

RESTORING

A River of Life



THE WILLAMETTE RESTORATION STRATEGY
OVERVIEW

WILLAMETTE RESTORATION INITIATIVE

FEBRUARY 2001

The Willamette Restoration Initiative is overseen by a 26-member Board of Directors, chaired by Oregon State University President Paul Risser. The board includes members from businesses, local government, utilities, tribes, academia, watershed groups, soil and water conservation districts, agriculture, forestry, environmental groups, and state and federal government.

WILLAMETTE RESTORATION INITIATIVE BOARD OF DIRECTORS

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THE WILLAMETTE RESTORATION STRATEGY

Recommendations for the Willamette Basin Supplement
to the Oregon Plan for Salmon and Watersheds

WILLAMETTE RESTORATION INITIATIVE

FEBRUARY 2001

PREFACE

The Willamette River is in trouble.

Oregonians have long treasured the Willamette Basin. Its wealth of resources has generated laudable economic growth and a quality of life that elicits pride and praise. We have derived many beneficial uses from the basin over the last 150 years: inexpensive power and irrigation, forestry, agriculture, recreation. To achieve these benefits, however, we have changed the very structure and function of the landscape. The environment has paid a high price for our gains.

We now face serious problems. We are witnessing disappearing fish and wildlife, toxins and wastes in waters, undependable water supplies, and continued habitat destruction. Many natural resources are being used beyond their ability to replenish themselves. Population growth and development continue to put pressure on the land and water.

Recognition of these problems is growing. A large number of people are sincerely committed to the environmental and economic health of the region, and many effective programs are in place. Together, we have achieved a number of successes as stewards of the Willamette Basin. We are proud of the efforts and financial resources we have invested in our environment, and have gained a national reputation as a forward-thinking state.

But our past accomplishments and existing programs are no longer sufficient to meet the challenges. Our current commitment has not kept pace with our intentions and reputation. We are no longer a national leader when it comes to the percentage of the state budget designated to care for the environment.

We simply are not doing enough.

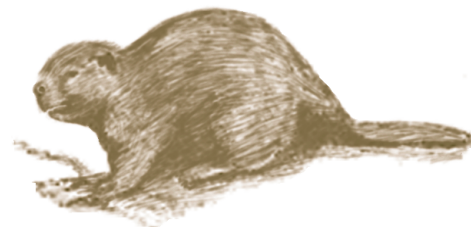
Slow, moderate gains are not sufficient to counter the grave threats to the basin's health. We need focused, concerted action. In many cases, we know enough to make a difference, but are not applying our knowledge to the greatest extent possible. In other cases, we are working at perceived cross-purposes: urban against rural, public versus private, economy versus environment. We are not yet working together to our highest capacity.

Many tough choices remain, and a much greater commitment is needed if we are to fulfill our responsibility to the next generation. If we do not act decisively and swiftly, the Willamette we love will slip away. At the beginning of this new century, we have both the opportunity and the obligation to pledge this generation's best efforts to restore the health of the Willamette Basin.

The *Willamette Restoration Strategy* recommends what those best efforts should be. It identifies needed and effective actions that must be taken to safeguard our valuable river resources. The *Strategy* is also recommended as the Willamette Basin supplement to the *Oregon Plan for Salmon and Watersheds*, for approval by the Governor and Oregon Legislature.

- The *Willamette Restoration Strategy* was developed by the Willamette Restoration Initiative (WRI). Established by State Executive Order 98-18 in 1998, the WRI is charged with developing a basinwide strategy to protect and restore fish and wildlife habitat, increase populations of declining species, enhance water quality, and properly manage floodplain areas—all within the context of human habitation and continuing basin growth.

The WRI's Board of Directors was selected to bring together many interests and points of view. The board has cut across organizational, jurisdictional, and geographic boundaries to best serve the overall health of the basin. The resulting *Strategy* is a holistic, integrated action plan that balances diverse human and ecologic needs.



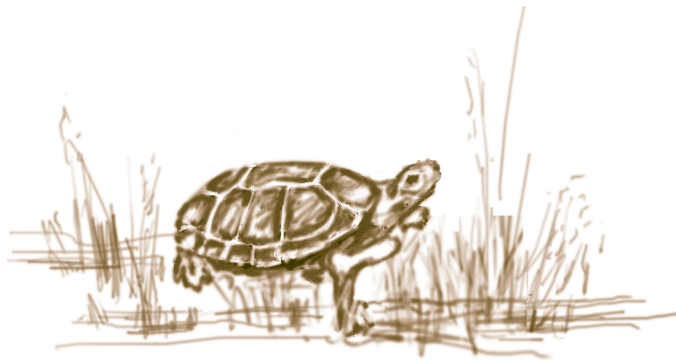
THE WILLAMETTE RESTORATION STRATEGY PROVIDES A RESTORATION VISION AND FRAMEWORK FOR THE ENTIRE WILLAMETTE BASIN.

The *Strategy* is:

- **IMPORTANT**
It presents 27 critical actions the WRI Board of Directors believes must be taken to restore the health of the Willamette Basin. Pressures against the environment are increasing at a rate that demands significant, assertive, and unwavering action **now**.
- **RESOURCEFUL**
It incorporates successful programs that are already underway. Building on the knowledge and accomplishments achieved to date, the *Strategy* sets a strong, integrated course of action.
- **COMPREHENSIVE**
It offers a variety of approaches to implement, support, and coordinate current and future restoration activities. It provides logical points of connection among basinwide and subbasin programs. The *Strategy* guides and promotes decisions that will collectively benefit the entire basin.
- **BALANCED**
Multiple values must be respected. The *Strategy* balances the values for a healthy environment, high quality of life, and strong economy.
- **SUPPORTED**
The *Strategy* was developed through a collaborative process involving many participants. The recommended actions are strongly endorsed by the WRI board.
- **MEASURABLE**
It provides ways to measure progress and determine if the actions are working.
- **PARTICIPATORY**
Many people are actively involved in restoring the Willamette today. Many more must be involved to ensure the basin's future. The *Strategy* recommends ways to work together efficiently and effectively.
- **A WORK IN PROGRESS**
It provides a strong foundation for action, but must also remain flexible and responsive. The *Strategy* is designed for continuous assessment and updating to reflect new understandings and needs.

WHAT IMPLEMENTING THE WILLAMETTE RESTORATION STRATEGY DOES

- **Advances** water quality improvement efforts.
- **Speeds** protection and restoration of riparian areas.
- **Identifies** key locations and preliminary goals to protect and restore habitat.
- **Places** a new, higher priority on the importance of floodplain management.
- **Focuses** on vastly improved delivery of incentives for landowners.
- **Recognizes** that local governments and watershed groups are essential partners in watershed health, and emphasizes their dire need for increased resources and assistance.
- **Identifies** key state and federal activities required for restoration.
- **Creates** new communication networks to integrate and coordinate environmental regulation at state and federal levels.
- **Initiates** a major, coordinated public awareness and education effort to familiarize citizens with their basin and its issues and connect them to local, regional, state, and federal efforts.
- **Proposes** initial indicators and offers example targets that will define what “success” looks like and identify if progress is being made.



The Strategy needs our commitment.

The *Strategy* is a carefully chosen set of interrelated actions. To be successful, it must be pursued in full and in concert. One of Oregon’s great strengths is its citizens’ willingness to develop and implement public policy. Hundreds of Oregonians were involved in the processes that led to the *Strategy*. Now many must put the *Strategy* into effect.

The *Strategy* shows where we need to go and how we can get there. It calls on people from all walks of life to take part—from terracing a field, to replacing an impassable culvert, to reducing use of gardening chemicals. Some actions will be relatively easy, while others will require significant changes in behavior by individuals, communities, organizations, institutions, and businesses. A number will require legal and policy revisions.

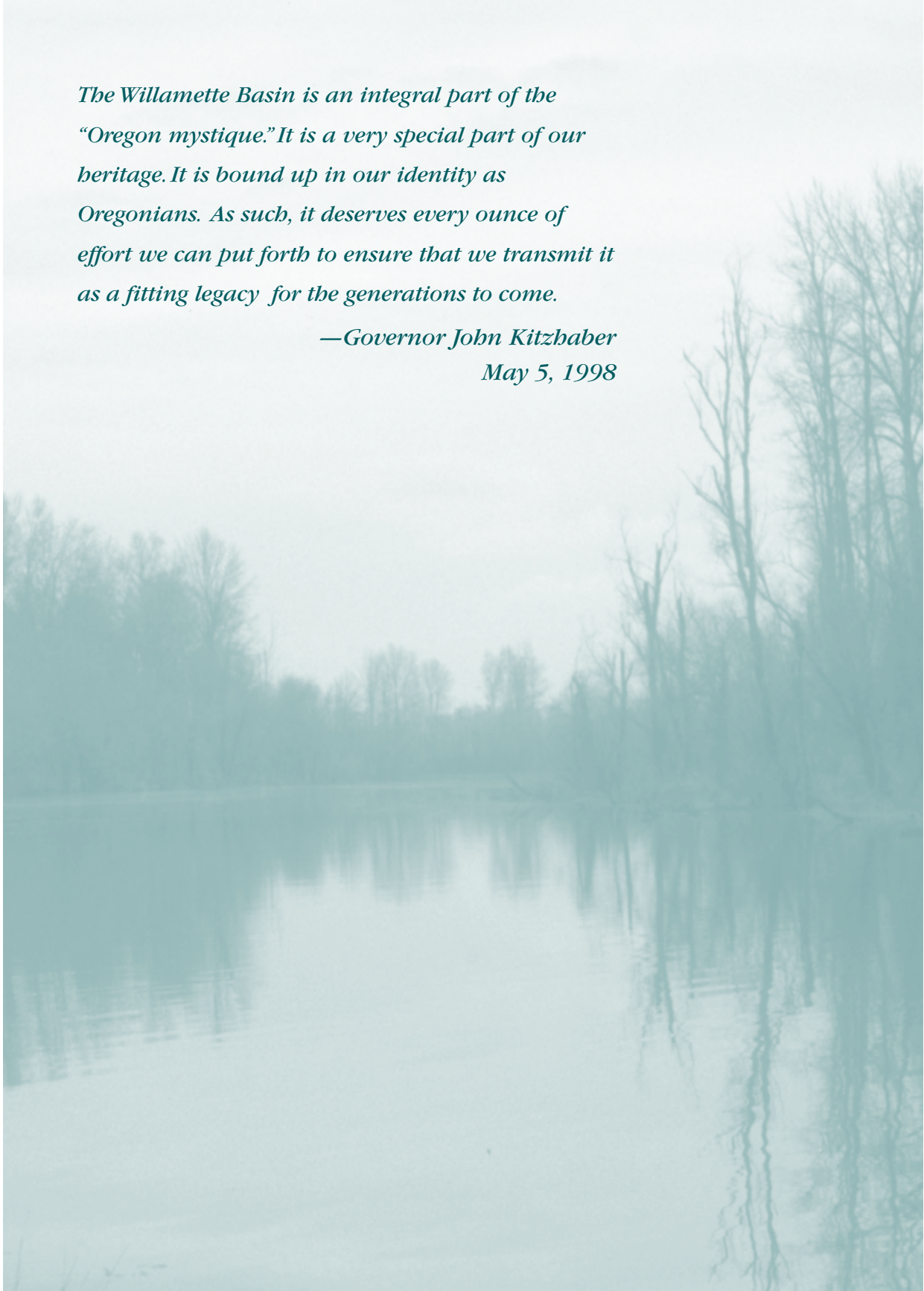
The greatest enemy to protecting, conserving, and restoring our natural resources is indifference. This is not a job for “them”—it is a job for us. Everyone makes a difference, to the good or to the bad. Every citizen must take action on their property, within their spheres of influence, through their daily routines.

