a shallow water table, or it may be found deep in bedrock. Streams, as they fluctuate with storms, snowmelt, and seasons, may gain or lose water from the ground water zones that may occur beneath them.

Rivers and shallow groundwater have a profound *formative* effect on the land, and vice versa. They create landscape diversity, which in turn supports biological diversity. Land areas adjacent

to rivers, lakes, wetlands, and shallow ground water are of considerable importance for the proper functioning and productivity of the water bodies themselves; for plant communities next to them; and for the extended web of living organisms that depend on surface waters to support their basic life needs such as feeding, breeding, and shelter. These distinctive landscape features and functions that are defined in part by their proximity to water are called *riparian areas*.

Riparian areas are known as “transition areas” between land and water. In Oregon law, “riparian area” is defined as “a zone of transition from an aquatic ecosystem to a terrestrial ecosystem, dependent upon surface or subsurface water, that reveals through the zone’s existing or potential soil-vegetation complex the influence of such surface or subsurface water. A riparian area may be located adjacent to a lake, reservoir, estuary, pothole, spring, bog, wet meadow, muskeg or ephemeral, intermittent or perennial stream.” (ORS 541.351(10)) The features of a transition area between a stream and its riparian system can vary widely over time periods ranging from hours to centuries and more. What is commonly referred to as the “river’s edge”—as if there is a fixed boundary between a stream and land—is actually a misnomer. There is no actual *single* river’s edge for most Oregon streams. Rather, there is a zone where the edge of the water may occur at any point throughout the year.

Riparian areas are an expression of the *form* of a river, its floodplain, and its flood patterns. Riparian areas can directly affect water quality in the stream and the web of organisms available for fish and other aquatic species. To some extent, riparian areas can also influence the degree to which a river will migrate when the next large storm sweeps across the landscape.

Ultimately, the riparian area is as much a part of the river as it is a part of the land. What is done there, is also done to the river. In the end, the “health,” productivity, and aesthetic and spiritual values of rivers are impossible to maintain without maintaining their unique, intimate, and complex connection to the land as is expressed in what we would recognize as a “healthy” riparian area.

### **STATE PROGRAMS AFFECT RIPARIAN AREAS**

Riparian areas provide several important ecosystem functions, which are further described below. But they are also valuable from a socioeconomic standpoint. They provide the setting for forestry and agricultural activities, residences, commerce, transportation, mining, and recreation. All of these kinds of activities can affect riparian areas and functions, and each kind of activity has evolved its own set of customary management practices. Each set of customary practices—for forestry, agriculture, ranching, and urbanization—has in turn resulted in its own regulatory framework, designed to protect both private property rights and public goods such as clean water and abundant fish and wildlife.

Oregon agencies implement a range of regulations and programs that influence how riparian areas and aquatic habitats on private land are managed. Each program that affects riparian resources has generally evolved independently in its ability and approach to address water quality and aquatic habitat objectives. Often, agency programs are aimed at protecting riparian areas in a manner compatible with the primary uses of that portion of the landscape for which the agency has some regulatory or management authority. Thus, there are functionally different protective regulations across the landscape, and as a result, fragmented management objectives for the riparian corridor. This fragmented management approach also has also led to different regulatory standards for some land management activities. Ultimately, different riparian landowners are subject to different land management standards, requirements, and expectations.

State policies and programs should explicitly address riparian management objectives and expectations for forest, agricultural, and urban land uses; and state water quality standards should be applied consistently across all land uses. Because of large variations in environmental conditions, ownership patterns, customary practices, past development commitments, and regulatory program applicability, there is a need for a policy that effectively addresses these differences, while providing some consistency and impetus to protect and improve public values without irreparably harming values enjoyed by private landowners.

### **A LANDSCAPE APPROACH TO RIPARIAN AREA MANAGEMENT**

Riparian areas in Oregon arise from complex interactions of biological and physical features. Riparian areas vary according to climate, geology, topography, hydrology, soils, disturbance regime (floods, fire, earthflows, etc.), time, and the current vegetation community. Almost everywhere, human activities also have a large influence on the ecological characteristics of riparian areas.

