Subbasin Planning Team Recommendations for Conservation and Restoration Priorities in the Willamette River Basin

October 11, 2005

The Willamette is the largest subbasin in the Council's program and the second largest tributary to the Columbia River. In fact, the Willamette subbasin contains several sub-watersheds[1] that are larger than many of the subbasins in the Council's program.

Conversion of native habitats to other land uses such as agriculture and urban areas, resource use, isolation of remaining native habitats, and changes in the ecological processes that maintained these habitats have significantly altered the original landscape of the Willamette River Basin. Historically, the Willamette River basin provided abundant key habitat for hundreds of wildlife, fish and plant species. Development in the Willamette Basin during the last 150 years has been concentrated in the lowland valley and floodplains adjacent to the Willamette River and its major tributaries.

Given the size, complexity and degree of change in the Willamette subbasin, we are taking a multi-species approach to restoration that focuses on two of the most important and heavily impacted major habitat types: (1) the riparian areas and floodplains of the mainstem Willamette River and lower elevation reaches of mainstem tributaries to benefit fish and wildlife, and (2) upland oak and prairie habitats primarily to benefit wildlife. These priorities reflect the limiting factors and critical needs identified in the *Willamette Subbasin Plan* (Primozich and Bastasch 2004).

I. Willamette Mainstem and Floodplain

The lowland reaches of mainstem tributaries and the mainstem Willamette were channelized, valley wetlands were drained, and riparian forests cleared to construct cities and roads; to increase farm and forest production; to enhance navigation of rivers; and to reduce damage from floods. One of the most significant changes to the landscape of the Willamette Valley has been the transformation of a complex and dynamic river and floodplain into a simplified and largely channelized river system. Even though modifications are significant, the lower elevation reaches of mainstem tributaries and the mainstem Willamette River and its floodplain areas provide remaining essential habitats for many species, at various life stages. These reaches also serve to connect biological communities and watersheds throughout the Willamette system.

Despite its ecological importance, the mainstem Willamette River has often been viewed simply as a migration route for anadromous fish. The *Willamette Subbasin Plan*, though, suggests that the complex habitats of the lower elevation reaches of mainstem tributaries and the mainstem Willamette River and its floodplain are integral to the functioning of the wider Willamette ecosystem. For example, EDT analysis of the McKenzie and Clackamas rivers and lower Willamette streams identified the mainstem and floodplain reaches as among the highest priorities for restoration of spring Chinook populations in the McKenzie and Clackamas rivers and of coho in the Clackamas and lower Willamette

[1] Sub-watershed refers to fourth-field HUCs such as the McKenzie, Santiam and Clackamas rivers.

streams[2]. Qualitative assessment of major tributaries also highlighted the importance of floodplain reaches and the mainstem Willamette River to resident fish species and upstream populations of salmonids.

Historically, the lower gradient riverine/floodplain environment was heavily influenced by annual flooding, which produced a complex network of stream channels, sloughs, and riparian terrestrial and aquatic habitats. The *Willamette Subbasin Plan* makes the case that these areas remain vitally important to the Willamette ecosystem and to specific wildlife and fish species. A multi-species ecosystem approach that emphasizes restoration and protection of natural habitat forming processes will provide benefits to wildlife and fish species and assist in recovery efforts in all sub-watersheds.

The "mainstem Willamette and floodplain" component of the river (see Figure 2) includes the 185 miles of the Willamette River mainstem and the floodplain and the lower elevation reaches of mainstem tributaries. Lower elevation reaches include tributary reaches up to approximately the first major gradient change when streams take on their own individual character.

Priority Aquatic and Floodplain Terrestrial Restoration Areas:

Restoration activities are needed throughout the Willamette mainstem and floodplain areas and should be implemented wherever possible. To aid decision-making when multiple high quality projects are available, two prioritization filters are provided.