The WRI has no legal authority. The *Strategy* is a set of recommendations from a citizen group to the state’s leaders and citizens:

- The Governor
- The Oregon Legislature
- State agencies
- The federal government
- Local governments
- Watershed groups
- The private sector
- Oregon’s residents

These recommendations will cost money. But the cost of doing nothing is even higher—economically, environmentally, and socially. Any approach that just meets the minimal legal requirements, gets around to it when we feel like it, or invests just enough money to make us feel good is a recipe for disaster. We can find the money. The *Strategy* demonstrates that consensus can be reached and cooperative action is possible. The real test is whether we have the will to implement what is needed.

The Willamette Basin needs help from its many caretakers. The challenges are great, but can—and must—be met. It is time to renew our commitment to our river, our environment, and those who follow us.



*The Willamette Basin is an integral part of the
“Oregon mystique.” It is a very special part of our
heritage. It is bound up in our identity as
Oregonians. As such, it deserves every ounce of
effort we can put forth to ensure that we transmit it
as a fitting legacy for the generations to come.*

*—Governor John Kitzhaber
May 5, 1998*

Bruce Taylor

OVERVIEW

Consider the Willamette Basin as it has been, is, and will be.

The Willamette Basin has long been. . .

A place of beauty, where the meandering Willamette River and its tributaries were surrounded by diverse landscapes of wetlands, prairies, and forests. Fish swam in its waters, and native plants and animals were plentiful. For thousands of years, Native American inhabitants depended on the river and land for food, clothing, tools, transportation, and spiritual sustenance. They used fire as a tool to manage the landscape, beginning the long process of adapting the natural world to human purposes. Historians believe these early residents had several names for this river that was their lifeline. One of those names was River of Life.

In the early 19th century, the basin's immense natural wealth began to draw explorers, trappers, traders, and homesteaders across the Oregon Trail. The population steadily grew as more and more land was settled (see Figure 1 on page 7). As the 20th century unfolded, commercial agriculture, fishing, and forestry expanded. Dams, irrigation systems, and dredging modified the river, tributaries, and floodplain. Major population and industrial centers developed. Great changes came to the River of Life and the land surrounding it.

The Willamette Basin is. . .

Still a place of beauty, diversity, and sustenance. Its multiple resources and myriad uses reflect the high quality of life for which Oregon is celebrated. The basin encompasses a variety of landscapes: rivers and streams, wetland and riparian areas, cultivated valleys, developed urban areas, and forested uplands (Figure 2). It is home to about 2.3 million people—70 percent of Oregon's population. Combined agricultural, forestry, and business activity in the basin constitutes nearly three-quarters of Oregon's economic output.

But not all is well. Our use of the basin's natural resources has taken a toll over the years. Despite impressive environmental gains, the basin still faces many challenges:

- At least 1,400 stream miles violate state water quality standards established under the Clean Water Act.
- The Oregon Health Division has issued health advisories regarding the risks of eating certain fish caught in the Willamette mainstem.
- Wild spring Chinook runs have declined from historic levels of around 300,000 to recent levels of 3,000.
- Formerly widespread habitat types have declined dramatically, jeopardizing native plants and wildlife. Over 99 percent of the original bottomland prairies and 72 percent of bottomland forest have been lost.
- Seventeen plant and animal species are listed under the federal Endangered Species Act.
- In summer, nearly all surface water has been appropriated through the state's water rights system, with little available for new uses.
- The basin's population has grown rapidly and is expected to almost double in about 50 years.

We now see that the wealth is not limitless and that prosperity has come at a cost. This River of Life and all connected to it are increasingly under stress.

The Willamette Basin will be. . .

What we—all its inhabitants—make it. Concerned citizens have made significant progress before. In the 1930s and again in the 1970s, public action resulted in steps to reduce pollution and improve water quality in the Willamette River. Environmental awareness has continued to grow since that time, and many important programs are in place to address basin issues. However, a comprehensive, integrated approach and participation by all the basin's citizens are now required.

Recognizing this, Governor John Kitzhaber signed Executive Order 98-18 in October 1998, creating the Willamette Restoration Initiative (WRI). The order was broadened in 1999 in cooperation with the Oregon Legislature.

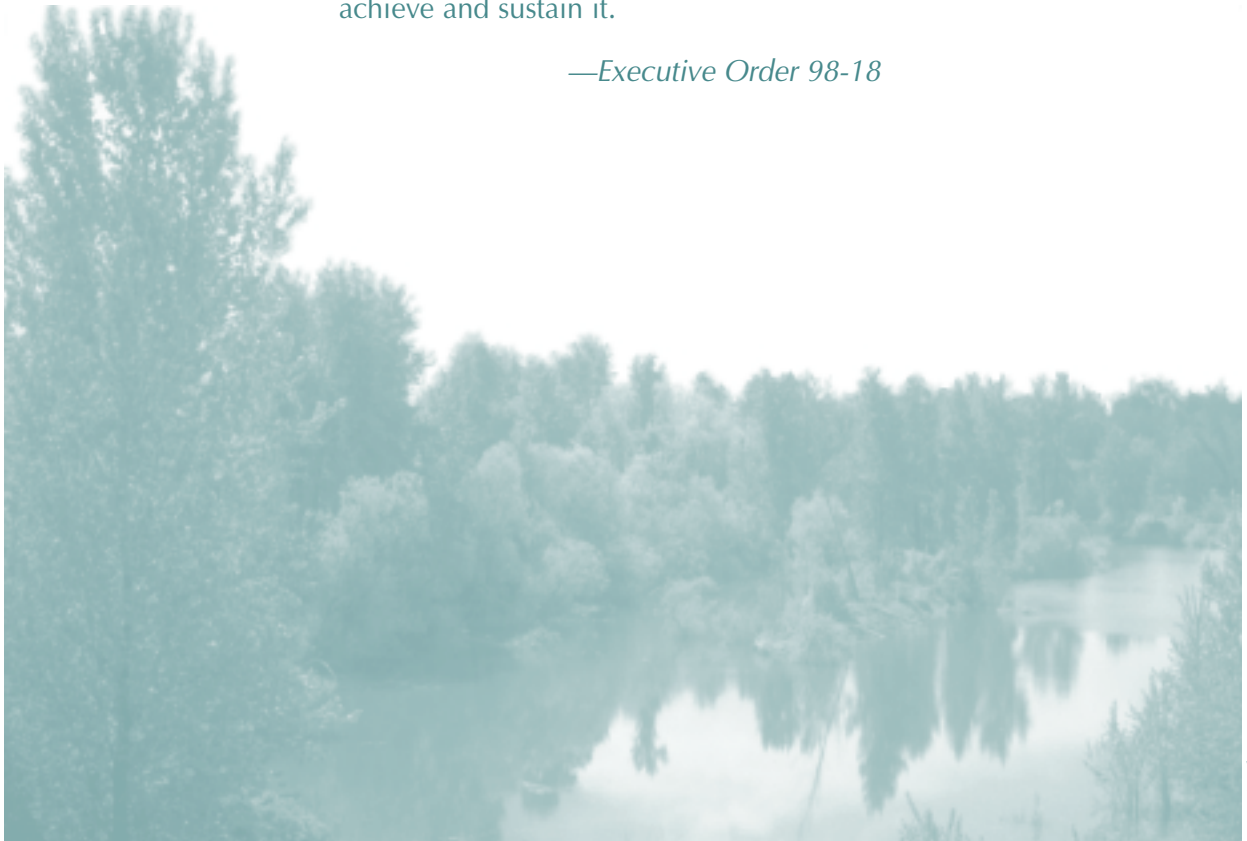
The WRI Board of Directors includes representatives from agriculture, forestry, business and industry, environmental and citizen groups, watershed groups, and governments. These diverse partners have collaborated with many existing efforts and organizations to develop the *Willamette Restoration Strategy*. The *Strategy* is recommended as the Willamette Basin supplement to the *Oregon Plan for Salmon and Watersheds*, for approval by the Governor and Oregon Legislature.