For example, activities that modify riparian areas or straighten meandering channels can affect how fast water moves in the channel and floodplains, which in turn can cause upstream and downstream changes to the channel, its banks, and its floodplain. Because of the relationship between riparian management activities on a specific site and their effects at other locations, a broader perspective—or landscape approach—is needed for riparian management.

In late 1999, the Independent Multidisciplinary Science Team (IMST) for the Oregon Plan for Salmon and Watersheds published a report on the adequacy of Oregon's Forest Practices Act to protect salmonid habitats (IMST, 1999). In its "forestry report," the IMST referred to a scientific discipline known as *landscape ecology* and to a "landscape approach" to land management. Landscape ecology is an emerging body of scientific and technical knowledge that uses landscape functions and relationships to guide management, conservation, and restoration activities. In the past, most floodplain alterations had a single purpose—such as flood control, agricultural production, or urbanization—and they focused only on the channel or channel-edge environment. Our understanding of the close relationship of riparian areas to stream conditions—and the complexity of that relationship—makes single-purpose approaches to stream and riparian areas less viable.

While the IMST forestry report was concerned with the management of forestlands, the concepts used in a landscape approach should be extended to include all parts of the watershed, not just forestlands. The IMST forestry report states: "*Since streams are tightly linked to the terrestrial landscape they flow through, when reviewing land-use practices and their effects on salmonid habitat, it is necessary to analyze impacts on both adjacent and distant components of the landscape*" (p. 13). Streams flow through all land uses; thus the landscape approach applies to all land uses.

Expanding the analysis of management of a riparian site to a landscape scale presents environmental managers with complex scientific issues. For example, placing riprap on a channel bank to protect a highway could cause erosion of downstream riparian areas or in-stream bars used by fish for spawning. This riprap could cause localized, irreversible changes to the channel, channel banks, and floodplain. A second example is the large-scale removal of vegetation and the creation of impervious surfaces that occurs with the urbanization of a watershed. This may result in a permanent alteration of runoff characteristics, which can cause fundamental changes in stream flow and channel stability. Impervious surfaces may affect a

larger portion of the landscape and create more long-term impacts than a single bank protection project. But taken together, all the bank protection projects on a river may cause as much damage to the stream as an urbanized area. Individually, the scale of impacts may be radically different, but both kinds of riparian management activities irreversibly diminish the capability of a site to maintain desired riparian functions or degree of interaction between the stream and its riparian area.

The landscape approach acknowledges and incorporates a better understanding of the cumulative impacts of all the activities in a watershed, resulting in better-informed decisions.

The implication of the landscape approach is that if the management of a site will irreversibly affect flooding, species survival, population viability, stream hydrography, or incrementally constricts the stream's migration zone, then some alternative approach should be considered.

The IMST recognized the significant limitations on implementing its recommendation to use a landscape approach. The present framework of laws and policies could restrict the implementation of a landscape approach. In practical terms, it is not entirely clear how the landscape approach would be implemented in the great variety of public and private land use and land management decisions that are made every day across Oregon. But despite all these essentially cultural barriers, the IMST concluded that "... *it is important to start, and [to] do what can be done where it is possible*" (p. 18). Thus, one of the principal components of the evolving landscape approach to riparian management should be to take advantage of every opportunity to consider the effect of site-specific riparian management decisions on stream and riparian features and functions both up- and downstream. Expansion of the decision framework to the landscape scale will continue to present challenges to landowners and agencies alike.

#### **ON MANAGING AND RESTORING RIPARIAN SYSTEMS**

In late 2000, the Riparian Management Work Group for the Oregon Plan for Salmon and Watersheds produced a report on state programs for managing riparian areas (Riparian Management Work Group. 2000). Review of the report and its "Key Conclusions" from the perspective of needing a landscape approach for managing riparian areas lead to the following observations about managing and restoring riparian areas. The Work Group's Report (which can be viewed at <http://www.oregon-plan.org/Riparian/4-0.pdf>) provides more detail on Oregon's present riparian management programs and the group's Key Conclusions.