Primary filter

Conservation and restoration opportunities within the Willamette River Greenway derived from multiple sources were combined and prioritized in the spring of 2005 by The Nature Conservancy at the request of Oregon State Parks. The following are geographic priorities for improving management, restoring habitat, and acquiring additional properties. These priorities provide a preliminary filter of areas with high ecological potential (See a map of the following list of locations in Figure1).

1) Confluence of the McKenzie to the Confluence with the Mary's River
    A. Confluence of the McKenzie downstream approximately 2 km from Green Island
    B. Blue Ruin Island downstream approximately 2 km
    C. Confluence of the Long Tom to Hoacum's Landing; especially around Sam Daws Landing
    D. Around Harkin's Lake Landing
    E. Above the confluence of the Mary's
2) Lands upstream and downstream of Willamette Mission State Park:
    A. Downstream to Jackson Bend Landing
    B. From Jackson Bend to the confluence of the Yamhill
    C. Upstream from Willamette Mission State Park to Darrow Bar Landing
    D. Downstream from the Confluence of the Yamhill and down past Dundee to southerly turn in the river

[2] Given the size of the subbasin, it was not possible to complete EDT assessments for the entire Willamette subbasin within the scope of subbasin planning

3) Downstream of Corvallis

A. Luckiamute/Santiam Confluence downstream from Vanderpool on both sides of the Willamette downstream to just below the Sidney Access.

B. Downstream of Corvallis to Half Moon Bend Landing

4) Confluence of the Middle Fork and Coast Forks upstream to Bristow Landing on the Coast Fork and Pisgah landing on the Middle Fork.

5) Downstream from Elijah Bristol State Park

6) Confluence of the Rickreal downstream approximately 5 km

7) Lower Reaches of the Mollala and Pudding Rivers

8) Willamette Narrows from Peach Cove to the Mouth of the Tualatin

Boundaries of activity sites in these areas (shown in Figure 1) should be refined based on field surveys, review of detailed topographic information, and a conservation planning process to define the restoration potential and habitat requirements for at-risk species within each of the areas.

Secondary Filter

Stream confluence areas typically provide superior complex channel and floodplain environments and should be given more weight than other important projects that effect Willamette mainstem and floodplain areas.

Due to the number and types of species they influence, three confluence areas in particular are considered to be of higher conservation and restoration value than others: the upper Willamette confluence area, the Santiam confluence area and the lower Willamette complex (see Figure 2). Designating the three restoration priority areas in Figure 2 is not intended to minimize the benefits of specific restoration activities in individual tributaries. However, at the scale of the Willamette River subbasin, the three areas in Figure 2 rank high because they provide cross-species and cross-watershed benefits.

Upper Willamette Confluence. The upper Willamette confluence is where the McKenzie, Middle Fork and Coast forks join to form the upper reaches of the mainstem Willamette River near Springfield and Eugene, Oregon. Historically this area was a complex of channels, wetlands and river deltas, and the remnants of these areas are vitally important for wildlife and aquatic species. Restoring channel complexity and floodplain habitats has the high potential to benefit salmon (Lestelle et al. 2005), including core and genetic legacy populations of ESA-listed upper Willamette spring Chinook.

Santiam Luckiamute Confluence. The Santiam confluence area includes the Willamette mainstem and the lower reaches of the North and South Santiam and the Luckiamute rivers. This area retains appreciable channel complexity and is near several major state and federal wildlife preserves. The Santiam River provides important habitat for spring Chinook and native Willamette winter steelhead. Core populations of both spring Chinook and winter steelhead were

identified in North and South Santiam Rivers. Populations of winter steelhead in the North and South Santiam Rivers are considered genetic legacy populations.