■ **Restoration** does not mean attempting to bring the basin back to a set of conditions that existed 150 years ago. Rather, it means *enhancing, restoring, and conserving the biological integrity and economic vitality of the Willamette Basin.*

A WILLAMETTE BASIN VISION

The Willamette Basin must attain a dynamic balance between diverse human and ecological needs. Basin residents should live in healthy watersheds with functioning floodplains and habitats supporting a diversity of native species. Opportunities should exist for people to interact with the wildness of a restored, healthy river system. Valley residents should be part of a larger basin community, connected by a system of rivers and streams. That system should provide healthy aquatic life, clean drinking water, safe places for recreation and support for a vibrant economy. Residents must accept individual and collective responsibility for this vision, and provide leaders with a mandate and the resources necessary to achieve and sustain it.

—Executive Order 98-18



Bruce Taylor

ACTING FOR THE COMMON GOOD

27 CRITICAL ACTIONS

The WRI Board of Directors identifies 27 critical actions it believes are necessary to restore the health of the Willamette Basin (see pages 5 and 17–25). Some actions build on activities already underway, while others are new. Many are aimed at forging better connections and coordination within the basin. Existing organizations, the WRI, and new partnerships all have roles in implementing the actions.

The actions fall into four restoration focus areas:

- Clean water
- Water quantity
- Habitats and hydrologic processes
- Institutions and policies

Although the actions are categorized by their primary focus area, they are interrelated. For example, an action that restores habitat may also contribute to clean water, and institutional improvements may benefit all of the other three focus areas.

The 27 critical actions have strong support from the WRI board. To be included in the *Strategy*, an action had to receive support from 80 percent or more of the board members, as expressed by voting during two board meetings.

4 KEY RECOMMENDATIONS

In addition to the 27 critical actions, the WRI board also highlights four key recommendations that cut across all restoration focus areas. These recommendations (below) reflect overarching themes that provide an important context in which the actions should take place.

4 KEY RECOMMENDATIONS OF THE WILLAMETTE RESTORATION STRATEGY

1. Use the Habitat Conservation and Restoration Opportunities map (Figure 3) as a tool to guide restoration decisions in the basin. (See page 16 for additional information.)
2. Use environmental indicators from the *Oregon State of the Environment Report 2000* (Oregon Progress Board, 2000) to guide development of basin-specific restoration targets, and provide a new system for accurately tracking restoration progress. (See page 16 for additional information.)
3. Begin the process of establishing a sound restoration investment plan for the basin by clearly identifying existing assets and forecasting future needs and funding sources. (See page 26 for additional information.)
4. Provide for an organization to continue the refinement of the *Willamette Restoration Strategy* and track its implementation. (This recommendation is addressed under separate cover in a recommendation to the Governor, Oregon Legislature, and Oregon citizens.)

27 CRITICAL ACTIONS OF THE WILLAMETTE RESTORATION STRATEGY

1. Support the Willamette Basin total maximum daily load (TMDL) process, including coordination and communication.
2. Support effective implementation of the agricultural water quality management plan process (Senate Bill 1010) and encourage its use to address species needs.
3. Reduce the levels of toxic pollutants in the Willamette Basin.
4. Provide economic incentives to decrease water pollution.
5. Promote a developer education/certification program tied to incentives.
6. Initiate an effluent and “water quality impact” trading pilot project in the Willamette Basin.



7. Support improvements to water quantity management efforts to meet water supply needs for ecologic and economic purposes.
8. Support the Corps of Engineers’ ongoing assessment of flood control reservoir operation by helping identify and communicate changes needed to address streamflow issues.



9. Establish science-based riparian area protection guidelines.
10. Support basinwide scientific investigations of how to restore floodplain function.
11. Inventory, map, and conserve priority fish and wildlife habitats in the basin.
12. Improve both upstream and downstream fish passage at dams, culverts, and water diversions.
13. Support improvements to hatchery and harvest management systems.
14. Prevent the introduction and control the spread of the most harmful invasive species.
15. Improve delivery mechanisms for incentive programs, especially the Conservation Reserve Enhancement Program (CREP).
16. Support funding for on-the-ground protection and restoration projects.



17. Increase public and consumer awareness of the Willamette Basin health issues.
18. Help grow the market for, and encourage development of, environmentally friendly products.
19. Create new stewardship pathways through agreements and incentives.
20. Reduce tax barriers to conservation on private lands.
21. Create an effective and cooperative strategy at the local level to fund and implement watershed action plans.
22. Create watershed technical assistance teams.
23. Establish a basinwide salmonid recovery coordinating council.
24. Coordinate and integrate major regulatory programs and responses to them.
25. Improve Willamette Basin information management.
26. Increase usefulness of land use planning and management programs for watershed issues.
27. Strengthen agency capacity to implement and administer existing programs, including enforcement.



INTEGRATED AGENCY MEASURES

The WRI board recommends the *Willamette Restoration Strategy* to the Governor and Oregon Legislature as the Willamette Basin supplement to the *Oregon Plan for Salmon and Watersheds*.

Previous versions of the *Oregon Plan* consisted almost entirely of state and federal agency activities. One of the innovations of the *Strategy* is how the work of state and federal agencies is incorporated into a broader context. The WRI board—a citizen group—first established the vision, goals, and restoration framework for the basin. State and federal agencies then worked with the WRI to analyze how agency measures—both those already underway and those that are needed—fit into the overall framework.

Over 200 individual agency measures (most with detailed tasks) are organized under the four restoration focus areas.¹ The agency measures are folded into the *Strategy* along with actions and tasks recommended for the private sector, local governments and groups, and non-governmental organizations.

This comprehensive approach:

- Matches agency activities to the basin’s restoration goals, rather than the other way around.
- Links the activities to each other.
- Provides new ways to see opportunities for integration by grouping agency activities under restoration focus areas, thus “mapping” the considerable integration that needs to occur.
- Ties agency activities (and other actions in the *Strategy*) to environmental indicators for the first time.
- Emphasizes that although government agencies have a critical role in restoring the Willamette’s health, their job is only one part of the larger responsibility shared by all who live and work in the basin.

- The WRI board recognizes the critical role and enormous commitment of local partners, including watershed councils (27 in the basin), soil and water conservation districts (10 in the basin), and local governments (over 100 in the basin). While the *Strategy* reflects the input of these local groups, the board understands that much more remains to be done to provide them with the resources and recognition they need and deserve as restoration partners. Implementation of the *Strategy* and future planning will need to honor the grassroots, “ground-up” approach needed for successful restoration.

The purpose of the *Oregon Plan* is to “enhance, restore and protect Oregon’s native salmonid populations, watersheds, fish and wildlife habitat, and water quality, while sustaining a healthy economy.”

The *Oregon Plan* began in 1995 as an effort to restore coho salmon on the Oregon coast. A “steelhead supplement” was added in 1997 to address steelhead trout populations in the lower Columbia River. In 1999, the Governor issued Executive Order 99-01, which created a statewide framework for the *Oregon Plan*.

As the recommended Willamette Basin supplement to the *Oregon Plan*, the *Strategy* is an important “building block” within the statewide framework.

¹ The state and federal agency measures are identified in the full *Strategy* report.

FIGURE 1
POPULATION GROWTH IN THE WILLAMETTE BASIN
BETWEEN 1850 AND 2050

- The population of the Willamette Basin will nearly double in the next 50 years.

