

Chapter 12

Keeping the Green Edge: Stream Corridor Protection

in the Portland Metropolitan Region

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Every year, fifth and sixth graders across the Portland metropolitan region climb into school buses and head for three nights to a week on the wet Oregon coast or in the high desert east of the Cascades. Sleeping with their classmates in cabins of various sizes, shapes, and levels of comfort at night, they spend the days crawling through lava tubes and tasting ants, stepping over banana slugs, and peering into tide pools. Children of staunch urbanites; of new immigrants from eastern Europe, Southeast Asia, or Latin America; and of rugged outdoor enthusiasts alike, all dirty their designer shoes and K-mart cargo pants as they encounter the best nature the state has to offer.

@txt:Outdoor School has been a routine part of the elementary school experience for more than 300,000 students in the Portland region since 1966 (Friends of the Outdoor School 2003). More than 47,000 high school students have served as camp counselors. While ostensibly part of the “science” curriculum, these students are also learning what might be called “environmental appreciation.” The Outdoor School mirrors, and reinforces, the strong support that the environment has consistently scored among voters. The State of Oregon is a national leader in environmental legislation. It was one of the first states to pass a bottle bill (1971) and a toxics use reduction act (1989). Voters in the Portland metropolitan region not only consistently list the protection of natural resources, parks, and open spaces as among their highest priorities, they also back this sentiment up with their pocketbooks. For example, in 1995 they elected to tax themselves to the tune

of \$135 million through a bond measure for the purchase of open space. And Portland residents consistently cite environmental issues as among their highest concerns.

Anecdotally, while school children nationwide have been heard questioning the tobacco smoking habits of their elders, Portland area children have been known to insist that their parents use native vegetation to landscape their yards.

Plant selection for one's home or seeing the value of natural resources along the coast or within parks, however, may be quite a separate matter from limiting subdivision and construction on city lots that abut streams. Within city boundaries, land is perceived as scarce, and infrastructure for development is readily available, creating a compelling rationale for the sacrifice of natural areas to urbanized uses. In the backyard, alternative uses and aesthetic tastes compete for the homeowner's allegiance and investment. But natural resources within the urban area are increasingly recognized as critical elements of our broader ecosystems (Platt et al. 1994). Moreover, as urban sprawl spills over into the hinterlands, a failure to attend to natural resources within urban areas means an absolute loss across the broader landscape with serious consequences for the ecological system. In the Portland metropolitan region, as in every locale in the United States, environmental protection occurs within a matrix of federal, state, and local policies. While federal policies provide a common context across the nation, the state of Oregon has distinguished itself from the other 49 states because of its 1973 state land use law. (Hawaii passed a state land use law the same year and other states have since passed growth management legislation. However, Oregon's action was early and uniquely ambitious in breadth.) At the same time, in Oregon as elsewhere, local jurisdictions

maintain considerable discretion through their authority over land use decisions (i.e., what gets built where and how).

Given this potential for variation, do management approaches and policies in the Portland region differ widely? To what extent are local policies a response to state and federal directives? Or, to what extent are actions of nongovernmental actors critical? Finally, is there evidence that these management strategies create measurable on-the-ground differences? This chapter addresses such questions by examining the protection provided for a specific resource, riparian corridors. Although restoration efforts are becoming an increasingly significant factor in vegetation coverage, this chapter focuses on the prevention of loss. A close examination of the efforts directed toward protection of this resource may shed light on the interactions between the policies and responses of multiple levels of government and citizen groups that share responsibility for environmental protection. We find that environmental management in the Portland metropolitan region is best understood as an evolving process that involves many players, each of which contributes authority, inspiration, resources, and expertise. We posit that a similar dynamic may occur to varying degrees in other localities across the country.

This chapter begins by summarizing the ecological functions served by riparian buffers and factors in urban land patterns that present special challenges to stream corridor protection. We then present an overview of relevant federal and state policies and move on quickly to a narrative of the management histories of three cities in the Portland region up to 2002. This section ends with a preliminary assessment of on-the-ground conditions using two measures, the number of building permits issued within 30 meters of the stream for three cities between 1990 and 2002, and the loss in vegetation

cover within the same “bandwidth” for two of these cities between 1990 and 1997. The stories of these three cities illustrate the flexibility and opportunities that federal and state policies represent to municipalities, the important role of citizen advocates, and the need for leadership in the management of environmental resources that cross jurisdictional boundaries.

