

# Bringing the River Back:

Working with Landowners on Willamette River Restoration



August 2012



*Prepared by*

## **The Institute for Natural Resources**

Created by the Oregon Legislature through the 2001 Oregon Sustainability Act, the Institute for Natural Resources' mission is to provide Oregonians with ready access to current, relevant, science-based information, methods, and tools for better understanding natural resource management challenges and developing solutions.

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Cover Photo, Willamette River adjacent to the Harkens Lake area, courtesy of Michael Pope, Executive Director of the Greenbelt Land Trust

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## Executive Summary

The Willamette River has gone through extensive changes since Euro American settlement – changes that have reduced channel connectivity, destroyed important habitat for species and vastly undermined floodwater storage capacity. Efforts to preserve portions of the river have a controversial legacy that has left lingering suspicions of government involvement in any activity that includes private lands. Nonetheless, there are opportunities for willing landowners to work with governmental and non-governmental partners to design and implement voluntary restoration projects which can provide financial and land use benefits. The river’s floodplain can be an asset and a resource beyond its usefulness for agricultural production.

This report is part technical guide, part story based on interviews we conducted with different interests. We have separated out the landowners’ viewpoints and experience to make clear the importance of understanding that critical central element in restoration planning. The Harkens Lake area of the Willamette River near Monroe, Oregon, is a priority conservation area detailed in the 2002 *Willamette River Basin Planning Atlas: Trajectories of Environmental and Ecological Change*. The Horning families who own property in the Harkens Lake area have teamed with several partners to design and implement a restoration project as a way to, in their words, bring what was once a living area back to life as a way to give back to the river.

If the potential for restoration is to be realized, landowners and their partners need to be aware of the multiple associated challenges and ways to work through them. Restoration is still new to many landowners, and projects can become complicated fairly quickly. The concept of lead project partners as case managers for landowners is critical. This approach will help landowners define their needs and expectations, develop the level of trust essential to project success, and ensure that landowners are not overwhelmed with the complexity of financing, the demands of design and permitting, and the challenge of incorporating good science.

Landowners also need to know that there is a broad range of restoration programs and tools available, along with associated funding. The sweep of these programs and tools can be confusing.

Though the Harken’s Lake project has not yet required permits from regulatory agencies, many stakeholders interviewed for this report identified permitting as one of the most perennially vexing parts of project implementation. It typically requires cooperation among different agencies at different levels of government, and can take from three months to three years, requiring a great deal of patience on the part of landowners and matching perseverance on the part of project partners.

Finally, as the Harkens Lake story illustrates, a vital concept that may help ensure successful processes is making certain project partners and landowners discuss critical timing issues, align process steps accordingly, and develop two-way assurances that serve as accountability measures and benchmarks for progress.

Those involved with the Harkens Lake restoration project expressed clear hopes: that the project will be a model for more restoration on the mainstem of the Willamette, that restoration will provide good compensation to property owners so that restoration represents a practical addition to agricultural business portfolios, and that landowners will feel good about their legacy in its benefits to the health of the river.

The report should be of interest to landowners, agencies and others in the conservation community, and academics. We emphasize that it is a case study of one landowner's experience, and the pool of associated interview participants was limited. Typical of single case studies, the experiences and outcomes cannot be generalized. There are nonetheless many elements of the study that represent long-standing landowner issues and concerns still shared by many, as indicated by the landowners and by several of the people we interviewed.

Generational issues play out in science, and on the land, and in agencies. Managing natural resources is the easy part; managing people is the real challenge.

--- *Stan Gregory, Professor of Fisheries, Oregon State University*

## **Introduction**

The Willamette River is an indispensable resource for economic development and human settlement, just as it is critical habitat for a variety of regional species, some of them listed as threatened or endangered under federal law. It is also an Oregon icon. Due to the river's importance and history, and changing restoration and protection opportunities, there has been renewed interest and attention to the upper Willamette based on the Meyer Memorial Trust (MMT) and Oregon Watershed Enhancement Board (OWEB) Special Investments Partnership along with the 2008 Willamette Basin Project Biological Opinion and the 2010 Upper Willamette Conservation Recovery Plan for Chinook Salmon and Steelhead. Meyer Memorial Trust provided funding for the Institute for Natural Resources to document restoration process on a key area for Willamette mainstem restoration near Monroe, Oregon.

The project involved tracking progress on a specific project involving partnering with private landowners to achieve Willamette River restoration goals. Our work included interviewing a range of area organizations, state agencies, and university researchers, as well as some of the landowners, at multiple stages in the process. Interviews did not include the funding entities. The report does not cover technical aspects of restoration project design and monitoring. It focuses on details without which restoration will remain a vision rather than becoming a reality: the relationships and institutional issues among the project partners and landowners involved in the Harkens Lake restoration planning process.

The report contains four sections. Section I provides a history and context for current plans regarding the Harkens Lake area. Section II is a general discussion of issues and concerns among those organizations and landowners involved in restoration planning and action. Section III reports on specific issues involving the Harkens Lake project; in particular, the perspectives of the landowners involved. Where possible, we have tried to maintain the same topic headings between Section II and Section III. Section IV contains recommendations aimed at improving coordination and collaborative capacity among those involved in similar efforts. The recommendations should be of interest to a range of practitioners and other participants, all of whom need to understand the inescapable requirement for socially acceptable and politically proficient ways to advance natural resource restoration.



## **I. History and Current Context**

### **A. Settlement and River Changes**

The Willamette River holds a prominent place in Oregon's natural and cultural history. It has been designated an American Heritage River,<sup>1</sup> and its floodplain is listed in the National Natural Landmarks registry.<sup>2</sup> Flowing 187 miles from source waters in the Cascades near the southern end of the Willamette Valley, it joins the Columbia River northwest of Portland. Indigenous populations inhabited the river environs for approximately 10,000 years before Euro American settlement, which began in the early 1800s and accelerated with the nation's westward expansion following the Oregon Trail.

Beyond natural floodplain meandering and other river dynamics, the Willamette River was significantly transformed as a result of settlement. As lands were settled, channels and banks were altered, dams were built, and floodplain forests and associated vegetation were removed. These human actions changed flow and temperature dynamics, floodplain connectivity and habitat. In many instances, the river was used as a waste sink; and by the early 20<sup>th</sup> century, the Willamette River was described as "an open sewer."<sup>3</sup> Little was done for several decades, however, with respect to reducing pollution from sediment and chemical inputs.

In the 1990s, approximately two-thirds of Oregon's population lived in the Willamette River Basin. Oregon's population was estimated to be approximately 3.8 million in 2009. It is estimated that more than that—well over four million—will live in the Willamette River Basin alone by 2050,<sup>4</sup> putting significantly increased demands on an already stressed river system.

From approximately 1850 to 1995, river channels and islands decreased from a total area of 41,000 to 23,000 acres. Loss of side channels and related off- river features have subsequently decreased important habitat and connectivity.<sup>5</sup> Reduction of these features also decreases the capacity of floodplain lands to effectively absorb flood waters.

### **B. Restoration as a Priority**

In the 1960s, the Willamette River's condition acquired high political visibility. A series of plans and actions to restore and protect it came out of two major programs: The Willamette River Greenway program and, to a much larger extent in the 1990s, the Willamette Restoration Initiative.

Although he was not the first person to publicly introduce the idea, Governor Tom McCall made the Willamette Greenway one of his initiatives soon after his 1966 election. McCall had already been instrumental in bringing attention to Willamette River pollution issues. Prior to his entry into politics, he had been a television reporter with an interest in environmental issues. He produced the 1962 documentary *Pollution in Paradise* highlighting Willamette River pollution

that inspired effective cleanup efforts—so much so that a 1972 *National Geographic* article credited him for his part in the improvements.

Several dams were constructed between the 1940s and 1960s. While they contributed to certain types of pollution reduction through flow regulation in addition to issues Governor McCall highlighted, they created different problems for the river by changing various floodplain characteristics.<sup>6</sup>

There was a great emphasis at the time in preserving open spaces along the river for a parks and trails system consistent with a national interest in preserving waterways' natural environments as a part of greenbelt planning.<sup>7</sup> Under McCall's direction and the support of various interests, the Oregon Legislature established the Willamette River Greenway in 1967 as a matching grant program for land acquisition. Legislation to establish the program, comprising multiple proposals, was controversial. Agricultural interests protested provisions for scenic easements that implied land use constraints, foreseeing interference with private property rights and traditional agricultural land uses. There were also charges from the same sector that the greenway would have specifications for eminent domain, the seizure of private property by the government for a "public good." Provisions prohibiting such land acquisitions were added to legislation in an effort to quell those concerns. Along with other proposal modifications, the name of the greenway was changed to the Willamette River Parks System.<sup>8</sup>

The Greenway Corridor Program, proposed in 1971, complemented the existing greenway program and restored the concept of a continuous river parkway system abandoned in the earlier legislation. Once again, the issue of the state acquiring property touched off protests. Some supporters, disappointed by the small amount of land purchased up to that point, wanted to include condemnation as a tool. Condemnation was indeed threatened, though there are conflicting accounts of whether it was actually used. The State Emergency Board intervened, freezing acquisition funds until it was made clear that the program would not exercise condemnation.<sup>9</sup> In 1973, the legislature passed a newer Willamette River Greenway Act with express prohibitions against condemnation in all areas except for five existing river parks. In 1975, Willamette River protection became Oregon Statewide Planning Goal 15 "To protect, conserve, enhance and maintain the natural, scenic, historical, agricultural, economic and recreational qualities of lands along the Willamette River as the Willamette River Greenway" under the jurisdiction of the newly formed Land Conservation and Development Department.

In general, the various greenway plans have been moribund since the 1970s. For riverfront property owners, mostly agricultural producers, the condemnation threats and experiences associated with the river corridor programs created and reinforced deep seated, lingering mistrust that affects current proposals for river corridor land protection and restoration.

In 1998, at the recommendation of the Willamette River Basin Task Force, Governor John Kitzhaber signed EO 98-18 establishing the Willamette Restoration Initiative (WRI). The WRI goal was to create a long-term, coordinated, collaborative effort to improve the health of

Willamette River basin comprising “a dynamic balance between diverse human and ecological needs” (EO 98-18). One of the outcomes was the basin-wide Willamette Restoration Strategy, an integrated conservation strategy covering fish and wildlife habitat issues, water quality concerns, flooding and overall watershed health throughout the basin.<sup>10</sup> The strategy was later included as the Willamette Chapter of the Oregon Plan for Salmon and Watersheds, also a Kitzhaber initiative. The Willamette Partnership later replaced the WRI to create broader support by shifting various restoration efforts from a government program to a non-governmental entity.

More recently, the Oregon Watershed Enhancement Board and the Meyer Memorial Trust have established the Willamette Special Investment Partnership (SIP) to support projects designed to restore channel complexity, floodplain connectivity and fish and wildlife habitat in high priority “anchor habitat” areas along the river. In addition, in 2010 the Oregon Department of Fish and Wildlife and the Bonneville Power Administration entered into the Willamette Valley Wildlife Mitigation Settlement Agreement, which provides funds to acquire (through fee acquisition or easements) and maintain fish and wildlife habitat, including riparian and floodplain habitat, to mitigate for the adverse habitat impacts of Willamette Basin dams. Together, these programs are bringing significant new resources to restoration efforts along the mainstem Willamette.

### **C. Harkens Lake**

Areas with high potential to restore natural conditions and/or contribute to available habitat possess valuable conservation and restoration potential. Harkens Lake, adjacent to the Willamette River and east of Monroe, Oregon, is one such area. It has, among other features, remnants of a mature floodplain forest, non-crop vegetative community diversity, off-channel ponds and side-channel sloughs, gravel bars, historically high levels of biodiversity, and capacity to absorb flood waters. Restoration can enhance all of these and other important attributes.

In January 2010, two members of the Horning family contacted the Corvallis-based Greenbelt Land Trust about selling a 43-acre parcel adjacent to the river and Anderson County Park within the historical Harkens Lake side-channel and offering a conservation easement on an additional 202 acres in this area. The Hornings enlisted their sister and brother-in-law, Mark and Sherie Adams, to include their adjacent 74-acre parcel in the discussions for this conservation initiative. In winter 2012 another landowner, Bill Pitcher, agreed to discuss the inclusion of his adjacent 52 acre parcel in the effort. Concurrently, the National Resource Conservation Service (NRCS) was engaged with an adjacent landowner on a Wetland Reserve Program project for 113 acres. The area also contains about 119 acres of public land (Department of State Lands, Oregon Parks and Recreation and Benton County).

Project partners joining the landowners included Benton County, Oregon Department of State Lands, Bonneville Power Administration, the Institute for Natural Resources at Oregon State University, Meyer Memorial Trust, Oregon Parks and Recreation Department, the U.S. Fish and Wildlife Service, and the Oregon Watershed Enhancement Board. The restoration and reconnection of this priority floodplain area—a mix of private and public ownership parcels—is a shared goal among land management entities and researchers. The area has remnant floodplain forest and both species and habitat complexity. The outcome of this collaboration will be a

conservation area of over 500 acres in a critical floodplain location of the upper Willamette River. Significant portions of the area are annually inundated during high flow events. Conservation objectives for the area include restoration of hardwood floodplain forests and reconnecting floodplain areas, which will create additional water storage capacity and increase the potential for refugia for juvenile spring Chinook.