Lower Willamette-Clackamas. The lower Willamette River includes the Clackamas River, the lower Willamette River at Portland and lower portions of tributaries such as Tryon and Johnson creeks and the Columbia Slough. The Clackamas is one of the last bastions of listed lower Columbia River coho salmon. The smaller lower river tributaries, such as Tryon, Johnson and Kellogg creeks, Multnomah Channel and the Columbia Slough, have considerable potential to add off-channel habitat and refugia for all anadromous fish populations in the Basin that are lacking in the heavily urbanized lower Willamette River. This area may also provide off-channel habitat to the Columbia River, which could benefit upriver fish populations.

Priority limiting factors

Within these Aquatic and Floodplain Terrestrial priority areas, the *Willamette Subbasin Plan* noted the following habitat limitations that affect both wildlife and fish: loss of habitat features resulting from conversion of native habitats to other uses, flow modifications, channel confinement, absence of available large wood and sediment affecting channel-forming processes.

Preferred strategies. Actions should address the processes and functions responsible for these habitat limitations within the listed priority restoration areas. Although focused habitat restoration certainly has a role, long-term solutions need to address the underlying causes of habitat limitations. This means that strategies to address habitat limitations may lie outside the designated areas. For example, water temperature cannot be controlled locally; rather, it is the cumulative result of conditions and actions in upstream areas.