- ❖ There is no overall comprehensive riparian corridor management strategy or framework (landscape perspective) in state law, policy, or rule. Each program that affects riparian resources is independently evolving in its ability and approach to address water quality and aquatic habitat objectives.
- ❖ Although riparian management programs in general need to manage for the full range of riparian landscape functions, it may not be feasible or possible to manage all individual sites for the same level or types of riparian functions.
- ❖ There is no statewide inventory of riparian areas, nor is there a standardized approach for conducting such an inventory.
- ❖ There are no state standards defining specific desired riparian or aquatic habitat conditions.
- ❖ Riparian areas cannot be effectively managed without considering the dynamic nature of rivers and streams.

- ❖ Water quality and aquatic habitat have been harmed by past legal land use practices and resource management approaches that did not sufficiently consider their effect on the larger system.
- ❖ The functions, productivity, and characteristics of a stream and its riparian area are less likely to be maintained through a fragmented management approach than an integrated approach based on an understanding of the stream in its terrestrial setting.
- ❖ Management prescriptions for any given site should be designed in consideration of their effect on, and role in, the expected functioning of the channel, river reach, tributary, and watershed.
- ❖ The degree of riparian function to manage for is an important policy consideration. Most function-oriented management systems have been based on achieving water quality standards, but it is not clear that such systems will also achieve a level of desired stream function.
- ❖ Returning rivers to their "natural state" through human action is probably unattainable in many cases. However, management in human-modified landscapes can restore functions that approximate natural conditions and make progress toward approaching rebalanced systems.
- ❖ Managing for improved riparian function and riparian-stream connection will require that land use and land management policies and practices anticipate, plan for, and adjust to more dynamic stream systems than has been past practice.
- ❖ Some regulatory and conservation programs have adopted linear setbacks for stream buffers to protect riparian areas. Flood inundation follows topographical boundaries and is nonlinear. To a large degree, frequently flooded terraces control relative channel stability and lateral migration. Managing and protecting riparian areas should consider the significance of flood frequency and the extent of the floodplain.
- ❖ For meandering systems, proper management of the channel migration zone is an important consideration.

## **6. FUNCTIONS PROVIDED BY RIPARIAN AREAS**

Riparian areas are often understood in terms of the landscape functions they serve. Ensuring the integrity and continuity of riparian functions where possible will be central to developing a landscape approach to riparian restoration and management. The riparian policy emphasizes the need to protect, restore, and sustain the functions of riparian areas across the landscape. The condition of a fully functioning riparian area is in some cases referred to as “properly functioning condition.” The federal agency Riparian Management Service Team provides a good description of “properly functioning condition” as it relates to riparian functions and areas:

*“A riparian area is considered to be in properly functioning condition when adequate vegetation, landform, or large woody debris is present to:*

- ❖ *dissipate stream energy associated with high waterflow, thereby reducing erosion and improving water quality;*
- ❖ *filter sediment, capture bedload, and aid floodplain development;*
- ❖ *improve water retention and ground-water recharge;*
- ❖ *develop root masses that stabilize streambanks against cutting action;*

- ❖ *develop diverse ponding and channel characteristics to provide the habitat and the water depth, duration, and temperature necessary for fish production, waterfowl breeding, and other uses;*
- ❖ *support greater biodiversity*

*The components of this definition are in order relative to how processes work on the ground”* (Pritchard, D. et al., 1998).

State agency programs that affect riparian zones should seek to manage for riparian functions as much as possible along the entire stream system, consistent with regional ecology, site capability, and social and economic needs. Practical application of a landscape approach to riparian management will be based in part on consideration of the capability of a site to provide some or all of the functions normally provided by riparian areas. Important riparian functions are briefly described below; these descriptions are summarized from the Riparian Management Work Group report “Oregon State Programs for Managing Riparian Areas” (Riparian Management Work Group, 2000).

### **Aquatic shade and water temperatures**

Stream temperature is critical to maintaining viable salmonid populations, as well as other aquatic life. Stream temperature conditions are influenced by shade through vegetation and stream channel morphology.