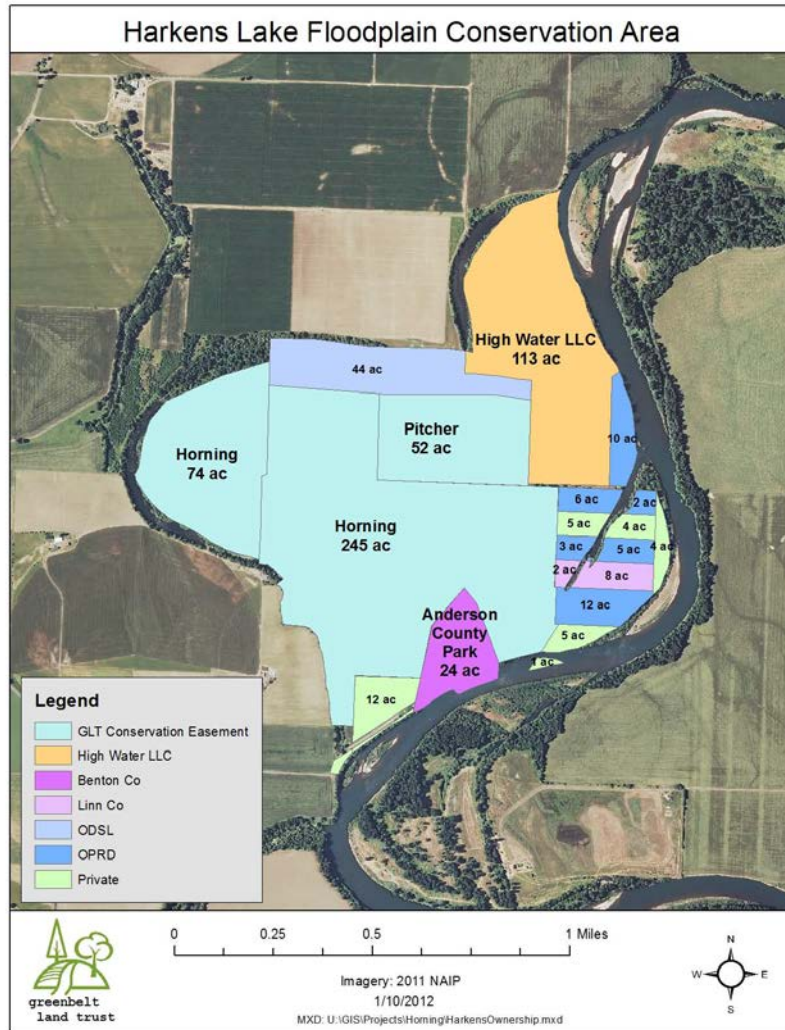
The 2002 Willamette River Basin Planning Atlas includes Harkens Lake as an example (p.147) of how restoration along a particular segment of the river might influence flooding effects, based on the December 1996 basin flood magnitude. It compares the area's potential flooding effects based on breaching an existing revetment and allowing the river to utilize a remnant side channel that was originally the mainstem of the Willamette. Historically the area was a key connector between two very complex and diverse floodplains north of Harrisburg. With anthropogenic changes to the river, these complex floodplains have been altered and simplified and currently the Harkens Lake area is one of the most complex floodplains between Harrisburg and Corvallis. In addition to the Willamette River Planning Atlas, the area has been identified in The Nature Conservancy's Willamette Synthesis Map, and the Oregon Conservation Strategy, as a priority or focal area for conservation investments.

Figure 1: Harkens Lake area in foreground during high water event, June 5, 2010.



Source: Greenbelt Land Trust

Figure 2: Parcel Ownership



Source: Greenbelt Land Trust

Benton County owns Anderson Park, a parcel comprising approximately 26 acres, which currently has no facilities but has limited land and water access. The state owns a parcel at the opposite end of the forested area. The county’s goals are to manage the area for light recreational use, outdoor education and conservation of natural values. The Benton County Health Department was a successful grant applicant for the Robert Wood Johnson Foundation’s Healthy Kids, Healthy Communities (HKHC)<sup>11</sup> focusing on south Benton County, and the Benton County Natural Areas and Park Department envisions including the Anderson Park area in HKHC program plans. Eventual design and implementation depends on the language and particulars of the conservation easements as well as the decisions of the broader partnership. As of the date of this report, there had been recent, onsite discussions among the partners and the

landowners including an overall vision for joint management of the county and state parcels and public access management.

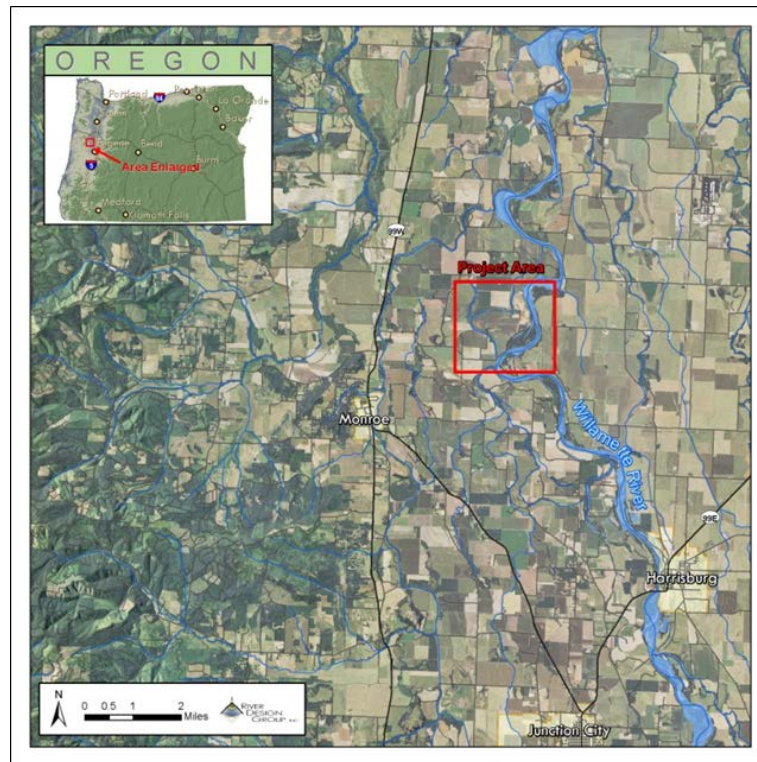
#### D. Harkens Lake Project Design

River Design Group, Inc. (RDG) was retained by the Greenbelt Land Trust (GLT) to initiate restoration planning for the area. Design will be based on a joint planning effort of landowners, stakeholders, and sound restoration science. The Corvallis RDG office will provide hydraulic modeling and detailed terrain modeling while integrating biological criteria to help target a sustainable restoration design. The firm’s restoration design philosophy seeks to minimize the burden on landowners for long-term maintenance while restoring natural river processes for aquatic and wildlife habitats.

The management agreement for the area comprises goals of restoring more effective floodplain functions and re-establishing native vegetation communities to benefit aquatic and terrestrial species. A more detailed explanation of the design process is contained in a December 2011 memo, Harkens Lake Restoration Planning Summary, Appendix A.

Examples of maps to be utilized for design include, but are not limited, to the following:

Figure 3: Project Vicinity Map



Source: River Design Group 2011

Figure 4: Historic Vegetation Map

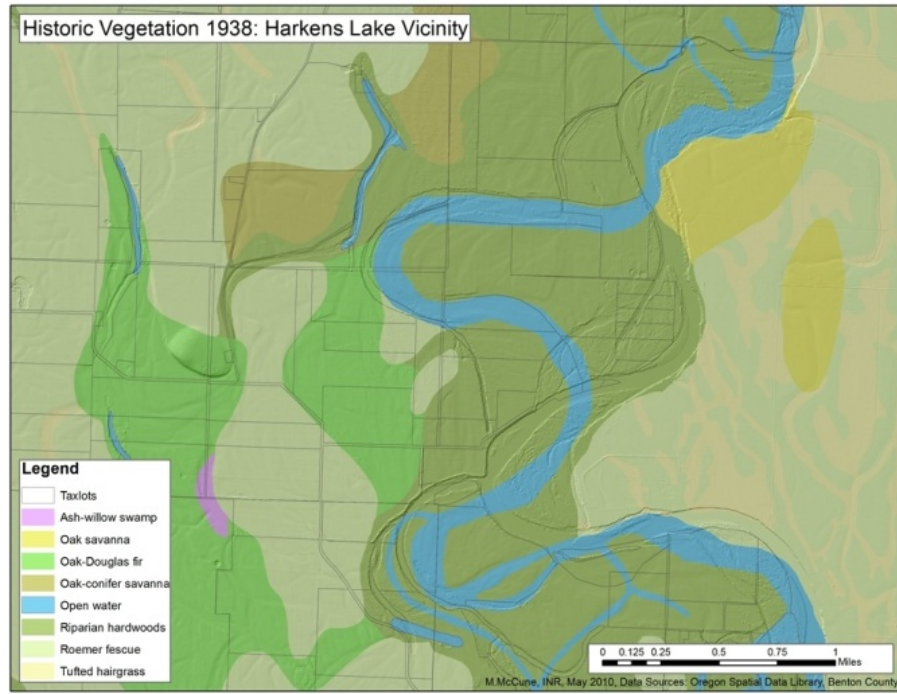


Figure 5: Current Vegetation 2008: Harkens Lake Vicinity

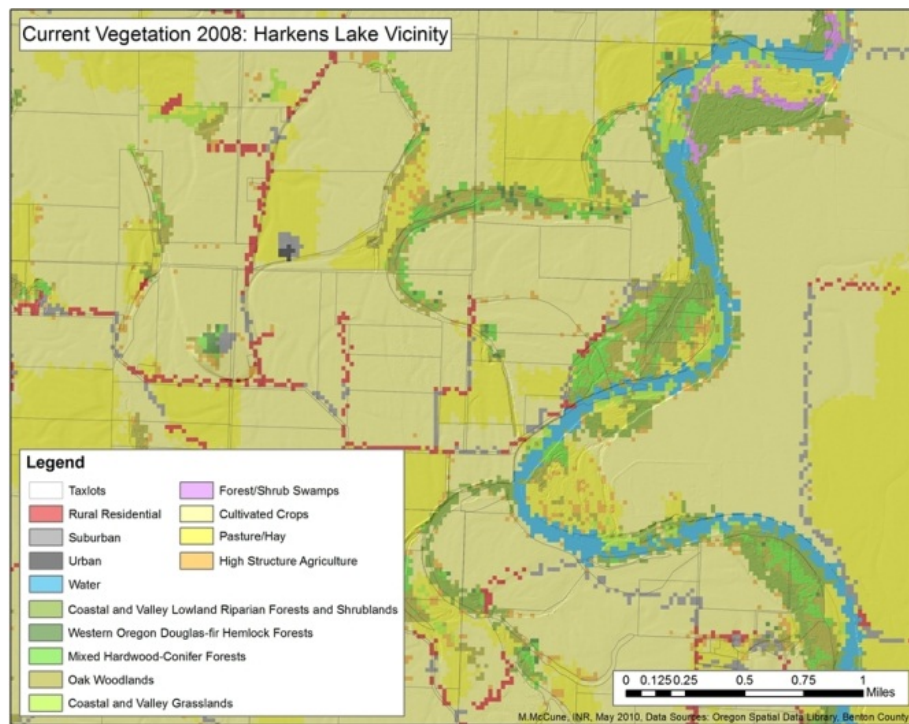


Figure 6: Historic Flood Extents: Harkens Lake Vicinity

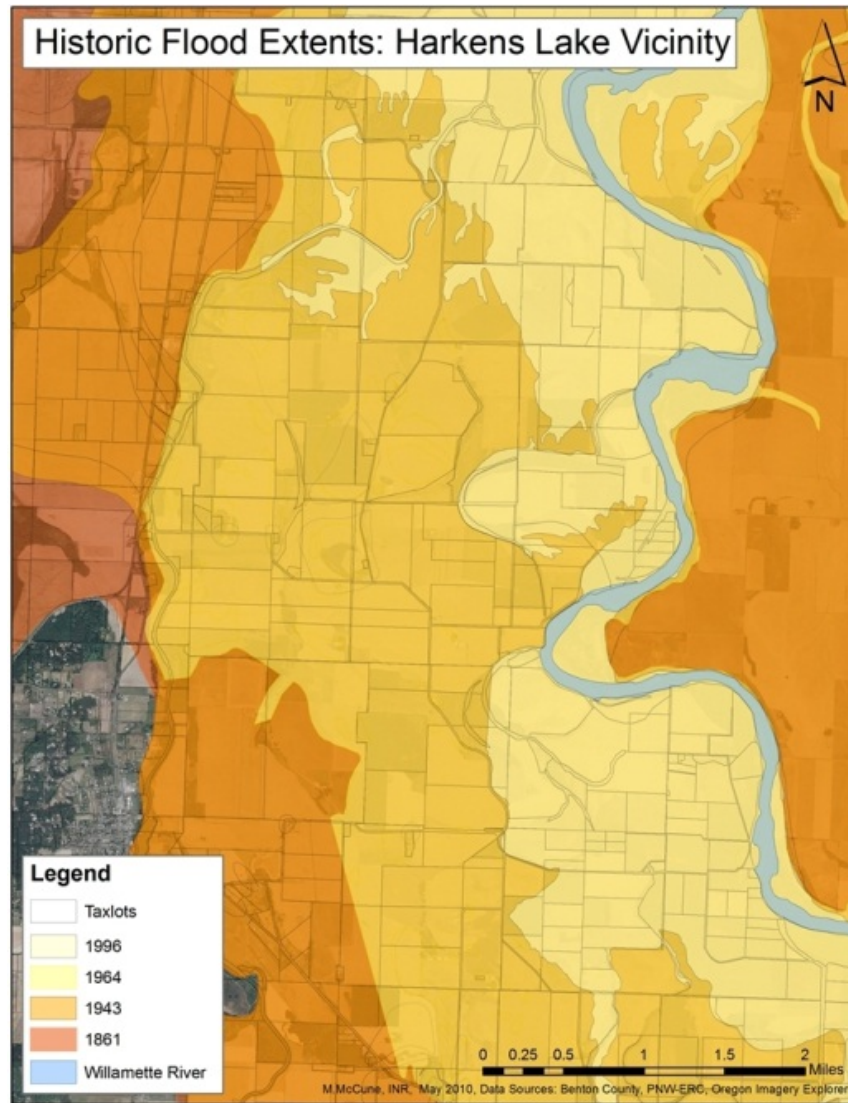
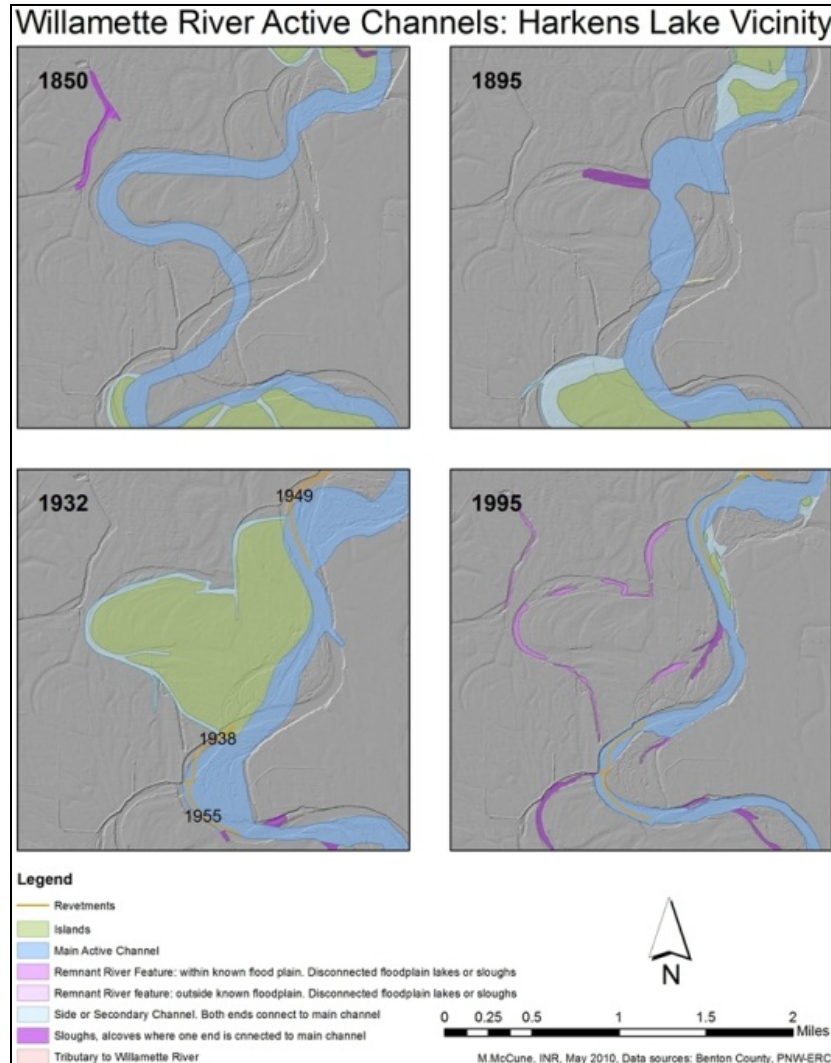




Figure 7: Government Land Office Plat Map, 1850



Figure 8: Willamette River Active Channels: Harkens Lake Vicinity



## II. Common Themes and Issues in Willamette Restoration Planning

### A. Working with Landowners

The mainstem of the Willamette River presents some unusual challenges based on the history of controversy surrounding the various state-level conservation efforts; in particular, its two greenway initiatives. Especially because of the issue of eminent domain, there is long-standing distrust regarding government and concomitant restoration programs.

Various people who have worked on restoration projects have noted that building trust is a critical and long-term process. Careful listening to determine landowners' needs is an essential

first step. Listening may reveal that landowners are not certain of what they want, or of the value of what is being proposed. It therefore becomes important to first determine mutual needs in order to discuss reasonable expectations for project outcomes.

It is important to ask rather than tell landowners about land history and characteristics when discussing restoration opportunities. Landowners tend to look upon academics as domineering and arrogant without any practical knowledge; they share concerns that academics have a habit of talking about land and water actions without acknowledging landowners' detailed, experiential, and historical familiarity with their lands and their legitimate concerns. Such an approach creates the perception that those who do not understand landowners' needs and realities are trying to impose their values on landowners' properties, practices, and lives, with little or no concern for the implications of such actions.

In many cases, landowners may be unfamiliar with the objectives of restoration-oriented organizations. It is therefore important to spend time "introducing" organizations and their various missions and capabilities. Although landowners may be well acquainted with a variety of government programs, they are also likely to have an inherent distrust of government and perhaps, by association, organizations that work with government agencies on restoration issues. Assuming trust exists, those partnering with landowners for restoration need to communicate regularly to maintain what is likely to be a perpetually fragile relationship. It is also important to maintain landowner contact in order to clarify circumstances and either verify or dispel rumors which may spread through the agricultural community regarding government actions.

Landowners who have successfully implemented restoration projects can provide the best outreach for other landowners. Information that comes from peer discussions among landowners is likely to be perceived as more trustworthy than discussions with "outsiders." For instance, in the Harkens Lake area, allowing the Hornings to judge when the timing was right to talk with neighbors has led to other property owners' expressing interest in similar projects. Although there is no way to determine if other outreach approaches would have yielded the same results, past issues with government and some NGOs make it more likely that endorsements and information coming from neighbors with direct experience will be better received.

Along with social issues, various incentives and disincentives affect restoration options. Understanding the social context and how to approach the process wisely when prospects materialize can make the difference between opportunities lost and realized.

## *Incentives*

Landowners have a variety of reasons for wanting to engage in restoration projects. Often they are driven by a strong attachment to their land and a desire to see it protected and improved for the long-term. They also may be willing to investigate restoration as a land use alternative based on tax and income considerations, events such as divorce or a death in the family, or a decision to retire—in whole or in part—from whatever business the property supports.

Although for cultural and economic reasons agricultural producers have historically balked at the concept of taking land out of production, marginally productive floodplain lands may present new revenue opportunities. In addition to the ever-present risk of losing topsoil and crops to flooding, turning a profit on production associated from marginal lands—which used to be comparatively easy—is increasingly difficult. Prices have fallen for a lot of Willamette Valley crops, with grass seed as a prime example during the recent global financial crisis. Processing facilities for row crops are no longer readily available. Furthermore, banks that have dependably been providing loans to landowners for multiple generations have suddenly tightened lending requirements. Loans are therefore less reliable than they once were. Easement payments may be attractive alternatives to the uncertainty of markets as well as river and weather issues.

Although there appears to be an overall lack of experience regarding partnering for restoration among agricultural landowners, one interviewee noted the increase in entities involved in watershed restoration has continually expanded over the past several years, creating more potential exposure to restoration information and opportunities. Because of the expanded field of restoration entities, there is “something for everyone at nearly all levels, from plantings for butterflies to major structural projects.” This provides for different levels of experimentation and involvement. That, in turn, affords more chances for success stories that will likely be shared. Landowners who have observed others become involved with positive outcomes may subsequently envision possibilities for their lands.

One interviewee suggested that paying landowners equivalent returns to tend restoration-associated vegetation rather than crops can make the prospect economically attractive. Reframing restoration as producing a different sort of crop may also reduce reluctance to take land out of traditional production practices as a result of cultural values. This suggestion comes with a strong caution, however, offered by an agency representative:

If asked to plant trees to reduce flooding and protect and enhance water purity, farmers still see this as government imposing its values on their land where they're dedicated to farming. There needs to be a shift in how landowners view farming, and that's a long-term process.

## *Disincentives*

Many landowners have no history of being partners on restoration projects. They therefore have no one in a trusted position such as a neighbor or other member of their cultural group to turn to for advice, support or general knowledge. Early adopters—pioneers within an identified group—are likely to have worked with some of the entities; however, it is important for any organization’s representative to make it clear to landowners what programs and services the organization offers.

The complexity of planning and implementing a project can be overwhelming. The critical role of a “case manager” and/or broker is a recurring theme. Agricultural producers face substantial time demands most of the year—time that does not allow for negotiating complicated financial and other project-associated requirements.

If landowners are going to engage in restoration activities, there needs to be agreement among landowners and those organizations that want them to undertake restoration activities that their efforts will be supported. According to one landowner, in one instance several years ago, a group of farmers was willing to lead a coordinated restoration process, but interest within various entities in state government, and accompanying funding, did not materialize. As a result of that and similar experiences with what is often a complicated permitting process, landowners tend to be disinterested in proposals for alternative land uses.

While easements are a good way to provide income, landowners may perceive that easements are risky for multiple reasons. First, they represent a loss of control over decision-making regarding one’s property. Another concern is the financial commitment required for restoration. Another interviewee observed that farming families cannot afford to get too financially extended because of the unpredictable nature of the agricultural commodities market: landowners “essentially mortgage their business lives yearly.” Contracts are set for the current year’s output, but payouts don’t occur until a year later. The weather or other natural events—including flooding—can significantly affect yields. There have also been recent reports of agricultural products distributors not honoring their contracts.

A critical issue that became a potential deal-breaker in the Harkens Lake process was the timing for easement purchase and conveyance. If the process is not well planned and scheduled, it can result in tax planning issues for landowners. Raising awareness of mutual timing requirements and developing critical-path planning strategies and two-way assurances between landowners and project partners may help reduce project uncertainties and bottlenecks.

Managing river behavior is inherently risky, as landowners know all too well. Altering existing conditions at any point in time inevitably changes land-river relationships; landowners therefore generally regard changes in river management structures with a good deal of skepticism and unease. Different interview participants spoke about landowners’ concerns regarding flooding and the high awareness that the river is unpredictable and cannot, ultimately, be controlled. High

water is a manageable condition; flooding, however, is something else altogether. Rightly or wrongly, the sense among landowners along the river that restoration projects are likely to increase flooding potential is a serious disincentive.

## **B. Permitting**

Permitting issues tend to be one of the most significant project constraints. At best permitting can be time consuming; at worst, the permit process constitutes an overwhelming gauntlet of agency coordination and approvals. It is not a simple, linear process. In general, the types of permits required and the agencies involved at the local, state and federal level may be affected by a number of variables. These include, but are not limited to, funding sources, the degree and amount of landscape removal and/or fill involved in the project area, whether landscape manipulation includes surface or subsurface disturbance, whether the project includes areas with endangered species, and whether the project area is subject to agricultural or other regulatory exemptions. The list of agency involvement and permit approvals therefore needs to be developed on a case-specific basis. An overview of the range of permit requirements for water-related restoration is available at [http://oregonstatelands.us/DSL/PERMITS/docs/WRPPIT\\_guide\\_2008\\_lms.doc](http://oregonstatelands.us/DSL/PERMITS/docs/WRPPIT_guide_2008_lms.doc).

Agencies tend not to think in collaborative terms, even though joint agreements and multi-party project design and implementation are no longer novel concepts. Depending on the level of project complexity, multi-permit approval can take from months to years. Permitting can be further complicated by the fact that it is not unusual for agency personnel to transfer, taking with them institutional memory of the context for particular agreements. New staff, lacking this contextual understanding, may balk at what have been common understandings, stalling or unraveling progress. Different interviewees noted that based on such experiences, many landowners feel that any process involving government takes too long. One participant also explained that when the process stalls or falls apart, landowners may think it's the partner organization and not some other entity that has caused the problem. This further erodes credibility and, with it, trust.

## **C. Conservation Easements: Legal and Financial Issues**

A conservation easement is a legally binding restriction on a piece of property that limits its uses to accomplish goals such as preventing development or achieving restoration outcomes such as improved fish and wildlife habitat. The easement remains in place either for a number of years or in perpetuity regardless of whether the land is sold or passed on to heirs.