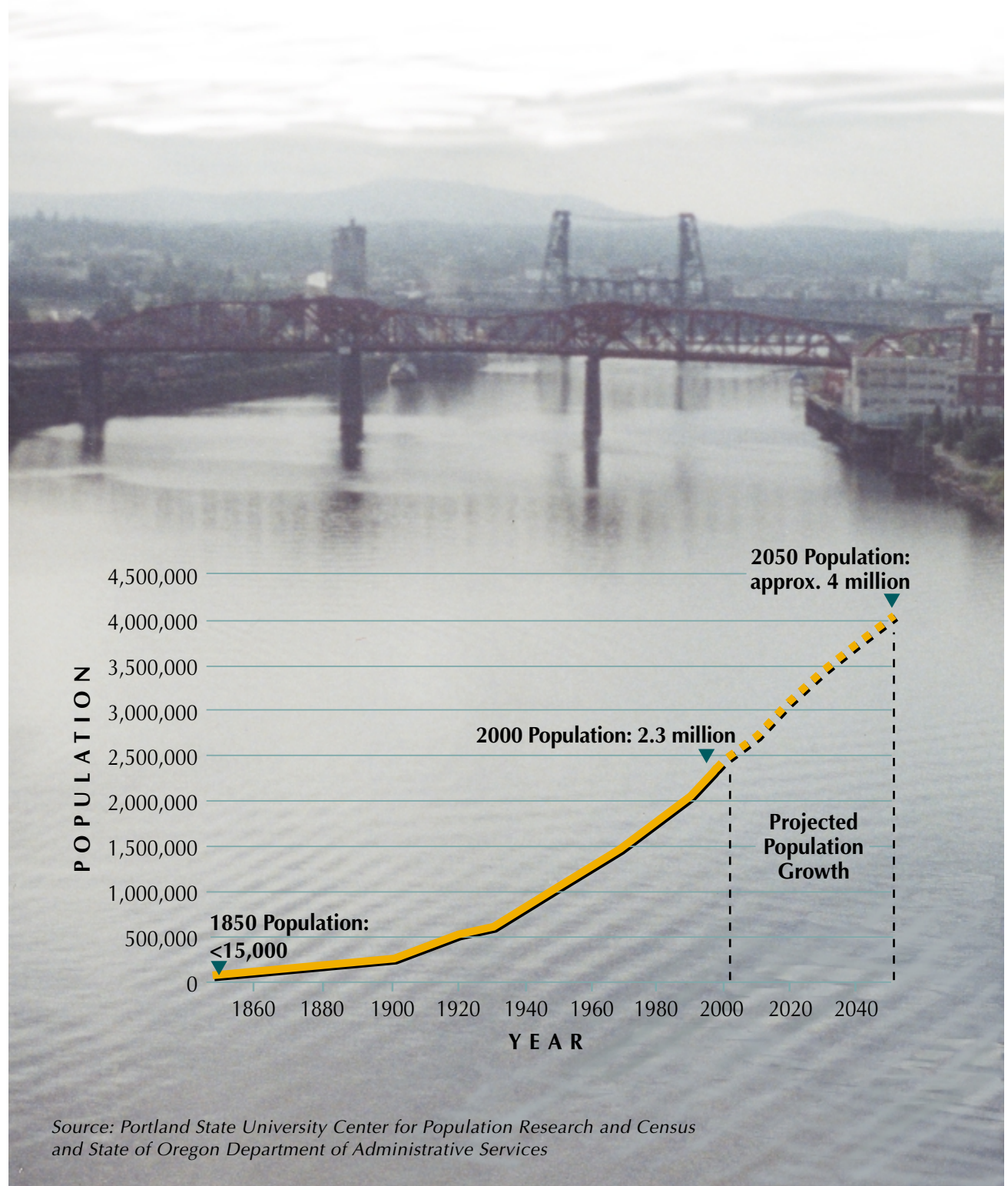


FIGURE 2 THE WILLAMETTE BASIN

Some Willamette Basin Facts

The Willamette Basin includes the Willamette River, its 13 major tributaries, and the land that drains to these rivers. For the purposes of this *Strategy*, it also includes the Sandy River subbasin. The basin lies between the Cascade Mountains and the Coast Range, and extends from the source of the Willamette River south of Eugene, northward to the Columbia River. It is 150 miles long and 75 miles wide and comprises approximately 12,000 square miles, almost one-eighth of Oregon’s total area.

Willamette Basin approximately 12,000 square miles
(including Sandy River subbasin)

Land Use (% of basin):

Forest	68%
Agriculture	20%
Urban	7%
Other (roads, water)	5%

Public land ownership 41%

Willamette River 187 miles long
Total stream miles in basin about 16,000

Pre-1850 population <15,000
Estimated current population 2.3 million
(about 70% of Oregon’s total population)
Projected 2050 population approx. 4 million

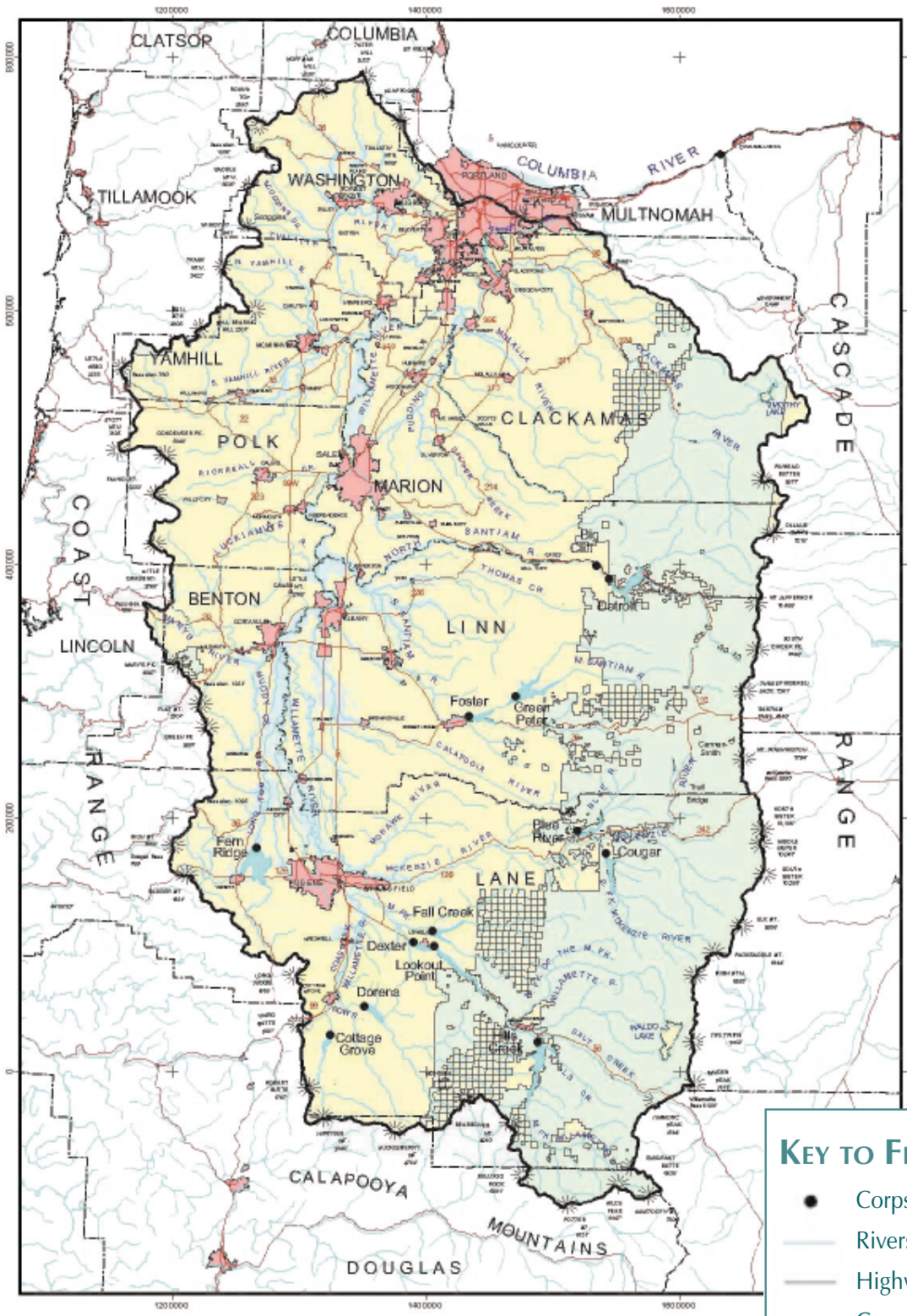
Number of cities about 100
Number of counties 10
Number of watershed councils 27
Number of soil and water conservation districts 10

Agricultural sales produced by Willamette Basin farms:
approximately one-half of Oregon’s \$3 billion total annual
agricultural sales

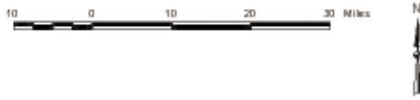
*Oregon, in her soil,
climate, timber, grass,
health, water, navigation,
and local position,
is unsurpassed by
any portion of
North America.*

*—David Newsom
early settler, 1858*





LOCATION MAP



KEY TO FEATURES

- Corps of Engineers Dams
- Rivers and Water Bodies
- Highways
- - - County Boundaries
- Willamette Basin Boundary
- City Limits
- National Forest