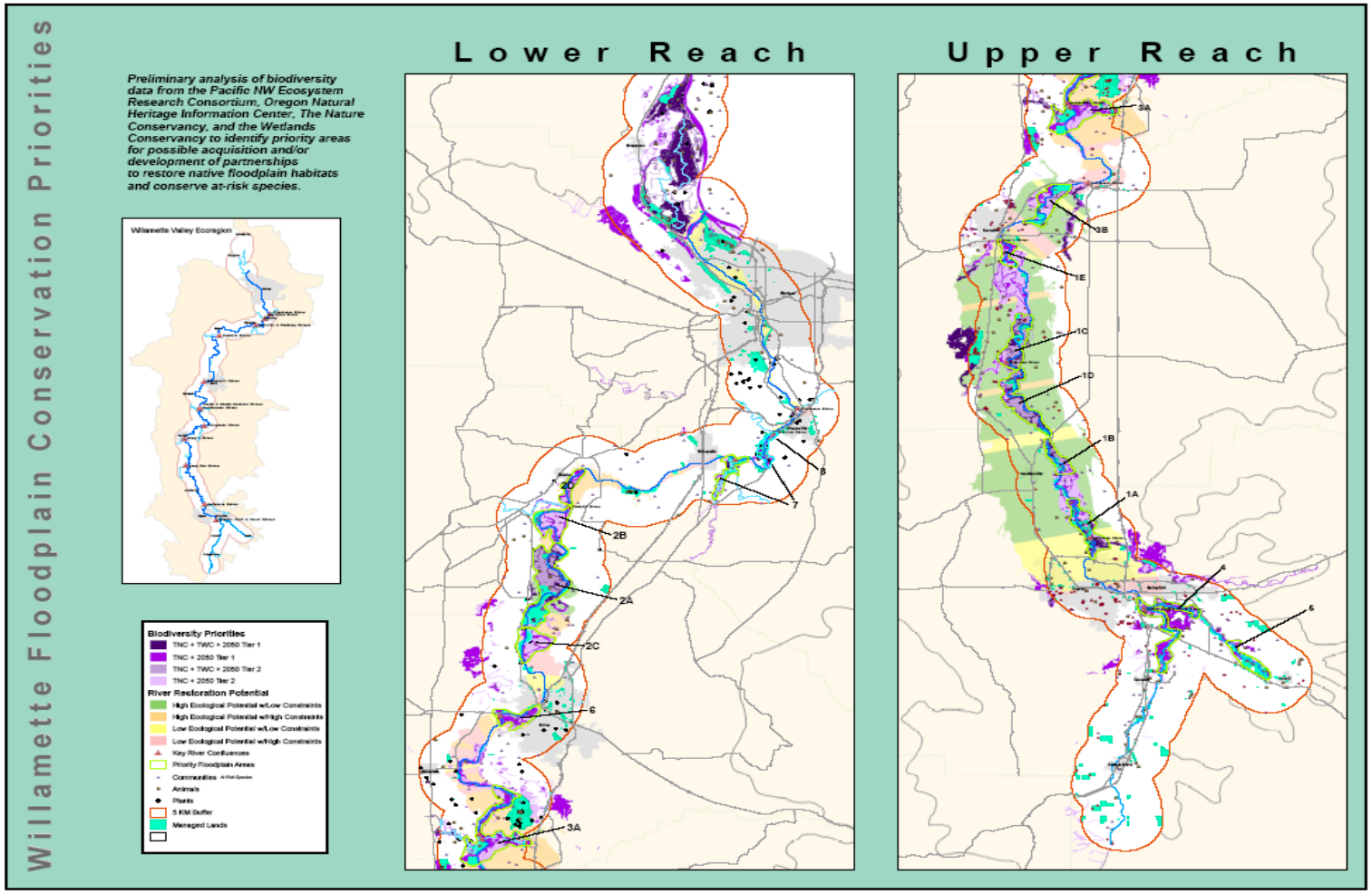

Figure 1. Willamette River Conservation and Restoration priorities compiled by The Nature Conservancy for the Oregon State Parks Willamette River Greenway Committee, Spring 2005