Conservation easements can provide financial incentives to engage in restoration. There are, however, various financial considerations landowners need to take into account, discussed below. Conservation easements can be voluntary donations, agreements for time-limited restrictions, or fee simple sales. The easement holder, typically a government agency or a non-profit organization—most often a land trust—retains the right to enforce the easement

restrictions and is responsible for maintaining the property as specified in the terms of the easement.

### *Permanent Easements*

There are many reasons property owners grant or sell conservation easements. They may want to ensure that their property retains its traditional use as part of the family's heritage. Alternatively, or additionally, the owners may want to protect some special feature such as important wildlife, plant fish habitat.

Easements are unique to each property and are written to reflect landowners' needs. They can be written to allow property owners to continue current land uses such as agricultural production, forestry, ranching, recreational use and residential occupancy. They can cover only a portion of the property and need not include public access.

Land under a conservation easement may have a lower monetary value than land that does not contain any development limitations, although this could change with social acceptability of conservation actions. These limitations may have implications for land sales or financing. Depending on the terms of the easement, however, there may also be tax advantages for the property owner.

While easements are a good way to provide income, they also involve disincentives and risks. One such risk is loss of productive land. Loans are based on acreage in production. When considering easements, landowners and their organizational partners need to determine the financing implications of taking land out of production. Permanent easements as part of a restoration plan also need to include long-term funding assurances. As a project partner stated:

It's a risk for landowners just to take land out of production without the surety of funding. Selling an easement is not the same as fallowing those acres, which the landowner can decide to farm again in the future. There's no turning back. They need to know that alternative revenues will continue to be available as part of the restoration plan.

On the benefit side of the equation, if reasonable payment can be assured from commitment of unproductive lands, property owners will have additional monies to invest in their more productive lands. Some newer practices, such as precision farming that requires fine resolution soil mapping, are very expensive. Appropriate, assured compensation can offset some of those expenses and thereby help with overall economic viability. It is extremely important for project partners to ensure that agricultural producers at the very least break even on any agreements they enter into for restoration activities.

Entities holding easement titles also acquire risks. They must maintain the property in the condition that meets the easement and conservation objectives. If they fail to do so, they could be

held liable by the easement funder and might have to replace the property or reimburse the funder as a result of performance failure. Different funders have different compliance requirements, some of which would be regarded as overly burdensome by property owners and easement holders. In one example, landowners and/or easement holders could be held liable for paying back the cost of an easement and potentially up to five times the original cost of the easement for failure to achieve desired conditions at a specified future date.

Even assuming the property will be maintained properly, there are a lot of front-end financial and staff time costs for the easement holder. They include, among other things, performing due diligence, putting together the funding, arranging appraisals and land audits and paying associated legal fees. In addition, for many projects, there is a need to find matching funds and comply with any restrictions. For Oregon Watershed Enhancement Board matching funds, for instance, there are limitations on the types of things for which match funding can be used. There may also be a need to find funding through donations in order to finance an agreement. An organization's staff time commitment can be considerable before it becomes sufficiently clear that the easement is truly a possibility; so there is the risk of substantial unproductive costs in pursuing an easement agreement.

Despite the risks involved, a conservation easement can nonetheless be a good legal and financial tool that provides for property restoration and protection while benefiting landowners.

#### *Time-limited Easements*

A number of government programs provide funding or cost sharing options to property owners for voluntary enrollment in programs aimed at protection, restoration and enhancement of agricultural lands for various conservation objectives.

The Natural Resource Conservation Service's (NRCS) Conservation Reserve Program (CRP) provides technical and financial assistance to eligible farmers and ranchers to implement cost-effective, environmentally beneficial practices for soil, water and other natural resources in compliance with Federal, State, and tribal environmental laws. The program provides cost sharing and annual rental payments on multi-year contracts that involve implementing environmentally beneficial land use practices. NRCS also offers the Conservation Reserve Enhancement Program (CREP), a voluntary land retirement program under CRP for qualifying acreage. An optional program under CRP, CREP contracts, which provide annual land rental payments, require multi-year commitments to keep lands out of agricultural production. Contracts may also include incentives for implementing specific environmentally beneficial practices on retired lands. CRP and CREP are non-permanent easements that do not involve title transfer but do restrict the types of land uses.

The NRCS's Wetland Reserve Program (WRP) offers options regarding wetlands restoration projects to provide benefits for migratory birds and other wetland-dependent wildlife and plant species. The program also works to enhance a number of water related land functions such as



restoring active floodplains along creeks and rivers, enhancing flood control, and improving water quality through vegetation restoration on appropriate lands.

Oregon's WRP priorities link with the Oregon Department of Fish and Wildlife (ODFW) Conservation Strategy for Oregon. The WRP provides three enrollment options which include permanent and limited term easements. In all cases, property owners retain land ownership while agreeing to restrict traditional uses as necessary only on those portions under easement in order to manage them as wetlands consistent with program requirements.

Agricultural producers are more likely to be familiar with NRCS and similar programs, which amount to temporary easements, than they are with permanent easements. Permanent easements, as discussed above, carry additional risks and rewards and are currently used less often than state and federal programs. An agency representative expressed the opinion that the best approach to restoration may be to increase the overall number of easements. After a few landowners have them, others might be more inclined to follow the example. In order for this to occur, there need to be a number of factors in place: money available to cover purchasing the easements along with sufficient monies to cover a permanent monitoring program; a purchase price high enough to ensure that the landowner is fairly compensated for giving up alternative land uses; trust between landowners and those involved in setting up and purchasing the easements; and broader acceptance by landowners that such easements are good alternatives to traditional land uses. The same agency person suggested that, to accelerate the number of landowners amenable to easements:

Farmers should be in charge of the change process through a sort of farmer-driven land trust. It will still take strong, reliable partnerships with people who 'know the ropes' and can guide the entity through some perennially complicated processes.

There has been an attempt by agricultural producers to create interest in such a trust in the past, but at the time there did not appear to be interest in Salem in supporting the idea. This suggests keeping in mind that timing, as well as "small wins" through working with receptive landowners, can affect the success of innovative approaches to restoration. As a project partner reflected:

It will help the paradigm shift by working with people like the Hornings and being highly cooperative, being successful with them on their terms and letting them tell their success story.

#### **D. Interorganizational Collaboration**

Restoration projects typically involve manipulating existing landscape and, with respect to rivers in the Pacific Northwest, also likely involve threatened and endangered species. Such projects therefore require the cooperation and coordination of multiple regulatory and administrative agencies at different levels of government for approval of the necessary Clean Water Act, Endangered Species Act and other state and local permits. Agency authority for various permits

is highly fragmented. In addition, due to steadily shrinking budgets over the past decades, agencies have fewer human resources to attend to complicated permitting processes. Coordination and cooperation may take additional up-front resource commitments, but doing so can add substantial efficiency to planning, design and implementation activities.

Regarding the coordination required and volume of paperwork involved, an interviewee stated that there is, “no way a lay person could get through it.” Many non-profit and non-regulatory entities therefore play a critical role as an intermediary between landowners and agency partners, and it is essential to develop individual relationships within the relevant agencies. This can significantly help the permitting process and interactions with landowners. An agency representative provided the following caution as a starting point for people working between agencies and landowners:

Don't overpromise in terms of what can happen and in what time frame – be realistic. Even if you're willing to put in the effort to keep a process moving, it's highly dependent on a lot of other people in your own and other agencies; there are many layers to an approval process.

The permitting and approval process can take months and sometimes years. Over time, personnel in agencies periodically change jobs. As a result, institutional memory for the context of agreements can disappear. Relationships and understanding need to be re-created, adding to time and other resource commitments. Landowners may lose patience and either drop out of projects and/or decide not to engage in future dealings with the government.

One agency interviewee noted that the better processes and projects are those with lots of coordinated planning input up front and which have a lead agency. This reduces the tendency of the involved agencies to carry out project design from individual organizational perspectives, which can lead to confusing or incompatible project designs and expectations.

There has been some progress on joint review and decision making such as joint biological opinion review and document preparation as required by the Endangered Species Act. A researcher pointed out, however:

Up to now, this has not been the norm. There needs to be a coordinated assessment program that could be funded. Until that happens, there's no reason for up-front coordination of funding and, therefore, no reason to get permitting in sync.

Oftentimes, permitting can be a significant problem for organizations lacking sufficient familiarity and experience concerning regulatory requirements. The same person who identified the characteristics of better processes and projects suggested that a solution would be funding for

non-regulatory agencies to hire someone familiar with permitting requirements and language. Someone who “speaks regulatory language” and understands what’s required would likely be able to move permits through the process more quickly as non-regulatory agencies are not likely to have this expertise.

In addition to collaboration to meet legal requirements such as Endangered Species Act provisions, involved agencies need to come to agreement on what restoration means, and how partners will gauge restoration success. To accomplish this, there needs to be joint agreement on monitoring criteria and performance measures to determine whether project actions are genuinely leading to restoration.

Reflecting on the role of landowners in various project activities, an interviewee explained that many of them quickly become overwhelmed by the number of agency partners required while others “like the crowd.” Additionally, some landowners want minimal engagement with actual activities while others get quite excited about restoration and want to be in the middle of activities, helping out, making observations and learning more about restoration in general and how it is affecting their property. It is therefore important to gauge landowner tolerance for working with all partners and create an appropriate level of involvement.

It can be a challenge, real or perceived, to provide flexibility to accommodate landowners’ needs. Agencies generally have narrowly-defined objectives and priorities. An interview respondent observed that if landowners are not comfortable with, and therefore agreeable to, agencies’ project plans, agency personnel often do not feel they have the latitude to make the types of adjustments that might make the project acceptable to all parties. Sometimes the agencies are legally constrained from making modifications. In other cases, however, inflexibility may be the result of institutional habit, and agency staff may have more flexibility than they believe exists.

Some agencies tend to have historical interagency relationships that run from mildly competitive to antagonistic. As a result, building good relationships and developing joint objectives among the public-sector partners can be as important as building relationships between landowners and agencies. Assessing collaborative capacity and acting accordingly is therefore important.

The foregoing discussion indicates that there will inevitably be a network of entities interacting with landowners and with one another. Because of the complexity of many restoration projects, there are a lot of data, permitting, timing, and relationship issues, among other matters, to attend to from concept to project monitoring. There needs to be close attention to timing between agencies and landowners in addition to timing among agency partners. Agencies may not be aware that landowners also have critical deadlines with respect to tax and crop planning where easements may be involved. Putting projects or finances on hold, even for short periods, may make it prohibitively expensive for landowners to go forward, resulting in expensive lost opportunities for all parties.

In addition to fragmentation of authority, the Harkens Lake project illustrates the fragmentation of information about the particular stretch of the Willamette involved in this project. There is sometimes a disconnect among agencies working on specific projects at various points along the mainstem. According to one person who spoke about the issue, various organizations knew what was going on regarding their side of the river, but not the other. Based on interviews and conversations, it appears resource constraints affecting funding and staff likely influenced this confusion. Most staff seemed to be perpetually struggling to stay on top of work requirements. This should not be seen as a criticism; rather, it points to the need for additional help to build collaborative capacity.

In many instances for projects within specified watersheds, watershed councils act as “case managers” but there are few similar organizations for the mainstem of the Willamette. Focusing on the network of project partners as a structural issue may help identify ways to increase strategic efficiency and effectiveness.

## **F. Integrating Science**

Science is a pivotal and evolving aspect of restoration projects. One scientist noted that, in contrast to an earlier emphasis on single projects with focused outcomes, the more successful restoration efforts are those which are adaptive and where those people designing future scenarios are thinking about a general trajectory rather than a fixed outcome. An example would be designing for overall ecosystem function rather than focusing solely on trying to replicate historic conditions on a particular plot since, “The past is just a context.” In one example, project designers left agricultural production in as part of the plan since restoration wasn’t feasible on that portion of the property.

No viable restoration is likely to take place without a thorough scientific understanding of baseline conditions, historical patterns and changes, and what would constitute a healthy ecosystem. Various aspects of the Willamette River have now been studied for decades: maps have been digitized, and general knowledge is both broad and deep. At the same time, however, issues—including incorporating science—are as much social as they are a function of scientific expertise. A researcher observed:

There’s always a need for science, but it’s not the limiting factor. We need social models of how to create a common goal. We need to know how to have people from different backgrounds, ownerships, entities and communities work together to accomplish those common goals in ways that people feel good about the process. That way, the process builds its own momentum. It doesn’t need a charismatic leader because the broader community wants to be part of it.

Regarding models, the same researcher also talked about a typical misunderstanding of scientific models as an aspect of project outcome assurance:

Everyone thinks that models tell you about the future. They tell you about conditions at a certain point. If the river changes at all in the future, the model changes too. They're definitely useful, but they're a snapshot of a moment in time.

A wide range of variables can change river behavior, yet typically only certain ones, under certain conditions, are components of modeling. If the river dynamics change, the model will need to change as well. With the Harkens Lake project, property owners in the area wanted assurances that there would not be a risk to neighboring properties from alterations to existing land uses and structures. Given that models are snapshots—and limited ones at that—no absolute guarantee is possible. Thus, it is critical to establish that uncertainty is an element of landscape change for restoration, just as it is with respect to the larger issue of living and farming in a floodplain. Nonetheless, attention to providing the best available level of realistic assurances is an important negotiating step.