### **Streambank stability and erosion processes**

Well-vegetated riparian areas help maintain the stability of stream banks, reduce bank erosion, and foster the development of complex habitats along channel margins. Riparian plants produce root mass that is distributed throughout the soil column, thereby providing additional resistance to elevated stream velocities. Outside of the channel, healthy stands of riparian vegetation can significantly dampen off-channel floodplain velocities and create backwater conditions. Sediments and nutrients deposited in slack water contribute to water quality and the health and stability of riparian areas.

### **Floodplain complexity and riparian vegetation**

Riparian forests can produce large amounts of wood. This wood plays a critical role in aquatic ecosystems by dissipating the force of water and helping to create complex habitats. When high energy streams enter lowlands and valleys, deposition of sediments causes increased interaction between the channel and floodplain, and results in floodplain complexity such as side channels, sloughs, oxbow lakes and spring fed creeks.

### **Nutrient and sediment sources**

Riparian vegetation provides a nearly constant input of leaves, wood, insects, spores, and other materials, which represent an important part of the aquatic food chain, and contributes to the overall productivity of aquatic systems. Riparian areas may also be a source of sand and gravel for transport and the creation of instream bars, new riparian areas, and channel complexity downstream.

### **Filtration of sediments, organic material, and toxic substances in surface runoff**

All streams, under natural conditions, produce sediment and other inputs at varying levels. Human activities can increase these inputs to a point where they have a negative effect on the health and productivity of the stream. The magnitude of these inputs depends upon local soil types and substrates, topography, vegetation and precipitation. Healthy riparian vegetation can capture and hold these materials, thus keeping them out of the water.

## **Wildlife habitat**

When compared to most upland areas, riparian areas provide greater habitat diversity, and often support higher species diversity. In healthy riparian ecosystems, structural complexity and habitat diversity result from diverse plant species, multiple canopy layers, and a range of plant age classes.

## **7. RIPARIAN ASSESSMENT, EVALUATION, AND MONITORING**

Implementation of the riparian policy will require associated efforts to assess the current condition of riparian areas, quantitatively monitor riparian area status and trends, and to evaluate the effectiveness of the policies, management practices, and restoration actions intended to improve riparian functions. Better knowledge of riparian conditions across the state of Oregon is needed to understand where the best opportunities exist for improving water quality and aquatic habitat by protecting and re-establishing native riparian trees and vegetation. Currently, several different programs collect information at different levels, usually site or plot information or riparian inventories that cover extensive stream reaches. There is no comprehensive inventory of riparian condition that allows assessment at regional or statewide scales.

The Oregon Plan Monitoring Program will facilitate the work of the state agencies, watershed councils, local governments, and landowners to conduct monitoring by providing guidance on methods and protocols that can be used to assess, monitor, and evaluate riparian conditions and functions. Because of the complexity of riparian issues, and because of the need to assess conditions at multiple spatial scales for multiple purposes, no single method or protocol can meet all needs.

The protocol to assess “Properly Functioning Condition” of riparian and stream channel conditions provides a consistent approach for considering hydrology, vegetation, and channel attributes and processes (Pritchard et al., 1998). Properly Functioning Condition (PFC) has gained acceptance as a useful tool for understanding of these processes and to foster informed discussions of riparian site potential. Although not intended to be a quantitative measure of riparian condition, PFC assessments have proven utility for identifying constructive restoration and management activities and as a starting point for more intensive monitoring efforts.

Among state agencies, Fish and Wildlife, Forestry, and Environmental Quality have active monitoring programs that include protocols for quantitative and stream reach riparian assessments. These agencies, together with other agency representatives, are developing standard methods to assess trends in riparian condition and to evaluate restoration project effectiveness. The Oregon Watershed Enhancement Board will support distribution and training of the finished protocols as well as implementation of the monitoring methods by funding watershed councils, soil and water conservation districts, or other groups to do the work.

Overall evaluation of the long-term implementation of the riparian policy will need to include assessments conducted at regional and statewide scales. The ability to detect large scale trends in riparian vegetation using remote sensing methods has been demonstrated.

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