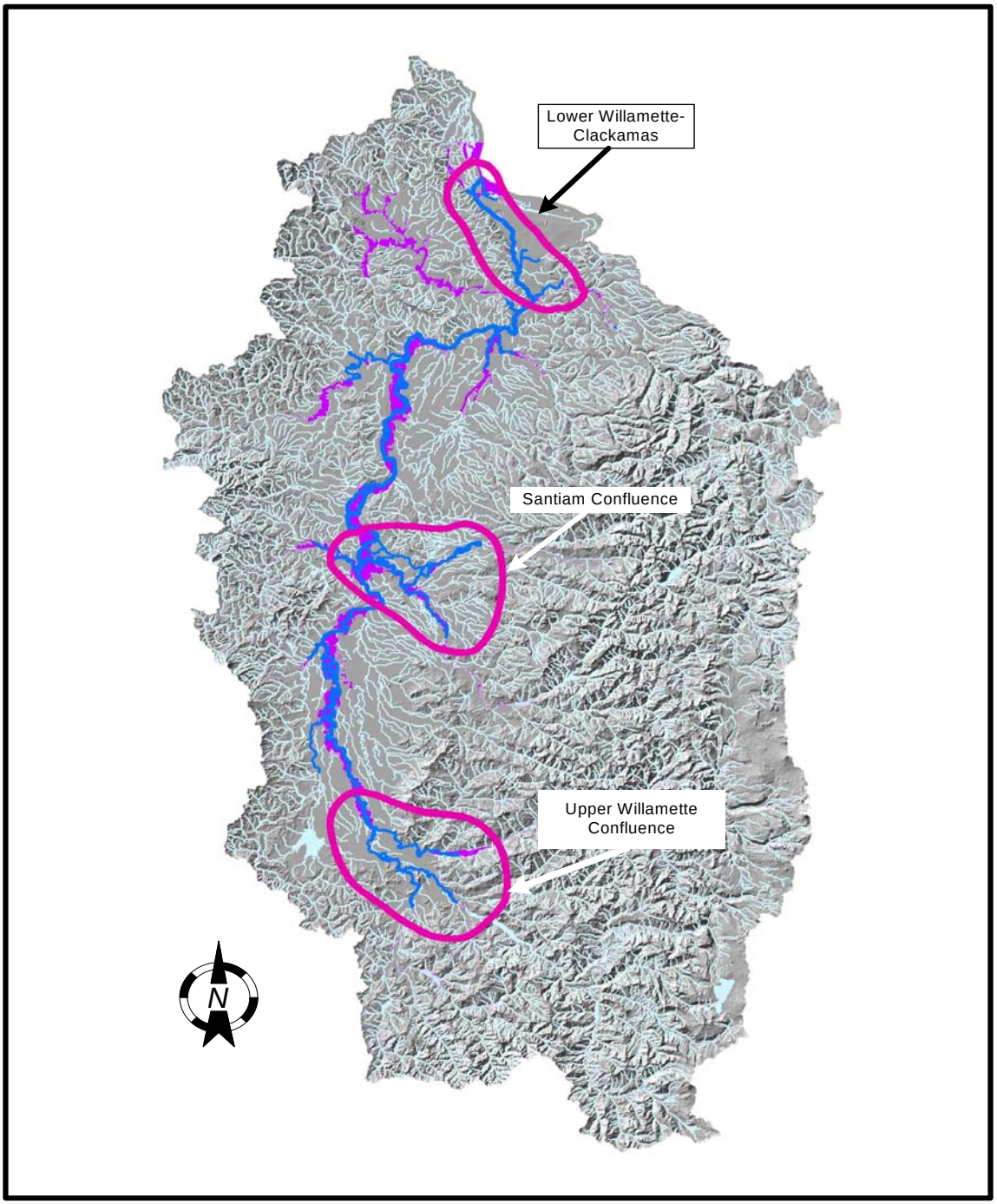

Figure 2. Willamette Mainstem-Floodplain Areas. This includes the mainstem Willamette River (blue), floodplain and low-elevation tributary reaches (purple). Also shown are three restoration priority areas at the Willamette confluence, Santiam confluence and lower Willamette River.

I. Oak Woodlands, Savanna and Prairie

Historically, prairies, savanna, and oak woodlands formed a successional mosaic covering over 1.5 million acres on the basin floor and foothills. The mosaic was in large part maintained by fire, often set intentionally by indigenous tribes. Today, less than 1% of the prairie and less than 7% of the woodlands remain in predominantly native condition making them among the most endangered ecosystems in the North America. As described in the Willamette Subbasin Plan and illustrated in the *Willamette River Basin Planning Atlas*, the Willamette Basin has lost 80 percent of its bottomland forests, 97 percent of its natural grasslands, and nearly100 percent of its oak savanna.

In addition to outright loss of habitat, the condition of much of the remaining oak woodlands, savannas and prairies have been altered as a result of decades of fire suppression, introduction of non-native species and grazing. Overcrowding of oaks and invasion of oak stands by faster growing Douglas-fir has reduced the amount of light reaching the woodland floor of most oak woodlands, thus reducing the percent cover and diversity of understory plants. This trend toward structural simplification and smaller-diameter trees has been documented as having adverse effects on wildlife populations.

Compared with other Willamette habitat types, oak woodlands in good condition provide the best habitat for 37 wildlife species, and are used regularly by at least an additional 100 wildlife species. A number of listed and declining species occur in these habitats including: Kincaid's lupine (federal –threatened); Willamette Daisy, Bradshaw's lomatium and Fender's blue butterfly (federal—endangered); Golden Paintbrush (*Castilleja levisecta*, now extirpated from the basin), federal vesper sparrow (state—critical); and sharptail snake, western rattlesnake, and western bluebird (state-vulnerable). Wildlife species that may have used oak woodland regularly before vanishing (as breeders) from the Willamette Basin include: Lewis's woodpecker, black-billed magpie, and lark sparrow. Wildlife species that may have used savanna regularly before vanishing as breeders from the Willamette Basin include Lewis's woodpecker, black-billed magpie, lark sparrow, and Oregon spotted frog.

As a result, the *Willamette Subbasin Plan* identified oak woodland, savanna and prairie habitats as priorities in the Willamette Basin.