Science is just as significant on the back end of projects as it is on the front end. Monitoring—tracking and evaluating management outcomes—is essential for both those who have contributed money to restoration projects and for landowners. As discussed elsewhere, interviews indicated that one reason more landowners may be hesitant to undertake restoration projects is poor performance and upkeep on older projects. It is not clear what sort of funding was involved; however, lack of performance goals and active, adaptive management appears to have left some landowners discouraged with restoration efforts.

An adaptive management approach, which relies on flexible, iterative management decision making to compensate for ecosystem surprises and changes, is crucial for restoration as ecosystem dynamics and responses to manipulation are still not well understood. In addition, any number of unpredictable events and conditions such as floods, droughts or toxic spills can affect project activities. The acknowledged uncertainty essential for adaptive management can, however, be threatening to landowners. There may be concerns regarding potential liabilities and increased costs if project actions do not produce results. To overcome such legitimate concerns, agencies and other project partners need to provide written, contractual assurances that landowners will not be responsible for project setbacks or failures beyond their control.

### **III. Themes and Issues in the Harkens Lake Process: The Hornings' Story**

The following section covers the history and process regarding the Harkens Lake project. It includes relevant project partners' observations; however, it is primarily the landowners' story. To the extent possible, section topics and heading are similar to those in Section II covering

general themes concerned with restoration planning which emerged from interviews with a range of project partners and advisors.

The Hornings' story provides important policy and practice information about working with landowners to restore Willamette River habitat and functions. As discussed in earlier sections, many landowners along the Willamette tend to be mistrustful of working with government, a condition that acts as a barrier to greater landowner participation. If greater restoration success is to be realized, project partners need to keep in mind the lessons their story provides.

### **A. Landowners' Expectations**

The Hornings have lived on their property for five generations. As a result, they have a long relationship and a great depth of understanding regarding the river, and they have witnessed significant changes in river behavior. The river has followed numerous paths across their land through those generations regardless of human attempts to better control it, even with revetments and dams in place. For instance, the Hornings noted ways in which, along with agricultural practices, dams have had significant impacts on river actions:

Dams have changed the way the river moves. You can look at LIDAR maps and see it. The river has been changing forever, but now the dams have changed the way it changes.

Revetments also changed river dynamics. According to the Hornings, before the dams went in, floods were bigger but of shorter duration and therefore did not do as much damage to farms along the river's banks. Floods used to clear out sloughs and backwaters; now many of those areas are filled up and stagnant except during larger floods and high water events. During the period since dams were built, some farmers began planting in lower ground than they had in the past, which created additional risks: because of contamination from pathogens such as *E.coli*, if river water touches any edible crops, processors will not take them.

There have been other landscape changes as well. Area landowners recall water skiing in an area that now has 50-foot-high trees. The Hornings talked about other ways in which they have experienced the landscape changes:

Growing up on the river, we had a lot of recreation like hunting, fishing and tubing. The sloughs were good habitat, but now they're all dead, dammed off at one end to the other. They're just big, stagnant ponds.

In 2010, they approached the Greenbelt Land Trust to talk about restoration, and became aware of the potential for an easement that would allow them to keep title to the land and continue to use property for agricultural production for up to ten years. Income from continued agricultural use of the property under easement will go into an established stewardship fund for the property. Their hopes for a restoration project are simple. One of them said:

I'd like to see the channel alive again. It's one thing when you grow up around it and you slowly see it die. We've filled in channels and sloughs that were mostly stagnant ponds; but that was a living area, and it would be nice to see it come back. We've taken a lot from the river, and this is a way we can give back to it.

The Hornings would like the project to be an example of how restoration can be accomplished efficiently and effectively. Their hope is that this project can be an example for other people along the river and that it will open up opportunities for other restoration projects.

## **B. Working with the Landowners: Incentives and Disincentives**

The Hornings expressed enthusiasm for project possibilities on numerous occasions. At the same time, however, they and several interviewees familiar with local sentiments and knowledge expressed a number of concerns and limitations that could affect successful project planning and implementation.

The risks and benefits of restoration comprise tradeoffs that are, in the words of one agency person interviewed, “a big, broad bucket of both risks and rewards over space and time and from local and personal to system-wide and societal.” The implied, interlinked issues to consider are who ultimately bears the risks and who enjoys the benefits. An example is the tradeoff between individuals' agricultural production and economic viability and the societal environmental interest in endangered species. The agency representative suggested that,

In an ideal world, striking an equitable balance would involve the long-term commitment by key institutions to minimize financial harm to property owners for making a contribution to societal gains such as healthy ecosystem functions.

Projects do not take place in isolation. One important concern for landowners is the effect of a proposed restoration project on relationships with neighbors, and Harkens Lake is no exception. Changes in river management structures are generally regarded with a good deal of skepticism and unease. Different interviewees spoke about landowners' apprehensions regarding flooding and the high awareness that the river is unpredictable and cannot, ultimately, be controlled. Nonetheless, restoration—especially the current view that projects should be designed to “let the river do the work”—introduces additional uncertainty. That increases fears that land and productivity will be lost to river behavior. Despite repeated and increasing messages regarding the need to provide fish habitat along with more natural conditions both in and alongside the river, landowners' justified concerns tend to override ecosystem considerations. An agency representative summed up the situation:

Landowners understand that rivers have huge power and can change the land very quickly. The river has been here for centuries, and you're essentially living and farming *in* the river by virtue of being in the floodplain. Thus there's a risk for even owning this part of it – anything you do there, including stabilizing it, is a

risk for adjacent landowners. You create more power for the river to affect upstream and downstream owners by changing hydraulics.

A high risk, and one that concerns the Hornings, is the possibility of a large-scale river change, such as creating an unanticipated new channel which destroys existing property. Although no absolute assurance is possible regarding river behavior, one of the Hornings pointed out,

That risk is true no matter who has the liability, us or the state. If there's not some kind of apparatus in place to ensure [unanticipated property destruction] won't happen, the project won't go forward. We have to have an understanding that in an emergency it will be fixed immediately if it starts to happen. The Corps, the state, need to protect your investments.

There are also changes in production practices to keep in mind. One project partner observed:

Restoration will change the way the land is used. It will be opening up the river, and people are not going to be able to use their land for production in the same way they used to. There may be different crops and different growing conditions.

Aside from identifying neighborhood-wide issues when approaching restoration, there are other good reasons to ensure substantial landowner input early in the process. The Hornings talked about the lack of interaction between landowners and those interested in restoration, a problem since "Greenway" times.

People have been out to the area to survey fish, wildlife and other resources without ever surveying the *landowners* to find out what we know about our lands and where our interests lie with respect to restoration. We seem to be the overlooked resource in restoration planning.

When reflecting specifically on this latest process, the Hornings talked about an early community meeting regarding restoration possibilities for the area as both a high point and a low point. It was a high point in that they were at a table with two other farmers. But the fact that there were so few landowners in the room made it a low point as well. As one of them commented:

It seems like the farming community should have a fairly significant presence (at these types of meetings). There's a lot of interest in it. Most farmers have a piece of ground they'd like to do something with, but they need to be properly recognized to get the process started.

The comment indicates that, in addition to being able to provide information on potential projects, meetings with more landowner representation also provide an opportunity for restoration partners to hear a variety of landowner needs, experiences and concerns that can be incorporated into future action plans. In doing so, project partners may be able to reduce disincentives while increasing incentives.



As mentioned elsewhere in the report, easements can affect bank loan potential. The area of the Horning's operation covered by restoration plans comprises poor soils and is not good farmland. Additionally, it is an area which is frequently inundated though it does not contain wetland soils. The Hornings will *retain ownership* of a large block of acreage and are open to all restoration options, including not farming the area. However, early in the process they made it known that they wanted to ensure that the block of acreage being considered either be put in restoration as a whole or that it be divided into farmable, *economically viable units* in order to maintain reasonable land use options. They're not interested in selling their property because of their strong attachment to the land, and they see this project as a way to help them stay in place.

The Hornings want to be a part of restoration activities and are willing to help with all aspects of restoration. They know how to do the work, but it needs to pencil out for them. As one of them summed it up:

This requires the same commitment as we have now for the land. All we're going to be doing is farming different crops – native plants and shrubs and trees – so you should put the exact same amount of effort as you do your commodity crops.

According to the Hornings and some of the project partners, there have been many project sites which were either poorly designed or poorly monitored, and this has likely had a negative influence on the way landowners up and down the mainstem view restoration. Several people observed that if Harkens Lake is a project that demonstrates good process, good design, good economic outcomes for the Hornings and good stewardship among landowners and project partners, it has significant potential to make restoration attractive to other landowners. One project partner talked about multiple project benefits:

You have a group of landowners meeting and learning about restoration. We have this opportunity of working together, and we haven't always had that. It's interesting because generally people are starting to see things differently, see what important values there are regarding the river. Before, they were always battling it. Now, they're beginning to realize that maybe it's better to work with it than against it. That's what Harkens Lake is: working with the river in ways that have benefits all around – for habitat and for species and for the landowners.

The Hornings expressed the importance of having management partners develop a *common management agreement* to ensure the area will be maintained in an appropriate manner from keeping weeds at bay to the question of public access. Although the upcoming project will not provide public access through their property, there are issues regarding public access within the larger designated conservation zone. Neighboring landowners have had lingering concerns regarding further land based and river activity development of Anderson Park, based on past vandalism on nearby park properties. This has included unlawful firearms use, littering, alcohol related vandalism, and unlawful after-hours use of park property. While there are currently no

signs indicating Anderson Park, it can be approached along roadways as well as by the river. Road access has been intermittently cut off through gate closures; however, it was unclear who has authority to determine when and if gates should be open or closed. Benton County is working with law enforcement and other entities and meeting with landowners regarding park expansion management plans and public access as of the date of this report.

The Harkens Lake project clearly reveals a range of benefits and risks. One project partner expressed the hope, however, that Harkens Lake restoration, and the Willamette in a bigger sense, will represent a positive shift for landowners – away from struggling and battling with the river to turning it into an asset and a benefit. A researcher expressed the additional hope that ultimately,

...landowners will feel good about the use of their land for restoration purposes and the legacy they will be leaving in terms of their contributions to land use, land cover and the health of the river.

### **C. Permitting Issues**

At this stage, it is not clear which agencies will ultimately be involved in permitting for the Harkens Lake area restoration project. Those who were interviewed for this report had highly variable perspectives on the permit process. For some, the process appears to be time consuming but fairly readily navigated. For others, the process has been highly frustrating and discouraging for landowners and project partners alike. Emphasizing the potential deal-breaking nature of the process in the eyes of landowners, one of the project partners observed:

It's a huge time sink for landowners with no certainty that they'll get what they want out on the far end. They're reluctant to head into that tunnel when they can't see what's at the far end.

An earlier section of the report discusses the issue of multi-permit approval as a fundamental component of restoration project permitting. Although collaboration is not a new concept, a project partner described the problem of joint agency permitting and its effect on project timing in the following terms:

Agencies get in the way of themselves. They have a lot of goals in common such as restoring endangered species, but they all have different processes for going about it. We have this problem – we can give landowners a clear picture of the project design and the budget for it and a clear picture of the construction and the budget for that; but we can't give them a clear picture of the time involved for getting the permits. Permitting is the thing in the middle. It could take three months or it could take three years, and there's no way of knowing.

Permit timing complexity and unpredictability can certainly be a barrier to getting landowners involved in restoration projects. Those involved in shepherding projects should be clear with landowners about the time-consuming nature of permitting. In addition, there should be coordinating meetings with involved agencies to determine potential sticking points and establish agreed-to problem-solving protocols to minimize the potential for impasses and holds-ups. This topic is further discussed in the following section, Interorganizational Collaboration.

#### **D. Conservation Easements: Legal and Financial Issues**

As discussed elsewhere, the appraisal is the linchpin of the process. Several challenges can arise around appraisals for a conservation easement. *Low appraisal prices* are not surprising in a depressed real estate market. There is also the appraisal challenge of low turnover among agricultural properties. Low appraisal prices are unlikely to provide sufficient economic incentive for landowners' entering into an agreement. The Greenbelt Land Trust, which would hold the easement, is prohibited from paying above appraised value. A landowner could be reluctant to sell property at depressed rates for both personal and community reasons. Property sold at a lower value would also negatively affect neighboring property owners' land values and, subsequently, the ability to secure loans.

In the Harkens Lake process, due to timing, the decision was made during 2010 to commission a "restricted" appraisal to determine if the range of values met the landowners expectations. A likely combination of the market, which was at a long-time low when the restricted appraisal was completed, along with a less formal appraisal that may not have reflected all necessary considerations, led to an initial valuation the landowners rejected.

One issue that likely added to a low appraisal rate, and an issue that will likely affect other restoration projects, is the fact that wetlands have an assigned value, but *non-wetland acreage providing flood storage currently has no value assigned to it*. The Hornings believe this condition needs to be corrected to make restoration more financially attractive to landowners. It is also important that such acreage be assigned a dollar value since, as a project partner noted:

People draw wetland boundaries and that's where people focus; yet some of the most important habitat is in the 'fringe' between the wetland and the upland areas. That's where different species take refuge, where they nest. There are different types of food there as well. It's really important for lots of reasons.