Riparian Areas and Challenges of Urban Environmental Management

Riparian corridors are a fundamental element of natural ecosystems, and yet urban environmental management has only recently targeted them. Typically vegetated in their undisturbed state, riparian corridors serve as the primary transfer area between terrestrial and aquatic components on a landscape. Vegetation along streams protects water quality by filtering heavy metals and sediment, assisting in the uptake of nutrients (primarily nitrogen and phosphorus), and cooling water temperatures by canopy shading and runoff absorption from impervious surfaces. The vegetation also increases the storage capacity of the stream and alleviates flood crests by diverting storm runoff. Finally, riparian corridors provide connectivity and migratory pathways for wildlife, and the proximity to fresh water provides a supportive habitat to various wildlife species, contributing to biodiversity in the region.

In cities, riparian corridors often represent relict green spaces that have been avoided by developers to some extent because of steep slopes or the threat of flooding (Spirm 2002). Alternatively, creek side locations may command high value from property owners who are drawn by the picturesque water feature. Often homeowners are tempted to clear vegetation in order to create an unobstructed view of the water and generally do so without public oversight. Consequently, while riparian corridors serve a unique

ecosystem function, urban resource managers often neglect the contribution of such features to collective goals such as water quality, flood prevention, habitat preservation, and species diversity.

In fact, the management of riparian corridors in urban areas presents a number of special challenges. In contrast to rural, agricultural, or forest lands, urban lands are more fragmented in ownership and command higher economic rents. Equity conflicts arise, such as the fairness of restricting new development rather than requiring modification of existing practices, and the weighing of off-site impacts on water quality, such as runoff from impervious surfaces compared to the direct effects of cutting down trees. Finally, as in many areas of environmental management, uncertain science and dismal science burden the protection of natural resources in urban areas. In general, riparian functions are still not well understood and are difficult to generalize among ecosystems that vary in geologic history, climate, soils, and the evolutionary history of fauna and flora. The major scientific studies on riparian functions have been conducted on forested and agricultural lands. Thus urban managers often must extrapolate from scientific work based on nonurbanized systems. It is also unclear what the benefits of lower stream protection and restoration are compared to upper stream protection. In addition, there is a serious lack of data about riparian conditions in urban areas and the relative cost of their protection. Consequently, urban environmental managers face severe obstacles to setting policies that adequately protect the riparian resource. Hence, riparian corridor protection (and restoration) is an appropriate focus of examination precisely because of its political and technical complexity.

The Policy Context

In his seminal work, “The Tragedy of the Commons,” Garrett Hardin (1969) attested that common resources will be depleted in the absence of strong, central control because individual incentives to exploit a particular resource will outweigh the rational understanding of the need to restrain consumption to levels that will allow for natural replenishment of the resource. Traditional administrative theory proposes a hierarchical organization with strong leadership by a centralized authority. In the environmental field, the traditional model has prevailed with the federal government acting as a strong force for the past 40 years, pulling states along in the effort to clean up air and water quality, and with some success (Vig and Kraft 2000). However, the federal role has been periodically attacked by states rights advocates, and as funding and administrative support for monitoring and enforcement activities decline, “command-and-control” approaches in general appear increasingly less viable.

Urban land use and ownership patterns present an additional challenge to the hierarchical model, due to the place-bound and regional nature of many natural resource systems paired with the prerogative of local governments to dictate land use decisions within their jurisdictions. Urban environmental management requires not only coordination among municipalities but also the cooperation of individual landowners. The “new governance” models suggest a network of interdependent bodies, comprising both governmental and nongovernmental actors (Rosenau 1999, Salamon 2000). However, other scholars have pointed out the risks of dismantling the federal regulatory infrastructure (Gottlieb 1995, Rabe 2000). Our examination of riparian protection illustrates how these two approaches may coexist and complement one another.