FEMA Q3 DATA

- 100 Year Floodplain

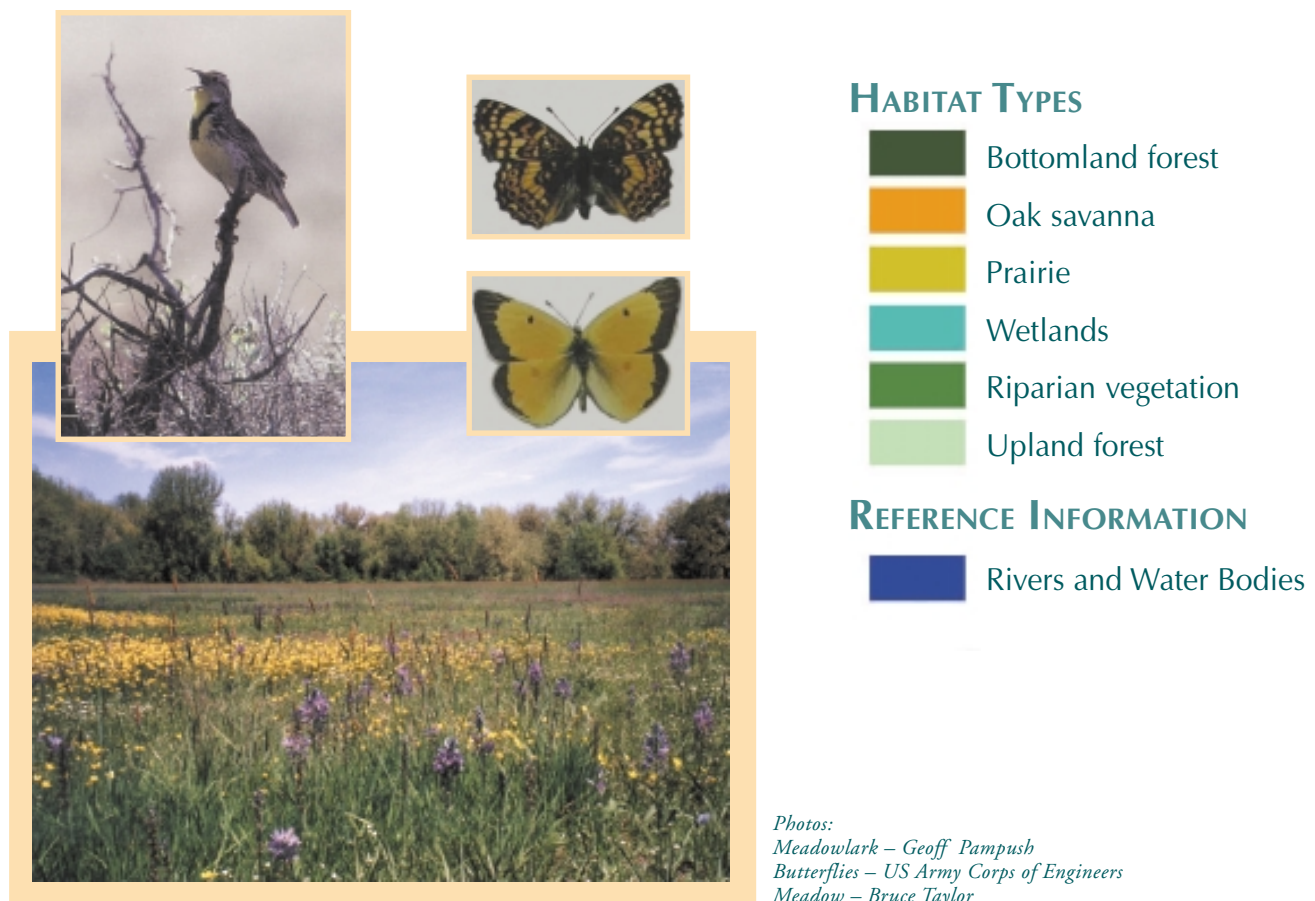
FIGURE 3

HABITAT CONSERVATION AND RESTORATION OPPORTUNITIES

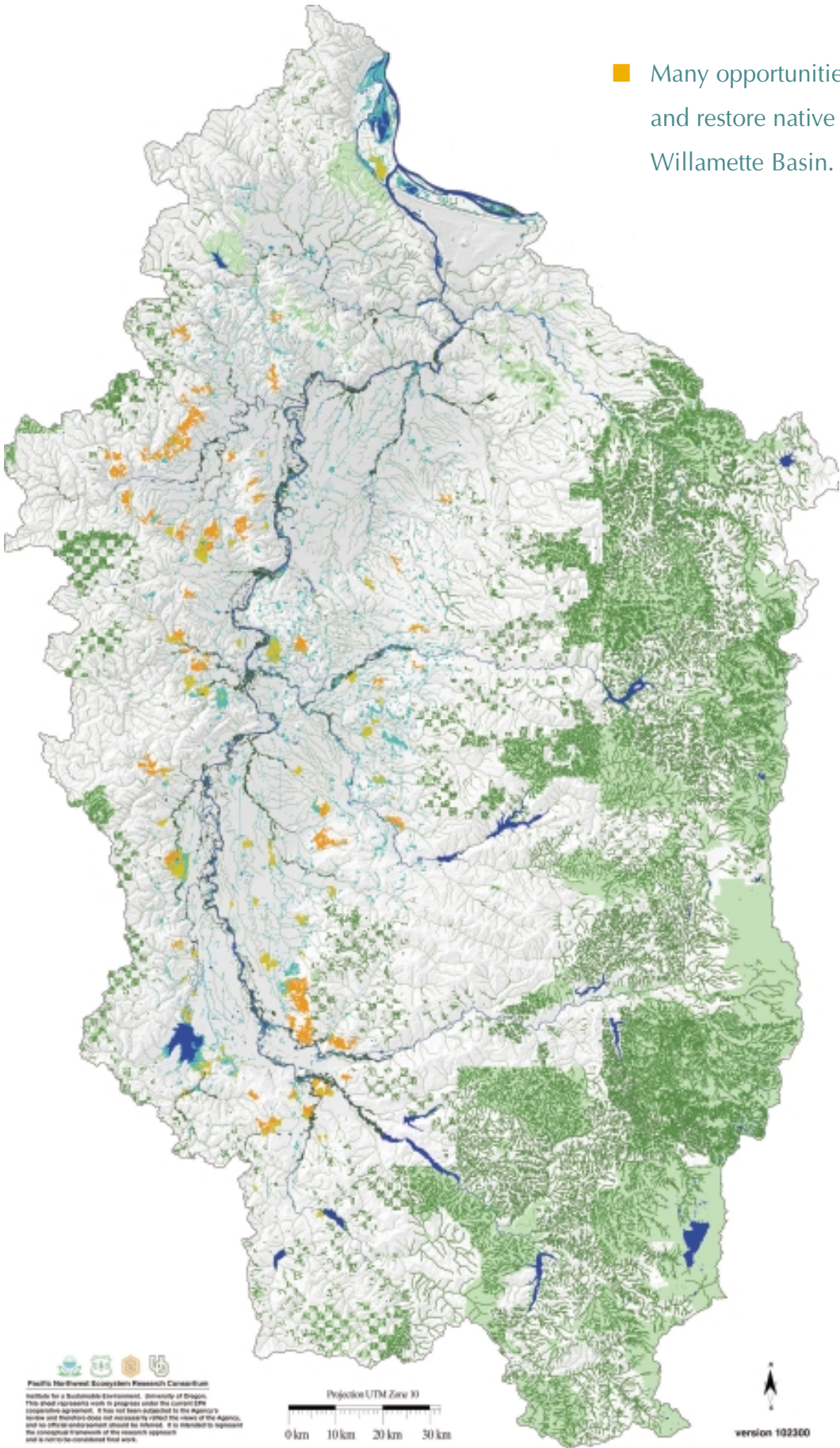
The Habitat Conservation and Restoration Opportunities map displays areas in the Willamette Basin where different types of native habitat can be most effectively protected or restored through the year 2050. It is based on the Pacific Northwest Ecosystem Research Consortium's (ERC) scientific analysis of past habitat location and current land cover. ERC worked with basin experts and residents to ensure the map reflects a plausible future condition.

The map shows both existing habitat that should be conserved and areas where current land uses might be managed to reestablish habitat. Although the map reflects the dominance of opportunities on public lands (especially in the Cascade Mountains and foothills of the eastern basin), it also shows there are opportunities in the lower-elevation lands in the valley floor.

The map is a "first approximation" of potential habitat management opportunities, intended to promote a dialogue about habitat restoration. Although based on highly detailed geographic information, it has been produced here at the reduced scale required for publication, and is intended for general information purposes only. The actual locations and extents of habitat are generalized. More detailed map products will be created and shared with the public and decision makers. This will allow the maps to be verified, refined, and put to use in the basin with confidence.

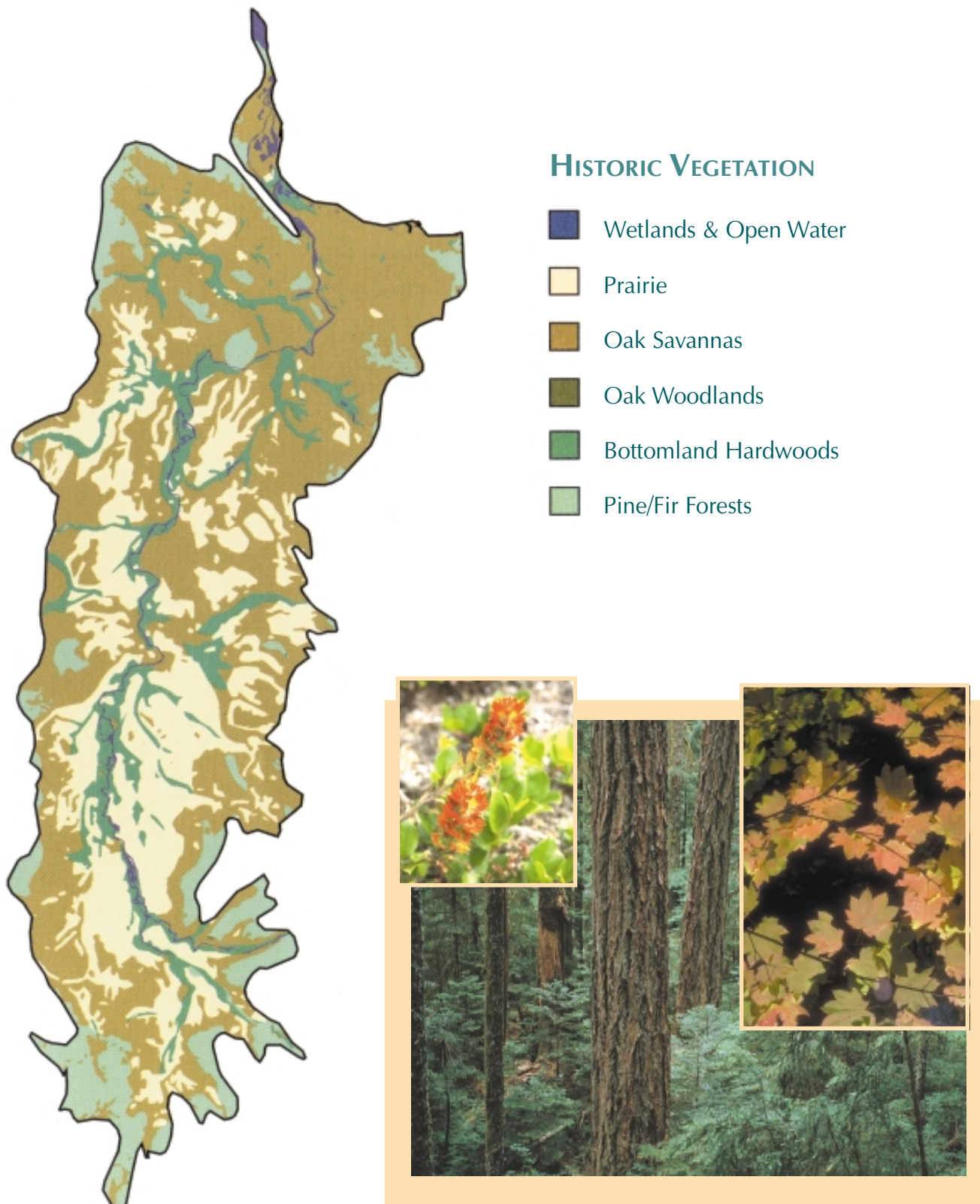


■ Many opportunities exist to conserve and restore native habitat in the Willamette Basin.