During an early 2011 interview, the Hornings referred to the initial disappointing appraisal rate as a "bump in the road." They did, however, express frustration over the fact that many appraisers aren't as knowledgeable as they need to be to determine appropriate agricultural and restoration land valuation. Many use the same appraisal methodology used to determine current house values such as comparable prices within the last 12 months. This is not appropriate for lands which seldom come on the market. Agricultural land is a special land use type which requires special evaluation techniques. What may have influenced selection of the first appraiser

was a need to find someone to meet deadlines for project appraisal figures at a time when no experienced agricultural appraisers were available. If that is the case, there is a distinct lesson: in trying to get an appraisal sooner rather than later, selecting an appraiser without the requisite experience may impede the process.

The Greenbelt initiated discussions with another appraiser who was more familiar with the land values in the upper Willamette Basin. After consultations with the landowners, a full “yellow-book” appraisal was undertaken in 2011 and the values from this work proved acceptable to the Hornings and the other property owner included in the easement acquisition process.

The second appraisal was done within the deadline set by one of the funders. The Hornings were notified over the summer, however, that the deadline had been pushed back to a later time in the fall, which came as a surprise. Although the landowners had to provide a written letter of intent regarding their commitment, the funding agencies did not provide reciprocal written commitments. The Hornings suggested that some sort of written commitment to time-sensitive activities on both sides would provide more assurance to landowners and be more equitable.

Pushing the deadline back so that it was close to the end of the calendar year had two effects. The Hornings became concerned regarding their ability to do adequate planning both for tax purposes and for the next year’s planting within such a small window. And, for the first time, there was a degree of uncertainty regarding the process.

They had already invested substantial money in attorney fees, in part because the complicated due diligence requirements of OWEB necessitated close reviews by their attorney and, in part because the project had two funding sources, BPA and OWEB. Each agency had a specific process for due diligence which likely made the effort more complicated than if there had been a single funding source. The process was also more complex because there needed to be three separate easements, appraisals, and other due diligence work (surveys, land audits, public reviews etc.) for each of the property owners. During the process there were legal reviews of all documents by attorneys for BPA, OWEB, Greenbelt Land Trust and the landowners so the transactions were very intensive given all the legal scrutiny. Some new ground was clearly broken during this process, because this land transaction was the first time that BPA and OWEB had agreed to have third party rights on the same easements so the funding partners were working out a template for how they could act in concert on the easement and accept each other’s requirements. The high legal costs for the Hornings caused them to reflect on the cost-prohibitive nature of legal fees and time investment for landowners with smaller acreages. Those with smaller properties cannot aggregate acreages to reach any economy of scale; each property must be handled individually. They also pointed out that their attorney expressed doubts about the process, based on a somewhat similar experience in Lane County in which the landowners were not given adequate time to make decisions regarding certain changes during negotiations.

They were philosophical about the situation during an interview in late summer 2011, expressing an understanding that, since this was to be a pilot project and would be a template for subsequent projects, funders appeared to be very cautious about the process to ensure its success. Although the Hornings indicated they still believed in the process and that everything would work out, based in a new sense of uncertainty and what they identified as a one-sided liberty to change deadlines, they made it clear after the 2011 deadline was shifted to late in the fall that they would “be done” with the process and withdraw their offer to put the property under easement if there were any further delays. One of them expressed the particular frustration:

They asked for extensions when we couldn't ask for them, according to (the agreement) language. No wonder nobody wants to do this kind of deal. If this had been for a smaller amount of land, it wouldn't have been worth it. We put a lot of time and money into it.

The stakes were high for a successful conclusion on the easement. Based on the history of mistrust of government among landowners up and down the Willamette, news that this process became overly burdensome and that the agencies did not appear to act in good faith and with the landowners' needs foremost could undermine any future efforts to establish trust and reinforce the perception that dealing with the government is not in landowners' interests.

GLT staff, along with staff in the funding organizations, worked extremely hard to reconcile various liability issues, some of which appeared to the landowners to be of minor consequence but which nonetheless created bottlenecks. In late 2011, all transactions were successfully completed. The Hornings gave high praise to GLT staff. Reflecting on the final phase of the process, the Hornings commented:

It's so important when you're dealing with something with this kind of value. The tax planning is critical. A lot of people deserve a lot of credit on firming up the deadline. It wasn't just us. But just because you're an agency, you can't eliminate all liabilities. That's how attorneys should look at it, but it's not how you get things done.

In an interview after the process had been completed, the Hornings indicated they would not want to go through a similar process again, and it was unclear to them whether it had created a practicable template for future processes. Reflecting on their three-year experience, they had several comments and words of advice to other landowners. Legal costs can be substantial. An interested landowner needs to have capital available and needs to be committed to the idea in order to withstand what may likely be a costly, drawn-out process. Such processes are time consuming for a group—farmers—who don't have much slack time, if any, during active planting, growing and harvesting seasons, which constitute most of the year. Delays or changes can add to the time required. Having an experienced attorney is essential. And, of equal importance, the landowner needs to be partnered with an organization such as the GLT, with staff that have a lot of experience and will be a dedicated, trusted landowner advocate. One of the Hornings commented:

The absolute most important thing is, you'd better find an organization like the Greenbelt Land Trust. If we didn't buy into the Greenbelt Land Trust, we would have walked away a long time ago. If you're still a little leery of your middleman, it would be a disaster.

Despite the frustrations, difficulties, and near-breakdown of the negotiations for the easement, the Hornings talked about one of the high points of the process being the people they met with face to face and got to know. They indicated that they are also looking forward to the interactions that will be a part of the actual restoration.

Although they indicated they would not want to repeat the process, the Hornings are enthusiastic about restoration plans going forward:

This is just a first step. It's a good start...When we can look back in ten to fifteen years at a project that has a good foothold, then we can pat ourselves on the back...We haven't accomplished that much on the ground in the grand scope of things yet. The sense of accomplishment will come when we have a forest. The first year we tentatively have a ten-acre block planned. We're excited to get it going.

## **E. Interorganizational Collaboration**

Organizations such as land trusts play very important roles to help coordinate project needs related to land protections through fee simple acquisitions and easements and the planning and implementation of restoration work on these lands.. This is the recurring theme of "case worker" or broker. According to one of the Hornings:

Without a group like the Greenbelt Land Trust and someone like Michael [Pope, executive director], it's too much for farmers. We've been told by others who've had projects that we should be prepared to start over two or three times. You'd get so frustrated you'd give up. It is such a complicated process.

As noted elsewhere, restoration projects typically involve manipulating existing landscape and require the cooperation and coordination among multiple regulatory and administrative agencies at different levels of government for approval of the necessary Clean Water Act, Endangered Species Act and other state and local permits. Consistent with characteristic restoration projects, Harkens Lake project will involve agencies at the local, state and possibly federal levels.

Underscoring potential project complexity, a researcher noted:

Floodplain reconnection projects, which require moving earth around, become complicated immediately. Not only are there state or federal agencies involved;

there are typically multiples of both. This is a long-term challenge, and we have to keep chipping away on it.

As the Harkens Lake process demonstrates, a project can also be complex due to the involvement of multiple properties and joint funding. The due diligence and timing for a single property can be challenging. The chance to involve multiple properties for a larger and more comprehensive restoration footprint represented a special opportunity; however, each property required its own easement appraisal and associated survey, title review and due diligence process.

Agency partners had budget, timing and resource issues to contend with that did not align with landowner planning and tax needs. Funding availability was an issue as the state and federal fiscal years are different: June 30<sup>th</sup> as the fiscal year end for Oregon state agencies and September 30<sup>th</sup> for the federal partners. Furthermore, agencies had to deal with time constraints due to diminished staff to carry out project requirements. Without similar experiences to guide them, the agencies had to develop new collaborative strategies and skills because each agency is constrained by their own internal procedures and policies.

Resulting bottlenecks and delays provided a highly important lesson. All involved entities should understand landowner timing needs and plan accordingly at the front end of similar processes. As discussed elsewhere, due to scheduling issues, the Hornings were placed in a position where due diligence and negotiations regarding the accepted appraisal, based on agency scheduling, might not have provided enough time to take care of the necessary tax planning as well as production planning for the next crop year. The situation nearly became a deal breaker. Some intense negotiation was needed; and, fortunately, all parties were able to come to agreement so that the appraisal and acquisition processes were successfully completed.

The challenges of collaborating with multiple project partners are many, but the Hornings recognized *consistent and trusting collaboration* is critical to success:

Wrangling up all the groups will take time and patience. Every meeting we've had, we got something out of or were able to explain our viewpoint. All of the meetings have been important, and we get to meet people and hear their different concerns. It seems like we're all interested in the same thing. There are several steps to this project: appraisals, easements, design and implementation, permits, care of the project, and funding for the long term. If you don't have those last two things in place, we know what you get—bad projects—and nobody's happy.

An important upside to the difficulties encountered in the Harkens Lake experience is that there is now a template available for future, similar joint processes, although participants are not certain any given template would work universally, as every case is unique. Equally important, the landowners were able to have their needs met and, as a

result, there is a story with a positive outcome regarding landowner/government relations that may encourage other landowners to become involved in partnering with government after decades of mistrust.

## **F. Integrating Science**

With respect to the Harkens Lake vicinity, bringing scientists to the table provided the necessary credibility to the effort, verifying that the project is important and that this is a valuable opportunity. For the Horning families, the science and technology in the Willamette River Basin Planning Atlas provided the inspiration for them to approach possible partners to help them pursue their vision for the property. Their interest was reinforced because of the opportunity to work with, in their words, “people who obviously have such a passion for their work and for the river.”

It was after the Hornings originally approached the GLT regarding their property that they became aware of the Willamette River Basin Planning Atlas and, specifically, the Atlas example of what could be accomplished in the Harkens Lake area. As one of the Hornings indicated:

The most exciting point was seeing the planning atlas and learning about what we could do with the property. At that point we were looking at a smaller piece of property. That was the first time we looked at each other and said maybe we could do this whole island.

We’re farmers. We don’t know a lot about fish and such things. We went out one day when they were shocking fish and saw the relationships between native and non-native species, water temperature, dynamic parts of the river and how much of the river can really be helped or saved because of the water temperature and (other restoration activities).

They also understood the benefits of restoration to their farming operations:

We had the potential to bring life back to our whole channel, which had been dying for decades, and realized we could make a few changes that would bring it back to life that would not only help the entire river system but...would benefit our fields down the river based on the science.

It’s unclear if all farmers would have the same level of enthusiasm and interest as the Hornings regarding how restoration can provide multiple benefits to both natural and agricultural systems. The Hornings’ comments, however, indicate that integrating science into planning in ways that provides a picture to landowners of how restoration can be personally as well as environmentally beneficial, can make potential projects that much more attractive.



## **G. Project Design**

In addition to credible science, the choice of modeling is an important element of design. River Design Group recommended the stage-discharge correlation approach rather than hydraulic modeling as,

...it can provide similar information at a planning-scale for a fraction of the cost of hydraulic modeling if landowners are able to collect the water stage data. The information gathered is also useful for calibration if hydraulic modeling is required at a later date. These data will be used to better estimate river hydraulics and determine areas suitable for potential reconnection/floodplain restoration. The staff plates will remain after the project and may be used for future monitoring.

Bathymetric data, which would be integrated into an existing LiDAR dataset, may be collected in backwatered/ponded areas. This would be done in order to better estimate potential channel capacities and material quantities for future construction and cost estimating. The design consultants have already produced preliminary restoration planning maps with potential alternatives. The maps and alternatives will be further developed and refined as data gathering is completed and as the alternatives are reviewed by the Greenbelt Land Trust and stakeholders to help identify the primary restoration strategy.

As discussed elsewhere, the Harkens Lake project is noteworthy as it involves an identified priority restoration area. At the same time, however, one of the project partners talked about the significance of restoration projects in larger terms:

In the bigger picture, it would be good to see restoration for the Willamette River be a more holistic effort. Right now it's just project by project with willing landowners. It would be good to have a more calculated restoration program for filling in the bigger picture than the current opportunistic, project-by-project approach.

Correct design is not straightforward. An earlier section contained discussion regarding landowners needing help to determine what they want from restoration projects. On another level, those with expertise face similar challenges, according to researchers and project partners. One of them spoke of the issue in the following terms:

One of the biggest hurdles is developing a good understanding of what good restoration looks like at each site. There are 20-30 people giving their ideas about how to accomplish restoration. We need to make sure we know what we want.

Beyond determining the criteria for good restoration, design is also challenging for a variety of reasons, according to one of the project partners:

It's difficult to show what the outcome will be before the project is implemented. We're using a two-dimensional depiction, and that's hard to understand. Most people who aren't used to looking at drawings don't understand what it is.

In addition to initial design, good plans for monitoring and management are also essential. These have historically been overlooked as fundamental to restoration, and they still present challenges. According to one project partner,

Funding agencies typically demand that an approved management plan be in place within 18 months of acquisition. While it is an appropriate requirement, it adds some additional burdens to the landowners and easement holders. There needs to be some associated funding perhaps linked to the acquisition costs to offset what amounts to an unfunded mandate.