Priority Oak Woodland, Savanna and Prairie Restoration/Protection Areas:

Both the historical and current oak woodland occurs mostly in the southern and western portions of the Willamette Basin. Most of the oak and prairie habitat exists on private land. Restoration activities are needed wherever there are remaining oak woodlands, savannas and prairie habitat and should be implemented wherever possible. However, in a recent effort completed subsequent to the Willamette Subbasin Plan, the Oregon Department of Fish and Wildlife identified 19 Conservation Opportunity Areas as especially important areas for oak woodland, savanna and prairie protection and restoration (Figure 3).

WV-01. Columbia River Bottomlands
WV-03A. Mt. Pisgah area
WV-04. Smith-Bybee Lakes
WV-07. Clackamas River area
WV-08. Yamhill Oaks
WV-09. Amity Oaks
WV-11. Basket Butte
WV-12. Habeck Oaks
WV-13. Airlie Savanna
WV-15. Airlie Oaks
WV-16. Salem Hills-Ankeny NWR
WV-18. Kingston Prairie area
WV-19. Corvallis area
WV-21. One Horse Slough - Beaver Creek
WV-22. Finley-Muddy Creek area
WV-23. West Eugene
WV-24. Coburg Ridge area
WV-25. Mohawk River
WV-26. McKenzie River

Priority limiting factors. For these oak woodland, savanna and prairie habitats, the *Willamette Subbasin Plan* noted the following habitat limitations: loss of habitat features resulting from conversion of native habitats to other uses, changes in habitat structure and processes especially loss of fire, and introduction of non-native species.

Preferred strategies. The Subbasin Plan identified the overall objective for wildlife of significantly increasing population trends of focal species, especially those listed under the Endangered Species Act, and the quantity and quality of connected habitats on which they depend.

As described in the Willamette Subbasin Plan, wildlife priorities in the Willamette should focus on conserving and restoring biological communities by protecting existing high-quality habitats and restoring degraded habitats with a particular emphasis on oak and prairie habitat types and riparian and floodplain areas. Areas that provide a diverse assemblage of habitats and that accommodate the greatest range of biological diversity should be prioritized for protection and restoration especially areas adjacent to existing wildlife management areas, wildlife refuges, and greenways.

Actions that connect habitats in a manner that maximizes the potential to maintain or enhance wildlife population distribution is one of the primary conservation strategies proposed in the subbasin plan. Many species require multiple habitats and large geographic ranges for their life history needs. Linking habitats that provide these attributes should be a priority. Actions that include linking upland and bottomland habitats, diverse habitats across watersheds, and reconnection of wetland, riparian terrestrial, and aquatic habitats should be emphasized. Actions should address the processes and functions responsible for these habitat limitations within these priority restoration areas.