Map from
Pacific Northwest Ecosystem
Research Consortium

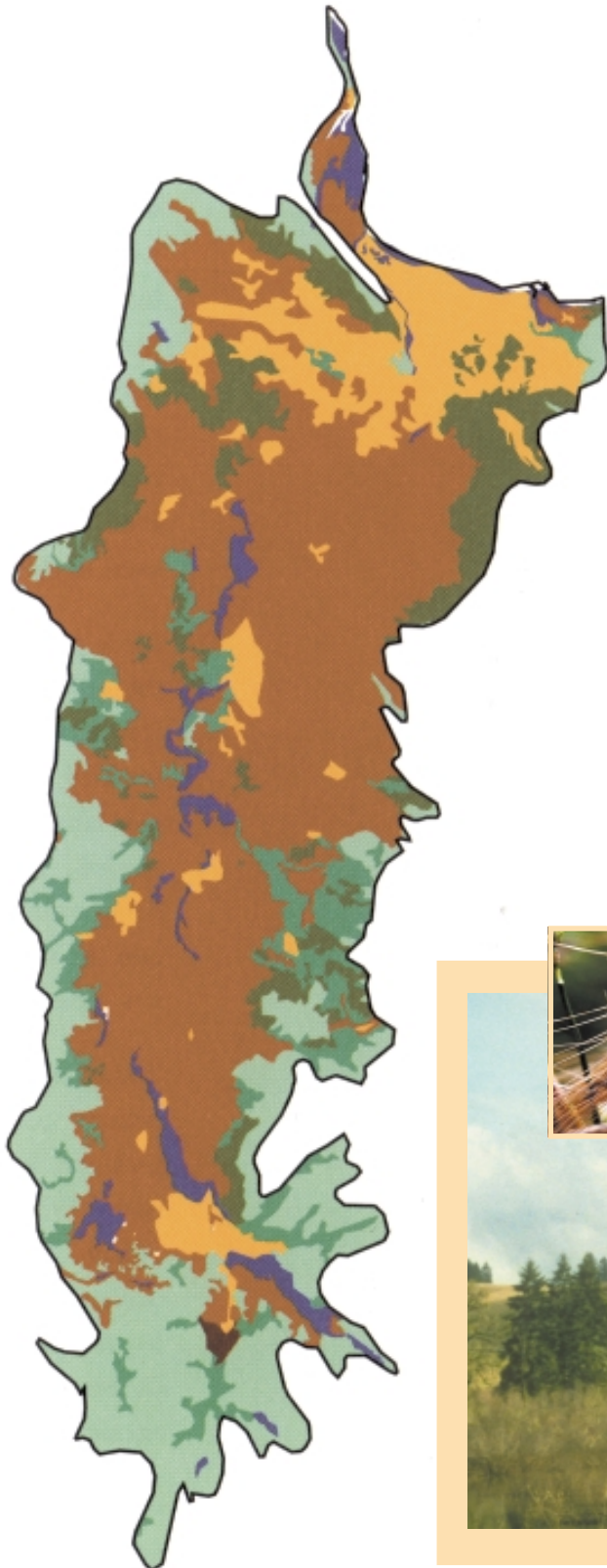
FIGURE 4
HISTORIC AND CURRENT VEGETATION COVER IN THE
WILLAMETTE VALLEY ECOREGION



*DOW map based on data from Oregon
Actual Vegetation (Kagan & Caicco 1992)*

*Photos:
Forest – Larry N. Olson; Flowers and Leaves – BLM, Eugene District*

- Almost all the natural vegetation in the Willamette Valley floor has been replaced with farms and cities.



CURRENT VEGETATION

- Wetlands & Open Water
- Native Grasslands
- Oak Savannas & Woodlands
- Bottomland Hardwoods
- Pine/Fir Forests
- Agriculture
- Urban
- Exotics

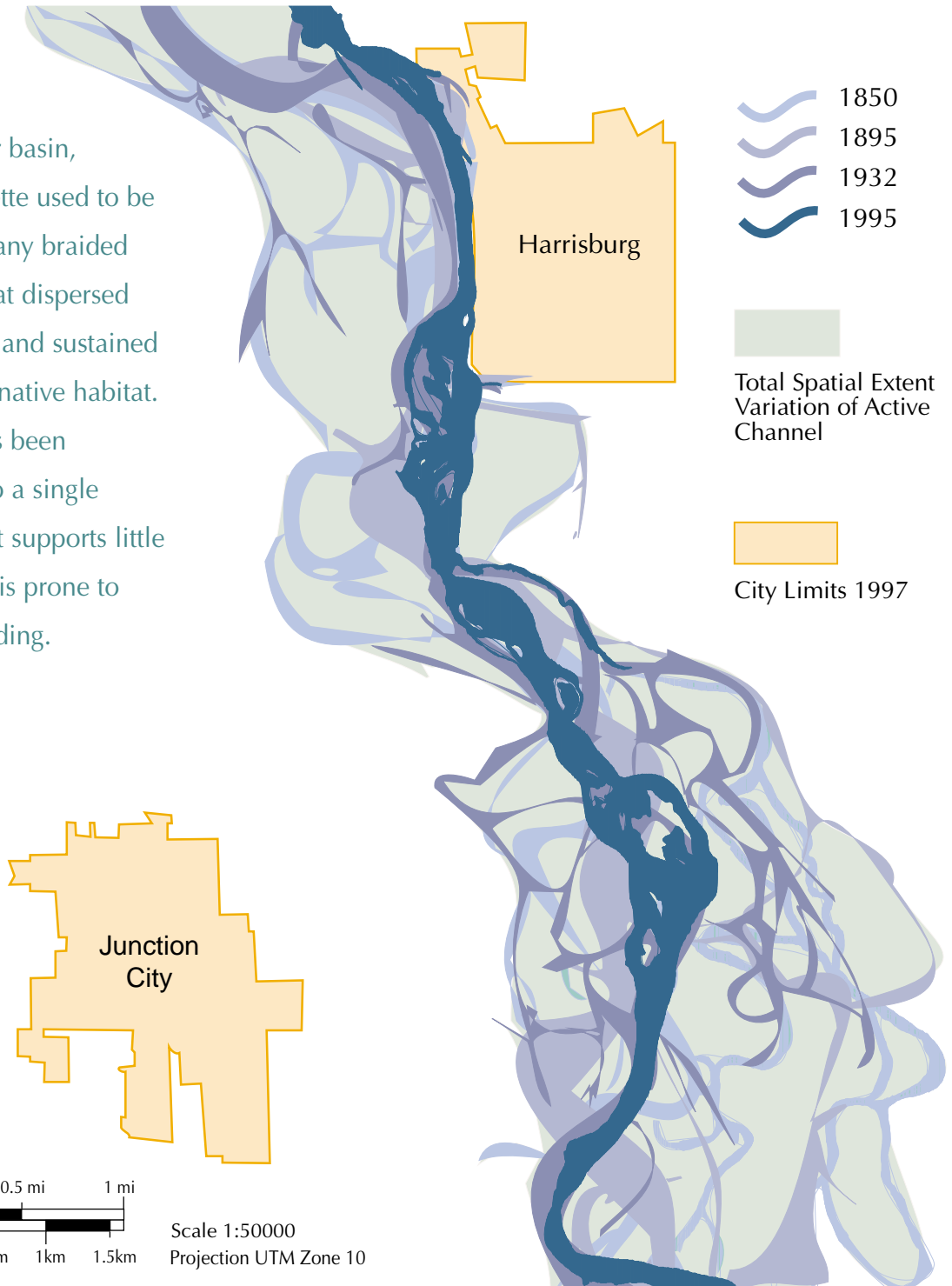


DOW map based on data from Oregon Actual Vegetation (Kagan & Caicco 1992)

Photo: Green Field – Bruce Taylor

FIGURE 5
CHANGES IN THE WILLAMETTE CHANNEL AREA (HARRISBURG AREA)
BETWEEN 1850 AND 1995

■ In the upper basin, the Willamette used to be a river of many braided channels that dispersed floodwaters and sustained a wealth of native habitat. Today, it has been simplified to a single channel that supports little habitat and is prone to serious flooding.



Based on channel map from Pacific Northwest Ecosystem Research Consortium

One of Oregon's greatest environmental challenges for this century lies in the Willamette Valley. Transformation of prairies, woodlands, riparian areas, and rivers of the valley has fueled our economic growth and settlement for over 150 years. Yet this transformation has left a mark on our environment and a debt to pay.

Whether we can improve the ecological health of the valley, measured currently by recovery of salmon and watersheds, while continuing economic growth and development for homes and communities will be a stern environmental test.

*— Oregon State of the Environment Report 2000
(Oregon Progress Board, 2000)*



MEASURING RESULTS

The WRI board recognizes the need to determine how well the recommended actions are working. The *Strategy* includes three methods for tracking progress and measuring results:

- Provisional indicators and targets are provided for each restoration focus area.² Indicators identify important aspects of the environment that need to be monitored. They are like a yardstick for measuring environmental health. Targets lay out desired goals. They are the marks along the yardstick that are important to reach.

The WRI board has agreed to use indicators recommended in the *Oregon State of the Environment Report 2000* (Oregon Progress Board, 2000) as an initial step toward customizing indicators specific to the Willamette Basin. The board has also identified example targets, which can be further refined during dialogue with basin residents about specific objectives and schedules.

Example:

CLEAN WATER FOCUS AREA

Provisional Indicator: The proportion of streams and rivers with good to excellent water quality, according to the Oregon Water Quality Index (WQI)

Example Target: [80?] percent of streams have a year-round WQI rating of good to excellent by [2010?]. [To be specified through a dialogue with stakeholders and the public.]

- A habitat conservation and restoration opportunities map (Figure 3) identifies general areas within the basin where conservation and restoration activities can be pursued most productively. The map reflects estimates of the amount of habitat needed to support self-sustaining populations of certain species. It charts where in the basin this habitat might be most effectively protected or restored by the year 2050. The map is a tool to help focus incentives, technical assistance, funds, and resources for voluntary (not regulatory) land transactions.

Although it will be verified and refined through more work with stakeholders and the public, the map provides a “first approximation” of where important opportunities lie. Based on the map and supporting data, the WRI board believes a balanced approach of incentives and technical assistance can increase native habitat in the basin’s lower elevations by over 260,000 acres in the next 50 years.

- Action success measures are provided for each of the 27 actions.³ These are specific ways to gauge how well an action is doing.

Example:

ACTION 9: Establish science-based riparian area protection guidelines.

Action Success Measure: Implementation of riparian management strategy.

² The provisional indicators and targets are identified in the full *Strategy* report.

³ The action success measures are identified in the full *Strategy* report.