It will take accommodation on the part of all partners throughout the project design and implementation in the event of surprises and unforeseen developments. Understanding and acceptance are crucial on the part of the landowners regarding the adaptive requirements for project design and implementation. It's also important for project partners to accept and accommodate landowners' needs for changes. A project partner explained:

The river is dynamic, not static; you don't put in the project and then walk away. Nature doesn't work on our schedule. There will be changes in the channel, sediment accumulation, and flood deposits. That happens now, but not as much [as it will under restoration conditions]. The types and rate of change are on a continuum; we're always going to be managing the river and its environs – forever. Adaptive management will be a big part of the project. We're certainly willing to make changes. For successful restoration, the landowner has to be 100 percent on board. The landowner has to 'own' the project. If we need to change the project midstream to make it work, that's not a problem. It's far better to make the necessary changes and have a happy landowner.

The foregoing also underscores the need, expressed by the Hornings, for an acceptable post-project management plan to accompany project design and implementation activities. All restoration partners spoke in appreciative terms about the Hornings' willingness, patience and enthusiasm regarding the project, indicating that they are indeed, on board with the effort. This sort of accommodation for restoration is still rather rare in the region, however, as one project partner noted,

We're starting to see landowners take a different view. They see their property as aquatic and wildlife and habitat resources, not just farming resources.

This is a distinct paradigm shift. Successful projects increase the chances that additional landowners may adopt this perspective. It means the stakes are high for the Harkens Lake

project. Based on the combination of willingness, expertise and trust, there is good reason to believe the outcome will meet partners' hopes and expectations.

#### **IV. Recommendations**

Although there was not an extensive institutional assessment on the Harken's Lake Project, there were aspects of the process that provide important lessons. Looking beyond Harkens Lake to the "bigger picture" of Willamette River restoration, we recommend several actions to better coordinate restoration over particular segments of the Willamette in order to potentially increase collaborative capacity, as follows:

- Based on the Horning families' experiences, project partners need to establish a "critical path" for landowners' participation, taking into account production needs, tax timing and expense thresholds. When this has been agreed to, project partners need to develop and commit in writing to mutual assurances.
- In order to achieve the collaboration, all project partners need to establish their own critical path plans in order to pinpoint and reconcile potential scheduling, funding, administrative and other problems that could affect project success.
- After designating a strategic reach of the river for restoration purposes, project partners need to identify the "restoration network" needed to cover data sharing, permitting, communications, outreach and all other pertinent coordination issues.
- Partners need to designate a network or area communications manager, either within one of the partner organizations or as a separate position, to act as the information clearing house and be responsible for ensuring that all organizations and landowners in the "restoration district" have up-to-date information. The same person can serve as an ombudsman to reduce proliferation of unfounded rumors that can have a corrosive effect on restoration efforts.
- Regardless of scale, all projects need to be designed and conducted based on a whole river system, or least a whole river reach and the system around it. In the past, projects were predominantly designed on a property-by-property basis. Working opportunistically does generate restoration activities; however, developing a landscape-level plan can help identify how to best coordinate efforts for optimum landowner recruitment and investments.
- Adaptive management will be critical to project success. It is also a crucial component of landowners' relationships. Adaptive management tenets need to be broadly understood by all parties: monitoring is crucial to ensure restoration performance outcomes as a part of adaptive management. Its design is as important as all other aspects of a restoration

project not only to ensure acceptable outcomes but to ensure against waste of financial resources.

- Restoration funders and partners have every right to expect that investment dollars will yield real and lasting dividends in terms of healthy, functioning ecosystems. Requiring too much in terms landowner investment and liability, however, may well reduce the number of projects.
  - One example is potentially extreme financial sanctions for projects that fail to meet project specifics. It would be helpful for project partners to reach agreement on appropriate landowner/easement holder liability for non-performance and to develop long-range planning that incorporates consultation and assistance for landowners and easement holders to help them avoid financial penalties. This would constitute a form of assurance to landowners that they will not be taking on excessive risk by entering into a restoration partnership.
  - Another example is the requirement for management plans without plan development funding. Project partners would be well advised to see if there might be some way to cost-share for management plan development. Landowners and easement holders already have substantial transaction costs to absorb, and any reduction in those costs will help make restoration an appealing and realistic proposition.
- Projects inevitably involve uncertainty, but the *perceived* uncertainty is likely to be higher when adaptive management is used. It may therefore help reduce landowners' sense of uncertainty by providing assurance agreements.
- Landowner knowledge is vital at every step. No agency should be allowed to proceed with restoration planning—including studies, funding, permitting and any other associated activities--without it. Also, it should be an essential step for anyone working on restoration to understand or 'be indoctrinated' about meeting and talking to landowners – if for no other reason than to show respect and recognition that there's something on a site other than habitat to be analyzed. These are *socio-ecological systems*, not just science or agency-driven restoration projects.
- It is possible to continue farming while conducting restoration. This does not appear to be widely understood and is a major knowledge barrier for landowners. Case studies and empirical data will help demonstrate to landowners and others that combining restoration with agricultural production can be successful. Additional landowner interviews from effective projects must be included, to show the early, middle, and late stages of restoration work.

- Management of risk is variably understood and should be investigated in depth, to determine whether any policy changes might make restoration on the mainstem more attractive through insurance or other means.
- The most effective outreach is likely to be neighbor-to-neighbor or peer-to-peer, particularly in areas where there is long-standing mistrust of government and/or outsiders. The Hornings' experience confirms this.

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<sup>1</sup> <http://www.crcwater.org/issues5/19980727americanrivers14.html>

<sup>2</sup> <http://www.nature.nps.gov/nnl/pdf/RevisedRegistryJune2009.pdf>

<sup>3</sup> Robbins, William G. 2005. *Oregon: This Storied Land*. Portland, OR: Oregon Historical Society Press. P. 152

<sup>4</sup> Hulse, David, Stan Gregory and Joan Baker for the Pacific Northwest Ecosystem Research Consortium. 2002. *Willamette River Basin Planning Atlas: Trajectories of Environmental and Ecological Change*. 2nd Edition. Corvallis, Oregon: Oregon State University Press.

<sup>5</sup> Hulse, David, Stan Gregory and Joan Baker for the Pacific Northwest Ecosystem Research Consortium. 2002. *Willamette River Basin Planning Atlas: Trajectories of Environmental and Ecological Change*. 2nd Edition. Corvallis, Oregon: Oregon State University Press.

<sup>6</sup> Robbins, William G. 2005. *Oregon: This Storied Land*. Portland, OR: Oregon Historical Society Press.

<sup>7</sup> Cox, Thomas R. 1988. *The Park Builders: A History of State Parks in the Pacific Northwest*. Seattle, WA: University of Washington Press. Little, Charles E. 1990. *Greenways for America*. Baltimore, MD: The Johns Hopkins University Press.

<sup>8</sup> In Cox, Thomas R. 1988. *The Park Builders: A History of State Parks in the Pacific Northwest*. Seattle, WA: University of Washington Press, the author reports that condemnation was never actually invoked; however, in Willamette River Greenway Parklands Strategy Task Force. 2005. *Willamette Greenway Parklands Strategy: A Report from the Task Force*. Salem, OR: Oregon Parks and Recreation Department, the authors report that an instance of condemnation occurred.

<sup>9</sup> Willamette River Greenway Parklands Strategy Task Force. 2005. *Willamette Greenway Parklands Strategy: A Report from the Task Force*. Salem, OR: Oregon Parks and Recreation Department.

<sup>10</sup> Allen, Jennifer, Autumn Salamack, and Peter Schoonmaker. 1999. *Restoring the Willamette Basin: Issues and Challenges*. Institute for the Northwest. Resolve Inc. 2001. *Assessing Issues and Challenges Related to Implementation of the Willamette Restoration Initiative Restoration Strategy*. Portland, OR: Resolve, Inc.

<sup>11</sup> see <http://www.healthykidshealthycommunities.org/communities/benton-county-or>

## Harkens Lake Restoration Planning Summary

**DATE:** December 2, 2011

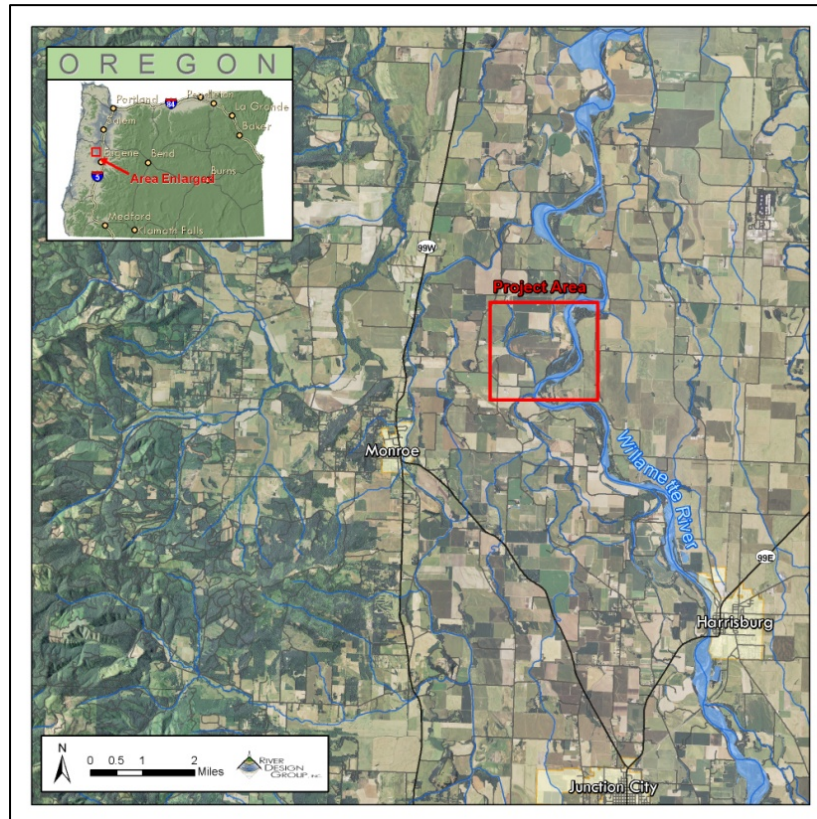
**TO:** Michael Pope, Greenbelt Land Trust

**FROM:** Peter Gruendike, River Design Group, Inc.

**SUBJECT:** Summary of work to date for Harkens Lake.

### 1 INTRODUCTION

River Design Group, Inc. (RDG) was retained by the Greenbelt Land Trust (GLT) to initiate restoration planning on the Willamette River in the vicinity of Anderson County Park near Monroe, Oregon (Figure 1-1). The project area includes nearly 600 acres of Willamette River floodplain bounded by a remnant side channel of the Willamette River. The area is comprised of several different ownerships, with much of the area owned by the Horning family, a five-generation farming family.

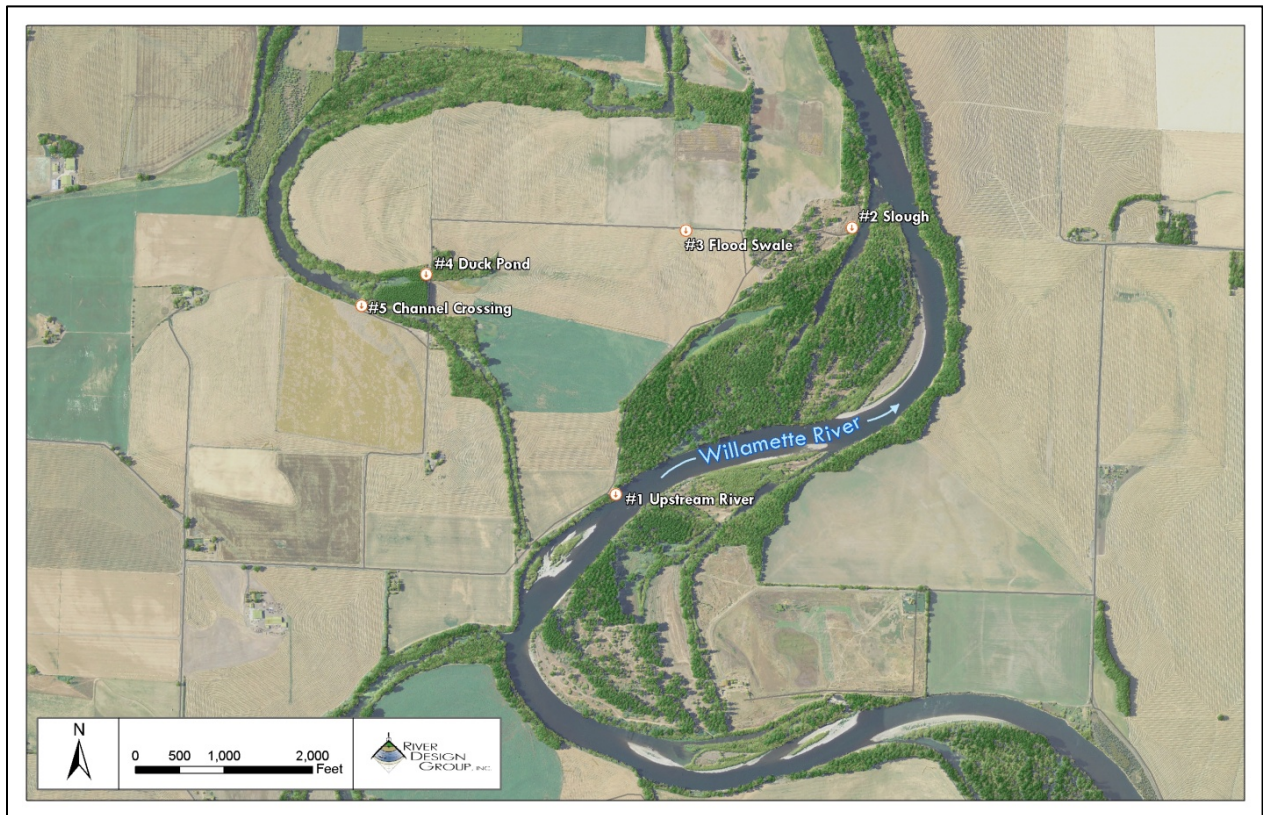


**Figure 1-1.** The project area vicinity map.

The project area has been identified as a priority area for conservation and restoration investment, and provides habitat for many native species including Western pond turtles, Pacific lamprey, cutthroat trout, and endangered spring Chinook salmon. A collaborative effort among landowners, GLT, state of Oregon, and Natural Resources Conservation Service has resulted in a management agreement with the goals of restoring proper floodplain function and re-establishing native vegetation communities to benefit aquatic and terrestrial species. To support restoration efforts, RDG is investigating hydrological processes in the project area.