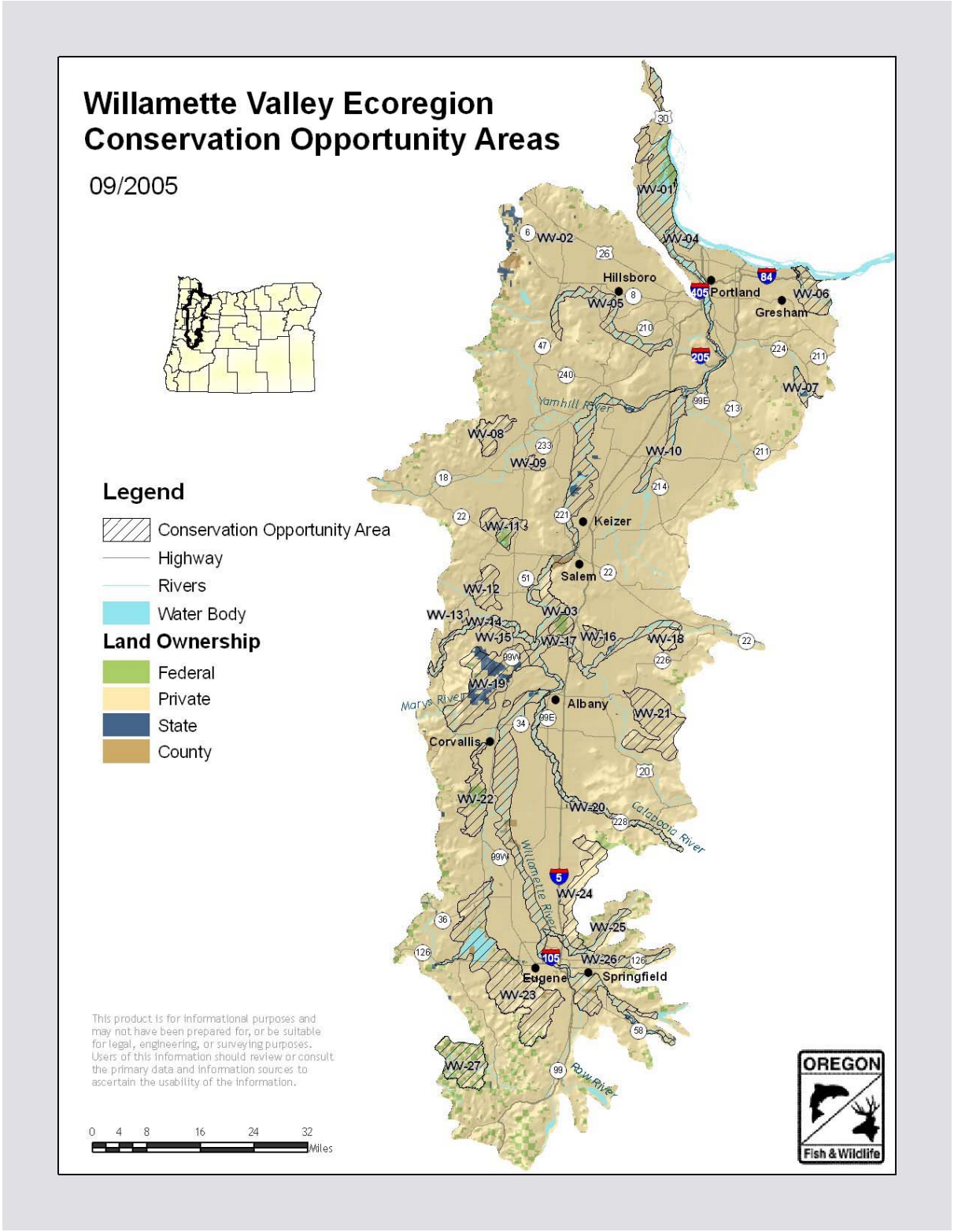

Figure 3: Conservation Opportunity Areas identified in the Oregon Comprehensive Wildlife Strategy, 2005, Oregon Department of Fish and Wildlife.

REFERENCES CITED

Hulse, D., S. Gregory, and J. Baker. 2002. Willamette River Basin Planning Atlas. Oregon State University Press, Corvallis, OR.

Lestelle, L., W. E. McConnaha, G. Blair, and B. Watson. 2005. Chinook salmon use of floodplain, secondary channel and non-natal tributary habitats in river of Western North America: Application to the Willamette River (Oregon) and Formulation of Species-Habitat Rules for EDT Analysis. Prepared for Mid-Willamette Council of Governments--U.S. Army Corps of Engineers by Mobrand-Jones and Stokes, Vashon, WA; Report, 75 pages.

Primozich, D., and R. Bastasch 2004. Willamette River subbasin plan. Northwest Power and Conservation Council, Portland, OR, 758 pages.

Sedell, J. R., and J. L. Froggatt. 1984. The importance of stream-side forests to large rivers: the isolation of the Willamette River, Oregon, USA from its floodplain by snagging and stream-side forest removal. Internationale Vereinigung fur theoretische und angewandte Limnologie, Verhandlungen **1**:1828-1834.