27 CRITICAL ACTIONS: WHAT WE NEED TO DO AND WHY

RESTORATION FOCUS 1:

- Protect **clean water** sources and improve degraded water sources to support fish and wildlife, recreation, human health, and other beneficial uses.

THE PROBLEMS

Although there are locational and seasonal differences within the basin, water in the Willamette River usually fails to meet water quality standards for temperature, bacteria, and other criteria during most of the year. These problems result mostly from “non-point source” pollution. This is pollution that is washed in from fields, gardens, city streets, and logging areas and roads. In addition, a number of chemicals (such as pesticides and dioxin), heavy metals, and other contaminants have been found in the water and sediments, especially in the lower reaches of the river (*Oregon State of the Environment Report 2000*, Oregon Progress Board, 2000). The Oregon Department of Environmental Quality completed a Willamette fish consumption study in November 2000 that found high levels of chemical contaminants, particularly mercury and PCBs, in many tissue samples of sampled fish species. The U.S. Environmental Protection Agency has designated six miles of the lower Willamette as a federal Superfund site because of toxic contamination.

ACTION 1

Support the Willamette Basin total maximum daily load (TMDL) process, including coordination and communication.

The TMDL process calculates the maximum amount of a pollutant that a water body can receive and still meet water quality standards, and allocates that amount to the pollutant’s various sources. TMDLs will be set in most of the basin by 2003. Support of this process involves improving public understanding of its benefits, ensuring adequate resources for implementation, and integrating the process with other restoration efforts.

ACTION 2

Support effective implementation of the agricultural water quality management plan process (Senate Bill 1010), and encourage its use to address species needs.

The Oregon Department of Agriculture is developing water quality management plans to control pollution from agricultural areas. Plans will be completed for most areas in the Willamette Basin by 2002, and will be crucial for restoring the basin. Local landowners will need technical and financial assistance to develop and implement plans. It is important that these local plans address species and habitat issues.



ACTION 3

Reduce the levels of toxic pollutants in the Willamette Basin.

Toxic pollutants continue to accumulate in sediments, water, and aquatic organisms of the Willamette Basin. It is essential to reduce toxic pollutants from all sources as soon as possible.

ACTION 4

Provide economic incentives to decrease water pollution.

Economic incentives (e.g., providing economic rewards to facilities that pollute less) can have powerful impacts on behavior. Potential incentives should be examined, including effective programs adopted by other states or countries.

ACTION 5

Promote a developer education/certification program tied to incentives.

Land developers and homebuilders have many opportunities to implement conservation measures during site selection, design, and construction. Local governments should be encouraged to train, certify, and provide incentives for developers who follow these measures.

ACTION 6

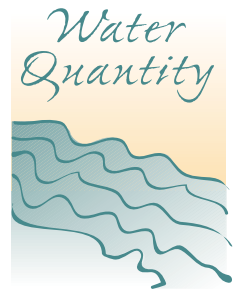
Initiate an effluent and “water quality impact” trading pilot project in the Willamette Basin.

Pollution trading allows polluting sources (such as cities, industries, farms, or forest operations) to meet water quality requirements by negotiating with other polluting sources to reduce their own pollution. The result is a net pollution decrease in the receiving waters. Pilot projects could determine how well this innovative process can work in Oregon, where it has not yet been tried.



RESTORATION FOCUS 2

- Provide sufficient **water quantities** to meet the needs of fish and wildlife, recreation, and domestic and commercial needs.



THE PROBLEMS

As wet as the Willamette Basin is perceived to be, water supplies are insufficient to meet existing needs, especially during summer months when flow is lowest and demand highest. Even now, cities are running out of water needed to serve their growing areas. They are turning to new sources, including the Willamette River itself, which until now has served only a very small part of the basin's population. The importance of a clean Willamette River has therefore never been greater. Low summer and fall flows have been identified as a key factor in the decline of salmon and steelhead. The competition for water among various human and ecosystem needs will only intensify as population increases. The management, or allocation, of water can have a significant impact on water quality, also.

ACTION 7

Support improvements to water quantity management efforts to meet water supply needs for ecologic and economic purposes.

More concentrated efforts to improve water quantity management are needed. This includes educating decision makers and the public about the serious water supply challenges facing the basin. Another important task is to increase knowledge of and participation in the state's Streamflow Restoration Program, which targets areas in the Willamette Basin most suitable for streamflow restoration.

ACTION 8

Support the Corps of Engineers' ongoing assessment of flood-control reservoir operation by helping identify and communicate changes needed to address streamflow issues.

The amount and timing of water released from flood control dams in the Willamette Basin greatly influences water supplies for agriculture, fish, recreation, and diluting pollution. These represent competing needs. The Corps is currently reviewing its operations in light of Endangered Species Act requirements and future water supply needs. It is critical for basin residents to understand the need for changes and to participate in selecting necessary tradeoffs.



Manda Beckett

RESTORATION FOCUS 3

- Protect riparian, terrestrial, and in-stream **habitats** and **hydrologic processes** sufficiently to support self-sustaining levels of associated native fish, aquatic species, and wildlife populations.

THE PROBLEMS

Formerly widespread native habitat types have declined dramatically, jeopardizing native plants and wildlife (Figure 4). Over 99 percent of the original bottomland prairies, 72 percent of bottomland forest, 88 percent of upland prairies, and 87 percent of upland forests at the margin of the Willamette Valley have been lost (*Willamette River Basin Planning Atlas 1.0*, Pacific Northwest Ecosystem Research Consortium, 1998). Between 1982 and 1994, 2.5 percent of the basin's remaining wetlands were lost, despite the state's policy of no net loss of wetlands (*Wetland and Land Use Change in the Willamette Valley, Oregon: 1982 to 1994*, Oregon Division of State Lands, 1998). Along the upper and lower Willamette River, there has been an 80 percent loss of the total riparian forest since the 1850s. Riparian forests shade streams and rivers, contribute leaves and large wood to streams, take up nutrients, stabilize stream banks and floodplain soils, and provide wildlife habitat. Introduced plants now make up 10 percent of the number of species in the headwaters and more than 50 percent in riparian areas of the Willamette River mainstem (*Oregon State of the Environment Report 2000*, Oregon Progress Board, 2000).

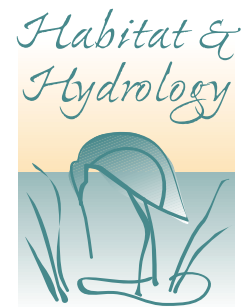
The channel complexity of the upper Willamette River has been significantly reduced. For example, it is estimated that 84 percent of the tributary and slough reaches between Eugene and Corvallis have been lost (Figure 5).

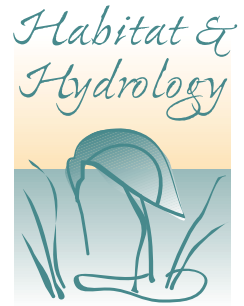
Sixteen plant and animal species are listed under the federal Endangered Species Act. Nearly 50 native plant and animal species are considered at risk in the basin. Wild spring Chinook runs have declined from historic levels of around 300,000 to recent levels of 3,000.

ACTION 9

Establish science-based riparian area protection guidelines.

Clear, science-based management protocols are needed to protect riparian areas across the basin's diverse landscapes—urban, farm, and forest lands. For some landscapes, there is a large body of research that can be assessed and applied. For other landscapes, especially low-elevation streams, research is scarce, and recommended riparian approaches must be crafted and designed to adapt to new information. These approaches need to address the role of riparian transition zones in providing large wood, shade, and other functions. Recommended protocols would be applied primarily through existing, well-recognized land management programs, including statewide planning goals (such as Goal 5), provisions in Oregon's Forest Practices Act, and various state and local water quality management plans (including TMDL implementation plans).





ACTION 10

Support basinwide scientific investigations of how to restore floodplain function.

The Willamette River and its tributaries have been extensively diked and channeled to create valuable farmland and protect property, at the cost of reduced natural flood storage and fish and wildlife habitat. Restoring some measure of floodplain function needs to be based on careful study of hydraulic, ecologic, and economic factors. Additional investigations and tools are needed to identify appropriate restoration sites.

ACTION 11

Inventory, map, and conserve priority fish and wildlife habitats in the basin.

It is important to invest in those habitat areas and practices that will achieve the greatest restoration benefits. Because our current habitat inventories and mapping have a limited scope and are often conducted in a fragmentary manner, they provide only limited assistance in meeting this goal. Far better information needs to be collected, and information management needs to be much more coordinated. As a start, improvements should include the riparian area protection guidelines developed under Action 9 and the habitat conservation and restoration opportunities map and inventory developed by the Pacific Northwest Ecosystem Research Consortium (see page 16). These tools can help reconcile various emerging approaches being proposed by state and federal governments and target conservation efforts for greatest effect.

ACTION 12

Improve both upstream and downstream fish passage at dams, culverts, and water diversions.

Despite a significant number of existing federal, state, local, and private programs, fish passage is not provided at many culverts and dams, and large numbers of water diversions are not screened. A concerted, coordinated effort is needed to identify and address the highest priorities to improve fish passage and reduce fish injury and death.

ACTION 13

Support improvements to hatchery and harvest management systems.

Spring Chinook salmon and winter steelhead are listed as threatened species under the federal Endangered Species Act. Hatchery operations and harvest management have been identified as contributing to the decline of these species. Hatchery and harvest practices should be evaluated and made consistent with the latest, state-of-the-art management principles and strategies.

ACTION 14

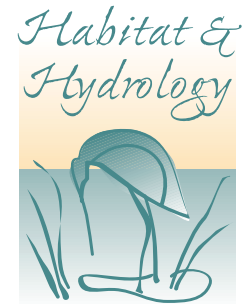
Prevent the introduction and control the spread of the most harmful invasive species.

Many invasive species destroy habitat and interfere with natural processes. State and federal agency coordination is needed to quantify these species, educate the public, and work with landowners to control harmful invasive species populations.

ACTION 15

Improve delivery mechanisms for incentive programs, especially the Conservation Reserve Enhancement Program (CREP).