## 2 HYDROLOGIC ANALYSIS

In December 2010, RDG installed five staff plates in the project area to investigate water surface elevation correlations between off-channel floodplain habitats and the Willamette River with the goal of determining how off-channel habitat inundation relates to Willamette River stage during high water events. Floodplain habitats are known to provide refugia for juvenile and adult salmonids that inhabit the Willamette River system. The staff plates were mounted on steel poles anchored in concrete. Each staff plate was surveyed with a survey grade Trimble Real Time Kinematic (RTK) Global Positioning System (GPS) to determine the real world coordinates and elevations of the zero mark on each plate. Figure 2-1 shows the location of staff plates that were installed in the project area.



**Figure 2-1.** Project maps showing location of five installed staff plate locations in the Harkens Lake project area.

Water surface stage (elevation) was recorded by the Horning family and RDG during moderate to high flow events throughout the winter and spring of 2010-2011. Each site visit included recording the water surface stage at each staff plate. Since installation, the staff plates have served two purposes; first, to create a stage-discharge correlation between the Harkens Lake project area and the U.S. Geological Survey (USGS) gages operated at Harrisburg and Corvallis on the Willamette River, and secondly, to serve as a calibration point for a broader floodplain inundation investigation RDG completed for the Eugene to Albany reach of the Willamette River.



**Figure 2-2.** A staff plate during installation on December 1, 2010 (left) and the same staff plate during a high flow event on January 18, 2011 (right).

Establishing a stage-discharge relationship between the Harkens Lake staff plates and the USGS gages allows stakeholders to evaluate current river-floodplain connectivity at various flow events throughout the Willamette River hydrograph. Once a stage-discharge relationship has been developed between the Harkens Lake staff plates and the Willamette River, calibrated floodplain inundation maps can be created for various flows related to biological objectives. The inundation maps provide a snapshot of inundation extent and depth over the Harkens Lake project area under different flow scenarios and help identify areas for potential floodplain reconnection or restoration. For example, the inundation mapping suggests that a 2-year flood event on the Willamette River at the Harrisburg gage will inundate the intact floodplain forest located on the State Park's property located adjacent to the Horning's property. Inundated floodplain forest provides excellent off-channel winter habitat for listed juvenile spring Chinook salmon.

The Harkens Lake staff plate data were also used as a calibration point for the inundation modeling work that RDG completed for the Eugene to Albany reach of the Willamette River. The staff plates at Harkens Lake provided actual surveyed water surface elevations on the Willamette River floodplain at a location distant from the USGS gages where error in predicted water surface elevations versus actual water surface elevations should be greatest.

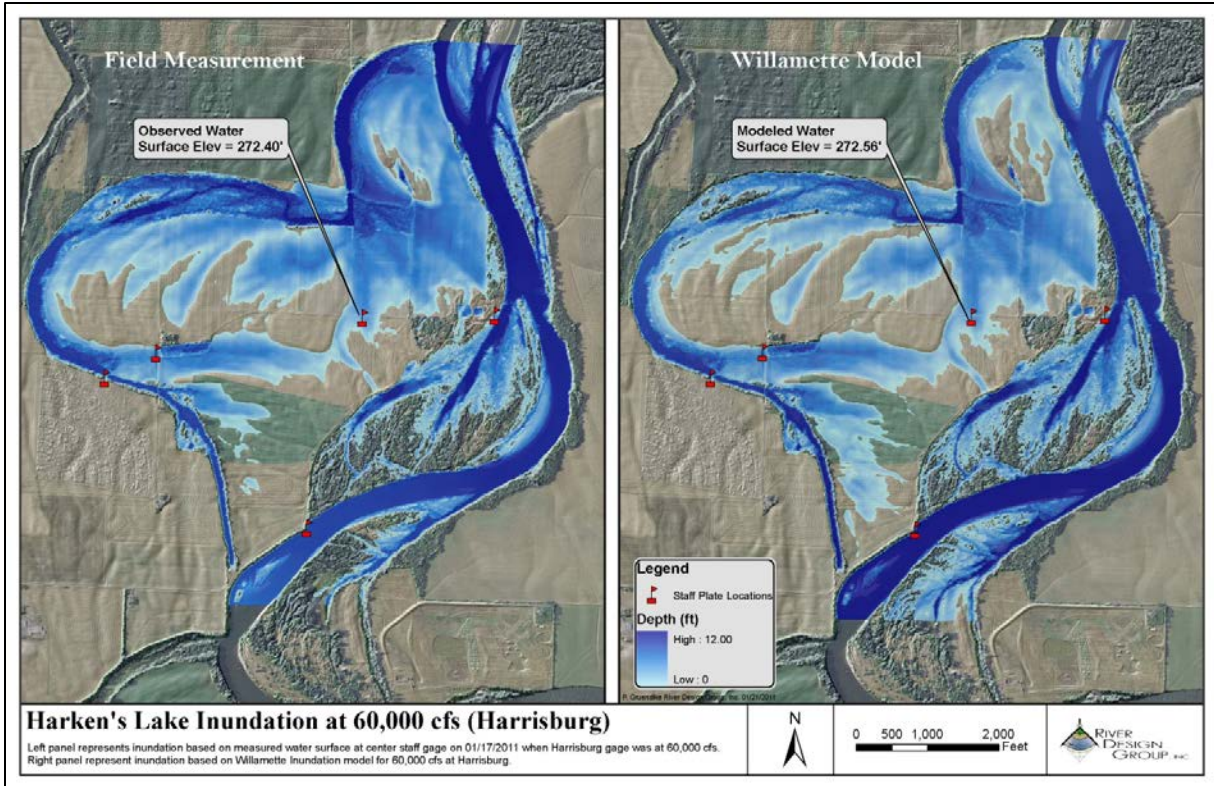


Finally, inundation maps developed from staff plate data can provide insights regarding how floodplain restoration may affect floodplain habitats. For example, analyses could evaluate how restoration actions such as berm or levee removal, channel grading, or other actions would influence floodplain inundation and habitat creation. These modeled depictions help facilitate the development of restoration alternatives, provide insight to stakeholders and landowners, and support restoration planning to assist in the recovery of Upper Willamette River spring Chinook salmon and Upper Willamette River winter steelhead.

### **3 SITE OBSERVATIONS**

Since installation, the Horning family and RDG have recorded water surface elevations in the project area during a variety of moderate to high flow events. A summary of the collected data is provided in Section 4 of this report.

On January 17, 2011, a 2-year flood event occurred at the Harrisburg gaging station and the project area. Water surface elevations were recorded at the project staff plates and at the Harrisburg gage (via the USGS gage website). The staff plate water surface elevations were also compared to the 2-year flood curve that was derived during RDG's Eugene to Albany floodplain inundation modeling effort. The results indicated that the modeled water surface elevations had a strong correlation with observed water surface elevations (272.40 ft observed vs. 272.56 ft modeled) from the project area (Figure 3-1). This analysis provided a greater degree of confidence that the predicted 2-year flood inundation could be used to prepare restoration alternatives within the Eugene to Albany reach, including the Harkens Lake project area and adjacent properties. This information also provides the landowners additional assurance for expected outcomes for restoration designs. Additional high water events were measured in January, 2012.



**Figure 3-1.** Comparison of observed water surface elevation data recorded from a staff plate in the project area (left) and from modeled 2-year flood water surface data from the Willamette River inundation mapping in the Eugene to Albany reach.

#### 4 Staff Plate Data

Staff Plate #	Name	Description	Elevation
#1	River	Located at large pull out next to the Willamette River approximately 1000' NE of the main gate. Walk down trail on top of bank to river's edge.	271.578
#2	Slough	Located directly north of the boat landing area on the slough located on State Park's property.	268.082
#3	Swale	Located on the south side of the east-west running road that follows the Horning's and Pitcher's property lines. Plate is located adjacent to an irrigation riser.	269.592
#4	Duck Pond	Located ~50 ft west of the north-south running road that bisects the side channel and project area. The plate is due west of a collapsed culvert under the road.	267.419
#5	Crossing	Located just west of a low water crossing on the side channel.	266.574

Harken's Lake Water Stage Monitoring Data Form						
Staff Plate #	Date	Time	Stage (ft)	Surveyor	Comments	Stage at Harrisburg
1	12/1/2010	16:14	0.42	Pete Gruendike	River rising quickly	8.87
2	12/1/2010	16:22	0.76	Pete Gruendike	River rising quickly	8.92
4	12/6/2010	15:00	0.38	Steve Horning		7.59
5	12/6/2010	15:00	0.86	Steve Horning		7.59
1	12/11/2010	10:00	-0.50	Gary Horning	estimated 6 inches below zero mark	7.84
2	12/11/2010	10:00	0.10	Gary Horning		7.84
3	12/11/2010	10:00	0.00	Gary Horning		7.84
4	12/11/2010	10:00	0.22	Gary Horning		7.84
5	12/11/2010	10:00	0.62	Gary Horning		7.84
1	12/13/2010	10:00	0.64	Gary Horning		8.77
2	12/13/2010	10:00	0.95	Gary Horning		8.77
3	12/13/2010	10:00	0.00	Gary Horning		8.77
4	12/13/2010	10:00	0.30	Gary Horning		8.77
5	12/13/2010	10:00	0.97	Gary Horning		8.77
1	12/14/2010	10:00	2.11	Steve Horning		9.88
2	12/14/2010	10:00	2.30	Steve Horning		9.88
3	12/14/2010	10:00	0.00	Steve Horning		9.88
4	12/14/2010	10:00	0.85	Steve Horning		9.88
5	12/14/2010	10:00	1.85	Steve Horning		9.88
1	12/15/2010	10:00	2.77	Pete Gruendike	Good access, staff clear of debris	10.11
2	12/15/2010	10:14	2.80	Pete Gruendike	walk in only, Binoculars would help	10.12
3	12/15/2010	10:27	~-0.4 est	Pete Gruendike	dry at plate, water on both sides of road. Likely inundated at storm peak	10.08
4	12/15/2010	10:35	2.00	Pete Gruendike		10.09
5	12/15/2010	11:00	2.83	Pete Gruendike	Only accessible from South, Road flooded	10.06
1	12/20/2010	13:30	3.19	Steve Horning		10.58
2	12/20/2010	13:30	3.35	Steve Horning		10.58
3	12/20/2010	13:30	0.25	Steve Horning		10.58
4	12/20/2010	13:30	2.48	Steve Horning		10.58
5	12/20/2010	13:30	3.32	Steve Horning		10.58
1	12/29/2010	14:20	3.70	Steve Horning		11.57
2	12/29/2010	14:20	3.70	Steve Horning		11.57
4	12/29/2010	14:20	1.00	Steve Horning		11.57
5	12/29/2010	14:20	2.18	Steve Horning		11.57
4	12/30/2010	9:00	3.20	Steve Horning	Had to boat to it	10.59
5	12/30/2010	9:00	3.90	Steve Horning		10.59
4	1/5/2011	9:00	0.40	Steve Horning		6.13
5	1/5/2011	9:00	0.60	Steve Horning		6.13
1	1/17/2011	14:30	5.95	Steve Horning		13.26
2	1/17/2011	14:30	5.90	Steve Horning		13.26
3	1/17/2011	14:30	2.78	Steve Horning		13.26
4	1/17/2011	14:30	no access	Steve Horning	couldn't access	13.26
5	1/17/2011	14:30	5.60	Steve Horning		13.26
1	1/18/2011	11:05	4.45	Pete Gruendike		11.01
5	1/18/2011	12:25	4.70	Pete Gruendike		10.86
Staff Plate #	Date	Time	Stage (ft)	Surveyor	Comments	Stage at Harrisburg
1	1/20/2012	9:00	7.00	Steve Horning		13.2
5	1/20/2012	9:00	6.50	Steve Horning		13.2