The policy context in the management of stream corridors in the Portland metropolitan region involves federal, state, and regional bodies; local authorities; and citizen advocates. Figure 12.1 portrays elements of environmental management systems focusing on place-based resource issues. Development pressure, brought about by increasing populations and economic expansion, creates a demand for urbanization that can lead to degradation of ecosystems. Governments at various levels, as well as private and nongovernmental interests, have tried to mitigate this pressure by imposing regulatory controls and undertaking direct public actions. Many of these actions require substantial coordination. In the area of riparian buffer protection, for example, the federal Clean Water Act seeks to control effluents into water bodies and to protect wetlands. Implementation is achieved through the actions of state agencies empowered through agreement with federal agencies. Figure 12.1 portrays the overarching but indirect effect of federal law on local decisions.

[Insert Figure 12.1 about here.]

In addition to the Clean Water Act, the federal influence has been exerted through the Flood Insurance Protection Act. Although both these pieces of legislation focus on water quality and the protection of human lives and property, they have provided the impetus and the funding for riparian protection, as will be discussed following here. More recently, National Oceanic and Atmospheric Administration (NOAA) Fisheries, then called the National Marine Fisheries Service, spurred action by listing endangered and threatened salmonids under the federal Endangered Species Act in certain west coast cities, including those in Portland, in 1998. This action similarly has spurred local

governments to attend to factors that affect habitat conditions in salmon-bearing streams (Metro 2002a).

The Oregon state land use law set forth several goals for protection of riparian corridors, most specifically Goal 5 but also Goals 6, 7, and 15, as described in Table 12.1. These goals were set forth as a result of considerable public consultation about what Oregonians value (Oregon Department of Land Conservation and Development 2004). The state land use law requires every city, county, and regional authority with planning authority to prepare and submit a comprehensive plan to meet Goals 5, 6, 7, and 15 to the Department of Land Conservation and Development (DLCD) for approval. In the first round of comprehensive plan acknowledgments, DLCD pragmatically focused its review on a few, not all 19, of the goals. Development of more specific guidelines and expectations was an incremental and evolving process.

[Insert Table 12.1 about here]

Consequently, it was not until the second round of comprehensive plan reviews, which began in the mid-1980s, that DLCD grew more attentive to Goal 5. Even then, however, the state agency was reluctant to impose punitive conditions on the cities that failed to make significant progress toward resource protection (Brooks 2003). Instead, the state more typically would accept the progress made and prod the municipality to move forward in specific directions, such as by completing what might be a partial inventory of natural resources. In 1996, DLCD recommended new guidelines for Goal 5. These guidelines remained process oriented and did not mandate specific substantive outcome standards, except in the case of the “safe harbor” provision (Metro 2002d).<+>1<+>

In the Portland metropolitan region, the regional planning agency, Metro, has become a strong force in the management of resources of regional significance. (See Chap. 2, Seltzer.) By state administrative law, Metro has the authority to identify “regional resources” and to require cities and counties to comply with defined goals and objectives and measures to achieve them.

Adopted in 1998, Metro’s Urban Growth Management Functional Plan comprises 11 titles, focusing on various aspects of growth management. Title 3 addresses water quality, flood management, and wildlife habitat. This section of the plan targets the protection of 775 miles, or 87%, of streams inside the urban growth boundary. At the time of adoption about 51 % of the 10,434 total acres of vegetated corridor areas were developed. Title 3 thus pertained to about 4,154 acres of undeveloped land and required minimum buffer widths that range from 15 to 200 feet, contingent on slope and flow characteristics (Metro 2002c).

In addition, the agency’s Metropolitan Greenspaces Master Plan inventoried and ranked the significance of natural resources in the area and set as a priority the acquisition of streamside open space. A 1995 bond measure provided \$135.6 million for land purchase, of which all but \$8 million had been expended by 2003. Anticipating future growth of the urban area, some of these spaces lie beyond the borders of the current urban growth boundary. In 2003, Metro had purchased approximately 63 miles of stream bank (Metro March 2003b).

Metro relies heavily on advisory committees in its plan-making efforts. These committees typically include representatives from environmental organizations, the local Audubon Society, the regional Coalition for a Livable Future, 1000 Friends of Oregon,

local businesses, local, state, and federal agencies of relevance, and, as in the case of the Economic Advisory Committee, academic and private consulting economists. Hundreds of “friends” groups, or citizen-based voluntary organizations, as well as organizations favoring property rights participate by submitting testimony at public hearings (Ketcham 2003).