The Oregon Conservation Reserve Enhancement Program provides over \$200 million for riparian protection on 100,000 acres of agricultural lands statewide. Because of problems with program design and administrative resources, only around 2,200 acres have been enrolled in the program, and only about 500 in the Willamette Basin (as of November 2000). Other potentially useful landowner incentive programs suffer from similar problems, resulting in complicated rules that limit flexibility and participation. In addition, landowners who already practice good stewardship are often excluded from incentives programs, which can be a disincentive to good land management. Improved program design and implementation are needed.



ACTION 16

Support funding for on-the-ground protection and restoration projects.

As agencies, organizations, and citizens become more actively engaged in meeting restoration goals in the Willamette Basin, new ideas and approaches will be offered. Many of these new approaches can be accomplished with watershed groups and agency programs, but others may require new mechanisms. There is a critical need for additional support structures to help local governments and watershed groups address species needs and integrate their efforts with Clean Water Act requirements.

THE SALMON CONNECTION

Many interrelated factors have led to salmon declines, including water quality, streamflows, habitat, floodplain function, land use, harvest, and hatcheries. WRI is recommending strategic and specific actions for all these factors.

Swift completion of the total maximum daily load process (Action 1) and agricultural water quality management plans (Action 2) will benefit both water quality and salmon. Applying a new understanding of floodplain function (Action 10), carefully managing riparian areas (Action 9), addressing streamflow needs (Action 7), and offering land stewardship incentives (Actions 15 and 19) will provide critical habitat for salmon and other species. Identifying and fixing the worst fish passage barriers as soon as possible (Action 12) is critical for salmon recovery. Modernizing hatchery operations and carefully reviewing harvest regulations (Action 13) are key components of bringing salmon back. Establishing an advisory body for salmon recovery in the basin (Action 23) will assure the organized, locally informed approach necessary for successful recovery. WRI's recommendations also incorporate scores of specific salmon recovery measures identified by state and federal agencies.



RESTORATION FOCUS 4

- Assure **institutions and policies** work in concert to restore watershed health in the basin.



THE PROBLEMS

Sustaining environmental quality and community vitality requires well-run and well-connected institutions. Integrated, balanced approaches must respect the landscape and be coordinated across interests and jurisdictions. Today, dozens of public and private interests administer several hundred projects and programs in the Willamette Basin. While these efforts achieve many positive outcomes, they have also resulted in a regulatory maze frustrating to both citizens and agencies. Increased and more successful institutional integration and coordination are desperately needed. New and more flexible incentives must be provided to basin residents to encourage on-the-ground stewardship. Funding of existing programs must be adequate to meet restoration objectives. Finally, institutions can only be led into better integration and more effective restoration at the insistence of an informed public.

ACTION 17

Increase public and consumer awareness of the Willamette Basin health issues.

The basin restoration strategy cannot hope to succeed without the active and informed involvement of those living here. A two-part approach is recommended to involve the public in restoration decisions. First, an unprecedented effort is needed to raise public awareness of both the fortunes and challenges of living here. Second, an aware public must be connected with tools and organizations to give it a voice in basin affairs. Increased use of toll-free numbers, web services, and print and electronic media are needed to connect people with their local watershed groups and provide them with watershed information.

ACTION 18

Help grow the market for, and encourage development of, environmentally friendly products.

Increased markets for environmentally friendly goods and services could be a powerful incentive for stewardship in the basin. The most promising market approaches should be identified (both state procurement and private sector processes), and pilot projects implemented.

ACTION 19

Create new stewardship pathways through agreements and incentives.

Oregon needs to encourage and support private stewardship that goes beyond regulatory requirements. Landowners and businesses should be encouraged to develop stewardship plans that address multiple restoration needs, including ways to control pollution and erosion, lower water consumption, control invasive species, and manage riparian areas—all within the context of watershed or regional conservation efforts. Agreements with participating government agencies would obligate the landowner or business to implement the plan and the agencies to deliver specific incentive benefits in return (e.g., tax breaks, technical assistance, direct financial help).



ACTION 20

Reduce tax barriers to conservation on private lands.

A number of current tax policies discourage conservation on private land. The cooperation of private landowners is critical to restore the Willamette Basin's health. Approaches for reducing tax barriers need to be investigated and solutions reported to the Governor, Oregon Legislature, and other decision makers.

ACTION 21

Create an effective and cooperative strategy at the local level to fund and implement watershed action plans.

Funding scarcity and administrative requirements often prevent watershed councils and soil and water conservation districts from implementing the integrated, holistic watershed action plans they have developed. These groups also often find themselves competing for funding with other projects within the same watershed, even though the other projects have not resulted from cooperative, watershed-based approaches and may be at odds with the objectives of the watershed action plan. Better strategies are needed to fund and implement integrated local watershed action plans.

ACTION 22

Create watershed technical assistance teams.

Local watershed groups in the Willamette Basin have identified additional technical assistance as a critical need. A multi-disciplinary technical team of government and private experts should be created to provide this assistance. Increased use of the Oregon State University Extension Service should also be a priority.

ACTION 23

Establish a basinwide salmonid recovery coordinating council.

Meeting the needs of salmon, steelhead, and other at-risk species is complicated, and is currently driven largely by legal mandates, governmental requirements, and lawsuits. True recovery, however, will require the committed and concerted actions of the community: individuals, organizations, local agencies, and state and federal government. A basinwide recovery coordinating council is needed to represent community interests in developing recovery plans, promoting coordination among multiple agencies and the basin's diverse interests, and developing restoration support and capacity at a local level. The council should include broad representation from local, state, and federal government; watershed groups; the Oregon Legislature; and the private sector, including landowners and non-governmental organizations.

ACTION 24

Coordinate and integrate major regulatory programs and responses to them.

Local governments and individuals currently have to comply with multiple environmental regulations, many with similar purposes but different requirements. A more streamlined and coherent approach is needed to make basin management more effective and reduce the burden on communities.



ACTION 25

Improve Willamette Basin information management.

No organization or alliance of interests is currently tracking, coordinating, and sharing information for the entire basin. With Endangered Species Act listings, continued water quality problems, habitat loss, and rapid population growth, the need to do so has never been greater. Policy makers, planners, and stakeholders all need a solid scientific base for making the right decisions. Citizens deserve to have a place to view and understand the research their tax dollars have funded. Agencies and organizations need assistance to integrate disparate data and do the kind of “cross-boundary” assessment needed to support ecosystem-level management. A scientific data management entity should be established to address information management needs in the basin, and probably statewide, since this problem is common to many areas across the state.

ACTION 26

Increase usefulness of land use planning and management programs for watershed issues.

Oregon’s land use planning program has been used effectively to address urban sprawl, farm and forest protection, and transportation needs, but has not focused on watershed issues. Considering watershed issues in the planning process and improving alignment between habitat protection and land use planning would yield significant long-term conservation benefits. More immediately, local governments should be encouraged to use the information developed under the *Strategy* (e.g., riparian, habitat, and floodplain inventories) to help address statewide planning goals. Model ordinances should be developed to help local governments address erosion control, wetlands and riparian protection, floodplain development, and stormwater management.

ACTION 27

Strengthen agency capacity to implement and administer existing programs, including enforcement.

Before new environmental laws are considered, it is essential to ensure the regulated community understands and is following current regulations. State, federal, and local governments need additional resources to explain, implement, and enforce existing programs.



INVESTING IN THE FUTURE

Implementing the recommended actions in the *Strategy* will require enormous commitment and energy. Part of that commitment will involve money. Hundreds of millions of dollars will be needed over the decades ahead to meet restoration objectives and regulatory requirements. The money will come from all levels of government, the private sector, and individuals.

While it is inevitable that large sums will be spent for restoration, it is not inevitable that those funds will be spent wisely. A Willamette Basin restoration investment plan is critically needed to provide guidance. The investment plan would clearly identify:

- Existing and needed resources
- Funding sources
- Costs, benefits, and tradeoffs of proposed actions
- Expenditure priorities
- Investment alternatives

One of the most important activities over the next few years will be to conduct the dialogue and analysis needed to establish a sound investment plan. Implementing the *Willamette Restoration Strategy* will provide a valuable opportunity to begin this process. The incorporation of the habitat conservation and restoration opportunities map and the development of basin indicators and targets will be critical elements of a more businesslike approach to restoration investments.

IMPLEMENTING THE *STRATEGY*

Implementing the *Strategy* will also require ongoing coordination, management, and tracking. Some fundamental needs are currently not addressed by any organization: basinwide policy and budget coordination; dispute resolution; collaborative work planning; and public information delivery and involvement. The WRI Board of Directors respectfully recommends at least three areas where the continued involvement of WRI or some coordinating body is needed:⁴

- Coordinating communication and promoting the *Strategy* among the diverse participants and interests in the basin.
- Taking the lead to implement or organize specific actions (such as clarifying riparian guidelines, establishing a salmonid recovery coordinating group, and promoting a developer education/certification incentives program, as described in more detail in the full *Strategy* report); supporting and participating in other actions.
- Monitoring and evaluating implementation of the *Strategy*, including an annual review report to assess progress toward achieving restoration goals.

⁴The WRI Board of Directors is preparing a more detailed recommendation under separate cover.

A LASTING COMMITMENT

The problems that confront the Willamette Basin are far-reaching and complex. Many of them are the cumulative result of small, individual actions over many years. The solutions will also require the action of many people for generations to come. The *Strategy* provides the guidance needed for all of us to join together to realize the Willamette Basin as it can be:

- A healthy, living mosaic of many uses.
- A place hospitable to all its inhabitants.
- With our commitment, a restored River of Life.



Based on photo by Bruce Taylor

The Willamette Restoration Initiative is overseen by a 26-member Board of Directors, chaired by Oregon State University President Paul Risser. The board includes members from businesses, local government, utilities, tribes, academia, watershed groups, soil and water conservation districts, agriculture, forestry, environmental groups, and state and federal government.

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