Although the Greenspaces Master Plan and the Water Quality and Flood Management Plans provide substantial protection to riparian corridors, the coverage is not complete (Metro 2002d). Therefore, Metro set out in 1998 to develop a fish and wildlife habitat plan for the region. The initial outreach, which involved meetings, surveys, and education campaigns regionwide with residents and representatives from local jurisdictions and state and federal agencies, demonstrated both substantial public support for more extensive natural resource protection and cautious resistance from local governments concerned about home rule (Metro 2000c). Metro has moved forward with an economic, social, environmental, and energy (ESEE) assessment, and staff expect to bring a plan to the Metro Council in 2004.

The Management Stories of Three Cities

We turn now to a narrative about the regulatory and management approaches of three cities in the Portland metropolitan region. The 23 cities and three counties under Metro’s jurisdiction illustrate a variety of local responses, the influence of federal and state policy on local actions, and the roles and effect of nongovernmental actors. We chose three cities to demonstrate a range of these responses

Portland was selected for obvious reasons, as the largest city in the state and the focal point of much of the region’s activities. We chose the cities of Hillsboro and

Oregon City because of their comparable, rapid growth rates in the 1990s, their physical locations at the western and southeastern edges of the region, as well as their reputations as communities respectively less and more progressive in their attitudes toward development and resource protection.

We end this section with analyses of building permit activity and vegetation loss to provide a sense of conditions on the ground. This report is limited to the cities of Hillsboro and Oregon City, as our efforts to analyze vegetation loss in Portland are still under way. Although this analysis is preliminary, it is suggestive, and presents a protocol for further research and future comparisons with other cities and regions.

The City of Portland

As the largest city in Oregon, Portland essentially had an open field to shape the rules of Goal 5 compliance. In the mid-1980s, the City of Portland began to work in earnest toward a strategy for protecting natural resources within its boundaries.

According to former Portland planner Duncan Brown, the planning team was urged forward by Audubon Society of Portland advocate Mike Houck, who had been inspired by a meeting with David Goode, who in 2003 was the director of environment for the Greater London Authority, and by the initiatives of Bellevue, Washington, and Eugene, Oregon, and Pierce County, Washington. The Portland planners met with a biologist, Esther Lev, for direction and instruction about conducting qualitative assessments of the city's natural resource areas. Lev counseled the planners to consider the value of specific tracts with regard to plant diversity, canopy cover, and habitat quality, measured by availability of food, water, and cover. The planner team divided the city map into eight areas and headed out to cross check sites with aerial photographs and existing

inventories. Based on the eight subsequent reports, with input from a technical advisory committee, through which Mike Houck remained active, the planners drew zoning maps delineating environmental “preservation” and “conservation” zones (together known as environmental or E-zones). The zoning was approved by the city council in 1989.

@txt:Business interests were not oblivious to the planners’ undertakings. An industrial landowner who feared that this zoning approach would infringe on his firm’s business in the port district took the city to court in 1990. The lawsuit cited the lack of an ESEE analysis and ultimately forced the City to develop methods of quantifying the need for what were to become environmental protection and conservation zones. The first of these documents was approved by the city council in December 1990 and the last in September 1994.

By 2003, more than 7,689 hectares (19,000 acres) had been designated in environmental zones. The E-zones provide an additional review step for new development, expansion of existing structures, land divisions, and topographical alterations. Permits for construction can be obtained either by demonstrating compliance with specific development standards or by a more customized review through which applicants must demonstrate that approval criteria are met through alternative means. In both cases, the application is subject to opportunities for public comment. Preservation zones (P-zones) essentially forbid any new development except pathways, roads, and the laying of pipes or cables. Conservation zones (C-zones) allow the construction of structures but set forth specific criteria for the percentage of disturbed area allowed, special construction conditions, and requirements for the replacement of vegetation, among other items.

The City began work to expand the environmental zones in 2001. The proposed changes would have affected an additional 13,000, or 10%, of the city's landowners. Some landowners in southwest Portland mobilized quickly to oppose the city's effort, arguing that the proposed changes would require compensation to landowners for lost value in their land under the state's then in-limbo property rights Measure 7. Measure 7 has since been found "invalid" by the state judicial system and the landowners leading the charge against the E-zone expansion, ironically, have moved out of the state. The city, however, has not resumed its efforts publicly as of autumn 2003.

The City of Portland has worked on other fronts toward improving the conditions near streams and other water features. One of its most visible efforts revolved around Johnson Creek, which flows from the foothills of the Cascade Mountains westward, crossing through east Portland and emptying into the Willamette River. Historically, annual flooding over the banks of Johnson Creek created fertile farmland. This constructive attribute became destructive as the city encroached on the farmland and houses crowded the edges of the stream. Decades of bickering among service districts, governmental agencies, and taxpayers delayed flood control efforts (Seltzer 1988). However, the 1987 amendments to the Clean Water Act, including attention to nonpoint sources of water pollution and the assignment of responsibility for water quality standards to cities with populations of 100,000 or more, prodded the City of Portland into action once again. Harnessing the energy, knowledge, and commitment of local residents who had been mobilized to ward off road construction in the canyons of the creek a few years earlier, the city's Bureau of Environmental Services successfully sponsored a

facilitated management plan making process. After five years of information gathering and analysis, the plan was produced and adopted by the City of Portland in 1995.

One of the offshoots of the Plan was a “willing sellers” program to purchase properties in the flood-prone sections of Johnson Creek floodplain from homeowners at market rate prices. Since 1997, 90 properties have been purchased. Most of these properties are within the Johnson Creek 100-year floodplain. The program has expended \$10.7 million, with funds from Metro’s greenspaces program, community development block grants, the Federal Emergency Management Act (FEMA), and the City of Portland.

The Johnson Creek Resource Management Plan experience led the group of citizen participants to a crossroad. They could become an official arm of the City of Portland, or they could apply for a state grant to launch an independent watershed council. The citizens chose the latter route. They have since maintained an active and vocal presence in watershed planning and restoration activities in the region and are recognized and included in land use development planning efforts (Adler and Ozawa 2002).

The City of Portland’s Bureau of Environmental Services took the experience with Johnson Creek forward and expanded into a watershed stewardship program that includes six streams within city boundaries. The City works with local resident and business organizations to provide educational workshops, increase local awareness of current issues, and develop management plans and programs for maintaining and restoring watershed health.

Finally, the city’s most recent and perhaps most ambitious initiative originated in response to the 1998 and 1999 listing of steelhead trout and chinook salmon as threatened under the federal Endangered Species Act. The City of Portland organized a staff of

scientists and managers under the auspices of its new Endangered Species Act (ESA) Program, which recently produced a draft of the *Framework for Integrated Management of Watershed and River Health* (City of Portland, Bureau of Planning 2004). The *Framework* has several objectives including (a) creating a scientific information database that can inform city government decisions, (b) integrating the city's response to several federal regulatory statutes, and (c) guiding the development of watershed plans within the city.

The *Framework* is a comprehensive watershed-based plan that touches all land use or development within the city boundaries with any potential effect on aquatic or riparian habitat or conditions. Its goals encompass hydrology, physical habitat, water quality, and the biological community, and focus on the health of aquatic and riparian ecosystems. The *Framework* proposes an iterative watershed management process, and seeks to integrate the mandates of various city bureaus under one umbrella that focuses on improving watershed and river health. The *Framework* seeks to achieve this integration by (a) providing a set of common goals and actions for each watershed in the city, (b) guiding development of additional plans and documents needed to comply with federal and state laws, and (c) providing guidance for city plans and actions that do not specifically relate to watershed health to ensure that they are compatible with watershed health goals.

In addition to the Endangered Species Act, the *Framework* is driven by other regulatory requirements including the Clean Water Act (CWA), the Safe Drinking Water Act (SDWA), and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), or Superfund. Locally, the *Framework* was also a

response to the City of Portland's River Renaissance initiative, endorsed by the Portland City Council in March 2001, which seeks to ensure a clean and healthy river system for fish, wildlife, and people.

It is notable that in July 1998 the city council chose not only to respond to the federally mandated requirement to avoid or minimize *<I>take</I>* of threatened species, but also committed the city to *<I>recovery</I>* of those species. The *<I>Framework</I>* is a thoughtfully presented, scientifically based document, reviewed by an independent science team (IST) of biologists, ecologists, and hydrologists from Oregon, Washington, and Idaho. The IST presented their findings before the Portland City Council in July 2003. While the members of the team had some criticisms on details of the *<I>Framework,</I>* the IST was largely supportive of the City's approach. The IST found that "The *<I>Framework</I>* is a well-written, scientifically defensible document. It provides a framework that will give sound ecological guidance to some of the decisions, actions and plans that will comprise Portland's watershed restoration program." The ESA program anticipates completing revisions to the Framework and seeking city council approval during 2004.

The City of Hillsboro

While planners in Portland took an aggressive, proactive stance toward Goal 5 and the protection of riparian corridors, Hillsboro planners chose instead to "fly below the radar." Hillsboro was predominantly a farming community on the western edge of the metropolitan region until the 1990s, when it became the heart of the area's "Silicon Forest," with Intel and other transnational high tech firms located within its boundaries. (See Chap. 1, Mayer and Provo.) Population growth rates in Hillsboro during the 1990s

were among the highest in the region, growing by 86% to 69,883 in 2000, making it the fourth most populous city in Oregon. The city planning department is led by a director, two supervisors (of current and long-range planning), nine staff line planners, and a planning database coordinator.

About 63.5 km of rivers and streams meander through Hillsboro, including the Tualatin River, which empties into the Willamette River several kilometers downstream from the city border. Despite the abundance of water features, the city planning department had not singled out riparian corridors for special protection until 2003. Until then, resource protection had been achieved through a jigsaw puzzle of significant resources identified through specific area plans, the review of “planned unit development” projects, or by referral to the Washington County water services provider, now called Clean Waters Services (CWS), which implements programs to meet federal water quality standards.

The City of Hillsboro responded to the objectives of Goal 5 in sporadic steps. A “regulated floodplain district” map was adopted in 1980, which essentially required erosion controls, and a partial inventory of “significant natural resource areas” was completed in 1991. These controls flagged a portion of riparian corridors for special design considerations but did not prohibit outright development or removal of vegetation. A potential avenue of protection was provided through the Planned Unit Development (PUD) Overlay District, which allowed exceptions to setbacks and minimum lot size in order to avoid the destruction of sensitive resources without impeding development. Throughout the 1990s, development permit applications were shuffled to the water service district organization for review, working from a set of maps that included the

1991 partial resource inventory, floodplain maps, and other similar documents.

Regulations in place forbid structures or construction within 25 feet of stream banks, but exceptions would allow developers to encroach within 15 feet.

Since February 2000, the standards have remained essentially the same, but the review process has been refined. CWS routinely examines all applications that may include a Sensitive Area onsite or within 200 feet. (Sensitive Areas are defined as existing or created wetlands, rivers, streams, and springs with year round or intermittent flow, and natural lakes, ponds, and in-stream impoundments.) Sensitive Areas are identified by a CWS biologist through a field investigation conducted prior to permitting and again during construction. The required “no-build” buffer varies from 15 to 200 feet depending on slope, drainage area, and resource quality.

In spring 2003, the City of Hillsboro adopted a “significant natural resources program,” which was intended to bring it into full compliance with state Goal 5 for the first time. The program consists of delineating a significant resources overlay district, which includes specified buffers around identified natural resource sites and impact areas. The ordinance recognizes the possibility of future revisions to comply with Metro’s current Goal 5 work on fish and wildlife habitat. Hillsboro planners developed the ordinance with opportunities for public comment. However, there was no conspicuous presence of environmental groups. Property owners did express opposition and the city lessened proposed restrictions on the impacted area (Rollins 2003).

Oregon City

:Sitting at the southeastern edge of the Portland metropolitan area, Oregon City is the oldest city in Oregon. It is proud of its historic role as well as its natural beauty.

Located at the confluence of the Clackamas and Willamette Rivers, it has roughly one-third the population of Hillsboro, but also experienced rapid population growth in the 1990s, increasing nearly 74 % from 14,698 to 25,533 over the last census period.

Oregon City has pursued resource protection through the creation of a number of special overlay districts, as displayed in Table 12.2. Development permit applicants must check the zoning maps to ascertain whether their property falls within any of these special overlay districts. If so, the applicant must demonstrate the extent to which the specified resources will be impacted and how such impacts will be mitigated. The overlay districts do not forbid incursions into vegetated stream corridors but they do flag situations when they are likely to arise and encourage avoidance or mitigation of adverse impacts.

[Insert Table 12.2 about here.]

The planning staff at Oregon City has turned over quite frequently in recent years; the public works director, who has been with the city since 1996, has been serving longer than any current planning staff member. Perhaps more significantly, the planning staff may or may not have the expertise to assess potential impacts; they typically rely on the technical reports of consultants hired by permit applicants.

In the early 1990s, Oregon City conducted a partial inventory of natural resources to comply with Goal 5. A major step forward occurred in 1999 when the city revised its overlay districts to conform to Metro's 1998 Title 3 water quality and flood management maps. Riparian areas are now protected primarily through the Water Quality Resource Area Overlay District, which stipulates vegetated buffers from 15 to 200 feet, depending on slope.

While the city council is apparently quite supportive of protective measures, the city's resources are stretched. The staff welcomes Metro's leadership and is comfortable relying on Metro's data and policy guidance. Citizen organizations are not actively involved in resource management in Oregon City, except on highly specific issues, when particular individuals rally around issues that affect areas of their special concern. The city council has recently approved \$10,000 to fund a watershed group for Abernathy Creek. Clackamas Community College, located in Oregon City, has housed since 2000 an environmental learning center that hosts educational programs and outreach activities. As of fall 2003, however, the center had lost state funding and was actively seeking a community partner in order to remain open (Clackamas Community College 2004).

Building Permits and Vegetation Loss in the 1990s

:Ultimately, the test of public policy and private initiatives is the extent to which vegetation in urban riparian corridors is lost or gained in comparison with the corresponding gains or losses of other social benefits. Although from an ecosystem perspective, any loss is a cost that should be avoided, the current planning system in the United States views the loss of natural resources as a value to be balanced against other socially desirable gains or undesirable losses. Therefore, the effectiveness of any natural resource protection policy cannot fully be gauged by the amount of resource protected or maintained. Some loss may be socially acceptable, given other potential social costs.

Nonetheless, a rough evaluation of policies to protect targeted resources would measure the extent of resource loss, pollution, or incursions into protected areas. We have examined two metrics: new construction permits issued and net change in vegetation within 30 meters from streams. The number of building permits issued within stream

corridors suggests the extent to which municipalities are limiting construction that may reduce vegetation and degrade the riparian corridor; an analysis of actual loss in vegetation cover more accurately indicates the extent to which the resource is protected. Figure 12.2 shows the total number of permits issued for new construction in the three cities based on Regional Land Information System (RLIS) data obtained from Metro. The figure shows a relatively steady increase in permits issued over time, suggesting at least constant demand for new construction.

[Insert Figure 12.2 here.]

Figure 12.3 shows the number of permits issued by each city for new construction within 30 meters of a stream. The data are “normalized” for each city to account for differences in the amount of stream frontage to total land area. The City of Portland shows a clear decline in the number of new construction permits issued within 30 meters over this time period. The record for Hillsboro and Oregon City during this time is less clear.

[Insert Figure 12.3 about here.]

Figure 12.4 shows the on-the-ground losses of two vegetation classes, unmanaged and tree vegetation, located adjacent to streams in Oregon City and Hillsboro. (The data for Portland were unavailable at the time of publication.) We calculated these figures by digitizing and orthorectifying aerial photos taken in 1990 and 1997. Stream location data were obtained from Metro and site checked when a discrepancy appeared in the matching of our two data sources. The annual loss of vegetation within the 30 meter buffer is substantial in both cities, with a combined loss equivalent to about one high school football field (or 0.54 ha) every three weeks. Given that Hillsboro has nearly twice the length of stream frontage, the rate of loss in Oregon City is substantially higher for the 30

meter buffer width in Oregon City than in Hillsboro, as is also indicated in Figure 12.4. Interestingly, for the 100 meter buffer, the percentage loss of both tree and all unmanaged vegetation is similar, suggesting that the closer-in riparian areas are indeed under greater threat in Oregon City than in Hillsboro.

[Insert Figure 12.4 here.]

Analysis and Conclusions

Local governments in the Portland metropolitan region have recognized the vital importance of vegetated stream corridors to the overall health of the urban ecosystem. The city of Portland appears to have in place the strongest protection of riparian vegetation coverage. Hillsboro and Oregon City show less promise, although Hillsboro's loss relative to the volume of its streamside resources is less than Oregon City's.

The examples of these three cities illustrate that efforts to protect riparian buffers have varied over time and across jurisdictions. Despite the common framework of federal and state policies, local governments have retained considerable leeway in the management of this urban resource, and they have exercised this freedom with varying outcomes. Differences among the municipalities' staffing, resources, and administrative procedures certainly reflect both the level of commitment and the capacity to act on it. Nonetheless, federal and state policies have been essential in both prodding and supporting the independent will of local governments, the individuals who stand behind the counters, and the citizen activists who have pushed their governments to new limits. Whereas policies such as the Clean Water Act and the Flood Management Protection Act have provided both the legal foundations and, as in the case of Portland's willing seller program, even monetary funds to protect stream corridors, the federal Endangered

Species Act and the listing of salmon in the late 1990s and beyond have boosted efforts to create and maintain contiguous wildlife habitat. The experience of the Portland region suggests that federal policy and programs make an indelible imprint on the resource management landscape.

Observers often blithely attribute much of the Portland region's current conditions to the state land use law. However, although the protection of natural resources is among the state's 19 goals, the state has in fact commanded rather little and controlled even less. Despite the level of awareness and concern about the importance of riparian buffers, loss continued well past the passage of the law.

Fortunately, the state's acknowledgment of the importance of natural resources is more than symbolic, largely because of the authority the state has awarded to Metro, which has taken a proactive stance on the protection of resources of regional significance. Metro has organized and gathered critical information, has committed resources and expertise and, most importantly, has helped level the field and has written the rules for fair play in riparian protection in the metropolitan region. While Metro's actions are relatively recent and their impact unproven, the public discussion that Metro generates provides local jurisdictions in the metropolitan area little choice but to either lead or be led. We expect on-the-ground changes to be far more uniform over time, and riparian vegetation loss to be tempered, provided the present processes that involve an informed citizenry in local decision making are allowed to continue.

Finally, the story of resource protection in the Portland metropolitan region challenges Hardin's "tragedy of the commons" notion by underscoring the complex interactive dynamic among different levels of government and the strength of informal

and formal networks of relationships among the planners, citizen organizations, and activists. Individual advocates such as Mike Houck, naturalist at the Audubon Society of Portland; Esther Lev, biologist at the Wetland Conservancy; and members of watershed organizations and friends groups, who believe protection of nature is a given, have pushed Portland to the forefront of local protection strategies. (See Johnson, Chap. 5.) Such organizations and individuals are similarly vital to Metro's work. Alternatively, the dynamic in the Portland region might be viewed as a process dominated by policy elites. However, public acceptance of governmental regulatory efforts is a reflection of the cultural context in which it occurs. Efforts to cultivate a sense of environmental appreciation in this region or in any other should not be ignored. The legacy of the Outdoor School may be the imprint not only on children's minds but also on our landscape. Further analysis of change in riparian buffers over time should demonstrate the strength of our policies and popular support.

Our research to assess the on-the-ground changes under different management schemes is ongoing and not yet complete. It nonetheless provides a template for planners, scientists, and citizens in other parts of the country to similarly examine how well or poorly their own localities are faring with respect to protecting riparian buffers and maintaining the functions of a healthy urban ecosystem. With such efforts, we will better understand the relative importance of the various federal, state, and local bodies and actors, and how to best coordinate policies, resources, and actions to protect natural resources. Meanwhile, riparian protection in the Portland metropolitan region also reveals that the interplay of formal institutions and laws and local governments with the varying

capacities to respond and initiate collective actions is only part of the story. Citizen advocates bring an unregulated and serendipitous ingredient to the mix.

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Notes

1. The safe harbor provision allows local governments to opt out of certain requirements of the standard Goal 5 process by following specific criteria for particular features. For example, rather than inventorying riparian corridors within its jurisdictional boundaries, a municipality may employ a standard setback from all fish-bearing lakes and streams in accordance with particular physical conditions listed by DLCDC, such as stream flow.